

## SPD Installations and NEC 285.12 Requirements

### *National Electric Code (NEC) 2008*

#### *ARTICLE 285 Surge-Protective Devices (SPDs), 1 kV or Less*

##### *II. Installation*

##### *285.12 Routing of Connections.*

***"The conductors used to connect the SPD (surge arrester or TVSS) to the line or bus and to ground shall not be any longer than necessary and shall avoid unnecessary bends."***

Testing has demonstrated that every inch of extra lead length on the leads of an SPD on installation results in an increase in let-through-voltage of approximately 20 volts down line to the "protected" equipment. Look at these installations to see how poor installation practices can hamper the performance of an SPD:

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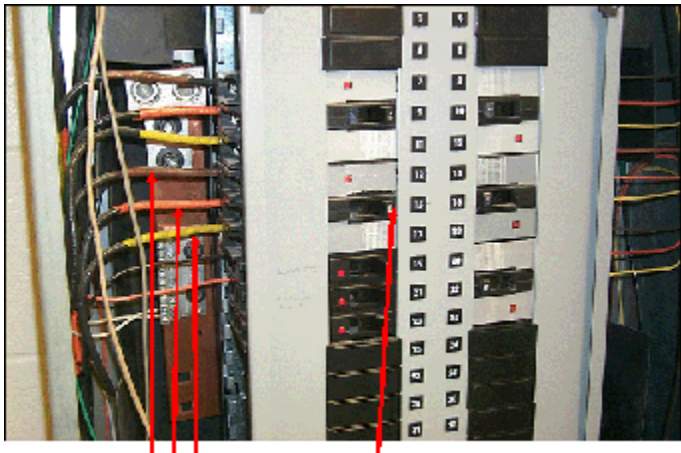
With the size of the SPD, the extra cable and conduit is necessary to allow for installation. It results in an increase in lead length of over five extra feet, which translates to an increase in let-through-voltage of over 1250 volts going to the "protected" equipment.



**SPD**

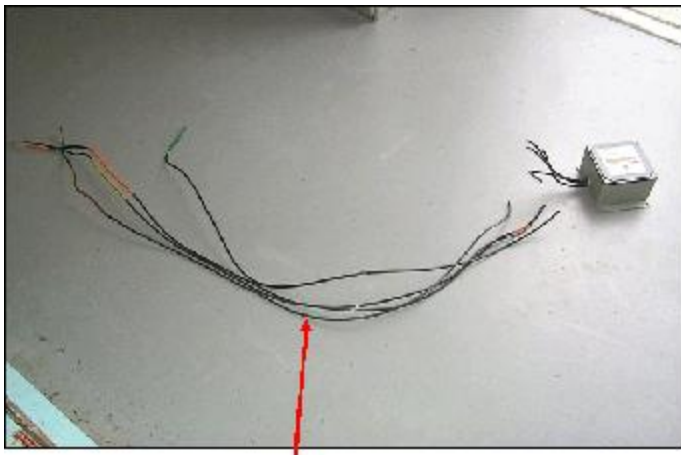
**Breaker location on Panel**

**Schedule, #13, 15, 17**

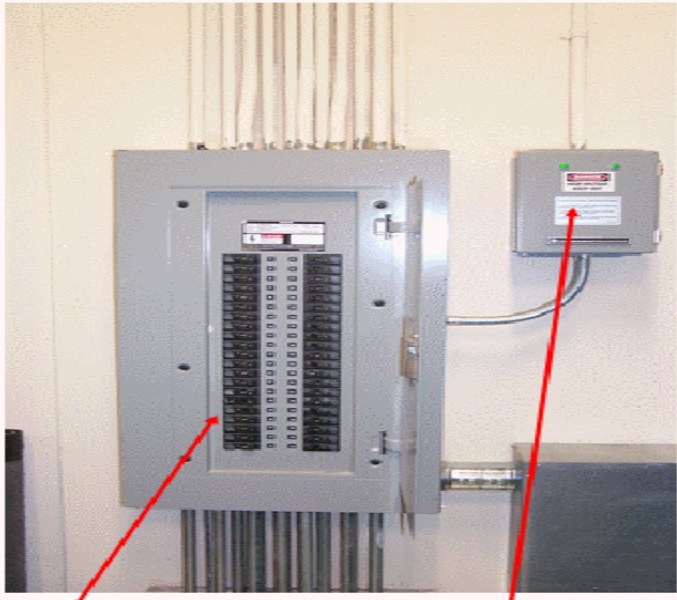


**Leads from SPD**

**Breaker #13, 15, 17 for SPD**

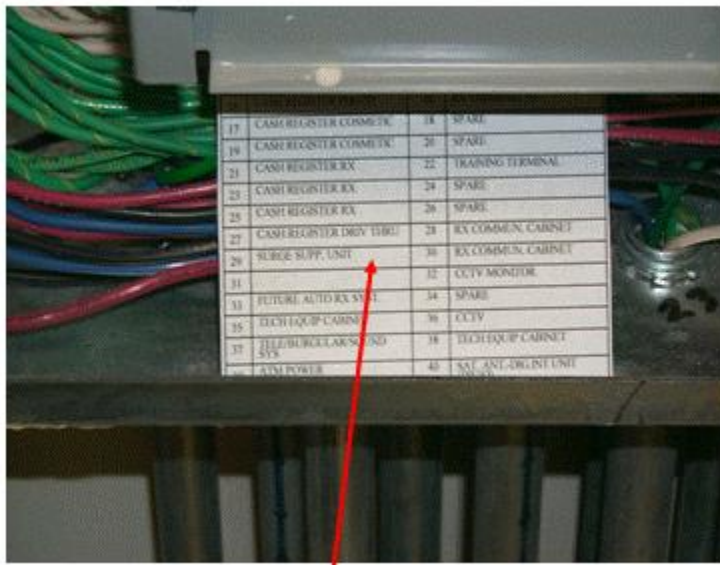


Over 6 ½ feet of extra lead length which equals approximately 1600 additional volts reaching the "protected" equipment downline from this electronic branch panel.

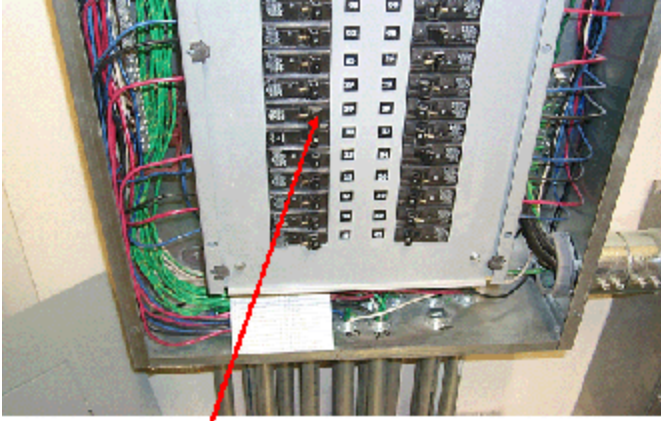


**Branch Panel**

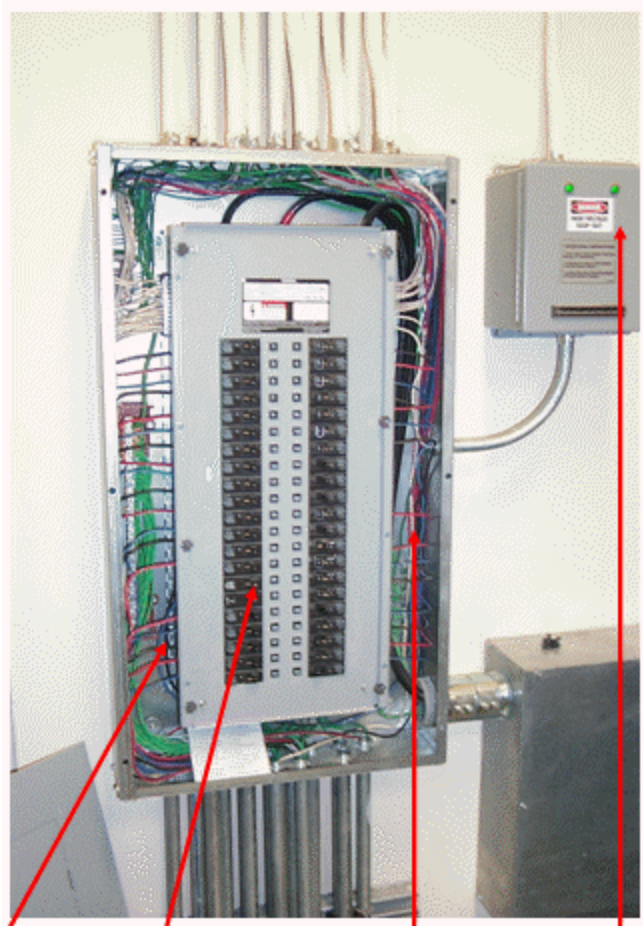
**SPD**



**Dedicated Breaker #29, 31**



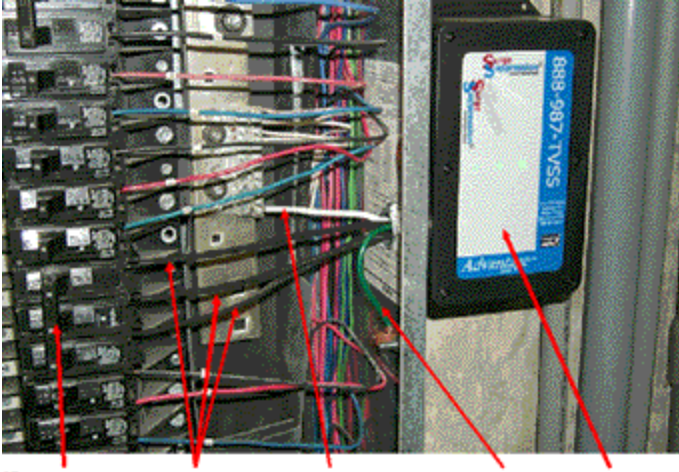
**Dedicated Breaker #29, 31**



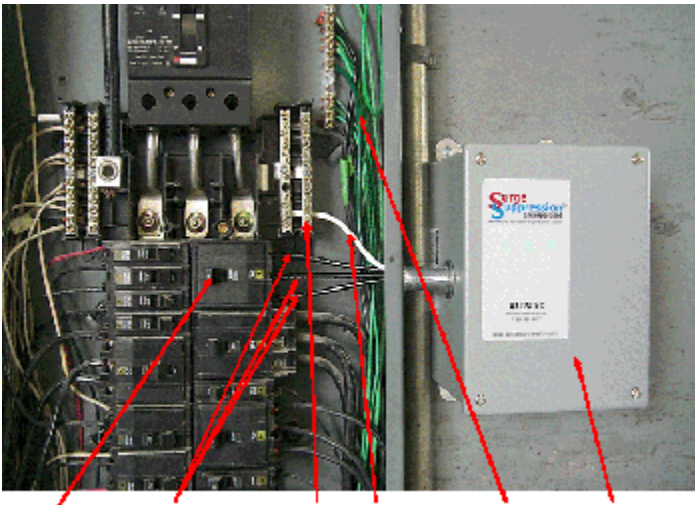
**Leads    Dedicated Breaker    Leads    SPD**

This installation also had an extra 6 ½ feet of lead length which allowed approximately 1600 excess volts to reach the "protected" equipment down line.

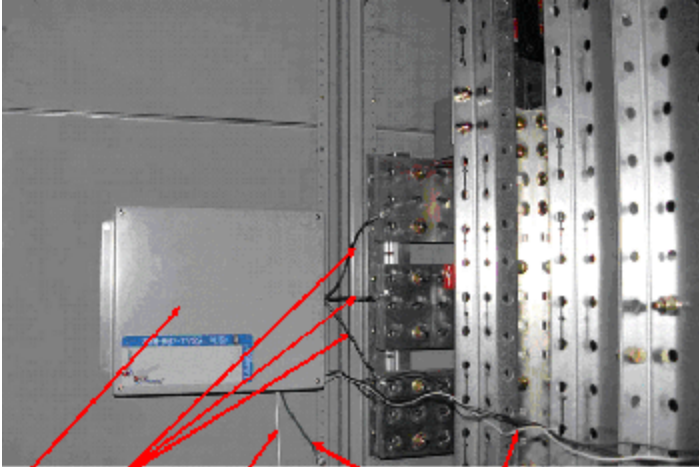
**Proper installation requires the leads to be as short and straight as possible. The below images show how the installation should be done:**



**Breaker Phase Leads Neutral Lead Ground SPD**



**Breaker Phase Leads Neutral Ground SPD**



**SPD Phases Neutral Ground Remote Lite Wires**



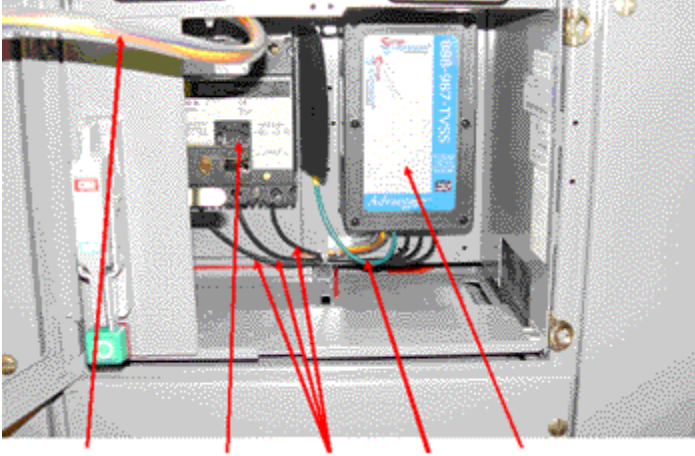
**Breaker SPD SPD Breaker**



**SPD    Breaker**



**SPD Ground Phases Neutral Breaker**



### **Remote Lites Breaker Phases Ground SPD**

**Proper installation, with all leads as short and straight as possible, will provide the maximum protection for the equipment down line.**