VAISALA

USER'S GUIDE

Vaisala GPS Antenna GA31

M210546EN-L

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 the information needed to use Vaisala GPS Antenna GA31.

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, provides a general description of GA31.
- Chapter 3, Installation, provides information on GA31 installation and on the selection of a suitable site for the antenna.
- Chapter 4, Operation and Maintenance, explains the use of the GA31 antenna and preventive maintenance.
- Chapter 5, Specifications, presents the technical specifications for the antenna.
- Chapter 6, Spare Parts List, presents the spare parts lists for GA31.
- Chapter 7, Technical Support, provides contact information for technical support.

Version Information

Table 1 Manual Revisions

Manual Code	Description
M210546EN-L	March 2015. Updated information on cable lengths.
M210546EN-K	August 2013. Added information on GA45007SP, GPS bullet antenna with TNC-N adapter.
M210546EN-J	January 2013. Latest version. Installation instructions updated, figures updated.
M210546EN-H	May 2012. Information on installation added.
M210546EN-G	February 2012. Information on grounding added.
M210546EN-F	March 2011. Technical specifications edited.
M210546EN-E	January 2011. Aluminum insert in the base and new assembly figure added. Spare parts list updated.
M210546EN-D	September 2010. Information on cable type and length added.
M123456EN-C	June 2008.

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.

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.

NOTE Note highlights important information on using the product.

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. It is possible to damage the product, however, 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 an ESD workbench is not available, ground yourself to the equipment chassis with a wrist strap and a resistive connection cord.
- If you are unable to take either of the above precautions, touch a conductive part of the equipment chassis with your other hand before touching ESD sensitive components.
- Always hold component 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

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

Warranty

Visit our Internet pages for standard warranty terms and conditions: www.vaisala.com/warranty.

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.

CHAPTER 2

PRODUCT OVERVIEW

This chapter provides a general description of GA31.

General

Vaisala GPS Antenna GA31 is intended for reception of C/A code signals from the NAVSTAR satellites. These signals are Right Hand Circular Polarization (RHCP) centered at 1575.42 MHz. GA31 is suitable for stations equipped with the GPS wind finding system.

The Radiator Element with the Low Noise Amplifier module is a commercially available GPS antenna unit that rejects the unwanted Left Hand Circular Polarisation (LHCP) and out-of-band signals. The antenna filters, amplifies and transfers the signals to the navigation unit for further processing.

GA31 differs from GA20, another GPS antenna version, in that it includes an N-to-TNC cable for connecting the antenna to sounding instruments.

Construction

The active GPS Antenna module consists of an L1 frequency antenna element integrated with an internal interference rejection filter and Low Noise Amplifier (LNA). The element is enclosed within a radome with an attached mounting base. A single N connector carries both the GPS signal to the navigation unit and the 5-voltage power to the LNA. The radiator element and preamplifier are housed in a watertight round-shaped plastic radome that is mounted on top of the 1.5-meter pole.

The aluminum insert in the base of the antenna accepts a standard 1"-14 pole mount. The N connector is located inside the threaded insert allowing the antenna cable to be routed through the pole mount, which protects the cable connection from the environment for added reliability.

The antenna is equipped with a mounting flange at the lower end of the pole.

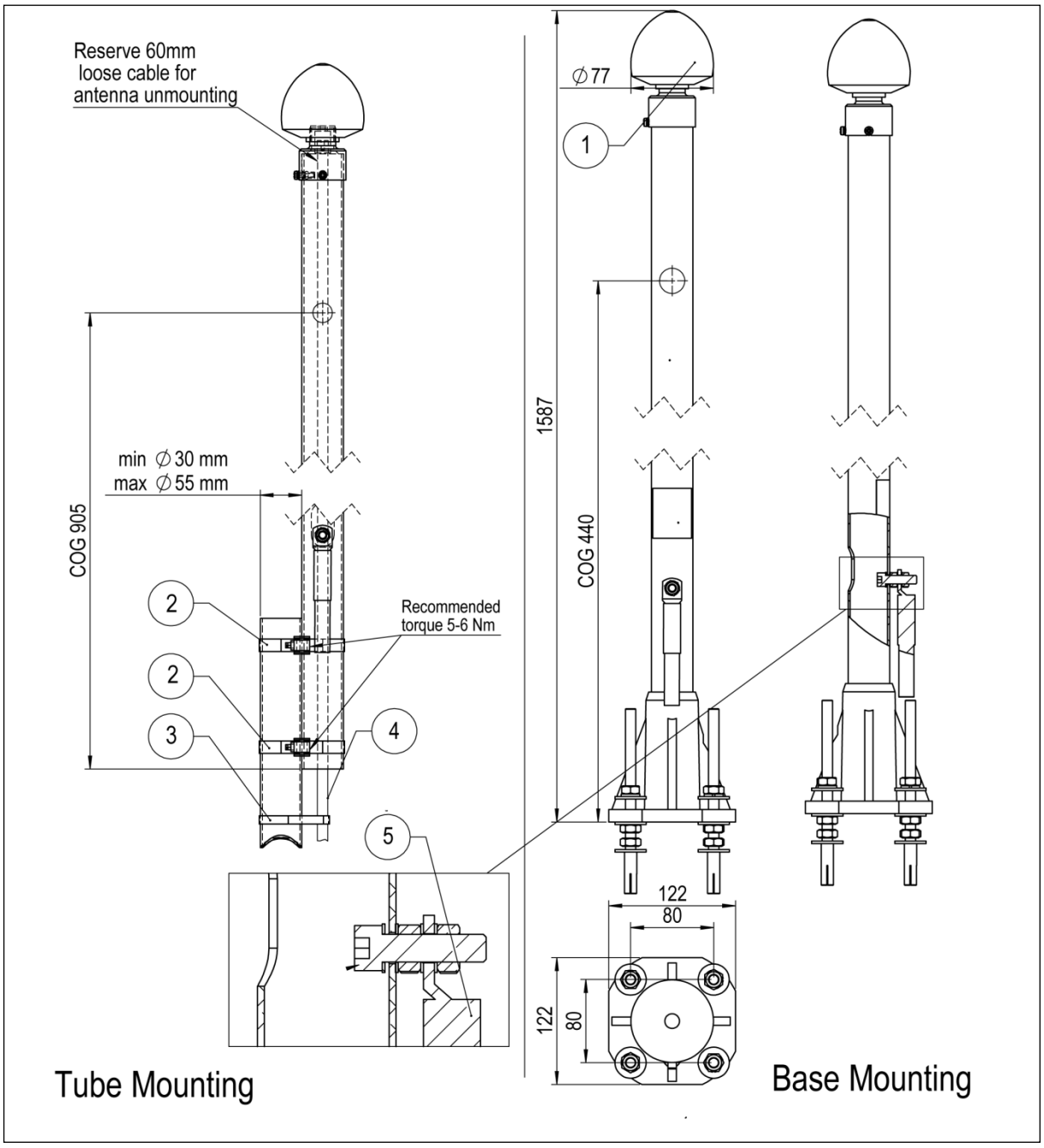

Figure 1 GPS Antenna GA31

The following numbers refer to Figure 1:

1 = GPS bullet antenna
2 = Clamps for tube mounting
3 = Cable tie
4 = Coaxial cable
5 = Grounding cable

CHAPTER 3

INSTALLATION

This chapter provides information on GA31 installation and on the selection of a suitable site for the antenna.

Selecting Installation Site

Proper siting of the antenna is important for good performance. As a general rule, the antenna should be installed so that it is not screened by large obstacles, such as buildings, thick forest, or high metal masts.

For best reception, choose an antenna location that has a clear view of the sky down to the horizon in all directions. This will ensure that all satellites in view can be tracked without obstruction. In some cases it may be required to mount the antenna on an elevated structure to guarantee unobstructed reception.

A single obstacle has little effect on reception if it is not exceptionally dense or very near the antenna (less than 20 meters). Sparse forest causes some attenuation but is usually no hindrance.

Antenna masts and other similar metal structures with a small diameter do not normally disturb reception to a serious extent if they are located more than 20 meters away. Metal roofs and other corresponding large surfaces can reflect signals in some instances, causing multipath reception. A large metal structure or a building screens the antenna, and reception through it is then impossible.

Installing GA31

CAUTION	The protective grease on the antenna connector must not be removed. Be careful not to let sand or dirt get to the connector during installation.

NOTE	For maintenance purposes, leave an empty area of 600 mm around the antenna.

The antenna can be mounted with the mounting flange on a foundation that is solid enough. See Base Mounting in Figure 1 on page 8.

Alternatively, the flange can be removed and the pole can be attached with the clamps included in the delivery, for instance, to a vertical rail of a railing. See Tube Mounting in Figure 1 on page 8.

Before attaching the antenna pole to the antenna unit, it is recommended to pass the antenna cable through the pole by doing the following:

1. To make it easier to slip the cable to the tube, first remove the bushing on the top of the pole.
2. Loosen the two M4 screws and lift the bushing up.
3. Pass the cable through the pole.
4. Before attaching the cable to the antenna unit, pass the cable through the bushing, too.
5. After attaching the connector, wring the bushing to the thread of the antenna unit and press the bushing to the top of the tube, pulling the cable cautiously out from the tube at the same time.

   In base mounting, pass the antenna cable through the hole at the bottom end of the antenna. The minimum size for the TNC connector hole is 17 mm. See Figure 1 on page 8.
6. Lock the knob with M4 screws.

The minimum bending radius for the antenna cable is 55 mm.

Length of the Antenna Cable

The standard length of the antenna cable is 33 meters and the attenuation of the standard cable type (RG-213/U) is 26 dB/100 m at 1500 MHz.

Other cable types and lengths are possible, but, for full system performance, the attenuation of the antenna cable must be between 5 - 15 dB.

Table 2 Antenna Cable Length

Vaisala Code	Cable Length
DRW216768SP	33 meters
DRW216768S	60 meters

Grounding

Because antennas can act as lightning rods, a separate lightning protection grounding must be taken into consideration according to local lightning protection regulations. To protect structures, equipment and personnel, a low-resistance path to the ground (ground electrode) must be provided for the current of the lightning strike.

A good grounding also protects the personnel against hazardous touch voltages under fault conditions; therefore, the grounding system must get proper attention.

Attach the grounding cable as follows:

1. Attach the grounding cable (= down conductor) separately from the other cables, and secure it firmly at intervals of one meter or less.
2. Make sure the bending radius is not under 200 mm (eight inches). All bends must be smooth and never over 90 degrees.
3. Route the grounding cable to the ground as directly as possible. Do not let the excess cable form loops.

CAUTION Never let the excess cable form loops.

Grounding Cable

The grounding cable is weather, UV and ozone-resistant, and also suitable for direct burial.

Table 3 Grounding Cables

Vaisala Part Number	Cable Length	Other Information
CBL210160-4M	4 meters	35 mm^2 stranded copper with jacket and M8 tube cable lugs on both cable ends
CBL210160-SPEC	Can be ordered separately at custom length	

CHAPTER 4

OPERATION AND MAINTENANCE

This chapter explains the use of the GA31 antenna and preventive maintenance.

Operation

GA31 can be used in conjunction with Vaisala sounding instruments equipped with MRG GPS receiver unit.

Sensitive parts of the antenna are protected by the plastic cover and are thus not prone to mechanical damage.

Preventive Maintenance

The cover also protects the parts from rain. Nevertheless, from time to time it is advisable to inspect the antenna for possible corrosion damage and ensure that the connectors are in good condition.

When disassembling the antenna element, the M4 screws are loosened first. The antenna element with the mounting bush can then be removed.

If the antenna operates poorly as a whole, first check that the DC supply input (+5V) is found at the end of the antenna cable. If the supply voltage is in order, the fault is possibly in the antenna preamplifier. Replace the GPS bullet antenna (spare part number GA45007SP).

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CHAPTER 5

SPECIFICATIONS

This chapter presents the technical specifications for the antenna.

General Specifications

Table 4 General Specifications

Feature	Specification
Operating temperature	-40°C to +85°C
Storage temperature	-55°C to +100°C
Weight	2.55 kg (antenna and tube, no cables)
LNA power	+5V DC (±10%)
Power consumption	30 mA (maximum)
Frequency	1575 MHz
Output impedance	50 Ω
VSWR	2.0 (maximum)
Gain	35 dB ±3 dB (maximum)
Noise figure	3.3 dB (maximum)
Pass-band width	50 MHz
Azimuth coverage	360° (omni-directional)
Elevation coverage	0° to 90° elevation (hemispherical)

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CHAPTER 6
SPARE PARTS LIST

This chapter presents the spare parts lists for GA31.

Table 5 GA31 Spare Parts

Part Number	Item	Quantity
DRW216768SP	Antenna cable 33 m	
DRW216768SP	Antenna cable 60 m	
GA45007SP	GPS bullet antenna with TNC-N adapter	
60172	Worm bar M10x150, A4	4
0952	Anchor, M10x150 /Fe/Zn	4
3069	Nut, hex M10 DIN934 A4	12
16267	Washer, Fender A10,5 DIN9021 A4	12
4342	Washer, spring, B 10 A4	2
CBL210160-4M	Grounding cable, 4 m	1
CBL210160-SPEC	Grounding cable. Can be ordered separately at custom length.	
234092	Fixing screw set for the grounding cable	

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CHAPTER 7

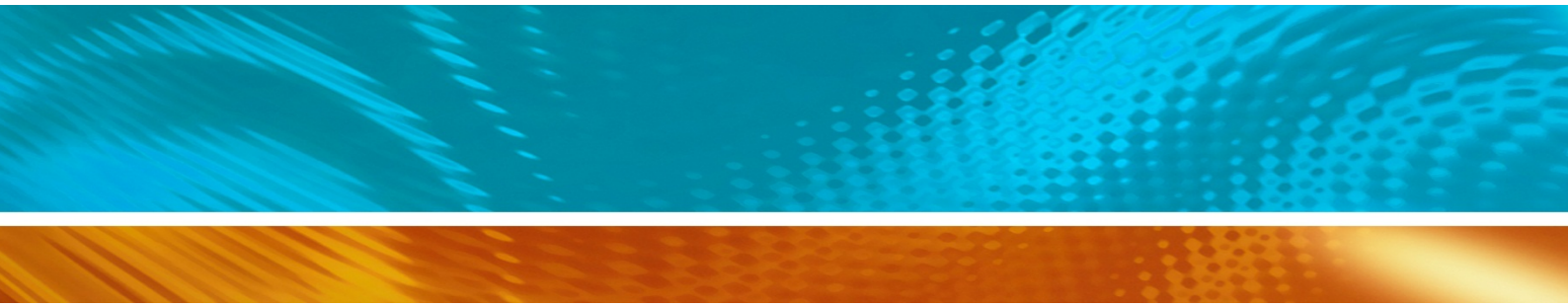
TECHNICAL SUPPORT

This chapter provides contact 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.



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