SURGE PROTECTION DEVICES

Lovato electric

ENERGY AND AUTOMATION

SPD SYSTEM CONFIGURATOR
INSTALLED IN THE ENERGY POINT OF DELIVERY (230/400VAC)

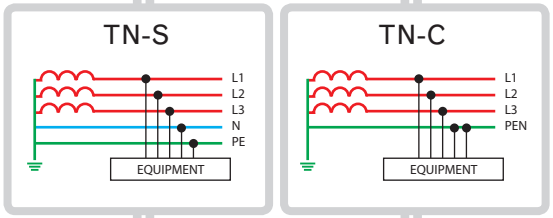
HV system

Typical case: large industrial or commercial plant with cabin inside the final user's plant.

LV system

Typical case: small/ medium industrial/ commercial plant or residential plant.

DISTRIBUTION SYSTEM



SPD **before** the first plant residual circuit breaker

SPD **after** the first plant residual circuit breaker

	SINGLE-PHASE	THREE-PHASE + NEUTRAL	THREE-PHASE	SINGLE-PHASE	THREE-PHASE + NEUTRAL	SINGLE-PHASE	THREE-PHASE + NEUTRAL
URBAN AREA	SG22PA300	SG24PA300	SG23PA300	SG21NA300	SG23NA300	SG22PA300	SG24PA300
NON-URBAN AREA	SA0B2PA320R	SA0B4PA320R	SA0B3PA320R	SA01NA320R	SA03NA320R	SA02PA320R	SA04PA320R
EXPOSED NON-URBAN AREA	SA1B2PA320R	SA1B4PA320R	SA1B3PA320R	SA1B1NA320R	SA1B3NA320R	SA1B2PA320R	SA1B4PA320R

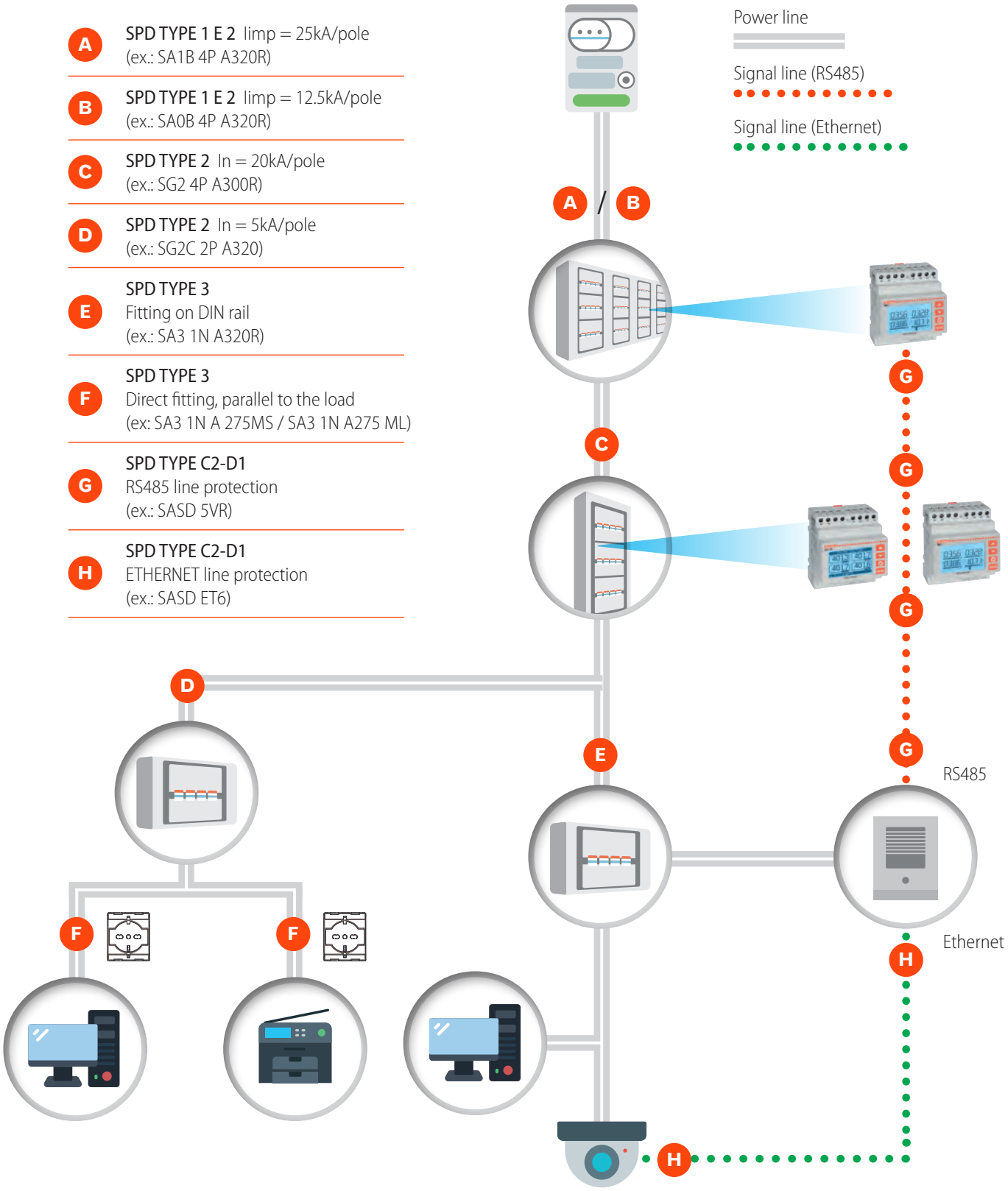
LOVATO ELECTRIC SPD TYPE TO BE CHOSEN DEPENDING ON THE AREA

- **URBAN AREA:** Area subjected to induced overvoltages with 8/20µs waveform (SPD Type 2).
- **NON-URBAN AREA** An area subjected to major direct lightning strikes with a 10/350µs waveform and to induced overvoltages with an 8/20µs waveform (SPD Types 1 and 2).
- **EXPOSED NON-URBAN AREA:** An area subjected to large direct lightning strikes with a 10/350µs waveform and induced overvoltages with an 8/20µs waveform (SPD Types 1 and 2).

NOTE: This scheme represents typical configurations. In any case, the choice of the SPDs must be made in accordance with CEI64-8 and with any applicable standards for the plant design.

Lovato electric
ENERGY AND AUTOMATION

TN-S SYSTEM INDUSTRIAL PLANT TYPICAL SIZING, THREE-PHASE + NEUTRAL



Lovato electric
ENERGY AND AUTOMATION

THREE-PHASE PLANTS, DELIVERY IN LV

Industrial plants

Residential complexes and public locations

Offices

AC side of three-phase photovoltaic systems

Protection device wiring rules

- Wiring as illustrated in the figure.
- Connection length to the equipotential bar within 0.5 metres (b).
- Replace the protection plug device when the status indicator turns red.

SINGLE-PHASE PLANTS, DELIVERY IN LV

Homes

AC side of three-phase photovoltaic systems

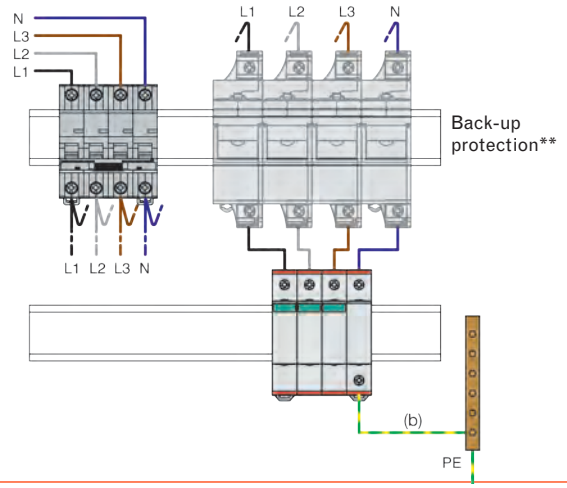
Protection device wiring rules

- Wiring before the first plant residual circuit breaker.
- In/out wiring as shown in the figure below.
- Connection length to the equipotential bar within 0.5 metres (b).
- Replace the protection plug residual current breaker device when the status indicator turns red.

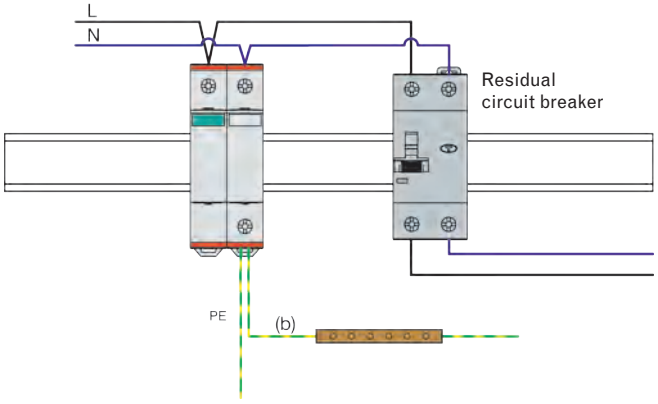
Area	Type	Discharge capacity	Order code	DIN modules
URBAN	2	In 20kA (8/20)	**SG2 3N A300**	4
NON-URBAN	1-2	limp 12.5kA (10/350)	**SA0 3N A320R**	4
NON-URBAN EXPOSED AREA*	1-2	limp 25kA (10/350)	**SA1B 3N A320R**	8

Area	Type	Discharge capacity	Order code	DIN modules
URBAN	2	In 20kA (8/20)	**SG2 1N A300**	2
		In 5kA (8/20)	**SG2C 1N A320**	1
NON-URBAN	1-2	limp 12.5kA (10/350)	**SA0 1N A320R**	2
NON-URBAN EXPOSED AREA*	1-2	limp 25kA (10/350)	**SA1B 1N A320R**	4

Installation and wiring



Installation and wiring



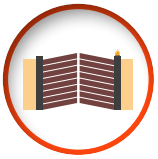
* Large direct lightning strikes.

** Back-up protection required when line thermal-magnetic circuit breaker is higher than125 A (SA1B.. AND SG2..), 80A (SA0..).

PLANTS WITH ELECTRONIC EQUIPMENT

With acoustic trip indication

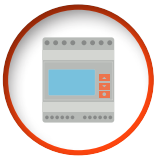
With visual trip indication



Electric gate

Boilers / Stoves Air Conditioners

TVs / PCs



Electronic control units

Protection device wiring rules

DIN guide

- Connection length to the equipotential bar within 0.5 metres (b).
- Replace the plug when the status indicator turns red.

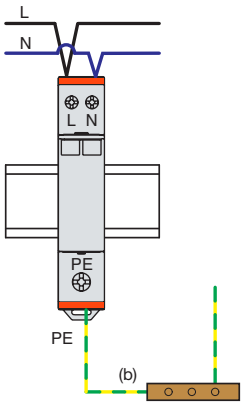
Plug-in solution

- Replace the protection device when the visual signalling turns off or when the audible signalling activates.

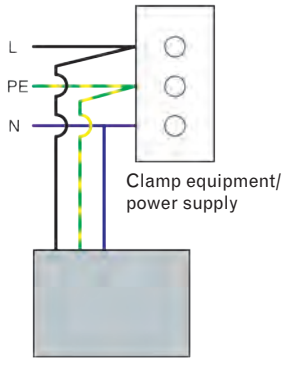
Application	Type	Order code	Install.	Trip indication
Installation near the equipment to be protected	3	**SA3 1N A320R**	DIN guide	Series relays
		SA3 1N A275MS	Box 503, board, duct	Audible
		SA3 1N A275ML		Visual

Installation and wiring

DIN guide



Plug-in solution

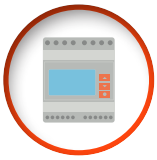


PLANTS WITH DATA LINES

Videocameras

Switch Router

TVs / PCs



Electronic control units
Measurement devices

Protection device wiring rules

RS485

- Conductors a-b and a'-b' must not be in the same cable path.
- Replace the plug if the signal is lacking.

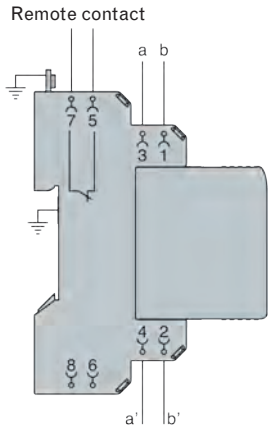
Ethernet Cat. 6 - POE

- The Ethernet cables c-c' must not be in the same cable path.
- Replace the protection device if the signal is lacking.

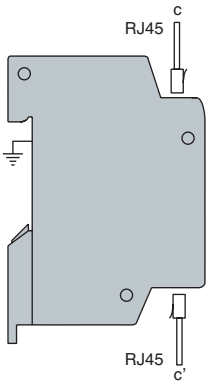
Application	Type	Order code	Install.	DIN modules
RS485	CD-D1	**SASD 5VR**	Guide DIN	1/2
Ethernet Cat. 6 Power over Ethernet (POE)		**SASD ET6**		1

Installation and wiring

RS485



Ethernet CAT. 6 - POE



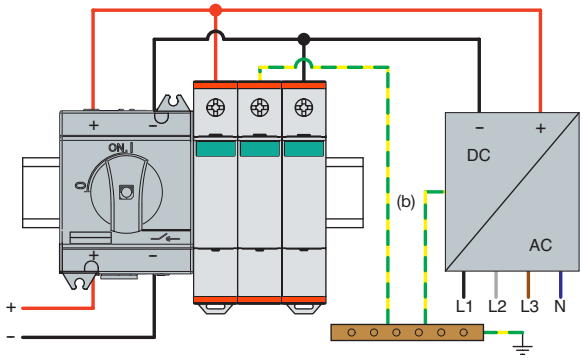
PHOTOVOLTAIC **SYSTEMS**

DC side of photovoltaic systems

Protection device wiring rules

- Wiring as illustrated in the figure.
- Connection length to the equipotential bar within 0.5 metres (b), with a minimum section of 6mm^2.
- Replace the protection plug device when the status indicator turns red.

Installation and wiring



Max. rated voltage	Type	Short circuit current Iscpv	Order code	DIN modules
600VDC	2	100A	**SA2 DG 600 M2**	2
1100VDC	2	11000A	**SG2 DG K10 M3**	3

Order code	Type	Rated voltage	Max. continuous voltage	Protection level	Rated current	Maximum current	Short circuit current	Backup fuse gPV (A)	DIN modules	Relay output	Cartridge
	IEC/EN 61643-11	Un (VDC)	Ucpv (VDC)	Up (kV) (L-N/N-PE)	In 8/20 (kA) pole	Imax 8/20 (kA) pole	Iscpv (A)				
SA2 DG 600M2	2	600	600	< 1.9	15	30	100	100	2	-	Yes
SA2 DG 600M2R	2	600	600	< 1.9	15	30	100	100	2	Yes	Yes
SG2 DG K10M3	2	1100	1100	< 3.8	20	40	11000	-	3	-	Yes
SG2 DG K10M3R	2	1100	1100	< 3.8	20	40	11000	-	3	Yes	Yes
SG2 DG K50M3	2	1500	1500	< 5	20	30	11000	-	3	-	Yes

All AC protection devices are compliant with the IEC/EN 61643-11 standard.

ORDER CODES

Order code	Rated voltage	Max. continuous voltage	Protection level	Pulse current	Rated current	Maximum current	Short circuit current	Backup fuse gL/gG	Immunity to TOV	DIN modules	Relay output
	Un (VAC)	Uc (V)	Up (kV) (L-N/N-PE)	Imp 10/350 (kA) pole	In 8/20 (kA) pole	Imax 8/20 (kA) pole	Isc 50 Hz (kA)	A	V		
SPD TYPE 1-2 monoblock											
SA1B 1N A320R	230	320	< 1.4 / < 1.3	25	25	100	50	250	Yes - 335 V	4	Yes
SA1B 2P A320R	230	320	< 1.4	25	25	100	50	250	Yes - 335 V	4	Yes
SA1B 3P A320R	230/400	320	< 1.4	25	25	100	50	250	Yes - 335 V	6	Yes
SA1B 3N A320R	230/400	320	< 1.4 / < 1.5	25	25	100	50	250	Yes - 335 V	8	Yes
SA1B 4P A320R	230/400	320	< 1.4	25	25	100	50	250	Yes - 335 V	8	Yes
SPD TYPE 1-2 with removable cartridge											
SA0 1N A320R	230	320	< 1.5 / < 1.7	12.5	25	60	25	160	Yes - 335 V	2	Yes
SA0 2P A320R	230	320	< 1.5	12.5	25	60	25	160	Yes - 335 V	2	Yes
SA0 3P A320R	230/400	320	< 1.5	12.5	25	60	25	160	Yes - 335 V	3	Yes
SA0 3N A320R	230/400	320	< 1.5 / < 1.7	12.5	25	60	25	160	Yes - 335 V	4	Yes
SA0 4P A320R	230/400	320	< 1.5	12.5	25	60	25	160	Yes - 335 V	4	Yes
SPD TYPE 1-2 monoblock											
SA0B 1N A320R	230	320	< 1.5 / < 1.5	12.5	20	50	50	250	Yes - 335 V	2	Yes
SA0B 2P A320R	230	320	< 1.5	12.5	20	50	50	250	Yes - 335 V	2	Yes
SA0B 3P A320R	230/400	320	< 1.5	12.5	20	50	50	250	Yes - 335 V	3	Yes
SA0B 3N A320R	230/400	320	< 1.5 / < 1.5	12.5	20	50	50	250	Yes - 335 V	4	Yes
SA0B 4P A320R	230/400	320	< 1.5	12.5	20	50	50	250	Yes - 335 V	4	Yes
SPD TYPE 2 with removable cartridge											
SG2 1N A300	230	300	< 1.5 / < 1.5	-	20	50	25/50	315/250	Yes - 337 V	2	No
SG2 1N A300R	230	300	< 1.5 / < 1.5	-	20	50	25/50	315/250	Yes - 337 V	2	Yes
SG2 2P A300	230	300	< 1.5	-	20	50	25/05	315/250	Yes - 337 V	2	No
SG2 2P A300R	230	300	< 1.5	-	20	50	25/50	315/250	Yes - 337 V	2	Yes
SG2 3P A300	230/400	300	< 1.5	-	20	50	25/50	315/250	Yes - 337 V	3	No
SG2 3P A300R	230/400	300	< 1.5	-	20	50	25/05	315/250	Yes - 337 V	3	Yes
SG2 3N A300	230/400	300	< 1.5 / < 1.5	-	20	50	25/50	315/250	Yes - 337 V	4	No
SG2 3N A300R	230/400	300	< 1.5 / < 1.5	-	20	50	25/50	315/250	Yes - 337 V	4	Yes
SG2 4P A300	230/400	300	< 1.5	-	20	50	25/05	315/250	Yes - 337 V	4	No
SG2 4P A300R	230/400	300	< 1.5	-	20	50	25/50	315/250	Yes - 337 V	4	Yes
SG2C 1N A320	230	320	< 1.5	-	5	15	25/50	63	Yes - 335 V	1	No
SG2C 1N A320	230	320	< 1.5	-	5	15	25/05	63	Yes - 335 V	1	No
SPD TYPE 3											
SA3 1N A320R*	230	320	< 1.5	-	-	-	10	63	Yes - 337 V	1	Yes
SA3 1N A275MS**	230	275	< 1.5 / < 1.7	-	-	-	1	16**	Yes - 337 V	-	No
SA3 1N A275ML**	230	275	< 1.5 / < 1.7	-	-	-	1	16**	Yes - 337 V	-	No

* SPD with removable cartridge ** SPD with reduced dimensions, protection MCB/B 16A.

SPD FOR PLANTS WITH DATA LINES

Order code	Type	Rated voltage	Max. continuous voltage	Protection level	D1 Pulse current	C2 Rated current	Maximum current	Bandwidth	Current of L load at 25°C	DIN modules	Relay output	Monoblock	Cartridge
	IEC/EN 61643-21	Un (VDC)	Uc (VDC)	Up (V) (line-line/ line-PE)	Imp 10/350 (kA)	In 8/20 (kA)	Imax 8/20 (kA)	Mhz	A				
SASD 5VR	D1/C1 C2/C3	5	6	/	2.5	10	20	30	1	1/2	Yes	-	Yes
SASD ET6		48	50	150/550	1	10	10	250 Cat. 6	1	1	-	Yes	-

All AC protection devices are compliant with the IEC/EN 61643-11 standard.

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Lovato electric

ENERGY AND AUTOMATION

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