

USER GUIDE OFF-PREMISE MULTI-PROTECTOR

Usage and Features

The Cambridge Electronics Laboratories Off-Premise Multi-Protector is designed to enhance the survivability of a telecom device connected to a single copper pair which may be exposed to a.c. induction, lightning or power cross, typically an off-premise extension from a PBX, Key System or Automatic Ringdown Unit. Effective protection requires a properly installed ground and even so 100% survivability is not assured due to the power levels involved in e.g. a direct lightning strike. However the Off-Premise Multi-Protector will greatly enhance the reliability of telecom devices connected to exposed lines.

The Off-Premise Multi-Protector enhances survivability by utilizing three component types.

- Gas tubes to divert majority of energy to ground; these highly reliable devices will survive a lightning strike but allow a remnant of the potentially damaging energy to pass by.
- Varistors to absorb the entire remnant energy and/or divert to ground. Unless themselves protected these devices may fail.
- Thermistors to protect the varistors.

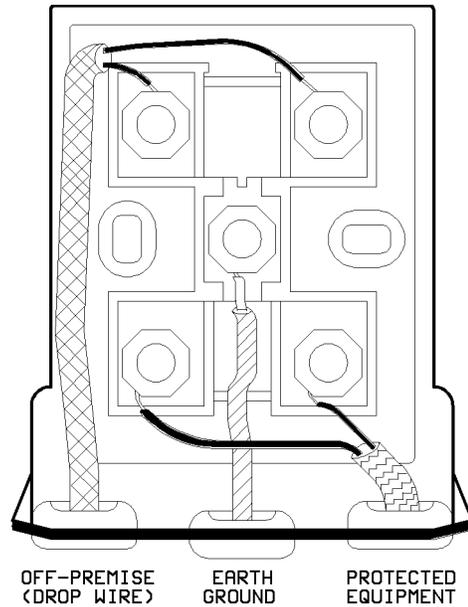
Used together these three types of components protect both each other and a connected telecom device.

Mechanical Installation

Locate the Protector either inside or outside convenient to the off-premise line and locally-connected device. The principal consideration is access to a proper ground.

Remove the Protector's cover by holding the base firmly and sliding the cover upward.

Remove and set aside the five nut/washer sets holding the printed circuit board. Mount the protector with the two furnished wood screws by driving them through the plastic at the rear of the respective mounting cavities. Replace printed circuit board, washers and nuts but do not yet tighten the nuts.



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Electrical Connections: Ground

Using 14 gauge or larger wire dressed through the center rubber grommet, connect the center binding post to a proper earth ground. Strip 5/8 inch of the ground conductor's insulation and then wrap the bare conductor clockwise around the center binding post between the two washers. Use of long-nose pliers will facilitate this operation. Tighten the nut.

A ground resistance of 25 ohms will provide minimally effective protection, but the ground should ideally have a resistance of five ohms or less. It is essential that the ground lead be run straight to its earth bonding point (solid metal water pipe, driven ground rod), without sharp bends and at least 18 inches distant from any iron objects such as gutters, pipes or conduits. Sharp bends and nearby iron objects will substantially increase the inductance of the ground conductor interfering with its ability to conduct a fast-rising wavefront safely to ground.

If the connected device is also electrically grounded, ensure that its ground is directly connected via a 14 gauge wire to the center post of the Protector. This will prevent possibly dangerous potential differences which could arise should the Protector and the connected device be grounded at physically separate points.

Refer to the Reference section below for further information on grounding techniques and standards.

Electrical Connections: Signal

Dress the pair coming from the exposed off-premise area (normally hard-copper drop wire) through the left-most rubber grommet, strip about 1-1/2 inches of the the outer insulation, strip 5/8 inch of the inner insulation, and then wrap the bare (if necessary burnished) copper conductors clockwise around the upper binding posts between the two washers. Use of long-nose pliers will facilitate this operation. Tighten the nuts.

Dress the pair coming from the protected device (normally soft-copper inside wire) through the right-most rubber grommet, strip about 1-1/2 inches of the the outer insulation, strip 5/8 inch of the inner insulation, and then wrap the bare (if necessary burnished) copper conductors clockwise around the lower binding posts between the two washers. Use of long-nose pliers will facilitate this operation. Tighten the nuts.

Miscellaneous

The protective varistors are semiconductors which may result in radio frequency interference (RFI) in the presence of a powerful transmitter. Should RFI be experienced, employ an RFI filter; depending on the circuit configuration and characteristics of the impinging signal the filter may have to be connected either before or after the Protector or even both before and after. For further details and suggested vendors, refer to the FCC URL in the References section below.

Off-premise lines from electrical substations or other areas of possible ground potential rise require special treatment; refer to the References section below.

Noise on lengthy off-premise lines requires careful investigation and treatment; refer to the References section below.

References

Charles E. Durst, "Noise Reduction", **Lee's abc of the Telephone**, Geneva, Illinois.

"Electrical Protection Grounding", **Bell System Practices**, 876-101-130.

Federal Communications Commission <<http://www.fcc.gov/cib/Publications/phone.html>>

Russ Gundrum, "Power Line Interference: Problems and Solutions", **Lee's abc of the Telephone**, Geneva, Illinois.

Roland E. Palmquist, "Ground Testing and Its Importance", **I.A.E.I. News**, available from James G. Biddle Company.

Gilbert Sharick, "Grounding and Bonding", **Lee's abc of the Telephone**, Geneva, Illinois.

Warranty

Manufacturer warrants its products to be free of failure for a period of one year from date of shipment. Any unit returned within this one-year period will be repaired or replaced free of charge unless Manufacturer determines that the failure occurred due to improper installation, physical damage, or operation outside of specified limits. This warranty is in lieu of all other warranties implied or expressed. Manufacturer shall not be liable for operation delays or consequent damages of any type.

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