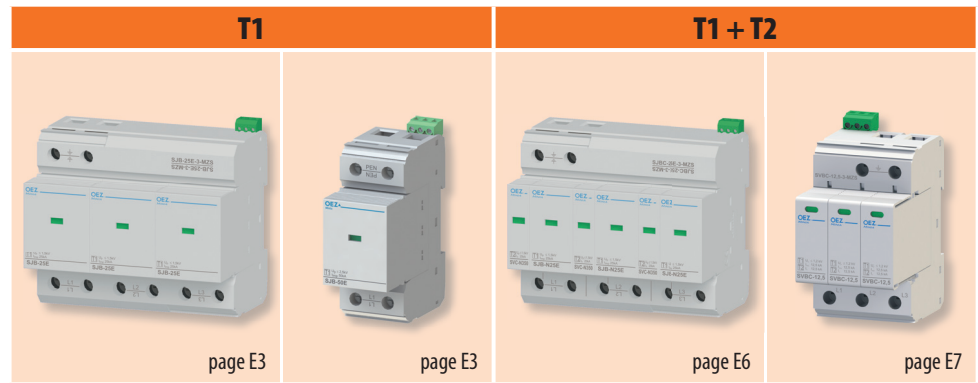


# Modular devices



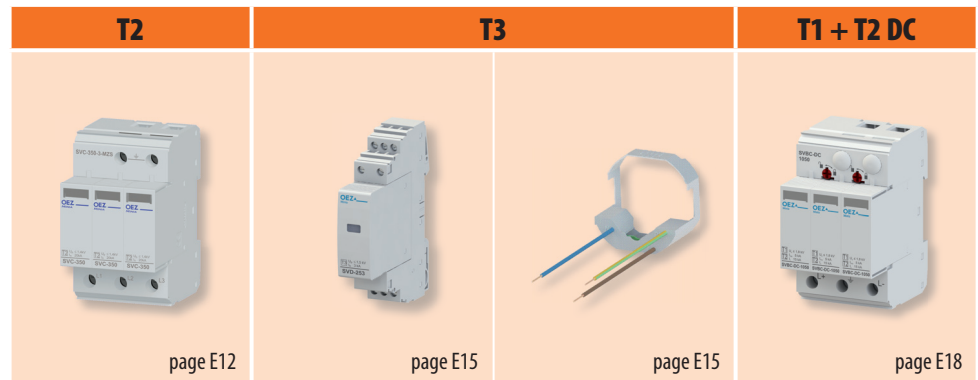


## SUMMARY OF MODELS



Type		<b>SJB-25E</b>	<b>SJB-50E</b>	<b>SJBC-25E</b>	<b>SVBC-12,5</b>
Arrester classification according to EN 61643-11		type 1	type 1	type 1 + type 2	type 1 + type 2
Maximum constant operating voltage	$U_c$	AC 350 V	AC 264 V	AC 350 V	AC 335 V
Impulse current (10/350 $\mu$ s) / pole	$I_{imp}$	25 kA	50 kA	25 kA	12.5 kA
Rated discharge current (8/20 $\mu$ s) / pole	$I_n$	25 kA	50 kA	25 kA	12.5 kA
Maximum discharge current (8/20 $\mu$ s) / pole	$I_{max}$	-	-	40 kA	50 kA
Voltage protection level	$U_p$	$\leq 1.5$ kV	$\leq 2.5$ kV	$\leq 1.5$ kV	$\leq 1.2$ kV
Replaceable module		✓	✓	✓	✓
Optical signalling		✓	✓	✓	✓
Remote signalling		✓	✓	✓	✓

✓ available, - unavailable

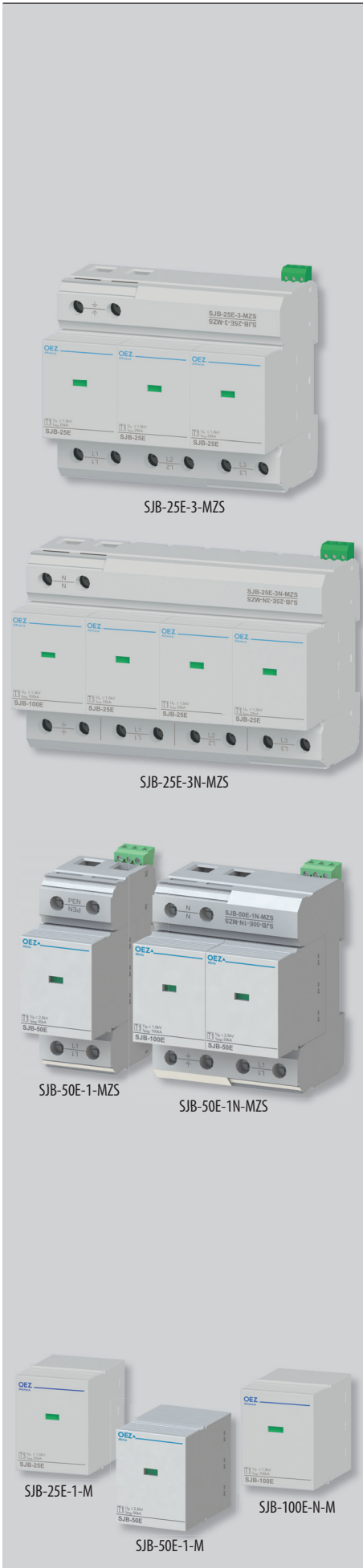


Type		<b>SVC-350</b>	<b>SVD-253</b>	<b>SVD-255</b>	<b>SVBC-DC</b>
Arrester classification according to EN 61643-11		type 2	type 3	type 3	type 1 + type 2
Maximum constant operating voltage	$U_c$	AC 350 V	AC 253 V	AC 255 V	DC 1050 V
Impulse current (10/350 $\mu$ s) / pole	$I_{imp}$	-	-	-	5 kA
Rated discharge current (8/20 $\mu$ s) / pole	$I_n$	20 kA	3 kA	-	15 kA
Maximum discharge current (8/20 $\mu$ s) / pole	$I_{max}$	40 kA	-	4 kA	40 kA
Off-load voltage	$U_{oc}$	-	6 kV	6 kV	-
Voltage protection level	$U_p$	$\leq 1.5$ kV	$\leq 1.1$ kV	$\leq 1.5$ kV	$\leq 3.5$ kV
Replaceable module		✓	✓	-	✓
Optical signalling		✓	✓	-	✓
Acoustic signalling		-	-	✓	-
Remote signalling		✓	✓	-	✓

✓ available, - unavailable

# LIGHTNING CURRENT ARRESTERS SJB

T1



- 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 of electric networks and equipment in residential, commercial and industrial buildings etc.
- It reduces voltage and „cut up“ the overvoltage wave power caused by direct or indirect lightning stroke.

- Use: as the first stage (coarse protection) in three degree scale of protection against overvoltage – **type 1** according to EN 61643-11.
- For detailed information on OEZ overvoltage protection see the dokument „Overvoltage protection – Application manual“.

### Lightning current arresters SJB-25E-...

- Lightning current arresters designed for building, residential, commercial and other similar installations classed in group „big installation threat“.
- For four-wire TN-C network use SJB-25E-3-MZS.
- For five-wire TN-S, TT network use SJB-25E-3N-MZS.
- Main component is a powerful arrester gap with electronic ignition release able to arrest lightning current up to 25 kA (10/350µs).
- Ability of quenching of follow current up to 50 kA.
- 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 lightning current arrester is non-functional and the replaceable module must be replaced).
- The modules can be turned in their base by 180°, so that it is also possible to turn the whole device while keeping legibility of description (e.g. at connection from the top).

Network	Type	Order code	Number of modules	Weight [kg]	Package [pcs]
TN-C (3L + PEN)	<b>SJB-25E-3-MZS</b>	OEZ:38357	6	0.910	1
TN-S (3L + N + PE)	<b>SJB-25E-3N-MZS</b>	OEZ:38358	8	1.310	1

### Lightning current arresters SJB-50E-...

- Lightning current arrester intended for demanding applications (where SJB-25E-... is not enough), classed in group „industrial and special applications“.
- For four-wire TN-C network use 3 pcs SJB-50E-1-MZS.
- For five-wire TN-S, TT network use the combination 2 pcs SJB-50E-1-MZS + 1 pc SJB-50E-1N-MZS.
- Main component is a powerful arrester gap with electronic ignition release able to arrest lightning current up to 50 kA (10/350 µs) / pole.
- Ability of quenching of follow current up to 50 kA.
- 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 lightning current arrester is non-functional and the replaceable module must be replaced).
- The modules can be turned in their base by 180°, so that it is also possible to turn the whole device while keeping legibility of description (e.g. at connection from the top).

Network	Type	Order code	Number of modules	Weight [kg]	Package [pcs]
TN-C (1L + PEN)	<b>SJB-50E-1-MZS</b>	OEZ:45559	2	0.410	1
TN-S (1L + N + PE)	<b>SJB-50E-1N-MZS</b>	OEZ:45560	4	0.770	1








### Replaceable modules

For device	Spare module	Order code	Number of modules in the device	Weight [kg]	Package [pcs]
SJB-25E-3-MZS	<b>SJB-25E-1-M</b>	OEZ:38360	3	0.240	10
	<b>SJB-25E-1-M</b>	OEZ:38360	3	0.240	10
SJB-25E-3N-MZS	<b>SJB-100E-N-M</b>	OEZ:38359	1	0.240	10
SJB-50E-1-MZS	<b>SJB-50E-1-M</b>	OEZ:45561	1	0.270	10
SJB-50E-1N-MZS	<b>SJB-50E-1-M</b>	OEZ:45561	1	0.270	10
	<b>SJB-100E-N-M</b>	OEZ:38359	1	0.240	10

## LIGHTNING CURRENT ARRESTERS SJB

T1

### Specifications

Type		SJB-25E-3-MZS	SJB-25E-3N-MZS	SJB-50E-1-MZS	SJB-50E-1N-MZS		
Standards		EN 61643-11 IEC 61643-11	EN 61643-11 IEC 61643-11	EN 61643-11 IEC 61643-11	EN 61643-11 IEC 61643-11		
Approval marks							
Rated voltage	$U_N$	AC 230/400 V	AC 230/400 V	AC 230 V	AC 230 V		
Maximum constant operating voltage	$U_C$	L-N	-	-	AC 264 V		
		L-PEN	AC 350 V	-	AC 264 V	-	
		N-PE	-	AC 350 V	-	AC 264 V	
Impulse current (10/350 $\mu$ s)	$I_{imp}$	L-N	-	75 kA (25 kA / pole)	-		
		peak value $I_{peak}$	L-PEN	75 kA (25 kA / pole)	-	50 kA	
			N-PE	-	100 kA	-	100 kA
		charge Q		37.5 As	50 As	25 As	25 As
		specific energy W/R		1.4 MJ/ $\Omega$	2.50 MJ/ $\Omega$	625 kJ/ $\Omega$	625 kJ/ $\Omega$
Rated discharge current (8/20 $\mu$ s)	$I_n$	L-N	-	25 kA / pole	-		
		L-PEN	25 kA / pole	-	50 kA	-	
		N-PE	-	100 kA	-	100 kA	
Rated frequency	$f_n$	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz		
Voltage protection level	$U_p$	L-N	-	$\leq 1.5$ kV	-		
		L-PEN/L-PE	$\leq 1.5$ kV / -	- / 2.5 kV	$\leq 2.5$ kV / -	- / 3 kV	
		N-PE	-	$\leq 1.5$ kV	-	$\leq 1.5$ kV	
Arrester classification		according to EN 61643-11	type 1 	type 1 	type 1 		
		according to IEC 61643-1	class I	class I	class I		
Response time		L-N	-	$\leq 100$ ns	-		
		L-PEN	$\leq 100$ ns	-	$\leq 100$ ns	-	
		N-PE	-	$\leq 100$ ns	-	$\leq 100$ ns	
Quenching follow-current	$I_{fi}$	L-N	-	50 kA / AC 264 V	-		
		L-PEN	50 kA / AC 264 V	-	50 kA / AC 264 V	-	
		N-PE	-	0.1 kA	-	0.1 kA	
Maximum backup fuse gG/gL		parallel connection (T)	315 A	315 A	500 A		
		serial connection (V)	125 A	125 A	125 A	125 A	
Degree of protection - with connected conductors		IP20	IP20	IP20	IP20		
Mounting on "U" rail according to EN 60715 – type		TH 35	TH 35	TH 35	TH 35		
Connection							
Conductor – rigid (solid, stranded)		2.5 $\div$ 35 mm <sup>2</sup>	2.5 $\div$ 35 mm <sup>2</sup>	2.5 $\div$ 35 mm <sup>2</sup>	2.5 $\div$ 35 mm <sup>2</sup>		
Conductor – flexible		2.5 $\div$ 25 mm <sup>2</sup>	2.5 $\div$ 25 mm <sup>2</sup>	2.5 $\div$ 25 mm <sup>2</sup>	2.5 $\div$ 25 mm <sup>2</sup>		
Torque		4.5 Nm	4.5 Nm	4.5 Nm	4.5 Nm		
Top or bottom connection		yes	yes	yes	yes		
Optical signalling							
Functional state		green	green	green	green		
Non-functional state		red	red	red	red		
Remote signalling							
Arrangement of contacts <sup>1)</sup>		001	001	001	001		
Max. voltage/current	$U_{max}/I_{max}$	AC 250 V / 1 A	AC 250 V / 1 A	AC 250 V / 1 A	AC 250 V / 1 A		
		DC 30 V / 1 A	DC 30 V / 1 A	DC 30 V / 1 A	DC 30 V / 1 A		
Min. voltage/current	$U_{min}/I_{min}$	AC 12 V / 10 mA	AC 12 V / 10 mA	AC 12 V / 10 mA	AC 12 V / 10 mA		
Connection – conductor (rigid, flexible)		0.14 $\div$ 1.5 mm <sup>2</sup>	0.14 $\div$ 1.5 mm <sup>2</sup>	0.14 $\div$ 1.5 mm <sup>2</sup>	0.14 $\div$ 1.5 mm <sup>2</sup>		
Torque		0.25 Nm	0.25 Nm	0.25 Nm	0.25 Nm		
Operating conditions							
Ambient temperature		-40 $\div$ 80 °C	-40 $\div$ 80 °C	-40 $\div$ 80 °C	-40 $\div$ 80 °C		
Working position		arbitrary	arbitrary	arbitrary	arbitrary		

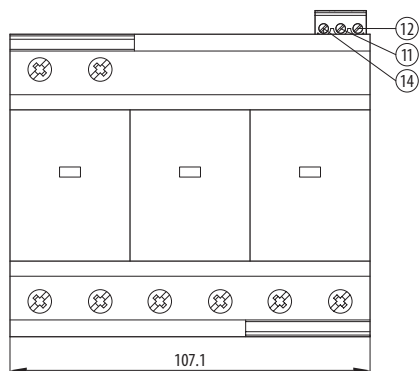
<sup>1)</sup> Each digit indicates successively the number of make, break and break-make contacts.

# LIGHTNING CURRENT ARRESTERS SJB

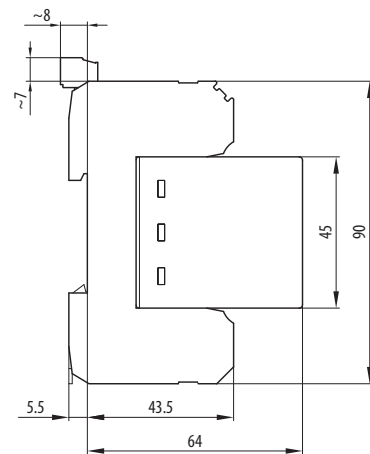
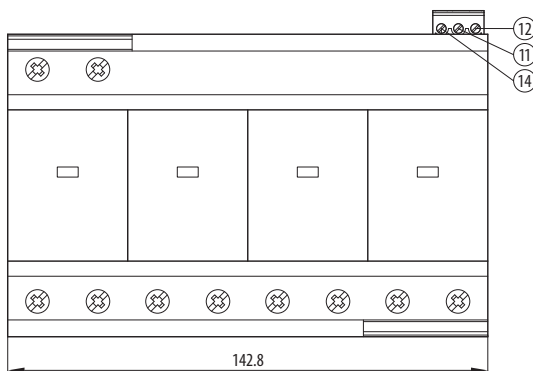
T1

## Dimensions

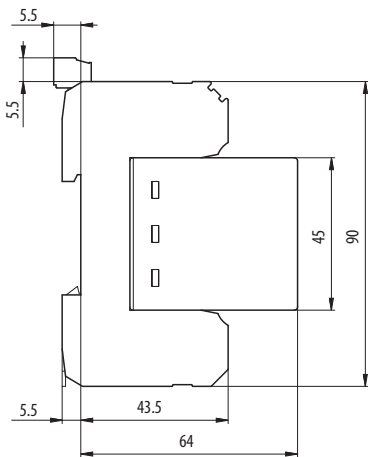
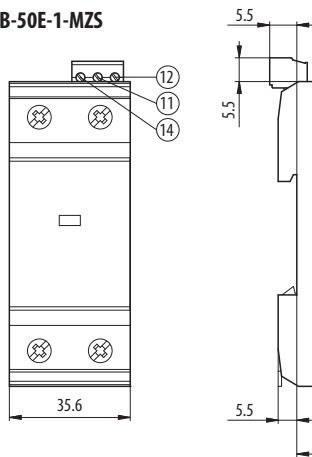
SJB-25E-3-MZS



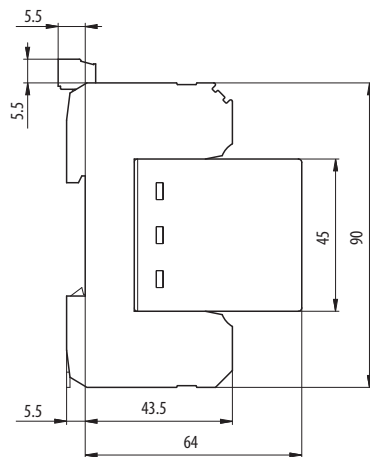
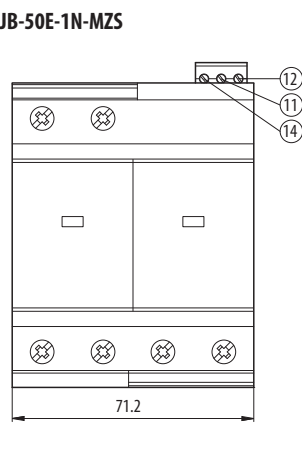
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SJB-50E-1-MZS

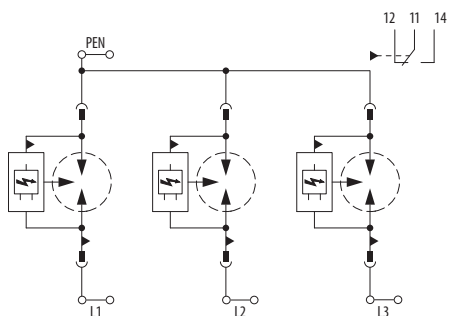


SJB-50E-1N-MZS

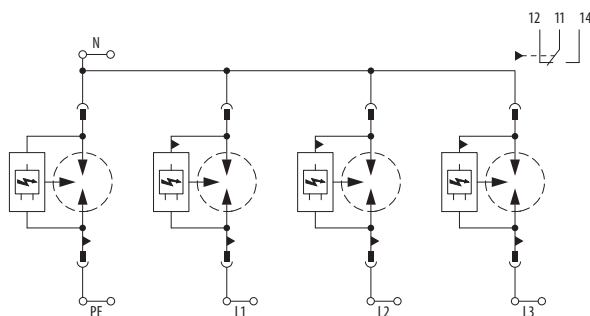


## Diagram

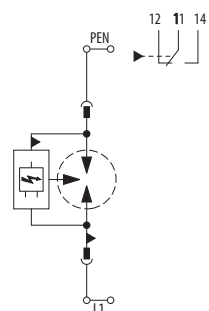
SJB-25E-3-MZS



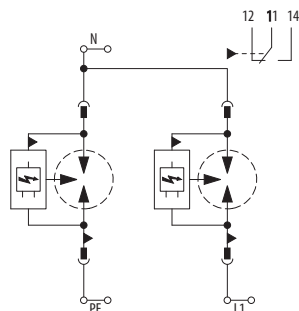
SJB-25E-3N-MZS



SJB-50E-1-MZS



SJB-50E-1N-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	
Type 3	SVD-335-3N-MZS	OEZ:38372	-	-	without direct replacement can be replaced by 3x SVD-253-1N-MZS
	SVD-335-1N-AS	OEZ:39164	SVD-255-1N-AS	OEZ:46246	maximum constant operating voltage AC 255 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	540 ÷ 594 V <sup>1)</sup>
SVC-350-3-MZS	T2	OEZ:38366	509 ÷ 621 V	SVD-255-1N-AS	T3	OEZ:39164	558 ÷ 682 V <sup>2)</sup>
SVC-350-3N-MZ	T2	OEZ:38367	509 ÷ 621 V				

<sup>1)</sup> Due to internal connection only N(+) L(-) polarity can be measured. Measuring in reverse polarity indicates incorrect values.

<sup>2)</sup> Measuring may be carried out at 5 mA current.

# RECOMMENDATIONS FOR DESIGN, INSTALLATION AND MEASUREMENT OF OVERVOLTAGE PROTECTIONS

## INSTALLATION OF OVERVOLTAGE PROTECTIONS

### 1. Installation of lightning current arresters – T1 T1

Lightning current arresters, i.e. the arresters of type 1 are installed mainly on the interface of zones LPZ0/LPZ1. The main switchboard is usually placed on this interface. The devices are installed on "U" rail type TH 35 (DIN rail). Installation of the lightning current arresters in electrometer switchboard shall be approved by relevant power distribution companies. In not measured part, use the lightning current arresters SJB.

### 2. Installation of combined lightning current T1+T2 and surge voltage arresters of type T1 + T2

We recommend to install the compact combined arrester type 1 and 2 ( SJBC = spark gap + varistor) in the main switchboard on "U" rail type TH 35, in case it is possible to unite the boundaries of lightning protection levels LPZ0/LPZ1 and LPZ1/LPZ2. With its parameters and small dimensions, this combination is suitable for both industrial applications and applications in buildings, apartments etc. The advantage of combined arresters is that they provide complete solution for given system (etc. TN-C, TN-S) without the need of interconnecting busbars etc. - „one device = complete solution“.

If it is not possible to unite the boundaries of lightning protection levels LPZ0/LPZ1 and LPZ1/ LPZ2 (etc. in block of flats - in the unmeasured part there can not be installed varistor based overvoltage protection), then type SJB has to be used on the boundary of LPZ0/ LPZ1 and type SVC-... on the boundary of LPZ1/ LPZ2.

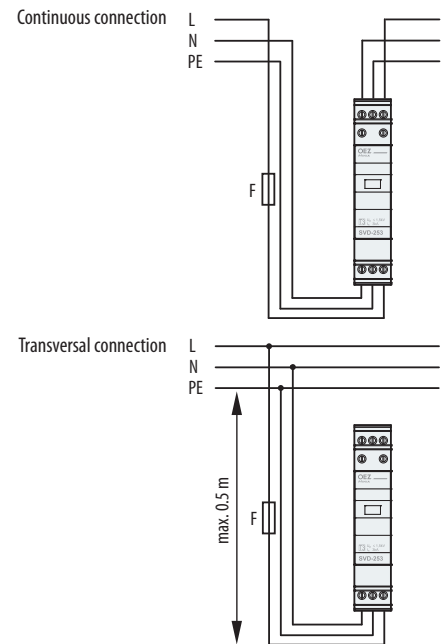
Combined arrester of lightning current type 1 and type 2 (SVBC – varistor) can be used in switchboards of individual flats in cases when it is not possible to install common first protection stage (etc. block of flats, where there is not allowed to install in unmeasured part any type of overvoltage protection). Combined arrester of lightning current SVBC is thank to lightning current separation in several branches convenient protection for these applications. It is installed on "U" rail type TH 35.

### 3. Installation of surge voltage arresters – T2 T2

Surge voltage arresters T2 are installed mainly on boundaries of LPZ1/LPZ2 that means in subsidiary switchboard behind the arresters of lightning current installed in the main switchboard. They are installed on "U" rail type TH 35. It is necessary to ensure coordination of individual protection stages at installation. For more information see paragraph "Coordination of overvoltage protection".

### 4. Installation of surge voltage arresters – T3 T3

Surge voltage arresters SVD are installed on "U" rail of type TH 35. If the length of the line is between T2 and T3 < 5 m, it is not necessary to use T3 – the parameters of coordination T2 and T3 would not be fulfilled. Protection is sufficiently provided by the surge voltage arrester T2. Install another surge voltage arresters of stage 3 max. 10 m downstream of the previous T3. Surge voltage arresters of stage 3 can be connected to the line both lengthwise and cross-wise. Cross-connection to the line is advantageous in particular if the current flowing through the line is higher than the permitted rated load current  $I_L$  of the surge voltage arrester T3.



### 5. Installation of surge voltage arresters for photovoltaic systems

Overvoltage protections SVBC-DC and SVC-DC are installed on "U" rail type TH 35 usually at the solar panel. At the length of the line between solar panels and inverter L > 10 m we recommend to install the overvoltage protection also at the inverter on the DC side.

### 4. Protection of arresters for connection „3+1“

Arresters for connection between N and PE conductors are not protected separately. Because their protection is already provided by fuses F1, F2 or F3, see the wiring diagram examples.

### 5. Protection of arresters for photovoltaic systems

It is not needed to protect the arrester for photovoltaic systems in any individual way. However, in case of two varistors design and one spark gap the limit of maximum short-circuit current has to be considered.

## PROTECTION OF OVERVOLTAGE PROTECTIONS

### 1. Protection of lightning current arresters – T1 T1

Protection can be implemented in two ways:

- protection only by fuses F1 in the house main switchboard, if F1 correspond to the values stated in the table of technical parameters of given type. However, if in such wiring there are leakages and follow short-circuit currents, though the SJB arresters are able to quench the follow short-circuit currents, F1 may blow with subsequent interruption of power supply in the building.
- use of fuses F2 in addition to F1 if the latter are too big or if you do not want to interrupt the power supply. In such case selectivity must be ensured between F1 and F2 i.e. ( $I_{nF1} \geq 1.6 \times I_{nF2}$ ). With this ratio of rated currents, F2 will cut out sooner than F1, and the power supply of

the building will not be interrupted. However the values  $I_{nF2}$  may be low and F2 will blow more frequently. For this reason it is recommended to equip the fuse F2 with a signalling device.

### 2. Protection of surge voltage arresters – T2 T2

The previous paragraph applies also to the protection of surge voltage arresters, however in *Wiring diagram examples* these fuses are designated F3.

### 3. Protection of surge voltage arresters – T3 T3

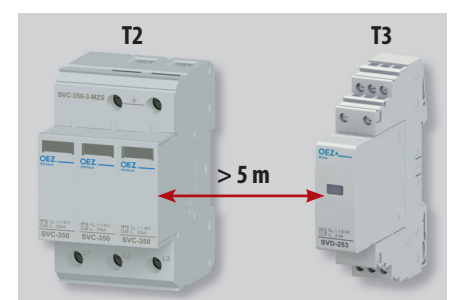
Surge voltage arresters SVD shall be protected by circuit breakers or fuses gG max. 25 A for design on "U" rail TH 35 or 16 A for design into mounting box.

## COORDINATION OF OVERVOLTAGE PROTECTION

The correct function of multiple stage protection is conditioned by correct coordination of individual stages. At first the most sensitive stage of protection reacts. Before it gets overloaded the superior stage has to react.

For overvoltage protections SJB-... and SVC-... specified in this catalogue, coordination is ensured by their internal structure. Thus they can be installed straight close to each other.

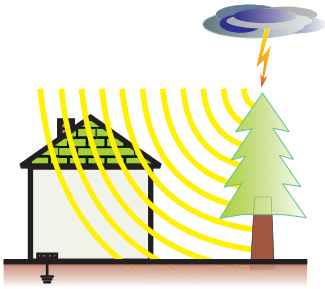
For coordination between the second and third protection stage it is necessary to observe a minimum distance of 5 m.





# RECOMMENDATIONS FOR DESIGN, INSTALLATION AND MEASUREMENT OF OVERVOLTAGE PROTECTIONS

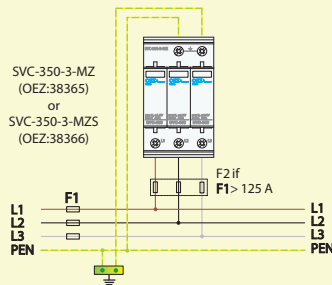
## Low installation thread



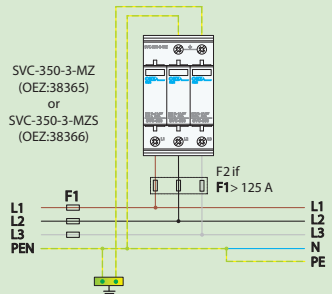
- a) **Family houses without lightning conductor and exposed conductive parts**
  - Conducted by underground cable line.
  - Where there is no threat of direct lightning stroke to the nearby building with lightning conductor which is galvanically connected to the protected building.
- b) **Individual housing units**
  - It is possible to install common first protection stage T1 in the main switchboard in the block of flats..

### Standard solution

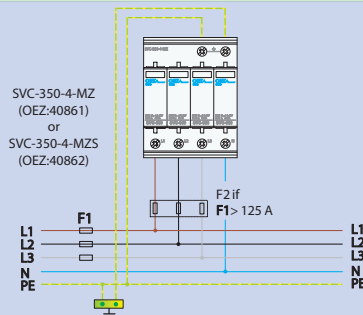
TN-C



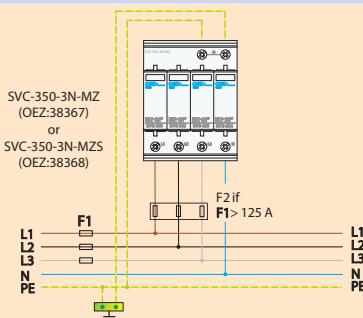
TN-C-S



TN-S

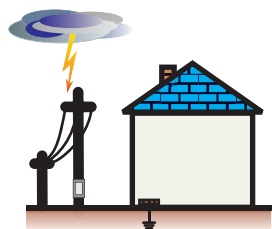


TN-S, TT



# RECOMMENDATIONS FOR DESIGN, INSTALLATION AND MEASUREMENT OF OVERVOLTAGE PROTECTIONS

## Medium installation thread



### a) Family houses

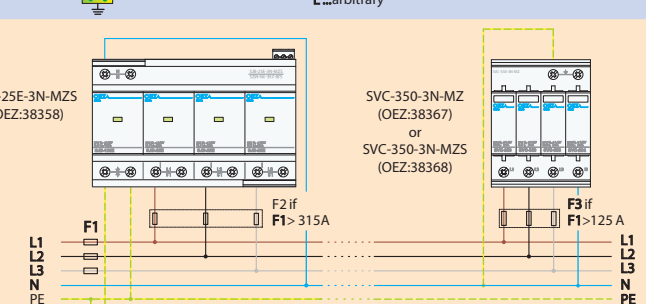
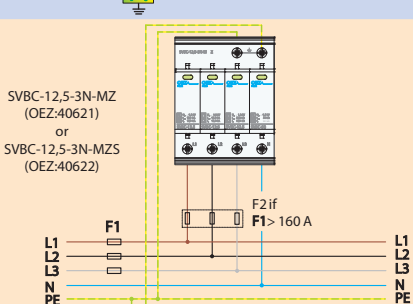
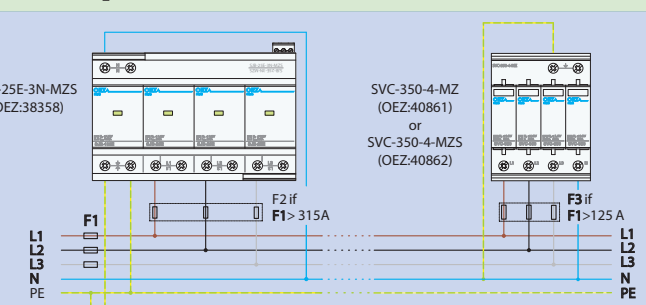
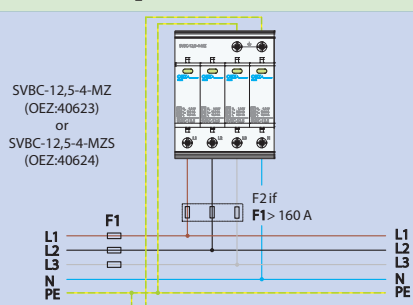
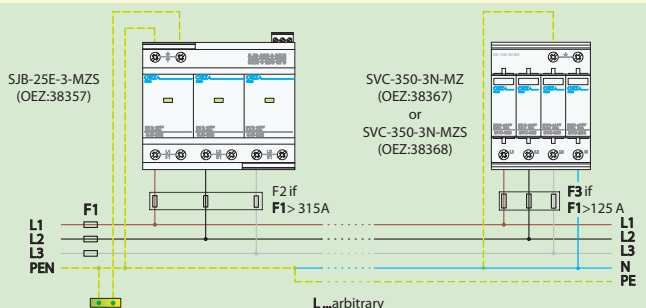
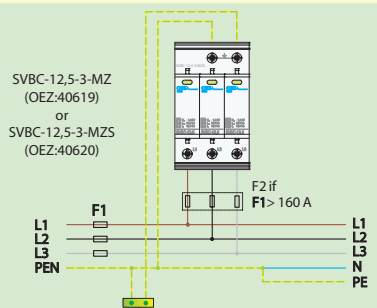
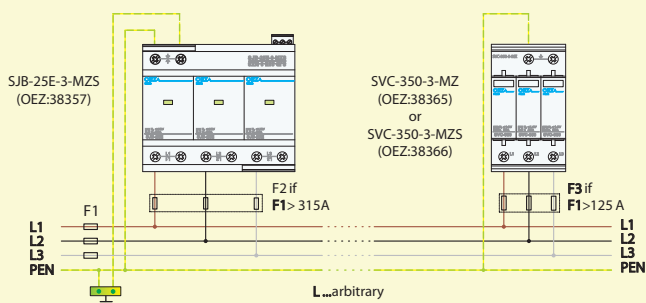
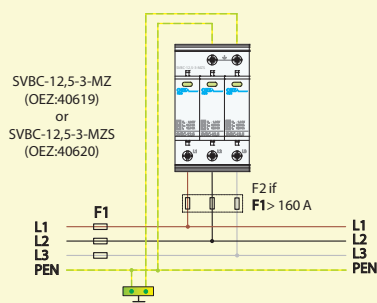
- Where there is a threat of direct lightning stroke to the protected building or to the nearby building with lightning conductor which is galvanically connected to the protected building - level of protection against lightning LPL III or LPL IV.
- With overhead cable line.

### b) Individual housing units

- In the block of flats where it is not possible to install common first protection stage T1 in the main switchboard and where due to lightning current separation in several branches its level does not exceed 12.5 kA (10/350 μs).

### Standard solution

### Solution for necessary T1 and T2 separation



TN-C

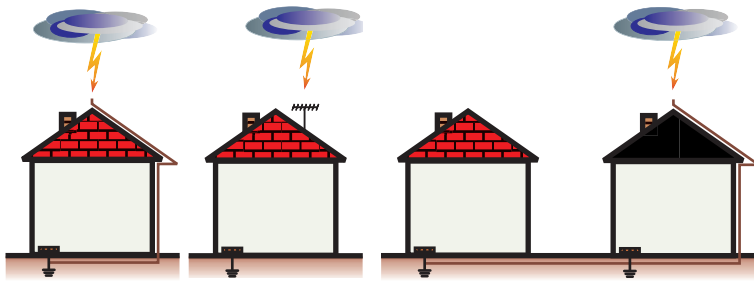
TN-C-S

TN-S

TN-S, TT

# RECOMMENDATIONS FOR DESIGN, INSTALLATION AND MEASUREMENT OF OVERVOLTAGE PROTECTIONS

## Big installation thread

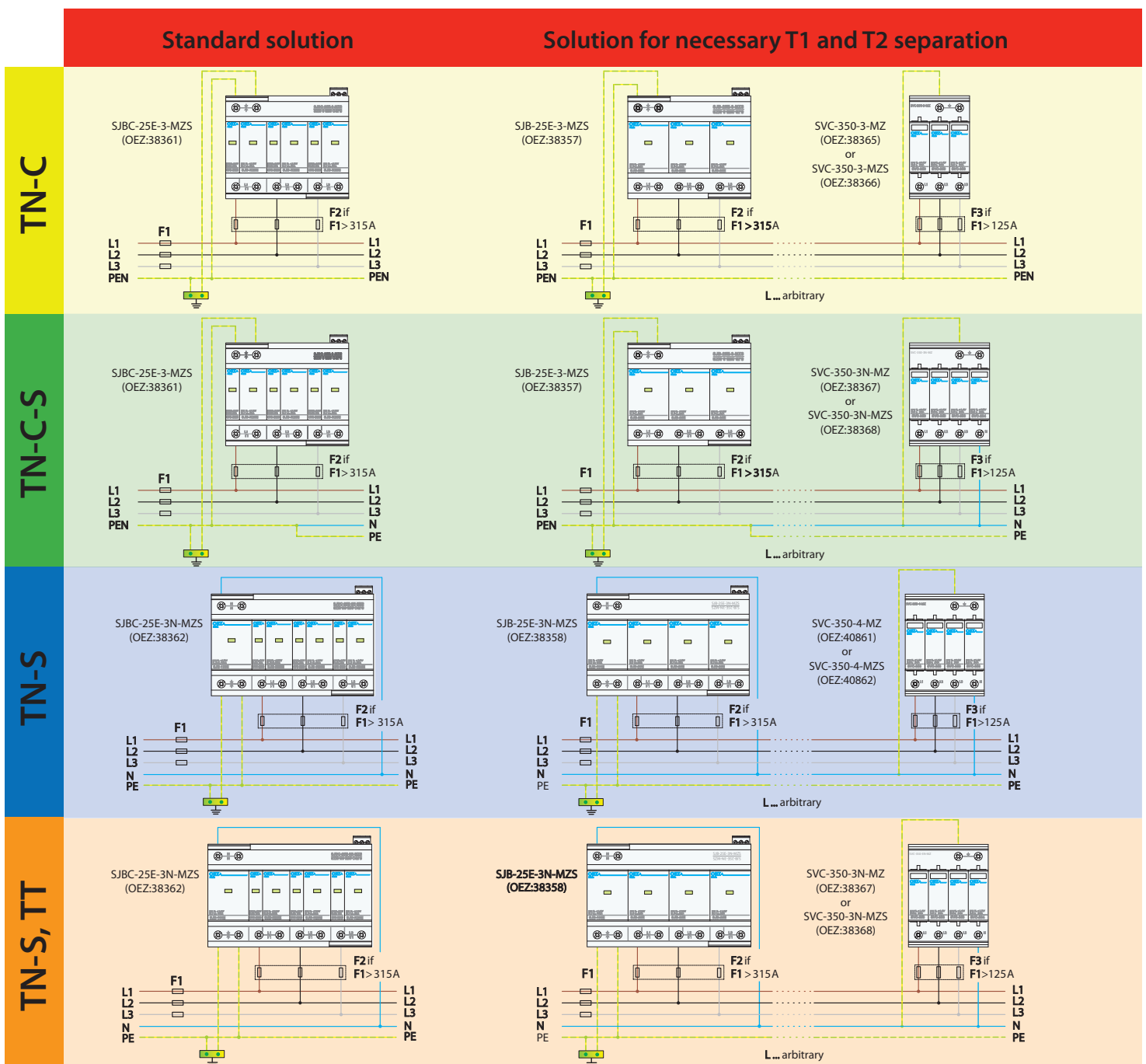


**a) Family houses with lightning conductor or exposed conductive parts.**

- Independent on connection type.
- Where there is a threat of direct lightning stroke to the protected building or to the nearby building with lightning conductor which is galvanically connected to the protected building - level of protection against lightning LPL I or LPL II.

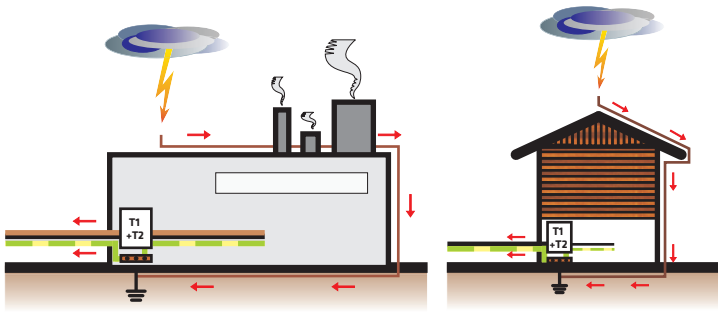
**b) Individual housing units.**

- In the block of flats where it is not possible to install common first protection stage T1 in the main switchboard and where the lightning current can exceed 12.5 kA (10/350 μs).



# RECOMMENDATIONS FOR DESIGN, INSTALLATION AND MEASUREMENT OF OVERVOLTAGE PROTECTIONS

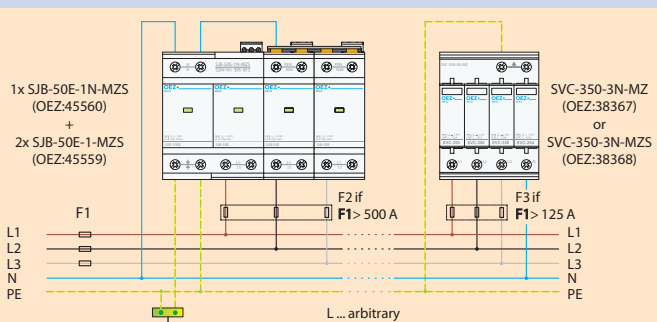
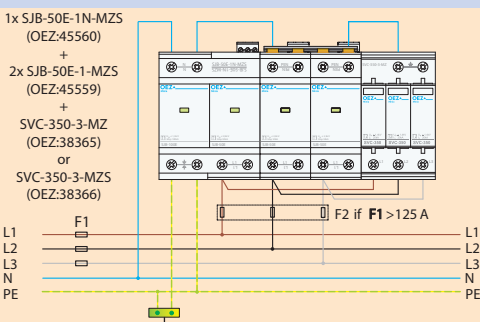
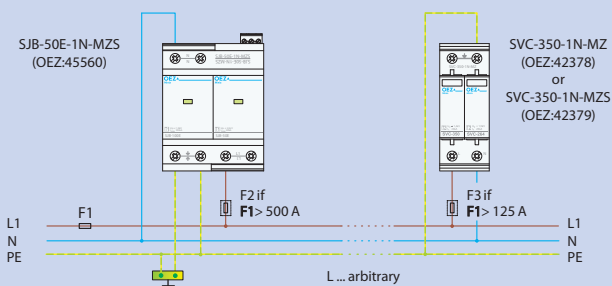
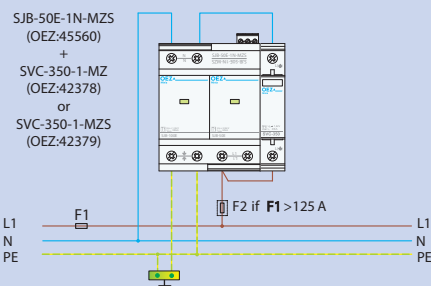
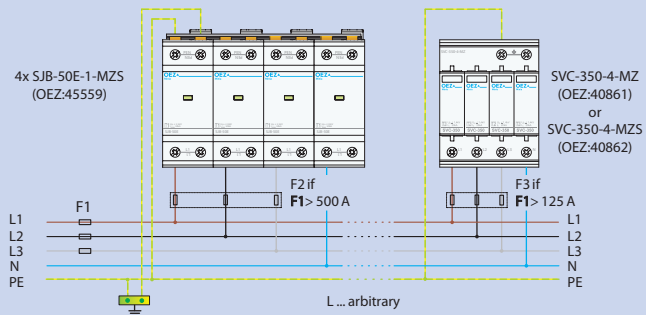
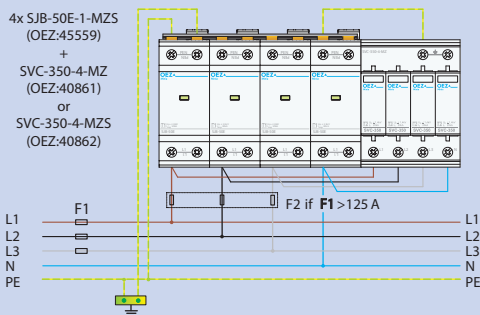
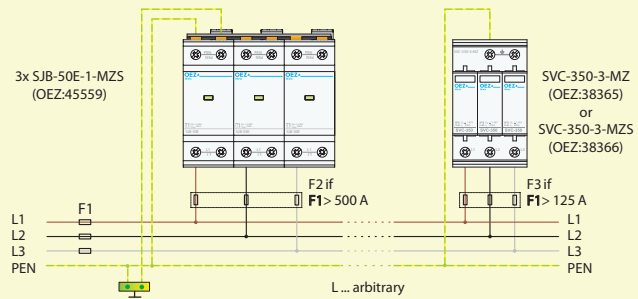
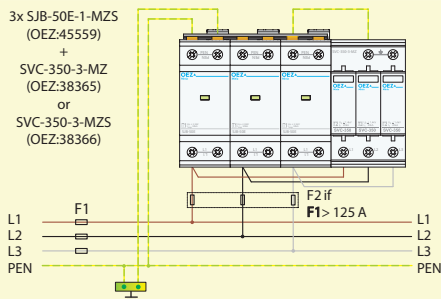
## Industrial and special applications



- a) Industrial applications, where higher requirements for overvoltage protections have to be met, e.g. due to high short-circuit current.
  - The separation of lightning current is the same as in case of big installation threat.
- b) Buildings with two-conductor lead fulfil the parameters of group big installation threat.

### Standard solution

### Solution for necessary T1 and T2 separation



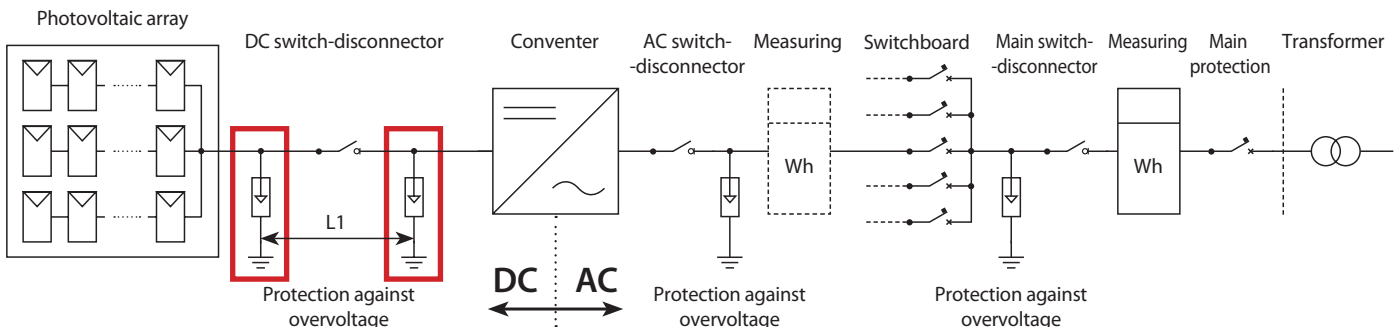
TN-C

TN-S

TN-S, TT

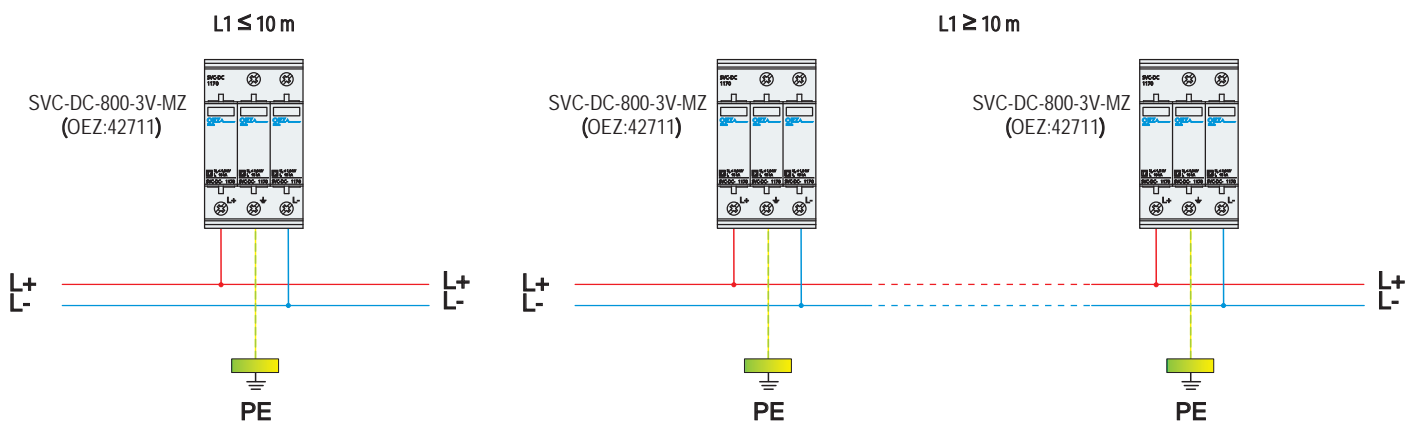
# RECOMMENDATIONS FOR DESIGN, INSTALLATION AND MEASUREMENT OF OVERVOLTAGE PROTECTIONS

## Photovoltaic systems



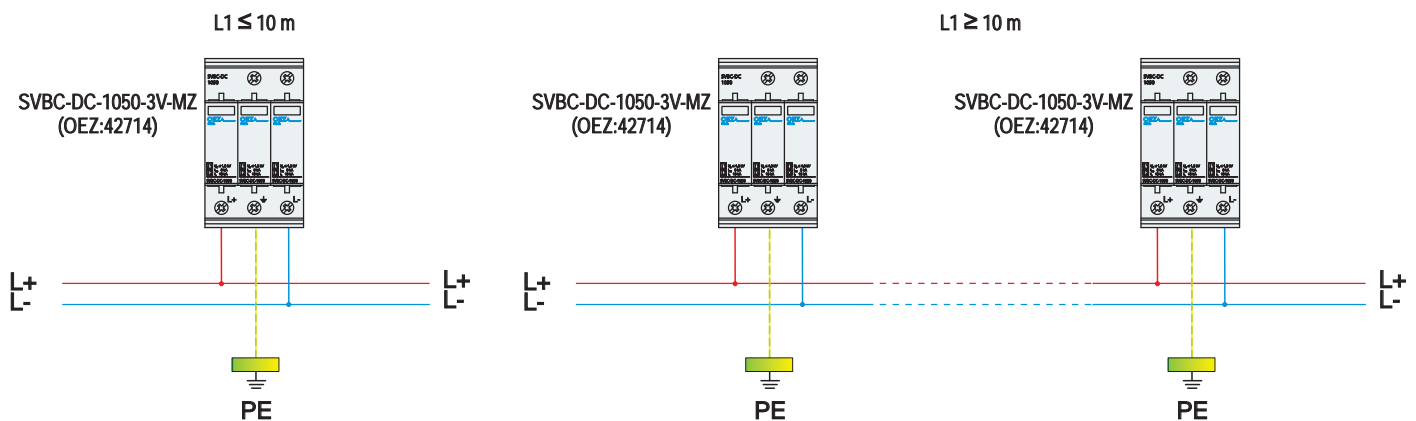
### a) Photovoltaic sources, where there is no threat of direct stroke to the solar panel or lines

- 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  $L1 > 10$  m we use the overvoltage protection at both the solar panel and the inverter, at the length of the line  $L \leq 10$  m we use the overvoltage protection either at the solar panel or at the inverter.
- Design 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  $L1 > 10$  m we use the overvoltage protection at both the solar panel and the inverter, at the length of the line  $L \leq 10$  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).



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