MALA EasyLocator HDR

Operating manual

Version 1.0

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1 Introduction

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Thank you for purchasing the EasyLocator HDR.

The EasyLocator series of products is the most widely used GPR-system for utility detection, world-wide. The HDR-version is the latest in a line of easy-to-use tools for the locating industry. It builds on its predecessors in terms of handling and user interface while incorporating the latest and most potent technology currently available.

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 shock-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.

1.4 Important information regarding the use of this MALA GPR unit

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

- The CX unit should not be left ON when leaving the system unintended. 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 regulations states that whenever GPR-antennas are in use the following note apply:

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

This Ground Penetrating Radar Device shall be used only by law enforcement agencies, scientific research institutes, commercial mining companies, construction companies and emergency rescue or firefighting organizations.

2 Hardware and Start Up

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2.1 Hardware

The EasyLocator HDR is a GPR system with integrated, height-adjustable wheels. The main components are the UWB-transducer(antenna), the monitor the mechanical carrying system and the batteries. The system is, preferable powered with one battery and data communication between the GPR-transducer and the monitor is managed with an Ethernet link on a cable which carries power to the monitor as well, see figure below.

2.2 Start up

Prior to surveying with the system the following easy steps should be followed.

- Make sure that the battery is fully charged. The battery powers both the transducer and the monitor and is good for about 5 hour's operation.
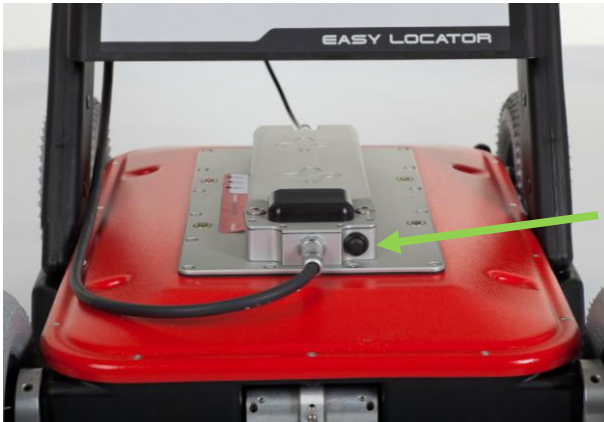
- Connect the traducer to the battery by means with cable supplied, see picture below.

- Connect the Monitor to the transducer with the cable supplied, see picture below.


- Press and release the button the GPR-transducer, shortly, do keep it pressed. This will start up the unit; the LED's on the panel will start to blink as well as the LED inside the button, see figure below.

- Press the button on the monitor; it'll take about 30 seconds for the unit to start up.

After these simple steps the monitor will display the screen shown in figure below, and the system is ready for operation.
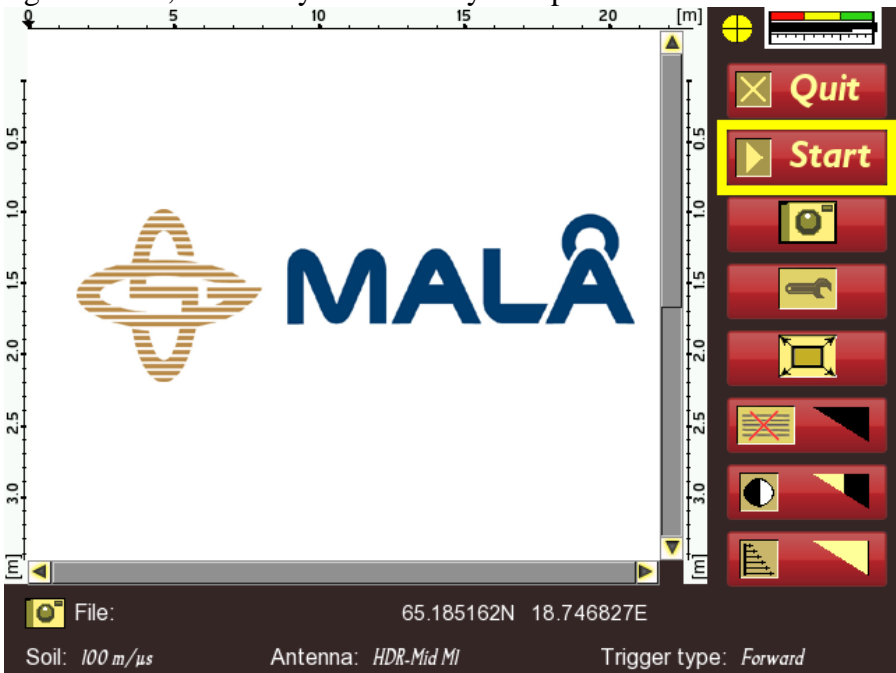
3 Using the EasyLocator HDR

The EasyLocator is shipped folded, with monitor and cables attached, but without the battery mounted. You need to connect the two battery-packs together and mount the in the battery bay (this is due to shipment regulations for Li-Ion batteries). In figure below a folded EasyLocator ready for shipment is shown.


In order to unfold the unit; just lift the monitor to upright position and fasten the clips on the side of the shackles. See figure below.

Once the unit is un-folded and started as described in previous paragraph, operation is very straight-forward and self-explanatory, some details will be described in the following text.

Referring to the start-up screen is shown in figure below, the area of the screen between the depth scales are reserved for data presentation, the lower portion for information about the ongoing survey and the right column are mainly for controlling the instrument trough the turn-push button.
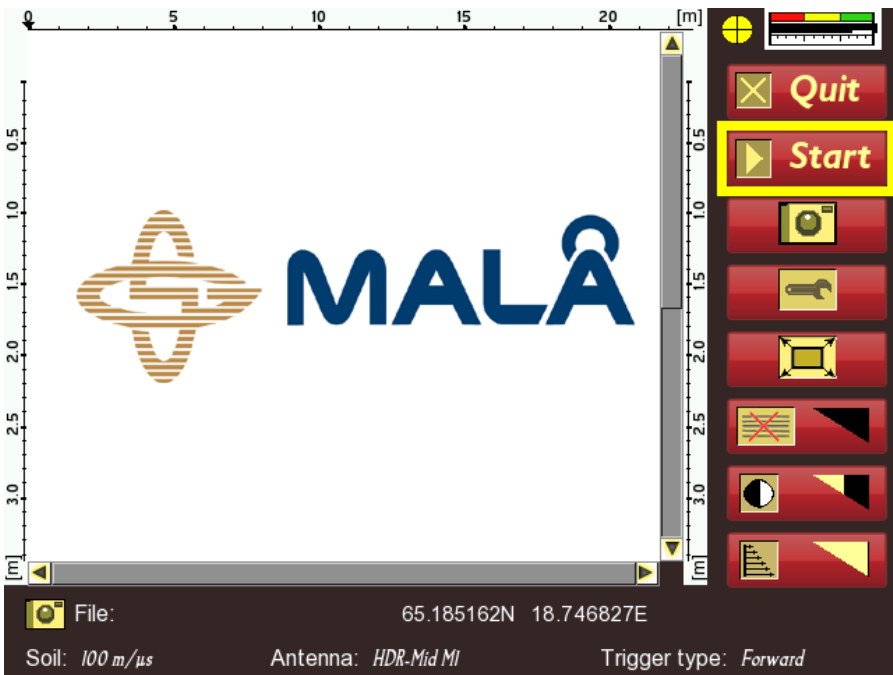
Starting from the top-right:

The yellow circle with a cross-hair is indicating the GPS-status; red means that there's no GPS attached or no satellites available, yellow means normal GPS accuracy (about 10m) and green means that the unit has been able to apply differential correction.

The scale with red, yellow and green indicates the battery status. It is divided into two black bars, since there's an option of using a separate battery for the transducer. In other respects, this scale is self-explanatory.

The Quit button is also self-explanatory, press on this and you'll have the option for turning off the unit. Note that the unit should always be turned off this way, since just pulling the power cable may harm the internal memory of the unit.

Pressing the "Start" button will immediately put the unit into data collection mode and a radar image of the subsurface will start to display as soon as the unit is moved.

The camera button enables the operator to save a jpeg image of the current screen for later downloading to a USB device. This is intended for documentation purposes.

The wrench button gives possibility to change some of the settings controlling the data collection process and house-keeping functionality in the unit, see separate section of this manual.

The last 3 buttons controls filter to be applied on the data, prior to display, they are, top to down, background removal, contrast level and gain function. Pressing the push-turn button while turning it increases or decreases the strength of these filters, right-turn; increase and left-turn; decrease.

The bottom part of the screen shows some information about the ongoing survey. It's self-explanatory except for the trigger-type field. The trigger type field explains what controls the data acquisition, there's three different types of control; forward wheel, backward wheel and time triggering. Time triggering means that the unit collects data with certain frequency, normally 10 to 20 Hz; it is to be used when surface conditions prohibit the use of a wheel.

3.1 Surveying

When a survey has been initiated the main menu changes, see figure below. Now the user may stop the survey, save a jpeg-image of the current screen check the velocity trough hyperbola fitting or save a GPS-marker on the current location.

An important feature in the instrument is the track-cursor pointed to by the red-arrow in the figure. This cursor will move with the system, so that if the unit is moved backwards, this cursor along with a vertical line will start to move back on the screen. This is the primary function used when locating buried targets. When the unit is pushed forward again, data collection will start when you reach the point where you started to move backward, not before.
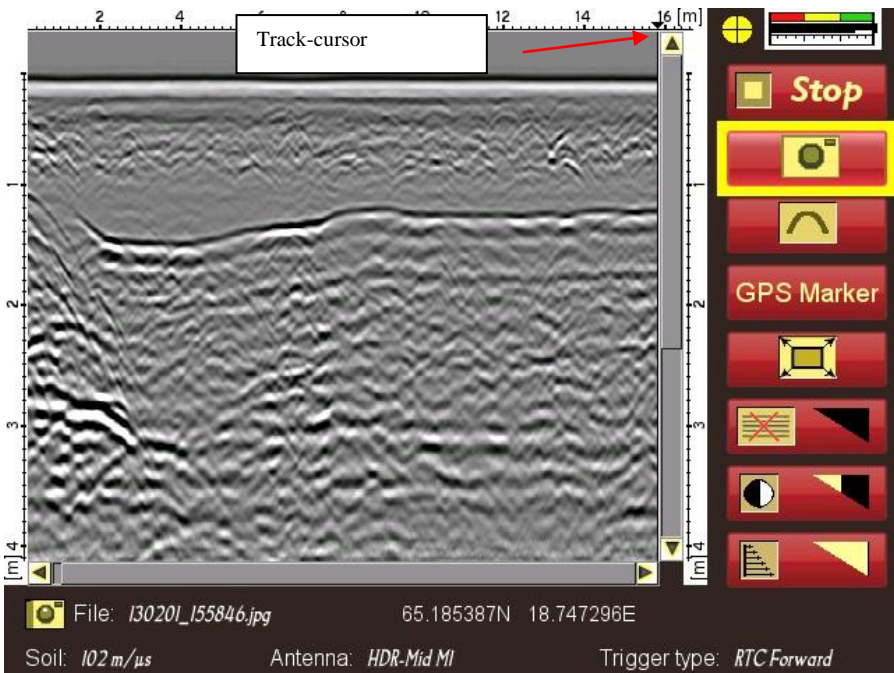
3.2 The settings menu

The settings menu is entered through the wrench button on the main menu; it is shown in figure below.
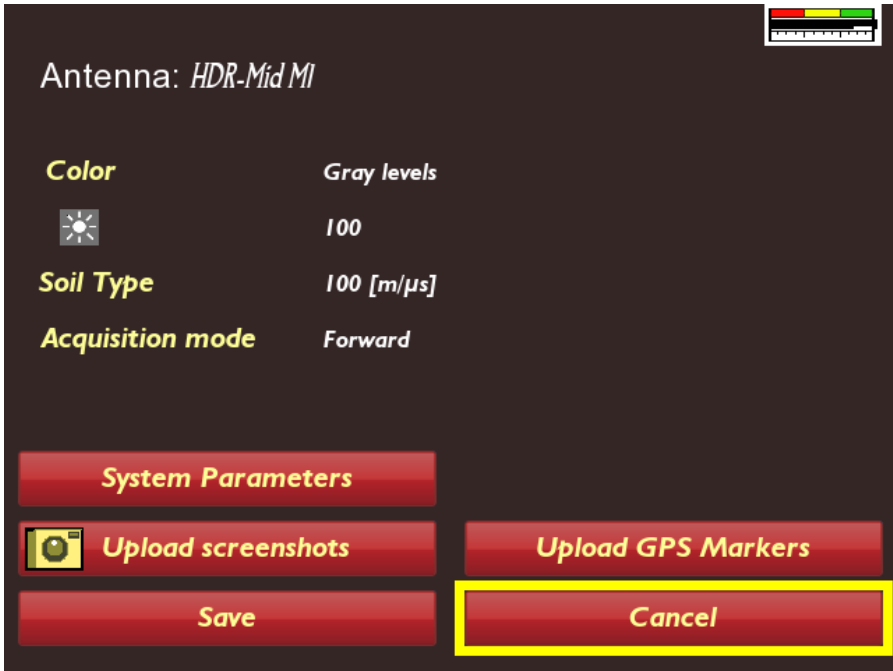
Activating the green text-fields, but turning the push-turn button, and then depressing it gives the user means for changing the settings. Below the different options are described.

- Color, the user can switch between gray-scale and color scale for the displayed radar data. The vast majority of users prefer the grey-scale, since there's no natural interpretation of color for this type of data. It can actually be quite confusing.
- The sun-symbol is for setting of the backlight of the screen, default is 100%. By lowering this parameter, battery-life can be extended by up to 1 hour.

- Soil Type, is defining which ground velocity should be used when converting reflections from a specific time to a depth to be shown on the scales. Note that this type of instrument actually measures time of flight for electromagnetic waves, in ground. The depth displayed on the scales is estimations only. Variations in normal ground are between 80 to 120 meters/microseconds. <u>A user must be aware of this fact.</u>

The System Parameters sub-menu is not accessible for operators; it is used for factory calibrations, service centers during manufacturing and service/repair

The other sub-menus are self-explanatory. Contact your local dealer if further information is needed.

4 EasyLocator HDR specifications

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Useful Bandwidth	> 120 %
Time window	> 150 ns
Total weight incl. batteries	27 kg
Power supply	12 V Li-ion rechargeable batteries
Operating time	5 hours with standard batteries
Operating temperature	-20 to + 50 ^{0}C
Data acquisition	Wheel or time based
Environmental	IP67
Certifications:	ETSI, FCC (pending), ICC (pending)