

# MPP1000

Pin Point Locator  
User Manual

**Megger.**

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**MPP1000**  
Pin Point Locator  
User Manual

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The information presented in this manual is believed to be adequate for the intended use of the product. If the product or its individual instruments are used for purposes other than those specified herein, confirmation of their validity and suitability must be obtained from Megger. Refer to the warranty information below. Specifications are subject to change without notice.

## WARRANTY

Products supplied by Megger are warranted against defects in material and workmanship for a period of one year following shipment. Our liability is specifically limited to replacing or repairing, at our option, defective equipment. Equipment returned to the factory for repair must be shipped prepaid and insured. Contact your MEGGER representative for instructions and a return authorization (RA) number. Please indicate all pertinent information, including problem symptoms. Also specify the serial number and the catalog number of the unit. This warranty does not include batteries, lamps or other expendable items, where the original manufacturer's warranty shall apply. We make no other warranty. The warranty is void in the event of abuse (failure to follow recommended operating procedures) or failure by the customer to perform specific maintenance as indicated in this manual.

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# 1

## Introduction

Thank you for purchasing the MPP1000 KIT from Megger. This unit will allow you to pin-point the location of flashing faults on underground primary cables. When used with geophones, the MPP1000 amplifies the acoustic emission produced by a surge generator (thumper) allowing you to hear the actual flash over, as well as show the time delay between the magnetic pulse (thumper's pulse) and the acoustic event. This time delay can be displayed in terms of time (milliseconds) or as a relative distance (feet or meters). Direction to the fault can also be determined and displayed by using two geophones. The dual geophone operation will also provide indication when the operator is directly over the fault. This manual will list the specifications as well as the instructions on how to use the Megger MPP1000 Pin Point Locator.

If you find any discrepancies in the MPP1000 or have any comments please send them to Megger via fax, e-mail or phone.

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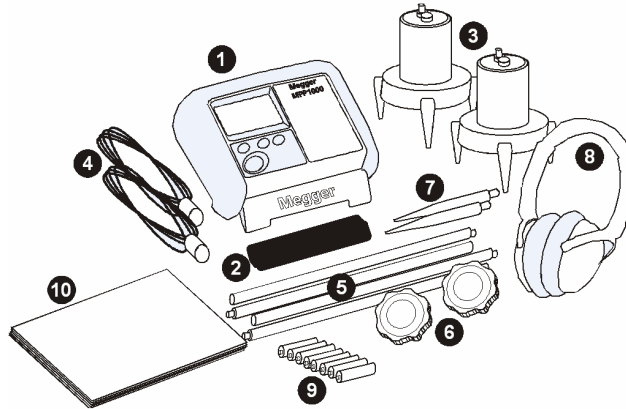
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## Receiving Information

Contents of MPP1000 Kit:



Ref. No.	Qty	Part No.	Description
1	1	MPP1000	MPP1000 Unit
2	1	6220-780	Carrying Strap
3	0, 1-2	36161	Geophones (1 or 2 units pending if single or dual were ordered)
4	0, 1-2	36063	Geophone Cables (1 or 2 units pending if single or dual were ordered)
5	0, 2-4	36172	Geophone Rods (2 or 4 units pending if single or dual were ordered)
6	0, 1-2	33153-2	Geophone Knob (1 or 2 units pending if single or dual were ordered)
7	0, 1-2	36063	Geophone Spikes (1 or 2 units pending if single or dual were ordered)
8	0, 1	36162	Headphones
9	8	23415	AA Batteries
10	1	AVTMMPP	Manual

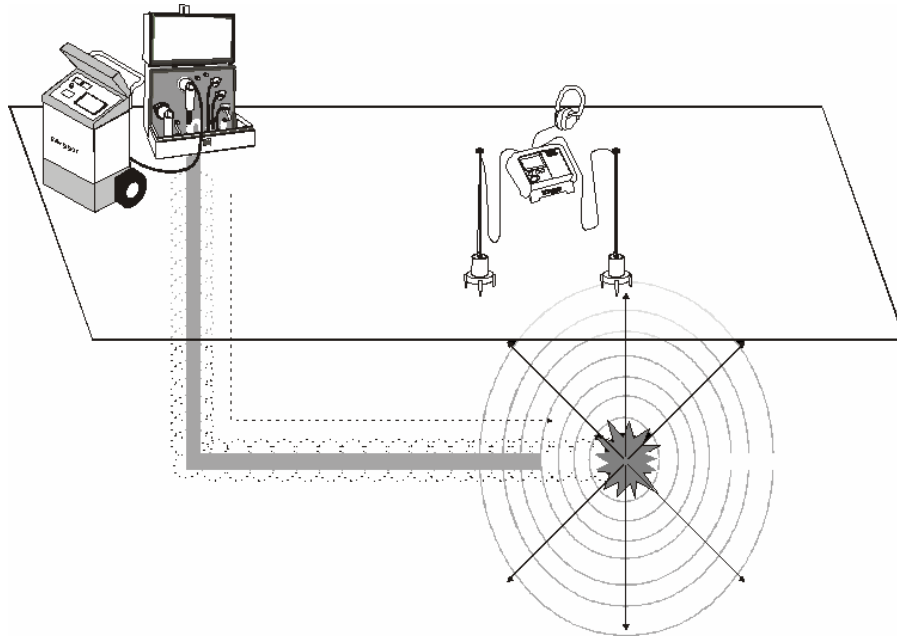
When your Megger MPP1000 Kit arrives, check the equipment received against the packaging list to ensure that all materials are present. Notify Megger of any shortages.

Examine the contents for damage received during transit. If any damage is discovered, file a claim with the carrier at once and notify Megger or its nearest authorized sales representative, giving a detailed description of the damage.

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## Overview

Specifically designed for service, industrial and power utility companies the Megger MPP1000 pinpoints faults in shielded and direct buried primary cables via a single or dual probe. The unit can successfully detect both the electromagnetic and acoustic pulses emitted from an arcing fault when it is surged. It can also be used with any Megger PFL Power Cable Fault Locating system/surge generator or other supplier.



The MPP1000 without any acoustic geophone provides

- Detection of the presence of the electromagnetic pulse
- Measures the amplitude of that pulse for a rough location.

The single probe version provides:

- Detection of the acoustic "thump"
- Measurement of time delay between acoustic and electromagnetic signals
- Relative distance calculation

The dual probe version provides:

- Detection of the acoustic "thump"
- Measurement of time delay between acoustic and electromagnetic signals
- Direction and approximate distance to the fault

The instrument's receiver is contained in a lightweight, compact housing that can easily be carried by a "hands free" adjustable strap around the neck. A convenient hook on the knurled poles also allows for safe cable holding. The detector's durable weatherproof enclosure allows for operation in all weather conditions.


A pushbutton controls the volume of the sound in the headphones and can be adjusted for operator comfort. A single mute button is provided to turn off the sound from the detectors.

## ***Applications***

The MPP1000 pinpoints faults while the cable is being surged by a surge generator, or "thumper." An arc occurs when the high energy surge delivered from the surge generator breaks the cable fault down and a loud acoustic emission is created. Since buried power cables are typically beneath 3 ft (0.9 m) or more of earth or pavement, this acoustic emission can go undetected without the aid of an acoustic amplification device. In many situations, simple acoustic amplification is not enough. Because acoustic emission from an arcing fault occurs at a single point along the cable path, information such as distance and direction to the fault becomes critical for fast, efficient pinpointing. Without this information, the acoustic emission can mislead when pinpointing the fault.

If the cable fault is in a duct or conduit, the loudest acoustic emission will be detected either at the conduit end or the conduit's actual breaking location. When pinpointing over paving, the loudest sound may be at a crack or seam. Because tree roots tend to carry the sound in all directions, the MPP1000 becomes especially useful. Fast, accurate pinpointing also means less use of the surge generator and thus less stress on service aged cables.

The receiver's display shows the operator the acoustic signal strength and the time delay between the electromagnetic surge and acoustic event. As the detector is placed closer to the fault, the acoustic signal strength increases while the time difference between surge and acoustic emission decreases. When directly over the fault, the time difference is at a minimum and the acoustic level is at a maximum. The same procedure can be used when placing the detector at a right angle to the cable path. Faults can be located more quickly by using a second detector. When using two detectors, the receiver's display will show a direction

arrow; that points to the detector closest to the fault. When the unit is directly over the fault,  will appear.

The receiver's display also provides level of the electromagnetic surge, a measurement of the volume of the acoustic emission, and the time difference between the two events.

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## Technical Specifications

Operating Modes:	Electromagnetic Pulse Pickup
	Single Acoustic Pickup
	Dual Acoustic Pickups
Range:	0 – 99.9 mS, 0.1 mS resolution
Inputs:	Two for left and right pickups
Output:	Stereo Headphones
Electromagnetic Gain:	Automatic when button depressed to mid scale of bar graph
Acoustic Pickup:	Geophone, 660 Ohm, 40 Hz, 1.22V/in/sec +/- 10%
Acoustic Pass Bands:	125 – 1000 Hz / 500 – 1000 Hz
Display:	LCD with switch able backlight
Battery Life:	= 65 hours with alkaline batteries, continuous use = 85 hours with lithium batteries, continuous use > 200 hours, intermittent, less with backlight enabled
Isolation:	Electrical isolation between handle and pickup
Power:	8, AA alkaline cells
Enclosure:	IP54, Weather Resistant
Ambient Noise Cancellation:	Built into headphones provided.
Operating Temperature:	14° – 122° F
Storage Temperature:	-40° – 158° F
Humidity:	up to 95%, non-condensing
Meets CE requirements:	EN50081-1, EN50081-2 and EN50082-1.
Meets IEC Requirements IEC61010	


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## Safety

### **Warnings and Safety Precautions**

	<p style="text-align: center;"><b>WARNING!</b></p> <p><b>Death, serious injury, or fire hazard could result from improper use/installation of this instrument. Read and understand this manual before installing this instrument.</b></p>
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Installation of this instrument **MUST** be performed in compliance with the National Electric Code and any additional safety requirements applicable to your installation.

Installation, operation and maintenance of this instrument **MUST** be performed by qualified personnel only. The National Electrical Code defines a qualified person as one familiar with the construction and operation of the equipment and the hazards involved.

### **Safety Precautions**

The following safety precautions **MUST** be taken whenever the MPP1000 will be operated.

Power line must be disconnected from source.

Wear insulated boots or rubber overshoes and insulated gloves when making circuit connections.

These warnings and safety precautions are to be used where appropriate when following instructions in this manual.

<i>Notice:</i>	<i>The equipment could be impaired from improper use. Read the complete manual before use.</i>
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## MPP1000 Operation

The following section describes the operation of the MPP1000. This section will describe in a step by step manner how to interconnect the MPP1000 with its accessories, as well as how to operate the unit in order to locate faults in wires.

### ***Battery Installation***

The MPP1000 Plus unit requires 8 AA batteries. If the temperature the units will operate in is from 0C to +50C then Energizer E2 AA batteries are recommended. For temperatures outside this range, Lithium AA batteries are recommended.

1. Remove the battery cover, by removing screw on battery compartment lid. (As shown below, item1)



2. Insert 8 AA batteries. (As shown below) Then re-install the battery cover.



3. Re-install battery cover.

## ***Connectors and Accessories***

The MPP1000 unit has several input and output connectors as well as various accessories. This section of the manual will outline the function of the various

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inputs / output connectors on the MPP1000 as well as outline the functionality of the various accessories.

## Input / Output Connectors

1. The geophone input connectors: This is where the cables from the geophones plug in.



2. The headphone output jack: This is where the headphones plug into the unit.



3. The Geophone output connector: This is where the geophone cables plug into the geophone.



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**MPP1000 Accessories Include:**

- Geophone: Detects acoustic “thump”
- Geophone Rod: Screws into geophone
- Geophone knob: Screws into rod
- Geophone Spike: Screws into bottom of geophone. Spikes are used to penetrate frozen ground. This helps improve signal strength to geophone.
- Geophone cable: Connects geophone to MPP1000 unit.
- Headphones: Plugs into MPP1000. Allows the user to hear acoustic “thump”
- Strap: Connects to unit. Allows the user to carry the MPP1000 around their neck.
- Batteries: AA Alkaline Batteries (8 cells are needed to power unit)
- Carrying Case: For MPP1000 and all accessories.



## *Interconnect*

This section of the manual will describe how to interconnect the various accessories with the MPP-1000 unit.

### **Assembling the Geophone**

Locate the bottom rods and the top rods. The top rods have clips on them, while the bottom rods do not.

1. Screw the bottom rod into a geophone.
2. Screw the top rod into the bottom rod.
3. Screw the knob into the top rod.
4. Screw the spike into the bottom of the geophone. (Optional)
5. Repeat this process with the second geophone. (If two are being used)





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### Interconnecting the unit.

1. Verify the strap is on the MPP1000
2. Plug the geophone cables into the geophones.
3. Plug the geophones into the geophone input connectors on the MPP1000.  
The geophone on the right plugs into connector No. 1 and the geophone on the left plugs into connector No. 2.
4. Slide the geophone cables in to the clips on the top rod. (This will keep them clear of your feet when you are walking with the unit)
5. Plug the Headphones into the headphone jack on the MPP1000.



## Keypad and Display Functions

The following section will describe the keypad and display functionality as well as the various options the MPP1000 offers.

### Display



**Magnetic Pulse Strength:** This arrow will move left or right on the scale to indicate the strength of the magnetic pulse. When the START TEST button is depressed (see keypad) the arrow will null out to center scale. This indicates the ambient magnetic field. All measurements are relative to this point.

**Filter:** This symbol indicates whether the acoustic noise filter is active. A closed switch indicates the noise filter is active. An open switch indicates the noise filter is disabled.

**Battery:** This indicates the battery strength remaining. The stronger the batteries the more bars will be displayed.

**Pulse Detector:** This symbol indicates when a magnetic pulse has been detected. Whenever this symbol illuminates then a magnetic pulse has been detected.

**Time Delay:** This indicates the time delay in milliseconds between the magnetic pulse and the acoustic pulse. This can also be programmed to display acoustic amplitude or approximate distance the fault.

**Directional Arrows (Left / Right):** These arrows indicate whether the fault is to the left or the right of the user (*only when using geophones*).

**Directional Arrow (Down):** This will illuminate when the user is over the fault (*only when using geophones*).

## Keypad



**Power ON / OFF:** This button turns the MPP1000 ON and OFF.  
(The unit will automatically turn off after 1 hour).

**Start Test:** This button nulls out the ambient magnetic field. This button should be depressed prior to every test. It can also be depressed anytime during a test to null out the ambient magnetic field.

**Filter IN / OUT:** This button will enable or disable the MPP1000 noise filtering. If there is ambient noise in the area such as traffic noise then enabling the filters will greatly reduce the stray noise.

**Backlight ON / OFF:** This button will turn the backlight of the display ON and OFF for ease of viewing.

**Volume UP:** This button will raise the volume going to the headphones.

**Volume Down:** This button will lower the volume going to the headphones.

**MUTE:** This button will MUTE the sound going to the headphones.

**Display:** This key shall toggle the display between time delay (between magnetic pulse and acoustic thump) and the acoustic amplitude.

## Special Function

**Displaying Distance:** Depressing the <ms/a> button repeatedly will toggle the display through time, amplitude and distance in meters to the fault.

## *Locating the Fault*

Introduction – The MPP1000 allows for 3 modes of operation, the Magnetic Only, the Single Probe mode and the Dual Probe mode.

### **Magnetic Only Mode**

In the Magnetic Only Mode the unit displays the strength of the magnetic field created from the applied surge. The measurement is shown on the scale relative to the ambient magnetic noise. In this mode no geophones are required, only the MPP1000 itself is needed.

Directions

1. Place MPP1000 around neck.
2. Press Power ON button. Display should illuminate.
3. Stand over cable
4. Depress the start button.
5. Apply surge to wire under test.
6. The arrow on the scale should go to the center point. This is the relative zero point of the ambient magnetic field.
7. Apply surge to wire under test.
8. The magnetic pulse detector should now flash on the display to verify the unit measured the pulse.
9. The arrow on the scale should indicate the strength of the magnetic pulse relative to the ambient magnetic field.
10. Repeat surging the wire. As you get closer to the fault the magnetic strength indication will get greater.

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## Probe Mode

In the Single Probe Mode the unit will display the strength of the magnetic field created from the applied surge as well as the time delay between the magnetic pulse and the acoustic thump.

The MPP1000 can also be configured to display the strength of the magnetic field created from the applied surge or the approximate distance to the fault.

The MPP1000 can also be configured to be used as an acoustic detector, locating the fault by displaying the acoustic amplitude of the thump

### Directions:

1. Assemble the Geophone (See Section 6.3)
2. Connect Geophone and headphones to unit (See Section 6.3)
3. Place MPP1000 around neck.
4. Press Power ON button. Display should illuminate.
5. Place pick-up on ground over cable.
6. Depress the start button.
7. Apply surge to wire under test.
8. The arrow on the scale should go to the center point. This is the relative zero point of the ambient magnetic field.
9. Apply surge to wire under test.
10. The magnetic pulse detector should now flash on the display to verify the unit measured the pulse.
11. The arrow on the scale should indicate the strength of the magnetic pulse relative to the ambient magnetic field.
12. The unit will now display the time delay in milliseconds between the magnetic pulse and the acoustic thump.
13. Repeat surging the wire. As you get closer to the fault the time delay between the magnetic pulse and the acoustic thump shall approach zero.

## Dual Probe Mode

In the Dual Probe Mode the unit will display the strength of the magnetic field created from the applied surge as well as the time delay between the magnetic pulse and the acoustic thump and in this mode the unit will also display the direction to the fault as well as indicate when you are over the fault.

The MPP1000 can also be configured to display the approximate distance to the fault in this mode as well as in single probe mode.

### Directions:

1. Assemble the Geophones (See Section 6.3)
2. Connect Geophones and headphones to unit (See Section 6.3)
3. Place MPP1000 around neck.
4. Press Power ON button. Display should illuminate.
5. Place both pick-ups on ground over cable.
6. Depress the start button.
7. Apply surge to wire under test.
8. The arrow on the scale should go to the center point. This is the relative zero point of the ambient magnetic field.
9. Apply surge to wire under test.
10. The magnetic pulse detector should now flash on the display to verify the unit measured the pulse.
11. The arrow on the scale should indicate the strength of the magnetic pulse relative to the ambient magnetic field.
12. The unit will now display the time delay in milliseconds between the magnetic pulse and the acoustic thump.
13. A left / right arrow will also illuminate indicating the direction to the fault.



14. Repeat surging the wire. As you get closer to the fault the time delay between the magnetic pulse and the acoustic thump shall approach zero. When you are directly over the fault a down arrow will illuminate.



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## Special Functions

### Viewing distance to fault:

To display the approximate distance in meters depress the <ms/a> button. The display will toggle through time, distance and amplitude. Please note that the distance is only approximate, it shall vary depending on soil density, composition and moisture.

### Viewing acoustic amplitude

To View the acoustic amplitude just depress the display button.



This will toggle the display between milliseconds (the time delay between the magnetic pulse and the acoustic thump) and the amplitude of the acoustic pulse.

As you get closer to the fault the amplitude will increase. The acoustic amplitude will be maximum over the fault.

### Muting Headphones

To mute the headphone simply depress the MUTE button.



This will toggle the headphones ON and OFF.

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## Spare Parts

This section of the manual lists the parts numbers for all the accessories for the MPP1000. All parts and accessories except the AA and AAA batteries need to be purchased through Megger.



Description	Part Number
Pin-Pointer Kit with Single Probe	MPP1001
Pin-Pointer Kit with Dual Probe	MPP1002
Pin-Pointer	MPP1000
Strap for Unit	6220-780
Geophone Assembly with rods, knob, spike & cable	36161
Rods with wire clips	36172

<b>Description</b>	<b>Part Number</b>
Knobs	33153-2
Wire Clips for Geophone rods	36176
Geophone Cable	36063
Geophone Spike	34302
Headphones	36162
AA Batteries	23415
AAA Batteries for Headphones	36171
Unit Carrying Case	36120
MPP1000 Manual	AVTMMPP

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## Troubleshooting

This section of the manual shall describe some potential problems and there causes and fixes, users can experience while tracing cable faults.

<b>Description</b>	<b>Cause</b>	<b>Correction</b>
Unit will not turn on.	Dead Batteries	Replace AA Batteries in MPP1000
No Sound from Headphones	MUTE button ON	Depress MUTE button on MPP1000
	AAA Batteries dead	Replace AAA batteries in headphones
Arrows not illuminating	Only one probe in use	Must use two probes to view direction arrows
	Faulty Geophone Cable	Replace Geophone Cable
No Reading on Display	Low Battery	Replace AA Batteries in MPP1000
	Faulty Geophone	Replace Geophone
	Faulty Geophone Cable	Replace Cable
	Frozen Ground	Use Spike on Bottom of Geophone
Inconsistent Acoustic Reading	Frozen Ground	Use Spike on Bottom of Geophone

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