SALTEK®

Overvoltage controlled. ANYWHERE.

SOLUTION

Photovoltaic systems

Protection against surges

Why protect?

Photovoltaic arrays are costly to install and demanding in terms of technology. Their service life must be measured in decades to see a return on the invested funds. Manufacturers usually provide about a twenty-year guarantee for photovoltaic systems.

To provide trouble-free technology throughout its service life, it is necessary to include comprehensive protection against atmospheric and induced overvoltage at the design stage to implement the technology into the project. Protection must be provided not only at the output side of the inverter, but also at the photovoltaic panels.

What standards?

As for the anticipated risks (pursuant to EN (IEC) 62305-2), direct or near lightning strikes are considered. Photovoltaic system designs, including lightning and transient overvoltage suppression, shall comply with the HD (IEC) 60364-7-712 standard (Electrical installations of buildings – Solar photovoltaic (PV) systems), EN (IEC) 61173 (overvoltage protection for photovoltaic (PV) power generating systems), group of standards EN (IEC) 62305 (protection against lightning), technical specification CLC/TS 50539-12 and HD 60364-5-534 (IEC 60364-5-53 clause 534), which deals with the terms and conditions of the surge arresters connection.

Basic principle

The core (key device) of the whole photovoltaic system is the inverter, so the lightning and transient overvoltage protection should be focused on the inverter and, it should be incorporated into the whole lightning and transient overvoltage protection system. Furthermore, photovoltaic units and their bearing metal structures should be integrated into the grounding design.

SPD selection for DC side:

- U_{CPV} maximum continuous operating voltage
  $U_{OC\ STC}$ standardized test circuit voltage of PV String

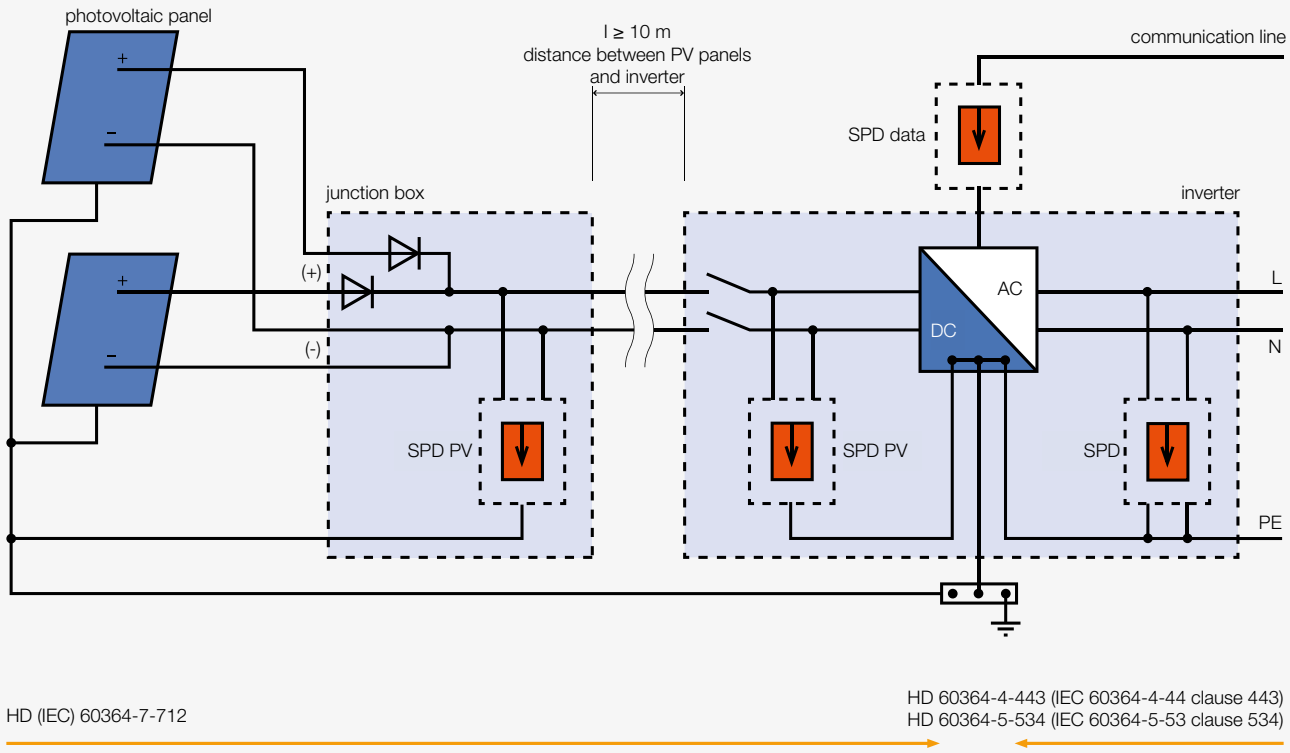
$$U_{CPV} \geq 1{,}2 \times U_{OC\ STC}$$

- If separating spark-over distance “s” is kept
  – Type 2 SPD PV is installed
  – If distance “l” between PV modules and inverter is longer than 10m - SPD is installed on both sides of the DC line

- If separating spark-over distance “s” is not kept
  – Type 1 and 2 SPD PV is installed
  – It is always necessary to install SPD PV on both sides of the DC line

All surge protections SALTEK® for photovoltaic systems are tested according to EN 50539-11.

General circuit diagram of solar photovoltaic systems

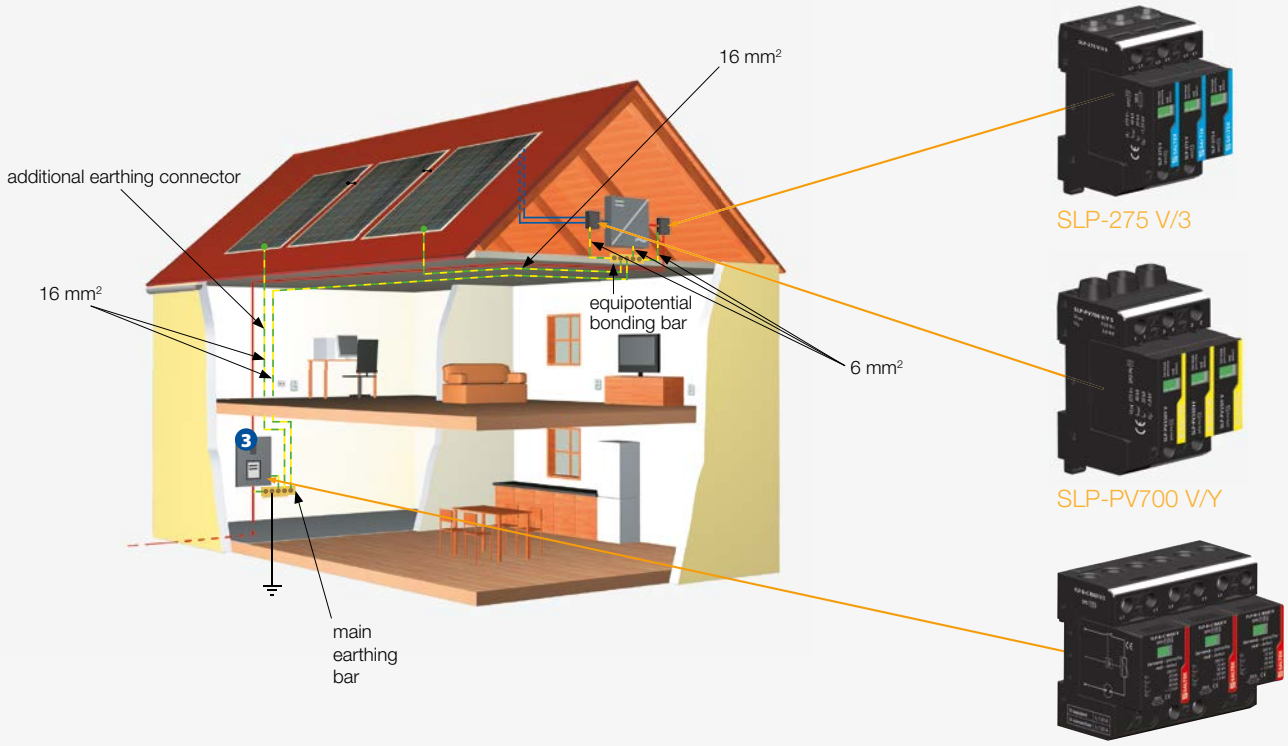


HD (IEC) 60364-7-712

HD 60364-4-443 (IEC 60364-4-44 clause 443)
HD 60364-5-534 (IEC 60364-5-53 clause 534)

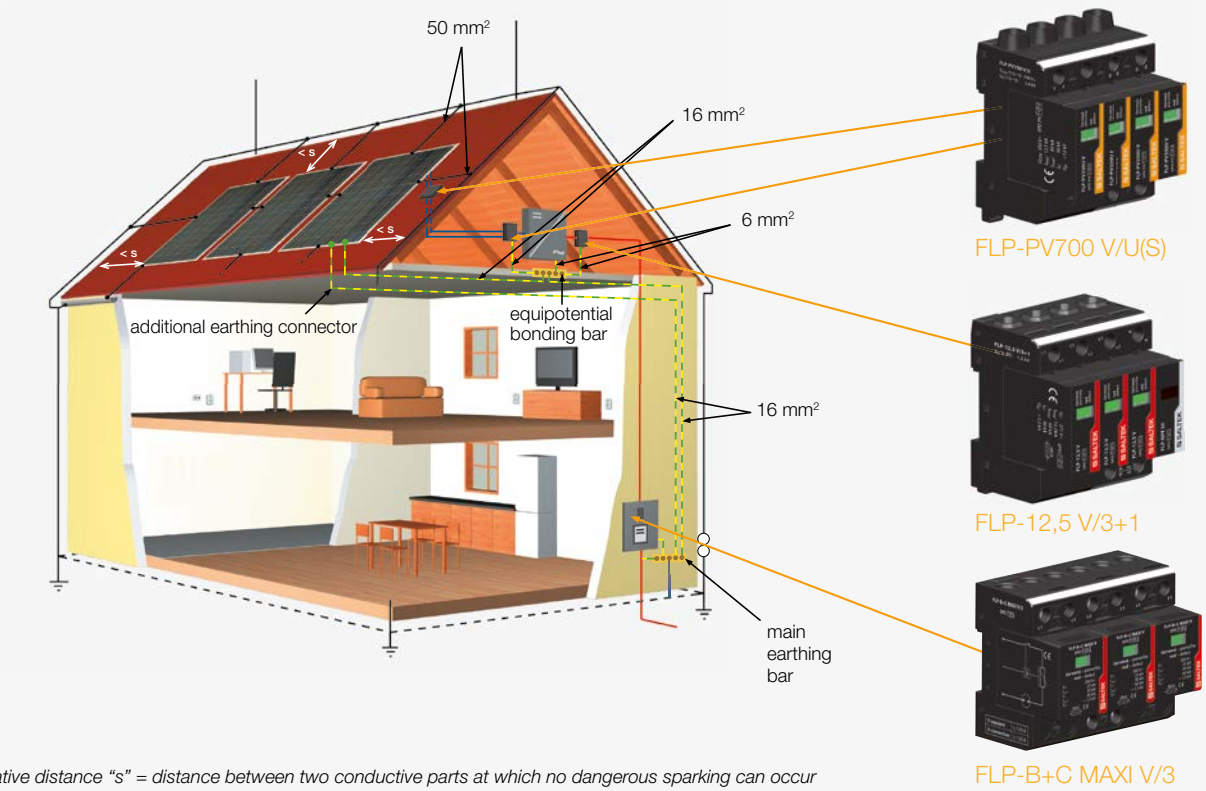
Instalation on the roof

Without external LPS or when the separation distance “s” between PV panels and external LPS is kept



Separative distance “s” = distance between two conductive parts at which no dangerous sparking can occur

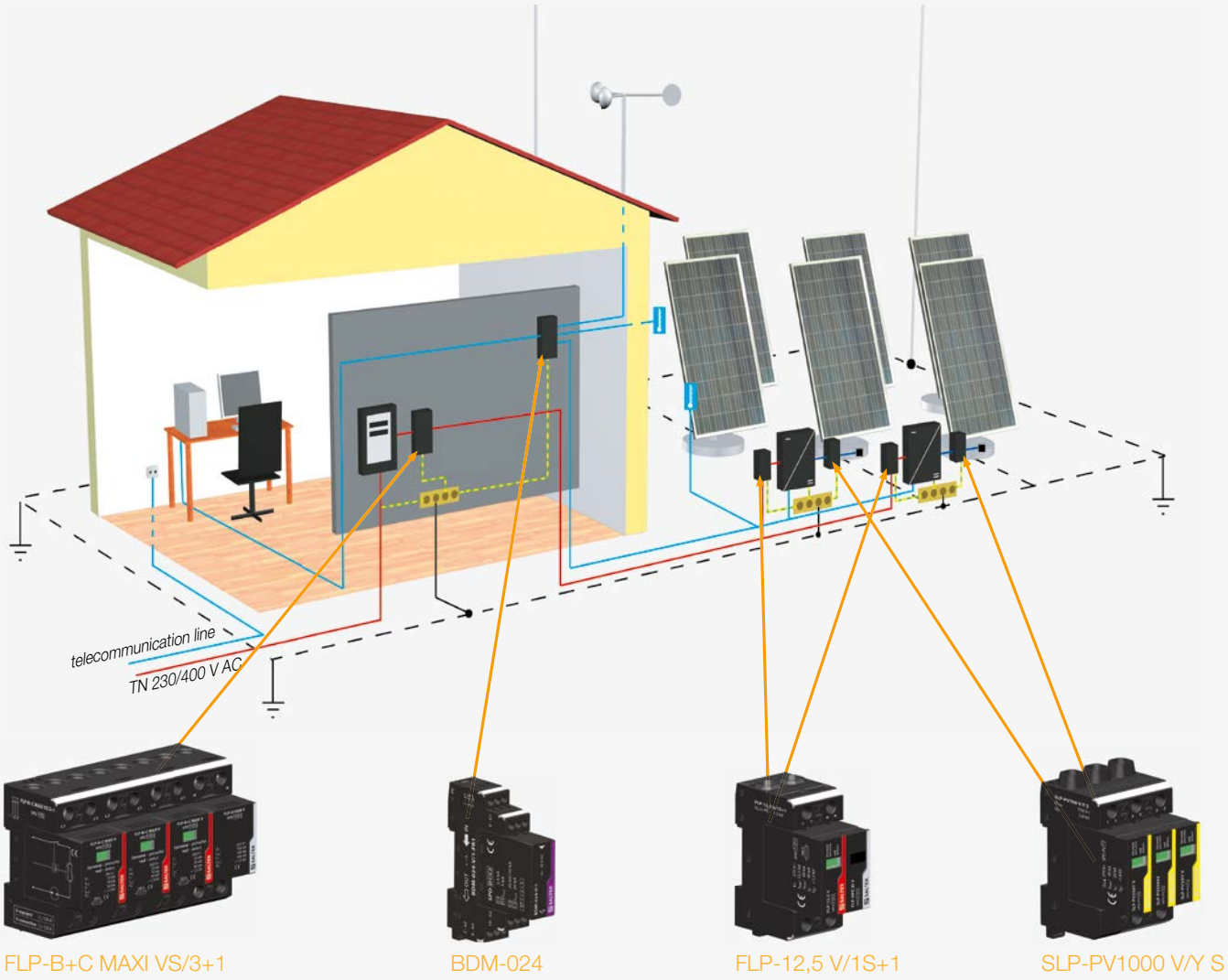
Unkept separation distance “s” between PV panels and external LPS



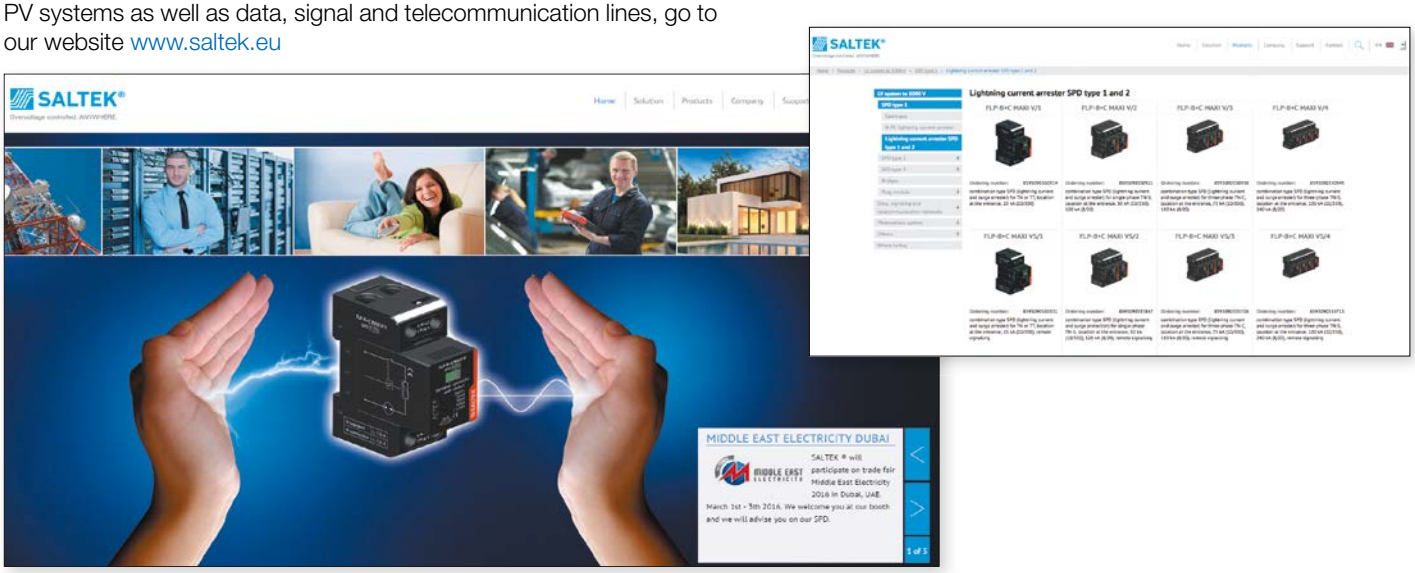
Separative distance “s” = distance between two conductive parts at which no dangerous sparking can occur

Instalation on the field

Instalation with decetralized inverter



For detailed information about SALTEK® products for power systems, PV systems as well as data, signal and telecommunication lines, go to our website www.saltek.eu



Surge arrester – Type 2 SPD PV

Performance surge arrester designated for installation in DC circuits of photovoltaic systems.

SLP-PV170 V/U(S)

U_{CPV} = 170 V DC
I_n = 15 kA (8/20 µs)
I_{max} = 40 kA (8/20 µs)
U_p ≤ 0.6 kV

(S) remote status signaling version

SLP-PV500 V/U(S)

U_{CPV} = 510 V DC
I_n = 20 kA (8/20 µs)
I_{max} = 40 kA (8/20 µs)
U_p ≤ 1.8 kV

(S) remote status signaling version

SLP-PV700 V/Y(S)

U_{CPV} = 750 V DC
I_n = 20 kA (8/20 µs)
I_{max} = 40 kA (8/20 µs)
U_p ≤ 3.6 kV
I_{SCPV} = 1000 A

(S) remote status signaling version

SLP-PV1000 V/Y(S)

U_{CPV} = 1 020 V DC
I_n = 15 kA (8/20 µs)
I_{max} = 40 kA (8/20 µs)
U_p ≤ 4.0 kV
I_{SCPV} = 1000 A

(S) remote status signaling version

SLP-PV1500 V/Y(S)

U_{CPV} = 1 500 V DC
I_n = 15 kA (8/20 µs)
I_{max} = 40 kA (8/20 µs)
U_p ≤ 4.2 kV
I_{SCPV} = 1000 A

(S) remote status signaling version

Lightning current arresters – Type 1 and 2 SPD PV

Performance lightning current arrester designated for installation in DC circuits of photovoltaic systems.

FLP-PV1000 V/Y(S)

U_{CPV} = 1 000 V DC
I_n = 30 kA (8/20 µs)
I_{max} = 60 kA (8/20 µs)
I_{imp} = 12.5 kA (10/350 µs)
U_p ≤ 3.6 kV

(S) remote status signaling version

FLP-PV700 V/U(S)

U_{CPV} = 700 V DC
I_n = 30 kA (8/20 µs)
I_{max} = 60 kA (8/20 µs)
I_{imp} = 25 kA (10/350 µs)
U_p ≤ 2.4 kV

(S) remote status signaling version

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