Intellian

C100M GMDSS Installation Guide

Intellian - Empowering Connectivity

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 throughout the product life cycle. The printed version of the guide is periodically updated, but it may contain inaccuracies or omissions compared to the most recent product information. The most up-to-date information is always available on our website at www.intelliantech.com.

Document Information (HW/SW Version)

This manual applies to the following HW and SW versions. Please note that the contents may be updated without notice and could differ from the actual product.

HW Version

SCU	V0.7	Handset	V0.4
Alarm Box	V0.6	SSAS Box Alert/Test	V0.5
Junction Box	V0.4	Alarm Unit*	V5.0

* The Alarm Unit's version is the main control version because the alarm unit has four types of PCBAs inside.

SW Version

SCU	1.0.0	SSAS Box Alert/Test	1.1.1
Alarm Box #1, #2, #3	1.1.1	Alarm Unit	1.0.2
ADU	1.0.0		

Table of Contents

Chapter 1. Precautions

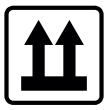
1.1 Warnings, Cautions, and Notes

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

1.2 General Precautions

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

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

* **DO NOT SHIP VIA RAIL**: Ensure systems are not shipped via rail.
* **Shock Hazard:** To minimize shock hazard and to protect against lightning, you must connect the equipment chassis and cabinet to an electrical ground. Make sure the system is correctly grounded and power is off when installing, configuring, and connecting components.
* **Do not operate in an explosive atmosphere:** Do not operate the equipment in explosive environments or in the presence of flammable gases. Operating this equipment in such an environment causes a definite safety hazard.
* **Keep away from live circuits:** Operating personnel must at all times observe all safety regulations. Do not replace components or make adjustment inside the equipment with any power supply turned on. Under certain conditions, dangerous voltage may exist in the power supplies even with the power cable removed. To avoid injuries, always remove the power and discharge a circuit before touching it.

Chapter 2. Certifications

This device complies with Part 15 of the FCC Rules, Industry Canada licence-exempt RSS standard(s), as well as MED, MER, and other national regulatory requirements.

Operation is subject to the following two conditions:

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

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

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

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

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

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

Radiofrequency radiation exposure Information:

This equipment complies with MED and FCC, IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 30 cm between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter Refer to the guidance in Section 4 for guidance on installing this product nearby other antennas and transmitters.

Chapter 3. Introduction

3.1 Introduction of C100M GMDSS System

Intellian's C100M GMDSS System comprises two core products that can be augmented with a range of accessories. The two core products are the ADU (Above Deck Unit) and Safety Control Unit (SCU) that is the primary indoor unit and user interface.

The C100M system is an L-band terminal designed by Intellian to connect to Iridium's constellation of 66 active LEO satellites that provide truly global coverage. The Iridium Certus® 100 service provides two high-quality voice lines with concurrent IP data. The maximum data speeds are 88 kbps downlink and 22 kbps uplink.

The Safety Control Unit (SCU) includes a 7" touchscreen and a dedicated handset that ship staff can use to access the GMDSS services

Intellian offer a full range of MED certified accessories to provide additional capabilities, including:

- AC/DC Power Supply Unit: Supports inputs from the vessel's AC distribution systems (110V/220V) or from the battery backup for the bridge communication equipment.
- GMDSS Alarm Box: Using these devices, a GMDSS DISTRESS Alert can be sent using the C100M GMDSS System from locations other than the GMDSS console. Typical locations include the conning position, Ship's Office & Captain's cabin.
- GMDSS Alarm Unit: Using this device, GMDSS DISTRESS Alerts can be sent using all of the available GMDSS communications devices (VHF, MF/HF & C100M GMDSS) from a location other than the GMDSS console.
- SSAS Box Alert: Using this device an SSAS Alert can be discreetly sent to the Company Security Officer at the vessel operator's shore offices.
- SSAS Box Test: This device is used to test the SSAS communication system.

3.2 Iridium Satellite Network

The Iridium satellite network is comprised of 66 low-earth orbiting (LEO), cross-linked satellites, providing voice and data coverage over Earth's entire surface.

At only 476 mile (780 km) from the earth, the proximity of Iridium's LEO network means pole-to-pole coverage, a shorter transmission path, stronger signals, lower latency, and shorter registration time than with GEO satellites. The network is considered a meshed constellation of interconnected, cross-linked satellites so that each satellite "talks" with the other nearby satellites in front, behind, and adjacent orbits.

In space, each Iridium satellite is linked to up to four others creating a dynamic network that routes traffic among satellites to ensure global coverage, even when traditional local systems are unavailable.

Figure 1: Earth Showing Iridium Satellites in Six Defined Orbital Planes

The Iridium GMDSS Service provides essential maritime safety communications using the Iridium satellite network. It is the only GMDSS solution offering global satellite coverage, including the polar regions. This service integrates multiple functions, including GMDSS, the Ship Security Alert System (SSAS), Long Range Identification and Tracking (LRIT), auxiliary data services, and voice communication, within a single terminal for efficient operation.

3.3 Iridium Certus GMDSS SIM Card

The C100M GMDSS system requires a valid Iridium Certus GMDSS SIM Card to utilize GMDSS communication services via the Iridium satellite network. This SIM Card can be obtained from authorized Iridium GMDSS Service Providers. Link the Iridium website page that shows a list of their maritime Certus Service Providers: https://www.iridium.com/services/certus-gmdss.

During service enrollment, registration documents containing the ship's main information (Ship Name, IMO No., MMSI No., Vessel Call Sign, etc.) will be submitted to the service provider. Upon successful registration, a SIM card specifically configured for the registered ship will be issued. This SIM card is uniquely identified by its physically-assisted ICCID (Integrated Circuit Card Identifier) and MSISDN (Mobile Station International Subscriber Directory Number), which serves as the intrinsic Iridium satellite number used within the Iridium GMDSS service. The registered ship's main information will be verified during the Installation Wizard process for the C100M GMDSS.

If any information contains errors, the user must contact the service provider to modify it before activating or installing the GMDSS system.

The SIM card type is Mini-SIM (dimensions: 25mm x 15mm). It will be provided attached to a plastic card. Before inserting the SIM card into the equipment, detach the Mini-SIM portion from the plastic card.

Chapter 4. Planning Installation

The antenna installation requires precaution and safety measures to be followed. Failure to follow the correct installation process may lead to injury of the installer and/or cause damage to the system. To maximize the performance of the system, a thorough review of this installation guide is strongly recommended. In addition, you should follow the installation process as it is described in this manual.

4.1 Selecting Installation Site

The antenna should be placed in an area on-board the vessel with an unobstructed view extending from (at least) 8° above the horizontal surface in all azimuth directions. Maximizing visibility to 17° below the horizon is recommended to ensure a stable connection during vessel motion.

When the antenna is transmitting, obstacles in the beam path will cause decreased satellite signal strength. The antenna unit requires direct line-of-sight with the desired satellite without any obstacles in the beam path.

Do not place the antenna near to a funnel because smoke deposits can cause corrosion of the antenna. In addition, the deposit can impact performance or cause malfunctions.

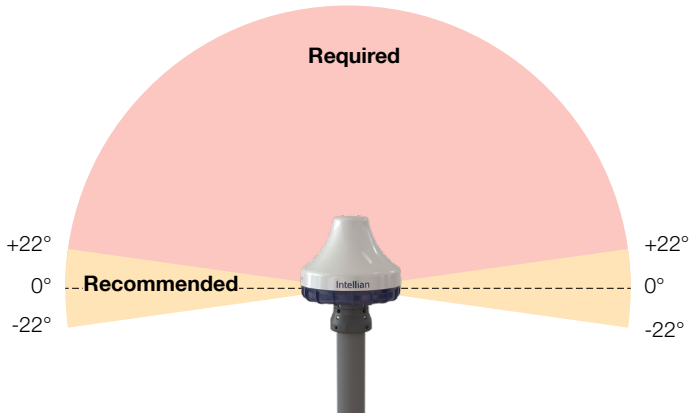
Do not place the antenna where there is direct seawater spray of.

4.1.1 Required Visibility for Iridium satellites

The antenna requires line-of-sight visibility to the satellite to maintain the connection. For best performance, it's recommended to install the ADU at the highest possible position on the vessel.

The minimum elevation angle for Iridium satellites is 8° above the horizon. The ADU requires visibility to the sky with as few blockages as possible in the "Required Zone" in Figure 1.

Vessel motions will lower this value. Our recommendation is to minimize blockages to 22° below the horizon, to ensure reliable performance for up to 30° roll.

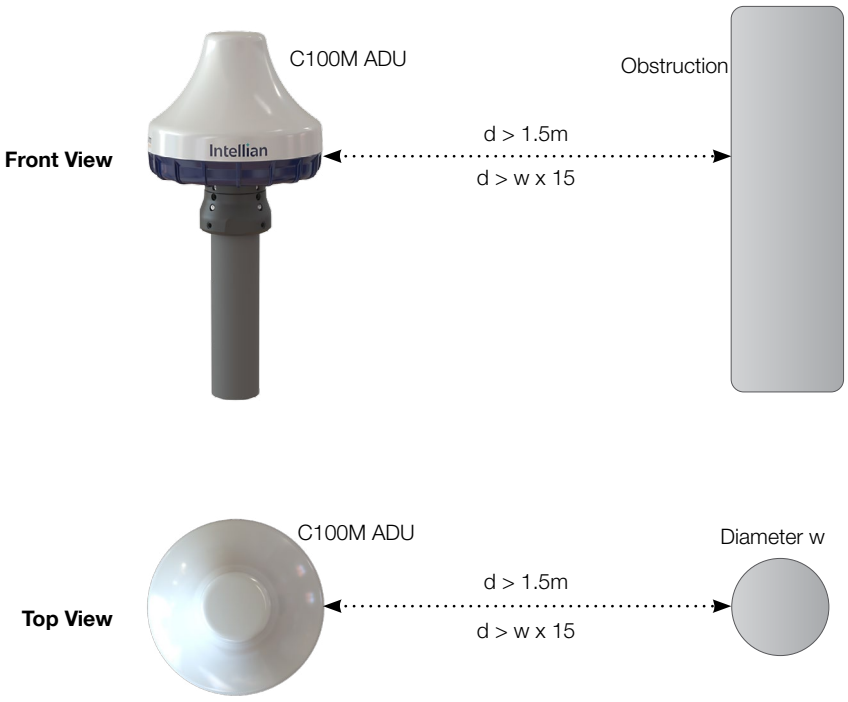


4.1.2 Separation to Obstacles

Obstructions between the ADU and satellite will interrupt the connection, and should be minimized as much as possible.

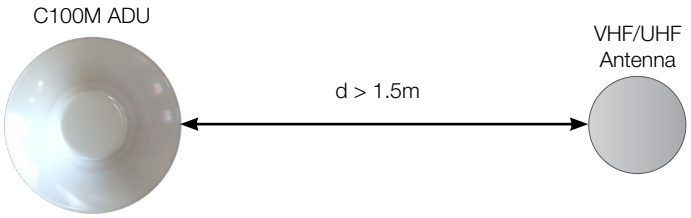
The distance from the ADU to any obstruction should be at least 1.5m (above 8° from horizon).

Small obstructions will not significantly impact performance. Our recommendation is to ensure the distance to any obstruction is greater than 15 times the effective diameter of the obstruction.



4.1.3 Separation to other antennas (eg UHF, VHF)

The ADU should be kept at least 1.5m away from any other antennas (eg VHF, UHF, Starlink, cellular).



4.1.4 Co-existing with Inmarsat and Iridium L-Band terminals

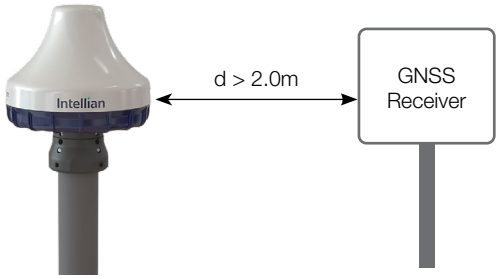
It is possible to install the C100M GMDSS system on-board a vessel that already has an Inmarsat or Iridium L-Band equipment installed.

It is advised that the C100M GMDSS is installed as far away as possible, however if location is constrained then the C100M GMDSS ADU must be mounted below the other terminal antenna unit below an angle of 15 degrees and at the minimum horizontal distance specified below when co-locating is required.

- Install the C100M GMDSS ADU at a minimum horizontal distance of:
  - 1m from an Inmarsat C antenna
  - 5m from an Inmarsat Fleet Broadband antenna
  - 1m from a Certus 100 antenna
  - 2m from a Certus 200 antenna
  - 5m from a Certus 700 antenna

It is advised that the units are separated by the maximum possible distance, irrespective of the guidance above. As this is an Iridium Certus GMDSS installation, we recommend a survey by a qualified installer.

Intellian also recommends that the GMDSS C100M Antenna Unit be installed with a minimum distance of 2 meters from any receivers and transmitters operating on the listed frequencies below:



Receivers adjacent to Iridium Transmission band	
GNSS	1563.0 -1587.0 MHz
Glonass	1593.0 -1610.0 MHz
GALILEO	1559.0 -1591.0 MHz
BeiDou	1559.05 -1563.15 MHz

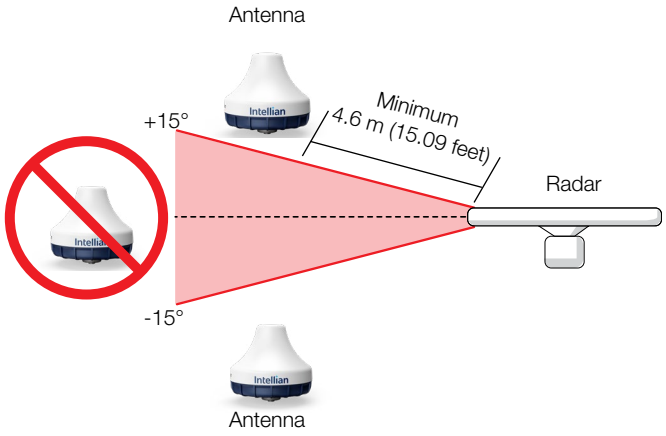
Transmitters and receivers adjacent to Iridium Transmission band	
Inmarsat Tx	1626.5 – 1675.0 MHz
Iridium Tx/Rx	1610.0 – 1626.5 MHz

4.1.5 Avoiding Radar Interference

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

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 permanently damage the antenna.

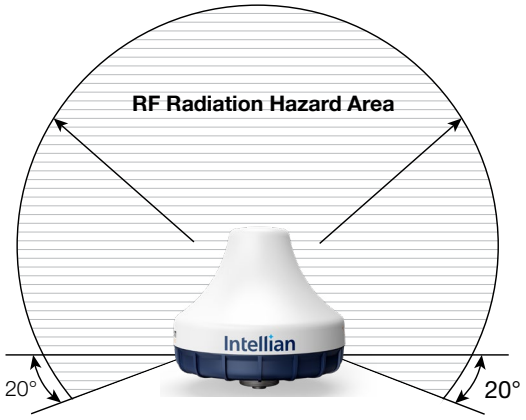


4.1.6 RF Hazard Precautions

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

During transmission, ensure to keep the minimum safety distance. The recommended minimum safety distance to the antenna on the focal line is as follows. It is based on a Radiation Exposure Level of W/m² that applies under an uncontrolled environment. No hazard exists >20° below the antenna's mounting plane.

Radiation Exposure Level	Recommended Minimum Safety Distance
10 W/m²	more than 10cm
25 W/m²	more than 5cm
100 W/m²	more than 3cm



MICROWAVE RADIATION
MINIMUM SAFE DISTANCE

10 W/m²	10cm
25 W/m²	5cm
100 W/m²	3cm

4.2 System Package

4.2.1 Above Deck Unit (ADU)

The Above Deck Unit (ADU) is an antenna unit with an omni-directional antenna, Iridium transceiver modem, and a GNSS module. The radome protects the antenna unit from the marine environment. All signals (and DC power) pass through the single coaxial antenna cable, which connects the ADU to the SCU.

4.2.2 Safety Control Unit (SCU)

The Safety Control Unit (SCU7000C) functions as the display unit and controls the GMDSS system, supporting external interfaces and an operational user interface designed for safe and reliable maritime communication. It is intended for indoor mounting to ensure optimal performance and compliance with maritime safety standards.

4.2.3 Packing List

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

Basic System including		
Item	**Description**	
C100 ADU	C1-10-A00N	
C100 Pole Mount Kit	MC-0104	
Safety Display Terminal	SDT7000C	
Handset w/o PTT	HS7000	
Handset Cradle	HC1000	
Data & Power 12P 3M cable for SDT7000C	DPC12-3	
4 taping screws & bolts	Installation material	
Operation Manual	OM-S	

Option		
Item	**Description**	
Intellian AC/DC Power Supply 180W/24VDC	PSU180D	
Junction Box Unit for Navtex and sat GMDSS	JB1000	
Data 14P 3M cable for IN3000R to JB1000	DC14-3	
Intellian AB1000 Alarm Box with Distress	AB1000	
Intellian AU1000 Alarm Unit with Distress	AU1000	
SSAS Box Alert	SB7000A	
SSAS Box Test	SB7000T	
SRP-350 PLUS III Serial and Lan interface printer 24V	SRP-350 PLUS III	
3M DC Power and data cable for Printer	PDCP-3	
Intellian HC2500 Handset w/o PTT	HS7000	
Intellian HC2500 Handset Cradle	HC1000	
Intellan EDS-205 MOXA Switch 5 Port	ISW205	
Extended Warranties 3year for sat GMDSS series (Part & Labour)	ISEXT3	
Extended Warranties 4year for sat GMDSS series (Part & Labour)	ISEXT4	
Extended Warranties 5year for sat GMDSS series (Part & Labour)	ISEXT5	

Equipment		
Item	**Description**	
C100 ADU	C1-10-A00N	
Safety Control Unit (Iridium)	SCU7000C	
Handset w/o PTT and cradle	HSC7000	
Junction Box	JB1000	
Handset w/o PTT	HS7000	
Handset Cradle	HC1000	
GMDSS Alarm Unit (Multiple system)	AU1000	
GMDSS Alarm Box (Single system)	AB1000	
SSAS Box (Alert)	SB7000A	
SSAS Box (Test)	SB7000T	
AC/DC Power Supply Unit (180W)	PSU180D	
Serial & LAN Interface Printer 24V	SRP350 PLUS III	
EDS-205 MOXA Switch 5 Port	ISW205	
Keyboard	SPR-8695TU	

4.3 ADU to SCU Cable (Customer Supplied)

4.3.1 Antenna RF Cable (Customer Supplied)

The model does not come with an Antenna RF Cable, and you will need to purchase it separately.

The C100M systems supports two different types of cables between the ADU and SCU – coaxial, and NMEA2000.

Coaxial cable is recommended for most installations, typically either LMR200 or LMR400. Both the ADU and SCU have TNC connectors to interface with the antenna cable.

To reduce cost of retrofit installations where NMEA2000 cabling exists, this cable type is also supported. The ADU includes a NMEA2000 connector that interfaces directly with the cable. The connection to the SCU requires the use of an adapter cable that can be supplied separately by Intellian (part number MC-0105).

The table below summarizes the maximum support cable length for each type.

Coaxial Cable Type	Attenuation (@ 200 MHz)	*Max. Cable Length (17.5 dB loss @ 200 MHz)	Min. Bend Radius
LMR200	0.159 dB/1 m	200 m	Installation 12.7 mm (0.5 in.)
RG214	0.103 dB/1 m	320 m	Installation 55mm (2.16 in.)
LMR400	0.061 dB/1 m	500 m	Installation 25.4 mm (1 in.)

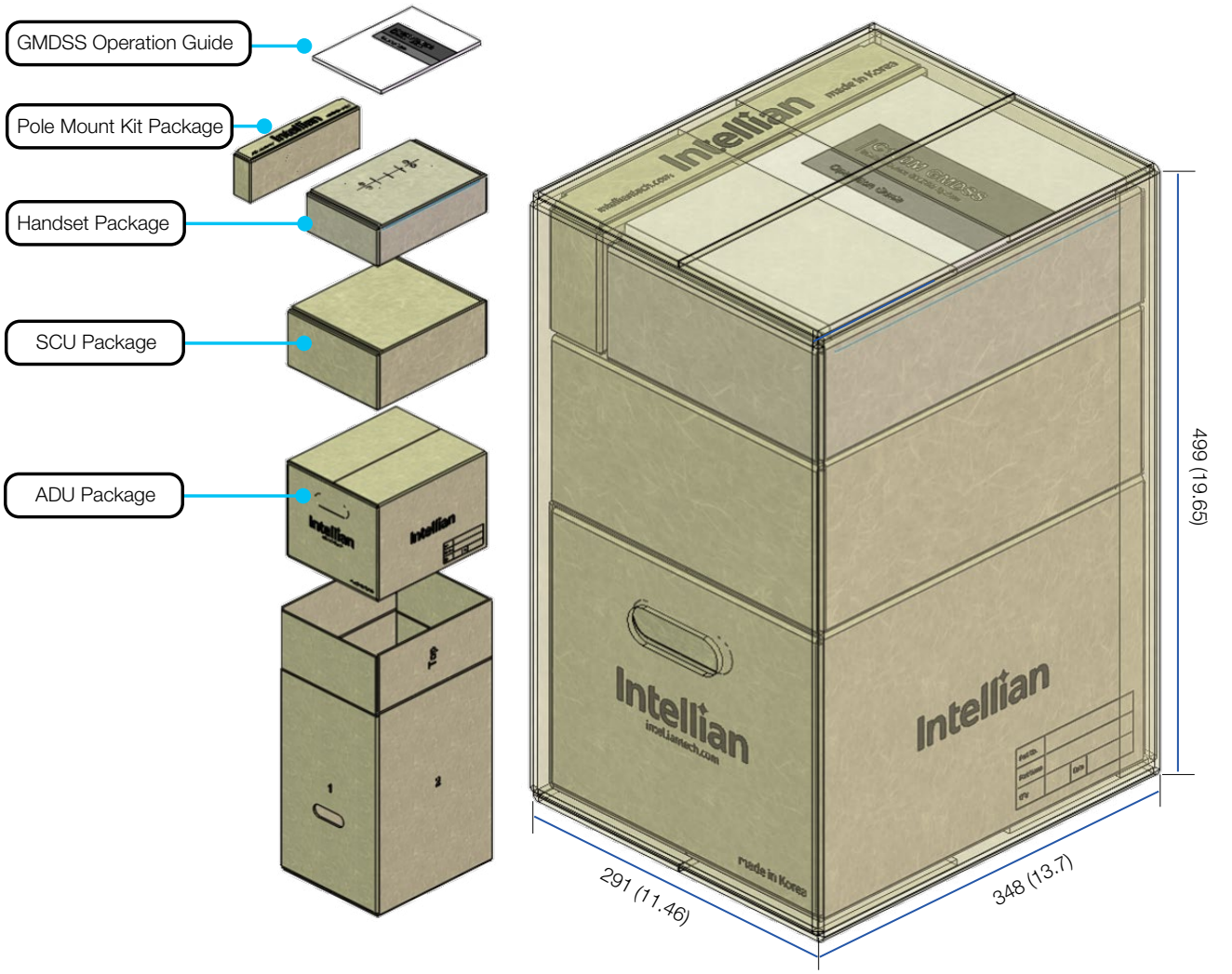
- Connector type: TNC
- Optimal tightening torque: 1.5 N-m
- Maximum DC resistance of RF cable: 8.5 Ω
- *Maximum RF loss at 200MHz: 33 dB including connector

4.4 Unpacking Package

4.4.1 Composition of the GMDSS Package

All equipment constituting the GMDSS system is packaged in a single box. The image below shows the shape of the GMDSS package, the internal layout of each component, and their relative sizes.

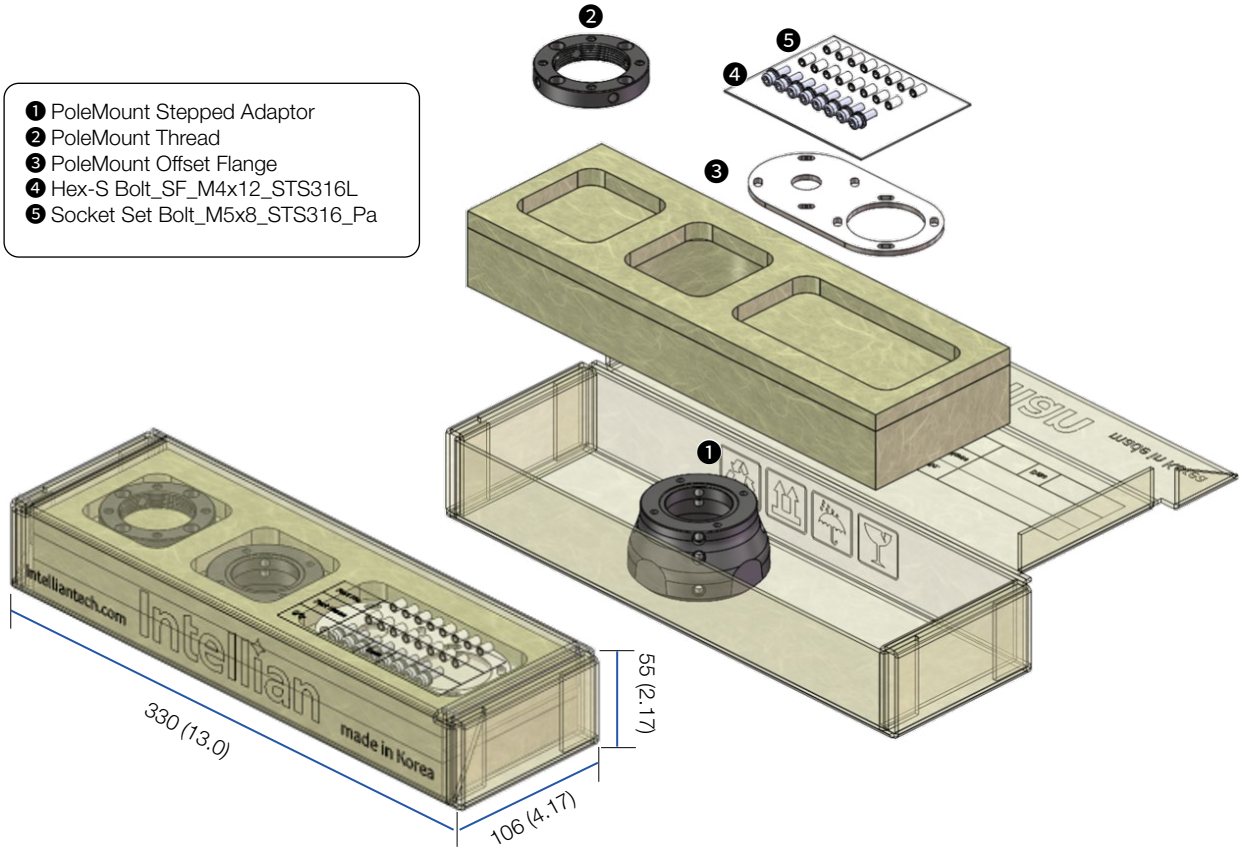
Unit: mm (inches)



The unpacking instructions for the components are described in the order from top to bottom, according to their loading status within the GMDSS package.

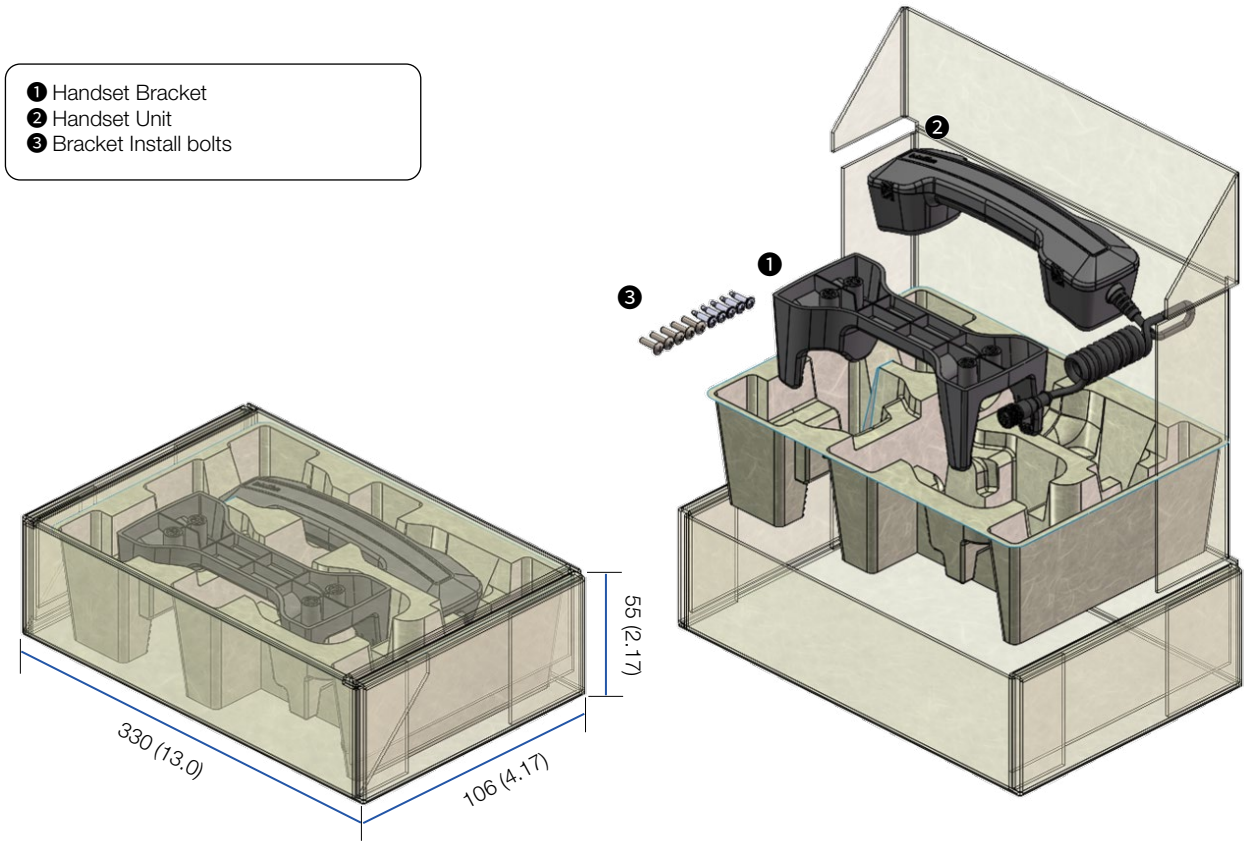
4.4.2 Unpacking Pole Mount Kit Package

Follow the steps for easy and safe unpacking. Open the package and take out the pole mount kit, which includes a pole mount adaptor, thread, offset flange and bolt sets.



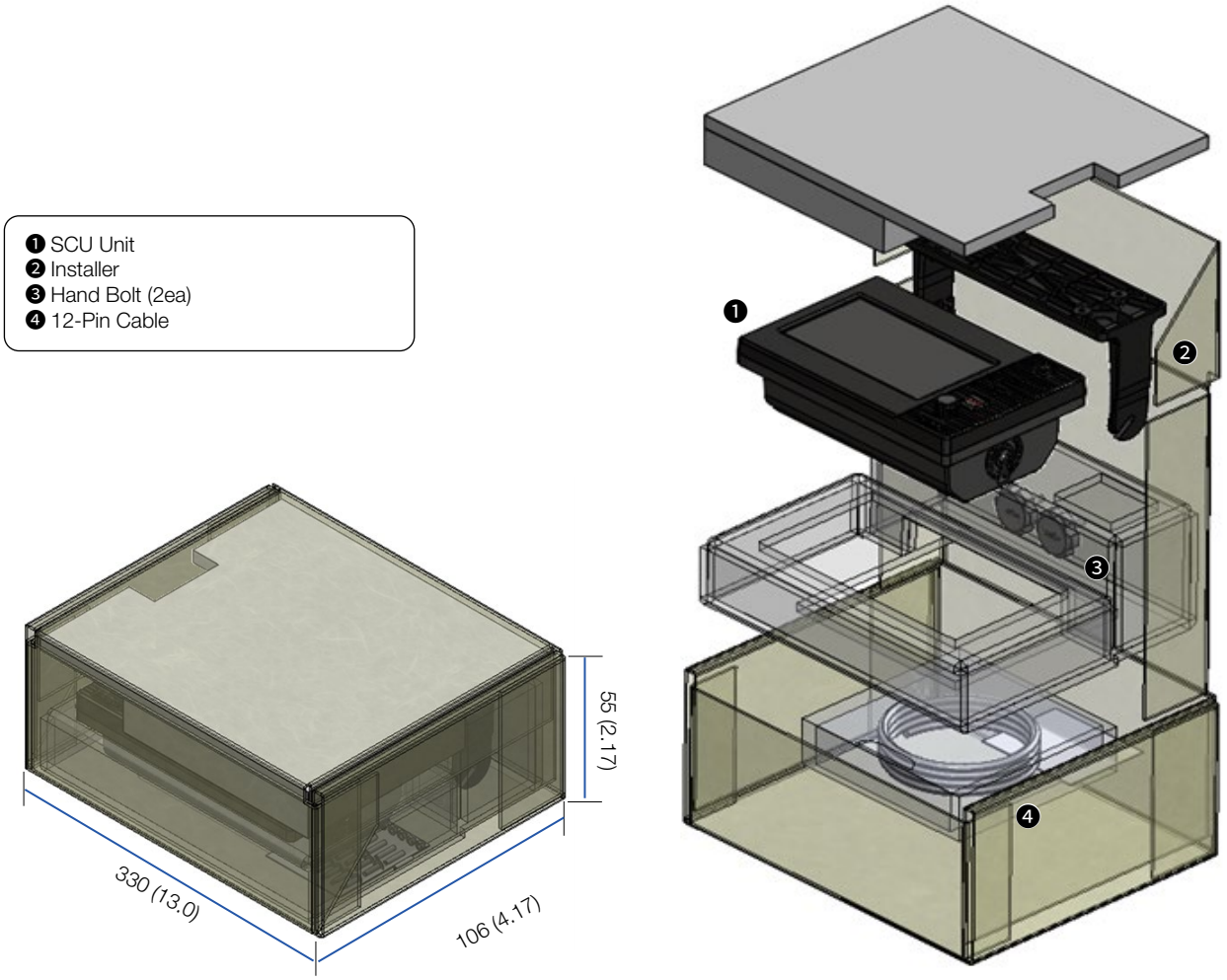
4.4.3 Unpacking Handset Package

Follow the steps for easy and safe unpacking. Open the package and take out the handset package, which includes a handset bracket and a Handset Unit.



4.4.4 Unpacking SCU Package

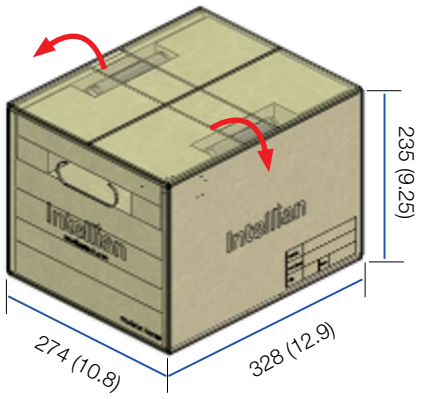
Follow the steps for easy and safe unpacking. Open the package and take out the SCU package, which includes bracket mounting knobs (2 ea), an SCU Unit, Installer, an Ethernet cable, and a 12-pin cable.

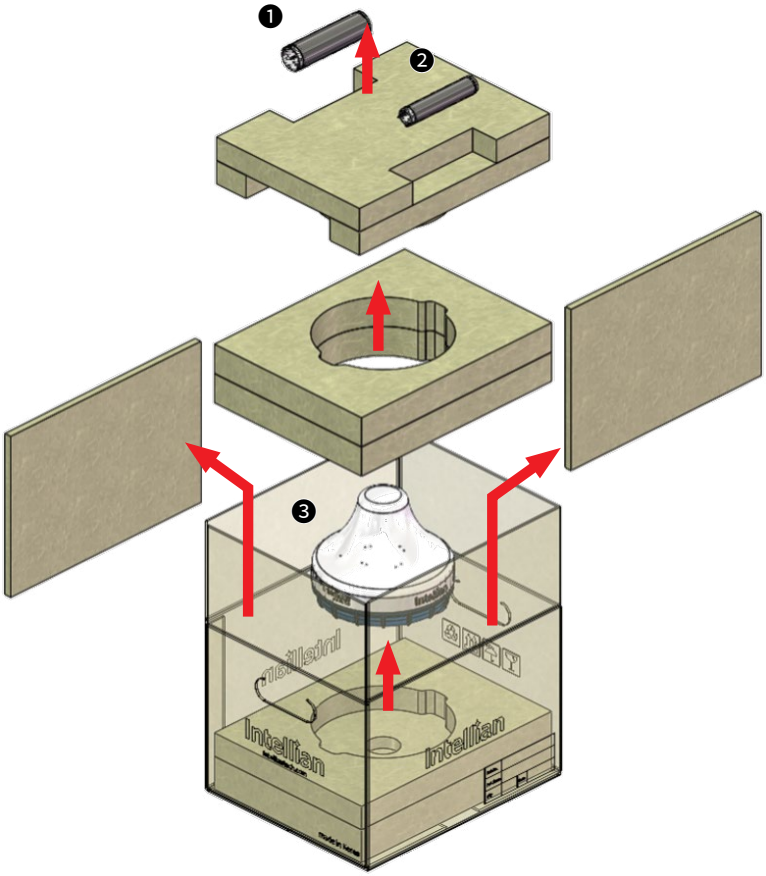


4.4.5 Unpacking ADU Package

Follow the steps for easy and safe unpacking. Open the package and take out the handset package, which includes a handset bracket and a Handset Unit.

❶ Cold Shrink Tube (NMEA 2000)
❷ Cold Shrink Tube (TNC)
❸ ADU Unit





Chapter 5. Installing ADU

5.1 Antenna Dimensions

Before installing the antenna unit, confirm its height and diameter (see figure below).

Unit: mm (inches)

Figure 2: Antenna Dimensions

5.2 Mounting Antenna on Pole (Optional: MC-0104)

Intellian offers the Antenna Pole Mount Kit to mount the antenna on the pole. The kit is designed based on Nominal Pipe Size (NPS) standards with diameters of 1 inch, 1.5 inch, and 2 inch and a wall thickness of Schedule (Sch) 40. Here, NPS 1.5 inch corresponds to a 40A pipe.

The Pole Mount Kit is precision-engineered to fit the outside diameter (OD) of pipes following international ASTM/ANSI NPS (Nominal Pipe Size) standards. Please review the specifications below to ensure compatibility.

Terminology & Standards

- NPS (Nominal Pipe Size): An international standard for pipe dimensions defined by ASTM/ANSI B36.10M. Note that the NPS value (e.g., 1 inch) is a nominal designation and does not represent the exact measured OD. Please refer to the actual OD values in the table.
- Schedule (Sch) & STD: These indicate the wall thickness of the pipe. For the sizes covered (NPS 1” to 2”), Schedule 40 (Sch 40) is identical to the Standard Weight (STD) specification.
- Consistency of OD: For a given NPS, the Outside Diameter (OD) remains constant regardless of the pipe’s Schedule (thickness). This ensures our mount provides a consistent fit across different wall thicknesses within the same NPS size.

This kit also offers high compatibility with Metric (A-series) pipes, which are defined under ISO/JIS and other international metric standards.

ASTM NPS Nominal	**NPS Outside Diameter**	**Similar size in Metric standards (A-Series)**	**Metric (A-Series) Outside Diameter (OD)**
1”	33.4 mm (1.315”)	25A	34.0 mm (1.339”)
1.5”	48.3 mm (1.900”)	40A	48.6 mm (1.913”)
2”	60.3 mm (2.375”)	50A	60.5 mm (2.382”)

Installation Note: The NPS 1.5” model is highly compatible with the 40A (Metric) pipe standard. The difference in outside diameter is less than 0.3mm (0.012 in), allowing for a secure and stable installation on both standards.

5.2.1 Mounting Antenna on Pole (Optional: MC-0104)

The Pole Mount Kit can be configured into three different arrangements by combining components based on the installation purpose. The final assembled Pole Mount configurations and their corresponding assembly diagrams are provided below.

1. Place the antenna on the pole-mounted bracket then tighten them using bolts. Before assembling bolts, apply Loctite #243 to the bolt's threads to ensure the bolts are fastened firmly.
   - When installing the ADU and pole with concentric alignment.
   - When routing the TNC cable through the interior of the pole.
   - When connecting the NMEA 2000 cable externally while the ADU and pole are concentrically aligned.

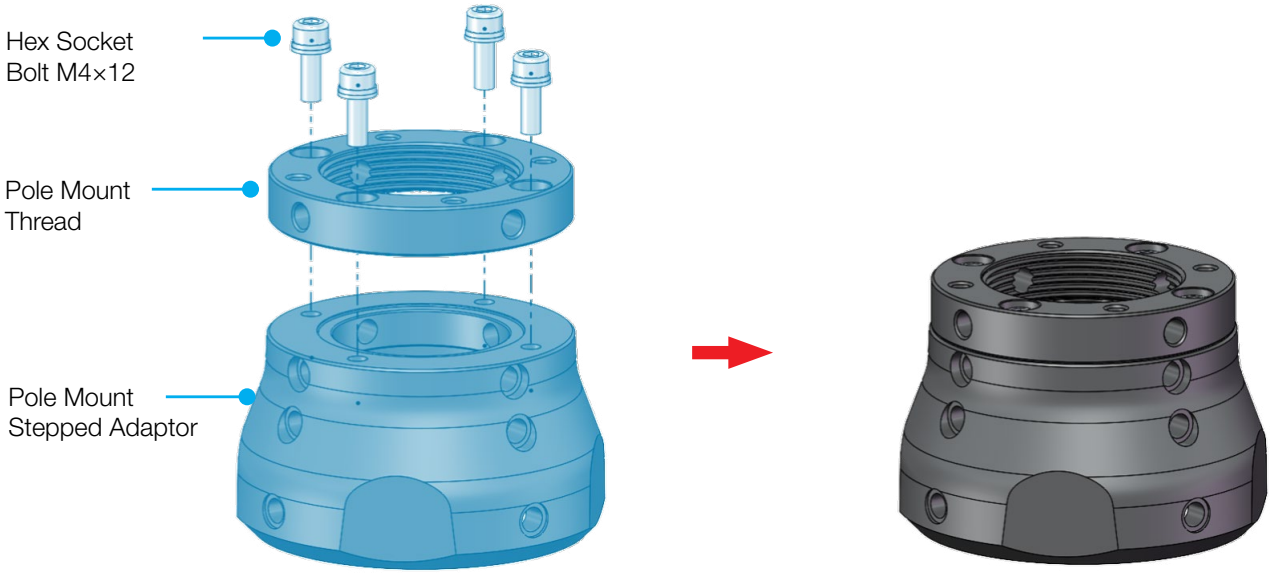


Figure 3: Assembling Pole Mount adapter

2. Two Configurations for Offset Pole Mounting.
   - When installing the ADU with an offset from the pole.
   - When routing the TNC cable externally along the pole.
   - When connecting the NMEA 2000 cable externally in an offset configuration.
   - When routing the NMEA 2000 cable through the interior of the pole in an offset configuration.

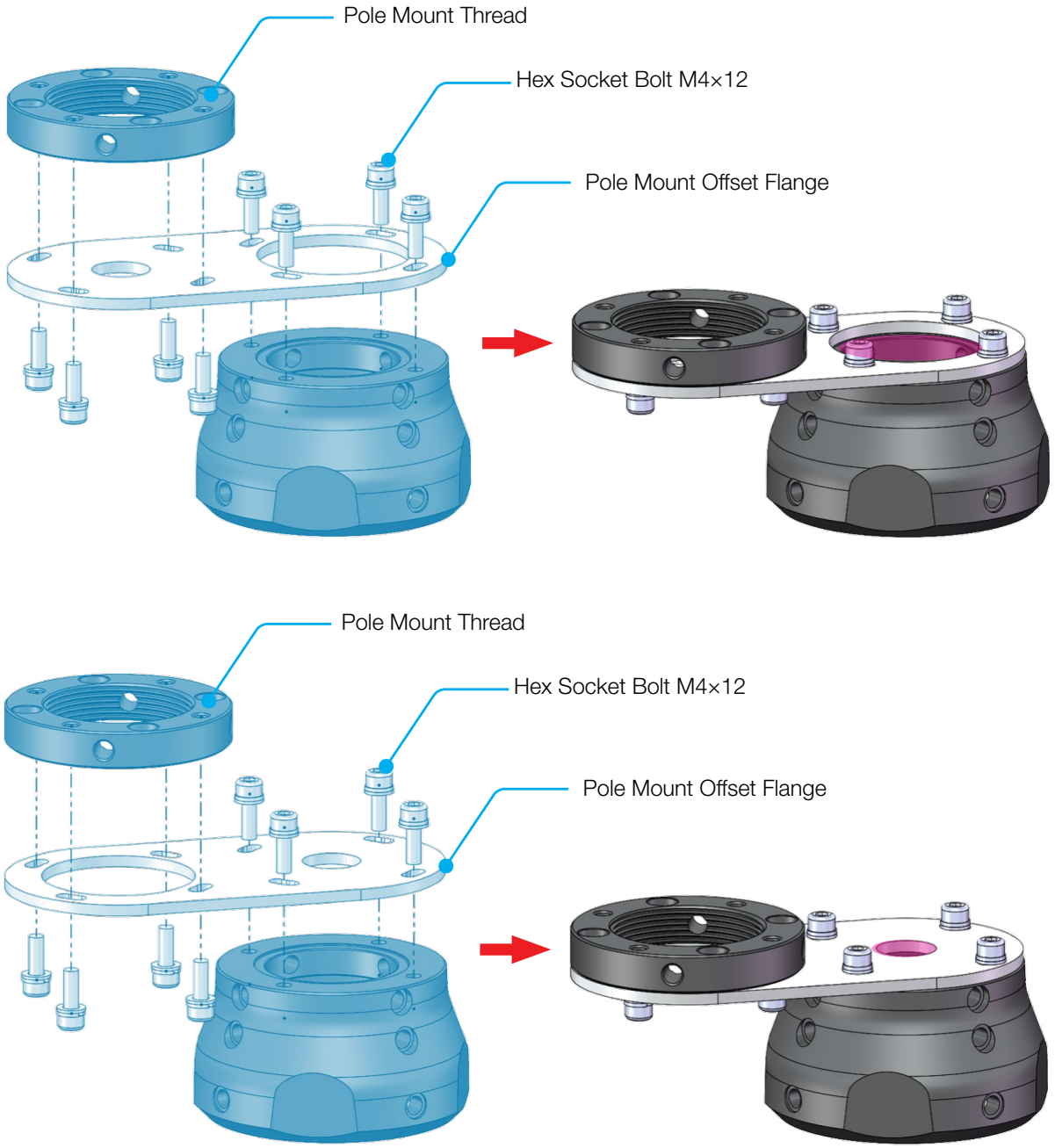


Figure 4: Pole Mount adapter with offset flange

5.2.2 Configurations and Installation Procedures by Purpose

The Pole Mount Kit is designed for maximum versatility, supporting both aligned and offset installation options to optimize ADU positioning. Along with flexible cable routing (internal or external) and compatibility with NPS 1, 1.5, and 2-inch pipe standards, the kit accommodates a total of 14 unique installation scenarios. Accordingly, this section provides detailed illustrations for each configuration along with their respective installation procedures.

IMPORTANT

During the assembly of the ADU and Pole Mount, ensure proper cable connection and the application of cold shrink tubing for effective weatherproofing. Please be aware that pre-installing the cables or the Pole Mount to the ADU may lead to cable twisting or make the final installation impossible. To avoid these issues, strictly adhere to the specific installation sequences illustrated below

Bolt Fastening and Torque Specifications

To ensure long-term reliability and vibration resistance in marine environments, please follow the fastening instructions below:

- Thread Locker Application: Before assembly, apply a small amount of Loctite #243 (Medium Strength) to the threads of all bolts. This is critical to prevent the bolts from loosening due to engine vibration or environmental stress.
- Precision Torque Control: Use a calibrated torque wrench and the correct hex key size to tighten the bolts according to the following specifications. Do not exceed the maximum torque, as this may damage the threads.

Bolt Type & Location	Specification	Hex Key Size	Tightening Torque
Set Screws (Grub Screws)	M5 x 8L (STS316)	2.5 mm	3.5 – 4.0 N·m
Socket Head Cap Bolts	M4 x 12L (STS316L)	3.0 mm	1.8 – 2.0 N·m

NOTE

Ensure the hex key is fully seated in the bolt head before applying torque to prevent rounding of the socket. Using a worn or incorrect size tool may damage the hardware.

1. Aligned Mounting with Internal TNC Cable Routing

Compatibility: NPS 1”, 1.5”, and 2” poles.

Description: Ideal for a clean, streamlined setup where the TNC cable is protected within the pole.

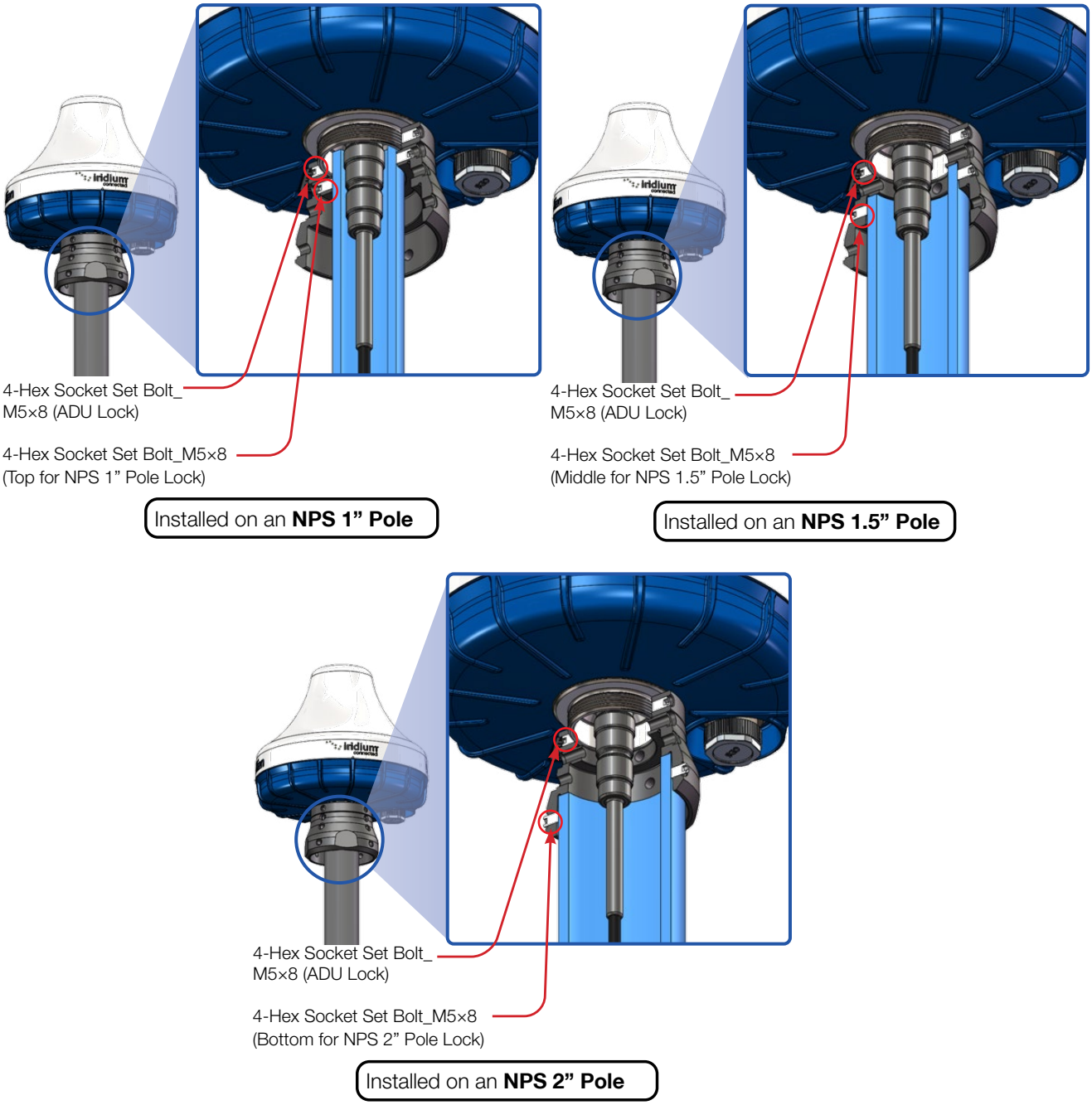


Figure 5: Aligned Mounting with Internal TNC Cable Routing

Installation Steps

1. Pass the TNC cable emerging from the pole through both the Pole Mount and the cold shrink tube.
2. Connect the TNC cable connector to the port on the bottom of the ADU. (Hand-tighten only).
3. Position the cold shrink tube against the base of the ADU, then pull the plastic core handle to shrink the tube securely around the cable and connector.
4. Screw the Pole Mount onto the threaded section of the ADU base until it is fully seated.

5. Secure the ADU to the Pole Mount by installing four M5 x 8L set screws into the top-most taps.
6. Secure the assembly to the pole by installing four M5 x 8L set screws into the taps corresponding to the diameter of the installed pole.

NOTE

While pushing the ADU downward to ensure it is firmly seated against the pole, lightly tighten all four screws first to align the unit, then apply the final specified torque.

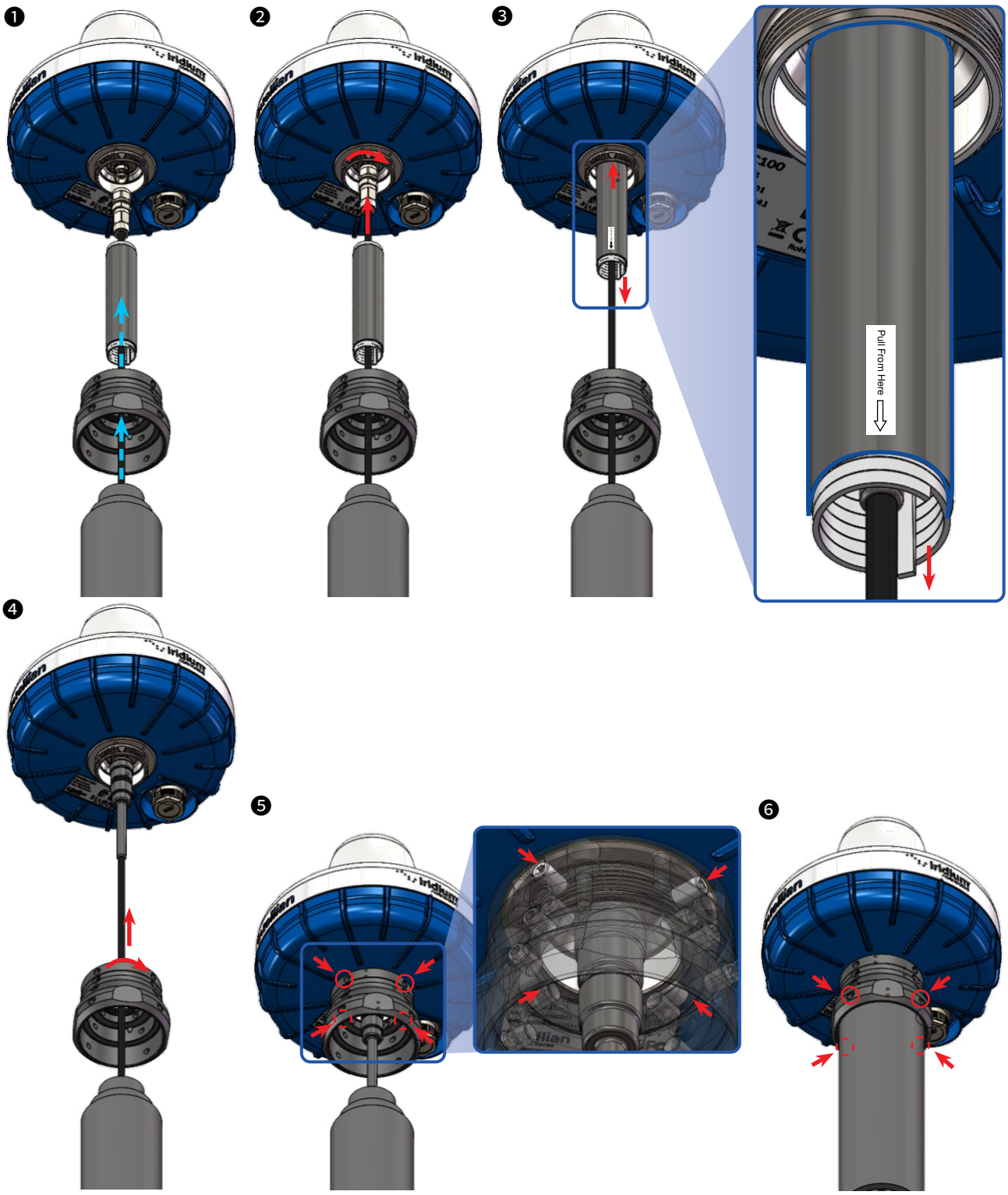


Figure 6: Aligned Mounting with Internal TNC Cable Routing

2. Aligned Mounting with External NMEA 2000 Cable Routing

Compatibility: NPS 1”, 1.5”, and 2” poles.

Description: Suitable for scenarios where the NMEA 2000 cable is connected to the ADU from outside the pole structure.

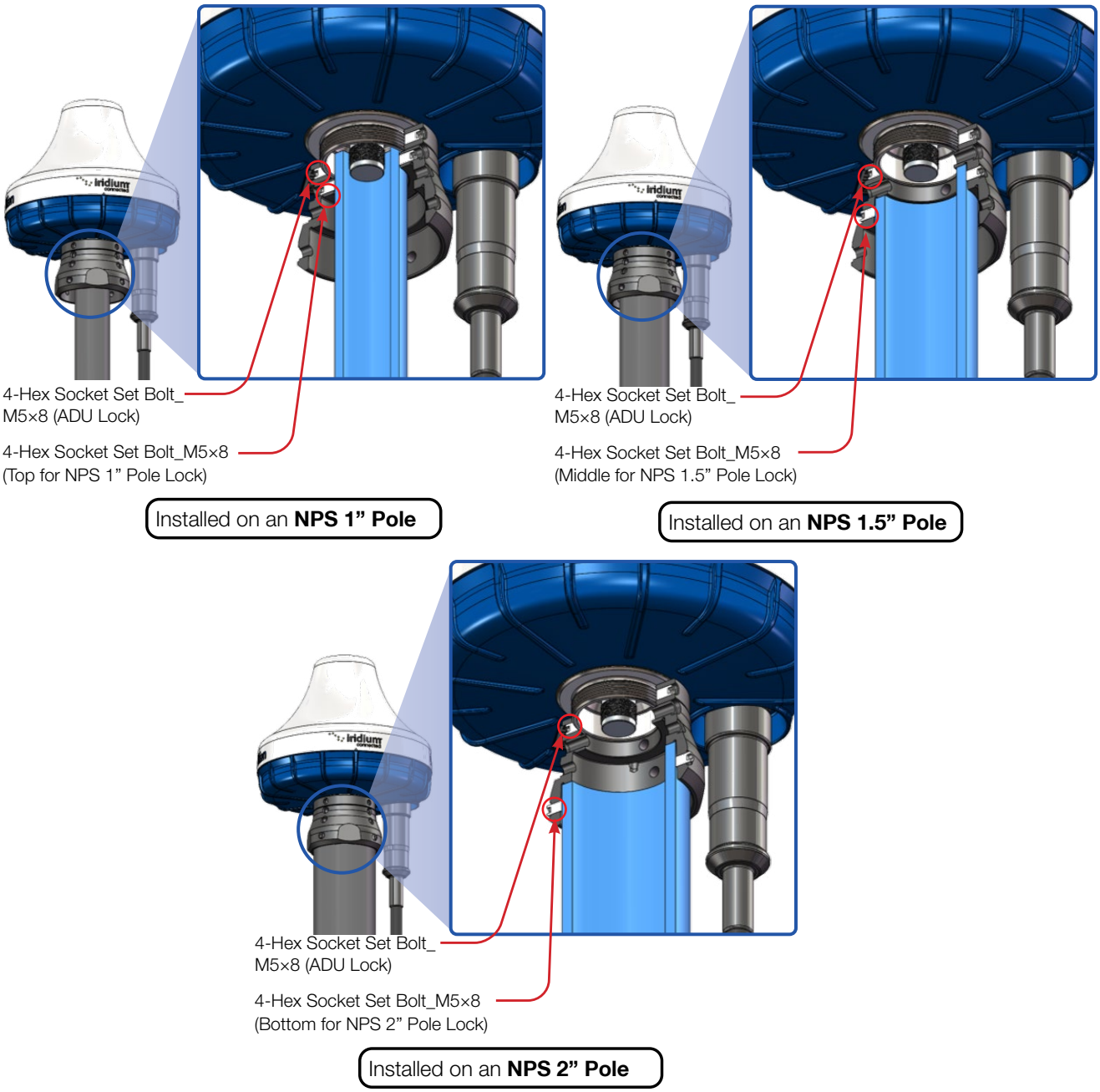


Figure 7: Aligned Mounting with External NMEA 2000 Cable Routing

Installation Steps

1. Screw the Pole Mount onto the threaded section of the ADU base until it is fully seated.
2. Secure the ADU to the Pole Mount by installing four M5 x 8L set screws into the top-most taps.
3. Connect the NMEA 2000 Mini cable connector to the port on the bottom of the ADU. (Hand-tighten only).
4. Position the cold shrink tube against the base of the ADU, then pull the plastic core handle to shrink the tube securely around the cable and connector.

5. Place the Pole Mount assembly onto the pole.
6. Secure the assembly to the pole by installing four M5 x 8L set screws into the taps corresponding to the installed pole diameter.

NOTE

While pushing the ADU downward to ensure it is firmly seated against the pole, lightly tighten all four screws first to align the unit, then apply the final specified torque.

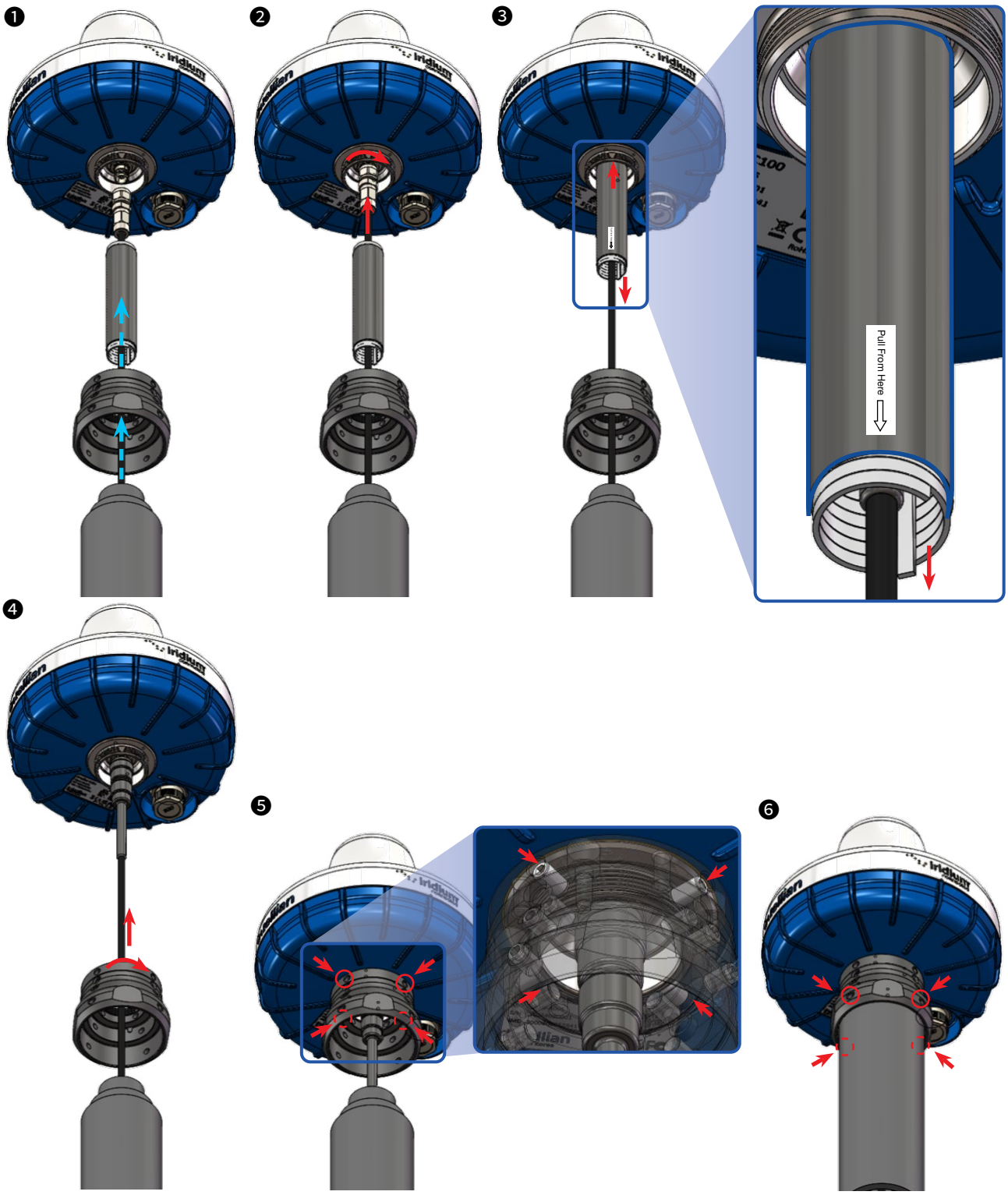


Figure 8: Aligned Mounting with External NMEA 2000 Cable Installation

3. Offset Mounting with TNC Cable Routing

Compatibility: NPS 1”, 1.5”, and 2” poles.

Description: Used when the ADU must be positioned away from the pole center while utilizing TNC cable connections.

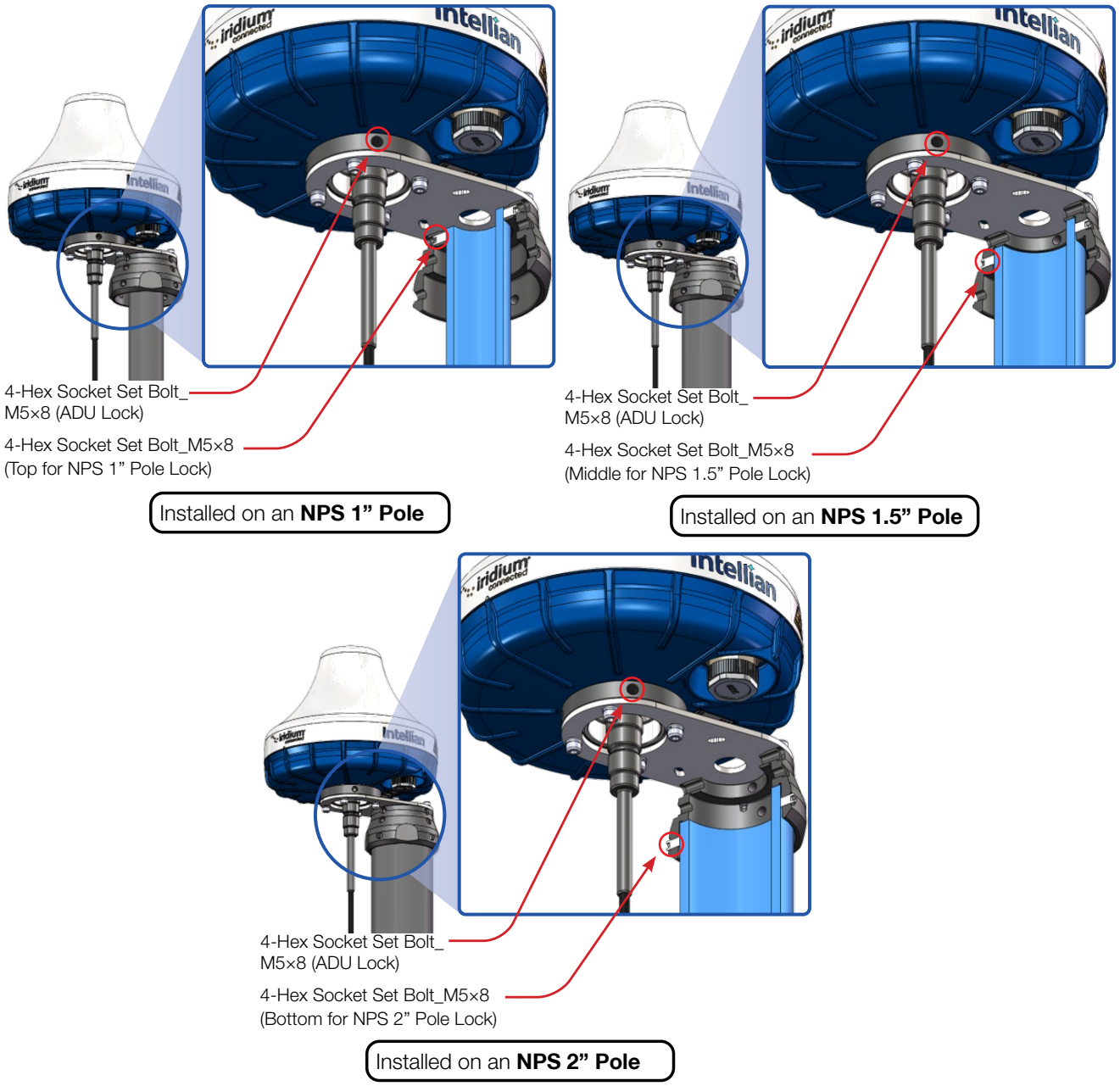


Figure 9: Offset Mounting with TNC Cable Routing

Installation Steps

1. Pass the TNC cable and cold shrink tube through the hole in the ADU mounting section of the Offset Pole Mount.
2. Connect the TNC cable connector to the port on the bottom of the ADU. (Hand-tighten only).
3. Position the cold shrink tube against the base of the ADU, then pull the handle to shrink the tube securely around the cable and connector.
4. Screw the Pole Mount onto the threaded section of the ADU base until it is fully seated.
5. Secure the ADU to the Pole Mount by installing M5 x 8L set screws into at least two (or more) of the four

taps on the threaded component of the Pole Mount.

6. Secure the assembly to the pole by installing four M5 x 8L set screws into the taps corresponding to the installed pole diameter.

NOTE

While pushing the ADU downward to ensure it is firmly seated against the pole, lightly tighten all four screws first to align the unit, then apply the final specified torque.

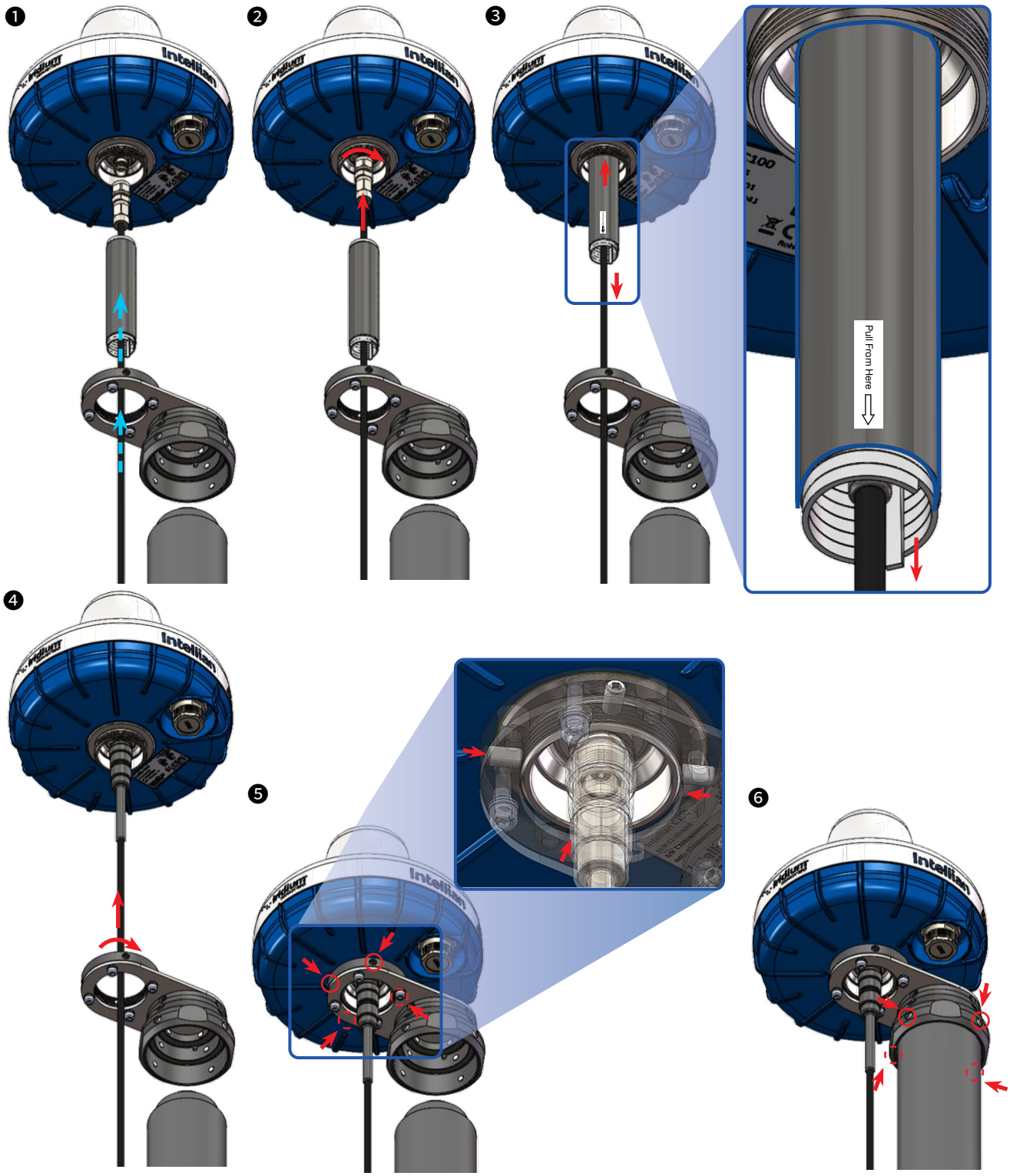


Figure 10: Aligned Mounting with Internal TNC Cable Installation

4. Offset Mounting with External NMEA 2000 Cable Routing

Compatibility: NPS 1”, 1.5”, and 2” poles.

Description: Designed for offset ADU positioning with an externally connected NMEA 2000 cable.

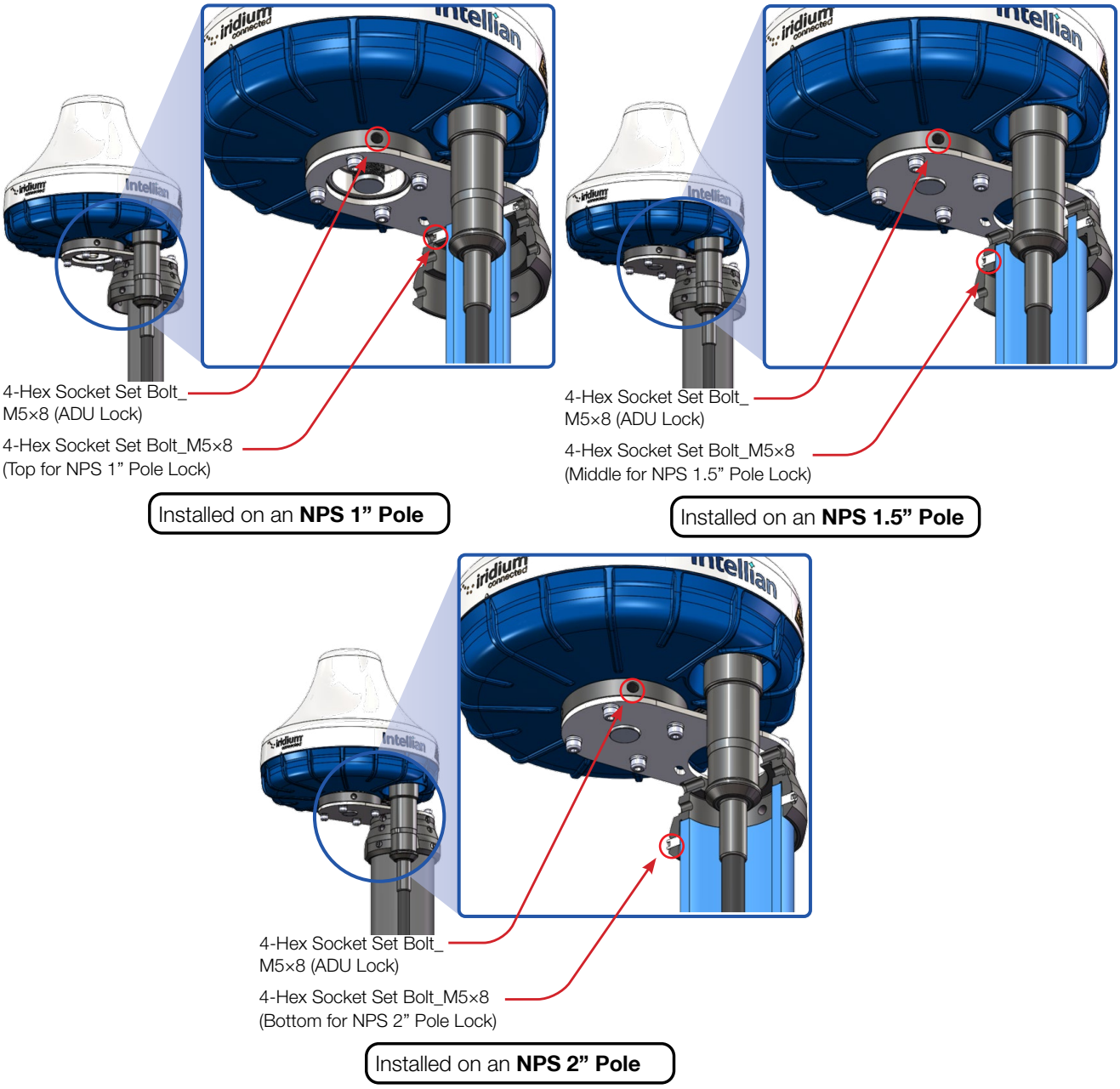


Figure 11: Offset Mounting with External NMEA 2000 Cable Routing

Installation Steps

1. Screw the Pole Mount (pre-assembled in the Offset Mounting configuration) onto the threaded section of the ADU, ensuring the NMEA 2000 connector is oriented in your desired position.
2. Secure the ADU to the Pole Mount by installing M5 x 8L set screws into at least two (or more) of the four taps on the threaded component of the Pole Mount.
3. Place the Pole Mount assembly onto the pole and secure it by installing four M5 x 8L set screws into the taps corresponding to the installed pole diameter.

NOTE

While pushing the ADU downward to ensure it is firmly seated against the pole, lightly tighten all screws first to align the unit, then apply the final specified torque.

4. Connect the NMEA 2000 Mini cable connector (which has been passed through the cold shrink tube) to the port on the bottom of the ADU. (Hand-tighten only).
5. Position the cold shrink tube against the base of the ADU, then pull the handle to shrink the tube securely around the cable and connector.
6. Assembly Complete.

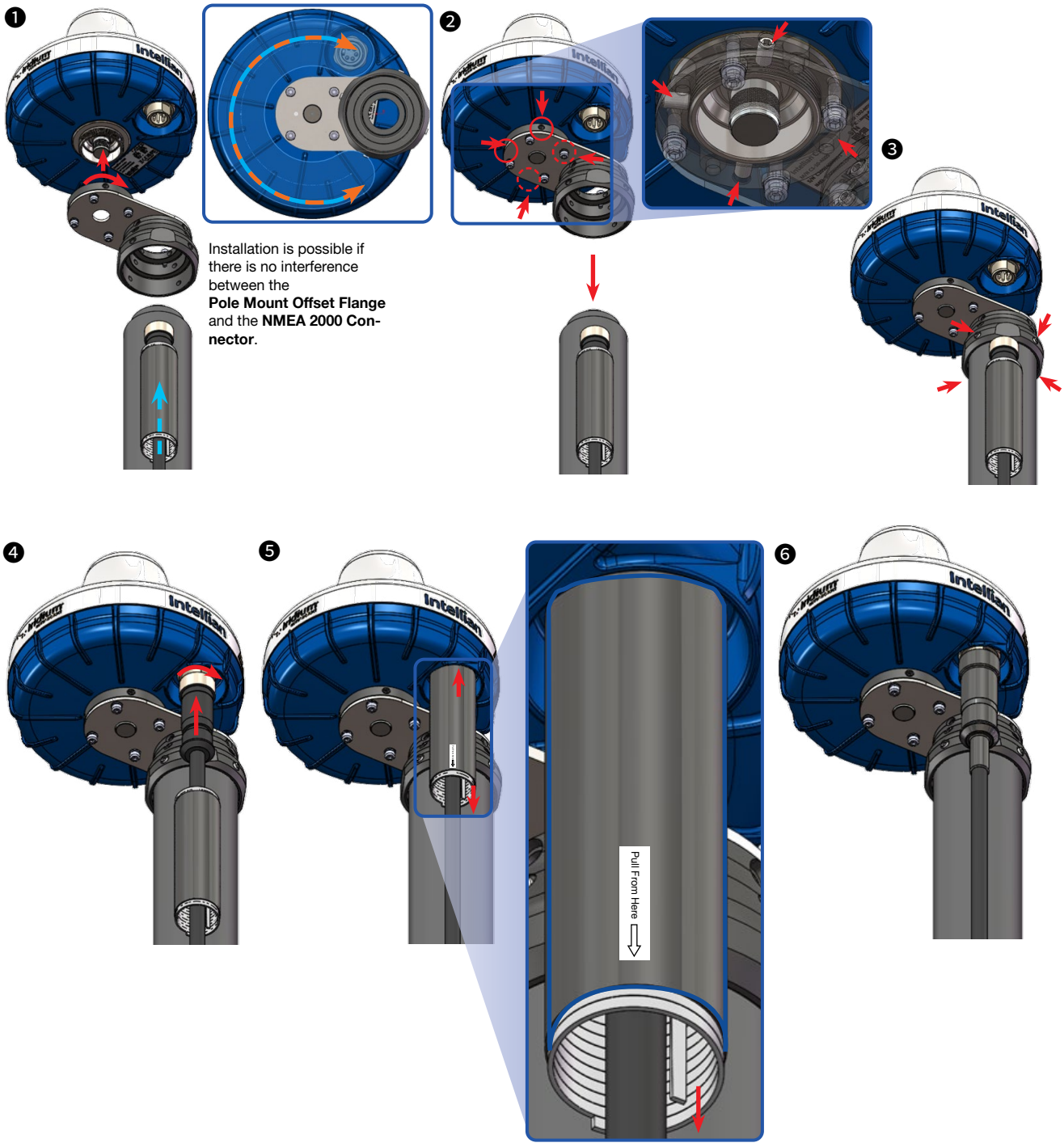


Figure 12: Offset Mounting with External NMEA 2000 Cable Installation

5. Offset Mounting with Internal NMEA 2000 Cable Routing

Compatibility: NPS 1.5” and 2” poles ONLY (Not compatible with NPS 1”).

Description: Specifically configured for routing the NMEA 2000 cable inside the pole in an offset setup.

NOTE

Internal routing is not possible for 1-inch poles because the diameter of the NMEA 2000 connector exceeds the internal diameter (ID) of the pipe.

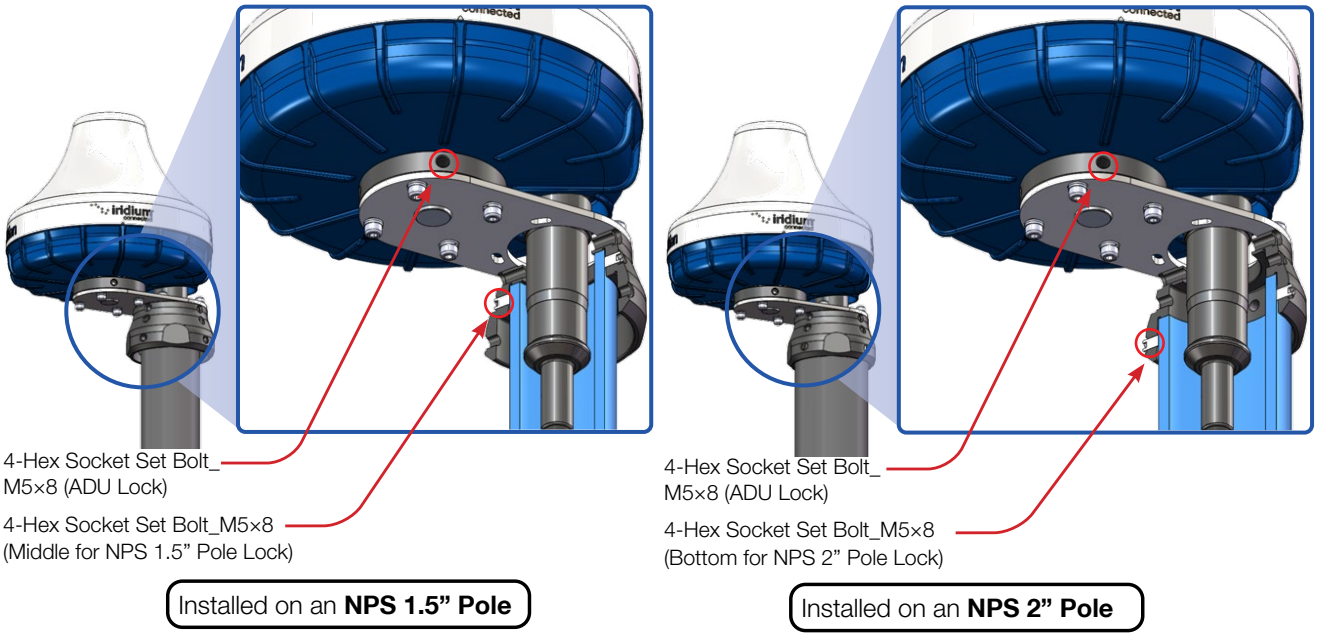


Figure 13: Offset Mounting with Internal NMEA 2000 Cable Routing

Installation Steps

1. Pass the NMEA 2000 mini cable (emerging from the pole) through the Pole Mount (pre-assembled with only the Stepped Adaptor and Offset Flange) and the cold shrink tube.
2. Secure the ADU to the Pole Mount thread component by installing four M5 x 8L set screws into the designated taps.
3. Connect the NMEA 2000 mini cable connector (which has been passed through the cold shrink tube) to the port on the bottom of the ADU. (Hand-tighten only).
4. Position the cold shrink tube against the base of the ADU, then pull the handle to shrink the tube securely around the cable and connector.
5. Align the taps of the Pole Mount thread component with the holes in the Offset Flange to ensure the cable is appropriately positioned for the pole.
   (Detailed instructions regarding this step are provided separately after this sequence section.)
6. Secure the Pole Mount thread component (fixed to the ADU) to the Offset Flange by installing four M4 x 12L socket head cap bolts into the corresponding taps.
7. Place the ADU-Pole Mount assembly onto the pole, taking care to avoid any damage to the cable.
8. Secure the assembly to the pole by installing four M5 x 8L set screws into the taps corresponding to the installed pole diameter.

NOTE

While pushing the ADU downward to ensure it is firmly seated against the pole, lightly tighten all screws first to align the unit, then apply the final specified torque.

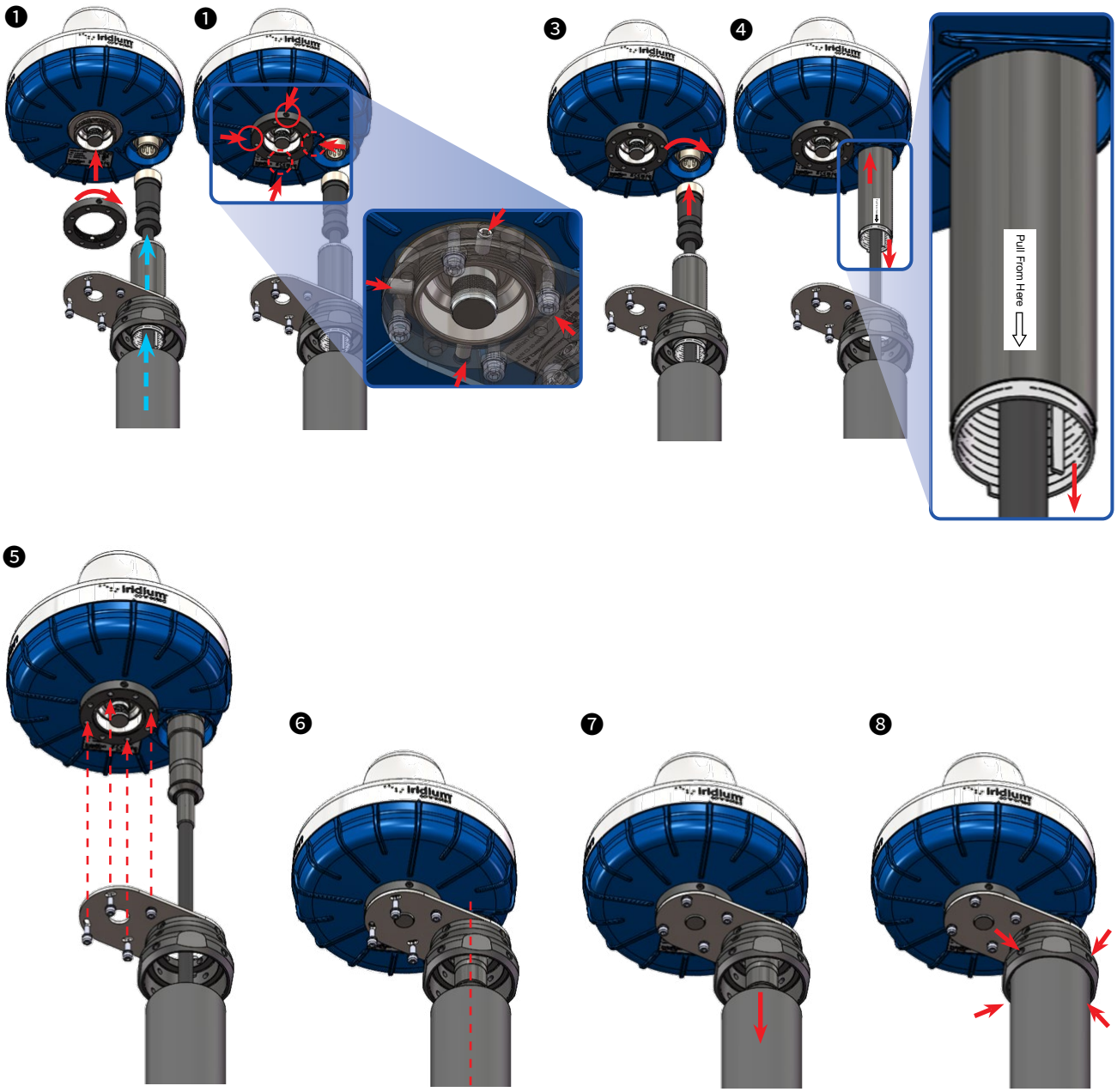


Figure 14: Offset Mounting with Internal NMEA 2000 Cable Installation

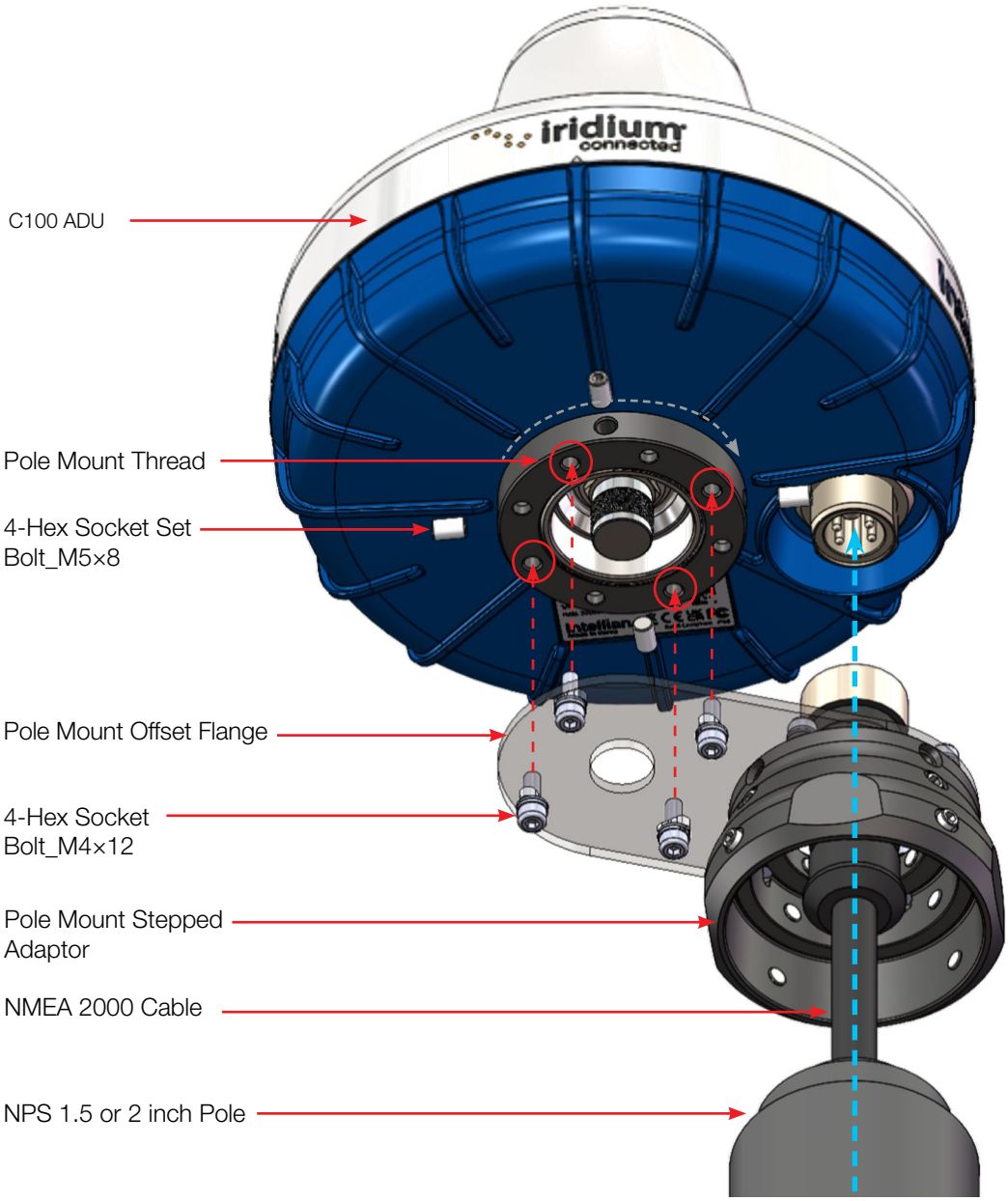


Figure 15: Offset Mounting with Internal NMEA 2000 Cable Installation

For installations where the NMEA 2000 cable is routed through the interior of the pole, the ADU connector must be aligned with the cable path. Please follow the steps below for proper installation:

1. **Thread Attachment and Alignment**: Screw the Pole Mount Thread into the bottom of the ADU until fully seated. Ensure that the threaded taps (marked with red circles) align with the mounting holes on the Pole Mount Offset Flange.
2. **Securing the Position**: If the connector orientation or screw holes do not align at full tightness, slightly unscrew the Thread (counter-clockwise) until they are perfectly aligned. Once aligned, tighten the four M5×8 Hex Socket Set Bolts to lock the Thread securely to the ADU.
3. **Cable Connection and Flange Assembly**: Connect the NMEA 2000 cable to the ADU connector. Then, secure the Offset Flange to the Thread using the four M4×12 Hex Socket Bolts.
4. **Final Mounting**: Finally, secure the Pole Mount Stepped Adaptor to the pole to complete the installation.

5.2.3 Installing Waterproof Tape on the Cable (Optional)

During antenna installation, make sure that, once the cable is connected to the antenna, proper waterproofing of the connector is done with self-amalgamating tape.
If you need any assistance, please contact Intellian Technical Support (support@intelliantech.com).

Outline of Taping

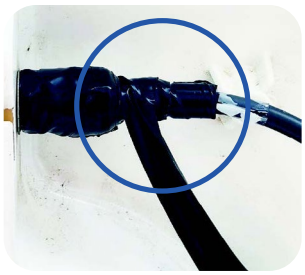
Self-amalgamating tape comes with a protective plastic peel-away layer that allows the tape to be rolled and shipped. To waterproof a connector, first peel away a portion of this protective plastic layer, and then start wrapping the tape around the cable to be protected.

Procedure

1. Connect the cable to the connector where it is to be fully secured.

CAUTION
- DO NOT over-tighten the connector, nuts, or screws when mounting the antenna to avoid damage.
- DO NOT leave any cables loosened or non-fixed, especially those installed outside of the antenna.

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



3. Ensure that the entire RF connector is taped up as shown in the picture on the 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 properly wrap cabling will result in rust and corrosion to the cable and its connector, and this might end up damaging the antenna.

Chapter 6. Installing the SCU

6.1 Selecting SCU Installation Site and Cautions

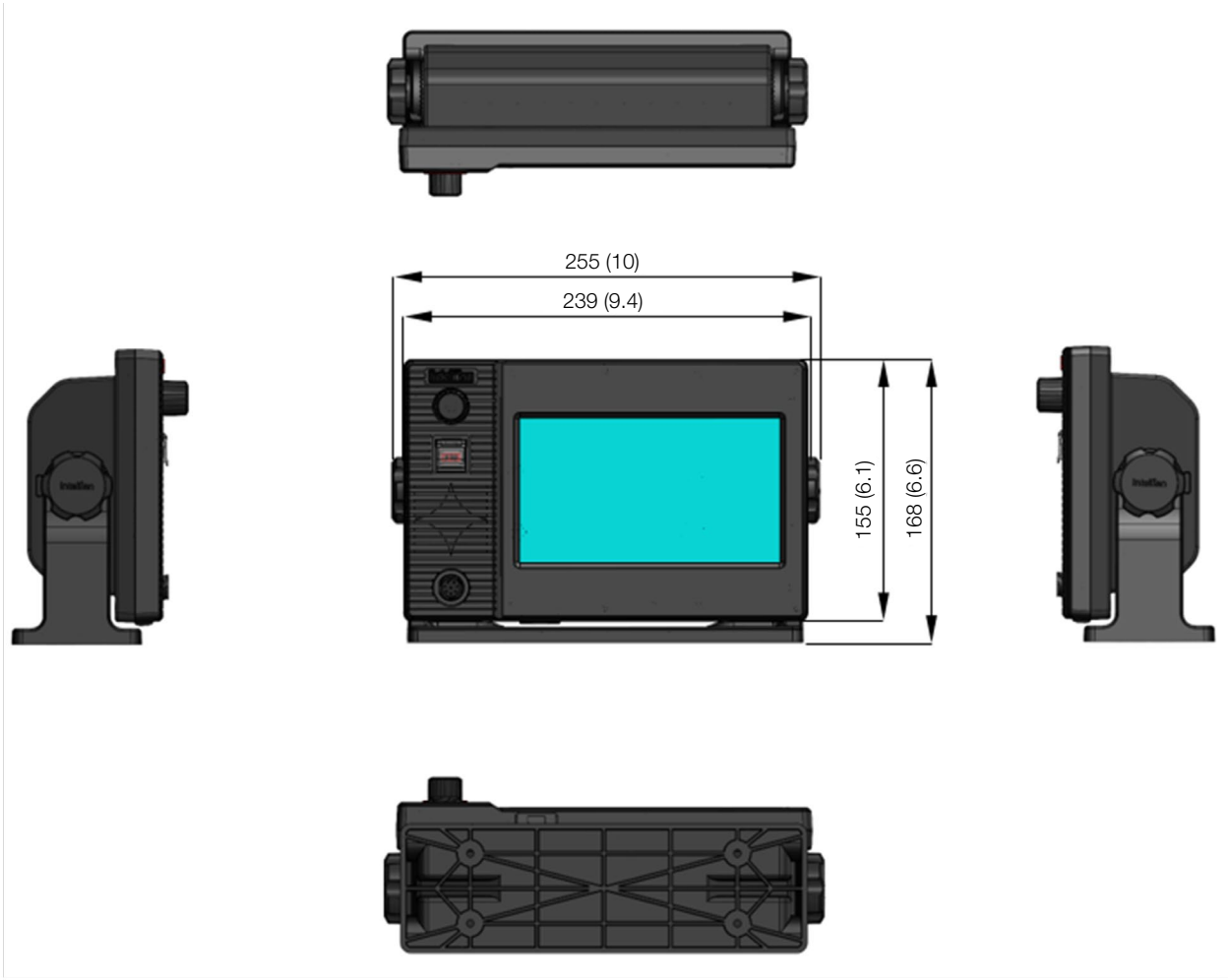
For optimum system performance, the following guidelines on where to install and mount the SCU must be followed. It is recommended to mount the unit in a location that fulfills these requirements:

- Mount the unit indoors (not exposed to direct water).
- Maintain a compass safe distance of 0.6m.
- Do not turn on the system power to prevent electric shock if the front and rear panels are damaged during shipping.
- Read the precautions on the title page of the user guide before installing or operating the system.
- Mount the unit using either the bracket mount or flush mount.
- Mount the unit on a rigid structure with minimal exposure to vibration and shock.
- Mount the unit in an area with an ambient temperature between -15°C and +55°C (+5°F and +131°F).

6.2 SCU Dimensions

Confirm the dimensions of the SCU before installation.

Unit: mm (inch)



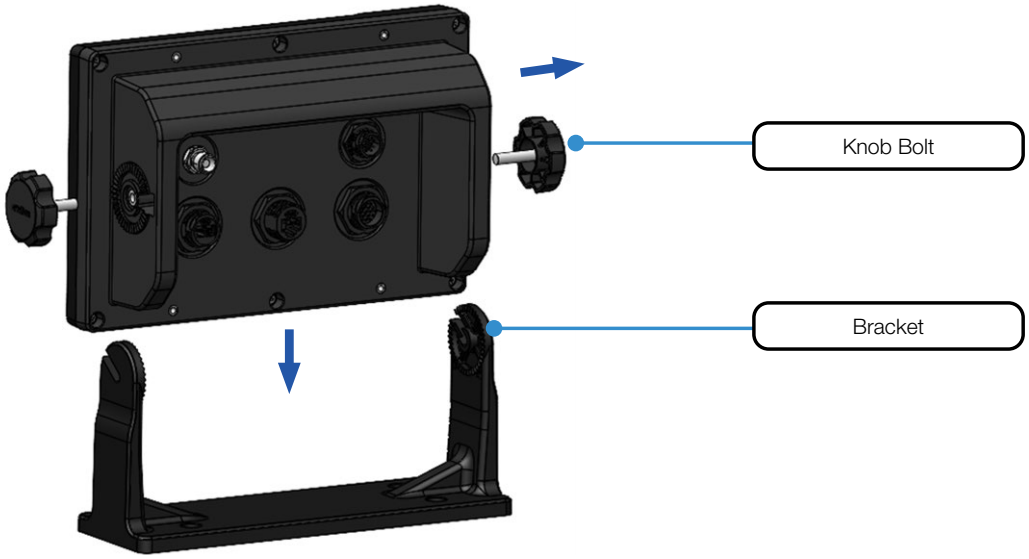
6.3 Mounting SCU

The SCU offers two mounting options. It can be installed on a desktop or mounted flush, typically within a console. If needed, a cable strain relief can also be used.

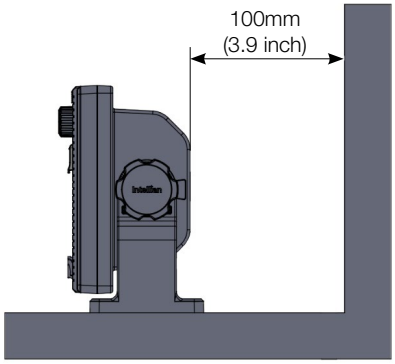
6.3.1 Bracket Mounting Type

The SCU is equipped with a fixing bracket, which is designed with four corner holes for easy direct mounting on a wall or desktop.

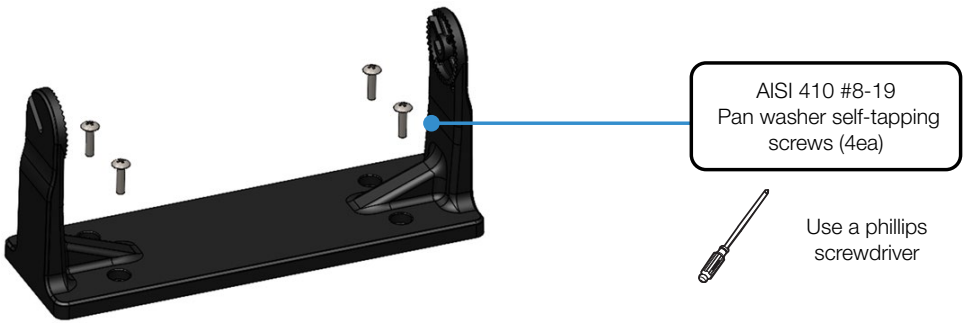
1. Turn knob bolts anticlockwise to detach the display from the bracket.



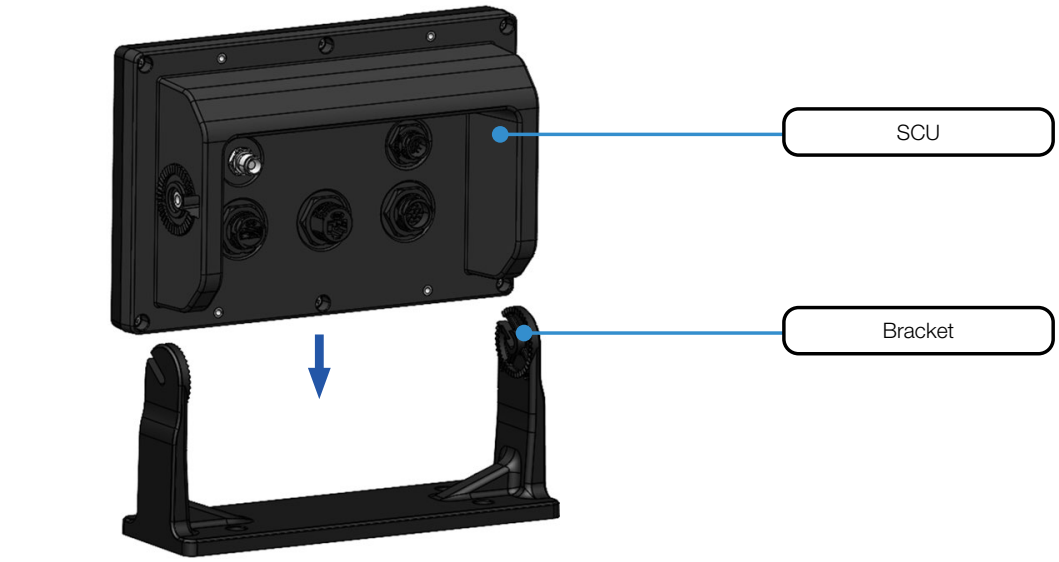
2. Place the SCU in the bracket. Position the SCU mounting bracket to ensure at least 100mm of clearance behind the SCU for cable access.



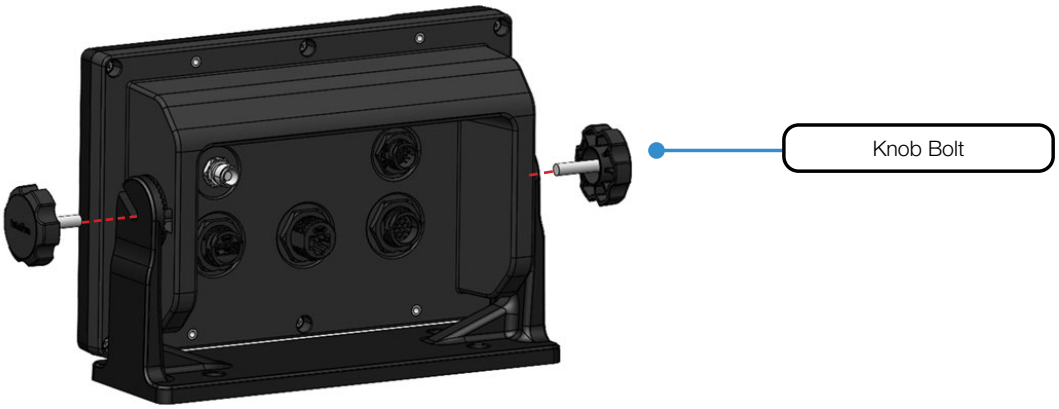
3. Insert the AISI 410 #8-19 Pan washer self-drilling screws (4ea) through the holes in the bracket, then tighten using a Phillips screwdriver.



4. Connect the cables. See section 6.5.
5. Align the grooves on the SCU with those on the bracket, then insert the SCU into the bracket.



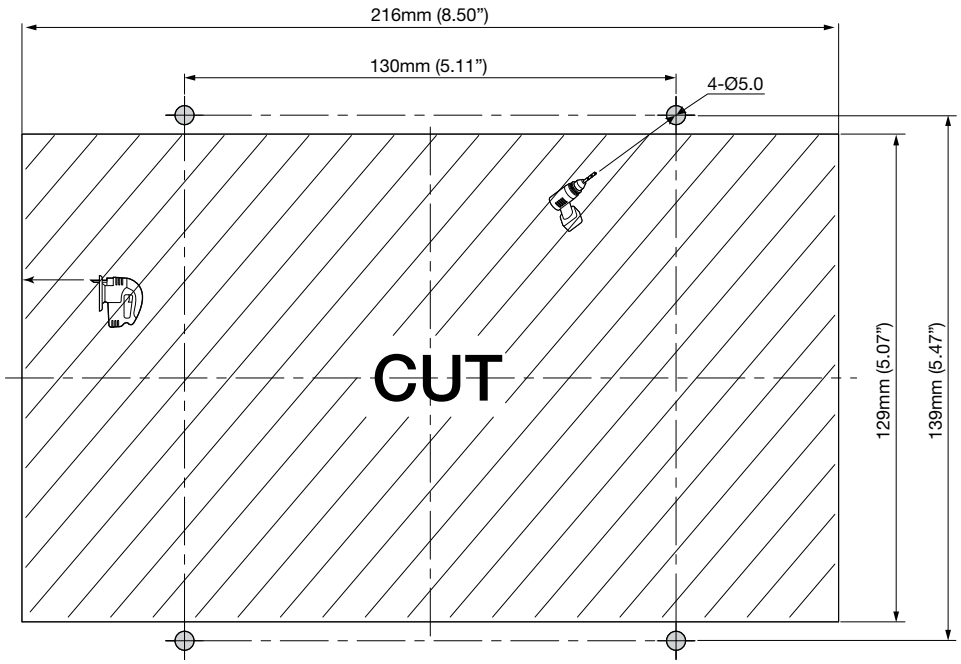
6. Adjust the SCU angle to the desired position.
7. Turn knob bolts clockwise to attach the display to the bracket.



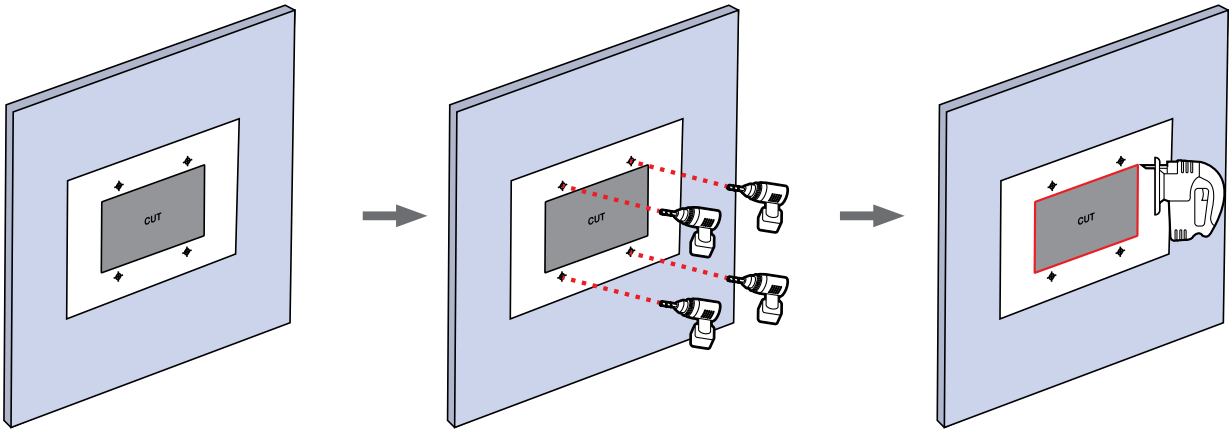
6.3.2 Flush Mounting Type

This method involves embedding the indicator inside the ship's hull by cutting a hole in the ship panel to match the indicator's size, inserting the indicator, and securing it with bolts from the rear.

1. Print out the mount cutout template. When printing the template, set the print scale to 200% in the print setup.



2. Making the cutout for flush mounting
   a. Secure the template to the ship's panel.
   b. Drill four 5mm holes using a 5mm drill bit.
   c. Using a jigsaw or rotary cutting tool, cut along the inside of the solid line indicated on the template.



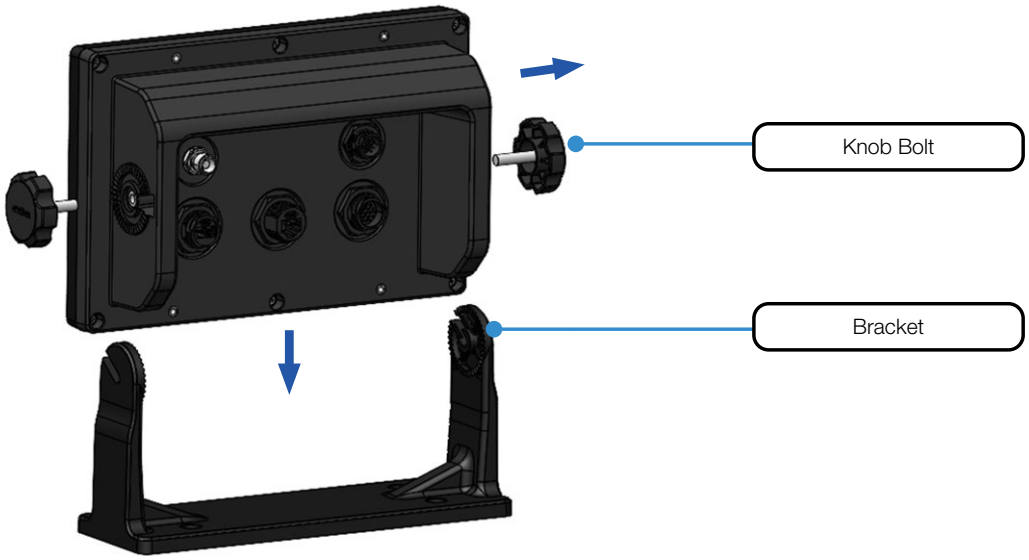
   d. Insert the device into the cutout to check the fit.

NOTE

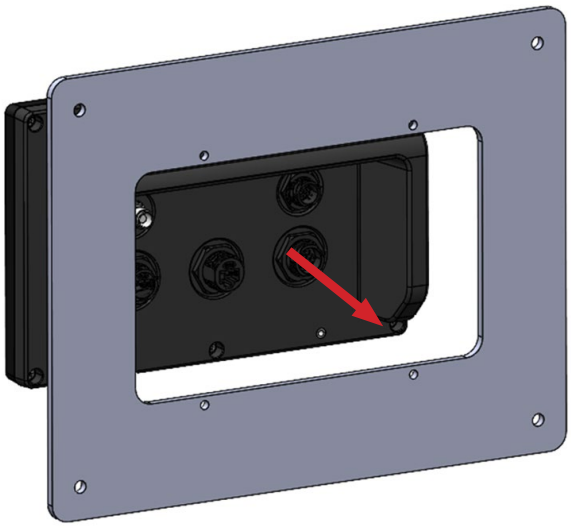
If necessary, use a file or sandpaper to adjust the hole size.

   e. Remove the template from the mounting surface.

3. Turn knob bolts anticlockwise to detach the display from the bracket.



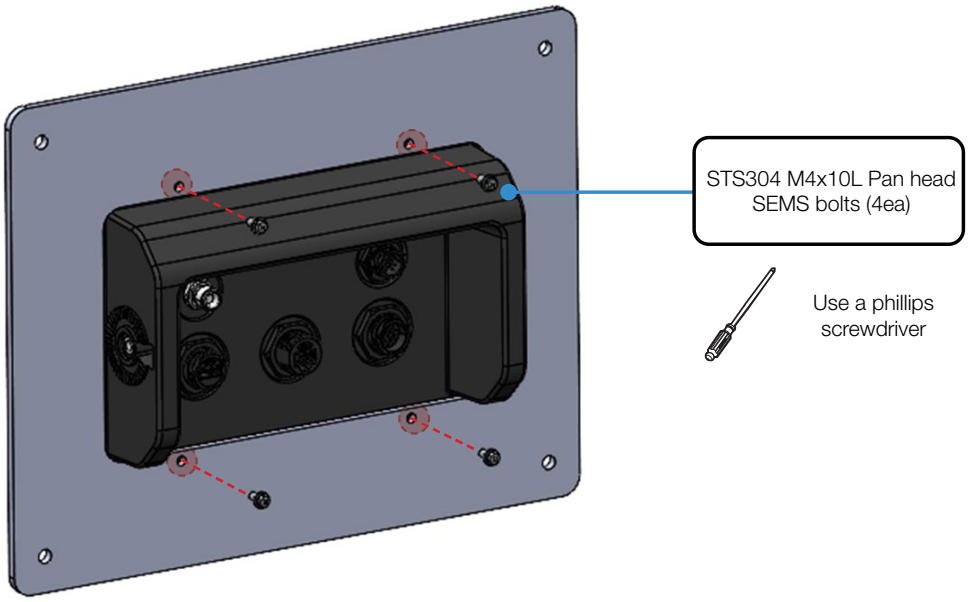
4. Connect the cables. See section 6.5.
5. Insert the SCU into the bezel cutout.



NOTE

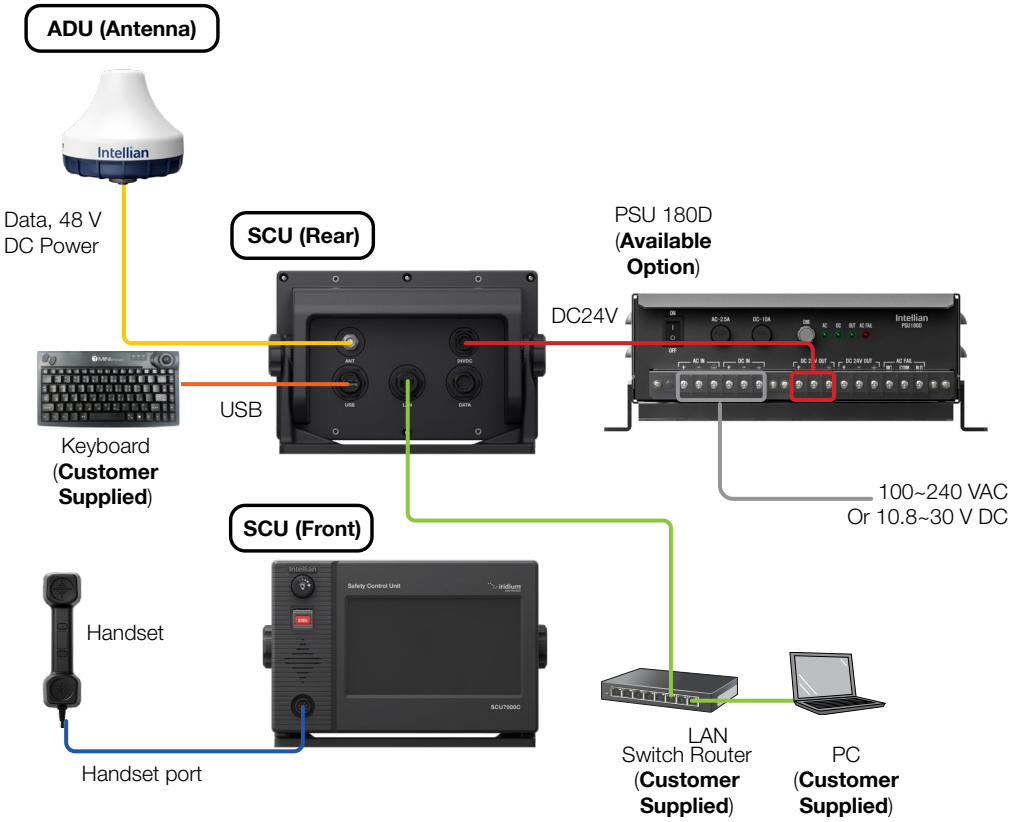
If access to the back of the device will be restricted after installation, connect all necessary cables to the cradle and secure them with the locking bracket or locking rings before inserting the device.

6. Insert the STS304 M4x10L Pan head SEMS bolts (4ea) into the built-in insert on the back of the SCU and tighten them using a Phillips screwdriver.

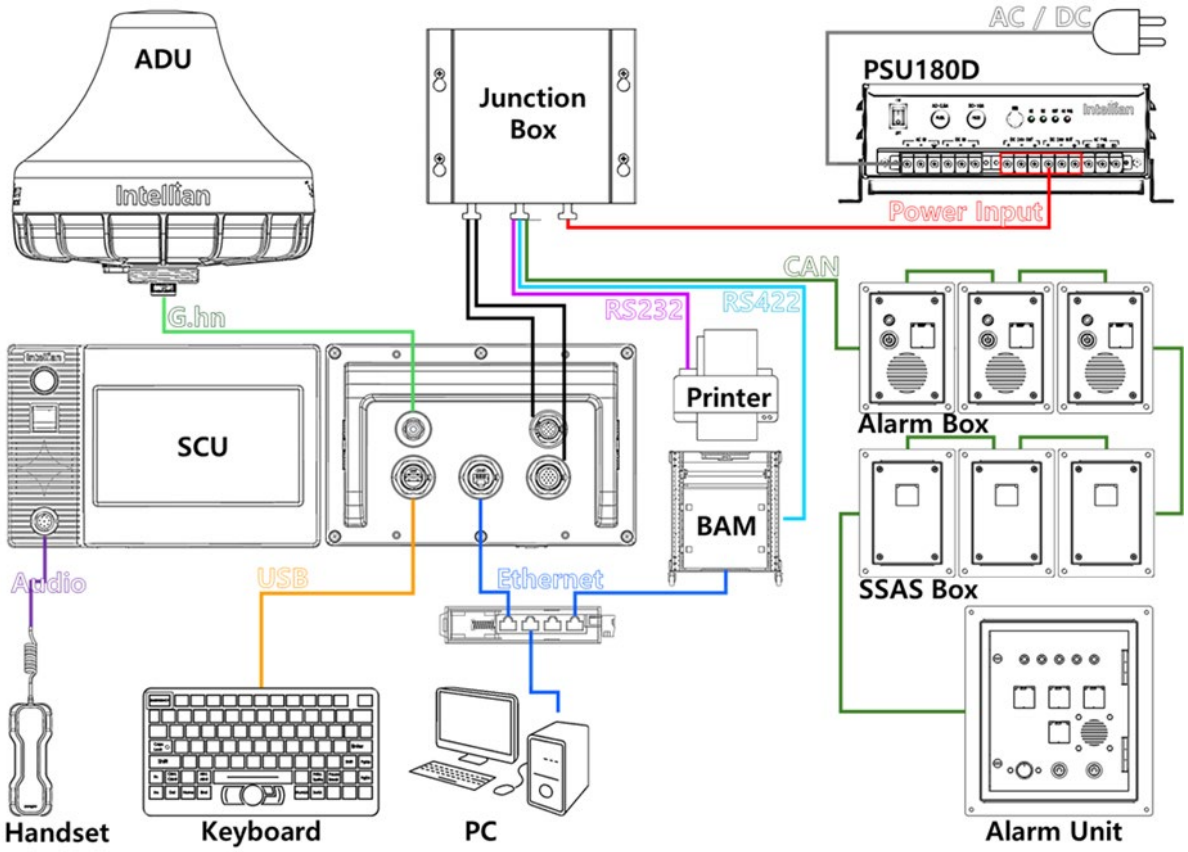


6.4 SCU System Configuration

6.4.1 Basic Configuration



6.4.2 Optional Configuration



NOTE

- CAM-HMI Installation Location:
  - At least one Central Alert Management HMI (CAM-HMI) device must be installed at the navigation and maneuvering workstation.
  - If necessary, it can also be additionally installed at the monitoring workstation.
- Attention:
  - If an Integrated Navigation System (INS) is already installed and operational on-board, installing an additional, separate Central Alert Management (CAM) system alongside this equipment is not permitted. The INS system must include or integrate the CAM functionality.

6.5 SCU Cable Connection

6.5.1 SCU Front/Back Panel

The following figures show the SCU front and back panels.

Front

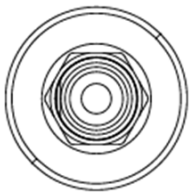
No.	Key	Function
①	Photo IC Diode (Light Sensor)	Provide the Auto-Dimming function so that the LCD screen brightness is automatically changed and it depends on the brightness of surroundings. Auto-Dimming function will be activated in case the user sets the Auto-Dimming mode in the display menu.
②	Dimmer knob	Control the LCD screen brightness by the dimmer knob.
③	DISTRESS key	Press and hold the button for three seconds to transmit the Distress Alert. **Note: DISTRESS** button is covered by transparent cover to prevent user from accidental operation.
④	Front speaker	Front speaker is located inside the housing.
⑤	Handset port	Connect the provided handset (HS7000).
⑥	7" LCD screen	Displays the user interface including menu, function, message, etc.

Rear

No.	Port	Function
①	ADU Power / Data	This is a TNC-type connector. It utilizes PLC (Power Line Communication) to provide the Power and Ethernet required for ADU operation.
②	USB	Connect the optionally provided SPR-8695TU (keyboard). Connect the USB flash drive. (only supports FAT32).
③	LAN (Ethernet)	Enter the APTUS web UI by connecting the LAN port to the EDS-205A (LAN switch) or a PC/LAPTOP. The web UI displays information such as the C100M link state.
④	Data	Connect the provided IN-CCCAF14FCC-03H cable to the JB1000. • This cable supports RS-422, CAN, and RS-232 (printer) communications.
⑤	DC24V	Connect the provided IN-CCBAF12FBB-03H cable to the JB1000. • This cable supplies DC power from the PSU180D and supports RS-422 communication..

6.5.2 SCU Connector Pinout Guide

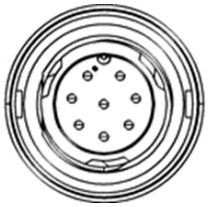
ADU Power / Data Connector



IEC 320 C14 Plug Male

Pin	Signal
1	MCB Interface_P
2	MCB Interface_M

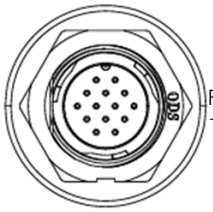
Handset Connector



Font view, Panel lock,
12 pin male

Pin	Signal
1	MIC+BIAS
2	Det_Key_ADC
3	Speaker +
4	Speaker -
5	Hook_ADC
6	AF_1.8V
7	Shield
8	GND

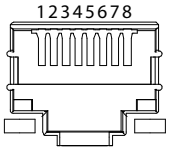
DATA Connector (DC Power)



Font view, Panel lock,
14 pin male

Pin	Signal	Wire color
1	EXT2_RX A (Input, IEC61162-1/2)	Black
2	EXT2_RX B (Input, IEC61162-1/2)	Brown
3	EXT1_GND	Red
4	EXT2_TX Z (Output, IEC61162-1/2)	Orange
5	EXT2_TX Y(Output, IEC61162-1/2)	Yellow
6	DC_OUT + (DC 24V+ Out)	Green
7	DC_OUT – (DC 24V- Out)	Blue
8	CAN_H (IEC61162-3)	Purple
9	CAN_L (IEC61162-3)	Gray
10	EXT_EARTH (Isolation, GND)	White
11	RS-232 RX (Input, IEC61162-1/2)	Pink
12	RS-232_GND	Light Green
13	RS-232 TX (Output, IEC61162-1/2)	Black/White
14	Not Connect	Black/White

Ethernet Connector



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

Power Connector (DC Power)

Font view, Panel lock,
12 pin male

Pin	Signal	Wire color
1	BATT- (DC 24V -)	Black
2	BATT- (DC 24V -)	Brown
3	BATT- (DC 24V -)	Red
4	BATT+ (DC 24V +)	Orange
5	BATT+ (DC 24V +)	Yellow
6	BATT+ (DC 24V +)	Green
7	EARTH (Isolation, GND)	Blue
8	EXT1_RX A (Input, IEC61162-1/2)	Purple
9	EXT1_RX B (Input, IEC61162-1/2)	Gray
10	EXT1_GND	White
11	EXT1_TX Z (Output, IEC61162-1/2)	Pink
12	EXT1_TX Y(Output, IEC61162-1/2)	Light Green

USB Connector

USB A Female

Pin	Signal
1	VBUS
2	USB DM(-)
3	USB DP(+)
4	GND

6.6 Establishing SCU Connections

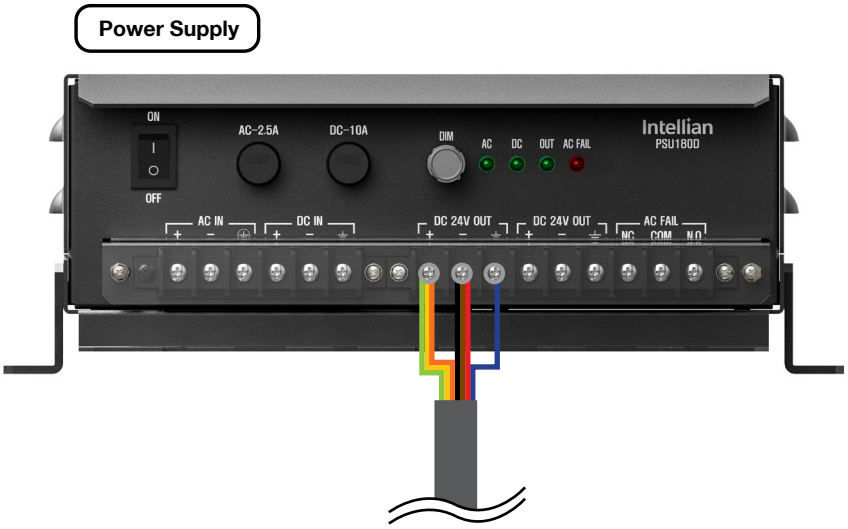
NOTE

The DC connection configuration is unique to this SCU model and must be wired exactly as specified below.

6.6.1 Connecting DC Power to the SCU

Directly Connecting Power Cable to the SCU

1. The wire should be terminated with a ring connector (Optional) as shown below:
   - Positive (BATT + / DC 24 +): Orange, Green, Yellow wires
   - Negative (BATT - / DC 24 -): Red, Black, Brown wires
   - Earth: Blue wires
2. Remove the safety protection cover of the Power Supply.
3. Unscrew the “+” terminal on DC 24V OUT using a Phillips screwdriver. Insert the ring connector of the Orange, Yellow and Green (positive) wires into the terminal and tighten the screw back into the terminal.
4. Unscrew the “-” terminal on DC 24V OUT using a Phillips screwdriver. Insert the ring connector of the Red, Black and Brown (negative) wires into the terminal and tighten the screw back into the terminal.
5. Unscrew the “⏚” terminal on DC 24V OUT using a Phillips screwdriver. Insert the ring connector of the Blue (earth) wires into the terminal and tighten the screw back into the terminal.



Pin	Signal	Wire color
1	BATT- (DC 24V -)	Red
2	BATT+ (DC 24V +)	Orange
3	BATT- (DC 24V -)	Black
4	BATT- (DC 24V -)	Brown
5	BATT+ (DC 24V +)	Yellow
6	BATT+ (DC 24V +)	Green
7	EARTH (FG)	Blue

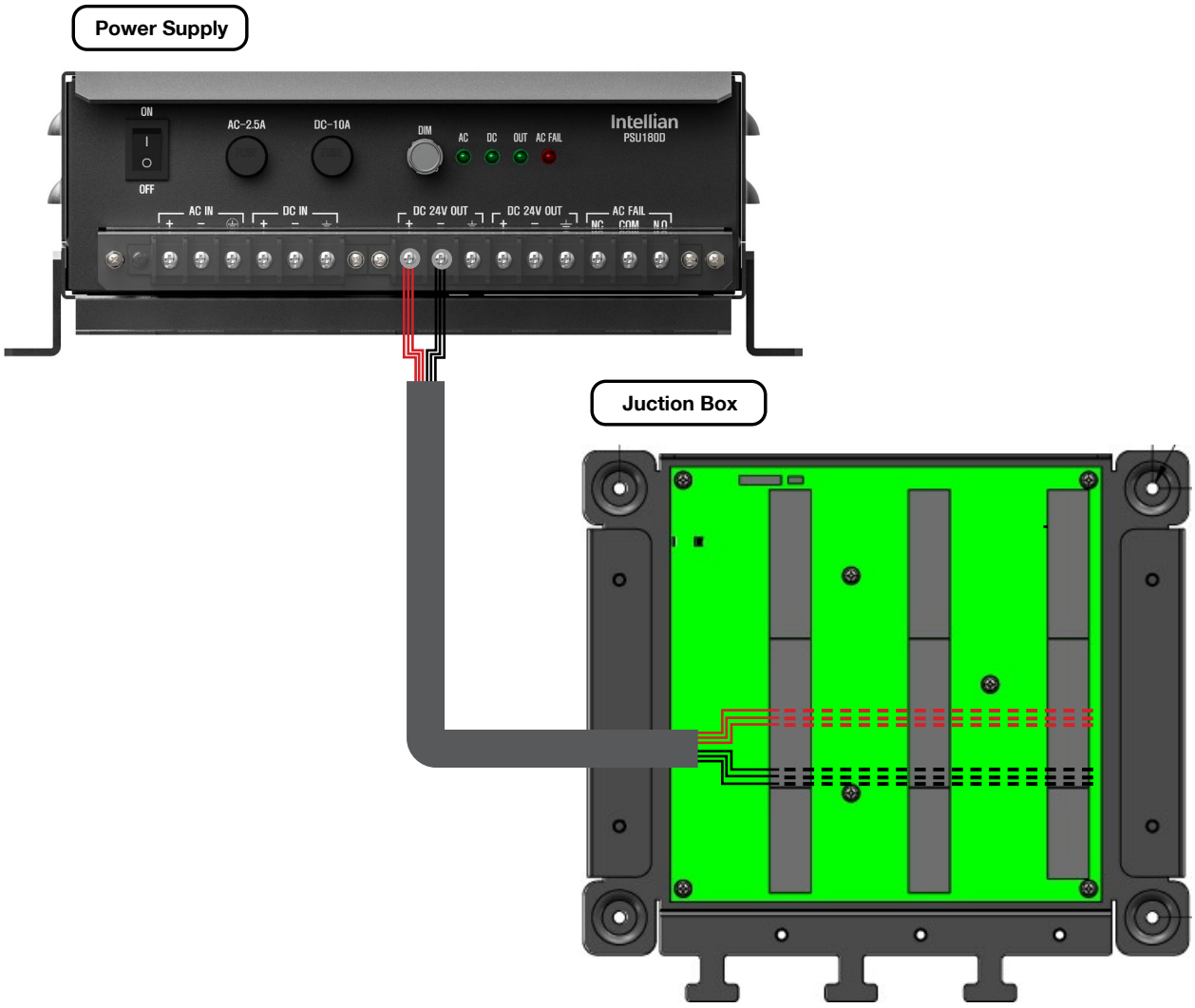
6. Replace the safety protection cover of the Power Supply.
7. Connect the 12-pin power connector to the DC 24V port on the back of the SCU.

8. Finger-tighten the lock ring on the waterproof housing connector to ensure a secure and waterproof connection.

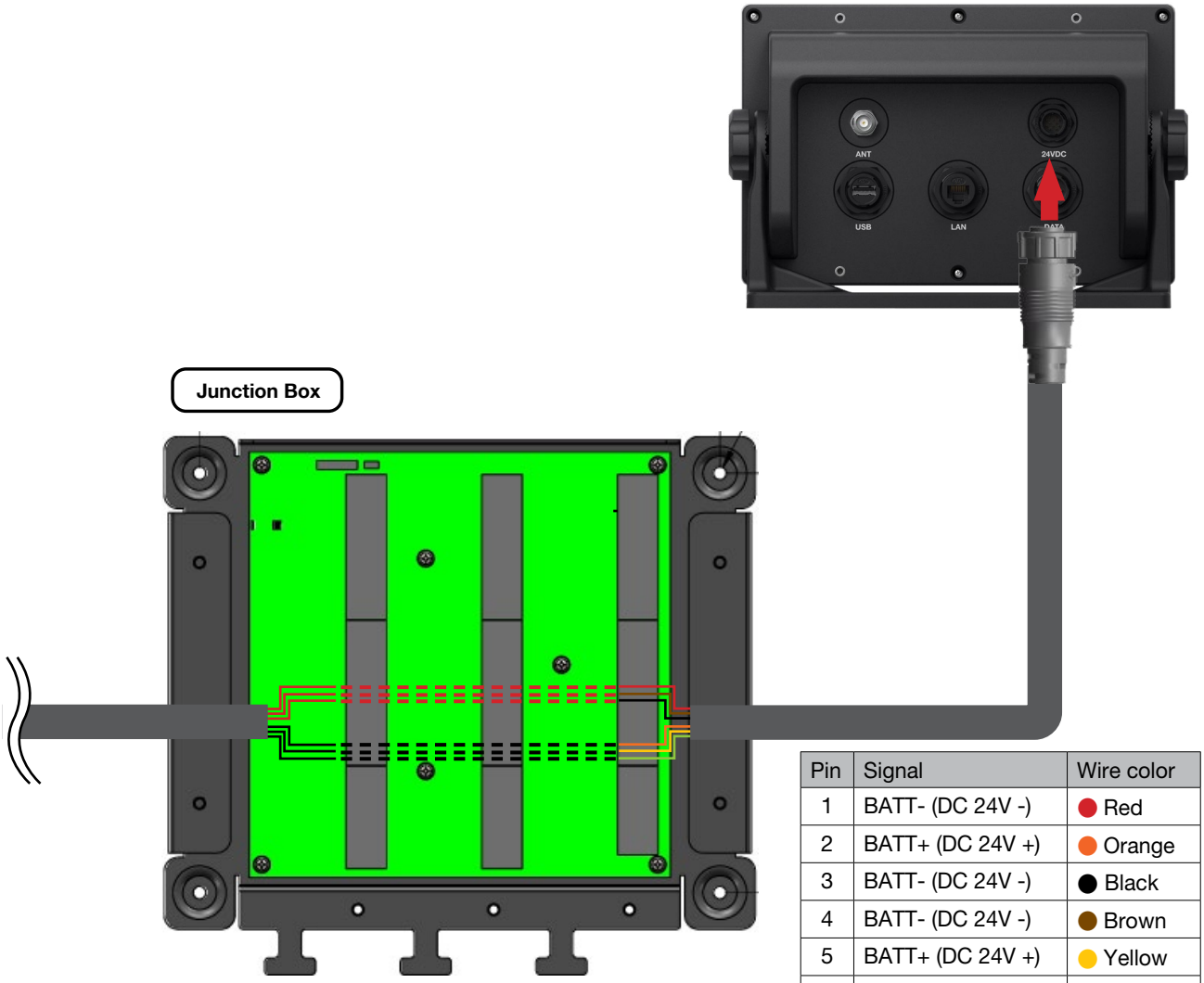
Connecting Power Cable to SCU Junction Box Power Supply

To connect the power to the junction box, you will need to purchase the Junction Box and Power Supply (PSU-18D) separately. These items are provided in a separate box when supplied.

1. Connect the PSU-18D to the junction box using the power cable:
   a. Unscrew the “+” terminal on DC 24V OUT using a Phillips screwdriver. Insert the ring connector of the Red (positive) wire into the terminal and tighten the screw back into the terminal.
   b. Unscrew the “-” terminal on DC 24V OUT using a Phillips screwdriver. Insert the ring connector of the Black (negative) wire into the terminal and tighten the screw back into the terminal.
   c. Connect the Red wire to both the terminals labeled “+” on the junction box.
   d. Connect the Black wire to both the terminals labeled “-” on the junction box.



2. Connect the Power Supply (PSU-18D) to the junction box with the power cable:
   a. Connect the 12-pin power connector to the DC 24V port on the back of the SCU.
   b. Finger-tighten the lock ring on the waterproof housing connector to ensure a secure and waterproof connection.
   c. Thread the red and orange wires into the cable groove in the junction box, aligning them with the '+' pin. Then, fully tighten the screws using a Phillips screwdriver.
   d. Thread the red and orange wires into the cable groove of the junction box, aligning them with the '-' pin. Then, fully tighten the screws using a Phillips screwdriver.

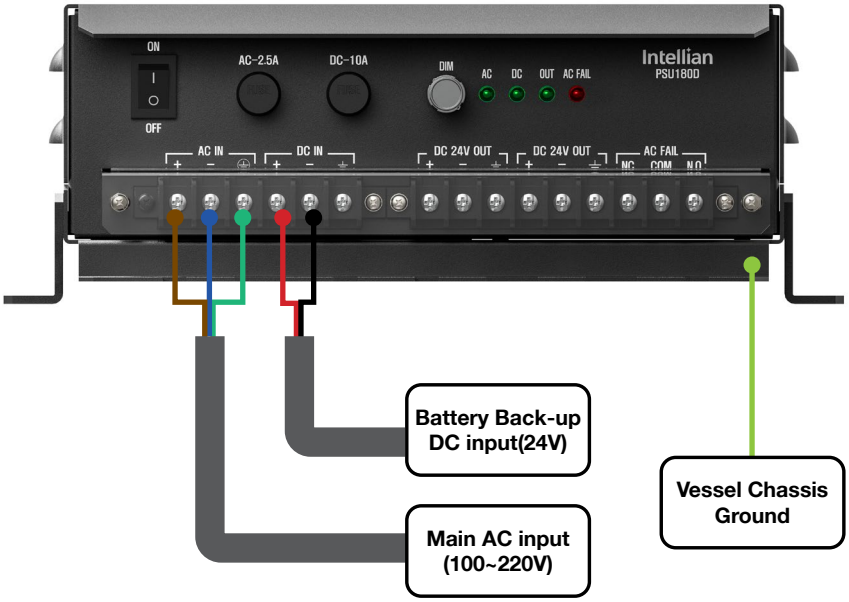


Pin	Signal	Wire color
1	BATT- (DC 24V -)	Red
2	BATT+ (DC 24V +)	Orange
3	BATT- (DC 24V -)	Black
4	BATT- (DC 24V -)	Brown
5	BATT+ (DC 24V +)	Yellow
6	BATT+ (DC 24V +)	Green

6.6.2 Connecting Main/ Emergency and Reserve Power Source

The C100M GMDSS system can be connected to main/emergency (VAC input) and reserve (VDC input) power sources through the PSU180D (Power Supply Unit).

When both main/emergency (VAC input) and reserve (VDC input) power sources are connected simultaneously, the PSU 180D (Power Supply Unit) delivers DC output using the main/emergency VAC input. In case of a failure on the VAC supply, it automatically switches over to the reserve VDC input.



If the VAC input, such as the main power, disconnects or experiences irregularities, it automatically switches to the VDC input and outputs DC voltage.

6.6.3 Connecting SCU to Devices using the LAN Port

Intellian provides an Ethernet cable. To access the APTUS web UI, connect the SCU's LAN port to a LAN switch (HUB) or a PC/Laptop.

1. Connect one end of the Ethernet cable to the LAN port on the back of the SCU and the other end to a LAN switch (HUB) or a PC/Laptop.
2. Finger-tighten the cable locker on the water housing connector to ensure a secure and waterproof connection.

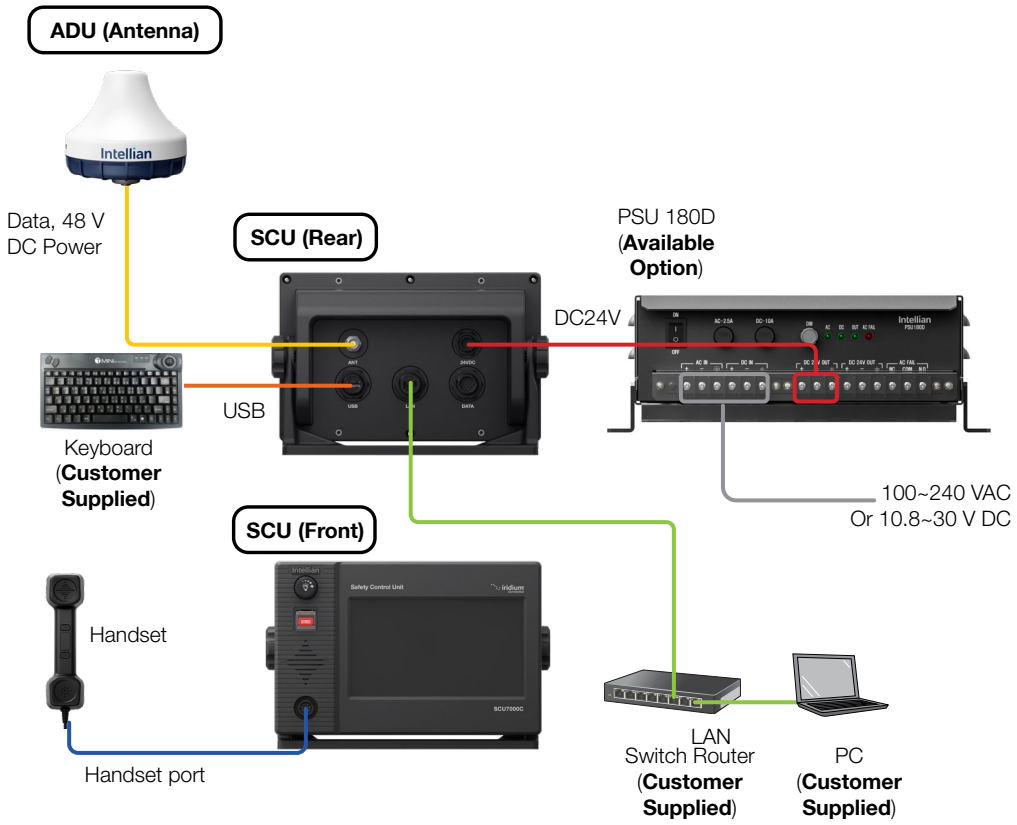
6.6.4 Connecting SCU to a Keyboard using the USB Port

Intellian provides a USB A male to A female extension cable. This allows a keyboard to be connected for entering safety messages and controlling the mouse pointer within the GMDSS SCU user interface.

1. Connect the USB A connector of the keyboard's cable to the USB A female end of the provided extension cable.
2. Connect the USB A male end of the extension cable to the USB port on the back of the SCU.
3. Finger-tighten the cable locker on the water housing connector to ensure a secure and waterproof connection.

6.7 Power Consumption

The SCU of the main basic configuration for the C100M GMDSS system are powered by a 24 VDC power source. This section provides the maximum power consumption and typical average power consumption. This information can be used for calculating the back-up battery capacity, a requirement for GMDSS equipment onboard SOLAS vessels.



If you installed the C100M GMDSS system using the PSU180D (customer-supplied) as shown in the image, the maximum power consumption is listed in the table below.

Maximum 24V DC Output Power Consumption (W) - PSU180D	
System Unit	**Power [W]**
SCU	15W
ADU	20W
Cable loss	0 – 25W
Total Power (maximum)	60W

NOTE

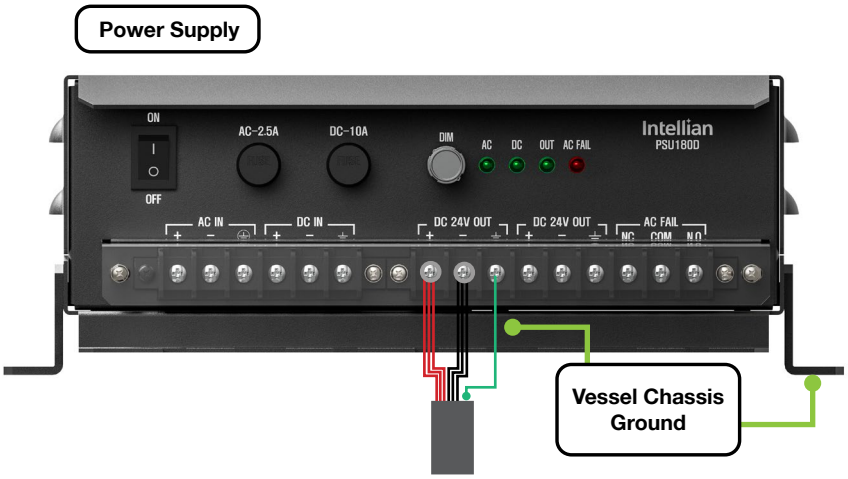
The maximum power consumption is calculated based on the operation of all interfaces.

6.8 DC Isolation Resistance & Grounding

6.8.1 Connecting PSU Chassis Ground & Isolation resistance

SCU Unit

- Chassis Ground (GND) must be connected to Vessel FG
- VDC (+) and VDC (-) connected Power Cable must be connected to the Vessel 24 VDC power supply.
- Isolation resistance, measured between GND and VDC (-), is > 10 MΩ.
- Galvanic isolation between VDC (-) and GND must be maintained.



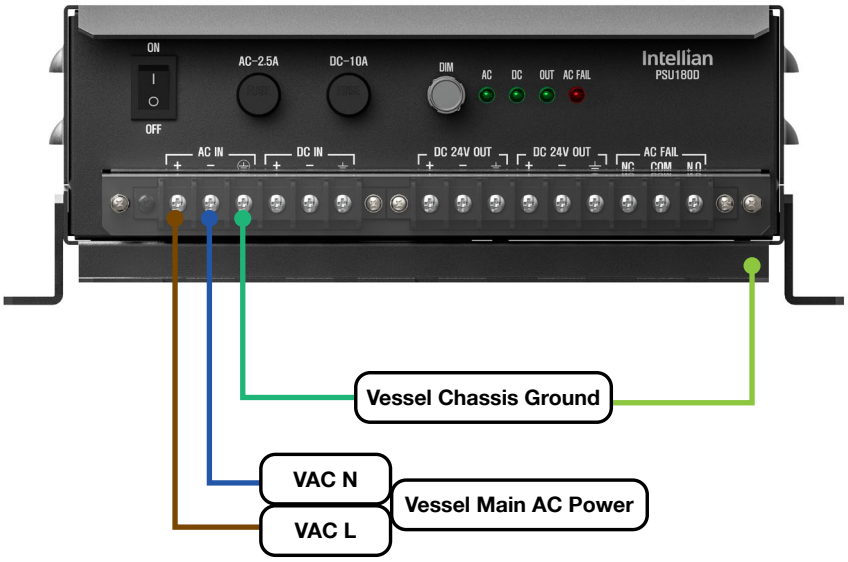
6.9 Galvanic Isolated Power Supply

Use an IEC 60945 approved AC/DC or DC/DC galvanic isolated power supply for the C100M GMDSS system. The galvanic isolated power supply must be used to protect the C100M GMDSS. It is also possible to use a Battery as a power supply, but it must be connected to a galvanic isolated Power Supply.

6.9.1 Connecting VAC IN & Chassis Ground

PSU-180D Power Unit

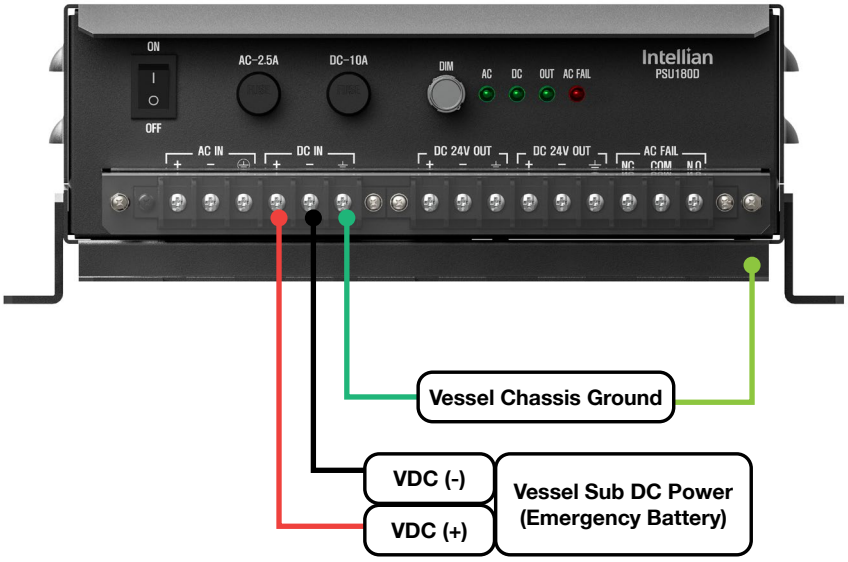
- Chassis Ground (GND) must be connected to Vessel GND.
- AC Power Cable must be connected to Vessel VAC.
- Isolation resistance, measured between GND and VAC (L or N), is > 10 MΩ.
- Galvanic isolation between VAC (L or N) and GND must be maintained.



6.9.2 Connecting VDC IN & Chassis Ground

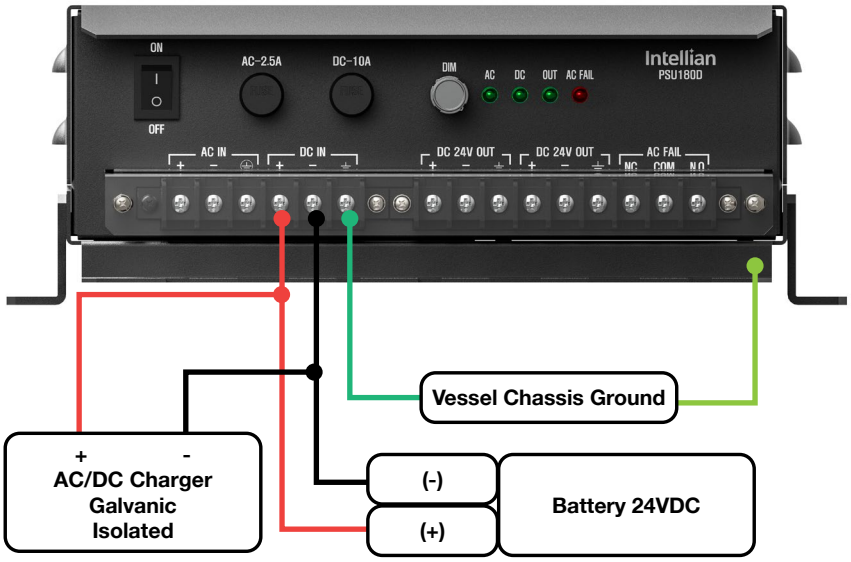
PSU-180D Power Unit

- Chassis Ground (GND) must be connected to Vessel GND.
- DC Power Cable must be connected to Vessel VDC (Emergency Battery or VDC).
- Isolation resistance, measured between GND and VDC (-), is > 10 MΩ.
- Galvanic isolation between VDC (-) and GND must be maintained.



6.9.3 Connecting Battery Power Supply with AC/DC Galvanic isolated Charger

Connection of 24 VDC Battery to a Galvanically Isolated AC/DC Charger



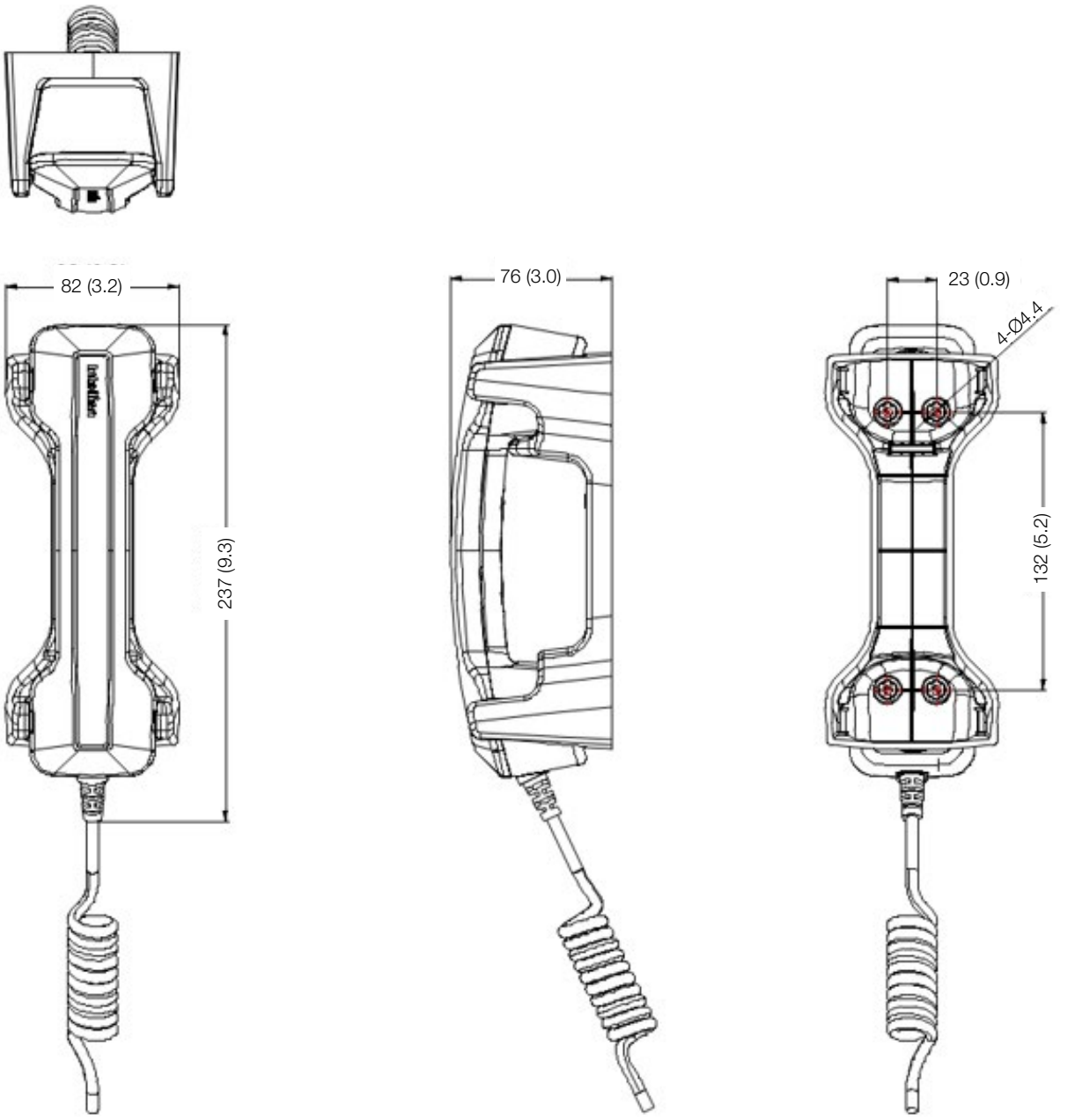
Chapter 7. Installing Handset

7.1 Selecting Handset Installation Site

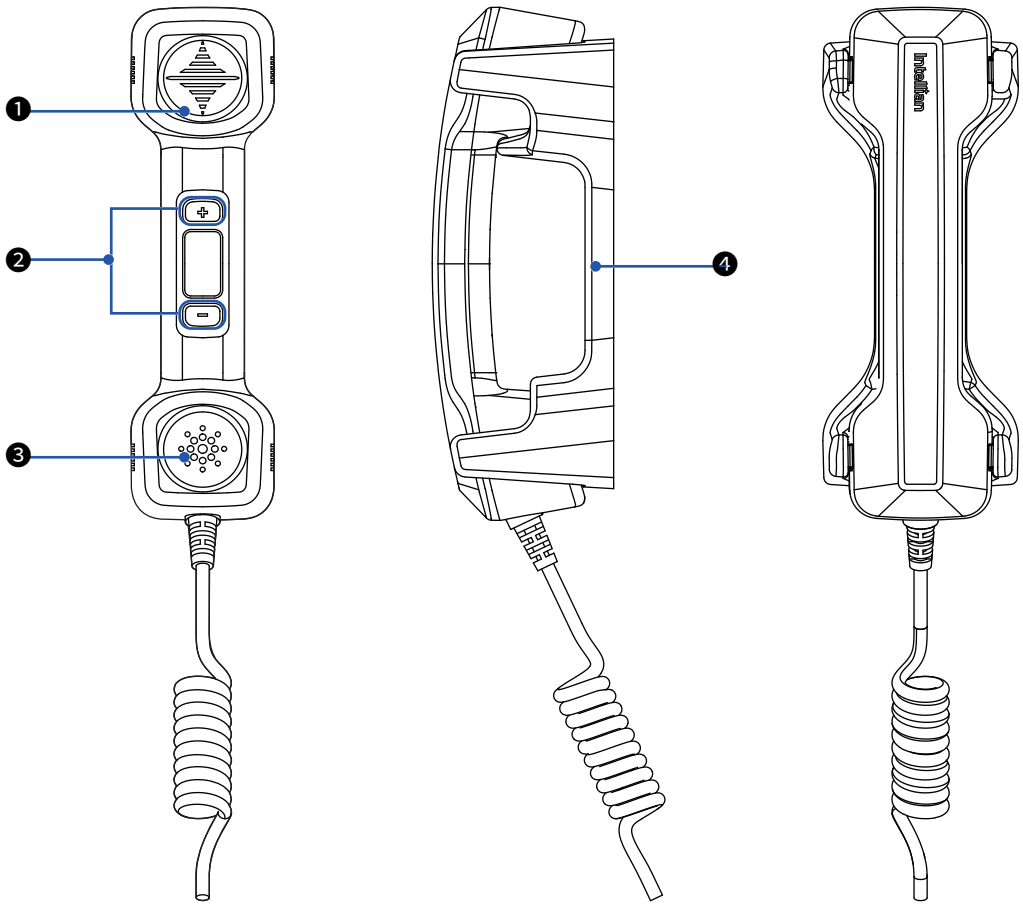
The handset should be installed below the deck in a location that is dry, cool, and ventilated. The front panel of handset should be easily accessible to users.

7.2 Dimensions

Unit: mm (inch)



7.3 Overview



No.	Part	Function
①	Speaker	The opposite user's voice output is generated.
②	Volume button	Adjust the volume by pressing the button.
③	MIC	The microphone (MIC) allows the user to transmit their voice by converting sound into an electrical signal.
④	Cradle	The object used to place the handset. P/N: HC1000

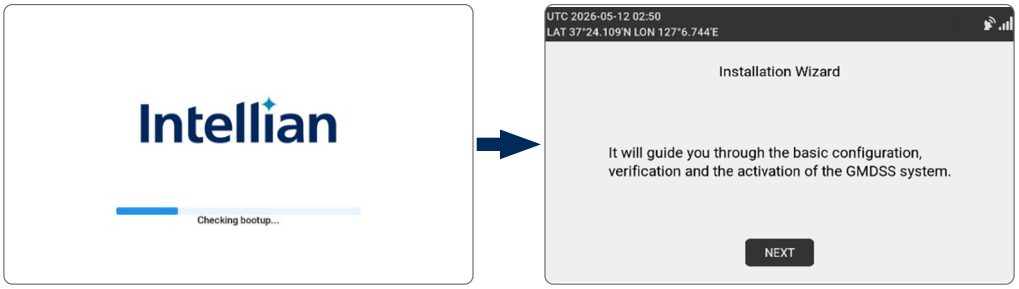
7.4 Connecting the Handset Cable to the SCU

1. Connect the 8-pin handset connector on the handset cable to the 8-pin port on the front of the SCU.
2. Finger-tighten the cable lock on the waterproof housing connector to ensure a secure and watertight connection.

Chapter 8. Operating Install Wizard

8.1 Turning On System

When the system starts up for the first time, connect the SCU to the PSU180D, then switch on the power switch on the front of the PSU180D. The equipment and accessories will then power on. The bootsplash (logo) screen will appear, followed by the home screen.



8.2 Installation Wizard

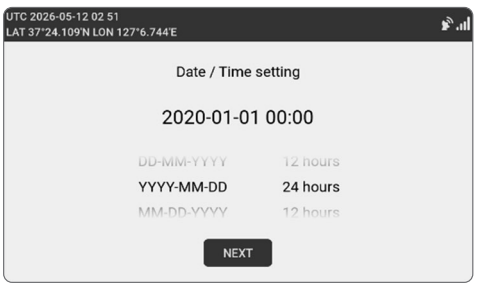
When installing the SCU and switching it on for the first time, the Installation Wizard will start automatically. Afterward, the Installation Wizard can be manually executed through a separate menu. The Installation Wizard guides you through essential system setup tasks, such as commissioning and network configuration, to ensure the SCU operates normally. Once the setup is complete, a test of the main functions will be executed, and the SCU will activate after connecting to the Iridium GMDSS network.

The Installation Wizard must be completed successfully for the GMDSS system to function properly.

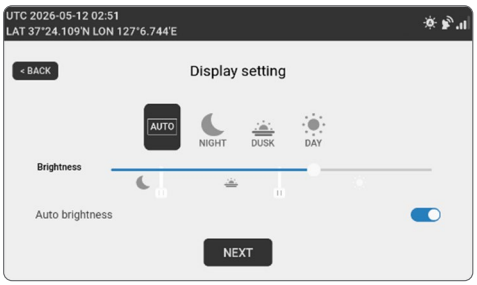
The Installation Wizard will be displayed when powering up the system for the first time or after a factory reset.

It proceeds in the following order: Date/Time Setting → Display Setting → Select SES #1/2 → OTA Commissioning → GMDSS Test.

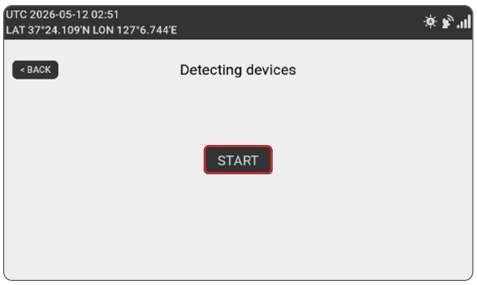
1. Click the **Next** button to start the installation wizard.



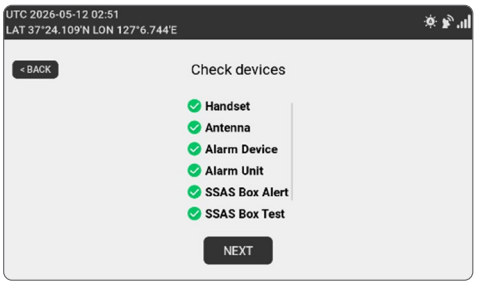
2. Select the date format (**YYYY-MM-DD, MM-DD-YYYY, DD-MM-YYYY**) and the time format (**12, 24 hour**).



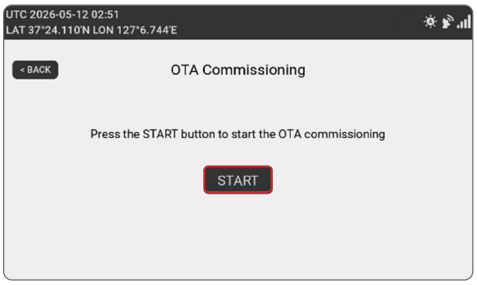
3. Select the display theme (**Auto, Day, Dusk, Night**).



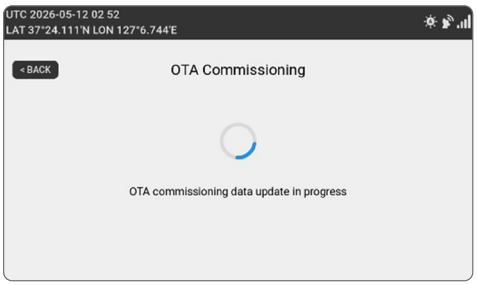
4. Press the **Start** button to verify the connected devices.



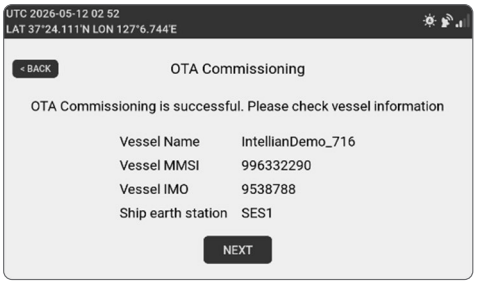
Connected devices will be indicated with a check mark and displayed.



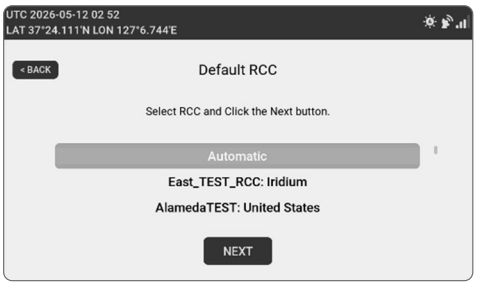
5. Proceed with OTA Commissioning to activate the GMDSS function. Press the **Start** button.



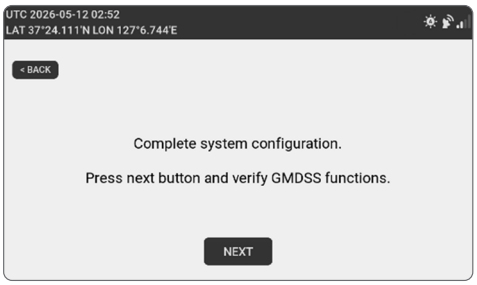
This will take a few seconds. The information in the SIM will be registered to the server via satellite.



If OTA Commissioning is successful, the screen will display as shown in the image.



6. Select the Default RCC (**Automatic or Manual**).
   If Automatic is selected, the RCC will be sent based on the current position.

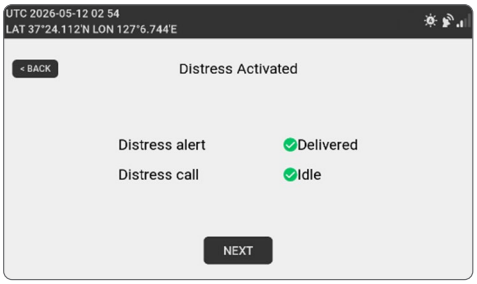


7. After completing the system configuration, enter GMDSS Test Mode to verify the GMDSS functions. The terminal enters the configured GMDSS mode. The GMDSS functions will be tested to ensure they are working correctly. In Test Mode, verify that the Iridium GMDSS server interaction is functioning properly.

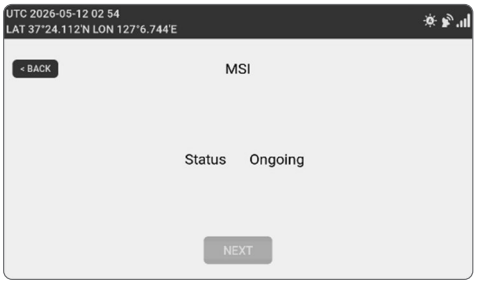
   Note: In Distress Test mode, Distress messages and Distress Calls attempt to connect to a Test RCC, not an actual RCC.

   a. Press and hold the **Distress** button for 3 seconds.

   b. Verify the Distress status. When the alert is successfully transmitted to the IGS (Change order for Distress alert status: Sending → Sent → Delivered), a Distress Call will be received.
   When the Distress alert status is “Delivered,” a Distress call will attempt to connect to the Test RCC. If a Distress call successfully connects to the Test RCC, a voice call will sound from the Test RCC.

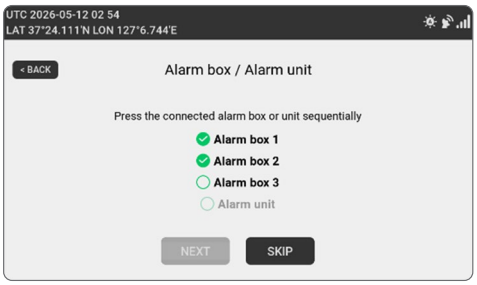


   c. Wait for a few minutes until the communication is finished. If communication is completed automatically, the **Next** button will activate.



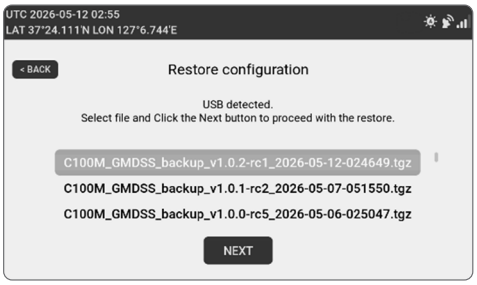
   d. Receives a Test MSI message.

e. If the MSI message is received normally, the **Next** button will activate.



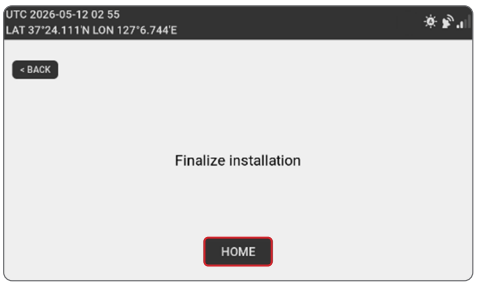
f. If an Alarm Box and Alarm Unit are connected to the system, press the Distress button for each accessory and verify them.

g. The system can be restored to the previous configuration.



h. Connect a USB containing a Config backup file* to restore the system. When the restore is completed, the system will start rebooting automatically.

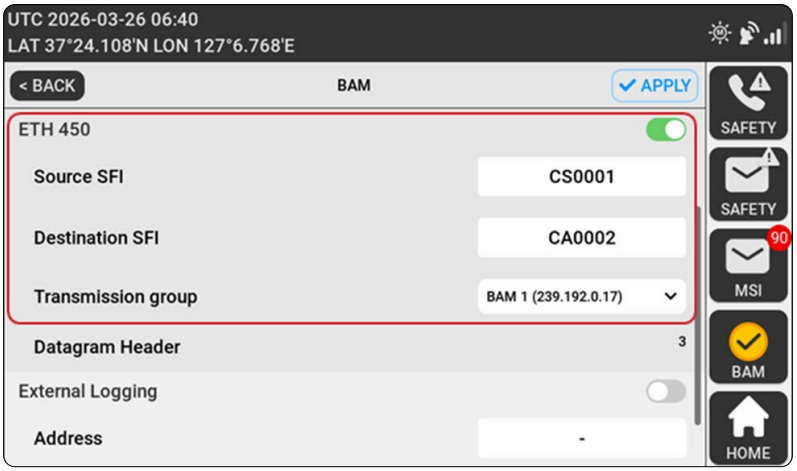
* Config backup file: This file contains the SCU settings from a previous backup. It is backed up using the Web UI or a USB drive in advance.



9. The Installation Wizard has now been successfully completed, and the GMDSS System is ready for use. Press the **Home** button to return to the home screen.

8.3 Assignment of BAM System Function ID

The BAM system is designed to centralize the management and presentation of alerts generated by different sources on the vessel. For the BAM system to function correctly and reliably identify the source of each alert transmitted over the interface, proper configuration of this device during the initial installation is essential. The SCU utilizes the IEC 61162-450 network standard, also known as Lightweight Ethernet, to communicate with the Central Alert Management (CAM) system and other onboard equipment. When the SCU is properly connected to the CAM system, BAM alerts can be seamlessly transmitted and received.



- **System Function ID (SFI) Configuration**
  The SFI must be set correctly during the initial installation process before the ETH 450 BAM functionality is enabled for the first time. Multiple devices generating similar or identical data may be connected to the network. Each SF requires a unique identifier so that other devices on the network can clearly identify the exact source (device and function) of the data. This is called the SFI (System function ID). Using the SFI, receiving devices can select data from desired sources, differentiate data from specific devices, and prevent data conflicts or confusion.
- **SFI Structure (6-character string)**
  The SFI consists of a 6-character string. The first two characters are letters and indicate the type of the SF. For the SCU's Default value, "CS", which stands for Communications satellite, is used for the Source SFI, and "CA", an abbreviation for CAM of BAM, is used for the Destination SFI. "CS" in the Source SFI cannot be changed in the SCU.
- **Transmission Group Selection**
  The Transmission group for ETH 450 can be selected between BAM1, BAM2 and RCOM. While the SFI 'CS' used by the SCU defaults to the RCOM transmission group, it is recommended to select BAM1 or BAM2 for its transmission group instead. This is because the SCU fundamentally acts as an alert source device that transmits BAM alerts to CAM, and these groups are specifically designated for such alert communication purposes, allowing for optimized traffic management. Also, only the UdPbC datagram header is supported.

How to set up the ETH450

1. Navigate to Menu → System Setting → BAM menu.
2. Click Source SFI and Destination SFI, then enter the designated 6-character strings.
3. Configure the Transmission Group (BAM1 or BAM2 recommended).
4. Click the ETH 450 toggle switch to Enable the function. Once the SFI configuration is complete, the ETH 450 is ready for use.

WARNING

Upon enabling the ETH 450 BAM functionality for the first time, the configured Source SFI, Destination SFI and Transmission group values will be permanently locked. Therefore, if a change to a locked SFI is necessary, the only method is to perform a full Factory Reset. This procedure returns the device to its default state, erasing all configurations and requiring the setup process, including SFI configuration, to be completed again.

Chapter 9. Specification

9.1 Applicable Equipment Standards

Standards
IEC 60945:2002 incl. IEC 60945 Corr. 1:2008
IEC 61162-1:2016
IEC 61162-2 Ed.1.0:1998-09
IEC 61162-3 Ed.1.2 Consol. with A1 Ed. 1.0:2010-11 and A2 Ed. 1.0:2014-07
IEC 61162-450:2018
IEC 61097-16:2019
IEC 62923-1:2018
IEC 62923-2:2018
ETSI EN 301 444 V2.2.1:2021. And additionally, for Iridium equipment

9.2 C100M GMDSS Specification

9.2.1 SCU7000C

Item	Specification
Input Voltage	24Vdc
Power Consumption	15W
Weight	1.0 kg (2.2 lbs)
Dimensions	255 x 148 x 94 mm (10.0" x 5.8" x 3.7")
Temperature, operational	-15°C to +55°C (+5°F to +131°F)
IP rating, dust and water	IP34
Interfaces	1 x Ethernet (IEC 61162-450), 2 x RS-422 (IEC 61162-1,2), USB, CAN
Maximum number of alert interfaces	RS-422 (IEC 61162-1, 2): 2 ports Ethernet (IEC 61162-450): 1 port
Interface Input	ACN, HBT, SRP
Interface Output	ALC, ALF, ARC, SM1, SM2, SM3, SM4, SMB, SMV, SRP, GGA, GLL, GNS, RMC, ZDA
LCD	7 inch, 1024 x 600 Pixels
CPU	800MHz
Brilliance control	10 steps
Compass Safe Distance, standard	1.3 m (4.3 ft)
Compass Safe Distance, steer	0.9 m (3.0 ft)
Response time(Backlight on)	25ms(Max 35ms)

9.2.2 Handset(HS7000) w/o PTT button for SCU

HandSet(HS7000)	
Item	**Specification**
Weight	0.4 kg (0.9 lbs)
Dimensions	61 x 237 x 64 mm (2.4" x 9.3" x 2.5")
Temperature, operational	-15°C to +55°C (+5°F to +131°F)
IP rating, dust and water	IP56
Compass Safe Distance, standard	1.5m (4.9 ft)
Compass Safe Distance, steer.	1.2m (3.9 ft)
Cradle(HC1000)	
Item	**Specification**
Weight	0.2 kg (0.4 lbs)
Dimensions	82 x 189 x 69 mm (3.2" x 7.4" x 2.7")
Compass Safe Distance, standard	1.5m (4.9 ft)
Compass Safe Distance, steer.	1.2m (3.9 ft)

9.3 Accessory Specification (Optional)

9.3.1 Alarm Box(AB1000)

Item	Specification
Input Voltage	24Vdc
Power Consumption	2.5W
Weight	0.5 kg (1.1 lbs)
Dimensions	104 x 139 x 57 mm (4.1" x 5.5" x 2.2")
Temperature, operational	-15°C to +55°C (+5°F to +131°F)
IP rating, dust and water	IP10
Interfaces	CAN
Compass Safe Distance, standard	0.80 m (2.6 ft)
Compass Safe Distance, steer.	0.60 m (2.0 ft)

9.3.2 SSAS Box (SB7000T/SB7000A)

Item	Specification
Input Voltage	24Vdc
Power Consumption	0.2W
Weight	0.4 kg (0.9 lbs)
Dimensions	104 x 139 x 49 mm (4.1" x 5.5" x 1.9")
Temperature, operational	-15°C to +55°C (+5°F to +131°F)
IP rating, dust and water	IP10
Interfaces	CAN
Compass Safe Distance, standard	0.50 m (1.6 ft)
Compass Safe Distance, steer.	0.30 m (1.0 ft)

9.3.3 Alarm Unit (AU1000)

Item	Specification
Input Voltage	24Vdc
Power Consumption	3.6W
Weight	2.3 kg (5.1 lbs)
Dimensions	215 x 240 x 104 mm (8.5" x 9.4" x 4.1")
Temperature, operational	-15°C to +55°C (+5°F to +131°F)
IP rating, dust and water	IP20
Interfaces	CAN
Compass Safe Distance, std.	0.90 m (3.0 ft)
Compass Safe Distance, steer.	0.60 m (2.0 ft)

9.3.4 Junction Box (JB1000)

Item	Specification
Weight	1.1 kg (2.4 lbs)
Dimensions	210 x 190 x 34 mm (8.3" x 7.5" x 1.3")
IP rating, dust and water	IP10
Interfaces	2 x RS-422, RS-232, CAN
Compass Safe Distance, std.	0.40 m (1.3 ft)

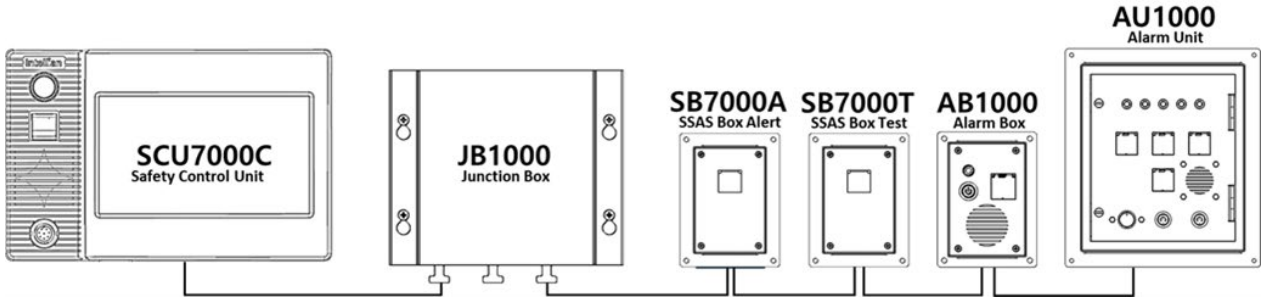
Compass Safe Distance, steer.	0.30 m (1.0 ft)

9.4 Environmental Specification

Test	Intellian Standard	
Operation temperature	Antenna	IEC-60945 (-25°C to +55°C / power on)
	Other	-15°C to +55°C
Storage temperature	IEC-60945 (-40°C to +85°C / power off)	
Relative humidity	95% at 40°C (without dew condensation)	
Vibration	IEC 60945	
Shock	IEC-60068-2-27	

Chapter 10. Optional products CAN Bus communication connection guide

The optional products for the C100M GMDSS system include the Junction Box (JB1000), Alarm Box (AB1000), Alarm Unit (AU1000), and SSAS Box (SB7000A/T). All of these units are connected in parallel using CAN Bus communication, which facilitates installation and enables their respective functions. Since multiple devices communicate via one CAN bus, the number of wires can be reduced, and cost savings can be achieved through efficient system layout.



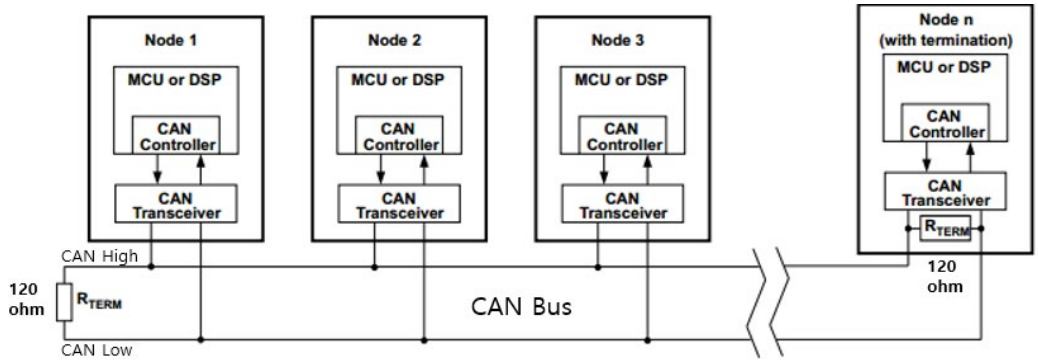
Each optional device (NODE) on the CAN bus, such as the Junction Box (JB1000), Alarm Box (AB1000), Alarm Unit (AU1000), and SSAS Box (SB7000), can be added according to the user system requirements.

Device Specifics:

- Junction Box (JB1000):
  - This is not an ID identification device target for CAN communication.
  - It is connected directly to the SCU (SCU7000C) and includes the Bus termination resistor (120 ohm) for the SCU device.
- Alarm Box (AB1000):
  - There can be a total of 4 Alarm Boxes (AB1000s), and each device has a unique identification ID.
- SSAS Box (SB7000A):
  - There can be a total of 3 SSAS Alert devices.
- SSAS Box (SB7000T):
  - There can be 1 SSAS Test device, and each device can have a unique identification ID.
- Alarm Unit (AU1000):
  - This is a single device and has a unique identification ID.

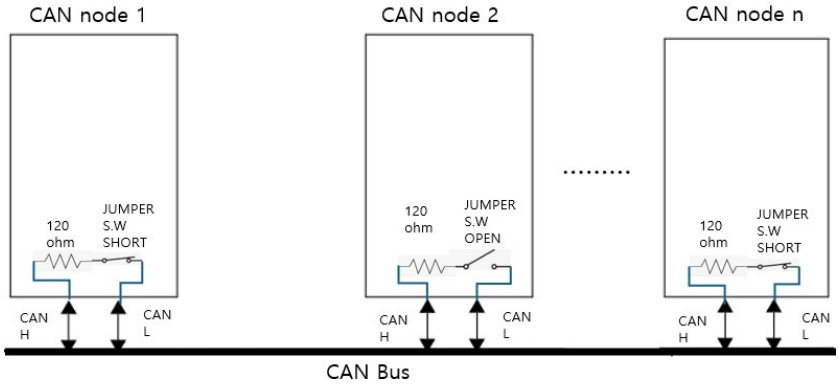
Termination Resistor Connection Guide:

The CAN data bus system consists of at least two nodes, CAN-low wiring, CAN-high wiring, and termination resistors at each end of the Bus.



In each optional device (JUNCTION BOX, ALARM BOX, SSAS BOX, ALARM UNIT), there is a PCB mounted jumper pin that connects the 120 ohm termination resistor, which can be shorted or connected depending on the Bus location.

(※ The termination resistor jumper location is shown in the photo of each optional device.)



Jumper Configuration Rules:

- Depending on the device selection, the JUMPER is SHORT by using the starting termination resistor at SCU + JUNCTION BOX (Node 1).
- Additional devices (Node 2, 3, 4...) do not use the termination resistor, and their JUMPERs are OPEN.
- The JUMPER shall be set to SHORT to use the termination resistor at the optional device (Node n) connected to the last CAN bus device.

Chapter 11. Appendix

11.1 Tightening Torque Specification

This table shows the recommended values of tightening torques.

Bolt Size	Hex Key (Hex Socket Bolt)	Wrench (Hex Bolt)	Tightening Torque (N m)
M2			1
M2.5			1
M3	M2.5	M5.5	1
M3.5		6	2
M4	3	7	3
M5	4	8	5
M6	5	10	7
M8	6	13	17
M10	8	16	34
M12	10	19	59
M14	12	22	95
M16	14	24	147
M20	17	30	288
M24	19	36	497

11.2 Accessory Connections (Optional)

11.2.1 Junction Box

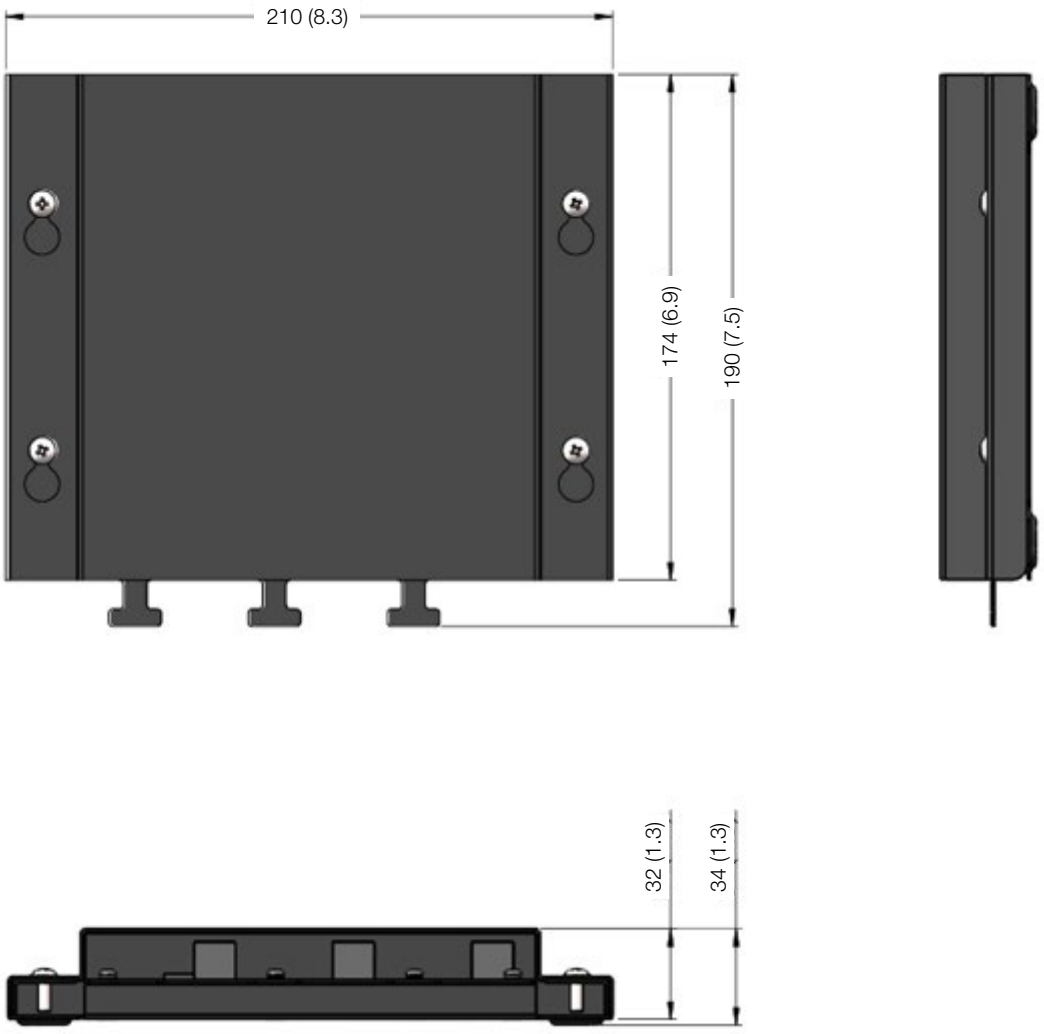
The Junction Box is an extension board that connects to the C100M GMDSS and interface connector in an indoor environment. It is necessary to use the Junction Box to connect accessories. The Junction Box connects to the SCU via a 14-pin connector. The accessories that can be connected to the Junction Box are listed below:

- Alarm Box (max. 3ea)
- SSAS Box (including Test Box, max. 4ea)
- BAM network (rs232, rs422)
- Printer

The cover of the Junction Box is secured with bolts, which can be loosened to open.

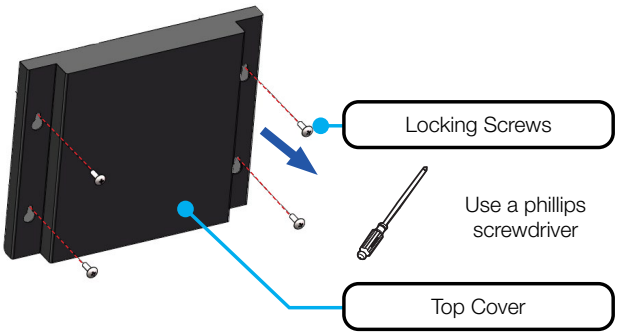
Dimensions

Unit: mm (inch)

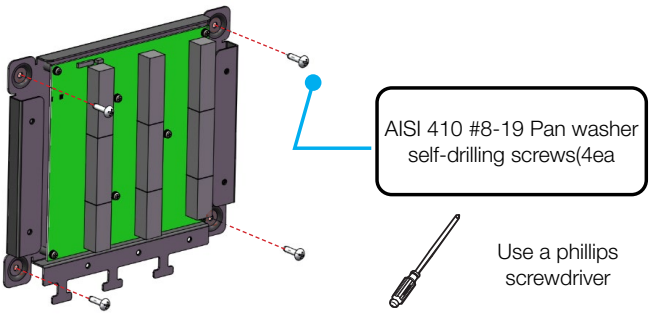


Mounting Junction Box

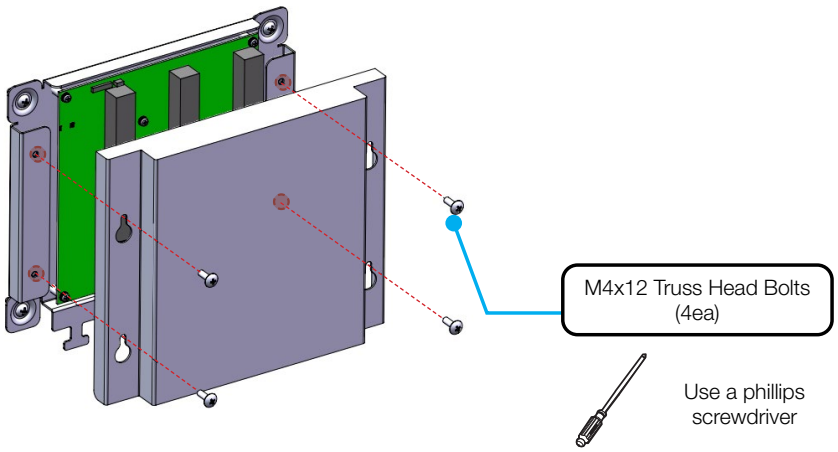
1. Loosen the locking screws on the top cover of the junction box using a Phillips screwdriver, then open the cover.



2. Place the detached rear panel on the wall or desk.
3. Insert the AISI 410 #8-19 Pan washer self-drilling screws(4ea) into the built-in nuts on the rear panel, then tighten them using a Phillips screwdriver.

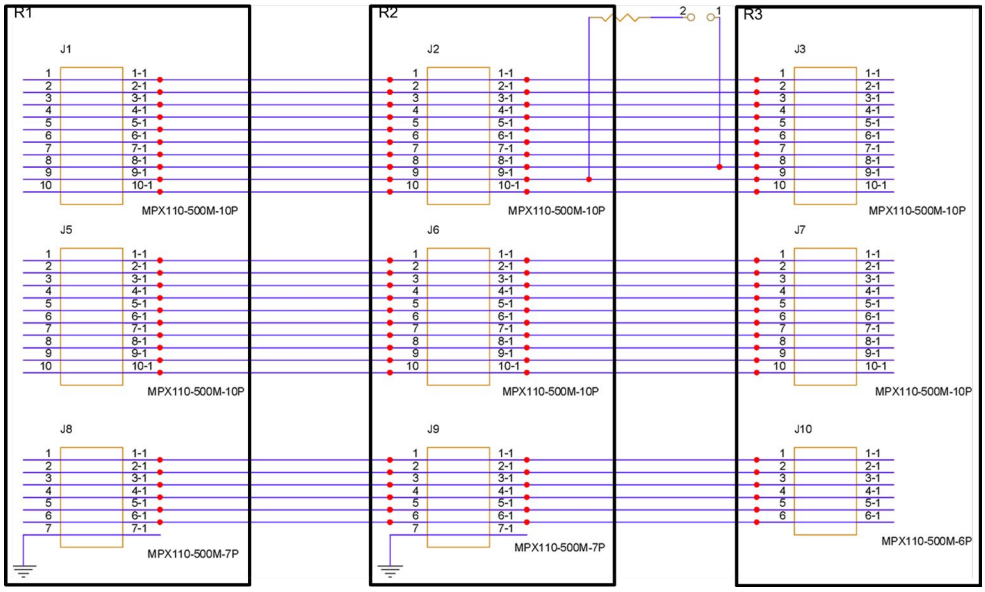


4. Position the top cover of the junction box, then secure it by installing the locking screws using a Phillips screwdriver.

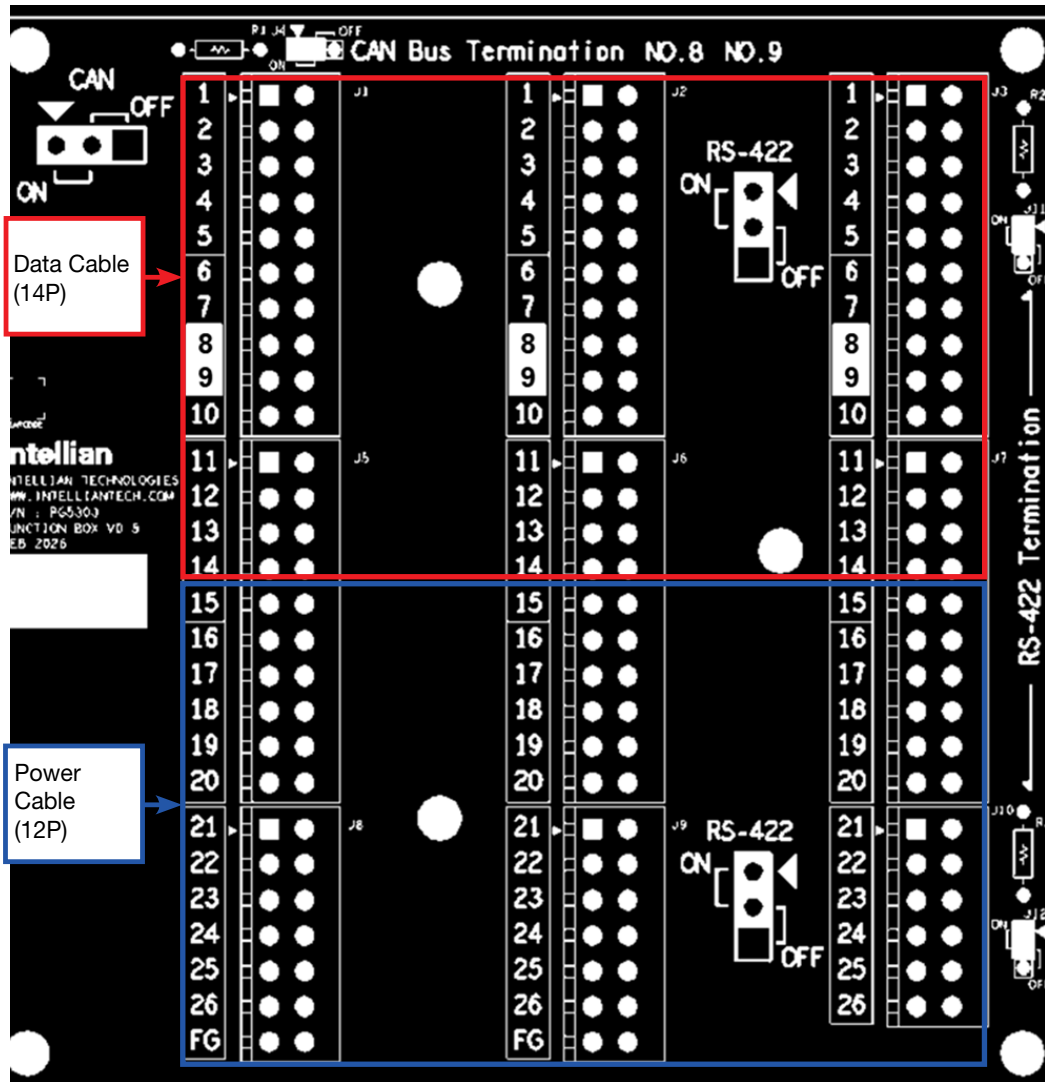


Junction Box Cable Connection

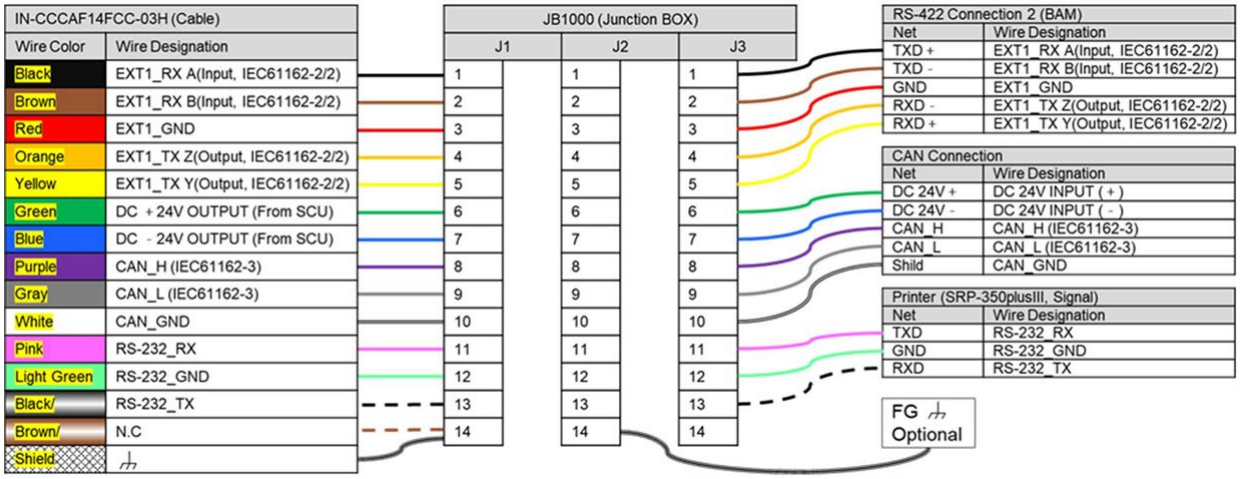
The terminal block inside the junction box is arranged in three rows, with each row containing a total of 27 pins. All three rows (1 to 3) are interconnected in a circuit, as shown in Figure XX.



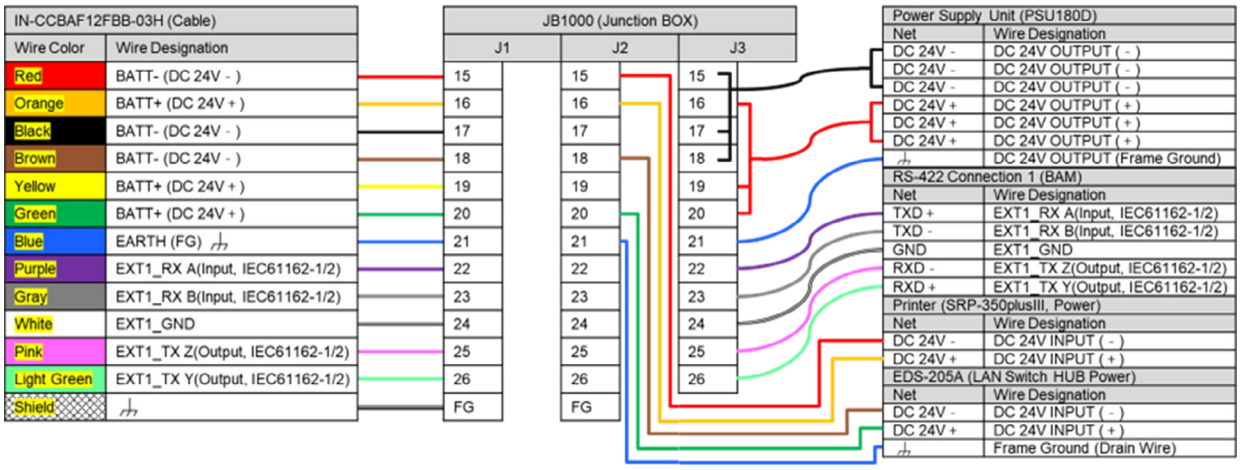
However, pins 8 and 9 in rows R1 to R3 are designated for connecting the termination resistor for CAN (NMEA 2000) communication. Therefore, pins 8 and 9 are exclusively reserved for CAN communication.



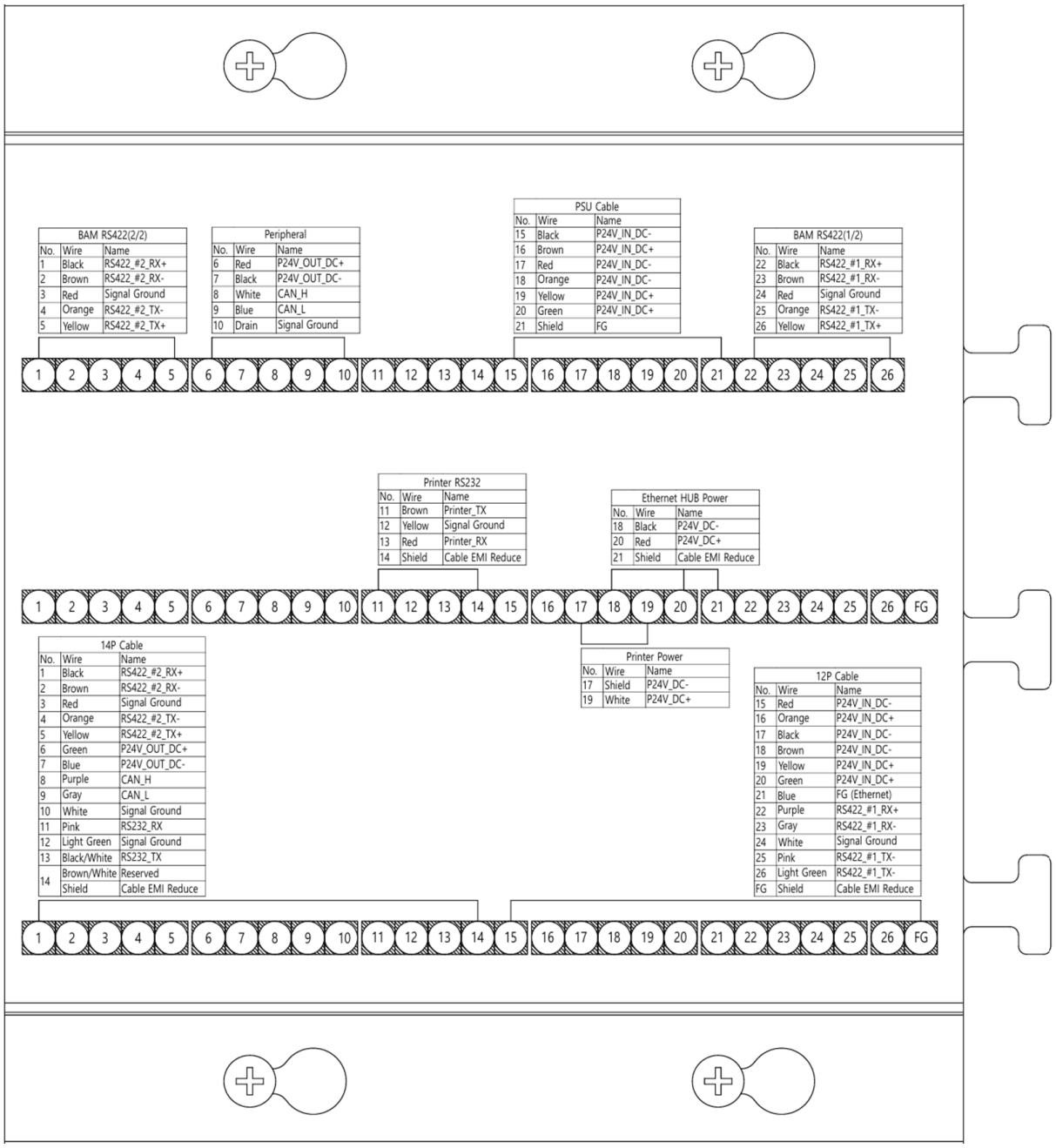
Data Cable(14P) Connection



Power Cable(12P) Connection



Cable Connection Overview



CAN Bus Cable Requirements

The image on the right shows our optional components for C100M GMDSS, used with CAN cables. (Product Codes: LG5422, LG5423, LG5424, corresponding to 25m, 50m, and 100m lengths, respectively)

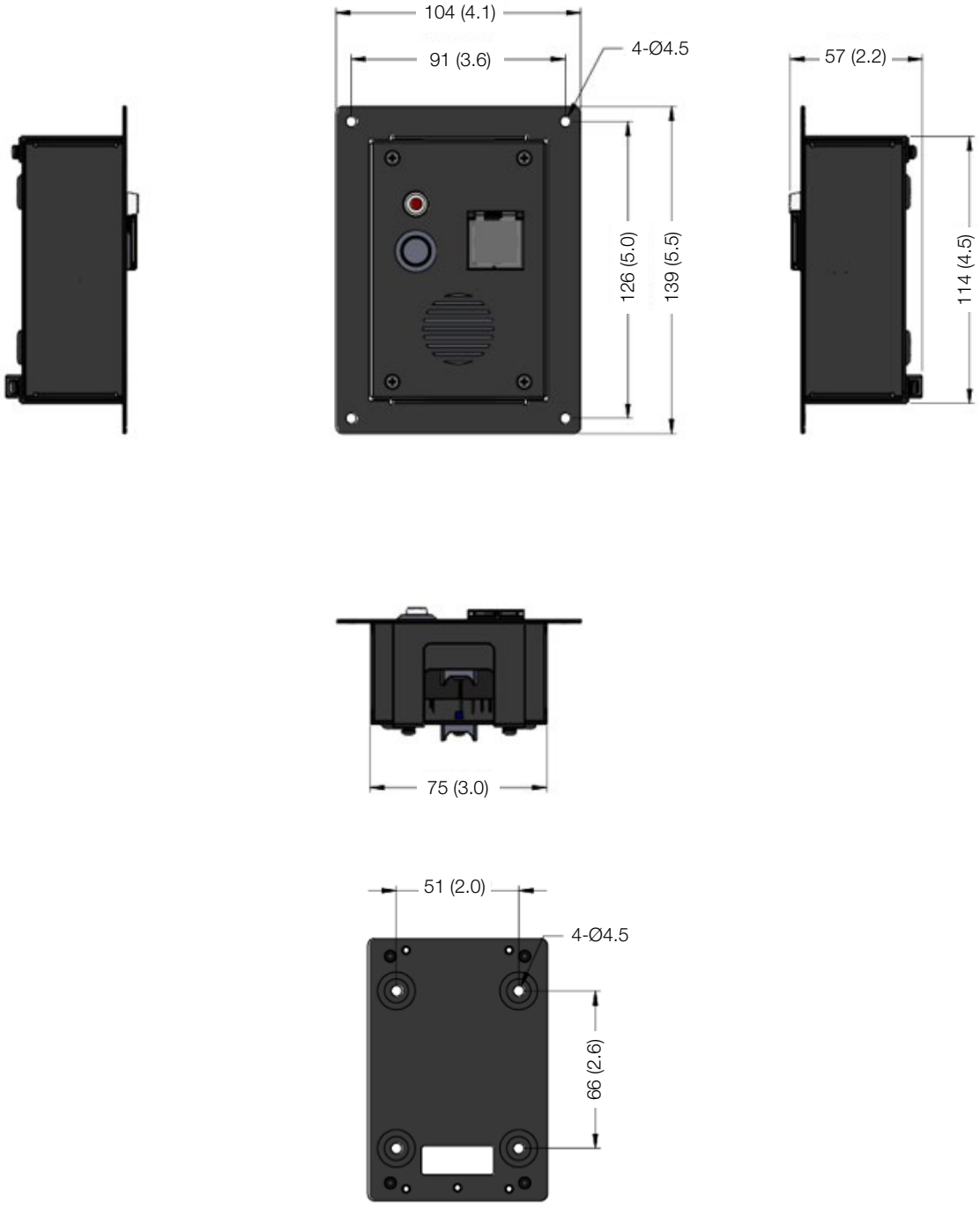
Item	Description
Number of wires	4 (Shield cable not included) The shield cable covers the 4 wires.
Number of conductors	2 (Each conductor consists of 2 wires.)
Shield	Present (The product includes a shield cable.)
Cable type	Twisted pair (To reduce EMI and noise)
Wire size	0.75 mm²

11.2.2 Alarm Box

The Alarm Box is an accessory that transmits a distress alert to the SCU via remote control in distress situations.

Dimensions

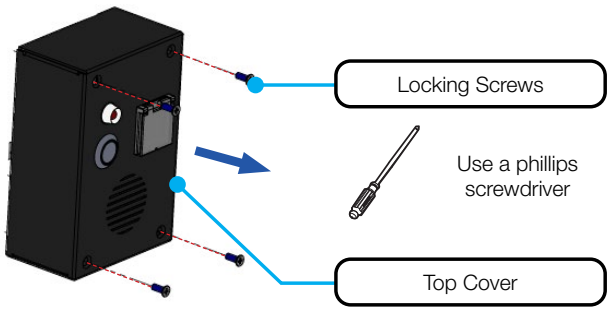
Unit: mm (inch)



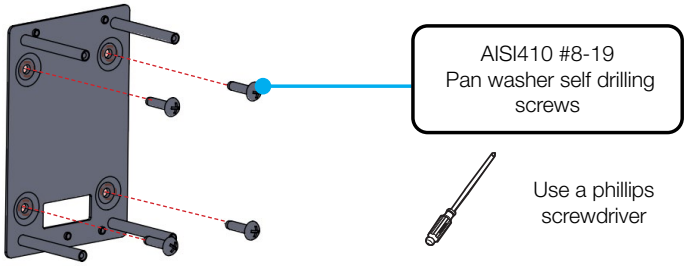
Mounting Alarm Box

- **Bracket Mounting Type**

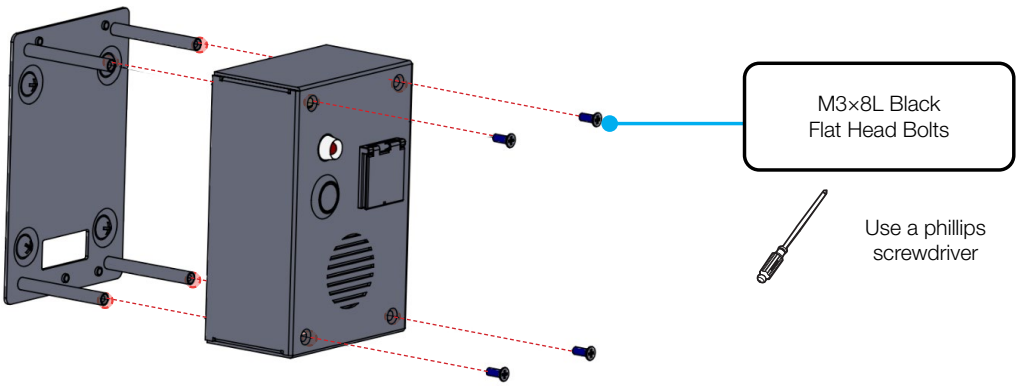
1. Bring the AISI 410 #8-19 Pan washer self-drilling screws(4ea) , M3x8L black phosphate flat head bolts (4ea) from the install kit box.
2. Loosen the locking screws on the top cover of the Alarm box using a Phillips screwdriver, then open the cover.



3. Place the detached rear panel on the wall or desk .
4. Insert the AISI 410 #8-19 Pan washer self-drilling screws(4ea) into the built-in nuts on the rear panel, then tighten them using a Phillips screwdriver.

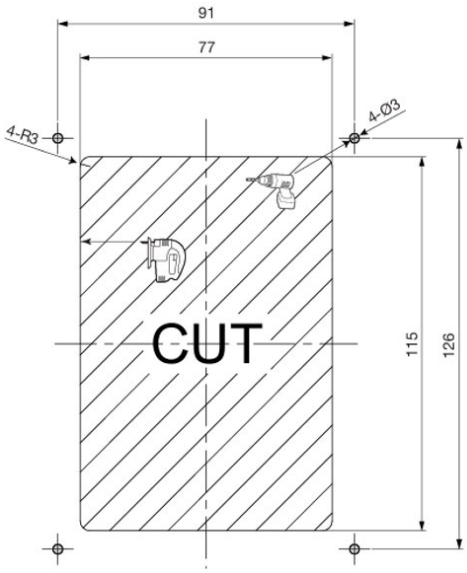


5. Position the top cover of the Alarm box, then secure it by installing the M3×8L black flat head bolts (4ea) using a Phillips screwdriver.

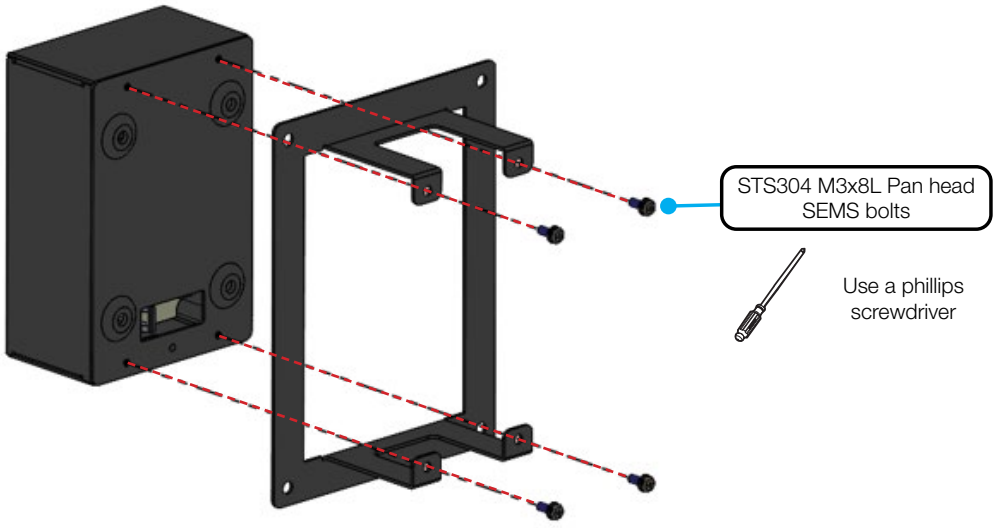


- **Flush Mounting Type**

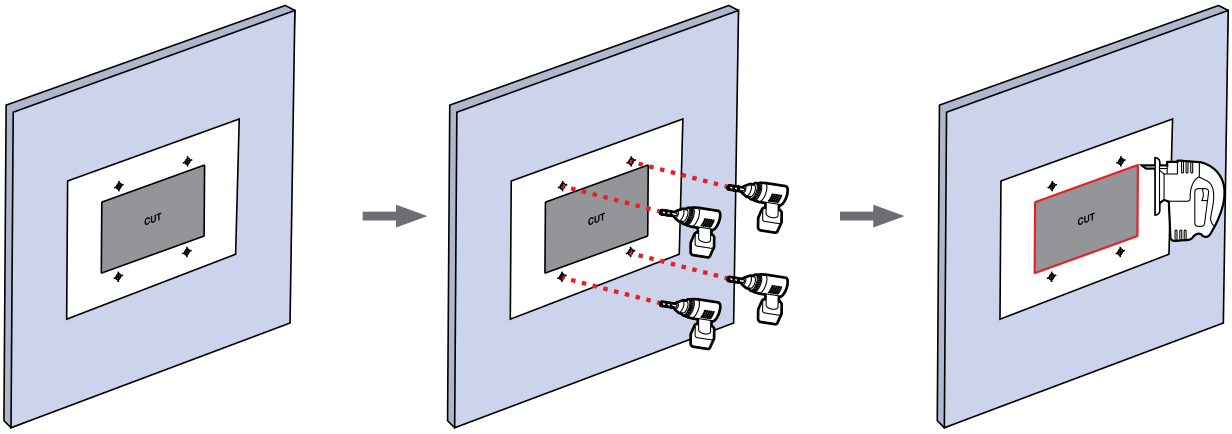
1. Print out the mount template. When printing the mount template, set the print scale to 200% in the print setup.



2. Bring the AISI 410 #8-19 Pan washer self-drilling screws(4ea), STS304 M3x8L Pan head SEMS bolts (4ea) and mount bracket for flush mounting from the install kit box.
3. To assemble the mount bracket to the Alarm box, insert the Alarm box into the mount bracket and secure it using four STS304 M3x8L Pan head SEMS bolts, as shown in the image below. Fully tighten the bolts using a Phillips screwdriver.



4. Secure the template to the ship panel.
5. Drill four 3mm holes using a 3mm drill bit.
6. Using a jigsaw or rotary cutting tool, cut along the inside of the solid line indicated on the template.



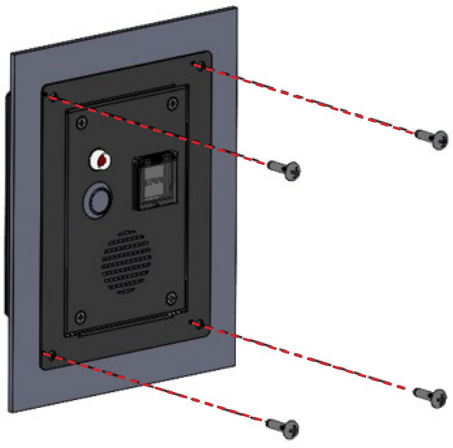
7. Insert the alarm box into the cutout to check the fit.

   Note: If necessary, use a file or sandpaper to adjust the hole size.

8. Remove the template from the mounting surface.
9. Insert the alarm box into the cutout.

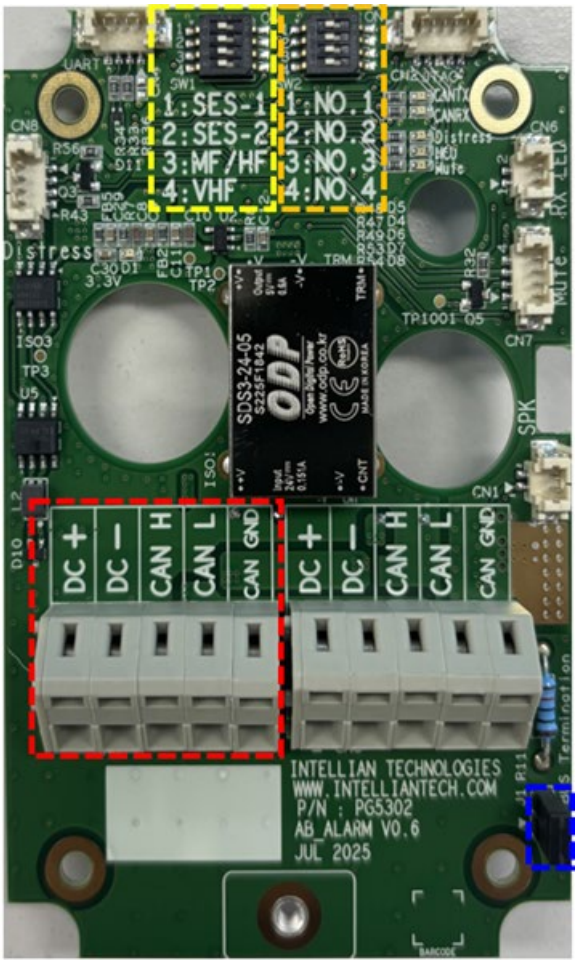
   Note: If access to the back of the alarm box will be restricted after installation, connect all necessary cables to the cradle and secure them with the locking bracket or locking rings before inserting the device.

10. Secure the device to the mounting surface using the included screws.



AB1000 (Alarm Box) CAN Cable Connection

This section details the CAN cable connection procedure for the AB1000 Alarm Box (AB1000) with the JB1000 Junction Box.



- **CAN Network Configuration:**

This connection scenario assumes the CAN network starts with the following sequence: SES1 → JB1000 → AB1000 → etc.

- **Jumper Configuration (Blue Marking):**
  - End of CAN Chain (No further units connected after AB1000): The installer must short the blue marked jumper. (e.g., JB1000 → AB1000: Short the jumper.)
  - Intermediate Unit in CAN Chain (Further units connected after AB1000): The installer must leave the blue marked jumper open. (e.g., JB1000 → AB1000 → SB7000A: Leave the jumper open.) (Reference: The jumper is shown in the short position in the image above.)
- **Connector Connectivity (Red Marking and Another Connector):**

The connectors marked in red and the other specified connector, each containing 5 ports, are electrically connected internally. For example, CAN H on Connector 1 is electrically connected to CAN H on Connector 2.

- **Cable Connection:**

The installation engineer can connect the cables to either of the 2 available connectors.

Important: Ensure that the entire CAN unit is connected in a serial (daisy-chain) configuration.

- **GMDSS Equipment Configuration (Yellow Marked Switch):**

To distinguish which GMDSS equipment is connected to the AB1000, about the yellow marked one, set the ID by moving one switch to the right that corresponds with the desired ID, while ensuring the other switches are in the left position.

- 1: SES-1
- 2: SES-2
- 3: MF/HF
- 4: VHF

- **AB1000 Unit Number Configuration (Orange Marked Switch):**

To distinguish the number of the AB1000 unit itself (in case of multiple AB1000 units connected within the CAN network), about the orange marked one, set the ID by moving one switch to the right that corresponds with the desired ID, while ensuring the other switches are in the left position. If multiple AB1000 units are included in the CAN network, differentiate their numbers.

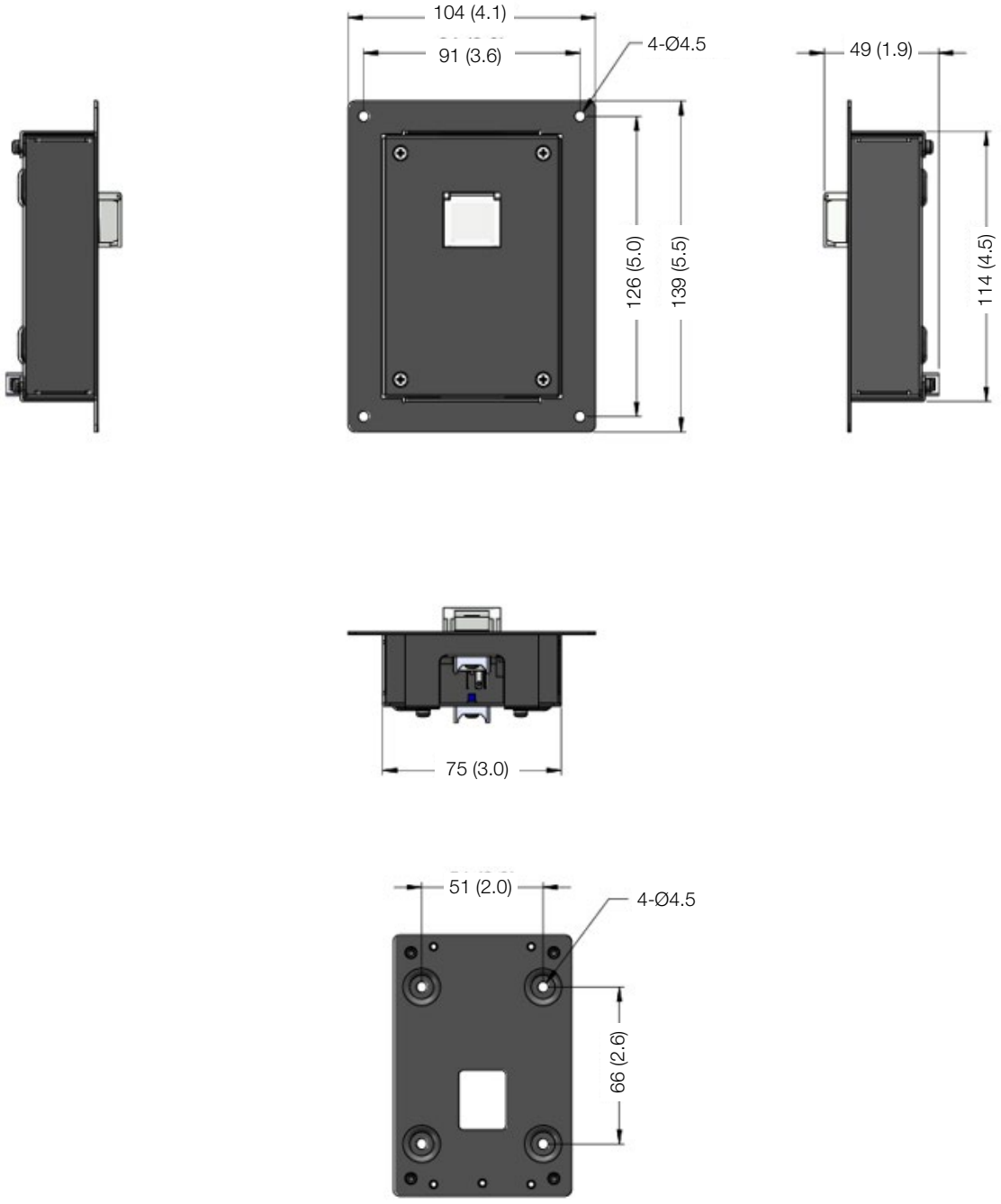
- 1: NO.1
- 2: NO.2
- 3: NO.3
- 4: NO.4 - Reserved (Not in use)

11.2.3 SSAS Box

This accessory is used to execute the SSAS (Ship Security Alert System) function. It has two types of boxes: a SSAS Box Alert for sending SSAS alerts and a SSAS Box Test to check if the system is operating normally. The C100M GMDSS can connect to a total of 4 SSAS boxes (3 SSAS Box Alerts and 1 SSAS Box Test).

Dimensions

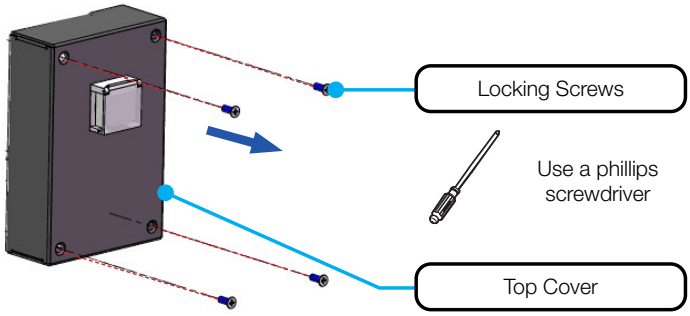
Unit: mm



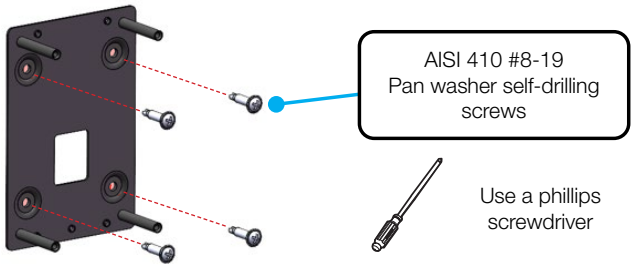
Mounting SSAS Box

- **Bracket Mounting Type**

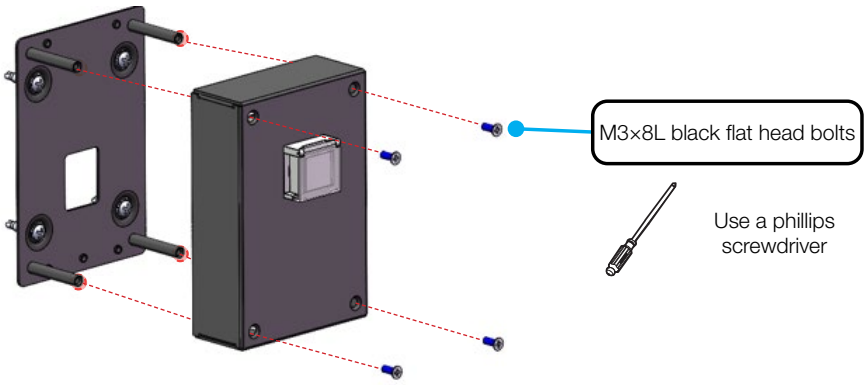
1. Bring the AISI 410 #8-19 Pan washer self-drilling screws(4ea) , M3x8L black phosphate flat head bolts (4ea) from the install kit box.
2. Loosen the locking screws on the top cover of the SSAS box using a Phillips screwdriver, then open the cover.



3. Place the detached rear panel on the wall or desk
4. Insert the AISI 410 #8-19 Pan washer self-drilling screws(4ea) into the built-in nuts on the rear panel, then tighten them using a Phillips screwdriver.

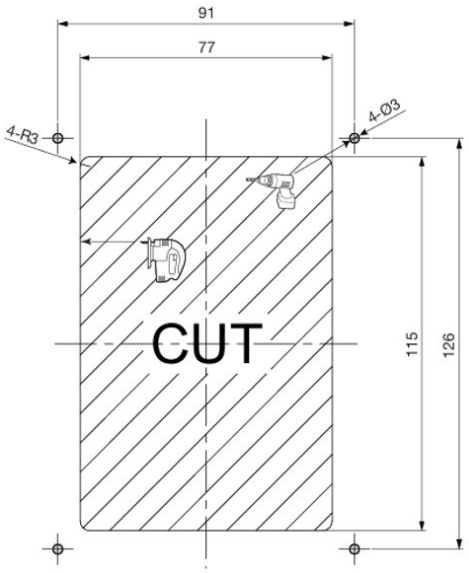


5. Position the top cover of the SSAS box, then secure it by installing the M3×8L black flat head bolts (4ea) using a Phillips screwdriver.

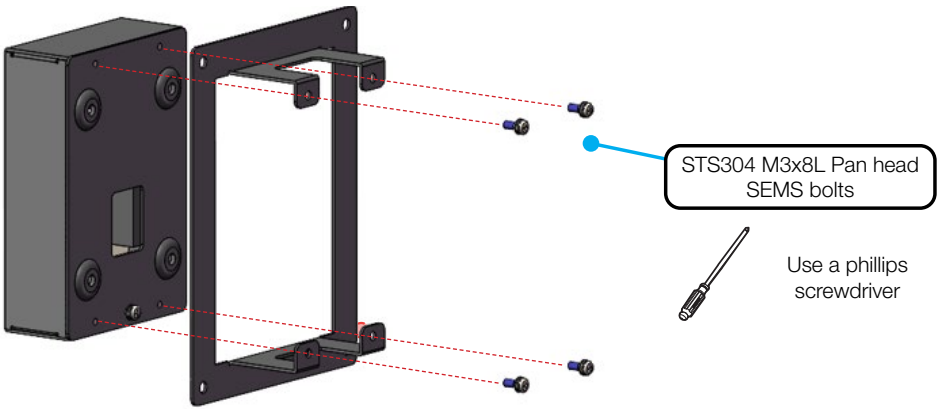


- **Flush Mounting Type**

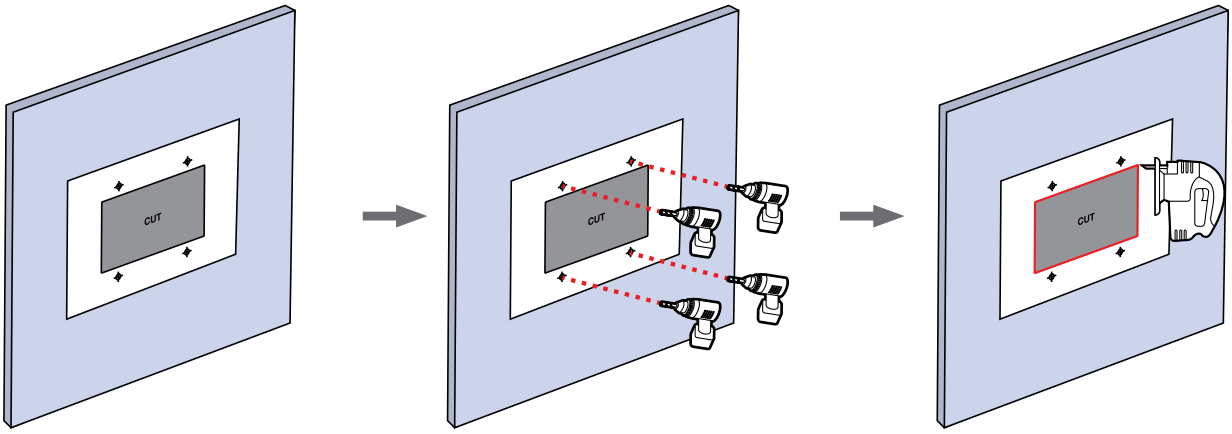
1. Print out the mount template. When printing the mount template, set the print scale to 200% in the print setup.



2. Bring the AISI 410 #8-19 Pan washer self-drilling screws(4ea), STS304 M3x8L Pan head SEMS bolts (4ea) and mount bracket for flush mounting from the install kit box.
3. To assemble the mount bracket to the SSAS box, insert the SSAS box into the mount bracket and secure it using four STS304 M3x8L Pan head SEMS bolts, as shown in the image below. Fully tighten the bolts using a Phillips screwdriver.



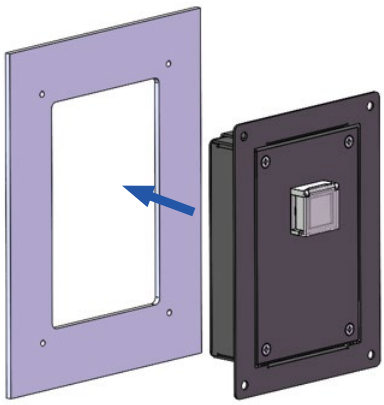
4. Secure the template to the ship panel.
5. Drill four 3mm holes using a 3mm drill bit.
6. Using a jigsaw or rotary cutting tool, cut along the inside of the solid line indicated on the template.



7. Insert the SSAS box into the cutout to check the fit.

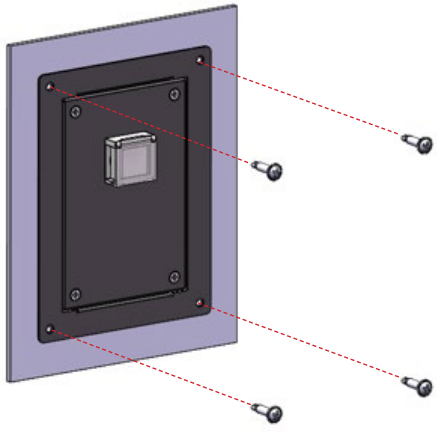
   Note: If necessary, use a file or sandpaper to adjust the hole size.

8. Remove the template from the mounting surface.
9. Insert the SSAS box into the cutout.



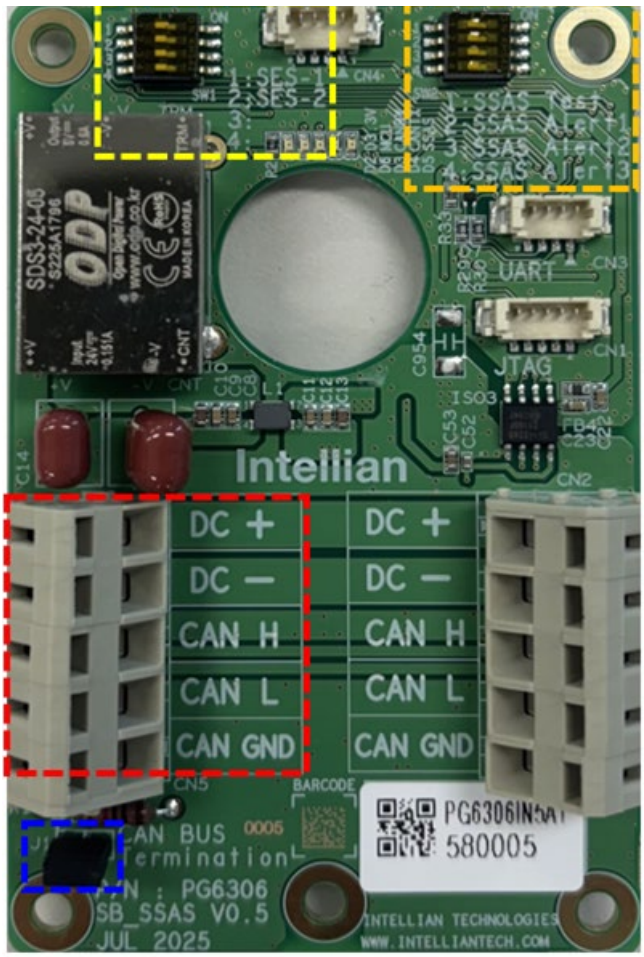
   Note: If access to the back of the SSAS box will be restricted after installation, connect all necessary cables to the cradle and secure them with the locking bracket or locking rings before inserting the device.

10. Secure the device to the mounting surface using the included screws.



SB7000A/T (SSAS Box) CAN Cable Connection

This section details the CAN cable connection procedure for the SB7000A/T (SSAS Box) with the JB1000 Junction Box.



- **CAN Network Configuration:**

This connection scenario assumes the CAN network consists of the following sequence: SES1 → JB1000 → SB7000A/T → etc.

- **Jumper Configuration (Blue Marking):**
  - End of CAN Chain (No further units connected after SB7000A/T): The installer must short the blue marked jumper. (e.g., JB1000 → SB7000A/T: Short the jumper.)
  - Intermediate Unit in CAN Chain (Further units connected after SB7000A/T): The installer must leave the blue marked jumper open. (e.g., JB1000 → SB7000A/T → AB1000: Leave the jumper open.) (Reference: The jumper is shown in the short position in the image above.)
- **Connector Connectivity (Red Marking and Another Connector):**

The connectors marked in red and the other specified connector, each containing 5 ports, are electrically connected internally. For example, CAN H on Connector 1 is electrically connected to CAN H on Connector 2.

- **Cable Connection:**

The installation engineer can connect the cables to either of the 2 available connectors.

Important: Ensure that the entire CAN unit is connected in a serial (daisy-chain) configuration.

- **SCU7000C Number Configuration (Yellow Marked Switch):**

To distinguish the number of the SCU7000C units connected to the SB7000A/T, about the yellow marked one, set the ID by moving one switch to the right that corresponds with the desired ID, while ensuring the other switches are in the left position.

  - 1: SES-1
  - 2: SES-2

- **SB7000A/T Unit Number Configuration (Orange Marked Switch):**

To distinguish the number of the SB7000A/T unit itself (in case of multiple SB7000A/T units connected within the CAN network), about the oranged marked one, set the ID by moving one switch to the right that corresponds with the desired ID, while ensuring the other switches are in the left position. If multiple SB7000A/T units are included in the CAN network, differentiate their numbers.

✓Button Identification:

  - SB7000A: Uses a red Alert button.
  - SB7000T: Uses a green Test button.

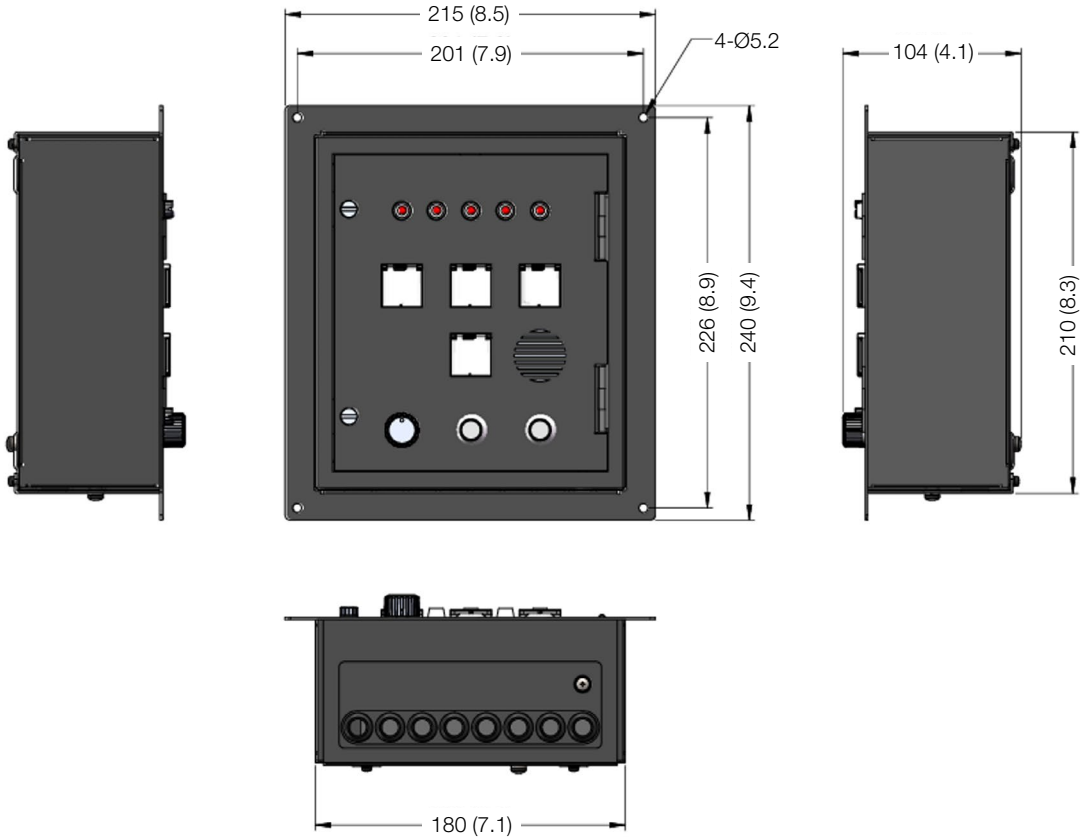
✓Switch Positions:

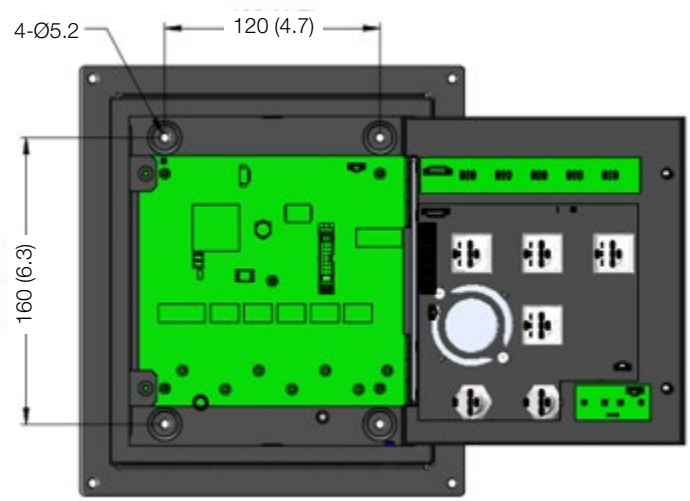
  - 1: SSAS Test
  - 2: SSAS Alert 1
  - 3: SSAS Alert 2
  - 4: SSAS Alert 3

11.2.4 Alarm Unit

Dimensions

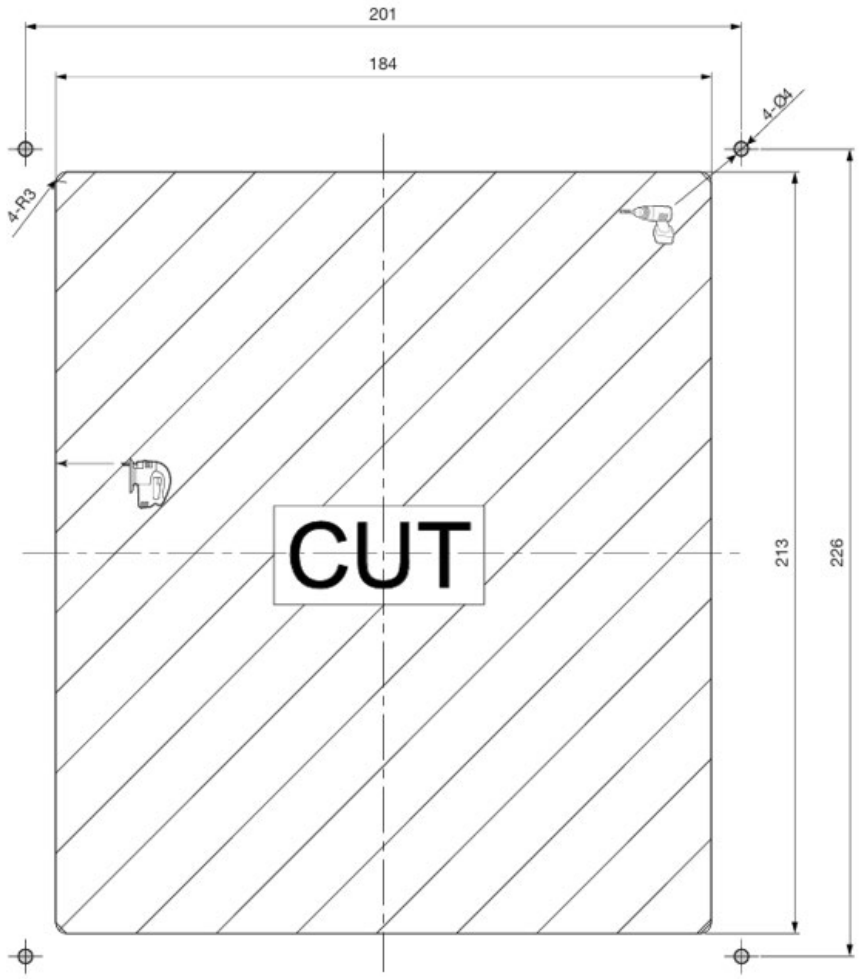
Unit: mm



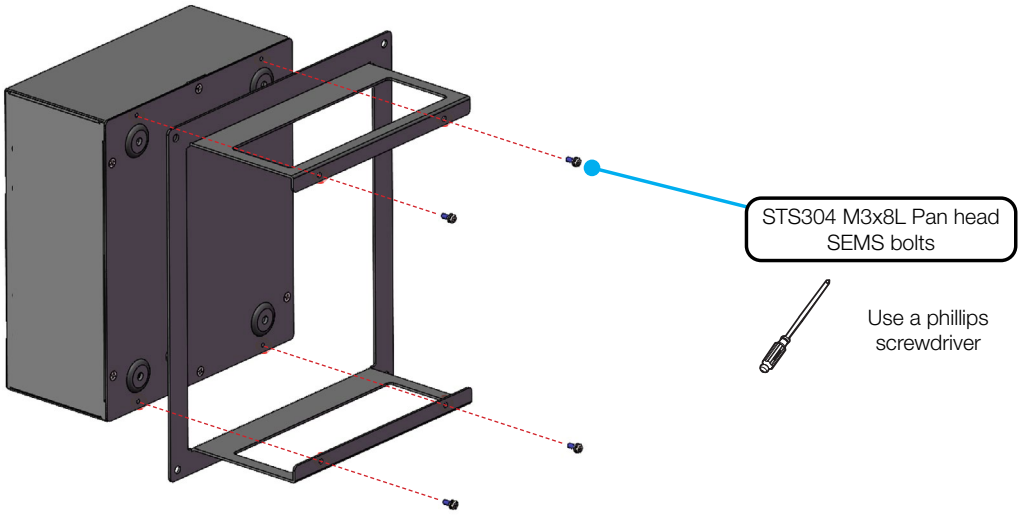


Mounting Alarm Unit

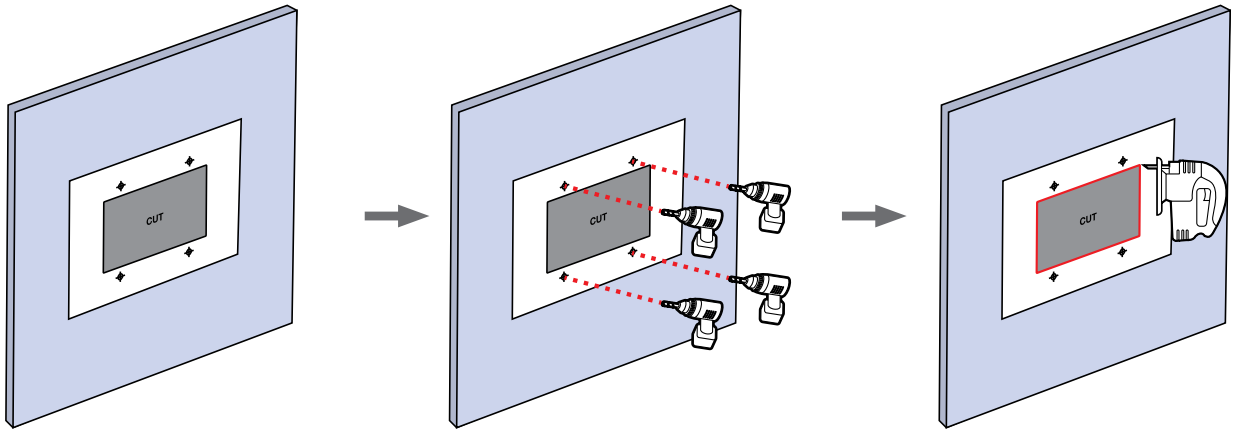
1. Print out the mount template. When printing the mount template, set the print scale to 200% in the print setup.



2. Bring the AISI 410 #10-19 Pan washer self-drilling screws(4ea), STS304 M3x8L Pan head SEMS bolts (4ea) and mount bracket for flush mounting from the install kit box.
3. To assemble the mount bracket to the Alarm Unit, insert the Alarm Unit into the mount bracket and secure it using four STS304 M3x8L Pan head SEMS bolts, as shown in the image below. Fully tighten the bolts using a Phillips screwdriver.

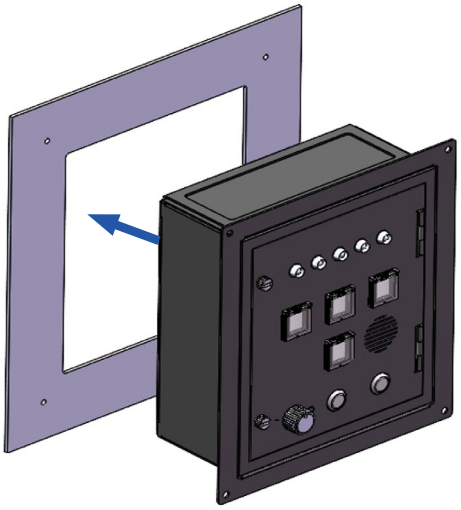


4. Secure the template to the ship panel.
5. Drill four 4mm holes using a 4mm drill bit.
6. Using a jigsaw or rotary cutting tool, cut along the inside of the solid line indicated on the template.



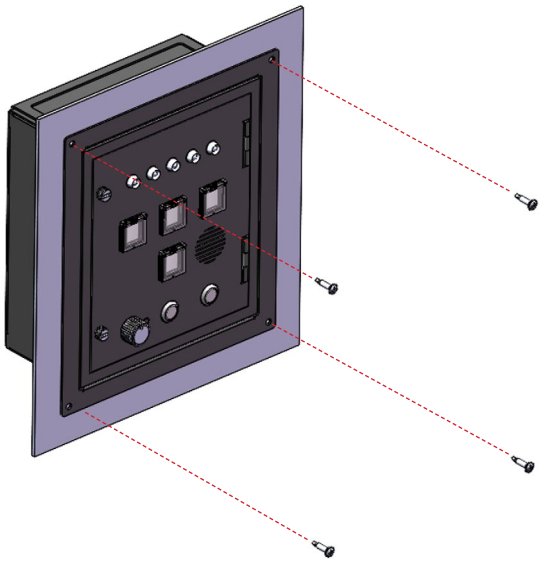
7. Insert the Alarm Unit into the cutout to check the fit.

   Note: If necessary, use a file or sandpaper to adjust the hole size.
8. Remove the template from the mounting surface.
9. Insert the Alarm Unit into the cutout.



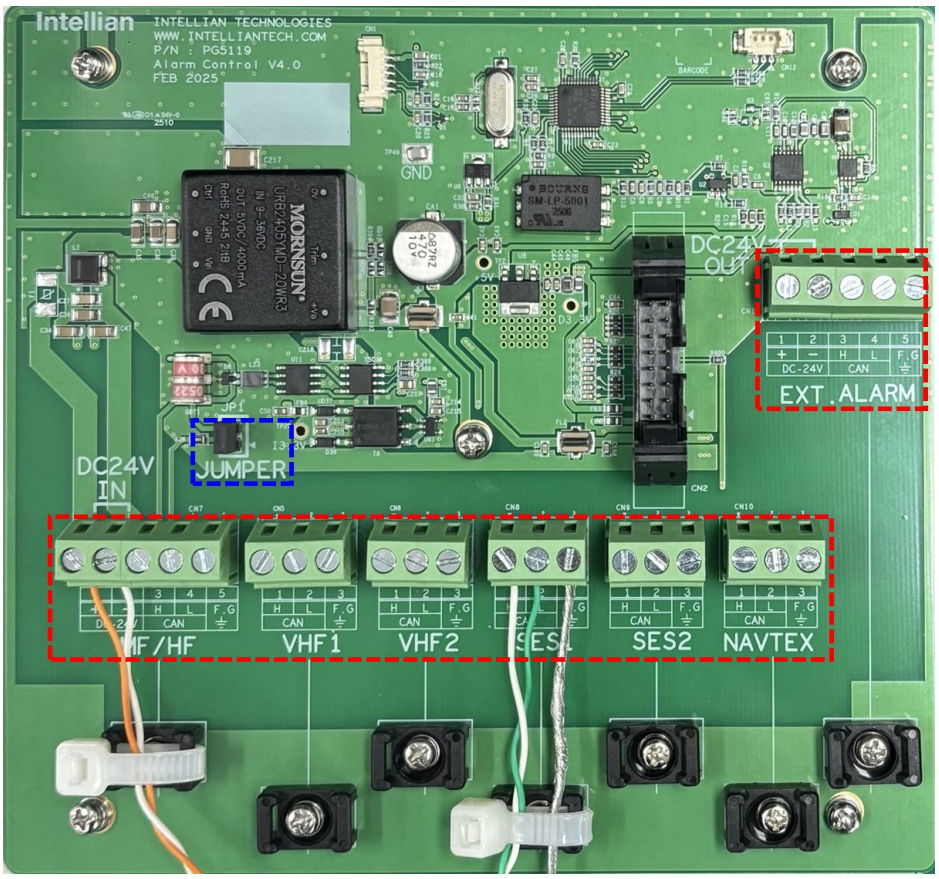
Note: If access to the back of the Alarm Unit will be restricted after installation, connect all necessary cables to the cradle and secure them with the locking bracket or locking rings before inserting the device.

10.Secure the device to the mounting surface using the included screws.



Alarm Unit (AU1000) CAN Cable Connection

This section details the CAN cable connection procedure for the AU1000 Alarm Unit (AU1000) with the JB1000 Junction Box.



- **CAN Network Configuration:**

This assumes the CAN network starts with the sequence: SES1 → JB1000 → AU1000.

- **Jumper Configuration (Blue box):**
  - If AU1000 is the last unit in the CAN chain: Short the blue marked jumper. (e.g., JB1000 → AU1000: Short the jumper.)
  - If further units are connected after AU1000: Leave the blue marked jumper open. (e.g., JB1000 → AU1000 → SB7000A: Leave the jumper open.) (Reference: The jumper is shown in the shorted position in the image below.)
- **Connector Connectivity (Red box):**

The red marked connectors, each with 3 or 5 ports (+, -, CAN H, CAN L, F.G), are internally connected. For example, the CAN H port on VHF1 is electrically connected to the CAN H port on SES1.

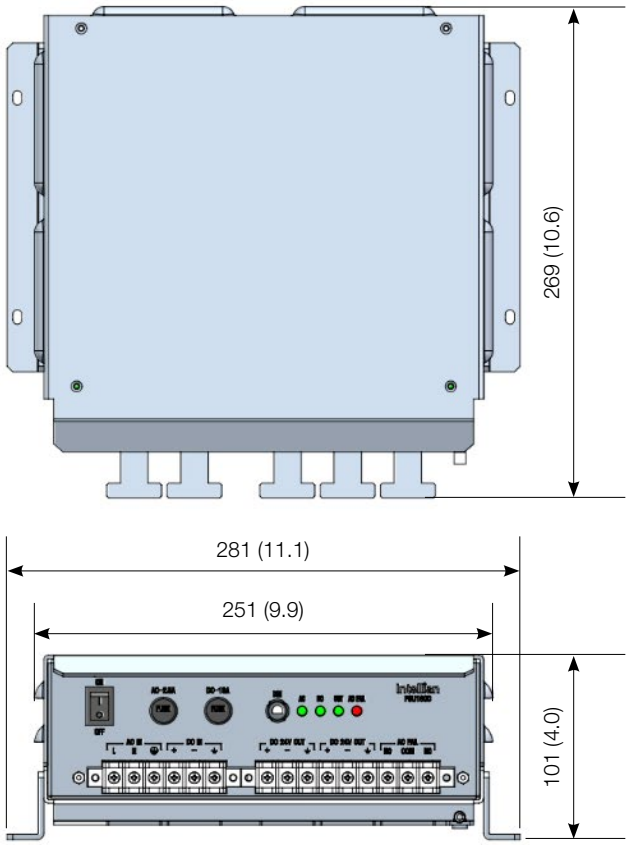
- **Connection Procedure:**

1. Connect the CAN cable to one of the 7 available connectors on the AU1000, depending on the GMDSS equipment being connected.
2. Ensure the entire CAN unit is connected in a serial (daisy-chain) configuration.

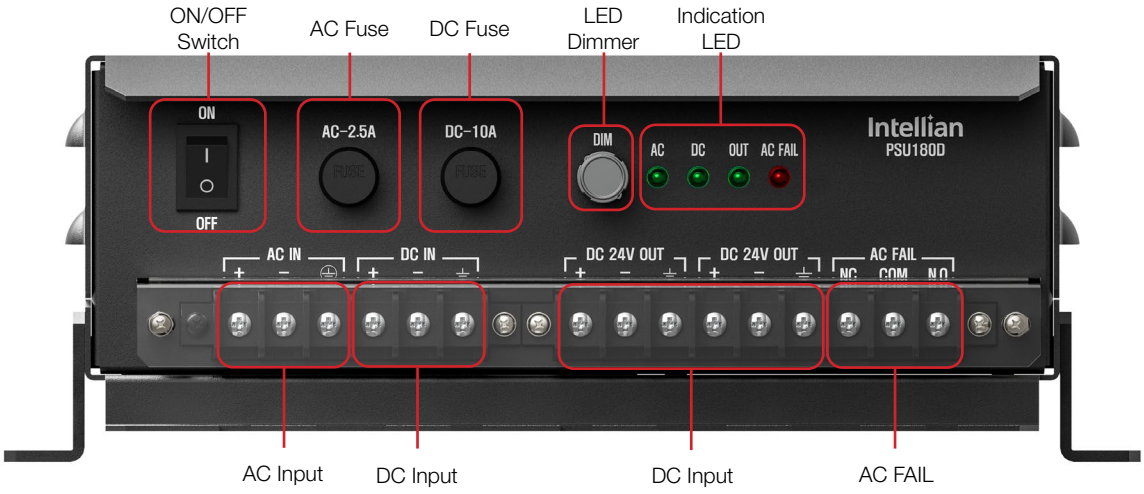
11.2.5 Power Supply (PSU-180D)

Dimensions

Unit: mm (inch)



Power Supply Description



1. PSU Operating Condition

- The priority order of applied voltage shall prioritize AC power input
- When AC power fails, it shall automatically switch to DC input, and there shall be no change in output voltage during this transition. (Power must not shut off even under full-load conditions)
- When AC power is restored, the DC input shall stop and automatically switch back to AC input.
- There shall be no abnormalities during 12 hours of continuous operation under full-load conditions.

2. Input / Output Power Indicators

- AC Input Power Operation: AC LED-ON (GREEN)
- DC(or Battery) Input Power Operation : DC LED-ON(GREEN)
- DC Power Normal Output Operation : DC LED-ON(GREEN)
- LED brightness must be adjustable using a dimmer volume control

3. Alarm Function

- Operating Condition
  - When AC Input is absent (Failure)
- DC Power Normal Output Operation : DC LED-ON(GREEN)
  - Fault Alarm(Display): AC FAIL LED-ON(RED)
  - Fault Alarm(Contact Signal) : Relay Contact Output

Electrical Specification

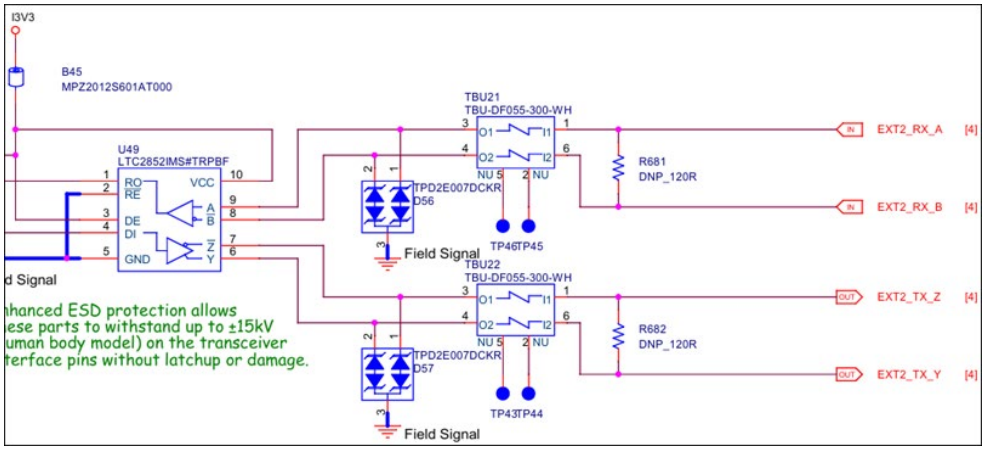
Description		Specification	Remark
AC INPUT	Rated Input Voltage	Single Phase 220V	
	Input Voltage Tolerance Range	90 ~ 264Vac	
	Input Frequency Tolerance Range	45~65Hz	
	Input Current	2.5A or less	Typical
	Leakage Current	2.0mA or less	Typical
	Inrush Current	50A or less	Typical
DC INPUT	Rated Input Voltage	24Vdc	
	Input Voltage Range	21.6~31.2Vdc	
	Input Current	11A or less	Typical
OUTPUT SPECIFICATION	Rated Output Voltage	24Vdc	Based on 50% Load
	Rated Output Stability	23.76~24.24Vdc	Based on 50% Load
	Output Voltage Range	23.76~24.24Vdc	
	Efficiency	80% or more	Same for both AC, DC device
	Max Output Current (Power)	7.5A(180W)	
	Overcurrent Limitation	101~130% of rated current	Output standard 7.58~9.75A
	Noise Voltage Peak Value	250mV or less	100% load condition

11.3 BAM Alert List

Alert Identifier	Title
3013	Doubtful pos
3016	Lost position
3062	System fault
3062	Printer fault
3079	Paper low
3116	Lost connection
3122	Distress Rx
3122	Urgency Rx
3122	Distress missed
3122	Urgency missed
3123	MSI Rx
3123	Safety Rx
3123	Safety missed
3079	Storage low
12001	Invalid antenna
12002	Lost handset
12002	Lost antenna ADU
12002	Lost alarm box
12002	Lost alarm unit
12002	Lost SSAS box
12201	Invalid SIM card
12202	Lost SIM card
21002	GMDSS fault
21003	Invalid alarm box
21003	Invalid alarm unit
21003	Invalid SSAS box
22002	Safety Tx fail

11.4 RS422-1, RS422-2 Hardware Specification

11.4.1 Transceiver (listener/Talker) schematic



11.4.2 Transceiver (listener/Talker) Electrical Characteristics

SYMBOL	PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
Driver							
$\|V_{OD}\|$	Differential Driver Output Voltage	R = ∞, V_{CC} = 3V (Figure 1)	●			V_{CC}	V
		R = 27Ω, V_{CC} = 3V (Figure 1)	●	1.5		V_{CC}	V
		R = 50Ω, V_{CC} = 3.13V (Figure 1)	●	2		V_{CC}	V
$\Delta\|V_{OD}\|$	Difference in Magnitude of Driver Differential Output Voltage for Complementary Output States	R = 27Ω or 50Ω (Figure 1)	●			0.2	V
V_{OC}	Driver Common Mode Output Voltage	R = 27Ω or 50Ω (Figure 1)	●			3	V
$\Delta\|V_{OC}\|$	Difference in Magnitude of Driver Common Mode Output Voltage for Complementary Output States	R = 27Ω or 50Ω (Figure 1)	●			0.2	V
I_{OZD}	Driver Three-State (High Impedance) Output Current on Y and Z	DE = 0V, (Y or Z) = –7V, 12V (LTC2852)	●			±10	µA
		H-Grade	●			±50	µA
I_{OSD}	Maximum Driver Short-Circuit Current	–7V ≤ (Y or Z) ≤ 12V (Figure 2)			±180	±250	mA
			●	–250		300	mA
Receiver							
I_{IN}	Receiver Input Current (A, B)	DE = TE = 0V, V_{CC} = 0V or 3.3V, V_{IN} = 12V (Figure 3) (C, I-Grade)	●			125	µA
		DE = TE = 0V, V_{CC} = 0V or 3.3V, V_{IN} = –7V, (Figure 3) (C, I-Grade)	●	–100			µA
		DE = TE = 0V, V_{CC} = 0V or 3.3V, V_{IN} = 12V (Figure 3) (H-Grade)	●			250	µA
		DE = TE = 0V, V_{CC} = 0V or 3.3V, V_{IN} = –7V, (Figure 3) (H-Grade)	●	–145			µA
R_{IN}	Receiver Input Resistance	$\overline{RE}$ = V_{CC} or 0V, DE = TE = 0V, V_{IN} = –7V, –3V, 3V, 7V, 12V (Figure 3) (C, I-Grade)	●	96	125		kΩ
		$\overline{RE}$ = V_{CC} or 0V, DE = TE = 0V, V_{IN} = –7V, –3V, 3V, 7V, 12V (Figure 3) (H-Grade)	●	48	125		kΩ
V_{TH}	Receiver Differential Input Threshold Voltage	–7V ≤ B ≤ 12V	●			±0.2	V
ΔV_{TH}	Receiver Input Hysteresis	B = 0V			25		mV
V_{OH}	Receiver Output High Voltage	I(RO) = –4mA, A-B = 200mV, V_{CC} = 3V	●	2.4			V
V_{OL}	Receiver Output Low Voltage	I(RO) = 4mA, A-B = –200mV, V_{CC} = 3V	●			0.4	V
I_{OZR}	Receiver Three-State (High Impedance) Output Current on RO	$\overline{RE}$ = V_{CC}, 0V ≤ RO ≤ V_{CC} (LTC2850, LTC2852)	●			±1	µA
I_{OSR}	Receiver Short-Circuit Current	0V ≤ RO ≤ V_{CC}	●			±85	mA
Logic							
V_{IH}	Logic Input High Voltage	V_{CC} = 3.6V	●	2			V
V_{IL}	Logic Input Low Voltage	V_{CC} = 3V	●			0.8	V
I_{INL}	Logic Input Current		●		0	±10	µA

11.4.3 Driver (Output) Characteristics

The driver provides full RS485/RS422 compatibility.

When enabled, if DI is high, Y-Z is positive for the full-duplex devices (LTC2851, LTC2852) and A-B is positive for the half-duplex device (LTC2850). When the driveris disabled, both outputs are high impedance.

For the full-duplex devices, the leakage on the driver output pins is guaranteed to be less than 10µA over the entire common mode range of –7V to 12V. On the half duplex LTC2850, the impedance is dominated by the receiver input resistance, RIN.

The driver outputs are protected from short-circuits to any voltage within the Absolute Maximum range of (VCC – 15V) to 15V. The typical peak current in this condition does not exceed 180mA. If a high driver output is shorted to a voltage just above VCC, a reverse current will flow into the supply. When this voltage exceeds VCC by about 1.4V, the reverse current turns off. Preventing the driver from turning off with outputs shorted to output voltages just above VCC keeps the driver active even for receiver loads that have a positive common mode with respect to the driver a valid condition. The worst-case peak reverse short-circuit current canbe as high as 300mA in extreme cold conditions. If this current can not be absorbed by the supply, a 3.6V Zener diode can be added in parallel with the supply to sink this current. All devices also feature thermal shutdown protection that disables the driver and receiver in case of excessive power dissipation

1. Differential Output Voltage ($|\boldsymbol{V_{OD}}|$)
   This measures the strength of the signal across the differential outputs.
   - Conditions: It is tested under three load scenarios: no load (R = ∞), a 27Ω load (simulating a heavily loaded bus), and a 50Ω load.
   - Performance: With a standard load, the driver is guaranteed to provide at least 1.5V of differential swing, ensuring a clear signal even over long cable.

1. Output Balance ($\Delta||\boldsymbol{V_{OD}}||$ and $\Delta|\boldsymbol{V_{OC}}|$)
   This measures the strength of the signal across the differential outputs.
   - $\Delta|\boldsymbol{V_{OD}}|$: The difference in signal magnitude between a “High” state and a “Low” state must not exceed 0.2V.
   - $\Delta|\boldsymbol{V_{OC}}|$: The change in the common-mode voltage when switching states is also limited to 0.2V This balance is critical for minimizing electromagnetic interference.

2. Common Mode Output Voltage ($\boldsymbol{V_{OC}}$)
   This is the average voltage of the two output lines relative to ground.
   - The table specifies that this remains at or below 3V.

3. Three-State Output Current ($\boldsymbol{I_{OZD}}$)
   This represents the “leakage” current when the driver is disabled (put into a High-Impedance state by setting (DE = 0V).
   - For standard grades, the leakage is a very low ±10µA.
   - For the H-Grade (High Temperature), this limit increases to ±50µA.

4. Maximum Short-Circuit Current ($\boldsymbol{I_{OSD}}$)
   This is a protective specification.
   - If the output pins are accidentally shorted to a voltage source ranging from
   - The current is typically limited to ±180mA, with an absolute maximum limit of 250mA (or 300mA for certain conditions).

11.4.4 Receiver (Input) Characteristics

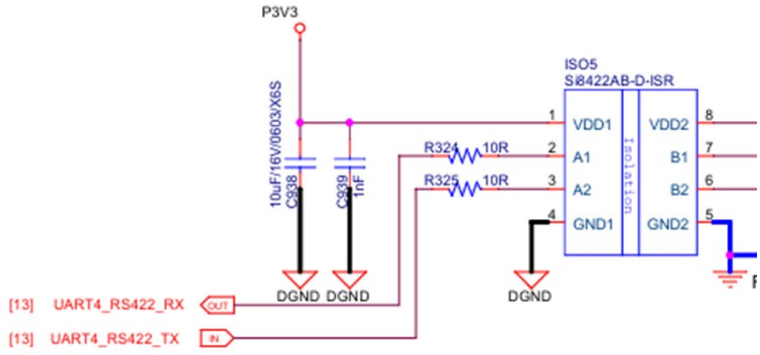
With the receiver enabled, when the absolute value of the differential voltage between the A and B pins is greater than 200mV, the state of RO will reflect the polarity of (A-B) These parts have a failsafe feature that guarantees the receiver output to be in a logic-high state when the inputs are either shorted, left open, or terminated but not driven. This failsafe feature is guaranteed to work for inputs spanning the entire common mode range of –7V to 12V. The receiver output is internally driven high (to VCC) or low (to ground) with no external pull-up needed. When the receiver is disabled the RO pin becomes Hi-Z with leakage of less than ±1μA for voltages within the supply range.

The receiver input resistance from A or B to ground is guaranteed to be greater than 96k (C-, I-grade). This is 8x higher than the requirements for the RS485 standard and thus this receiver represents a one-eighth unit load. This, in turn, means that 8x the standard number of receivers, or 256 total, can be connected to a line without loading it beyond what is specified in the RS485 standard. The receiver input resistance from A or B to ground on high temperature H-grade parts is greater than 48k providing a one-quarter unit load. The high input resistance of the receiver is maintained whether it is enabled or disabled, powered or unpowered.

1. Input Load and Impedance Specifications
   These parameters define the electrical load the receiver places on the RS485 bus.
   - I_{IN} (Receiver Input Current): This is the current flowing into or out of the pins when the input voltage (V_{IN}) is 12V or -7V. Lower values indicate less burden on other devices on the bus.
   - R_{IN} (Receiver Input Resistance): This represents the input impedance of the receiver.
     · C- and I-Grades: The resistance is at least 96kΩ, which is 8 times higher than a standard RS485 unit load. This “1/8 Unit Load” characteristic allows for up to 256 nodes on a single bus.
     · H-Grade: The high-temperature grade has a minimum resistance of 48kΩ (1/4 Unit Load).
2. Signal Sensitivity and Noise Immunity
   - V_{TH} (Differential Input Threshold Voltage): This is the voltage difference required for the receiver to recognize a signal as “High” or “Low”. It is guaranteed to be within ±0.2V. Specifically, if pin A is at least 200mV higher than pin B, the output is High; if it is 200mV lower, the output is Low.
   - ΔV_{TH} (Receiver Input Hysteresis): The device implements approximately 25mV of hysteresis. This prevents the output from “chattering” or oscillating due to small amounts of noise on the signal.
3. Output Levels and Protection
   - V_{OH}/V_{OL} (Receiver Output Voltage): These are the voltages at the output pin (RO). At a 3.3V supply, a High output is at least 2.4V and a Low output is no more than 0.4V, ensuring reliable communication with logic circuits.
   - I_{OZR} (Three-State Output Current): When the receiver output is disabled (RE is High), the leakage current is extremely low, at less than ±1μA.
   - I_{OSR} (Receiver Short-Circuit Current): If the RO pin is accidentally shorted to ground or the supply, the current is limited to ±85μA (Typical) to protect the chip from damage.

11.4.5 Electrical isolation

1. Data Isolation



The description of the part with reference number ISO5 (Si8422AB-ISR) in the above circuit is as follows: A low-power, single- and dual-channel digital isolator, a CMOS device that offers significant data transmission speed, propagation delay, power, size, reliability, and external BOM advantages over existing isolation technologies.

It includes a selectable fail-safe operation mode that controls the default output state during a power failure and a selection of insulation ratings (up to 5kV). This part is safety certified by UL, CSA, and VDE, and the wide package product supports reinforced insulation up to 5kVRMS.

Safety Regulatory Approvals

- UL 1577 recognized
  - Up to 5000 V_{RMS} for 1 minute
- CSA component notice 5A approval
  - IEC 60950-1, 61010-1, 60601-1 (reinforced insulation)
- VDE certification conformity
  - IEC 60747-5-5 (VDE0884 Part 5)
  - EN60950-1 (reinforced insulation)

The operation method is as follows:

This component operates similarly to the operation of an optocoupler, but the RF carrier is modulated instead of light

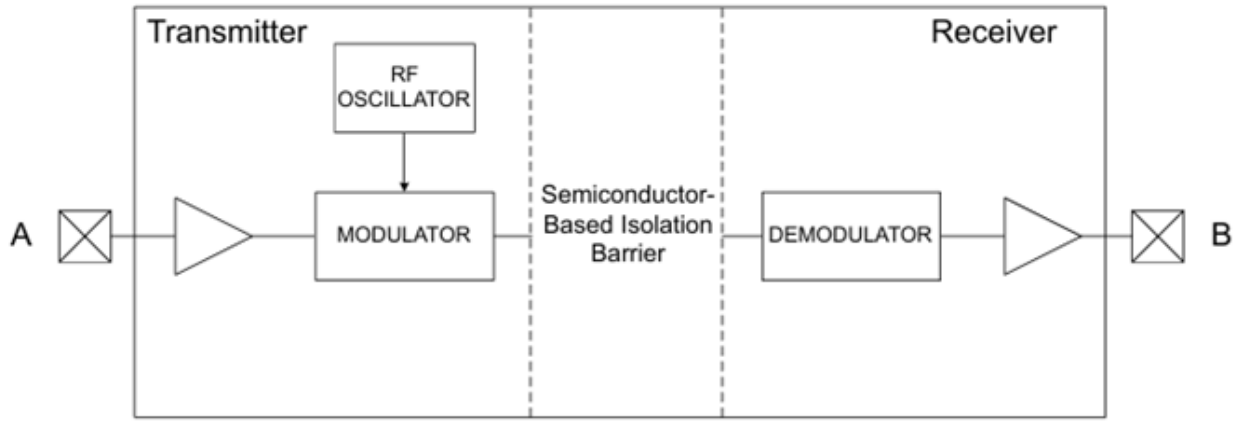


Figure 3.1. Simplified Channel Diagram

The internal structure consists of an RF transmitter and an RF receiver separated by an insulation barrier. Referring to the transmitter, input A modulates the carrier provided by the RF generator using on/off keying. The receiver includes a demodulator that decodes the input state based on the RF energy content and applies the result to output B via the output driver. This RF on/off keying method is superior to the pulse code method as it provides best-in-class noise immunity, low power consumption, and better magnetic field immunity.

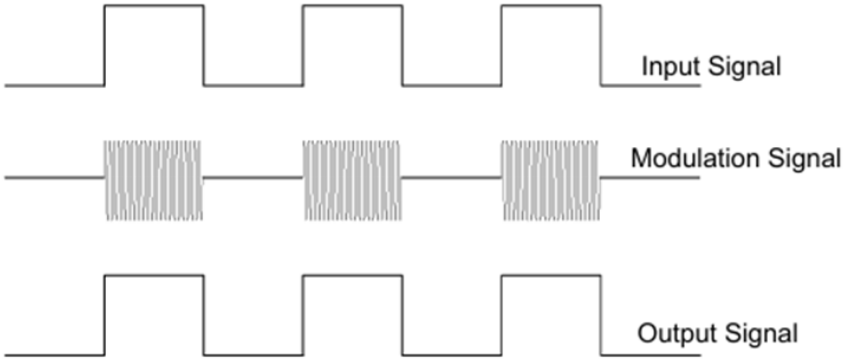
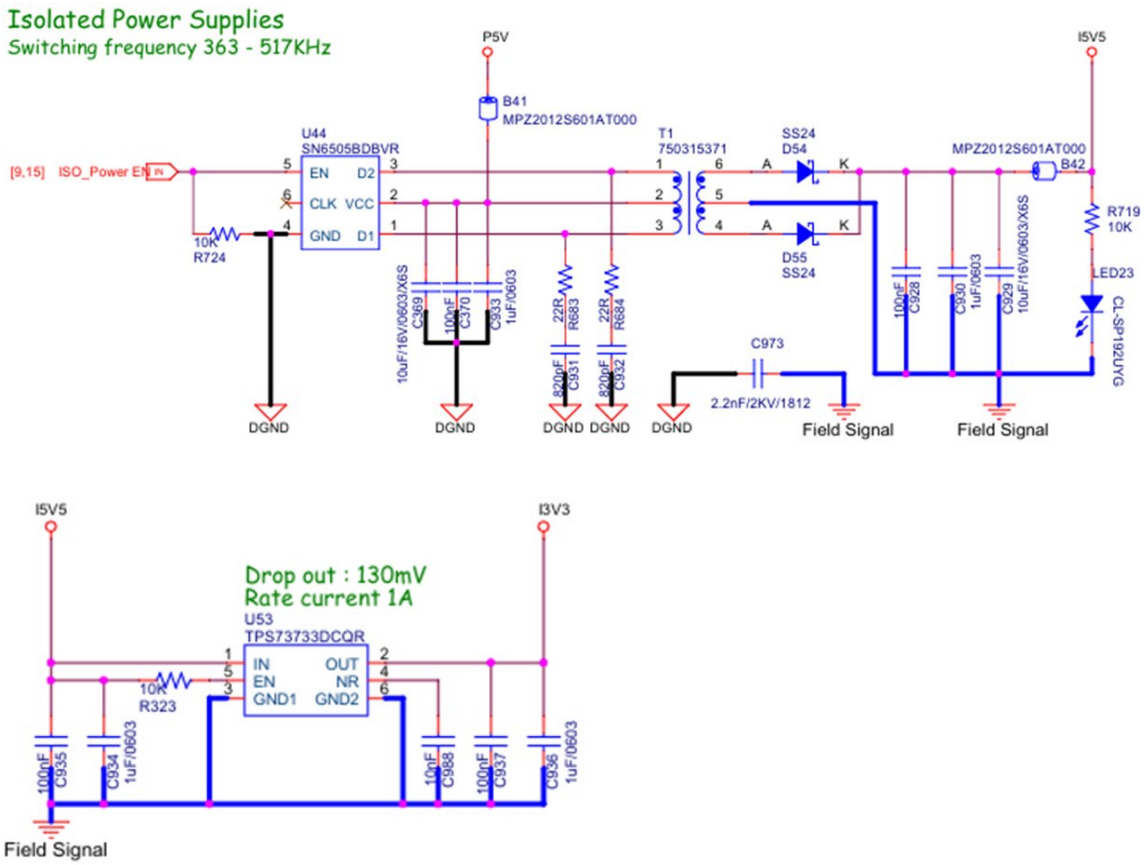


Figure 3.2. Modulation Scheme

2. Power Isolation



The above circuit is used to generate an isolated power supply (I3V3).

U44(SN6505DBVR) is a push-pull driver for generating an isolated power supply and generates an isolated power supply I5V5(Isolation 5.5V) using a T1(750315371) transformer. The insulation condition is established based on the transformer, and I3V3 (Isolation 3.3V) is supplied as power to the U49, U46 (LTC2852IMS#TRPBF) transceiver.

TURNS RATIO	V × T (Vμs)	ISOLATION (V_{RMS})	DIMENSIONS (mm)	APPLICATION	LDO[1]	ORDER NO.
1:1.1 ±2%	7	2500	6.73 x 10.05 x 4.19	3.3 V → 3.3 V, 100mA, SN6505B Refer to Figure 6-13 and Figure 6-14	No	760390011
1:1.1 ±2%	11			5 V → 5 V, 100mA, SN6505B Refer to Figure 6-15 and Figure 6-16		760390012
1:1.7 ±2%				3.3 V → 5 V, 100mA, SN6505B Refer to Figure 6-17 and Figure 6-18		760390013
1:1.3 ±2%				3.3 V → 3.3 V, 100mA, SN6505B Refer to Figure 6-19 and Figure 6-20	Yes	760390014
1:1.3 ±2%				5 V → 5 V, 100mA, SN6505B Refer to Figure 6-21 and Figure 6-22		760390014
1:2.1 ±2%				3.3 V → 5 V, 100mA, SN6505B Refer to Figure 6-23 and Figure 6-24		760390015
1.23:1 ±2%				5 V → 3.3 V, 100mA, SN6505B		750313710
1:1.7 ±2%	8.9		8.3 x 12.6 x 4.1	3.3 V → 3.3 V, 1A, SN6505B Refer to Figure 6-25 and Figure 6-26		750316028
1:2.1 ±2%				3.3 V → 5 V, 1A, SN6505B Refer to Figure 6-27 and Figure 6-28		750316029
1.3:1 ±2%	10.8			5 V → 3.3 V, 1A, SN6505B Refer to Figure 6-29 and Figure 6-30		750316030
1:1.1 ±2%	8.6			3.3 V → 3.3 V , 1A , SN6505B 5 V → 5 V , 1A , SN6505B Refer to Figure 6-11 and Figure 6-12	No	750315371

11.4.6 Compliance of ITU-T X.27V.11.

Test Report

Korea Marine Equipment Research Institute
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Report No.:
KOMERI-0314-26T0697(E)
http://www.komeri.re.kr

Korea Marine Equipment Research Institute

시점확인본 진본 2026-04-09 10:39:10 KST 정보시점확인센터

1. Applicant

○ Company Name : Intellian Technologies, Inc.

○ Address : 18-7, Jinwisandan-ro, Jinwi-myeon (Chungho-ri), Pyeongtaek-si, Gyeonggi-do, Korea

2. Equipment under Test

○ Name of Product : C100M GMDSS

○ Model : C1-10-x00x

○ Serial No. : -

3. Test Standards : Applicant's Requirement(ITU-T X.27 V.11)

4. Test Period : 2026. 03. 23.

5. Test Site : □ Permanent Testing Lab ■ On Site Testing
(Address : Intellian Technologies, 18-7, Jinwisandan-ro, Jinwi-myeon (Chungho-ri),Pyeongtaek-si, Gyeonggi-do, Korea)

6. Test Result : Refer to TEST SUMMARY

Note 1. The information of the sample(s) in this test report is provided by the applicant. And you can check website (www.g4b.go.kr) to verify the authenticity of the certificate.
Note 2. The results shown in this test report refer only to the sample(s) tested unless otherwise stated and do not guarantee the quality of all the applicant's products.
Note 3. This test report shall be used only within the purpose of its defined use and shall not be used for public relation, advertisement and lawsuit.

Affirmation	Tested by	Technical Manager
	Name : Dong-Geon KIM (Signature)	Name : Myeong-Gwan HAN (Signature)

This test report is unrelated to KS Q ISO/IEC 17025 and KOLAS accreditation.

Date of issue : 2026. 04. 09.

The President of Korea Marine Equipment Research Institute (Signature)

11.5 Abbreviation / Acronym

Abbreviation / Acronym	Meaning
A	
AC	Alternating Current
ACK	Acknowledgment
ACNI	Automatic Carrier Noise Injection
ADU	Above Deck Unit
AF	Audio Frequency
ALC	Automatic Level Control
ALF	Adaptive Load Forecasting
ALR	Alarm Report
ARC	Automatic Repeat reQuest
AWG	American Wire Gauge
B	
BAM	Bridge Alert Management
BATT	Battery
BCX	Bandwidth Compression and Expansion
BOW	Bow
C	
CNR	Carrier-to-Noise Ratio
CRQ	Change Request
D	
dB/K	Decibels per Kelvin
dBW	Decibel-watts
DC	Direct Current
E	
ESD	Electrostatic Discharge
EXT	External
F	
FCC	Federal Communications Commission
G	
G/T	Antenna Gain-to-Noise-Temperature Ratio
GEO	Geostationary Orbit
GGA	Global Positioning System Fix Data
GLL	Geographic Latitude and Longitude
GMDSS	Global Maritime Distress and Safety System
GND	Ground
GNS	Global Navigation Satellite
GNSS	Global Navigation Satellite System
GPIO	General Purpose Input/Output
H	
HBT	Heterojunction Bipolar Transistor
I	
IEC	International Electrotechnical Commission
L	
L2	Second Frequency Band
LAN	Local Area Network
LCD	Liquid Crystal Display

Abbreviation / Acronym	Meaning
LEO	Low Earth Orbit
LMR	Land Mobile Radio
M	
Max	Maximum
MED	Marine Equipment Directive
MHz	Megahertz
MIC	Microphone
Min	Minimum
MoCA	Multimedia over Coax Alliance
N	
NRM	Normal Response Mode
NRX	Noise Reduction X
P	
P/N	Part Number
PABX	Private Automatic Branch Exchange
PoE	Power over Ethernet
POTS	Plain Old Telephone Service
PTT	Push-To-Talk
PTTs	Push-To-Talk systems
PWR	Power
Q	
QIG	Quick Installation Guide
R	
RED	Radio Equipment Directive
RF	Radio Frequency
RMC	Recommended Minimum Navigation Information
RSS	Received Signal Strength
RX	Receive
S	
SCU	Safety Control Unit
SIM	Subscriber Identity Module
SIP	Session Initiation Protocol
SSAS	Ship Security Alert System
T	
TNC	Threaded Neill-Concelman
TX	Transmit
U	
UHF	Ultra High Frequency
UI	User Interface
USB	Universal Serial Bus
USIM	Universal Subscriber Identity Module
V	
VBUS	USB Power Voltage
VBW	Video Bandwidth
VDC	Volts Direct Current
VHF	Very High Frequency
VHW	Water Speed and Heading
VTG	Velocity Made Good

Abbreviation / Acronym	Meaning
W	
WAN	Wide Area Network
Wi-Fi	Wireless Fidelity
Z	
ZDA	Time & Date (UTC + Local Time Offset)

Note

Note