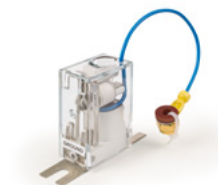


APPLICATION NOTE

Reliability Benefits of Surge Protective Devices for Railroad Electronic Systems



Bourns® Model 1675-01
Hybrid Lightning Arrester (HLA)

Introduction

In modern railway signaling systems, power surges caused by lightning or switching transients can severely affect critical safe and continuous operations. Surge Protective Devices (SPDs) are known to be vital protection solutions to help safeguard sensitive railroad electronic system electrical and signaling equipment from the effects of these unpredictable events.

This application note presents the protection benefits that can be achieved by employing Bourns® Model 1675-01 Hybrid Lightning Arrester (HLA). This arrester is specifically designed for use in railroad applications. It has been engineered as an effective, high reliability solution to protect signal circuits from power surges and lightning strikes, preventing disruption and equipment failure. Also highlighted in the application note are this model's industry standards compliance that aids in streamlining railway system designs, and helpful installation guidelines for various railway signaling applications.

Purpose of SPDs in Railroad Electronic Systems

Railroad signaling and communication systems are crucial elements in safe and efficient rail networks. These systems control wayside signals, track circuits, switch controls, and communication lines, which can be highly susceptible to electrical surges. Such surges can originate from:

- Lightning strikes near structures or utility lines
- Induced surges from high voltage transmission lines
- Switchgear operations within the rail system

Bourns designed the Model 1675-01 HLA to mitigate these threats, enabling the railway's electronic systems to remain operational, even during extreme weather conditions or electrical disturbances. By preventing extreme voltage from reaching sensitive equipment, this model contributes to reducing system downtime, which in turn helps to extend the life of railroad signaling and communication components.

APPLICATION NOTE

Reliability Benefits of Surge Protective Devices for Railroad Electronic Systems



Bourns® Model 1675-01
Hybrid Lightning Arrester (HLA)

Overview of Bourns® Model 1675-01 HLA

The Model 1675-01 Hybrid Lightning Arrester is a cutting-edge solution designed to shield railroad systems from the devastating effects of electrical surges. This advanced module provides superior protection for both new installations and retrofits, ensuring the utmost reliability and safety of the critical infrastructure. The module meets the requirements set forth in the AREMA Communications & Signal Manual and can operate on circuits up to 36 VDC and 24 VAC.

KEY FEATURES

- **Wide Voltage Range:** Capable of operating between 0 V and 36 VDC or up to 25 VAC.
- **High Surge Protection Rating:** Clamps surges as specified in AREMA guidelines, providing reliable protection during high-energy transient events.
- **Long Operating Life:** Designed to provide reliable surge protection over a 25-year lifespan under typical operating conditions.
- **Visual Health Indication:** A built-in indicator provides clear arrester health data without requiring removal, aiding in maintenance checks.
- **Fail-mode Operation:** Designed with a fail-open mechanism, the device ensures the integrity of the protected circuit by automatically disconnecting when it detects a fault, preventing potential damage or disruption.

APPLICATIONS

The Model 1675-01 HLA is engineered with the features necessary to protect a wide range of railroad electronics, including:

- **Track Circuits:** Protects both AC and DC track circuits.
- **Wayside Signals:** Ensures reliable signaling even during electrical disturbances.
- **Switchgear and Communication Lines:** Provides surge protection to prevent signal loss and equipment damage.
- **Lighting Systems:** Protects low current lighting circuits from surges and transients.

IMPORTANT NOTE:

The Bourns® Model 1675-01 HLA should NOT be used on crossing equipment!

APPLICATION NOTE

Reliability Benefits of Surge Protective Devices for Railroad Electronic Systems



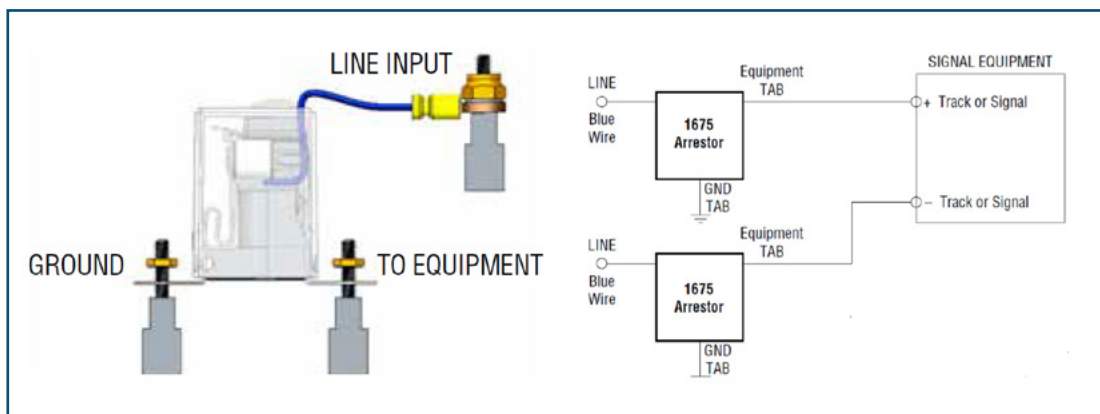
Bourns® Model 1675-01
Hybrid Lightning Arrester (HLA)

Installation Guidelines

Proper installation of this SPD is critical to ensuring railroad systems get this device's maximum protection capabilities. Key installation guidelines to ensure optimal performance of the SPD are shown below:

MOUNTING CONSIDERATIONS

- Place the lightning arrester on the binding posts according to the label instructions provided: Ground Tab to Grounding Post, Equipment Tab to Equipment Post and tighten the nuts.
- Next, connect the blue wire to the Line Input Post, install with washer and then tighten the isolation nut.
- It is necessary to install the device in proximity to the equipment being protected to minimize lead lengths and reduce the likelihood of voltage let-through during surges.



GROUNDING

Grounding plays an essential role in the performance of any surge protection system. Therefore, the arrester needs to be grounded properly in accordance with AREMA standards and industry guidelines. A low impedance ground connection is required so that there is efficient dissipation of the surge energy.

ENVIRONMENTAL CONSIDERATIONS

The Model 1675-01 is designed for use in indoor environments. Make sure the device is installed in a location that is safe from environmental factors such as corrosion, water exposure, and extreme temperatures.

SURGE COORDINATION

For optimal protection, surge protection devices should be coordinated throughout the railway system. It is recommended that the Model 1675-01 Series HLA be installed alongside other SPDs in a coordinated protection strategy to maximize surge protection, covering both high-energy and low-energy transient events.

APPLICATION NOTE

Reliability Benefits of Surge Protective Devices for Railroad Electronic Systems



Bourns® Model 1675-01
Hybrid Lightning Arrester (HLA)

Maintenance and Troubleshooting

HEALTH INDICATION

The Model 1675-01 has visual indicators that feature spring-loaded red tabs. This helpful indication signifies that the SPD will need to be replaced when the red tab protrudes from the side of the arrester. There is also a fuse designed into the arrester, which is visible through the magnifying lens at the top of the arrester. If this fuse is blown, the arrester should be replaced.

SCHEDULED INSPECTION

It is highly suggested that operators do a periodic inspection of the SPD and associated wiring to ensure ongoing protection. During routine maintenance inspections, it is important to check that the device remains in good condition and that no significant surges have degraded its performance.

FAILURE MODES

The Model 1675-01 HLA is designed to fail safely in an open-circuit mode. This prevents equipment from being shorted in the event of an SPD failure, and is another feature that helps eliminate unnecessary equipment shutdown for continuous system operation.

Industry Standards and Certifications

The Model 1675-01 HLA adheres to the following industry standards and certifications:

- **AREMA Communications & Signal Manual:** Has been tested to AREMA manual requirements for railway signal system surge protection.
- **UL 94V-0:** Constructed with flame retardant materials that comply with railway fire protection safety standards.
- **Environmental Standards:** Complies with AREMA's environmental guidelines for wayside equipment.
- **Temperature Resistance:** Tested to operate reliably between -40 °C and +70 °C.

APPLICATION NOTE

Reliability Benefits of Surge Protective Devices for Railroad Electronic Systems



Bourns® Model 1675-01
Hybrid Lightning Arrester (HLA)

Conclusion

The Bourns Model 1675-01 Hybrid Lightning Arrester offers a superior solution for reliable surge protection in railway electronic systems. Its exceptional performance across a wide range of voltages and its resilience to environmental conditions make it an ideal choice for both new installations and retrofits in railway signaling, communication, and power circuits.

By effectively shielding against lightning-induced surges and transient voltage threats, the Model 1675-01 significantly enhances system uptime and minimizes the risk of costly downtime and equipment replacement. Railway operators can rely on the effective protection it provides to safeguard critical signaling infrastructure which also adds an extra level of safety to rail networks.

For more details on product specifications, installation, and certification, please refer to the [Model 1675-01 data sheet](#) and [installation guide](#) available on the Bourns website.

www.bourns.com

Americas: Tel +1-951 781-5500
Email americus@bourns.com

EMEA: Tel +36 88 520 390
Email eurocus@bourns.com

BOURNS®

Asia-Pacific: Tel +886-2 256 241 17
Email asiacus@bourns.com

Mexico: Tel +52 614 478 0400
Email mexicus@bourns.com

COPYRIGHT © 2024 • BOURNS, INC. • 10/24 • e/SPD2439

"Bourns" is a registered trademark of Bourns, Inc. in the U.S. and other countries.