Surge protection devices

- Protection against overvoltage and high surge conditions caused by direct or indirect lightning strikes
- Types with plug-in cartridge provide fast servicing capability
- Mechanical indicator for visual failure status signalling of single modules
- Versions with or without output for remote SPD status indication
- Versions for data and signal lines
- Versions for photovoltaic applications.

Surge protection devices (SPD) — Sec. - Page

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SURGE PROTECTION DEVICES TYPE 1 AND 2 MONOBLOCK VERSIONS

- 1P, 1P+N, 2P, 3P, 3P+N, 4P
- IEC impulse current Iimp (10/350µs): 25kA
- IEC maximum discharge current Imax (8/20µs): 100kA
- SPD status indicator
- Version with output for remote status indication.

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SURGE PROTECTION DEVICES TYPE 1 AND 2 VERSIONS WITH PLUG-IN CARTRIDGE

- 1P, 1P+N, 2P, 3P, 3P+N, 4P
- IEC impulse current Iimp (10/350µs): 12.5kA
- IEC maximum discharge current Imax (8/20µs): 60kA
- IEC combined surge Uoc/Isc (1.2/50, 8/20µs): 10kV/5kA
- Single module status indicator
- Version with output for remote status indication.

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SURGE PROTECTION DEVICES TYPE 1 AND 2 MONOBLOCK VERSIONS

- 1P, 1P+N, 2P, 3P, 3P+N, 4P
- IEC impulse current Iimp (10/350µs): 12.5kA
- IEC maximum discharge current Imax (8/20µs): 50kA
- SPD status indicator
- Version with output for remote status indication.

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SURGE PROTECTION DEVICES TYPE 2 VERSIONS WITH PLUG-IN CARTRIDGE

- 1P, 1P+N, 2P, 3P, 3P+N, 4P
- IEC maximum discharge current Imax (8/20µs): 50kA or 15kA
- IEC rated discharge current In (8/20µs): 20kA or 5kA
- Single module status indicator
- Versions with and without output for remote status indication.

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SURGE PROTECTION DEVICES TYPE 3 VERSIONS WITH PLUG-IN CARTRIDGE AND COMPACT VERSIONS

- 1P+N
- Version with plug-in cartridge
  - IEC rated current In(8/20µs):5kA
  - Combined impulse Uoc: 10kV
  - SPD status indicator
  - Output for remote status indication
- Compact version
  - IEC rated current In(8/20µs):3kA
  - Combined impulse Uoc: 6kA
- Acoustic or optical intervention indicator.

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SURGE PROTECTION DEVICES TYPE C2-D1 FOR DATA AND SIGNAL LINES

- Version for line RS485
  - Rated voltage Un:5VDC
  - C2 Rated current In(8/20µs):10kA
  - D1 Impulse current Iimp (10/350 µs): 2.5kA
  - Output for remote status indication
- Version for Ethernet line Cat.6 - POE
  - Rated voltage Un:48VDC
- C2 Rated current In (8/20 µs) L-PE: 10kA
- D1 Impulse current Iimp (10/350 µs): 1kA.

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SURGE PROTECTION DEVICES TYPE 2 FOR PHOTOVOLTAIC APPLICATIONS

- Versions with plug-in cartridge: +, -, PE
- IEC maximum operational voltage: 1500VDC
- IEC maximum discharge current Imax (8/20µs): 40kA
- IEC rated discharge current In (8/20µs): 20kA
- Single module status indicator
- Versions with or without output for remote status indication
- Tested according to EN 50539-11.

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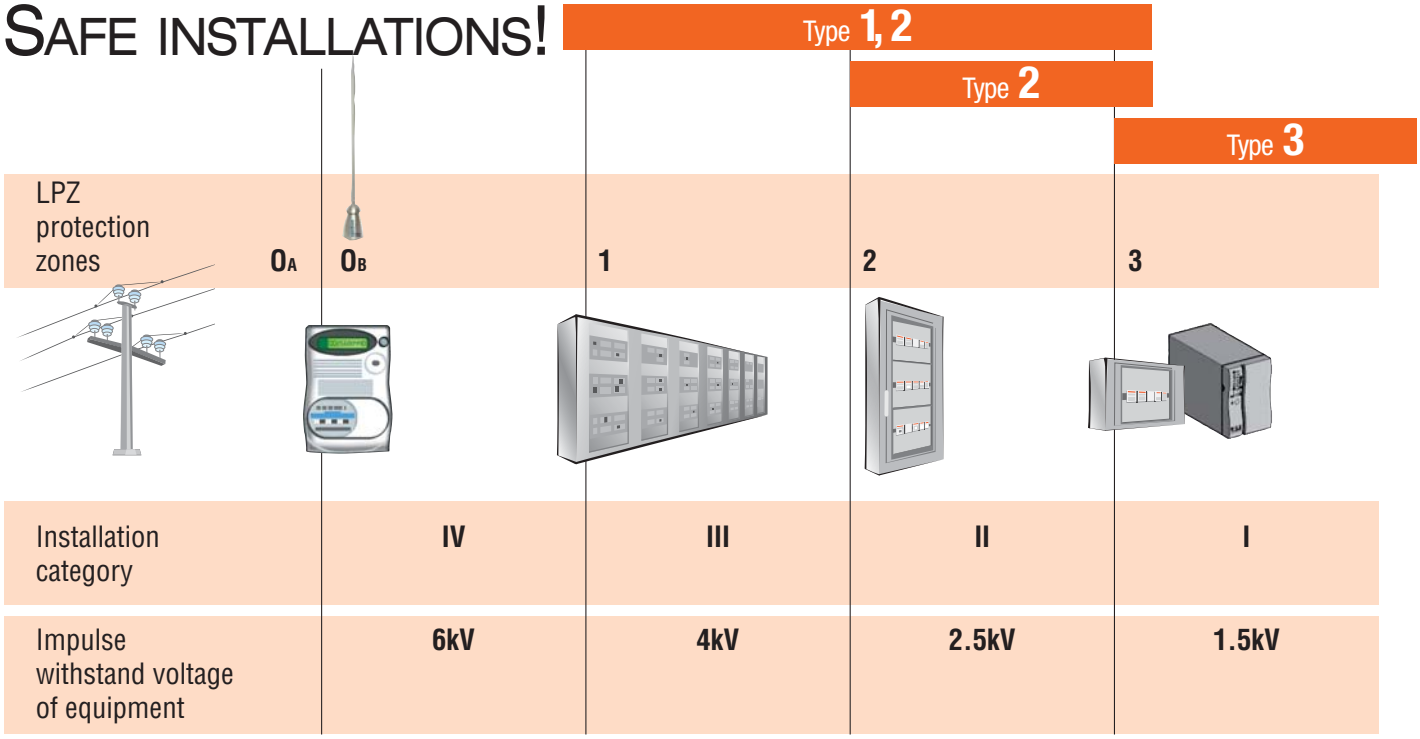
SPARE PLUG-IN CARTRIDGES

- Versions suitable for SPDs:
  - Type 1 and 2
  - Type 2
  - Type 2 for photovoltaic applications
- Status indicator for single modules.

Lovato electric

SAFE INSTALLATIONS!



SURGE PROTECTION DEVICES

The surge arresters commonly defined as SPDs (Surge Protection Devices), are devices designed to protect electric systems and equipment against transient and impulse overvoltages such as those caused by lightning strikes and by electric switching.
Their function is to divert the discharge or impulse current generated by an overvoltage to earth/ground, thereby protecting the equipment downstream.
SPDs are installed in parallel with the electric line to be protected. At the mains rated voltage, they are comparable to an open circuit and have a high impedance at their ends.
In the presence of an overvoltage, this impedance falls to very low values, closing the circuit to earth/ground.
Once the overvoltage has ended, their impedance rises again rapidly to the initial value (very high), returning to open loop conditions.
The SA1B and SA0B (monoblock) type protects against direct and indirect lightning strikes as well as induced overvoltage conditions. It can be installed in areas with a high risk of direct lightning strikes, inside main distribution boards or nearby sub-distribution boards. With the SA0 plug-in cartridge type, the same features are available with the advantage of only having to replace the protection cartridge once the SPD blows.

PROTECTION ZONES

Standards define the LPZs (Lightning Protection Zones), which indicate the different zones at risk. These are distinguished among:

LPZ 0A: Area outside a building not protected by LPS (e.g. lightning rods) where a direct lightning strike is possible. In this zone, there is total exposure to induced electromagnetic fields.

LPZ 0B: Area outside a building protected by LPS; therefore, a direct lighting strike is not possible. In this zone, there is total exposure to induced electromagnetic fields.

LPZ 1: Area inside a building so protected against direct lightning strikes.
In this zone, there is the possibility of very high overvoltages and of induced electromagnetic fields which may be attenuated depending on the degree of screening. This zone must be protected by an SPD type 1 at the boundary with zone LPZ 0A or 0B.

LPZ 2: Area inside a building (e.g. in a room), in which there is the possibility of low overvoltages since they are limited by SPDs installed upstream. This zone must be protected by an SPD type 2 at the boundary with zone LPZ 1.

LPZ 3: Area inside a building (e.g. the system connected to a socket in a room) characterised by very sensitive equipment, in which there is the possibility of very low overvoltages as they are limited by SPDs installed upstream.
This zone must be protected by an SPD type 3 at the boundary with zone LPZ 2.

INSTALLATION CATEGORY

For the correct choice of the SPD, the dielectric strength of the equipment to protect needs to be considered. This level is established by IEC 60664-1 standard.
For a 230/400V installation, it specifies:

Installation category IV: 6kV for devices installed upstream of the distribution board (for example, delivery point with the distribution system).

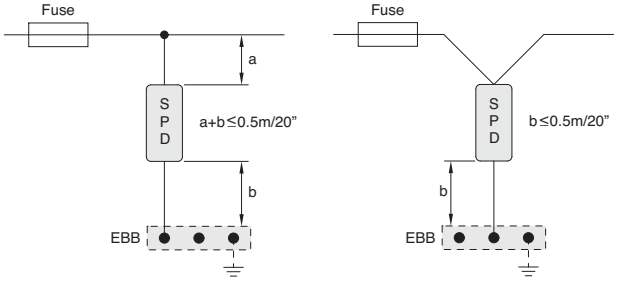
Installation category III: 4kV for devices being part of the fixed system (for example, distribution boards, switching devices, isolators, ducting and their accessories)

Installation category II: 2.5kV for non electronic devices (for example, household appliances or electric tools)

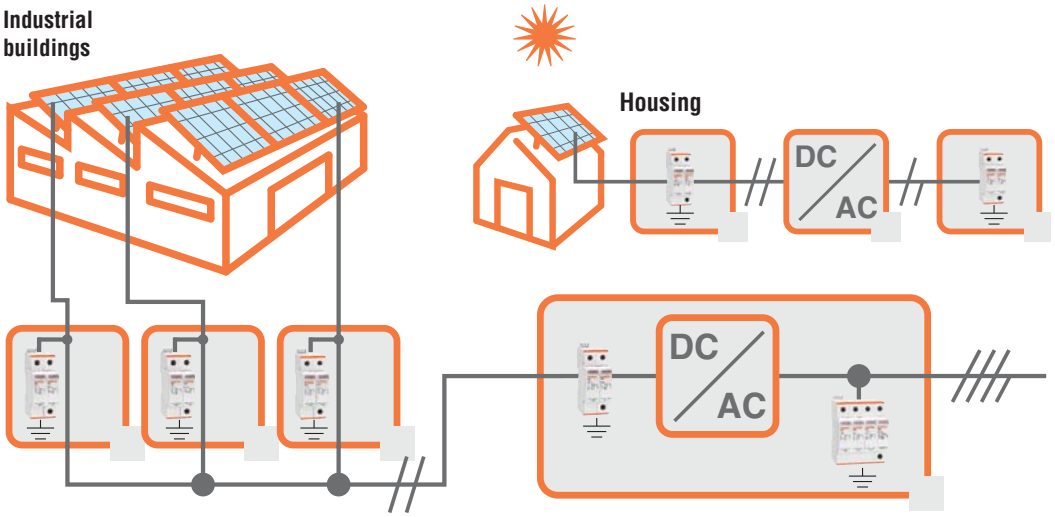
Installation category I: 1.5kV for equipment containing “particularly sensitive” electronic circuits (for example, electronic devices like PCs or TVs)

RECOMMENDATIONS FOR INSTALLATION

For correct installation, it is advisable to make connections between the line and the SPD input (phase or neutral terminals) as well as between the SPD output (earth/ground terminal) and the equipotential bonding connection with a maximum 0.5m/20” length of the leads. To reduce the distance, use of the so-called “V connection” is admissible.



For more details, IEC/EN 62305 standards can be consulted.



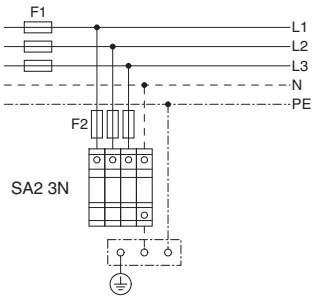
Type 2 DC

SURGE PROTECTION DEVICES FOR PHOTOVOLTAIC APPLICATIONS

In photovoltaic applications in a domestic environment or industrial facility or other similar circumstances, equipped with lightning rod systems having a safety distance (S), SPD type 2, suitable for DC duty, can be used to protect the installation. It is advisable to install these devices as close as possible to the photovoltaic panels, consequently in the so-called string boards. If the AC/DC inverter is far away from the string boards (indicatively more than 10m/33' apart), another SPD type 2 DC needs to be installed next to the inverter on the DC side. Installation of SPD type 2 suitable of AC duty is also required downstream of the inverter on the AC side. For more details, consult specific national standards and/or application guides issued by local authorities for solar systems concerning protection against lightning. The SA2DG… and SG2DG… types with plug-in cartridges are suitable for connection in the DC side of a solar installation and offer protection against induced overvoltage conditions. The SA2...A300 type is suitable for installation downstream of the inverter on the AC side and in intermediate panels.

BACKUP PROTECTION

Protection against short circuits of SPDs is provided by overcurrent devices (gL/gG fuses), which should be chosen according to the SPD manufacturer's recommendations.



Fuse size depends on SPD

SPD COORDINATION

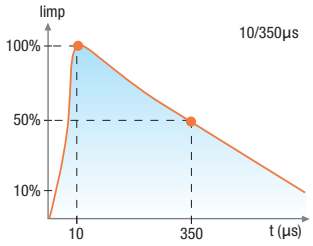
In order to obtain an effective protection against overvoltage, it is advisable to install several SPDs coordinated with one another in cascade connection.
For instance, it is advisable to have a Type 1 SPD in the main distribution board, a Type 2 SPD in the sub-distribution board and a Type 3 SPD near the terminal equipment to be protected.
In this way, the energy originating from an overvoltage gradually decreases as it reaches the equipment to protect.

DEFINITIONS AND RATINGS ACCORDING TO IEC/EN

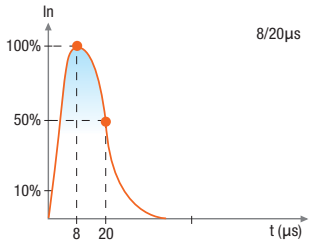
Maximum continuous voltage Uc:
Maximum value of AC or DC voltage that the SPD is capable of permanently withstanding without activating or getting damaged; this is its rated voltage.

Protection level voltage Up:
Maximum value of the voltage between the terminals of the SPD in presence of an impulsive overvoltage. It is a fundamental parameter to correctly choose the SPD; it must be taken into account with regards to the impulse voltage of the equipment to protect.

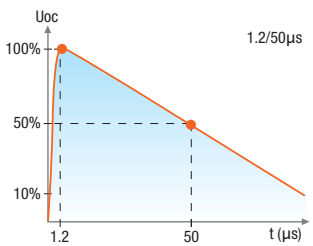
Impulse current Imp:
Crest value of the current that circulates in the SPD with a 10/350µs waveform (activation must be guaranteed for 20 times without damage). It is used to classify SPDs in test class I.



Rated discharge current In:
Crest value of the current that circulates in the SPD with an (8/20µs waveform (activation must be guaranteed for 20 times without damage). It is used to classify SPDs in test class II.



Open circuit discharge voltage Uoc:
Crest value of the no-load discharge voltage delivered by the test generation with a 1.2/50µs waveform simultaneously with a short-circuit current of an 8/20µs waveform, applied at the SPD terminals. It is used to classify SPDs in test class III.



Monoblock limp=25kA

SA1B 1P A320R

SA1B 3N A320R

Order code	Pole arrange-ment	Relay output	Number of DIN modules	Qty per pkg	Wt
		(SPDT)		n°	[kg]
MONOBLOCK VERSION. IEC impulse current limp (10/350µs) 25kA per pole.					
SA1B 1P A320R	1P	YES	2	1	0.275
SA1B 1N A320R	1P+N	YES	4	1	0.390
SA1B 2P A320R	2P	YES	4	1	0.395
SA1B 3P A320R	3P	YES	6	1	0.595
SA1B 3N A320R	3P+N	YES	8	1	0.760
SA1B 4P A320R	4P	YES	8	1	0.780

Main characteristics
The surge protection device type SA1B combines the performance of SPD type 1 and 2 into a single product.
It protects against direct and indirect lightning strikes as well as induced overvoltage conditions.
It can be installed in areas with a high risk of direct lightning strikes, inside main distribution boards or nearby sub-distribution boards.

Operational characterstics
- IEC maximum continuous operating voltage Uc: 320VAC
- IEC maximum discharge current Imax (8/20µs): 100kA per pole
- IEC rated discharge current In (8/20µs): 25kA per pole
- Version with relay output having changeover contact for remote status indication
- IEC degree of protection: IP20.

Certifications and compliance
Certification obtained: EAC.
Compliant with standards: IEC/EN 61643-11.

Characteristics

Type	IEC rated voltage Un	IEC voltage pro-tection level Up	Power installation system
	[V]	[kV] L-N	
SA1B 1P A320R	230	<1.4	TN-C, TN-S, TT❶
SA1B 1N A320R	230	<1.4/1.3	TT, TN-S
SA1B 2P A320R	230	<1.4	TN-S
SA1B 3P A320R	230/400	<1.4	TN-C
SA1B 3N A320R	230/400	<1.4/1.5	TT, TN-S
SA1B 4P A320R	230/400	<1.4	TN-S

❶ Between L-N only.

With plug-in cartridge limp=12.5kA

SA0 1P A320R

SA0 2P A320R

Order code	Pole arrange-ment	Relay output	Number of DIN modules	Qty per pkg	Wt
		(SPDT)		n°	[kg]
VERSION WITH PLUG-IN CARTRIDGE. IEC impulse current limp (10/350µs) 12.5kA per pole.					
SA0 1P A320R	1P	YES	1	1	0.195
SA0 1N A320R	1P+N	YES	2	1	0.365
SA0 2P A320R	2P	YES	2	1	0.370
SA0 3P A320R	3P	YES	3	1	0.540
SA0 3N A320R	3P+N	YES	4	1	0.670
SA0 4P A320R	4P	YES	4	1	0.670

PLUG-IN CARTRIDGE

Order code	Description	Qty per pkg	Wt
		n°	[kg]
SAX00 P A320	For SA0... type	1	0.100

Main characteristics
SURGE PROTECTION DEVICES TYPE SA0
It has a plug-in cartridge and combines the performance of SPD type 1 and 2 into a single product. It is ideal in all those systems of reduced extent to protect the load side downstream of main circuit breaker to terminal equipment.
It protects against direct and indirect lightning strikes as well as induced overvoltage conditions. It can be installed inside main distribution boards and nearby terminal equipment.
The protection cartridges are plug-in and can be easily replaced for quick servicing.

SURGE PROTECTION DEVICES TYPE SA0B
Monoblock version SPD, it combines the performance of SPD type 1 and 2 into a single product. It is ideal in all those systems of reduced extent to protect the load side downstream of main circuit breaker to terminal equipment.
It protects against direct and indirect lightning strikes as well as induced overvoltage conditions.
It can be installed inside main distribution boards and nearby terminal equipment. The protection cartridges are plug-in and can be easily replaced for quick servicing.

Operational characteristics
- IEC maximum continuous operating voltage Uc: 320VAC
- IEC maximum discharge current Imax (8/20µs) per pole: 60kA (SA0...); 50kA (SA0B)
- IEC rated discharge current In (8/20µs): 25kA per pole (SA0); 20kA (SA0B)
- Versions with or without relay output having changeover contact for remote status indication
- IEC degree of protection: IP20.

Certifications and compliance
Certification obtained: EAC.
Compliant with standards: IEC/EN 61643-11.

Monoblock limp=12.5kA

SA0B 1P A320R

new

Order code	Pole arrange-ment	Relay output	Number of DIN modules	Qty per pkg	Wt
		(SPDT)		n°	[kg]
MONOBLOCK VERSION. IEC impulse current limp (10/350µs) 12.5kA per pole.					
SA0B 1P A320R	1P	YES	2	1	0.205
SA0B 1N A320R	1P+N	YES	2	1	0.155
SA0B 2P A320R	2P	YES	2	1	0.230
SA0B 3P A320R	3P	YES	3	1	0.330
SA0B 3N A320R	3P+N	YES	4	1	0.600
SA0B 4P A320R	4P	YES	4	1	0.600

Characteristics

Type	IEC rated voltage Un	IEC voltage protection level Up	Power installation system
	[V]	[kV] L-N	
SA0... 1P A...	230	<1.5	TN-C, TN-S, TT❶
SA0... 1N A...	230	<1.5	TT, TN-S
SA0... 2P A...	230	<1.5	TN-S
SA0... 3P A...	230/400	<1.5	TN-C
SA0... 3N A...	230/400	<1.5	TT, TN-S
SA0... 4P A...	230/400	<1.5	TN-S

❶ Between L-N only.

With plug-in cartridge In=20kA

SG2...

new

Order code	Pole arrange-ment	Relay output	Number of DIN modules	Qty per pkg	Wt
				n°	[kg]
VERSION WITH PLUG-IN CARTRIDGES. Rated discharge current In (8/20µs) 20kA per pole.					
SG2 1P A300	1P	NO	1	1	0.128
SG2 1P A300R	1P	YES	1	1	0.135
SG2 1N A300	1P+N	NO	2	1	0.234
SG2 1N A300R	1P+N	YES	2	1	0.240
SG2 2P A300	2P	NO	2	1	0.252
SG2 2P A300R	2P	YES	2	1	0.266
SG2 3P A300	3P	NO	3	1	0.366
SG2 3P A300R	3P	YES	3	1	0.376
SG2 3N A300	3P+N	NO	4	1	0.477
SG2 3N A300R	3P+N	YES	4	1	0.486
SG2 4P A300	4P	NO	4	1	0.496
SG2 4P A300R	4P	YES	4	1	0.505

PLUG-IN CARTRIDGE.

Order code	Description	Qty per pkg	Wt
		n°	[kg]
SGX02 P A300	For SG2...A300/300R types	1	0.100

In=5kA

SG2C...

new

Order code	Pole arrange-ment	Relay output	Number of DIN modules	Qty per pkg	Wt
		(SPDT)		n°	[kg]
VERSION WITH PLUG-IN CARTRIDGES. Rated discharge current In (8/20µs) 5kA per pole.					
SG2C 1N A320	1P+N	NO	1	1	0.126
SG2C 2P A320	2P	NO	1	1	0.144

Main characteristics

SURGE PROTECTION DEVICES TYPE SG2
They are available in plug-in cartridge version and they are suitable for installation in secondary boards and in terminal equipment.
They ensure protection against overvoltages conditions.
The protection cartridges are plug-in and can be easily replaced for quick servicing.
SG2 surge arresters are immune to temporary overvoltages (TOV) and block the circulation of the subsequent network current after the intervention.

SURGE PROTECTION DEVICES TYPE SG2C
They are available in plug-in cartridge version and suitable for installation in residential boards where a 5kA per pole indirect discharge protection is sufficient. They have compact size, 1 module width for two poles.

Operational characteristics

- IEC maximum continuous operating voltage Uc: 300VAC (SG2)/320VAC (SG2C)
- IEC maximum discharge current Imax (8/20µs): 50kA per pole (SG2); 15kA (SG2C)
- IEC rated discharge current In (8/20µs): 20kA per pole (SG2); 5kA (SG2C)
- Versions with or without relay output having changeover contact for remote status indication (SG2)
- IEC degree of protection: IP20.

Certifications and compliance

Certification obtained: EAC.
Compliant with standards: IEC/EN 61643-11.

Characteristics

Type	IEC rated voltage Un	IEC voltage protection level Up	Power installation system
	[V]	[kV] L-N	
SG2 1P A..	230	<1,5	TN-C, TN-S, TT❶
SG2/SG2C 1N A..	230	<1,5	TT, TN-S
SG2/SG2C 2P A..	230	<1,5	TN-S
SG2 3P A..	230/400	<1,5	TN-C
SG2 3N A..	230/400	<1,5	TT, TN-S
SG2 4P A..	230/400	<1,5	TN-S

❶ Between L-N only.

14

Type 3 with plug-in cartridge

SA3 1N A320R

Order code	Pole arrange-ment	Relay output	Number of DIN modules	Qty per pkg	Wt
		(SPDT)		n°	[kg]
VERSION WITH PLUG-IN CARTRIDGES. Combined impulse Uoc/Icw(1.2/50µs, 8/20µs) 10kV/5kA.					
SA3 1N A320R	1P+N	YES	1	1	0.140

Type 3 compact version

SA3 1N A275MS SA3 1N A275ML

Order code	Pole arrange-ment	Intervention signaling	Qty per pkg	Wt
			n°	[kg]
COMPACT VERSION. Combined impulse Uoc/Icw(1.2/50µs, 8/20µs) 6kV/3kA.				
SA3 1N A275MS	1P+N	Acoustic	1	0.050
SA3 1N A275ML	1P+N	Optical	1	0.050

General characteristics
SURGE PROTECTION DEVICE TYPE SA3
They are available in pluggable cartridge version for installation on DIN rail or compact version for installation in terminal block or electrical conduct. They are used for protection of end users (Electronic devices). The DIN rail version includes a relay output with exchange contact for status reporting. The compact versions are available with acoustic or light signaling and are provided with pre-wired connectors, length 11cm.

Operational characteristics
- IEC nominal voltage Un: 230VAC
- IEC rated current In (8 / 20µs): 5kA (SA3 ... A320R), 3kA(SA3..MS, SA3 ... ML)
- IEC combined impulse Uoc: 10kV (SA3 ... A320R), 6kV(SA3..MS, SA3 ... ML)
- IEC Protection level Up <1.5kV
- IEC degree of protection: IP20.

Certifications and compliance
Certification obtained: EAC.
Compliant with standards: IEC/EN 61643-11.

Type C2-D1 for data and signal lines

SASD 5VR SASD ET6

Order code	Application	Relay output	Qty per pkg	Wt
			n°	[kg]
MONOBLOCK VERSION. Rated current C2 In(8/20 µs): 10kA.				
SASD 5VR	RS485	YES	1	0.058
SASD ET6	Ethernet Cat.6 - POE	–	1	0.120

General characteristics
Surge protection device for data lines type RS485 (5VDC) and Ethernet Cat. 6 Power Over Ethernet (POE).
Typically used for protection of televisions, data lines, PCs, video cameras, electronic control units, measuring devices, switches and routers.

Operational characteristics
TYPE SASD 5VR
- IEC rated voltage Un: 5VDC
- C2 rated current In (8 / 20µs): 10kA
- D1 impulse current limp (10 / 350µs): 2.5kA
- IEC degree of protection: IP20.

TYPE SASD ET6
- IEC rated voltage Un: 48VDC (POE)
- C2 rated current In (8 / 20µs) L-PE: 10kA
- D1 limp impulsive current (10 / 350µs): 1kA
- IEC degree of protection: IP20.

Certifications and compliance
Certification obtained: EAC.
Compliant with standards: IEC/EN 61643-11.

With plug-in cartridge

SA2 DG 600M2R

SG2 DG K10M3R

Order code	Pole arrange-ment	Relay output	Number of DIN modules	Qty per pkg	Wt
		(SPDT)		n°	[kg]
VERSION WITH PLUG-IN CARTRIDGE. EN short-circuit current rating Iscpv 100A.					
SA2 DG 600M2	+, -, PE	NO	2	1	0.320
SA2 DG 600M2R	+, -, PE	YES	2	1	0.325
EN short-circuit current rating Iscpv 1000A.					
SG2 DG K10M3	+, -, PE	NO	3	1	0.396
SG2 DG K10M3R	+, -, PE	YES	3	1	0.406
SG2 DG K50M3	+, -, PE	NO	3	1	0.444

new

PLUG-IN CARTRIDGES

Order code	Description	Qty per pkg	Wt
		n°	[kg]
SAX02 DG 600M2	For SA2 DG 600M2/M2R type	1	0.100
SGX02 DG K10M3	For SG2 DG K10M3/M3R type	1	0.100
SGX02 DG K50M3	For SG2 DG K50M3 type	1	0.100

new

Main characteristics
The surge protection device type SA2 D and SG2 DG with plug-in cartridge for photovoltaic applications is suitable for installation on the direct-current end of a photovoltaic installation and protects against induced overvoltage conditions.
The protection cartridges are plug-in and can be easily replaced for quick servicing.

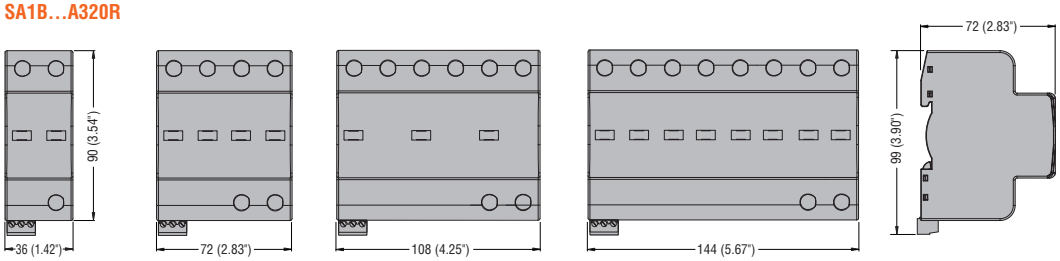
Operational characteristics
- EN maximum continuous voltage Ucpv: 600VDC, 1100VDC, 1500VDC
- Versions with or without relay output having changeover contact for remote status indication
- EN degree of protection: IP20.

Characteristics

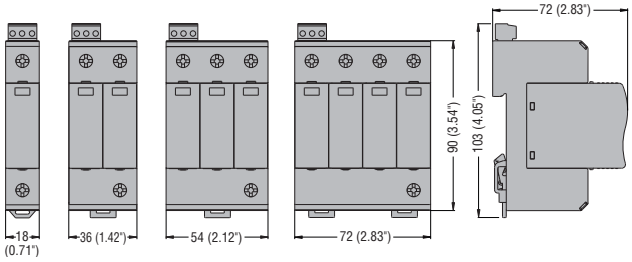
Type	EN rated voltage Un	EN continuous voltage Ucpv	EN voltage protection level Up
	[VDC]	[VDC]	[kV]
SA2 DG 600M2	600	600	<1.9
SA2 DG K10M3	1100	1100	<3.8
SA2 DG K50M3	1500	1500	<5.0

Certifications and compliance
Certification obtained: EAC.
Compliant with standards: IEC/EN 50539-11.

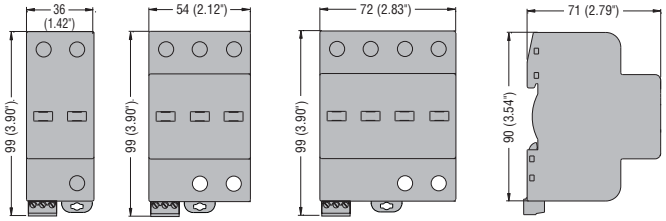
SA1B...A320R



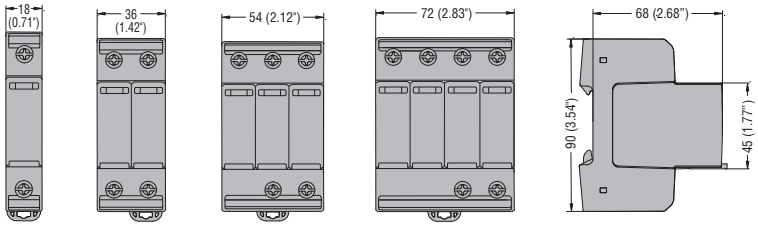
SA0...A320R



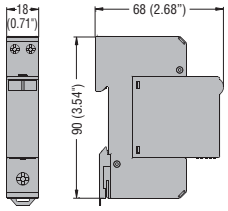
SA0B...A320R



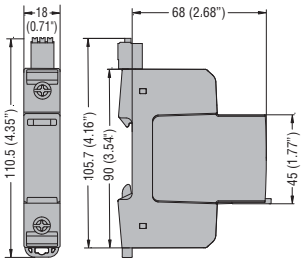
SG2... A300



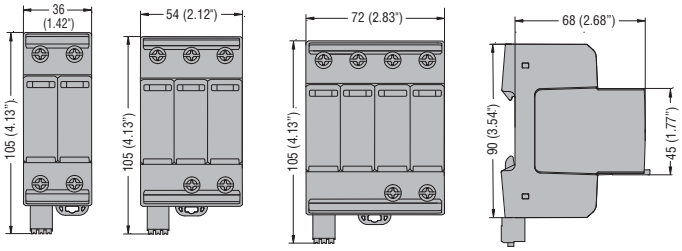
SG2C... A320



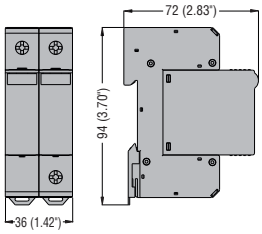
SG2 1P A300R



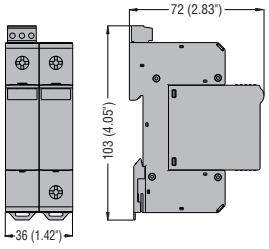
SG2... A300R



SA2 DG...



SA2 DG...R



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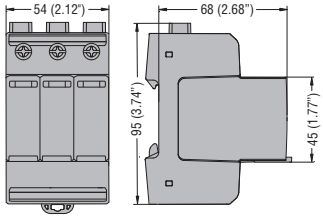
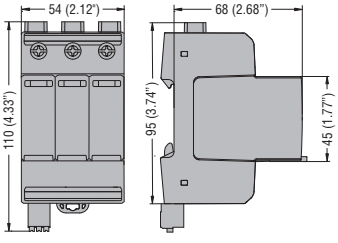
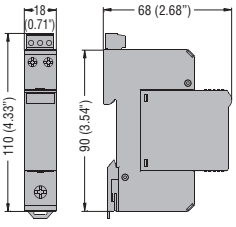


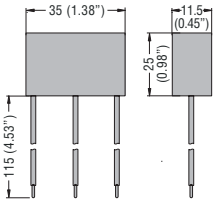
SG2 DG...M3R



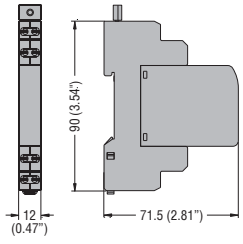
SA3 1N A320R



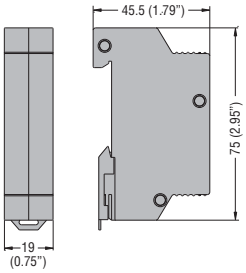
SA3 1N A275M...



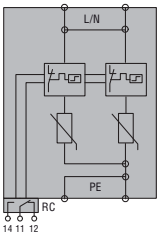
SASD 5VR



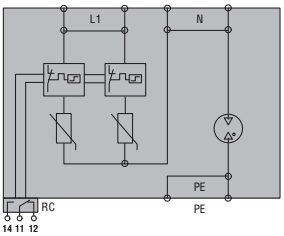
SASD ET6



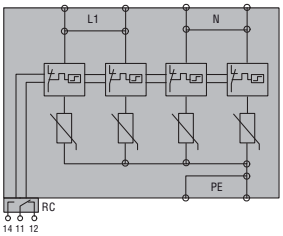
SA1B 1P A320R



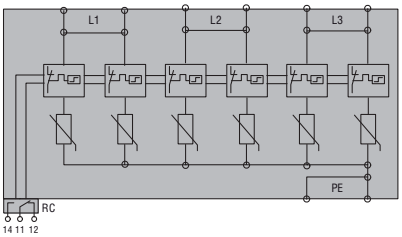
SA1B 1N A320R



SA1B 2P A320R



SA1B 3P A320R



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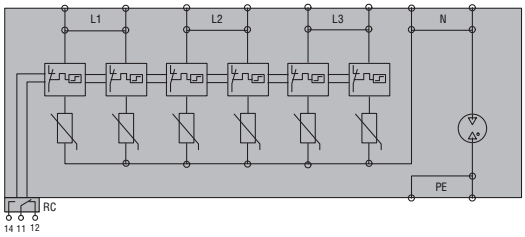
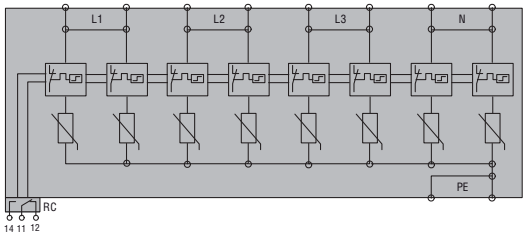
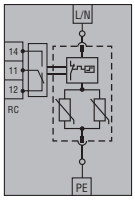


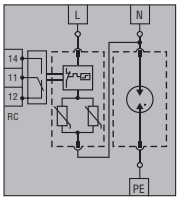
SA1B 4P A320R



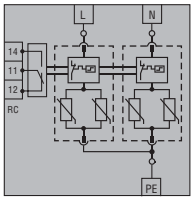
SA0 1P A320R



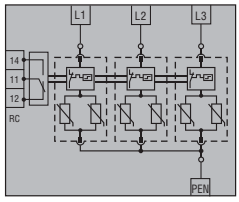
SA0 1N A320R



SA0 2P A320R



SA0 3P A320R



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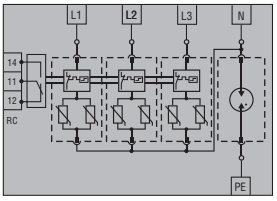

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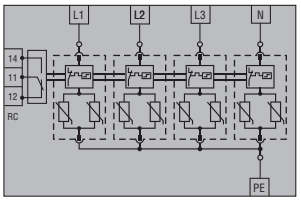

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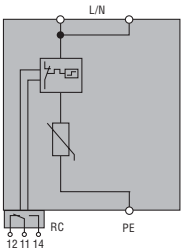

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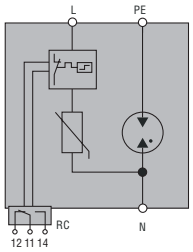
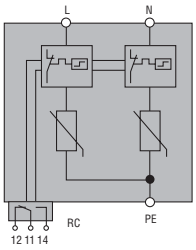


SA0B 2P A320R



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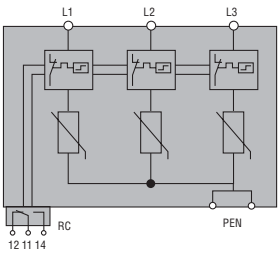

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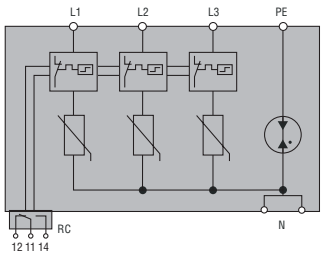

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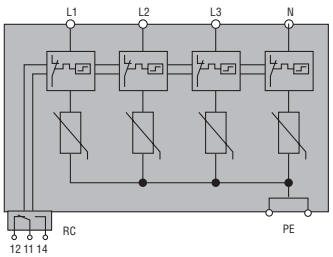
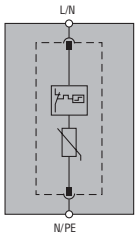
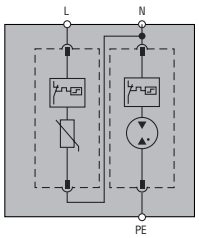


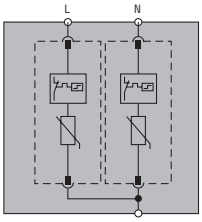
SG2 1P A300



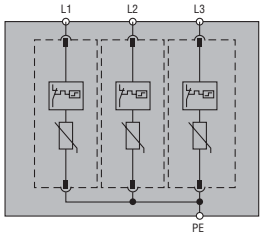
SG2 1N A300



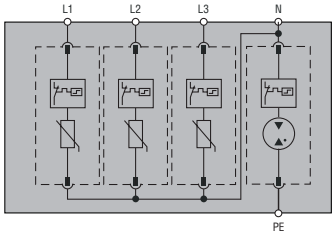
SG2 2P A300



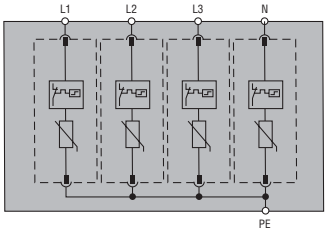
SG2 3P A300



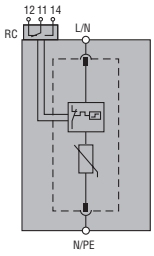
SG2 3N A300



SG2 4P A300



SG2 1P A300R



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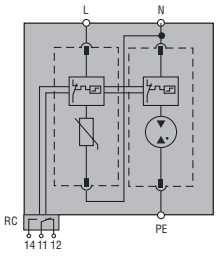
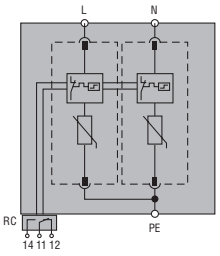
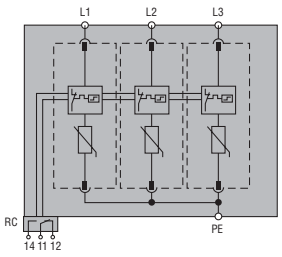


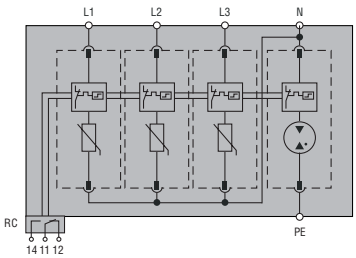
SG2 2P A300R



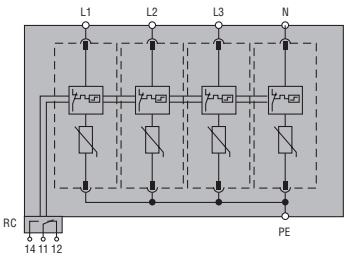
SG2 3P A300R



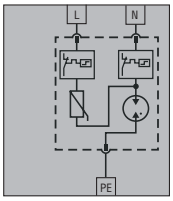
SG2 3N A300R



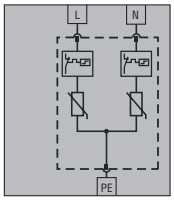
SG2 4P A300R



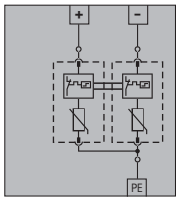
SG2C 1N A320



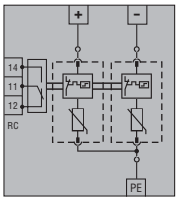
SG2C 2P A320



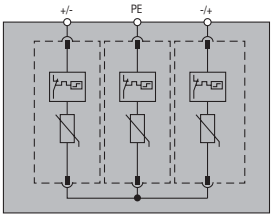
SA2 DG 600M2



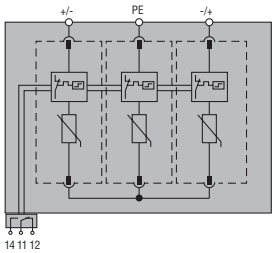
SA2 DG 600M2R



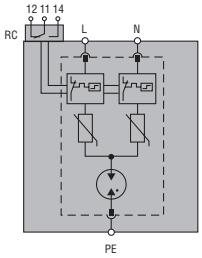
SG2 DG K10M3
SG2 DG K50M3



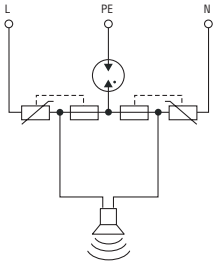
SG2 DG K10M3R



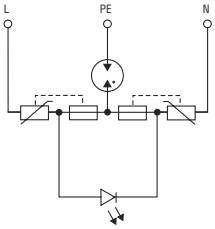
SA3 1N A320R



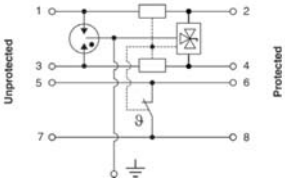
SA3 1N A275MS



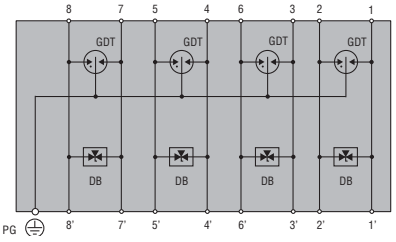
SA3 1N A275ML



SASD 5VR



SASD ET6



TYPE with relay output		SA1B 1P A320R	SA1B 1N A320R	SA1B 2P A320R	SA1B 3P A320R	SA1B 3N A320R	SA1B 4P A320R
ELECTRICAL PROPERTIES							
SPD per IEC/EN 61643-11		Type 1, 2 (test class I, II)					
IEC rated voltage Un	VAC	230	230	230	230 / 400	230 / 400	230 / 400
IEC maximum continuous voltage Uc	VAC	320					
IEC impulse current Iimp (10/350) (L-N/N-PE)	kA	25	25 / 50	25 per pole	25 per pole	25 / 100	25 per pole
IEC max impulse current Imax (8/20) (L-N/N-PE)	kA	100	100 / 100	100 per pole	100 per pole	100 / 100	100 per pole
IEC rated discharge current In (8/20) (L-N/N-PE)	kA	25	25 / 50	25 per pole	25 per pole	25 / 100	25 per pole
IEC voltage protection level Up (L-N/N-PE)	kV	<1.4	<1.4 / <1.3	<1.4	<1.4	<1.4 / <1.5	<1.4
Temporary overvoltage (TOV) Ut (L-N for 5s)	VAC	335					
IEC residual voltage Ures (L-N/N-PE) at 5kA (8/20)	kV	1	1	1	1.1	1.1	1.1
IEC follow current If (N-PE)	Arms	no	>100	no	no	>100	no
Tripping time ta (L-N/N-PE)	ns	<25	<25 / 100	<25	<25	<25 / 100	<25
Thermal isolation protection		Yes					
IEC backup protection fuse (supply >250A) (L-N/N-PE)	fuse A	250 gL/gG					
IEC maximum short-circuit current 50Hz	kA	50					
Status indicator - operating / failure	colour	Green / Red					
CONNECTIONS							
IEC degree of protection		IP20					
Terminal tightening torque	Nm	3					
Maximum conductor section	mm^2	25 (flexible) / 35 (rigid)					
RELAY OUTPUT FOR REMOTE STATUS INDICATION							
Type of contact		Changeover (NO/NC - SPDT)					
Contact capacity	A	0.5A at 250VAC; 3A at 125VAC; 0.1A at 250VDC; 0.2A at 125VDC					
Contact terminal tightening torque	Nm	0.25					
Maximum contact conductor section	mm^2	1.5					
AMBIENT CONDITIONS							
Operating temperature		-40...+80°C					
Fixing		On 35mm DIN rail (IEC/EN 60715)					
Housing material		Thermoplastic, RAL 7035, UL 94 V-0					

TYPE with relay output		SA0 1P A320R	SA0 1N A320R	SA0 2P A320R	SA0 3P A320R	SA0 3N A320R	SA0 4P A320R
ELECTRICAL PROPERTIES							
SPD per IEC/EN 61643-11		Type 1, 2, 3 (test class I, II, III)					
IEC Rated voltage Un	VAC	230	230	230	230 / 400	230 / 400	230 / 400
IEC maximum continuous voltage Uc	VAC	320					
IEC impulse current Iimp (10/350) (L-N/N-PE)	kA	12.5	12.5 / 50	12.5 per pole	12.5 per pole	12.5 / 50	12.5 per pole
IEC max discharge current Imax (8/20) (L-N/N-PE)	kA	60	60 / 50	60 per pole	60 per pole	60 / 50	60 per pole
IEC rated discharge current In (8/20) (L-N/N-PE)	kA	25	25 / 30	25 per pole	25 per pole	25 / 30	25 per pole
IEC combined surge Uoc/Isc (1.2/50, 8/20)	kV/kA	10 / 5					
IEC voltage level protection Up (L-N/N-PE)	kV	<1.5	<1.5 / <1.7	<1.5	<1.5	<1.5 / <1.7	<1.5
IEC temporary overvoltage (TOV) Ut (L-N for 5s)	VAC	335					
IEC residual voltage Ures (L-N/N-PE) at 5kA (8/20)	kV	0.8	0.8 / 0.2	0.8	0.8	0.8 / 0.2	0.8
IEC follow current If (N-PE)	Arms	no	>100	no	no	>100	no
Tripping time ta (L-N/N-PE)	ns	<25	<25 / 100	<25	<25	<25 / 100	<25
Thermal isolation protection		Yes					
IEC backup fuse (supply>160A) (L-N/N-PE)	fuse A	160 gG					
IEC maximum short-circuit current 50Hz	kA	25					
Status indicator - operating / failure	colour	– / Red					
CONNECTIONS							
IEC degree of protection		IP20					
Terminal tightening torque	Nm	3					
Maximum conductor section	mm^2	25 (flexible) / 35 (rigid)					
RELAY OUTPUT FOR REMOTE STATUS INDICATION							
Type of contact		Changeover (NO/NC - SPDT)					
Contact capacity	A	0.5A at 250VAC; 3A at 125VAC; 0.1A at 250VDC; 0.2A at 125VDC					
Contact terminal tightening torque	Nm	0.25					
Maximum contact conductor section	mm^2	1.5					
AMBIENT CONDITIONS							
Operating temperature		-40...+80°C					
Fixing		On 35mm DIN rail (IEC/EN 60715)					
Housing material		Thermoplastic, RAL 7035, UL 94 V-0					

TYPE with relay output		SA0B 1P A320R	SA0B 1N A320R	SA0B 2P A320R	SA0B 3P A320R	SA0B 3N A320R	SA0B 4P A320R
ELECTRICAL PROPERTIES							
SPD per IEC/EN 61643-11		Type 1, 2 (test class I, II)					
IEC Rated voltage Un	VAC	230	230	230	230 / 400	230 / 400	230 / 400
IEC maximum continuous voltage Uc	VAC	320					
IEC impulse current Iimp (10/350) (L-N/N-PE)	kA	12.5	12.5 / 50	12.5	12.5	12.5 / 50	12.5
IEC max discharge current Imax (8/20) (L-N/N-PE)	kA	50	50 / 100	50	50	50 / 100	50
IEC rated discharge current In (8/20) (L-N/N-PE)	kA	20	20 / 50	20	20	20 / 50	20
IEC voltage level protection Up (L-N/N-PE)	kV	<1.5	<1.5 / <1.5	<1.5	<1.5	<1.5 / <1.5	<1.5
IEC temporary overvoltage (TOV) Ut (L-N for 5s)	VAC	335					
IEC follow current If (N-PE)	Arms	no	>100	no	no	>100	no
Tripping time ta (L-N/N-PE)	ns	<25	<25 / 100	<25	<25	<25 / 100	<25
Thermal isolation protection		Yes					
IEC backup fuse (supply>250A) (L-N/N-PE)	fuse A	250 gG					
IEC maximum short-circuit current 50Hz	kA	50					
Status indicator - operating / failure	colour	Green / Red					
CONNECTIONS							
IEC degree of protection		IP20					
Terminal tightening torque	Nm	3					
Maximum conductor section	mm^2	25 (flexible) / 35 (rigid)					
RELAY OUTPUT FOR REMOTE STATUS INDICATION							
Type of contact		Changeover (NO/NC - SPDT)					
Contact capacity	A	0.5A at 250VAC; 3A at 125VAC					
Contact terminal tightening torque	Nm	0.25					
Maximum contact conductor section	mm^2	1.5					
AMBIENT CONDITIONS							
Operating temperature		-40...+85°C					
Fixing		On 35mm DIN rail (IEC/EN 60715)					
Housing material		Thermoplastic, RAL 7035, UL 94 V-0					

TYPE without relay output with relay output		SG2 1P A300 SG2 1P A300R	SG2 1N A300 SG2 1N A300R	SG2 2P A300 SG2 2P A300R	SG2 3P A300 SG2 3P A300R	SG2 3N A300 SG2 3N A300R	SG2 4P A300 SG2 4P A300R
ELECTRICAL PROPERTIES							
SPD per IEC/EN 61643-11		Type 2 (test class II)					
IEC Rated voltage Un	VAC	240	240	240	240 / 400	240 / 400	240 / 400
IEC maximum continuous voltage Uc	VAC	300					
IEC max discharge current Imax (8/20) (L-N/N-PE)	kA	50	50 / 65	50	50	50 / 65	50
IEC rated discharge current In (8/20) (L-N/N-PE)	kA	20	20 / 40	20	20	20 / 40	20
IEC level protection Up (L-N/N-PE)	kV	<1.5	<1.5 / <1.5	<1.5	<1.5	<1.5 / <1.5	<1.5
IEC temporary overvoltage (TOV) Ut (L-N for 5s)	VAC	337					
IEC follow current If (N-PE)	Arms	no	100	no	no	100	no
Tripping time ta (L-N/N-PE)	ns	<25	<25 / 100	<25	<25	<25 / 100	<25
Thermal isolation protection		Yes					
IEC backup fuse (supply>315A) (L-N/N-PE)	fuse A	315/250 gG					
IEC maximum short-circuit current 50Hz	kA	25 / 50					
Status indicator - operating / failure	colour	Green / Red					
CONNECTIONS							
IEC degree of protection		IP20					
Terminal tightening torque	Nm	4.5					
Maximum conductor section	mm^2	25 (flexible) / 35 (rigid)					
RELAY OUTPUT FOR REMOTE STATUS INDICATION							
Type of contact		Changeover (NO/NC - SPDT)					
Contact capacity	A	1A at 250VAC; 1A at 125VAC; 0.5A at 48VDC; 0.5A at 24VDC; 0.5A at 12VDC					
Maximum contact conductor section	mm^2	1.5					
AMBIENT CONDITIONS							
Operating temperature		-40...+85°C					
Fixing		On 35mm DIN rail (IEC/EN 60715)					
Housing material		Thermoplastic, RAL 7035, UL 94 V-0					

TYPE		SG2C 1N A320	SG2C 2P A320
ELECTRICAL PROPERTIES			
SPD per IEC/EN 61643-11		Type 2 (test class II)	
IEC Rated voltage Un	VAC	230	
IEC maximum continuous voltage Uc	VAC	320	
IEC max discharge current Imax (8/20) (L-N/N-PE)	kA	15/35	15
IEC rated discharge current In (8/20) (L-N/N-PE)	kA	5/20	5
IEC voltage level protection Up	kV	<1.5	
IEC temporary overvoltage (TOV) Ut (L-N for 5s)	VAC	335	
IEC follow current If (N-PE)	Arms	>100	no
Tripping time ta (L-N/N-PE)	ns	<25 / 100	<25
Thermal isolation protection		Yes	
IEC backup fuse (supply>63A) (L-N/N-PE)	fuse A	63 gG	
IEC maximum short-circuit current 50Hz	kA	6	
Status indicator - operating / failure	colour	- / Red	
CONNECTIONS			
IEC degree of protection		IP20	
Terminal tightening torque	Nm	0.5 (L,N); 3 (PE)	
Maximum conductor section	mm^2	L,N: 4 (flexible) / 6 (rigid) PE: 25 (flexible) / 35 (rigid)	
AMBIENT CONDITIONS			
Operating temperature		-40...+85°C	
Fixing		On 35mm DIN rail (IEC/EN 60715)	
Housing material		Thermoplastic, RAL 7035, UL 94 V-0	

TYPE		SA3 1N A320R	SA3 1N A275MS	SA3 1N A275ML
ELECTRICAL PROPERTIES				
SPD per IEC/EN 61643-11		Type 3 (test class III)		
IEC Rated voltage Un	VAC	230	230	
IEC maximum continuous voltage Uc	VAC	320	275	
Combined impulse (1.2/50; 8/20) Uoc/Icw	kV/kA	10/5	6/3	
IEC max discharge current Imax (8/20)	kA	10	–	
IEC level protection Up (L-N/N-PE)	kV	<1.5	<1.5 / <1.7	
IEC temporary overvoltage (TOV) Ut (L-N for 5s)	VAC	337		
Tripping time ta (L-N/N-PE)	ns	<100ns		
IEC backup protection	A	63A fuse gG (line fuse >63 A)	MCB/B 16A (if MCB >16A)	
IEC maximum short-circuit current 50Hz	kA	10	1	
Status indicator - operating / failure		Red replace + relay output	Buzzer	LED
CONNECTIONS				
IEC degree of protection		IP20		
Terminal tightening torque (L-N / PE)	Nm	0.5 / 3	–	
Maximum conductor section	mm^2	L-N: 4 (flexible) / 6 (rigid); PE: 25 (flexible) / 35 (rigid)	1 (rigid)	
RELAY OUTPUT FOR REMOTE STATUS INDICATION				
Type of contact		Changeover (NO/NC - SPDT)	–	
Contact capacity	A	0.5A at 250VAC; 3A at 125VAC	–	
Contact terminal tightening torque	Nm	0.25	–	
Maximum contact conductor section	mm^2	1.5	–	
AMBIENT CONDITIONS				
Operating temperature		-40...+85°C		
Fixing		On 35mm DIN rail (IEC/EN 60715)	Socket circuit	
Housing material		Thermoplastic, RAL 7035, UL 94 V-0		

TYPE		SASD 5VR	SASD ET6
ELECTRICAL PROPERTIES			
SPD according to IEC/EN 61643-21		D1/C1/C2/C3 types	
Application		RS485	Ethernet Cat.6, Power over Ethernet (POE)
IEC rated voltage Un	VDC	5	48
IEC maximum continuous voltage Uc	VDC	6	50
C2 rated current In (8/20)	kA	10	10
Maximum discharge current Imax (8/20)	kA	20	10
D1 impulse current Iimp (10/350)	kA	2.5	1
EN residual voltage Ures at 5kA (8/20)	V	<22	–
Protection level Up (L-L / L-PE)	V	–	150 / 550
Load current I_L at 25°C	A	1	1
Tripping time ta	ns	<1	<1
Line resistance	Ω	1.6...2.0	–
Capacity	pF	50	–
Bandwidth	MHz	30	250, Cat.6
CONNECTIONS			
IEC degree of protection		IP20	
Terminal tightening torque	Nm	0.5	(RJ45 sockets)
Conductor section (L / PE)	mm^2	4 (max) / 6 (min)	–
RELAY OUTPUT FOR REMOTE STATUS INDICATION			
Type of contact		NC	–
Contact capacity	A	0.5A 250VAC; 1A 50VDC	–
Maximum contact conductor section	mm^2	0.3...4	–
AMBIENT CONDITIONS			
Operating temperature		-40….+80°C	
Fixing		On 35mm DIN rail	
Housing material		Thermoplastic, V-0	Metal

TYPE	without realy output		SA2 DG 600 M2	SG2 DG K10 M3	SG2 DG K50 M3
	with relay output		SA2 DG 600 M2R	SG2 DG K10 M3R	–
ELECTRICAL PROPERTIES					
SPD according to EN50539-11			Type 2 (test class II)		
IEC rated voltage Un		VDC	600	1100	1500
Maximum continuous voltage Ucpv		VDC	600	1100	1500
Maximum discharge current Imax (8/20)		kA	30	40	30
Rated discharge current In (8/20)		kA	15	20	20
Protection level Up		kV	<1.9	<3.8	<5.0
EN residual voltage Ures at 5kA (8/20)		kV	1	-	-
Tripping time ta		ns	<25		
Thermal isolation protection			Yes		
EN maximum short-circuit current Iscpv		A	100	11kA	
EN backup protection fuse (Isc>100A)		A	100A gPV	-	
Status indication - operating / failure		colour	Green / Red		
CONNECTIONS					
EN degree of protection			IP20		
Terminal tightening torque		Nm	3	4.5	
Maximum conductor section		mm^2	25 (flexible) / 35 (rigid)		
RELAY OUTPUT FOR REMOTE STATUS INDICATION					
Type of contact			Changeover (NO/NC)		
Contact capacity		A	0.5A 250VAC; 3A 125VAC; 0.1A 250VDC; 0.2A 125VDC	1A 250VAC; 1A 125VAC; 0.5A 48VDC; 0.5A 24VDC; 0.5A 12VDC	
Maximum contact conductor section		mm^2	1.5		
AMBIENT CONDITIONS					
Operating temperature			-40...+80°C	-40...+85°C	
Fixing			On 35mm DIN rail (IEC/EN 60715)		
Housing material			Thermoplastic, RAL 7035, UL 94 V-0		