INSTRUCTION MANUAL
Model GA-52
Magnetic Locator

SCHONSTEDT INSTRUMENT COMPANY
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PREFACE

The Model GA-52 Magnetic Locator is a product of a quarter century of experience in producing the world’s finest flux-gate magnetometers and magnetic detectors for aerospace, military and civilian applications. The GA-52 incorporates the knowledge gleaned from manufacturing under the most rigid quality control standards.

The heart of the GA-52 is its patented Schonstedt HeliFlux® magnetic field sensors. These sensors, acknowledged to be the world’s finest, make possible the unequalled performance of the locator.

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INTRODUCTION

The Model GA-52 Magnetic Locator detects the magnetic field of a ferromagnetic object. It responds to the difference in magnetic field between two sensors spaced about 20 inches apart. The response consists of a change in the frequency of a signal that is emitted by a loudspeaker.

The figure below illustrates an application of the locator in which it is used to detect an iron marker for a property corner. In the illustration, the magnetic field of the iron marker is stronger at sensor A than it is at sensor B. As a result, the frequency of the signal on the loudspeaker is higher than the idling frequency, 65 Hz, which exists when the field is the same at both sensors.

Magnetic field of an iron marker.
OPERATION (cont.)

TURN-ON, VOLUME AND SENSITIVITY SETTINGS

Turn on the Model GA-52 and adjust the volume level by rotating the ON-OFF/VOLUME control in a clockwise direction until the idling tone reaches the level desired. Position the SENSITIVITY (range) control as shown in the figure. With the knob in this position, the sensitivity is set for what is referred to as NORMAL RANGE. The locator can be oriented in any direction without producing a significant change in frequency of the tone from its idling rate. In cold weather it may be necessary to turn the SENSITIVITY knob slightly more in the clockwise direction to obtain normal range.

When headphones are used, no variation in sound volume is provided by turning the VOLUME Control.

LOW SENSITIVITY

Unwanted background signals due to nearby magnetic objects may require that the range of the locator be reduced. To reduce the range, turn the sensitivity knob in a counterclockwise direction. Reduced range is useful in pinpointing the location of a strongly magnetized marker.

Control Setting for Low Sensitivity
OPERATION (cont.)

HIGH SENSITIVITY

The sensitivity of the locator is increased by turning the sensitivity knob in a clockwise direction. A high sensitivity setting imposes some constraint on operating methods. The locator tone will vary in frequency depending on the instrument's orientation in the earth's magnetic field.

Control Setting for High Sensitivity

SEARCH

Set the sensitivity control for normal operation and grasp the locator just below the large end as illustrated. Because the upper sensor is located near where the locator is usually held, wrist watches may produce unwanted tone frequency changes. To avoid such problems either remove the wrist watch or use the other hand. Also, avoid bringing the locator close to your shoes, since they might contain magnetic material.

To obtain maximum area coverage, the locator should be swept from side to side with the small end of the instrument kept close to the ground. A higher frequency tone will be heard from the loudspeaker when the locator is within range of an iron marker.

When searching using extended range, keep the locator in a fixed orientation, preferably vertical. Avoid turning the locator about its long axis as this may produce signal variations arising from misalignment of the sensors. The presence of a ferromagnetic object will be indicated by a change in tone frequency.

Searching With the Locator
After you have detected a signal, you can precisely locate the target to save digging over a wide area. Simply hold the locator vertically while moving it in an "X" pattern. The peak signal occurs directly over a vertical target, and over the ends of a horizontal target.

Using the "X" pattern allows precise location of small objects. A 1-1/4" P-K nail marker can be located at depths from 4" to 8". It can be uncovered by using a 1/2" star drill.

A trick that helps if you find more than one signal, when you should find only one, is to raise the locator a few inches. Any signal that disappears is probably not the one you are looking for. The signal from a rusty bolt or other small item will drop much faster with distance than the signal from a larger target such as a corner marker. Average locating depth for an 18-inch length of 3/4 inch pipe is 3 to 7 feet.
STRONGLY MAGNETIZED MARKERS

Strongly magnetized markers at or near the surface may give misleading information as to the location of the markers. The magnetic field of such a marker is illustrated below.

The heavy line in the figure represents the variation in tone frequency obtained when passing the locator over the marker. In moving the instrument from A to B, the tone frequency increases and then suddenly decreases at B. From just beyond B the tone frequency increases sharply, becomes very high over the marker and decreases just before reaching C. From C to D, the pattern is the reverse of that from A to B. It is obvious that the locator must enter the B-C region. Otherwise the marker might be assumed to be between A and B or C and D.

The phenomenon is explained by the fact that the locator is sensitive to the magnetic field components parallel to its long axis. At points B and C, the field is perpendicular to the locator so no high frequency is produced at these points.
The magnetic field is strongest at the edges of a shallow manhole cover. Turn the sensitivity down all the way and you can easily trace the edges of covers near the surface. Average locating depth is 6 to 8 feet.

The great length of a well casing provides a strong field at the surface that permits easy locating of casings buried from 10 to 15 feet.

The locator can be used to precisely locate the metal handles or reinforcing bars on septic tank covers buried from 2 to 4 feet.
APPLICATION NOTES (cont.)

BARBED-WIRE, WATER, SNOW

You may use the locator in flooded areas – just keep the electronic unit out of the water.

Examine trees for bench marks and embedded barbed wire of old fence lines. Hold the locator parallel with the direction of the wire.

You can often trace barbed-wire (of old fence lines) beneath the surface. Even if the wire is only a trail of rust, it can be detected near the surface. Tip the locator a little lower than usual – but not parallel with the ground.

Snow poses no problem – just thrust the locator into the snow as deeply as necessary to locate the target.
ALONG FENCES

Search in the vicinity of an iron-wire fence requires not only a reduced sensitivity setting but also some control over the orientation of the locator. Position the locator substantially horizontal with its long axis approximately perpendicular to the fence. This orientation assures that the upper sensor is kept away from the fence.

Search by moving the locator along the fence, keeping the end a constant distance from the fence. When a point 1-5/8" from the end of the locator is directly over the stake, the signal will drop abruptly as shown below. Any variation in position will produce an abrupt rise in the frequency of the tone.
VALVE BOXES

Both the valve and its casing, when iron, provide strong magnetic fields which make them easy to locate. Plastic enclosures containing magnets are easily located at depths of 6 feet or more.

CAST IRON PIPES

Cast iron pipes produce the strongest magnetic signals at their joints. Initial search is best done as follows:

1. Turn sensitivity to maximum.
2. Hold locator vertical approximately 1-1 1/2 feet above the surface.
3. Walk without turning or tilting the locator.
4. Mark the approximate locations of signal maximums.
5. Return to the marked area and probe near the surface for signal maximums. To do so it may be necessary to reduce the sensitivity of the locator. Four-inch pipe can be located at 4 to 8 foot depths.

The exact location of pipe joints may be displaced slightly from the point of maximum signal — particularly on pipes oriented east-west.
OTHER NOTES

1. A burbling sound indicates the presence of an energized power line. The burbling is due to the alternating magnetic field associated with the electrical current.
2. The instrument will not detect nonmagnetic materials such as gold, silver, copper, brass, aluminum, snow, water, ice, etc.
3. Normally, telephone lines cannot be detected.

MAINTENANCE

REPLACEMENT OF BATTERIES

The GA-52 is designed and built to give trouble free operation. Normally, maintenance is limited to occasional replacement of the batteries. In the event that your locator does malfunction, we ask that you refer to the troubleshooting guide located on page 12. This lists a few possible problems that can generally be corrected in the field so that you will be able to continue using the locator without interruption.

The GA-52 is powered by four C-cell batteries carried in a battery holder illustrated in the exploded view of the electronic assembly below. Access to the batteries is obtained by removing the two knurled nuts, and sliding off the cover.

The four batteries are connected in series. The proper polarities for the batteries are shown on the battery holder. Batteries must be removed and installed in the order as shown in the illustration on the next page.

![Exploded View of the Electronic Unit Cover](image-url)
MAINTENANCE (cont.)

REMOVE FIRST

INSTALL FIRST

REMOVE FIRST

INSTALL FIRST

BATTERY KEEPER (Screw need not be removed)

COIL SPRING HERE

BATTERY BOX

TERMINALS

COIL SPRING HERE

BE SURE THAT THESE TERMINALS DO NOT MAKE CONTACT WITH EACH OTHER
GA-52 TROUBLE SHOOTING GUIDE

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible Cause</th>
<th>How to Check</th>
<th>How to Fix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dead</td>
<td>Dead Batteries.</td>
<td>Replace.</td>
<td>Replace.</td>
</tr>
<tr>
<td></td>
<td>Batteries not making contact.</td>
<td>Check for contact corrosion.</td>
<td>Clean Contacts.</td>
</tr>
<tr>
<td>Intermittent</td>
<td>Batteries not making good contact.</td>
<td>Check for corrosion.</td>
<td>Clean Contacts.</td>
</tr>
<tr>
<td>No sound</td>
<td>Speaker terminals shorted to cover.</td>
<td>Visual.</td>
<td>Bend terminals.</td>
</tr>
</tbody>
</table>

SERVICE INFORMATION

If your locator needs service, you may return it to the dealer from which it was purchased or return it to the factory along with the following information: Name, Address, Where Purchased, Date, and Description of Trouble(s).

SPECIFICATIONS

(Specifications subject to change without notice.)

- **Input Power:** Supplied by four C-cell batteries (1 ½ V each).
- **Battery Life:** 50 hours of intermittent operation.
- **Output:** Approximate 65 Hz idle tone in speaker. Tone frequency increases (or decreases) with gradient-field intensity.
- **Weight:** Approximately 3 lbs. (1.36 kg.).
- **Operating Temperature:** 0°F to 120°F (−18°C to 49°C)
- **Length:** 42-5/16 in. (107.4 cm.)
  - Waterproof Length: 34-1/2 in. (87.6 cm.)
  - Nominal Sensor Spacing: 20 in. (50.8 cm.)
- **Construction:** Rugged, all solid state.

PATENTS

Manufactured under the following Patents: United States: 2,916,696; 2,981,885; 3,894,283; 3,907,704; 3,961,245; 3,977,072; 4,110,688; 4,161,568 and 4,163,877.
- Canada: 637,963; 673,375; 1,006,915 and 1,037,121.
- Great Britain: 1,446,741; 1,446,742 and 1,494,865.
- France: 2,205,671.
- Germany: 25 51 968.0-09; 23 55 630.
- Other United States and foreign patents pending.
WARRANTY

The Schonstedt Instrument Company warrants each instrument of its manufacture to be free from defects in material and workmanship. Our liability under this warranty is limited to servicing or adjusting any instrument returned to the factory for this purpose and to replace any defective part thereof. Electron tubes, batteries, lamps and fuses are specifically excluded under this warranty.

This warranty is effective for one year after delivery to the original purchaser. As a condition of the warranty, the instrument must be returned by the original purchaser, transportation charges prepaid, and prove to our satisfaction to be defective. If fault has been caused by misuse or abnormal conditions of operation, repairs will be billed at cost. Prior to repair in this instance, a cost estimate will be submitted.

Service or shipping information will be furnished upon notification of the difficulty encountered. Model and serial number must be supplied.