Lightning and Surge protection for Photovoltaic (PV) systems.

Due to their exposed installation sites and large collection areas, Photovoltaic (PV) installations are at a high risk of damage due to both direct and indirect lightning strikes. Since the PV system is connected directly to the building electrical system, the subsequent damage and disruption from these surges can cause serious damage to PV installations, expensive inverters and the building electrical system. Damage is not only limited to potentially high repair costs but also loss of service and important revenue for Solar Power plants.

Protection for rooftop PV systems.

Caution must be taken when installing PV systems and also plant equipment onto buildings that already have an existing external Lightning Protection System in place.

On such buildings where an external Lightning Protection System has already been installed to BSEN 62305, care must be taken to ensure that the retro fit installation of any PV / plant equipment does not render the existing Lightning Protection System non-compliant.

A PV system installed above the protective zone offered by the existing Lightning Protection System may now be at risk of receiving a direct lightning strike. Not only could this make the existing Lightning Protection System non-compliant it could also provide a path for lightning currents to enter the building and endanger life.

In order to avoid this, steps should be taken to ensure that the PV system is incorporated into the protective zone of the existing air termination system and protected against direct lightning strikes. Additionally, the correct surge and lightning equipotential bonding SPD’s should be installed where required on incoming services.

Co-ordination between PV designers, installers and lightning protection specialists is essential to ensure the continued integrity of the Lightning Protection System.

Buildings with external lightning protection and sufficient separation distance.

The PV system must be located within the protective zone of the isolated Lightning Protection System and the separation distance must also be maintained between the PV and the Lightning Protection System. If both these factors are met, the PV system is now protected from direct strikes and the possibility of flashover. (Figure 1)

Surge protection on the inverter DC and AC electrical supplies can be provided by the DEHN RED/Line Type 2 range of SPD’s.
The main AC electrical incoming services into the building must now also be bonded with a Type 1 Lightning Current arrester such as the RED/Line DEHNshield or DEHNventil. (Figure 1)

**Buildings with external lightning protection and insufficient separation distance.**
If the separation distance cannot be maintained, for example in the case of a metal roof or when the PV panels are bonded to the Lightning Protection System then lightning equipotential bonding must be carried out using Type 1 SPD’s due to the risk of a flashover bringing lightning currents into the building. (Figure 2)

The DC and AC electrical incoming services into the building must now be bonded with Type 1 SPD’s such as the RED/Line DEHNshield or DEHNventil for AC supplies and the DEHNlimit or DEHNcombo for DC supplies. (Figure 2)
DEHN have extensive experience in the design and development of Lightning Protection solutions for PV systems with a wide range of dedicated products aimed specifically at protecting PV installations. For more information, a dedicated brochure (DS109) for protecting Photovoltaic systems is available. Please contact DEHN (UK) Ltd for more information.