M211725EN-C

User Guide

Vaisala Telemetry Antenna

RM32

VAISALA

PUBLISHED BY

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1. About This Document

1.1 Version Information

This manual provides information for installing, operating, and maintaining RM32.

Table 1 Document Versions (English)

Document Code	Date	Description
M211725EN-C	January 2020	Vertical antenna was changed to long monopole antenna Scan 23304-000B. Cable lengths and spare parts were updated.
M211725EN-B	March 2015	Updated table *Cable Lengths*.
M211725EN-A	June 2014	First version of this document.

1.2 Related Manuals

Table 2 Related Manuals

Document Code	Name
M211415EN	*Vaisala DigiCORA Sounding System MW41 Technical Reference*
M211429EN	*Vaisala DigiCORA Sounding System MW41 Getting Started Guide*
M210568EN	*Antenna Amplifier and Switch RAA111 Technical Reference*

1.3 Documentation Conventions

WARNING! Warning alerts you to a serious hazard. If you do not read and follow instructions 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 highlights important information on using the product.

Tip gives information for using the product more efficiently.

Lists tools needed to perform the task.

Indicates that you need to take some notes during the task.

1.4 Trademarks

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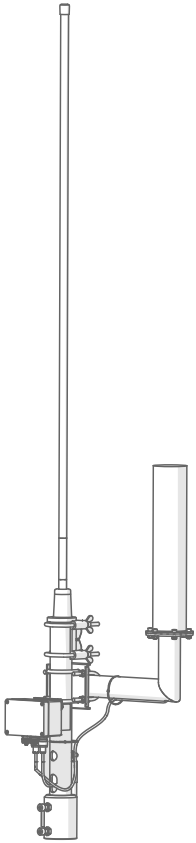
2. Product Overview

2.1 Vaisala Telemetry Antenna RM32



Vaisala Telemetry Antenna RM32 is an antenna system that can be used with Vaisala sounding systems equipped with Sounding Processing Subsystem SPS311G. It is well suited for fixed installations, but it can also be used in portable systems, where feasible.

RM32 has two antenna elements which have been selected to optimize the performance in all elevation angles, both near the horizon and at the zenith. The vertical antenna has a maximum gain of 5 dBi just below zero elevation, and the helix antenna has approximately hemispheric coverage and a maximum gain of 3 dBiC at the zenith.

2.2 Antenna Assembly

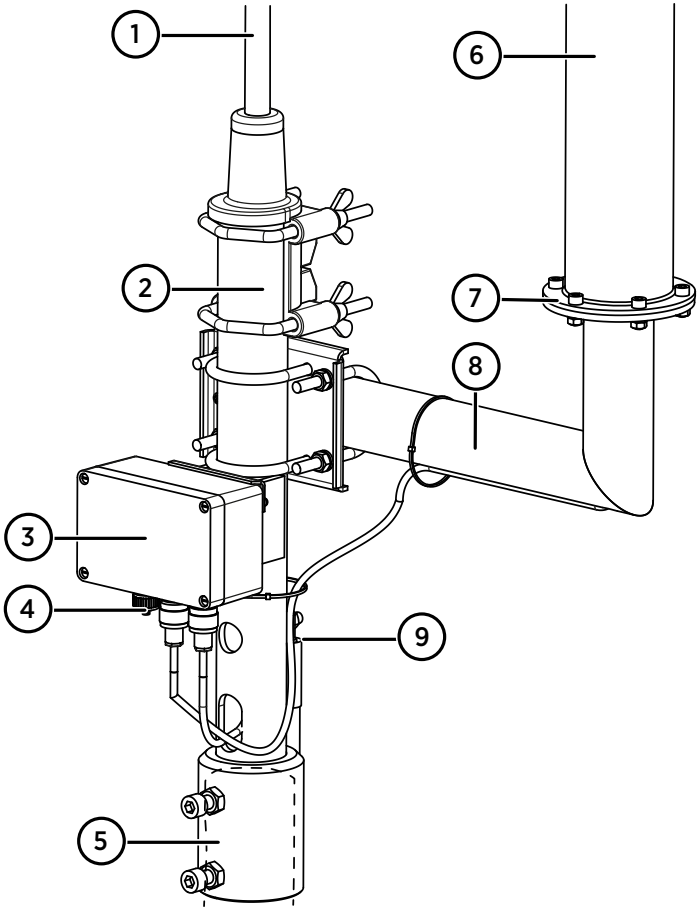


Figure 1 RM32 Parts

1 Vertical antenna
2 Tubular antenna mast
3 Antenna Amplifier and Switch RAA111
4 Connector for antenna cable
5 Mounting sleeve for mounting the assembly to antenna mast
6 Helix antenna
7 Flange
8 Tube branch
9 Grounding cable

2.2.1 Vertical Antenna

The vertically polarized omnidirectional monopole antenna performs best at low elevation angles when the radiosonde is near the horizon. The maximum gain of 5dBi is just below zero elevation. The antenna receives radiosonde signals in the 403 MHz meteorological band.

The antenna type is long monopole antenna Scan 23304-000B. For more detailed information on the antenna, see manufacturer documentation.

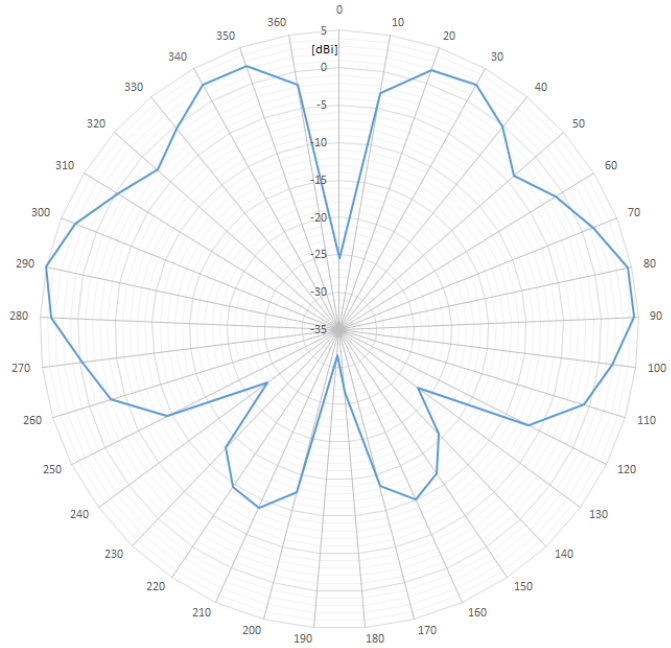


Figure 2 Radiation Pattern for Vertical Antenna

2.2.2 Helix Antenna

The helix antenna is an omnidirectional antenna with approximately hemispheric coverage with a maximum gain of 3 dBiC at the zenith.

The antenna type is Harsh International 14A-N. For more detailed information on the antenna, see manufacturer documentation.

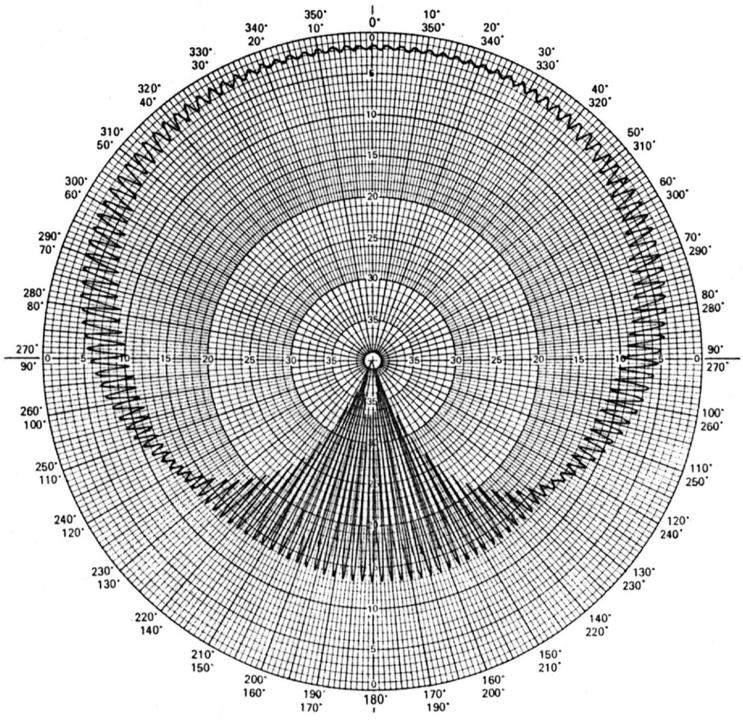


Figure 3 Radiation Pattern for Helix Antenna

2.2.3 Antenna Amplifier and Switch RAA111

Antenna Amplifier and Switch RAA111 is an antenna amplifier with a two-position antenna switch.

All the amplifier parts are housed in a watertight box at the base of the antenna mast.

2.2.4 Antenna Mast and Tube Branch

RM32 includes a tubular mast for mounting the vertical antenna and the amplifier box, and a tube branch and a flange for mounting the helix antenna.

A mounting sleeve with a diameter of 61.5 mm is provided for mounting the whole antenna on top of an external mast.

2.3 Antenna Cable

Table 3 Antenna Cable Options

Part number	Cable Length	Other Information
RARC13SP	33 m	Standard cable type RG-213/U. Attenuation 14 dB/100 m at 400 MHz.
-	Custom length	Can be ordered separately.

Other cable types and lengths are possible, but, for full system performance, the attenuation of the antenna cable must be less than 10 dB.

2.4 Grounding Cable

Table 4 Grounding Cable Options

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

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

2.5 Safety

The antenna delivered to you has been tested for safety and approved as shipped from the factory. Note the safety precautions.

WARNING! Ground the product and verify outdoor installation grounding periodically. Failure to provide proper grounding can result in injury or death from electrical shock and can severely damage the equipment.

WARNING! Do not substitute parts or modify the system, or install unsuitable parts in the system. Improper modification can damage the product or lead to malfunction.

2.5.1 ESD Protection

Electrostatic Discharge (ESD) can damage 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 in the equipment housing.

To avoid delivering high static voltages to the product:

- Handle ESD-sensitive components on a properly grounded and protected ESD workbench or by grounding yourself to the equipment chassis with a wrist strap and a resistive connection cord.
- If you are unable to take either precaution, touch a conductive part of the equipment chassis with your other hand before touching ESD-sensitive components.
- Hold component boards by the edges and avoid touching component contacts.

3. Installation

3.1 Selecting the Installation Site

Proper siting of the antenna is important for good performance. For best reception, 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.

The antenna must have 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.

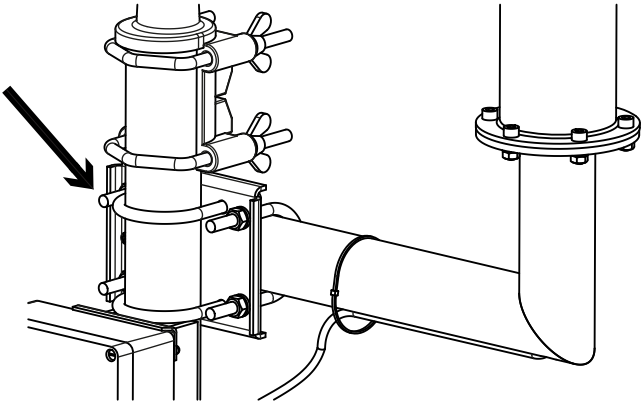
A single obstacle does not affect signal reception to any significant degree, unless it is exceptionally dense or very close (less than 20 m from the antenna set). Sparse forest can cause some attenuation, but is usually not a real hindrance.

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

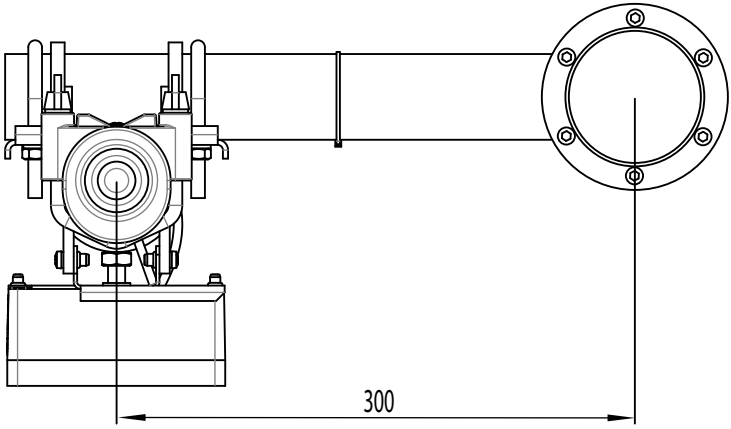
3.2 Setting Up the Antenna

1. Unpack the antenna system.
2. Fit Antenna Amplifier and Switch RAA111 on the tubular mast.

3. Attach the tube branch to the tubular mast using the clamp included.

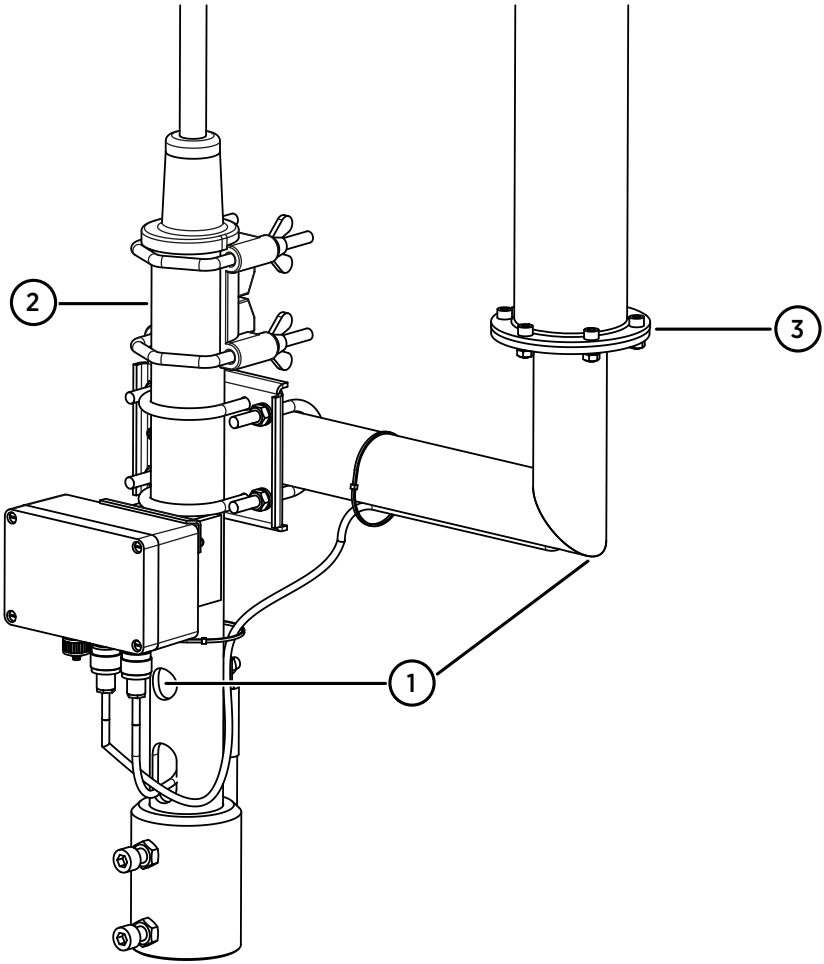


The distance between the vertical and helix antennas in the system is optimized to minimize mutual interference. Set the distance as shown in the following figure.



4. Connect the vertical antenna with cable DRW214802 to the **ANT1** connector in RAA111, and the helix antenna to the **ANT2** connector.

5. Connect the antennas:
   a. Fit the vertical antenna on top of the tubular antenna mast (2).
   b. Fit the helix antenna on the flange of the tube branch (3).



1 Holes in the tubular antenna mast and tube branch
2 Tubular antenna mast
3 Flange of the tube branch

6. Connect the antenna cable (RARC13) to the **OUT** connector in RAA111.

7. If you are mounting the whole antenna assembly on top of an external mast, use the mounting sleeve of the tubular antenna mast.
   The inner diameter of the mounting sleeve is 61.5 mm.
8. Connect the grounding cable to the grounding point in the antenna mast.

3.3 Grounding the Antenna

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.

WARNING! 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 1 meter or less.
2. Make sure that the bending radius is not under 200 mm (8 in). All bends must be smooth and never over 90°.
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.

4. Maintenance

4.1 Performing Preventive Maintenance

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

1. Clean the antenna set regularly by removing excess dirt and dust.
2. Inspect the cables for:
   - Breaks
   - Cracks in the protective coating or connectors
   - Bent or damaged pins
3. Replace broken cables when needed.

5. Technical Data

5.1 RM32 Specifications

Table 5 Antennas

Property	Description/Value
Frequency range	400.15 ... 406 MHz
Vertical Antenna	
Directivity	5.1 dBi
Polarization	Vertical
Horizontal pattern	Omnidirectional
Helix Antenna	
Gain	3 dBiC
Polarization	Right-hand circular
Horizontal pattern	Omnidirectional with hemispheric coverage

Table 6 Telemetry Range

Property	Description/Value
With RS41-SG, RS41-SGP, and RS41-SGM radiosonde	200 km

Table 7 Amplifier

Property	Description/Value
Gain	20 dB typical
Noise figure	< 2 dB
Operating voltage	+10 ... 12 VDC
Typical power consumption	130 mA through antenna cable
Output impedance	50 Ω
VSWR	< 1.5:1

Table 8 Operating Environment

Property	Description/Value
Operating temperature	–40 … +55 °C
Operating humidity	0 … 100 %RH
Operating precipitation	Unlimited
Maximum wind speed	65 m/s
Storage temperature	–50 … +100 °C
Storage humidity	0 … 100 %RH

Table 9 Mechanical Specifications

Property	Description/Value
Height with tubular mast	1912 mm
Weight (with antenna cable)	11.4 kg
Weight (without antenna cable)	6.3 kg
Distance between the antennas	300 mm
Antenna cable	
Connector	Coaxial N-type male
Standard length	33 m
Mounting sleeve for mounting to external mast	
Inner diameter	61.5 mm
Depth	90 mm

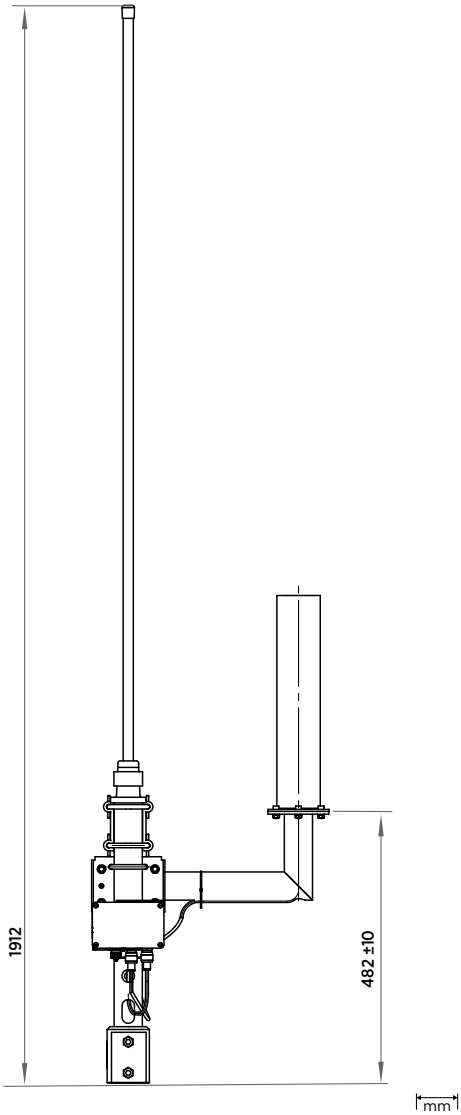


Figure 4 RM32 Dimensions

5.2 RM32 Spare Parts

Table 10 RM32 Spare Parts

Part Number	Description
256383SP	Long monopole antenna Scan 23304-000B
215809SP	Helix antenna
RAA111GSP	UHF antenna amplifier (gray)
RAA111WSP	UHF antenna amplifier (white)
DRW214802	Amplifier-to-antenna cable
RARC13SP	Antenna cable N(m) - N(m), RG-213, 33 m
CBL210160-4MSP	Grounding cable, 4 m
CBL210160-SPEC	Grounding cable, custom length. Can be ordered separately.

Technical Support

Contact Vaisala technical support at helpdesk@vaisala.com. Provide at least the following supporting information as applicable:

- Product name, model, and serial number
- Software/Firmware version
- Name and location of the installation site
- Name and contact information of a technical person who can provide further information on the problem

For more information, see www.vaisala.com/support.

Warranty

For standard warranty terms and conditions, see 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.

Recycling

Recycle all applicable material.

Follow the statutory regulations for disposing of the product and packaging.

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