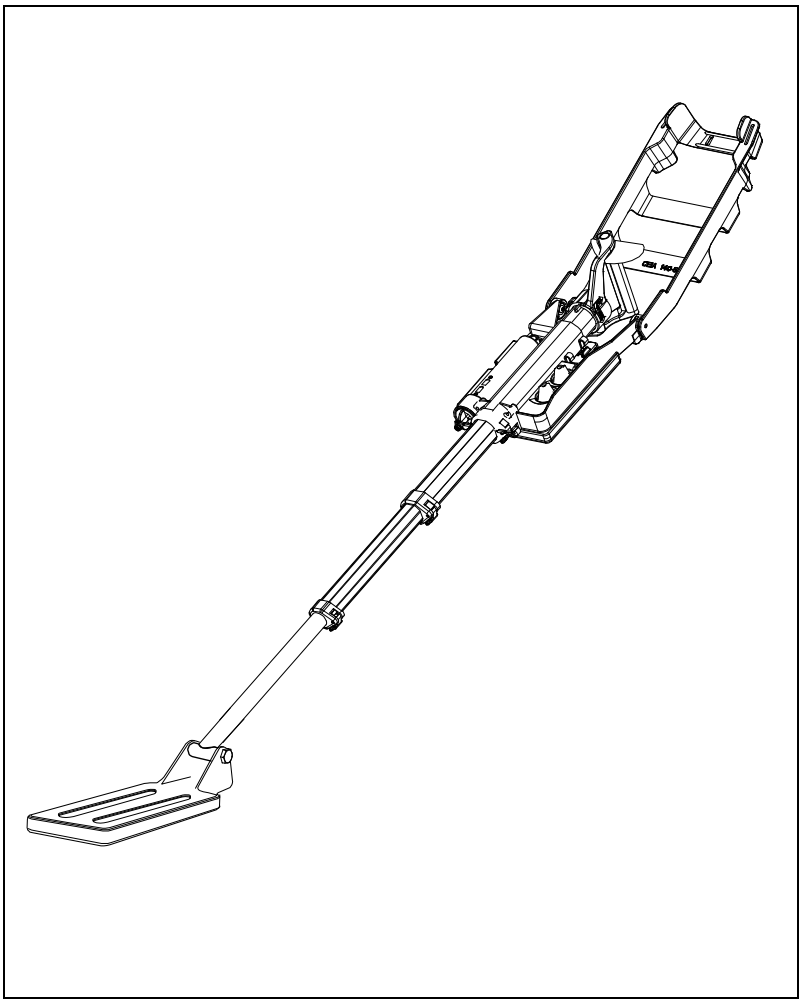
D2



CEIA CMD V2.00

Light Weight Metal Detector
with Detection Capability
of Non-Metallic Conductive Targets
Operator manual

ATTENTION!

Read this manual carefully before installing, operating or carrying out maintenance on the device.
Keep this booklet in a safe place for future reference.

Rev.: FI 041 GB 140K5 v3_301	Model Version: 2.00 Software version(s): 2.00, 2.03, 2.04, 2.06	Date: 2012-11-21

INSTRUCTIONS

ATTENTION! READ THESE INSTRUCTIONS BEFORE WORKING WITH THE DEVICE.

- Follow the instructions contained in this manual for all operations relating to installation, use and maintenance of the device. CEIA cannot be held responsible for any damage resulting from procedures which are not expressly indicated in this manual.
- Using the detector other than specified may result in non-detection of the search target. CEIA will not be held responsible for any damage resulting from improper use of its equipment.
- As with all equipment, care should be taken to avoid damage as a result of non-intended use.
- Do not wash the device with liquid detergents or chemical substances. Use a slightly moist, non-abrasive cloth for cleaning.
- Read the chapter on “Troubleshooting and Maintenance” carefully before calling the service centre. Whatever the problem, only specialised service personnel trained by CEIA should service this equipment.
- Any damaged components should be only replaced by original CEIA parts.

BATTERIES

- **It is the operator’s responsibility to use only batteries compatible with the unit.**
- **It is the operator’s responsibility to use and maintain the batteries properly.**
- **Battery polarity**: insert the batteries according to the diagram on the case, close to the battery compartment.
- Do not leave batteries in the device during storage or for extended periods of time. **Check the expiration date of the batteries and, if necessary, replace them before operation**.
- Do not dispose of used batteries in general rubbish bins; use public battery collection facilities as per local regulations, or return them to a CEIA office. If the equipment is to be disposed of, remove the batteries and dispose of them separately.

Rechargeable batteries

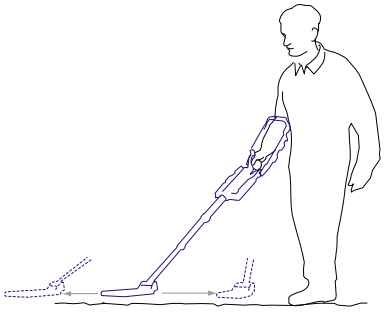
- **Recharge the battery only when necessary:** the detector warns the operator by means of a "BATTERY ALMOST FLAT" signal**. After this message, the detector can be used for approximately 1 hour AND DURING THIS TIME THE DETECTION CAPABILITY AND ALL THE OTHER PERFORMANCES OF THE UNIT ARE NOT AFFECTED.**
- **If the equipment is not used for an extended period of time**, it is recommended that the battery undergoes a complete charge cycle periodically (see “Troubleshooting and Maintenance” section). Otherwise they might have difficulties in recharging.
- **Use only the CEIA-supplied battery charger**. Do not use any other kind of battery charger.
- **Use only the CEIA batteries supplied with the Metal Detector Set or as spare parts**. Do not try to charge any other kind of batteries with **the CEIA-supplied battery charger**.
- **Do not try to charge non-rechargeable batteries**. **DANGER OF EXPLOSION!**
- **Use of non-rechargeable batteries**. If rechargeable batteries are not available, the unit can be powered by 2 C-size 1.5V alkaline batteries. **The operational and functional characteristics are not affected.**

WARRANTY CONDITIONS

The warranty on all CEIA products, extended to the period agreed with the Sales Department, is applicable to goods supplied from our factory, and for every constituent part thereof, with the exception of the batteries. Any form of tampering with the device, and in particular opening its container, is strictly forbidden and will invalidate the warranty. The warranty lapses if the equipment is not used in accordance with the instructions contained in this manual. In particular, the equipment must be transported in the special case supplied with the equipment, and its various parts arranged therein as described in this manual. Transport of the equipment without its case supplied with the device is only allowed when it is being carried by hand. The warranty lapses if non original CEIA rechargeable batteries are used or in case of attempts to charge non rechargeable batteries.

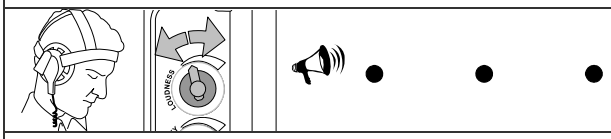
NOTES ON SAFETY DURING USE

Recommended Operation

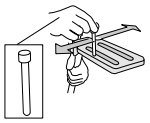


The CEIA CMD V2.00 Metal Detector is a detector which can be used to localize small or large metal masses in all soil conditions as well as non metallic conductive targets. This manual describes the ways of employing the detector, but does not contain detailed information on general precautions for specific applications: the operator must have attended a specific course and have been authorised to carry out such work.

The device must only be used by qualified personnel.

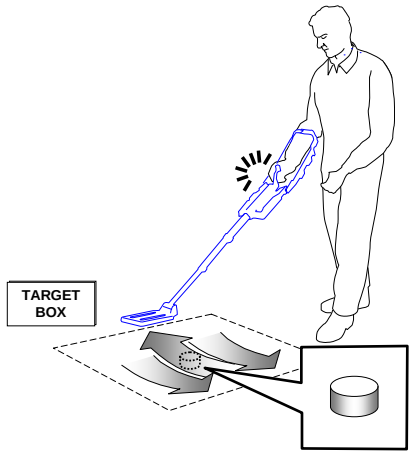


Before switching on the detector or putting on the headphone, set the volume to minimum and adjust it so that the “Confidence Click” can be heard clearly.



It is recommended that a verification with the test samples provided is carried out before a mission with the detector and at least once every day of operation and at least once every day of operation.

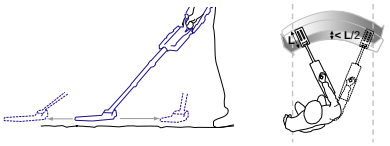
This is to check that the device is operating correctly.



When allowed by the operating conditions, periodically test the detector’s efficiency by checking the sensitivity, using the specific sample (target) on an area of the soil which is free of other metal parts.

The CEIA CMD Metal Detector can be used on all types of soil, even on those with a high metal content, The detection depth is automatically optimised according to the soil, following the compensation procedure, and also depends on the quantity of metal contained in the target to be detected. **Before starting operation, check the detection depth after carrying out the compensation procedure on a “Metal Free Area”, using the target with the minimum metal content.**

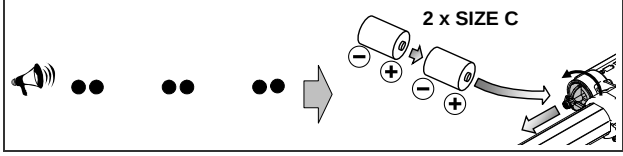
After carrying out the soil compensation procedure, check the sensitivity of the detector using the specific sample (target), to be detected at the desired detection distance.



When moving over the soil, keep the height as constant as possible.

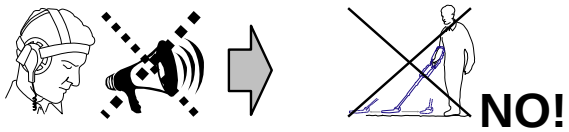
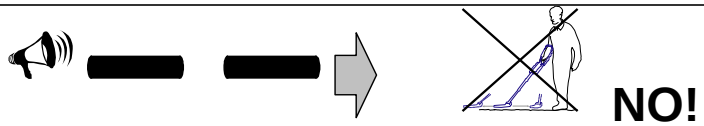
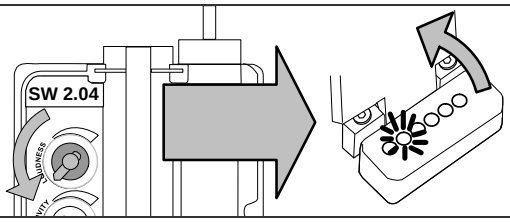
Move forward not more than half the length of the sensitive part of the search head.

Pay attention to the position of the sensitivity potentiometer, since this modifies the detection depth of the detector. Keep the sensitivity at the level necessary to detect the specific sample (target).



Prepare a spare battery pack as soon as possible if the low battery signal (double beep) is heard.

Battery polarity: insert the batteries according to the diagram on the bottom of the case.

INCORRECT Operation!	
	DO NOT OPERATE IF THERE IS NO "CONFIDENCE CLICK" EVERY 4 SECONDS. Refer also to section "Operational features versus the model version and the software version".
	DO NOT OPERATE IF THE **FAULT** ALARM TONE IS HEARD DURING NORMAL OPERATIONS.
	IN "ACOUSTIC SIGNALS DISABLED" MODE, MAKE SURE THE LED-BAR IS VISIBLE BEFORE OPERATING! Refer also to section "Operational features versus the model version and the software version".

Contents

Customer Satisfaction Report

Your suggestions and comments on the products and services offered by CEIA and its distribution network are extremely important for improving our procedures. We would ask you to send them to us by compiling and returning the form available:

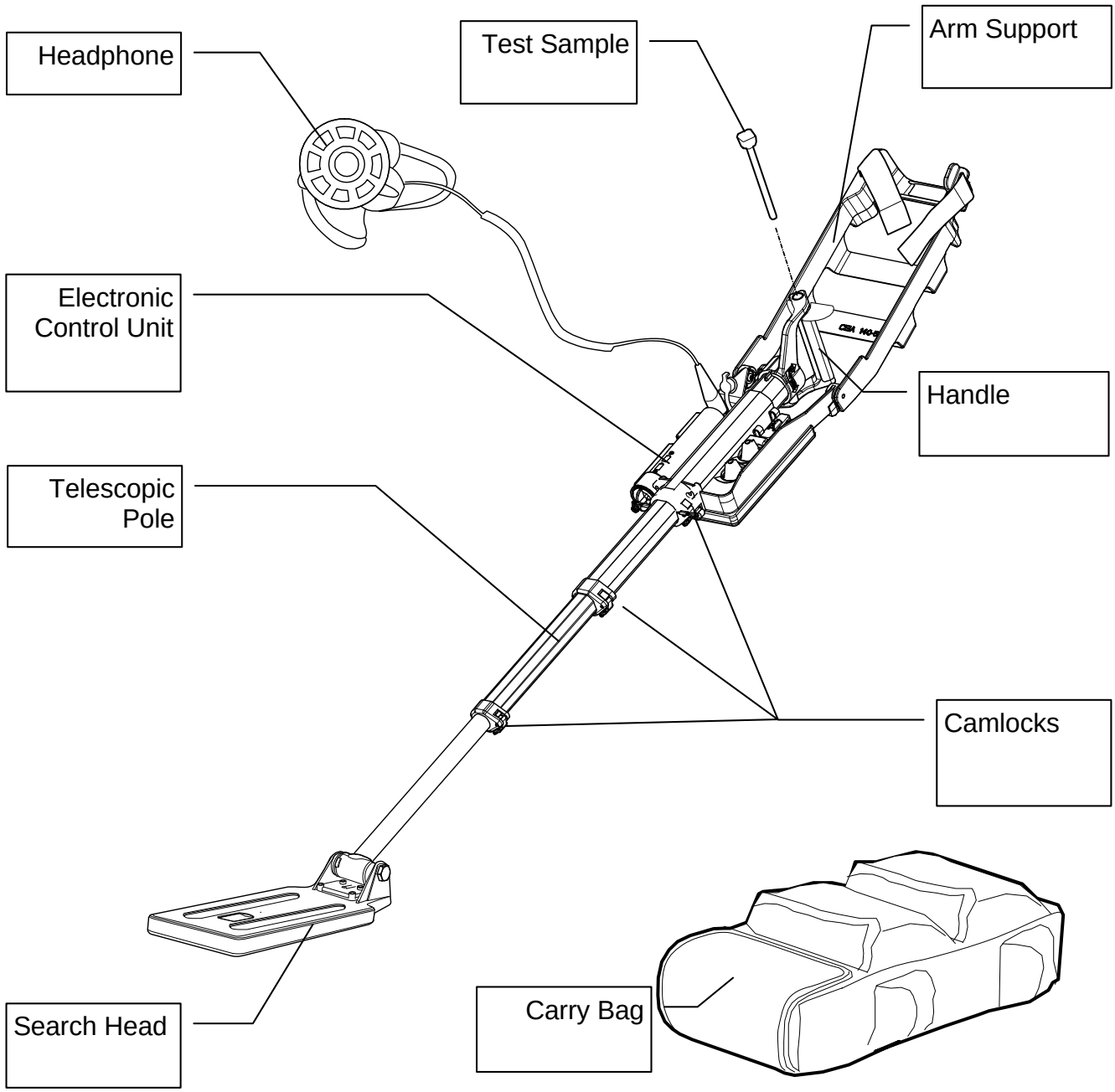
http://www.ceia.net/groundsearch/satisfaction

Thank you for your kind interest and co-operation.

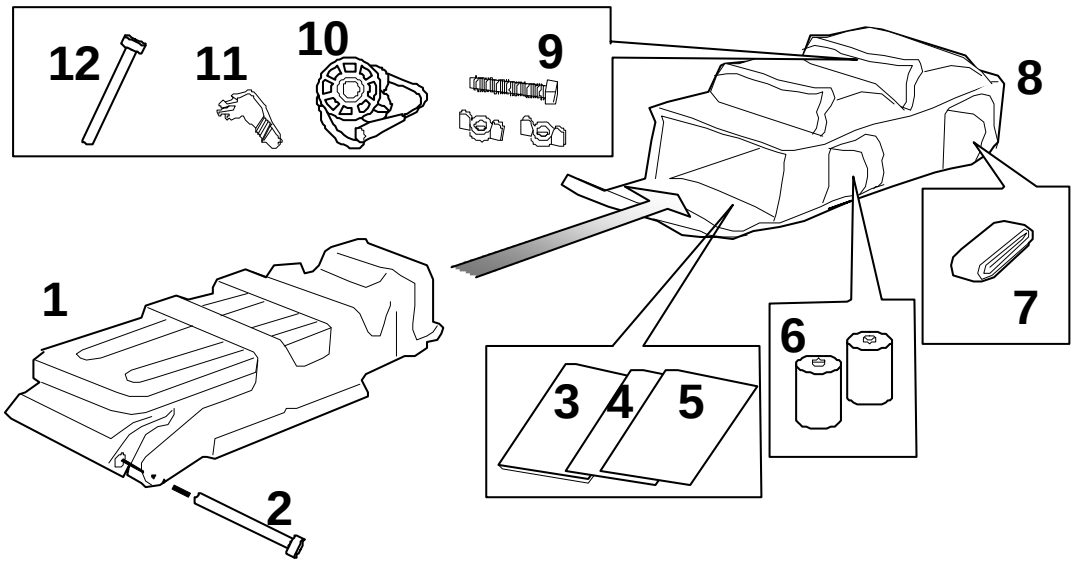
1 - Overview

1.1. Equipment Description

The **CEIA CMD V2.00 - Light Weight Metal Detector** is a device that can be used to detect small or large metal masses in all soil conditions as well as non metallic conductive targets.

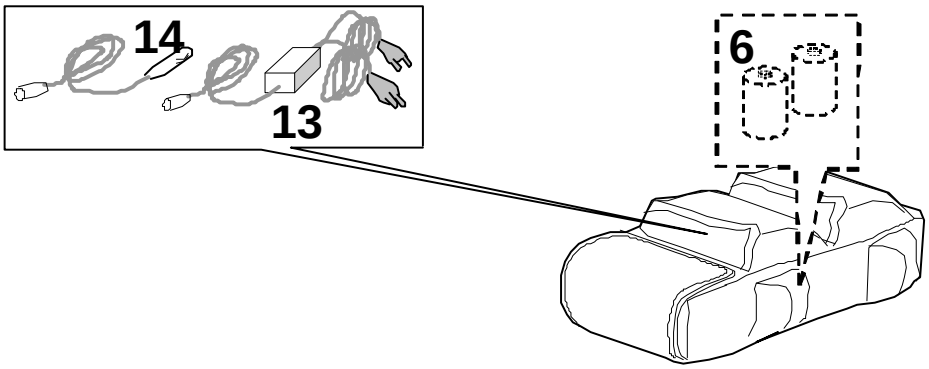


CEIA CMD V2.00 - Metal Detector



CEIA CMD V2.00 Metal Detector in its Carry Bag

#	Description	Code	Quantity
1	CMD V2.00 Metal Detector	55094	1
2	Metallic Test Sample (orange stick)	43860	1
3	Operating manual	55096	1
4	Field instructions and Parts List	55099	1
5	Periodic Maintenance Guide – Cleaning Procedures	56252	1
6 *	High capacity 1.5V alkaline ANSI C or IEC size LR14 Batteries	43663	2
7	Leg strap for the carry bag	43682	1
8	Carry bag	56126	1
9	Plastic locking bolt for search head (spare)	43666	1
10	Monaural headphone with connecting cable	GSMD-HP	1
11	Hook/clip for headphone	24407	1
12	Non Metallic Test Sample (black stick)	55131	1



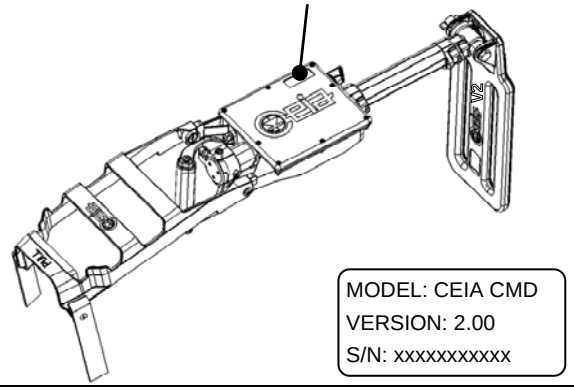
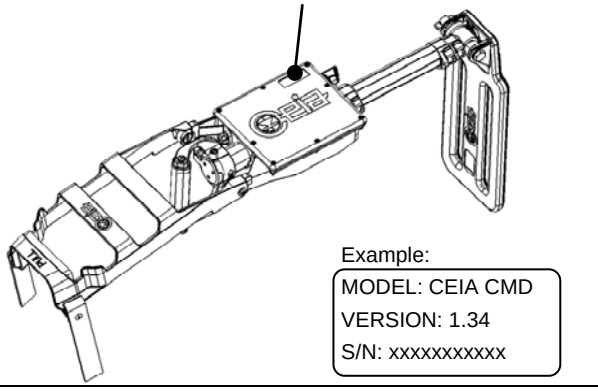
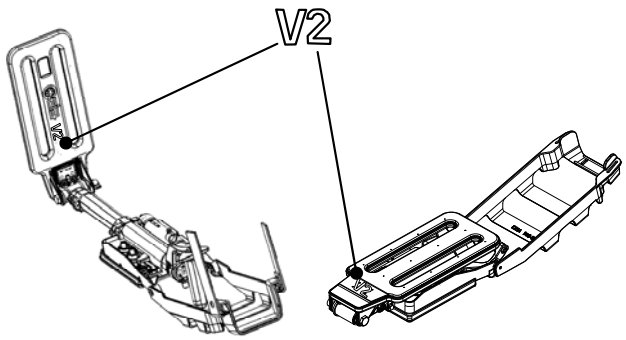
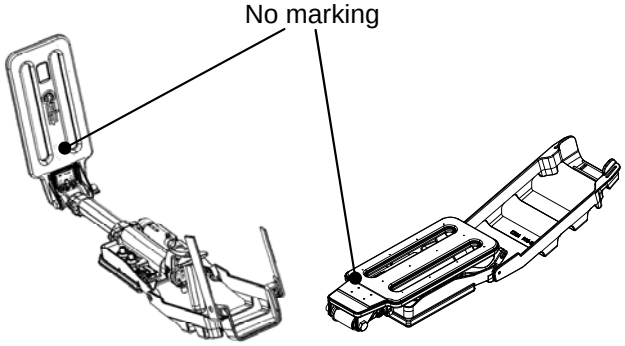
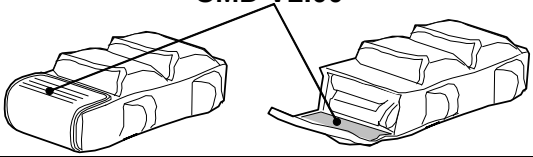
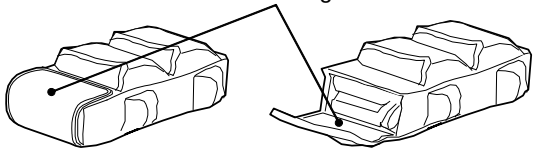
OPTIONS

#	Description	Code	Quantity
6 *	High capacity 1.2V Ni-MH ANSI C or IEC size LR14 Batteries	43664	2
13	Power Supply Adapter for the built-in battery charger, with power cords (UL and CEE plug)	GSMD-ACPSA1	1
14	Power Supply Cable for the built-in battery charger fitted with a car cigarette lighter plug	GSMD-DCPSA1	1

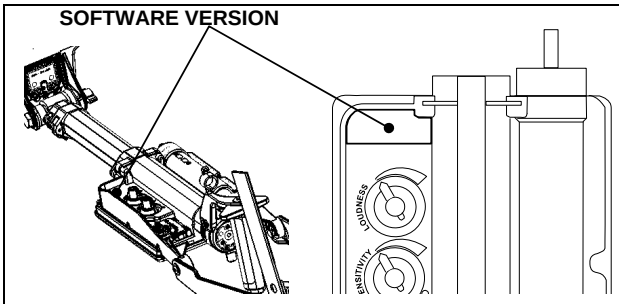
* Only one type of battery is provided according to the order

1.2. Marking of the equipment

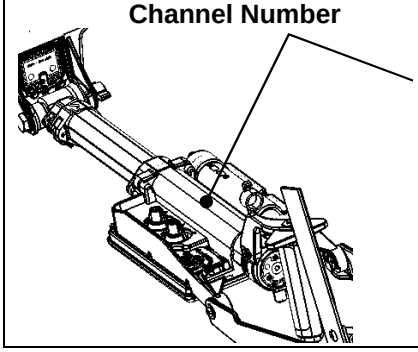
1.2.1. Model Version markings

2.00	1.20 or 1.34
"VERSION 2.00" 	**"VERSION 1.20" or "VERSION 1.34"** 
	
"CMD V2.00" 	No marking 

1.2.2. Software Version Label

	NOTE This label is not present in units with sw version 2.00

1.2.3. Channel

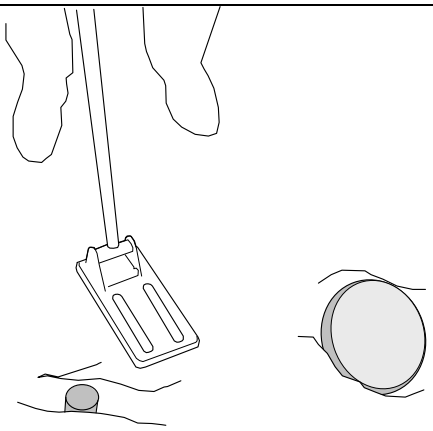


Label Color	Channel	Last figure of the serial number
RED	A	1
BLUE	B	2
GREEN	C	3
YELLOW	D	4
GRAY	E	5
RED	A	6
BLUE	B	7
GREEN	C	8
YELLOW	D	9
GRAY	E	0

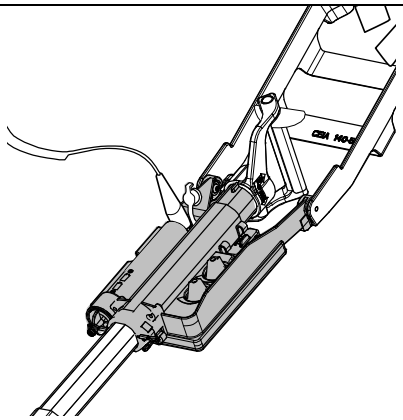
1.3. Purpose

The CEIA CMD Metal Detector is a device that can be used to detect and localize small or large metal masses in all soil conditions as well as non metallic conductive targets.

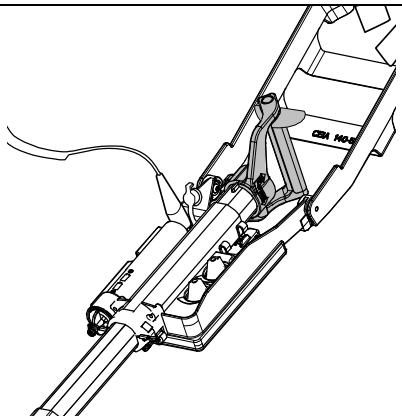
This device is characterized by high reliability, high sensitivity and easy handling.



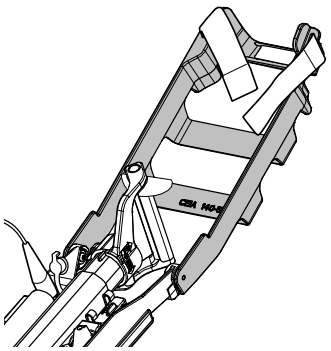
1.4. Major Hardware Components



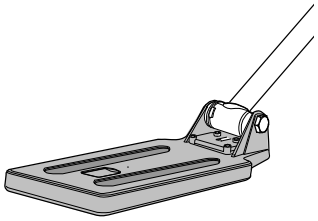
Electronic Control Unit



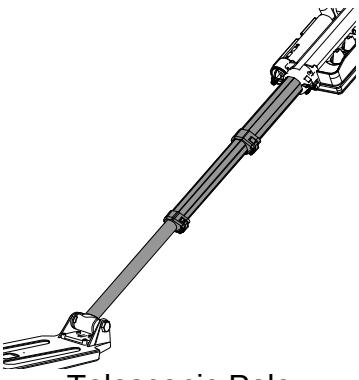
Handle



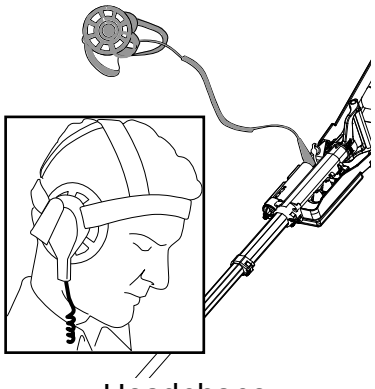
Arm Support



Search Head



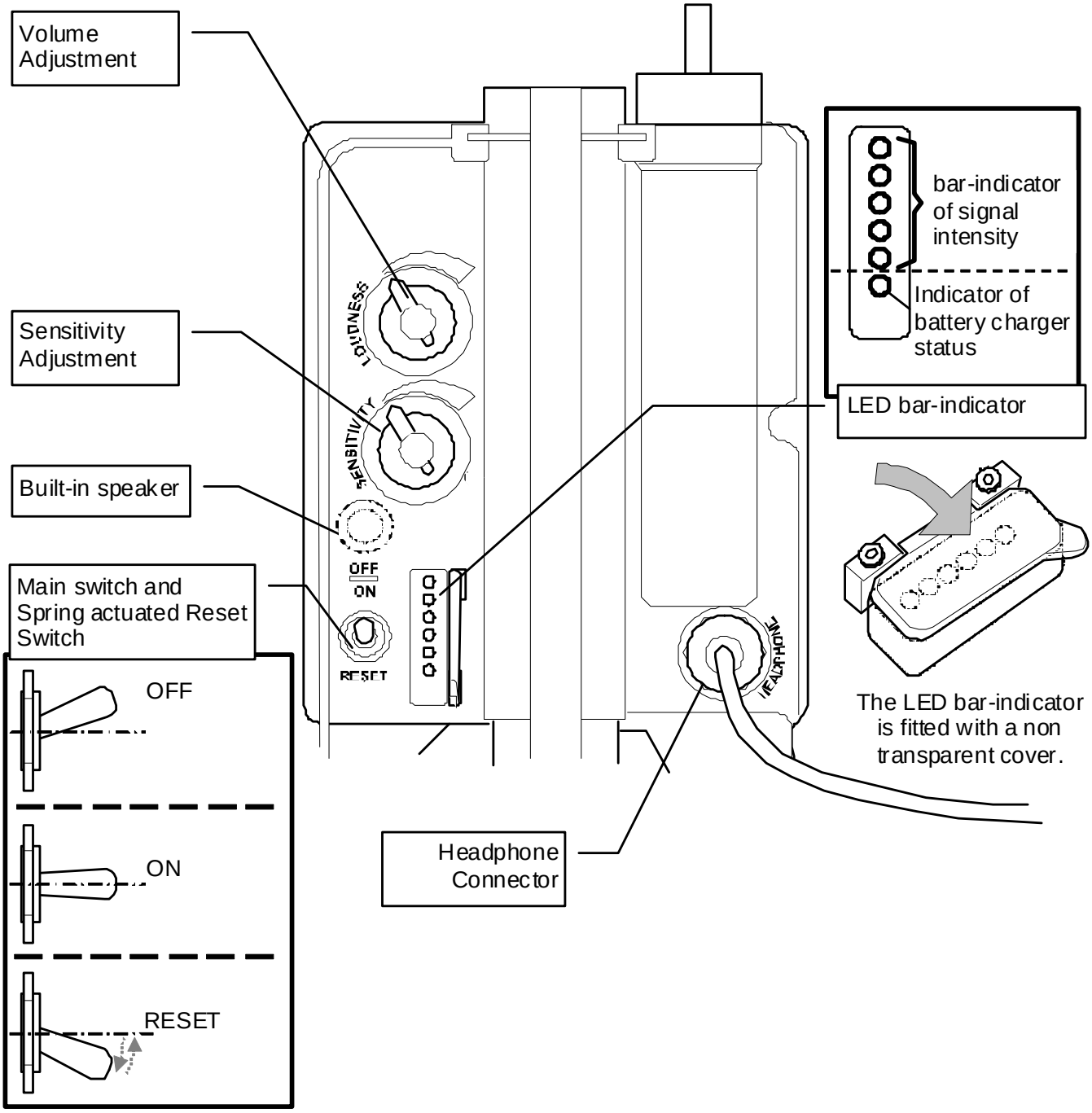
Telescopic Pole



Headphone

2 - Operational Features

2.1. Controls and signalling devices on the Electronic Control Unit



NOTE The built-in speaker of the control unit is disabled when the headphone is connected.

2.1.1. Acoustic Signals Disabling

According to the software version, the acoustic signals can be disabled by setting the LOUDNESS control to its minimum. Refer to section “Operational features versus the model version and the software version” .

2.1.2. Operational features versus the model version and the software version

The following table illustrates the main differences between the CMD version 2.00 and the previous ones.

Feature	Model Version	
	2.00	1.20 or 1.34
Detection of minimum magnetic and non magnetic metal targets	YES	YES
Detection of non-metallic conductive targets	YES	NO
Permanent storage of the last soil compensation setting	YES	NO

The following table illustrates the main differences between the various software versions of the CMD V2.00.

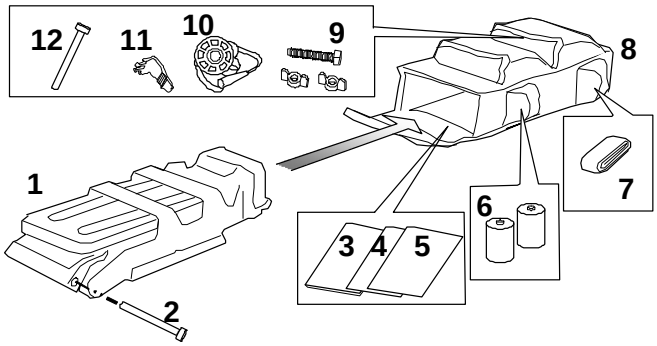
		Software Version			
Feature		**2.00**	**2.03**	**2.04**	**2.06**
Acoustic Signals Disabling	All acoustic signals disabled when the volume is set to its minimum.	--	--	●	--
	All acoustic signals still operating when the volume is set to its minimum.	●	●	--	●
Optical alarm for non-metallic conductive targets	LED-bar completely on.	●	●	--	--
	LED-bar even and odd lights in sequence.	--	--	●	●
Acoustic alarm for non-metallic conductive targets	Standard volume.	●	--	--	--
	Increased volume.	--	●	●	●
Metal Clutter Rejection at maximum sensitivity to non-metallic conductive targets.		--	●	●	●

3 - Assembly and Disassembly

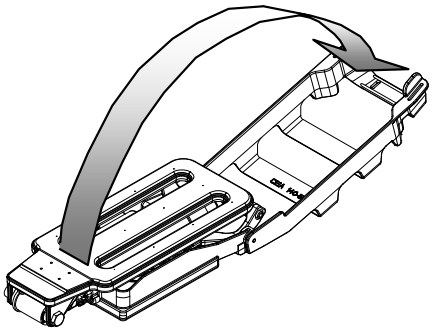
3.1. Assembly

1

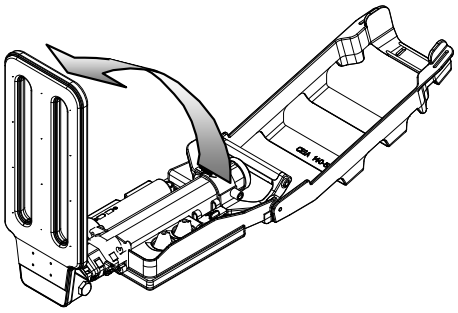
Check that all the pieces are present.



#	Description	Quantity
1	CMD V2.00 Metal Detector	1
2	Metallic Test Sample (orange stick)	1
3	Operating manual	1
4	Field instructions and Parts List	1
5	Periodic Maintenance Guide – Cleaning Procedures	1
6	ANSI C or IEC size LR14 Batteries	2
7	Leg strap for the carry bag	1
8	Carry bag	1
9	Plastic locking bolt for search head (spare)	1
10	Monaural headphone with connecting cable	1
11	Hook/clip for headphone	1
12	Non Metallic Test Sample (black stick)	1

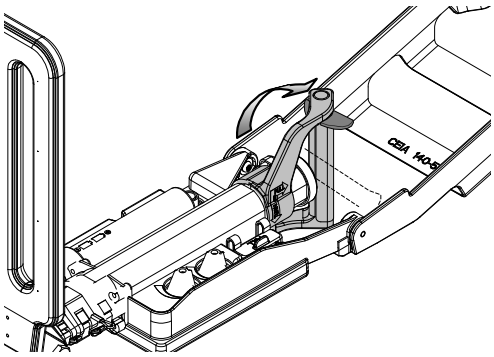


2

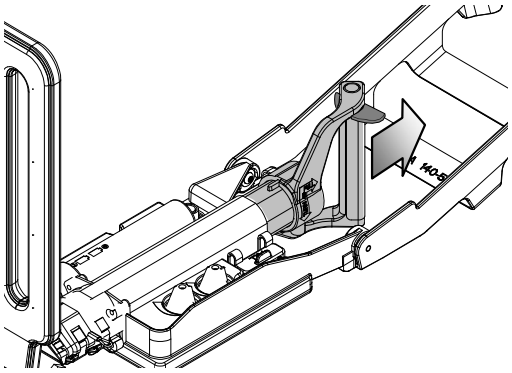


3

Open the metal detector.

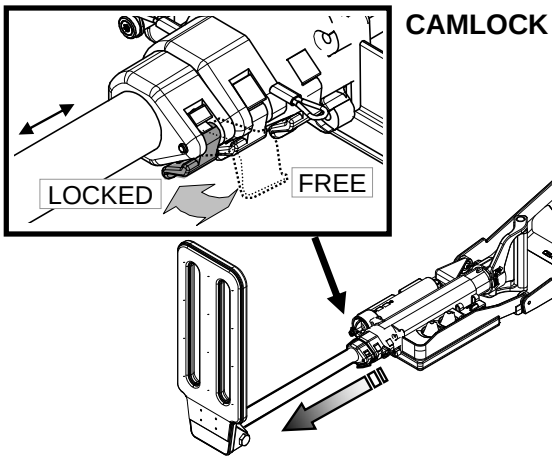


4

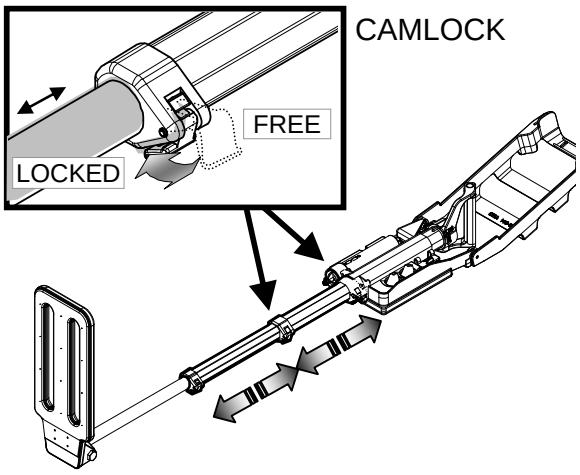


5

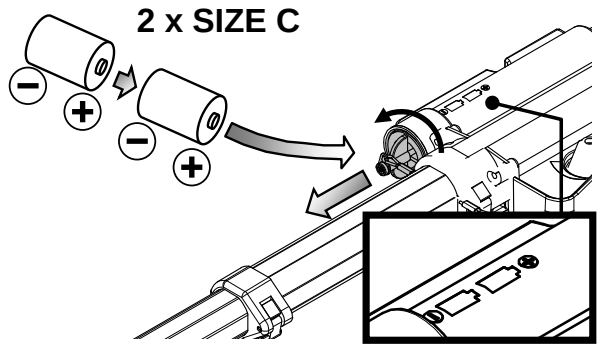
Turn and extract the handle.



6



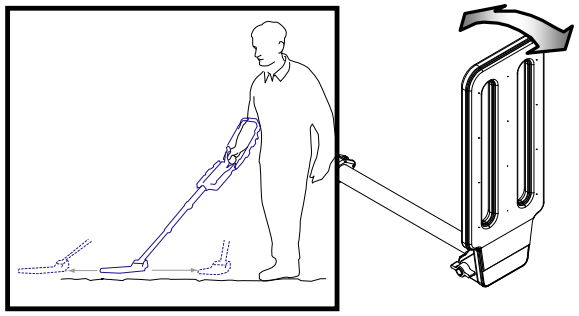
Completely extend the end section of the telescopic pole and then adjust the total length of the pole by appropriate extension of the other two sections. Block the position of each section using the camlocks.



7

Insert the batteries according to the diagram on the case.

NOTE: in case of rechargeable batteries charge them before using the first time.

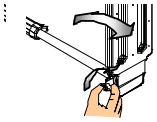


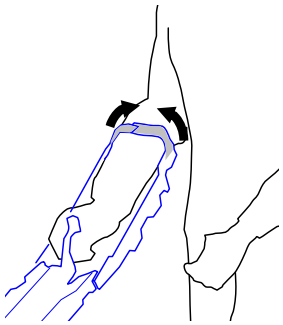
8

The search head must be parallel to the soil during operation: adjust its position if necessary.

WARNING!

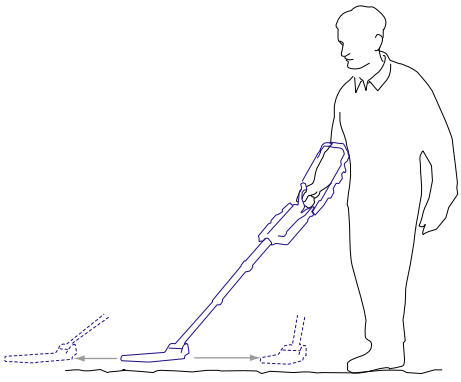
When adjusting the plastic locking screw, hand tighten the screw and the plastic Wing-Nut without excessive force, in order to avoid any damage to the fixing fins.





9

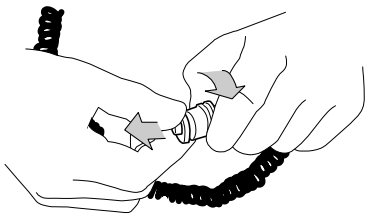
Tighten the strap on the arm



10

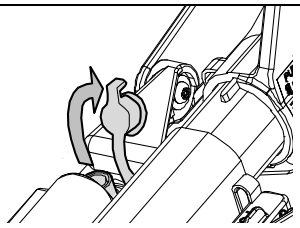
Ready to start up.

3.1.1. Connecting the headphone



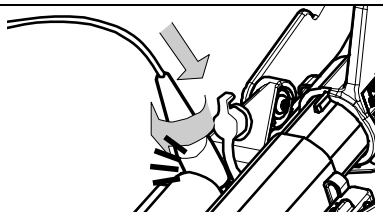
11

Remove the Cover from the Headphone Connector.



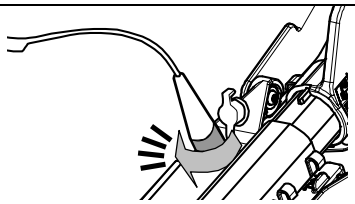
12

Lift-up the Rubber Protection from the Headphone Connector on the Control Unit



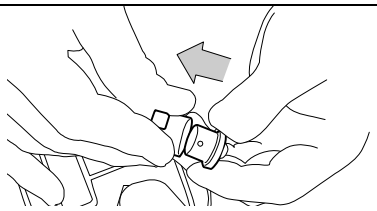
13

Connect the HEADPHONE to the Electronic Control Unit: rotate the **connector body** until the grooves of the cable connector match to the pins of the Control Unit connector and push down the cable connector (without forcing it!).



14

Secure the connector by rotating the **locking ring** until a click is heard**.**



14

Insert the Connector Cover into the Rubber Protection.

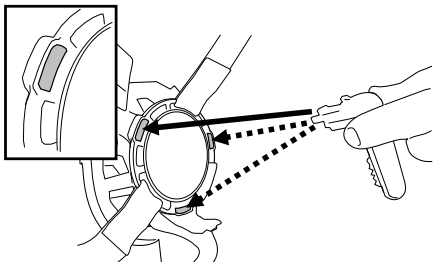
15

Place the Headphone on your head and adjust for comfort.

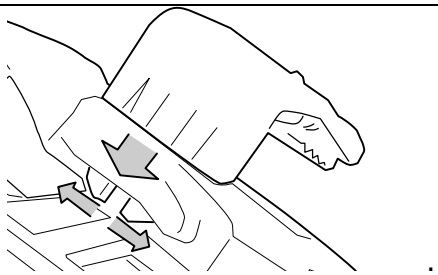
3.1.2. Attaching the headphone to clothing

If the operator does not wish to wear the headphone on the head, it can be attached to clothing using a special hook/clip.

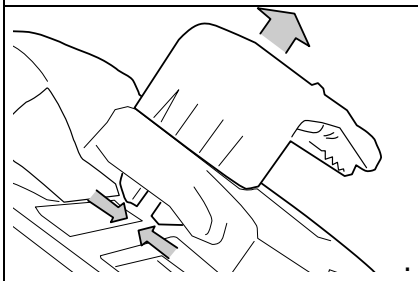
N.B.: in this case the audible signal volume must be increased by the necessary amount.



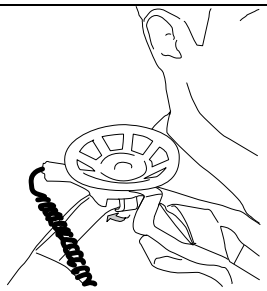
1. Attach the hook/clip to the headphone using one of the available slots.



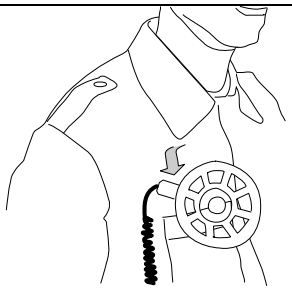
2. Detail of the clip insertion.



3. Detaching the hook/clip from the headphone.



4.1 Headphone attached to epaulet.



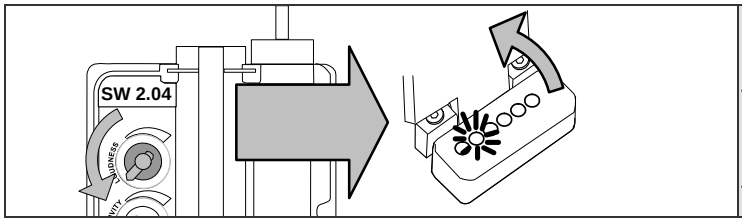
4.2 Headphone attached to uniform pocket.

3.2. Disassembly and Packing in the Carry Bag

Use the reverse assembly procedure.

4 - CEIA CMD V2.00 Detector Start-up Procedure

IMPORTANT!



IN "ACOUSTIC SIGNALS DISABLED" MODE, MAKE SURE THE LED-BAR IS VISIBLE BEFORE OPERATING!

Refer also to section "Operational features versus the model version and the software version".

4.1. Recommended Start-Up Procedure vs Quick Reaction Start-Up Procedure

By using CEIA's recommended start-up procedure the operator ensures optimum performance of the detector for the specific area of operation.

The **Recommended Start-Up Procedure** consists of the following steps:

1 Start-up and settings
2 Soil compensation in a metal-free area
3 Verification of the detection of a specific target buried in the soil (recommended)

The ***specific target*** is an object equivalent to the mass of the hardest to detect threat object known to be in the operation area.

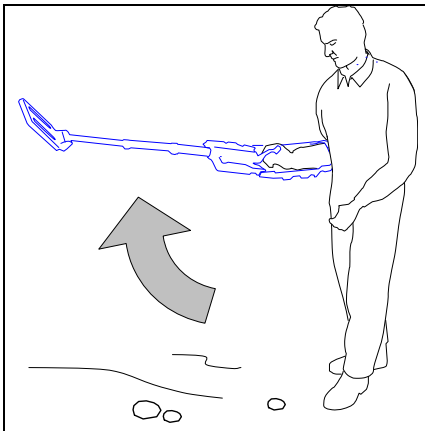
By using the **Quick Reaction Start-Up Procedure** the operator can save valuable seconds, the detector will perform well but may not be fully optimized for the particular area of operation.

The **Quick Reaction Start-Up Procedure** consists of the following steps:

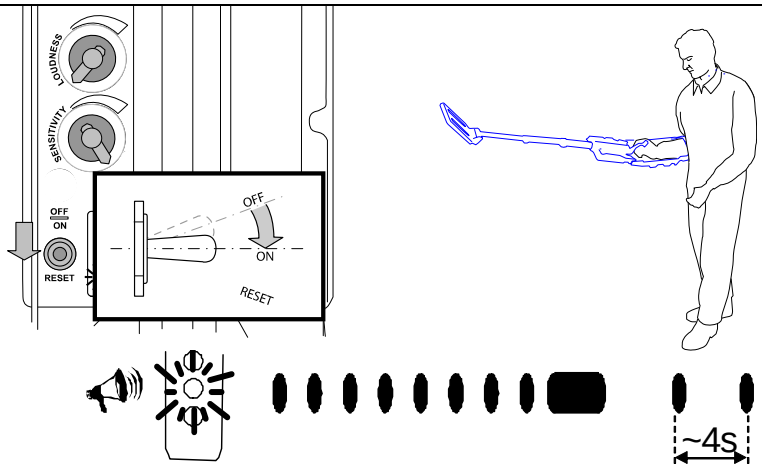
1 Start-up and settings
2 Quick verification whether a soil compensation is required
3 Verification of the detection of a specific target buried in the soil (recommended)

4.2. Recommended Start-Up Procedure

4.2.1. Detector Start-Up



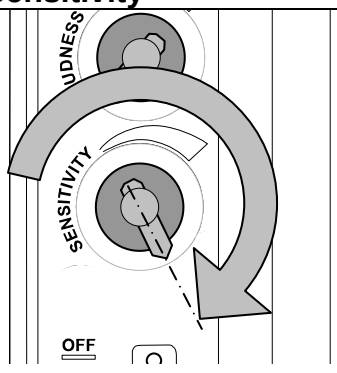
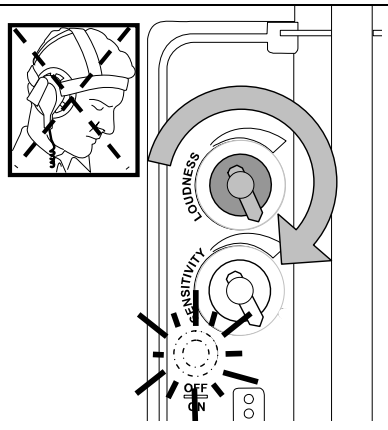
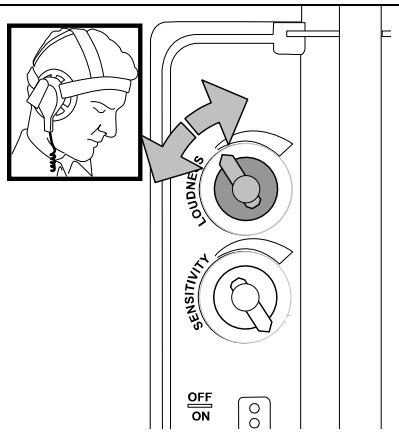
Lift the detector search head in the air **approximately 1 meter from the ground**.
Ensure the detector search head is held away from any metal objects.



Turn the detector on by placing the Main Switch in the centre.
Operator will hear several rapid beeps then one beep approximately every 4 seconds ("detector ready " signal).
The second LED down lights up with each beep sounded by the speaker.

WARNING!
If a continuous tone is heard after performing start-up and raising the Search Head, perform a reset (see section "Troubleshooting and Maintenance").

4.2.2. Settings

Sensitivity	Audio Volume	
		
Set the Sensitivity Knob to the MAXIMUM	Set the Volume Knob to its Maximum if operating without headphone.	Set to a comfortable level when using headphone.

NOTE The built-in speaker of the control unit is disabled when the headphone is connected.

WARNING! Continuous operation with excessive volume settings may cause hearing loss. Adjust volume to a comfortable level if necessary.

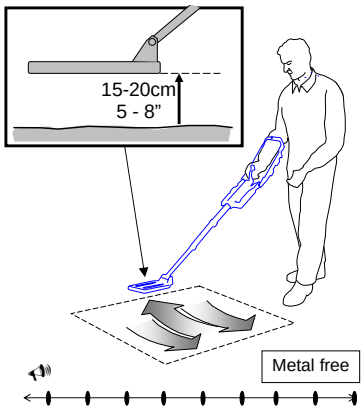
WARNING! According to the software version, the acoustic signals can be disabled by setting the LOUDNESS control to its minimum. Refer to section "Operational features versus the model version and the software version" .

4.2.3. Soil Compensation

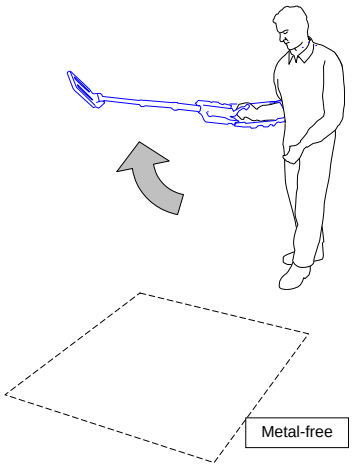
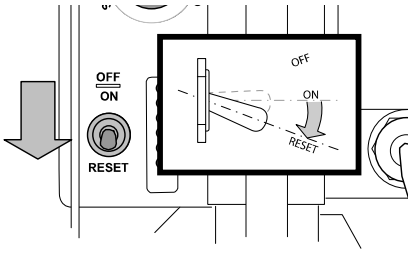
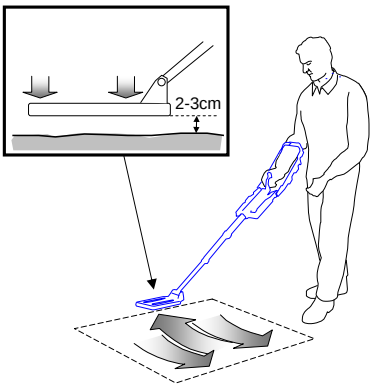
4.2.3.1. Identifying a metal-free area

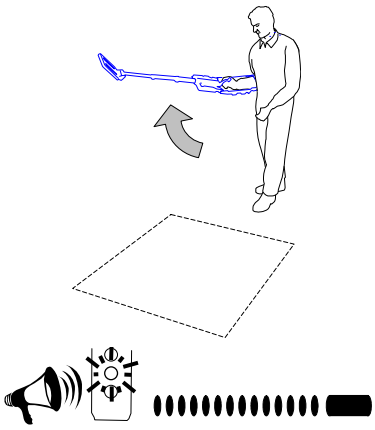
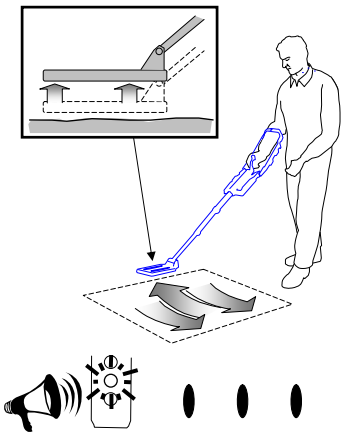
To acquire the soil characteristics properly, the soil compensation must be carried out on an area free of metal parts.

1 Take the search head within 15-20 cm (6-8 inches) of the ground and sweep over the intended compensation area.
2 If no target sound is heard, area is suitable for Soil Compensation Procedure.
3 Otherwise, move to a different soil area and repeat steps 1 and 2 until a suitable metal-free box is found.

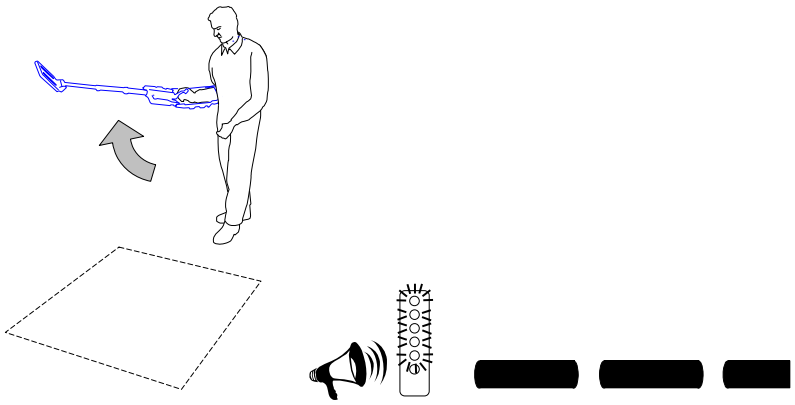


4.2.3.2. Soil Compensation Procedure

STEP 1	STEP 2	STEP 3
	 	 
Lift up the detector above the Metal Free area.	Hold down the Main Switch on Reset until the high frequency intermittent tone changes to a double beep.	At the double beep, return the search head to the ground and sweep the search head from left to right in the metal-free area, keeping it <u>at the suggested distance of 2-3 cm (one inch)</u> above the soil or ground obstructions without touching it. During this phase the detector acquires the soil characteristics.

STEP 4	STEP 5	
 If the double beep changes to a high frequency intermittent tone, the soil compensation has been performed successfully. Lift up the detector ...	 …until the “detector ready” signal returns (a single beep every 4 seconds). Lower the search head and verify that no alarms are triggered while sweeping the soil at the normal operational distance. In presence of alarms, lower a little the sensitivity and try again, until the Metal-free area does not generate any nuisance alarm.	**OK!** **The equipment is ready to operate!** NOTE. In the event the operator receives a persistent acoustic signal from the soil, repeat the soil compensation procedure.

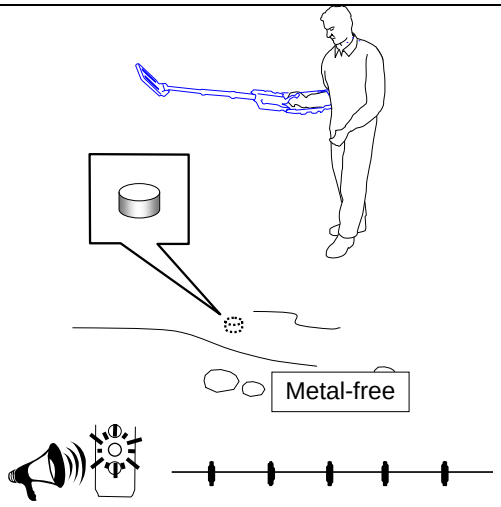
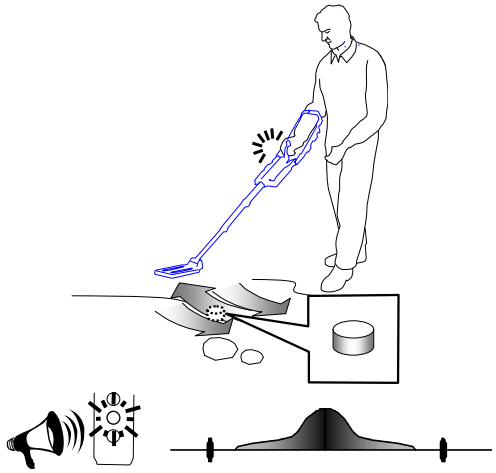
4.2.3.3. Soil Compensation Aborted

Negative result	
STEP 4  If at step 4 the double beep changes to a low frequency intermittent tone, the Soil Compensation has not been performed successfully. Lift up the detector to complete the procedure.	**NO!** **Re-validate the absence of metals in the Metal-free area and perform the soil compensation procedure again**. **NOTE**: if the procedure fails, the detector resets to the last soil compensation carried out.

4.2.4. Verification of the detection of a specific target, buried in the soil

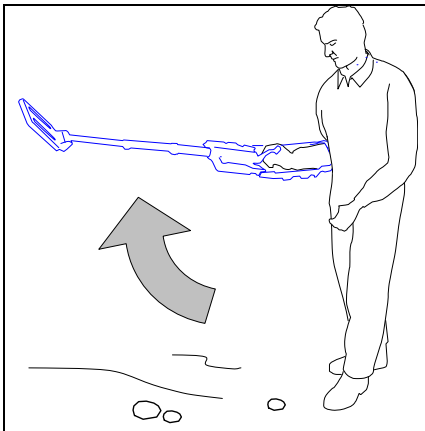
The soil compensation procedure sets all detection parameters to the optimal operative value permitted by the soil characteristics.

It is recommended that the actual detection capability is verified using a ***specific target***, if available (the ***specific target*** is an object equivalent to the mass of the hardest to detect threat object known to be in the operation area).

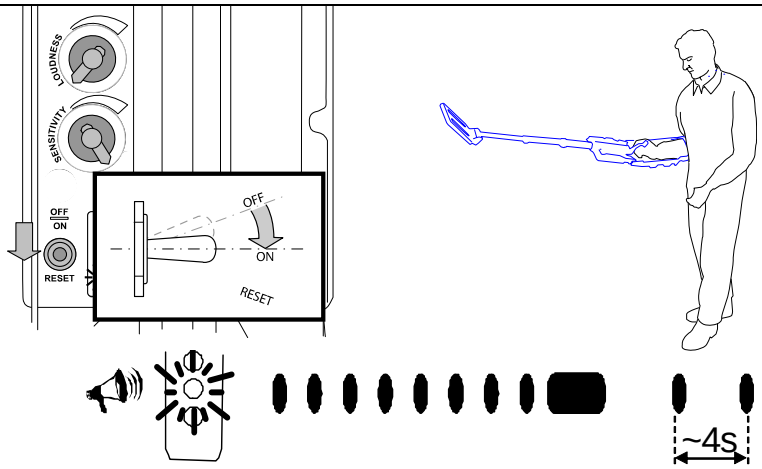
 Bury the specific target in the metal-free area .	 Verify that the Specific Target is detected before starting the search operations.

4.3. Quick Reaction Start-Up Procedure

4.3.1. Detector Start-Up



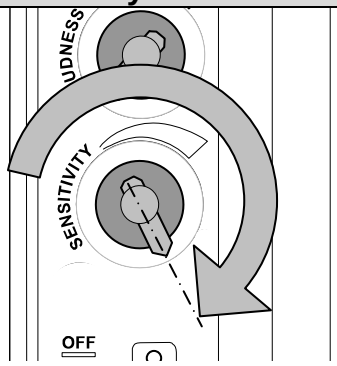
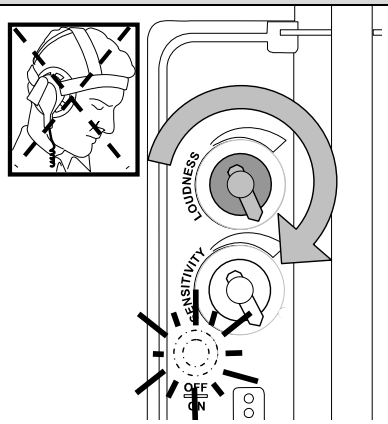
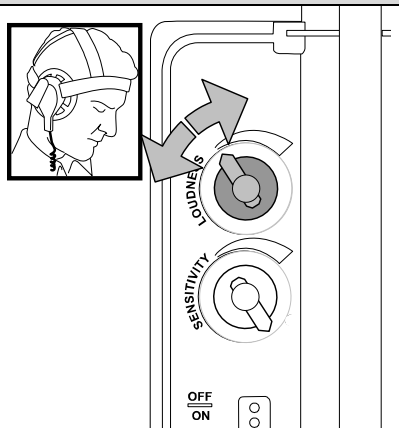
Lift the detector search head in the air **approximately 1 meter from the ground**.
Ensure the detector search head is held away from any metal objects.



Turn the detector on by placing the Main Switch in the centre.
Operator will hear several rapid beeps then one beep approximately every 4 seconds ("detector ready " signal).
The second LED down lights up with each beep sounded by the speaker.

WARNING!
If a continuous tone is heard after performing start-up and raising the Search Head, perform a reset (see section "Troubleshooting and Maintenance").

4.3.2. Settings

Sensitivity	Audio Volume	
		
Set the Sensitivity Knob to the MAXIMUM	Set the Volume Knob to its Maximum if operating without headphone.	Set to a comfortable level when using headphone.

NOTE The built-in speaker of the control unit is disabled when the headphone is connected.

WARNING!
Continuous operation with excessive volume settings may cause hearing loss. Adjust volume to a comfortable level if necessary.

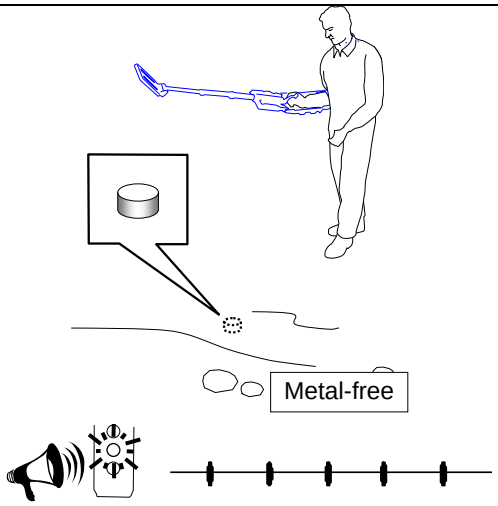
4.3.3. Quick verification whether a soil compensation is required

Take the search head to ground .
If no constant alarms are heard sweeping the area then **the unit is ready to operate**..

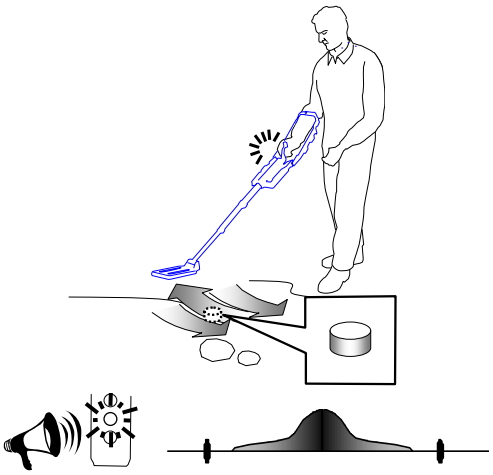
Otherwise the unit must be decompensated: the ***CEIA Recommended Start-Up Procedure*** must be carried out.

4.3.4. Verification of the detection of a specific target, buried in the soil

It is recommended that the actual detection capability is verified using a ***specific target***, if available (the ***specific target*** is an object equivalent to the mass of the hardest to detect threat object known to be in the operation area).



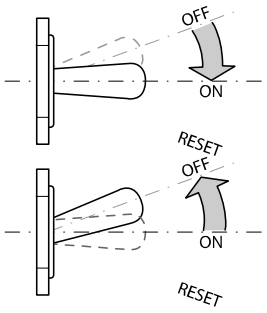
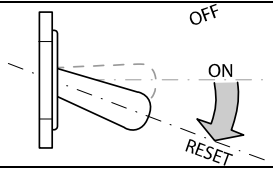
Bury the specific target in the metal-free area .



Verify that the Specific Target is detected before starting the search operations.

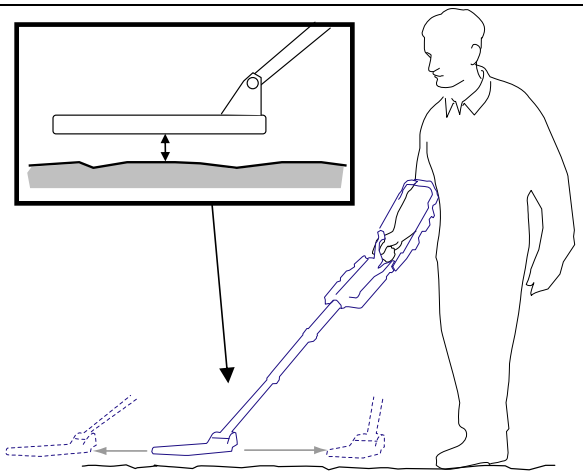
5 - CEIA CMD V2.00 Operation

5.1. Soil Compensation during operations

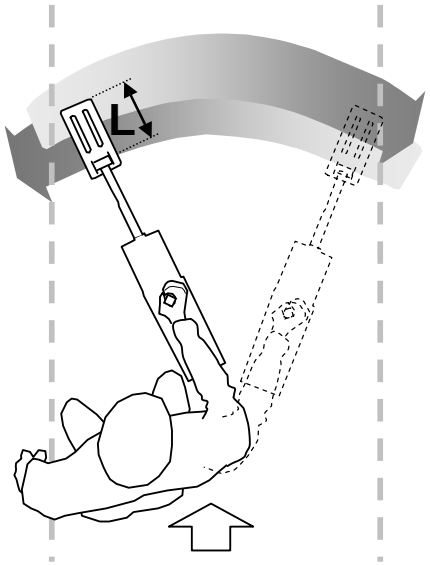
	Once calibrated to immediate surroundings through the Soil Compensation Procedure, the system stores the current compensation parameters in order to provide an “instant-on” capability until the environmental conditions change: the setting at start-up is referred to the last soil compensation procedure carried out and is retained indefinitely. If the soil characteristics change, some audio signal can occur, generated either by the system for metal detection or by the system for non metallic conductive Targets. In this case perform again the Soil Compensation Procedure to adjust the equipment to the new environmental conditions.
	REMARK A reset does not affect already established soil compensation parameters.

5.2. Detection and Pin-pointing of a Metal Target

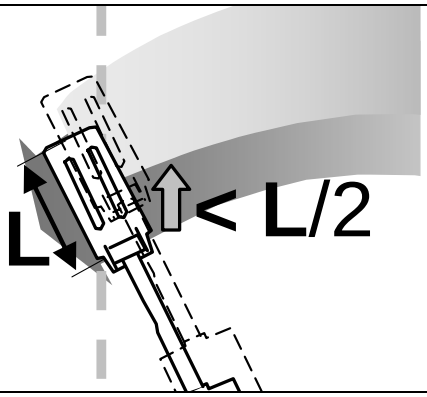
5.2.1. Searching Operation

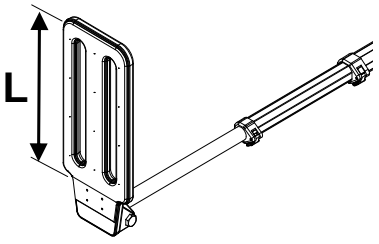


Hold the Search Head parallel and close to the ground.



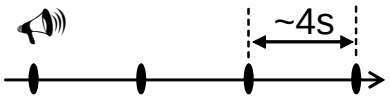
The operator advances performing wide sweeps from left to right and vice versa.

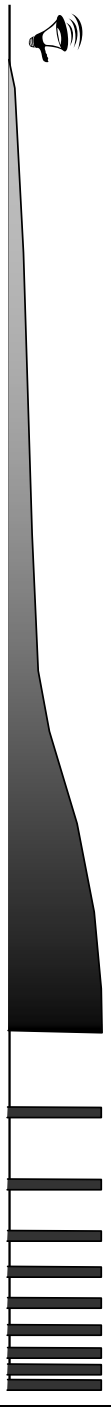
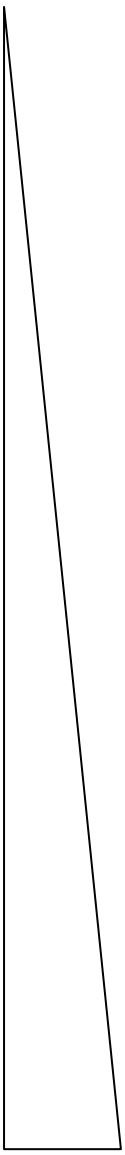


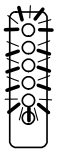


Do not advance more than half of the useful length (L) of the search head!

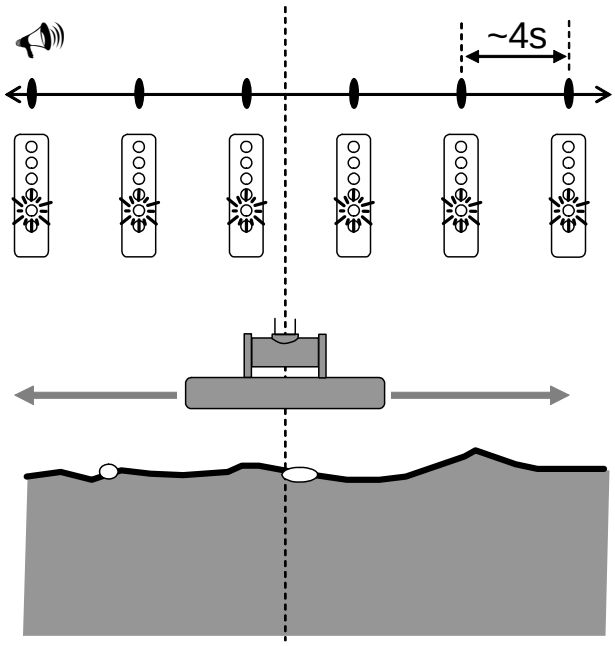
5.2.2. Acoustic and optical signals

<table>
<tr><th colspan="2">Acoustic indication</th><th>LED indication</th><th>Signal intensity</th></tr>
<tr><td colspan="2"> 

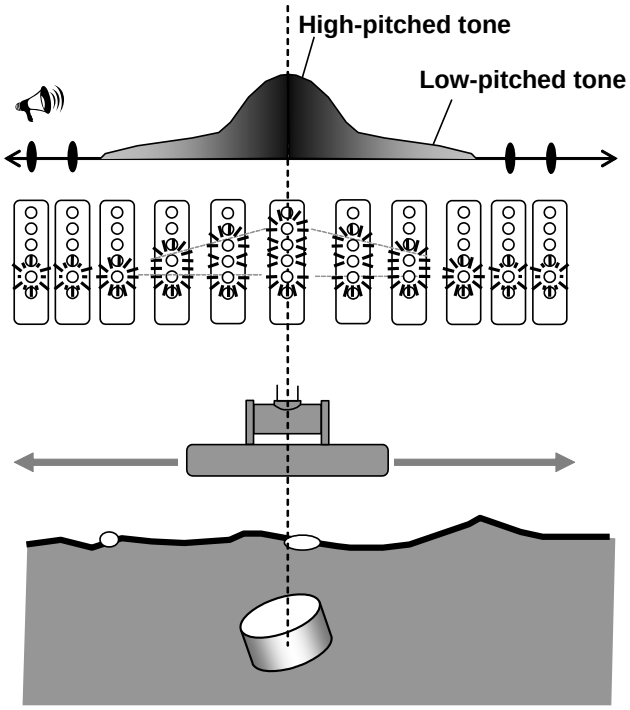
acoustic impulses (beeps)
(“detector ready” confidence click)</td><td> 
The second LED down lights up with each beep sounded by the speaker.</td><td>Null signal.</td></tr>
<tr><td rowspan="7">  </td><td>Continuous low-pitched tone.</td><td> 
one LED lit</td><td rowspan="7">Low signal (small metal mass).
 
High signal (large metal mass)</td></tr>
<tr><td></td><td> 
two LEDs lit</td></tr>
<tr><td></td><td> 
three LEDs lit</td></tr>
<tr><td></td><td> 
four LEDs lit</td></tr>
<tr><td>Continuous high-pitched tone</td><td> 
five LEDs lit</td></tr>
<tr><td>Intermittent signals at long intervals

Intermittent signals at short intervals</td><td> 
five LEDs flashing
(the same interval heard through the speaker)</td></tr>
</table>

5.2.3. Signals in case of detection of metal masses

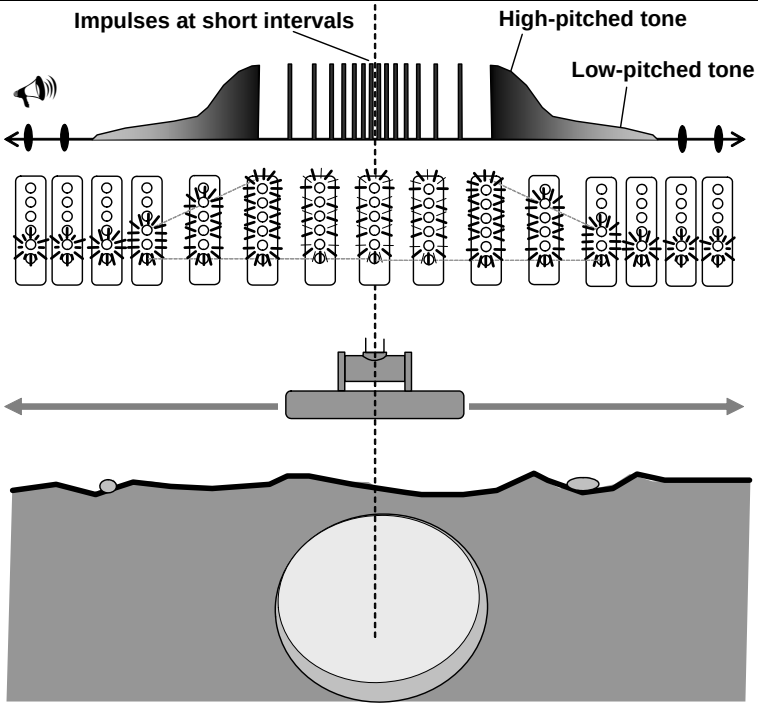


With no targets in the ground only the operating beep is heard (1 every 4 seconds). The second LED down lights up with each beep sounded by the speaker

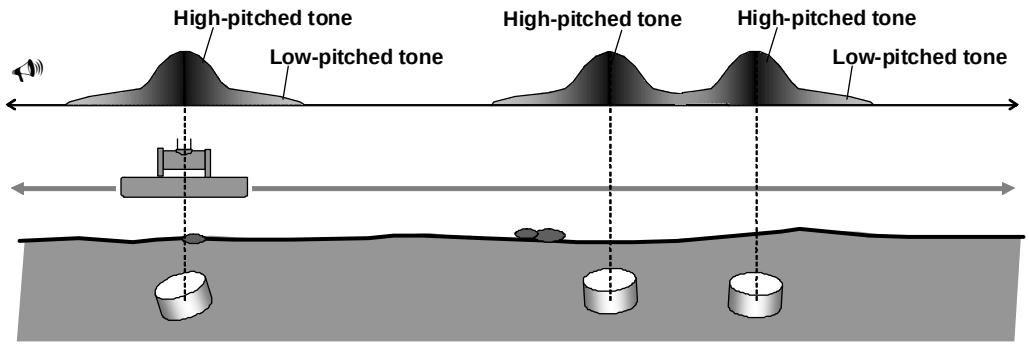


Detection of a small metal mass.
The centre of the target corresponds to the highest-pitched tone of the speaker.

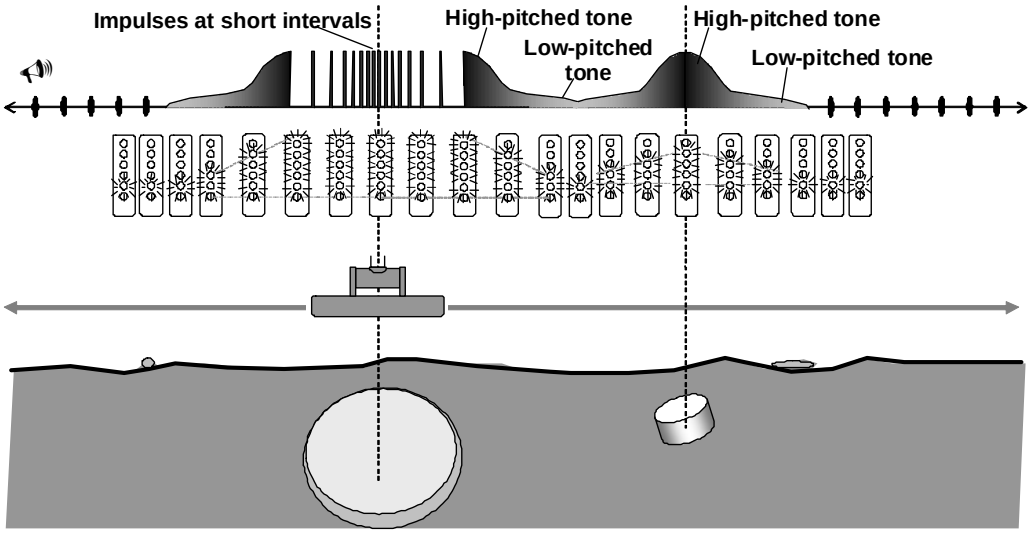
Detection does not require constant movement of the search head.



Detection of a large metal mass: the detection area is wider and the acoustic signal consists of impulses at intervals decreasing with the size of the mass.

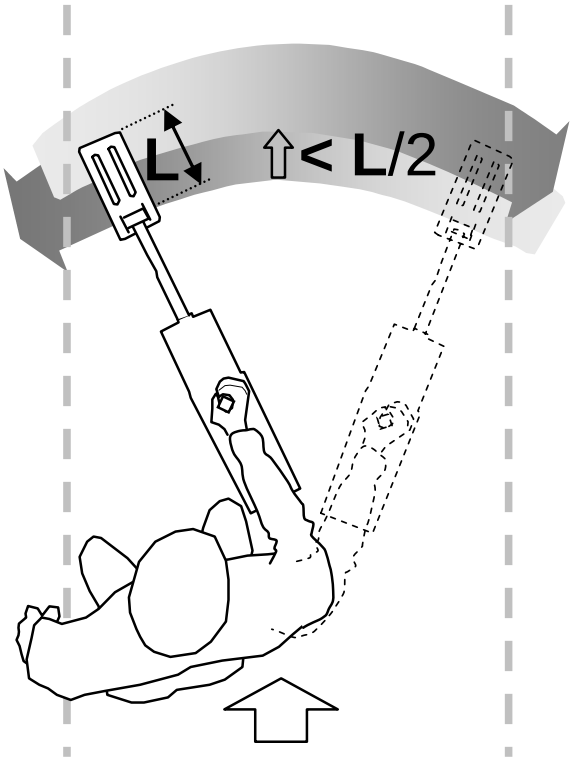


Detection of multiple metal masses: the detector gives a sequence of acoustic signals.



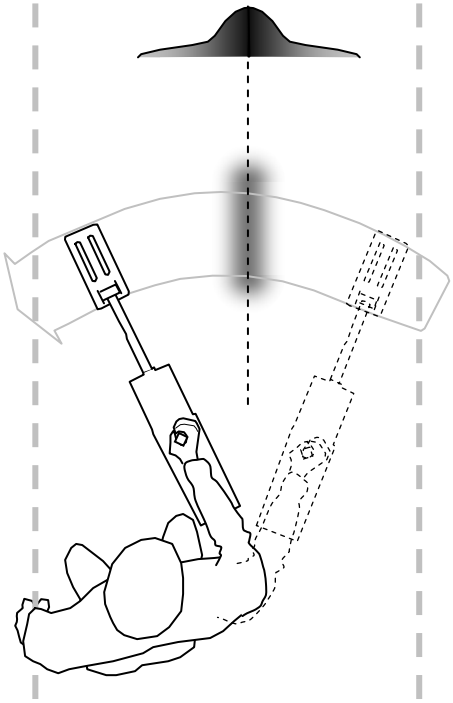
Detection of a small metal mass close to a large metal mass: the detector gives a sequence of acoustic signals with different pitch and duration.

5.2.4. Two-step localization procedure ("+" Pin-Pointing)



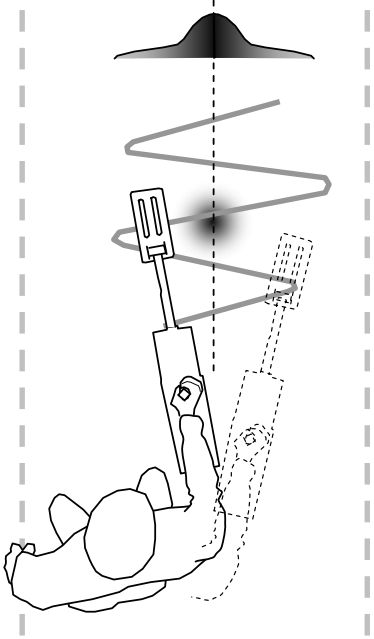
The operator advances performing wide sweeps from left to right and vice versa. **Do not advance more than half of the search head useful length!**

Step A (alpha)



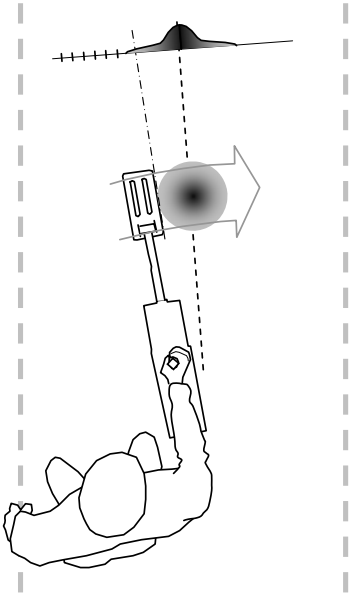
When the pin-pointing system detects a target, the tone change indicates the centreline of an area where it is probably located.

Step B (bravo)

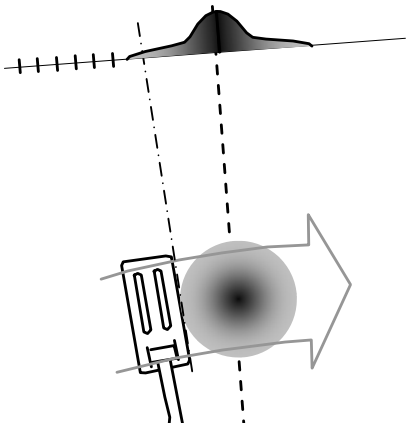


In case of alarm signal, the operator performs a more precise localization, continuing sweeping while moving along the vertical direction in order to determine the central point of the target.

5.2.5. Edge detection

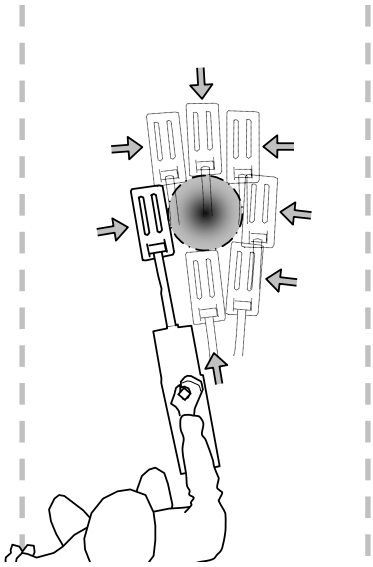


The procedure determines the zone that requires deep inspection.



RULE
The metal target zone is marked by the lines where the acoustic signal starts.

REMARK: sweep slowly!



The path corresponding to the acoustic signals delimits the metal target zone.

5.3. Detection of non-metallic conductive targets

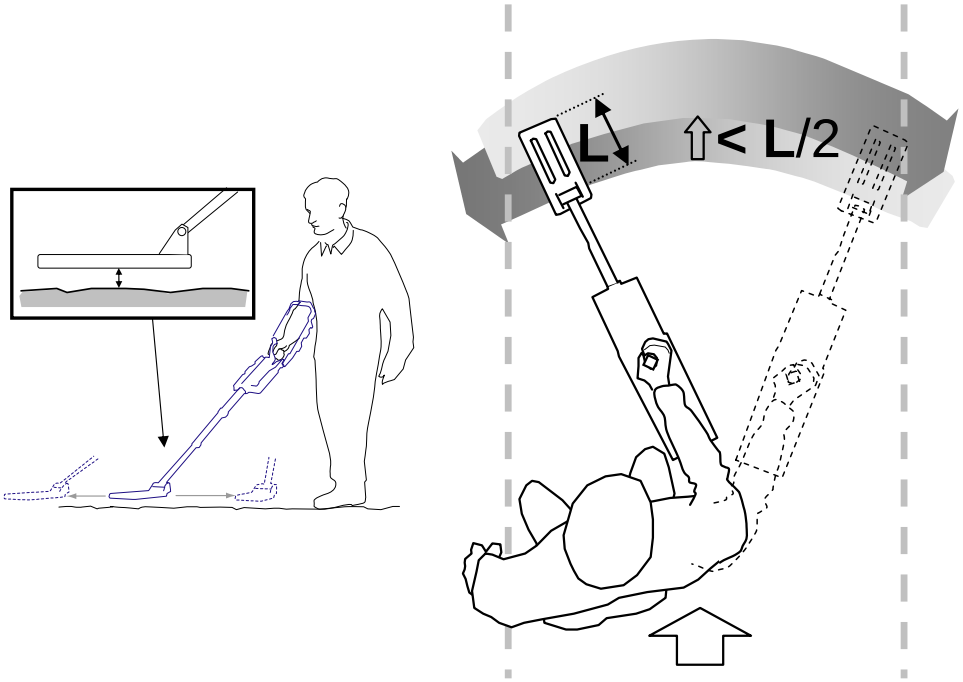
This feature is an enhancement of the CMD detection capability, which allows to detect a wide range of non-metallic conductive devices incorporated in current IEDs,

The operator advances performing wide sweeps from left to right and vice versa.

Do not advance more than half of the search head useful length!

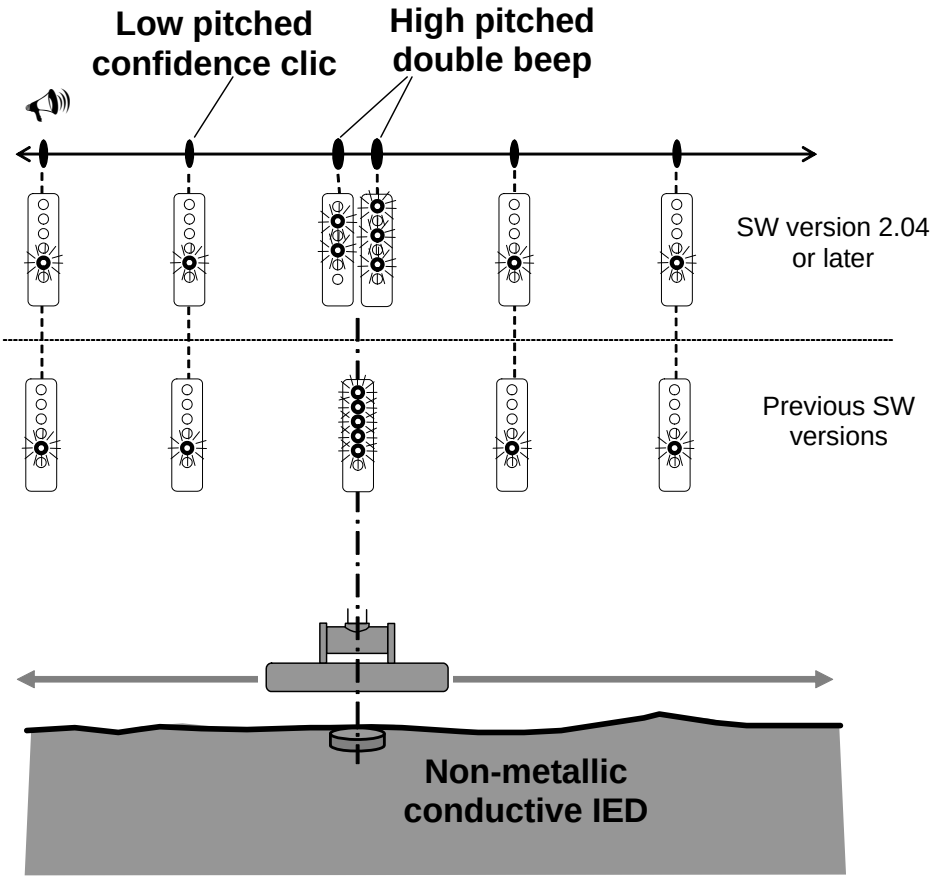
IMPORTANT!

This detection mode is dynamic (not static): the search head must be swept continuously!



When a non-metallic conductive object is detected, a high frequency double pitch is emitted and the LED-bar lights up: even and odd lights in sequence (SW version 2.04 or later) or all lights on (previous SW versions).

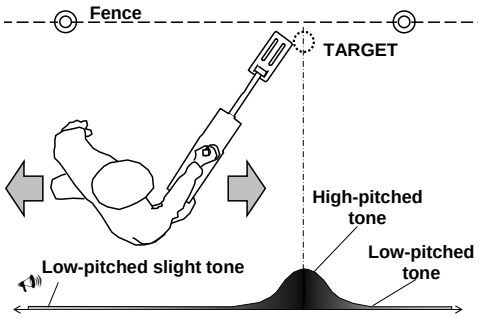
Localization: the search head is over the mass when the signal occurs.



5.3.1. Soil Screening along Metallic Perimeter Barriers (fences, tracks, etc.)

In this case the operator must proceed parallel to the fence or track, keeping the search head inclined, so as a slight tone is emitted (a bit above the alarm threshold).

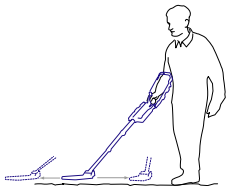
Passing over a sufficiently large metal mass will cause a change in the tone of the acoustic signal.



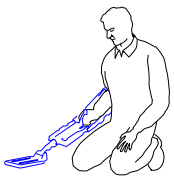
Inspection of the soil along a fence

5.3.2. Possible positions during use

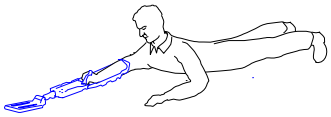
CEIA CMD is capable of being used by an operator while standing, kneeling or in the prone position.



Standing operator



Kneeling operator

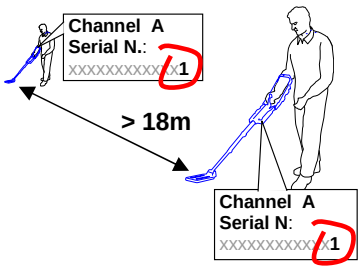


Prone position

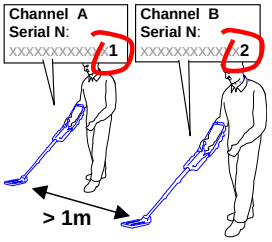
5.3.3. Simultaneous use of several detectors

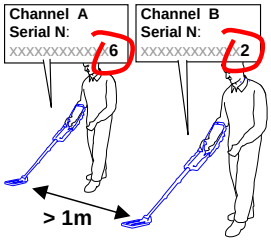
The **minimum operational distance is of 1m**, when a different channel is selected for each unit, **18 m** when the same channel is selected for each unit. The channels are selected in factory, according to the table below (five possible values: A, B, C, D and E).

Color of the label present on the detector body	Channel	Last figure of the serial number
RED	A	1
BLUE	B	2
GREEN	C	3
YELLOW	D	4
GRAY	E	5
RED	A	6
BLUE	B	7
GREEN	C	8
YELLOW	D	9
GRAY	E	0



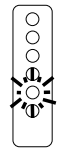
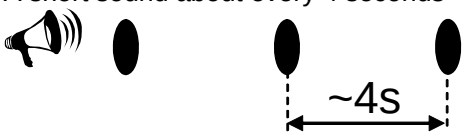
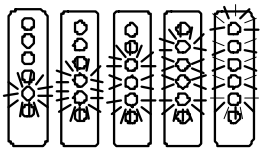
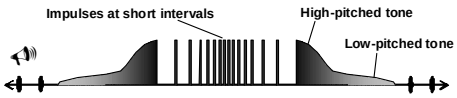
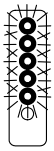
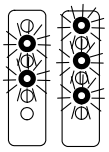
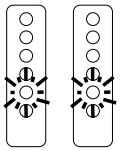
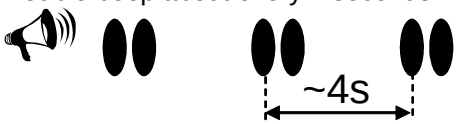
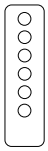
Example 1: Two units with the same channel (A): minimum operational distance of **18 m**.





Example 2: Two units with different channels (A and B, serial number 1-2 and 6-2): minimum operational distance of **1 m**.

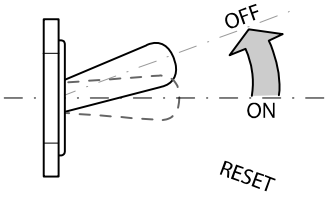
5.4. Summary of the acoustic and optical signals

LED bar-indicator	Acoustic Signal	Cause	Action	Status
 flashing	Single Beep A short sound about every 4 seconds 	**Normal Operation**	None	Detector Operative
 continuous/flashing bar-graph indication	Continuous /intermittent tone 	**Detection of a metal mass**	Manage the metal mass according to the specified procedures.	Detector Operative
 The LED-bar lights up completely [1]  The LED-bar lights up (even and odd lights in sequence) [1]	High-Frequency Double Beep 	**Detection of non-metallic conductive IED**	Detector Operative	Manage the object according to the specified procedures.
 flashing	Low-Frequency Double Beep Double beep about every 4 seconds 	**Almost flat batteries.**	Keep on detecting. Prepare spare batteries.	Detector Operative
 off	Low-Frequency Continuous Tone 	**Flat Batteries.**	Replace the batteries.	**Detector Not Operative**

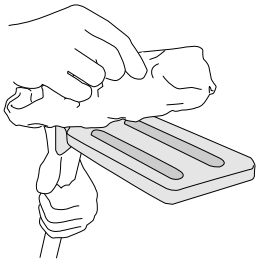
1) According to the software version. Refer to section “Operational features versus the model version and the software version”.

REMARK REGARDING THE ACOUSTIC SIGNALS
According to the software version, the acoustic signals can be disabled by setting the LOUDNESS control to its minimum. Refer to section “Operational features versus the model version and the software version”.

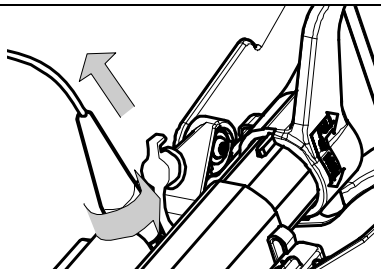
5.5. Shutting Down the Detector



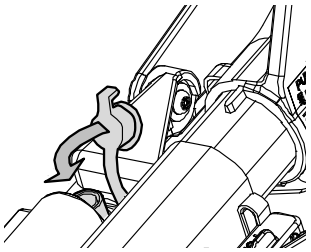
Set the ON/OFF switch to the OFF position.

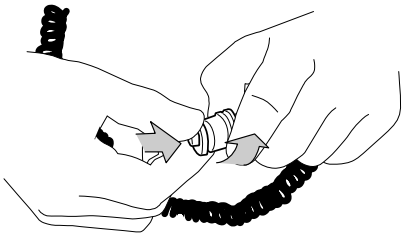


Remove any kind of dirt (dust, sand, moisture, …) and clean the detector using a slightly moist, non-abrasive cloth.

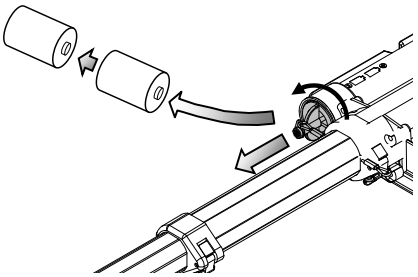


Disconnect the headphone cable.

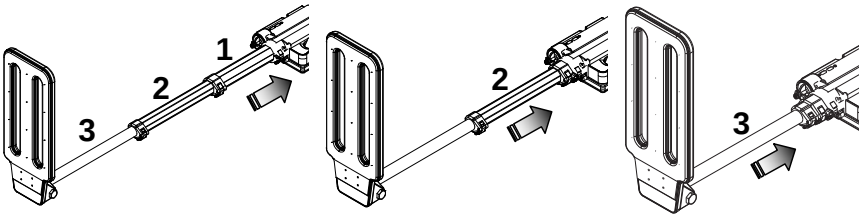




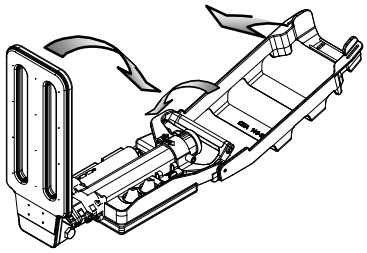
Reattach the protections to the connectors.



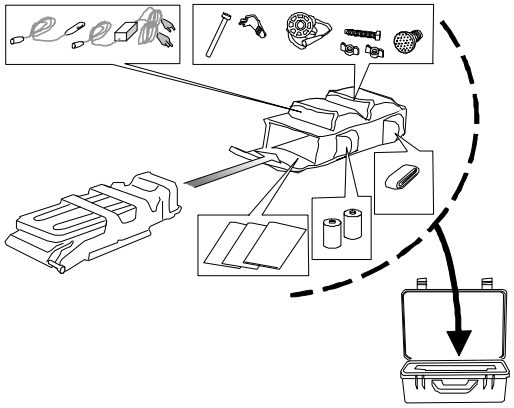
Remove the batteries from the battery compartment (for long periods only).



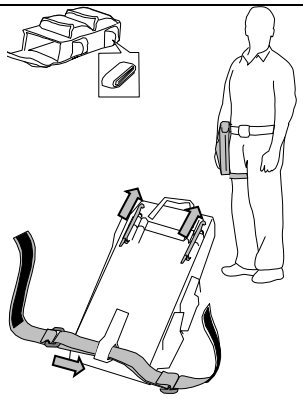
Open the camlocks and collapse all sections of the telescopic pole, starting from the closest to the electronics unit. Secure the pole by closing again the camlocks.



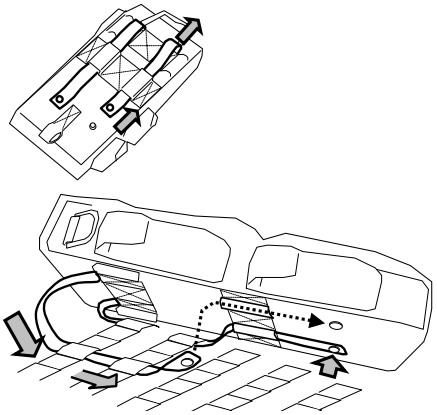
Rotate the handle and close up the metal detector.



Pack all components into the Carry Bag (for a short pause in operations or transportation within operation area).
Pack all components into the Transport Case (option, for prolonged storage or transport world-wide).



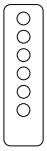
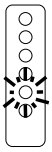
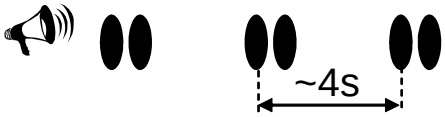
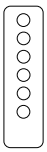
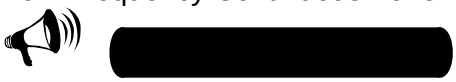
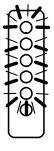
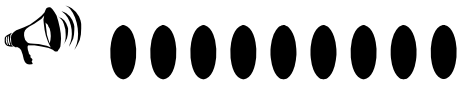
Carrying the unit in the bag by using the leg strap: hang the bag to the belt and fasten it to the leg.

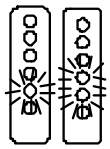
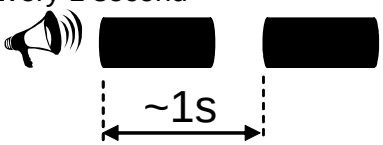
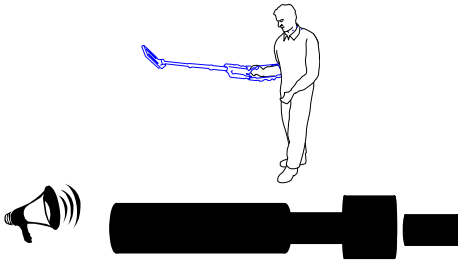


PALS attachment: open the press studs of the two straps on the rear side of the bag and attach them to the rucksack. Secure the straps to the press studs.

6 - Troubleshooting and Maintenance

6.1. Acoustic and optical warning signals

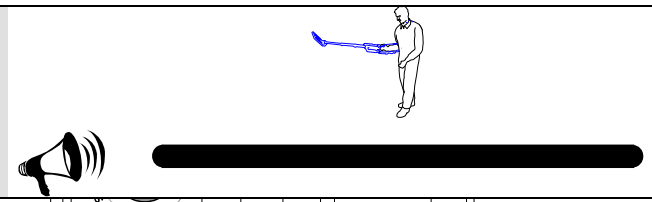
LED-bar indicator	Acoustic Signal *	Cause	Intervention	Status
 **off**	No audible signal	Device switched off	Check the position of the main switch.	Detector Operative after intervention
		Batteries completely discharged.	Check the charge level of the batteries and recharge or replace them if necessary.	
		Batteries inserted wrong.	Check that the batteries are inserted correctly.	
 **flashing** every 4 seconds	No audible signal	Acoustic signals disabled by setting LOUDNESS to minimum.	Verify whether the specific software version of the unit supports this special feature. Refer to section "Operational features versus the model version and the software version". Otherwise go to next steps.	Detector Operative
		Too low LOUDNESS setting	Increase volume.	
	No audible signal from the built-in speaker	Faulty built-in speaker	Connect headphone: if it works properly, keep on operating using the headphone.	Detector Operative
			Otherwise, replace the Control Unit.	**Detector Not Operative**
	No audible signal from the headphone	Faulty headphone	Disconnect headphone: if the built-in speaker works properly, keep on operating using the built-in speaker.	Detector Operative
			Otherwise, replace the Control Unit.	**Detector Not Operative**
 **flashing**	Low-Frequency Double Beep Double beep about every 4 seconds 	Almost flat batteries.	Keep on detecting. Prepare spare batteries.	Detector Operative
 **off**	Low-Frequency Continuous Tone 	Flat Batteries.	Recharge or replace the batteries.	Detector Operative after intervention
 **flashing**	Low-Frequency Intermittent Tone A fault was detected by the Control Unit 	Search Head cable damaged.	Replace.	**Detector Not Operative**
		The system is not operating properly.	Replace the Search Head or the Control Unit.	

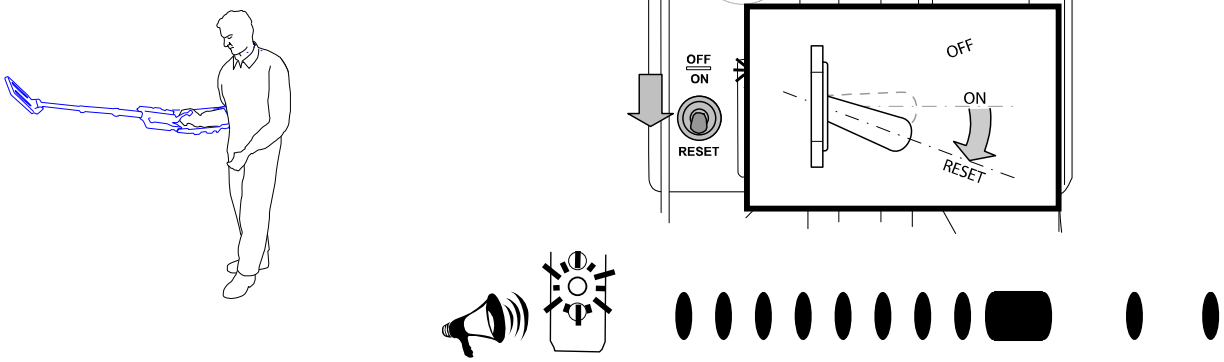
LED-bar indicator	Acoustic Signal *	Cause	Intervention	Status
 bar-graph indication	Continuous /intermittent tone when sweeping metal free soil. 	Change of the soil characteristics during searching operations after a soil compensation.	Repeat the soil compensation to adjust the equipment to the new operating conditions.	Detector Operative
 **flashing**	High-Frequency Intermittent Tone Every 1 second 	Soil Compensation aborted. Presence of metals in the area chosen for the soil compensation procedure.	Repeat the Soil Compensation procedure in a soil without metals.	Detector Operative
	**Continuous Tone or changing irregularly,** even keeping the search head far from the soil. 	Electromagnetic interference.	Carry out the RESET procedure. If the noise remains unchanged: • verify that no other detectors are operating in the area (see section “Simultaneous use of several detectors”) • verify that no electromagnetic interference sources are present in the area (radio transceivers, …).	Detector Not Operative

* **REMARK REGARDING THE ACOUSTIC SIGNALS.** According to the software version, the acoustic signals can be disabled by setting the LOUDNESS control to its minimum. Refer to section “Operational features versus the model version and the software version” .

6.1.1. Reset function

WARNING!
If a continuous tone is heard after performing start-up and raising the Search Head, perform a reset.



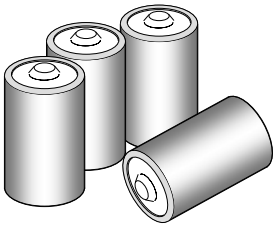


Activate the Reset Function by pushing the Main Switch down and holding for about 1 second. Operator will hear several rapid beeps then one beep approximately every 4 seconds (“detector ready”).
The second LED lights up with each beep sounded by the speaker.

6.2. Periodic maintenance

- The unit itself does not require periodic maintenance, with the exception of the normal care (cleaning) of it at the end of operations.
- When using rechargeable batteries, it is necessary to maintain them periodically
- Verify the calibration periodically.

6.2.1. Periodic maintenance of the Ni-MH battery

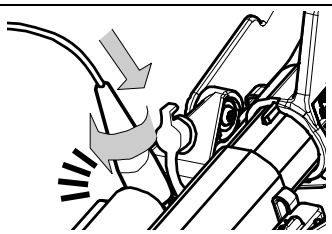
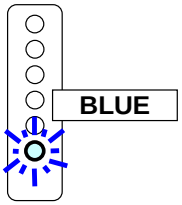
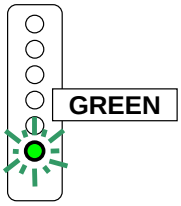
	In case of a prolonged period of storage/unuse Ni-MH batteries lose naturally almost all their charge and then they might have difficulties in recharging. In order to prevent that, we recommend that they undergo a complete charge cycle at least every 4 months even when unused. Recharge the batteries every month to keep them always ready to use (charge at 80% or more).
CEIA will not be held responsible for any damage resulting from failure to observe the above mentioned instructions.	

6.2.1.1. Use of the built-in battery charger

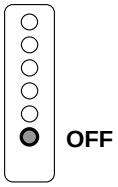
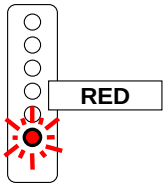
The metal detector includes a battery charger for NI-MH cells (see also the “Technical Features” section).

REMARK: the metal detector cannot be used during the recharging process.

CAUTION! Do not try to charge alkaline batteries or other types of non-rechargeable battery!

1 	**2** 	**3** 
Connect the power supply adapter to the EARPHONE connector (it is also available a cable for 12/24Vdc power supply, fitted with a car cigarette lighter plug)	The charging process starts automatically (the bottom LED turns on BLUE).	When the battery is fully charged the LED turns on GREEN (approx. after 3 h). NOTE: there is no risk of overcharging the batteries.

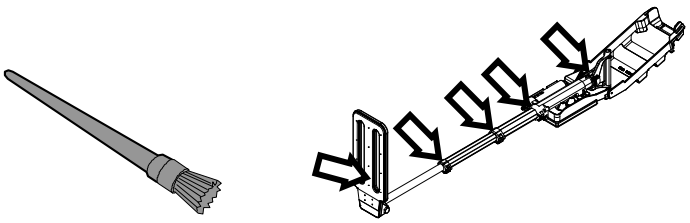
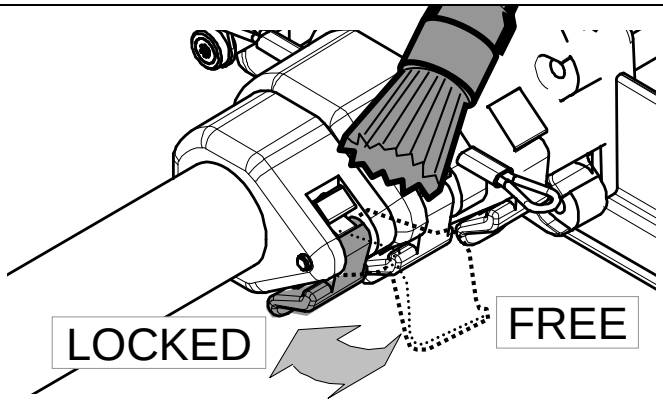
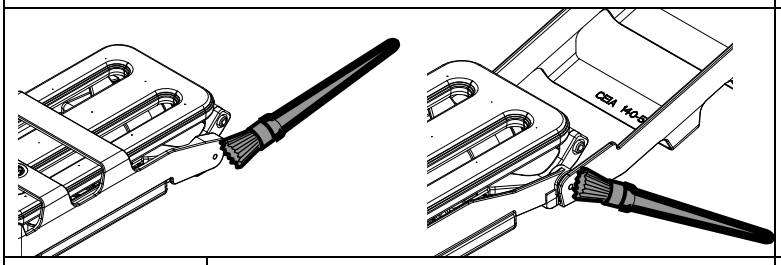
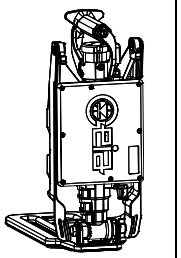
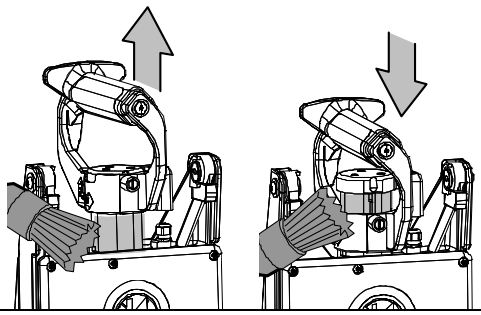
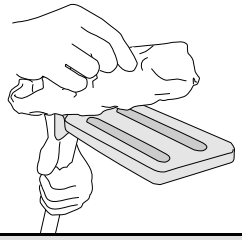
Error signals

	
The LED is off: - wrong input voltage (too low or too high). - absent or wrongly inserted batteries.	The LED is RED: - disconnect the power supply cable from the EARPHONE connector. - reconnect the power supply cable to the EARPHONE connector: if the LED is RED again, one or both batteries are not working properly or are not compatible with the unit and must be replaced.

6.2.2. Cleaning Procedure

In case the unit is used in presence of dust, sand or other possible heavy environmental conditions, before packing it, a deep cleaning is recommended, to prevent the moving parts from possible damages.

Procedure

	**General cleaning**. Clean all parts of the unit deeply, using a brush.
	**Cleaning the camlocks**. Clean the telescopic pole deeply, using the brush. Open the levers and clean the camlocks deeply, using the brush. Check that the camlocks can be operated correctly and without excessive force. If necessary, clean the camlocks again in both locked and free position.
	**Cleaning the arm support.** Clean the pivot of the arm support deeply, both in closed and in open position, using the brush.
 	**Cleaning the handle.** Collapse the telescopic pole and close the arm support, so as the handle can be operated easily. Clean the handle sliding zone deeply in both collapsed and extended position, using the brush. Check that the handle can be collapsed/extended correctly and without excessive force. If necessary, clean again the sliding zone with the handle in both collapsed and extended position.
	**Final general cleaning.** Clean the detector using a slightly moist, non-abrasive cloth.

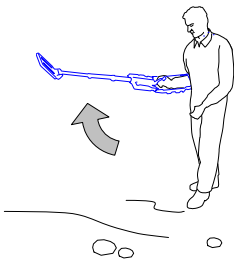
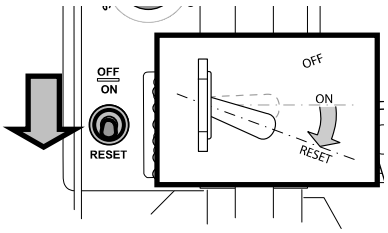
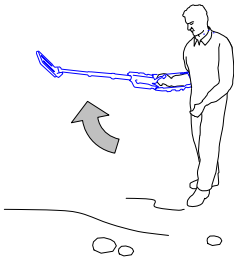
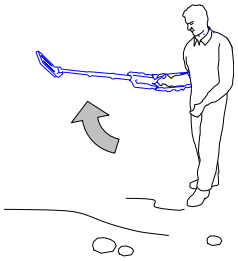
NOTE
Do not wash the device with liquid detergents or chemical substances!

6.3. Verification of the Calibration

The following procedure should be performed before a mission with the detector and at least once every day of operation.

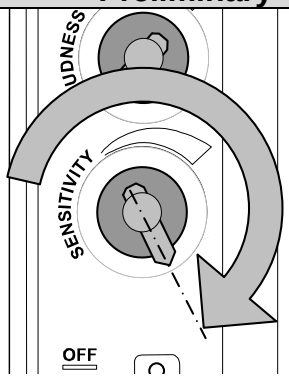
The reference sample is intended to verify that the detector is calibrated as shipped from the factory, according to the following procedure.

- **This procedure should only be performed at start up!**
- **The reference sample must be used only after reset the soil compensation (Air Compensation)**.
- **The reference sample does not represent or simulate the actual metal content of a target!**

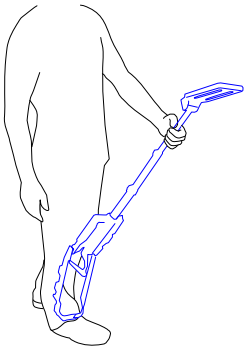
<table>
<tr><th colspan="3">Preliminary Verification of the Calibration</th></tr>
<tr><td rowspan="2">Reset of the Soil Compensation (Air Compensation)</td><td>STEP 1
 
Lift up the detector far from the soil.</td><td>STEP 2
 
 
Hold down the Main Switch on Reset until the high frequency intermittent tone changes to a double beep.</td></tr>
<tr><td>STEP 3
 
 
At the double beep, keep the search head far from the soil.</td><td>STEP 4
 
 
When the double beep changes to a high frequency intermittent tone, the procedure has been completed.
NOW the equipment is set to the default operating mode.</td></tr>
</table>

Preliminary Verification of the Calibration

Preparing the unit for the test

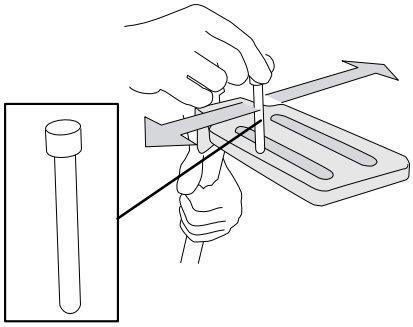


Rotate the Sensitivity Knob to the maximum.



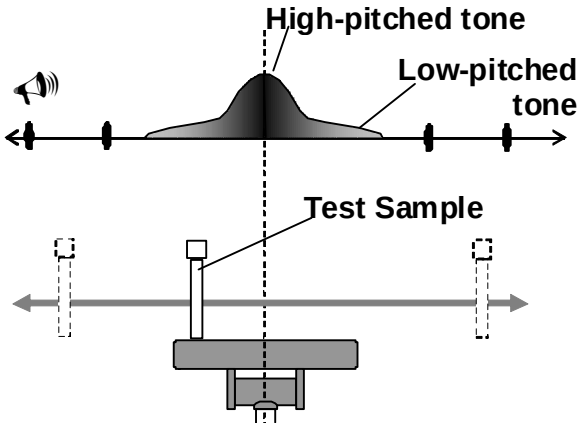
Reverse the detector and hold it as shown in the picture.

Verification with the Metallic Test Sample



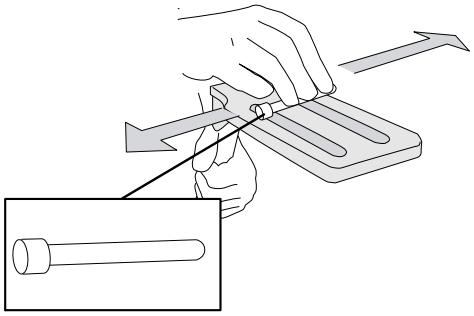
Pass the **Metallic Test Sample** (orange stick) **close to the Search Head** as shown in the picture.

Metallic Test Sample (orange colour)



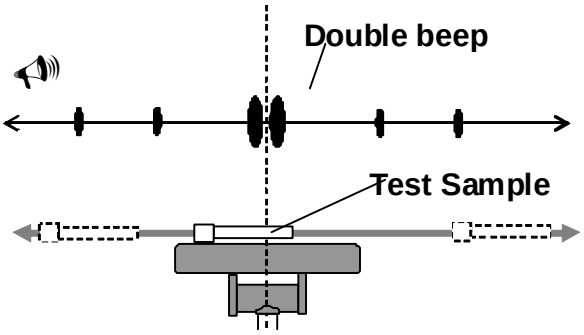
Check the presence of the alarm tone.

Verification with the Non Metallic Test Sample



Pass the **Non Metallic Test Sample** (black stick) **close to the Search Head** as shown in the picture.

Non Metallic Test Sample (black colour)



Check the presence of the alarm tone.

ATTENTION!
Do not use the detector if the verifications with the Metallic Test Sample and the Metallic Test Sample fail after a proper Reset the Soil Compensation (Air Compensation). Discontinue the equipment and call service personnel for assistance.

7 - Appendices

7.1. Technical Features

Main features

- Detection of magnetic and non-magnetic metals.
- Detection of non-metallic conductive IEDs
- Very high sensitivity.
- Automated Soil Compensation.
- High precision pin-pointing of the target.
- Static and dynamic detection independent of the speed.
- Long battery operating time.
- Extremely compact, Light Weight construction
- Light Weight detection head for maximum comfort during use.
- Synchronisation between adjacent detectors to eliminate reciprocal interference (down to 1m distance between units working on different channels).
- Extremely robust and reliable.
- Self-diagnosis system with audible signal in the case of malfunction or low battery charge.
- Built-in battery charger.

Technical data

- Very high detection distance, even for objects with a small content of metal.
- Adjustable sensitivity.
- Audio alarm with adjustable volume and optical alarm with LED bar-indicator.
- Built-in speaker and external headphone.
- Battery : 2 cells,
  - Type:
    - alkaline 1.5V or rechargeable Ni-MH 1.2V
    - size: ANSI standard size C or IEC standard size LR14
  - Acoustic warning message before complete battery discharge: about 1 hour of operation (during this time the detection capability and all the other performances of the unit are not affected).
  - Operational time (after reset, at 20°C /68°F)
    - Alkaline batteries: ≥ 6 hrs. (with high quality batteries)
    - Rechargeable batteries: ≥ 8 hrs. (high capacity rechargeable batteries size C)
      Battery self-discharging: residual charge of 65% when stored for 28 days at 20°C.
      Battery cycle life: > 500 cycles (IEC)
- Battery charger: battery type: 4500 to 6000 mAh NI-MH; input voltage 10…35Vdc; completely automatic charging process.

Protection degree (IEC 60529): IP 68 (water proof to 2 m).

- Storage temperature: -55 to +85°C (-67°F to 185°F).
- Operating temperature: -46 to +70°C (-51°F to 158°F).

- Complies with the international standards on radio interference and human exposure to electromagnetic fields.
- Dimensions :
  - Detection head: 140mm x 350mm (5.51” x 13.78”); Sensitive area: 140mm x 280mm (5.51” x 11.02”)
  - Maximum length of the arm support-telescopic pole unit: 1290mm (50.79”)
  - Telescopic pole length adjustment: 690mm (27.17”).
  - Dimensions:
    - Closed metal detector: 387mm x 157mm x 76mm (15.24” x 6.18” x 2.99”)
    - Metal detector in carry bag:
      - without accessories: 395mm x 200mm x 110mm (15.55” x 7.87” x 4.33”)
      - complete of all accessories (hard transport case excluded): 395mm x 205mm x 130mm (15.55” x 8.07” x 5.12”)
- Weights:
  - Metal detector, batteries included: 2100 g (4.67 lbs.)
  - Carry bag in synthetic canvas: 540 g (1.19 lbs.)
  - Monaural Headphone: 170 g (6.1 oz.)

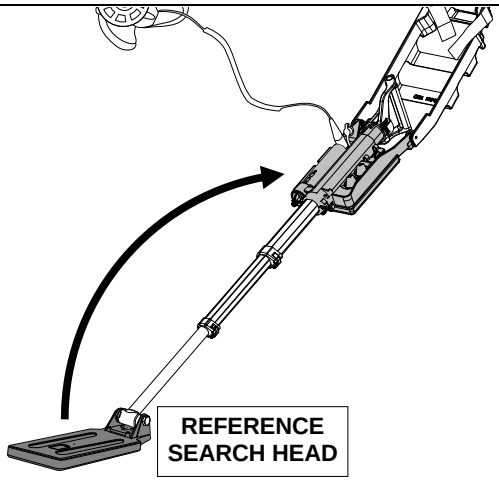
OPTIONS/ACCESSORIES

- 100-260V~ Power Supply Adapter for the built-in battery charger. Dimension and weight: 98mm x 42mm x 32mm (3.86” x 1.65” x 1.26”); 390g (0.86 lbs.) .
- DC Power Supply Cable for the built-in battery charger fitted with a car cigarette lighter plug.
- External loudspeaker.
- Hard Transport Case. Dimension and weight: 475mm x 350mm x 175m (18.7” x 13.78” x 6.89”); 4 kg (8.8 lbs.).

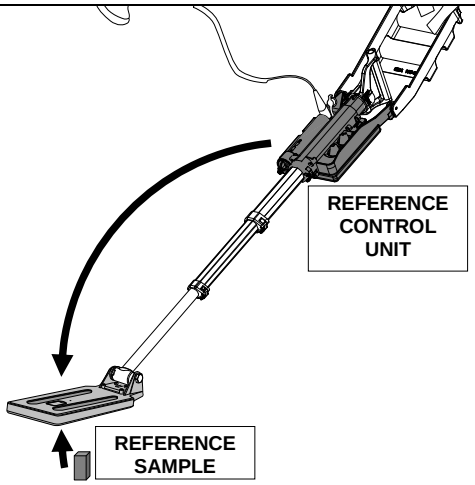
7.2. Operating Principle

The electronics unit generates a suitable electromagnetic field through the search head.

The search head detects any change in the electromagnetic field due to the presence of a metal mass and sends this information to the electronics unit.
If the received signal is higher than a reference threshold (SENSITIVITY), an acoustic and optical alarm is given.



All Control Units are calibrated on a Reference Search Head during manufacturing.
The Control Unit Calibration Factors are stored in an EEPROM located on the control board.



All Search Heads are connected to a calibrated Control Unit and calibrated by means of Reference Samples during manufacturing.
The Antennae Calibration Factors are stored in an EEPROM located inside the Search Head.