



# **Hughes 4500 Install Guide**

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# Understanding safety alert messages

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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.

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## 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.

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## 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:** Potential Radio Frequency (RF) hazard. Where you see this alert symbol and WARNING heading, strictly follow the warning instructions to avoid injury to eyes or other 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 one 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 one 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

## Overview

This Install Guide provides instructions on how to manually mount a Hughes 4500 Terminal using Hughes Optional Installation Items. Please refer to the following documents for more details:

1. Quick Start Guide (3004339-0001):  
This guide focuses on the instructions to unpack and bring up the Hughes 4500 Terminal for the first time.
2. User Guide:  
This guide provides the most up to date information available on the Hughes 4500 Terminal including configuration details and troubleshooting suggestions.

## Quick start

Here are the instructions to bring up Hughes 4500 Terminal for the first time:

1. Remove the SIM door using a Philips screwdriver
2. Install the USIM into the Terminal unit before powering up the unit



3. Connect the terminal barrel connector to power and Ethernet and power up the Terminal
  - a. Refer to Sections 'System Power Requirement' and 'Terminal Connector' of this Guide for more details related to the terminal connector
4. After powering up the Hughes 4500 Terminal will register and establish an IP context automatically by default. 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

Table 1: LED states

5. Connect the Hughes 4500 Terminal 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. The many configuration options are documented in the 4500 User Guide from which can be downloaded from <http://echostarmobile.com>
6. Confirm Internet connectivity via the Ethernet port (the USB port is restricted to local configuration only) using a browser to access a remote web site
7. Reinstall the SIM Door and gasket to maintain the water and dust sealing of the enclosure.

### NOTICE

Note: Please note that the torque specification on the SIM door assembly is 0.68 Nm (6 lbf in).

## Determining where to install the Terminal

For your Hughes 4500 Terminal to work correctly, it must be installed in a location that provides a clear view of the sky in all directions for a vehicular install and a clear 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.

## Optional Installation Items

Please refer to the Hughes catalog and pricelist for the purchase of any optional installation items.

### ***Magnetic Mounting Kit***

This kit may be used for mounting the Hughes 4500 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.

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

Item	Part Number	Specifications
Magnetic Mounting Kit	3501354-0001	High quality corrosion resistant plate with two circular magnets attached, ideal for vehicular installations

Table 2: Magnetic Mounting Kit

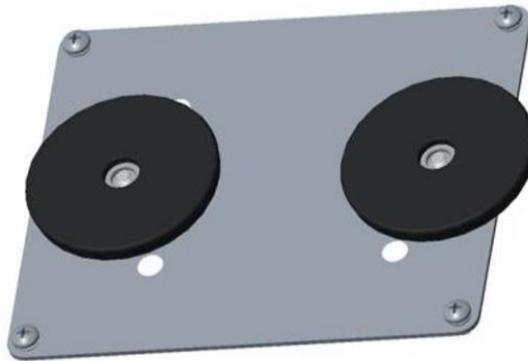


Figure 1: Magnetic Mounting Bracket

### ***Fixed Mounting Bracket Kit***

This kit may be used for mounting the Hughes 4500 Terminal to a vertical flat surface. The mounting kit includes:

- One bracket
- Four screws and four washers, to attach the bracket to the Terminal.

Mounting the bracket on the pole can be accomplished by using U-clamps that can be sourced separately.

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

Item	Part Number	Specifications
Fixed Mounting Bracket	3501353-0001	High quality corrosion resistant angle bracket ideal for vertical installations

Table 3: Fixed Mounting Bracket Kit



Figure 2: Fixed Mounting Bracket

### Cable Options

Several readymade cables are available for connecting to the 4500 Hughes Terminal.

Item	Part Number	Specifications
Power & Data Cable, blunt wire, 5m	3501314-0002	Blunt wire including the mating barrel connector to the 4500 Terminal
Power & Data Cable, blunt wire, 10m	3501314-0003	Blunt wire including the mating barrel connector to the 4500 Terminal
Power & Data Cable, cig lighter plug & RJ45 socket, 5m	3501314-0004	Ideal for temporary vehicular installations
Mating Power & Data Connector, bare	9509554-0001	For custom cable installations
Custom Power & Data Cable, 8.5mm OD, 100m	9509573-0001	For custom cable installations

Table 4: Cable Options in Catalog



Figure 3: Cables Options

## Terminal Installation using the Optional Mounting Kits

### *Terminal Installation using the Magnetic Mounting Kit*

Using the Magnetic Mounting Kit, the Hughes 4500 Terminal can be installed on any horizontal metallic surface (e.g. on the top of a vehicle).

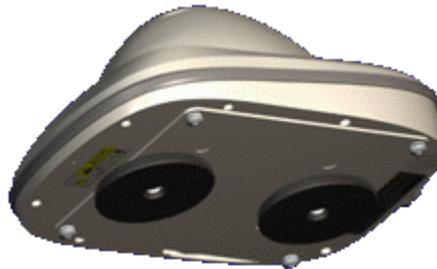


Figure 4: Magnetic Mounting Kit Installation

All the parts included in the Mounting Kit (one plate with two magnets, washers and screws) should be used and positioned as shown in the following figures and described below:

1. Place the plate so its four holes must face the equivalent ones on the Terminal. The holes on each side have the same dimensions
2. Position all the washers 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 where you are going to install the Terminal
5. Place the assembly so the magnets are on top of the horizontal surface
6. Ensure the Terminal is stable, and it is not moving
7. Refer to the 3004339-0001 Hughes Quick Start Guide for more details to install the SIM and bring up the Terminal
8. Refer to the User Guide for further details.

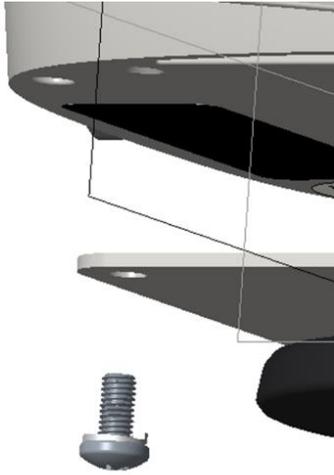


Figure 5: Positioning the washers and screws

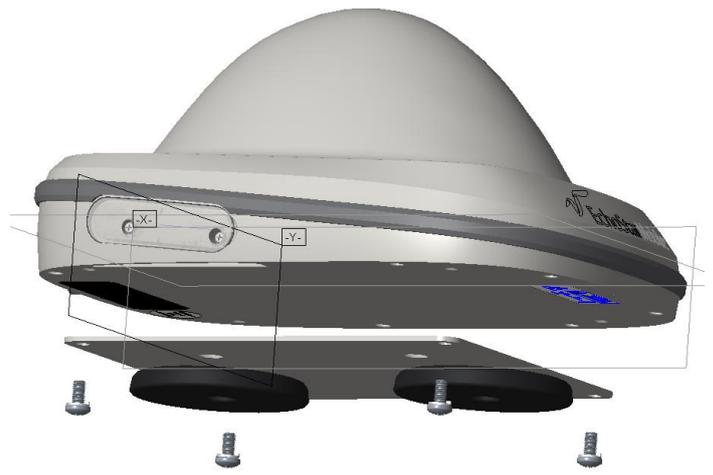


Figure 6: Placing the plate and tightening the screws

### ***Terminal Installation using the Fixed Mounting Bracket Kit***

Using the Fixed Mounting Bracket Kit, the Hughes 4500 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> as well as other such hardware sources.

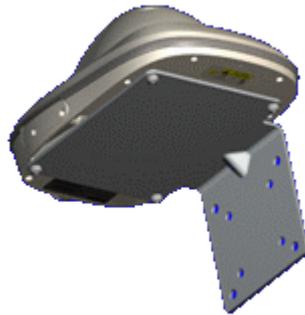


Figure 7: Fixed Mounting Bracket Installation

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 following figures and described below:

1. Point the bracket in the correct way, with one side facing the Terminal and the other side facing the vertical surface
2. Place the bracket so its four holes must face the equivalent ones on the Terminal. The holes on each side have the same dimensions

3. Position all washers 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 washers are compressed
5. Ensure the Terminal is stable, and it is not moving
6. Refer to the 3004339-0001 Hughes Quick Start Guide for more details to install the SIM and bring up the Terminal
7. Refer to the User Guide for further details.

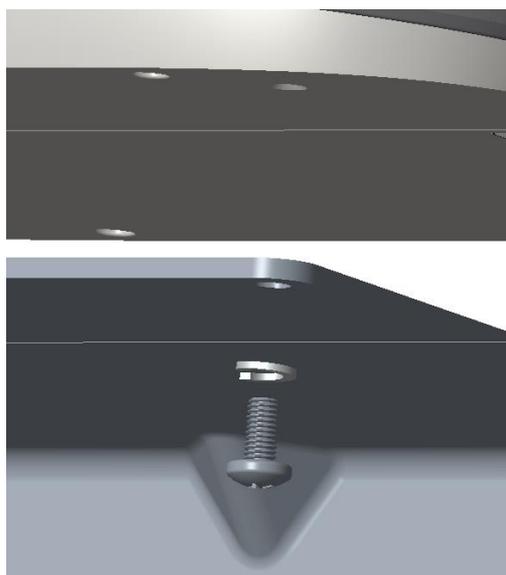


Figure 8: Positioning the washers and screws



Figure 9: Placing the plate and tightening the screws

## System Power Requirements

The Terminal must be connected to a power supply that has the following 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 <i>(with a Power cable length &lt; 10m)</i>	12 VDC
Power Supply Voltage Suggested <i>(with a Power cable length &gt; 10m)</i>	19 VDC
Power Supply Requirement	16 W
Power Supply Peak Current	3.5 A

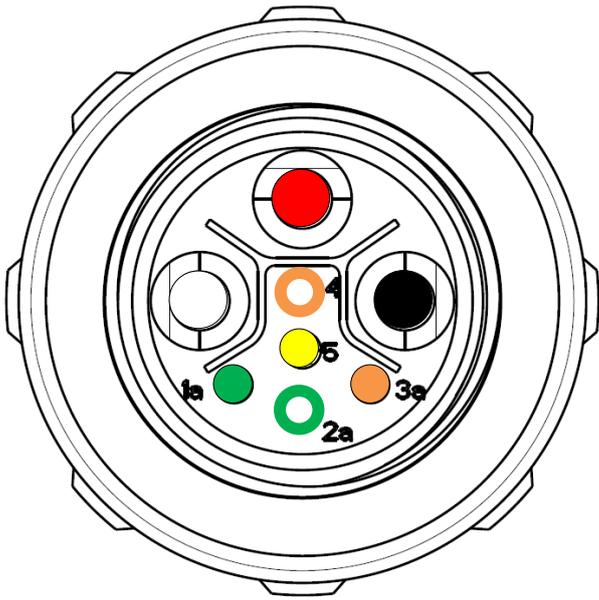
Table 5: System Power Requirements



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.

## Terminal Connector

The Terminal connector 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, then a jumper wire must be connected between Pin 1 and Pin 3 or connect Pin 1 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	unused

Figure 10: Terminal Connector with pinout

Table 6: Connector Pinout



Figure 11: Terminal Connector

## Vehicular installation

### 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 13 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.

Pin	Wire Color	Function	Details
1	White	Remote Switch/Ignition	Link Pin 1 & 3 if Ignition not enabled
2	Black	Ground	
3	Red	Power +12VDC	

Table 7: Power plug pin-out

### Vehicular power schematics

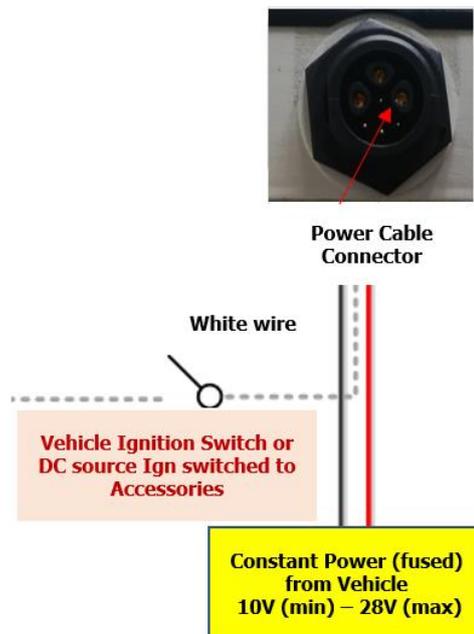


Figure 12: Vehicular wiring configuration (using Ignition Sense / Remote Switch)

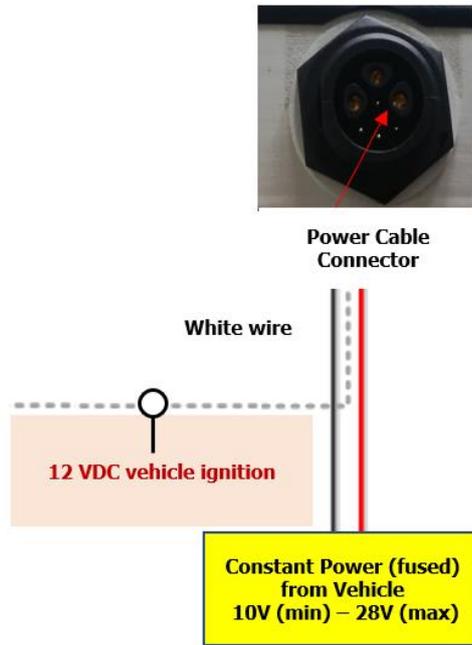


Figure 13: Vehicular wiring configuration (without ignition sense) with pins 1 & 3 connected

## Fixed installation

### ***Terminal power connection***

The Hughes 4500 Terminal can be powered by a direct source – see System Power Requirements and Terminal Connector sections for more details.

# Technical specifications

## Bracket

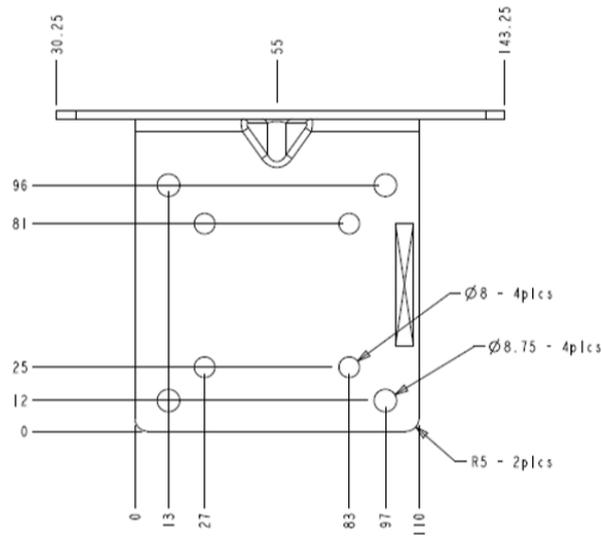


Figure 14: Detailed 2D view of the bracket

## Screws and Washers

Part	Type	Quantity	Details
Screw	Pan Head, Cross Recessed, Stainless Steel	4	<ul style="list-style-type: none"> <li>- Diameter = M5.0</li> <li>- Pitch = 0.80 mm</li> <li>- Length = 10mm</li> </ul>
Washer	Spring Lock, M5, Stainless Steel	4	<ul style="list-style-type: none"> <li>- Diameter = M5.0</li> </ul>

Table 8: Technical Specifications of the screws and washers