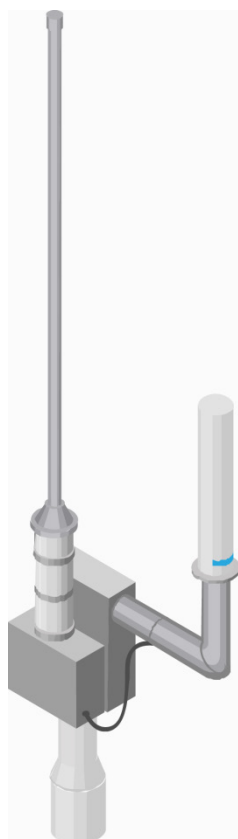


USER'S GUIDE

Vaisala Telemetry Antenna RM32



PUBLISHED BY

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CHAPTER 1

GENERAL INFORMATION

This chapter provides general notes for the manual and Vaisala Telemetry Antenna RM32.

About This Manual

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

Contents of This Manual

This manual consists of the following chapters:

- Chapter 1, General Information, provides general notes for the manual and Vaisala Telemetry Antenna RM32.
- Chapter 2, Product Overview, gives a general description of Vaisala Telemetry Antenna RM32.
- Chapter 3, Installing RM32, explains how to install RM32.
- Chapter 4, Maintenance, provides information on the basic maintenance of RM32.
- Chapter 5, Technical Specifications, presents RM32 technical specifications.
- Chapter 6, Spare Parts List, presents the spare parts for RM32.
- Chapter 7, Technical Support, provides contact information for technical support.

Version Information

Table 1 Manual Revisions

Manual Code	Description
M211725EN-B	March 2015. Updated Table Cable Lengths.
M211725EN-A	June 2014. This manual. First version.

Related Manuals

Table 2 **Related Manuals**

Manual Code	Manual 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

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.
-------------	---

Safety

RM32 delivered to you has been tested for safety and approved as shipped from the factory. Note the following precautions:

WARNING	Ground the product and verify outdoor installation grounding periodically to minimize shock hazard.
----------------	---

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. 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

DigiCORA® is a registered trademark of Vaisala Oyj.

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 gives a general description of Vaisala Telemetry Antenna RM32.

Introduction to RM32

Vaisala Telemetry Antenna RM32 is an antenna system intended to be used with Vaisala sounding systems equipped with Sounding Processing Subsystem SPS311. It is well suited for fixed installations, but it can also be used in portable systems where feasible.

RM32 has two antennas which have been selected to optimize the performance in all elevation angles, both near the horizon and at the zenith. The sounding system selects the antenna with the best reception through a two-position antenna switch.

Antenna Assembly

Vaisala Telemetry Antenna RM32 consists of:

- vertical antenna (number 1 in Figure 1 on page 8)
- helix antenna (2)
- Antenna Amplifier and Switch RAA111W (3)
- tubular antenna mast, tube branch and antenna cables.

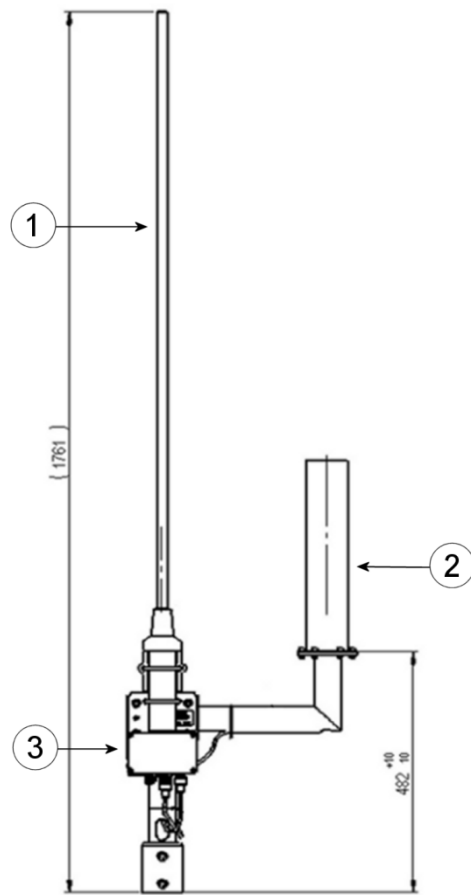


Figure 1 RM32 Antenna Assembly

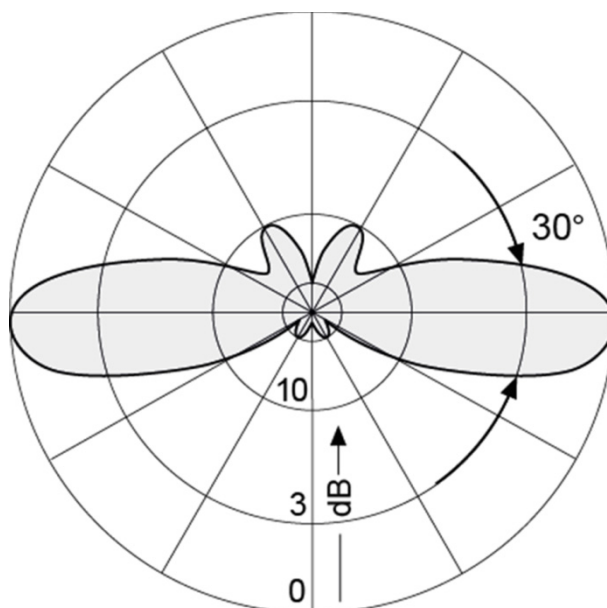
The following numbers refer to Figure 1 above:

- 1 = Vertical antenna
- 2 = Helix antenna
- 3 = Antenna Amplifier and Switch RAA111W

Vertical Antenna

The vertically polarized omnidirectional antenna performs best at the 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 type of the antenna is Kathrein K 75 15 21 1.



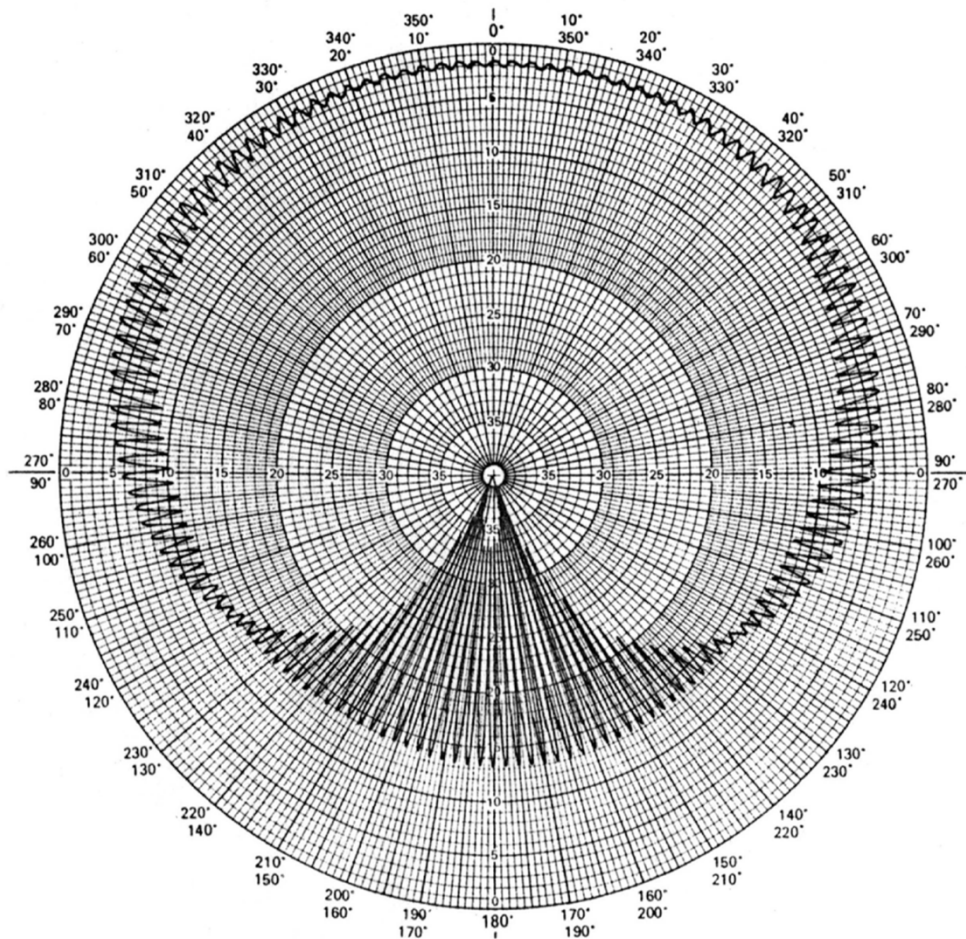
1405-075

Figure 2 Radiation Pattern for Vertical Antenna

For more detailed information on the antenna, see the supplier's manuals.

Helix Antenna

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



1405-076

Figure 3 Radiation Pattern for Helix Antenna

For more detailed information on the antenna, see the supplier's manuals.

Antenna Amplifier and Switch RAA111W

The Antenna Amplifier and Switch RAA111W 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. The amplifier runs on +12 VDC voltage, supplied by the UHF receiver.

Antenna Mast and Tube Branch

The vertical antenna is installed on top of a tubular mast, and the amplifier box is mounted on the base of the mast. The helix antenna is attached to a flange in the tube branch.

A mounting sleeve is provided for mounting the whole antenna on top of an external mast.

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CHAPTER 3

INSTALLING RM32

This chapter explains how to install RM32. For instructions on connecting the antenna as part of the sounding system, see the relevant sounding system documentation.

Selecting Installation Site

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

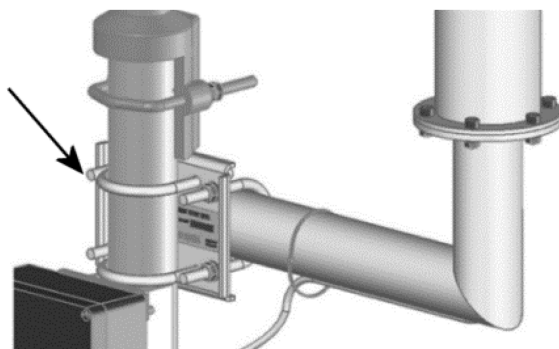
- Open, in other words, clear of obstacles such as buildings, dense forests, or high metal masts.
- Even, in other words, the ground is even and relatively firm.

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.

Setting up the Antenna

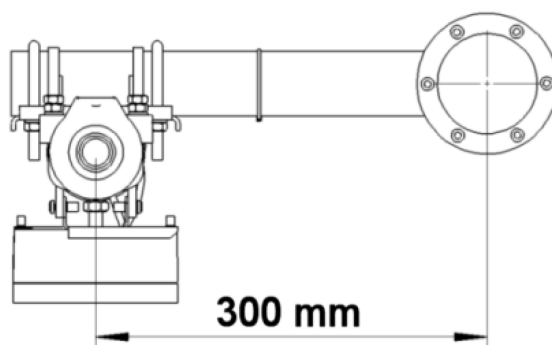
1. Fit the Antenna Amplifier and Switch RAA111W on the tubular mast.
2. Attach the tube branch to the tubular mast using the clamp included as shown in Figure 4 on page 14.



0611-037

Figure 4 Attaching the Tube Branch to the Tubular Mast

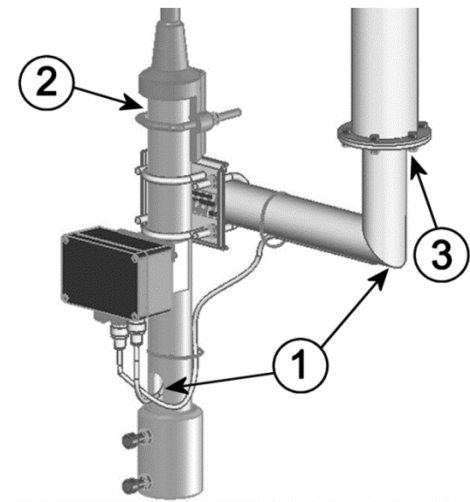
The distance between the antennas in the system is optimized to minimize mutual interference. Set the distance as shown in Figure 5 below.



0611-038

Figure 5 Distance Between the Vertical and Helix Antennas

3. Connect the vertical antenna with cables (DRW214802) to the ANT1, and the helix antenna to the ANT2 connector in RAA111W.
4. Fit the vertical antenna on top of the tubular mast as shown in Figure 6 on page 15.
5. Fit the helix antenna on the flange of the tube branch as shown in Figure 6 on page 15.



0611-036

Figure 6 Connecting the Antennas

The following numbers refer to Figure 6 above:

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

- 6. Connect the feeder antenna cable (RARC13) to the OUT connector in RAA111W.
- 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 sleeve is 61.5 mm.

Cable Lengths

The standard length of the antenna cable is 33 meters and the attenuation of the standard cable type (RG-213/U) is 14 dB/100 m at 400 MHz.

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

Table 3 RM32 Cable Lengths

Vaisala Code	Length
RARC13SP	33 m
RARC13S	75 m

Grounding

Because antennas can act as lightning rods, a separate lightning protection grounding must be taken into consideration according to local equipment and personnel. 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.

CAUTION

A good grounding 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.

CAUTION

Never let the excess cable form loops.

3. Route the grounding cable to the ground as directly as possible. Cut any excess cable. Do not 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	
CBL210160-800		Inner grounding cable

CHAPTER 4

MAINTENANCE

Under normal conditions, RM32 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.

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CHAPTER 5

TECHNICAL SPECIFICATIONS

This chapter presents RM32 technical specifications.

Table 5 RM32 Technical Specifications

Property	Value
Vertical Antenna	
Frequency range	400 - 406 MHz
Directivity	5 dBi
Polarization	Vertical
Horizontal pattern	Omnidirectional
Helix Antenna	
Frequency range	400 - 406 MHz
Gain	3 dBic
Polarization	Right-hand circular
Horizontal pattern	Omnidirectional
Telemetry range	
With Vaisala digital radiosonde	200 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
Mechanics	
Cable connector	Coaxial N-type male
Total height including mast	1760 mm
Inner diameter of mounting sleeve	61.5 mm
Depth of mounting sleeve	90 mm
Distance between the antennas	302 mm
Weight	11.4 kg with the feeder cable, 6.3 kg without the cable
Standard cable length	33 m fixed
Environmental Conditions	
Operating temperature range	-40 ... 55° C
Operating humidity range	0 ... 100 % RH
Operating precipitation	Unlimited
Maximum wind speed	65 m/s
Storage temperature	-50 ... +100 °C
Storage humidity	0 ... 100 % RH

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CHAPTER 6

SPARE PARTS LIST

This chapter presents the spare parts for RM32.

Table 6 RM32 Spare Parts

Part Number	Item
212167SP	UHF antenna Kathrein, spare part for MW
215809SP	Helix antenna for RM, spare part for MW
RAA111GSP	UHF antenna amplifier for RM, spare part for MW (gray)
RAA111WSP	UHF antenna amplifier for RM, spare part for MW (white)
DRW214802	Amplifier-to-antenna cable
RARC13SP	Antenna cable N(m), 33m, spare part for MW
RARC13S	Antenna cable 75m, spare part for MW
CBL210160-4MSP	Grounding cable, 4 m
CBL210160-SPEC	Can be ordered separately at custom length

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CHAPTER 7

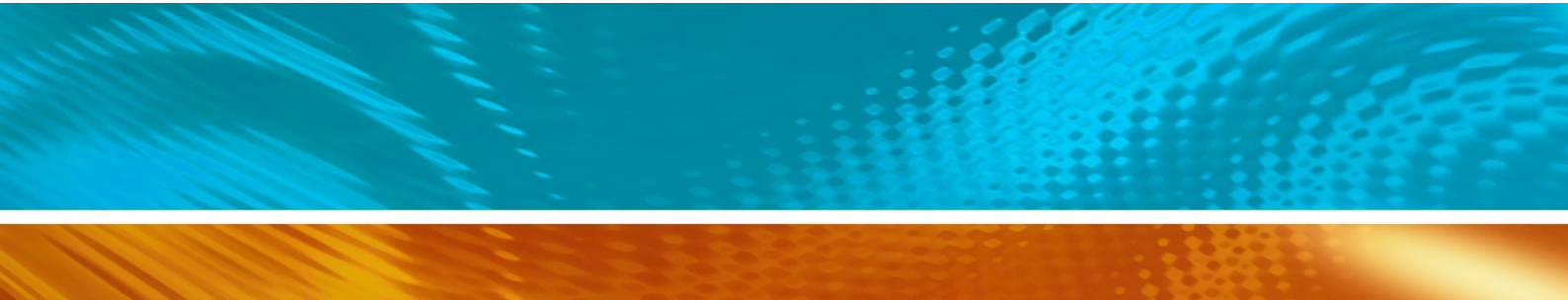
TECHNICAL SUPPORT

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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