3-IN-1 STUD/VOLTAGE/METAL DETECTOR

USER'S MANUAL

MSV100

Please read this manual carefully and thoroughly before using this product.

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INTRODUCTION

The MSV100 exploits two electrical phenomena to 1) accurately locate wood studs and joists and metal behind walls or inside furniture and 2) detect energized AC outlets and “live” wires carrying AC voltage behind walls or ceilings.

The first phenomenon—the so-called fringing field effect—refers to the change in the capacitance of a material produced by its slight spreading of a local electric field. In the case of the MSV100 (and most pinless moisture meters), this field is generated by the instrument itself. When you power on the MSV100 (by pressing the **PUSH** button on its left side), two plates behind its rear panel are charged with opposite polarity and pulsed at a high frequency. This causes current to flow, creating a three-dimensional electromagnetic wave that extends about 2 in. (50mm) perpendicular to the instrument. When the back of the MSV100 is placed against a wall, ceiling or fabric, the increased

capacitance of that material (as well as any material behind it) distorts the wave's electric field to a measurable extent.

The distortion of the field is sensed by a coil in the MSV100. Induction—the second phenomenon—causes current to flow in the instrument in direct proportion to how much the wave is distorted. The MSV100 uses the relationship between current flow and the presence (or absence) of material within the instrument's local field to make two precise determinations. One is the thickness of the surface behind the back of the instrument when placed against it. This inferred measurement of thickness is used to adjust the sensitivity of the MSV100's induction circuit, in effect calibrating the detector to the test environment. Different baseline sensitivities are used for wood and metal.

Once you have calibrated the detector in this way, you continue holding the back of the instrument against the surface and continue pressing the **PUSH** button while slowly moving the detector to the left in an area where a stud, joist or metal rod may be. There will be an abrupt change in the level of induced current as you pass the edge of any hidden wood or metal. This is the second determination—the position of the right edge of a wood or metal object.

Repeat the procedure, but now moving to the right, and the MSV100 will again detect a change in induced current. However, this time the change will be at the left edge of the hidden wood or metal. By using a pencil and the MSV100's marker slot and "peak" central arrow to mark the left and right edges, you can precisely locate the center of any wood or metal stud or frame, wood joist, or metal pipe or conduit.

Using induction alone, the MSV100 can also identify "live" (energized) AC outlets and locate hidden "hot" wires and outlets. This is not only convenient, but essential to safety. On jobs ranging from installing a through-the-wall air-conditioner to renovating a house with new wiring and plumbing, it is vital to know the locations of existing electrical cables and wires and metal pipes carrying water or gas. Without access to the building's construction drawings, there is no way to be sure that an action as simple as driving a nail into a wall will not produce an electric shock—or far worse.

Regardless of which mode it is operating in, the MSV100 will display the familiar ⚠ icon whenever it detects AC voltage. It's critical to realize that AC voltages as weak as 50V can be hazardous to your health.

KEY FEATURES

- Detects wood joists/studs, live wires and pipes/cables behind walls or ceilings
- Also detects wood furniture frames
- Automatically compensates for wall thickness in all three detection modes
- In AC voltage mode, automatically compensates for distance to live wire
- Center arrow and beeper indicate edge of detected material
- Marking slot on top of unit
- Big, bright backlit LCD
- Powered by “9V” battery
- 1 year warranty

SAFETY INSTRUCTIONS

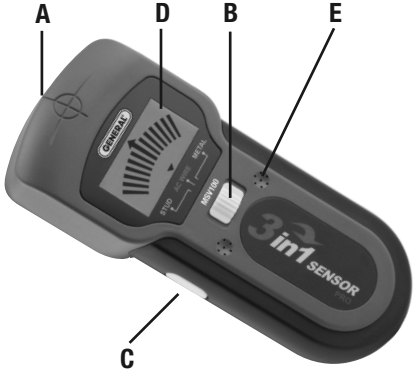
- Before using the instrument to detect wood and metal on the same side of a wall as a live AC wire, de-energize the appropriate circuit.
- Before penetrating a wall, ceiling or floor, detect whether there are wires or pipes behind it.

PRODUCT OVERVIEW

The two figures below show the MSV100’s controls, indicators and display icons. Familiarize yourself with their positions and functions before moving on to the Setup Instructions and Operating Instructions.

A. Marker slot. For inserting pencil to mark left and right edges of wood or metal structure. Mark is directly above central arrow indicating peak change in induced current.

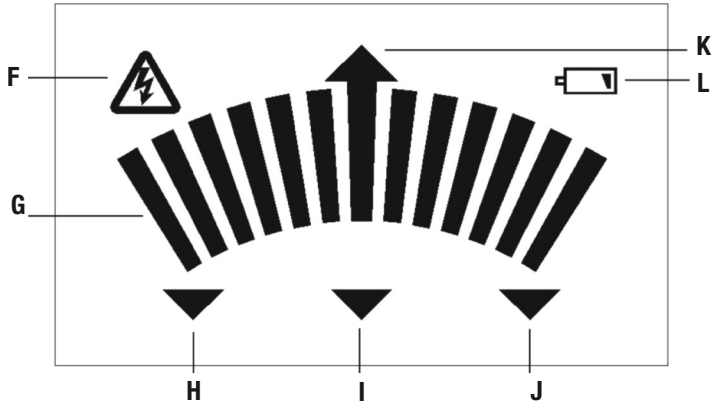
B. Mode switch. Optimizes sensitivity for detecting wood, AC voltage or metal. Switch positions are labeled **STUD, AC WIRE** and **METAL**.



C. PUSH button. Activates backlight and powers on instrument. When on, instrument generates local electromagnetic field and measures current induced by distortion of field by wood or metal. When released, **PUSH** button powers off instrument.

D. LCD. Indicates detection mode and strength of change in induced current.

E. Beeper holes. Enable beeper to be heard.



F. "Live" wire indicator

G. Indicator of a nearby object. The closer the object, the more bars will light, from the outside in.

H. Wood detection mode indicator

I. AC wire detection mode indicator

J. Metal detection mode indicator

K. Central arrow. When lit, indicates that detector is at edge of an object

L. Low battery indicator

SETUP INSTRUCTIONS

INSTALL BATTERY

To open the battery compartment, turn the MSV100 over and lift the tab on the bottom of the battery compartment cover. Remove the cover and set it aside. Then insert the included "9V" battery into the compartment, orienting the battery so its + and – terminals (anode and cathode) line up with the + and – markings in the compartment below the flanges. Don't forget to place the black fabric strap under the battery before you install it to make the battery easy to remove later.

OPERATING INSTRUCTIONS

DETECTING WOOD STUDS, JOISTS AND FRAMES

1. Slide the Mode switch on the front panel (Callout B on p. 4) to the **STUD** position. The Wood detection mode indicator arrow (Callout H on p. 5) will illuminate.
2. Hold the back of the MSV100 against an area of the wall, ceiling or upholstery behind which you would *not* expect to find a stud, joist or frame. What you are looking for is a section of the surface with nothing but air behind it.
3. Press and hold the **PUSH** button on the left side of the instrument with your right thumb while moving the MSV100 a few inches to the left and right, and then a few inches up and down.

   If the beeper sounds for several seconds and then stops, you have chosen an area with nothing but air behind it and successfully calibrated the instrument's sensitivity to the thickness of the wall, ceiling or fabric. DO NOT release the **PUSH** button yet.

   If the beeper fails to stop sounding as you move the instrument, there is something distorting the field behind the area that you have chosen. Release the **PUSH** button, choose another area, and repeat this step until you have successfully calibrated the MSV100 to the thickness of the surface.

4. Keeping the **PUSH** button pressed, hold the back of the MSV100 against the surface while moving the instrument slowly to the left at the same height. As you begin, the only icon on the green backlit LCD should be the black Wood detection mode indicator arrow (Callout H). When the instrument comes within 1.5 in. (38mm) of the right edge of a wood stud, joist or frame, black vertical bars will begin appearing on both the left and right sides of the display. The nearer you get to the wood object, the more bars will appear, from the outside in.
5. Continue to press and hold the **PUSH** button while moving the MSV100 slowly to the left until the central arrow (Callout K) lights up and the beeper sounds. The right edge of the wood stud, joist or frame is now directly behind or below the center of the instrument. Mark this position on the surface by placing the tip of a pencil in the marker slot on the top of the MSV100 (Callout A on p. 4). To verify that an edge has been detected, continue moving the instrument slowly to the left; the beeper should stop sounding and the black bars should disappear.
6. Without releasing the **PUSH** button, repeat Steps 4 and 5 above, but this time moving the MSV100 slowly to the right. When the instrument detects the left edge of the wood stud, joist or frame, mark that position on the surface with a pencil.
7. Draw a line between the marks representing the right and left edges. The center of the wood stud, joist or frame is directly behind or below the center of this line.

Notes:

- If you accidentally release the **PUSH** button during any step, you must repeat the entire procedure, beginning with the calibration steps.
- For the calibration steps (#2 and #3), do not choose an area whose surface is wet or freshly painted.
- If the “Live wire” indicator appears during any step, mark the position of the MSV100 on the surface for later reference.

DETECTING METAL STUDS, PIPES AND FRAMES

1. Slide the Mode switch on the front panel (Callout B on p. 4) to the **METAL** position. The Metal detection mode indicator arrow (Callout J on p. 5) will illuminate.
2. Repeat Steps 2 through 7 on pages 6 and 7. As with wood, you will calibrate the MSV100 for surface thickness, mark the right and left edges of detected metal, and locate the center of a hidden metal stud, pipe or frame.
3. Read the three Notes below the procedure for detecting wood. They apply to detecting metal as well.

DETECTING AC VOLTAGE

1. Slide the Mode switch on the front panel (Callout B on p. 4) to the **AC WIRE** position. The AC wire detection mode indicator arrow (Callout I) will illuminate.
2. Repeat Steps 2 through 5 in the "Detecting Wood Studs, Joists and Frames" section on pages 6 and 7. As with wood and metal, you will first calibrate the sensitivity of the MSV100's induction circuit to the thickness of the surface. The difference in AC voltage detection mode is that the detector's calibration also takes into account the distance to the live wire from the back of the wall or ceiling.

   It is not necessary to perform Steps 6 and 7 of the wood/metal detection procedure because pinpointing the right edge of a thin voltage-bearing wire or cable is sufficient to locate it.
3. Read the first two Notes below the procedure for detecting wood. They apply to detecting voltage as well.

OPERATING & MAINTENANCE TIPS

- The MSV100 requires a fully charged battery to function accurately. When the battery becomes low on charge, the  display icon will appear and begin to blink continuously. To replace the battery, follow the instructions on p. 6.
- To avoid affecting the operation of the MSV100, do not hold its upper half in your hand. Hold the lower half of the instrument with one hand and keep your other hand at least 6 inches away.
- The MSV100 will not detect DC circuits (doorbell and twisted-pair telephone lines, for example) as live wires. It also cannot detect live AC wires inside metal pipes or conduit.
- Walls covered with metallic wallpaper and drywall with aluminum foil backing will prevent the MSV100 from detecting wood, metal or AC voltage.
- Do not use the MSV100 near a strong electromagnetic field or in the presence of high-frequency radiation.
- Remove the battery whenever you do not expect to use the MSV100 for an extended period of time (months).
- Do not immerse or get water on the instrument. To clean its housing, use a soft cloth.

SPECIFICATIONS

Maximum Wall Thickness for Wood Detection: 3/4 in. (19mm)
Maximum Detection Range for Iron or Copper Pipe: 1.5 in. (38mm)
Maximum Detection Range for AC Voltage: 2 in. (50mm)
Operating Temperature: 40° to 104°F (5° to 40°C)
Dimensions: 7.1 x 3.0 x 1.2 in. (180 x 75 x 30mm)
Weight: 7.3 oz. (207g)
Power Source: (1) “9V” Alkaline battery
Battery Life: 1 year normal use

WARRANTY INFORMATION

General Tools & Instruments' (General's) MSV100 3-in-1 Stud/Voltage/Metal Detector is warranted to the original purchaser to be free from defects in material and workmanship for a period of one year. Subject to certain restrictions, General will repair or replace this instrument if, after examination, the company determines it to be defective in material or workmanship.

This warranty does not apply to damages that General determines to be from an attempted repair by non-authorized personnel or misuse, alterations, normal wear and tear, or accidental damage. The defective unit must be returned to General Tools & Instruments or to a General-authorized service center, freight prepaid and insured.

Acceptance of the exclusive repair and replacement remedies described herein is a condition of the contract for purchase of this product. In no event shall General be liable for any incidental, special, consequential or punitive damages, or for any cost, attorneys' fees, expenses, or losses alleged to be a consequence of any damage due to failure of, or defect in any product including, but not limited to, any claims for loss of profits.

RETURN FOR REPAIR POLICY

Every effort has been made to provide you with a reliable product of superior quality. However, in the event your instrument requires repair, please contact our Customer Service to obtain an RGA (Return Goods Authorization) number before forwarding the unit via prepaid freight to the attention of our Service Center at this address:

Remember to include a copy of your proof of purchase, your return address, and your phone number and/or e-mail address.

NOTES

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