Guideline Geo

MALÅ Ground Explorer Antennas

User Guide

Our Thanks...

Thank you for choosing Guideline Geo and MALÅ! The very core of our philosophy is to provide our users with excellent products, support, and services. Our team is committed to providing you with the most efficient and easy-to-use solutions to meet your efficiency and productivity needs.

Whether this is your first MALÅ product or an addition to the MALÅ collection, we believe that a small investment of your time to familiarize yourself with the product by reading this manual will be rewarded with a significant increase in productivity and satisfaction.

Please let us know about your use and experience of our products and the contents and usefulness of this manual. We are excited to be part of your journey!

Guideline Geo AB

www.guidelinegeo.com

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Preface

About this Manual

This manual is written for the end user of the product and explains how to set up and configure the product, as well as providing detailed instructions on its use.

Additional Resources

Training:	www.guidelinegeo.com/training-gpr-resistivity-seismics-tem/
Downloads:	www.guidelinegeo.com/support-service-advice-training/resource-center/
Applications:	www.guidelinegeo.com/application-areas/

Feedback

Feedback regarding the contents of this manual or the product may be sent by using any of the channels found at www.guidelinegeo.com

Safety and Compliance User Notices

This GPR device is certified according to FCC, subpart 15, IC RSS-220 and ETSI EN 302 066-1&2.

You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: —Reorient or relocate the receiving antenna. —Increase the separation between the equipment and receiver. —Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. —Consult the dealer or an experienced radio/TV technician for help.

According to the regulations stated in ETSI EN 302 066-1 (European Telecommunication Standards Institute):

The control unit should not be left ON when leaving the system unattended. It should always be turned OFF when not in use.

The antennas should point towards the ground, walls etc. during measurement and not towards the air.

The antennas should be kept in close proximity to the media under investigation.

Canadian and US regulations state that whenever GPR antennas are in use the following notes apply:

This Ground Penetrating Radar device shall be operated only when in contact with or within 1 meter of the ground.

Only law enforcement agencies, scientific research institutes, commercial mining companies, construction companies and emergency rescue or firefighting organizations shall use this Ground Penetrating Radar Device.

This device complies with Industry Canada license-exempt RSS standards. Operation is subject to the following two conditions: (1) This device may not cause interference and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

French translation:
Cet instrument de Géoradar se devra d'être opéré seulement en contact à même le sol ou en deça d'un mètre du sol.

Cet instrument de Géoradar se devra d'être utilisé seulement par les agences chargées de l'application de la loi, les instituts de recherches scientifiques, les compagnies minières à buts lucratifs, les compagnies de construction et les organisations responsables pour le sauvetage et la lutte contre les incendies.

Cet instrument répond aux exigences de la licence avec Industrie Canada- exempt des standards RSS. L'opération est sujette aux deux conditions suivantes: (1) Cet instrument ne peut pas causer une interférence et (2) cet instrument se doit d'accepter quelque interférence que ce soit, incluant une interférence qui pourrait causer une opération non-souhaitable de l'instrument.

Radiation Exposure Statement

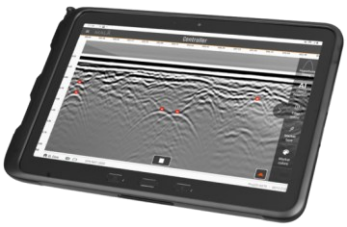
To comply with ISED RF exposure compliance requirements, a separation distance of at least 20cm should be maintained between the EUT and all persons during normal operation.

French translation:
Pour se conformer aux exigences de conformité d'exposition ISDE RF, une distance de séparation d'au moins 20 cm doit être maintenue entre l'EST et toutes les personnes pendant le fonctionnement normal.

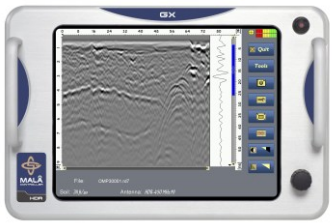
Get Ready. Set up. Go

This user manual walks through the steps for getting ready, setting up and basic operation of your new MALÅ Ground Explorer (GX) GPR System. In this user manual the GX antennas are explained.

Information on the MALÅ GX Controller or the MALÅ Controller App are found in separate user manuals. Use this manual together with the *MALÅ Controller App User Manual* or *MALÅ GX Controller User manual.*



MALÅ Controller App



MALÅ GX Controller

MALÅ GX features

MALÅ is an integrated GPR solution with a wide range of antenna options. Through unique HDR technology, MALÅ GX offers a high data quality and fast acquisition rates. The GX antennas are fully integrated with the MALÅ Controller App (on a tablet) or with the GX Controller and as well as the MALÅ Vision software platform. MALÅ GX is an easy to use and field proof GPR solution for a wide range of applications.

Advantages compared to conventional GPR technology

- Real-time sampling technology – HDR enabled
- Significantly faster data acquisition rates
- Greater signal-to-noise ratio
- Increased bandwidth
- Unprecedented dynamic range and resolution
- 32 bit data output
- Greater depth penetration
- Better detection capabilities
- Data collection with the MALÅ Controller App or dedicated GX Controller

Accessories and Optional Extras

Rough Terrain Carts, MALÅ RTC and MALÅ RTC Mini

MALÅ Rough Terrain carts, the RTC and the RTC Mini, are robust carriers for GX antennas designed to handle rough GPR surveying. The RTC cart is suitable for the GX antennas 160, 450 and 750 MHz and the RTC Mini for the GX antennas 450 and 750 MHz. Visit our website for more information.

MALÅ GX Towing Options

Rough terrain skid plate with tow attachment and tow handle.

Shipping Cases

Robust shipping cases for the MALÅ GX Controller and accessories.

Measuring Wheels and String Encoder

GX Measuring Wheel

GX Spring-loaded Wheel

String Encoder

Others

- GNSS bracket and extension pole for easy attachment of a GNSS antenna on the GPR antenna or the RTC / RTC Mini.
- Different types of additional Li-ion Battery Packs for the GX antennas.

Unpack. Inspect. Register

Unpack

Great care should be taken when unpacking the equipment. Be sure to verify the contents shown on the packing list and inspect the equipment and accessories for any loose parts or other damage.

Note: The packing list that is included with the shipment should be read carefully and any discrepancy should be reported to our sales department at www.guidelinegeo.com

Note: If a defect in the equipment is discovered, make sure to contact Guideline Geo prior to use and follow the instructions for *Repacking and Shipping* in this section.

Remove the protective shipping cover from the antenna.

Using the supplied Torx screwdriver, remove the four Torx screws.

Remove and store the black plastic cover for future use, if shipping is required at a later date.

Note: All packing material should be kept in the event that any damage occurred during shipping.

File any claim for shipping damage with the carrier immediately after discovery of the damage and before the equipment is put into use. Any claims for missing equipment or parts should be filed with Guideline Geo within fourteen (14) business days from the receipt of the equipment.

Repacking and Shipping

The Guideline Geo packing kit is specially designed for shipping MALÅ GX antennas. The packing kit should be used whenever shipping is necessary. If original packing materials are unavailable, pack the instrument in a box that is large enough to allow at least 80 mm of shock absorbing material to be placed all around the instrument. This includes top, bottom and all sides.

Warning: Never use shredded fibres, paper or wood wool, as these materials tend to pack down and permit the instrument to move inside its packing box.

Please read our shipping instructions before returning instruments to Guideline Geo. These instructions can be found on our website www.guidelinegeo.com

Registering MALÅ GX HDR

By registering your equipment, you ensure that you receive up-to-date documentation, software upgrades and product information, which all helps to optimize the utilization of the equipment and realize the maximum return on your investment.

To register your equipment, simply visit www.guidelinegeo.com and submit the registration form.

Note: The serial number can be found on top of the antenna. If a GX Controller is used, the serial number of this is found on the underside of the monitor.

System Set Up

MALÅ GX is an integrated GPR system, consisting of a GX antenna, a tablet with the MALÅ Controller App installed or the GX Controller, linked through Wi-Fi or wire.

Note: A single data/power cable can be used for communication between the GX antenna and the GX controller. If using a mobile device / tablet, this always communicates through Wi-Fi.

The MALÅ GX GPR system can either be pulled, with a rough terrain skid plate or pushed in a MALÅ Rough Terrain Cart.

When using a cart, the MALÅ GX Controller or mobile device is mounted on the handle of the MALÅ RTC or RTC Mini with a monitor or tablet holder.

When using a skid plate, the MALÅ GX Controller or mobile device is mounted on a shoulder harness.

Mount the battery to the antenna

Connect the measurement wheel to the antenna

Always remember to attach the sprint for a firm connection of the wheel.

If using a MALÅ RTC or RTC Mini, connect the cart´s integrated measurement wheel cable instead.

Note: The precision of the encoder wheel depends on several factors, such as the condition of measurement surface, the pressure applied on the wheel and possible wear.

Note: Depending on the wheel used, change the wheel settings to the correct wheel in the GX Controller or in the MALÅ Controller App.

Power up antenna and Wi-Fi

Start the MALÅ GX antenna by pressing the power button on the antenna, make sure the Wi-Fi is powered as well. Also start up the GX Controller or the mobile device with the MALÅ Controller App. See separate *User Manuals* for these two options.

The GX antenna power button is found on the right side of the cable, with a red LED-light.

On the left side of the cable, you find the power button for the Wi-Fi connection, with a blue LED-light.

Note: If you use the single data/power cable for communication the Wi-Fi should be OFF.

Connection by Wi-Fi to GX Controller or MALÅ Controller App

The GX antenna is pre-installed and paired with the GX Controller from the factory. When the GX antenna is powered up, the available GX antennas are visible in the antenna list on the main menu of the GX Controller. Otherwise, see *GX Controller User Manual*, for Wi-Fi initialization through cable.

If using a mobile device and the MALÅ Controller App, make sure that the hotspot on your tablet is configured correctly and the MALÅ Controller App will automatically connect to your GX antenna. Otherwise, see *MALÅ Controller App User Manual*.

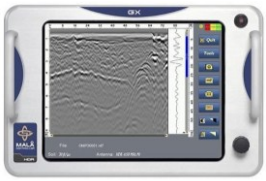
Cable connection

If the system is communicating with the single data/power cable connect this both to the GX antenna and the GX Controller. The Wi-Fi button on the antenna should be turned off to save power. Turn on the GX Controller and start measurements according to the *GX Controller User Manual*.

Note: Look for the countersink in the power cable and place it towards the mark on the connection. Push lightly. If you have it in the correct orientation it will go into its position smoothly. To disconnect, pull out holding the metal part of the connector.

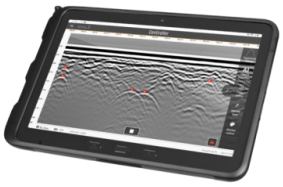
Measurements with GX Controller

If measurements are carried out with the dedicated GX Controller, see the *GX Controller User Manual* for further instructions on measurement settings.



Measurements with a mobile device and MALÅ Controller App

If measurements are carried out with a mobile device and the MALÅ Controller App, see the *MALÅ Controller App User Manual* for further instructions on measurement settings.



Power down with GX Controller

To turn the antenna and monitor off, first select Shut down from the Start Menu in the GX Controller, confirm the action by selecting YES. When the Controller screen is black, push the power button on the monitor and release quickly.

Note: The antenna will automatically turn off when the monitor is powered down.

Note: If a power cable is accidentally pulled out, the MALÅ GX HDR components will start automatically when reconnected.

Power down with MALÅ Controller App

Turn off the MALÅ Controller App and turn off the GX antenna with the antenna power button. Press and hold until the red LED-light turns off. The Wi-Fi will automatically turn off as well.

Indicators and Batteries

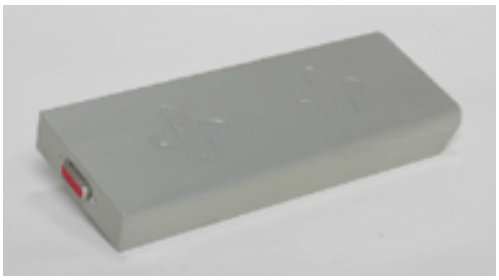
Antenna LED Indicators

Three LED-indicators are visible on the antenna product label.

- DATA: Continuous flashing light indicates the unit is working properly and ready for data collection. Irregular flashing on this LED means erroneous antenna configuration or possible software version issue. The LED switches to continuous illumination when the unit enters data collection.
- GPS: Flashing light means that the GPS option is installed and that the internal computers are successfully communicating with the GPS-unit. This LED switches to continuous light whenever there's 4 or more satellites available.
- INFO: This LED indicates a serious system error, whenever active. Please contact your local Guideline Geo representative.

Antenna Battery Maintenance and Charging

A 12V/8.7Ah Li-ion battery pack is shipped with the MALÅ GX Antenna and is the recommended power source for the antenna.



Under normal operating and handling conditions, this battery is capable of up to 5 hours of continuous operation.

MALÅ GX antenna will automatically turn itself off when the battery voltage drops below 10V. A meter showing the remaining battery capacity is displayed in the MALÅ Controller App or on the GX Controller.

Warning: Power sources other than the recommended 12V/8.7Ah Li-ion battery are not compatible with the power meter and the status of the battery will not be indicated accurately.

To remove and charge the antenna battery, pull the battery release pin on the rear of the battery module and gently remove the battery pack by lifting upward and in a backward direction.

When re-mounting the battery, gently attach the d-sub connector on front of the battery with the d-sub on the mounting tower. Then pull the battery release pin and press down on the battery until the release pin slots into place.

With the use of the correct adaptor, connect the supplied battery charger to the battery pack.

The LED light on the charger indicates the following:

Red = Charged < 80%
Yellow = Charged 80-100%
Green = Maintenance charging

Tip: Though recharging up to 80% of the full capacity is typically very fast, it is recommended to keep the battery charging until it is fully charged to help extend the battery life.

Note: The battery charger can be left on after the battery has been fully charged where it will then automatically enter a maintenance-chargingmode

Charging time for the 8.7Ah batteries is approximately 3-5 hours (80%-100%).

The temperature when charging should be within 0 to +45°C / 32 to 110°F. Do not charge the batteries in direct sunlight or when surrounding temperature is below freezing point.

Tip: If storing the battery for long periods of time, discharge the battery to approximately 50%, this will maximize the life of the battery

Powering the GX antenna from the optional battery bag or other external battery source

With the use of the optional antenna battery adaptor, the GX antenna can be powered from the optional battery bag together with a dummy battery mounted on the antenna.

There are also cables available for use together with external 12 V batteries.

Note: The battery bag can also power the GX Controller.