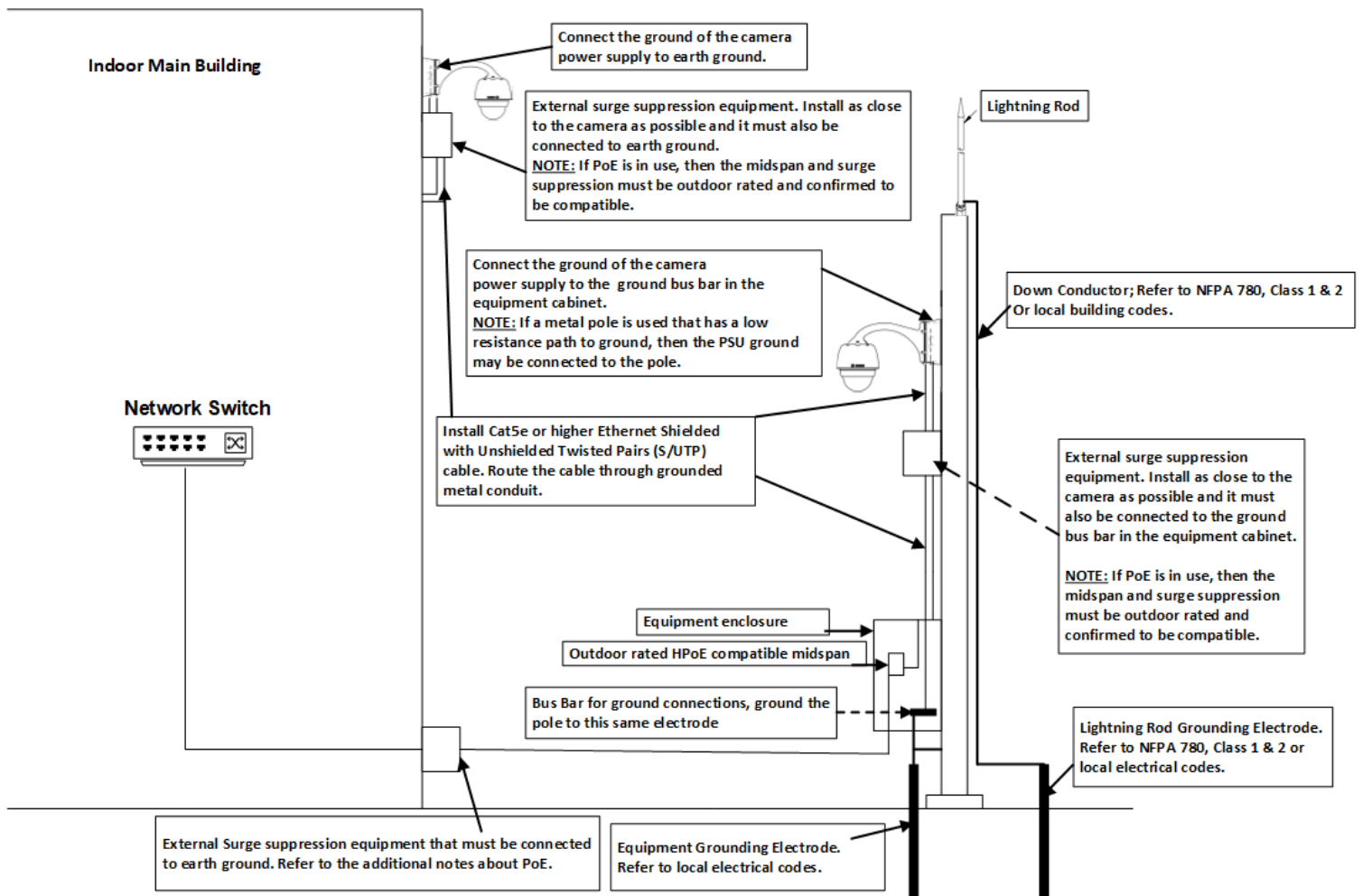


IP Cameras Surge and Lightning Suppression (Best Practices)

OVERVIEW

Cameras installed outdoors are typically exposed to surges, transients, and lightning. The wiring and installation details in this guide are based on common practices used at sites to ensure proper surge and lightning suppression.

This drawing is an example of the best practices to follow during design and installation. This information is applicable to any IP camera, but the mounting hardware will vary between models.



WIRING/CABLING

- **All cables** must be in metal grounded conduit. (Earth grounded across the entire span).
 - Power and signal cables must be in separate conduits with the correct physical separation distance between them.
- **Ethernet cables** must be a minimum of Shielded with Unshielded Twisted Pairs (S/UTP), either Cat 5e, Cat 6, or any new category with improved specifications.
 - The S/UTP cable should be grounded at both ends.
 - Bosch network cameras for outdoor installations incorporate internal surge suppression to help reduce damage from power surges and transients. But this requires the use of a grounded shield to ensure a path for the power surge to reach ground.
 - Don't exceed a cable length of 100 m (328 ft).
 - The following shielding methods provide additional suppression for challenging installations.
 - SF/UTP, has both an overall braided shield (S) and a foil shield (F) with unscreened twisted pairs (UTP). This cable is very effective at preventing EMI from entering or exiting the cable.
 - S/FTP has an overall braided shield (S) with foil screened twisted pairs (FTP). The additional foil on individual pairs limits the amount of crosstalk between the pairs.
- **Additional wiring guidelines**
 - Maintain the separation distance between the Ethernet cable and high voltage/EMF sources. These are typical recommendations, but also refer to local electrical codes.

Voltage Range	Minimum Separation Distance
For less than 600 VAC	50 mm (2 in)
For > 600 VAC < 3 kV	1.5 m (5 ft)
For > 3 kV	3 m (10 ft)

- The camera Power Supply Unit (PSU) and the camera housing must be grounded using a separate earth conductor to an earth grounding bus round or grounded electrode.
 - If a metal pole is being used, also ground the pole to this same electrode. If the metal pole has a low resistance path to ground, then the PSU ground may be connected to the pole.
- Refer to the local electrical codes.

OUTDOOR MIDSPAN

- Must be compatible with HPoE 4-wire operation.
 - Examples:
 - Bosch VJC-7000-90
 - Microsemi PD-9601GO (<http://www.microsemi.com>)
 - Or Equivalent.
 - Refer to the manufacturer's installation instructions and local building codes.

SURGE SUPPRESSION

- Lightning rod and electrode
 - Refer to NFPA 780, Class 1 & 2, UL96A, or the equivalent code appropriate for the country/region.
 - Also refer to the manufacturer's installation instructions and local building codes.
- Must install surge suppressors at the cable entrance into the building and at the camera.
 - Must be compatible with HPoE 4-wire operation.
 - Examples:
 - ITW Linx CAT6-75/POE-RJ45 (<http://www.itwlinx.com/>)
 - Microsemi PD-OUT-SP11
 - Or equivalent.
 - Refer to the manufacturer's installation instructions and local building codes.