



SM8-250HPV PV Specially Used DC molded case circuit breaker

SM8-250HPV series photovoltaic special DC molded case circuit breaker is suitable for DC grid circuit with rated voltage up to DC1500V and rated current of 250A. DC circuit breaker has overload long delay protection, short circuit instantaneous protection function, used to distribute electric energy and protect circuit and the power supply equipment is protected from the danger of overload, short circuit, etc.

The operating mechanism of the DC circuit breaker has the functions of quick closing and fast reading segmentation, compact structure, small size and convenient use.



Specifications

name	model	Attachment code	Attachment installation location	Control voltage
Auxiliary contact	AX	250PV	-	-
Alarm contact	AL	250PV	-	-
Shunt release	SHT	250HPV	right side installation	DC24V/AC230V/AC400V

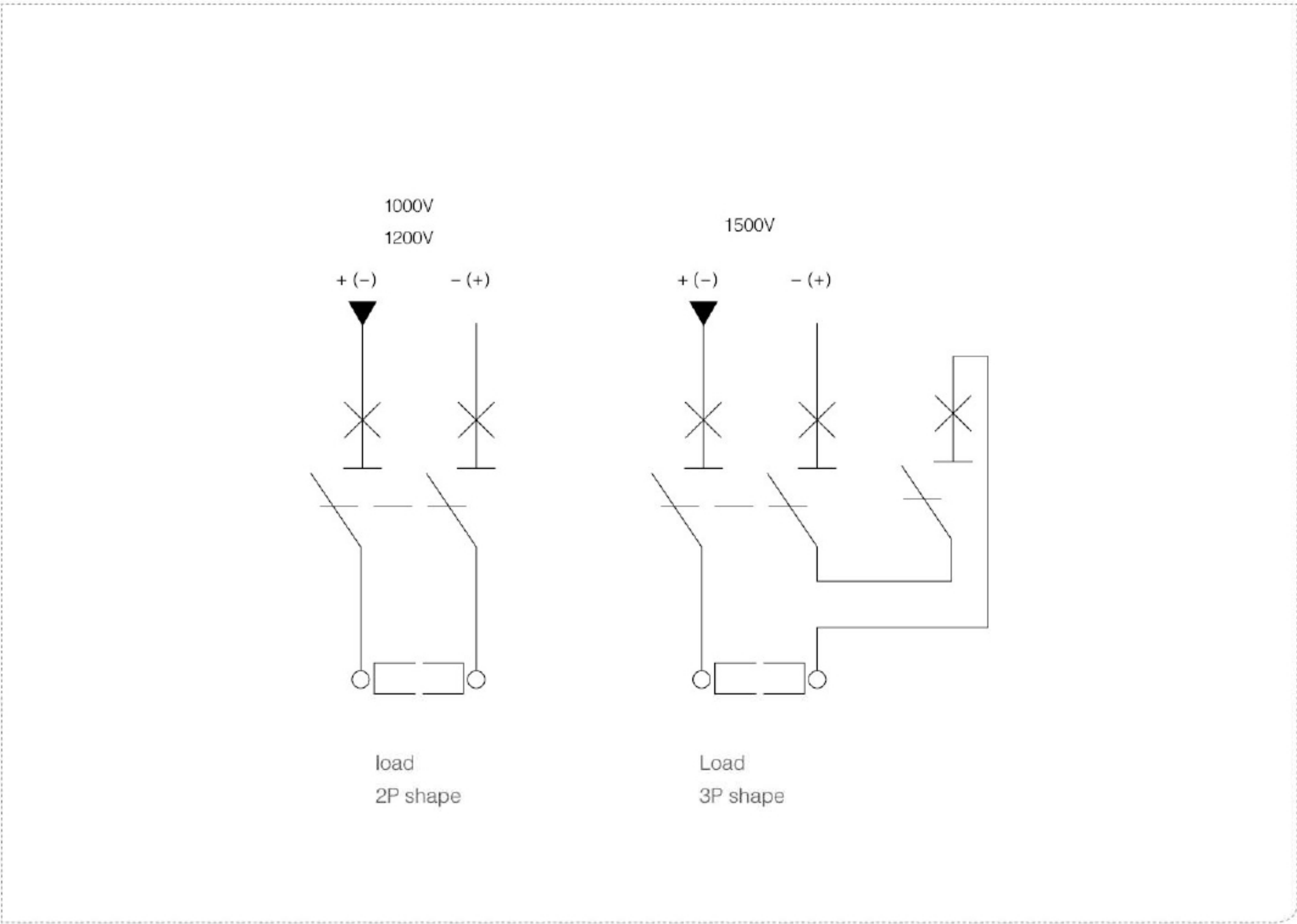
The main technical parameters

Product number		SM8-250HPV /2 1000V SM8-250HPV /2 1200V	SM8-250HPV /3 1500V
product name		PV DC MCCB PV DC MCCB	
Rated operating voltage U_e		DC1000V DC1200V	DC1500V
Rated insulation voltage U_i		1500V	1500V
Rated impulse voltage U_{imp}		12kV	12kV
Number of poles		2	3
Trip unit type		Thermomagnetic(Not adjustable), TMD Fixed	
Rated ultimate short-circuit segmentation capability I_{cu}		U_e1200v 10kA U_e1000v 16kA	U_e1500v 20kA
Running segmentation capability I_{cs}		U_e1200v 7.5kA U_e1000v 12kA	U_e1500v 15kA
Protective function	Long delay protection I_r	1In	
	Instantaneous protection I_i	5In	
Dimensions W×H×D		90×200×86mm	135×200×86mm

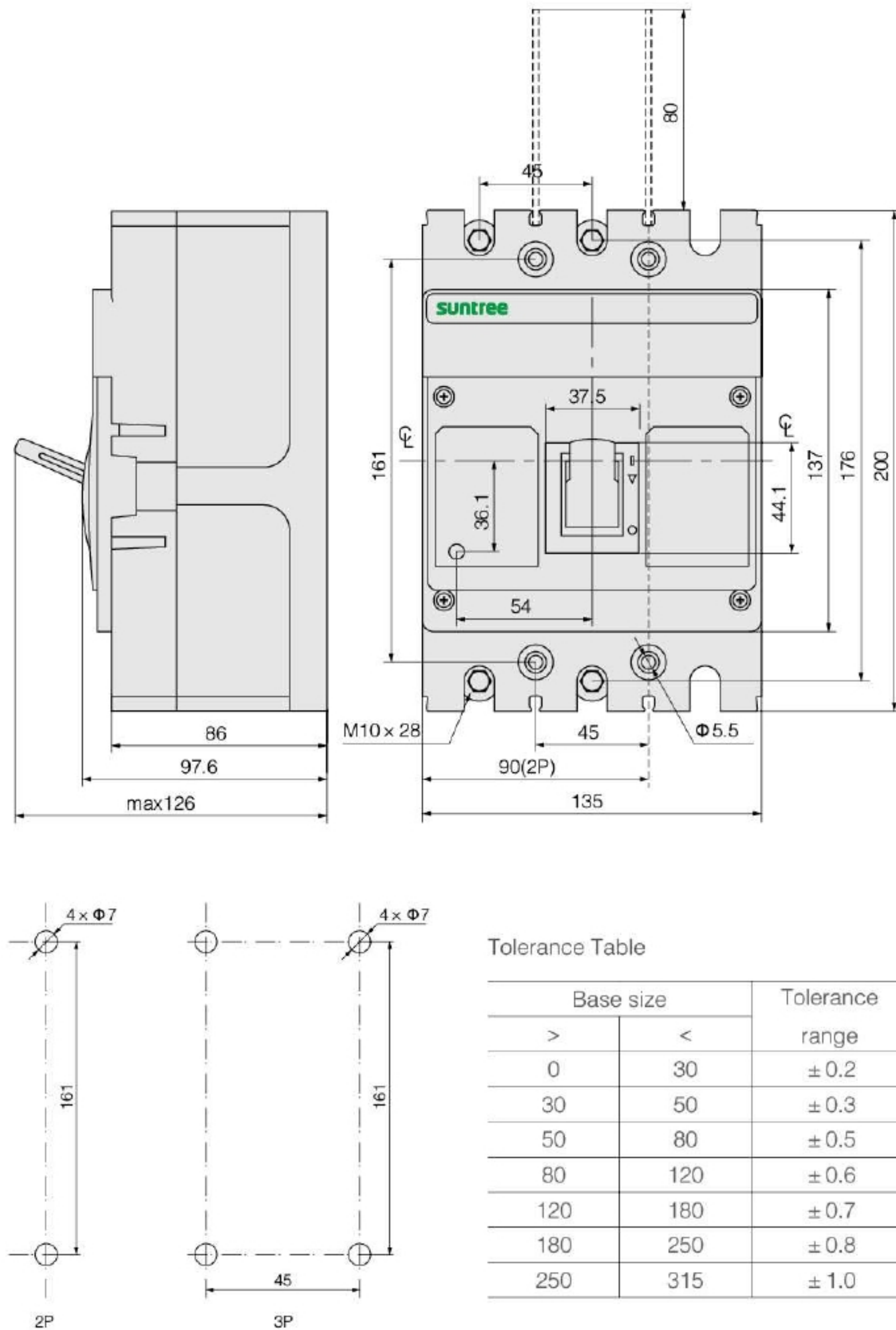
Thermal protection

Serial number	Experimental current	I/Ir	Appointed time	Initial state
1	Conventional non-tripping current	1.05	>1h(In≤63A)	Cold state
			>2h(In>63A)	
2	Conventional discharge current	1.3	≤1h(In≤63A)	After the test according to the serial number 1
			≤2h(In> 63A)	

Wiring diagram



Shape and Installation Dimensions(mm)



PV SURGE PROTECTOR

The handle connecting rod material you can choose stainless steel, or plastic materials



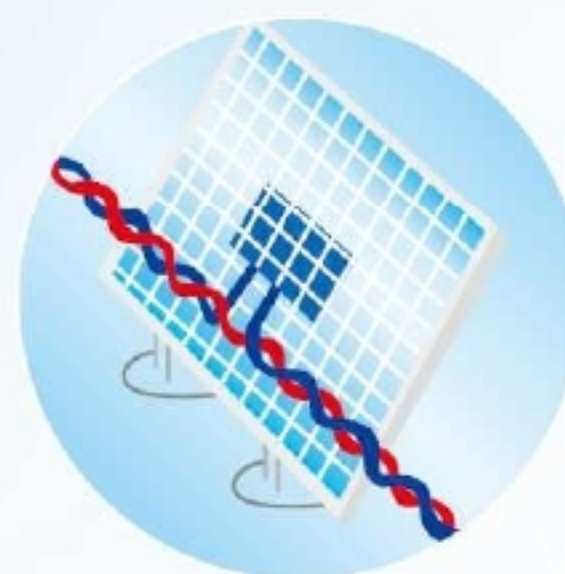
Lightning and surge protection for PV systems installed on buildings

Please take the following measures to protect the PV system from damage of lightning impulse or surge voltage:

- All metal parts (such as framework, support, etc) of PV system must be connected to the main equipotential bus to ensure reliable equipotential connection of the whole system.
- Must keep a safe distance (S) between all parts of PV systems and the external lightning protection system. The external lightning protection system can be connected to the main equipotential bus, fundamental earth screen or ground ring only.
- Adoption of twisted-pair wiring to reduce system jamming.
- For cables from outdoors, the surge protection device should be installed at the entrance of buildings. An all-round and systematic lightning protection should also protect other facilities on buildings from being damaged.

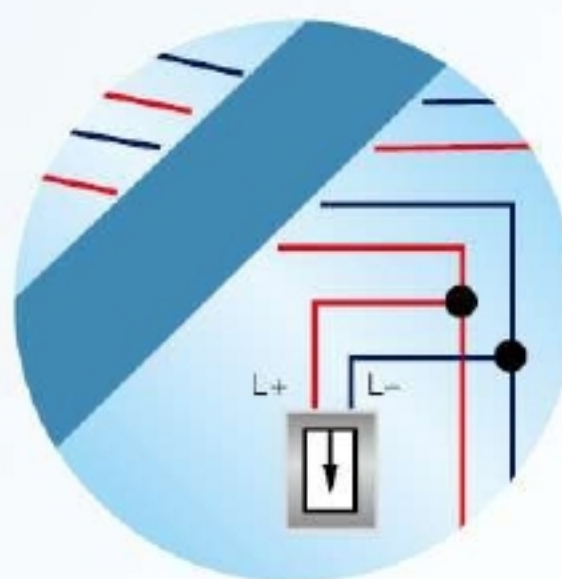
Reasonable wiring:

adoption of twisted-pair wiring with lines as short as possible, to avoid big loop and reduce induced voltage on circuits.



Surge protection device installed on the DC side:

for cables from outdoors, the surge protection device should be installed at the entrance of buildings.

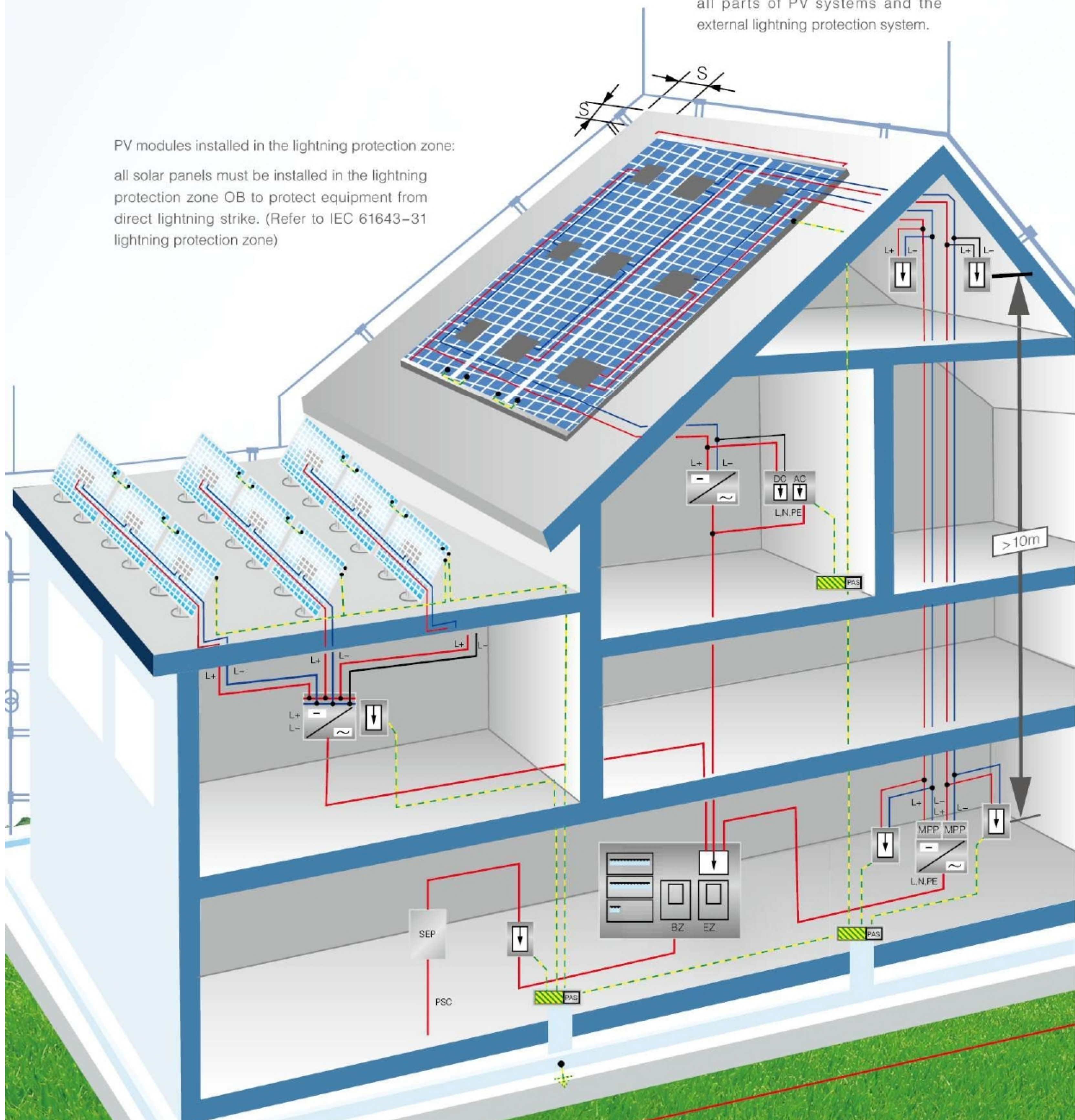


safe distance (S):

must keep a safe distance between all parts of PV systems and the external lightning protection system.

PV modules installed in the lightning protection zone:

all solar panels must be installed in the lightning protection zone OB to protect equipment from direct lightning strike. (Refer to IEC 61643-31 lightning protection zone)





SUP2H-PV Series Surge Protector

SUP2H-PV surge protective device, protect against lightning surge voltages in solar system (photovoltaic power supply system).

These units must be installed in parallel on the DC networks to be protected and provide common and different modes protection. Its installed location are recommended at both ends of the DC power supply line (solar panel side and inverter/converter side), ely if the line routing is external and long.

High energy MOVs equipped with specific thermal disconnectors and related failure indicators.

CE  ROHS

Specifications

SUP2H-PV series surge protector		SUP2H-PV	
PV DC-specific (LEC 66143-1/EN 61643-31)			
Pole		2P	2P
Electrical Parameter			
Classified test		II	II
UCPV(V DC)		500	800
In(8/20)us (kA)		20	20
Imax(8/20)us (kA)		40	40
Up (kV)		2.8	3.0
Remote control and indication			
Indication window			
Plug-in Module			
Remote signal contact			
Remote signal contact	maximum working voltage(V)	250 AC/30V DC	250AC/30V DC
	maximum working current (A) 1A(250V/ AC)	1A(250V/ AC)	1A(250V/ AC)
	1A (30V DC)	1A(30V/ AC)	1A(30V/ AC)
Wiring & installation			
Wiring capacity(mm²)	Hard wire	4~25	4~25
	Flexible wire	4~16	4~16
Stripping length(mm)		10	10
Terminal screw		M5	M5
Torque(Nm)	Main circuit	3.5	3.5
	Remote signal contact	0.25	0.25
Protection class	All profile	IP40	IP40
	Connection port	IP20	IP20
Installation environment		No obvious shock and vibration	
Altitude (m)		≤2000	≤2000
Working Temperature		-3.0~+70	-3.0~+70
Relative humidity		30%~90%	30%~90%
How to Install		Installed with H35-7.5/DIN35 steel mounting rail	
Size(mm)(WxHxL)	W	36	54
	H	90	90
	L	67.6	67.6
Weight (kg)		0.24	0.36

SUP2H1-PV Photovoltaic Surge Protective Device



The Cooper suntree three-module photovoltaic Surge Protective Device (SPD) (with three-step DC switching device) features visual indication and optional remote contact signaling (floating changeover contact) for use in PV systems.

These complete surge protective devices are suitable for all PV systems in accordance with IEC 61643-31. Includes a five year limited warranty.

These prewired solutions consist of a base and locking modules that feature a combined disconnection and short-circuiting (shunting) device with safe electrical isolation to prevent fire damage due to DC arcs. An integrated DC fuse allows safe module replacement without arc formation.

In case of insulation faults in the generator circuit, a reliable and tested fault-resistant Y circuit prevents damage to the surge protective devices.

The green and red visual indicator flags show the module protective status (green = good, red = replace). Apart from this visual indication, the remote signaling option features a three terminal floating changeover contact that can be used as a make or break contact depending on the particular monitoring system design employed.

Visual Status Indication

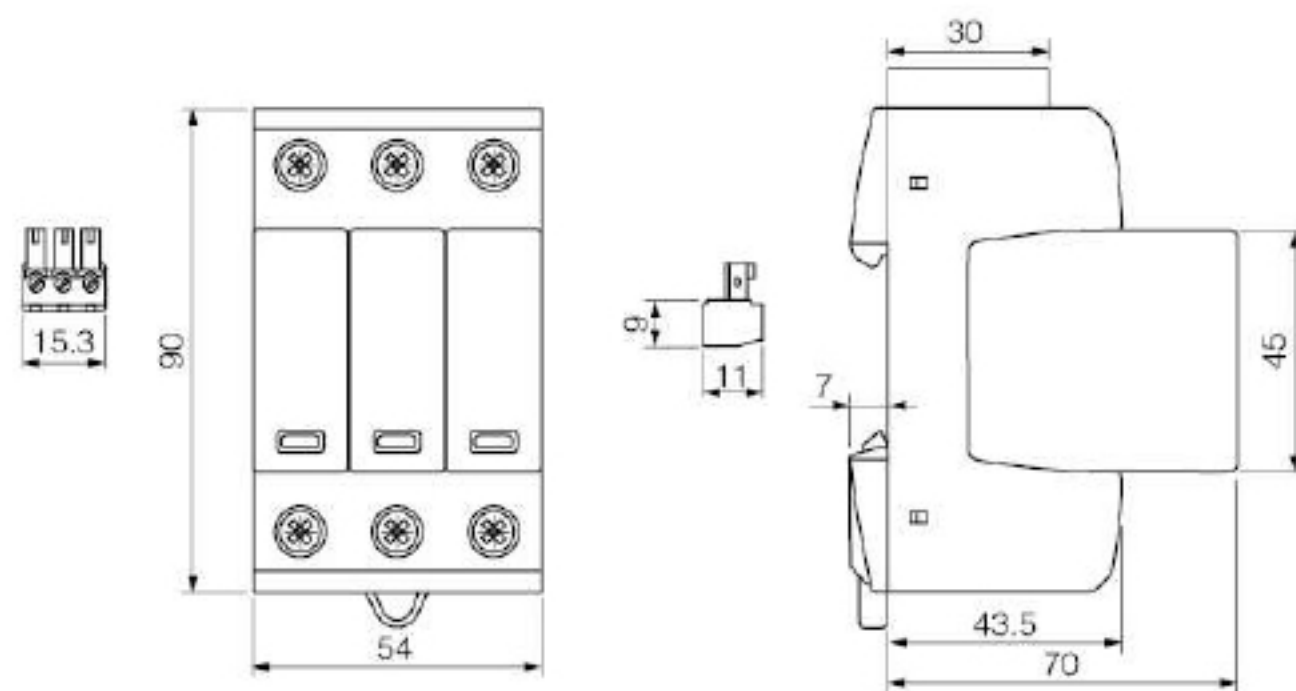


Remote Signal Contact Available

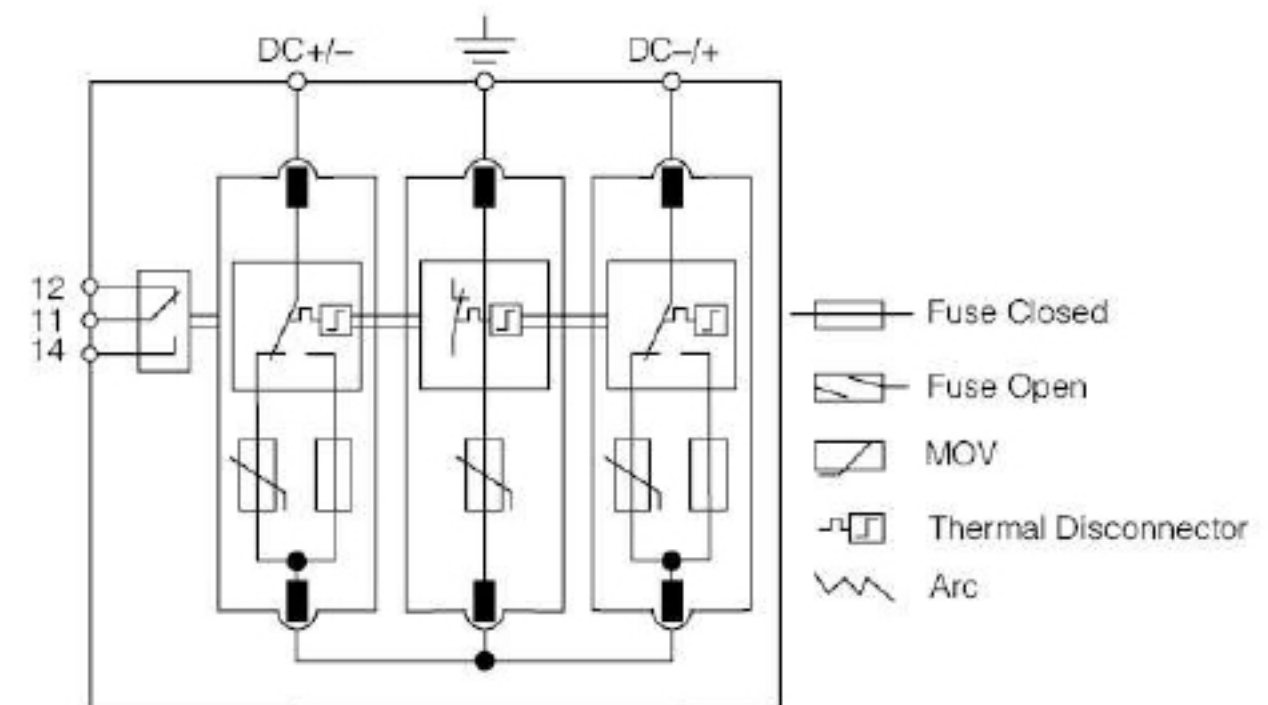


CE TÜV ROHS

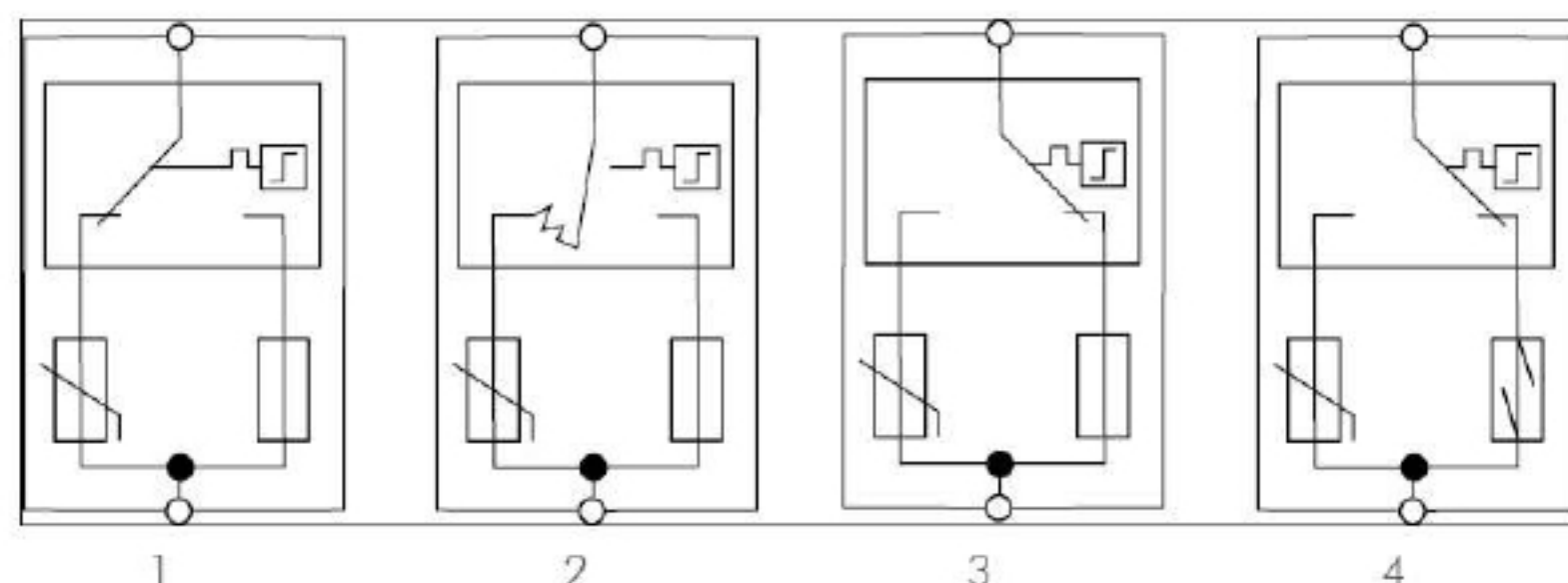
Dimensions(mm)



Module Circuit Diagrams



Short-Circuit Interrupting (SCI) Technology



1. Original State
2. Disconnection Device Response
3. Arc Extinguishes
4. Safe Electrical Isolation

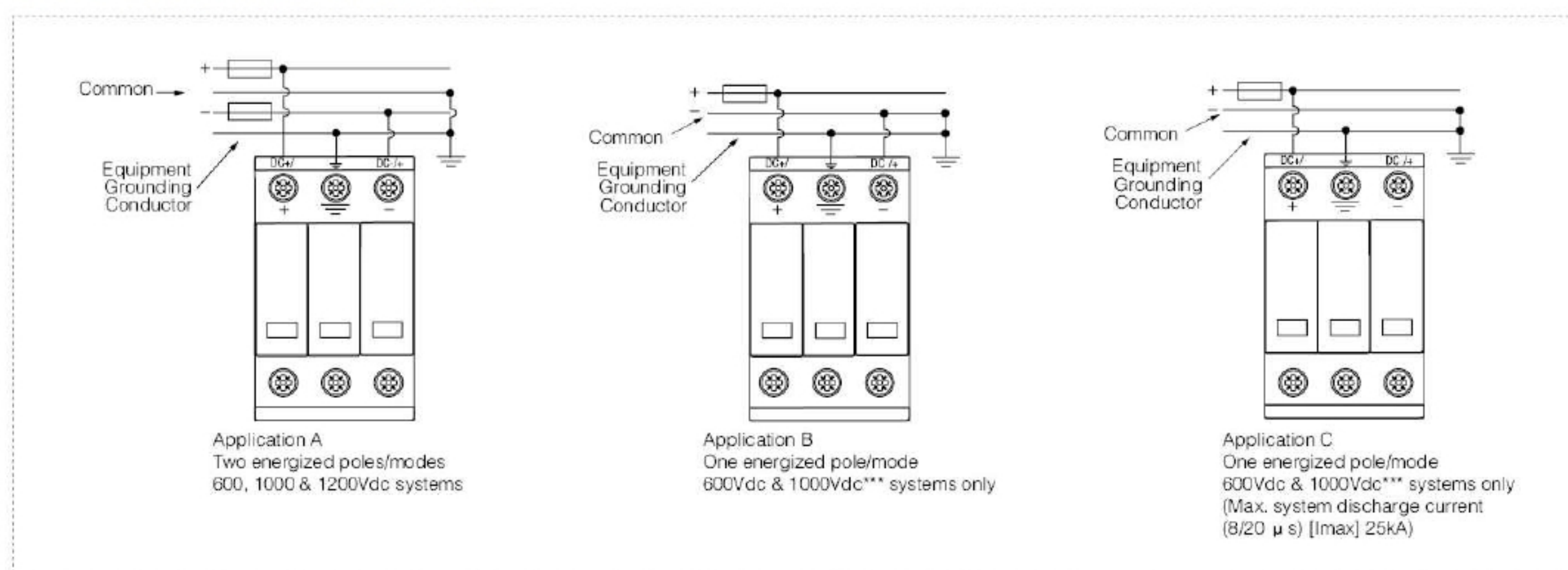
Specifications

SUP2H-PV series surge protector		SUP2H1-PV	SUP2H1-PV	SUP2-PV
UCPV(V DC)		1000V	1200V	1500V
Max System Discharge Current (8/20 μ s) [I _{max}]		40kA	40kA	40kA
Voltage Protection Level [UP]		≤ 4.0 kV	≤ 4.5 kV	≤ 4.5 kV
Voltage Protection Level at 5kA [UP]		≤ 3.6 kV	≤ 4.0 kV	≤ 5.0 kV
Integrated Fuse Breaking Capacity/Interrupting Rating		40kA/1000Vdc	40kA/1200Vdc	40kA/1500Vdc
Technology		Short-Circuit Interruption (SCI) Overcurrent Protection		
Operating Temperature Range [TU]		-40°C to +80°C		
Nominal Discharge Current (8/20 μ s) [(DC+/DC-) --> PE] [In]		20kA		
Response Time [tA]		<25ns		
Operating State/Fault Indication		Green (good)/Red (replace)		
Conductor Ratings and Cross-Sectional Area:	Minimum	60/75°C 1.5mm ² /14AWG Solid/Flexible		
	Maximum	60/75°C 35mm ² /2AWG Stranded/25mm ² /4AWG Flexible		
Mounting		35mm DIN Rail per EN 60715		
Enclosure Material		UL 94V0 Thermoplastic		
Degree of Protection		IP20		
Capacity		3 Modules, DIN 43880		
Standards Information:		IEC 61643-31 Type 2, IEC 61643-1 Class II		
Product Warranty		Five Years**		

Remote Contact Signaling

Remote Contact Signaling Type	Changeover Contact
AC Switching Capacity (Volts/Amps)	250V/0.1A
DC Switching Capacity (Volts/Amps)	250V/0.1A; 125V/0.2A; 75V/0.5A
Conductor Ratings and Cross-Sectional Area for Remote	60/75°C Max. 1.5mm ² /14AWG Solid/Flexible
Contact Signal Terminals	
Ordering Information	Order from Catalog Numbers Above

Typical Application Schematics



* Does not apply to 1200Vdc.

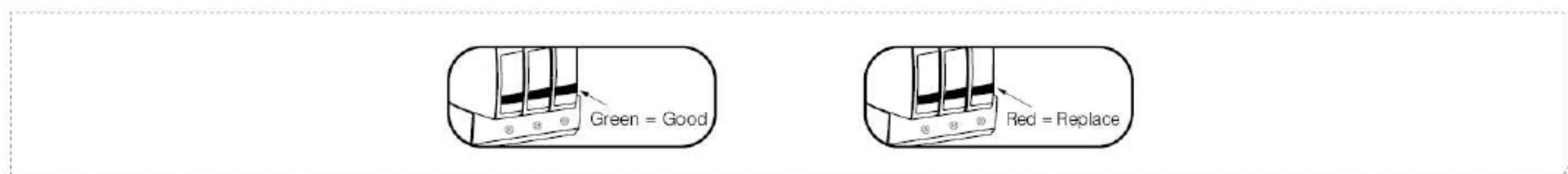
1. Use a suitable electrical insulator to keep a 10mm min. safety distance from the PV-SPD and other grounded parts in the housing.
2. No metal covers are in the area of the module release buttons as shown.

Conductors and Busbars for Use in Photovoltaic Systems

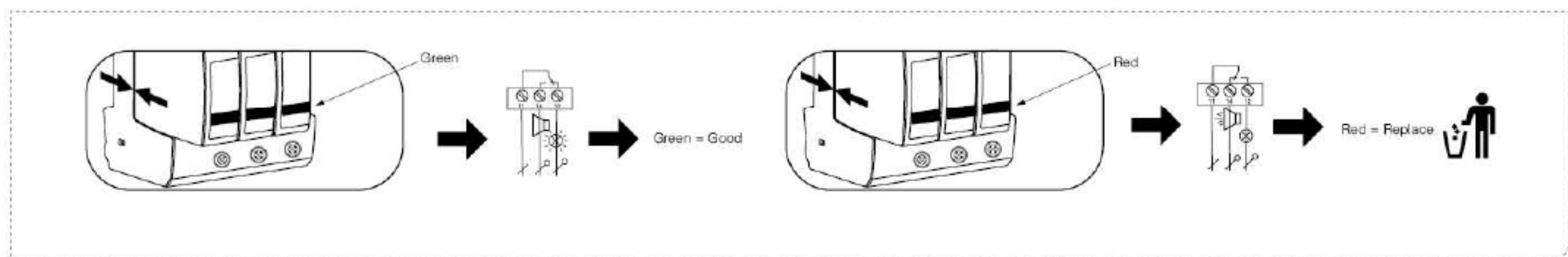
IEC 60364-7-712 (DIN VDE 0100 Part 712)

60/75°C Cu Conductors		
Min. □ DC±, DC±, ↓	1.5mm ² /14AWG	
Max. □ DC±, DC±, ↓	25mm ² /4AWG	35mm ² /2AWG
Busbar	16mm ² Cu  ≥ 15.5mm	

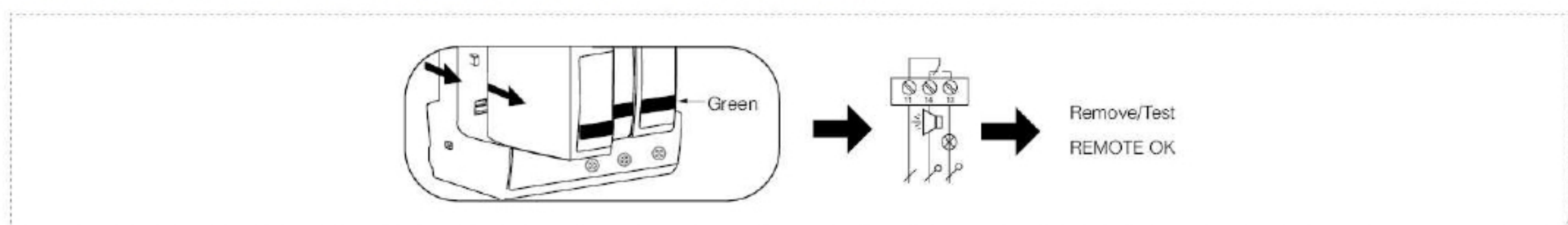
Visual Indication Status



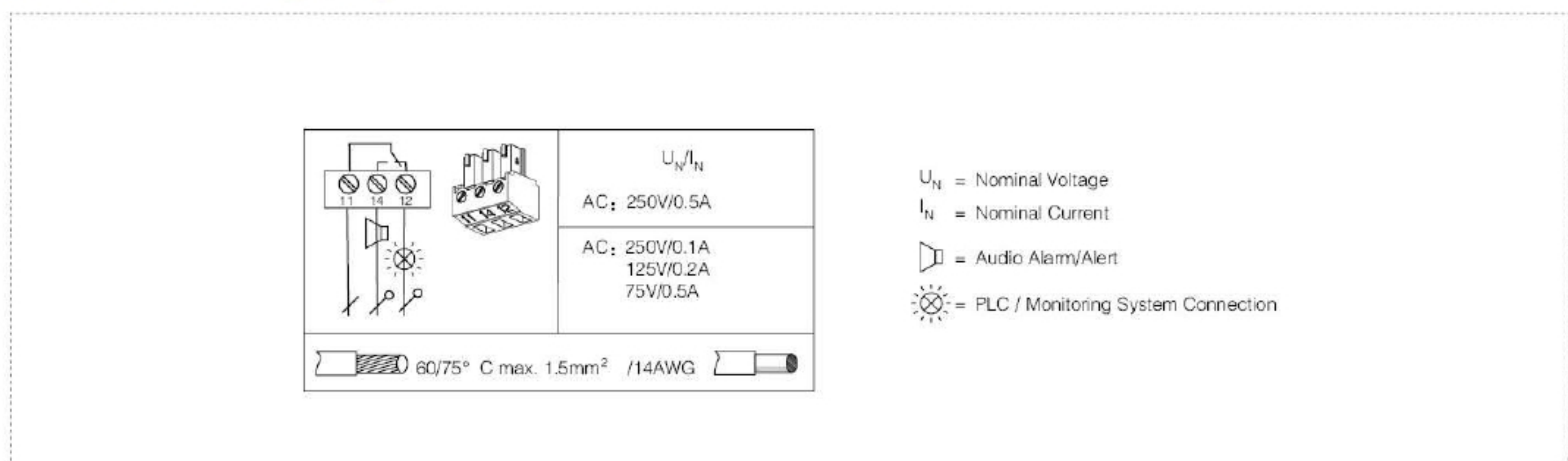
Fault Indication & Remote Contact Signaling (with modules installed)



Testing Remote Contact Signaling (with modules removed)



Remote Contact Signaling



SMC4 Solar Connector



- Simple on-site processing.
- Acomodates PV cable with different insulation diameters.
- Mating safety provided bykeyed housings.
- Multiple plugging and unplugging cycles .
- High current carrying capacity.
- TUV and UL approved.

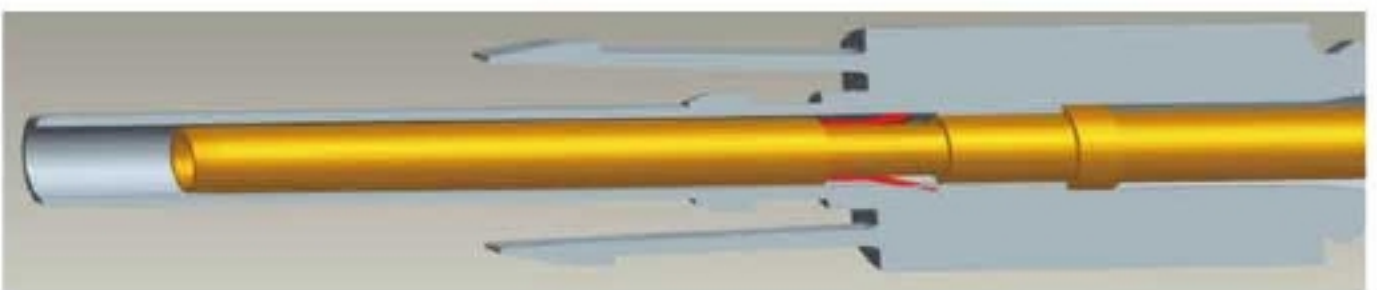
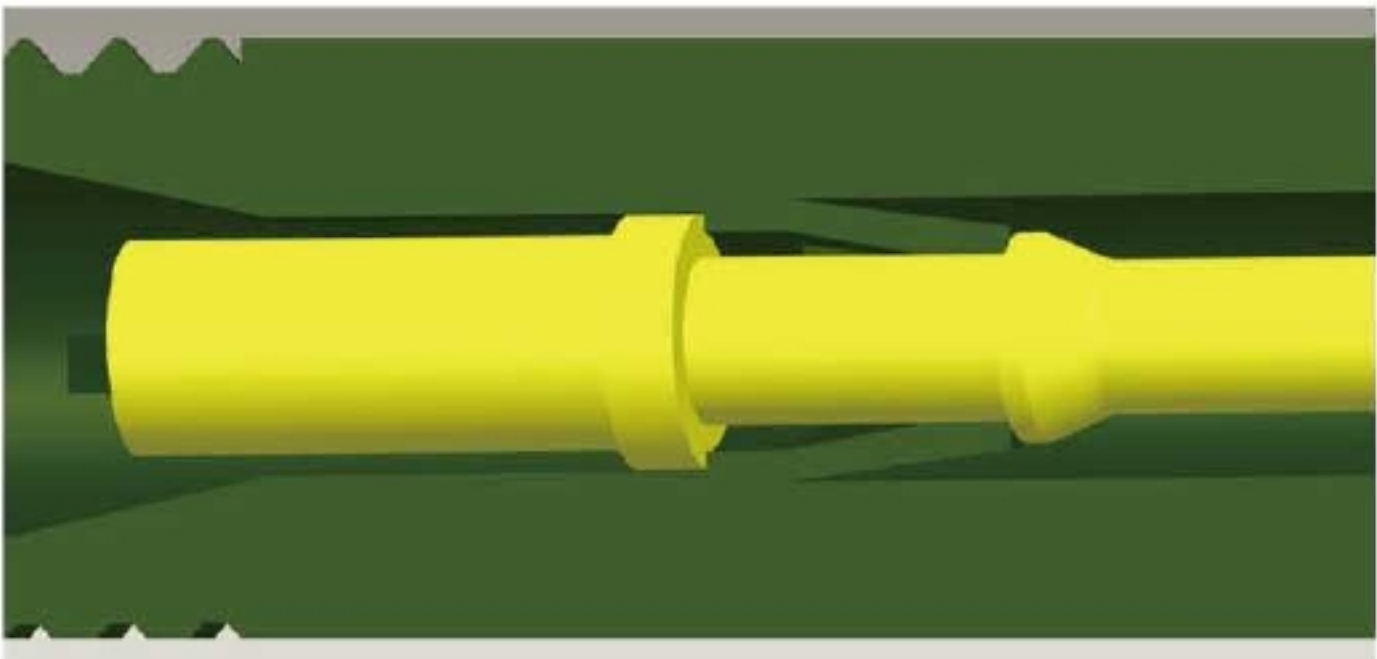
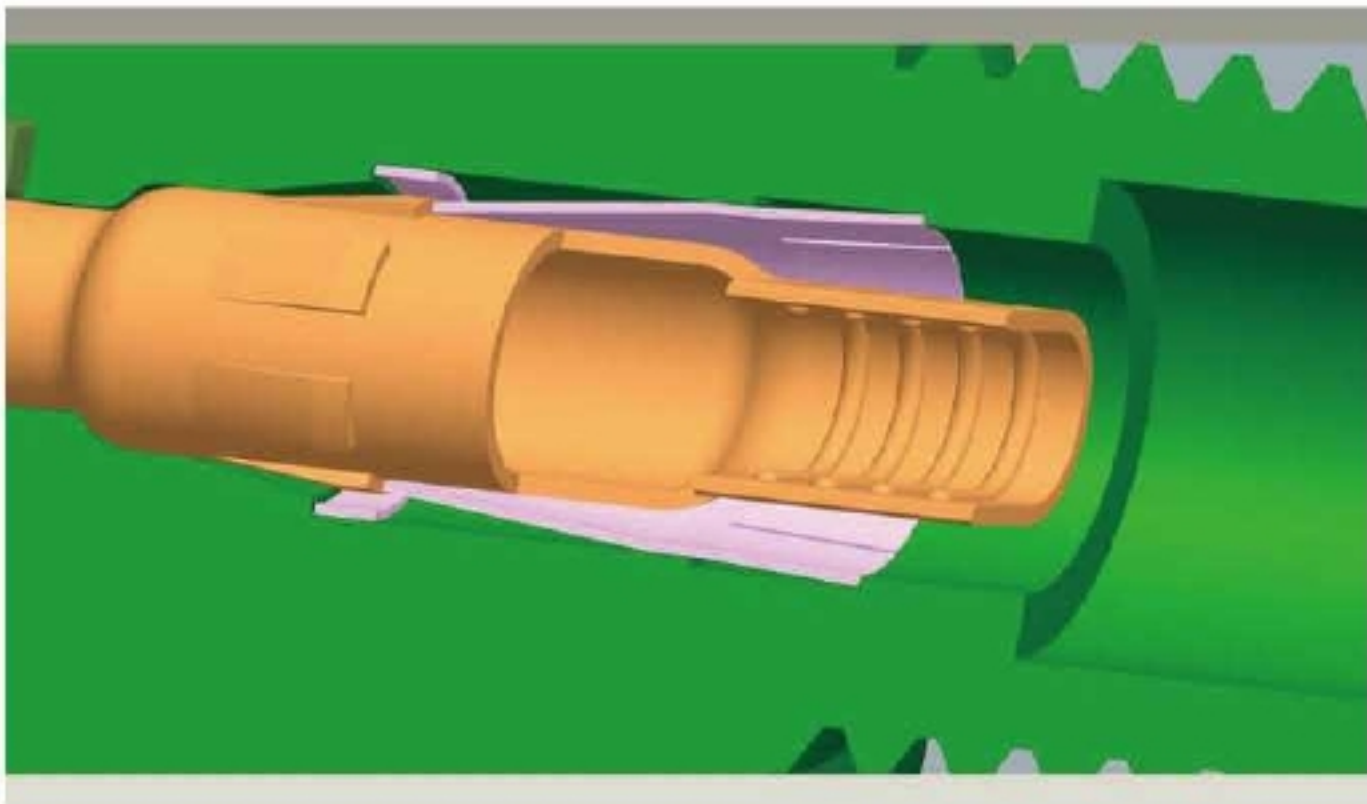


Specifications

Order NO.	Part P/N		Cable	
	Connector	Terminal	Conductor size (mm ²)	Cable OD (ΦDmm)
SMC4-CMMM-14	SMC4-CMMM-H	SMC4-CM-T14	AWG 14(2.5 mm ²)	Φ4.5-Φ8.5
SMC4-CMMM-12		SMC4-CM-T12	AWG 12(4.0 mm ²)	
SMC4-CMMM-10		SMC4-CM-T10	AWG 10(6.0 mm ²)	
Order NO.	Part P/N		Cable	
	Connector	Terminal	Conductor size (mm ²)	Cable OD (mm)
SMC4-CFPM-14	SMC4-CFPM-H	SMC4-CF-T14	AWG 14(2.5 mm ²)	Φ4.5-Φ8.5
SMC4-CFPM-12		SMC4-CF-T12	AWG 12(4.0 mm ²)	
SMC4-CFPM-10		SMC4-CF-T10	AWG 10(6.0 mm ²)	
Rated current		30A(2.5-6mm ²)		
Rated voltage		1000v DC		
Test voltage		6000V(50Hz,1min)		
Overvoltage type/pollution degree		CAT III /2		
Contact resistance of plug connector		1mΩ		
Contact material		Copper,Tin-plated		
Insulation material		PPO		
Degree of protection		IP2X/IP67		
Flame class		UL94-VO		
Safety class		II		
Suitable cable		OD 4.5-8.5(2.5-6.0 mm ²)		
Insertion force/withdrawal force		≤50N/≥50N		
Connecting system		Crimp connection		
Temperature range		-40℃ ~ +125℃		

comparation for internal structure

Connectors of other companies



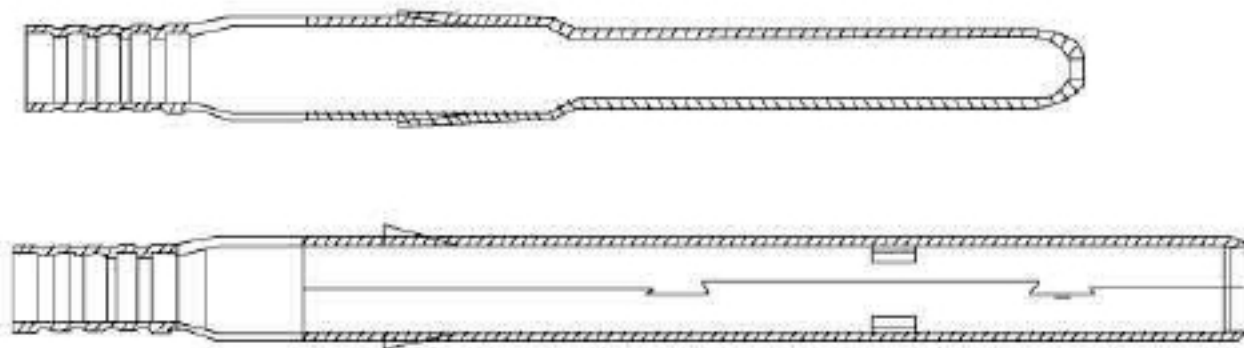
SMC4 Solar Connector

Structure:

Insulator design by forced demoulding Create a slot (red circle marked) to fix spring by forced demoulding. Using spring to position terminal.

Shortcoming:

- Forced demoulding is not very steady It can't ensure any products with same performance.
- Maintain force will change between 7~20kgf.
- Must assemble spring . It is to be a risk that sometimes operator will miss the spring.



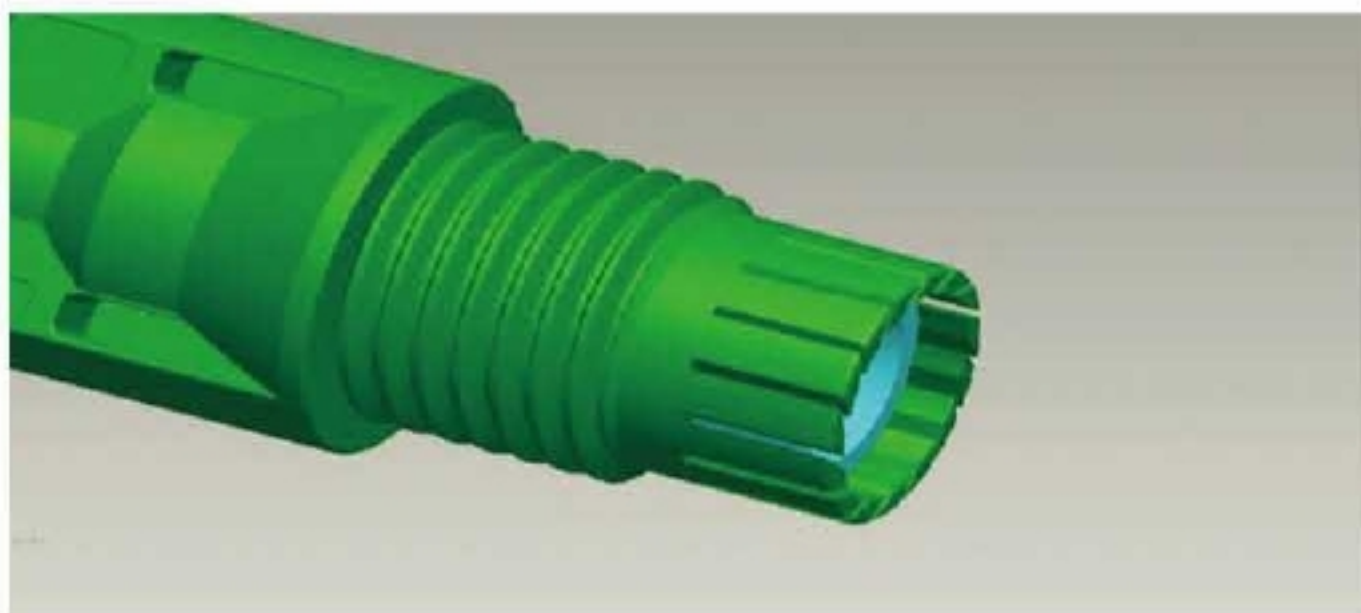
Process: Stamping , Tin plating

Strongpoint:

- Low cost ,high productive capacity.
- It can be continually rivet because of terminal have strip feeder .

Shortcoming

- Material is thin .
- It's easy to deform.
- It will be heat serious in a long time when using
- It need to solder after riveting to reach pull force 31kgf.



Strongpoint:Simple structure

Shortcoming:

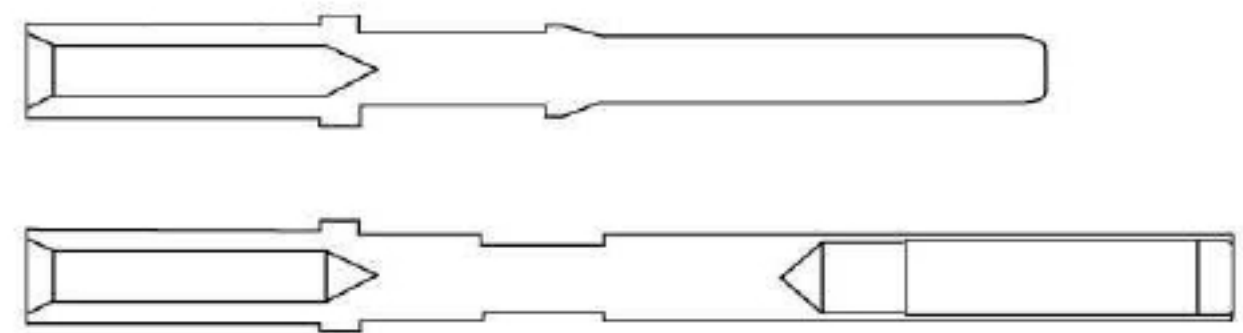
- The thread can't return back when screw open
- Because of first reason , it can't be reuse.
- The screw is easy to get open.

Structure:

Moulding a fixed structure to replace spring (red circle marked) .The fixed structure will be expand when terminal insert into insulator . It will be back to original position when terminal is to correct position and hold to terminal.

Shortcoming:

- All product is with same performance.
- Maintain force is 35kgf Min.
- Cut down the accessories.



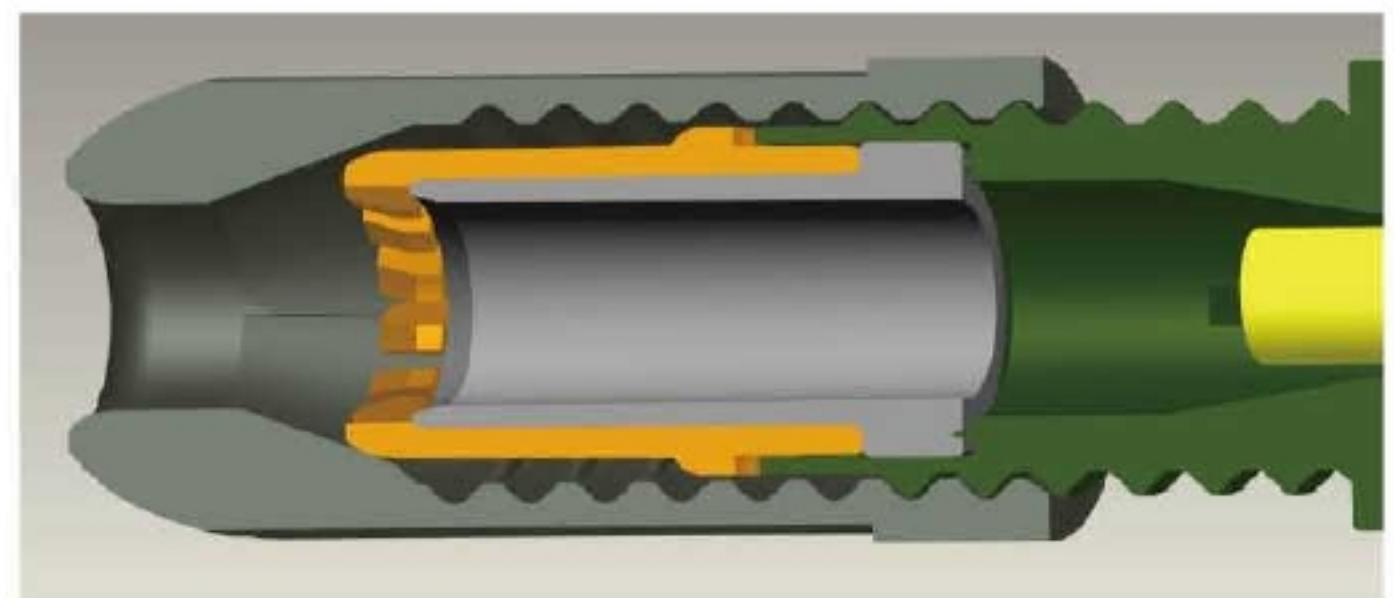
Process: Lathe Machining , Ag plating

Strongpoint:

- High cost ,low productive capacity
- It can't be continually rivet because it's without terminal rail.

Shortcoming

- Material is thin .
- It's easy to deform.
- It will be heat slight in a long time when using.
- Pull force can reach 31kgf after riveting.



Strongpoint:Add a part

Shortcoming:

- The thread can return back when screw open.
- It can be reuse.
- It's with an anti-loosen part ,screw is not easy to get open.

SRD-10gPV 1A-20A Photovoltaic Fuse

Standard:IEC 60269-6,GB/T 13539.6

Interrupting Capacity

30,000 amperes at 1000V DC (Time Constant: 1-3ms)

CE TÜV ROHS

Specifications

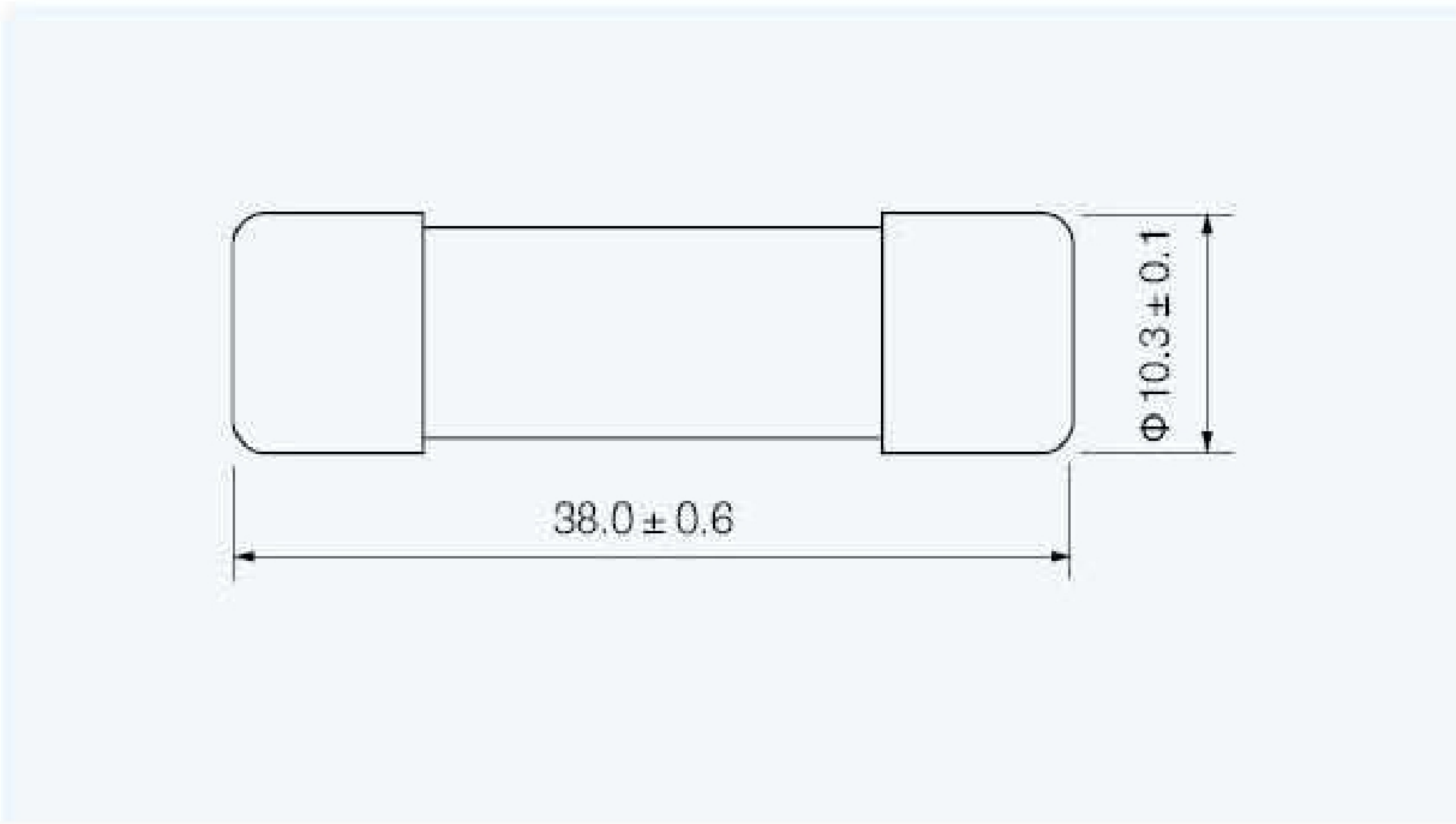
Catalog No.	Current Rating	Safety Approvals
		TUV
10gPV1U0	1A	●
10gPV2U0	2A	●
10gPV3U0	3A	●
10gPV3.5U0	3.5A	●
10gPV4U0	4A	●
10gPV5U0	5A	●
10gPV6U0	6A	●
10gPV8U0	8A	●
10gPV10U0	10A	●
10gPV12U0	12A	●
10gPV15U0	15A	●
10gPV16U0	16A	●
10gPV20U0	20A	●

U0 Denotes For 1000V DC:
● Denotes For Approval ○ Denotes For Pending

Electrical Characteristics

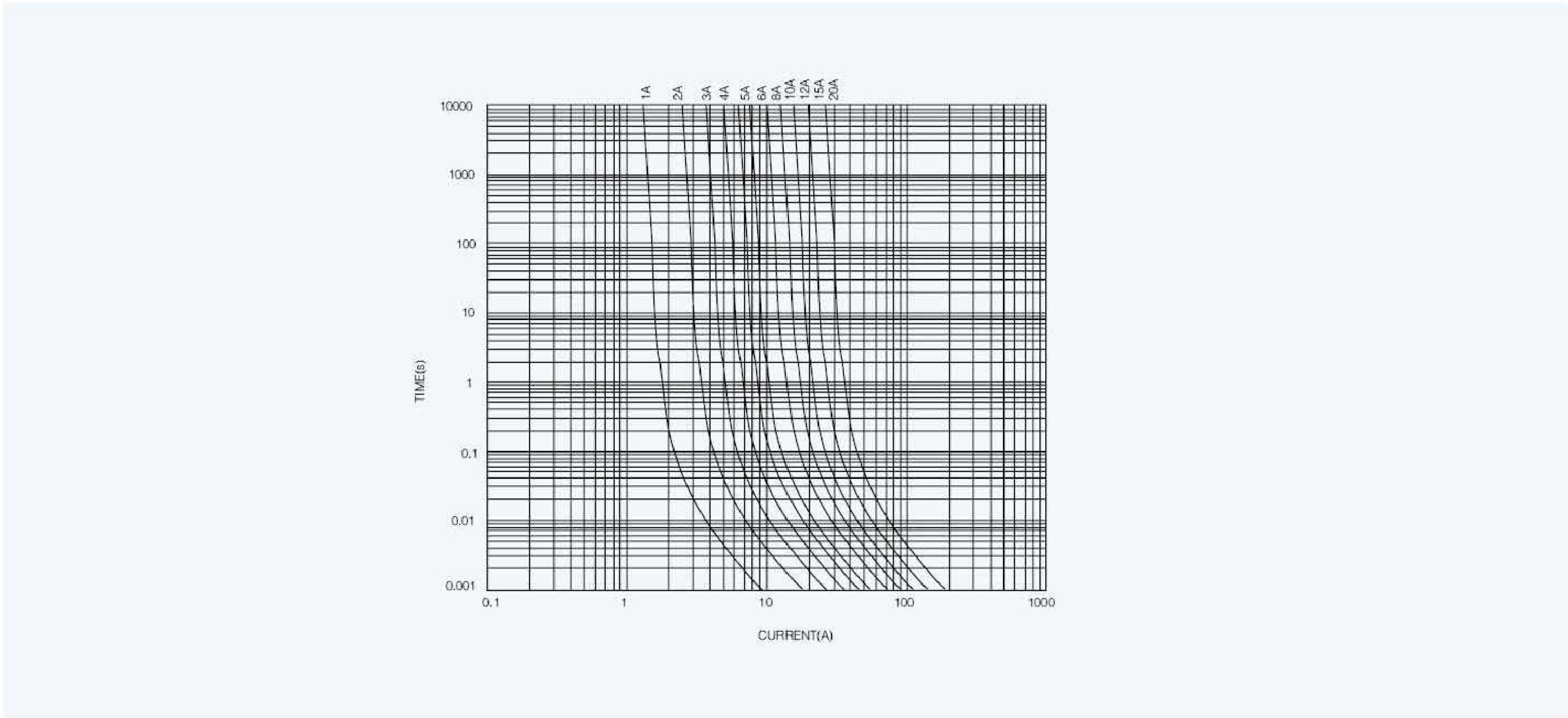
% of Current Rating	Blowing Time
113%	1 hour Min.
145%	1 hour Max.

Dimensions



SRD-10gPV

Average I-T Characteristics Curve
(For Reference Only)



SL7 Non-Polarity DC circuit breaker

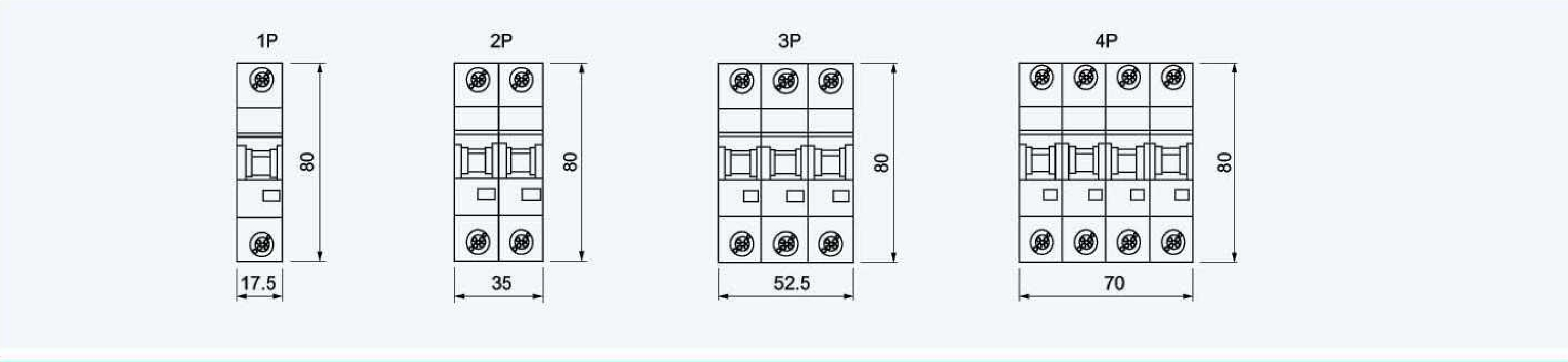
SL7 PV DC breaker supplementary protectors are designed to provide overcurrent protection within appliances or electrical equipment, where a branch circuit protection is already provided or not required. Devices are designed for direct current (DC) control circuit applications.



Specifications

SL7 PV Series Circuit Breaker		SL7-63			
Frame degree rated current (A)		63			
Electrical performance					
Ue Rated operating voltage (V DC)		2P: DC440V DC550V DC800V 4P:DC800V DC1000V DC1200V			
Rated Current In (A)		6-10-16-20-25-32-40-50-63			
Rated insulation voltage Ui (V DC)		2P: 800V 4P: 1200V			
ated Impact voltage Uimp (kV)		4			
Ultimate breaking capacity Icu (kA)		6	6	6	6
Run breaking capacity Ics (%Icu)		75%	75%	75%	75%
Curve type		C			
Trip type		Thermal-magnetic			
MECHANICAL	Actual average value	20000			
	Standard value	8500			
ELECTRIC	Actual average value	2500			
	Standard value	1500			
Control and indication					
Shunt release (SHT)		Option			
Undervoltage release (UNT)					
Auxiliary contact (AX)					
Alarm contact (AL)					
Connection and installation					
Wiring capacity (mm²)		In≤32A,1~25 mm²,I≥40A,10~35mm²			
Ambient temperature (℃)		-20~70			
Altitude		≤2000			
Relative humidity		≤95%			
Pollution Level		3			
Installation Environment		No obvious shock and vibration			
Installation category		Class III			
Installation		DIN Standard rail			
Dimensions(W)x(H)x(Deep)	W	17.5	35	52.5	70
	H	80	80	80	80
	Deep	71	71	71	71
Weight (kg)		0.12	0.24	0.36	0.48

Dimensions(mm)



Twins core PV Cable

Dual wall insulation, electron beam cross-linked
Excellent resistance to UV,water, ozone, fluids, salt, general weathering
Excellent resistance to abrasion
Halogen free, flame retardant, low toxicity
Excellent flexibility and stripping performance
High current carrying capacity
TUV and UL approved

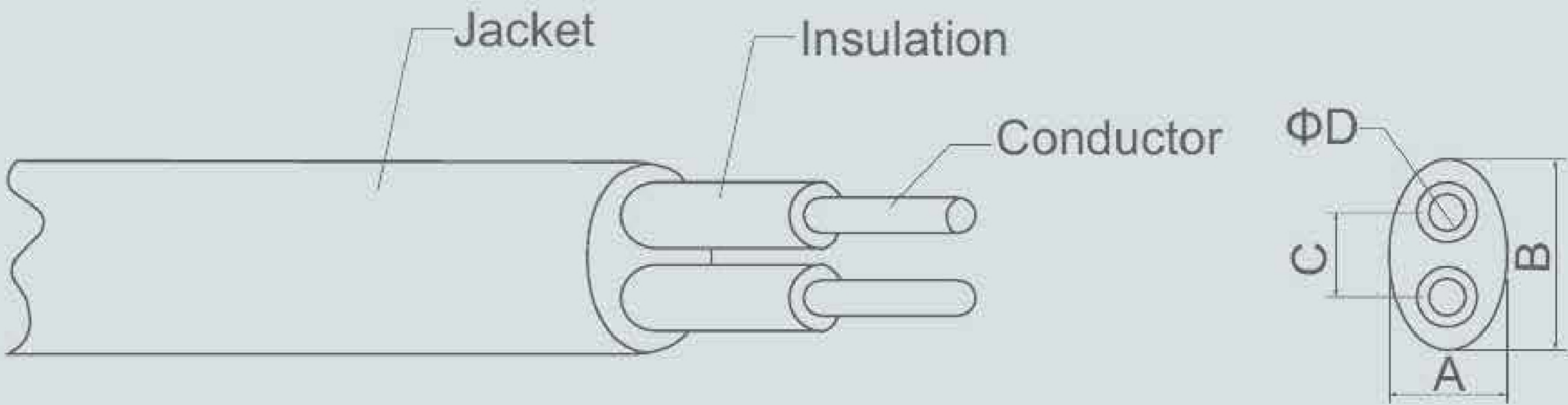


Specifications

Type	Cross section	Strand design	Conductor diameter	Conductor resistance	Outer diameter AxB	Rated voltage	Rated current
	mm ²	No.x ϕ (mm)	mm	Ω /km	mm	V AC/DC	A
PV-2x1.5 mm ²	1.5	30 x ϕ 0.25	1.6	13.9	5.80x9.30	1000/1800	20
PV-2x2.5 mm ²	2.5	50 x ϕ 0.25	2.0	8.06	6.20x9.90	1000/1800	30
PV-2x4.0 mm ²	4.0	56 x ϕ 0.3	2.6	4.97	6.9x11.30	1000/1800	50

Wire	Class 5, tinned
Insulation material	XLPE
Double insulated	
Halogen-free	
High resistance against oils, greases, oxygen and ozone	
Microbe-resistant	

UV resistant	
High wear and abrasion resistance	
Flam test according to	DIN EN 50265-2-1 UL1571(VW-I)
Smallest permissible bending radius	5XD
Temperature range	-40℃ ~ +90℃
Colours	Black/red



Single core PV Cable

Dual wall insulation, electron beam cross-linked
Excellent resistance to UV,water, ozone, fluids, salt, general weathering
Excellent resistance to abrasion
Halogen free, flame retardant, low toxicity
Excellent flexibility and stripping performance
High current carrying capacity
TUV and UL approved

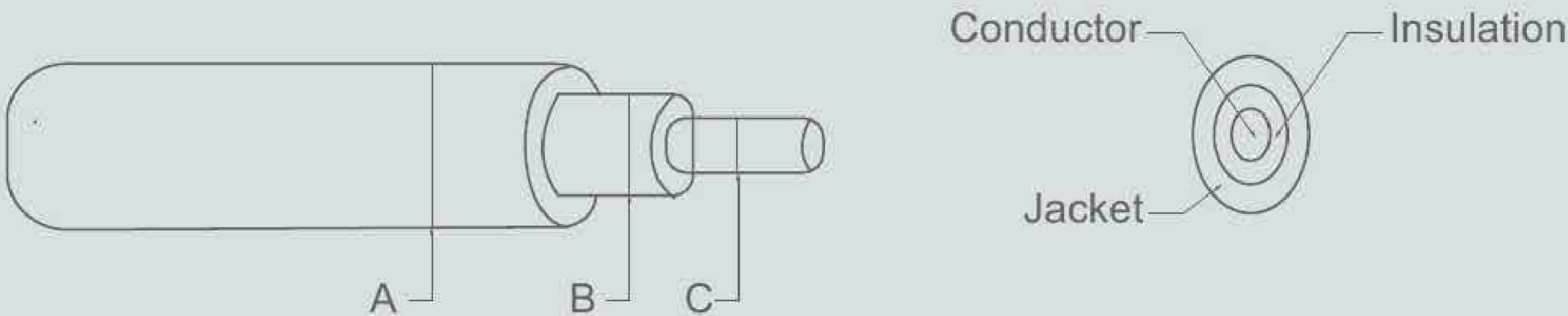


Specifications

Type	Cross section	Strand design	Conductor diameter	Conductor resistance	Outer diameter AxB	Rated voltage	Rated current
	mm ²	No.x ϕ (mm)	mm	Ω /km	mm	V AC/DC	A
PV-1x1.5 mm ²	1.5	30 x ϕ 0.25	1.6	13.9	4.5	1000/1800	20
PV-1x2.5 mm ²	2.5	50 x ϕ 0.25	2.0	8.06	5.3	1000/1800	30
PV-1x4.0 mm ²	4.0	56 x ϕ 0.3	2.6	4.97	6.4	1000/1800	50
PV-1x6.0 mm ²	6.0	84 x ϕ 0.3	3.3	3.52	7.2	1000/1800	70
PV-1x10.0 mm ²	10.0	200 x ϕ 0.25	4.4	2.12	8.3	1000/1800	95
PV-1x16.0 mm ²	16.0	224 x ϕ 0.3	5.2	1.95	9.5	1000/1800	140

Wire	Class 5, tinned
Insulation material	XLPE
Double insulated	
Halogen-free	
High resistance against oils, greases, oxygen and ozone	
Microbe-resistant	

UV resistant	
High wear and abrasion resistance	
Flam test according to	DIN EN 50265-2-1 UL1571(VW-1)
Smallest permissible bending radius	5XD
Temperature range	-40℃ ~ +90℃
Colours	Black/red



PV Branch
Plug SMC3Y/SMC4Y-2MIF
Socket SMC3Y/SMC4Y-2FIM



Specifications

[illegible]

PV Cable Assembly

Examples of cable assemblies
Can be customized according to customer requirements

Extension line series



SMC3 TO SMC4



Panel Connector Series



Main Switch for DIN Rail Mounting

- DIN rail mounting
- Extremely short power shut off time of approx. 3ms
- 2 poles and 4 poles available
- IEC60947-3 standard
- DC21B: 16A, 25A and 32A up to 1500V DC



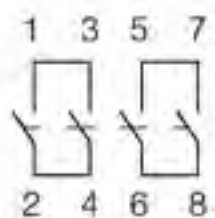
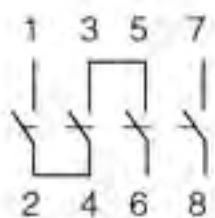
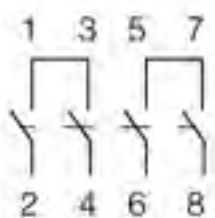
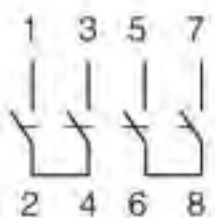
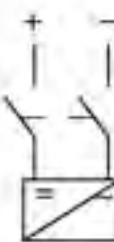
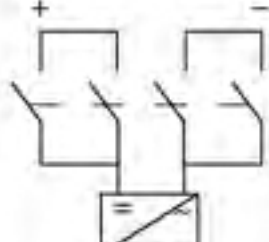
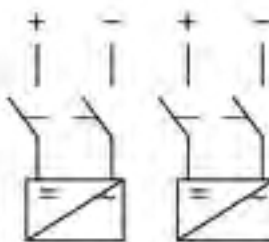
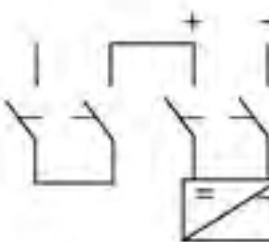
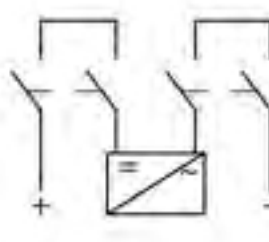
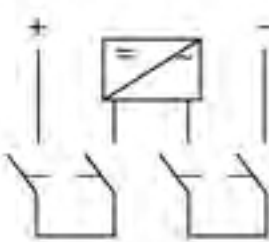
Specifications

Contact configuration	600V	800V	1000V	1200V	Poles In series	Number of strings	Type Number
	16A	16A	16A	9A	2	1	SISO.2-16 D2
	25A	25A	20A	11A	2	1	SISO.2-25 D2
	32A	32A	23A	13A	2	1	SISO.2-32 D2
	29A	29A	16A	9A	2	1	SISO.2-16 D2H
	45A	45A	20A	11A	2	1	SISO.2-25 D2H
	58A	58A	23A	13A	2	1	SISO.2-32 D2H
	16A	16A	16A	9A	2	2	SISO.2-16 D4
	25A	25A	20A	11A	2	2	SISO.2-25 D4
	32A	32A	23A	13A	2	2	SISO.2-32 D4
	16A	16A	16A	16A	4	1	SISO.2-16 D4S
	25A	25A	25A	25A	4	1	SISO.2-25 D4S
	32A	32A	32A	32A	4	1	SISO.2-32 D4S
	16A	16A	16A	16A	4	1	SISO.2-16 D4B
	25A	25A	25A	25A	4	1	SISO.2-25 D4B
	32A	32A	32A	32A	4	1	SISO.2-32 D4B
	16A	16A	16A	16A	4	1	SISO.2-16 D4T
	25A	25A	25A	25A	4	1	SISO.2-25 D4T
	32A	32A	32A	32A	4	1	SISO.2-32 D4T

1500V DC voltage require customized

Main Switch for DIN Rail Mounting

Switching Configurations

Type	2-pole	2-pole 4 paralleled poles	4-pole	4-pole with Input on top output bottom	4-pole with Input and output bottom	4-pole with Input and output on top
SISO.2-16	2	2H	4	4S	4B	4T
SISO.2-25	2	2H	4	4S	4B	4T
SISO.2-32	2	2H	4	4S	4B	4T
Contacts Wiring graph						
Switching example						

Dimensions(mm)

