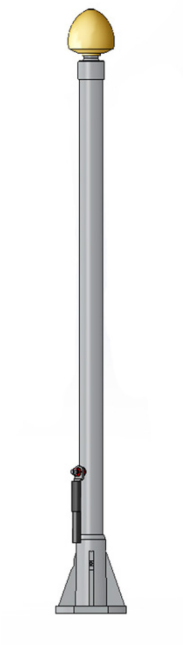
VAISALA

USER'S GUIDE

Vaisala GPS Antenna GA31N



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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 GPS Antenna GA31N.

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 Vaisala GPS Antenna GA31N.
- Chapter 3, Installation, provides information on installing GA31N.
- Chapter 4, Maintenance, describes GA31N maintenance.
- Chapter 5, Specifications, provides the technical specifications for GA31N antenna.
- Chapter 6, Spare Parts List, provides the spare parts lists for GA31N.

Version Information

Table 1 Manual Revisions

Manual Code	Description
M211030EN-H	March 2015. Updated information on cable lengths.
M211030EN-G	April 2013. Installation instructions updated, figures updated.
M211030EN-F	February 2012. Information on grounding added.
M211030EN-E	May 2011. New cover picture. Antenna weight added to Chapter Specifications.
M211030EN-D	March 2011. Maximum operating temperature edited.
M211030EN-C	January 2011. New aluminum insert in the base.
M211030EN-B	June 2010.
M211030EN-A	Unpublished first version.

Related Manuals

Table 2 Related Manuals

Manual Code	Manual Name
M211069EN	Vaisala MARWIN Sounding System MW32 User's Guide
-	Vaisala DigiCORA Sounding System MW41 On-line help, available in the web user interface

General Safety Considerations

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. 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

MARWIN® is a registered trademark 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. 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 provides a general description of Vaisala GPS Antenna GA31N.

General

Vaisala GPS Antenna GA31N is intended for the reception of C/A code signals from the NAVSTAR satellites. These signals are Right Hand Circular Polarization (RHCP) centered at 1575.42 MHz. GA31N is suitable for stations equipped with the GPS wind finding system.

The antenna contains a radiator element with a low noise amplifier module that 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.

GA31N can be used in conjunction with Vaisala sounding instruments equipped with MWG processor boards.

Antenna Assembly

The GA31N 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 dome 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 plastic dome that is mounted on top of the 1-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. The antenna's height is only one meter, so it is optimized for naval use.

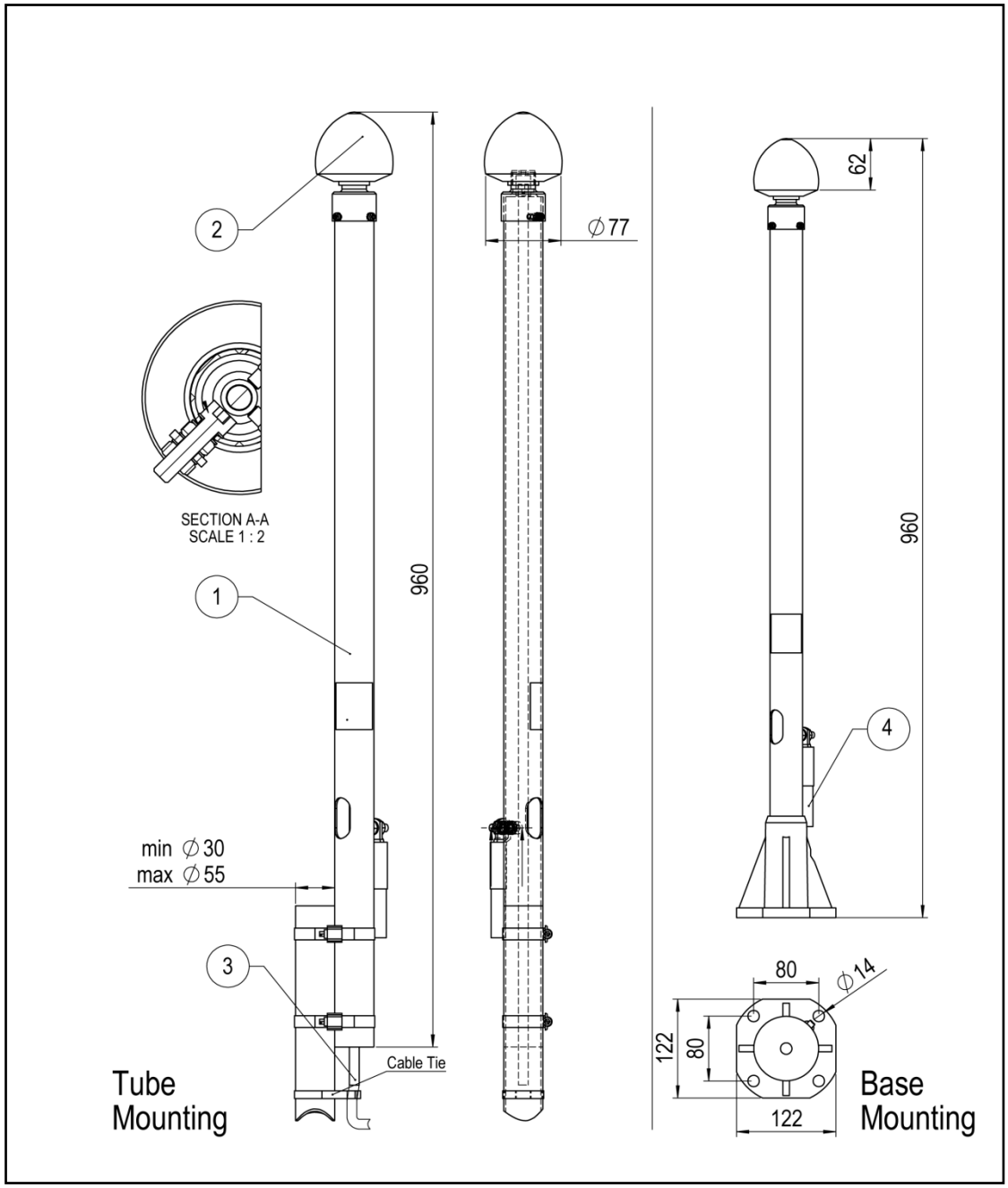

Figure 1 GPS Antenna GA31N

The following numbers refer to Figure 1 above:

1 = Antenna body
2 = GPS bullet antenna with N connector
3 = Coaxial cable
4 = Grounding cable

CHAPTER 3

INSTALLATION

This chapter provides information on installing GA31N.

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.

Unpacking

Unpack the system, attach it in place, and connect the feeder cable. After this, the antenna is ready for use.

Setting Up the Antenna

CAUTION	Do not remove the protective grease on the antenna connector. 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 mounting 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 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 top of the pole.
2. Loosen 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.
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 carefully out of the tube at the same time.
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 should be between 5 - 15 dB.

Table 3 Cable Lengths

Vaisala Code	Length
DRW216768SP	33 m
DRW216768S	Customer-specific length, max. 60 m

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 less than 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. Cut any excess cable. 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 4 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	

Disassembly for Transportation

When disassembling the antenna element, loosen the M4 screws first. Next, remove the antenna element with the mounting bushing.

CHAPTER 4
MAINTENANCE

Under normal conditions, GA31N 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.

Sensitive parts of the antenna are protected by the plastic cover and are thus not prone to mechanical damage. 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, first check that the DC supply input (+5V) is found at the end of the antenna cable. If the supply voltage is correct, the fault is possibly in the antenna preamplifier. Replace the antenna element GA45007.

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CHAPTER 5

SPECIFICATIONS

This chapter provides the technical specifications for GA31N antenna.

General Specifications

Table 5 General Specifications

Property	Value
General	
Prime power	+5 V DC (±10%)
Power consumption	30 mA (maximum)
Frequency	1575 MHz
Output impedance	50 Ω
VSWR	2.0 (maximum)
Gain	35 dB
Noise figure	3.3 dB (maximum)
Pass-band width	50 MHz
Azimuth coverage	360° (omni-directional)
Elevation coverage	0° to 90° elevation (hemispherical)
Weight	2.1 kg (without cable)
Environmental Conditions	
Operating temperature	-40 °C to +85 °C
Storage temperature	-50 °C to +100 °C

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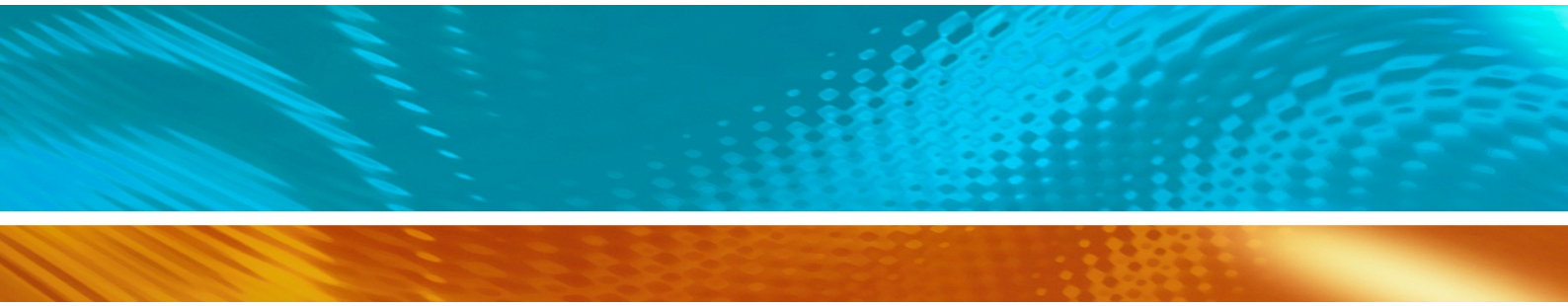
CHAPTER 6
SPARE PARTS LIST

This chapter provides the spare parts lists for GA31N.

Table 6 Spare Parts for GA31N Antenna

Item Number	Item
DRW231380	Antenna pedestal assembly L 900 mm
GA45007SP	GPS bullet antenna with N-connector
DRW216768SP	Coaxial cable TNC (m-/N(m), RG213, 33 m
DRW216768S	Cable, max. 60 m
CBL210160-4M	Grounding cable, 4 m
CBL210160-SPEC	Grounding cable. Can be ordered separately at custom length.
234092	Fixing screw set for the grounding cable



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