



Hughes 45XX Install Guide

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Contents

Understanding safety alert messages	4
Messages concerning personal injury	4
Messages concerning property damage	4
Safety symbols.....	4
Additional symbols.....	4
Warnings for Satellite Terminal.....	5
Equipment users.....	6
Chapter 1	
Installation instructions	8
1.1 Overview.....	8
1.2 45XX quick start	8
1.3 Determining where to install the terminal.....	10
1.4 Optional 45XX mounting hardware	10
1.4.1 Terminal mounting points.....	10
1.4.2 Magnetic mounting kit	11
1.4.3 Fixed mounting bracket kit	11
1.4.4 Pole mount kit	12
1.4.5 Cables and connectors options	12
1.5 Terminal installation using the optional mounting kits.....	13
1.5.1 Terminal installation using the magnetic mounting kit	13
1.5.2 Terminal installation using the fixed mounting bracket kit	14
1.6 System power requirements	16
1.7 Power and data cable	17
1.7.1 Custom connection (power and data cable: RJ45 wiring block)	17
1.8 Vehicular installation	18
1.8.1 Terminal power connection	18
1.8.2 Vehicular power schematics	19
1.9 Maritime installation	19
1.9.1 Terminal power connection	19
1.9.2 Marine coating description	19
1.10 Fixed installation.....	20
1.10.1 Terminal power connection	20
Chapter 2	
Technical specifications	21
2.1 Bracket.....	21
2.2 Screws and washers.....	21

Understanding safety alert messages

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

Messages concerning personal injury

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



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

Messages concerning property damage

A NOTICE concerns property damage only.



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

Safety symbols

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

Additional symbols

This document uses the following hazard symbols:



Warning: Where you see this alert symbol and WARNING heading, strictly follow the warning instructions to avoid personal injury.



Warning: Where you see this alert symbol and WARNING heading, strictly follow the warning instructions to avoid personal injury.



Danger: Electric shock hazard: Where you see this alert symbol and DANGER heading, strictly follow the warning instructions to avoid electric shock injury or death.

Warnings for Satellite Terminal

CAUTION



Do Not Stand near by the Antenna: This device emits radio frequency energy. To avoid injury, do not place head or other body parts in front of the satellite antenna when system is operational. Maintain half meter distance from the terminal while active.



General: Handle your Satellite Terminal with care. The unit is weather resistant per IEC 60529 IP67; however, do not submerge the unit. Avoid exposing your Satellite Terminal to extreme hot or cold temperatures outside the range -25° C to +65° C.

Avoid placing the Terminal close to cigarettes, open flames or any source of heat.

Changes or modifications to the Terminal not expressly approved by Hughes Network Systems could void your authority to operate this equipment.

Only use a soft damp cloth to clean the Terminal.

To avoid impaired Terminal performance, please ensure the unit's antenna is not damaged or covered with foreign material like paint or labeling

When inserting the SIM, do not bend it or damage the contacts in any way. When connecting the interface cables, do not use excessive force.



In the Vicinity of Blasting Work and in Explosive Environments:

Never use the Satellite Terminal where blasting work is in progress. Observe all restrictions and follow any regulations or rules. Areas with a potentially explosive environment are often, but not always, clearly marked. Do not use the Terminal while at a petrol filling station. Do not use near fuel or chemicals.



Qualified Service: Do not attempt to disassemble your Satellite Terminal. The unit does not contain consumer-serviceable components. Only qualified service personnel may install or repair equipment.



Accessories: Use Hughes approved accessories only. Use of non-approved accessories may result in loss of performance, damage to the Satellite Terminal, fire, electric shock or injury.



Connecting Devices: Never connect incompatible devices to the Satellite Terminal. When connecting the Satellite Terminal to any other device, read the device's User Manual for detailed safety instructions.

⚠ CAUTION



Pacemakers: The various brands and models of cardiac pacemakers available exhibit a wide range of immunity levels to radio signals. Therefore, people who wear a cardiac pacemaker and who want to use a Satellite Terminal should seek the advice of their cardiologist. If, as a pacemaker user, you are still concerned about interaction with the Satellite Terminal, we suggest you follow these guidelines:

- Maintain a distance of half meter from the main antenna front and sides and your pacemaker
- Refer to your pacemaker product literature for information on your particular device

If you have any reason to suspect that interference is taking place, turn off your Satellite Terminal immediately.

⚠ CAUTION



Hearing Aids: Most new models of hearing aids are immune to radio frequency interference from Satellite Terminals that are more than 2 meters away. Many types of older hearing aids may be susceptible to interference, making it very difficult to use them near a Terminal. Should interference be experienced, maintain additional separation between you and the Satellite Terminal.

⚠ CAUTION



Electrical Storms: Operation of the Satellite Terminal during electrical storms may result in severe personal injury or death.

Equipment users

User must be a skilled person. Designated users should not be exposed to conditions that could cause pain or injury, nor intentionally caused said conditions.

Installation instructions

1.1 Overview

This Install Guide provides instructions on how to manually mount a Hughes 45XX Terminal using the optional mounting hardware. Please refer to the following documents for more details:

1. **Quick Start Guide:** This guide focuses on the instructions to unpack and set up the Hughes 45XX Terminal for the first time.
2. **User Guide:** This guide provides the most up-to-date information available on the Hughes 45XX Terminal, including configuration details and troubleshooting suggestions.

1.2 45XX quick start

Here are the instructions on setting up a Hughes 45XX Terminal for the first time:

1. Unpack the box. Without tearing the plastic around the 45XX, lift it out of the box, unfold the flaps, and slide it out of the sleeve. Save the box and packing material should you need to ship the 45XX at a later date.
2. Remove the SIM door.
3. Insert the satellite SIM card supplied by your service provider in the SAT SIM slot as shown in [Figure 1](#). Push until you hear a click.



Figure 1: Hughes 4500 SIM slot

4. If you are using the 4510 terminal and a third-party cellular service cellular SIM:
 - a. Insert the cellular SIM card supplied by your service provider in the CELL SIM holder provided. The position of the SIM within the holder is shown below:

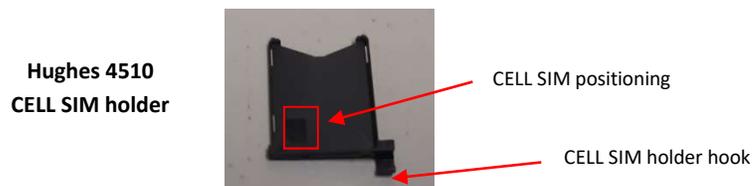


Figure 2: Hughes 4510 CELL SIM holder

- b. Carefully insert the CELL SIM holder into the CELL SIM slot as shown in [Figure 3](#):

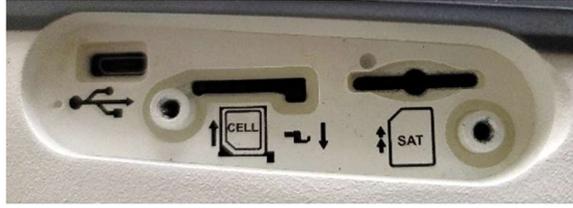
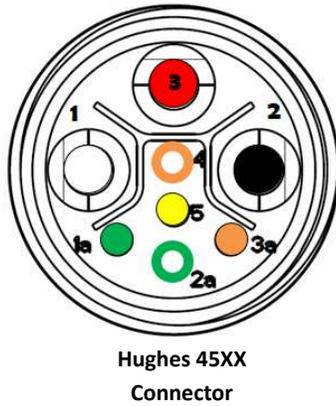


Figure 3: Hughes 4510 SIM slots

Note: If you need to remove the CELL SIM from the terminal, carefully pull out the hook to remove the CELL SIM holder from the slot.

5. Connect a Hughes cable (3501314-000x) from the barrel connector to power and Ethernet using the cable pinout table below:



Pin	Wire Color	Function
1	White	Remote Switch/Ignition
2	Black	Ground
3	Red	Power +12VDC
1a	Green	Ethernet RX-
2a	White/Green	Ethernet RX+
3a	Orange	Ethernet TX-
4	White/Orange	Ethernet TX+
5	Yellow	GPIO (for future use)

Figure 4: Cable Pinout Table

6. Ensure that the red wire is connected to always-on 12VDC and that the white wire is connected to switched power (e.g., vehicle ignition) to power the 45XX on and off automatically, as there is no power button on the 45XX.

Note: The power supply must be rated for a maximum peak current of 3.5 A at 12V.

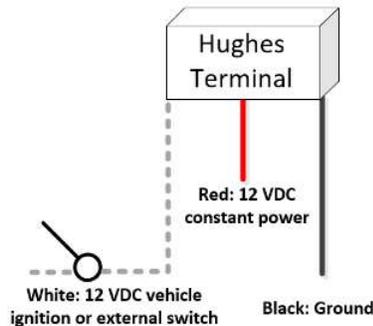


Figure 5: Terminal wiring configuration

After powering up, the 45XX will attempt to establish a connection. The LED states are provided in the table below.

State	LED
Powering up	Solid GREEN
Network acquisition	GREEN flashing
Registered and IP context active	Solid GREEN
Hardware Fault	Solid RED

7. Connect the 45XX to your computer via Ethernet or the USB port under the SIM door. Open a Web browser and enter the address 192.168.128.100 (Ethernet) or 169.254.1.1 (USB) to access the home page of the UT Web User Interface.
8. Many configuration options are documented in the 45XX User Guide, which can be downloaded from <http://echostarmobile.com>.

1.3 Determining where to install the terminal

For your Hughes 45XX Terminal to function correctly, it must be installed in a location that provides a clear view of the sky in all directions for a vehicular install and an unobstructed view to the satellite in a fixed install. The terminal does not need to be pointed, but it should be mounted on a roughly horizontal surface.

1.4 Optional 45XX mounting hardware

Please refer to the Hughes catalog and pricelist for the purchase of any mounting hardware, or visit our website:

<https://www.hughes.com/products-and-technologies/satellite-ground-systems/mobile-satellite-terminals/echostar-mobile-satellite-terminals>

1.4.1 Terminal mounting points

The 45XX Terminal has four mounting points with M5 threads as shown in Figure 6. The optional mounting hardware is attached to these mounting points:

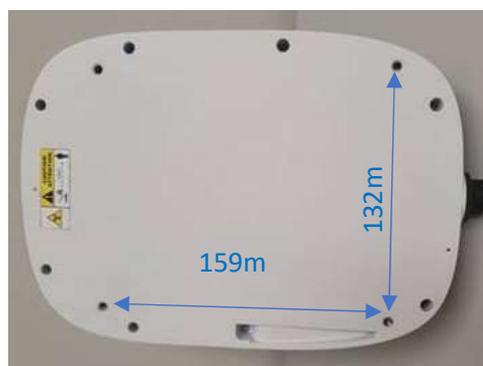


Figure 6: Bottom view of 45XX showing mounting points

1.4.2 Magnetic mounting kit

This kit may be used for mounting the Hughes 45XX Terminal to a horizontal, magnetic, flat surface. The mounting kit includes all the parts needed to install the magnetic mount to the terminal:

- One mounting plate with two circular magnets
- Four screws and four washers (to attach the mounting plate to the terminal).



Figure 7: Magnetic mounting kit

Table 1: Magnetic mounting kit

Item	Part Number	Specifications
Magnetic Mounting Kit	3501365-0001	Custom designed kit for mounting the terminal to a horizontal, magnetic, flat surface. The kit contains all the parts needed to add magnetic mounting to the terminal.

1.4.3 Fixed mounting bracket kit

This kit may be used for mounting the Hughes 45XX Terminal to a vertical, flat surface. The mounting kit includes:

- One bracket
- Four screws and four washers (to attach the bracket to the terminal)

Refer to Chapter 2 for more technical specifications about the bracket, the screws, and the washers.



Figure 8: Fixed mounting bracket

Table 2: Fixed mounting bracket kit

Item	Part Number	Specifications
Fixed Mounting Bracket	3501366-0001	High-quality, corrosion-resistant angle bracket for mounting the terminal to a vertical, flat surface. Pole mounting can be accomplished by adding U-clamps, which can be sourced separately.

1.4.4 Pole mount kit

This kit provides the parts required for a convenient pole mount installation. The kit includes:

- One pole mount (including all brackets and hardware)
- One 45xx mounting plate with nuts, washers and lock washers



Figure 9: Pole mount kit

1.4.5 Cables and connectors options

Several ready-made cables and connectors are available for connecting to the 45XX Hughes Terminal.

Table 3: Cable options in the catalog

Item	Part Number	Specifications
Power and data cable, blunt wire, 5 m	3501314-0002	Ready-made cables for connecting the terminal to DC power and Ethernet data
Power and data cable, blunt wire, 10 m	3501314-0003	
Power and data cable, cigarette lighter plug , and RJ45 socket, 5 m	3501314-0004	The cigarette lighter plug and RJ45 version is ideal for temporary vehicular installs
RJ45 wiring block	9510250-0002	The RJ45 wiring block is useful with blunt wire cables
Mating power and data connector, bare	9509554-0001	

Item	Part Number	Specifications
Custom power and data cable, 8.5 mm OD, 100 m	9509573-0001	The bulk cable and solder-ready barrel connector allow for custom cable installations
SIM tray	9510093-0001	The SIM tray is used for a cellular insertable SIM with the 4510 Terminal. Two SIM trays will be provided in the kit box.

NOTICE

- The nominal outer diameter of the 45XX cables is 8.50 +/- 0.30 mm
- The bend radius of the 45XX cables is 50 mm



Figure 10: Cables and connectors options

1.5 Terminal installation using the optional mounting kits

1.5.1 Terminal installation using the magnetic mounting kit

Using the magnetic mounting kit, the Hughes 45XX Terminal can be installed on any horizontal, metallic surface (e.g., on the top of a vehicle).

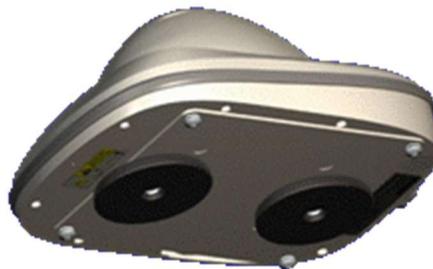


Figure 11: Magnetic mounting kit installation

All parts included in the mounting kit (one plate with two magnets, washers, and screws) should be used and positioned as shown in [Figure 12](#) and [Figure 13](#) and as described below:

1. Place the plate so that its four holes are flush with the identical holes on the terminal. The holes on each side have the same dimensions.
2. Position all washers so that they are touching the head of each screw.
3. Tighten all the screws so that washers are compressed.

NOTICE

Note: Please note that the torque specification for the screws is 1~1.25 Nm (9.0~11.0 lbf in).

4. Decide the install location of the terminal.
5. Place the assembly so that the magnets are on top of the horizontal surface.
6. Ensure the terminal is stable and not moving.
7. Refer to the Quick Start Guide for more details on installing the SIM and setting up the terminal.
8. Refer to the User Guide for further details.

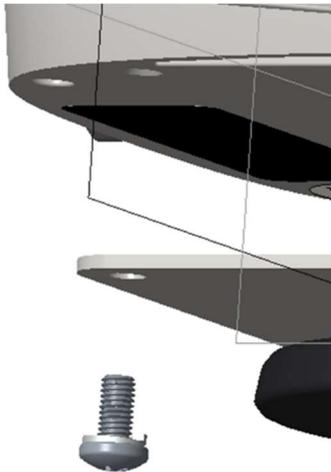


Figure 12: Positioning the washers and screws



Figure 13: Placing the plate and tightening the screws

1.5.2 Terminal installation using the fixed mounting bracket kit

By using the fixed mounting bracket kit, the Hughes 45XX Terminal can be installed on any vertical surface.

For pole mounting, the user may source appropriate U-bolts to attach the supplied mount to the pole. Examples of this can be found at <https://www.mcmaster.com/u-bolts> or other hardware sources.

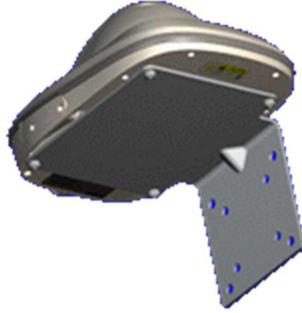


Figure 14: Fixed mounting bracket kit installation

All the parts included in the fixed mounting bracket kit (one bracket, the washers, and the screws) should be used and positioned as shown in [Figure 15](#) and [Figure 16](#) and as described below:

1. Point the bracket so that one side is facing the terminal and the other side facing the vertical surface.
2. Place the bracket so that its four holes are flush with the identical holes on the terminal. The holes on each side have the same dimensions.
3. Position all washers so that they are touching the head of each screw.

NOTICE

Note: Please note that the torque specification for the screws is 1~1.25 Nm (9.0~11.0 lbf in).

-
4. Tighten all screws so that the washers are compressed.
 5. Ensure the terminal is stable and not moving.
 6. Refer to the Hughes Quick Start Guide for more details on installing the SIM and setting up the terminal.
 7. Refer to the User Guide for further details.

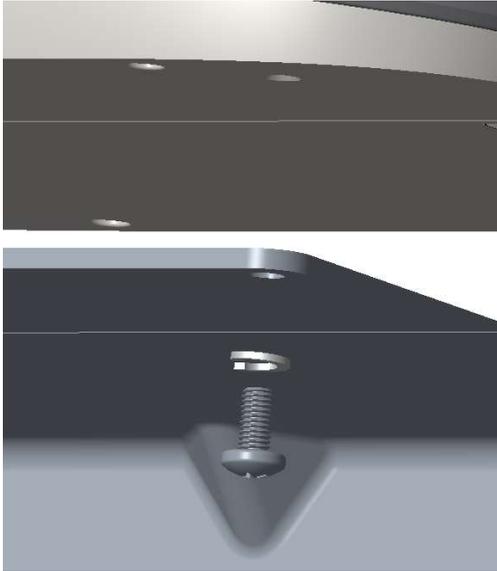


Figure 15: Positioning the washers and screws



Figure 16: Placing the plate and tightening the screws

1.6 System power requirements

The terminal must be connected to a power supply with the requirements shown in [Table 4](#):

Table 4: System power requirements

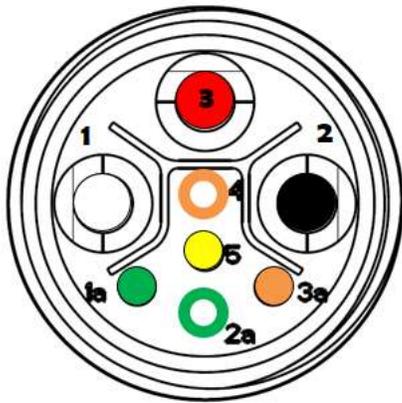
System Component	Power Requirement
Terminal input voltage minimum	10 VDC
Terminal input voltage maximum	28 VDC
Power cable length maximum	30 m
Power supply voltage suggested (with a power cable length < 10m)	12 VDC
Power supply voltage suggested (with a power cable length > 10m)	19 VDC
Power supply requirement	16 W
Power supply peak current	3.5 A

CAUTION

Note: Ensure the power source is fused at the source to protect against any short circuits in the terminal power wiring. A 5A slow blow fuse is recommended.

1.7 Power and data cable

Every UNI 45XX power and data cable has provisions for the positive DC (red wire) and the ground (black wire) lines along with a remote switch/ignition (white wire). The remote switch/ignition can be used for vehicles to ensure power is only supplied to the terminal when the ignition switch is on. If the remote switch/ignition wire is not used, a jumper wire must be connected between Pin 1 and Pin 3, or Pin 1 must be connected to the power source.



Pin	Wire Color	Function
1	White	Remote Switch/Ignition
2	Black	Ground
3	Red	Power +12VDC
1a	Green	Ethernet RX-
2a	White/Green	Ethernet RX+
3a	Orange	Ethernet TX-
4	White/Orange	Ethernet TX+
5	Yellow	GPIO (for future use)

Figure 17: Power and data cable internal wires details

1.7.1 Custom connection (power and data cable: RJ45 wiring block)

If the user wants to connect one of the 45XX power and data cables to an RJ45, they must following the procedures below:

1. Strip the power and data cable to get to the internal wires shown in [Figure 17](#).
2. Connect the RJ45 wiring block to the internal wires of the power and data cable using a straight-through connection. Follow the information in [Table 5](#) to achieve the correct connection between the wires (45XX power and data cable) and the pinouts (RJ45).

Table 5: Pin-out table

Cable Pin	Cable Wire Color	Function	Connection	RJ45 Pinout
1a	Green	Ethernet RX-	Straight-through	6
2a	White/Green	Ethernet RX+		3
3a	Orange	Ethernet TX-		2
4	White/Orange	Ethernet TX+		2

3. Strip and tin the remaining wires (power, ground, and remote switch wire ends) of the cable.

Note: The yellow wire of the UNI power cable is for future use, so it can be ignored for now.

4. Use tie wraps for strain relief if necessary, see [Figure 18](#) for further details
5. The remote switch/ignition can be used for vehicles to ensure power is only supplied to the Terminal when the ignition switch is ON. If the remote switch/ignition wire is not used, then a jumper wire must be connected between Pin 1 and Pin 3 or Pin 1 must be connected to the power source.



Figure 18: Power and data cable internal wires details

1.8 Vehicular installation

1.8.1 Terminal power connection

For vehicular use, determine if the remote switch/ignition line will be used or not. If used, the terminal will be powered up or down when the vehicle's ignition is switched on or off. Refer to [Figure 19](#) for the power schematic.



Note: If an ignition sense line is NOT used, the modem will be powered independently of the ignition being switched on or off. This could lead to the vehicle battery being completely discharged.

Table 6: Power plug pin-out

Pin	Wire Color	Function	Details
1	White	Remote switch/ignition	Link Pin 1 and 3 if ignition is not enabled.
2	Black	Ground	
3	Red	Power +12VDC	

1.8.2 Vehicular power schematics

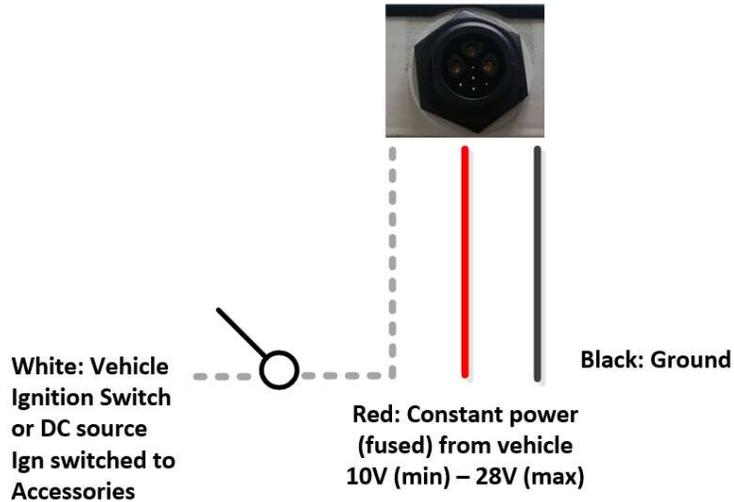


Figure 19: Vehicular wiring configuration (using ignition sense/remote switch)

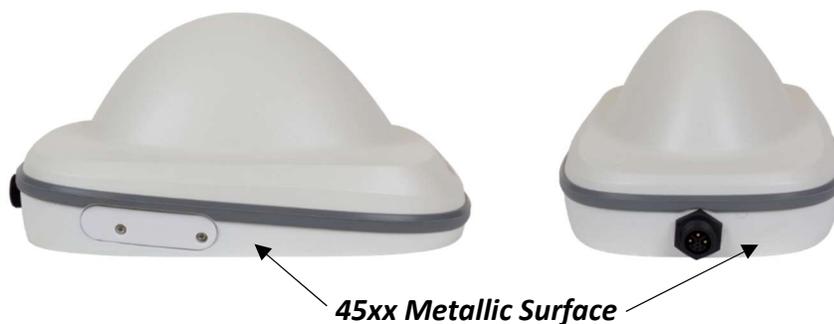
1.9 Maritime installation

1.9.1 Terminal power connection

The Hughes 45XX Terminal can be powered by a direct source. See Section 1.6 and the terminal connector section for more details.

1.9.2 Marine coating description

To protect the Hughes 45xx terminals from the harsh marine environment, please implement the following recommendations.



- Obtain a high-quality marine ceramic coating product, such as the one in the picture below and found online at <http://www.glidecoat.com/>



- Clean and wipe down the metallic surface of the 45xx terminal
- Apply the ceramic coating per manufacturer's directions (instructions enclosed in the package)
- Apply a second coat on the terminal as needed. The second application is at the discretion of the customer
- This ceramic coating will help protect the 45xx from the corrosive effects of the saltwater marine environment

1.10 Fixed installation

1.10.1 Terminal power connection

The Hughes 45XX Terminal can be powered by a direct source. See Section 1.6 and the terminal connector section for more details.

Technical specifications

2.1 Bracket

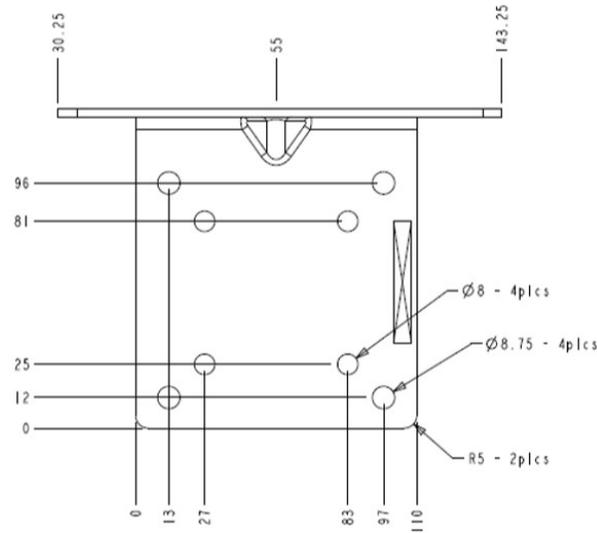


Figure 20: Detailed 2D view of the bracket

2.2 Screws and washers

Table 7: Technical specifications of the screws and washers

Part	Type	Quantity	Details
Screw	Pan head, cross recessed, stainless steel	4	<ul style="list-style-type: none"> Diameter = M5.0 Pitch = 0.80 mm Length = 8 mm
Washer	Spring lock, M5, stainless steel	4	<ul style="list-style-type: none"> Diameter = M5.0