

Monitoring Relays Surge Arresters for PV system Type DSF D

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- Type 2 (class C) according to EN61643-11 (VDE 0675, part 6-11)
- Approved UL1449 3rd Edition
- Complies with IEC-61643-1, VTE C 61-740-51
- Do not require backup fuse up to 200kArms (UL 1449 3rd Ed.)
- Innovative technology to prevent dangerous failures in case of temporary overvoltages
- Suitable for unstable networks where sustained overvoltages may persist for some minutes or longer
- Plug-in cartridges
- Optical indication of exhausted cartridges (red window)
- Voltage-free contact, for remote function monitoring
- Including thermal and dynamic separating device
- Assembled unit ready for mounting
- Marked connections
- For DIN-rail mounting

Product Description

DSF D is a Type 2 (Class C) surge arrester according to EN 61643-11 (VDE 0675, part 6-11) and UL1449 3rd edition suitable for protecting DC systems from transient overvoltage due to both indirect atmospheric discharges and switching actions. It is available both in 2-pole or 3-pole configurations, allowing both differential and common mode protection. The control windows (no/red indication) and the contact allow both a local and a remote monitoring of the

status of the plug-in cartridges, warning the operator about the need to promptly replace the cartridges themselves. In installation without external LPS (Lightning Protection System) or where the distance between the LPS elements and the solar panel frames is >50cm, DSF can be used in the DC side of photovoltaic generation plants, and can be installed on a DIN-rail in every commercially available distribution box.

Ordering Key

DSF 53 C D 1200 PV

Description	Code
Mounting	
DIN-rail	D
Function	
Surge arresters	S
Type	
Type 2 (class C) "Fuseless"	F
Cartridge dimensions	
17.5 mm	5
Configuration	
2-pole	2
3-pole	3
Contact	
None	X
1 (relay)	C
Network	
DC	D
Range	
600 VDC	600
1000 VDC	1000
1200 VDC	1200
Application	
Photovoltaic system	PV

Type Selection

Code	Description	Max. cont. operating voltage	Output relay	Cartridge
DSF52CD600PV	2-pole surge arrester for PV installations	600 VDC	SPDT	2x DS0600F
DSF52XD1000PV	2-pole surge arrester for PV installations	1000 VDC	NO	2x DS1000F
DSF52CD1000PV	2-pole surge arrester for PV installations	1000 VDC	SPDT	2x DS1000F
DSF53XD1200PV	3-pole (Y) surge arrester for PV installations	1200 VDC	NO	3x DS0600F
DSF53CD1200PV	3-pole (Y) surge arrester for PV installations	1200 VDC	SPDT	3x DS0600F

Product specifications

Max. continuous operating voltage DC DSF52CD600PV DSF52xD1000PV DSF53xD1200PV	U_c 600 VDC 1000 VDC 1200 VDC	Voltage protection level DSF52CD600PV DSF52xD1000PV DSF53xD1200PV	U_p < 2.2 kV < 2.8 kV < 4.4 kV
SPD (Surge Protection Device) according to EN 61643-11 DSF5xCDxxxxPV	Type 2	Response time DSF5xxDxxxx	t_a < 25 ns
SPD (Surge Protection Device) according to IEC 61643-1 DSF5xCDxxxxPV	Class II	Protection fuse size (UL 1449 3rd Ed.) DSF5xxDxxxx	Not required up to 200 kA rms
LPZ (Lightning Protection Zone) DSF5xCDxxxxPV	1 --> 2	Follow current DSF5xxDxxxx	No
Nominal discharge surge current (8/20) DSF52CD600PV DSF52xD1000PV DSF53xD1200PV DSF52CD600PV DSF52xD1000PV DSF53xD1200PV	I_n + or - to PE 20 kA 12.5 kA 20 kA + and - to PE 40 kA 25 kA 20 kA	Short-circuit withstand current (data for AC applications according to EN 61643-11) DSF5xxDxxxx	25kA/50Hz
Max. discharge surge current (8/20) DSF52CD600PV DSF52xD1000PV DSF53xD1200PV DSF52CD600PV DSF52xD1000PV DSF53xD1200PV	I_{max} + or - to PE 40 kA 25 kA 40 kA + and - to PE 80 kA 50 kA 40 kA	Front window DSF5xxDxxxx	No indication: working cartridge. Red: exhausted cartridge (to be replaced)
		Operating temperature DSF5xxDxxxx	-40 to +80 °C

Output Specifications

Output DSF5xCDxxxxPV Rating	SPDT AC: 250V/0.5A 125V/3A	Cable cross-section area Terminal torque	max 1.5 mm ² 0.25 Nm max
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General Specifications

Protection degree	IP 20	Approvals degree UL 94 V-0 CE, UL1449 3 rd Edition
Dimensions DSF52CD600PV DSF52xD1000PV DSF53xD1200PV	36 x 90 x 72 mm 36 x 90 x 72 mm 54 x 90 x 72 mm	
Screw terminals Cable cross-section area Terminal torque	25 mm ² (stranded) 35 mm ² (solid) 4.5 Nm max	
Housing material	Thermoplastic, extinguishing	

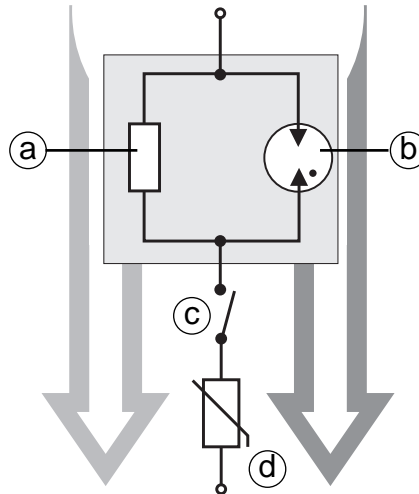
No backup-fuse technology

Long duration overvoltage path

The arrester is activated in the event of electric power system failure. The voltages are much lower than transient voltages but substantially more destructive. The system is composed of a current limiter and a varistor. In the event of increased voltage level the current limiter circuit limits the current through the varistor. When the normal condition is re-established (rated line voltage), the surge arrester continues to perform its normal function.

Transient (short duration) overvoltage path

The arrester is activated at the occurrence of instantaneous high voltage surges lasting only a few microseconds. Such condition states are experienced at switching operations and atmospheric discharges. The system is composed of a gas tube surge arrester and a varistor. Both components have a very short response time which is reflected in a low protective residual voltage level. This provides an efficient protection of sensitive electronic devices.



a) Current limiter b) Gas tube c) Thermal disconnecter d) Varistor

Installation notes

Protection distance

- If DSF is installed less than 10 m from the device to be protected, the distance can be ignored.
- If DSF and its connection wires have a total protection level $U_{p/f}$ (U_{prot}) $< 0.5 U_w$, where U_w is the breaking voltage of the device to be

protected, the distance can be neglected.

- If the protection distance is longer than 10 m, the real protection distance ℓ_{po} can be calculated by the following formula:

$$\ell_{po} = (U_w - U_{p/f}) / K \text{ [m]}$$

with $K = 25 \text{ V/m}$.

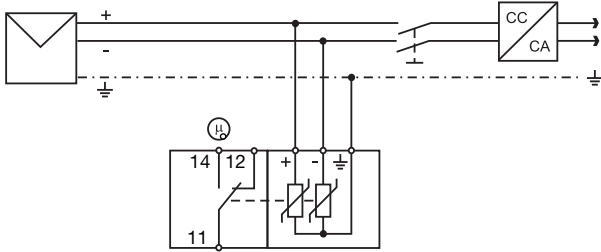
Protection against over-currents and indirect contacts

DSF can be installed without further integrative protections even if a general circuit breaker/fuses with nominal current $> 125 \text{ kA}$ is installed and if in the DSF installation point the short circuit current

is $> 25 \text{ kA}$ (but $< 200 \text{ kArms}$). No protection fuses are needed for backup protection.

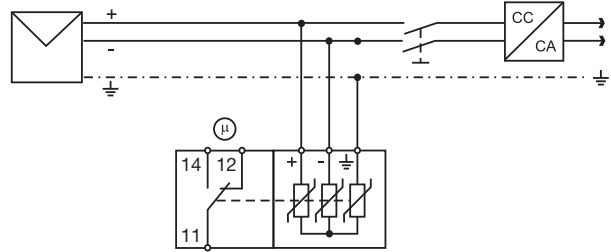
Wiring Diagrams

DSF52CDxxxx



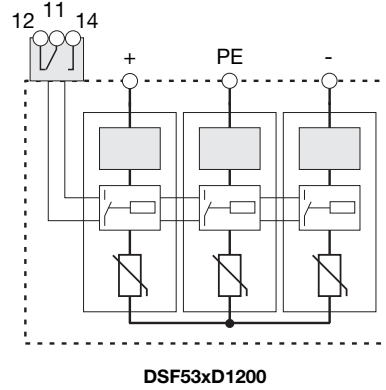
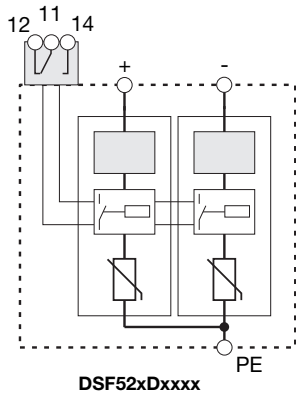
Relay output (11-12-14): only C option

DSF53CDxxxx



Relay output (11-12-14): only C option

Connection Diagrams



Dimensions

