RAMAC 2.5 GHz antenna

Operating manual

Version 1.0

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1 Introduction

Thank you for purchasing the RAMAC 2.5 GHz, the shielded high frequency antenna.

Together with the RAMAC CUII control unit and the RAMAC Monitor for data acquisition you have the entire 2.5 GHz at hand, the high frequency concept, giving you a straightforward one-man operated GPR system for concrete, forensic and other high-resolution applications.

We at Malå GeoScience welcome comments from you concerning the use and experience of this equipment, as well as the contents and usefulness of this manual. Please take the time to read through the assembling instructions carefully and address any questions or suggestions to the following:

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1.1 Unpacking and Inspection

Great care should be taken when unpacking the equipment. Be sure to verify the contents shown on the packing list and inspect the equipment for any loose parts or other damage. All packing material should be preserved in the event that any damage occurred during shipping. Any claims for shipping damage should be filed to the carrier. Any claims for missing equipment or parts should be filed with Mala GeoScience.

1.2 Repacking and Shipping

If original packing materials are unavailable, the equipment should be packed with at least 80 mm of absorbing material. Do not use shredded fibres, paper wood, or wool, as these materials tend to get compacted during shipment and permit the instruments to move around inside the package.

1.3 Limited Warranty and Liability

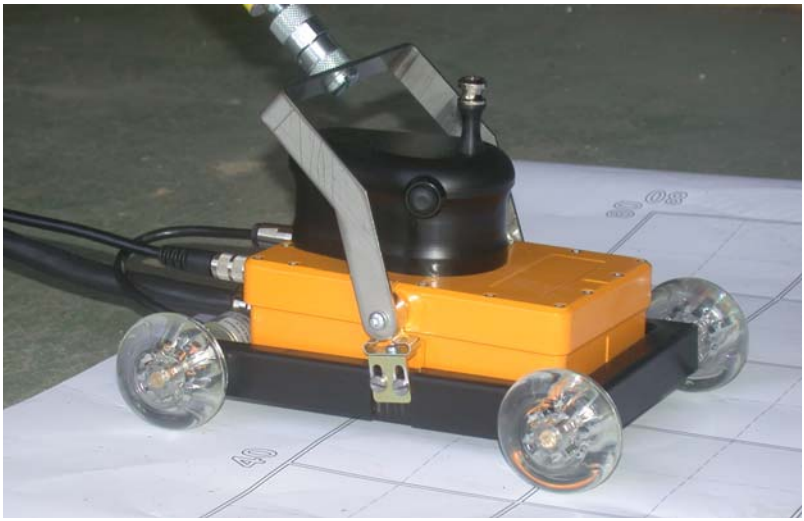
Malå Geoscience warrants that, for a period of 12 months from the delivery date to the original purchaser, Malå Geoscience products will be free from defects in materials and workmanship. **Except for the foregoing limited warranty, Malå Geoscience disclaims all warranties, express or implied, including nay warranty of merchantability or fitness for a particular purpose**. Malå Geoscience will repair and replace parts or equipment which are returned to Malå Geoscience, transportation and insurance pre-paid, without alteration or further damage, and which in Malå Geoscience´s judgement, were defective or became defective during normal use.

Malå Geoscience assumes no liability for any direct, indirect, special, incidental or consequential damages or injures caused by proper or improper operation of its equipment or software, whether or not defective.

2 Hardware and Start Up

2.1 Hardware

The 2.5 GHz is a one-piece radar antenna where the antenna elements are mounted in a small handheld, shielded box easily mounted on a small wheel carriage. See picture below.



The RAMAC 2.5 GHz antenna communicates with the control unit CUII through a 3 m long data cable, giving you an easily and freely movable antenna.

2.2 Start up

When initialising 2.5 GHz measurements the following easy steps are made to connect and start up the whole GPR system:

- Make sure that the battery is fully charged for the control unit CUII (See Operating Manual CUII) and correctly mounted. This battery also supplies the 2.5 GHz antenna with power.
- Connect the CUII supporting system part to the CUII itself. Three short coaxial cables to the R, T and D connectors and the encoder cable to the CUII encoder connection. The T corresponds to transmitter, R to receiver and D to data. See picture below.

- Connect the CUII (**LPT1**) to the external PC parallel port or to the parallel port on the RAMAC Monitor.
- Connect the 2.5 GHz data cable to the control unit CUII (dark gray connector at the left-hand side in the picture above).
- Attach an appropriate length-measuring device and connect it to port **ENC** on the antenna. When using the wheel carriage, the encoder is mounted on one of the wheels and only need to be connected to the antenna.
- Turn on the power on the CUII. Turn on the PC or the RAMAC Monitor. Your RAMAC 2.5 GHz is now ready for operation.

3 Using the RAMAC 2.5 GHz

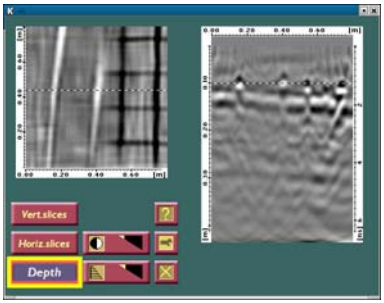
The 2.5 Ghz antenna is operated by 2 buttons on the shielded antenna box itself. You can easily create a new profile and start and stop the data collection.

The 2.5 Ghz antenna can also be used together with an extension handle (see picture below), giving you access to the two different remote controls to manage the system.

Observe!
One of the remote controls (on the antenna itself and on the extension handle) (see pictures below) also functions as a “kill” switch, so it has to be held down at all times duing measurments. If the button is released the transmitter will stop transmitting within 10 seconds.

The extension handle, with the remote control, are mounted on the wheel carriage and connected on the back-side of the 2.5 GHz antenna. See picture below.

When the 2.5 GHz system is used together with the RAMAC XV11 Monitor, you have access o the fully integrated data collection, 2.5D analysis tool and Migration Wizard.



See Manuals for the XV11 Monitor and Easy3D for further details.

Note! When working with the high frequency antenna as a hand held and wall-scanning device, it is required to activate the kill-switch function (according to FCC part 15.509). For more information see Section System Settings and FCC Part 15. When used as a normal GPR, (floor scanning, shallow utility detection etc.) it's not required to activate the kill-switch.

4 RAMAC 2.5 GHz specifications

Centre frequency	2.5 GHz
Bandwidth	> 100 %
Time window	> 50 ns
Reprate	100 kHz
Pulse width	430 ps
Total weight incl. batteries	0.6 kg
Cable length	3 m
Power supply	8 V Li-ion rechargeable batteries
Operating time	3 hours
Operating temperature	-20 to + 50 ^{0}C
Control Unit	RAMAC CUII
Data acquisition	RAMAC Monitor (preferred) or other laptop (with Malå Geoscience software Ground Vision)
Environmental	IP67