CITEL

Reliability in Surge Protection

80 YEARS SINCE 1937


# NEC / NFPA 70 Article 810.6 and 810.20 Radio and Television Equipment Systems Must Be Listed

## Overview of NEC 810.6 and 810.20

Article 810.6 and 810.20 requires the use of listed protectors for increased safety and fire prevention. Whenever an external antenna feed terminates through an outdoor wall, a listed surge protector or antenna discharge unit should be placed as close to the point of entrance as possible.

## Threat to Facilities

Facilities and 911 Call Centers are being accidently burned down because of direct lightning strikes. Overheated electrical cables and transient surges in electrical and electronic devices can also cause secondary fires inside of the facility.

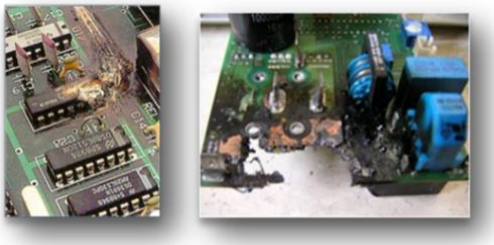
### These Threats can include:

**Disruption**

Surges can enter data lines through inductive coupling which can result in corrupt data processing.

**Degradation**

Repeated stress can cause component degradation and shorten the lifespan of equipment. This may not result in any visual damage.



**Destruction**

Immediate failure to a device due to a high level of energy from a surge. This can include burnt PCB's and melting electronic components.

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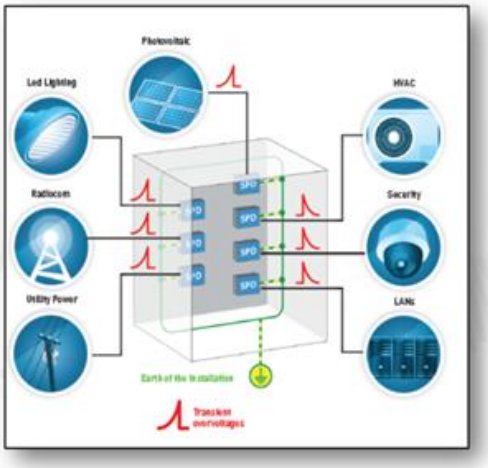
# The Solution for Radio and Television Systems

## Application of Surge Protection

A listed Surge Protective Device (SPD) should be installed as a minimum at any point where copper enters a facility. This measure will not only extend the life of the electronic based radio systems, but also increase the reliability of the electrical system as a whole.

**The "Box Concept"**




**Protect All Copper Wires!**
**Leave No Vulnerabilities!**

Surge protection is a cost-effective solution to prevent downtime, improve system and data reliability and elimination of equipment damage caused by transients and surges to both power and signal lines. Surge Protection Devices (SPD) are suitable for any facility or load (1000 volts and below).

## Selecting the appropriate SPD

NEC/NFPA 70 Article 810.6 and 810.20 require that Surge Protective Devices be Listed. This means selecting a surge protector is easier than it has ever been. There are only a few choices available for SPD's that are UL Listed for any of the most commonly used surge standards including UL1449 4th Edition, UL497B, and UL497E.

Only UL Listed protectors can qualify for a facility being listed under the "Master Label".

## Typical SPD applications include

Communication circuits, telephone or facsimile lines, cable TV feeds, security systems, alarm signaling circuits, entertainment center or stereo equipment, kitchen or household appliances.

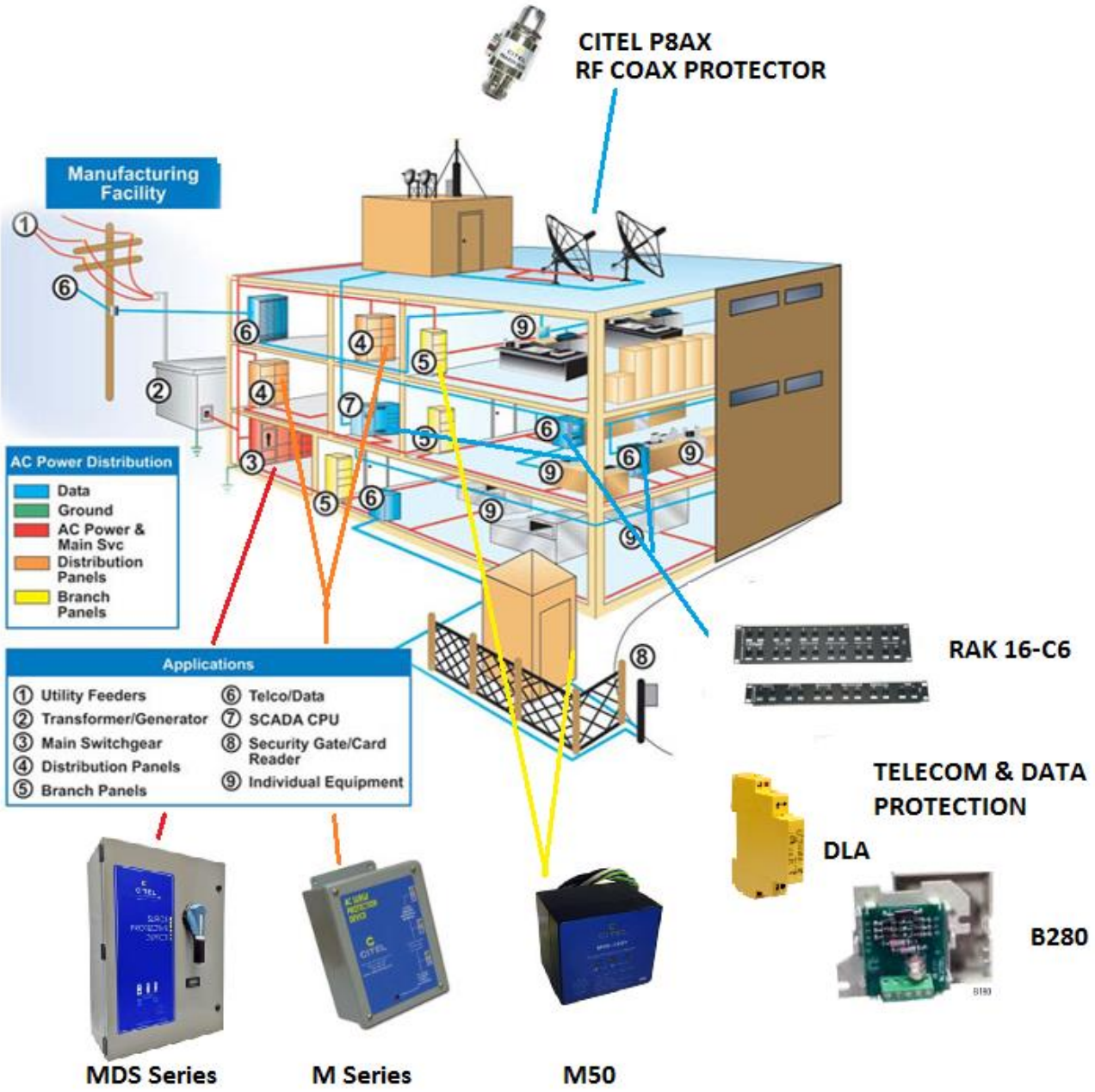
Power distribution, control cabinets, programmable logic controllers, electronic motor controllers, equipment monitoring, lighting circuits, metering, medical equipment, critical loads, back-up power, UPS, HVAC equipment

# Radio and Television Systems SPD per Application

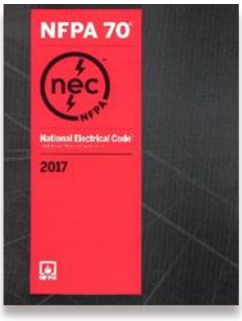
| Application | CITEL Solution Reference | CITEL Solution Pictures |
|---|---|---|
| **Radio, Satellite, CCTV, Ethernet** | DIN-XXX-HD<br>for Video, ADSL, RS232, RS422, RS423, RS485, RNIS |  |
| **TELECOM**<br>**RF Wireless Communication** | P8AX25-6G-N-FF<br>CSP25-NW-FF/DCB<br>For both RF DC Pass and DC Block |  |
| **Cat 5E and 6 Ethernet Signal**<br>**Power over Ethernet (PoE)** | MJ8-CAT5E<br>MJ8-POE-A or B |  |
| **TELECOM**<br>**110 Punchdown to RJ-45**<br>**12, 24 or 48 Port** | PCHxx-C6<br>PCHxx-PoE<br>PCH12-RJ45 |  |
| **TELECOM**<br>**Twisted Pair wires** | DLA-12D3 |  |
| **AC and DC Power Systems** | DS220S-24DC<br>DS220S-48DC<br>DS72US-120S |  |
| **Switchgear and Distribution Panels** | MDS-300E<br>M50F-480D |  |

UL Listing ensures the highest quality safety testing has been conducted

# Radio and Television Systems SPD Primary Location



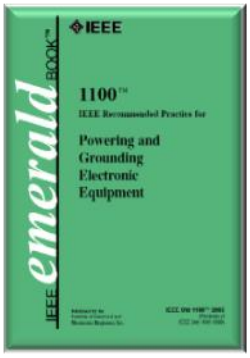
# Applicable Standards




## 810.6 Antenna Lead-In Protectors.

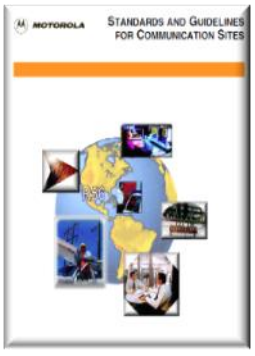
*"Where an antenna lead in surge protector is installed, it shall be listed as being suitable for limiting surges on the cable that connects the antenna to the receiver/transmitter electronics and* ***shall be connected between the conductors and the grounded shield or other ground connection."***

Informational Note: For requirements covering protectors for antenna lead-in conductors, refer to UL 497E, *Outline of Investigation*




## 810.20 Antenna Discharge Units — Receiving Stations.

(A) *"Where Required. Each conductor of a lead-in from an outdoor antenna shall be* ***provided with a listed antenna discharge unit."***




## IEEE 1100 EE Std 1100-2005 Section 9K

*"NEC has classified the telecommunication equipment providing such additional surge protection as secondary protectors. The NEC requires secondary protectors to limit currents safely to less than the current-carrying capacity of the listed indoor telecommunications wire and cable, the listed telecommunications set line-cords, and the listed TTE having ports for external wire-line telecommunications circuits. "*

***"Telecommunications primary protectors and secondary protectors must be listed in accordance with NEC requirements."***

"With surge lab facilities at three of our factories, in three countries, CITEL SPD's are designed and are fully tested to meet and exceed required industry standards."

# References

NFPA 70 Edition 2017, Article 810.06 Antenna Lead-In Protectors, and 810.20 Antenna Discharge Units retrieved from: http://www.nfpa.org

UL1449 4th Edition, Surge Protective Devices retrieved from: http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/showpage.html?&name=VZCA.GuideInfo&ccnshorttitle=Surge-protective+Devices&objid=1078524289&cfgid=1073741824&version=versionless&parent_id=1078524288&sequence=1

UL497E, Antenna Lead-in Conductors retrieved from:

http://database.ul.com/cgibin/XYV/template/LISEXT/1FRAME/showpage.html?name=QVLA.E349646&ccnshorttitle=Protectors+for+Antenna+Lead-in+Conductors&objid=1082185668&cfgid=1073741824&version=versionless&parent_id=1079208913&sequence=1

IEEE 1100 Std 1100-2005 - IEEE Recommended Practice for Powering and Grounding Electronic Equipment retrieved from: https://standards.ieee.org/findstds/standard/1100-2005.html

Motorola R-56 Std 69P81089E50-B -2005 – Standards and Guidelines for Communication Sites. Retrieved from: https://sites.auburn.edu/admin/facilities/spw-bid-calendar/11-150%20AU%20Regional%20Airport-Construct%20a%20Self-Supporting%20Radio%20Tower/Project%20Documents/1/Motorola_R56_2005_manual.pdf

CITEL general brochure retrieved from: http://www.citel.us/literature/CITEL_GENERAL_Brochure_USA.pdf