SURGE PROTECTION SYSTEMS

SCHIRTEC®

LIGHTNING PROTECTION AND EARTHING SYSTEMS

2008-2009

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INDEX

PRESENTATION

SCHIRTEC Company is located in Vienna-Austria and specialized in producing absolute solutions for "Lightning Protection, Earthing and Surge Protection Systems".

SCHIRTEC Company manufactures E.S.E. (Early Streamer Emission) Active Lightning Conductors Systems & Equipments using the latest advanced technology and is dealing in surge protection equipments with own label.

SCHIRTEC 's customer's satisfaction is our greatest concern. To our opinion, we have already achieved customer´s satisfaction, because we are always offering first-class quality products to fair prices, and the result is a broaden acceptance of end-consumers worldwide.

We have established next to our production line many quality control points in order to achieve our high quality standards. Our manufacturing processes are quality assured to **ISO-9001:2000** accreditation which means that they have detailed regulations for every step of operations across product lines.

SCHIRTEC Company is proud of its high quality products which are tested according to European Standards.

SCHIRTEC products are distributed in many countries worldwide. Our products are sold through our independent representatives in over 25 countries. We thank our business partners for the successful cooperation since years and we are looking forward to good business cooperation in the further future.

Quality System Accreditation

SURGE PROTECTION

WHICH SURGE PROTECTION UNITS CAN WE USE FOR DIFFERENT ZONES?

Impulse Test Classification

Class I tests
- tests carried out with the nominal discharge current I_n(8/20), the 1,2/50μs voltage impulse and the maximum impulse current I_{imp}(10/350) for class I test .

Class II tests
- tests carried out with the 1,2/50μs voltage impulse, with the nominal discharge current I_n(8/20) and the maximum discharge current I_{max}(8/20) for the class II test.

Class III tests
-tests carried out with the combination wave (1,2/50μs; 8/20μs)

In the chart shown below there are typical courses and parameters of lightning impulse voltages and currents,which occur in conductive parts of landscape, building constructions and metal lines in consequence of lightning stroke (taking in account influences caused by galvanic, inductive or capacitive coupling).
The typical values of lightning impulse voltages and currents, which occur in conductive parts of landscape, building constructions and metal lines.

	Surge (peak values)	Currents (peak values)	Halftail time
Direct lightning stroke	-up to few hundreds of kV	>30kA (50% of all the strokes) >100kA (5% of all the strokes) >150kA (1% of all the strokes)	cca 200μs...1000μs
Galvanic coupling	-up to few tens of kV	Distant strokes:up to 1kA Near strokes :up to few kA Straight strokes:up to few tens of kA	Typical :cca 700μs
Inductive coupling	-transverse surge up to few kV -lengthwise surge up to few tens of kV	up to few kA up to few tens of kA	Typical :cca 20 μs
Capacitive coupling	-transverse surge up to few kV -lengthwise surge up to few kV	up to few kA	Typical :50 to 100μs

Testing current impulse in the shape of 10/350μs is most often used for simulation of currents infiltrating into power lines and electric equipment in consequence of galvanic coupling. In case of inductive and capacitive coupling the voltage and current impulses are considerably shorter. The examination of interfering lightning effects in relation to inductive surges (currents) in consequence of inductive coupling is most often done by the testing current impulses in the waveform of 8/20μs. The examination of lightning effects in relation to interfering surges (currents) in consequence of capacitive coupling is similarly done by the testing voltage impulses in the waveform of 1,2/50μs.

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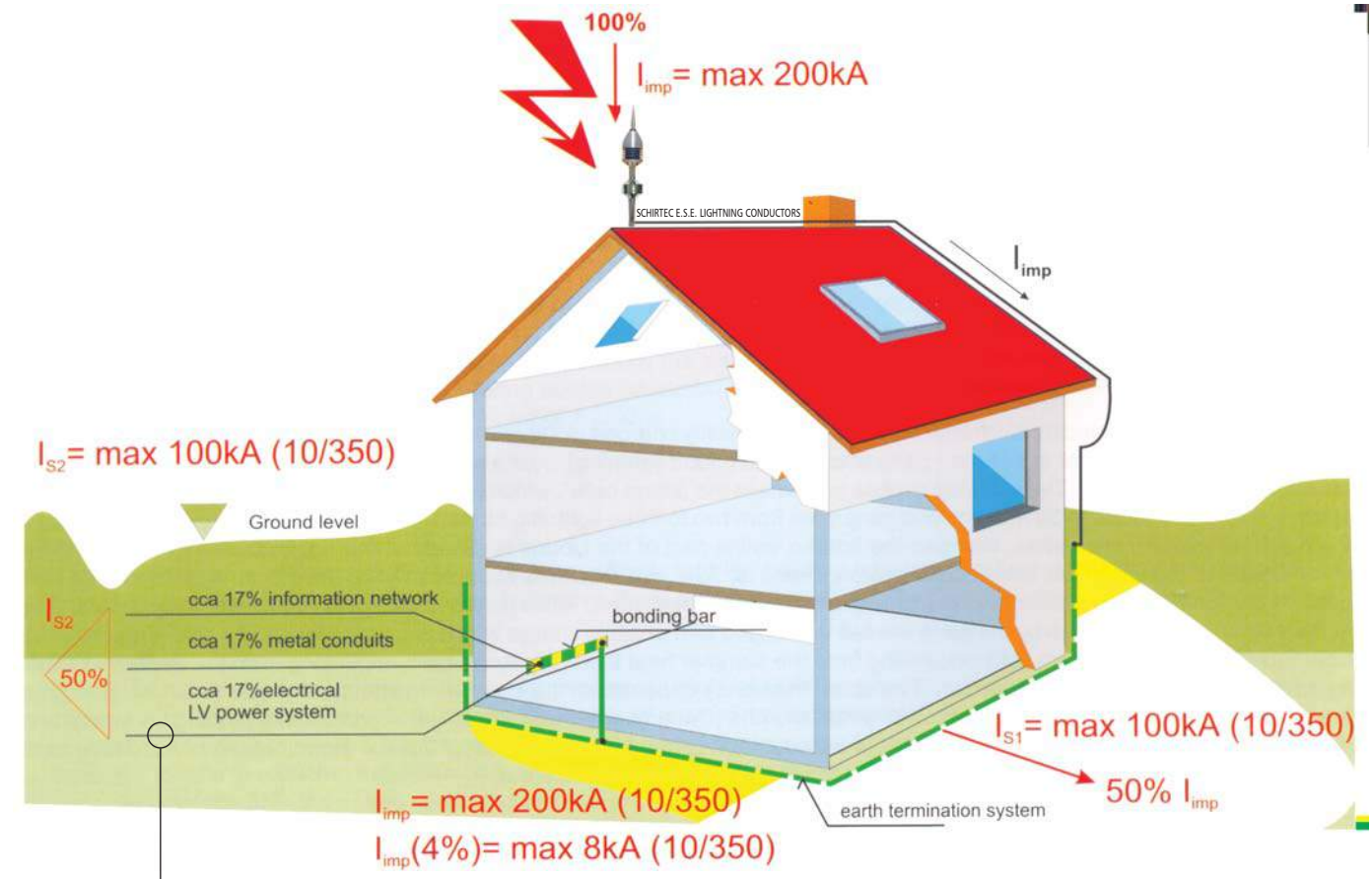
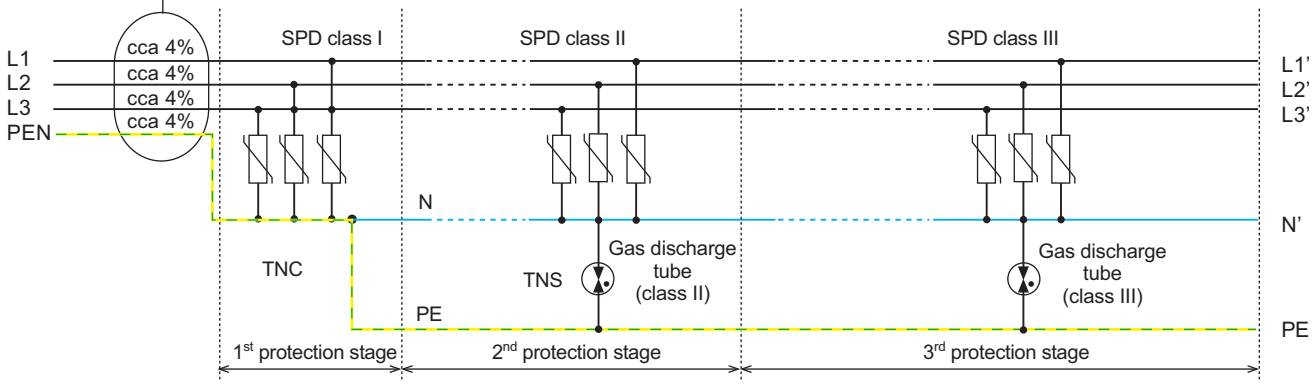
General distribution of lightning current when an object is thunderstruck, principle of L.V. power supply network protection thanks to cascaded 3-stage protection

Protection system of low voltage power supply network including lightning current arresters and surge arresters of the SPD must be able to discharge lightning currents or their substantial parts without their damage. It is generally recommended to come out from the ohmic strike of the building earthing, pipeline, power distribution system and so on for the purpose of establishing current distribution of the through-going SPD in case of direct lightning current strike into a building protected by the outside lightning system. The following picture shows a typical example of lightning current distribution in an object striken by direct lightning stroke.





Where an individual evaluation is not possible, it can be assumed that ;

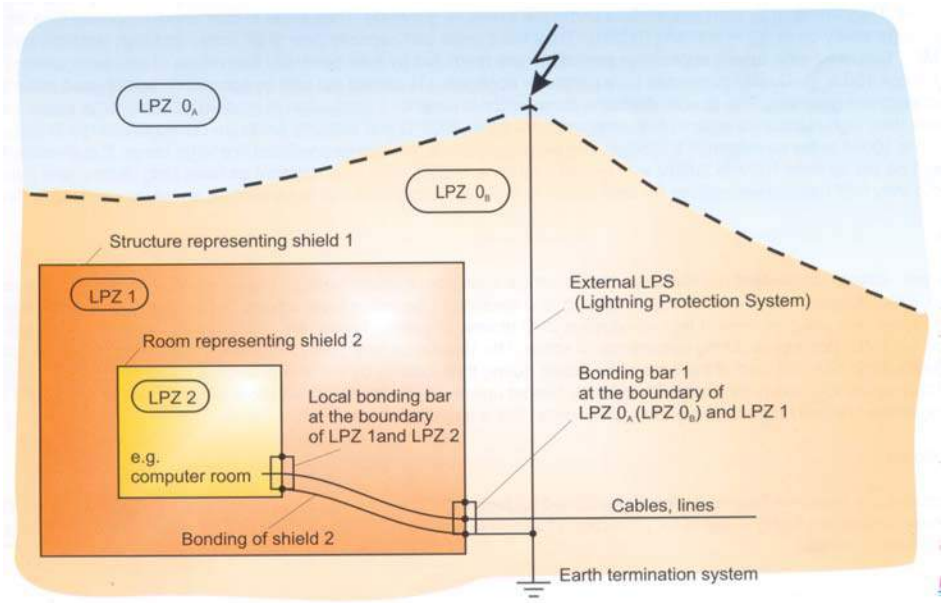
- 50% of the total lightning current I_{imp} =200 kA (10/350)... I_{S1} =100 kA (10/350) enters the earth termination system of the LPS (Lightning Protection System) of the structure considered
- 50% of I_{imp} =200kA (10/350)…I_{S2}=100kA (10/350) is distributed among the services entering the structure (external conductive parts, el. power, communication lines, etc.)The value of the current flowing in each service $\mathbf{I_i}$ is given by $\mathbf{I_s/n}$,where **n** is the number of the above mentioned services (see the above figure.) For evaluating the current $\mathbf{I_v}$ in individual conductors in unscreened cables,the cable current $\mathbf{I_i}$ is divided by **m**, the number of conductors i.e $\mathbf{I_v = I_i/m}$. For shielded cables, the current will flow along the shield.Requirement on dimensioning of protective system SPD in the most usual connection of the building and LV power system (TNC-system 230/400V/50Hz) results from this reasoning: For maximum lightning current size I_{imp} =200kA (10/350) it is enough to dimension the protective cascade of each phase conductor entering the object on cca 8 kA (10/350) in most cases.

Distribution of Protected Area into the of Lightning Protection Zones

The standard IEC 13 12-1 defines the lightning protection zones LPZ from the respect of the direct even indirect lightning effect. These zones are characteristic thanks to fundamental breaks of the electromagnetic conditions in their limited zones.
LPZ 0_A: The zones whose points are hit by the direct lightning strike, and that is why the whole lightning current could by transmitted by them. Attenuated electromagnetic field occures here.
LPZ 0_B: The zones whose points are not hit by the direct lightning strike, on the other hand unattenuated electromagnetic field occures here.
LPZ 1: The zones whose points are not hit by the direct lightning strike, and where currents are greatly reduced (in all the conducting parts) in comparison with the zones LPZ 0_A and LPZ 0_B. The electromagnetic field can be already attenuated in this zone.

The following zones (LPZ2 and so on):
If another reduction of the leakage currents or electromagnetic field is required, there is a need to projectively secure so-called following zones. The criteria for these zones is determined according to the general requirements on reduction of outside influences, which impact on protected system. A general rule applies, that effects of the electromagnetic field interferance and lightning current reduce when the number of protection zones increases. In the boundary zones of individual zones there is necessary to secure protective connection of all the metal parts and its periodical control.

Note: The creation of coupling in the boundary zones between LPZ 0_A, LPZ 0_B, and LPZ 1 is mentioned in the clause 3.1, the standard IEC 1024-1. The electromagnetic fields inside the construction are influenced by their opening, for example windows, sheetmetaling (drip, ledge) and by the route of the low voltage cables. The following picture shows an example of protected object being devided into several zones. Supply of the low voltage power network including telecommunication lines enter into protected zone exactly at one point (LPZ1) and are connected to the equipotential busbar 1 in the board zone LPZ 0_A, LPZ 0_B and LPZ1
The circuits are also connected to a local equipotential busbar 1 and an inside cover 2 with equipotential busbar 2. In the places where cabels go through one LPZ into another, the connection must be made in all the boundary zones.



The above described segmentation of the protected object into protection zones gives possibilities of active protection of the low voltage power network thanks to insertion of the protection SPDs (usually at the zone boundary LPZ 0⟶1 and LPZ 1⟶2) and other protection SPDs at the zone boundary LPZ 2⟶3. Standardly it is recommended to insert 2nd stage protection – surge arrester class II tested by testing impulse I_{max}(8/20). At the boundary of LPZ 2⟶3 and subsequently along the consequential circuit there is also recommended to shoulder after every cca 10m by so-called 3rd stage protection class III also tested by testing impulse I_{max} (8/20).

For extra important protected equipment it is recommended to secure by a quality countinuous surge protection class III with highfrequency filter at the boarder LPZ 2⟶3. In case that there exist neighbouring objects, between whom power and communication cables lead, then earthing systems should be interconnected and it is recommended to set up many parallel routes in purpose of current reduction in the cables. Network earthing system will then fulfil all the requirements. Inserting of metal tubes or concrete shoots, incorporated into network earthing system is another way how to reduce influences of the lightning current.

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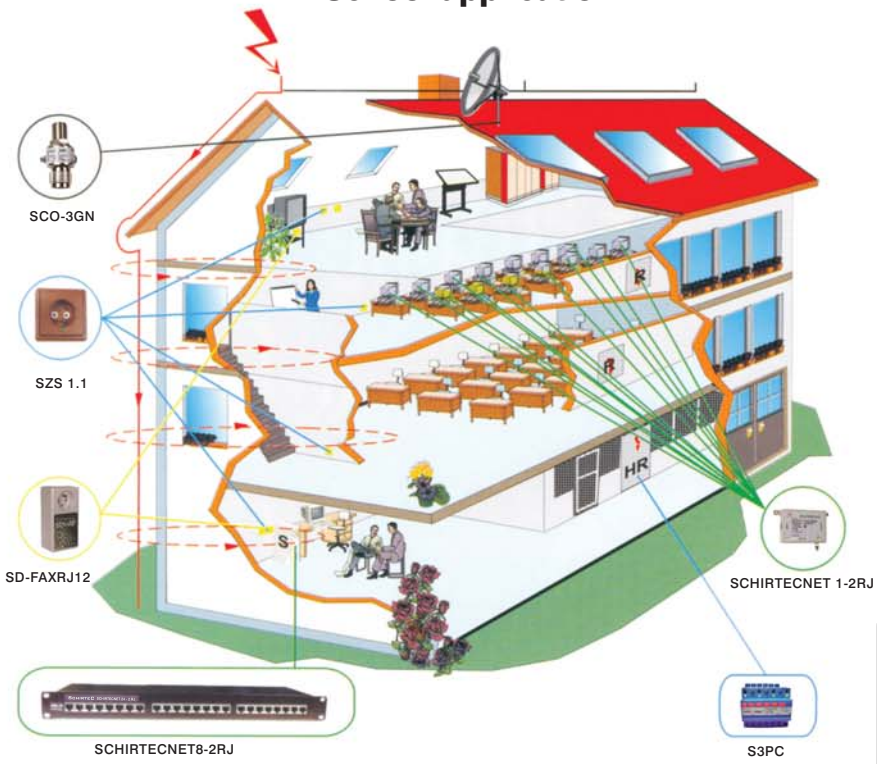
School application



Application :

SD-FAXRJ12 – fax, modem, telephone central

SCO-3GN – antenna lead-in

SZS-1.1 – socket circuits

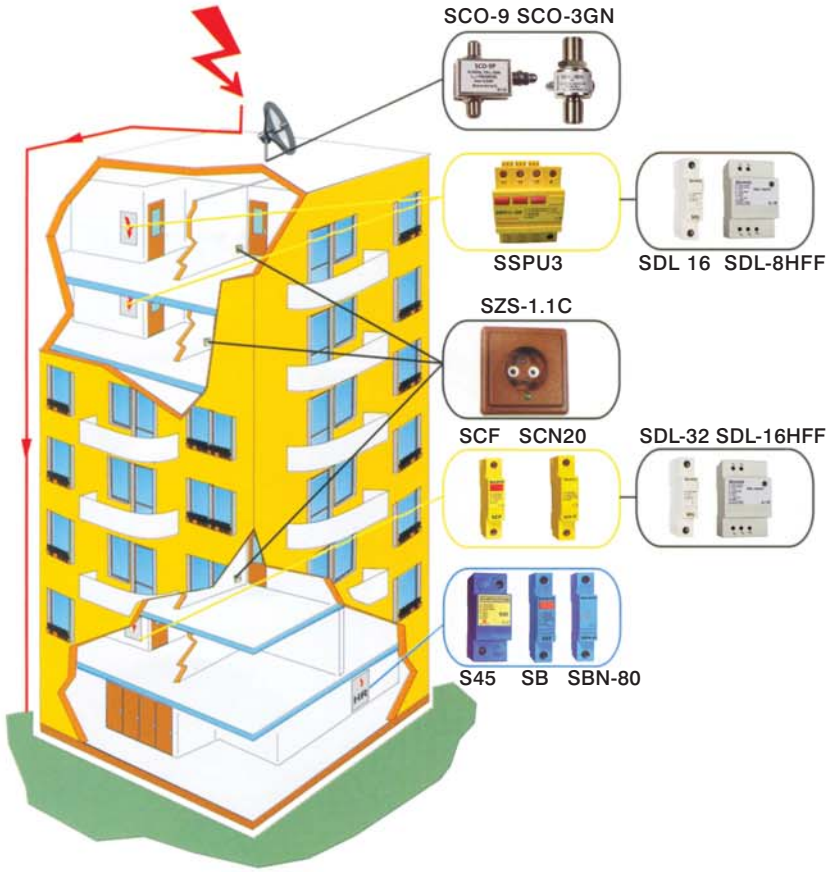
SCHIRTECNET8-2RJ – 19" server switchboard input

SCHIRTECNET1-2RJ – PC network card input

S3PC – main switchboard

HR – Main switchboard
R – Subdistribution switchboard
S – Server computer
C – Security system
TU – Telephone central
TR – Power supply

Apartment block application



Application :

S45 – main switchboard, in front of the electrometer and between L/N system TN-S, L/PEN system TN-C or

SB – main switchboard, behind the electrometer and between L/N system TN-S, L/PEN system TN-C

SBN80 – main switchboard, between N/PE only

SCF – subdistribution switchboard on each floor, between L/N system TN-S, L/PEN system TN-C

SCN20 – subdistribution switchboard on each floor, between N/PE only

SZS-1.1 – socket circuits

SDL – separating impedance between 2nd and 3rd stage of surge protection, in case of the spacing up to 10 m

SDL-16HFF, SDL-8HFF– subdistribution swichboard, supply circuit for electronic-controlled home appliances

SCO-3GN, SCO-9P – antenna lead-in

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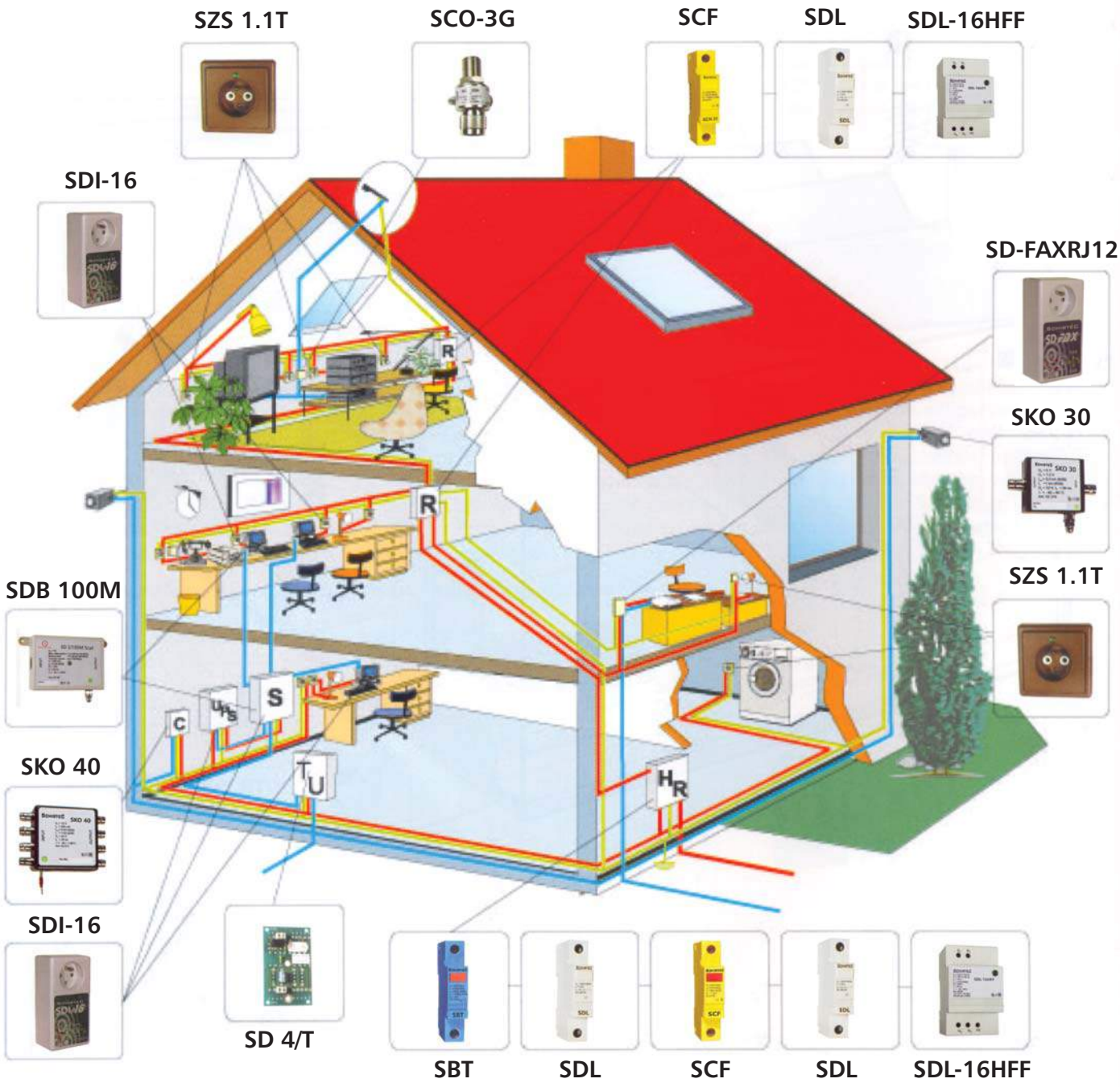
Home and office application



HR - Main switchboard
R - Subdistribution switchboard
TU - Tel. central
C - Security central
S - Server computer

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INSULATION LEVEL DROP DETECTORS

The Insulation Level Drop Detectors produced by Schirtec company enable an easy application for their users in IT power supply systems mainly in the engineering industry, metallurgy and in hospitals.

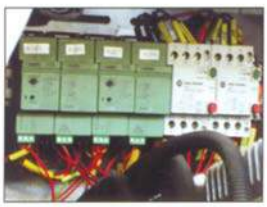
Monitoring of IT-systems in hospitals

Insulation Level Drop Detectors “SIS” are applied in the special workplaces and also in the common departments of hospitals.
SIS 71 : 75 devices are used for these applications.




Monitoring of IT-systems in traffic engineering

The protection of passenger’s health is the main viewpoint of insulation level monitoring in mass transportation.
SIS 77 device is used for these applications.

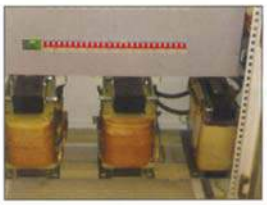
Monitoring of IT-systems in industry

SIS devices for industry applications are applied in a heavy industry, metallurgy and also in heavy chemistry and shipping.
SIS 500 device is used for these applications.




Monitoring of direct IT-systems

SIS devices intended for direct IT-systems are used in monitoring of control and supply systems for cold rolling mills.
SIS * VDC devices are used for these applications.

SIS

SIS, CE 500 and SMDA 10 are parts of a modular monitor systems designed for the purpose of monitoring insulation level of one-phase medical insulation IT-systems constructed and operated according to requirements of IEC 60364-7-710.

SMDA 10

SCE 500

SIS 500

For its excellent technical parameters, quality and easy installation into already operating industry applications, SIS 500 is widely used in various sectors, e.g. operating technological processes in metallurgy and heavy chemistry, in shipping and special scientific applications

SIS 401 VDC
SIS 651 VDC

The Insulation Level Drop Detectors SIS * VDC are intended for monitoring of the insulation level of VDC IT-systems.

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POWER SUPPLY SYSTEMS LIGHTNING ARRESTER CLASS I

S45, S55, S50-50, S50-3

This range of lightning arresters is mainly intended for applications in unmeasured parts of electrical installation within the Lightning Protection Zones Concept at the boundaries LPZ $0_{A(B)} - 1$ (according to IEC 1312-1 and IEC 62305). The lightning arrester is constructed as an encapsulated multiple cellular carbon spark gap with high values of self-extinguished follow currents.
Types S45 ,S55 and S50-50 are designed for the protection of phase bus bars of L.V. supply system (L/N), (L/PE) and (L/PEN) .

Type		S50-50	S50-16	S50-3	S45	S55
Test class according to IEC 61643-1and EN 61643-11		I / T1				
Modes of protection		L/N, L/PE, L/PEN				
Nominal voltage	U_N	230V/ 50 (60) Hz				400 V/50 (60) Hz
Max.continuous operating voltage	U_C	255 V / 50 (60) Hz				440 V/50 (60) Hz
Insulation resistance	R_i	> 100 MΩ				
Max.lightning impulse current (10/350) * charge * specific energy	I_{imp} Q W/R	50kA 25 As 600 kJ/Ω			60kA 30 As 900 kJ/Ω	
Maximum discharge current (8/20)	I_{max}	120 kA				
Voltage protection level at I_{imp}	U_p	< 1,3 kV				< 2,5kV
Follow current interrupting rating at U_c	I_f	$25kA_{rms}$	$16kA_{rms}$	$3,5kA_{rms}$	$20kA_{rms}$	$3,5kA_{rms}$
Response time	t_A	< 100ns				
Recommended back-up fuse		315 AgL/gG				
Operating temperature range	ϑ	-40°to + 80°C				
Cross-section of the connected conductors (at tightening moment of clamps 4Nm)		50mm² (solid) 35mm² (flexible)				
Protection type		IP 20				
Mounting on		DIN rail 35mm				
Housing material		SLOVAMID 6FRC2				
Colour		blue				
Weight	m	< 225g				

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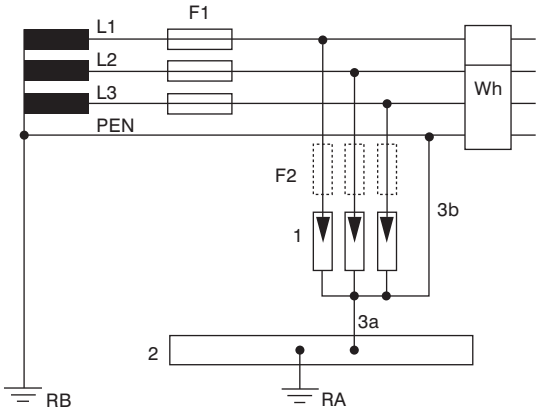
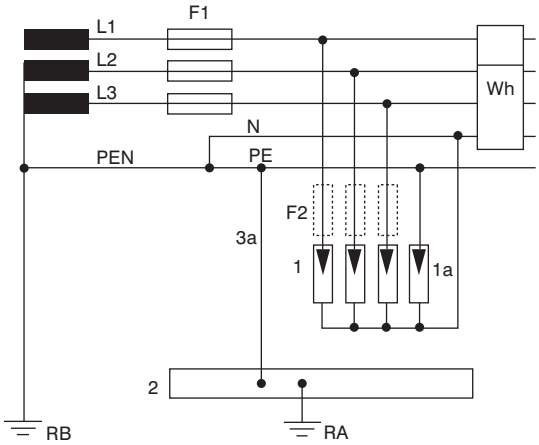
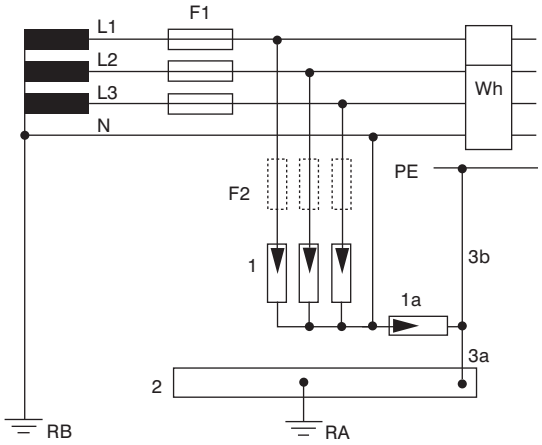
System TN-C



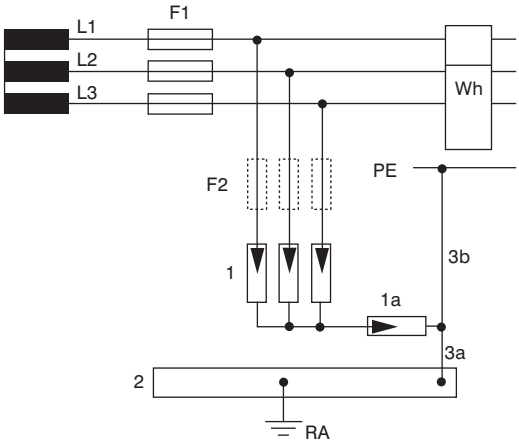
System TN-S



System TT



System IT



1	Multiple chamber carbon spark gap S45, S55, S50-50, S50-16 or S50-3*
1a	Single carbon spark gap S100 or gas discharge tube SBN100**
2	Main equipotential bus bar
3a, 3b	Grounding wires for arresters
F1	Main back-up fuse of service main
F2	Recommended back-up fuse 315AgL/gG (only if the main back up fuse F1 is fitted with back up fuses > 315 AgL /gG)
RA	Grounding of the equipment
RB	Grounding system

* For IT systems without outlet we use lightning arresters dimensioned for phase -to-phase voltage.
** For IT systems we use a special modification of gas discharge tubes or spark gap S100.

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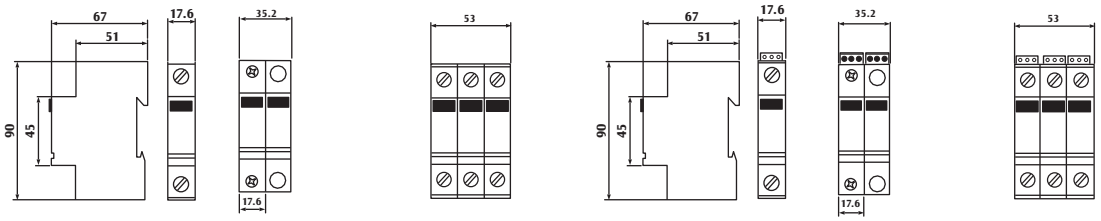
SB*

for 120, 230V | for 400V | for 500, 720V | for 120, 230V | for 400V | for 500, 720V



It is a complex range of lightning arresters, class I according to IEC 61643-1 and EN 61643-11 (1st stage protection). To be placed into the main switchboards at the beginning of electrical supply into a building.
The recommended use is in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$-1 according to IEC 1312-1 and IEC 62305 in low voltage power supply systems TNC and TNS, but it can be used also in TT and IT systems.

SB* contains a combination of highly efficient varistors ZnO with maximum discharge ability $I_{max}(8/20)=100kA$ and $I_{imp}(10/350)=10kA$. The devices are manufactured with nominal voltages of 120V, 230V, 400V, 500V and 720V.

SB*S can be used in applications, where the remote monitoring of failure is required. This type has the same construction as SB, but also contains potential free signal contact for remote monitoring of failure.

* The devices are manufactured with nominal voltages of 120V,230V,400V,500V and 720 V.

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Type		SB120 SB120S	SB230 SB230S	SB400 SB400S	SB500 SB500S	SB720 SB720S
Test class according to IEC 61643-1and EN 61643-11		I / T1				
Nominal voltage/50 (60) Hz	U_N	120 V	280 V	400 V	500 V	720 V
Max.continuous operating voltage/50 (60) Hz	U_C	144 V	320 V	480 V	600 V	865 V
Max.lightning impulse current (10/350) * charge * specific energy	I_{imp} Q W/R	10kA 5 As 25 kJ/Ω				
Maximum discharge current (8/20)	I_{max}	100 kA				
Nom. discharge current (8/20)	I_n	50 kA				
Voltage protection level at I_{imp}	U_p	< 950 V	< 1kV	< 1,6 kV	< 2,1 kV	< 3,2 kV
Response time	t_A	< 25ns				
Recommended back-up fuse		250 AgL/gG				100 AgL/gG
Short-circuit withstand capability at max. back-up fuse	I_p	100 kA_{rms}				
Operating temperature range	ϑ	-40° to + 80°C				
Cross-section of the connected conductors (at tightening moment of clamps 3Nm)		6 ÷ 25 mm^2 (solid) 6 ÷ 16 mm^2 (flexible)				
Protection type		IP 20				
Mounting on		DIN rail 35mm				
Housing material		SLOVAMID 6FRC2				
Potential free signal contact (S)		el.strength against surround. circuits 3750 V_{rms} el.strength against network circuits 3750 V_{rms} insulation resistance $2x10^7\Omega$ max.switching current ~0,5 A max.switching voltage ~250 V				
Lifetime		100.000 hrs				
Weight	m	130 g	140 g	330 g	380 g	420 g

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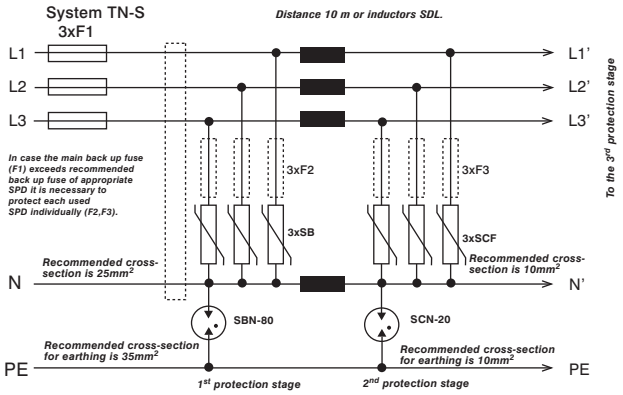
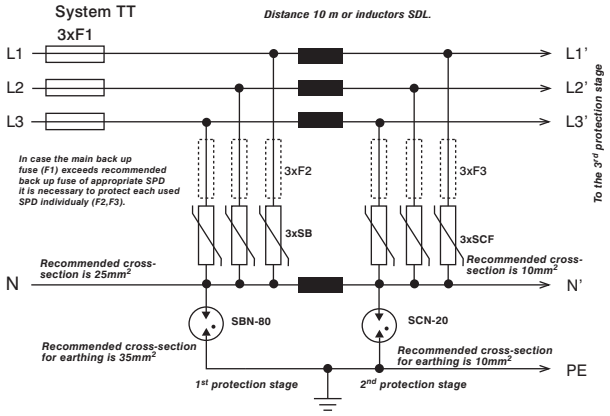
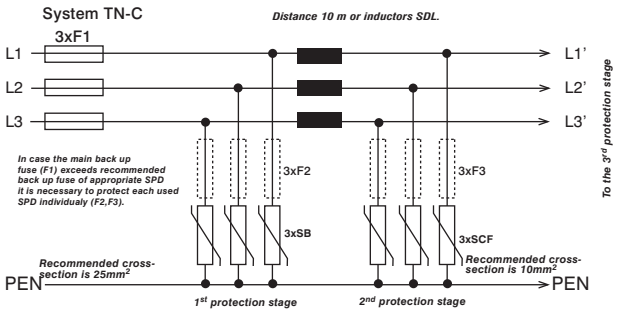
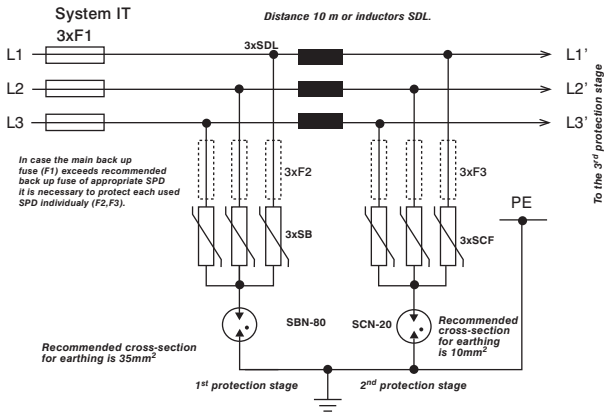
Recommended applications of lightning arresters









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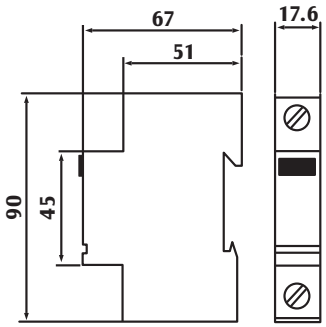
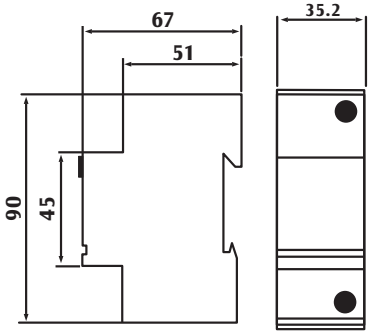
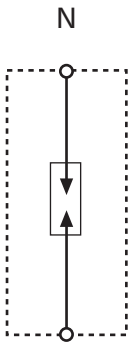
SBN80, SBN100 and S100





Basic circuit diagram of S100



Modules SBN80, SBN100 and S100 are one part of modular units of surge protection intended for mounting on DIN rail 35 mm. They are used for the protection of L.V. power supply systems against surges at direct lightning stroke. Therefore,they create an integral part of building protection and its installations against surge effects.

SBN80 and S100 contain a high power gas discharge tubes.The construction of S100 is based on spark gap technology for max. lightning impulse current I_{imp}=100 kA(10/350). These arresters are mainly used if there is an overhead line as a low voltage supply to a building. Both types fulfil construction demands posed on class I for lightning arresters. The recommended use is in the Lightning Protection Zones Concept at the boundaries of LPZ 0 $_{A(B)}$-1 according to IEC 1312 -1 and IEC 62305 in low voltage power supply systems TNS, TT and IT. These types are intended for equipotential bonding between N and PE.

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Type		SBN80	SBN100	S100
Test class according to IEC 61643-1and EN 61643-11		I / T1		
Use		N/PE		
Max.continuous operating voltage	U_c	255 V/50 (60) Hz		
Insulation resistance	R_i	>1000MΩ		
Max. discharge current (8/20)	I_{max}	120kA	150kA	150kA
Nominal discharge current (8/20)	I_n	60kA	75kA	75kA
Max.Lightning impulse current (10/350)	I_{imp}	80kA	100kA	100kA
* charge	Q	40As	50As	
* specific energy	W/R	1600kJ/Ω	2500kJ/Ω	
Voltage protection level at I_{imp}	U_p	<1,3 kV		<1,5 kV
Follow current interrupting rating at U_c	I_f	100 A_{rms}		100 A_{rms}
Response time	t_A	<100 ns		
Lightning impulse sparkover voltage 1.2/50μs		<1,5 kV		
Operating temperature range	ϑ	-40 to +80°C		
Recommended cross-section of the connected conductors (at tightening moment of clamps 4Nm)		25 mm^2 (solid) 16 mm^2 (flexible)	50 mm^2 (solid) 25 mm^2 (flexible)	
Protection type		IP 20		
Mounting on		DIN rail 35mm		
Housing material		SLOVAMID 6FRC2		
Housing colour		Blue		
Weight	m	140 g	210 g	230 g

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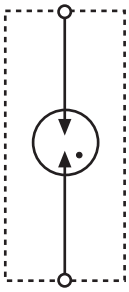
SBN25

Basic circuit diagram of SBN25



Module SBN25 is one part of modular units of surge protection intended for mounting on DIN rail 35mm. It is used for the protection of L.V. power supply systems against surges caused by lightning stroke. Therefore, it creates an integral part of building protection and its installations against surge effects. SBN25 contains a high power gas discharge tube rated for max. lightning impulse current I_{imp} = 25kA (10/350). It is mainly used if there is an overhead line as a low voltage supply to a building or if there are residual current circuit breakers in protected facility. It fulfils construction demands posed on class II for lightning arresters. The recommended use is in the Lightning Protection Zones Concept at the boundaries of LPZ 0_B – 1 and more according to IEC 1312-1 in low voltage power supply systems TNS, TT and IT. SBN25 is in these applications mainly used for equipotential bonding between N and PE (equipotential busbar).

Type		SBN25
Test class according to IEC 61643-1 and EN 61643-11		I / T1
Mode of protection		N/PE
Maximum continuous operating voltage	U_C	255 V/50 (60) Hz
Insulation resistance	R_i	>1000 MΩ
Max. lightning impulse current (10/350) * charge * spesific energy	I_{imp} Q W/R	25 kA 12,5 As 150 kJ/Ω
Max. discharge current (8/20)	I_{max}	60kA
Nominal discharge current (8/20)	I_n	30kA
Voltage protection level at I_{imp}	U_p	<1,3 kV
Lightning impulse sparkover voltage 1,2/50 µs		<1,5 kV
Follow current interrupting rating at U_C	I_{fi}	<100 A_{rms}
Response time	t_A	<100 ns
Operating temperature range	ϑ	-40°to + 80°C
Cross-section of the connected conductors (at tightening moment of clamps 3 Nm)		10 mm^2
Protection type		IP 20
Mounting on		DIN rail 35mm
Housing material		Silamid EFX
Lifetime		100.000 hrs
Weight	m	90 g

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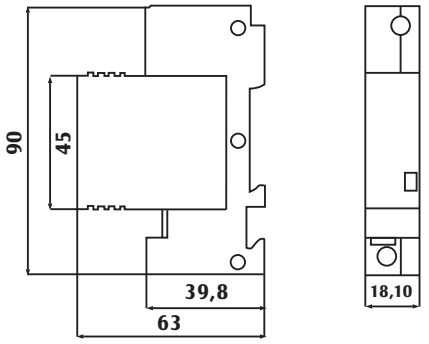
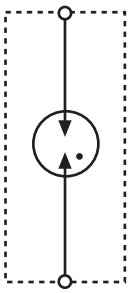
SBN25P



Basic circuit diagram of SBN25P



It is used for the protection of L.V. power supply systems against surges caused by lightning stroke. There fore, it creates an integral part of building protection and its installations against surge effects. SBN25P contains a high power gas discharge tube rated for max. lightning impulse current I_{imp} = 25kA (10/350). It is mainly used if there is an overhead line as a low voltage supply to a building or if there are residual current circuit breakers in protected facility. The recommended use is in the Lightning Protection Zones Concept at the boundaries
of LPZ 0_B – 1 and more according to IEC 1312-1 in low voltage power supply systems TNS, TT and IT. SBN-25P is in these applications mainly used for equipotential bonding between N and PE (equipotential busbar).

Type		SBN25P
Test class according to IEC 61643-1 and EN 61643-11		I+II / T1 + T2
Mode of protection		N/PE
Maximum continuous operating voltage	U_C	255 V/50 (60) Hz
Insulation resistance	R_i	>1000 MΩ
Max. lightning impulse current (10/350) * Charge * Spesific energy	I_{imp} Q W/R	25 kA 12,5 As 150 kJ/Ω
Max. discharge current (10/350)	I_{max}	60 kA
Nominal discharge current (8/20)	I_n	30 kA
Voltage protection level at I_{imp}	U_p	<1 kV
Lightning impulse sparkover voltage 1,2/50 µs		<1,5 kV
Follow current interrupting rating at U_C	I_{fi}	100 A_{rms}
Response time	t_A	<100 ns
Operating temperature range	ϑ	-40°to + 80°C
Cross-section of the connected conductors (at tightening moment of clamps 3 Nm.)		10 mm^2
Protection type		IP 20
Mounting on		DIN rail 35 mm
Housing material		Silamid EFX
Lifetime		100.000 hrs
Weight	m	90 g

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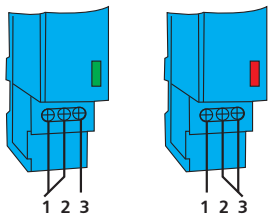
SB120PS

SB120PS

It is lightning arrester class I + II according to IEC 61643-1 and EN 61443-11. To be placed into the main or secondary switchboards at the beginning of electrical supply into a building. Complete device consists of a base and pluggable module.
These pluggable modules can be exchanged without disconnection of power supply. The recommended use is in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ -1 according to IEC 1312-1 in low voltage power supply systems TNC and TNS, but it can be used also in TT and IT systems. SB*P is used for protection of power supply system either by cable lines or by L.V. overhead line.

Type		SB120PS
Test class according to IEC 61643-1 and EN 61643-11		I+II / T1 + T2
Nominal voltage	U_N	120 V/50(60) Hz
Max. continuous operating voltage	U_c	144 V/50 (60) Hz
Max. lightning impulse current (10/350)	I_{imp}	8 kA
Max discharge current (8/20)	I_{max}	50kA
Nominal discharge current (8/20)	I_n	30kA
Voltage protection level at I_{imp}	U_p	<650 V
Response time	t_A	<25 ns
Recommended back up fuse		160 AgL/gG
Short-circuit withstand capability at max. back-up fuse	I_p	60 kA_{rms}
Operating temperature range	ϑ	-40°to + 80°C
Cross-section of the connected conductors (at tightening moment of clamps 3 Nm)		6 ÷ 25 mm^2 (solid) 6 ÷ 16 mm^2 (flexible)
Protection type		IP 20
Mounting on		DIN rail 35mm
Housing material		Silamid EFX
Potential free signal contact (S)		el.strength against surround. circuits 3750 V_{rms} el.strength against network circuits 3750 V_{rms} insulation resistance $2x10^7\Omega$ max.switching current ~0,5 A max.switching voltage ~250 V
Lifetime		100.000 hrs
Weight	m	130 g

Mechanical Failure Indication
Is optically indicated by a red or green changeover field on front side of the device. The green field signals that the device is fully functional. The red field signals a damage of the protecting unit.



Connection of Remote Monitoring
As long as the unit SB*PS is functional, the contacts 1-2 are connected. This applies if the unit is alive or also if there is absence of voltage. If there is a damaged varistor in the unit because of heat effect due to overload, the contacts 2-3 are connected.

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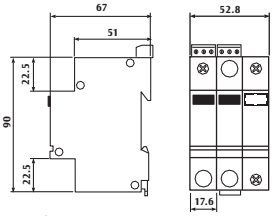
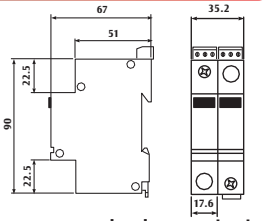
S1PC* and S1PC*S



A compact range of surge protection devices of 1st and 2nd stage. The recommended use is in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$-1 according to IEC 1312-1, IEC 62305 and EN 61643-11 in low voltage power supply systems TNS, TNC, TT. S1PC* (Surge Protection Compact) is suitable for protection of electrical installation which are connected to supply system by cable lines or overhead line as a low voltage supply to a building. They are produced in a compact range for max. discharge currents I_{max} (8/20) = 60, 90, 120, 150kA (L/N). The withstand capability against discharge current between the terminals N/PE are either I_{imp}(10/350)=20kA (for models S1PC) or I_{imp}(10/350)=80kA (for models S1PC*.0).

Type			S1PC 60(S) S1PC.0 60	S1PC 90(S) S1PC.0 90	S1PC 120(S) S1PC.0 120	S1PC 150(S) S1PC.0 150
Test class according to IEC 61643-1and EN 61643-11			I + II / T1 + T2			
Nominal voltage	U_N		230 V/50 (60) Hz			
Max.continuous operating voltage	U_C		275 V/50 (60) Hz			
Max.lightning impulse current (10/350) * charge * specific energy	I_{imp} Q W/R	L/N	8 kA 4 As 16 kJ/Ω	12 kA 6 As 36 kJ/Ω	16 kA 8 As 64 kJ/Ω	20 kA 10 As 100 kJ/Ω
Max.lightning current I_{imp} (10/350) * charge * specific energy	I_{imp} Q W/R	N/PE	20 kA (S1PC),80 kA (S1PC.0) 10 As (S1PC),40 As (S1PC.0) 100 kJ/Ω (S1PC),40As (S1PC.0)			
Maximum discharge current (8/20)	I_{max}	L/N	60 kA	90 kA	120 kA	150 kA
Nom. discharge current (8/20)	I_n	L/N	30 kA	50 kA	65 kA	80 kA
Voltage protection level at I_{imp}	U_p	L/N	< 1,3 kV			
Response time	t_A	L/N N/PE	< 25ns < 100 ns			
Recommended back-up fuse			315 AgL/gG			
Recommended back-up fuse (”V” connection)			63 AgL/gG			
Short-circuit withstand capability at max. back-up fuse	I_p		80 kA_{rms}			
Operating temperature range	ϑ		-40° to + 80°C			
Cross-section of the connected conductors (at tightening moment of clamps 4Nm)			50 mm^2 (solid) 35 mm^2 (flexible)			
Protection type			IP 20			
Mounting on			DIN rail 35mm			
Housing material			SLOVAMID 6FRC2			
Lifetime			min 100.000 hrs			
Weight	m		347 g			
Potential free signal contact (S)			el.strength against surround. circuits 3750 V_{rms} el.strength against network circuits 3750 V_{rms} insulation resistance $2x10^7\Omega$ max.switching current ~0,5 A max.switching voltage ~250 V			

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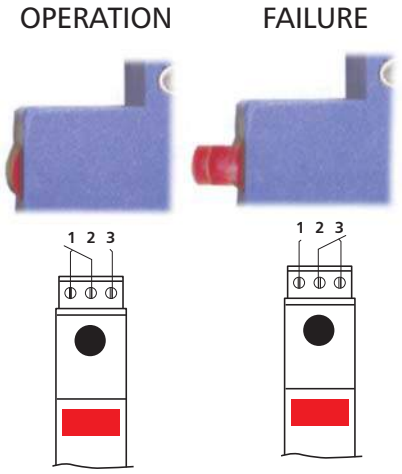
Type			S1PC.1 60 S1PC.1 60(S)	S1PC.1 90 S1PC.1 90(S)	S1PC.1 120 S1PC.1 120(S)	S1PC1 150 S1PC.1 150(S)
Test class according to IEC 61643-1and EN 61643-11			I + II / T1 + T2			
Nominal voltage	U_N		230 V/50 (60) Hz			
Max.continuous operating voltage	U_C		275 V/50 (60) Hz			
Max.lightning impulse current (10/350) * charge * specific energy	I_{imp} Q W/R	L/PEN	8kA 4 As 16 kJ/Ω	12 kA 6 As 36 kJ/Ω	16 kA 8 As 64 kJ/Ω	20 kA 10 As 100 kJ/Ω
Max.lightning impulse current (10/350) * charge * specific energy	I_{imp} Q W/R					
Maximum discharge current (8/20)	I_{max}	L/PEN	60 kA	90 kA	120 kA	150 kA
Nom. discharge current (8/20)	I_n		30 kA	50 kA	65 kA	80 kA
Voltage protection level at I_{imp}	U_p	L/PEN	< 1,3 kV			
Response time	t_A	L/PEN	< 25ns			
Recommended back-up fuse			315 AgL/gG			
Recommended back-up fuse ("V" connection)			63 AgL/gG			
Short-circuit withstand capability at max. back-up fuse	I_p		80 kA_{rms}			
Operating temperature range	ϑ		-40° to + 80°C			
Cross-section of the connected conductors (at tightening moment of clamps 4Nm)			50 mm^2 (solid) 35 mm^2 (flexible)			
Protection type			IP 20			
Mounting on			DIN rail 35mm			
Housing material			SLOVAMID 6FRC2			
Potential free signal contact (S)			el.strength against surround. circuits 3750 V_{rms} el.strength against network circuits 3750 V_{rms} insulation resistance $2x10^7\Omega$ max.switching current ~0,5 A max.switching voltage ~250 V			
Lifetime			min 100.000 hrs			
Weight	m		270 g			

S1PC* consists of lightning arrester 1st stage and surge arrester 2nd stage according to IEC 61643-1 and EN 61643-11. By a special distribution of varistors we have been successful in decreasing the size, especially by saving space by leaving out the decoupling elements, which are usually placed between the 1st and 2nd stage cascade of surge protection. The S1PC * compact protection products provide particularly effective power supply system protection against transverse and lengthwise surges in cooperation with recommended application of arresters of 3rd stage protection. Particular varistor sections connected between terminals L/N comply to IEC 61643-1 and EN 61643-11. They are provided with internal disconnecters which are activated when a failure of the varistors occurs. Indication of failure of these disconnecters is partly mechanical (by a red signalling target) and partly remote monitoring (by potential free signal contact).

Connection of remote monitoring for S1PC*



S3PC*

A compact range of surge protection devices of 1st and 2nd stage. The recommended use is in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ -1 according to IEC 1312-1, IEC 62305 and EN 61643-11 in low voltage power supply systems TNS, TNC and TT.
S3PC* (Surge Protection Compact) is suitable for protection of electrical installation which is connected to supply system by cable lines or overhead line. They are produced in a compact range for max. discharge currents $I_{max}(8/20)$ = 60, 90, 120, 150kA (L/N). The withstand capability against discharge current between the terminals N/PE are either $I_{imp}(10/350)=20kA$ (for models S3PC) or $I_{imp}(10/350)=80kA$ (for models S3PC.0).

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Type			S3PC 60 S3PC.0 60(S)	S3PC 90 S3PC.0 90(S)	S3PC 120 S3PC.0 120(S)	S3PC 150 S3PC.0 150(S)
Test class according to IEC 61643-1and EN 61643-11			I+II / T1 + T2			
Nominal voltage	U_N		3x400/230V/50(60) Hz			
Max.continuous operating voltage	U_C		3x480/275V/50(60) Hz			
Max.lightning impulse current (10/350) * charge * specific energy	I_{imp} Q W/R	L/N	8kA 4 As 16 kJ/Ω	12 kA 6 As 36 kJ/Ω	16 kA 8 As 64 kJ/Ω	20 kA 10 As 100 kJ/Ω
Max.lightning impulse current (10/350) * charge * specific energy	I_{imp} Q W/R	N/PE	20 kA (S3PC),80 kA (S3PC.0) 10 As (S3PC),40 As (S3PC.0) 100 kJ/Ω (S3PC), 1600 kJ/Ω (S3PC.0)			
Maximum discharge current (8/20)	I_{max}	L/N	60 kA	90 kA	120 kA	150 kA
Nom. discharge current (8/20)	I_n	L/N	30 kA	50 kA	65 kA	80 kA
Voltage protection level at I_{imp}	U_p	L/N	< 1,3 kV			
Response time	t_A	L/N N/PE	< 25ns < 100ns			
Recommended back-up fuse			315 AgL/gG			
Recommended back-up fuse ("V" connection)			63 AgL/gG			
Short-circuit withstand capability at max. back-up fuse	I_p		80 kA_{rms}			
Operating temperature range	ϑ		-40° to + 80°C			
Cross-section of the connected conductors (at tightening moment of clamps 4Nm)			50 mm^2 (solid) 35 mm^2 (flexible)			
Protection type			IP 20			
Mounting on			DIN rail 35mm			
Housing material			SLOVAMID 6FRC2			
Potential free signal contact (S)			el.strength against surround. circuits 3750 V_{rms} el.strength against network circuits 3750 V_{rms} insulation resistance $2x10^7\Omega$ max.switching current ~0,5 A max.switching voltage ~250 V			
Lifetime			min 100.000 hrs			
Weight	m		872 g			

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Type			S3PC.1 60 S3PC.1 60(S)	S3PC.1 90 S3PC.1 90(S)	S3PC.1 120 S3PC.1 120(S)	S3PC.1 150 S3PC.1 150(S)
Test class according to IEC 61643-1and EN 61643-11			I+II / T1 + T2			
Nominal voltage	U_N		3x400/230V/50(60) Hz			
Max.continuous operating voltage	U_C		3x480/275V/50(60) Hz			
Max.lightning impulse current (10/350) * charge * specific energy	I_{imp} Q W/R	L/PEN	8kA 4 As 16 kJ/Ω	12 kA 6 As 36 kJ/Ω	16 kA 8 As 64 kJ/Ω	20 kA 10 As 100 kJ/Ω
Max.lightning impulse current (10/350) * charge * specific energy	I_{imp} Q W/R					
Maximum discharge current (8/20)	I_{max}	L/PEN	60 kA	90 kA	120 kA	150 kA
Nom. discharge current (8/20)	I_n		30 kA	50 kA	65 kA	80 kA
Voltage protection level at I_{imp}	U_p	L/PEN	< 1,3 kV			
Response time	t_A	L/PEN	< 25ns			
Recommended back-up fuse			315 AgL/gG			
Recommended back-up fuse ("V" connection)			63 AgL/gG			
Short-circuit withstand capability at max. back-up fuse	I_p		80 kA_{rms}			
Operating temperature range	ϑ		-40° to + 80°C			
Cross-section of the connected conductors (at tightening moment of clamps 4Nm)			50 mm^2 (solid) 35 mm^2 (flexible)			
Protection type			IP 20			
Mounting on			DIN rail 35mm			
Housing material			SLOVAMID 6FRC2			
Potential free signal contact (S)			el.strength against surround. circuits el.strength against network circuits insulation resistance max.switching current max.switching voltage			3750 V_{rms} 3750 V_{rms} $2x10^7$ Ω ~0,5 A ~250 V
Lifetime			min 100.000 hrs			
Weight	m		788 g			

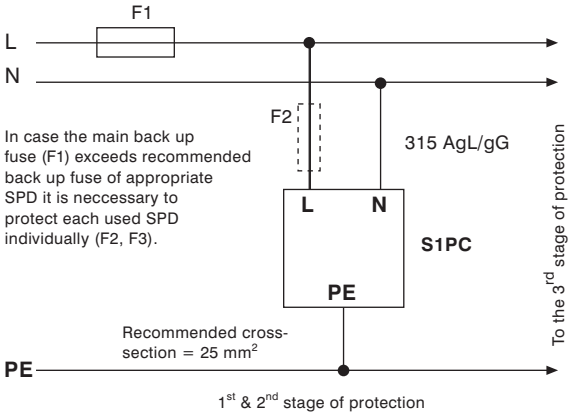
S3PC* consists of lightning arrester 1st stage and surge arrester 2nd stage according to IEC 61643-1 and EN 61643-11 standard. By a special distribution of varistors we have been successful in decreasing the size, especially by saving space by leaving out the decoupling elements, which are usually placed between the 1st and 2nd stage cascade of surge protection. The S3PC compact protection products provide particularly effective power supply system protection against transverse and lengthwise surges in cooperation with recommended application of arresters of 3rd stage (class III). Particular varistor sections connected between terminals L/N comply to IEC 61643-1 and EN 61643-11. They are provided with internal disconnecters which are activated when a failure of the varistors occurs.

Indication of failure of these disconnecters is partly mechanical (by a red signalling target) and partly remote monitoring (by potential free signal contact).
Note: It is possible to require S3PC.0 designed for IT-systems at U_N=3x400 V by the special demand entirely.

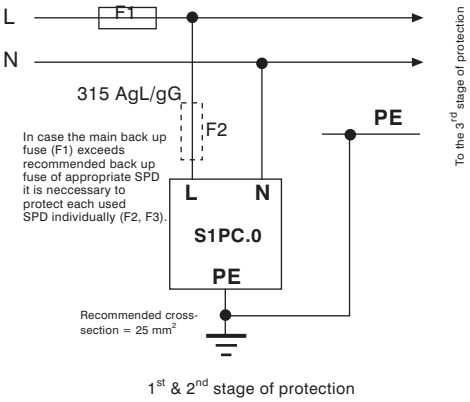
Connection of remote monitoring for S1PC* type.

Recommended wiring of lightning arresters S1PC*.type.

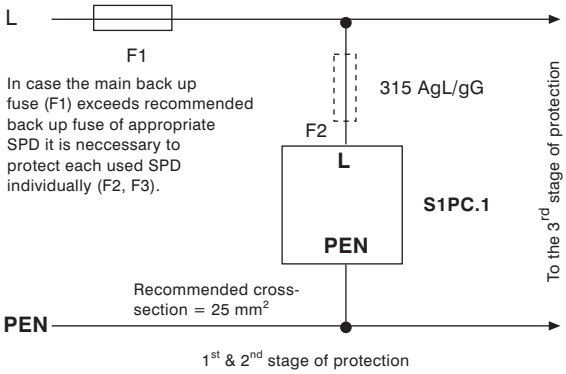
Recommended wiring for System TN-S



Recommended wiring for System TT

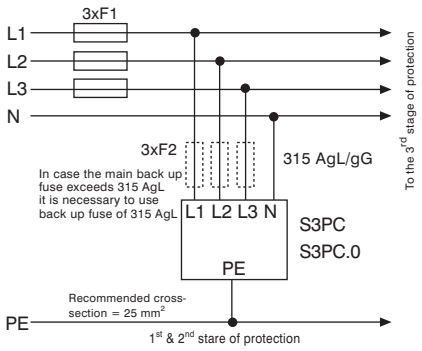


Recommended wiring for TN-C system

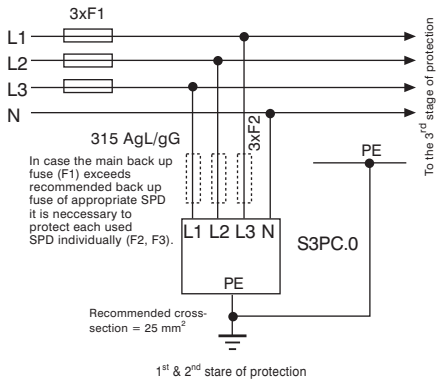


Recommended wiring of lightning arresters S3PC* type (S)

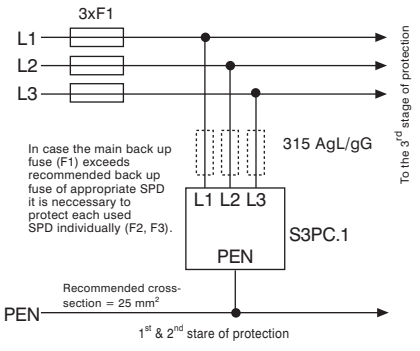
Recommended wiring for System TN-S



Recommended wiring for System TT



Recommended wiring for System TN-C



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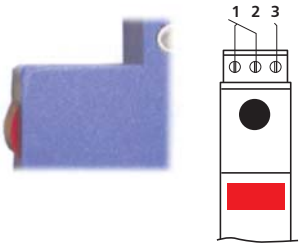
PROTECTION OF PHOTOVOLTAIC SYSTEMS CLASS I + II

SBC PV*

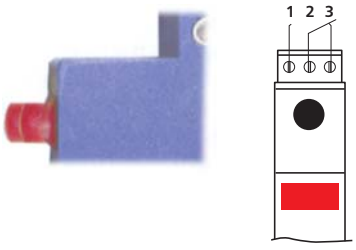
A compact range of surge protection devices (class I + II) is designed for protection of positive and negative busbars of photovoltaic systems against the surge effects according to EN 61643-11 and IEC 61643-1. The recommended use is in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 and higher according to IEC 1312-1 and IEC 62305. Particular varistor sectors connected between terminals L+, L- and PE are equipped with fitted internal disconnectors, which are activated when varistors fail (overheat). Failure indication of these disconnectors is partly mechanical (by red signalling target) and partly remote monitoring by potential free switching contacts (only SBC PV* S type).

Connection of Remote Monitoring For SBC*PV

OPERATION



FAILURE



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Type			SBC PV 200 SBC PV(S)200	SBC PV 400 SBC PV(S)400	SBC PV 600 SBC PV(S)600	SBC PV 800 SBC PV(S)800	SBC PV 1000 SBC PV(S)1000
Test class according to IEC 61643-1and EN 61643-11			I + II / T1 + T2				
Nominal AC voltage of several MOV sections	U_c		60 V	120 V	240 V	280 V	400 V
Max.continuous operating voltage DC(L + → L-)	U_N		200 V	400 V	600 V	800 V	1000 V
Max. Lightning impulse current (10/350)	I_{imp}	L+/L-	12 kA				
- charge	Q		6 As				
- specific energy	W/R		36 kj/Ω				
Max. discharge current (8/20)	I_{max}	L+/PE	120 kA				
Nominal dicsharge current (8/20)	I_n	L-/PE	65 kA				
Voltage protection level at I_{imp}	U_p		< 350 V	< 1100 V	< 2000 V	< 2400 V	< 3400 V
Response time	t_A		< 25ns < 100ns				
Recommended back-up fuse			63 AgL/gG				
Operating temperature range	ϑ		-40° to +80°C				
Cross-section of the connected conductors (at tightening moment of clamps 4Nm			6 ÷ 35 mm² (solid) 6 ÷ 25 mm² (flexible)				
Protection type			IP 20				
Mounting on			DIN rail 35mm				
Housing material			SLOVAMID 6FRC2				
Potential free signal contact (S)			el.strength against surround. circuits el.strength against network circuits insulation resistance max.switching current max.switching voltage				3750 V_{rms} 3750 V_{rms} $2x10^7\Omega$ ~0,5 A ~250 V
Lifetime			100.000 hrs				
Weight	m		780 g				

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POWER SUPPLY SYSTEMS LIGHTNING ARRESTER CLASS II

SCF*

Surge arrester class II according to IEC 61643-1 and EN 61643-11 (2nd stage protection). To be placed into the secondary switchboards . Models SCF* contains a special ZnO varistors with I_{max}(8/20)=40kA or I_{max} (8/20)=20kA.They are manufactured in a compact range for nominal voltages of 60V,120V,230V,280V,400V,500V and 720V.The recommended use is in the Ligtning Protection Zones Concept at the boundaries of LPZ O_B-1 and more according to IEC 1312-1and IEC 62305 in low voltage power supply systems TNC and TNS ,but it can also be used in TT and IT stystems. SCF S (SCT) can be used in applications, where the remote monitoring of failure is required.This type has some construction as SCF(SCT),but it also contains potential free contact for remote monitoring of failure.

Type		SCF 60 SCF 60(S)	SCF 120 SCF 120(S)	SCF 230 SCF 230(S)	SCF 280 SCF 280(S)
Test class according to IEC 61643-1and EN 61643-11		II / T2			
Nominal voltage /50 (60) Hz	U_N	60 V	120 V	230 V	280 V
Maximum continuous operating voltage/50 (60) Hz	U_C	75 V	144 V	275 V	320 V
Maximum discharge current (8/20)	I_{max}	40 kA			
Nom. discharge current (8/20)	I_n	15 kA	20 kA		
Voltage protection level at I_n	U_p	< 350 V	< 850 V	< 1,3 kV	
Response time	t_A	< 25 ns			
Recommended back-up fuse		160 AgL/gG			
Short-circuit withstand capability at max. back-up fuse	I_p	60 kA_{rms}			
Operating temperature range	ϑ	-40° to + 80°C			
Cross-section of the connected conductors (at tightening moment of clamps 3Nm)		6 ÷ 25 mm^2 (solid) 6 ÷ 16 mm^2 (flexible)			
Protection type		IP 20			
Mounting on		DIN rail 35mm			
Housing material		SLOVAMID 6FRC2			
Lifetime		min 100.000 hrs			
Potential free signal contact (S)		el.strength against surround. circuits el.strength against network. circuits insulation resistance max.switching current max.switching voltage			3750 V_{rms} 3750 V_{rms} $2x10^7\Omega$ ~0,5 A ~250 V
Weight	m	98 g			

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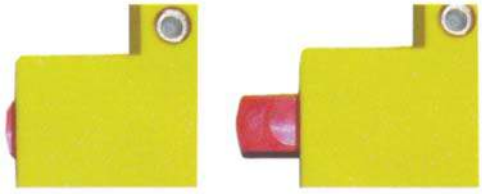
Type		SCF 400 SCF 400(S)	SCF 500 SCF 500(S)	SCT 230 SCT 230(S)	SCT 280 SCT 280(S)
Test class according to IEC 61643-1and EN 61643-11		II / T2			
Nominal voltage /50 (60) Hz	U_N	400 V	500 V	230 V	280 V
Max.continuous operating voltage/50 (60) Hz	U_C	480 V	600 V	275 V	320 V
Maximum discharge current (8/20)	I_{max}	40 kA		20 kA	
Nom. discharge current (8/20)	I_n	15 kA			
Voltage protection level at I_n	U_p	< 2 kV	< 2,5 kV	< 1,3 kV	
Response time	t_A	< 25 ns			
Recommended back-up fuse		160 AgL/gG		100 AgL/gG	
Short-circuit withstand capability at max. back-up fuse	I_p	60 kA_{rms}		30 kA_{rms}	
Operating temperature range	ϑ	-40° to + 80°C			
Cross-section of the connected conductors (at tightening moment of clamps 3Nm)		6 ÷ 25 mm^2 (solid) 6 ÷ 16 mm^2 (flexible)			
Protection type		IP 20			
Mounting on		DIN rail 35mm			
Housing material		SLOVAMID 6FRC2			
Lifetime		min 100.000 hrs			
Potential free signal contact (S)		el.strength against surround. circuits: 3750 V_{rms} el.strength against network. circuits: 3750 V_{rms} insulation resistance: $2x10^7\Omega$ max.switching current: ~0,5 A max.switching voltage: ~250 V			
Weight	m	100g	110g	90 g	

OPERATION FAILURE



Mechanical Failure Indication

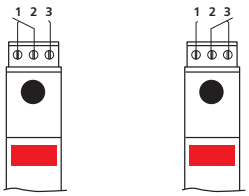
Is indicated by a red signalling target. If the red target is pushed in, the device is fully functional.
The red target pushed out signals a damage of the protecting unit.

* The devices are manufactured with nominal voltages of 60V,120V,230V,280V,400V,500V and 720 V.

Connection of Remote Monitoring

As long as the unit SCF-S (SCT* S) is functional, the contacts 1-2 are connected.
This applies if the unit is alive or also if there is absence of voltage. If there is a damaged varistor in the unit because of heat effect due to overload, the contacts 2-3 are connected.

Operation Failure



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SC*

Surge arrester class II according to IEC 61643-1 and EN 61643-11 (2nd stage protection). To be placed into the secondary switchboards. Complete device consists of a base and pluggable module. These pluggable modules can be exchanged without disconnection of power supply. Models SC* contains a special ZnO varistors with I_{max}(8/20)=40 kA or I_{max} (8/20)=20kA.
They are manufactured in a compact range for nominal voltages of 60 V, 120 V, 230 V, 280 V, 400 V, 500 V and 720 V. The recommended use is in the Lightning Protection Zones Concept at the boundaries of LPZ 0_B-1 and more according to IEC 1312-1 and IEC 62305 in low voltage power supply systems TNC and TNS, but it can also be used in TT and IT systems. SC*S can be used in applications, where the remote monitoring of failure is required. This type has the same construction as SC*,but it also contains potential free contact for remote monitoring of failure.

Type		SC 60 SC 60(S)	SC 120 SC 120(S)	SC 230 SC 230(S)	SC 280 SC 280(S)
Surge arrester class II according to IEC 61643-1 and EN 61643-11 (2nd stage protection)		II / T2			
Nominal voltage / 50 (60) Hz	U_N	60 V	120 V	230 V	280 V
Max.continuous operating voltage /50 (60) Hz	U_C	75 V	144 V	275 V	320 V
Maximum discharge current (8/20)	I_{max}	40 kA			
Nom. discharge current (8/20)	I_n	15 kA	20 kA		
Voltage protection level at I_n	U_p	< 350 V	< 850 V	< 1,3 kV	
Response time	t_A	< 25 ns			
Recommended back-up fuse		160 AgL/gG			
Short-circuit withstand capability at max. back-up fuse	I_p	60 kA_{rms}			
Operating temperature range	ϑ	-40° to + 80°C			
Cross-section of the connected conductors (at tightening moment of clamps 3Nm)		6 ÷ 25 mm^2 (solid) 6 ÷ 16 mm^2 (flexible)			
Protection type		IP 20			
Mounting on		DIN rail 35mm			
Housing material		SLOVAMID 6FRC2			
Lifetime		min 100.000 hrs			
Potential free signal contact (S)		el.strength against surround. circuits 3750 V_{rms} el.strength against network. circuits 3750 V_{rms} insulation resistance $2x10^7\Omega$ max.switching current ~0,5 A max.switching voltage ~250 V			
Weight	m	98 g			

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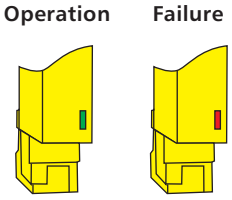
Type		SC 400 SC 400(S)	SC 500 SC 500(S)	SCMT 230 SCMT 230(S)	SCMT 280 SCMT 280(S)
Test class according to IEC 61643-1and EN 61643-11		II / T2			
Nominal voltage /50 (60) Hz	U_N	400 V	500 V	230 V	280 V
Max.continuous operating voltage /50 (60) Hz	U_C	480 V	600 V	275 V	320 V
Maximum discharge current (8/20)	I_{max}	40 kA		20 kA	
Nom. discharge current (8/20)	I_n	15 kA			
Voltage protection level at I_n	U_p	< 2 kV	< 2,5 kV	< 1,3 kV	
Response time	t_A	< 25 ns			
Recommended back-up fuse		160 AgL/gG		100 AgL/gG	
Short-circuit withstand capability at max. back-up fuse	I_p	60 kA_{rms}		30 kA_{rms}	
Operating temperature range	ϑ	-40° to + 80°C			
Cross-section of the connected conductors (at tightening moment of clamps 3Nm)		6 ÷ 25 mm^2 (solid) 6 ÷ 16 mm^2 (flexible)			
Protection type		IP 20			
Mounting on		DIN rail 35mm			
Housing material		SLOVAMID 6FRC2			
Lifetime		min 100.000 hrs			
Potential free signal contact (S)		el.strength against surround. circuits: 3750 V_{rms} el.strength against network. circuits: 3750 V_{rms} insulation resistance: $2x10^7\Omega$ max.switching current: ~0,5 A max.switching voltage: ~250 V			
Weight	m	100 g	110 g	90 g	90 g

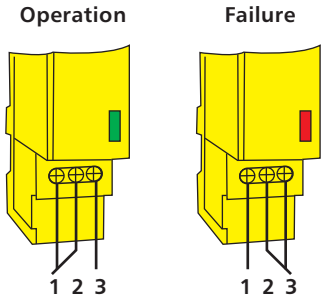
Mechanical Failure Indication

Is optically indicated by a red or green changeover field on front side of the device. The green field signals that the device is fully functional. The red field signals a damage of the protecting unit.



Connection of Remote Monitoring

As long as the unit SC* S is functional, the contacts 1-2 are connected. This applies if the unit is alive or also if there is absence of voltage. If there is a damaged varistor in the unit because of heat effect due to overload, the contacts 2-3 are connected.



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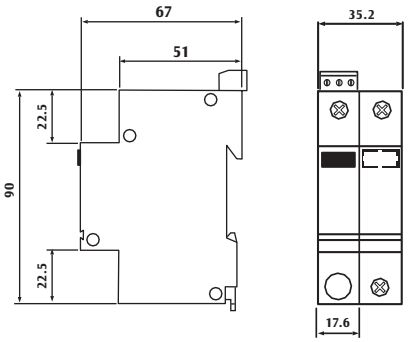
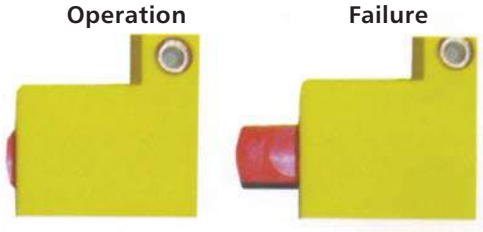
SSPU1* and SSPU3*



A compact range of surge protection devices (class II) is designed for protection of one-phase or there phases L.V. supply system against the surge effects. The recommended use is in the Lightning Protection Zones Concept at the boundaries of LPZ 0_B-1 and more according to IEC 1312-1 and IEC 62305 in low voltage power supply systems.There is a varistor in SSPU* (Schirtec Surge Protection Unit) fitted for protection of phase conductors, there is also a high power gas discharge tube intended for protection of middle operating conductor in TN-S and TT systems .The whole SSPU* configuration are housed in a yellow plastic box ,adapted for mounting on DIN rail 35 mm. All varistor sectors are equipped with fitted internal disconnectors ,which are activated if the varistors fail (overheat).Failure indication of these disconnectors is partially mechanical (by red signalling target pushed out while occurence of failure),and partially remote monitoring (by potential free switching contacts).

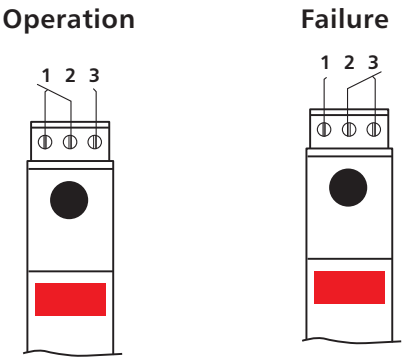
Mechanical Failure Indication

Is realized by a red signalling target. If the red target is pushed in, the function is right. The red target pushed out signals a damage of the protecting unit.



Connection of Remote Monitoring

As long as SSPU 1 unit is functional, the clamps 1-2 are connected. This applies if the unit is alive or also if there is absence of voltage. If there is a damaged varistor in the unit because of heat effect during its overload, the clamps 2-3 are connected.



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Type			SSPU1-120S	SSPU1-240S	SSPU3-120S	SSPU3-240S
Test class according to IEC 61643-1 and EN 61643-11			II / T2			
Nominal voltage AC	U_N		120 V	240 V	3X208/120 V	3X416/240 V
Max.continuous operating voltage / 50 (60) Hz	U_C	L/N	144 V	282 V	3X250/144 V	3X500/282 V
		N/PE	255V/50Hz			
Max. lightning impulse current (10/350)	I_{imp}	L/N	3 kA			
		N/PE	20 kA			
* Charge	Q	L/N	1,5 As			
		N/PE	10 As			
* Specific energy	WR	L/N	2,3 kJ/Ω			
		N/PE	100 kJ/Ω			
Max. discharge current (8/20)	I_{max}	L/N	40 kA			
Nominal discharge current (8/20)	I_n	L/N	20 kA			
Voltage protection level at I_n	U_P	L/N	<850V	<1,3 V	<850 V	<1,3 kV
		N/PE				
Voltage protection level at I_{imp}	U_P	L/N	<1,3 kV			
		N/PE				
DC sparkover voltage			500V ∓10%			
Follow current interrupting rating at U_c	I_{fi}	N/PE	<100A_{rms}			
Response time	t_A	L/N	<25ns			
		N/PE	<100ns			
Recommended back-up fuse			160 AgL/gG			
Short-circuit withstand capability	I_p		60 kA_{rms}			
Operating temperature range	ϑ		-40°to + 80°C			
Cross-section of the connected conductors (at tightening moment of clamps 3 Nm)			25mm^2 (solid) 16mm^2 (flexible)			
Protection type			IP 20			
Mounting on			DIN rail 35mm			
Housing Material			SLOVAMID 6FRC2			
Lifetime			min 100.000 hrs			
Potential free signal contact (S)			El.strength against surrond. circuits: 3750V_{rms} El.strength against network circuits: 3750V_{rms} Insulation resistance: 2x10^7Ω Max. switching current: ~0,5A Max. switching voltage: ~250V			
Weight	m		172g		380 g	

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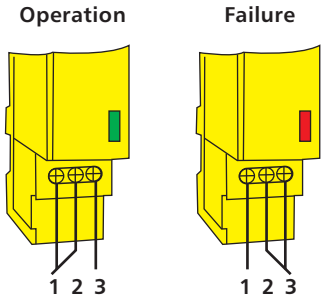
SSPUM1* and SSPUM3*

A compact range of surge protection devices (class II) is designed for protection of one-phase or there phases L.V. supply system against the surge effects. The recommended use is in the Lightning Protection Zones Concept at the boundaries of LPZ 0_B-1 and more according to IEC 1312-1 and IEC 62305 in low voltage power supply systems.
Complete device consists of a base and pluggable modules.These pluggable modules can be exchanged without disconnection of power supply.
There is a varistor in SSPUM 1 (Schirtec Surge Protection Unit) fitted for protection of phase conductors, there is also a high power gas discharge tube intended for protection of middle operating conductor in TN-S and TT systems.
All varistor sectors are equipped with fitted internal disconnectors which are activated if the varistors fail (overheat). Failure indication of these disconnectors is partially mechanical (by red signalling field on front side of device), and partially remote monitoring (by potential free switching contacts only SSPUM S).

Mechanical Failure Indication

Is optically indicated by a change of colour signalisation field on front side of the device.The green field signals that the device is fully functional.The red field signals a damage of the protecting unit.



Connection of remote indication

As long as SSPU3 unit is functional, the clamps 1-2 connected. This applies if the unit is alive or also if there is absence of voltage. If there is a damaged varistor in the unit because of heat effect during its overload ,the clamps 2-3 connected.

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Type			SSPUM1-240 S	SSPUM1-385 S	SSPUM3-240 S	SSPUM3-385 S
Test class according to IEC 61643-1 and EN 61643-11			II / T2			
Nominal voltage AC	U_N		240 V		3X416/240 V	
Max.continuous operating voltage / 50 (60) Hz	U_C	L/N	282 V	385 V	3X500/282 V	3X385/225 V
		N/PE	255V			
Max. lightning impulse current (10/350)	I_{imp}	L/N	3 kA			
		N/PE	15 kA			
* Charge	Q	L/N	1,5 As			
		N/PE	7,5 As			
* Specific energy	W/R	L/N	2,3 kJ/Ω			
		N/PE	50 kJ/Ω			
Max. discharge current (8/20)	I_{max}	L/N	40 kA			
Nominal discharge current (8/20)	I_n	L/N	20 kA			
Voltage protection level at I_n	U_P	L/N	<1,3 kV	<1,8 V	<1,3 kV	<1,8 kV
		N/PE				
Voltage protection level at I_{imp}	U_P	L/N	<1,3 kV			
		N/PE				
DC sparkover voltage		N/PE	500V ∓10%			
Follow current interrupting rating at U_c	I_{fi}	N/PE	<100A_{rms}			
Response time	t_A	L/N	<25ns			
		N/PE	<100ns			
Recommended back-up fuse			160 AgL/gG			
Short-circuit withstand capability at max. back-up fuse	I_p		60 kA_{rms}			
Operating temperature range	ϑ		-40°to + 80°C			
Cross-section of the connected conductors (at tightening momment of clamps 3 Nm)			25mm^2 (solid) 16mm^2 (flexible)			
Protection type			IP 20			
Mounting on			DIN rail 35mm			
Housing Material			SLOVAMID 6FRC2			
Lifetime			min 100.000 hrs			
Potential free signal contact (S)			El.strength against surrond. circuits: 3750V_{rms} El.strength against network circuits: 3750V_{rms} Insulation resistance: 2x10^7Ω Max. switching current: ~0,5A Max. switching voltage: ~250V			
Weight	m		172g		380 g	

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SCN20 and SCN20M

Module SCN20 is one part of modular units of surge protection intended for mouting on DIN rail 35 mm .It is used for the protection of L.V. power supply systems against surges caused by lightning stroke.Therefore,it creates an integral part of building protection and its installations against surge effects. SCN20 contains a high power gas discharge tube rated for max. lightning impulse current I_{imp}=20 kA(10/350). It is mainly used if there is an overhead line as a low voltage supply to a building or if there are residual current circuit breakers in protected facility. It fulfils construction demands posed on class II for lightning arresters. The recommended use is in the Lightning Protection Zones Concept at the boundaries of LPZ0_B-1 and more according to IEC 1312-1 and IEC 62305 in low voltage power supply systems TNS,TT and IT*.
SCN20 is in these applications mainly used equipotential bonding between N and PE (equipotential busbar).

* For IT systems without outlet we use a special modification of gas discharge tube SCN20M.

Type		SCN20	SCN20M
Test class according to IEC 61643-1 and EN 61643-11		II / T2	
Modes of protection		N/PE	
Max. continuous operating voltage	U_C	255V/50(60)Hz	
Insulation resistance	R_i	>1000MΩ	
Max. discharge current (8/20)	I_{max}	50kA	
Nominal discharge current (8/20)	I_n	20kA	
Max. lightning impulse current (10/350)	I_{imp}	20kA	15kA
Charge	Q	10As	7,5As
Spesific energy	W/R	100kJ/Ω	50kJ/Ω
Voltage protection level at I_{imp}	U_p	<1,3kV	
Follow current extinguishing capability at U_C	I_f	<100 A_{rms}	
Response time	t_A	<100ns	
Lightning impulse sparkover voltage 1,2/50 μs		<1,5kV	
Operating temperature range	ϑ	-40°to +80°C	
Cross-section of the connected conductors (at tightening moment of clamps 3Nm.)		10mm^2	
Protection type		IP 20	
Mounting on		DIN rail 35mm	
Housing material		SLOVAMID 6FRC2	
Weight	m	84g	

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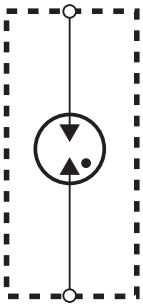
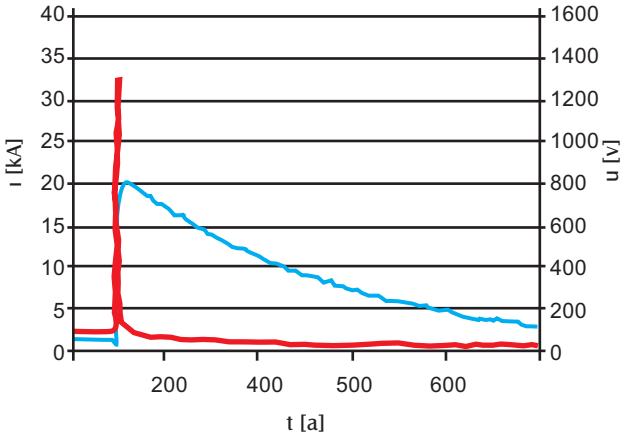
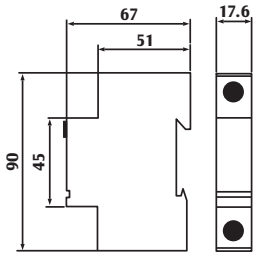
Basic circuit diagram of SCN-20



The typical SCN-20 response to a stroke of test impulse I_{imp}(10/350)=20kA



SPR 100



An auxiliary connection module which serves for easier installation of surge and lightning arresters on DIN rail 35mm.

Type		SPR100
Nominal voltage	U_N	500V (AC/DC)
Nominal current	I_N	100A
Max lightning impulse current I_{max}(10/350)	I_{imp}	100kA
Recommended back-up fuse		250AgL/gG
Short-circuit withstand capability	I_p	80kA$_{rms}$
Operating temperature range	ϑ	-40 to +80°C
Cross-section of connected conductors (at tightening of clamps 4Nm.)		6÷25mm^2 (solid) 6÷16mm^2 (flexible)
Mounting on		DIN rail 35mm
Housing material		SLOVAMID 6FRC2

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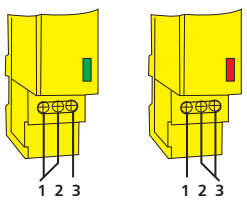
SSPUM PV*

A compact range of surge protection devices (class II) is designed for protection of positive and negative busbars of photovoltaic systems against the surge effects according to EN 61643-11 and IEC 61643-1. The recommended use is in the Lightning Protection Zones Concept at the boundaries of LPZ 0_B-1 and higher according to IEC 1312-1 and IEC 62305. SSPUM PV* consists of a base and pluggable modules. These pluggable modules can be exchanged without disconnection of power supply. Particular varistor sectors connected between terminals L+, L- and PE are equipped with fitted internal disconnectors, which are activated when varistors fail (overheat). Failure indication of these disconnectors is partly visual (discoloration of the signal field) and partly remote monitoring by potential free switching contacts (only SSPUM PV(S)* type).

Type		SSPUM PV200 SSPUM PV(S)200	SSPUM PV400 SSPUM PV(S)400	SSPUM PV600 SSPUM PV(S)600	SSPUM PV800 SSPUM PV(S)800	SSPUM PV1000 SSPUM PV(S)1000
Test class according to IEC 61643-1and EN 61643-11		II / T2				
Nominal voltage AC of plugable modules SC*	U_N	60 V	120 V	240 V	280 V	400 V
Max.continuous operating voltage DC(L+/L-,L+/PE,L-/PE)	U_C	200 V	400 V	600 V	800 V	1000 V
Max. discharge current at wave shape(8/20)	I_{max}	40 kA				
Nom. discharge current at wave shape (8/20)	I_n	15 kA	20 kA			15 kA
Voltage protection level at I_n	U_p	<950 V	<1,7 kV	<2,5 kV	<2,8 kV	<3,5 kV
Response time	t_A	<25ns				
Recommended back-up fuse		125 AgL/gG				
Operating temperature range	ϑ	-40° to + 80°C				
Recommended cross-section of connected conductors at tightening moment 3Nm		6÷25 mm² (solid) 6÷16 mm² (flexible)				
Protection type		IP 20				
Mounting on		DIN rail 35mm				
Housing material		SLOVAMID 6FRC2				
Potential free signal contact (S)		el.strength against surround. circuits el.strength against network circuits insulation resistance max.switching current max.switching voltage				3750 V_{rms} 3750 V_{rms} 2x10⁷Ω ~0,5 A ~250 V
Lifetime		100.000 hrs				
Weight	m	300 g				

Visual failure indication

Overloading and disconnection of varistor is indicated by discoloration of the signal field from green to red colour.



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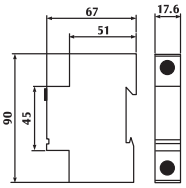
DECOUPLING ELEMENTS

SDL-*

SDL* range are decoupling inductors intended for nominal currents of 16,32,63,80 and 120A.These inductors (sometimes called decoupling impedance) ensure energy coordination between arresters of 1st and 2nd stage or 2nd and 3rd stage arresters according to IEC 61643-1, IEC 1024-1, especially in the places, where there is no adequate distance between arresters (e.g. when there are two following stages placed in one switchboard). A probability arises that arresters of a protection cascade stage could be damaged by lightning current impulse, if the energy coordination is not achieved. If there is at least 10m between following stages (in case of two following stages in two different switchboards),this section impedance can be considered as adequate.

Type		SDL-16	SDL-32	SDL-63	SDL-80	SDL-120
Nominal voltage	U_N	500V/50,60 Hz				
Nominal current	I_N	16A	32A	63A	80A	120A
Inductance	L	6μH±10%			4μH±10%	6μH±10%
DC resistance		<0,01Ω			<0,001Ω	
Protection type		IP 20				IP 10
Operating temperature range	ϑ	-40°to + 55°C				
Cross-section of the connected conductors		6÷25 mm² (solid) 6÷16 mm² (flexible) (at tightening moment of clamps 3Nm)		6÷35 mm² (solid) 6÷25 mm² (flexible) (at tightening moment of clamps 3Nm)		16÷50 mm² (solid) 16÷35 mm²(flexible) (at tightening moment of clamps 4Nm)
Mounting on		DIN rail 35mm				
Weight	m	141g	157g	360g	360g	1153g
Installation position		optional				
Lifetime		>100.000 hrs				

Type		SDL-16/15	SDL-32/15	SDL-63/15
Nominal voltage	U_N	500V/50 (60) Hz		
Nominal current	I_N	16A	32A	63A
Inductance	L	15μH±10%		
DC resistance		<0,01Ω		
Protection type		IP 20		
Operating temperature range	ϑ	-40°to +80°C		
Cross-section of the connected conductors (at tightning moment of clamps 3Nm)		6÷25mm² (solid) 6÷16mm² (flexible)		6÷35mm² (solid) 6÷25mm² (flexible)
Mounting on		DIN rail 35mm		
Weight	m	157g	330g	630g
Installation position		optional		
Lifetime		>100.000 hrs		

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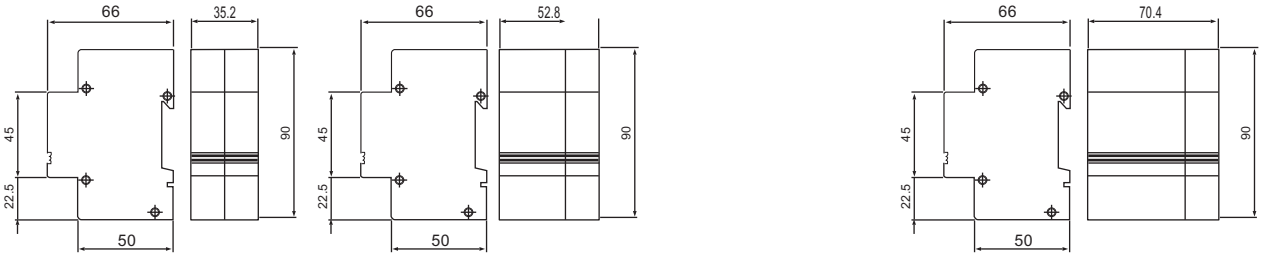
POWER SUPPLY SYSTEMS SURGE ARRESTER CLASS III

SDL-*HFF



* This complex range is produced in two versions for U_N =6,12,24,48,60,80,110,120,130,160, and 230V(AC/DC)

SDL-*HFF range are two stage,single-phase surge protection devices with a high-frequency filter. They are designed for protection of electronic appliances in L.V.supply systems against impulse surge and against high-frequency disturbance. The filters are constructed for mounting on DIN rail 35mm for nominal currents 8,16,25 and 32 A according to IEC 61643-1 and EN 61643-11 standards (arrester class III-3rd stage protection). SDL-*HFF range is equipped with max. discharge current I_{max}=8kA(8/20), t_A<25ns and a special core with extremely high permeability μ>80000. This complex range is produced in two versions for U_N=6,12, 24, 48, 60, 80, 110,120,130,160 and 230 V (AC/DC). The types SDL-8HFF,SDL-16HFF SDL-25HFF,SDL-32HFF are fitted with a green led diode,which signalizes the right functioning. The types SDL-16HFFS and SDL-25HFFS indicate the failure by target disconnection of mechanical thermal fuses, which react to varistors (non-linear elements) overheating above c. 120˚C. If any of the two fitted thermal fuses react, remote controlling potential- free contact FAILURE disconnects at the same time.

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Type		SDL-8HFF	SDL-16HFF	SDL-16HFFS	SDL-25HFFS	SDL-25HFF	SDL-32HFF
Test class acc. to IEC/EN		III / T3					
Nominal voltage	U_N	230/50 (60) Hz					
Max.continuous operating voltage	U_C	275V/50 (60) Hz					
Nominal current	I_N	8A	16A		25A		32A
Continuous operat. current	I_C	c.2mA		c. 50μA		c.2mA	
Nominal discharge current I_n(8/20)	I_n	3 kA (L→N, L→PE) 5 kA (L→PE)					
Combined impulse	U_{oc}	6 kV(L→N, L→PE) 10 kA (N→PE)					
Voltage protection level at U_{oc}	U_p	≤ 850 V (L→N) ≤ 1,5 V (L→PE) ≤ 0,5 V (N→PE)					
Recommended back up fuse		8A	16A		25A		32A
Response time	t_A	<25ns(L→N) <100ns (L→PE, N→PE)					
Recomm. Cross-section of connected conductors		2,5÷4mm²	4÷6mm²		6÷10mm²		
Operating temperature range	ϑ	-40°to + 55°C					
Protection type		IP 20					
Housing material		SLOVAMID 6FRC2					
Mounting on		DIN rail 35 mm					
Asymmetrical attenuation of filter (band-stop filter) 0,15 to 30 MHz		Min. 80dB at 4MHz Min. 40dB in band 0,15 to÷30 MHz					
Filter constants	C_X	150nF	220nF				
	C_y	22nF					
	L	1,2 mH	1,8mH		2,3mH		
Power loss at winding temperature 20°C		<2,2W	<3,5W				<4W
Potential free signal contact		El.strength against surround. circuits 3750V_{rms} El.strength against network circuit 3750V_{rms} Insulation resistance $2x10^7\Omega$ Max. switching current ~0,5 A Max. switching voltage ~250V					
Life time		min 100.000 hrs					
Weight	m	130g	166g	235g			

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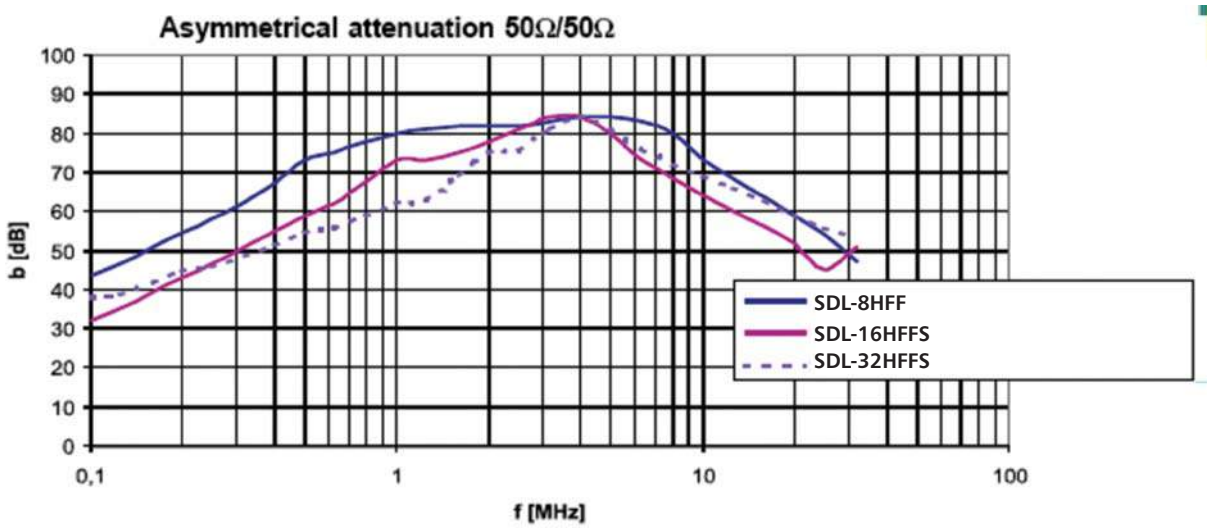
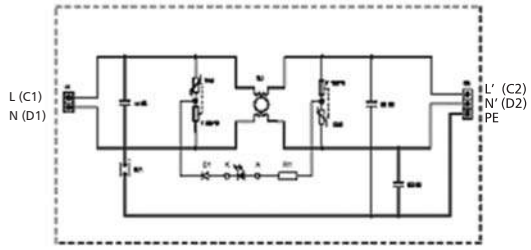
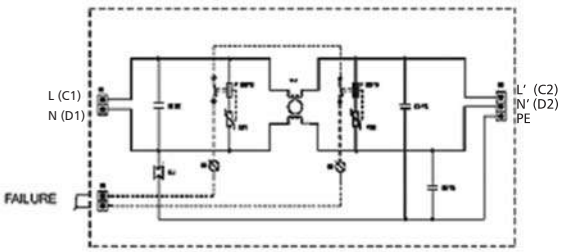


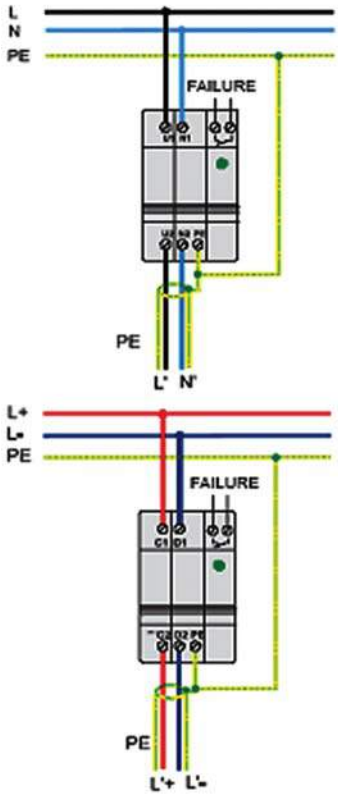
Basic circuit diagram of SDL-8HFF , SDL-16HFF , SDL-25HFF , SDL32HFF



Basic circuit diagram of SDL-25HFF , SDL-32HFFDS



Recommended connection of SDL-*HFF"



It is recommended to connect protected appliance by appropriately dimensioned shielding conductor.
Types of voltages:U_N=6,12,24,48,60,80,110,120,130 and 160 V(AC/DC) can be produced when a special order is placed.
The filter contains non-linear elements (varistors and gas discharge tubes),that is why it is necessary to disconnect the filter during controlling of switchboard and measuring of insulation resistance of L.V. supply system.

Recommended cross-section for grounding	
SDL-8HFF	2,5 mm^2 Cu
SDL-16HFF	4 mm^2 Cu
SDL-25HFF	6 mm^2 Cu
SDL-32HFF	6 mm^2 Cu

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SDL-*HFF

SDL-*HFF range are two stage,single-phase surge protection devices with a high-frequency filter.They are designed for protection of electronic appliances in L.V.supply systems against impulse surge and against high-frequency disturbance.The filters are constructed for mounting on DIN rail 35mm or they can be fitted straight onto construction of switchboard by four screws M4.They are intended for currents I_N=32,50,63, 80,120 and 150A and U_N= 6,12,24,48,60,80,110,120,130,160 and 230V(AC/DC).They apply to the standards IEC 61643-1and EN 61643-11 (Class III-3rd stage protection). SDL-*HFF range is equipped with special varistors with response time t_A<25ns and a special core with extremely high permeability μ>80.000. Function failure of non-linear elements - varistors are indicated by target disconnection of mechanical thermal fuses,which react to varistors overheating above c. 120˚C. If any of the two fitted thermal fuses react,the remote monitoring potential- free contact FAILURE disconnects at the same time.

Type		SDL-32HFF	SDL-50HFF	SDL-63HFF	SDL-80HFF	SDL-120HFFS	SDL-150HFFS
Test class according to IEC/EN		III / T3					
Nominal voltage	U_N	230V/50(60) Hz					
Max.continuous operating voltage	U_C	275V/50(60) Hz					
Nominal current	I_N	32A	50A	63A	80A	120A	150A
Nominal discharge current I_n(8/20)	I_n	3 kA (L→N, L→PE) 5 kA (N→PE)					
Voltage protection level at U_{oc}	U_P	≤850 V (L→N ≤ 1,5 kV (L→PE) <500V (N→PE)					
Combined impulse	U_{oc}	6 kV (L→N, L→PE) 10 kV (N→PE)					
Response time	t_A	<25ns (L→N) <100ns (L→PE, N→PE)					
Cross-section of connected conductors		10mm²	25mm²			35mm²	
Operating temperature range	ϑ	-40°to + 55°C					
Protection type		IP 10					
Housing material		Metal sheet 0,8 mm					
Mounting on		DIN rail 35 mm or by screws M4 on chassis					
Asymmetrical attenuation of filter (band-stop filter) 0,15 to 30 MHz		Min. 80dB at 3MHz Min. 40dB in band 0,15 to 30 MHz				Min. 80dB at 2MHz Min. 30dB in band 0,15 to 30 MHz.	
Filter constants	C_X	M68				2M	
	C_y	22 nF					
	L	2,2 mH			1,4mH	1mH	0,6mH
	R	820kΩ					
Power loss at winding temperature 20°C		<5W	<7W	<9W	<12W	<20W	<20W
Potential free signal contact		El.strength against surround. circuits 3750V_{rms} El.strength against network circuit 3750V_{rms} Insulation resistance 2x10^{7}Ω Max. switching current ~0,5 A Max. switching voltage ~250 V					
Life time		min 100.000 hrs					
Weight	m	870g	968g		1033g	1374g	1493g

* They are intended for currents I_N=32,50,63,80,120 and 150A and U_N =6,12,24,48,60,80,110,120,130,160 and 230V(AC/DC).

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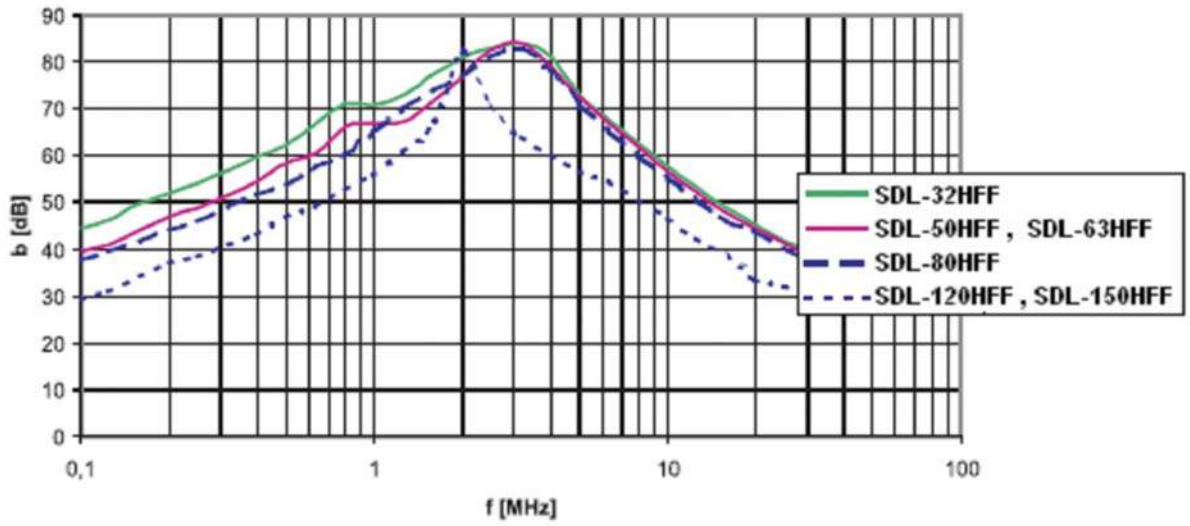
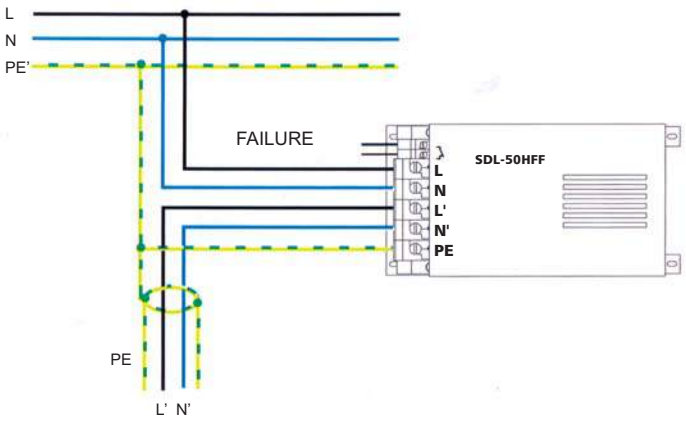
Asymmetrical attenuation 50Ω/50Ω

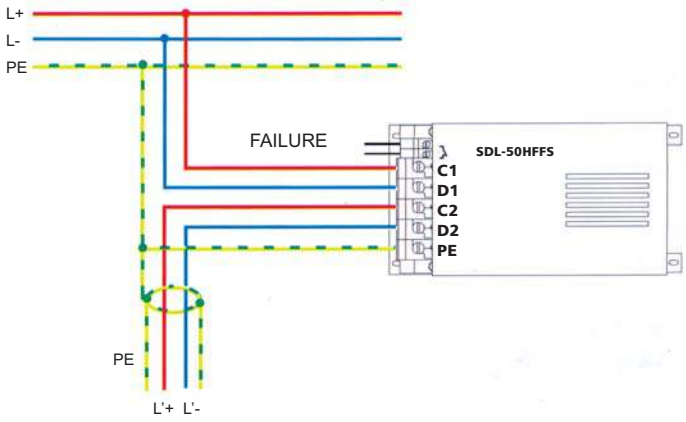


Recommended connection of SDL-*HFF

System TNS



System DC



Surge arresters SDL-32HFF,SDL-50HFF,SDL-63HFF,SDL-80HFF,SDL-120HFF,SDL-150HFF in basic version are designed for mounting on chassis with the help of 4 screws M4.If mounting on DIN rail is required, it is necessary to specify the requirement in the order - horizontal/vertical mounting (e.g. SDL-50HFF/DIN/H or SDL-50HFF/DIN/V).
It is necessary to ensure that the ventilation holes in the box of SDL-32HFF,SDL-50HFF,SDL-63HFF, SDL-80HFF,SDL-120HFF,SDL-150HFF are not covered.
It is recommended to connect protected appliance by appropriately dimensioned shielding conductor. The filter contains non-linear elements (varistors and gas discharge tubes),that is why it is necessary to disconnect the filter during controlling of switchboard and measuring of isolation resistance of L.V. supply system.

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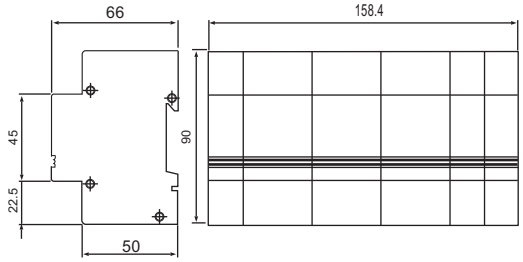
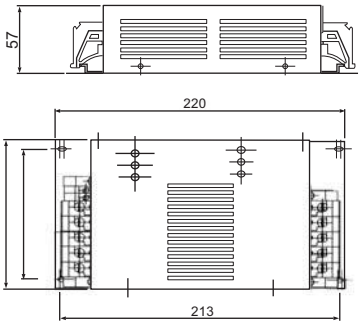
SDL-3*HFF





A complex range of two-stage,three-phase surge protection devices with a high-frequency filter. They are designed for protection of electronic equipment in L.V. three phase supply systems against impulse overvoltage and high-frequency disturbance. They are intended for nominal currents 16,25,32,50 and 80A for applications in TNS, TNC, TT and IT systems according to IEC 61643-1 and EN 61643-11 standards. All devices are constructed to be mounted on DIN rail 35 mm, it is possible to fit the filters intended for 32,50,63 with 4 screws straight onto chassis of switchboard.The devices are equipped with special varistors with discharge ability $I_{max}(8/20)=8kA$, response time $t_A<25ns$ and a special core with extremely high permeability of $\mu>80000$. Function failure of non-linear elements - varistors is indicated by target disconnection of mechanical thermal fuses, which react to varistors overheating above c. 120˚C. If any of the six fitted thermal fuses react, remote controlling potential-free contact FAILURE disconnects at the same time.

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Type		SDL-316HFF	SDL-325HFF	SDL-332HFF	SDL-350HFF	SDL-363HFF	SDL-380HFF
Test class according to IEC/EN		III / T3					
Nominal voltage	U_N	3x400/230V/50(60) Hz					
Max.continuous operating voltage	U_C	3x480/275V/50(60) Hz					
Nominal current	I_N	16A	25A	32A	50A	63A	80A
Nominal discharge current I_n(8/20)	I_n	3 kA (L→N, L→PE) 5 kA (L→PE)					
Combined impulse	U_{OC}	6 kV (L→N,L→PE) 10 kV (N→PE)					
Voltage protection level at U_{oc}	U_P	≤ 850 V (L→N) ≤ 1,5 kV (L→PE) ≤ 0,5 kV (N→PE)					
Recommended back up fuse		16A	25A	32A	50A	63A	80A
Response time	t_A	<25ns(L→N) <100ns (L→PE, N→PE)					
Cross-section of connected conductors		4÷6mm²		10mm²	25mm²		
Operating temperature range	ϑ	-40°to + 55°C					
Protection type		IP 20		IP 10			
Housing material		SLOVAMID 6FRC2		sheet metal 0,8 mm			
Mounting on		DIN rail 35 mm		DIN rail 35 mm or by screws M4 on chassis			
Asymmetrical attenuation of filter (band-stop filter) 0,15 to 30 MHz		Min. 80dB at 2MHz		min. 80dB at 1,5 MHz Min. 40dB in band 0,15 to 30 MHz			
Filter constants	C_{X1}	-		M15			
	C_{X2}	M33		M68			
	C_y	2x47 nF					
	L	1,3 mH	1,4mH	2,15 mH		1mH	0,9 mH
	R	820kΩ					
Power loss at winding temperature 20°C		<7,5W	<10W	<8W	<9W	<13W	<15W
Potential free signal contact		El.strength against surround. circuits 3750V_{rms} El.strength against network circuit 3750V_{rms} Insulation resistance 2x10^{7}Ω Max. switching current ~0,5A Max. switching voltage ~250V					
Life time		min 100.000 hrs					
Weight	m	494g		1400g	1600g		1710g

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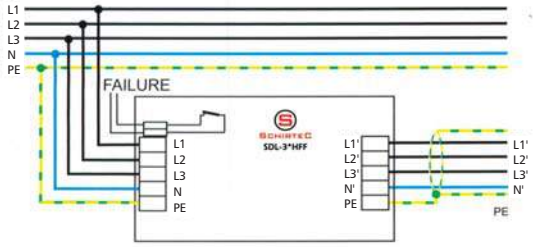
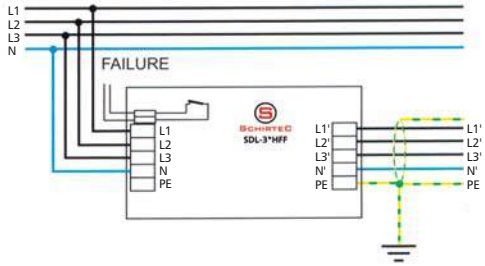
Recommended connection of SDL-3*HFF

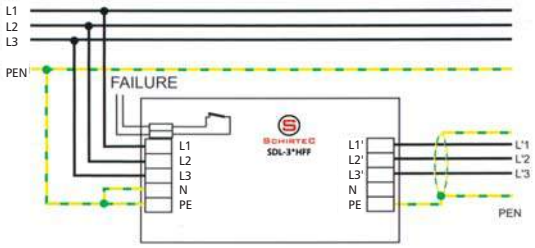
System TNS



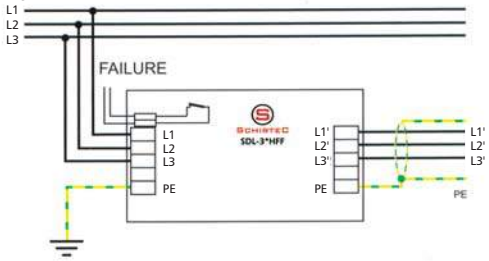
System TT



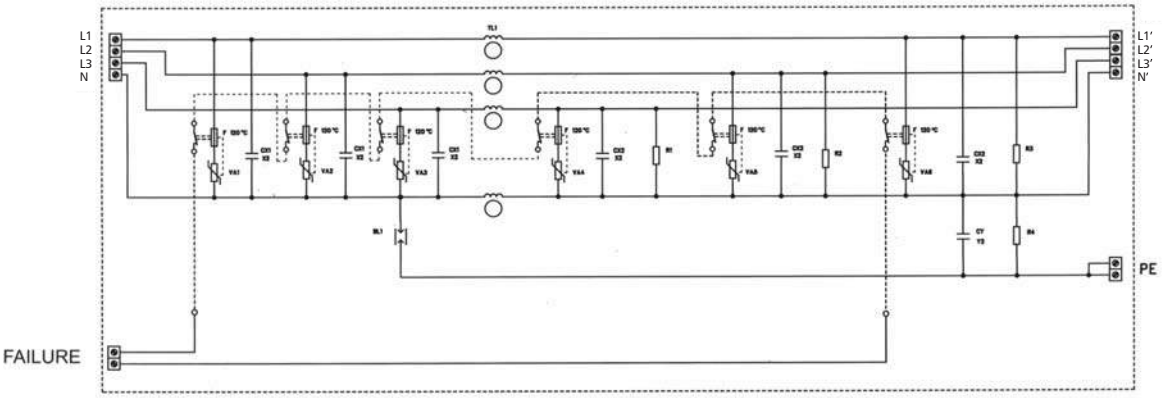
System TNC



System IT



Basic circuit diagram



It is recommended to connect protected appliance by appropriately dimensioned shielding conductor. Surge arresters SDL-332HFF,SDL-350HFF,SDL-363HFF.SDL-380HFF in basic version are designed for mounting on chassis by means of 4 screws M4.If mounting on DIN rail is required,it is necessary to specify when placing an order - horizontal/vertical mounting (e.g.SDL-350HFF/DIN/H or SDL-350HFF/DIN/V).

It is necessary to ensure that the ventilation holes in the box of SDL-332HFF, SDL-350HFF, SDL-363HFF, SDL-380HFF are not covered.

The filter contains non-linear elements (varistors and gas discharge tubes),that is why it is necessary to disconnect the filter during controlling of switchboard and measuring of insulation resistance of L.V. supply system.

Recommended cross-section for grounding	
SDL-316HFF	4 mm^2 Cu
SDL-325HFF	4 mm^2 Cu
SDL-332HFF	6 mm^2 Cu
SDL-350HFF	6 mm^2 Cu
SDL-363HFF	10 mm^2 Cu
SDL-380HFF	25 mm^2 Cu

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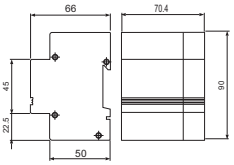
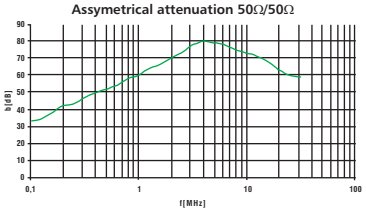
SDL-16/400 HFF



Two-stage ,single-phase protection SDL-16/400 HFFS with a high frequency filter is designed for protection of appliances supplied by voltage 400V (AC,DC) against pulse surges and HF interference.It is intended for the nominal current I_N=16A .Mounting on DIN rail 35 mm. This product complies to the IEC 61643-1and EN 61643-11 standards. SDL-16/400HFFS are equipped with special varistors with max. discharge current I_{max}=8kA(8/20), t_A<25ns and special core with a high permeability μ>80000. Function failure of non-linear elements-varistors is indicated by target disconnection of mechanical thermal fuses, which react to varistors overheating above cca 120°C. When one of the three thermal fuses reachts the remote monitoring Failure is disconnected.

Type		SDL-16/400HFFS
Test class according to IEC/EN		III / T3
Nominal voltage	U_N	400V/50/(60) Hz
Nominal current	I_N	16A
Nominal discharge current I_n(8/20)	I_n	5 kA (L/PE)
Response time	t_A	<25ns(Li/L2) <100ns(L/PE)
Max. Continuous operating voltage	U_C	480 V/50(60) Hz
Combined impulse	U_{oc}	6 kV (L/PE)
Recommended back-up fuse		16A
Operating temperature range	ϑ	-40°to + 55°C
Cross-section		4÷6mm^2
Protection type		IP 20
Housing material		SLOVAMID 6FRC2
Mounting on		DIN rail 35mm
Asymmetrical attenuation on filter (band-stop filter) 0,15 to 30 MHz		Min. 80 dB at 4MHz Min. 40 dB in band 0,15 to 30MHz
Filter constants	C_{X2} C_{y2} L R	M33 22n 1,8 mH M68
Power loss at the tempature of 20°C		<3,5W
Potential free signal contact:		El.strength against internal circuit 3750V$_{rms}$ El.strength against network circuit 3750V$_{rms}$ Insulation resistance 2x10$^7\Omega$ Max. switching current ~0,5A Max. switching voltage ~250V
Leakage current		<3mA
Lifetime		min 100.000 hrs
Weight	m	250g

Protected equipment is recommended to connect with appropriately dimensioned shielded cable.
Recommended cross section for grounding is 6 mm^2.
The DC version can be produced only on a special demand.



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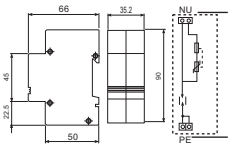
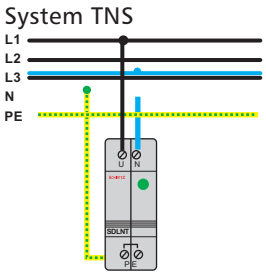
SDLTN

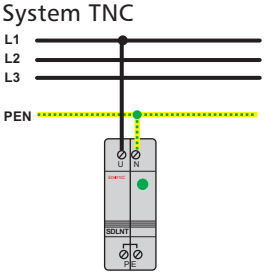


It is a surge protection device designed for universal application for protection of all electical appliances connected to the L.V. supply systems against impulse surge effects. It is suitable for TNS and TNC systems. It is possible to require this type for different operation voltage,when ordering. The device fulfils requirements of arrester class III according to IEC61643-1 and EN 61643-11 standards. SDLTN is equipped with non-linear elements-varistors with maximum discharge ability I_{max}=8kA (8/20) and special gas discharge tubes with maximum discharge ability I_{max}=10kA(8/20). Potential failure is indicated by a red target of thermal fuse, which reacts to varistor overheating above 120°C temperature.

Type		SDLTN
Test class according to IEC/EN		III / T3
Applicable for systems		TNS, TNC
Nominal voltage	U_N	230V/50(60)Hz
Max. continuous operating voltage	U_C	275V/50(60)Hz
Nominal discharge current I_n (8/20)	I_n	3 kA (L→N, L→PE) 5 kA (N→PE)
Combined impulse	U_{oc}	6 kV (L→N, L→PE) 10 kV (N→PE)
Voltage protection level at U_{oc}	U_p	≤ 1 kV (L→N, L→PE) ≤ 1,2 kV (L→PE, N→PE)
Response time	t_A	<25ns(L→N) <100ns(L→PE) <100ns(L→PE)
Recom.cross-section of connected conductors		Max. 2,5 mm²
Weight	m	80g
Protection type		IP 20
Mounting on		DIN rail 35mm
Housing material		SLOVAMID 6FRC2
Operating temperature range	ϑ	-40°to + 80°C
Colour		Grey

Recommended connection of SDLTN





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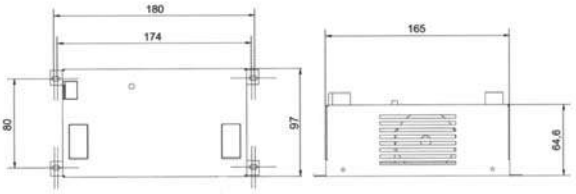
SDL-25RFI



SDL-25RFI is specially designed hybrid low noise filter intended for a high effective protection of expensive electronic equipment against high frequency disturbance and against impulse overvoltage. The combination of fast two-stage protection device and quality frequency filter provides extreme suppression of voltage levels of high-energetic impulses which come into the protected equipment from the L.V. power distribution side. This combination also provides an attenuation of high frequency noise levels in band 0,1 to 100MHz. The filter is equipped with a high power nonlinear components (varistors) with response time t_A< 25ns and total peak surge current of 48kA (8/20). All fitted varistors are equipped with thermal disconnecters that react to varistors overheating at overload. This device is equipped with optical indicator of right function STATUS INDICATOR and with remote monitoring of failure (FAULT MONITORING) by potential-free switching contact. These filters are constructed to be mounted on DIN rail 35mm or it is possible to fit them with 4 screws straight onto chassis of switchboard. The basic version of SDL-25RFI is for nominal current I_N = 25A and nominal voltage U_N = 230VAC (DC). However, we can also offer U_N = 6, 12, 24, 48, 60, 80, 110, 120, 130, 160VAC (DC) if required.

Type		SDL-25RFI
Test class according to IEC/EN		III / T3
Nominal voltage	U_N	230V/50(60)Hz
Nominal current	I_N	25A
Max. continuous operating voltage	U_c	275V/50(60)Hz
Total peak surge current of fitted varistors		48kA(8/20)
Test by combined impulse	U_{oc}	6 kV (L→N, L→PE, N→PE)
Voltage protection level at U_{oc}	U_P	<650 V (L→N, L→PE, N→PE)
Response time	t_A	<25ns
Recommended cross-section of connected conductors		4mm² Cu (L,N,PE) 1mm² Cu (FAULT MONITORING)
Operating temperature range	ϑ	-40°to + 55°C
Protection type		IP 00
Housing material		Sheet Metal 0,8 mm
Mounting on		by screws M4 on chassis or on DIN rail 35 mm
Asymmetrical attenuation of filter (band-stop filter 0,1-100MHz)		Min. 50 dB in band 1 to 100 MHz 20 to 50 dB in band 0,1 to 1 MHz
Filter constants	C_X C_y L R	220 nF + 3x4, 7μF 2X47 nF (or Acc. to customer's need) 2x1μH+2x44μH 68Ω
Power loss at winding tempature 20°C		29 W
Potential free signal contact:		El.strength against surround. circuits 3750V_{rms} El.strength against network circuit 3750V_{rms} Insulation resistance 2x$10^7\Omega$ Max. switching current ~10A Max. switching voltage ~250V
Life time		min 100.000 hrs
Weight	m	950g

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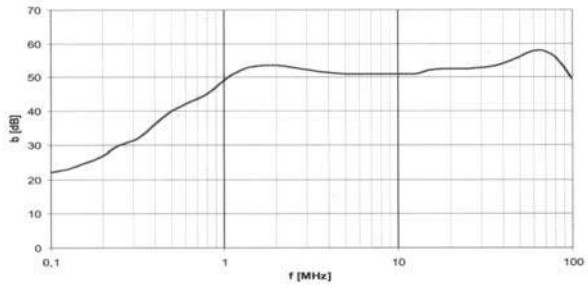
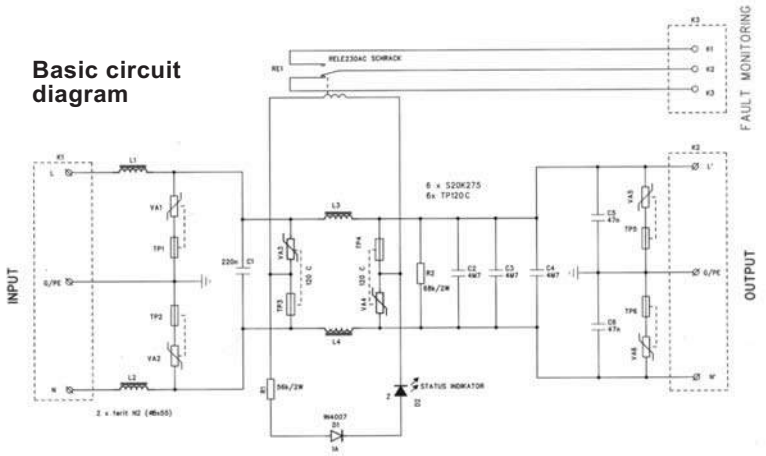
Asymmetrical attenuation 50Ω/50Ω



Basic circuit diagram



Note 1: Filter SDL-25RFI is in basic version designed for mounting on chassis by means of 4 screws M4. If mounting on DIN rail is required, it is necessary to specify when placing an order horizontal/vertical mounting (e.g. SDL-25RFI/DIN/H or SDL-25RFI/DIN/V).
Note 2: It is necessary to ensure that the ventilation holes in the box of SDL-25RFI are not covered.
Note 3: Filters for nominal voltages U_N = 6, 12, 24, 48, 60, 80, 120, 130, 160VAC (DC) are produced on a special demand only.
Note 4: The filter contains nonlinear components (varistors), that is why it is necessary to disconnect the filter during controlling of switchboard and measuring of insulation resistance of L.V. supply system.

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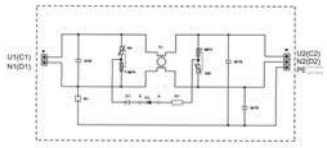
SDI-16

Basic circuit diagram



SDI-16 is a socket adaptor designed as so-called transient protection, where protective elements - varistors make two-stage cascade together with decoupling impedance created by current compensated inductor. This inductor is used because it has an absorbing ability during a transient effect initiated by current impulse stroke into an input clamps and it also effectively reduces the level of high-frequency disturbance in transient and reverse direction (in band 0,15 ÷ 30MHz acc. to IEC 939-2) The right function (the integrity of mechanical thermal fuses of non-linear elements - varistors) is indicated by a green led diode.
SDI-16 contains non-linear elements (varistors and gas discharge tubes), that is why, it is necessary to disconnect them from L.V. supply system during controlling the right function of switchboard and during measuring of insulation resistance.

Type		SDI-16
Test class acc. to IEC/EN		III / T3
Nominal voltage	U_N	230 V AC
Max.continuous operating voltage	U_C	275V AC
Nominal current	I_N	16A
Nominal discharge current I_n (8/20)	I_n	3 kA (L→N, L→PE)
Tested by combined impulse	U_{oc}	6 kV (L→N, L→PE)
Voltage protection level at wave shape I_{max} (8/20)	U_p	<840V (L→N) <500V(L→PE)
Response time	t_A	<25ns (L→N) <100ns (L→PE, N→PE)
Recommended corss-section of connected conductors		16A
Operating temperature range	ϑ	-5°to + 40°C
Protection type		IP 20
Asymmetrical attenuation of filter (band-stop filter) 0,15 to 30 MHz		min. 40 dB in band 0,15 to 30 MHz min. 80 dB in band 2,5 MHz
Filter constants	C_X C_Y L	220 nF 22 nF 0,4 mH
Power loss at winding temperature 20°C		<3,5W
Weight	m	180g

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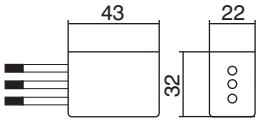
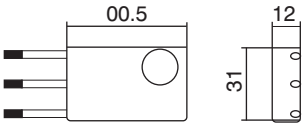
SZS-1I and SZS-1P

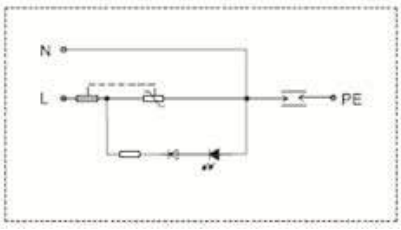




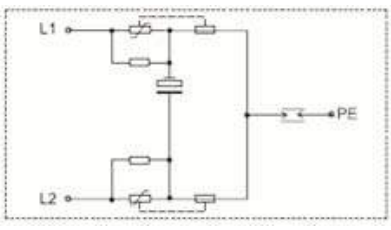
It is intended for mounting into electrical installation systems: underfloor systems, cable ducts and flush-mounted sockets. SZS-1I and SZS-1P are suitable supplements of socket distribution which are protected by SDL-*HFF protector. The right function is optically indicated by a green LED diode (I-type) or by sound of built piezosiren (P-type). SZS-1I and SZS-1P comply with IEC 61 643-1 and EN 61 643-11 standards.

Type		SZS-1I	SZS-1P
Test class according to IEC /EN		III / T3	
Nominal voltage	U_N	230 V/50(60)Hz	
Maximum continuous operating voltage	U_C	275 V/50(60)Hz	
Nominal discharge current I_n(8/20)	I_n	3 kA (L→N,L→PE) 5 kA (N→PE)	
Combined impulse	U_{oc}	6 kV (L→N) 10 kV (L+N→PE)	
Voltage protection level at U_{oc}	U_p	≤1 kV (L→N) ≤1,2 kV L(N) →PE	
Response time	t_A	<25 ns(L→N) <100 ns(L→PE) <100 ns(N→PE)	
Operating temperature range	ϑ	-5°C to +40°C	
Fault indication		Control green LED-diode does not shine	By sound of built piezosiren
Recommended back-up fuse		16A	
Cross section of leading lines		max.1,5 mm²	
Housing according to EN 605 29		IP 20	
Lifetime	m	min 100.000 hrs	

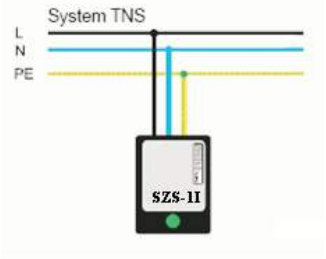
Recommended connection of SZS-1I



Recommended connection of SZS-1P



Recommended connection of SZS-1I and SZS-1P



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SZS-1.*C, SZS-1.*T

SZS-1.1C

SZS-1.1T

SZS-1.1CP

SZS-1.1TP

SZS-1.2T

SZS-1.2CP

SZS-1.2TP

SZS-1.2C

An innovated range of single and double sockets with inbuilt surge protections. The devices protect all kinds of electronic appliances against transverse and also lengthwise surge, which are created in consequences of atmospheric discharges or switching processes in L.V. supply system. They are intended for mounting into installation boxes KU 68 (40mm deep) and BCD 65 (45mm deep). The right function is indicated by a green LED diode (SZS* type), or inbuilt piezosiren (SZS*P type). Screw clamps are used for connection to L.V. supply system. TANGO or CLASSIC models are available in different colour shades.

Type		TANGO	CLASSIC
Test class according to IEC /EN		III / T3	
Nominal voltage	U_N	230 V/50(60)Hz	
Nominal current	I_N	16 A	
Maximum continuous operating voltage	U_C	275 V/50 (60)Hz	
Nominal discharge current I_n(8/20)	I_n	3 kA (L→N,L→PE) 5 kA (N→PE)	
Combined impulse	U_{oc}	6 kV (L→N,L→PE) 10 kV (N→PE)	
Voltage protection level at U_{oc}	U_p	≤1 kV (L→N, L→PE) ≤1,2 kV (L→PE, N→PE)	
Response time	t_A	<25 ns(L→N) <100 ns(L→PE) <100 ns(N→PE)	
Operating temperature range	ϑ	-5°C to +40°C	
Fault indication		green led diode (SZS* types) or inbuilt piezosiren (SZS*P types)	
Recommended back-up fuse		16A	
Recommended cross section of connected conductors		max. 2,5 mm²	
Protection type		IP 20	
Lifetime		min 100.000 hrs	
Colour		white / grape / black / dark-blue	bright-white/ivory/brown/ beige/antracit

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SPRO F, SPRO F/TEL, SPRO F/TV

Universal surge protectors type SPRO F reduce a risk of damage of the connected equipment owing to voltage pulses in the distribution network.
They may originate in consequence of a near lightning stroke, switching processes in the power supply system or heavy inductive loads switching (electromotors, inductive furnaces, fluorescent tubes etc.).
These adaptors comply to IEC 61643-1 and EN 61643-11 standards and fulfil conditions of class III.SPRO F contains varistors equipped with a thermal disconnector, gas discharge tubes and children protectors. The right function is indicated by a green LED diode. Power status is indicated by a red LED diode. It is suitable for office and household applications.
SPRO F/TEL protects telephone signals
SPRO F/TV protects TV signals

Type		SPRO F SPRO F/TEL SPRO F/TV	
		network section	TEL/TV
Test class according to IEC /EN		III / T3	
Nominal voltage	U_N	230V/50(60) Hz	-
Maximum continuous operating voltage	U_C	275V/50(60) Hz	-
Nominal current	I_N	16 A	-
Continuous operating current	I_c	c.2 mA	-
Nominal discharge current I_n(8/20)	I_n	2,5 kA	
Combined impulse	U_{oc}	5 kV	
Voltage protection level at I_n(8/20)	U_p	≤ 1,5 kV	≤ 300 V
Response time	t_A	< 25 ns	
Recommended back-up fuse		16 A	-
Operating temperature range		-5°C to +40°C	
Housing according to EN 605 29		IP 20	
Lifetime		min. 100.000 hrs	
Weight	m	126 g	

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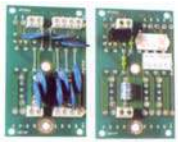
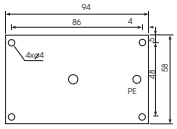
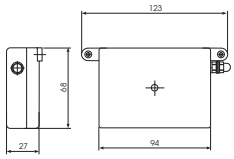
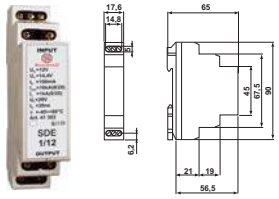
INFORMATION TECHNOLOGY SYSTEMS

SD, SDB, SDB/R and SDE

SD* is a complex range of surge protection devices designed for protection of data, communication, measuring and control lines against surge effects in the Lightning Protection Zones Concept at the boundaries of LPZ $O_{A(B)}$-1 and more, according to IEC 1312-1. All types provide effective protection of connected equipment against transverse and lenghtwise surge effects according to IEC 61643-21.
Models:
SD,SDNV 0,5A and **SDNV 5A** are complete printed circuit boards, **SDB, SDB/R, SDNVB 0, 5A** and **SDNVB** are possible to be screwed on a wall (provided in a plastic housing) **SDE,SDNVE 0,5 A** and **SDNVE 5A** are intended for application in measuring and control systems, mountable on DIN rail 35mm.
For the protection of telecommunication lines it is recommended to order the type with nominal voltage U_N= 170V or with the code mark D.

Use		Protection of tel.lines and data tranmission				Protection of supply mains 0,5A			Protection of supply mains up to 5A		
Type		SD	SDB	SDE	SDB/R	SDNV	SDNVB	SDNVE	SDNV	SDNVB	SDNVE
Max.number of fitted pairs		1-4		1-2	RJ45 1-4 RJ12 1-2	1-4		1-2	1-4		1-2
Recommended cross-section of connected conductors		1,5mm^2			0,3 mm^2	1,5mm^2			1,5mm^2		
Nominal voltage	U_N	6;12;24;48;170 V				6;12;24;48V		24;30;48; 80V	12;24;48;80; 110V		12;24;48; 80V
Max.continuous operating voltage	U_C	7,2;14,4;28,6;57,6;204V				7,2;14,4;28,6; 57,6 V		28,6;36; 57,6;96 V	14,4;28,6;57,6; 132V		14,4;28,6; 57,6;96V
Nominal current	I_N	100mA				0,5A			5A		
Series impedance		1,5 to 10Ω(on demand of a customer)				4,7 μH			zero		
Parasitic capacitance	C	1,5nF							10nF		
Maximal discharge current I_{max}(8/20)	I_{max}	10kA (type L20kA)			2kA	10kA (type L 20kA)			2kA for U_N=12;24;48V 6,5kA for U_N=80V 8kA for U_N=110V		
Nominal discharge current (8/20)	I_n	1kA									
Voltage protection level at I_n	U_P	15,28,64,160,500V				15,28,64,160V		64,75,85, 500V	56,90,170, 280,400V		56,90,170, 280V
Voltage protection level at 1kV/μs	U_P	9,18,34,66,260V				9,18,34,66V		34,54,66, 120V	27,50,118, 200,310V		27,50,118, 200V
Response time	t_A	<30ns							<25ns		
Data rate		min. 10MBit/s							-		
Operating tempature range	ϑ	-40°to + 80°C									
Protection type		IP00	IP20			IP00	IP20		IP00	IP20	
Category tested in accordance with IEC 61643-21:2000		A2, B2, C2, C3, D1									

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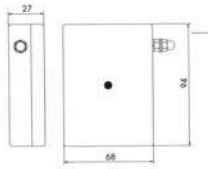
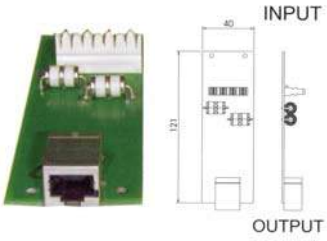
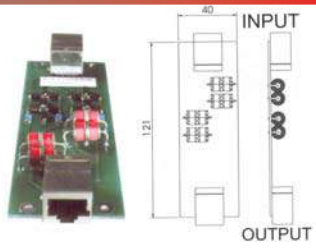
SD 2/100M 5cat







Complex range of surge protection devices designed for faultless data transfer with in computer networks category 5. They protect input electronic circuits of network cards against damage caused by surge effects in the Lightning Protection Zones Concept at the boundaries of LPZ $O_{A(B)}$-1 and more, according to IEC 1312-1. It is recommended to use these protection devices at the input of a protected equipment.

Models:

SPSK*/100 5 cat printed circuit board intended for mounting into SPSK 10, it is suitable for installation in 19'' rackmounts SPSK 2/100M 5 cat designed for protection of two pairs has LSA-Plus connector on the input side and RJ45 connector on the output side. SD */100M 5 cat is suitable for mounting on a wall.SD 2/100M 5 cat protects two pairs and SD 4/100M 5cat protects four pairs of conductors in the category 5 computer network.

Type		SPSK 2/100 5 cat SPSK 4/100 5 cat	SD 2/100M 5 cat SD 4/100M 5 cat
Insertion impedance		1,5Ω	
Characteristic impedance		100 Ω	
Insertion loss		<23,2 dB (at 100MHz)	
Attenuation crosstalk ratio (ACR)		Min.4dB (at 100MHz)	
Dual next crosstalk		Min.24dB (at 100MHz)	
Transfer speed		Max.100MBit/s	
Nominal current	I_N	300mA	
Nominal voltage	U_N	6V	
Max discharge current I_{max}(8/20)	I_{max}	10kA 2kA	2kA 2kA
Nominal discharge current I_n(8/20)	I_n	1kA	
Voltage protection level at I_n	U_P	10V	
Voltage protection level at 1kV/μs	U_P	<10V	
Parasitic capacity	C	<42pF	
Response time	t_A	<25ns	
Category tested in accordance with IEC 61643-21:2000		A2, C2, C3, B2, D1	
Input/Output		LSA-PLUS/RJ45 RJ45/RJ45	RJ45/RJ45 RJ45/RJ45
Number of protected pairs		2 for SD 2* and SPSK 2* 4 for SD 4* and SPSK 4*	
Operating temperature range	ϑ	-40°to + 80°C	

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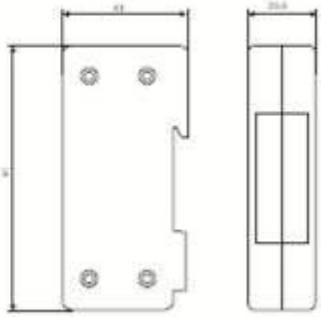
SCHIRTECNET 4/250M 6 cat



SCHIRTECNET 4/250M 6 cat is designed to protect 5E/6 data and communications lines running at 100 Base-T transmission speeds.
All pins of 4 data lines are protected by TRANSIL elements with extra-sharp clamping response which permanently eliminates transients from given locality in wide area of network applications. SCHIRTECNET 4/250M 6cat consists of a plastic box and leading lines which are terminated with RJ-45 connectors. Length of these lines (a,b) are to be specified by customer.

Type		SCHIRTECNET 4/250M 6 cat
Mode of protection		L-L,L-G(PE)
Number of protected data pairs		4
Frequency handling		up 250 MHz
Nominal voltage	U_N	6 V
Peak pulse current at vawe shape 10/1000 μs	I_{imp}	130 A
Data clamp voltage	U_p	<7,5 V
Voltage protection level at 1kV/μs	U_p	<15 V
Response time	t_A	<5 ns
Maximum capacitance	C	< 5pF
Connectors		9'&1' Patch Cords
Mounting		DIN rail 35 mm
Grounding method		through DIN rail 35 mm by special metal clasp on back side of box
Length of leading lines	a/b	acc.to customer's specification

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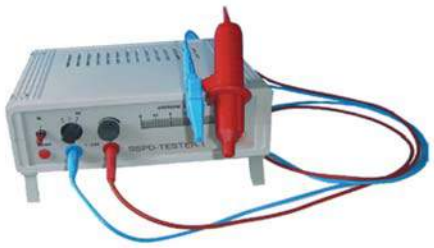
SSPD-TESTER-1



Equipment accessories:
1. 1piece of network line
2. 1piece of 3kV high voltage probe
3. 1piece of jumper cable
4. 1piece of safety crocodile clip

Portable service equipment intended for a quick diagnostics of operation efficiency of SPDs - class III, the device can be also used for a quick orientation control of SPDs condition - class I and II.

Advantages of the tester:
-a quick diagnostics of SPDs
-it optimally loads SPDs during tests so it does not lessen their lifetime
-used for servicing activity
-simple service

Tests:
-residual voltage
-disconnected arrester
-short-circuited arrester

Source resistance:
100Ω for 1kV range
200Ω for 2kV range
300Ω for 3kV range

Technical parameters:
Supply voltage: 230V±10%, 50Hz
Output voltage: optional switched 1kV, 2kV, 3kV
at a test impulse waveshape 1,2/50μs
Weight: 3kg
Supply: max. 50VA

Indication of the output voltage:
By the column display made out of 30 LED diodes (one LED diode switching on refers to level growth of the output voltage by step 100V).

Calibration of the column display:
The calibration is carried out by the potentiometer CALIBRATION, when MEASUREMENT button is pressed and output is unloaded. The calibration is carried out by switching on the 1st decade (0÷1kV) of display in 1kV range, it is carried out by switching on the 1st and 2nd decade (0÷2kV) in 2kV range and by switching on the 1st, 2nd and 3rd decade (0÷3kV) in 3kV range. The last diode in the top decade may glimmer during the calibration.

Measurement:
The measured arrester must be disconnected from supply conductors before measuring. The clamp (-) of tester is connected to one pole of the tested arrester by safety crocodile clip and a blue jumper cable. The terminal of the high voltage probe should be pushed in the clamp (+) of tester and you should apply its tip to the second pole of tested arrester by your hand. The button MEASUREMENT should be pressed by the other hand and then you should watch the data on the display for approximately two seconds. After reading the data you can release the button MEASUREMENT. The data match the residual voltage of the measured protective element with accuracy ±100V.

Protective units of class I are typically measured in 3kV range.
Protective units of class II are typically measured in 2kV range.
Protective units of class III are typically measured in 1kV or 2kV range depending on the fitted protective elements.

SCHIRTEC®

SSPD-TESTER-2

This impulse tester is especially constructed for diagnostics of operation efficiency of installed SPDs – class III in all kinds of communication, data and coaxial systems.

Advantages of the tester:
- a quick diagnostics of SPDs
- used for regular control activity
- simple service

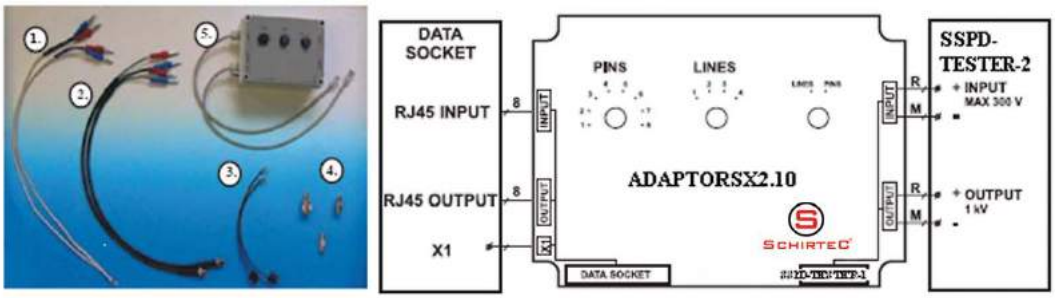
Tests:
- residual voltage of the surge protection devices
- interruption of the surge protection devices
- short-circuit of the surge protection devices

Technical parameters:
Supply voltage: 230V±10%, 50Hz
Supply: max. 20VA
Output voltage: 1kV at a test impulse waveshape 1,2/50μs
Source resistance: 100Ω
Output voltage indication: in 300V, 60V, 30V switching range by the 30 LED diodes column display.
Evaluation accuracy: <3 modules
Dimensions: 222x198x71mm
Weight: 2,5kg
Note: SSPD-TESTER-2 must be equipped with the adaptor SX 2.10 and the consequential accessories.

Installation instructions:
1. Connect the tester to the supply voltage
2. The switch RANGE should be switched over to CALIBRATION position
3. Switch the tester on
4. Press the button MEASUREMENT and set glimmering of the last LED diode at the column evaluating display by potentiometer CALIBRATION
5. Choose the range according to SPD type and catalogue maximum residual voltage by the switch with 300V, 60V, 30V range
6. Connect appropriate connecting adaptor to the tester´s output according to controlled SPD and connect to SPD´s input
7. Connect appropriate connecting adaptor to the tester´s input according to controlled SPD and connect to SPD´s output
8. Press MEASUREMENT button and read the residual voltage values on the display after stabilization
9. In case of SPD disconnecting, two lowest LED diodes at the display light up. In case of SPD short-circuiting, the displaydoesn´t light up. In case of SPD protective elements disconnecting, the whole display lights up.

ADAPTOR SX 2.10

Connection of ADAPTORSX 2.10 to SSPD-TESTER-2 and DATA SOCKET



Recommended accessories obtainable when placing a special order
1. Connecting cables for control of SPD with the terminal block
2. Connecting cables for control of SPD with BNC connectors
3. A connecting reducer for control of SPD with RJ12/RJ45 connectors
4. A reducer of BNC/N connector
5. The adaptor SX 2-10 for control of SPD with RJ45 connectors

ADAPTOR SX 2.10
Optional equipment of SSPD-TESTER-2 designed for control of data SPD fitted with RJ45 connector at the input and output (or it can be fitted with RJ12 connector when using transient reduction).

Warning:
1. Do not stretch the input or output cable fitted with RJ 45 connectors!
2. In the case that each line of SPD is not fitted, the testing impulses are induced into unloaded supplies during the control and 2 – 3 segments of LED display could light up at the LED indicator.

Advantages of adaptor:
- a quick control of up to four lines in SPD
- a quick control of particular pins in SPD
- simple service

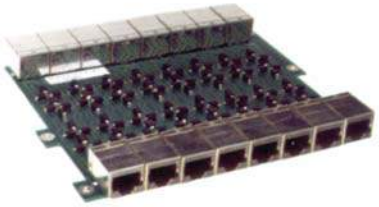
Installation instructions:
The adaptor is intended for control of SPDs fitted with RJ45 and RJ12 connectors.
1. Connect the adaptor to the input and output of the SSPD-TESTER-2 by means of cables with BNC connectors.
2. RJ45 connectors at the adaptor connect to the input and output of SPD
3. Connect the grounding clamp of SPD to X1 clamp at the adaptor
4. Switch FUNCTION button to LINES position and control the clearness of particular lines and the residual voltage at the output according to the type of SPD by switching over LINE 1-4 switch
5. Switch FUNCTION button to PINS position and by PINS 1-8 switch control the residual voltage of particular pins in comparison with grounding clamp

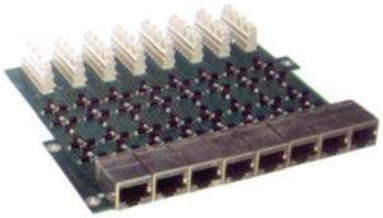
Installation instructions for ADAPTOR SX 2.10 when checking telephone SPDs
1. Attach the cable reductions RJ45 to RJ12
2. Connect RJ12 connectors into the telephone SPD
3. The switch on ADAPTOR SX 2.10 should be in LINES and LINES 1 position
4. Switch the range switch at SSPD-TESTER-2 over to 300V range
5. Press the measuring button and read the residual voltage on the display, suitable SPD fulfils U_P= 200V± 10%
6. Turn the switch of ADAPTOR SX 2.10 into PINS position
7. Switch the range switch of SSPD-TESTER-2 over to 60V range
8. Interconnect X1 point on ADAPTOR SX 2.10 with PE clamp of the telephone SPD
9. Press MEASUREMENT button and read the residual voltage, when the switch of ADAPTOR SX 2.10 is in PINS 1 position and then PINS 2 position. Suitable SPD fulfils U_P= 30 to 40V

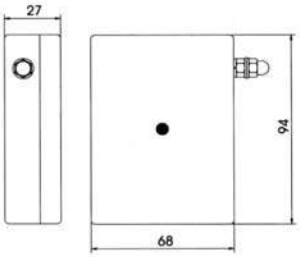
SCHIRTEC®

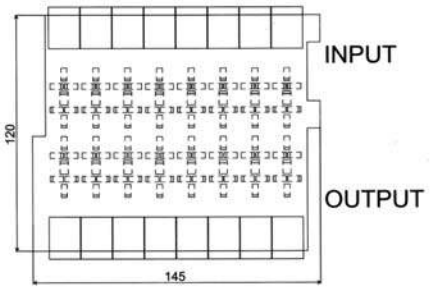
COMPUTER NETWORK PROTECTION

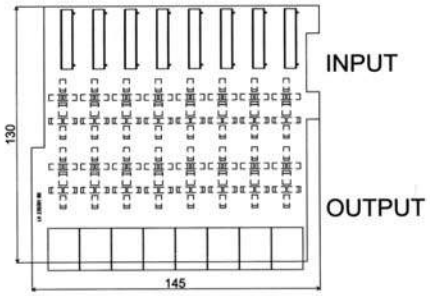
SCHIRTECNET











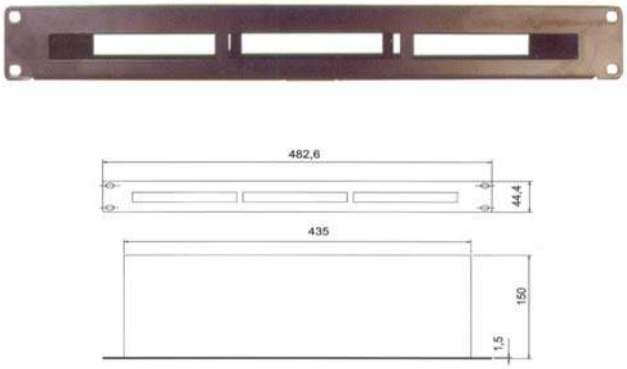
SCHIRTECNET is a complex range of protection devices specially designed for faultless data transfers within computer networks concerning the 5th category. They protect input electronic circuits of network cards against damage caused by surge effects in the Lightning Protection Zones Concept at the boundaries of LPZ $O_{A(B)}$-1 and more, according to IEC 1312-1. It is recommended to use these protection devices at the input of a protected equipment.
Schirtec offers the following models:

SCHIRTECNET 1.2RJ/RJ protects one line with two protected pairs ,it is available in a plastic housing,which enables screwing on a wall,also available with double-sided adhesive tape,which enables attaching to the protected appliance.There is RJ45 connector at the input and output of the device.
SCHIRTECNET 8.4RJ/RJ and SCHIRTECNET 8.4LSA/RJ types are designed for protection of eight lines with four protected pairs.They are constructed as fitted print-circuit boards to be mounted into the metal SPSK 24 panel.
SCHIRTECNET 8.4RJ/RJ-RJ45 connectors are at the input and output of the device. SCHIRTECNET 8.4LSA/RJ-LSA-PLUS connectors are at the input and RJ45 connectors at the output. SPSK 24 is a metal panel suitable for fitting in19'' rack mounts.

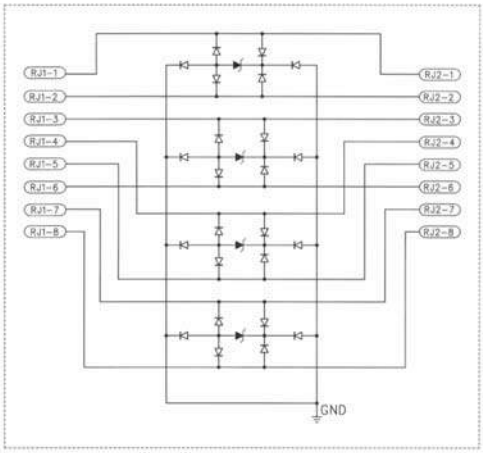
SCHIRTEC®

Type SCHIRTECNET		1.2 RJ/RJ	8.4 RJ/RJ	8.4 LSA/RJ
Characteristic Impedance		100 Ω		
Insertion Loss		<23,2 dB (at100 MHz)		
Attenuation Crosstalk Ratio (ACR)		Min. 4dB (at100 MHz)		
Dual Next Crosstalk		Min. 24dB (at100 MHz)		
Transfer Speed		Max. 100 Mbit/s		
Nominal Current	I_N	300mA		
Nominal Voltage	U_N	6V		
Nominal Discharge Current In(8/20)	I_n	300A		
Voltage Protection Level at In	U_P	25V		
Voltage Protection at 1kV/μs	U_P	<10V		
Parasitic Capacity	C	<47pF		
Response Time	t_A	<25ns		
Input/Output			RJ45/RJ45	LSA-PLUS/RJ45
Category Tested in Accordance with IEC 61643-21:2000		A2, B2, C2, C3, D1		
Number of Protected Pairs		1x2 pairs	Max.8x4 pairs	
Operating Temperature Range	ϑ	-40°to + 80°C		

SPSK 24



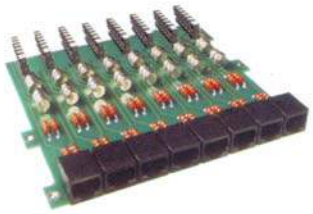
Basic circuit diagram



It is a metal panel suitable for fitting in 19'' rack mounts.Up to 3 pieces of SCHIRTECNET 8.4 can be mounted into this panel.

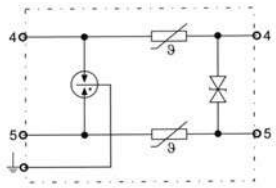
SCHIRTEC®

SCHIRTECTEL*

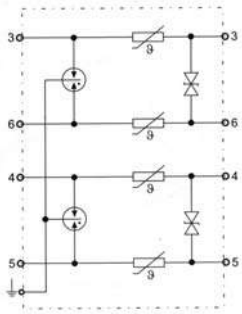


SCHIRTECTEL* is a complex range of protection devices specially designed for the protection of analog telecommunication appliances against surges.The recommended use is in the Lightning Protection Zones Concept at the boundaries of protection zones LPZ $0_{A(B)}$-1 and more, according to IEC 1312-1.
SCHIRTECTEL* protects one line with two protected pairs, it is available in a plastic housing ,which enables screwing on a wall,also available with double -sided adhesive tape, which enables attaching to the protected appliance. There is RJ45 connector at the input and output of the device.The number of protected pairs of each telephone lines is optional (1 or 2 pairs).

Basic circuit diagram SCHIRTECTEL 1.2



Basic circuit diagram SCHIRTECTEL 1.4

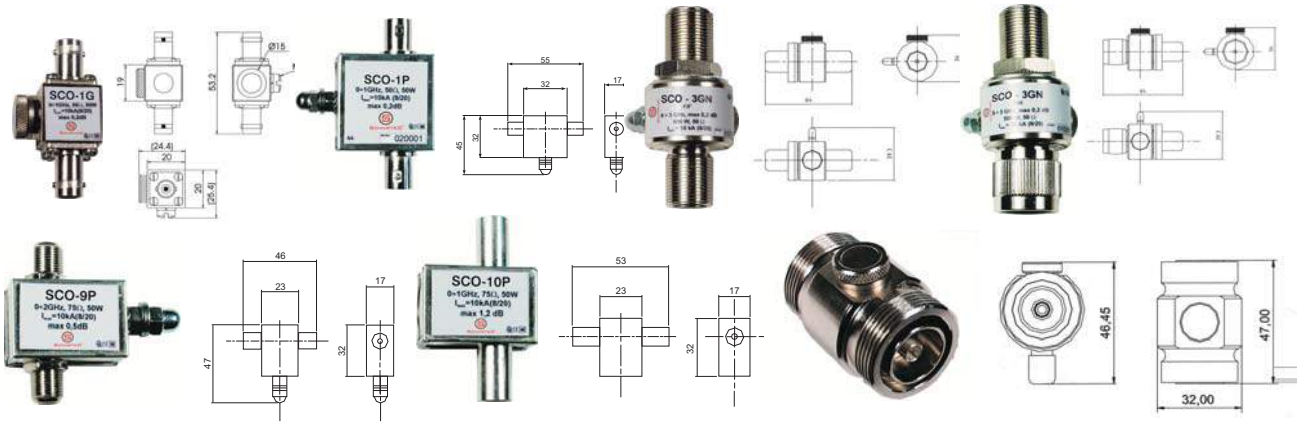


Type SCHIRTECTEL		8.1 RJ/RJ	8.2 RJ/RJ	8.1 XC/RJ	8.2 XC/RJ
Max. Continuous Operating Voltage	U_C	170V DC			
Nominal Current	I_N	150mA			
Nominal Discharge Current at Wave Shape I_n(8/20)	I_n	2,5kA/Line		5 kA/Line	
Voltage Protection Level at I_n Line/Line	U_P	<250 V		<275 V	
Line/PE		<600 V			
Voltage Protection Level at 1kV/µs Line/Line	U_P	<230V			
Line/PE		<600V			
A.C Current (50Hz,1s)		5 A			
Response Times Line/Line	t_A	<1ns			
Line/PE		<100ns			
Data Rate		Min. 10 Mbit/s			
Insertion impedance	R	10 Ω			
Parasitic capacity Line/Line	C	300pF			
Line/PE		15pF			
Operating Temperature Range	ϑ	-40°to + 80°C			
Arrester Class According to IEC 61643-21:2000		A2, C2, C3, B2,D1			
Connections Input		RJ45		LSA-PLUS	
Output		RJ45		RJ45	
Protection Type		IP00			
Lines assignment		4/5	3/6, 4/5	4/5	3/6, 4/5

SCHIRTEC®

COAXIAL PROTECTION

SCO-*



Innovated coaxial high-frequency protection ranges SCO-*P and SCO-*GN are designed for protection of equipment connected to an aerial system by means of coaxial cables.Special gas discharge tubes with maximum discharge current I_{max} =10kA (8/20) ensure a reliable protection of the receiving and the transmitting systems even against a lightning stroke nearby .A wide range of coaxial protectors can be used in various applications .The recommended use is in the Lightning Protection Zones Concept at the boundaries of $LPZ0_{A(B)}$-1 and more .

Type		SCO-1P SCO-2P	SCO-1G SCO-1G	SCO-3GN(F/F) SCO-3GN(F/M)	SCO-4GN(F/F) SCO-4GN(F/M)	SCO-5GN(F/F) SCO-5GN(F/M)	SCO-9P	SCO-10P
Connector type		BNC	BNC	N			F	TV
Max.Continuous operating voltage	U_C	72V 200V	72V 200V	72V	200V	0V	72V	
Nominal current	I_N	2,5A	2,5A	5A		0A	0,5A	
Lightning impulse I_{imp}(10/350)	I_{imp}	2kA				5kA	2kA	
Nominal discharge current I_n(8/20)	I_n	5kA				10kA	5kA	
Max. discharge current I_{max}(8/20)	I_{max}	10kA				20kA	10kA	
Voltage protection at 1kV/μs	U_P	500V 600V		500V	600V	<2V	500V	
Frequency range		0-1GHz		0-3 GHz		5-5,4 GHz	0-2GHz	0-1GHz
Max. output load	P_T	50W 400W		50W	400W	200W	500W	
Insertion loss		<0,2dB		<1,5 dB		<0,2dB	<0,5dB	<1,2dB
Return loss		>22dB						
Characteristic impedance	Z	50Ω					75Ω	
Category tested by IEC 61643:21-2000		A2, B2, C2, C3, D1						
Earthing		via enclosure						

Note: M….male
F…..female

SCHIRTEC®

COAXIAL PROTECTION

SCO-*

SCO-7/16

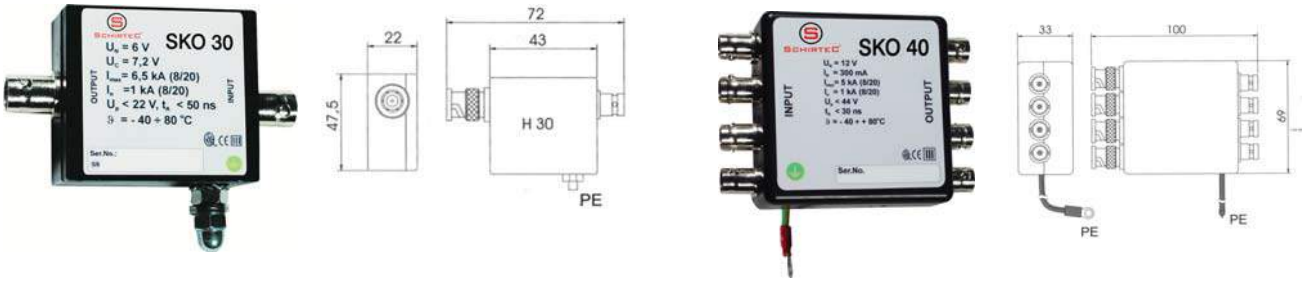
Innovated coaxial high-frequency protection range SCO-7/16 is designed for protection of equipment connected to an aerial system by means of coaxial cables. Special gas discharge tubes with maximum discharge current I_{max} =10kA (8/20) ensure a reliable protection of the receiving and the transmitting systems even against a lightning stroke nearby. A wide range of coaxial protectors can be used in various applications. The recommended use is in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 and more.

Type		SCO-7/16(F/M)	SCO-7/16(F/F)	SCO-7/16(F/M)
Connector type		7/16"		
Max. Continuous operating voltage	U_c	350V		600V
Nominal current	I_N	5A		12A
Lightning impulse I_{imp}(10/350)	I_{imp}	2kA		3kA
Nominal discharge current I_n(8/20)	I_n	5kA		10kA
Max. discharge current I_{max}(8/20)	I_{max}	10kA		20kA
Voltage protection at 1 kV/μs	U_P	950V		
Frequency range		0-2,6 GHz		
Max. output load	P_T	400W		900W
Insertion loss		<0,5dB		<0,2dB
Return loss		>15dB		>20dB
Characteristic impedance	Z	50Ω		
Category tested by IEC 61643:21-2000		A2, B2, C2, C3, D1		
Weight		175g	165g	510g
Earthing		Via earthing screw		

SCHIRTEC®

VIDEO SIGNAL PROTECTION

SKO 30, SKO 30-L, SKO 40 and SKO 40-L



SKO 30 and SKO 30-L are designed for protection of coaxial lines of 50Ω or 75Ω against induced surge effects in the Lightning Protection Zones Concept at the boundaries of $LPZ_{A(B)}$-1 and higher according to IEC 1312-1. They are used especially for protection of cameras and video signal concentrators.Applicaple for security systems and fire control equipment.
SKO 40 and SKO 40-L are designed for protection of coaxial lines of 50Ω or 75Ω against induces surge effects in the Lightning Protection Zones Concept at the boundaries of LPZ $O_{A(B)}$-1 and higher according to IEC 1312-1. There are four separate channels with video signal from TV cameras. Applicable for security systems fire control equipment.

Type		SKO 30	SKO 30-L	SKO 40	SKO 40-L
Category tested in acc. with IEC 61643-21		A2, B2, C2, C3, D1			
Nominal current	I_N	300mA			
Series impedance		10Ω			
Parasitic capacitance	C	27pF		47pF	
Nominal voltage of the videosignal	U_N	6 or 12V, acc to customer's demand			
Max discharge current at wave shape (8/20)	I_{max}	5kA	6,5kA	5kA	6,5kA
Nominal discharge current at wave shape (8/20)	I_n	1kA			
Voltage protection level at I_n	U_P	22 V at U_N (video)=$6V_{rms}$ 44 V at U_N (video)=$12V_{rms}$			
Voltage protection level at 1kV/µs	U_P	20 V at U_N (video)=$12V_{rms}$ 10 V at U_N(video)=$6V_{rms}$			
Response time	t_A	<30ns			
Operating Tempature range	ϑ	-40°to + 80°C			
Connection to		Connector BNC 50Ω or 75Ω acc. to customer's specification input-female ; output-male			
Life time		min 100.000 hrs			
Weight	m	53g	78g	210g	128g

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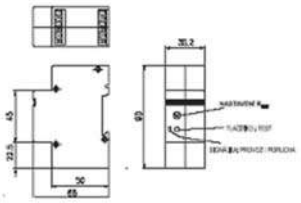
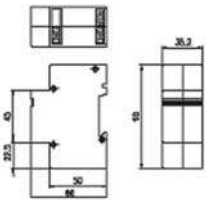
INSULATION LEVEL DROP DETECTOR

SIS, SCE 500 and SMDA 10





SIS , SCE 500 and SMDA 10 are parts of a modular monitor system designed for the purpose of monitoring insulation level of one-phase medical insulation IT systems constructed and operated according to requirements of IEC 60364-7-710. It can be also used in special scientific and industry applications. The device continuously monitors the resistance of insulation IT system against PE conductor. If the insulation resistance drops below the given value R_{CRIT}, the relay at the output switches and inform the detector by optically switching two-colour signal to red on the front panel at the same time. The signal is green under the normal conditions, which means that the resistance of insulation system against protective PE conductor is higher than given value R_{CRIT}. The value R_{CRIT} is set by knob of a potentiometer, placed at the front panel.

The detector of insulation level is mounted into a plastic box , which is as big as two modules (2M) and it is intended for mounting on DIN rail 35mm. The electronic is in two printed fitted circuits inside the box. Outside conductors are connected to extended connecting conductors by screw clamps. They enable connection of conductors with max. cross-section 1,5mm^2. Protection type of the device is IP 20. SIS can be supplied from TNS 230V/50Hz system or straight from the monitored IT system, but only if IT system has U_N= 230V/50Hz. Supply is connected to U and N clamps. The clamps PE and ART. CENTRE (artificial centre) are input clamps of the insulation level drop detector. A protective conductor is connected to PE clamp and ART. CENTRE clamp is suitable for connection of either secondary winding centre of decoupling transformer used for supplying of insulation IT system (if there is a centre outlet), or any conductor of this insulation system. If monitoring of 3-phased IT system insulation level is required, it is necessary to create system´s artificial centre by means of 3-phase decoupling element SCE 500.

The construction is suitable for internal function control by a fitted button TEST, and also for external control by input clamps EXT.TEST. The external button TEST (on a test panel or in a remote monitoring module, which is placed in a medical location) is connected between clamps EXT. TEST and +12V/20mA. During the initialization of internal or external test, the fitted relay makes a control of functioning so the input clamps connect insulation resistance and control functioning of measured circuit (when SIS electronic is all right, the signal OPERATION/FAILURE switches from green to red). This test can be even carried out when medical appliances are supplied from the monitored system. SIS device is provided with two outputs needed for remote monitoring. The first output of SIS is a potential free signal contact dimensioned at ~250V/2A with insulation strength 3750V_{ef} against internal circuits and also against network circuit. This contact is disconnected when operating and connects when insulation level drops below value RCRIT, given by the knob on the front panel. The second output of SIS is the switching contact C-MOS dimensioned at 30V DC/20mA, it is used for connection of remote monitoring modules.

This contact is at SMDA 1 and SMDA 2 outputs. It is possible to connect up to 10 modules onto SIS device.

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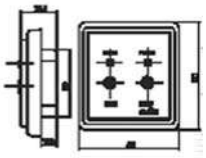
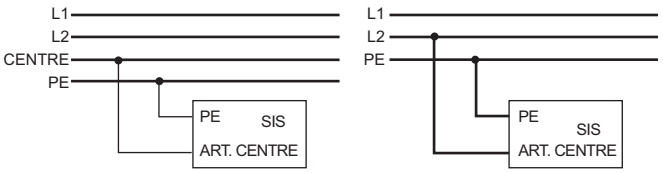
SMDA 10



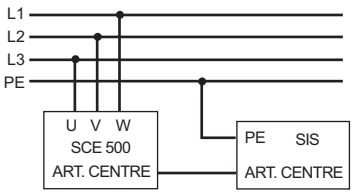
SMDA 10 module is mountable in insulation boxes KU68 and serves for controlling of monitored IT system at a further place from SIS device. Connection of SMDA SIS is provided by four conductors with cross-section max. 1,5mm^2. In case of failure evaulated by SIS device, a red signal FAILURE starts flashing and the fitted piezoelectric siren starts an acoustic alarm at the same time in SMDA 10 module.
Medical staff has the possibility to switch the acoustic alarm off by pressing STOPALARM button. TEST button fitted into SMDA 10 is used for operating remote control of SIS device. When the button is switched, FAILURE indicator must flash and piezoelectric siren must sound. If the outputs SMDA 1 and SMDA 2 are not used for connection of remote signalization modules, it is possible to use them for alternative connection of external signalization circuits. There must be an internal fitted supply 12V/20mA. Power consumption of these circuits should not exceed 20mA.

Recommended connection of SIS

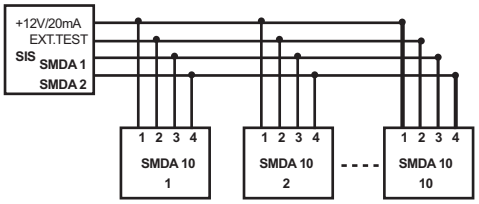
1-phase IT system



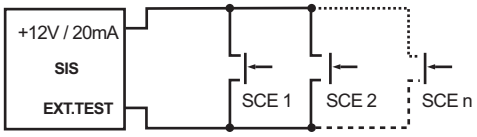
3-phase IT system



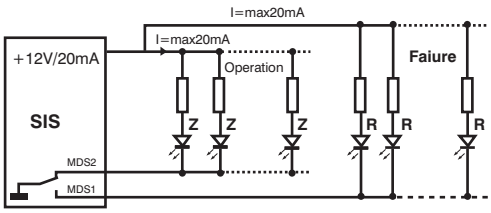
Recommended connection of remote signal module



Connection of external testing buttons to SIS device

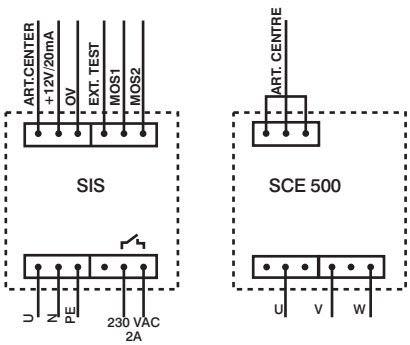


Connection of external signal circuits to SIS device



It is possible to connect external signal (evaluating) circuits to SIS device, if the internal supply 12V/20mA is not used by SMDA 10 modules. Consumption of these signal circuits must not exceed 20mA level!

Connection of busbar



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Type		SIS-71	SIS-72	SIS-73	SIS-74	SIS-75
Nominal voltage	U_N	~230V, +10%,-15%				
Monitored network voltage	U_{IT}	0 to 275 V/50Hz				
Consumption	P	Max 2,6VA				
Measuring voltage	U_M	24V DC From internal supply				
Measuring current	I_M	<1mA				
Source impedence	R_v	>3MΩ , typically 4,6MΩ at 230V~				
Monitored insulation resistance	R_{CRIT}	10÷210	1÷9	10÷50	50÷230	1÷20
Hysteresis	H	25% of set level R_{CRIT}				
Protection type		IP20				
Weight	m	250g				
Recommended cross section of connection conductors		30mA				
Operating temperature range	ϑ	-25 to +50°C				
Surge category		III acc.to IEC 529 and IEC 664				
Stage of contamination		2 acc. to IEC 529 and IEC 664				
Mounting on		DIN rail 35mm				
Recommended cross-section of connection conductors		1,5mm^2				
Potential free signal contact		El. strength against surround. circuits El. strength against network circuits Insulation resistance Max. switching current Max. switching voltage				3750V$_{rms}$ 3750V$_{rms}$ 2x10^{7}Ω 2A ~250V
CMOS switching contact		Max. switching current Max. switching voltage				20mA 30V DC
Type		**SCE 500**				
Nominal voltage	U_N	3x500V~				
Max. cont. operating voltage	U_C	3x600V~				
Cont. operating current	I_C	<3x0, 1mA				
Power loss	Pz	<0,2W				
Operation temperature range	ϑ	-25°to+55°C				
Recommended cross-section of connected conductors		1,5mm^2				
Protection type		IP 20				
Weight	m	280g				
Mounting on		DIN rail 35mm				
Type		**SMDA 10**				
Nominal voltage	U_N	12V DC				
Cont.operating current	I_C	c.2mA				
Operation temperature range	ϑ	-0°to+40°C				
Max.number of modules connected to SIS		10x (SMDA 10)				
Output		acoustic, light				
Weight	m	50g				
Mounting		Into KU 68 box				

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The exact setting of monitored level of the insulation resistance $R_{CRITICAL}$

The scale $R_{CRITICAL}$ on the front panel enables setting of the level only with limited accuracy – cca 20%. If users want to achieve higher accuracy, they can do so by disconnecting supply of SIS, which leads to ART. CENTRE clamp and connect calibration resistance between ART. CENTRE and PE clamps. The ohmic value of calibration resistance corresponds with set $R_{CRITICAL}$ level.
Now it is necessary to turn the button $R_{CRITICAL}$ left most and than slowly turn to the right. When the signal OPERATION/FAILURE turnes to red, the setting is finished. When the calibration resistance is disconnected and the disconnected conductor is connected to ART. CENTRE again,the control signal must turn to green (if the insulation resistance of particular side of monitored IT-system is higher than set $R_{CRITICAL}$ level).
In monitored 3-phase systems the exact setting of $R_{CRITICAL}$ is done in a similar way. The only difference is that the clamps U, V, W of the suppressor SCE 500 must be disconnected and the calibration resistance is connected between clamps PE and mutually short-circuited U, V, W of the suppressor SCE 500.

Proffesional requirements
Only qualified staff can install and set monitoring system.

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HIGH POWER GAS DISCHARGE TUBE

NEW SOLUTION EQUIPOTENTIAL BONDING OF CONDUCTING PARTS OF THE ELECTRICAL INSTALLATION BY HIGH POWER GAS DISCHARGE TUBE –SGDT-100

It is a separating high power gas discharge tube intended for equipotential bonding of an installation parts of buildings, which are not interconnected. In case of origin of p.d. (potential diference) between those parts, the high power gas discharge tube ignites and interconnects both parts for a transient time (typical value of internal resistance at start up of SGDT-100 is 0,001 ÷ 0,002 Ω). Recommended installation is inside of the buildings, outdoors, in the damp rooms as well as in the subterraneous areas.

Type	SGDT-100
DC Spark-Over Voltage	400….750 V
AC Spark-Over Voltage (50 Hz)	>500 V_{rms}
Impulse Spark-Over Voltage at 5kV/μs for 99% of measured values (wave 1,2/50 μs,6kV)	<1500V
Max.impulse Discharge Current (wave 8/20 μs)	150 kA
Nominal Impulse Discharge Current at Wave Shape (8/20)	75kA
Max. Lightning Impulse Current I_{imp} (10/350μs)	100kA
Charge	50As
Specific Energy	2500 kj/Ω
Insulation Resistance at 100VDC	>1GΩ
Capacitance at 1 MHz	5pF
Weight	320 g
Casing	corundum steel with an external plastic coat that is resistant to climatic effects
Connection	2 outlets-Ø10 mm
Operating and Storage Temperature	(-40°to + 90°C)
Climatic Category (IEC 60068-1)	40/90/21

For lightning protection equipotential bonding in accordance with IEC 61024-1 as well as for the use in IT - installations in accordance with IEC 60364-5-54.

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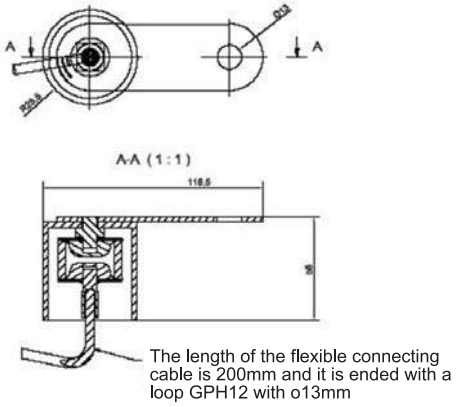
EQUIPOTENTIAL BONDING OF NON-CONDUCTING PARTS OF THE ELECTRICAL INSTALLATION

SGDT 100 Ex



It is an explosion-proof gas discharge tube with flexible connecting cable for equipotential bonding according to IEC 61024-1 and also for the use in IT installations according to IEC 60364-5-54.It complies with EN 50014 and EN 50028 standards.It is recommended for insulated flanges and insulated screw joints bridging in cathodic protected parts of industrial technology.

Type	SGDT 100 Ex
EC-Type examination certificate	II 2GDEExmIIT3
DC Spark-Over Voltage	400...750V
AC Spark-Over Voltage (50 Hz)	>500 V_{rms}
Impulse Spark-Over Voltage at 5kV/μs for 99% of measured values (wave 1,2/50 μs,6kV)	<1500V
Max.impulse Discharge Current (wave 8/20 μs)	150 kA
Nominal Impulse Disharge Current (wave 8/20μs)	75kA
Max. Lightning Impulse Current I_{imp} (10/350μs)	100kA
Charge	50As
Specific Energy	2500 kj/Ω
Insulation Resistance at 100VDC	>1GΩ
Capacitance at 1 MHz	5pF
Weight	535 g
Casing	corundum/binary resin with an external steel coat, resistant to climatic effects
Degree of protection	IP 66
Operating and Storage Temperature	(-40ºto + 90ºC)

Separating high power gas discharge tube SGDT 100 Ex is intended for equipotential bonding of the installation parts of buildings or technological entities which are not interconnected operationally. In case of p.d.(potential difference) origin between those parts, the high power gas discharge tube ignites and interconnects both parts for a transient time (typical value of internal resistance at start up of SGDT 100 Ex is 0,001+0,002Ω). Recommended installation is inside of the buildings,outdoors, in the damp rooms as well as in the subterraneous areas. SGDT 100 Ex may be used in hazardous areas.

SCHIRTEC Small Catalogue 2008

SCHIRTEC AG
IGNAZ-KÖCK STRASSE 10
A-1210 WIEN / AUSTRIA

PHONE: +43 1 27574 1601 +43 1 27574 1602
FAX: +43 1 27574 1610

www.schirtec.at **e-mail: info@schirtec.at**