



Novaris

Lightning and Surge Protection

Surge protection for CCTV systems

Power and Signal Protection

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Introduction

The distributed nature of a CCTV network makes the system particularly susceptible to lightning and surge activity. During a surge event each remote camera and the DVR will rise to a different earth potential as each unit has a different impedance to ground. This can cause insulation breakdown and overcurrent problems for the equipment. To protect against these effects the protection device provides a low impedance path that reacts at a voltage lower than the insulation breakdown voltage of the equipment.

It is important that protection is installed at both ends of a signal cable run. If only a single SPD is installed, the surge exposure will increase because of this lower voltage reaction.

By installing surge protection at both ends of the signal cable:

- The surge current has a clear path to ground at both ends
- The effective protection on the cable is doubled
- The shield wire can be used as a temporary equipotential bond during the surge
- The equipment at both ends is effectively protected due to their proximity to the SPD.

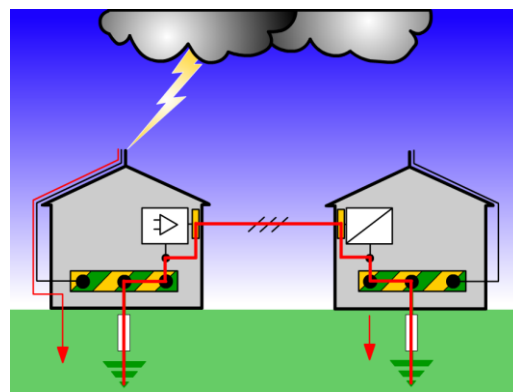


Figure 1 - Illustration of a large earth potential difference

This application note details the surge protection devices available for a most CCTV protocols and applications. For other CCTV applications not covered in this guide, please contact us at

info@novaris.com.au.

IP Cameras

The RJ45 range of network protection products are designed with IP camera applications in mind. They support both Cat6 Gigabit and PoE applications utilising up to 100W of power. The protection units are available in 2 form factors

RJ45-1PoE

The RJ45 single unit series are designed for point to point applications in field protection devices. They are a 2 stage protection device with 10kA of signal protection per pair on the line side and low impedance silicon based protection on the equipment side which faces the protected equipment. The PoE unit is designed to pass up to 1A of current per signal pair allowing it to be used for high current applications.



Figure 2 - RJ45-1PoE

RJ45-8PoE, RJ45-16PoE, and RJ45-24PoE

The second form factor is a 2RU rack mount unit for 8, 16 and 24 line installations. The surge protection configuration in these units is identical to that utilised in the 1PoE system in a convenient form factor for direct connection to a PoE switch.



Figure 3 - RJ45-24PoE

RJ45 Installation

Installation of the RJ45 network protection products is quite simple. They are simply plugged in line with the established network infrastructure ensuring the line side of the protection faces the line between the local and field equipment and the equipment side faces the equipment to be protected. There is an earth stud provided on the rear of the rack mount unit to ensure a clean path to ground is provided. The 1PoE units achieve their earth path either by the DIN rail or by the flying lead on the unit. The RJ45 protection units have no inline resistance and therefore do not affect the perceived cable length for the equipment.

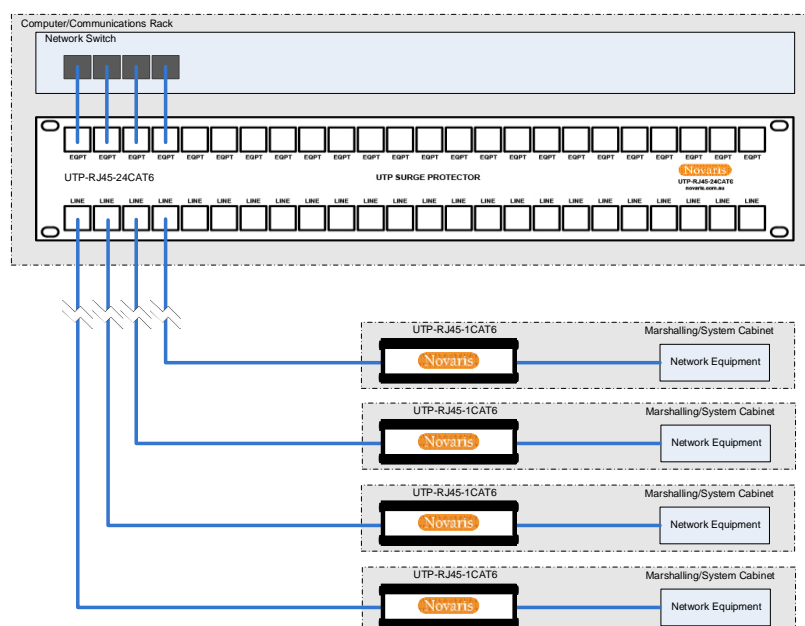


Figure 4 - Multiple feeds with rack unit and field protection

Coaxial Protection

Novaris offers a range of coaxial protection units depending on the particular application

BNC Coaxial Signal Protection

The CLB coaxial protection units are designed specifically for security and CCTV application. They have a 20kA protection front stage and secondary silicon based protection to provide a low let through voltage. They are enclosed in an extruded aluminium enclosure to protect the signal from external interference. The unit has an earth stud mount for earthing and can be ordered with a DIN rail mount option.



Figure 5 - CLB-MF-10

SFD Combined Power and Signal Protection

The SFD combined unit provides protection for both the power and signal lines of a coaxial based installation in a 28mm wide din rail mount unit. The power is protected with a 3 stage surge protection system which incorporates a low pass LC filter to provide a very low voltage let through. The power protection is has models available for 24V, 48V, 110V and 230V systems.

The signal protection is the same as used in the CLB protection devices and is isolated from earth through a Gas Discharge Tube to prevent any video interference due to ground loops.



Figure 6 - SFD1-6-2-30-DC

Balun converted coaxial transmission.

A convenient way of achieving good cable management when installing a balun converted coaxial system over Cat5/6 cable is to pass the cable through a krone mounting block. The Novaris range of Krone Protection units are available in a range of voltages to suit most applications up to 250mA. They can also be used to protect PTZ control systems such as Pelco D using the KPx-06DC unit.



Figure 7 - KP10-48DC

SDI Coaxial Protection

SDI CCTV systems operate at a much higher frequency than standard coaxial camera systems. The CB-FF-90-3 protection unit is able to pass up to 3 GHz signals with less than 0.2% transmission loss through the device whilst providing 20kA of protection for the signal. These devices are available with multiple mounting options such as flying lead, DIN mount and an L bracket. The power for the SDI camera can be protected with a Novaris signal protector such as the SSP6A-26-G.



Figure 8 - CB-FF-90-3

Control Signal Protection

The Novaris SL products are ideally suited for protecting PTZ control signals. The SL-485 is ideally suited for the underlying RS485 protocol of Pelco D. RS232 controlled cameras can use the Novaris SL-DH protectors.

The SL signal line protectors are a multi stage protection device with 10kA of protection on the front end. As with the other signal units, for optimum protection a device needs to be installed at both ends to provide a full current path in the case of a surge.



Figure 9 - SL Signal Line Protectors

DVR Power Protection

Power protection filters provide 3 stages of protection including a low pass LC filter stage to filter out the high frequency surge. 2 units that are particularly well suited to DVR application are the PP10 and the SFD series.

For wired installations the SFD surge filters are recommended. They provide a low 600V let through in a DIN rail format.

For plugin installations the PP10 filters provide the same low let through voltage for general purpose outlets for loads up to 10A.



Figure 10 - SFD1-32-50-275



Figure 11 - PP10-A2

Conclusion

Protecting both the power and distributed signalling system of a CCTV system with the Novaris range of products will increase the lifetime and uptime of the system. This is especially important for sites that require uninterrupted monitoring.