
TECHNICAL INFORMATION

SEARCHALERT™ Metal Detectors Catalog Nos. MI45, MI45E, MI45RE



INTRODUCTION

The SEARCHALERT™ is a compact, lightweight, durable and easy-to-operate hand-held metal detector. It is ideally suited for use in any security situation to detect metal objects on a person's body. One simple tuning control allows adjustment for various sizes of metal objects and situations. It is capable of detecting a paper clip from 2" (5.1cm) away and can be quickly adjusted to detect much larger metal objects, bypassing loose change and keys.

Physical contact is not necessary on body searches due to the pinpoint accuracy of the unique case-mounted Faraday-shielded search coil. The SEARCHALERT™ detects all metals, both ferrous and

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nonferrous, and produces both a visual and audible alarm with its built-in 2.25" (5.7cm) speaker and case-mounted LED. The optional earphone attachment available with No. MI45E allows only the operator to hear the alarm by disabling the speaker and LED. A rechargeable nickel-cadmium model No. MI45RE is also available.

The size and oblong shape of the search coil is designed to give high resolution and sensitivity to small objects while retaining a reasonably large search field. The size of the search field is theoretically defined by the shape and intensity of the electromagnetic field generated around the search coil. For all practical purposes, the area of the search field closely approximates the area of the search coil itself, enabling you to pinpoint finds with the tip of the search coil. The depth of the search field is dependent on the physical medium between the search coil and the target object being sought and on the size, shape and electrical properties of the target.

BATTERY INSTALLATION

Access the battery from the bottom of the unit by sliding the cover toward the search coil to lift off. The battery is held in place by a clip-type battery holder to prevent any movement. To install the battery, remove the battery clip lead from the compartment. Also remove the free end of the ribbon. The ribbon is used for battery removal and is positioned underneath the battery during installation (see right inset). Attach the battery clip lead to the battery and press the battery into the battery holder.



PROCEDURE

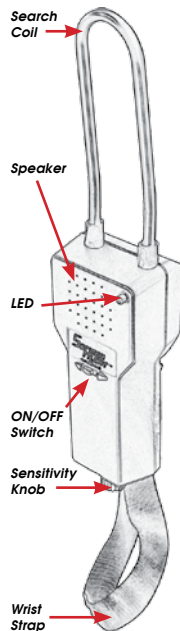
If you are going to search a large area with the SEARCHALERT™ (e.g., floor, wall, or field), we recommend you tune your unit by the *Sensitivity Control Knob* while holding the bottom plane of the coil about 1.25" (3.8cm) away from the general surface you intend to scan. This will normalize the initial tuning to the general characteristics of the surface so objects unique to the area being scanned will

noticeably deflect the audio tone. If you are investigating small objects, adjust the sensitivity control with the search coil suspended in air a considerable distance from any detectable object. When examining hand-held objects, be sure to remove your watch or any jewelry from the hand holding the object.

ON/OFF Switch—This switch is located on the top of the unit and positioned so you can easily operate it with your thumb. Sliding the switch to the right turns the unit ON. To conserve battery life, switch the unit OFF when not in use.

Sensitivity Control—The SEARCHALERT™ may be operated in either the silent (null) mode or at a setting of the Sensitivity Control Knob which produces a constant audible tone and light output from the LED Indicator. For most rapid searches, choose the null mode. When an object is detected in this mode, the unit will emit both a loud tone of increasing pitch and a brilliant light signal from the LED. The amount of change in tone is mostly determined by the size and type of material detected and its distance from the Search Coil. In general, large objects will cause a very large pitch change. The smaller the object and the greater the distance, the smaller the pitch change becomes.

The sensitivity is controlled by adjusting the knob at the end of the case. Its function is to tune the unit. With the battery installed and the switch ON, rotate the Sensitivity Control Knob slowly in either a clockwise or counterclockwise direction until you hear the tone. Next, rotate the control in the direction that lowers the pitch of the tone. Continue rotation in this direction until the tone stops (no audible sound). This is the center of the operating range and is referred to as the Null Point. The operating range extends on either side of the null point as far as you can hear a tone. As you move away from the null point in either direction, the frequency (pitch) of the audible tone will go up.



When operating at the null point, the unit is silent except when moved into the vicinity of a target. The sensitivity at the null point is approximately 50% lower than maximum. For maximum sensitivity, adjust the control to a point slightly off null where you can distinctly hear each separate audio beat. This is the most sensitive range of operation and also is more pleasing to the ear than higher frequencies. When the search coil comes in close proximity to metal objects, the frequency of the audio beats will change noticeably.

Earphone Operation

For private monitoring of the metal detection, we recommend using No. MI45E which is supplied with an earphone. Simply plug the earphone into the jack located on the left side of the unit and the speaker will automatically be disconnected. All search procedures previously described still apply. **NOTE:** *If your SEARCHALERT™ becomes unstable during use, the battery may need recharging or replacement.*

Drift and De-tuning

All sensitive metal detectors are susceptible to *drift* and *de-tuning*. These are phenomena with different causes. *Drift* is a term referring to general change in operating tone frequency (pitch) over a period of time. The SEARCHALERT™ is very stable and will normally drift only under the following conditions: abrupt ambient temperature change or a weak battery.

While the SEARCHALERT™ will operate reliably over a temperature range from 20°F-120°F (-7°C to 49°C), an abrupt change in ambient temperature may cause a slight drift in frequency. Any such drift can be compensated for by use of the sensitivity control. Continual drifting is usually an indication of a weak battery.

De-tuning is a term referring to a sudden change in audio pitch caused by a mechanical influence on the unit or a general change of electromagnetic conditions in the environment of operation. For example, if you are searching the ground for metal objects and encounter an area of highly mineralized soil, the unit's tone pitch will shift to an undesirable frequency. You can compensate for this general

change in soil condition by re-tuning the unit. De-tuning can also occur if the detector is dropped or subjected to impact or other mechanical forces in handling and transport. The cause of this type of de-tuning is due to either a deformation of the search coil or movement of the sensitivity control setting. Your SEARCHALERT™ was tested and tuned prior to leaving the factory. If the unit became de-tuned in shipment or in the course of your use, attempt to re-tune by the normal tuning procedure previously described. If the unit is still not functioning properly, contact the factory in accordance with the section entitled “Factory Repairs”.

CARE AND MAINTENANCE

- DO NOT store the SEARCHALERT™ in direct sunlight or in extreme heat such as the dashboard of a car. The outer case is made of a thermoplastic material that may distort when exposed to extreme heat.
- DO NOT probe or dig with the search coil. Such mechanical forces applied to the coil can cause it to deform and de-tune the unit. We recommend using a blunted ice pick or long, narrow-bladed screwdriver for probing in soil.
- DO NOT immerse the SEARCHALERT™ in water or sand. While the search coil will repel dirt and water, we do not recommend this practice since foreign matter may get inside the unit and cause shorting of electrical components and loss of operation.
- To extend battery charge life, always turn the unit OFF when not in operation.
- There are no user-serviceable components inside the unit other than the battery and the ferrite tuning adjustment which is accessible through the battery cover. However, if you need to open the case, use the following procedure:
 - a. Remove the 4 Phillips head screws on the bottom of the case.
 - b. Lift the bottom of the case upward approximately 1/8" (3mm) at the control knob end and care-

fully slide the bottom toward the search coil. This will release the tab which locks the case together at the search coil end.

- c. The bottom of the case is now free and may be lifted. Reassemble in reverse order. **CAUTION:** *The lock may be damaged if you pry the case apart or try to force item back together without having the lock tab properly seated.*

FIELD TUNING PROCEDURE

Occasionally, the SEARCHALERT™ may need internal re-tuning to bring the output frequency back within the fine tuning range of the external sensitivity control. This adjustment is a simple procedure that can be done in less than a minute. The only tool required is a small blade screwdriver.

Symptoms for Internal Re-tuning Required

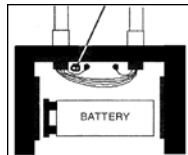
1. Inability to tune or null with the external sensitivity control knob.
2. Red indicator light (LED) stays on throughout the range of the sensitivity control.
3. No sound is obtainable throughout the range of the external sensitivity control, but the LED stays lit.

Re-tuning Procedure

NOTE: *Charge unit overnight or install fresh batteries before attempting to re-tune it.*

1. Remove the battery compartment cover and turn the unit ON.
2. Using care to ensure the unit is away from metal, hold the unit top down with the search coil away from you and the external sensitivity control knob towards you. If seated, you may find it convenient to lay the unit on your lap near your knees.
3. Center the external tuning control knob. This control is centered when the white dot on the knob is pointing upwards.

4. In the upper left hand corner of the battery compartment, near the search coil wires, you will see a black 1/4" (6mm) dia. slotted object (ferrite tuning core) on the circuit board. It will be nearly flush with the surface of the circuit board (see right insert). Rotate the ferrite tuning core with a small screwdriver to locate the null as follows:



- a. Slowly rotate the ferrite tuning core while carefully listening to the tone or pitch of the audio signal. Rotate in the direction that causes the tone or pitch to lower or decrease the frequency. Lower pitch or tone should not be confused with a decrease in volume or loudness. You are turning in the wrong direction if the pitch increases.
 - b. The null is reached when the pitch decreases in frequency to zero. Make certain not to tune through the null without noticing it.
 - c. Adjustment of the internal tuning core is normally less than 1/2 turn of the ferrite core. You have found the null when there is no audio signal heard and adjustments in either direction causes the tone to increase in pitch from a low, growling sound.
 - d. The LED is OFF at null and will light on either side of null whenever the audio signal is present. **NOTE:** *If a metal screwdriver is used to adjust the unit, the null will shift slightly when the screwdriver is inserted or removed. Re-insert the metal screwdriver and re-tune slightly off null until you can remove the metal screwdriver with the unit remaining or becoming quiet after removal.*
5. Slowly turn the external tuning control clockwise and then counterclockwise until the “stop” is felt in both directions. The unit should “sound off” when turned in either direction. The pitch of the sound reached when turning the control in one direction should equal the pitch achieved in the opposite direction. If this does not occur, re-adjust the ferrite turning adjustment and retry. **NOTE:** *As*

long as a null condition is obtained, the unit will be ready for metal detection—but centering this adjustment will make the unit less likely to need re-adjustment in the near future.

6. Test the unit by bringing the search coil in proximity to a coin or metal object.

FACTORY REPAIRS AND RETURNS UNDER WARRANTY

Your SEARCHALERT™ was tested and determined to be fully operational within its operating specifications when it was shipped from the factory. A warranty is provided with each unit produced. To be valid, your warranty must be registered with the factory in accordance with the instructions contained in the warranty. Units to be returned as defective under warranty must be authorized in writing by the factory prior to being returned. Postage or freight on returned goods must be prepaid by the sender. Any units received out of warranty, or where the customer failed to register their warranty, will be repaired with a charge for parts, labor, handling and returned to the customer C.O.D. Contact the factory by writing to: **SIRCHIE, 100 Hunter Place, Youngsville, NC 27596 USA**

SPECIFICATIONS:

- **CONSTRUCTION:** Rugged ABS thermoplastic injection-molded case
- **POWER SOURCE:**
MI45 or MI45E—one 9-volt alkaline battery
MI45RE—one 9-volt NiCad rechargeable battery with 110V AC charger
- **DIMENSIONS:** 12.25" x 2.75" x 2"
(31.1cm x 7cm x 5.1cm)
- **WEIGHT:** 11 oz. (0.3kg)
- **OPERATION:** Single-control tuning, on/off switch
- **ALARMS:**
Audible: (internal), 2.25" (5.7cm) dia. speaker (all models);
(external) earphone and jack (MI45E only);
Visual: case-mounted red LED
- **CIRCUITRY:** All solid state, internally shielded, beat frequency oscillator
- **DETECTION SENSITIVITY:** Minimum 0.1g
- **OPERATING FREQUENCY:** 70 kHz
- **AUDIO FREQUENCY:** 0 Hz-10 kHz
- **STANDBY CURRENT:** 12ma typical
- **BATTERY LIFE (typical):**
MI45 or MI45E—24-30 hours
MI45RE—5-7 hours
- **CARRYING CASE:** Lined vinyl holster with belt clip