

USER'S GUIDE

Vaisala Portable Antenna Set CG31



PUBLISHED BY

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CHAPTER 1

GENERAL INFORMATION

This chapter provides general notes for the manual and the product.

About This Manual

This manual provides information for installing, operating, and maintaining Vaisala Antenna Set CG31.

Contents of This Manual

This manual consists of the following chapters:

- Chapter 1, General Information, provides general notes for the manual and the product.
- Chapter 2, Product Overview, introduces portable antenna set CG31.
- Chapter 3, Installation, instructs you in installing the antenna set.
- Chapter 4, Technical specifications, provides the technical data of the antenna set.
- Chapter 5, Parts list, contains the spare parts list for the antenna set.
- Chapter 6, Technical Support Information, provides you with information for technical support.

Version Information

Table 1 Manual Revisions

Manual Code	Description
M210843EN-F	April 2015. Edited information on antenna cable connectors.
M210843EN-E	February 2012. Minor editorial updates.
M210843EN-D	September 2010. New template.
M210843EN-C	Previous version. Telemetry range corrected.

Documentation Conventions

Throughout the manual, important safety considerations are highlighted as follows:

WARNING	Warning alerts you to a serious hazard. If you do not read and follow instructions very carefully at this point, there is a risk of injury or even death.
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CAUTION	Caution warns you of a potential hazard. If you do not read and follow instructions carefully at this point, the product could be damaged or important data could be lost.
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NOTE	Note highlights important information on using the product.
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Product-Related Safety Precautions

CG31 delivered to you has been tested for safety and approved as shipped from the factory. Note the following precautions:

CAUTION	Do not modify the unit. Improper modification can damage the product or lead to malfunction.
----------------	--

ESD Protection

Electrostatic Discharge (ESD) can cause immediate or latent damage to electronic circuits. Vaisala products are adequately protected against ESD for their intended use. However, it is possible to damage the product by delivering electrostatic discharges when touching, removing, or inserting any objects inside the equipment housing.

To make sure you are not delivering high static voltages yourself:

- Handle ESD sensitive components on a properly grounded and protected ESD workbench. When this is not possible, ground yourself to the equipment chassis before touching the boards. Ground yourself with a wrist strap and a resistive connection cord. When neither of the above is possible, touch a conductive part of the equipment chassis with your other hand before touching the boards.

- Always hold the boards by the edges and avoid touching the component contacts.

Recycling



Recycle all applicable material.



Dispose of batteries and the unit according to statutory regulations. Do not dispose of with regular household refuse.

Trademarks

DigiCORA® and MARWIN® are registered trademarks of Vaisala Oyj.

Windows® is a registered trademark of Microsoft Corporation in the United States and/or other countries.

Warranty

For certain products Vaisala normally gives a limited one-year warranty. Visit our Internet pages for more information and our standard warranty terms and conditions: www.vaisala.com/services/warranty.html.

Please observe that any such warranty may not be valid in case of damage due to normal wear and tear, exceptional operating conditions, negligent handling or installation, or unauthorized modifications. Please see the applicable supply contract or Conditions of Sale for details of the warranty for each product.

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CHAPTER 2

PRODUCT OVERVIEW

This chapter introduces portable antenna set CG31.

Introduction to Portable Antenna Set CG31

Portable Antenna Set CG31 is a mobile antenna configuration designed to be used with GPS wind finding systems in field conditions. The antenna set consists of a Helix UHF antenna, a GPS antenna, and the Antenna Amplifier and Switch RAA111 on a tripod mount. The coloring of the parts is adjusted for field operation conditions. One person can transport and assemble the antenna set.

Portable Antenna Set CG31 receives radiosonde signals in 400 MHz meteorological range. The antenna set can be used with Vaisala DigiCORA and MARWIN MW32 sounding systems.

The tripod and the antennas fold compactly for transportation. The transport case is made of polypropylene and equipped with wheels for ease of transportation. The transport case also holds a tools bag, which contains foot pads, pegs, and a hammer.

Antenna Assembly

The Portable Antenna Set CG31 consists of the following parts:

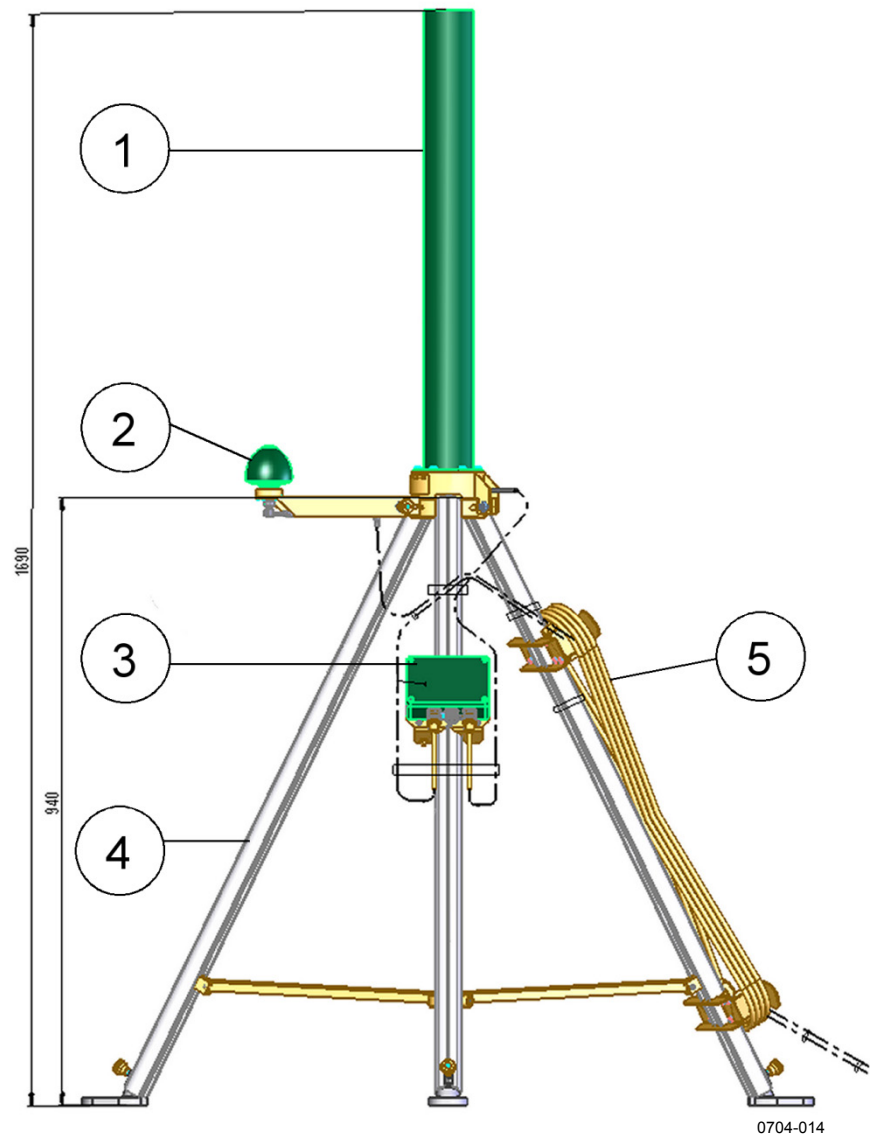


Figure 1 Antenna Set CG31 Assembly

The following numbers refer to Figure 1:

- 1 = Helix UHF antenna
- 2 = GPS antenna
- 3 = Antenna Amplifier and Switch RAA111
- 4 = Tripod
- 5 = Antenna cable UHF/GPS

CHAPTER 3

INSTALLATION

This chapter instructs you in installing the antenna set.

Selecting Location

For best results, select an installation site for the antenna set that is:

- open, in other words, clear of obstacles such as buildings, dense forests, or high metal masts.
- even, in other words, the ground is even and relatively firm.

A single tree does not affect signal reception to any significant degree, unless it is exceptionally dense or very close (less than 20 meters from the antenna set). Sparse forest can cause some attenuation but is usually not a real hindrance.

Other antenna masts and metal structures of small diameter do not disturb reception if situated more than 20 meters away from the antenna set. However, metal roofs or other large surfaces may reflect signals, causing short-duration fading. If the antenna set is screened by a large building, reception may be impossible.

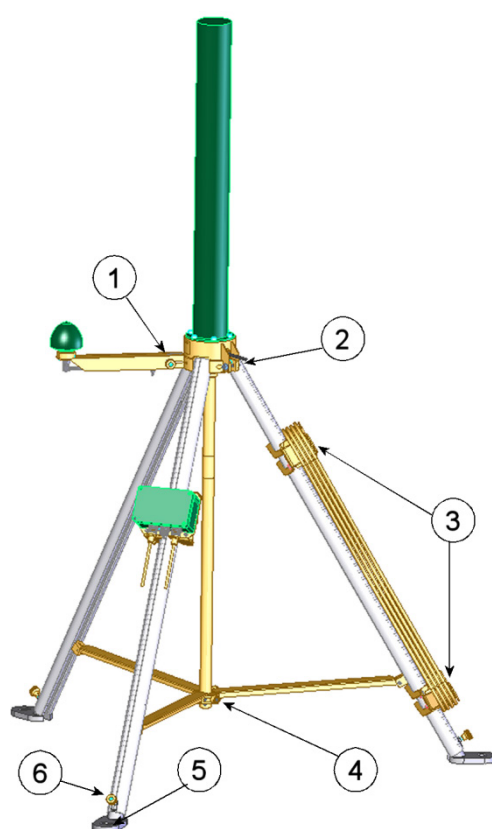
Install the antenna set on firm ground if possible. If the ground is soft, place the foot pads under the tripod legs to prevent the antenna set from sinking. Although the tripod legs are adjustable, the tripod is more stable when installed on an even surface.

Assembling the Antenna Set

One person can complete the antenna set assembly. When all the cables are connected and you assemble the antenna set on firm ground, the assembly takes less than two minutes.

NOTE

The antenna set is delivered with the Amplifier and Switch and the cable holder assembled. If you disassemble these parts, you must reassemble them to the exact locations in order for the antenna set to fit in the transport case. The tripod legs contain small markings that indicate the location for the top edge of the parts.



0704-015

Figure 2 CG31 Finger Nuts, Peg Hole and Cable Holder

The following numbers refer to Figure 2:

- 1 = Finger nut for GPS antenna
- 2 = Finger nut for Helix UHF antenna
- 3 = Cable holder
- 4 = Finger nut for locking ring
- 5 = Hole for peg
- 6 = Finger nut for tripod leg

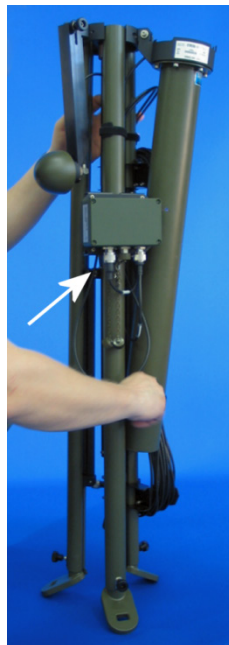
1. Take the tripod out of the transport case and place the tripod in an upright position.
2. Remove the strap that holds the tripod legs together.



0705-194

Figure 3 **Removing the Strap**

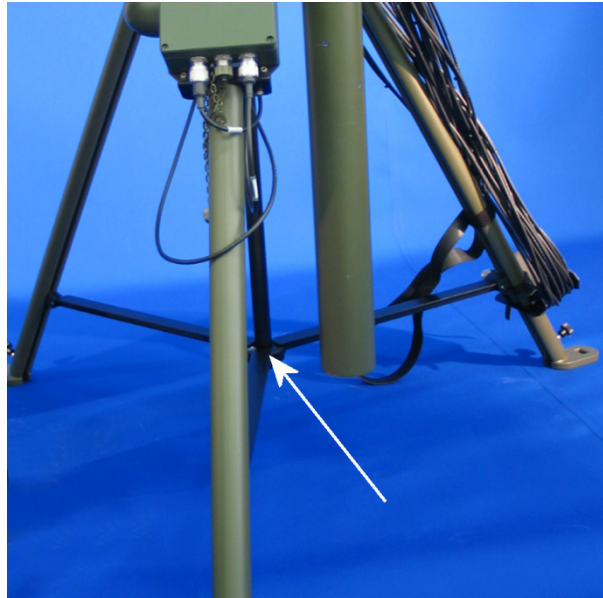
3. Loosen the locking ring with the finger nut.



0705-195

Figure 4 **Finger Nut for the Locking Ring**

4. Spread the tripod legs and push the locking ring all the way down to the end of the bar. The support bars should be horizontal.



0705-196

Figure 5 **Locking Ring Pushed to the End of the Bar**

5. Lock the locking ring by tightening the finger nut.



0705-197

Figure 6 **Locking the Locking Ring**

CAUTION Be careful not to pinch the cables during installation.
--

6. Adjust the legs to level the antenna set:
 - Loosen the finger nuts.
 - Pull the legs out.
 - Tighten the finger nuts.
 - Visually check that the antenna set is standing straight.



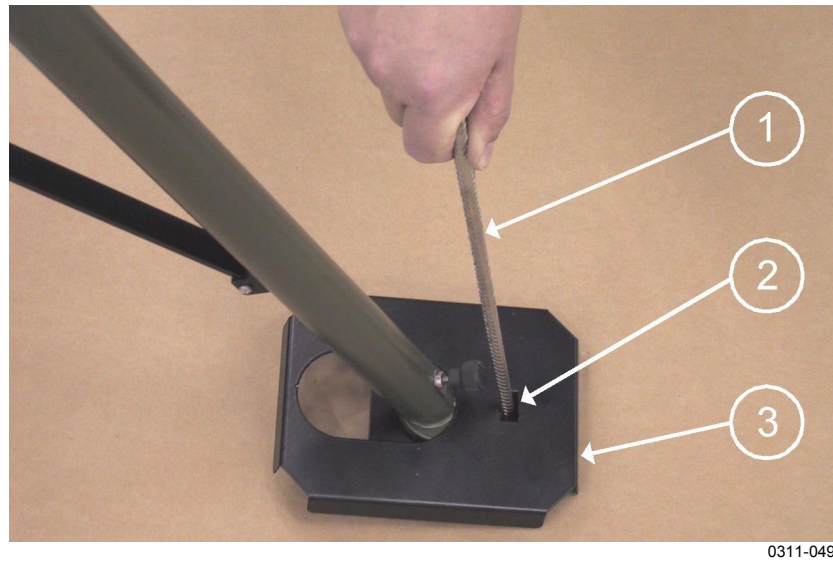
0705-198

Figure 7 **Adjusting the Legs**

NOTE

The higher the antenna is, the better the reception.

7. If the ground is soft, attach the foot pads (number 3 in Figure 8) under the legs to prevent the tripod from sinking.
 - Insert a peg (number 1 in Figure 8) through the hole (number 2 in Figure 8) to the ground to secure the leg.
 - Repeat this for all legs.
 - Use the provided hammer to pound the ground pegs in.



0311-049

Figure 8 **Attaching Foot Pads**

8. Lift the Helix UHF antenna up and lock it by tightening the finger nut.



0705-199

Figure 9 **Lifting the Helix UHF Antenna**

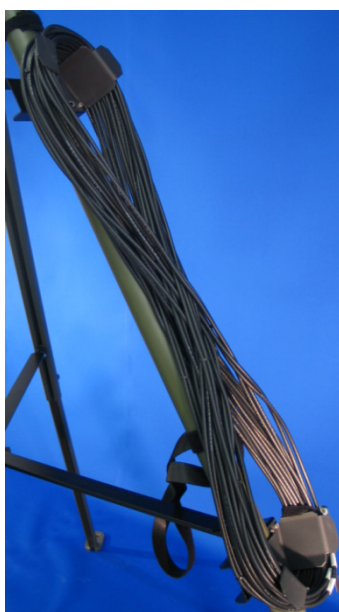
9. Lift the GPS antenna up and lock it by tightening the finger nut.



0705-200

Figure 10 Lifting the GPS Antenna

10. Check that all cables are connected. If they are not connected, refer to section Connecting Cables on page 16 for more information.
11. Connect the cables to the UHF and GPS antenna connectors in the sounding system.
12. Wind any extra cable length on the cable holder on the tripod leg in the pattern of figure eight. This will prevent the cable from becoming twisted and difficult to handle.



0705-201

Figure 11 Cable on the Cable Holder

Connecting Cables

The antenna set is delivered with all the cables connected. It is recommended to store the CG31 with the cables connected.

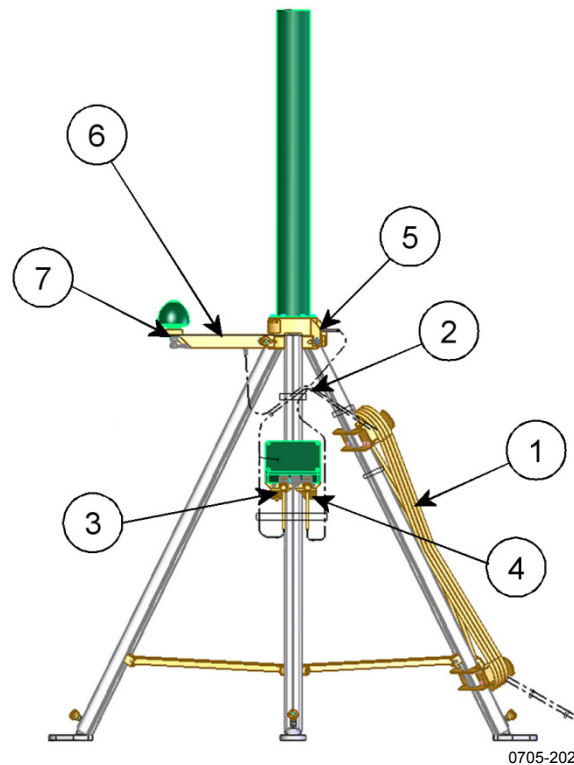


Figure 12 CG31 Cabling

The following numbers refer to Figure 12:

- 1 = Cable holder
- 2 = Cable guide
- 3 = OUT connector
- 4 = ANT1 connector
- 5 = Connector in the Helix UHF antenna
- 6 = Arm of the GPS antenna
- 7 = Connector in the GPS antenna

If the cables have been disconnected from the antennas and the Antenna Amplifier and Switch, do the following:

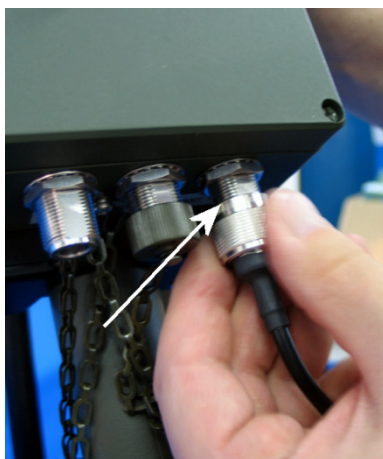
1. Assemble the antenna set.
2. Run the dual antenna cable from the cable holder to the guide on the tripod leg.
3. Connect the UHF antenna cables:
 - Connect the UHF part of the dual antenna cable to the OUT connector in the Antenna Amplifier and Switch.



0705-203

Figure 13 **OUT Connector in the Antenna Amplifier and Switch**

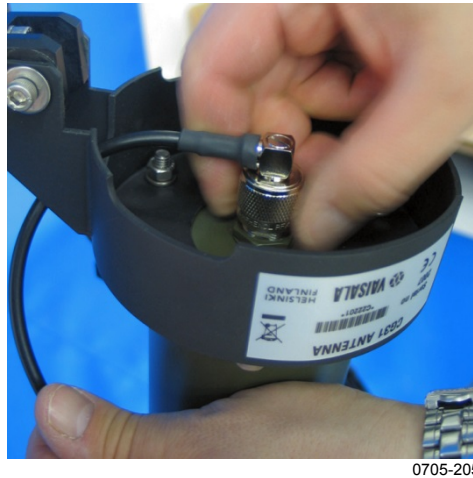
- Connect the UHF antenna cable to the ANT1 connector in the Antenna Amplifier and Switch.



0705-204

Figure 14 **ANT1 Connector in the Antenna Amplifier and Switch**

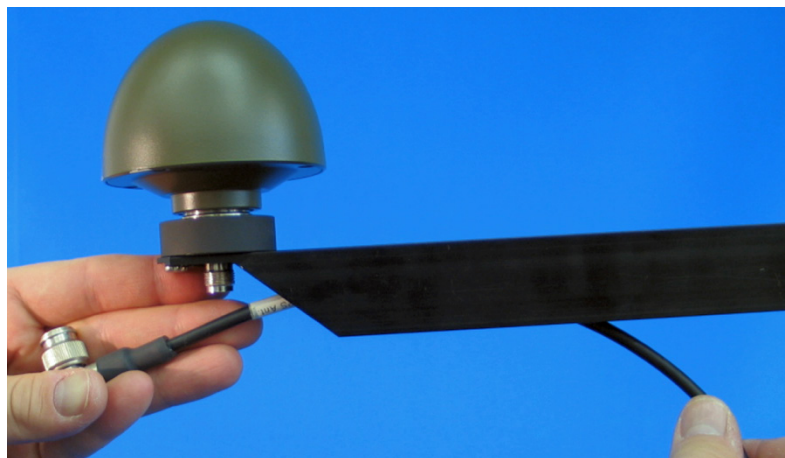
- Run the cable to the guide on the tripod leg and through the hinge in the Helix UHF antenna. Connect the end of the cable to the connector in the antenna.



0705-205

Figure 15 **Connecting the Cable to the Helix UHF Antenna**

4. Connect the GPS antenna cable:
 - Run the GPS part of the dual antenna cable inside the arm of the GPS antenna.



0705-206

Figure 16 **Cable Inside the Arm of the GPS Antenna**

- Connect the cable to the connector in the GPS antenna.



0705-207

Figure 17 Connecting the Cable to the GPS Antenna

Disassembly for Transportation

To disassemble the antenna set, do the following:

1. If you have used the foot pads under the tripod legs, remove them and put them in the tools bag.
2. Disconnect the cables from the sounding system and wind the cable on the cable holder on the tripod leg in the pattern of figure eight. This will prevent the cable from becoming twisted and difficult to handle.

NOTE

Do not disconnect the cables to the antennas and the Amplifier and Switch. It is recommended to store the CG31 with the cables connected.

3. Loosen the locking ring on the Helix UHF antenna with the finger nut and fold the antenna.
4. Loosen the locking ring on the GPS antenna with the finger nut and fold the antenna.
5. Loosen the locking ring on the tripod with the finger nut.
6. Fold the tripod legs together and attach the strap that holds the legs together.

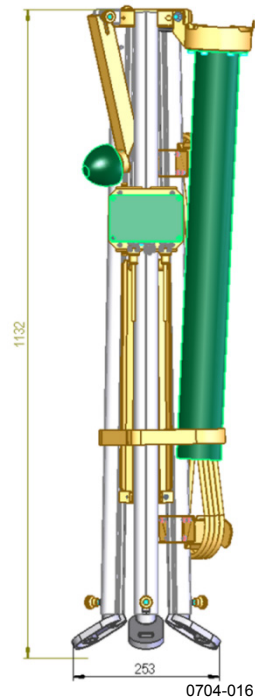
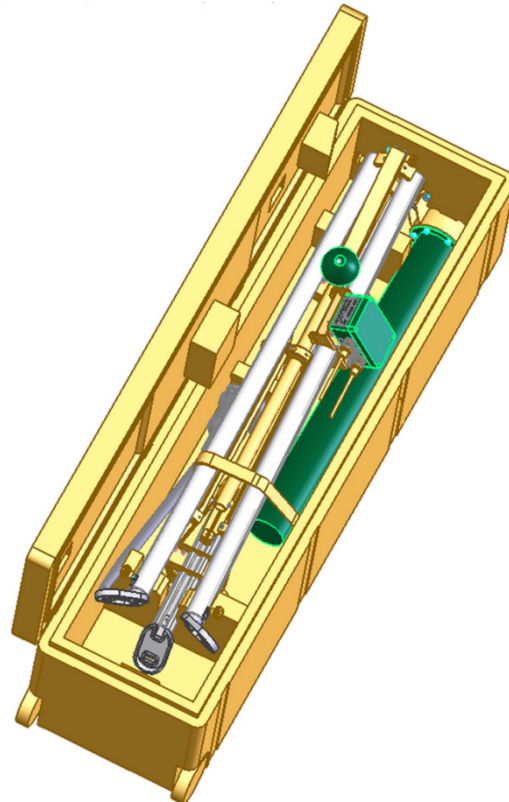


Figure 18 CG31 Disassembled for Transportation

7. Place the antenna set in the transport case:
 - Legs pointing to the wheels of the transport case
 - GPS antenna pointing upwards

Refer to Figure 19 on page 21 for the correct placement of the antenna set in the transport case.



0704-017

Figure 19 CG31 Packed for Transportation

Maintenance

Under normal conditions, the CG31 needs only a minimal amount of maintenance.

- Clean the antenna set regularly by removing excess dirt and dust.
- Inspect the cables for breaks, cracks in the protective coating or connectors, and bent or damaged pins. Replace broken cables when needed.
- Lubricate the tripod attachment screw with grease once a year.

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CHAPTER 4

TECHNICAL SPECIFICATIONS

This chapter provides the technical data of the antenna set.

General Specifications

Table 2 General Specifications

Property	Value
Frequency range	400 - 406 MHz
Directivity	3.5 dBic
Polarization	Horizontal
Horizontal pattern	Omnidirectional
Telemetry Range	150 km
Amplifier	
Gain	20 dB typical
Noise figure	<2 dB
Power input	+10 ... 12 VDC, typically 130 mA through RF cable
Output impedance	Output impedance 50 ohms, VSWR <1.5
GPS Antenna Module	
Primary power	+5 volts DC ($\pm 10\%$)
Power consumption	22 mA, 0.11 watts (nominal)
Output impedance	50 Ohms
Frequency	L1 (1575 MHz)
Polarization	Right-Hand Circular Polarization (RHCP)
VSWR	2:1
Axial Ratio	2 dB at zenith, 10 dB above 10° elevation
Gain	35 dB (nominal)
Noise	2.75 dB (nominal)
Pass-band width	50 MHz
Azimuth coverage	360° (omni-directional)
Elevation coverage	0° to 90° elevation (hemispherical)
Mechanics	
Antenna Cable Connector	UHF Antenna: Coaxial N-type male GPS Antenna: Coaxial TNC-type male
Diameter assembled	1133 mm
Total height assembled	1695 mm
Transportation case dimensions	1380 x 355 x 385 mm
Weight (antenna set / including case)	10.5 kg / 23.5 kg
Standard cable length	20 m

Environmental conditions	
Operating temperature range	-40 ... 55° C
Operating humidity range	0 ... 100 % RH
Operating precipitation	Unlimited
Storage temperature	-50 ... +71 °C
Storage humidity	0 ... 100 % RH

CHAPTER 5

PARTS LIST

This chapter contains the spare parts list for the antenna set.

Table 3 Spare Parts List for Portable Antenna Set CG31

Part no.	Item	Quantity
DRW220676	Tripod for CG31	1
DRW224063SP	Antenna Cable, Dual UHF/GPS 20m	1
DRW220836SP	GPS Antenna, TNC, green for CG31	1
RAA1111SP	UHF Antenna Amplifier and Switch, Green AN11	1
216425MWSP	Helix Antenna, Synergetics 15A-N, Green 285	1
DRW220872	Transport Case, EPP for CG31	1
DRW220856SP	Antenna Cable 0.8m	1
QMY103M	Set of Pegs and Pads with Bag (3+3)	1
25926 *)	Hammer 1.0 kg	1
QM40142 *)	Peg	3
QM40074 *)	Tools Bag	1
QM40276 *)	Large Foot Pad	3

*) Included in QMY103M Set of Pegs and Pads with Bag

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CHAPTER 6

TECHNICAL SUPPORT INFORMATION

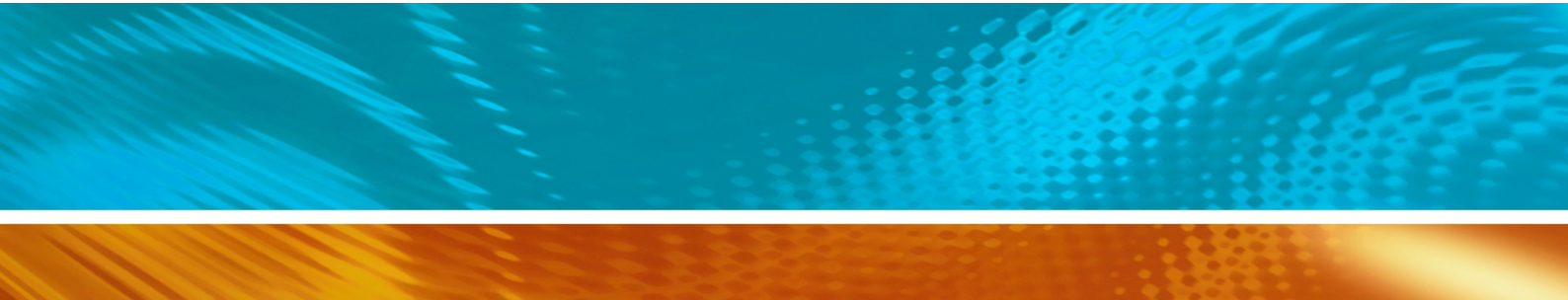
This chapter provides you with information for technical support.

Technical Support

For technical questions, contact the Vaisala technical support by e-mail at helpdesk@vaisala.com. Provide at least the following supporting information:

- Name and model of the product in question
- Serial number of the product
- Name and location of the installation site
- Name and contact information of a technically competent person who can provide further information on the problem.

For Vaisala Service Center contact information, see www.vaisala.com/servicecenters.



www.vaisala.com

