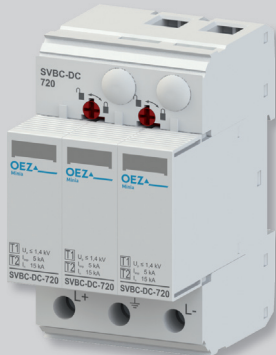


OVERVOLTAGE PROTECTIONS FOR DC APPLICATIONS

T1+T2, T2



SVBC-DC-1050-3V-MZ



SVBC-DC-720-3V-MZ

Combined lightning current and surge voltage arresters - type 1 + type 2 - DC

- For protection of electric networks and equipment against overvoltage from direct or indirect lightning strokes in the arresting equipment of buildings, LV lines etc.
- For protection against overvoltage caused by atmospheric disturbances and from switching processes in networks.
- For protection of parts of photovoltaic sources mainly on their DC side.
- It reduces voltage and „cut up“ the overvoltage wave power caused by direct or indirect lightning stroke and or switching processes in the networks.
- Use: as the first stage and the second stage in protection against overvoltage – type 1 and type 2 according to EN 50539-11.

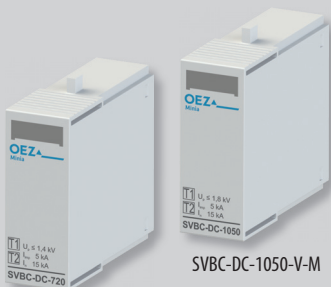
Combined lightning current and surge voltage arresters SVBC-DC with removable module

- Surge voltage arresters intended for building, residential, commercial and other similar installations, part of which are DC applications (e.g. photovoltaic source).
- Main components are varistors connected in Y.
- Possibility of mounting in casual empty enclosures and switchboard cabinets Distri.
- Design multipart, consisting of a base and replaceable modules. The modules can be removed in case of measurement or failure without necessity of device disconnection.
- Remote and visual signalling of the shut-down device state (after disconnection the surge voltage arrester is non-functional and the replaceable module must be replaced).
- Remote signalling of state is provided in type SVBC-DC-...-3V-MZS.

U _{CPV}	Design	Type	Order code	Number of modules	Weight [kg]	Package [pcs]
DC 1050 V	without remote signalling	SVBC-DC-1050-3V-MZ	OEZ:42714	3	0.379	1
	with remote signalling	SVBC-DC-1050-3V-MZS	OEZ:42715	3	0.385	1
DC 720 V	without remote signalling	SVBC-DC-720-3V-MZ	OEZ:42717	3	0.365	1
	with remote signalling	SVBC-DC-720-3V-MZS	OEZ:42718	3	0.371	1

Replaceable modules

For device	Spare module	Order code	Number of modules in the device	Weight [kg]	Package [pcs]
SVBC-DC-1050-3V-MZ(S)	SVBC-DC-1050-V-M	OEZ:42716	3	0.072	1
SVBC-DC-720-3V-MZ(S)	SVBC-DC-720-V-M	OEZ:42719	3	0.057	1



SVBC-DC-720-V-M

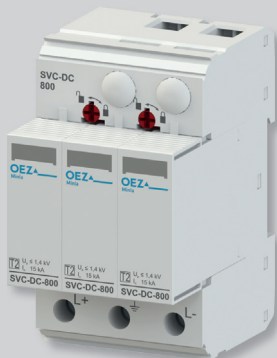
SVBC-DC-1050-V-M

OVERVOLTAGE PROTECTIONS FOR DC APPLICATIONS

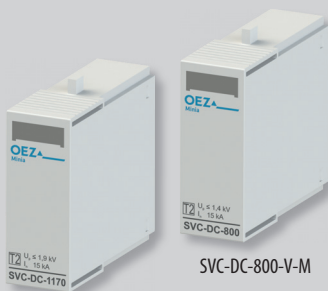
T1+T2, T2



SVC-DC-1170-3V-MZ



SVC-DC-800-3V-MZ



SVC-DC-1170-V-M

SVC-DC-800-V-M

Surge voltage arresters - type 2 - DC

- For protection of electric networks and equipment against overvoltage from indirect lightning strokes.
- For protection against overvoltage caused by atmospheric disturbances and from switching processes in networks.
- For protection of parts of photovoltaic sources mainly on their DC side.
- It reduces voltage and „cut up“ the overvoltage wave power caused by indirect lightning stroke and/or switching processes in the networks.
- Use: as the second stage in protection against overvoltage – type 2 according to EN 50539-11.
- For further information on OEZ offer for photovoltaic systems see catalogue „Protective and switching devices of photovoltaic sources“.

Surge voltage arresters SVC-DC with removable module

- Surge voltage arresters intended for building, residential, commercial and other similar installations, part of which are DC applications (e.g. photovoltaic source).
- Main components are varistors connected in Y.
- Possibility of mounting in casual empty enclosures and switchboard cabinets Distri.
- Design multipart, consisting of a base and replaceable modules. The modules can be removed in case of measurement or failure without necessity of device disconnection.
- Remote and visual signalling of the shut-down device state (after disconnection the surge voltage arrester is non-functional and the replaceable module must be replaced).
- Remote signalling of state is provided in type SVC-DC-...-3V-MZS.

U _{CPV}	Design	Type	Order code	Number of modules	Weight [kg]	Package [pcs]
DC 1170 V	without remote signalling	SVC-DC-1170-3V-MZ	OEZ:42708	3	0.328	1
	with remote signalling	SVC-DC-1170-3V-MZS	OEZ:42709	3	0.333	1
DC 800 V	without remote signalling	SVC-DC-800-3V-MZ	OEZ:42711	3	0.322	1
	with remote signalling	SVC-DC-800-3V-MZS	OEZ:42712	3	0.326	1

Replaceable modules

For device	Spare module	Order code	Number of modules in the device	Weight [kg]	Package [pcs]
SVC-DC-1170-3V-MZ(S)	SVC-DC-1170-V-M	OEZ:42710	3	0.076	1
SVC-DC-800-3V-MZ(S)	SVC-DC-800-V-M	OEZ:42713	3	0.068	1

OVERVOLTAGE PROTECTIONS FOR DC APPLICATIONS

T1+T2, T2

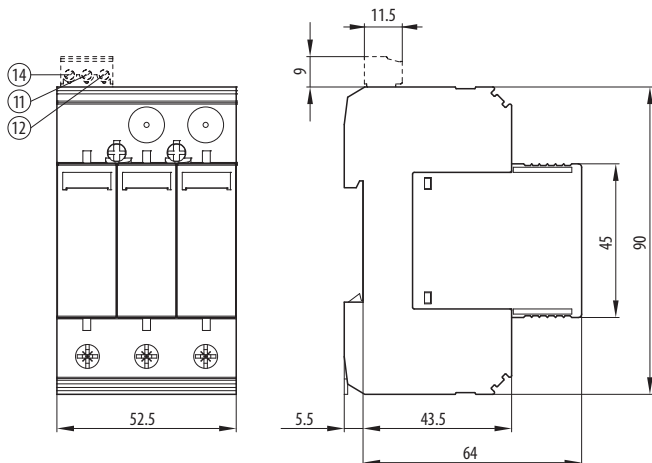
Specifications

Type		SVBC-DC-720-3V-MZ SVBC-DC-720-3V-MZS	SVBC-DC-1050-3V-MZ SVBC-DC-1050-3V-MZS
Standards		EN 50539-11 EN 50539-11	EN 50539-11 EN 50539-11
Approval marks		CE EAC	CE EAC
Max. off-load voltage	U_{UOCSTC}	DC 600 V	DC 875 V
Maximum constant operating voltage	U_{CPV}	DC 720 V	DC 1 050 V
Rated loading current (V-connection)	I_L	80 A	80 A
Max. short-circuit current (V-connection)	I_{SCP}	300 A	300 A
Impulse current (10/350 μ s)	I_{imp}	5 kA	5 kA
Rated discharge current (8/20 μ s)	I_n	15 kA	15 kA
Max. discharge current (8/20 μ s)	I_{max}	40 kA	40 kA
Voltage protection level	U_p	L+, L- (L+/L-), PE	L+, L- (L+/L-), PE
		≤ 2.6 kV	≤ 3.5 kV
Earth-leakage current	I_{PE}	≤ 20 μ A	≤ 20 μ A
Still stand power input	P_c	< 20 mVA	< 25 mVA
Arrester classification		according to EN 50539-11	according to EN 50539-11
		type 1 and type 2 T1+T2	type 1 and type 2 T1+T2
Response time		≤ 25 ns	≤ 25 ns
Degree of protection		IP20	IP20
Mounting on "U" rail according to EN 60715 – type		TH 35	TH 35
Connection			
Conductor - rigid (solid, stranded)		1.5 ÷ 35 mm ²	1.5 ÷ 35 mm ²
Conductor – flexible		1.5 ÷ 25 mm ²	1.5 ÷ 25 mm ²
Torque		4.5 Nm	4.5 Nm
Top or bottom connection		only bottom	only bottom
Optical signalling			
Functional state		transparent	transparent
Non-functional state		red	red
Remote signalling			
Arrangement of contacts ¹⁾		001	001
Max. voltage/current	U_{max}/I_{max}	AC 250 V / 1.5 A DC 30 V / 1 A	AC 250 V / 1.5 A DC 30 V / 1 A
Min. switched power		AC 5 V / 5 mA	AC 5 V / 5 mA
Connection – conductor (rigid, flexible)		0.14 ÷ 1.5 mm ²	0.14 ÷ 1.5 mm ²
Torque		0.25 Nm	0.25 Nm
Operating conditions			
Ambient temperature		-40 ÷ 80 °C	-40 ÷ 80 °C
Working position		arbitrary	arbitrary

¹⁾ Each digit indicates successively the number of make, break and break-make contacts.

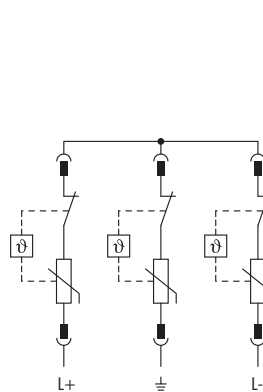
Dimensions

SVBC-DC

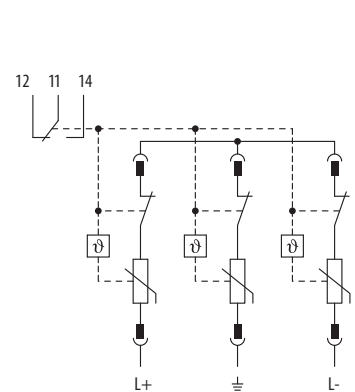


Diagram

SVBC-DC-...-3V-MZ



SVBC-DC-...-3V-MZS



OVERVOLTAGE PROTECTIONS FOR DC APPLICATIONS

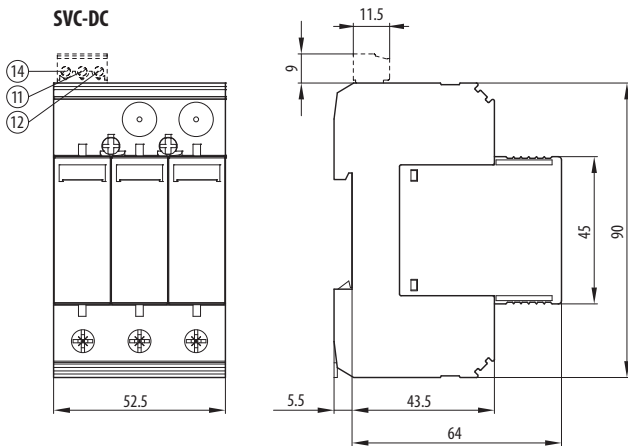
T1+T2, T2

Specifications

Type		SVC-DC-800-3V-MZ SVC-DC-800-3V-MZS	SVC-DC-1170-3V-MZ SVC-DC-1170-3V-MZS
Standards		EN 50539-11	EN50539-11
Approval marks		CE EAC	CE EAC
Max. off-load voltage	U_{UOCSIC}	DC 670 V	DC 970 V
Maximum constant operating voltage	U_{CPV}	DC 800 V	DC 1170 V
Rated loading current (V-connection)	I_L	80 A	80 A
Max. short-circuit current (V-connection)	I_{SCPV}	300 A	300 A
Rated discharge current (8/20 μ s)	I_n	15 kA	15 kA
Rated discharge current (8/20 μ s)	I_{max}	40 kA	40 kA
Voltage protection level	U_p L+, L- (L+/L-), PE	≤ 2.7 kV	≤ 3.7 kV
Earth-leakage current	I_{PE}	≤ 20 μ A	≤ 20 μ A
Still stand power input	P_C	< 20 mVA	< 25 mVA
Arrester classification	according to EN 50539-11	type 2 T2	type 2 T2
Response time		≤ 25 ns	≤ 25 ns
Degree of protection		IP20	IP20
Mounting on "U" rail according to EN 60715 – type		TH 35	TH 35
Connection			
Conductor - rigid (solid, stranded)		1.5 ÷ 35 mm ²	1.5 ÷ 35 mm ²
Conductor – flexible		1.5 ÷ 25 mm ²	1.5 ÷ 25 mm ²
Torque		4.5 Nm	4.5 Nm
Top or bottom connection		only bottom	only bottom
Optical signalling			
Functional state		transparent	transparent
Non-functional state		red	red
Remote signalling			
Arrangement of contacts ¹⁾		001	001
Max. voltage/current	U_{max}/I_{max}	AC 250 V / 1 A DC 30 V / 1 A	AC 250 V / 1 A DC 30 V / 1 A
Min. switched power		AC 5 V / 5 mA	AC 5 V / 5 mA
Connection – conductor (rigid, flexible)		0.14 ÷ 1.5 mm ²	0.14 ÷ 1.5 mm ²
Torque		0.25 Nm	0.25 Nm
Operating conditions			
Ambient temperature		-40 ÷ 80 °C	-40 ÷ 80 °C
Working position		arbitrary	arbitrary

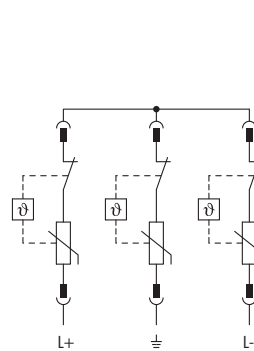
¹⁾ Each digit indicates successively the number of make, break and break-make contacts.

Dimensions

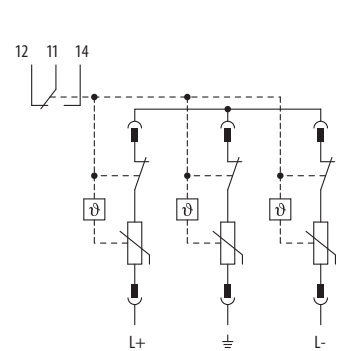


Diagram

SVC-DC-...-3V-MZ



SVC-DC-...-3V-MZS



RECOMMENDATIONS FOR DESIGN, INSTALLATION AND MEASUREMENT OF OVERVOLTAGE PROTECTIONS

Conversion tables of former and new designs

	Formerly produced devices		Newly produced devices		Note
	Type designation	Order code	Type designation	Order code	
Type 1	SJBplus-50-2.5	OEZ:39227	SJB-50E-1-MZS	OEZ:45559	rated voltage AC 230 V
	SJB-NPE-1.5	OEZ:34716	-	-	without direct replacement
	3x SJBplus-50-2.5	OEZ:39227	3x SJB-50E-1-MZS	OEZ:45559	rated voltage AC 230 V
	3x SJBplus-50-2.5 + 1x SJB-NPE-1.5	OEZ:39227 + OEZ:34716	2x SJB-50E-1-MZS + 1x SJB-50E-1N-MZS	OEZ:45559 + OEZ:45560	rated voltage AC 230 V
	4x SJBplus-50-2.5	OEZ:39227	4x SJB-50E-1-MZS	OEZ:45559	rated voltage AC 230 V
Type 2	SVM-440-Z	OEZ:34720	SVC-350-1-MZ	OEZ:42378	rated voltage AC 230 V
	SVM-440-ZS	OEZ:34721	SVC-350-1-MZS	OEZ:42379	rated voltage AC 230 V
	SVM-NPE-Z	OEZ:34723	-	-	without direct replacement
	3x SVM-440-Z	OEZ:34720	SVC-350-3-MZ	OEZ:38365	multipole design (3+0; TN-C), rated voltage AC 230 V
	3x SVM-440-ZS	OEZ:34721	SVC-350-3-MZS	OEZ:38366	multipole design (3+0; TN-C), rated voltage AC 230 V
	3x SVM-440-Z + SVM-NPE-Z	OEZ:34720 + OEZ:34723	SVC-350-3N-MZ	OEZ:38367	multipole design (3+1; TN-S, TT), rated voltage AC 230 V
	3x SVM-440-ZS + SVM-NPE-Z	OEZ:34721 + OEZ:34723	SVC-350-3N-MZS	OEZ:38368	multipole design (3+1; TN-S, TT), rated voltage AC 230 V
	4x SVM-440-Z	OEZ:34720	SVC-350-4-MZ	OEZ:40861	multipole design (4+0; TN-S), rated voltage AC 230 V
	4x SVM-440-ZS	OEZ:34721	SVC-350-4-MZS	OEZ:40862	multipole design (4+0; TN-S), rated voltage AC 230 V

Varistor function test

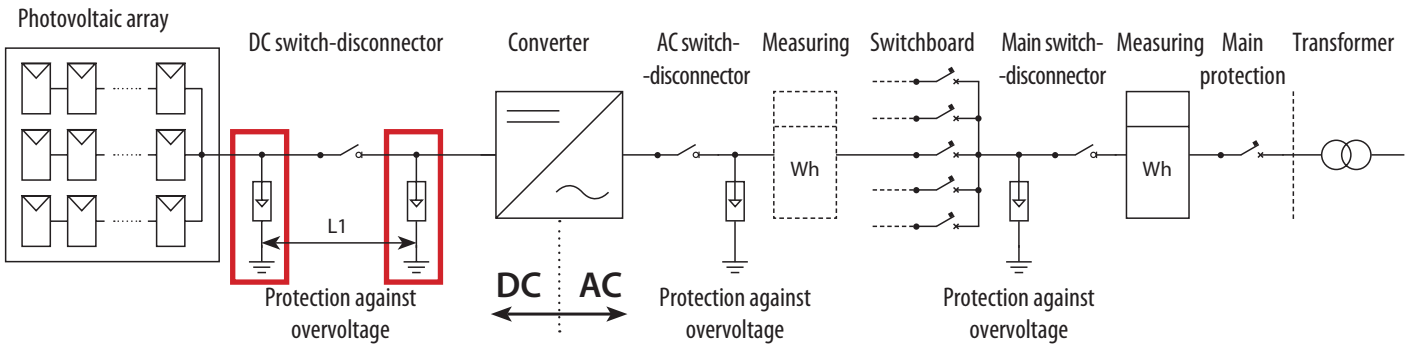
- Varistor is able to provide protection against overvoltage repeatedly. However, every such actuating changes its structure to certain extent. We can detect by timely varistor check whether is this change of structure and resulting varistor function already beyond the acceptable limit or not.
- Standard EN 62 305-4 requires besides others also periodic overvoltage protections checks. This check is usually completed with varistor measurement.
- On principle, the check of overvoltage protections is carried out by connecting to the DC voltage, while increasing the voltage to the point when current 1 mA flows through the arrester. Subsequently the voltage level is deducted. This procedure shall be repeated for opposite polarity as well.
- If the deducted voltage level is in between the Voltage tolerance zone given in the table, the overvoltage protection is functional. In the opposite case it is necessary to replace the overvoltage protection or its module. The table of Voltage tolerance zones is given below.

Table of tolerance zones at 1 mA

Type designation	Note	Order code	Voltage tolerance zone at 1 mA	Type designation	Note	Order code	Voltage tolerance zone at 1 mA
SVBC-12.5-1-MZ	T1+T2	OEZ:40615	510 ÷ 561 V	SVC-350-3N-MZS	T2	OEZ:38368	509 ÷ 621 V
SVBC-12.5-1N-MZS	T1+T2	OEZ:40618	510 ÷ 561 V	SVC-350-4-MZ	T2	OEZ:40861	509 ÷ 621 V
SVBC-12.5-3-MZ	T1+T2	OEZ:40619	510 ÷ 561 V	SVC-350-4-MZS	T2	OEZ:40862	509 ÷ 621 V
SVBC-12.5-3-MZS	T1+T2	OEZ:40620	510 ÷ 561 V	SVC-350-1-M	replaceable module T2	OEZ:38369	509 ÷ 621 V
SVBC-12.5-3N-MZ	T1+T2	OEZ:40621	510 ÷ 561 V	SVC-DC-1170-3V-MZ	T2	OEZ:42708	643.5 ÷ 786.5 V
SVBC-12.5-3N-MZS	T1+T2	OEZ:40622	510 ÷ 561 V	SVC-DC-1170-3V-MZS	T2	OEZ:42709	643.5 ÷ 786.5 V
SVBC-12.5-4-MZ	T1+T2	OEZ:40623	510 ÷ 561 V	SVC-DC-1170-V-M	replaceable module T2	OEZ:42710	643.5 ÷ 786.5 V
SVBC-12.5-4-MZS	T1+T2	OEZ:40624	510 ÷ 561 V	SVC-DC-800-3V-MZ	T2	OEZ:42711	484.5 ÷ 561 V
SVBC-12.5-1-M	replaceable module T1+T2	OEZ:40625	510 ÷ 561 V	SVC-DC-800-3V-MZS	T2	OEZ:42712	484.5 ÷ 561 V
SJBC-25E-3-MZS	T1+T2 - only varistor module is measured	OEZ:38361	508.5 ÷ 565 V	SVC-DC-800-V-M	replaceable module T2	OEZ:42713	484.5 ÷ 561 V
SJBC-25E-3N-MZS	T1+T2 - only varistor module is measured	OEZ:38362	508.5 ÷ 565 V	SVBC-DC-1050-3V-MZ	T1+T2	OEZ:42714	643.5 ÷ 786.5 V
SVC-N350-1-M	replaceable module T1+T2	OEZ:38364	508.5 ÷ 565 V	SVBC-DC-1050-3V-MZS	T1+T2	OEZ:42715	643.5 ÷ 786.5 V
SVC-350-1-MZ	T2	OEZ:42378	509 ÷ 621 V	SVBC-DC-1050-V-M	replaceable module T1+T2	OEZ:42716	643.5 ÷ 786.5 V
SVC-350-1-MZS	T2	OEZ:42379	509 ÷ 621 V	SVBC-DC-720-3V-MZ	T1+T2	OEZ:42717	484.5 ÷ 561 V
SVC-350-1N-MZ	T2	OEZ:42380	509 ÷ 621 V	SVBC-DC-720-3V-MZS	T1+T2	OEZ:42718	484.5 ÷ 561 V
SVC-350-1N-MZS	T2	OEZ:42381	509 ÷ 621 V	SVBC-DC-720-V-M	replaceable module T1+T2	OEZ:42719	484.5 ÷ 561 V
SVC-350-3-MZ	T2	OEZ:38365	509 ÷ 621 V	SVD-253-1N-MZS	T3	OEZ:38371	216 ÷ 264 V
SVC-350-3-MZS	T2	OEZ:38366	509 ÷ 621 V	SVD-335-3N-MZS	T3	OEZ:38372	459 ÷ 561 V
SVC-350-3N-MZ	T2	OEZ:38367	509 ÷ 621 V	SVD-335-1N-AS	T3	OEZ:39164	459 ÷ 561 V

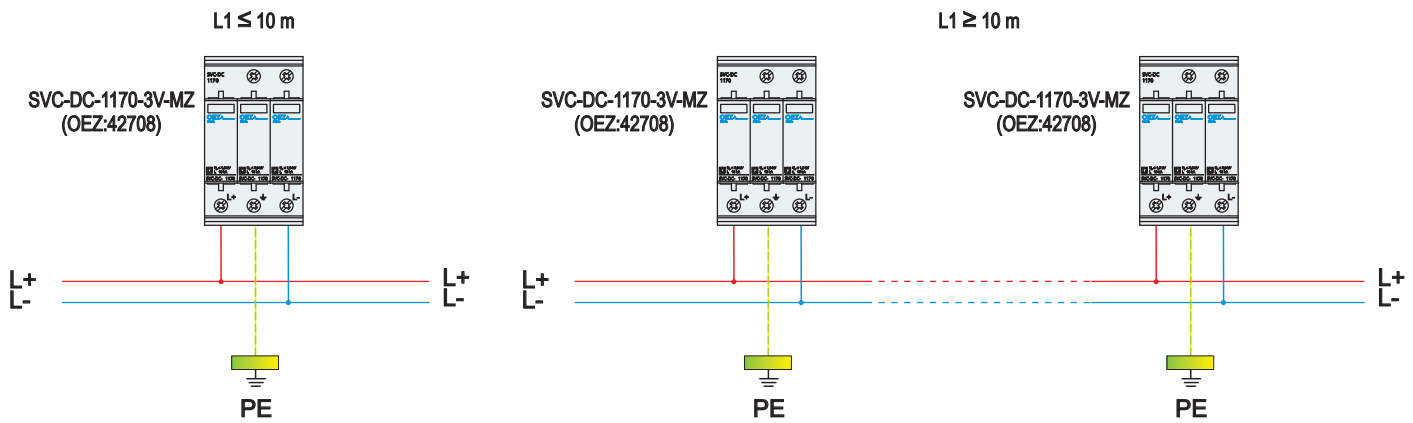
RECOMMENDATIONS FOR DESIGN, INSTALLATION AND MEASUREMENT OF OVERVOLTAGE PROTECTIONS

Photovoltaic systems



a) Photovoltaic sources, where there is no threat of direct stroke to the solar panel or lines

- Dependent on the length of line between the panels and the inverter one or two devices are used. In general, at the length of line $L1 > 10\text{ m}$ we use the overvoltage protection at both the solar panel and the inverter, at the length of the line $L \leq 10\text{ m}$ we use the overvoltage protection either at the solar panel or at the inverter.
- Design SVC-DC-1170-3V-MZ(S) or SVC-DC-800-3V-MZ(S).



b) Photovoltaic sources, wherein there is a risk of direct stroke in a panel or a line, especially in cases, where the panel is connected with the arresting system galvanically

- Dependent on the length of line between the panels and the inverter one or two devices are used. In general, at the length of line $L1 > 10\text{ m}$ we use the overvoltage protection at both the solar panel and the inverter, at the length of the line $L \leq 10\text{ m}$ we use the overvoltage protection either at the solar panel or at the inverter.
- Design SVBC-DC-1050-3V-MZ(S) or SVBC-DC-720-3V-MZ(S).

