

Advanced surge protection for photovoltaic energy generation

Improved plant performance with VARITECTOR surge protection

Lightning and surge protection



Weidmüller 

1,300 GW of total globally installed solar power is possible by 2023*



*Source: Solar Power Europe

Protect your energy generation against surge and overvoltage

Reliable protection technology maximizes system availability

Photovoltaic energy generation is one of the fastest-growing green energy sources. Hundreds of MW of rooftop systems and utility-scale PV parks are installed every year. Best system availability and minimised OPEX (operational expenses) define the profitability of any size of system.

PV systems are directly exposed to environmental conditions due to the fact that they are always installed in extraordinary locations. Thus, the probability of being impacted by lightning is high. Unprotected PV systems suffer repeated and significant damage to their components. This results in substantial repair and replacement costs, system downtime and loss of revenue. Automation systems, monitoring components and PV inverters must be protected reliably and in line with current standards. IEC and UL standards define precisely the rules to be applied for implementing state-of-the-art PV installations.



VARITECTOR surge protection for all kind of photovoltaic systems

Lean design and latest technology guarantee best plant protection

Modern photovoltaic energy generation is streamlined to efficiency. Reliable surge protection with future-proof performance is a must to maximise system uptime and profitability. The VARITECTOR PU PV series is designed for use in PV string combiner boxes for generator voltages up to 1,500 V and complies with latest UL and EN standards for global application.

1,000 V
1,500 V

Type I and II protection

Type I and II protection is supported for 1,000V and 1,500V systems fully compliant to latest EN / IEC standards.

I_{scpv}
11 kA

Maximum short-circuit capability

PV plants, which combine many panels in a string, are efficiently protected up to 11 kA of the prospective short-circuit current. Additional fuses for the SPD are not required.





Slim and pluggable arresters

The surge protection devices are easily pluggable and enable a tool-free, fast and cost-effective replacement.

Pluggable inserts



Safe operation up to 4,000 m

PV plants, also such located in high altitude regions, are reliably protected. An additional risk analysis of deratings is not required for extraordinary locations.

up to

4,000 m



Visit our website for more information
www.weidmueller.com/varitector

Let's connect.

Customise your protection with VARITECTOR PU devices

A full scale portfolio for tailored DC and AC protection solutions



Several aspects need to be covered that are related to the type of system (e.g. rooftop systems or utility-scale open space systems). When selecting overvoltage protection measures, a set of regulations have to be observed.

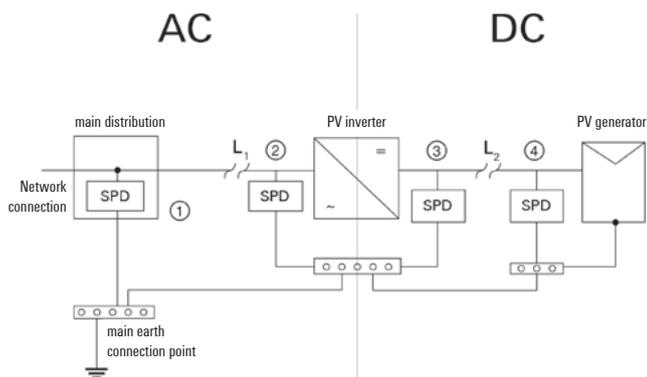
PV systems with external lightning protection

Type II surge protection can be used, provided the separation distance is maintained (usually > 0.7 m to 1 m). If the separation distance is not maintained, a surge protection Type I for DC cabling is required.

PV systems without external lightning protection

This is a common design for which surge protection Type II must be provided for DC cabling.

The figure on the right shows the general architecture of a PV system. The table below is intended to help you select the correct surge protection products according to the specifications of applicable standards in a PV system.



L_1 describes the cable length between the main distribution board and PV inverter (AC side) and L_2 describes the line length between PV inverter and PV generator (DC side). With a line length > 10 m, an SPD is required on both sides by the standard.

Selection guide surge protection



External lightning protection system	Observe separation distance	Line length $L_1 < 10$ m	Line length $L_2 < 10$ m	Place of installation ①	Place of installation ②	Place of installation ③	Place of installation ④
no	-	no	no	Type II AC	Type II AC	Type II DC	Type II DC
no	-	no	yes	Type II AC	Type II AC	Type II DC	-
no	-	yes	no	Type II AC	-	Type II DC	Type II DC
no	-	yes	yes	Type II AC	-	Type II DC	-
yes	yes	no	no	Type I AC	Type II AC	Type II DC	Type II DC
yes	yes	no	yes	Type I AC	Type II AC	Type II DC	-
yes	yes	yes	no	Type I AC	-	Type II DC	Type II DC
yes	yes	yes	yes	Type I AC	-	Type II DC	-
yes	no	no	no	Type I AC	Type I AC*	Type I DC	Type I DC
yes	no	no	yes	Type I AC	Type I AC*	Type I DC	-
yes	no	yes	no	Type I AC	-	Type I DC	Type I DC
yes	no	yes	yes	Type I AC	-	Type I DC	-

*If the inverter and the main distribution board are connected to the same earthing bar by an earthing cable not longer than 0.5 m, no SPD is required at installation location "2".



Recommendation

Since PV systems are usually installed in unprotected environments (danger from direct lightning strikes) it is always advisable to install type I+II surge protection. This increases also the service life of the protective components used.

DC protection in 1,000 V applications

Type	Classification	Order No.
VPU PV I+II 3 R 1000	Typ I/II	2530620000
VPU PV I+II 3 1000	Typ I/II	2530610000
VPU PV I+II 0 1000	Typ I/II	2530600000
VPU PV I+II OM 1000	Typ I/II	2534300000
VPU PV II 3 R 1000	Typ II	2530180000
VPU PV II 3 1000	Typ II	2530550000
VPU PV II 0 1000	Typ II	2530660000



DC protection in 1,500 V applications

Type	Classification	Order No.
VPU PV I+II 3 R 1500	Typ I/II	2530590000
VPU PV I+II 3 1500	Typ I/II	2530580000
VPU PV I+II 0 1500	Typ I/II	2530570000
VPU PV I+II OM 1500	Typ I/II	2534330000
VPU PV II 3 R 1500	Typ II	2530650000
VPU PV II 3 1500	Typ II	2530640000
VPU PV II 0 1500	Typ II	2530630000



AC protection for 230 V grids

Type	Classification	Order No.
VPU AC I 3+1 275V/25 LCF S 2PE	Typ I/II	2726760000
VPU AC I 3+1 R 275V/25 LCF S 2PE	Typ I/II	2726770000
VPU AC I 0 275V/25 LCF 2PE	Typ I/II	2730840000
VPU AC II 3+1 300/50	Typ II	2591080000
VPU AC II 3+1 R 300/50	Typ II	2591090000
VPU AC II 0 300/50	Typ II	2591010000



DC PV Box for 1,000 V/1,500 V applications

Description	Product description	Type	Voltage	MPPT	Connection	Order No.
VPUM111SXFV100TXPX10	VPU PV BOX CG I+II 3 1000 1M	Type I+II	1000 V	1	Cable Glands	2755970000
VPUM212SXFV100TXPX10	VPU PV BOX CG I+II 5 1000 2M	Type I+II	1000 V	2	Cable Glands	2755980000
VPUM111SXFV101TXPX10	VPU PV BOX WM4 I+II 3 1000 1M	Type I+II	1000 V	1	WM4C	2764140000
VPUM212SXFV101TXPX10	VPU PV BOX WM4 I+II 5 1000 2M	Type I+II	1000 V	2	WM4C	2764150000
VPUM111SXFV200TXPX10	VPU PV BOX CG II 3 1000 1M	Type II	1000 V	1	Cable Glands	2755950000
VPUM212SXFV200TXPX10	VPU PV BOX CG II 5 1000 2M	Type II	1000 V	2	Cable Glands	2755960000
VPUM111SXFV201TXPX10	VPU PV BOX WM4 II 3 1000 1M	Type II	1000 V	1	WM4C	2764110000
VPUM212SXFV201TXPX10	VPU PV BOX WM4 II 5 1000 2M	Type II	1000 V	2	WM4C	2764130000
VPUM111SXFV200TXPX15	VPU PV BOX CG II 3 1500 1M	Type II	1500 V	1	Cable Glands	2755990000
VPUM212SXFV200TXPX15	VPU PV BOX CG II 5 1500 2M	Type II	1500 V	2	Cable Glands	2756000000
VPUM111SXFV201TXPX15	VPU PV BOX WM4 II 3 1500 1M	Type II	1500 V	1	WM4C	2764160000
VPUM212SXFV201TXPX15	VPU PV BOX WM4 II 5 1500 2M	Type II	1500 V	2	WM4C	2764180000



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