Power surges

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Summary

Power surges are an inherent part of the electrical distribution system and may damage equipment if not handled properly. When installing Axis cameras, use shielded network cables (STP) throughout. To benefit from the surge-resistant design of the cameras, make sure your switches or midspans are properly grounded. If possible, also avoid running network cables parallel to power lines. For enhanced protection, consider adding surge protectors to your installation.

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1 Introduction

Power surges can destroy electronic equipment in mere microseconds unless proper protection is established. This white paper presents what power surges are, what they can do, and how you can protect your network with the built-in capabilities of Axis cameras as well as external protection.

2 Power surges

A power surge is a transient voltage spike in a power or data line. The most familiar cause is lightning strikes, but this is just one of several common reasons.

More frequent causes include the switching on and off of high-powered machinery, such as elevator motors or air conditioners. The resulting changes in magnetic or electrical fields around these high-power lines can lead to voltage transients in surrounding cabling.

Surges can also occur because of faulty equipment or downed power lines. In today's complex power distribution system, this kind of event should be considered inevitable.

Electronic equipment is constantly shrinking in scale, and modern, delicate components are increasingly sensitive to excessive variations in current and voltage. If a sufficiently powerful transient enters the equipment, it may become irrevocably damaged and even catch on fire.

3 Protection

Axis cameras are designed to resist power surges to a certain degree. This design depends on proper installation. The network cable connecting the camera to a switch can pick up strong magnetic and electrical fields in its immediate proximity. This could lead to voltage transients propagating along the cable. With a shielded network cable (STP), the electric energy is trapped by the shield instead, and can be diverted to ground without ever reaching the camera. This requires that the shield has an unbroken path to ground through the power sourcing equipment (PSE), which can be a Power over Ethernet (PoE) switch or a midspan.
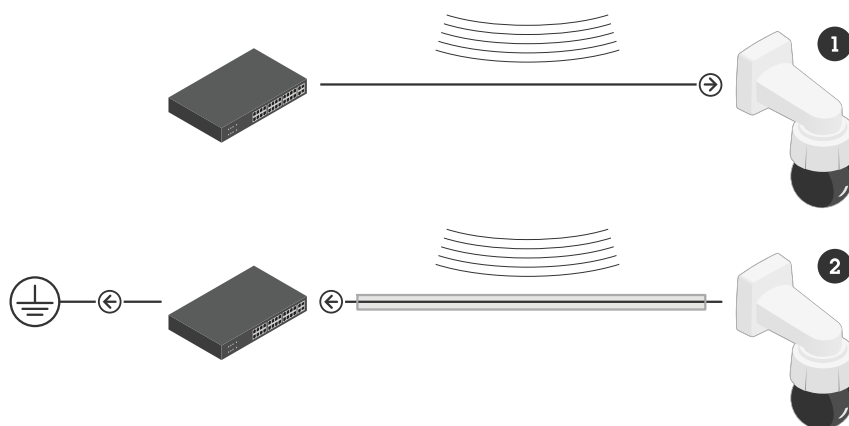
   1   *A camera connected with an unshielded network cable can be negatively affected by power surges caused by strong electromagnetic fields near the cable.*
   2   *A camera connected with a shielded network cable is protected because the shield diverts the electric energy to ground, away from the camera.*

For this to work, it is imperative that the PSE is properly grounded. An Axis PoE midspan should always be connected to a grounded socket for the shield to function properly. However, a desktop switch may lack a ground connection through the power line. Therefore, the switch needs to be grounded separately. Consider the entire cable path when performing the installation. If you are connecting several network cables together to reach the camera, make sure each cable and all patch panels and couplings are shielded.

In addition to the built-in resistance to voltage transients, PoE-compatible surge protectors can help shielding your system. These surge protectors protect the equipment by diverting the surges to ground before they reach the camera, while still allowing the transfer of both data and power. For most surge protectors to function properly, you must use a shielded network cable.
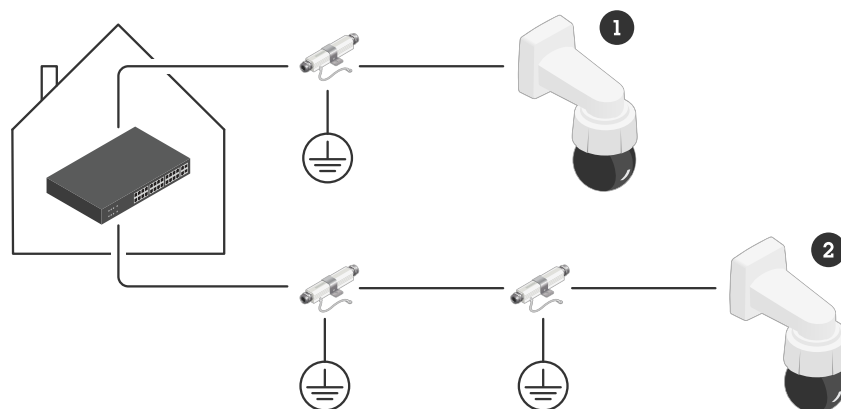
1   *An outdoor camera is protected by a surge protector. It is placed where the Ethernet cable is about to enter the building, and diverts any surges to ground before they reach the camera.*
2   *An outdoor camera located further away can be protected by a surge protector placed adjacent to the camera, while indoor network devices can be protected by another surge protector placed where the Ethernet cable is about to enter the building.*

About Axis Communications

Axis enables a smarter and safer world by creating solutions for improving security and business performance. As a network technology company and industry leader, Axis offers solutions in video surveillance, access control, intercom, and audio systems. They are enhanced by intelligent analytics applications and supported by high-quality training.

Axis has around 4,000 dedicated employees in over 50 countries and collaborates with technology and system integration partners worldwide to deliver customer solutions. Axis was founded in 1984, and the headquarters are in Lund, Sweden

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