Installation Instruction for Three Phase Delta, 4-wire Suppressors with Internal Fusing (three phases 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 and/or Canadian Electric Code, State, and Local codes. These requirements supersede this instruction.
POWER MUST BE REMOVED FROM THE ELECTRICAL SYSTEM BEFORE INSTALLING THE SUPPRESSOR.

INSTALLATION MATERIALS REQUIRED:

The following is a list of materials that may be needed for proper installation of this surge protective device (SPD). 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 "Listed" will void the "Listing" of the SPD.

- For Splices: 3 (or more) cable taps; such as: NSI IPCS- 2001 or 7501 (per Code).
- Attachment Hardware: Use (four) screws or anchor toggle bolts, flat washers and lock washers.
- ¾" hub (included with most models).
- Tools: Drill & bits, conduit knockouts, Channel Locks, Level, Screwdrivers, Appropriate Safety Equipment.

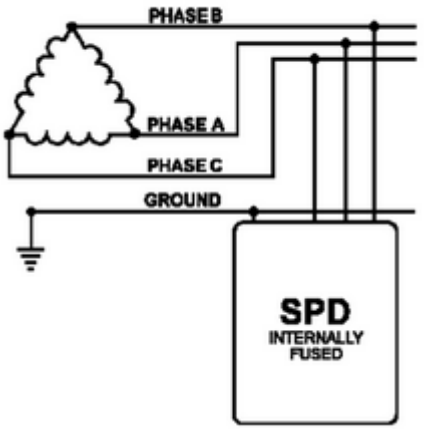
This device is suitable for use on a circuit capable of delivering not more than 200,000 RMS symmetrical Amperes, for the respective models' (max.) nominal voltage shown in the Table on pg.: 2.

The SPD is equipped with integral fuses. This allows the device to be installed directly to the system bus bars, to the main lugs in a panel or disconnect, or to a high ampacity circuit breaker. Consult NEC/CEC, State and Local Codes to assure compliance†.

In the event that one or more of the integral fuses should operate, the entire device should be returned for warranty replacement. If service of the device is a consideration (ie: removal and replacement), and there is no means to remove power from the SPD without removing power from the entire system, the installer may consider incorporating a disconnect device between the SPD and the system connecting point.

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 420 Hz applications. Frequency tracking units are designed to be used in 50 to 60 Hz applications and should not be used at locations where the voltage-frequency fluctuates (i.e.: variable frequency drives).

INSTALLATION DIAGRAM



When inspecting the panel for installation, make a visual check that there are no Neutral to Ground bonds that violate the NEC/CEC.
†[ex.: NEC '10-foot tap rule' for direct bus tapping.].

NOTE FOR ISOLATED GROUND (Metal Enclosures Only)

The Ground wire from the fused unit is bonded to the enclosure internally. If the system utilizes an isolated ground, the fused 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 fused unit must terminate at the isolated ground bus.

BEFORE INSTALLATION

For proper performance, the fused units must be installed with the shortest lead length possible. Sharp bends should be avoided.

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

3-Phase DELTA Nominal System Voltage	3Nx Model Voltage Code	Phase To Phase	Phase To Ground	Phase A Wire Color	Phase B Wire Color	Phase C Wire Color	Ground Wire Color
120	3N1	132 V	132 V	Black	Black	Black	Green
240	3N2	264 V	264 V	Black	Black	Black	Green
380	3N3	418 V	418 V	Black	Black	Black	Green
480	3N4	528 V	528 V	Black	Black	Black	Green
600	3N6	660 V	660 V	Black	Black	Black	Green
690	3N7	759 V	759 V	Black	Black	Black	Green

*NOTE: *If Neutral to Ground voltage is greater than 5 VAC, a problem may exist in the electrical system. The fused unit may be installed; however, a qualified electrician or Power Quality Engineer should be consulted to correct the problem.* (Other Model Voltage/Configurations available upon special order or request- Contact ECS for specific details.).

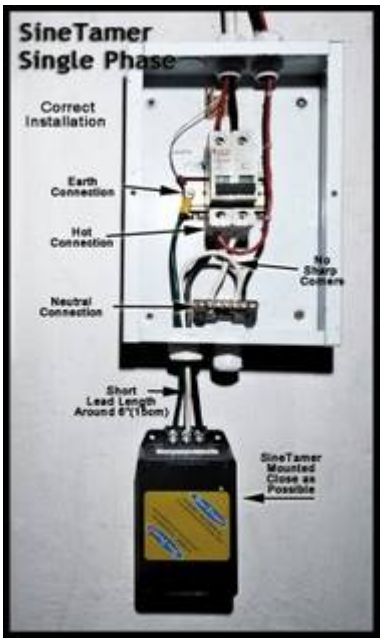
INSTALLATION STEPS: NOTE: *3N6 / 3n7 Models must be connected in A, B, C Phase rotational sequence to the electrical system*.

STEP 1: Check Voltages

- Confirm that the nominal system voltage does not exceed the maximum suggested operating voltage for the model to be installed according to the Table above. All voltage measurements should be completed with a RMS voltmeter. DO NOT INSTALL THE FUSED UNIT IF THE MEASURED VOLTAGE EXCEEDS THE MAXIMUM SUGGESTED OPERATING VOLTAGE OF THE DEVICE.

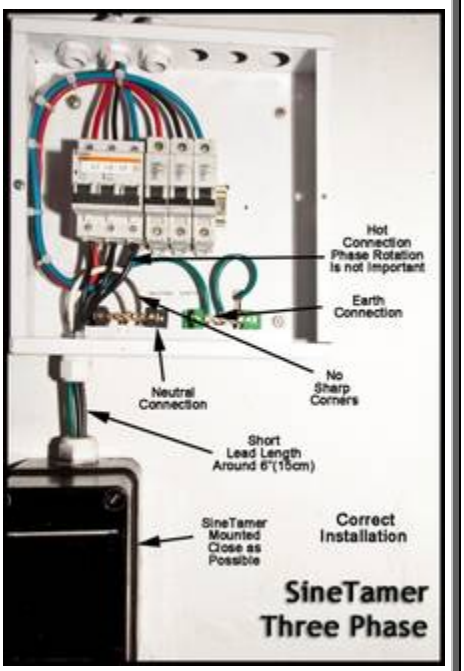
CAUTION: Do not proceed further until power has been removed from the electrical system.

STEP 2: Mounting the Unit



Non-lug type models are provided with 18-24 inches of #10 AWG/TEW 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 suppressor by about 10 volts for an ANSI/IEEE Category B, 6 kV, 3 kA impulse.

- 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.
- Do not cut any wires until suppressor has been mounted. Units with plastic hubs must be installed with the non-metallic flexible conduit and extra hub.
- While holding suppressor on wall, determine the shortest distance between the hub on suppressor and hub to be installed on panel. Cut conduit to shortest length possible to fit securely over both hubs.
- Twist conduit onto the extra hub. Slide conduit and hub over wires of suppressor; twist onto hub of suppressor.
- Mount suppressor to wall and install hub on panel.

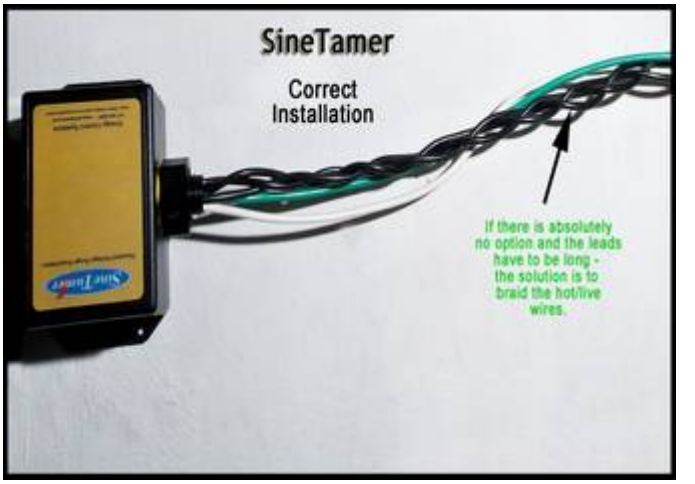


STEP 3: Connecting "Form C" Dry Relay Contacts (Contact Optioned Models Only)

- Make sure power is removed from surge suppressor.
- Open surge suppressor lid and note encapsulant height prior to drilling or punching enclosure. (Allow internal clearance for locknuts).
- 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/C) is normally closed and the other set (labeled 3 & 4, N/O) is normally open with power applied. The DRC terminal header block is located on the inside of the suppressor cover lid.
- Contacts are rated at 60 W (from 30 VDC @ 2 A to 150 VDC @ 0.4 A) or 100 VA (from 50 VAC @ 2 A to 220 VAC @ 0.45 A).
- Alarm contacts accept AWG #26 (0.14mm^2) to AWG #16 (1.5mm^2) wire. Wire size must be in compliance with NEC/CEC, 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 needed & the alarm contact wires to alarm control panel.
- Option C1 will already have wires connected internally and visible with the existing voltage connection wires from the hub.

STEP 4: Wire the Suppressor into the Electrical System

- Carefully layout the wires keeping them as short and straight as possible. (Wires may be slow-twisted together thereby reducing RF-impedance.) After a satisfactory layout has been made to the appropriate termination points as described below, cut the wires and connect them as instructed.
- 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 phase wires or "hot" wires (see table above for wire colors) from the surge suppressor to the phase conductors or buses of the electrical system through the required circuit interrupts (fuses or breakers) described above. Note that the units have internal fusing and do not require external circuit interrupts (external fuses or breakers). They may be directly connected to the phase conductors or buses after the main disconnect.
- Upon replacing front cover of suppressor, certain models allow various lid rotations (90° or 180°) for improved label orientation (< model specific).

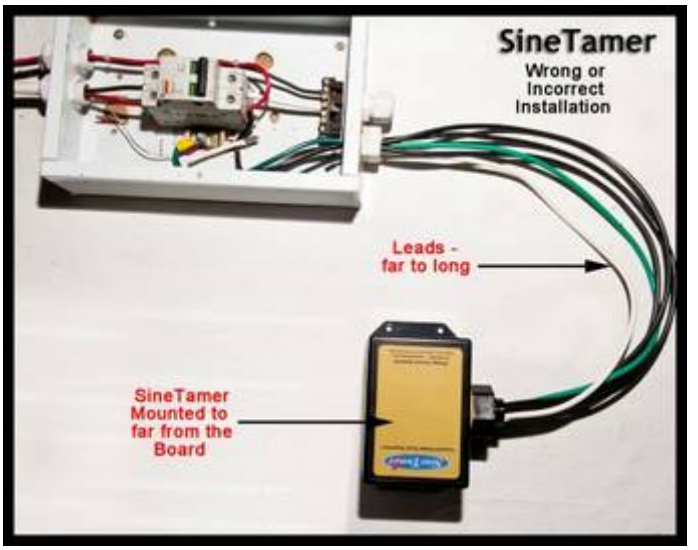


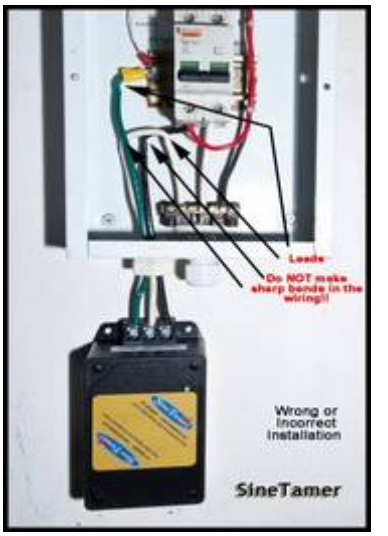
Before energizing, measure the voltage <u>again</u> to insure it is within the levels in the table above. Immediate failure of the surge suppressor will occur if installed on voltages higher than these.

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 supplier or Energy Control Systems at +1.817.483.8497 or info@sinetamer.com.

Incorrect connection diagrams:





SineTamer
"we ARE the standard"

ECS
ENERGY CONTROL SYSTEMS