FOR THE ARMED FORCES
OF UKRAINE

GAUSS MiL

«Gauss MD»

PROFESSIONAL METAL DETECTOR

with Gauss MiL firmware

OPERATING MANUAL

TABLE OF CONTENTS:

THE USE OF THE METAL DETECTOR WHILE CONDUCTING MINE CLEARANCE ACTIVITIES (including surveying of areas) IS ALLOWED ONLY FOR INDIVIDUALS WHO HAVE BEEN AUTHORIZED TO CARRY OUT SUCH WORKS, HAVE RECEIVED TRAINING ON THE OPERATION OF THE GAUSS MIL, HAVE READ THE OPERATING MANUAL FOR THE DEVICE, AND HAVE BEEN GRANTED PERMISSION UNDER RELEVANT ORDERS TO PERFORM SUCH ACTIONS.

1 PACKAGE CONTENTS

The Gauss MiL package includes:

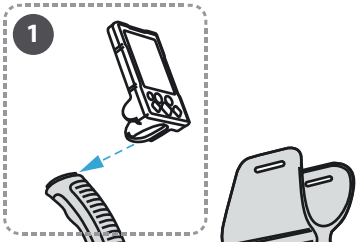
1. Control box
2. Shaft
3. Headphones
4. MDLink module
5. USB/mini USB cable
6. Magnetic charging cable
7. AC adapter with USB port
8. Set of rubber washers
9. Coil attachment bolt (2 pcs)
10. Tiger search coil
    + coil cover
    + connector protection cap
11. Tiger search coil
    + coil cover
    + connector protection cap
12. MarsMD Pointer
13. Carry bag

The Gauss MiL can be additionally equipped with the different sized search coils:

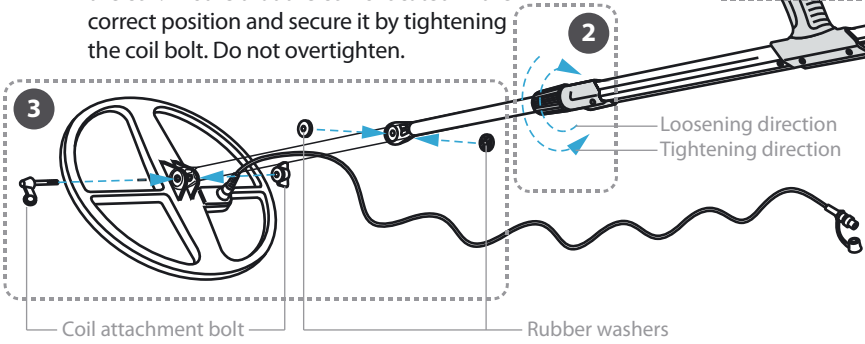
GOLIATH	**DISCOVERY**	**TIGER**	**SNIPER**	**7``**
search coil	search coil	search coil	search coil	search coil
(**38** cm)	(**33** cm)	(**25.5x32** cm)	(**15x25** cm)	(**18** cm)

2 ASSEMBLY

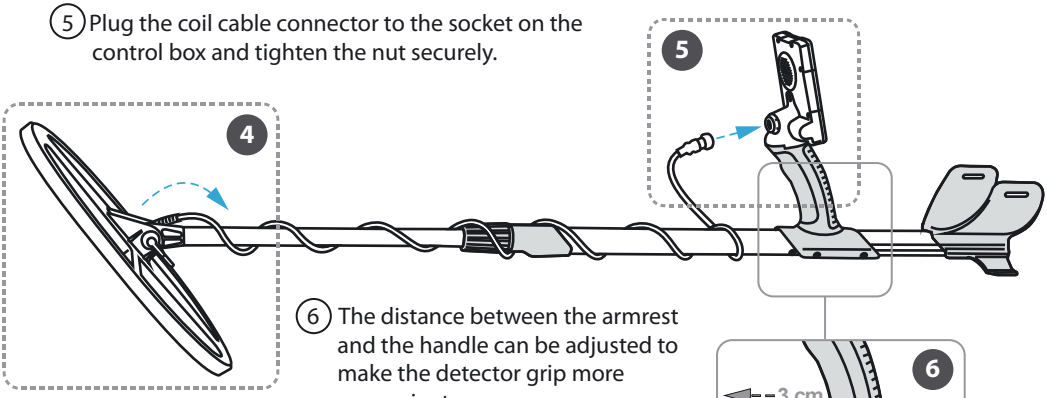
Assembling the Gauss MiL proceeds via the following steps:



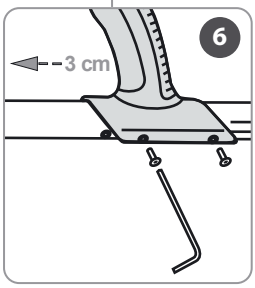
1. Attach the control box to the end of the shaft handle.
2. Adjust the shaft length to fit your height and tighten the twist lock to secure.
3. Insert the rubber washers into the holes of the lower shaft yoke and place the yoke between the mounting tabs on top of the coil. Ensure that the coil is located in the correct position and secure it by tightening the coil bolt. Do not overtighten.



4. Wrap the coil cable around the lower shaft in such a manner that the first loop close to the coil goes over the top of the lower shaft.
5. Plug the coil cable connector to the socket on the control box and tighten the nut securely.



6. The distance between the armrest and the handle can be adjusted to make the detector grip more convenient.
   For this purpose:



- using a 2 mm hex key (not supplied), remove the screws that hold the shaft handle;
- move the handle either forwards or rearwards until desired position is achieved and return the fixing screws to secure the handle in its new place.

3 TURNING THE DETECTOR ON

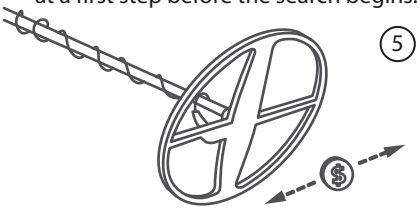
To turn on the device, press . You will hear a melody and "**On**" message will be shown on the display. Once turned on, the detector is ready for operation and automatically enters the search mode. Quick press to turn off the device.

It is recommended to turn on the detector in open terrains, as far away as possible from buildings and sources of electromagnetic interference. There may also be disturbance from cell phones, motors, TV sets and other household electrical appliances. Under these conditions the detector may behave erratically in the **An** mode producing a large number of false signals. If you hear an overload signal and see "**OL**" displayed on the screen, move the detector coil away from the source of overload.

Read and study this manual carefully before using the product. Understanding the settings and modes features will allow you to use your metal detector in the most effective and efficient way possible while searching.

4 QUICK START

1. Assemble the device according to the instructions given on page 4 (see Section 2).
2. Make sure that the detector coil is far away from metal objects and turn on the device. If you hear an overload signal and see "**OL**" on the screen, move the coil away from the source of overload.
3. Change the search settings in the Settings Menu and turn on the transmitter if you want to use the headphones with the MDLink module.
4. If first starting out is on the ground, the detector should be ground balanced (see Section 7) at a first step before the search begins.



5. Take a few different types of metal objects and wave them in front of the coil one by one. Learn how the detector reacts and responds to different metals, try to remember the Target ID values and sounds produced by each object - that will help you identify buried targets more accurately.
6. After the detector check is complete, turn off the device and the MDLink module.

5 CONTROLS

Wireless Audio

Appears when the built-in transmitter is activated. A digit nearby stands for the number of the current radio channel for sound transmission.

Backlight Indicator

Appears when the screen backlight is on.

Operating Frequency

Indicates the current operating frequency.

Battery Status Indicator

Indicates the current charge level of the battery. Starts blinking when the battery is nearly discharged.

TARGET ID

Shows the value that is given to a detected target depending on its characteristics.

Ground Balance Value

Displays the current ground balance value.

GAIN

Displays the value of the GAIN setting which stands for the detector sensitivity.

Battery Charge

The LED inside the control box indicates the charging process. Red when charging, blue when charged.

Settings Menu

Contains 5 adjustable settings.

ON / OFF

Ground Balance

PINPOINT / Exit

Change Settings

Settings / Backlight

6 SETTINGS MENU

The **Gauss MiL**
Settings Menu contains
5 adjustable settings.

Press ⚙ for the first time and the current setting and its Target ID value will be displayed on the screen. Pressing repeatedly calls up other possible menu settings. If you want to return to the previous setting, press ⏻.

The values of the selected setting can be adjusted by using « » . If a setting has multiple values, then press and hold one of these buttons to make fast adjustments. To exit the menu, press ⌖.

GAIN	**1, 2 ... 40**
FREQ	**L1, L2, ... L5**
MODE	**An, iL**
Vol	**1, 2, ... 10**
TRANS	**OF, c1, c2, c3, c4**

All the latest settings changes are saved in non-volatile memory of the device before it turns off.

GAIN (GAIN)

This setting value determines the detector sensitivity. It ranges from 1 to 40. The higher the value, the greater the distance targets can be detected at.

It should be kept in mind that the detector becomes more sensitive to the effects of electromagnetic interference and ground signals when entering the limit values of this setting.

FREQUENCY (FREQ)

LF1…LF5 is the detector's operating frequency with the value within the 16 kHz ± 200 Hz range. The LF group has 5 different frequencies - to tune out noise and mutual interference.

OPERATION MODE (MODE)

The iL mode for the use in both humanitarian and military demining.

iL is a special mode designed to detect metal-containing explosives. In this mode, the metal detector has one tone audio indication without determining the type of metal (ferrous/non-ferrous), TARGET ID isn't displayed on screen.

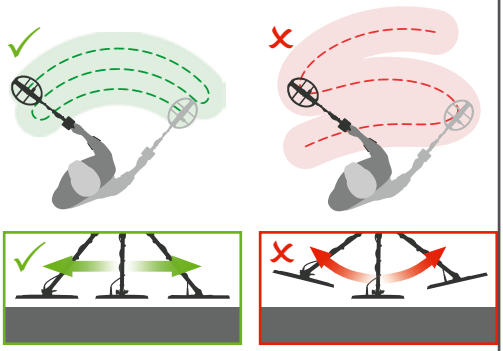
The audio tone increases/decreases as the coil approaches/gets farther away from a target.

It must be remembered that explosives may contain both ferrous and non-ferrous metallic elements (as **PMN-2** or **PFM-1** do), therefore an EOD specialist mustn't ignore any signals that may potentially be produced by explosives.
This is precisely why professional mine detectors operate in one-tone mode without determining the type of metal (ferrous/non-ferrous).

The **iL** mode is more resistant to radio waves interference and offers enhanced operating stability.

IMPORTANT!!! In the **iL** mode, you should scan the ground surface using slow, short sweeps.

IMPORTANT!!! While scanning, each subsequent sweep of the coil should overlap the previous sweep to ensure complete ground coverage.



An allows to distinguish between ferrous and non-ferrous metals.
In this mode, the operator can differentiate metal types:
• with tonality – 4 tones (1 ferrous tone, 3 non-ferrous tones);
• with TARGET ID:
ferrous range is -9 to -1;
non-ferrous range is 0 to 90.

VOLUME (Vol)

Volume adjustment. The higher the setting value is, the louder the sound volume and the smaller the difference in volume between strong and weak signals are. The recommended value when operating with the MDLink module is 6-8.

TRANSMITTER (TRANS)

The detector has an MDLink transmitter built-in in its control box. It provides wireless sound transmission to the headphones via the MDLink module without delay and distortion. To activate the transmitter, set it to the same channel as the module. When the transmitter is activated, the audio output will be automatically turned off from the built-in speaker. The radio module icon and the number of the chosen channel will appear at the top of the screen, and the green LED light will have a periodic blink inside the control box. For effective searching we recommend that you always use the headphones (to hear weak signals better) thereby reducing power consumption and increasing the detector's operation time without charging the battery.

7 GROUND BALANCE

The ground balance setting can be adjusted in two ways: manually **(Hd)** and automatically **(At)**.

You can switch between these two options by pressing repeatedly.
Once the ground balancing is completed, press to continue searching.
The current ground balance value is shown in the lower-left corner of the screen, below the **GEB** icon.

It's very important to always set the ground balance before starting the search. If the detector isn't properly ground balanced, its searching abilities may be reduced that way causing unstable operation and production of false responses. To minimize the effects that ground minerals have on the detector's performance, it's necessary to regularly set an accurate ground balance, especially when changing a search site.

MANUAL GROUND BALANCE

1. Find an area where there is no metal.
2. Press and switch the detector to the ground balance mode. If necessary, press repeatedly to set the manual mode. The letter-value **Hd** will be shown below the GEB icon, and a current ground balance value will be displayed in the Target ID field.
3. In a smooth motion - the key is, with no sudden movements and bumps - move the coil up and down at the height of 3-40 cm above the soil surface so that the coil passes over without touching it.
4. While moving, analyze the sounds emitted by the detector in this mode. If the device produces a low tone when you move the coil closer to the ground, increase the ground balance value using ». If the detector emits a high tone, do the opposite action – decrease the value using «. Press the buttons several more times until you get such GEB value when the sounds become as quiet as possible or completely silent while the coil is swung over the ground.
5. Upon completion of ground balance, press to continue detecting - a new ground balance value will be displayed in the GEB field.

AUTOMATIC GROUND BALANCE

1. Find an area where there is no metal.
2. Press and switch the detector to the ground balance mode. If necessary, press repeatedly to set the automatic mode. The letter-value **At** will be shown below the GEB icon, and a current ground balance value will blink in the Target ID field.
3. In a smooth motion - the key is, with no sudden movements and bumps - move the coil up and down at the height of 3-40 cm above the soil surface without touching it.
4. While the coil is moving over the ground, the detector starts calibrating itself to the local ground conditions and fine tuning the ground balance value. Repeat this exercise several times until the sounds become as quiet as possible or completely silent while the coil is swung over the ground and you get a constant ground balance value. Thus the detector automatically adjusts the ground balance in the same way as it is performed manually by the user.
5. Once the automatic ground balance is completed, avoid sudden movements with the coil to prevent values changing. To exit the mode, use . A new ground balance value will be displayed in the GEB field. Sometimes, upon completion of automatic ground balancing procedure, it's recommended to also switch to the manual mode and adjust the ground balance more accurately.

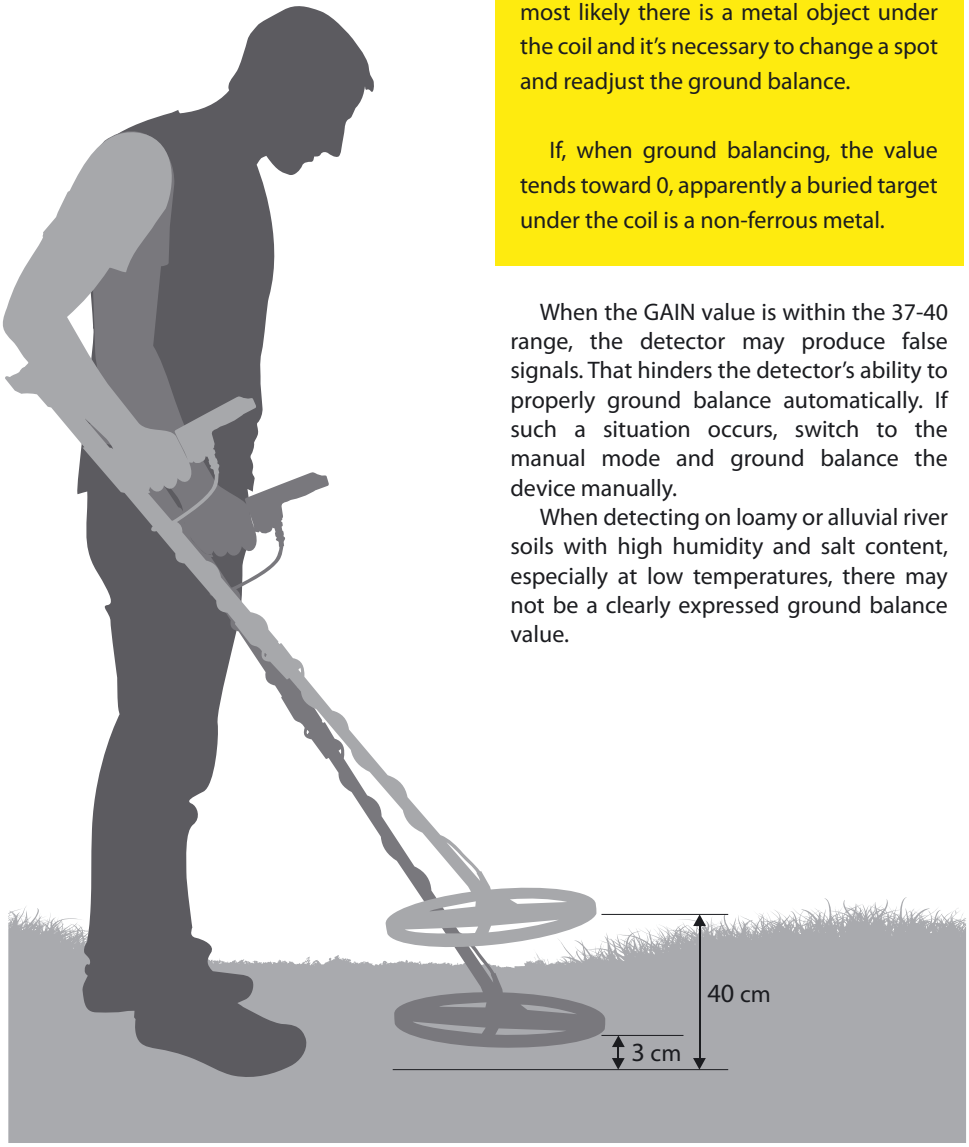
The ground balance value provides the current information about the ground you are searching on. The range of 6-20 is common to poorly mineralized sandy soils. The range of 20-45 is typical for dry clay loams and black soils with low salt content. The same soils at high humidity and low temperature may have the values within the 45-60 range. Clay, swamp environments and saltwater may increase this value up to 80.

If the ground balance value reaches 99, most likely there is a metal object under the coil and it's necessary to change a spot and readjust the ground balance.

If, when ground balancing, the value tends toward 0, apparently a buried target under the coil is a non-ferrous metal.

When the GAIN value is within the 37-40 range, the detector may produce false signals. That hinders the detector's ability to properly ground balance automatically. If such a situation occurs, switch to the manual mode and ground balance the device manually.

When detecting on loamy or alluvial river soils with high humidity and salt content, especially at low temperatures, there may not be a clearly expressed ground balance value.



8 PINPOINT

In the An mode, the Gauss MiL operates as a motion detector, that's why you should constantly move the coil over the ground in order for the device to detect targets. While moving, it's not always possible to effectively detect a buried object as it's hard to identify its exact location.

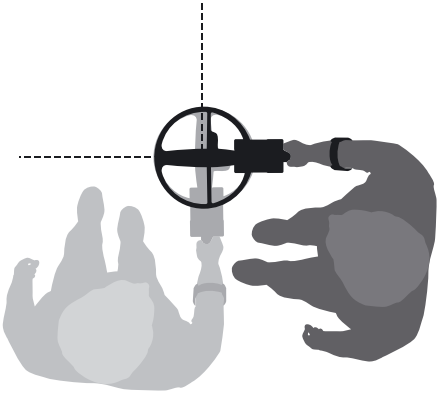
Once a target is detected and you want to determine its precise location, press . When the PINPOINT mode is activated, the device can't discriminate the metal types and becomes a non-motion detector.

The letters **PP** will be displayed in the Target ID field, and the black bars on its left and right sides will indicate the signal strength of a target under the coil. The detector will also produce an audio response with different volume level and frequency proportionally to the signal strength of a target, which additionally helps to identify its position and estimate the burial depth.

This mode is recommended for use while detecting valuable finds. It's also crucially important to keep the coil at the same height above the ground at all times when sweeping. The non-motion mode is unstable in time, that's why operation in this mode should be performed within a short period of time.

To determine the exact position of a target:

1. After the approximate target location is detected, move the coil away from that area and press .
2. Sweep the coil slowly closer to the target keeping it at the same height above the ground. Identify the location where the detector produces the loudest sound and displays the greatest number of black bars.
3. Keep this position in mind or mark it with a shovel. Then change your sweep direction – approach the target at a right angle to the original search line and repeat Step 2 above.
4. By doing so you'll quickly determine the target's exact location. Press to exit.



9 BACKLIGHT

The Gauss MiL LCD is equipped with a built-in backlight for operation in dark conditions. It has ***4 brightness levels.***

The last selected level will be saved in the detector's memory after it's turned off.

Press and hold to turn the backlight on or off. When the backlight is turned on, the icon will appear at the top of the screen and the brightness will increase smoothly to a set value.

If you continue holding down while turning on the backlight, you'll be able to choose one out of the 4 brightness levels in approximately 2 seconds.

When you turn on the detector, the LCD backlight - even if it's switched off - also turns on automatically for a short period of time.

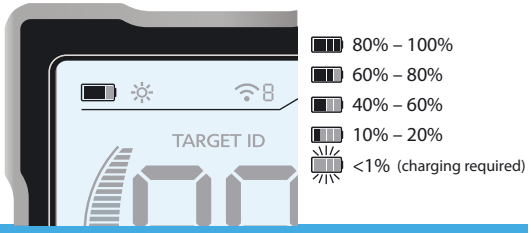
10 TARGET ID IN THE AN MODE

Target ID is the number produced by the device while identifying a buried object based on the electromagnetic properties of metals and physical dimensions of the item found. Ferrous targets mostly produce negative numbers (-9, -8…-1) whereas non-ferrous targets – positive numbers (0, 1…90). The last detected Target ID value stays on the display for 5 seconds until another object is detected.

11 BATTERY STATUS INDICATOR

While in operation, the detector is capable of continuously monitoring the current battery level which will be shown in the status bar at the top of the screen.

When the battery charge is almost exhausted, the battery status indicator starts blinking and your headphones/speaker will emit a short sound warning that the battery needs charging.



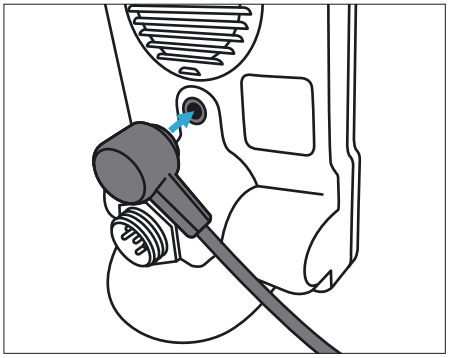
Important! When the battery level is critically low, the detector will turn off automatically.

12 BATTERY CHARGING

The Gauss MiL is powered by a built-in lithium-ion battery. The included USB charging cable with a magnetic connector is used to charge the battery.

The battery should be charged according to the following steps:

1. Take the supplied charging cable and connect its magnetic connector to the counterpart on the back of the control box.

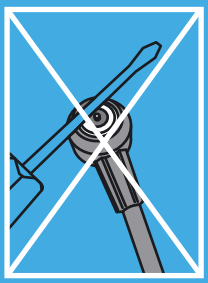


2. Plug the other end of the cable into the power adapter supplied or any standard powered USB-A port.

3. The LED on the left side of the front panel (near the ON/OFF button) will flash red indicating the charging process. When the battery is fully charged, the red light will turn blue.

4. Wait until the charging is complete and disconnect the cable in the reverse order: the cable end from the power adapter first and then the magnetic connector from the control box.

Important! Strictly observe the procedure for connecting the charging cable indicated in this manual. Keep the magnetic cable connector away from metal particles to avoid short circuiting and breakdown of the power adapter or other device the charging cable is plugged into.



Battery maintenance

Lithium-ion battery may degrade if they aren't in use for long periods of time. Fully charge the battery regularly, at least once every 2-3 months. However, be aware that the lithium-ion battery capacity decreases gradually with time, even under normal usage conditions. In view of this, the battery needs to be replaced every few years. Replacement batteries can be supplied and installed by an authorized service center.

The charging time for a completely discharged battery is estimated to be about 5 hours if the charging adapter provides a power output of 5V and 1A. Less power from the power source may extend the charging time. If the detector is turned on while charging, the charge time will be longer.

Important! To avoid battery damage, never charge a battery in an area with an ambient temperature of less than 5°C. Always allow the control box to first warm up to room temperature for a few hours, in order to then charge the battery under optimum condition.

To charge the Gauss MiL, the use of any quick charge AC power adapters is prohibited! It may cause damage or destroy the battery.
Use the power adapter supplied in the package.

13 CONNECTING HEADPHONES

How to connect your headphones to the MDLink module:

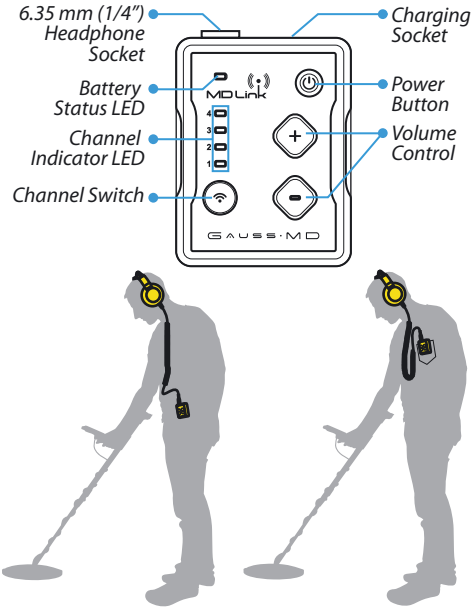
1. Plug your headphones into a 6.35 mm headphone jack on the MDLink module.
2. Turn on the detector and the module (sequence doesn't matter).
3. Quick press to step through the channel selection.
4. Activate the transmitter (TRANS) in the Settings Menu by setting it to the same channel as the module. Once the detector and the module are successfully paired, you will hear a beep sound and the LED light will flash constantly.
5. Use the + / - buttons on the module to adjust the volume to your preferred level.
6. Attach the module to a breast pocket or a belt.

The MDLink wireless audio system allows you to choose one of 4 channel options.

There are 10 levels of volume control. Once the maximum or minimum volume is reached, you will hear a low pitch sound indicating the upper or lower volume limit.

After turning off the MDLink power button, the current channel and volume level will remain in the module's memory.

If two MDLink wireless audio systems are located close to each other, they need to operate on different channels to eliminate mutual interference. If the transmitter is disconnected from the module (due to the channel change or connection loss), you will hear a disconnect signal while the current channel LED indicator will blink in a repeating pattern.



Module Charging / Low Battery Warning

The MDLink module contains a rechargeable Li-Ion battery and a built-in charge controller.

To charge the battery, you need to plug one end of the USB/mini USB cable (supplied) into the mini-USB output on the module and the other end into the USB power adapter (supplied) or a power bank (not supplied).

While being charged, the LED light will flash blue. Once charging is complete, the LED will turn off by itself.

When the module is turned on, the channel LEDs will flash briefly. Depending on the number of LED lights, you can get a rough estimate of the battery charge level (each LED represents 25%):

- One Light = 25%
- Two Lights = 50%
- Three Lights = 75%
- Four Lights = 100%

When battery level drops to roughly 5%, the battery LED on the module will start blinking red and you will hear a warning beep in your headphones.

When battery level approaches roughly 2%, the LED indicator on the module will be flashing red constantly and the beep will sound every 30 seconds until the battery is fully discharged.

14 FACTORY SETTINGS

All settings are saved in the **Gauss MiL`s** memory after it's turned off and are automatically restored after it's turned on.

TO RETURN YOUR SETTINGS TO THEIR FACTORY PRESETS, PERFORM THE FOLLOWING STEPS:

1. Turn off the detector.
2. Press and hold , turn on the detector using .
3. Hold down and wait until all options of the Settings Menu briefly appear on the LCD screen.

15 TROUBLESHOOTING

Trouble	Solution
The detector turns on, but turns off by itself	Ensure the battery is sufficiently charged.
The detector doesn't turn on	Connect the supplied charger to the detector and wait until charging is complete.
Erratic noises	1. Check the coil cable, make sure all the contacts are clean. 2. Ensure the nut on the coil connector is firmly tightened. 3. Move away from the source of interference. 4. Try switching to another operating frequency. 5. Reduce the detector's sensitivity
No sound from the built-in speaker	Ensure the built-in transmitter is turned off.
No connection with the MDLink module	Ensure both devices are set to the same channel.
Unstable connection with the MDLink module	Change the mounting spot of the MDLink module. It should be located at a place where electromagnetic waves meet no barriers.
The shaft twist lock seizes	Rotate the twist lock in loosening direction and clean it out to remove dirt and sand.

16 MAINTANENCE & SAFETY

The Gauss MiL is a high-quality electronic device, therefore proper care and maintenance is essential to ensure its continuous reliable operation.

GAUSS MIL CARE:

- Do not leave the detector in extreme cold or heat (e.g. in a hot car) as well as in damp locations.
- Avoid getting sand and grit in the shafts and fastening parts (e.g. twist locks and coil assembly).
- If there is a noticeable scratch on the lower shaft, wipe it thoroughly with a damp cloth.
- Treat the detector coil with constant care, do not subject to strong shock and always remove traces of dirt.
- Remember that the detector coil is submersible whereas the control box isn't. Never submerge the control box in water!
- Loosen the coil attachment bolt when the detector isn't in use so that the coil mounting tabs don't experience excessive deformation to prevent cracks in the housing.
- Rinse the coil and the shaft with fresh water after use on the beach. Do not wash the control box by spraying or pouring water on it!
- Before charging, remove metal particles accumulated on the magnetic cable connector.
- Strictly follow the relevant instructions of this manual while charging the detector.
- Ensure that the coil cable is in good condition and not subject to excessive stress.
- Observe safety precautions when transporting or storing the detector. The device screen can get scratches or serious damage if not treated with due care. Use a screen protector to keep it pristine.
- Do not expose the detector to extreme temperatures. Operating temperature range: -20°C to +45°C.

GENERAL CARE:

- Do not use solvents to clean the detector. Wipe down with a cloth using warm soapy water or a mild household detergent.
- Do not expose the accessories to moisture or excess humidity, keep them away from liquids.
- Do not open or distort the internal batteries.
- Strictly follow the relevant instructions of this manual while charging the accessories.
- Do not throw the detector or accessories into a fire as this may cause an explosion.

For reliable and long-lasting operation, the Gauss MiL and MDLink batteries need to be charged at least once every 3 months in a temperature range of 0°C to +45°C.
The storage temperature range: -20°C to +45°C.

17 ERROR MESSAGES

During operation, the detector is capable of continuously monitoring the coil condition to determine the coil disconnection or overload problem. If such situation occurs, a warning message will be displayed in the Target ID field.

Код сповіщення		Необхідні дії
OL	Overload	Move the coil away from the source of overload.
CU	Coil Not Connected	Ensure the coil connector is plugged into the control box socket. Check the coil cable and housing for any visible signs of damage.
Cd	Coil Connected	Continue searching.

18 TECHNICAL SPECIFICATIONS

Gauss MiL Detector

Detecting Range	Max range	≈ 150 cm
Operating Frequency		15.8...16.2 kHz
Indication	Visual	LCD
	Audible	4-tone volume control
Search Mode	Metal detector (An)	with metal discrimination
	Mine detector (iL)	without metal discrimination
Ground Balance	Manual	ground balance performed manually
	Automatic	ground balance performed automatically
Built-in Transmitter	Radio frequency range	2400 – 2483.5 MHz
	Power	+ 4 dBm
	Wireless transmission range	≤ 10 meters
LCD Backlight	4 brightness levels	
Power Supply	internal Li-ion battery	
Operating Time	up to 24 hours (but not less than 15 hours)	
Operating Temperature Range	-20 °C to +45 °C	
Storage Temperature Range	-20 °C to +45 °C	
Warranty*	24 months	
Shaft Length (min/max)	800 mm/1390 mm	
Weight	1,320 g	
Ступінь захисту	IP 65	

* The warranty doesn't apply to the headphones.

MDLink Module

Radio Frequency Range	2400 – 2483.5 MHz
Wireless Transmission Range	≤ 10 meters
Operating Time	10 hours
RF Transmission Power	+ 4 dBm
Sensitivity	-89 dBm
Audio Amplifier Power	1 W
Volume Adjustment	10 levels
Size	70.2x52x30 mm
Weight	64 g

gaussmil.com

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