

# Electromagnetic Impulse Detector



- **Indicates direction of fault**
- **Works under all weather conditions**
- **Survives rough handling and transport**
- **Long-lasting 9-volt battery**
- **Converts to voltage gradient tester with optional earth frame**

---

## DESCRIPTION

The Electromagnetic Impulse Detector is composed of an amplifier module, a sheath coil and a carrying case. An optional earth frame and surface coil are available. The amplifier, sheath coil and surface coil fit into the carrying case.

### Sheath Coil

This coupler is placed directly on the surface of the cable under test to sense the magnitude and direction of the net electromagnetic field produced by the impulse current from an impulse generator.

### Amplifier Module

This module accepts output signals from either the sheath coil described above or either of the two optional sensors (surface coil and earth frame). It amplifies signals with a unique "stretching circuit." A zero-center meter receives the amplifier output and indicates both magnitude and, more importantly, the direction of the fault. The gain of the amplifier (0 to 10,000) is controlled by a continuously variable control knob located on the right side panel.

The three-position mode switch, located on the front panel, has selectable positions of IMPULSE AND TRACE for fault locating and cable route tracing. The LOW-HIGH EARTH VOLTAGE settings are used to locate cable faults using the earth gradient method. A BATTERY TEST switch also appears on the front panel.

### Optional Surface Coil

The surface coil is a cable route tracer accessory that uses the amplifier module for its readout. Its antenna detects the electromagnetic field produced by the impulse current

or the burn current in the cable under test. The output from the antenna is amplified and displayed on the zero-center meter. Its swivel head can be adjusted to three positions relative to the ground surface.

For PEAK sensing, the antenna is placed parallel to the earth's surface so that a maximum reading is obtained when the antenna is directly over the cable being traced. For NULL sensing, the antenna is pointed straight down so that it is perpendicular to the earth. Thus, a zero reading is obtained when it is directly over the cable being traced. For determining depth of the cable, the antenna is adjusted to the 45° position.

### Optional Earth Frame

This is an earth gradient tester accessory that uses the above amplifier module for its readout. When impulse current or burn current leaking through the fault bypasses the shield or concentric neutral, the earth frame detects the direction and magnitude of the resulting voltage gradient in the earth. This valuable information is displayed on the meter.

## APPLICATIONS

### General

The electromagnetic detector system is used primarily to localize faults on cable buried in conduit. It may also be used to localize faults on non-buried and direct-buried cable.

When used with the optional surface coil, it is also possible to trace cable. When used with the optional earth frame, it is possible to pinpoint faults on direct-buried cable.

**Sheath Coil**

For localizing faults on cable in conduit, a thumper must first be connected to the cable to provide impulse current surges. These surges produce momentary electromagnetic fields around the outside of the cable that may be detected by a sensitive coupler known as a sheath coil.

The sheath coil is directional sensitive. It is marked with a large arrow which is always pointed toward the impulse generator. Its output is amplified and stretched by the amplifier unit and displayed on a zero-center meter. The user can readily see the direction in which the fault is located.

These measurements with the sheath coil are made at access points such as manholes, cabinets and pull boxes.

Comprehensive applications assistance is available from Megger, and is recommended for best results on complex conduit circuits.

**Optional Surface Coil**

For tracing direct-buried cable, a thumper must first be connected to the cable to provide either an impulse current or a burn current. The electromagnetic field generated can then be detected by the surface coil, either in its peak or null mode, for cable route tracing. The amplifier unit is used for readout of magnitude of the peak or null values.

**Optional Earth Frame**

For pinpointing faults on direct-buried cable, a thumper must first be connected to the cable to provide impulse current. When this impulse current leaks through the fault in the cable under test, some or all of it passes through the adjacent earth on its way back to the impulse generator.

This returning current generates a voltage gradient along the earth's surface which can be detected by a sensitive voltmeter. The voltage detected near the fault is much stronger than at points farther away. Also, because the impulse current is in one direction only, it can readily determine whether the operator is ahead of or beyond the fault.

Because of irregularities in the earth, the magnitude of the voltage detected along the route of the cable is sometimes deceptive. Consequently, it is advisable to look for the sharp reversal that occurs when the fault is passed.

The earth frame provides a convenient means for contacting the earth's surface at two in-line points along the route of the cable, evenly spaced. Magnitude and polarity are read on the amplifier unit. The low range is used for strong signals and the high range is used for weaker signals, providing all the flexibility usually required.

The earth frame may also be used to detect a 60-Hertz signal through the cable under test, but only magnitude is detected to guide the operator to the fault.

**FEATURES AND BENEFITS**

- Exclusive output level meter with zero center shows both magnitude and polarity of impulse current.
- Wide-range calibrated gain control adjusts to any application.
- Compact, rugged, and weather resistant.
- Optional surface coil for tracing route of underground cable from the impulse or burn signal

**SPECIFICATIONS**

**Dimensions:** 14 H x 19 W x 8.75 D in.  
(36 H x 49 W x 23 D cm)  
**Weight:** 11.5 lb (5.2 kg)

**Optional Surface Coil**

**Weight:** 1.5 lb (0.7 kg)

**Optional Earth Frame**

**Weight:** 6 lb (2.7 kg)

**ADDITIONAL EQUIPMENT FOR CABLE FAULT LOCATING**

**Acoustic/Electromagnetic Surge Detector**

The SD-3000 has been designed to pinpoint faults in shielded, direct buried cables by detecting both the electromagnetic and acoustic pulses emitted from an arcing fault when it is surged. Either single or dual detector configurations are available. As a single detector, the set provides detection of acoustic emission, measurement of time delay between acoustic and electromagnetic signals, and distance to the fault. If a second detector is added, the set will also display the direction to the fault.

The SD-3000 can be used with Megger PFL Systems or with surge generators of other manufacturers.



**ORDERING INFORMATION**

Item (Qty)	Cat. No.
Electromagnetic Impulse Detector	651113

**Included Accessories**

Amplifier [1]
Sheath coil pickup with 6-ft (1.8-m) cord [1]
Hard plastic, foam fitted carrying case [1]

**Optional Accessories**

Surface coil with 6-ft (1.8-m) cord - fits carrying case	651112
Earth frame with 6-ft (1.8-m) cord	651115

**UK**  
Archcliffe Road Dover  
CT17 9EN England  
T +44 (0) 1304 502101  
F +44 (0) 1304 207342

**UNITED STATES**  
4271 Bronze Way  
Dallas TX75237-1088 USA  
T 800 723 2861 (USA only)  
T +1 214 330 3203  
F +1 214 337 3038

**OTHER TECHNICAL SALES OFFICES**  
Valley Forge USA, Toronto CANADA,  
Mumbai INDIA, Trappes FRANCE,  
Sydney AUSTRALIA, Madrid SPAIN  
and the Kingdom of BAHRAIN.

Registered to ISO 9001:2000 Reg no. Q 09290  
Registered to ISO 14001 Reg no. EMS 61597

**ELEC\_IMP\_DETECTOR\_DS\_en\_V10**

[www.megger.com](http://www.megger.com)  
Megger is a registered trademark