CITEL

Reliability in Surge Protection

80 YEARS SINCE 1937

Surge Protection Requirements for Intelligent Traffic Systems (ITS) & Dynamic Message Signs (DMS)

Overview of NTCIP and NEMA TS 4-2016

NEMA TS 4-2016: section 10.2 Power Panels states: *"A power panel shall be installed in accordance with NEC, it shall contain, as a minimum [] voltage surge and lightning protection."*

All agencies have placed a greater emphasis on increasing personnel safety by mandating the use of Surge Protective Devices (SPDs), including the NEC & NFPA.

NEMA standard TS 4-2016 which recognizes the threat and subsequent failure of ITS equipment due to transient surges & lightning. (NTCIP 9001)

Threat to Intelligent Traffic Systems & DMS

A 2017 study commissioned by the Electrical Safety Foundation International (ESFI) finds that 94% of those surveyed find surge protection to be significantly important part of facility protection and safety. (2017 ESFI)

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

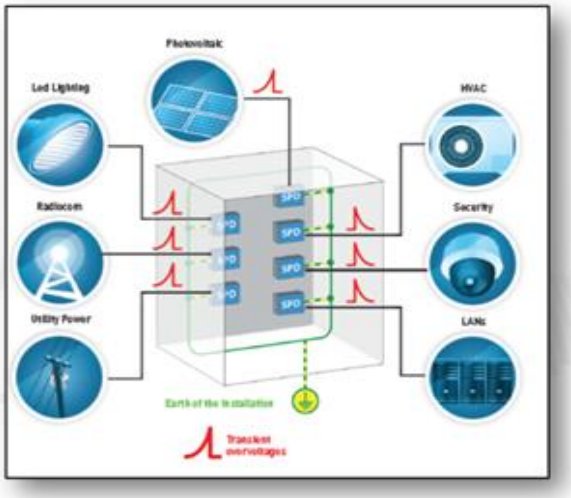
Immediate failure to a device due to a high level of energy from a surge. This can include burnt PCB's and melting electronic components

The Solution for Intelligent Traffic Systems & DMS

These standards have only just begun to address the expanding role that surge protection plays in preserving the integrity of equipment and, more importantly, protecting the lives.

The installation of Surge Protective Devices (SPDs) within the Traffic Cabinet or DMS control circuit is a measure the will not only extend the life of the circuit components but also increase the reliability of the system as a whole.

The "Box Concept"



Protect All Copper Wires!
Leave No Vulnerabilities!

Application of the "Box Concept" for Surge Protection

The installation of a Surge Protective Device (SPD) at all electrical entrances of the DMS or Traffic cabinet is the only way to completely harden the entire system. This means every copper wire entering or exiting the cabinet must be protected. This means power, data, ethernet, signaling, coax and others.

Preserving ROI

Surge protection is a cost-effective solution to prevent downtime, improve system and data reliability and elimination of equipment damage due to transients and surges for both power and signal lines. It is suitable for any facility or load (1000 volts and below). (2014 NEC)

Selecting the appropriate SPD

NEC/NFPA 70 require that Surge Protective Devices (SPDs) be UL 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.

Intelligent Traffic Systems & DMS SPD per Application

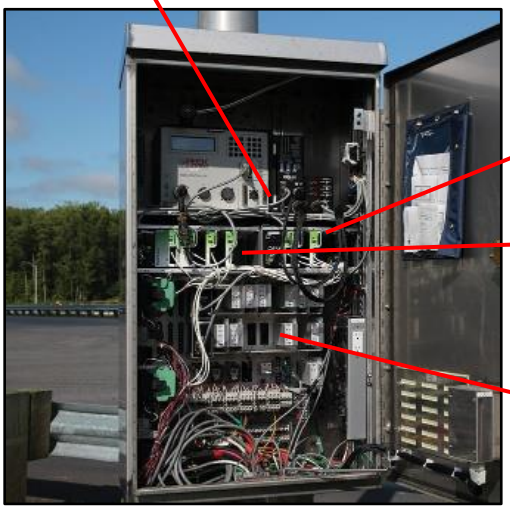
Application	CITEL Solution Reference	CITEL Solution Pictures
120/240Vac or 120/208Vac Incoming AC Supply	DS70US-120/240	
120Vac Power Supply	DS72US-120S	
24Vdc Power Supply	DS220S-24DC	
Twisted Pair – Data lines RS485 & 4-20mA	DLA-12D3	
Ethernet Signal	MJ8-Series	
Wireless Communication	P8AX09-6G-N-FF	

UL Listing ensures the highest quality safety testing has been conducted

Intelligent Traffic System & DMS SPD Primary Location

Incoming AC Supply

Twisted Pair – Data



24Vdc Power Supply

Ethernet Signal

References

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Baclawski, V et al, (2016). *Hardware Standards for Dynamic Message Signs (DMS)* (NEMA TS 4-2016). 1300 North 17th street Suit 900 Rosslyn, Virginia 22209

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NFPA 70 National Electrical Code Section 800; National Fire Protection Association® One Battery march Park, Quincy, Massachusetts 02169-7471

UL 1449 4th Edition Underwriters Laboratories retrieved from: https://standardscatalog.ul.com/

IEEE 1100 EE Std 1100-2005 (Revision of IEEE Std 1100-1999) - IEEE Recommended Practice for Powering and Grounding Electronic Equipment: retrieved from: https://standards.ieee.org/findstds/standard/1100-2005.html

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