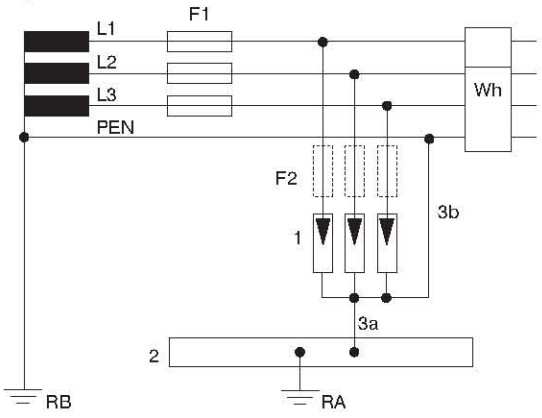
# POWER SUPPLY SYSTEMS LIGHTNING ARRESTER CLASS I

## S45, S55, S50-50, S50-3

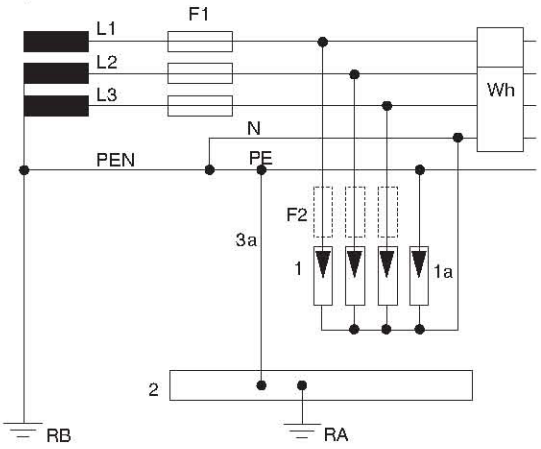

This range of lightning arresters is mainly intended for applications in unmeasured parts of electrical installation within the Lightning Protection Zones Concept at the boundaries LPZ $0_{A(B)}$ – 1 (according to IEC 1312-1 and IEC 62305). The lightning arrester is constructed as an encapsulated multiple 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)<br>* charge<br>* specific energy | $I_{imp}$<br>Q<br>W/R | 50kA<br>25 As<br>600 kJ/Ω | | | 60kA<br>30 As<br>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)<br>35mm² (flexible) | | | | |
| Protection type | | IP 20 | | | | |
| Mounting on | | DIN rail 35mm | | | | |
| Housing material | | SLOVAMID 6FRC2 | | | | |
| Colour | | blue | | | | |
| Weight | m | <225g | | | | |

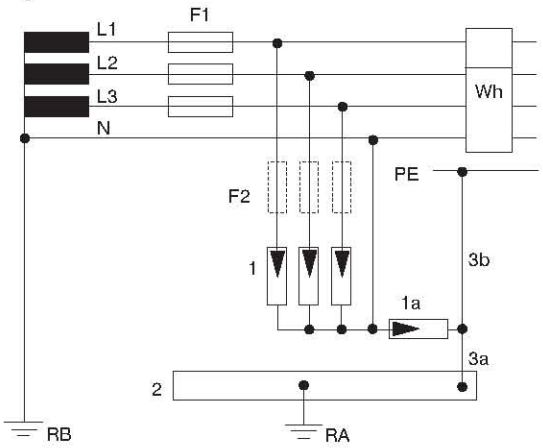
System TN-C



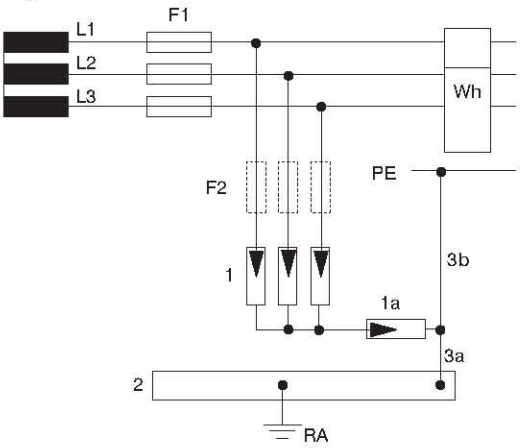

System TN-S




System TT



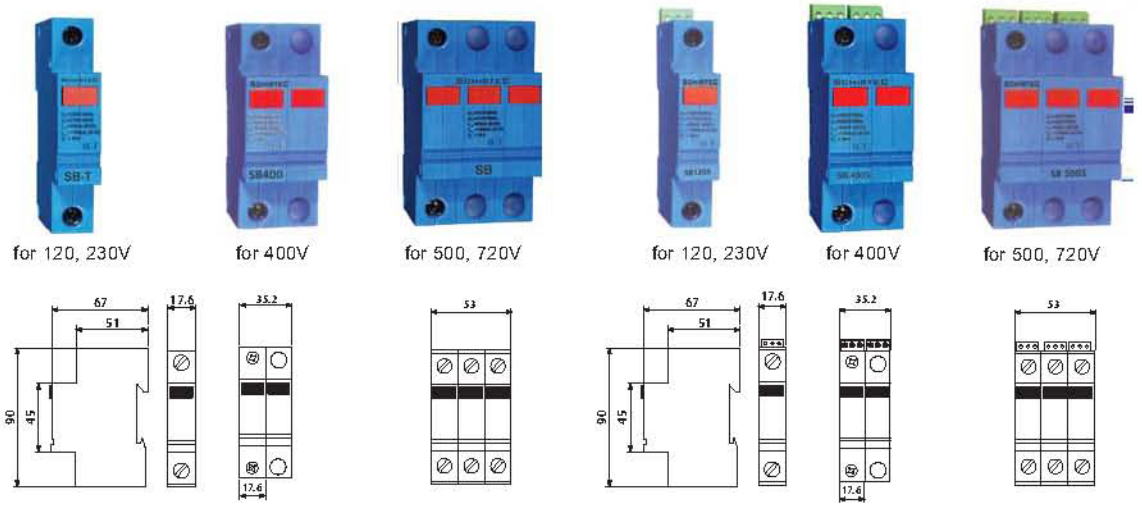

System IT




| | |
|---|---|
| 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.

# SB*




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.

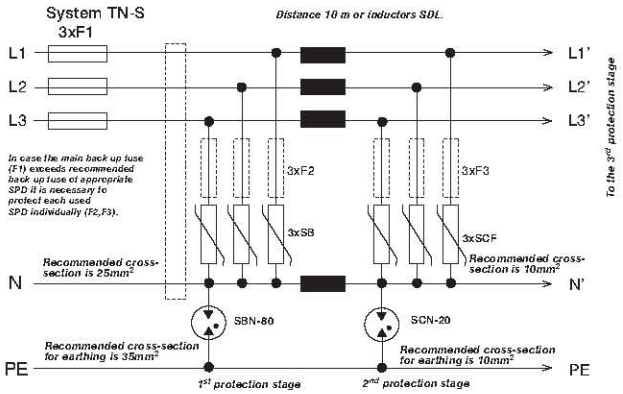
SB* contains a combination of highly efficient varistors ZnO with maximum discharge ability $I_{max}(8/20)=100kA$ and $I_{imp}(10/350)=10kA$. The devices are manufactured with nominal voltages of 120V, 230V, 400V, 500V and 720V.

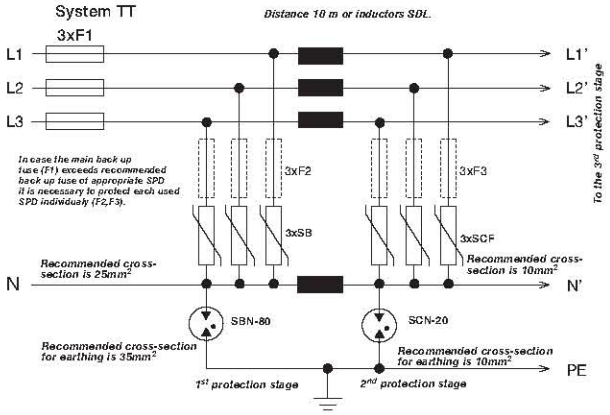
SB*S can be used in applications, where the remote monitoring of failure is required. This type has the same construction as SB, but also contains potential free signal contact for remote monitoring of failure.

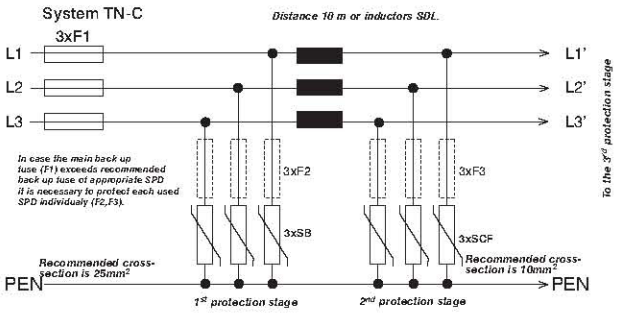
* The devices are manufactured with nominal voltages of 120V,230V,400V,500V and 720 V.

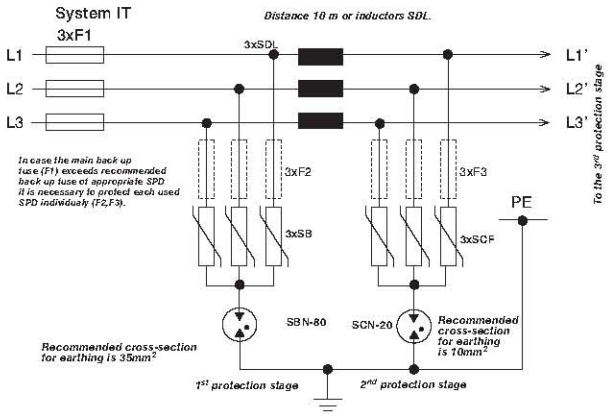
| Type | | SB120<br>SB120S | SB230<br>SB230S | SB400<br>SB400S | SB500<br>SB500S | SB720<br>SB720S |
|---|---|---|---|---|---|---|
| Test class according to IEC 61643-1and EN 61643-11 | | I / T1 | | | | |
| Nominal voltage/50 (60) Hz | $U_N$ | 120 V | 280 V | 400 V | 500 V | 720 V |
| Max.continuous operating voltage/50 (60) Hz | $U_C$ | 144 V | 320 V | 480 V | 600 V | 865 V |
| Max.lightning impulse current (10/350)<br>* charge<br>* specific energy | $I_{imp}$<br>Q<br>W/R | 10kA<br>5 As<br>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)<br>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 $V_{rms}$<br>el.strength against network circuits 3750 $V_{rms}$<br>insulation resistance $2x10^7\Omega$<br>max.switching current ~0,5 A<br>max.switching voltage ~250 V | | | | |
| Lifetime | | 100.000 hrs | | | | |
| Weight | m | 130 g | 140 g | 330 g | 380 g | 420 g |

## Recommended applications of lightning arresters

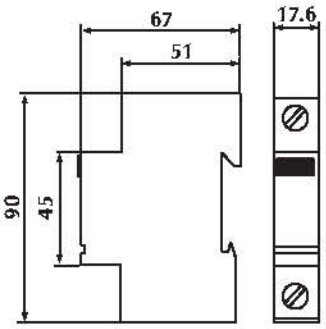


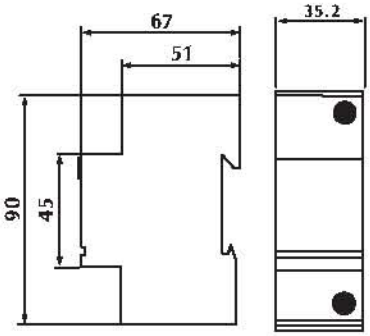



# SBN80, SBN100 and S100

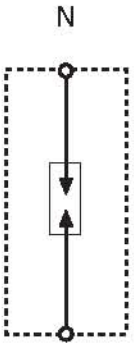









Basic circuit diagram of S100



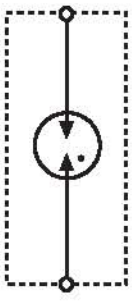

Modules SBN80, SBN100 and S100 are one part of modular units of surge protection intended for mounting on DIN rail 35 mm. They are used for the protection of L.V. power supply systems against surges at direct lightning stroke. Therefore,they create an integral part of building protection and its installations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

| 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)<br>16 $mm^2$ (flexible) | 50 $mm^2$ (solid)<br>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 |

# 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)<br>* charge<br>* spesific energy | $I_{imp}$<br>Q<br>W/R | 25 kA<br>12,5 As<br>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 $U_C$ | $I_f$ | <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 |