

**Installation Instructions for Single  
Phase, 120 or 240 volt, 3 wire  
(phase, neutral, and ground)**

**WARNING - HAZARDOUS VOLTAGES ARE PRESENT.** Improper installation may result in serious injury to the installer and/or damage to the electrical system or related equipment. Read all instructions before beginning the installation. Safety equipment must be used as prescribed by OSHA, whenever working around hazardous voltages.

**Failure of unit and/or consequential equipment damage due to improper installation or misapplication is not covered by the product warranty.**

Voltage measurements and **installation must be completed by a licensed/qualified electrician** in accordance with the National Electric Code, State, and Local codes. The National Electric Code, State and Local Code requirements supersede this instruction.

**POWER MUST BE REMOVED FROM THE ELECTRICAL SYSTEM BEFORE INSTALLING THE UNIT.**

**INSTALLATION MATERIALS REQUIRED**

The following is a list of materials that may be needed for proper installation of this surge suppression device. This list is intended to help the installer anticipate materials needed for a successful installation. The installer should become familiar with the scope of work to avoid lost time and improper installation. Failure to use fittings that are UL Listed will void the UL Listing and the Manufacturer's warranty.

- Power Wire: 18-24 inches of #10 THHN stranded wire is provided with the unit.
- Attachment Hardware: For plaster and sheet rock: Use (four ea.) TEK Screws or screws and anchor toggle bolts, flat washers and lock washers. For Wood: sheet metal screws, flat washers and lock washers.
- ¾" Meyers hub
- Conduit: Use ¾" offset nipple.
- Tools: Drill & bits, conduit knockouts, Channel Locks, Torpedo Level, Screwdrivers, Appropriate Safety Equipment.

**WIRING DIAGRAM**

*This device is suitable for use on a circuit capable of delivering not more than 200,000 RMS symmetrical Amperes, 120 Volts max when protected by 30 Amp class RK5 fuse.*

The 120 volt units must be connected to the electrical system using one of the following types of circuit interrupt devices:

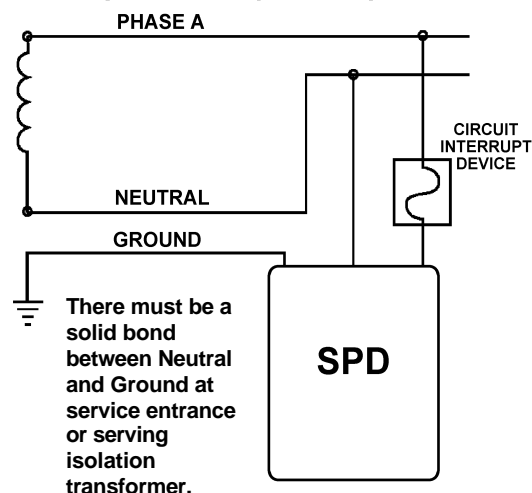
- 1 - Single Pole, 30 Amp Circuit Breaker
- 1 - 30 Amp, Class RK5 Fuse (Bussmann FRN-30).

*Note: Pre-existing breakers of the rated load size (30 amp, etc.), that are serving existing loads, may be utilized if the breaker is "Listed" for this application (see NEC) and provided the owner/tenant has authorized multiple conductor termination.*

The design of these units provides superior protection for sensitive/critical equipment connected to distribution panels, sub-distribution panels or individual equipment disconnects. These units are designed for use at IEEE C62.41 Location Categories A, B, and C. Fixed Clamping type units are designed to be used in 50 to 420Hz applications. Sinewave tracking units are designed to be used in 50 to 420Hz applications and should not be used at locations where the voltage frequency fluctuates (i.e variable frequency drives).

When inspecting the panel for installation, make a visual check that there are no Neutral to Ground bonds that violate the NEC.

**INSTALLATION DIAGRAM**



**NOTE FOR ISOLATED GROUND**

The Ground wire from the unit is bonded to the enclosure internally. If the system utilizes an isolated ground, the unit enclosure must be isolated from the panel or load it is being connected to through the use of an insulated conduit fitting or other "Listed" fitting. In this installation, the green ground wire from the unit must terminate at the isolated ground bus.

## BEFORE INSTALLATION

**For proper performance, the units must be installed with the shortest lead length possible.**

**Sharp bends should be avoided.**

There are no position-oriented components in this unit; therefore, the device can be mounted upside down or sideways to allow for the shortest possible lead length.

**Table of Maximum Suggested Operating Voltages and Unit's Wire Colors**

Nominal System Voltage Single Phase	Phase To Neutral	Phase To Ground	*Neutral To Ground	Phase A Wire Color	Neutral Wire Color	Ground Wire Color
120	130V	130V	<130V	Black	White	Green
240	240V	240V	<240	Black	White	Green

\*NOTE: If Neutral to Ground voltage is greater than 5 VAC, a problem may exist in the electrical system. The unit may be installed; however, a qualified electrician or Power Quality Engineer should be consulted to correct the problem. The neutral to ground voltage listed above is a requirement by UL.

## INSTALLATION STEPS

### STEP 1: Check Voltages

- Confirm that the system voltage does not exceed the maximum suggested operating voltage. All voltage measurements should be completed with a RMS voltmeter. **DO NOT INSTALL THE UNIT IF THE MEASURED VOLTAGE EXCEEDS THE MAXIMUM SUGGESTED OPERATING VOLTAGE OF THE DEVICE.**

**CAUTION: Do not proceed further until power has been removed from the electrical system.**

### STEP 2: Mounting the Unit

The units are provided with 18-24 inches of #10 THHN Stranded wire. For best performance, mount the unit so that all wires can be cut and connected in the shortest and most direct path possible. For every inch of conductor added to the installation, you increase the let-through voltage of the surge suppressor by about 10 volts for an ANSI/IEEE Category B3/C1 impulse.

- Visually determine the minimum lead length (shortest wire length) from the system bus to the casing of the device. No sharp bends should be made in the installation. If bends are unavoidable, make them smooth and flowing. The device contains no position-oriented components; therefore, the device can be mounted upside down or sideways.
- If the Myers Hub is not pre-installed, punch or drill a 3/4" hole through unit enclosure to ensure shortest wire leads. Be careful not to disturb or damage any internal components, and to remove any metal shavings from the inside of the unit. Mount the 3/4" Myers Hub to the unit.
- Mechanically mount the unit. Use an offset nipple so that it can be rotated and line up with concentric knockouts or installer penetrations on the panel, keeping the suppressor flush to the wall. Secure the suppressor with screws, using the mounting feet of the enclosure.

### STEP 3: Connecting "Form C" Dry Relay Contacts

- Make sure power is removed from surge suppressor.
- Open surge suppressor lid.
- Drill 0.5" diameter clearance hole through side, top or bottom of unit and install a watertight strain relief (i.e. Altech #225-A00).
- **NOTE:** Surge suppressor is equipped with two sets of contacts. The first set (labeled 1 & 2, N/O) is normally open and the other set (labeled 3 & 4, N/C) is normally closed with power applied.
- Contacts are rated at 60 W (from 30VDC @ 2A to 150VDC @ 0.4A) or 100 VA (from 50VAC @ 2A to 220VAC @ 0.45A).
- Alarm contacts accept AWG #26 (0.13mm<sup>2</sup>) to AWG #16 (1.3mm<sup>2</sup>) wire. Wire size must be in compliance with NEC, State or Local codes for power on circuit. Follow rules for the class of wiring used when routing alarm leads. To maintain NEMA 4 (IP66) rating use appropriate cable and watertight strain relief.
- Connect alarm circuit(s) to Normally Open (N/O) or Normally Closed (N/C) terminals as required.

Connect suppressor alarm contact wire(s) to alarm control panel.

### STEP 4: Wire the Suppressor into the Electrical System

- Carefully layout the wires keeping as short and straight as possible. After a satisfactory layout has been made to the appropriated termination points as described below, cut the wires and connect them as instructed. Cut all wires as short as possible.
- Connect the GREEN ground wire from the surge suppressor to the system ground bus bar. *Refer to earlier sections for systems utilizing an isolated ground.*
- Connect the WHITE neutral wire from the surge suppressor to the system neutral bus bar
- Connect the phase or "hot" wire (see table above for wire colors) from the surge suppressor to the phase conductor or buss of the electrical system through the required circuit interrupt (fuse or breaker) described above.

*Before energizing, measure the voltage again to insure it is within the levels in the table above. Immediate failure of the surge suppressor will occur if installed on voltages higher than these.*

### STEP 5: Apply Power to the Surge Suppressor

- The LED indicator lights should be illuminated. If they are not, remove power from the surge suppressor and contact Energy Control Systems at 817-483-8497.