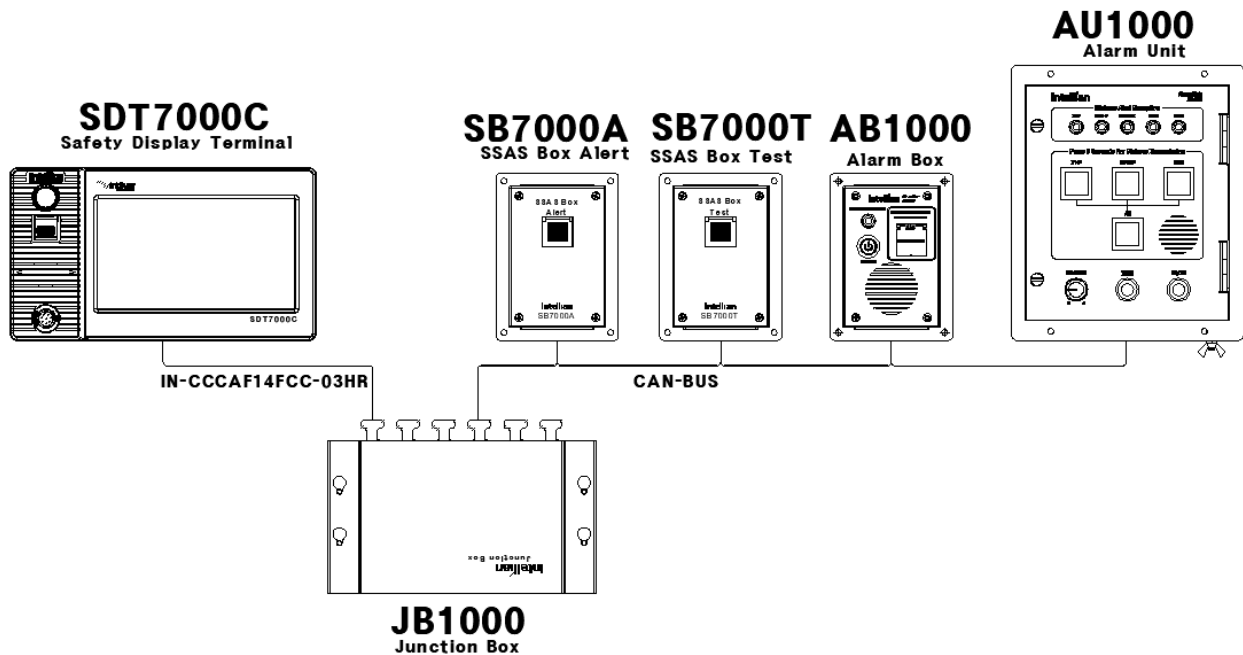


Chapter 11. Optional products CAN Bus communication connection guide

The optional products for the C700 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.



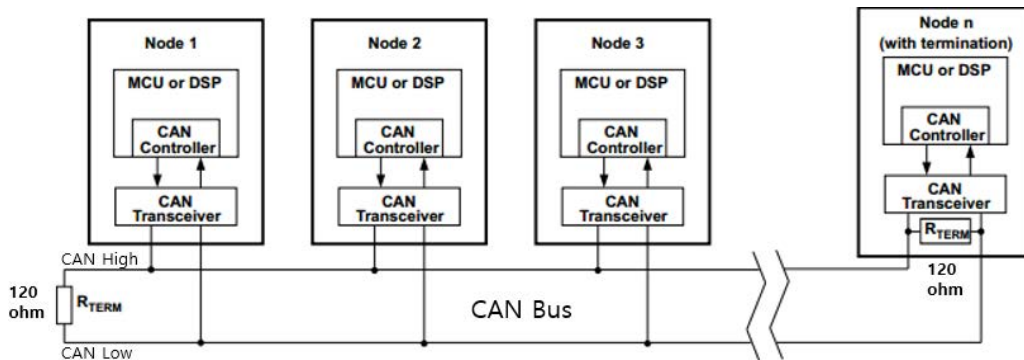
Each optional device (NODE) on the CAN bus, such as the Junction Box (JB1000), Alarm Box (AB1000), Alarm Unit (AU1000), and SSAS Box (SB7000), can be added according to the user system requirements.

Device Specifics:

- Junction Box (JB1000):
 - This is not an ID identification device target for CAN communication.
 - It is connected directly to the SDT (SDT7000C) and includes the Bus termination resistor (120 ohm) for the SDT 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.

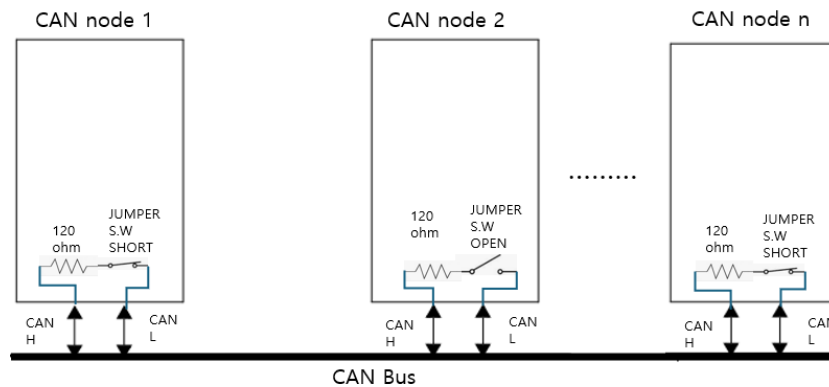
Termination Resistor Connection Guide:

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 SDT + 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 12. Appendix

12.1 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

12.2 Accessory Connections (Optional)

12.2.1 Selection of BDU Installation Site

Select a location inside the cabin where the device is highly visible in emergency situations and easy to wire, then install it in that position.

12.2.2 Junction Box

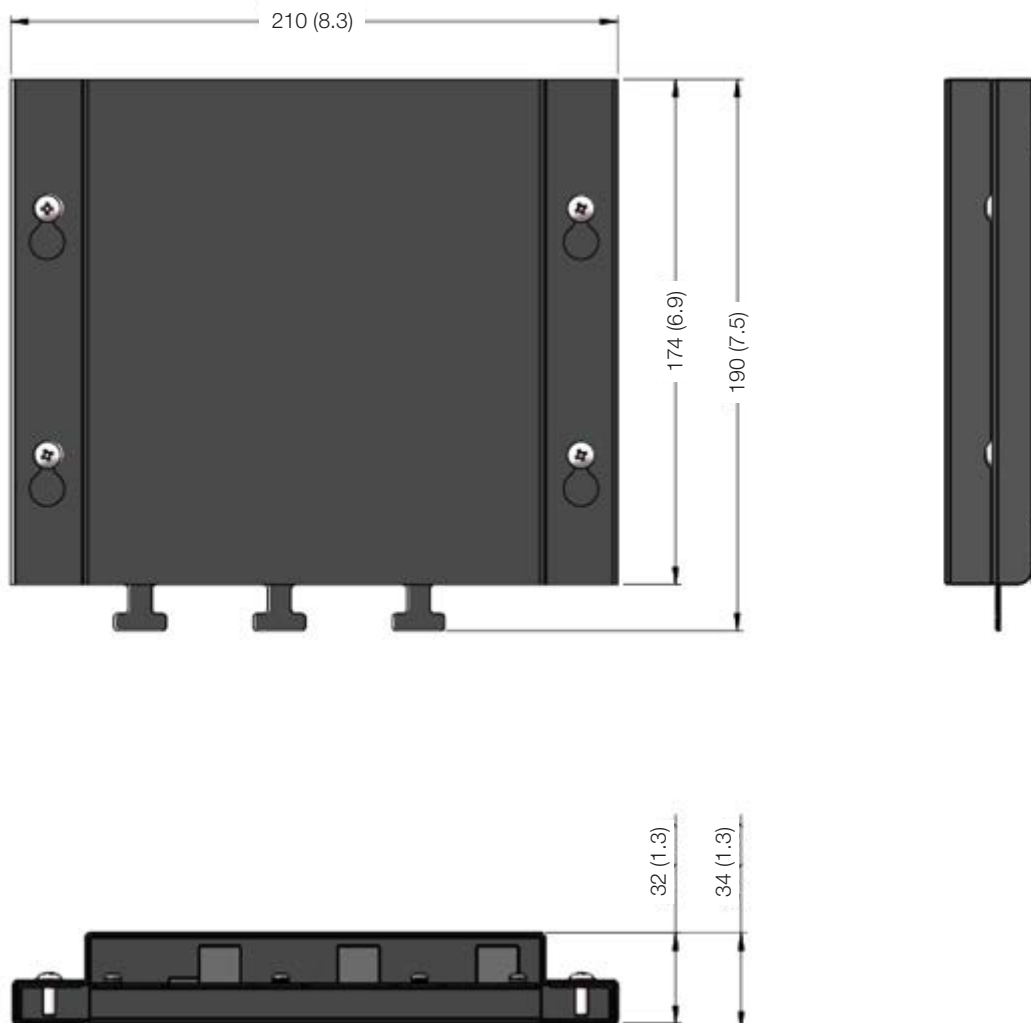
The Junction Box is an extension board that connects to the C200S and interface connector in an indoor environment. It is necessary to use the Junction Box to connect accessories. The Junction Box connects to the SDT via a 14-pin connector. The accessories that can be connected to the Junction Box are 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.

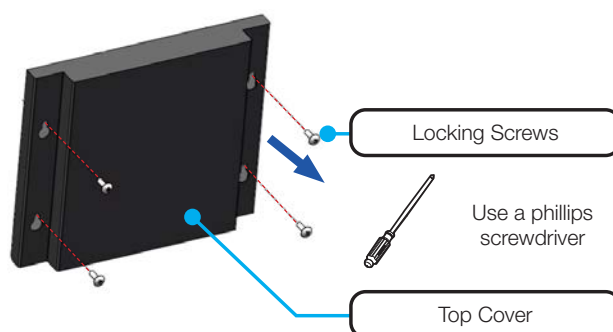
Dimensions

Unit: mm (inch)

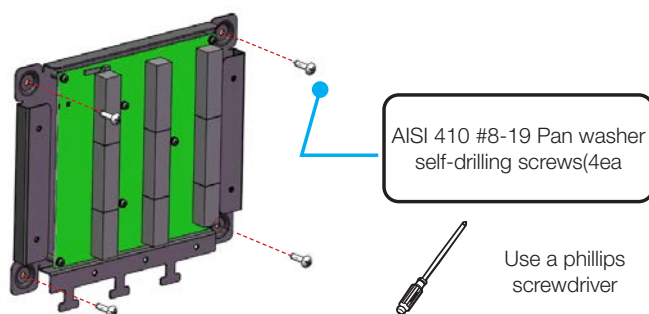


Mounting Junction Box

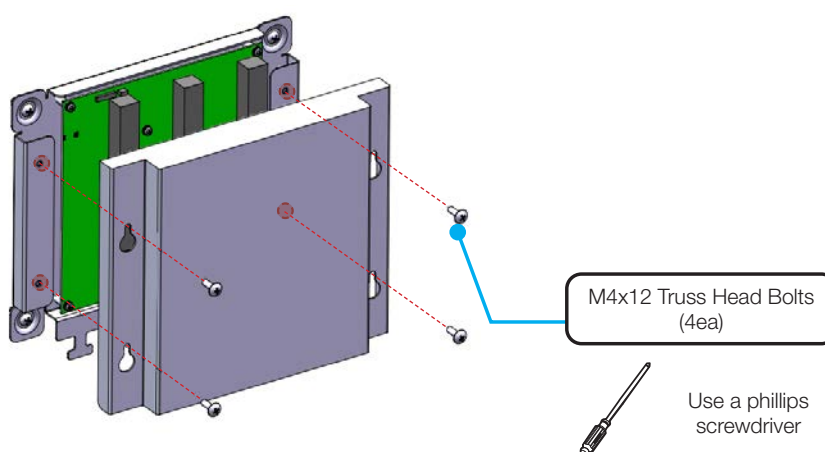
1. Loosen the locking screws on the top cover of the junction box using a Phillips screwdriver, then open the cover.



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.

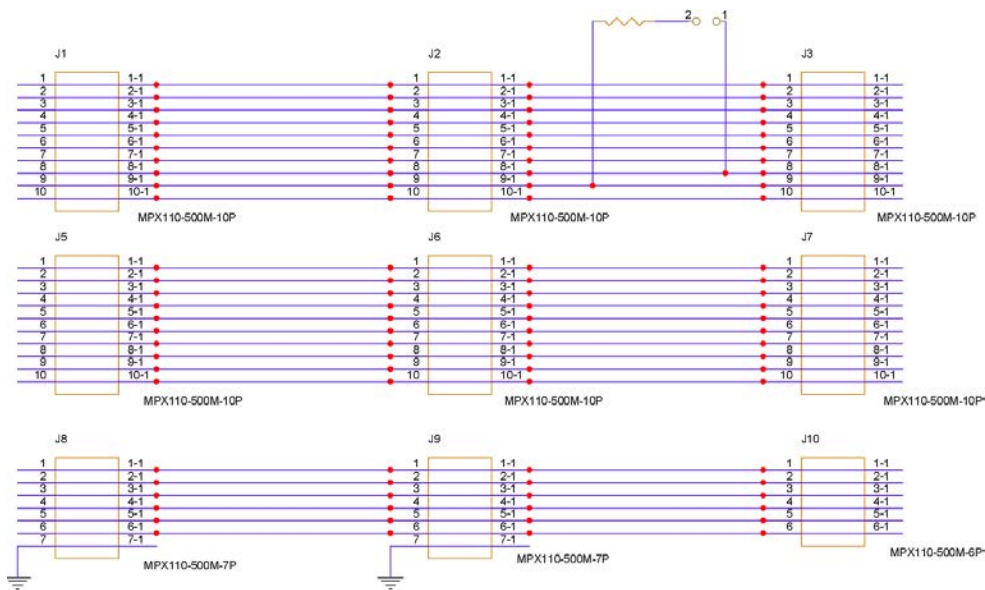


4. Position the top cover of the junction box, then secure it by installing the locking screws using a Phillips screwdriver.



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.

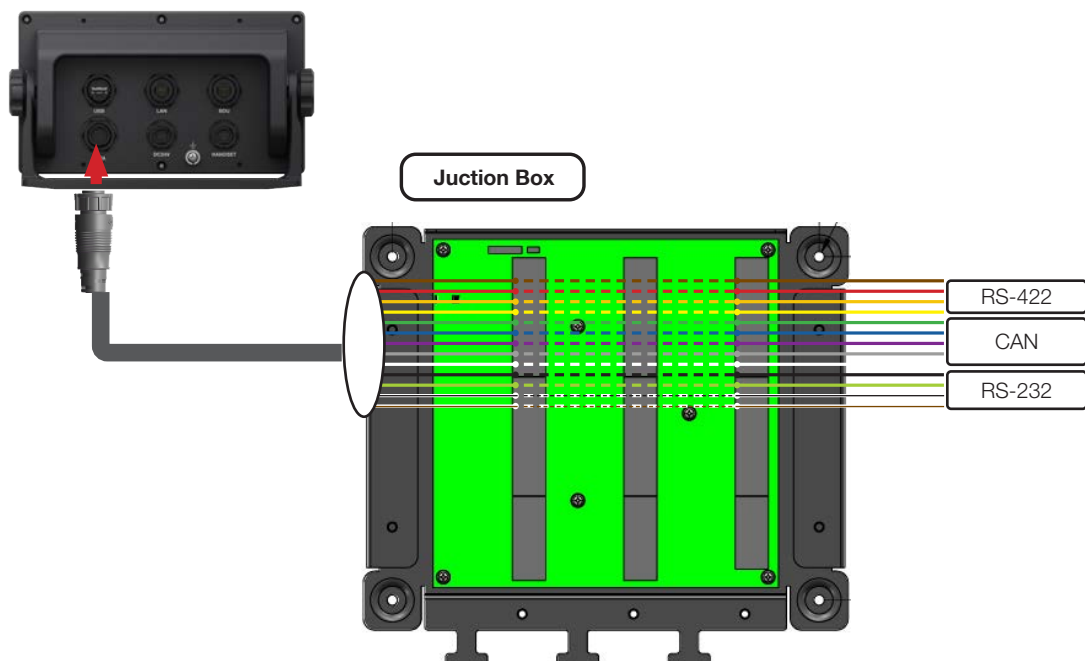


However, pins 8 and 9 in rows 1 to 3 are designated for connecting the termination resistor for CAN (NMEA 2000) communication. Therefore, pins 8 and 9 are exclusively reserved for CAN communication.

Connecting Data cable to SDT-Junction Box- Data in/out Device

The DATA cable connection using Junction Box in SDT is as follows.

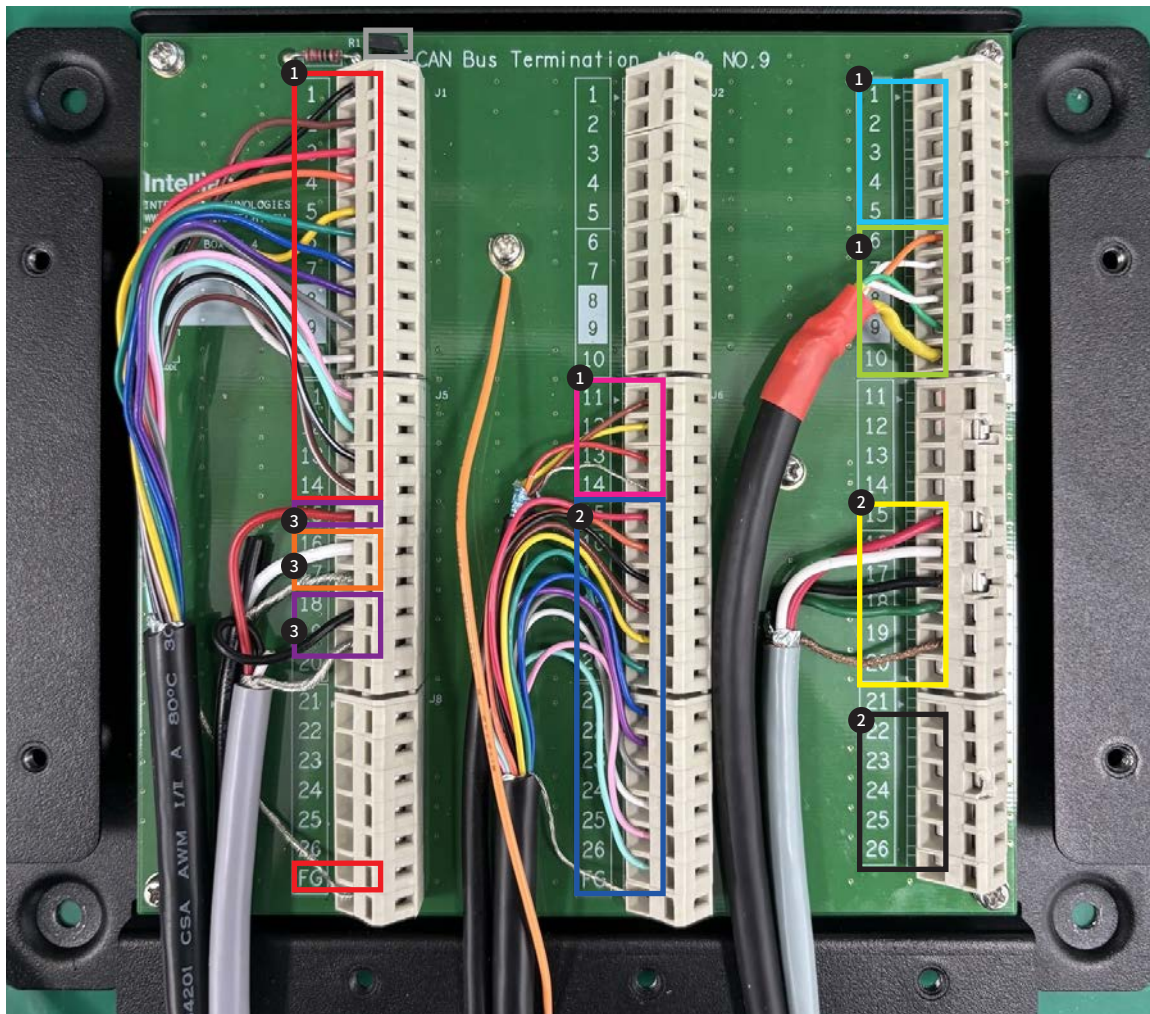
1. Connect the Data Cable (14pin Plug) supplied to SDT, and connect pins 1 to 14 to the terminal in the junction box in order and color arrangement. (Only use pins 8 and 9 for Can communication.)
2. When connecting to a device using data in the junction box, connect to the terminal according to the pin number defined in another column. After that, connect the power cable to the power connector of the SDT.



Junction Box (JB1000) Connections

This section details the cable connections for the JB1000 Junction Box.

(Actual installation image of JB1000 with connected cables.)



* In the case that SDT is located at the end(terminal) of the CAN network, the jumper should be short.(Gray Box)

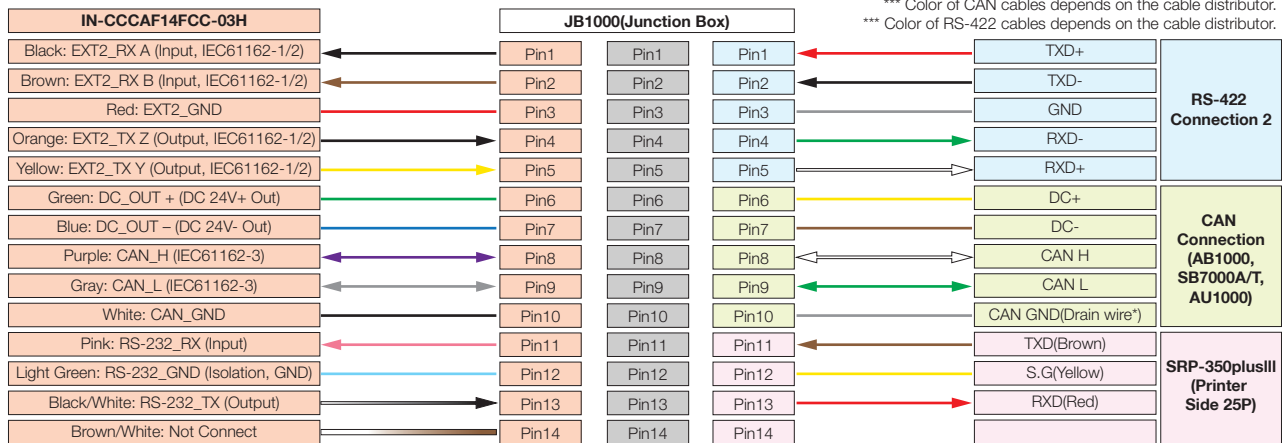


NOTE

The image is for information. The actual installation might be different from the image.

① Cable connection diagram(Red Box, Pink Box, Sky Blue Box, and Light Green Box)

※ Before cabling, CAN Termination Jumper(J4) should be **short**.



* Drain wire : Cable Shield

** Cable Shield is connected to the Junction Box Shield(FGND or Bolt)

Red Box:

- 14p cable is connected with SDT7000C by 14p cable.
- Drain wire : FG
- P/N : IN-CCCAF14FCC-03H

Pink Box:

- SRP-350plus III(Printer) signal cable is connected
 - TXD(Brown,11), S.G(Yellow,12), RXD(Red,13) → Opposite side pin
- P/N : TBD(Before customizing)

Sky Blue Box:

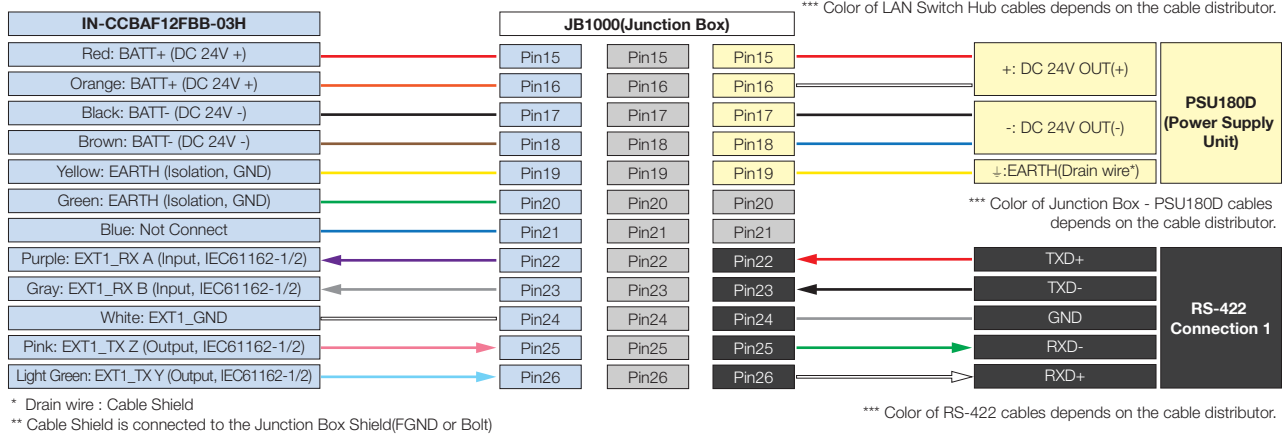
- RS-422 2 cable is connected
 - TXD+(1), TXD-(2), GND(Drain wire,3), RXD-(4), RXD+(5) → Opposite side pin
- P/N : Non provision, *It depends on the cable distributor so that it isn't attached in the image below.

Light Green Box:

- CAN cable is connected:
 - DC +(Yellow,6), DC -(Brown,7), CAN H(White,8), CAN L(Green,9), CAN GND(Drain wire*,10)
- JB1000 pin 8,9 are fixed.(CAN H,L)
 - P/N : 29995, (CAN BUS 2x2x0.75 120Ω)
 - The image of the above actual installation cable is not 29995 CAN cable(Different color). Please refer to the pin number only.
- P/N: Non provision // *Designating the cable color depends on the cable distributor.

② Cable connection diagram(Blue Box, Yellow Box and Black Box)

※ Before cabling, CAN Termination Jumper(J4) should be **short**.



Blue Box:

- 12p cable is connected with SDT7000C by 12p cable.
- Drain wire : FG
- P/N : IN-CCBAF12FBB-03H

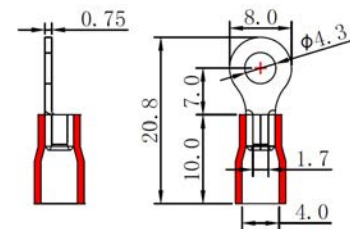
Yellow Box:

- PSU180D power cable is connected:
 - DC 24V OUT(+)(Red,White,15,16), DC 24V OUT(-)(Black,Blue,17,18), EARTH(Yellow or Drain Wire*,19)
- P/N : Non providable(But essential for turning on power of SDT, CAN units)

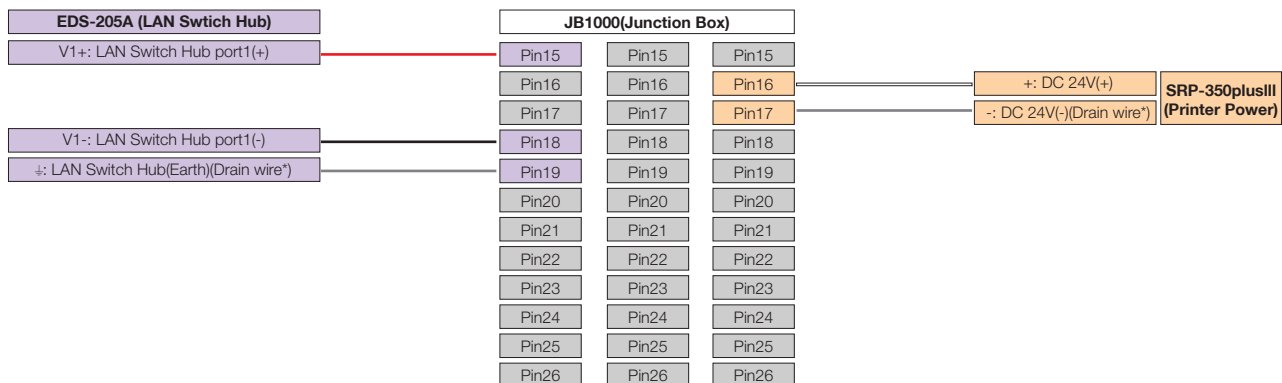
Black Box:

- RS-422 1 cable is connected
 - TXD+(22), TXD-(23), GND(Drain wire,24), RXD-(25), RXD+(26) → Opposite side pin

The connection side of PSU180D consists of O-ring and the specification is the same below.



③ Cable connection diagram(Purple Box and Orange Box)



Purple Box:

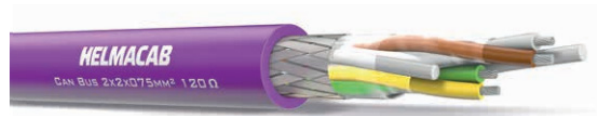
- EDS-205A(LAN Switch Hub) power cable is connected:
 - V1+(Red,15), V1-(Black,18), EARTH(Drain wire*,19)

Orange Box:

- SRP-350plus III(Printer) power cable is connected:
 - DC 24V(+)(White,16), DC 24V(-)(Drain wire,17)
- P/N: TBD(Before customizing)

CAN Bus Cable Requirements

The image on the right shows our optional components for C700 GMDSS, used with CAN cables. (Product Codes: LG5422, LG5423, LG5424, corresponding to 25m, 50m, and 100m lengths, respectively)



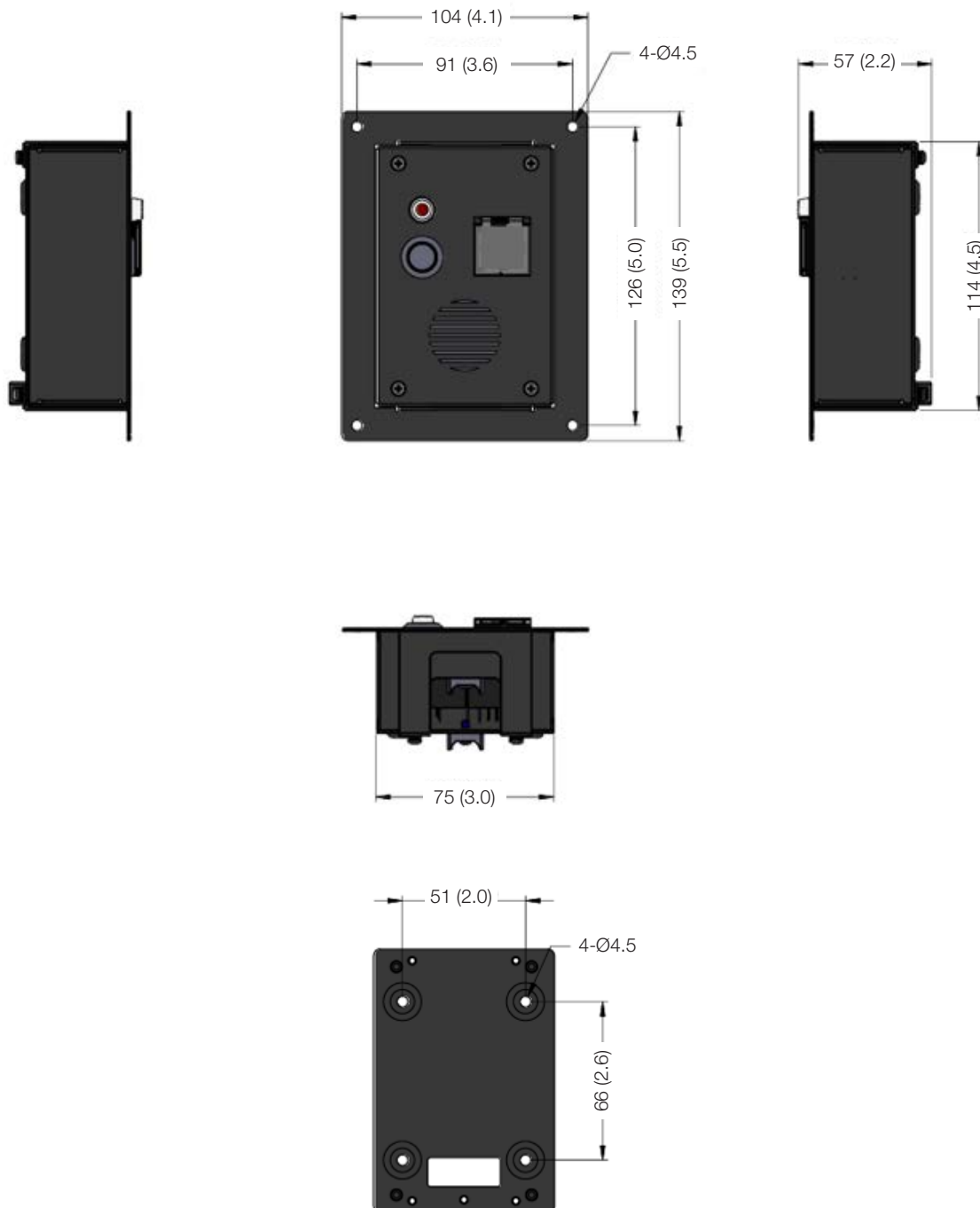
Item	Description
Number of wires	4 (Shield cable not included) The shield cable covers the 4 wires.
Number of conductors	2 (Each conductor consists of 2 wires.)
Shield	Present (The product includes a shield cable.)
Cable type	Twisted pair (To reduce EMI and noise)
Wire size	0.75 mm ²

12.2.3 Alarm Box

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

Dimensions

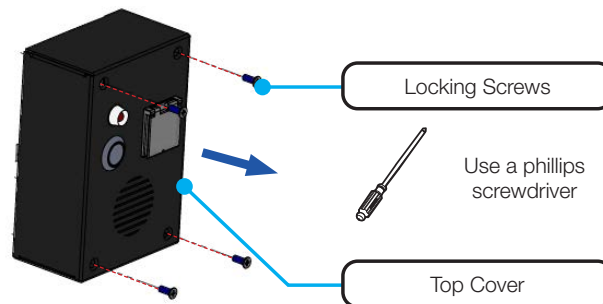
Unit: mm (inch)



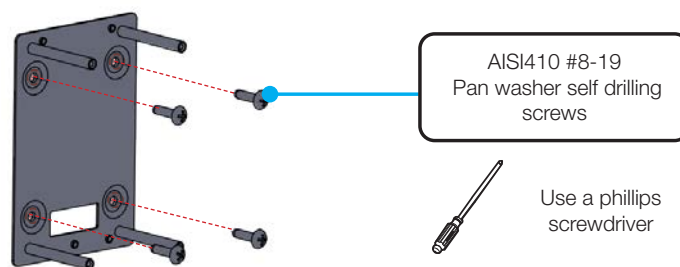
Mounting Alarm Box

• Bracket Mounting Type

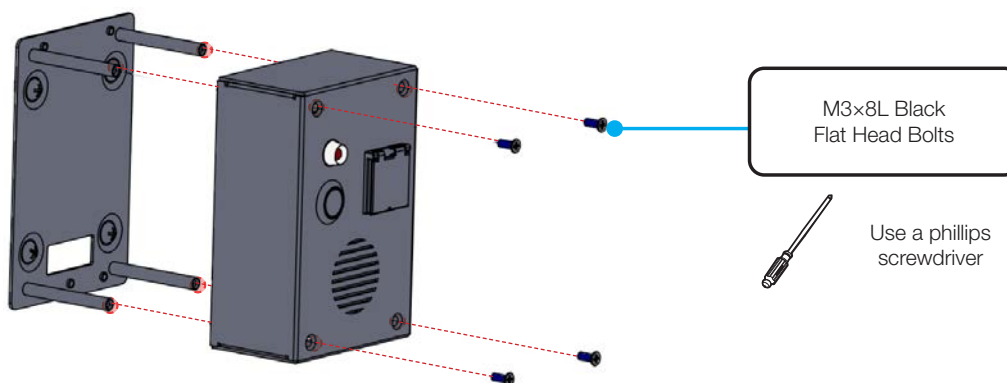
1. Bring the AISI 410 #8-19 Pan washer self-drilling screws(4ea) , M3x8L black phosphate flat head bolts (4ea) from the install kit box.
2. Loosen the locking screws on the top cover of the Alarm box using a Phillips screwdriver, then open the cover.



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.

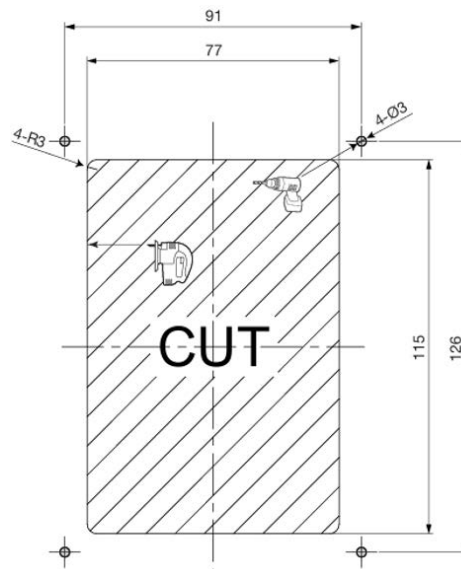


5. Position the top cover of the Alarm box, then secure it by installing the M3x8L black flat head bolts (4ea) using a Phillips screwdriver.

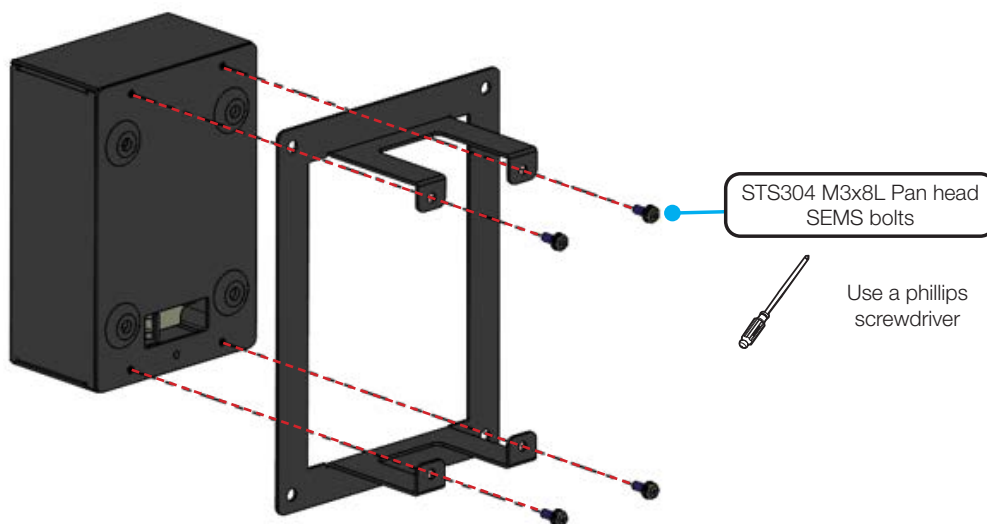


- Flush Mounting Type

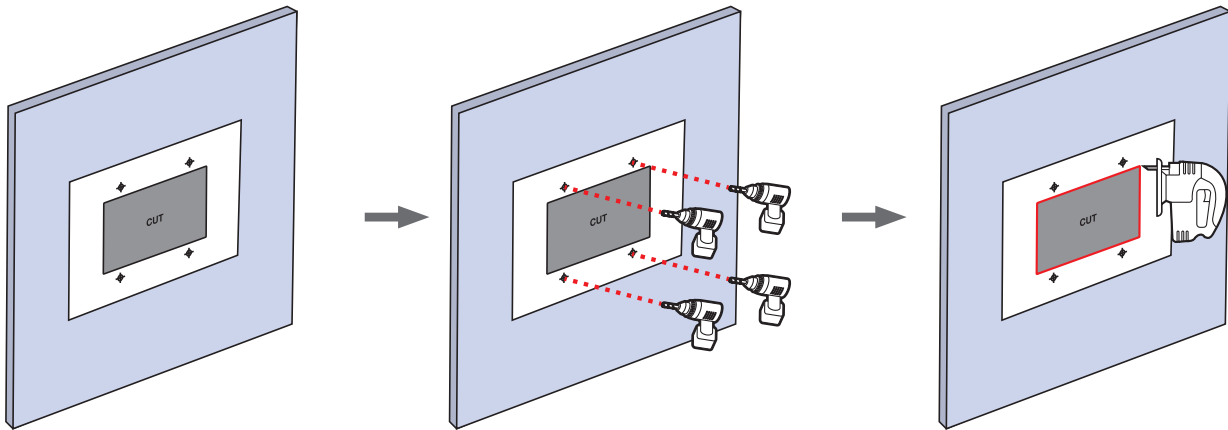
1. Print out the mount template. When printing the mount template, set the print scale to 200% in the print setup.



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.



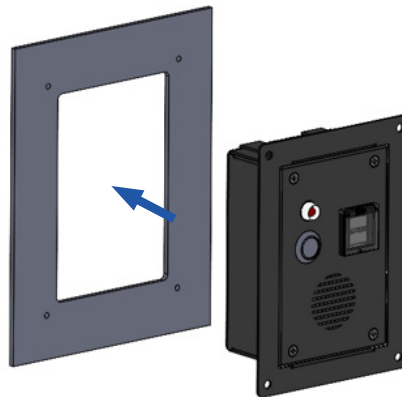
4. Secure the template to the ship panel.
5. Drill four 3mm holes using a 3mm drill bit.
6. Using a jigsaw or rotary cutting tool, cut along the inside of the solid line indicated on the template.



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

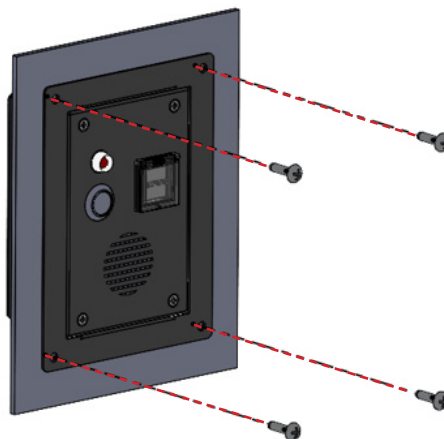
Note: If necessary, use a file or sandpaper to adjust the hole size.

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



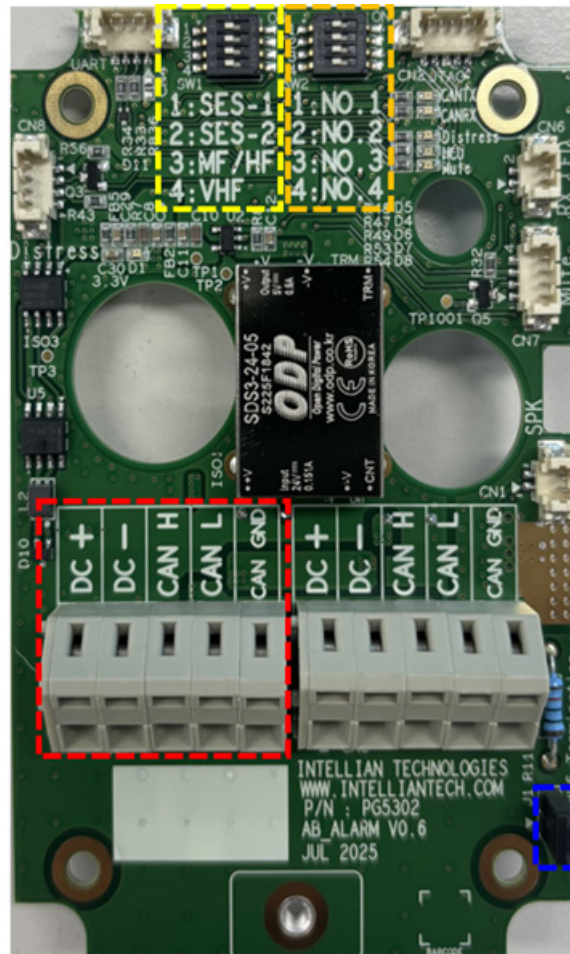
Note: If access to the back of the alarm box will be restricted after installation, connect all necessary cables to the cradle and secure them with the locking bracket or locking rings before inserting the device.

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.

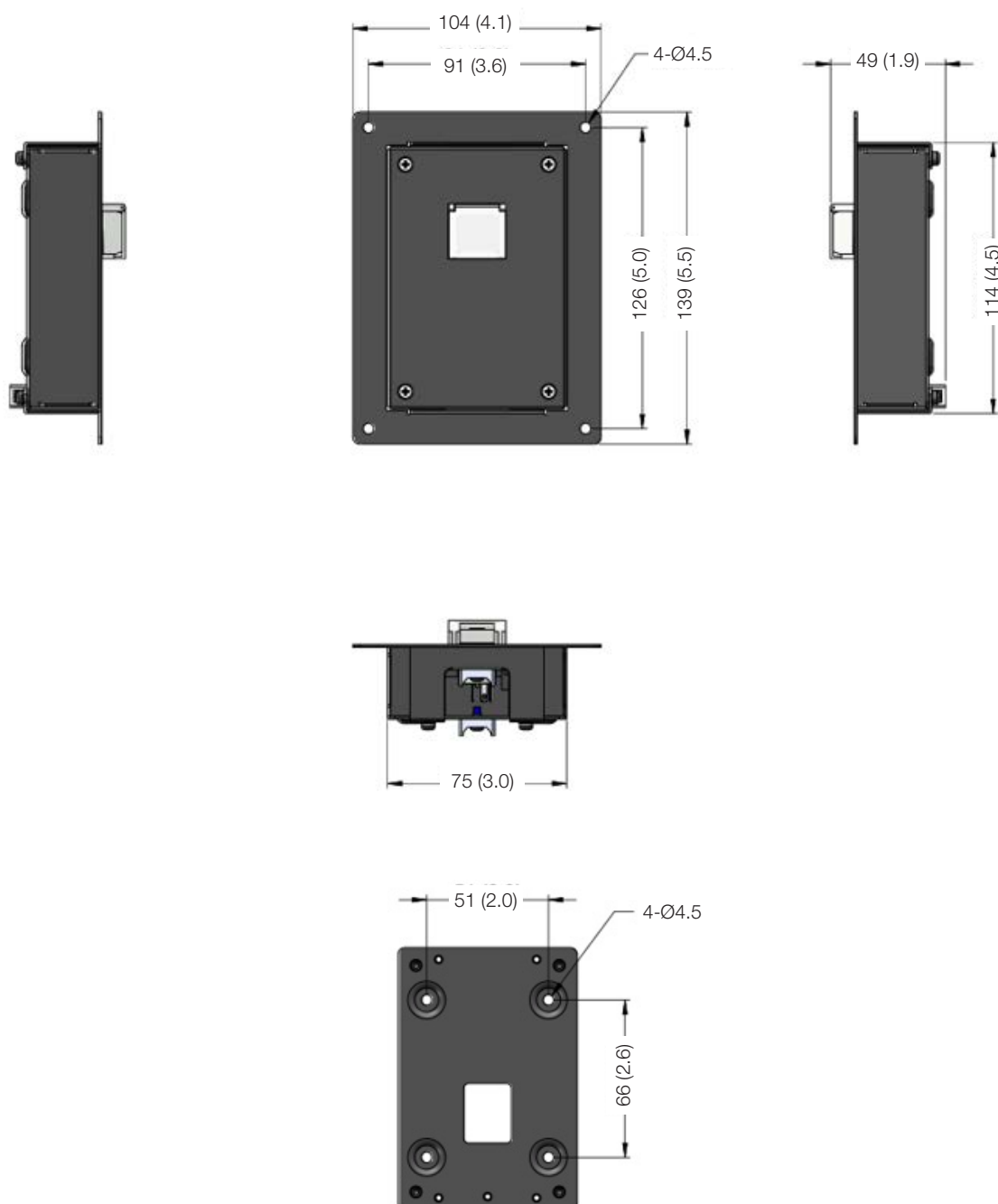
- 1: NO.1
- 2: NO.2
- 3: NO.3
- 4: NO.4

12.2.4 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 C200S can connect to a total of 4 SSAS boxes (3 SSAS Box Alerts and 1 SSAS Box Test).

Dimensions

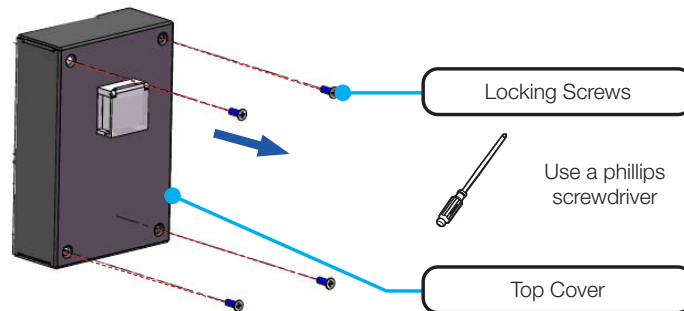
Unit: mm



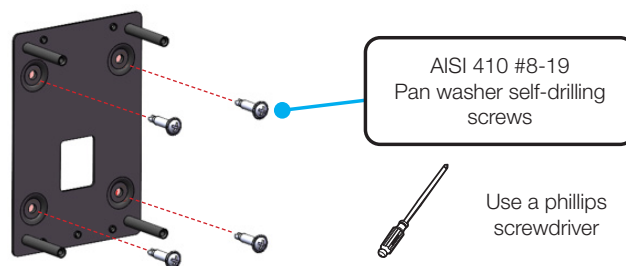
Mounting SSAS Box

• Bracket Mounting Type

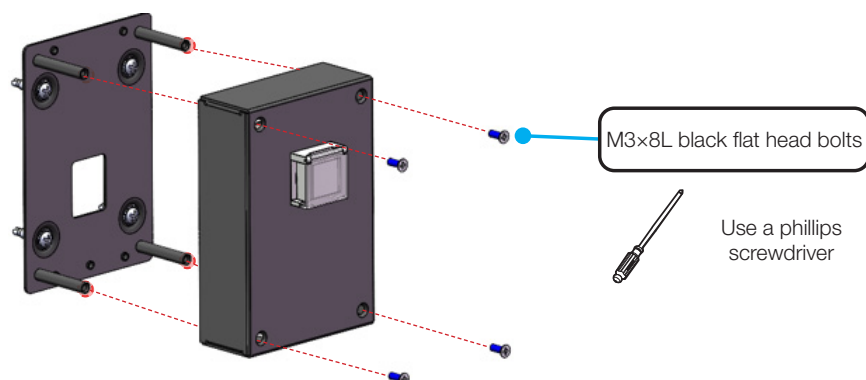
1. Bring the AISI 410 #8-19 Pan washer self-drilling screws(4ea) , M3x8L black phosphate flat head bolts (4ea) from the install kit box.
2. Loosen the locking screws on the top cover of the SSAS box using a Phillips screwdriver, then open the cover.



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.

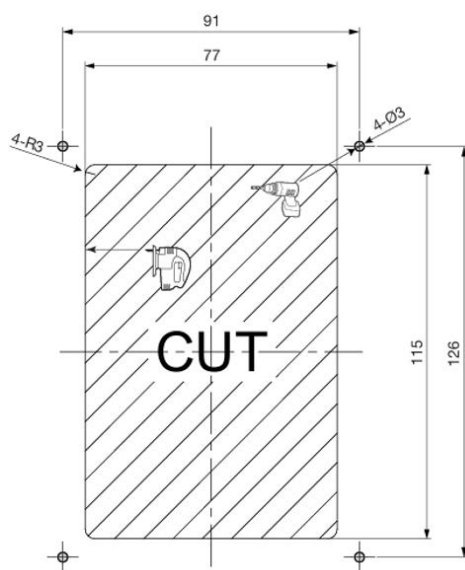


5. Position the top cover of the SSAS box, then secure it by installing the M3x8L black flat head bolts (4ea) using a Phillips screwdriver.

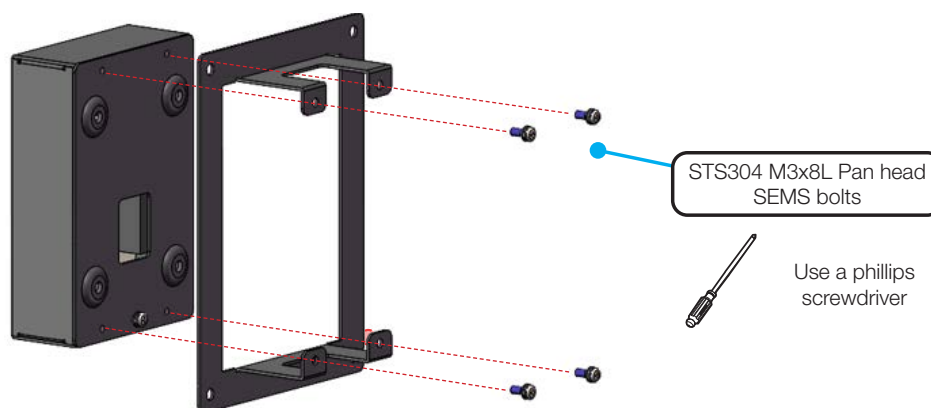


- Flush Mounting Type

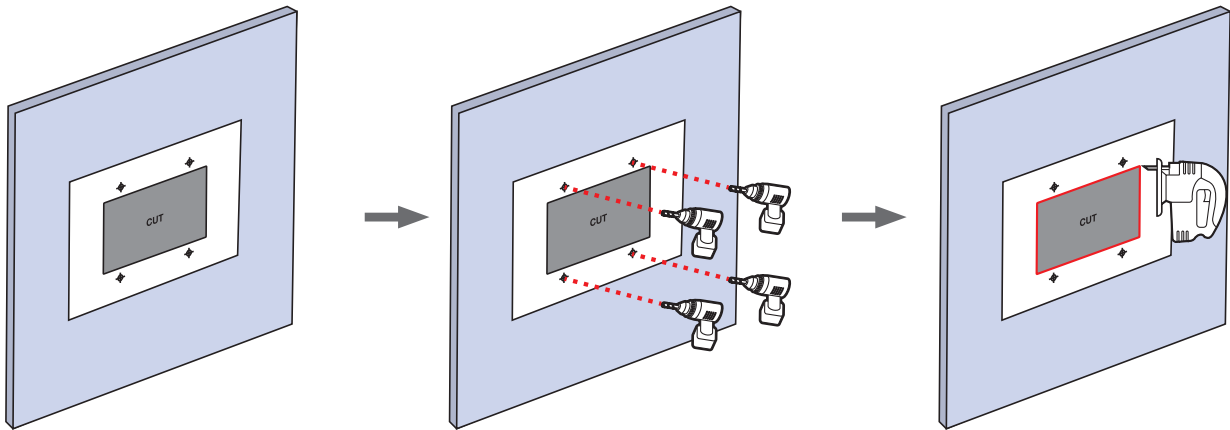
1. Print out the mount template. When printing the mount template, set the print scale to 200% in the print setup.



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.

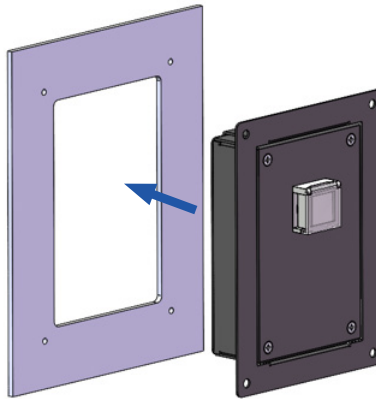


7. Insert the SSAS box into the cutout to check the fit.

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

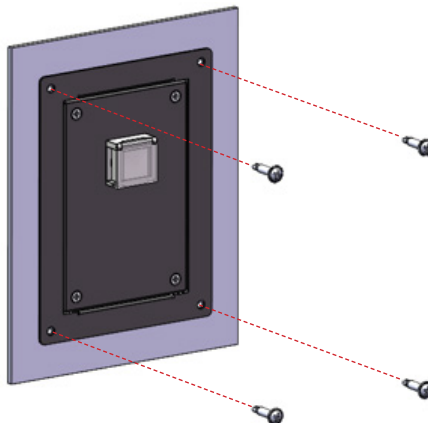
8. Remove the template from the mounting surface.

9. Insert the SSAS box into the cutout.



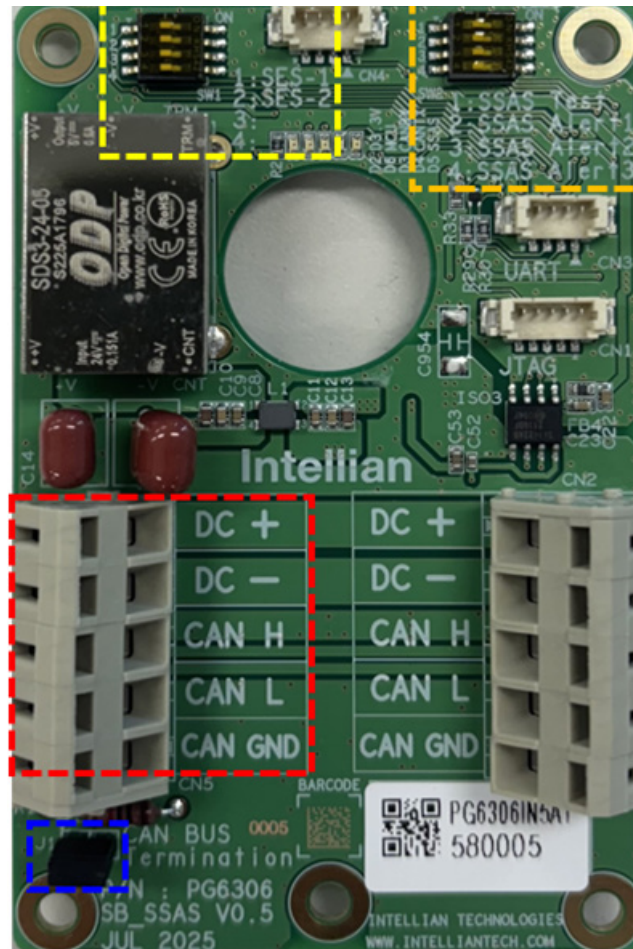
Note: If access to the back of the SSAS box will be restricted after installation, connect all necessary cables to the cradle and secure them with the locking bracket or locking rings before inserting the device.

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.

- **SDT7000C Number Configuration (Yellow Marked Switch):**

To distinguish the number of the SDT7000C 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 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 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.

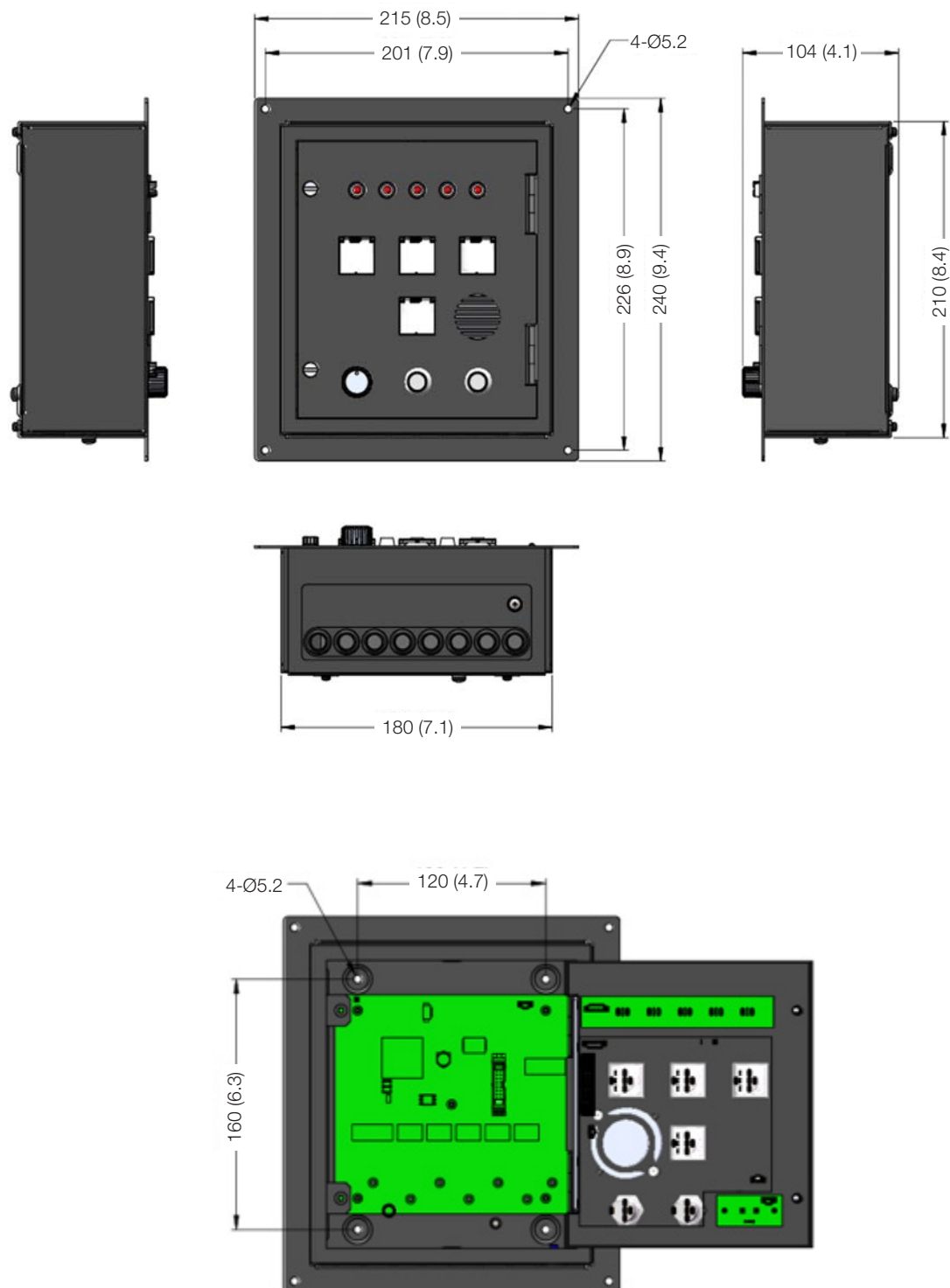
✓Switch Positions:

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

12.2.5 Alarm Unit

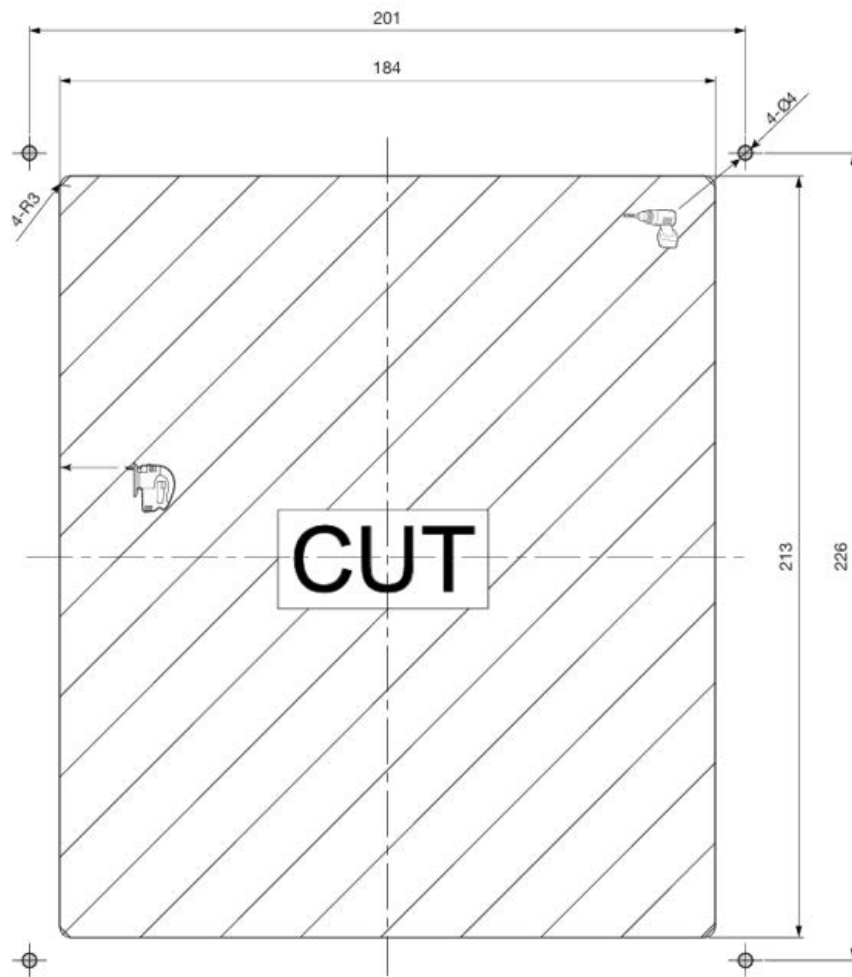
Dimensions

Unit: mm

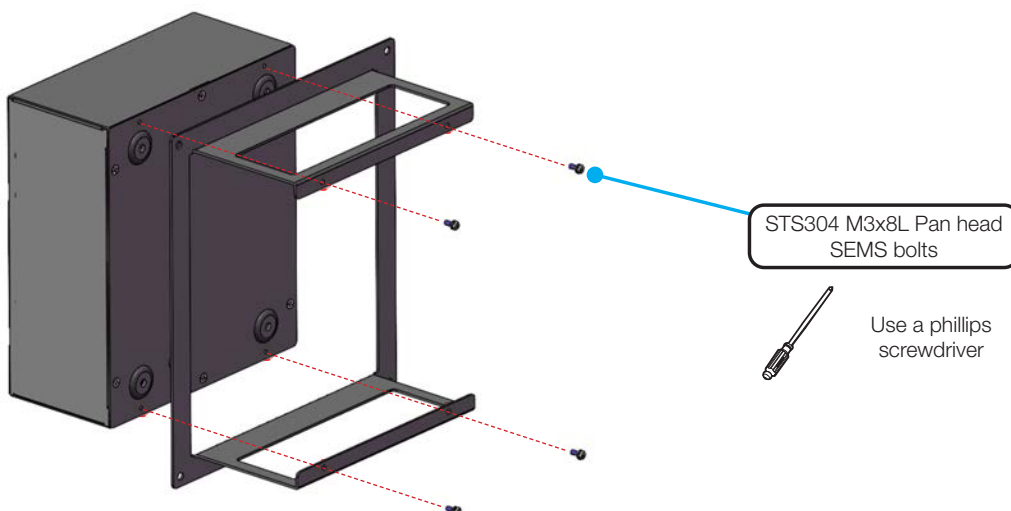


Mounting Alarm Unit

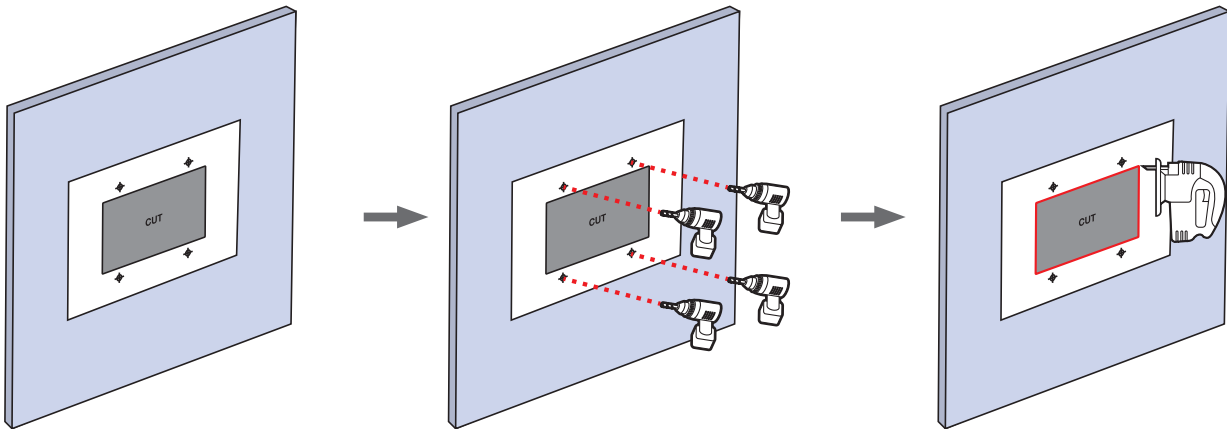
1. Print out the mount template. When printing the mount template, set the print scale to 200% in the print setup.



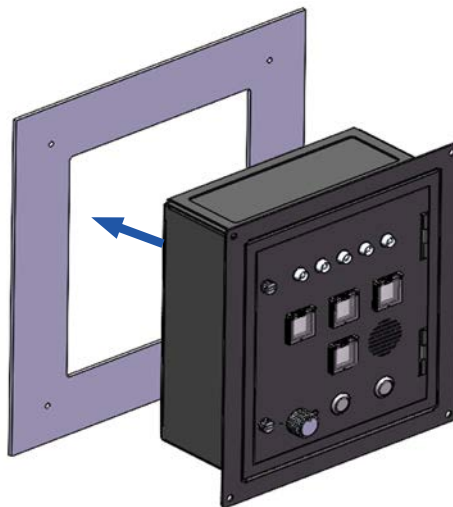
2. Bring the AISI 410 #10-19 Pan washer self-drilling screws(4ea), STS304 M3x8L Pan head SEMS bolts (4ea) and mount bracket for flush mounting from the install kit box.
3. To assemble the mount bracket to the Alarm Unit, insert the Alarm Unit into the mount bracket and secure it using four STS304 M3x8L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

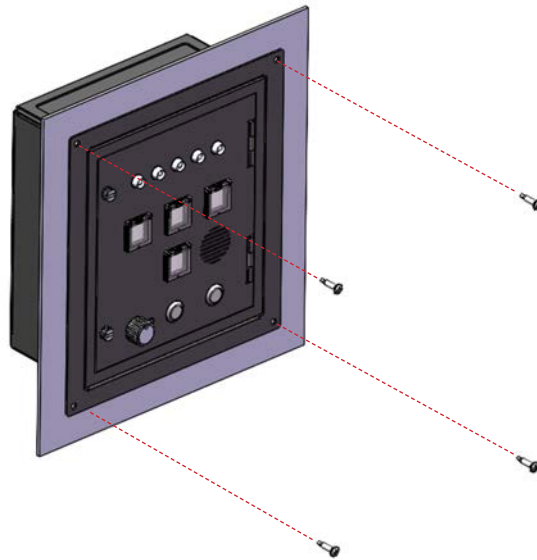


7. Insert the Alarm Unit into the cutout to check the fit.
Note: If necessary, use a file or sandpaper to adjust the hole size.
8. Remove the template from the mounting surface.
9. Insert the Alarm Unit into the cutout.



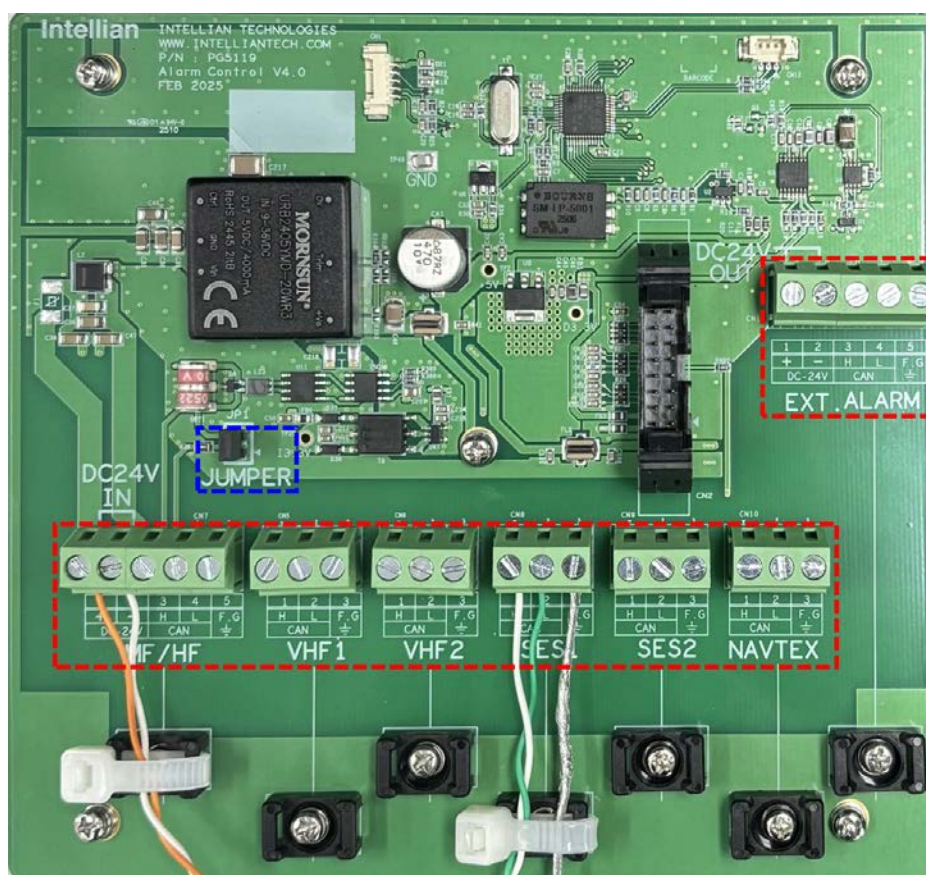
Note: If access to the back of the Alarm Unit will be restricted after installation, connect all necessary cables to the cradle and secure them with the locking bracket or locking rings before inserting the device.

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.

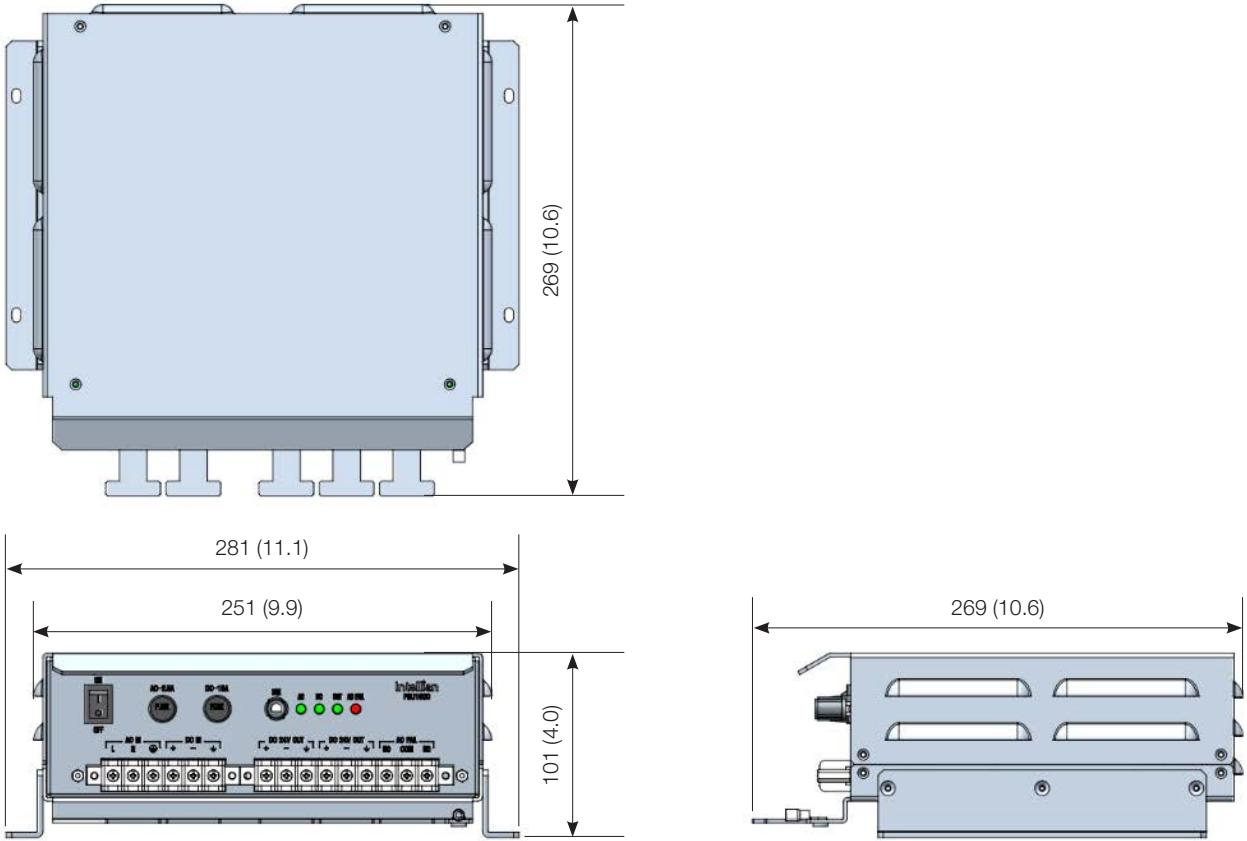
• Connection Procedure:

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.

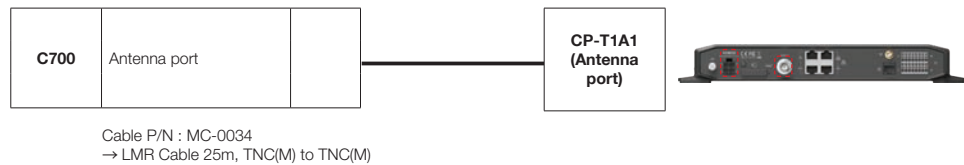
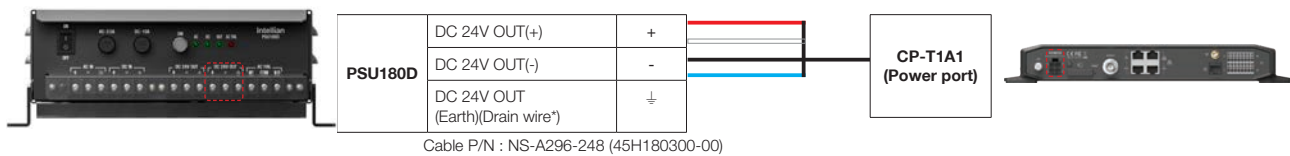
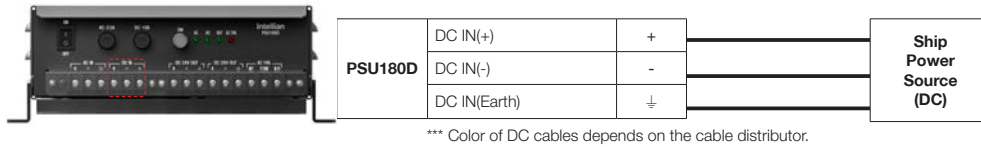
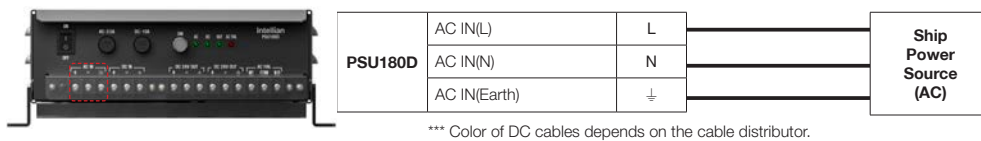
12.2.6 Power Supply (PSU-180D)

Dimensions

Unit: mm (inch)



Power Supply (PSU-180D) Cable Connection



12.3 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 antenna BDU/ADU
12002	Lost alarm box
12002	Lost alarm unit
12002	Lost SSAS box
12201	Invalid SIM card
12202	Lost SIM card
21002	GMDSS fault
22002	Safety Tx fail

12.4 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
BDU	Below Deck Unit
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

Abbreviation / Acronym	Meaning
L	
L2	Second Frequency Band
LAN	Local Area Network
LCD	Liquid Crystal Display
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	
SDT	Safety Display Terminal
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

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

Note