



Grommes~Precision Precision Electronics

Product Application Manual For The SLS & TLS Lightning Suppressors, CV-600 & IT-600



Typical Applications From The Field

Grommes~Precision and its commercial audio division, Precision Electronics, has been designing, engineering, and manufacturing quality sound equipment in the United States since it started operation in March of 1946. Over a half a century of quality, service, and flexibility as "Your Personal Manufacturer" have made us one of the last American audio manufacturers. If you have any questions with this or any one of our other fine products, give us a call. When you talk with a member of the Grommes~Precision team you'll be speaking with someone who had a hand in concept, design, production, or testing of this very product.



Grommes~Precision

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847-599-1799 · 800-SINCE-46 · FAX: 847-599-6178

1331 Estes Ave. · Gurnee, IL 60031 · USA

www.grommesprecision.com

Grommes~Precision is an American manufacturer of original, custom, and private labeled audio/electronic equipment for use in commercial, consumer, and industrial applications since 1946.

Introduction

A bolt of lightning follows two simple laws: (1) The Law of Physics: The path of least resistance as electrical energy travels to earth ground; and (2) The Law of Murphy: If something bad might happen, it will. Put the two together and you get the reason why Grommes~Precision created the SLS Speaker Line and TLS Tel-Page Line Lightning Suppressors.

Because the SLS and TLS involve one of the more powerful forces of nature, it is important to understand what exactly these little units prevent and what they cannot prevent. Lightning damage to electronic equipment can be broken down into two categories: (1) a direct strike, and (2) an indirect strike. As it turns out, direct strikes are actually quite rare in the industry as equipment, with the exception of outdoor speakers and speaker/telephone lines, is generally kept indoors. And since an average lightning bolt contains 1 billion volts and between 10,000 to 200,000 amperes of current, that's good news for both the owners of the electronic equipment who must pay to repair or replace and sound contractors who have to come in, disconnect, and substitute the fried equipment.

Much more likely, however, is the indirect, or induced strike. With the induced strike, lightning does not strike the electronic equipment or speaker/telephone line directly, rather, it propels, or induces large voltages of electrical energy into the system, thus frying the equipment. The electric energy is propelled into the surrounding nearby area, thus, surging it's way down nearby speaker/telephone lines on its way toward reaching earth ground and equilibrium (the connected electronic equipment). Unfortunately, it is at this very point that Murphy's Law meets the Law of Physics, for it is undoubtedly your speaker/Tel-Page line that is induced, and your electronic equipment left smoking in the corner of the room.

Since the induced strike is so much more likely, Grommes~Precision created the SLS and TLS. Both units are simple to integrate into a new or existing system and will provide peace of mind should lightning be induced into the system. Below are some typical applications illustrating how best to maximize the protectiveness of the SLS and TLS.

Products Illustrated In This Application Guide

1. SLS: Speaker Line-Lightning Suppressor

Designed to prevent speaker line lightning surges from harming electronic equipment connected to it. Simply locate the SLS within the speaker line directly after the electronic equipment to protect the equipment, or directly before the speaker to protect that speaker or speaker cluster.

2. CV-600: 25V, 70V, or 100V Speaker Line to 600 OHM or LINE Converter

An accessory designed to isolate and convert balanced or unbalanced speaker line level (25V, 70V, or 100V) voltage into a usable 600 OHM or LINE signal that can feed an additional amplifier.

3. TLS: Tel-Page Line-Lightning Suppressor

Designed to prevent Tel-Page line lightning surges from harming electronic equipment connected to it. Simply locate the TLS within the Tel-Page line directly before the electronic equipment to protect the equipment. NOTE: The TLS is NOT meant to protect the phone system as it is not designed to pass ringer voltage (REN = Z).

4. IT-600: 600 TO 600 OHM ISOLATION TRANSFORMER

An accessory designed to isolate and convert the telephone line sitting at DC potential so as to make it a usable signal for the amplifier and other electronic equipment. It also is useful for eliminating oscillation that can occur from long telephone lines.

Legend For Application Examples



SLS Speaker Line-Lightning Suppressor



TLS Tel-Page Line-Lightning Suppressor



Telephone System



Electronic Equipment, such as a Precision AXIOM power amplifier, MICRO mixer amplifier, etc..



IT-600



CV-600



Speaker or Speaker Cluster

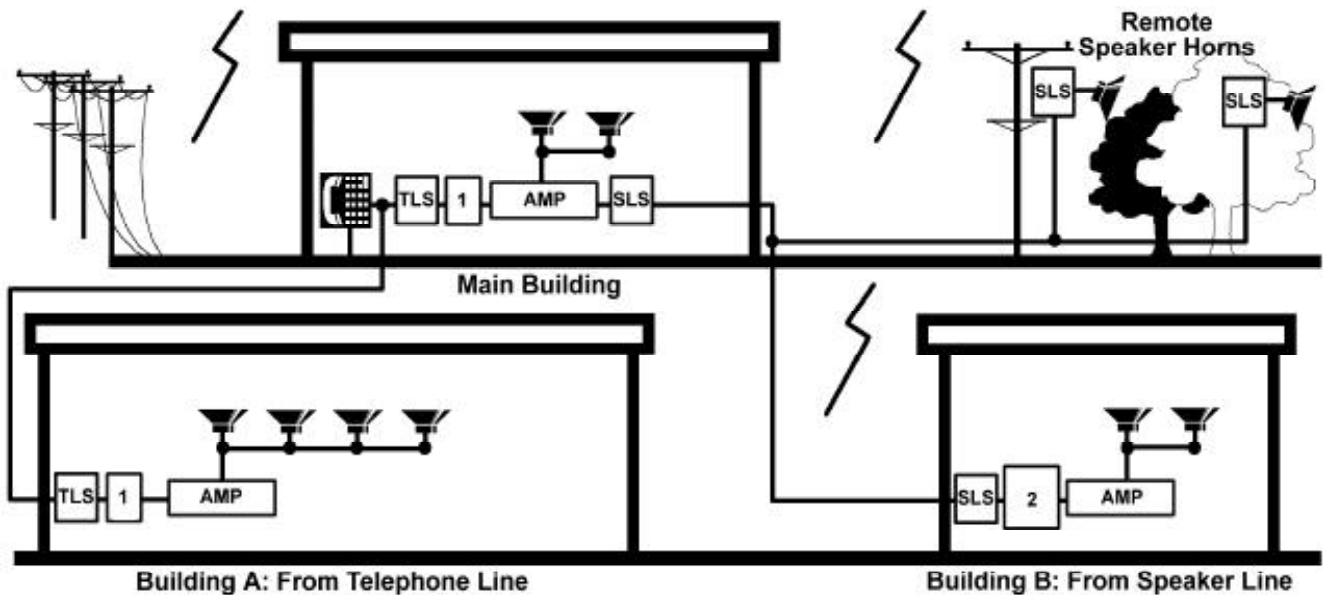


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General Application Example

The following General Application Example illustrates how the SLS, CV-600, TLS, and IT-600 can be integrated in a new or existing system.



1. Main Building:

A. Before the Electronic Equipment

Connect the Tel-Page line from the telephone system to the TLS directly before the electronic equipment to protect the amplifier and other electronic equipment from an lightning surge if that Tel-Page line is induced by lightning.

Using the IT-600, convert the telephone line into a 600 OHM line and connect to the amplifier, such as an AXIOM power amplifier which is engineered for all-in-one telephone paging solutions and includes a balanced, tamper resistant 600 ohm/Tel-Page input. The IT-600 serves a couple purposes: 1) it converts the telephone line (typically sitting at DC potential) into a usable signal that an amplifier can use, and 2) it eliminates oscillation that can occur in long telephone lines which produces unwanted noise in the audio signal.

B. At the Electronic Equipment

Connect the other electronic equipment, such as preamplifiers, EQ units, tuners, and interior speakers to the sound system.

C. After the Electronic Equipment

Connect the speaker line that will be running outside of the building to the SLS directly after the amplifier and other electronic components. Installing the SLS here will protect the amplifier and electronic equipment from a lightning surge if that exterior speaker line is induced by lightning.

2. Connecting the Outdoor Remote Speaker Horn or Speaker Cluster:

Connect the outdoor speaker line to the SLS directly before

the speaker or start of the speaker cluster that needs protection. This will protect that speaker or speaker cluster.

3. Building A: Audio From The Telephone Line:

Connect the telephone line from the telephone system coming in from the outside to the TLS. Using the IT-600, convert the telephone line into a 600 OHM line and connect to the amplifier and electronic equipment.

4. Building B: Audio From The Speaker Line:

Connect the speaker line coming in from the outside to the CV-600 directly after the amplifier and other electronic equipment. Installing the CV-600 here will protect the electronic equipment from a lightning surge if lightning induces that exterior speaker line running between the Main Building and Building B.

Next, connect the speaker line from the SLS to the CV-600. The CV-600 can convert either 25V, 70V, or 100V speaker line into either 600 OHM or LINE level so as to isolate and convert balanced or unbalanced speaker line level voltage into a usable signal that can feed the additional amplifier.

5. Connecting the Outdoor Remote Speaker Horn or Speaker Cluster:

Connect the outdoor speaker line to the SLS directly before the speaker or start of the speaker cluster that needs protection. This will protect that speaker or speaker cluster.

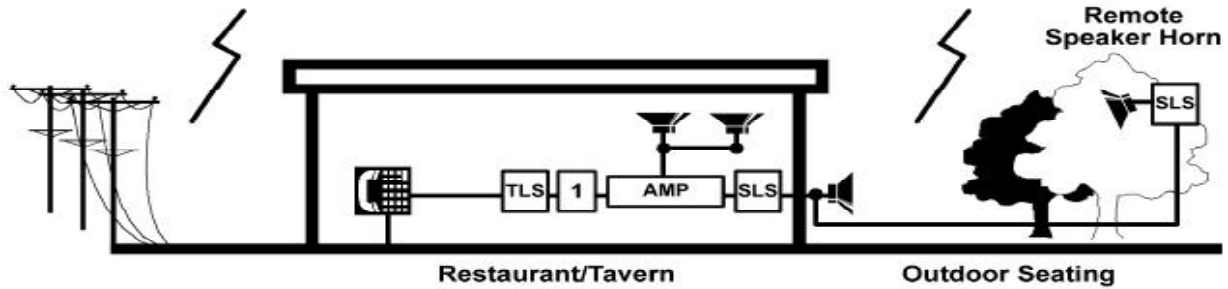


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Typical Field Applications

Field Application 1: Restaurant/Tavern



1. Restaurant/Tavern:

A. Before the Electronic Equipment

Connect the telephone line from the telephone system to the TLS directly before the electronic equipment. Installing the TLS here will protect the amplifier and other electronic equipment from an lightning surge if that exterior telephone line is induced by lightning.

Using the IT-600, convert the telephone line into a 600 OHM line and connect to the amplifier, such as an AXIOM power amplifier which is engineered for all-in-one telephone paging solutions and includes a balanced, tamper resistant 600 ohm/Tel-Page input. The IT-600 serves a couple purposes: 1) it converts the telephone line (typically sitting at DC potential) into a usable signal that an amplifier can use, and 2) it eliminates oscillation that can occur in long telephone lines which produces unwanted noise in the audio signal.

B. At the Electronic Equipment

Connect the other electronic equipment, such as preamplifiers, EQ units, tuners, and interior speakers to the sound system.

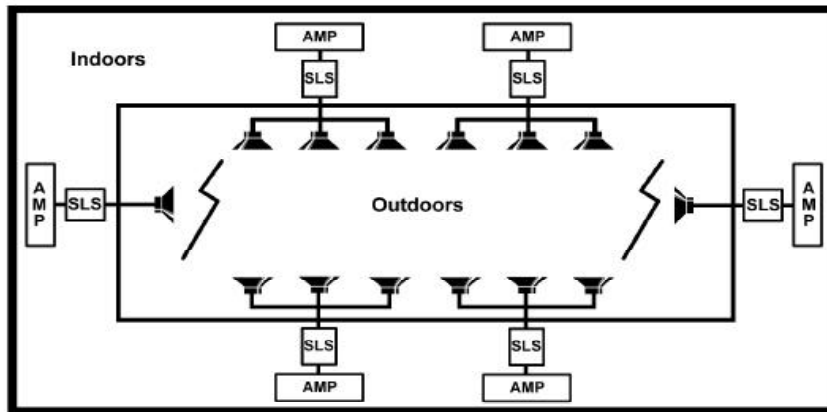
C. After the Electronic Equipment

Connect the speaker line that will be running outside of the building to the SLS directly after the amplifier and other electronic components. Installing the SLS here will protect the amplifier and other electronic equipment from an lightning surge if that exterior speaker line running the outdoor seating is induced by lightning.

2. Outdoor Seating

Connect the outdoor speaker line to the SLS directly before the speaker or start of the speaker cluster that needs protection. This will protect that speaker or speaker cluster. **NOTE:** The speaker horn directly outside of the restaurant/tavern in the diagram is an illustration of a speaker horn that is NOT protected from an induced lightning strike. Neither the SLS protecting the Outdoor Remote Speaker Horn, nor the SLS protecting the amplifier and electronic equipment within the restaurant/tavern will protect this lone speaker horn. To protect this speaker horn, connect the outdoor speaker line to the SLS directly before the speaker. Then, and only, then will this speaker be protected from an induced lightning strike.

Field Application 2: Stadium/Ballpark/Outdoor Arena/Venue



A. After the Electronic Equipment

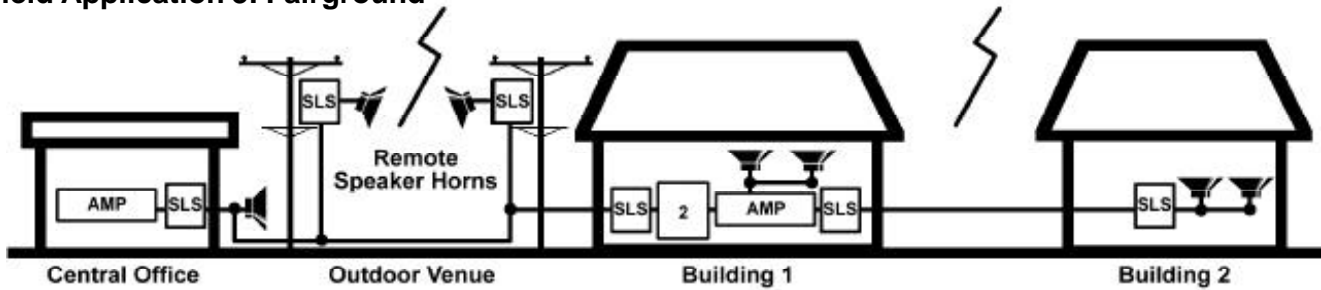
Connect the speaker line that will be running outside of the building to the SLS directly after the amplifier and other electronic components. Installing the SLS here will protect the amplifier and other electronic equipment from any lightning surge that may occur if that exterior speaker line running between is induced by lightning.



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Field Application 3: Fairground



1. Central Office:

Connect the speaker line that will be running outside of the building to the SLS directly after the amplifier and other electronic components. Installing the SLS here will protect the amplifier and other electronic equipment from an lightning surge if that exterior speaker line is induced by lightning. **NOTE:** The speaker horn directly outside of the Central Office in the diagram is an illustration of a speaker horn that is NOT protected from an induced lightning strike. Neither of the SLS units protecting the Outdoor Remote Speaker Horns on the telephone poles, nor the SLS protecting the amplifier and electronic equipment within the Central Office will protect this lone speaker horn. To protect this speaker horn, connect the outdoor speaker line to the SLS directly before the speaker. Then, and only, then will this speaker be protected from an induced lightning strike.

2. Outdoor Venue

Connect the outdoor speaker line to the SLS directly before the speaker or start of the speaker cluster that needs protection. In this diagram, there are two speaker clusters are on two separate telephone poles and therefore get their own SLS.

3. Building 1: Audio From The Speaker Line To Additional Amp or Mixer:

A. Before the Electronic Equipment

Connect the speaker line coming in from the outside to the CV-600. The CV-600 can convert either 25V, 50V, or 70V speaker line into either 600 OHM or LINE level so as to isolate and convert balanced or unbalanced speaker line level voltage into a usable signal that can feed the additional amplifier.

Connect the speaker line that will be running outside of the building to the SLS directly before the amplifier and

other electronic components. Installing the SLS here will protect the amplifier and other electronic equipment from an lightning surge if that exterior speaker line running between the Central Office and Building 1 is induced by lightning.

B. At the Electronic Equipment

Connect the other electronic equipment, such as preamplifiers, EQ units, tuners, and interior speakers to the sound system.

C. After the Electronic Equipment

Connect the speaker line that will be running outside of the building to the SLS directly after the amplifier and other electronic components. Installing the SLS here will protect the amplifier and other electronic equipment from any lightning surge that may occur if that exterior speaker line running between Building 1 and Building 2 is induced by lightning.

4. Building 2: Audio From The Speaker Line To Additional Indoor Speaker or Speaker Cluster

A. Before the Electronic Equipment

Connect the speaker line coming in from the outside to the CV-600. The CV-600 can convert either 25V, 50V, or 70V speaker line into either 600 OHM or LINE level so as to isolate and convert balanced or unbalanced speaker line level voltage into a usable signal that can feed the additional amplifier.

Connect the speaker line that will be running outside of the building to the SLS directly before the amplifier and other electronic components. Installing the SLS here will protect the amplifier and other electronic equipment from an lightning surge if that exterior speaker line is induced by lightning.

B. At the Electronic Equipment

Connect the other electronic equipment, such as preamplifiers, EQ units, tuners, and interior speakers to the sound system.

Conclusion

If installed properly, the **SLS** and **TLS** should protect your electronic equipment from induced lightning strikes. The **SLS** and **TLS** are designed to instantly reset once the induced strike surge passes, making your **SLS** and **TLS** not only reusable, but extremely cost effective. Of course, if you have any questions regarding the **SLS**, **TLS**, **CV-600**, **IT-600**, or any one of our Grommes~Precision products, please feel free to contact us. You can also learn more about the **SLS/TLS** and our other fine American-Made products by visiting us on the web at www.grommesprecision.com.



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