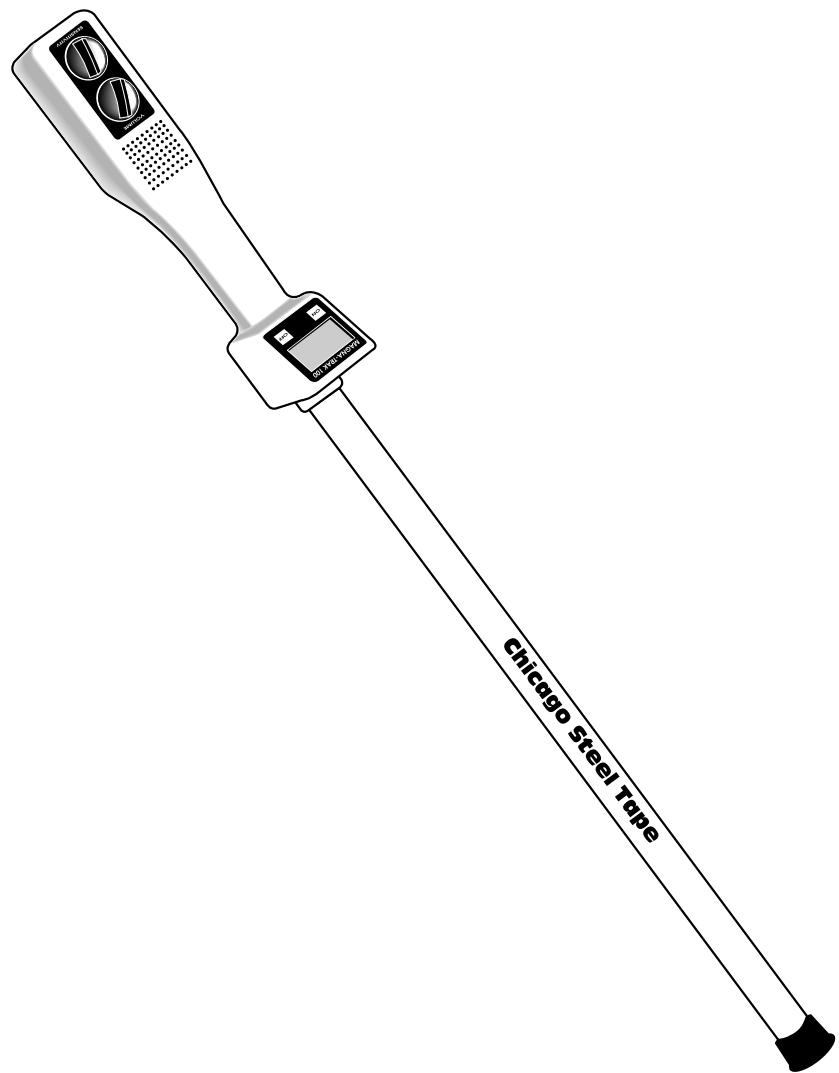


INSTRUCTION MANUAL

Magna-Trak 100[®] Magnetic Locator



Thank you for purchasing the Magna-Trak 100® Magnetic Locator. Please read this manual thoroughly before operation.

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1. INTRODUCTION

The Magna-Trak 100® magnetic locator is a flux-gate type of magnetometer which incorporates a unique patented technology that enables the factory to balance the magnetic sensing coils to a finite condition. This patented method of magnetic balancing is advanced in the state of the technology.

The Magna-Trak 100 implements "peak response" over ferromagnetic objects by yielding an increasing audio signal as the object is approached and passed over.

This instrument is the product of many years of experience and service provided by CST to the industry.

2. THEORY OF OPERATION

The Magna-Trak 100 locator finds ferromagnetic objects by sensing the magnetic field radiated by the object. The locator contains two sensor coil assemblies that are precisely spaced and electronically balanced to achieve a near magnetically-balanced operating condition. In a uniform magnetic field, such as the earth's field, the two sensor coils maintain a magnetically-balanced status, because both of the coils experience the same magnetic lines of force. However, when a ferromagnetic object is approached, the field strength and angle of the magnetic lines upon each sensor is different. This difference, although minute, is enough to offset the critical balance and produce an audible indicating signal (*Fig. 1*).

When no ferromagnetic objects are present, the speaker emits a steady low frequency tone. As the object is approached, the audio frequency increases until the center of the object is directly beneath the locator's lower tip sensor. The frequency peaks and then decreases as the object is passed. The peak indicates the exact location of the object.

Nonferrous objects do not affect the locator. Objects made of brass, aluminum, copper, etc. are ignored.

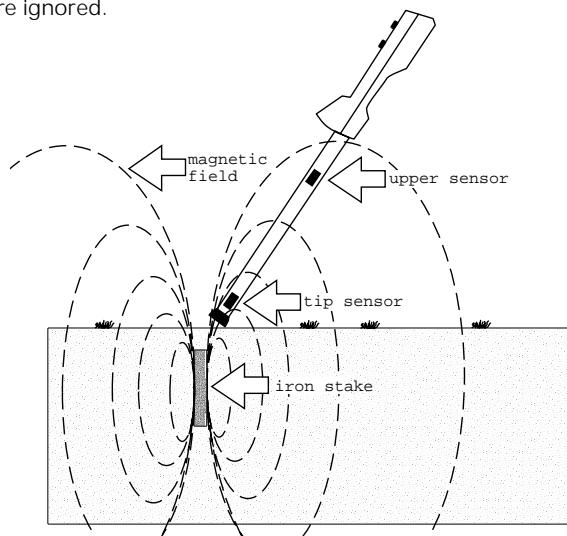
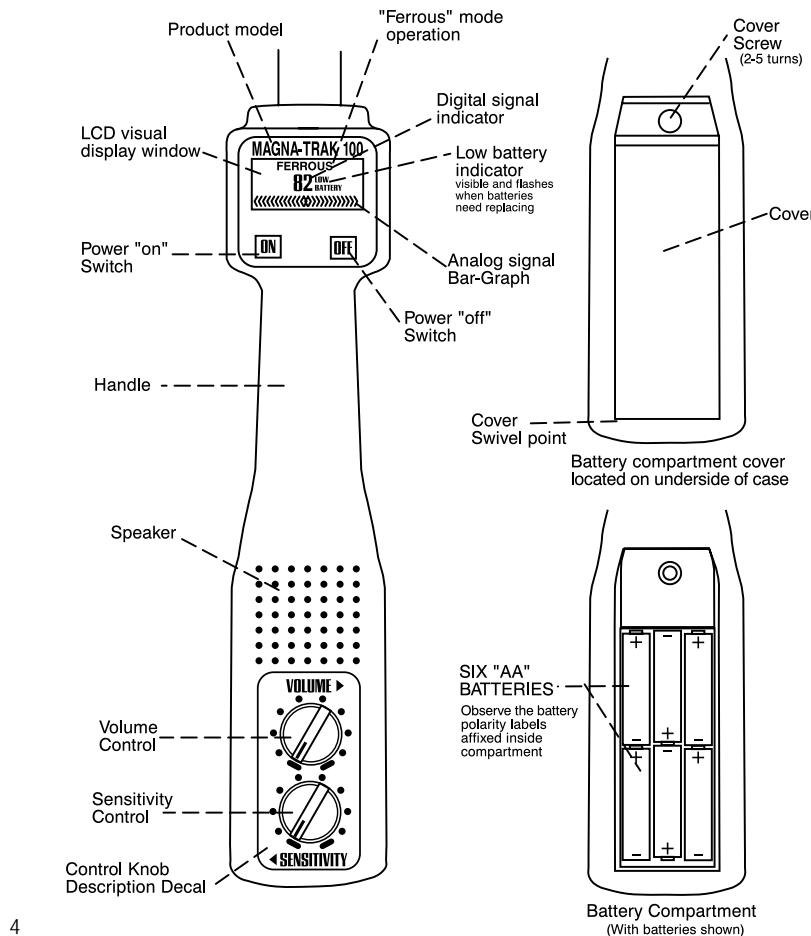


Fig. 1
Sensor coils unbalanced by magnetic field of iron stake.

3. FEATURES

- Rugged high-impact plastic enclosure with aluminum sensor pole
- Powerful magnetic speaker with waterproof Mylar cone
- Lightweight, comfortably balanced for easy handling
- Easy view LCD display for visual signal strength and battery information: includes two digit numeric signal indicator, expanding analog Bar-Graph signal indicator, and flashing "Low Battery" indicator
- Six "AA" (1½ volt) battery operation; ±100 hour battery life
- Quick-access battery compartment
- Adjustable sensitivity and volume controls
- Single hand touch-switch operation for power ON/OFF
- Deep tone audio under search conditions; signals "peak" over magnetic objects
- Full depth capability
- Includes padded carrying case with shoulder strap or hard case



4. BASIC OPERATION AND DESCRIPTION

4.1 Power On/Off Switches

Press "ON" once to activate the locator circuitry. Press "OFF" once to turn the battery power off.

4.2 Volume and Sensitivity Control Knobs

Rotate the volume knob to the desired audio volume level. Full volume is achieved when the knob is turned fully clockwise.

The sensitivity or depth range can be varied using the sensitivity knob. Maximum range is provided at full clockwise rotation. The optimal setting is determined by each particular application. Areas crowded with various undesired ferrous objects may require a reduced sensitivity level. Deeply buried objects being searched will require a higher sensitivity level.

A decal with markings for both the sensitivity and volume control knobs is provided as a reference for future settings or comparisons.

4.3 Speaker

When no ferrous metal is present, the audio sound heard will be a low frequency tone. As ferrous metals are approached, the audio tone will increase.

4.4 LCD Visual Display

Several visual display functions, provided for ease of operation, are defined below:

"Ferrous"

Defines the basic function of the locator as a ferrous locator (fixed indicator).

Digital Signal Indicator

A two digit numeric display shows the signal level as related to the audio signal response being heard from the speaker. At the lowest signal level, when no ferrous metal is present, a small number will be viewed (between "0" and "5"). As metal is approached, the numbers will increase, reaching "99" at its maximum peak. Deeply buried objects or lower sensitivity levels will yield a lower peak number to aid in pinpointing the object.

Analog Bar-Graph Signal Indicator

The bar graph display expands outward from the center "diamond" as related to the audio signal response being heard from the speaker.

5. BATTERY REPLACEMENT

The LCD will display a flashing "Low Battery" warning when the batteries fall below a predetermined voltage level, alerting you to replace the batteries soon. Several hours of battery life remain; however, in cold temperatures, this time may be shorter.

Replace the batteries as follows:

1:

Turn the power off.

2:

Unscrew the thumb screw on the battery cover (2-5 turns) and lift the cover off until the tab at the rear of the cover clears the slot it is located in.

3:

Remove the batteries by raising the batteries at the contact point of each pair.
Dispose of used batteries properly.

4:

Insert new batteries, observing the polarity labels located inside the battery well.

NOTE: Do not mix old and new batteries. Replace all batteries at the same time with new batteries. Also, do not replace the batteries under wet or rainy conditions, allowing water to enter the battery compartment.

5:

Reinstall the cover in the reverse manner, being careful not to overtighten the thumb screw.

In the event the "Low Battery" indicator is not displayed, no visual indications appear on the LCD window and no sound is heard after pressing the power ON switch, the batteries may be dead; check the battery compartment immediately. Dead batteries should be removed immediately as they are prone to leakage and can cause permanent damage.

Always remove batteries before storing your locator.

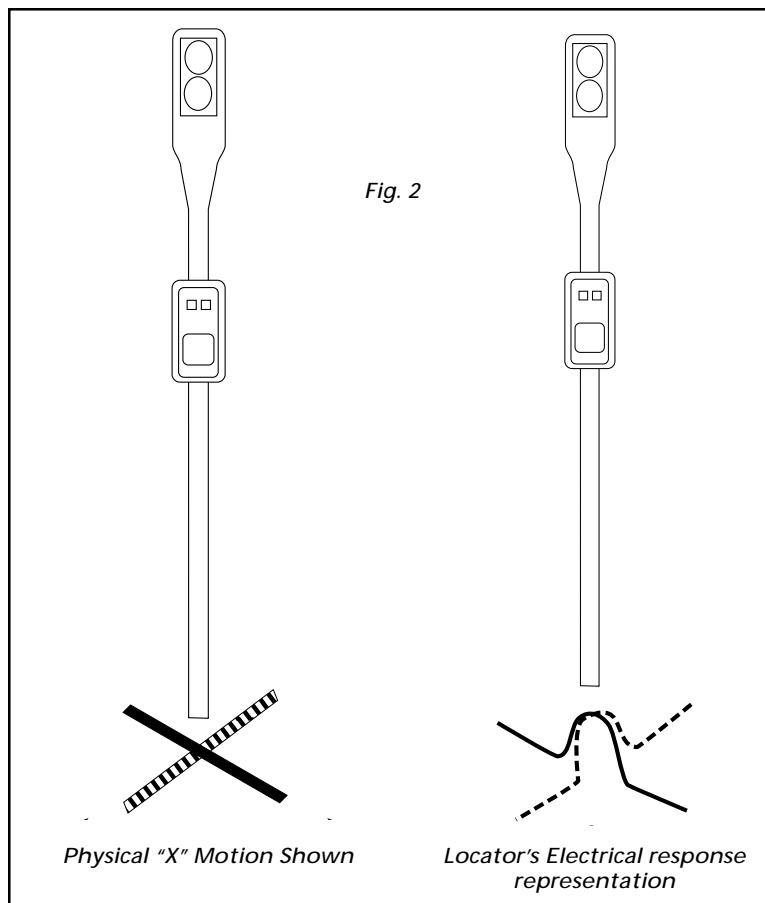
6. FIELD OPERATION

The recommended search position is a 45° angle from the earth's surface. Scan the locator pole from side-to-side in a slow sweeping motion while walking in a steady direction. Maintain a consistent height above the ground during the side-to-side sweeping motion.

Once the object being searched is located, pinpointing the object's location can be accomplished by holding the locator vertically and sweeping it in an "X" pattern until the absolute signal peak is found (*Fig. 2*). The audio sound and visual LCD display will provide the pinpointing results.

Please note that your magnetic locator is not only sensitive to buried ferrous objects, but also to items in your possession. Ferrous objects such as steel tipped shoes, a pocket knife, some wrist watches, key chains or other objects containing ferrous material can cause false signals during your search.

The locator is not affected by the presence of nonferrous objects, such as copper, aluminum pull tabs or foil, and other forms of trash that may be present in the ground. Snow, ice, water, wood, plastic, concrete, stones, and the ground itself have no effect on the performance of the locator.



6.1 Water Locations

The pole section of the locator can be submerged into water, up to just under the plastic case (Fig. 3).

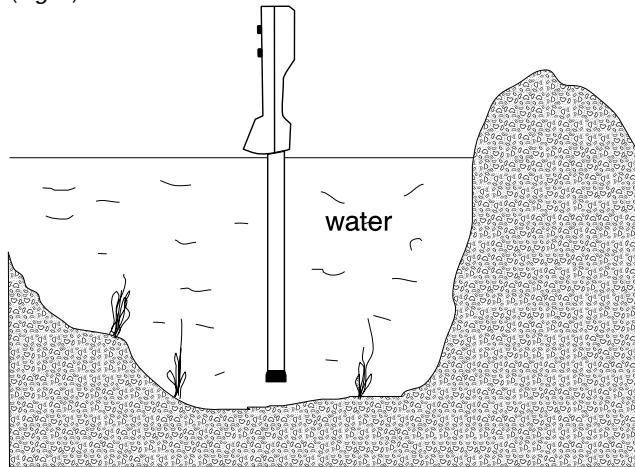
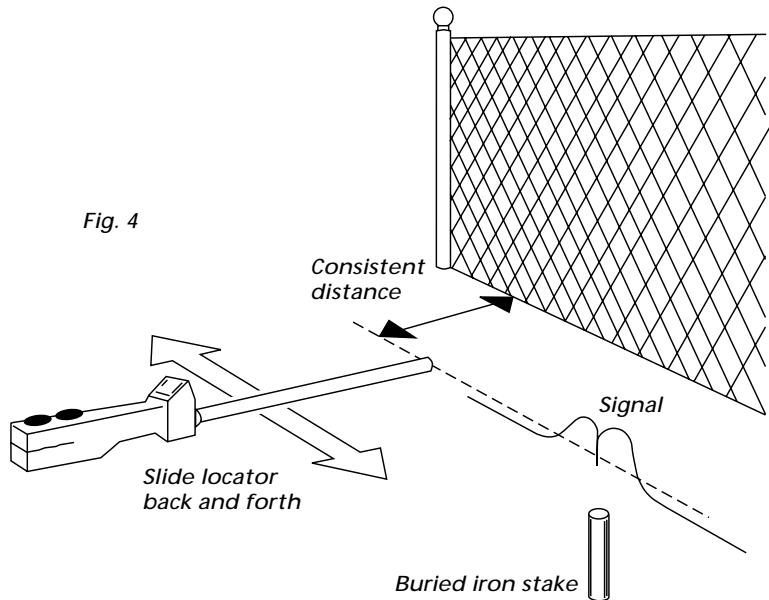


Fig. 3

6.2 Locating Near a Steel Fence

Move or slide the locator across the ground while holding the length of the locator body perpendicular to the fence. Do not roll the locator on the ground. Maintain a consistent distance between the tip of the locator and the fence.

The object will be directly below the tip of the locator (approx. $\frac{1}{4}$ " from the tip).



7. SIGNAL RESPONSE

Figure 5 shows audio and LCD visual signal response to:

- 1: no object,
- 2: one small deeper metal target, and
- 3: a second larger and shallower metal object.

The LCD display indicates both the numeric digital and analog bar-graph response as the locator passes over the ground.

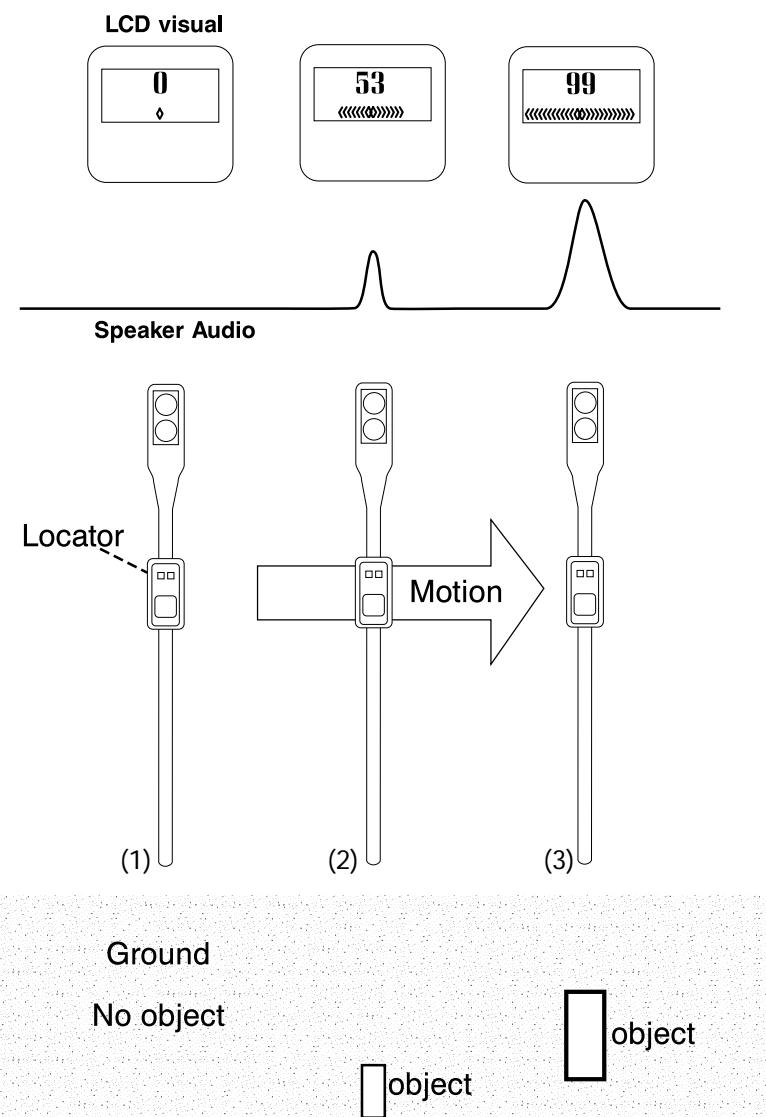


Fig. 5

7.1 Typical Signal Responses

The metal handles on the septic tank cover will provide a usable signal to determine the location of the actual cover (*Fig. 6*).

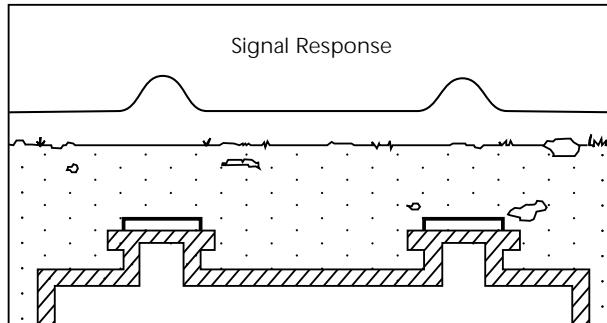


Fig. 6

Large metal objects may cause double signals as indicated (*Fig. 7*).

The center of the cover is found by sweeping the locator back and forth to create a ring pattern response. The center null will designate the cover's center.

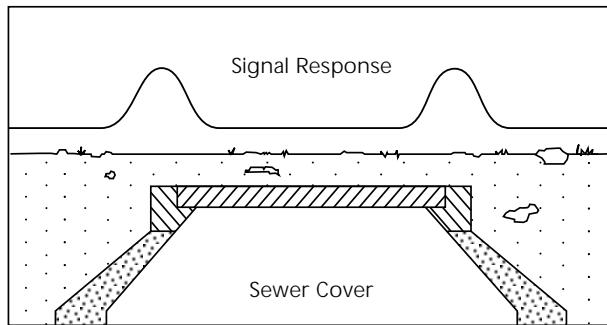


Fig. 7

The joints, elbows and ends of iron pipes will create the strongest signals (*Fig. 8*). Hold the locator in a vertical position while searching to produce the best results.

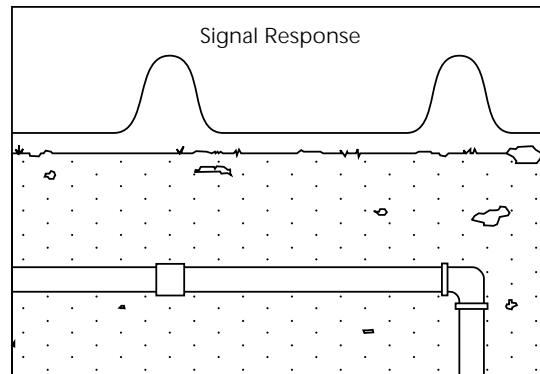


Fig. 8

8. SPECIFICATIONS

Power: Six "AA" (1½ volt) batteries

Battery life: ±100 hours of intermittent operation (alkaline batteries)

Output: Powerful magnetic speaker with waterproof Mylar cone

LCD Display: Numeric digital, analog Bar-graph and low battery indicator feature

Weight: Approximately 3 lbs. (1.3kg) with batteries

Operating temperature: 0°F to 120°F (-18°C to 49°C)

Length: 40 inches (101.6 cm)

Construction: High-impact water resistant plastic, epoxy painted. Aluminum sensor tube waterproof to just under the plastic case.

Patent: United States #4,439,732.

Nominal Sensor: 20 inches (50.8 cm)

Specifications subject to change without notice.

9. WARRANTY

The Magna-Trak 100® magnetic locator is warranted to be free from defects in materials and workmanship for a period of five years after the delivery of the product to the original user. Our liability under this warranty is limited to replacing any defective parts, adjusting and servicing any instrument or, at the company's option, replacement of the instrument returned by the original user, transportation charges prepaid, to the company. If the malfunction has been caused by misuse or abnormal conditions of operation, repairs will be billed to the user, with a cost estimate submitted prior to commencing repair work.

Batteries and the battery holder are not covered by this warranty.

All Magna-Trak 100 locators repaired out of warranty carry a warranty on replaced parts for a period of 90 days.