Monitoring Relays
Surge Arresters for PV system
Type DSF D



- **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 tecnology to prevent dangerous failures in case of temporary overvoltages**
- **Suitable for unstable networks where sustainend over-voltages 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

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Product specifications

Max. continuous operating voltage DC	**Uc**
DSF52CD600PV	600 VDC
DSF52xD1000PV	1000 VDC
DSF53xD1200PV	1200 VDC
SPD (Surge Protection Device) according to EN 61643-11	
DSF5xCDxxxxPV	Type 2
SPD (Surge Protection Device) according to IEC 61643-1	
DSF5xCDxxxxPV	Class II
LPZ (Lightning Protection Zone)	
DSF5xCDxxxxPV	1 --> 2
Nominal discharge surge current (8/20)	**In**
	+ or - to PE
DSF52CD600PV	20 kA
DSF52xD1000PV	12.5 kA
DSF53xD1200PV	20 kA
	+ and - to PE
DSF52CD600PV	40 kA
DSF52xD1000PV	25 kA
DSF53xD1200PV	20 kA
Max. discharge surge current (8/20)	**Imax**
	+ or - to PE
DSF52CD600PV	40 kA
DSF52xD1000PV	25 kA
DSF53xD1200PV	40 kA
	+ and - to PE
DSF52CD600PV	80 kA
DSF52xD1000PV	50 kA
DSF53xD1200PV	40 kA

Voltage protection level	**Up**
DSF52CD600PV	< 2.2 kV
DSF52xD1000PV	< 2.8 kV
DSF53xD1200PV	< 4.4 kV
Response time	**t_A**
DSF5xxDxxxx	< 25 ns
Protection fuse size (UL 1449 3rd Ed.)	
DSF5xxDxxxx	Not required up to 200 kA rms
Follow current	
DSF5xxDxxxx	No
Short-circuit withstand current (data for AC applications according to EN 61643-11)	25kA/50Hz
Front window	
DSF5xxDxxxx	No indication: working cartridge. Red: exhausted cartridge (to be replaced)
Operating temperature	
DSF5xxDxxxx	-40 to +80 °C

Output Specifications

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

General Specifications

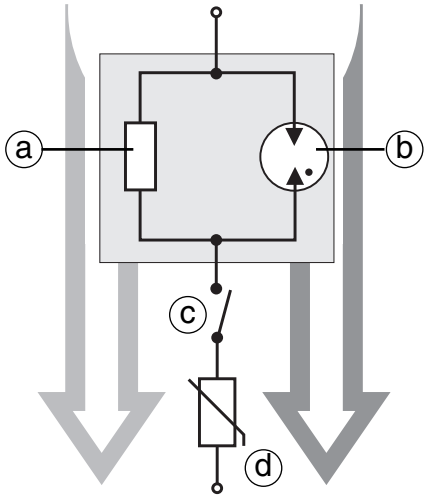
Protection degree	IP 20
Dimensions	
DSF52CD600PV	36 x 90 x 72 mm
DSF52xD1000PV	36 x 90 x 72 mm
DSF53xD1200PV	54 x 90 x 72 mm
Screw terminals	
Cable cross-section area	25 mm^2 (stranded) 35 mm^2 (solid)
Terminal torque	4.5 Nm max
Housing material	Thermoplastic, extinguishing degree UL 94 V-0
Approvals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

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No backup-fuse tecnology

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 occurence 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 disconnector **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:

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

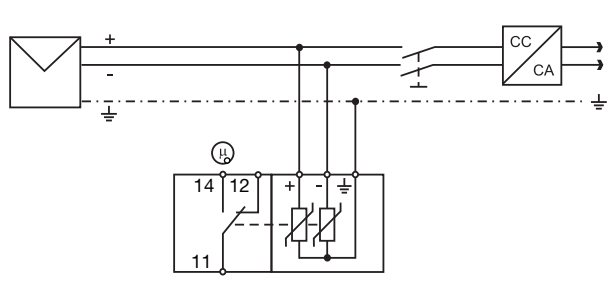
with K = 25 V/m.

Protection against overcurrents and indirect contacts

DSF can be installed without further integrative protections even if a general circuit breaker/fuses with nominal current >125 kA is installed and if in the DSF installation point the short circuit current is >25 kA (but <200kArms). No protection fuses are needed for backup protection.

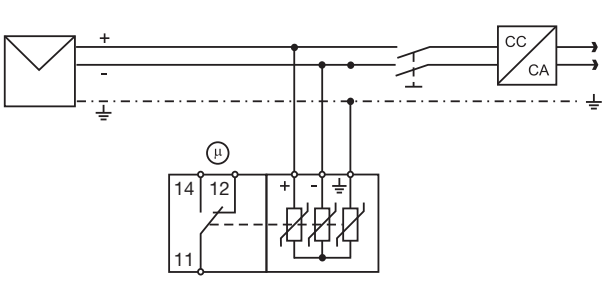
Wiring Diagrams

DSF52CDxxxx



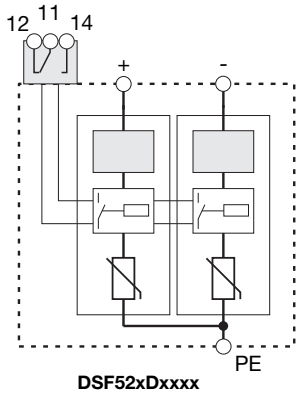
Relay output (11-12-14): only C option

DSF53CDxxxx

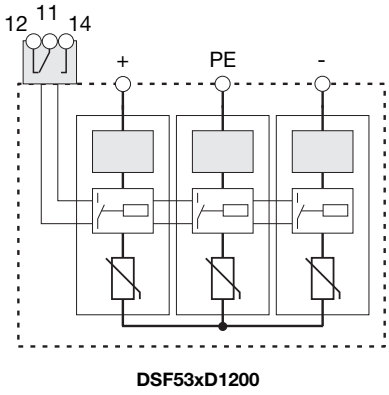


Relay output (11-12-14): only C option

Connection Diagrams



DSF52xDxxxx



DSF53xD1200

Dimensions

