

You would like to learn more about lightning protection zones

Let us give you a short overview

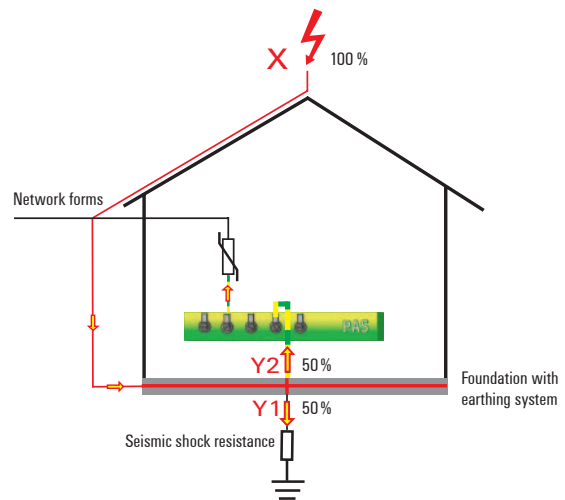
A lightning protection system is composed of both external and internal lightning protection. The air terminals or “lightning rods”, the conductors to the ground, and the specially installed ground rods offer external lightning protection. The internal lightning protection consists of a bonding network and lightning and overvoltage protection devices. Lightning protection systems protect people from injury and protect facilities from fire and electrical damage.

In order to classify which parts of your building or facility will benefit by or require protection, IEC 62305 Parts 1–4 stipulate that a risk assessment must be conducted on the facility to be protected. This risk assessment will indicate a protection class, I through IV, (formerly called a lightning protection class) for the lightning protection equipment. The equipment is classified according to the strength of the pulsating current and refers only to a current of 10/350 μ s or category I of IEC 61643-11:2012. Protection class I assumes a pulsating current of 200 kA. This is the worst case scenario in the event of a direct lightning strike to the external lightning protection equipment. This protection class covers buildings such as petrochemical facilities (external area), explosives storage facilities etc. Protection class II assumes that lightning strikes the external lightning protection equipment with a pulsating current of 150 kA. Example applications for this protection class include parts of hospitals, depots and telecommunications towers. Protection classes III and IV are thrown together because they both assume that lightning strikes the external lightning protection equipment at a pulsating current of 100 kA. Approximately 80 % of all applications fall under these protection classes.

To determine the dimensions of the protection devices, the electric current is assumed to be split, half going into the earth along the ground rods and half being fed to the conductive elements in the electrical installation. Consequently, it is assumed that lightning strikes a facility that falls under protection class I with a pulsating current of 200 kA (X) and 50 % of this, or 100 kA (Y1), would be directly conducted into the ground. The other half (Y2) would flow into the electrical installation or power supply. Depending on the number of power supply conductors, this electricity would be distributed evenly across all of them (simplified presentation). A network with 4 conductors means that 25 kA would be channelled to each in a protection class I facility.

Now, the lightning protection is actually divided into diverse lightning protection zones (LPZ), so that the protection system works efficiently. This division into lightning protection zones is done in layers from the outside in. Zone 0 is outside the building and is itself split into Zones 0A and 0B. The latter, Zone 0B, is located within the area covered by the lightning protection equipment. Zone 1 is, in general, found inside the building or facility. Zone 2 encompasses protected rooms, such as utility or service rooms. The final zone is Zone 3, which encompasses any devices to be protected. Protective measures in the form of lightning and overvoltage protection are always installed at the boundaries between zones when possible.

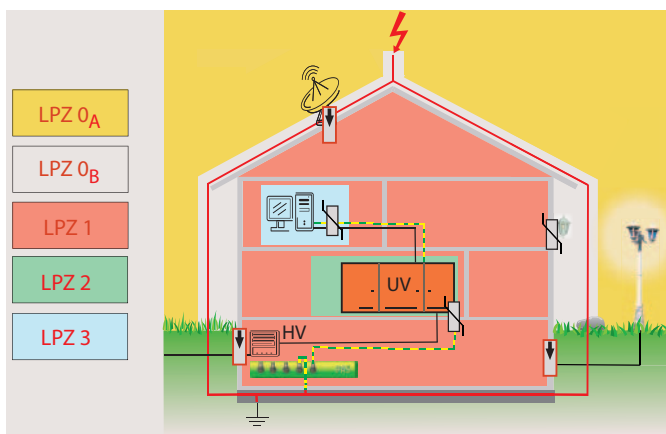
Lightning and surge protection level



LPL I	LPL II	LPL III/IV
X = 200 kA	X = 150 kA	X = 100 kA
Y1 = 100 kA	Y1 = 75 kA	Y1 = 50 kA
Y2 = 100 kA	Y2 = 75 kA	Y1 = 50 kA

Concept of lightning protection zones

Lightning and surge protection devices on the zone boundaries



Boundary between Zone 0 and Zone 1:

When external lightning protection is installed, the standards prescribe Type I lightning and overvoltage protection at the building entrance.

Boundary between Zone 1 and Zone 2:

Type II overvoltage protection is installed here.

Boundary between Zone 2 and Zone 3:

This is where the so called overvoltage protection for end devices is installed.

