OPERATION AND MAINTENANCE MANUAL

Metal detector
Art. MD01

FERVI
PRO SMART EQUIPMENT

TRANSLATION OF THE ORIGINAL INSTRUCTIONS

FOREWORD

Read this manual before operating any machinery

ORIGINAL INSTRUCTIONS

Before starting any operation it is compulsory to read this instruction manual. The guarantee of smooth operation and full performance of the instrument is highly dependent on the application of all the instructions contained in this manual.

Operator Qualification

The workers responsible for using this device must have all the necessary information, education and receive adequate training regarding safety, including:

a) The conditions of use of the equipment;

b) Foreseeable abnormal situations, pursuant to Article 73 of Legislative Decree 81/08.

We guarantee the instrument complies with the specifications and technical instructions described in the Manual on the date of its issuance (shown in this page). On the other hand, the instrument may also be subject to important technical changes in the future, without the manual being updated.

Therefore, see FERVI for information about modifications that could be implemented.

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1 INTRODUCTION

Using this metal detector, it is possible to hunt for coins, relics and jewellery made of ferrous and non-ferrous metals. The use of this instrument is suitable for any type of person and requires no special skills or qualifications. The instrument is very versatile and easy to use.

1.1 General safety information

- Protect the instrument from bumps or falls. Use extreme caution when handling the instrument.
- Protect the instrument from extreme temperatures and dust. Store the instrument in a clean, dry place.
- When the instrument is not being used for a long period of time it is necessary to remove the batteries to prevent damage from the leakage of corrosive substances.
- Use the device only for the purpose for which it was designed.
- Always observe local regulations in force.

2 DESCRIPTION AND CHARACTERISTICS

Figure 1 - Overview of the device

1	Armrest	4	Locking ring
2	Handle	5	Search coil
3	Control unit		

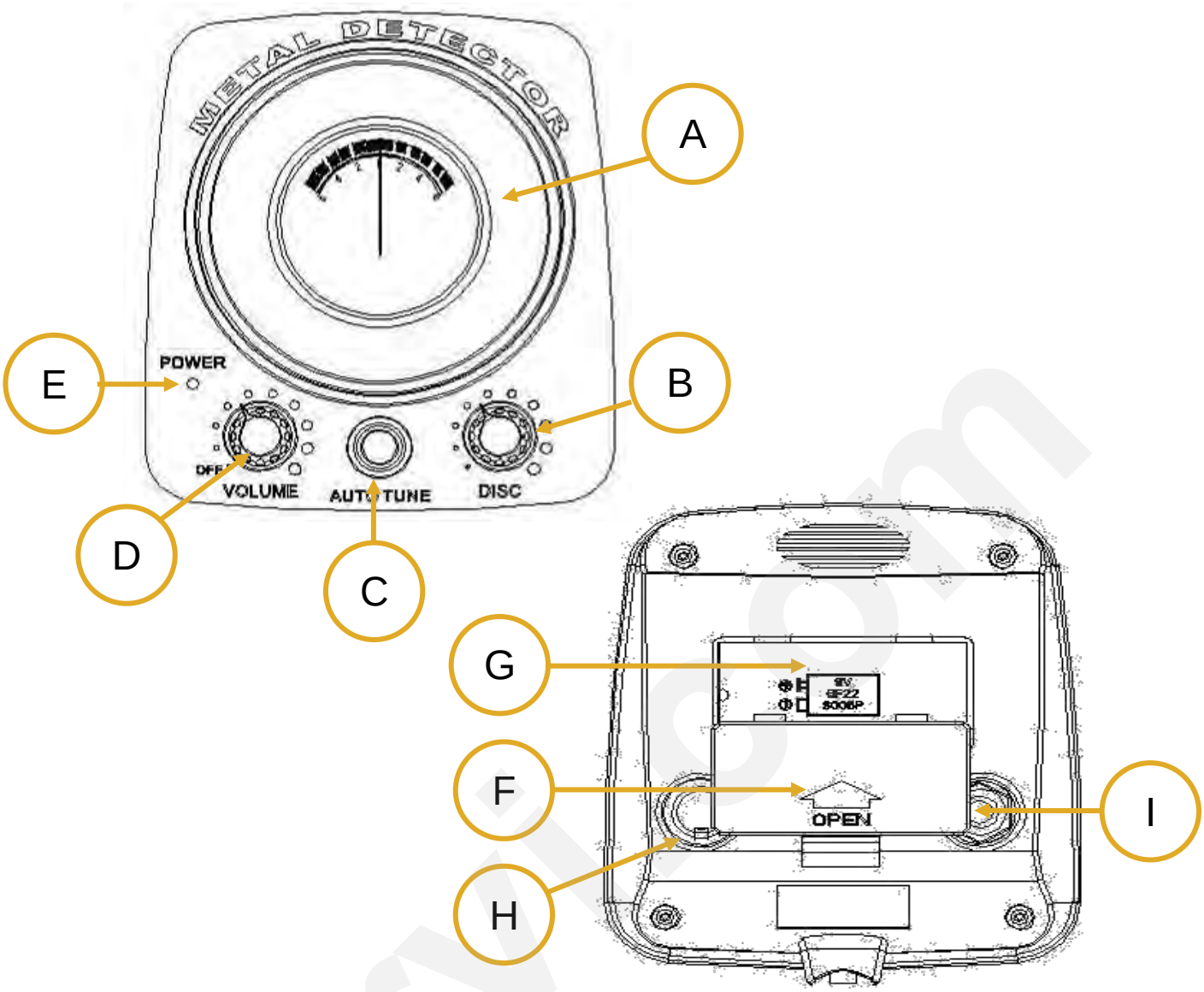

Figure 2 - Control unit

A	Analogue instrument
B	Discriminator adjustment knob
C	Auto tune button
D	Volume adjustment knob
E	Power light
F	Battery compartment cover
G	Battery compartment
H	Coil connection socket
I	Headphone jack

- **Headphone jack:** allows a pair of headphones (not included) to be connected to the device in order to hear the acoustic signals in private without disturbing others.
- **Analogue instrument and two-colour LED**: displays the probable type of metal found.
- **Waterproof search coil:** allows the instrument to be used even with the coil placed underwater.
- **Extendible stem:** this allows the length of the instrument to be changed for more comfortable use.
- **Power supply:** the instrument is powered by a single 9-volt alkaline battery

3 TECHNICAL SPECIFICATIONS

Description	MD 01
Coil diameter	170 mm
Jack connector	¼″
Maximum detection distance	15 cm for one coin of Ø 25 mm
Battery	1 x 9V
Weight	1.7 kg

4 ASSEMBLY

Assembling the metal detector is an easy task and does not require the use of any tools:

1. Loosen the knob on the search coil and remove the screw. Insert the bottom of the stem of the instrument and tighten the screw, so that the holes on the coil line up with the through hole on the stem.
2. Loosen the locking ring and insert the lower stem (black) into the upper stem (aluminium). After inserting the stem adjust the length to the desired point which is most comfortable for the user.

Figure 3 – Locking ring

3. Insert the locking screw of the control unit inside the stem and secure it by tightening the screw using the knob. Then connect the cable from the search coil to the control unit by inserting it into the appropriate socket. Wrap the cable around the stem of the instrument to prevent it from becoming accidentally damaged. Do not wrap it too tightly to allow the lengthening or shortening of the stem.

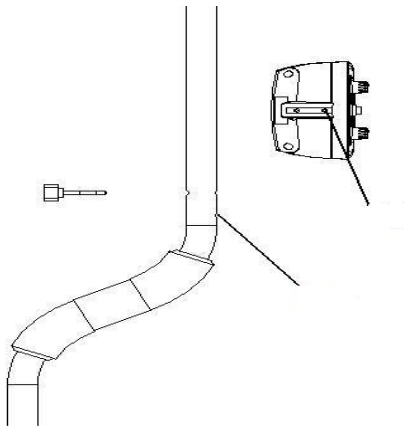

Figure 4 – Assembling the control unit

Precautions for use

- The connecting cable only connects to the socket in one direction. Do not force the connection.
- Do not disassemble the stem length block.

4.1 Installing the battery

1. If the metal detector is turned on, turn the volume knob anti-clockwise until it clicks to turn off the instrument.
2. Press the battery cover and slide it in the direction of the arrow.
3. Insert a 9V battery into the housing, making sure to respect the polarity.
4. Replace the cover.

Precautions for the battery

- Always remove old or weak batteries, which can leak and damage the electronic parts.
- If the metal detector is not going to be used for more than a week, remove the batteries from the compartment.
- Do not throw away dead batteries!
- When the power LED light starts blinking, the batteries will need to be replaced.

4.2 Using headphones

The user can connect a pair of stereo headphones (not included) to the instrument to listen to the signals privately. Using headphones also increases battery life and makes it easier to recognise small changes in the sounds produced for a more accurate search.

To connect the headphones, plug them into the 6.3 mm jack located on the rear of the control unit.

- When the headphones are connected, the instrument speakers are automatically disconnected.
- To protect your hearing, follow this procedure if you intend to connect the headphones to the instrument:
    - Set the volume to the lowest level possible before putting on headphones. Then turn up the volume to a comfortable level.
    - Do not listen to the sounds produced by the instrument at very high volume levels. Long periods of listening at a high volume may lead to permanent hearing loss.
    - Do not use the headphones in traffic areas or in the presence of motor vehicles.

5 HOW TO USE

This type of metal detector is able to distinguish between ferrous (containing iron) and non-ferrous metals (gold, silver, copper, platinum, aluminium, lead).

5.1 Switching on the instrument

To turn on the instrument, hold it in a comfortable position, then turn the volume knob clockwise from the OFF position to the desired volume. As soon as you start to turn the knob the power light will turn on.

5.2 Resetting the instrument

1. Rotate the volume knob to an intermediate position
2. Rotate the discriminator knob to an intermediate position
3. Keep the search coil at a distance of at least **50 cm** above the ground away from metal parts, press the AUTO TUNE button and hold it down until the needle is pointing at zero.

It will now be possible to re-press the AUTO TUNE button at any time while taking measurements to return the needle back to zero.

5.3 Testing and use of the instrument

To learn how to use the instrument and see how it reacts to different metals, the instrument should be tested before use. The function tests can be done both outdoors and indoors in buildings.

5.3.1 Testing inside buildings.

1. Remove any metal objects such as rings, watches, bracelets or any other metal objects that you are wearing.
2. Position the metal detector on a table made of wood or plastic and rotate the search coil so that it is pointing at the ceiling of the room.

Testing the metal detector

Never test the metal detector on a floor inside a building. Most buildings contain metal parts in the floors, which can interfere with the objects you wish to test the metal detector with, making reading unreliable.

3. Reset the instrument as described previously.
4. Move a sample of the element that you wish to find with the metal detector (such as a gold coin) at a distance of approximately 50 mm from the coil.

Testing the metal detector

When using objects to test the operation of the metal detector, the instrument will capture the signal more easily if the object is positioned with its largest area parallel to the coil.

If the metal detector detects ferrous material, it will emit a warning sound, the needle will move to the left and the analogue display will light up red.

If the metal detector detects non-ferrous material, it will emit a warning sound, the needle will move to the left and the analogue display will light up blue.

Generally the closer the coil is to the object detected, the further the needle will move towards the left or right extreme of the scale.

If the metal detector does not detect the object, check the battery is working properly and make sure the coil is properly connected to the control unit.

5.3.2 Testing and outdoor use

1. Find an area of land outside where there are no metals.
2. Place an object of the same type of material that you want to find in the ground. Mark the position where the object is placed to prevent losing sight of it, if it is placed in tall grass or not easily visible.
3. Turn the volume of the instrument up to 2/3 of its maximum power.
4. Carried out the resetting of the instrument.
5. Keeping the search coil parallel to the ground at a distance of about 25 - 50 mm, slowly move it with lateral displacements over the area where the test object is positioned.
6. If you want to look for other metallic materials in an area where an object has already been identified, it will be necessary to re-press the AUTO TUNE button to make the needle return to the 0 position.

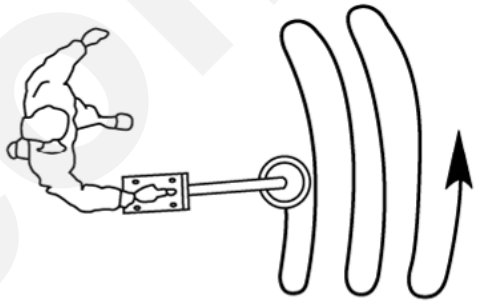

Figure 5 – Movements with the metal detector .

5.4 Operating tips

- Do not use the instrument as if it were a pendulum. Lifting and not keeping the search coil perfectly parallel to the ground could lead to incorrect readings.
- Move the instrument slowly. Hurried use could lead to objects being missed which are otherwise detectable.
- Keep the coil as close as possible to the ground. The higher the coil is held over the ground, the more difficult it will be to detect small objects.
- There may be situations in which the instrument can emit false signals. These can be caused by electrical interference, large pieces of irregular metals or loose soil.

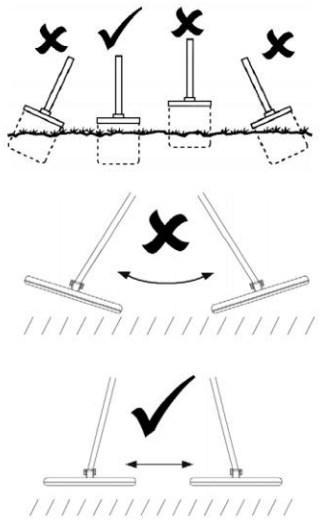

Figure 6 – Using the metal detector

6 TUNING OF THE INSTRUMENT

After the user has become familiar with the operation of the instrument, tune it to make it more selective with the identification of various types of objects.

Discrimination is the ability of the instrument to differentiate between various types of metals. The settings for the **DISCRIMINATION** function determine whether the instrument differentiates between ferrous and non-ferrous metals.

This function can be set from the minimum (DISC knob rotated fully anti-clockwise) to the maximum (DISC knob rotated fully clockwise) or any intermediate position.

It is recommended to use the instrument with the discriminator set to the 3rd point from the left in clockwise rotation, in such way both gold and tin are seen as non ferrous materials. In case of further rotation of the discrimination dial these materials will pass on red.

Turning the dial clockwise from the minimum setting the metal detector will discriminate the non ferrous metals following the table below.

MATERIALS INDIPENDENT FROM THE DISCRIMINATOR	
FERROUS MATERIALS	**NON FERROUS MATERIALS**
RED	**BLUE**
Cast iron	Copper
Steel	Alluminium
Iron	Silver
	Bronze

NON FERROUS MATERIALS THAT DEPENDS ON THE DISCRIMINATOR		
RED	Gold Tin	**BLUE**

MAX ← Clockwise rotation of the discrimination dial. → MIN

The metals that depend on the discriminator will be discriminated as you turn the dial in a clockwise direction. These materials will change from the blue visualization to the red visualization as the dial is rotated in a clockwise direction.

When a metal under discrimination is found, the needle will move towards the left and the red LED will light up.

When a non-discriminated metal is detected, the needle will move towards the right and the blue LED will light up.

Large pieces

In case of finding large dimensions metal pieces the instrument cannot correctly discriminate the material and therefore also in the case of ferrous materials the needle of the instrument will move on the right side and the panel will glow blue.

Discrimination settings

Each time the search area is changed the resetting must be carried out again and the discrimination value will be reset as the change of area can change the sensitivity of the instrument.

6.1 False positives

Due to the extreme sensitivity of the metal detector, small pieces of debris or other interferences may confuse the signal. The key to correctly read the information and give importance only to very strong, stable and repeatable signals. During the movement of the coil back and forth in the same position, learn to distinguish the signals that occur randomly from those that are stable and repeatable.

To minimise this problem in areas with a lot of interference, examine only small pieces of land at a time, making short movements and rechecking the same spot several times.

Unexploded ordnance

If the metal detector finds an unexploded bomb, do not try to move it or defuse it. Move away from the location immediately and contact the local authorities. Prevent other people from approach the area by warning them of the danger.

7 LOCATING THE OBJECT

Correctly and precisely locating an object makes the subsequent digging work much easier and shorter. Do not rush to dig at any detection made by instrument.

Accurate localisation requires practice by the user. It is recommended to practice detecting personal objects previously hidden to understand the various nuances of detection of the instrument.

Some objects will be difficult to locate because of the direction of the search movements. Try changing the search direction to improve the outcome.

Follow these steps to accurately locate an object:

1. When the metal detector detects a buried object, continue to move the coil back and forth over the object. Take a visual note of the position where is the strongest signal is given.
2. Stop the coil exactly over the marked spot and move it slowly back and forth with (away and toward you) to verify that the marked point is where the emitted signal is strongest.
3. Carry out movements to X over the presumed position of the object and check that the centre of the movement corresponds with the increased noise from the instrument.

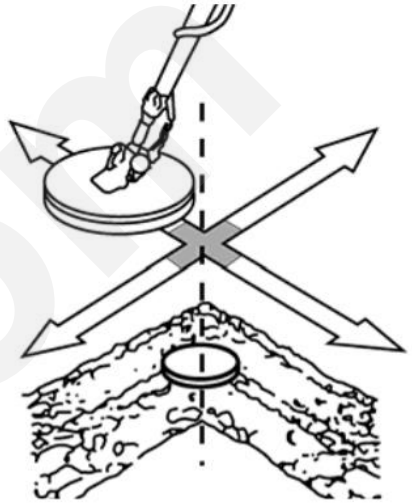

Figure 7 – Localisation

Oxidation

Metal objects buried for a long time are most likely oxidised. The oxidation of metals creates a halo around the detected object. Precise detection is therefore more difficult because the metal detector also detects the halo of oxidation.

Unexploded ordnance

If the metal detector finds an unexploded bomb, do not try to move it or defuse it. Move away from the location immediately and contact the local authorities. Prevent other people from approach the area by warning them of the danger.

8 FREQUENT PROBLEMS

PROBLEM	CAUSE	SOLUTION
The metal detector finds false positives	The coil is being moved too quickly or at the wrong angle. The metal detector might have encountered a highly oxidised object.	Move the coil more slowly and parallel to the ground. Try to locate the object by moving the instrument in various directions. If the instrument reading changes every time depending on the direction of sampling, the object is most likely very oxidized metal.
The metal detector does not display the correct type of metal when it detects an object	There might be more than one metal object in the area that you are sweeping. The object may be a type of metal that the instrument does not recognise. If the object is very oxidised the instrument may not report the correct type of metal.	

9 CARE AND MAINTENANCE

Keep the metal detector dry. If the instrument gets wet, dry it immediately with a soft cloth. Liquids might contain minerals that could corrode electronic circuits.

Use and store the metal detector in environments with a normal temperature
(+5°C ÷ +40°C). Extreme temperatures can shorten the life of electronic devices, damage batteries, and deform or melt plastic parts.

Keep the instrument away from dirt and dust that can cause premature wear of parts and components.

Handle the metal detector with care. Dropping the device may damage the internal circuits and the structure causing malfunctions.