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# HYPERION MAGNETOMETER

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#### **ATTENTION!** MUST READ BEFORE USING HYPERION

Thank you for choosing GRADIUM products. It is recommended that you read this user manual carefully to understand how the products work and then try to gain experience. This is a scientific and electronic device and all instriations in the user manual must be followed.



GRADIUM products should be used with caution as one do with electronic devices. Sensors and main unit should be used with caution; they should be protected against impacts and hard objects and refrain from applying excessive force.

GRADIUM products do not cause injury or health problems when used normally. GRADIUM products usually do not pose a threat to the human body. It should be kept away from children as one would do with electronic devices. Be careful to take all precautions against any kind of risk.

Before starting to search, make sure that the main unit battery is fully charged. An inadequate battery level may cause you to be in the wrong.

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## **General description**

GRDIUM supplies magnetic anomaly detectors since 10 years. The high-sensitivity Induction magnetometers are undergoing continuous hyperion for the detection object buried underground. Anyone with any level of knowledge can communicate with this system.









The policy of hardware and software design of this system has been based on user friendly, and therefore, in scanning and analyzing the data taken from the underground, it has been tried so that the user does not get involved in complicated calculations.

In this regard, efficient and very sensitive sensors with the following specifications are used, as well as CPU with high processing and ADC with 24-bit accuracy, as well as 16 GB internal memory for storing scans.



#### **Understanding Instrument Basics**





The GRADIUM Corporation has declared that the hyperion Magnetometer device described in this document conforms to the harmonized standards pursuant to Directive 89/336 EEC/Electromagnetic Compatibility (EMC). This User Manual is part of the scope of delivery. The operator must keep it to hand and it must remain together with the instrument at all times. We reserve the right to make changes as a result of further The publisher retains copyright.



#### **Technical data:**

- Scan depth: up to 36 meters for metal and cavities.
- Localization: Determines location, depth, and dimensions of buried objects.
- Magnetometer: high-sensitivity gradiometer induction magnetometer with very low noise and low power consumption.
- Build: precise handling, lightweight, compact design, ergonomic.
- operation: step/laser mode search.
- sensitivity: high sensitivity up to approx. 5 N / scale units.
- Measuring range: ± 3000nT
- **software:** review real 3D graphics on GRADIUM software.
- **Battery life:** up to 8 hours with 10 Ampere li-ion battery pack.
- CPU: high-performance and DSP with FPU, arm cortex-M7 MCU.
- **LCD:** 5-inch TFT LCD RGB interface \ capacitance touch screen.
- connectivity: wifi wireless connection.
- Accurate Location: Equipped with a satellite locator and LRF

#### Software:

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HYPERION software is introduced after the system boots up. Firstly, hardware components of the device are checked. Then, after the HYPERION logo, the pattern menu appears. By entering the correct PATTERN, the software enters and goes to the home screen. Clicking on the tabs on the left side of the screen reveals the corresponding pages.



#### **These pages include:**



# Home 3D scan GND Balance Files Config





The information displayed on the Home page includes: A- Time and date B- Satellite information C- Compass D- Battery information

It's worth mentioning that on all pages, clicking on the Speaker icon Switches between sound and silent mode.

# **2.3D Scan**

3D Ground scanning allows you to create 3D graphs based on whether you scan a specific area. There are 2 options in the ground scanning **Function: step mode and laser mode**.



#### 1. Step Mode

#### 2. L.R.F Mode

In Step Mode, scans are taken based on the user's normal walking speed, and it's relatively easier to scan compared to Laser mode.

It is necessary to take at least 6 to 10 identical scans with the same AREA LENGTH, AREA WIDTH, ROW WIDTH, and STARTING POINT from each environment that

has been scanned, if the target or targets are repeated in 3/4 of the scans, in order to receive information More precisely, regarding the depth of the targets, the same method of scanning is taken twice in the Laser Mode.

The detection of target depth is more accurate in the Step Mode than in the Laser Mode.

much as possible in a North--South or South--North direction for scan rows, Use the Compass on the Home page to determine the scanning direction.

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#### Adjustable from 2 to 12 meters.

Adjustable from 2 to 24 meters.

Selectable between 50 centimeters and 100 centimeters. Choosing a ROW WIDTH of 50cm will result in higher resolution scans. It's important to note that with larger AREA LENGTH and AREA WIDTH values, deeper depths can be analyzed. The depth analysis ratio is one to three. For example, in a scan with a length and width of 01 meters, a depth of 01 meters can be analyzed. To obtain more complete data from the scan environment, try to take lengths and widths of more than 4 meters. After setting the desired parameters in the New 3D-Scan Wizard page and clicking CONTINUE, the main scan page appears.

Compass





## **Step Mode :**



#### Laser Mode:



By considering the direction of movement using the Compass located on the upper right side of the screen, and by pressing the TRIGGER button (on the handle), the scan starts.

With the completion of each row, the next scan starts from the first row on the right and continues parallel to the starting point. After completing all designated ROWS, the scanned data is displayed on the Scan Preview page. The aforementioned points are also applicable in the Laser Scan menu; the only difference is in the function key for moving, which is done using the compass on the top right of the screen and starting the scan by pressing the TRIG-GER button on the handle. After each row scan is completed, the next row starts from the right side proportionally and parallel to the trigger point. In Laser Scan mode, the TRIGGER button must be pressed twice to start scanning: -Once to mark the laser on the Reflector and read the distance to the starting point with the Reflector, -and again to start the scan.



## **Device Usage:**

Ensure metallic objects like belt buckles, shoe nails, and items like mobile phones that may interfere with the magnetometer sensor are kept away. Before scanning, ensure the starting point's cleanliness using the GND Balance menu. Make sure the anomaly values do not deviate significantly from zero. If significant anomalies occur, choose a cleaner starting point.



#### **Scan Initiation:**

Segment the scan area according to its length, Width, and terrain to better identify rows and Features. This ensures accuracy in the collected data. You can use tape or markers on the ground for this purpose. During scanning, maintain a steady pace without pendulum-like or erratic movements, ensuring consistent direction and speed, similar to a normal walking pace. Practice to improve scanning speed for better results. During laser mode scanning, movement towards the target depends on changes in distance from the reflector placed at the scanning path.

Thus, users must move accurately and continuously along the path.

Automatic scanning occurs upon completing the specified distance.

#### **Scanning Steps:**

Estimate the length and width of the scan area. Select the starting point. Ensure the starting point is uncontaminated and proceed to subsequent lines to the right using the Grand Balance menu. Select the desired scan type (step mode or laser mode) from the scan 3D Scan Wizard menu. Input the length, width, and terrain of the scan area, then press "Continue." Use the compass (top right of the screen: Display) to de- termine your direction, then press the TRIGGER button on the handle to initiate scanning.

Simultaneously move during TRIGGER key pressure in the scan path. Note that in the laser scan mode, the TRIGGER must be pressed twice when starting the scan: First to mark the reflector and read the distance from the starting point to the reflector, Second to initiate the scan. When scanning in LASER MODE, place the reflector 50 centimeters away from the end of the row being scanned. After scanning the desired row, move the reflector to the end of the next row. Repeat this process until scanning all rows is completed. After reaching the end of each row, rescan parallel to the traversed row and select the median row as determined in the scan settings. Continue this way until all rows specified by you are completed. After completing the scan stages, the captured scans are displayed as a preview. Scans are stored in the device's internal memory, and the user can manage them in the Files menu. For analyzing the captured scans, first transfer the scanned file via WiFi to a laptop, then analyze it in a Windows environment using the Gradium software, which will be fully explained later.





It is necessary to turn off the Wi-Fi during scanning to prevent the Wi-Fi signal from interfering with the device's

sensor. Turn off Wi-Fi using the on/off switch located under the GNSS antenna. WiFi should be turned on only when transferring scanned files to a computer or laptop.

#### WARNING



Laser light when open. AVOID DIRECT EYE EXPOSURE.



## **3. GND Balance**

#### Menu Description





- 1. VDC: Display of DC voltage received from the sensors.
- 2. Displaying the magnetic anomaly received from the sensor based on the Nano Tesla unit
- 3. Displaying the magnetic anomaly received from the sensor in the form of a bar graph
- 4. Sensitivity adjustment.

#### Sensitivity ranges from Low to Ultra High Sensitivity in 5 steps.

- . Low Sensitivity
- . Normal Sensitivity
- . High Sensitivity
- . Very High Sensitivity
- . Ultra High Sensitivity



## **GND** Balanc

The Normal sensitivity mode is the best mode. The lowest and highest values received are displayed digitally. The sensitivity mode display can be switched between digital and graphical modes. Use the ZERO to zero out the received values. It is emphasized that ZERO should never be used when Balancing the Starting Point. Use the ZERO function only in PIN Pointer mode.

This menu has two uses. The first is to test the starting point for scanning to check for contamination or targets at the starting point. ZERO should not be used in this case. The second use is for points where targets are likely to be present.

## Files Menu:

All scans taken are stored in the 16GB device memory, with the ability to store minimum of 15000 scans. Step and laser scans are categorized separately. User can view file again and delete them if necessary.



EXIT

Battery 90%



## **Config Menu:**

## **Device settings include:**

Display brightness settings, which can be selected in three modes: day, night, and automatic. It can also be manually adjusted."

Settings for date and time must be saved using "Save" after making changes to the date and time.



## **PATTERN:**

The device's password utilizes the secure PATTERN algorithm for authorized access upon system startup. Users can enable, disable, or change this feature.

Be sure to note the new pattern securely; forgetting it will require referral to au-

thorized service centers for system startup. To change the pattern, input the current pattern first, then enter the desired pattern twice identically. At least 3 points are required for the new pattern. To disable the pattern, input the correct pattern first, and then click "REMOVE." In this state, "UNLOCKED" will be displayed at the bottom of the screen, and entering a pattern will not be necessary upon Re-starting the device.



# HARDWARE

The hardware section is solely for Ensuring sensor health Satellite signal Reception and receiving precise time Based on Greenwich Mean Time



# Note:

Being able to carry the instrument comfortably is important when you are using it for long

searches. Concentration must not be affected by an awkward arm position or bad posture.

You should therefore wear the shoulder strap when you are performing long searches.

Adjust the shoulder strap so that the position of the probe is correct for the height of the operator when standing upright.

The tip of the probe should be kept as close to the ground as possible  $\square$ 



Attention: Avoid shining the laser Beam towards individuals eyes.





## **Important:**

#### **Battery**

The HYPERION device is powered by a 10 Ampere battery, which is enough for at least 6 hours of continuous operation of the device when fully charged.

Make sure that the battery is charged with the original charger that comes with the device.

The allowed battery charging voltage is 12.6 volts and 3 Amps.

#### Repair

Any repairs resulting from technical malfunctions for a period of ONE (1) yearsfrom the date you purchased the product are free. Contact your dealer for product service or inquiries. The unit is inspected by a qualified technician and repaired if necessary. After ONE years, all repairs are charged. If you damage the product or open the main unit, the warranty will lose its validity.



#### **Technical Specifications:**

LENGTH:	Minimum Approx 550mm MaXimum Approx 850mm	
WEİHT:	Divice 4.6kg with box 6.7kg	
BATTERY CHARGING:	DC. 12.6V 3Amper	
OPERATINGE TIME:	Battery full: 8h at Temp 20°C	
TEMPRATYRE RANE:	-5°C to +45°C	
STORAGE TEMPRATYRE	-10°C to +55°C	

