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# SURGE PROTECTION FOR PV SYSTEM

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## Surge Protection for PV System

PV systems are set up outdoors and are prone to lightning damage. Lightning and surge protections are essential to their efficient operation. After the external lightning protection, the most crucial work is to protect the inverter.

SPDs are needed at the DC input end and AC output end of the Inverter. They are also needed at the two ends of long distance signal cable.

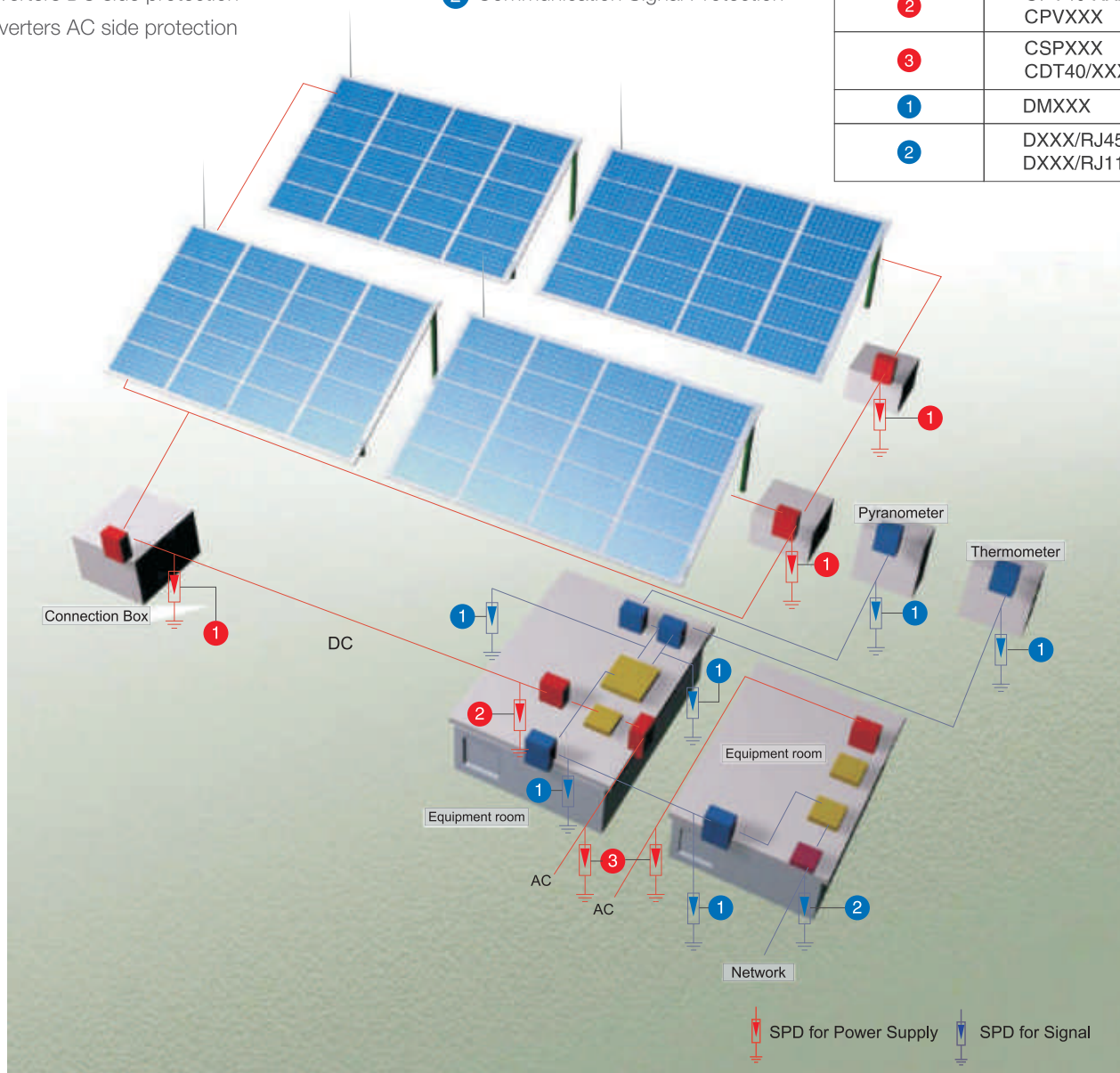
### Surge Protection for power supply

- 1 DC connection box protection
- 2 Inverters DC side protection
- 3 Inverters AC side protection

### Surge Protection for signal

- 1 Data Signal Protection
- 2 Communication Signal Protection

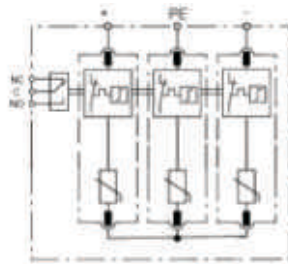
SPD's Location	IGE Models
1	BPV/12.5XXX
2	CPV40-XXX CPVXXX
3	CSPXXX CDT40/XXX
1	DMXXX
2	DXXX/RJ45 DXXX/RJ11



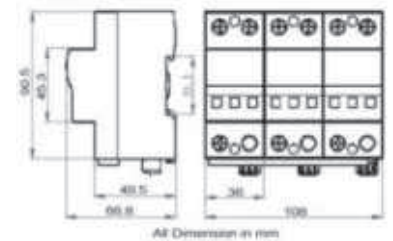
Common mode & Differential mode DC Surge arrester for PV/DC system protection against surges at the boundaries from lightning protection zone 0B-2 and higher.

## SURGE ARRESTERS - CLASS I+II

## BPV 12.5...



Basic circuit diagram



Dimension drawing

Type	BPV12.5-1000-V-CD (-S)	
Nominal Voltage (Un)	1000Vdc	
Protection mode	Common mode + Differential mode	
In accordance with	IEC61643-11:2011	
Category IEC / VDE	I+II/ B+C	
Max. continuous operating voltage (V)	1060Vdc	
Nominal discharge current (8/20) In	12.5kA	
Lightning impulse current (10/350) Iimp	12.5kA	
Max. discharge current (8/20) Imax	60kA	
Voltage protection level	@ In	3.2kV
	@ VPR	2.6kV
Response time	≤25 ns	
Follow current	No	
Backup fuse (only required if not already provided in mains)	160A gR/gPV (1100Vdc)	
Operating temperature range	- 40°C ~ + 80°C	
Cross-section of connection wire	Single-strand 35mm <sup>2</sup> ; multi-strand 25mm <sup>2</sup>	
Mounting	35mm DIN-rail in accordance with EN 50022/DIN46277-3	
Enclosure material	thermoplastic; extinguishing degree UL94 V-0	
Degree of protection	IP20	
Installation width	6 modules, DIN 43880	
Thermal disconnecter	Internal red - failure	
Remote alarm contact	Optional	
Approvals, Certifications	CE	
<b>Additional data for Remote Alarm Contacts</b>		
Remote alarm contact type	Isolated Form C	
Switching capability Un / In	AC: 250V/0.5A DC: 250V/0.1A; 125V/0.2A; 75V/0.5A	
Max. Size of connecting wire	Max. 1.5mm <sup>2</sup> (or # 16AWG)	

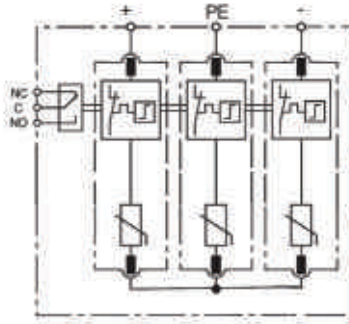
Common mode & Differential mode DC Surge arrester for PV/DC system protection against surges at the boundaries from lightning protection zone 1-2 and higher.

## SURGE ARRESTERS - CLASS II

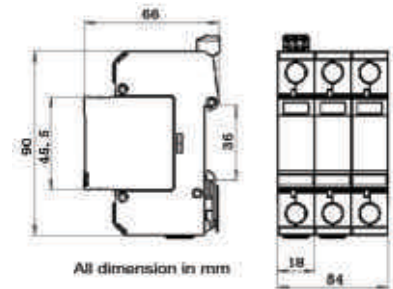
CPV40...



CE



Basic circuit diagram



Dimension drawing

Type	CPV40/xxx-V-CD(-S)	
In accordance with	1500	
Category IEC / VDE	IEC61643-11:2011	
Protection Mode	II / C	
Nominal voltage (Vdc)	Un	1500
Max. continuous operating voltage (Vdc)	Uc	1650
Nominal discharge current (8/20)	In	20kA
Max. discharge current (8/20)	Imax	40kA
Voltage protection rating	Up	5.2 kV
	VPR	4.0 kV
Response time	≤25 ns	
Follow current	No	
Backup fuse (only required if not already provided in mains)	125A gR/gPV	
Operating temperature range	- 40°C ~ + 80°C	
Cross-section of connection wire	Single-strand 35mm <sup>2</sup> ; multi-strand 25mm <sup>2</sup>	
Mounting	35mm DIN-rail in accordance with EN 50022/DIN46277-3	
Enclosure material	thermoplastic; extinguishing degree UL94 V-0	
Degree of protection	IP20	
Installation width	3 modules, DIN 43880	
Thermal disconnect	Internal green normal; red - failure	
Remote alarm contact	Optional	
Approvals, Certifications	CE	
<b>Additional data for Remote Alarm Contacts</b>		
Remote alarm contact type	Isolated Form C	
Switching capability Un / In	AC: 250V/0.5A DC: 250V/0.1A; 125V/0.2A; 75V/0.5A	
Max. Size of connecting wire	Max. 1.5mm <sup>2</sup> (or # 16AWG)	

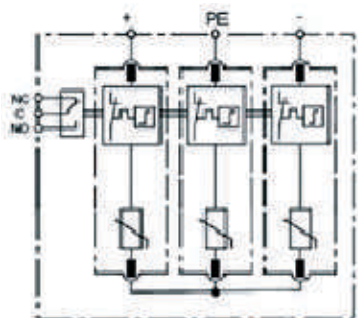
Common mode & Differential mode DC Surge arrester for PV/DC system protection against surges at the boundaries from lightning protection zone 1-2 and higher.

## SURGE ARRESTERS - CLASS II

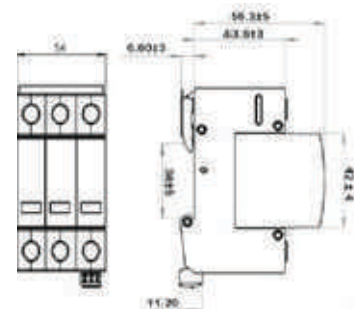
CPV...



CE



Basic circuit diagram



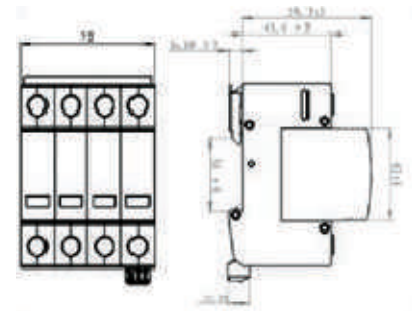
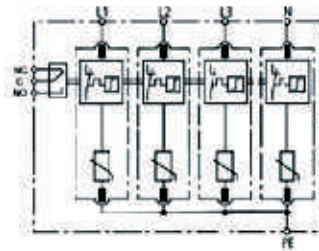
Dimension drawing

Type		CPVxxx-V-CD(-S)			
		600	750	1000	1200
In accordance with		IEC61643-11:2011			
Category IEC / VDE		II / C			
Protection Mode		Common mode & Differential mode			
Nominal voltage (Vdc)	Un	600	750	1000	1200
Max. continuous operating voltage (Vdc)	Uc	700	840	1120	1490
Nominal discharge current (8/20)	In	20kA			
Max. discharge current (8/20)	I <sub>max</sub>	50kA			
Voltage protection rating	@In	<2.8kV	<3.0kV	<4.0kV	<5.0kV
	@VPR	<1.8kV	<2.0kV	<3.0kV	<3.6kV
	@MLV	<4.2kV	<4.4kV	<4.8kV	<5.6kV
Response time		≤25 ns			
Follow current		No			
Backup fuse (only required if not already provided in mains)		125A gR/gPV			
Operating temperature range		- 40°C ~ + 80°C			
Cross-section of connection wire		Single-strand 35mm <sup>2</sup> ; multi-strand 25mm <sup>2</sup>			
Mounting		35mm DIN-rail in accordance with EN 50022/DIN46277-3			
Enclosure material		thermoplastic; extinguishing degree UL94 V-0			
Degree of protection		IP20			
Installation width		3 modules, DIN 43880			
Thermal disconnecter		Internal green normal; red - failure			
Remote alarm contact		Optional			
Approvals, Certifications		CE			
<b>Additional data for Remote Alarm Contacts</b>					
Remote alarm contact type		Isolated Form C			
Switching capability Un / In		AC: 250V/0.5A DC: 250V/0.1A; 125V/0.2A; 75V/0.5A			
Max. Size of connecting wire		Max. 1.5mm <sup>2</sup> (or # 16AWG)			

Surge arrester for low-voltage power supply system protection against surges at the boundaries from lightning protection zone 1-2 and higher.

## SURGE ARRESTERS - CLASS II

## CSPxxx/4P(-S)



Basic circuit diagram

Dimension drawing

Type	CSPxxx/4P(-S)								
	150	180	275	320	385	420	550	690	
In accordance with	IEC61643-11:2011								
Category IEC / VDE	II / C								
Max. continuous operating voltage V (AC/DC)	150 / 200	180 / 230	275 / 350	320 / 420	385 / 505	420 / 560	550 / 745	690 / 895	
Nominal discharge current (8/20)	In								
Max. discharge current (8/20)	20kA								
	I <sub>max</sub>	40kA <sup>1</sup> 50kA <sup>2</sup>	40kA <sup>1</sup> 50kA <sup>2</sup>	40kA <sup>1</sup> 50kA <sup>2</sup>	40kA <sup>1</sup> 50kA <sup>2</sup>	40kA <sup>1</sup> 50kA <sup>2</sup>	40kA <sup>1</sup> 50kA <sup>2</sup>	40kA <sup>1</sup> 50kA <sup>2</sup>	40kA <sup>1</sup> 50kA <sup>2</sup>
Voltage protection level	@In	<0.8kV	<1.0kV	<1.4kV	<1.5kV	<1.8kV	<2.0kV	<2.5kV	<3.0kV
	@VPR	<0.6kV	<0.7kV	<0.9kV	<1.0kV	<1.4kV	<1.5kV	<1.8kV	<2.5kV
	@MLV	<1.7kV	<1.7kV	<2.1kV	<2.2kV	<2.3kV	<2.4kV	<2.8kV	<3.2kV
Response time	≤25 ns								
Follow current	No								
Backup fuse (only required if not already provided in mains)	125A gL/gG								
Operating temperature range	- 40°C ~ + 80°C								
Cross-section of connection wire	Single-strand 35mm <sup>2</sup> , multi-strand 25mm <sup>2</sup>								
Mounting	35mm DIN-rail in accordance with EN 50022/DIN46277-3								
Enclosure material	thermoplastic; extinguishing degree UL94 V-0								
Degree of protection	IP20								
Installation width	4 modules, DIN 43880								
Thermal disconnecter	Internal green normal; red - failure								
Remote alarm contact	Optional								
SCCR	200kA	200kA	200kA	200kA	200kA	200kA	200kA	200kA	
Approvals, Certifications	KEMA / CE	CE	KEMA / CE	KEMA / CE	KEMA / CE	CE	CE	CE	
<b>Additional data for Remote Alarm Contacts</b>									
Remote alarm contact type	Isolated Form C								
Switching capability Un / In	AC: 250V/0.5A DC: 250V/0.1A; 125V/0.2A; 75V/0.5A								
Max. Size of connecting wire	Max. 1.5mm <sup>2</sup> (or # 16AWG)								

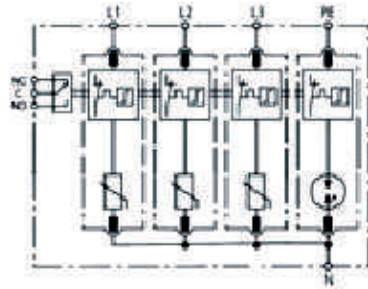
Surge arrester for low-voltage power supply system protection against surges at the boundaries from lightning protection zone 1-2 and higher.

## SURGE ARRESTERS - CLASS II

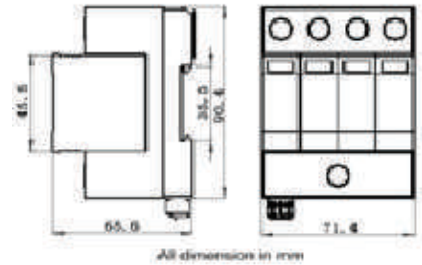
## CDT40



CE



Basic circuit diagram



Dimension drawing

Type		CDT40/xxx-3V+T(-S)						
		150	175	275	300	320	385	420
In accordance with		IEC61643-11:2011						
Category IEC / VDE		II / C						
Max. continuous operating voltage (AC/DC)	LN (AC / DC)	150 / 200	175 / 225	275 / 350	300 / 385	320 / 420	385 / 505	420 / 560
	NPE U <sub>c</sub>	150	150	255	255	255	255	255
Nominal discharge current (8/20) I <sub>n</sub>	LN	20kA						
	NPE	20kA						
Max. discharge current (8/20) I <sub>max</sub>	LN	40kA						
	NPE	40kA						
Voltage protection level	LN@I <sub>n</sub>	<0.8kV	<0.8kV	<1.3kV	<1.4kV	<1.5kV	<1.8kV	<2.0kV
	LN@V <sub>PR</sub>	<0.5kV	<0.6kV	<1.0kV	<1.0kV	<1.1kV	<1.3kV	<1.4kV
	NPE (1.2/50)	<0.8kV	<0.8kV	<1.5kV	<1.5kV	<1.5kV	<1.5kV	<1.5kV
Response time	LN	≤25 ns						
	NPE	≤100 ns						
Follow current	LN	No						
	NPE	I <sub>fi</sub> : 100Arms @ 255Vac						
Backup fuse (only required if not already provided in mains)		125A gL/gG						
Operating temperature range		- 40°C ~ + 80°C						
Cross-section of connection wire		Single-strand 35mm <sup>2</sup> , multi-strand 25mm <sup>2</sup>						
Mounting		35mm DIN-rail in accordance with EN 50022/DIN46277-3						
Enclosure material		thermoplastic; extinguishing degree UL94 V-0						
Degree of protection		IP20						
Installation width		4 modules, DIN 43880						
Thermal disconnecter		Internal green normal; red - failure						
Remote alarm contact		Optional						
Approvals, Certifications		CE						
Additional data for Remote Alarm Contacts								
Remote alarm contact type		Isolated Form C						
Switching capability U <sub>n</sub> / I <sub>n</sub>		AC: 250V/0.5A DC: 250V/0.1A; 125V/0.2A; 75V/0.5A						
Max. Size of connecting wire		Max. 1.5mm <sup>2</sup> (or # 16AWG)						

Surge arrester for low-voltage power supply system protection against surges at the boundaries from lightning protection zone 1-2 and higher.

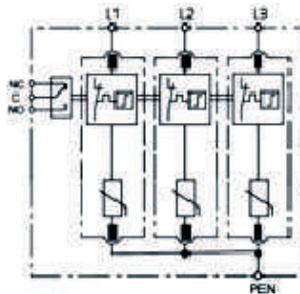
## Power Supply System

### SURGE ARRESTERS - CLASS II

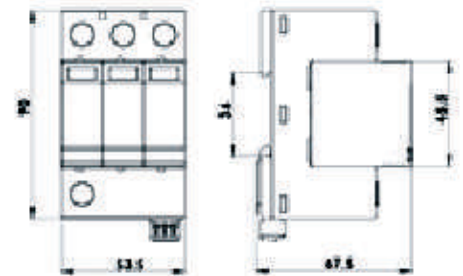
### CDT40



CE



Basic circuit diagram



Dimension drawing

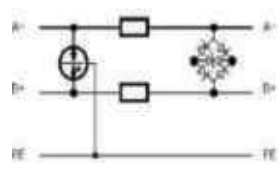
		CDT40/xxx-3V(-S)		
		550	690	850
In accordance with		IEC61643-11:2011		
Category IEC / VDE		II / C		
Max. continuous operating voltage V (AC/DC)		550 / 745	690 / 900	850 / 1100
Nominal discharge current (8/20)	In	20kA		
Max. discharge current (8/20)	I <sub>max</sub>	40kA		
Voltage protection level	@In	<2.8kV	<3.2kV	<3.5kV
	@VPR	<2.0kV	<2.4kV	<2.8kV
Response time		≤25 ns		
Follow current		No		
Backup fuse (only required if not already provided in mains)		125A gL/gG		
Operating temperature range		- 40°C ~ + 80°C		
Cross-section of connection wire		Single-strand 35mm <sup>2</sup> , multi-strand 25mm <sup>2</sup>		
Mounting		35mm DIN-rail in accordance with EN 50022/DIN46277-3		
Enclosure material		thermoplastic; extinguishing degree UL94 V-0		
Degree of protection		IP20		
Installation width		3 modules, DIN 43880		
Thermal disconnecter		Internal green normal; red - failure		
Remote alarm contact		Optional		
Approvals, Certifications		CE		
<b>Additional data for Remote Alarm Contacts</b>				
Remote alarm contact type		Isolated Form C		
Switching capability Un / In		AC: 250V/0.5A DC: 250V/0.1A; 125V/0.2A; 75V/0.5A		
Max. Size of connecting wire		Max. 1.5mm <sup>2</sup> (or # 16AWG)		



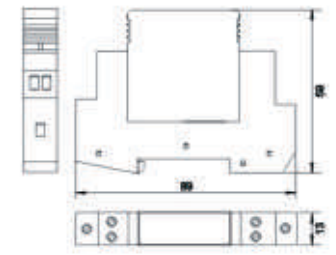
Surge arrester for double-wire systems / RS485 against surges at the boundaries from lightning protection zone 0B-2 and higher.

## TERMINAL BLOCK MODULES SERIES

## DM·xxx/BO



Basic circuit diagram



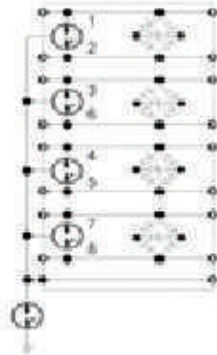
Dimension drawing

Type		DM-xxx/BO			
		5	12	24	48
In accordance with		IEC 61643-21:2005			
Nominal voltage (Vdc)	Un	5	12	24	48
Max. continuous operating voltage (Vdc/ac)	Uc	6/5	15/12	28/24	54/38
C2 Nominal discharge current (8/20)	In	5kA			
C2 Total nominal Discharge Current(8/20us)		10kA			
Voltage protection level (V)	L-L@C2 (8/20μs)Up	<30	<45	<55	<100
	L-G@C2 (8/20μs)Up	<500	<500	<500	<500
	L-L@C3 (1KV/μs)Up	<24	<38	<48	<75
	L-G@C3 (1KV/μs)Up	<600	<600	<600	<600
Nominal Current (A)	IL	0.5A			
Transmission Speed (bps)		2Mbps			
Insertion loss (dB)		≤0.5			
Series impedance per line (Ohm)		2.2 Ohm			
Protection line		One pair			
Mounting		35mm DIN-rail in accordance with EN 50022/DIN46277-3			
Type of Connection IN/OUT		screw/screw			
Dimensions (mm)		89 X 13 X 59			
Operating temperature range		- 40°C ~ + 80°C			

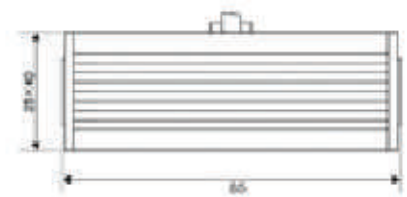
Surge arrester for Ethernet, Twisted Pair, Cat 5 network systems against surges at the boundaries from lightning protection zone 0B-2 and higher.

## RJ45 HIGH SPEED CONNECTION

## D-xxx/RJ45H-8



Basic circuit diagram



Dimension drawing

Type		D-xxx/RJ45H-8			
		5	12	24	48
In accordance with		IEC 61643-21:2005			
Nominal voltage (Vdc)	Un	5	12	24	48
Max. continuous operating voltage (Vdc/ac)	Uc	6/5	15/12	28/24	60/48
C2 Nominal discharge current (8/20µs)	In	100A(L-L)/ 2.5kA(L-G)			
C2 Total nominal Discharge Current(8/20us)		400A(L-L)/ 20kA(L-G)			
Voltage protection level (V)	L-L@C2 (8/20µs)Up	<30	<45	<55	<190
	L-G@C2 (8/20µs)Up	<600	<600	<600	<600
	L-L@C3 (1KV/µs)Up	<24	<38	<48	<145
	L-G@C3 (1KV/µs)Up	<800	<800	<800	<800
Nominal Current (A)	IL	1A			
Transmission Speed(bps)		1000Mbps			
Insertion loss at 80MHz (dB)		≤3.0			
Transmission standards		10BaseT / 100BaseT / 1000BaseT			
Pinning		1/2, 3/6, 4/5, 7/8			
Mounting		35mm DIN-rail in accordance with EN 50022/DIN46277-3 ( Optional )			
Type of Connection IN/OUT		RJ45 Female/ Female			
Dimensions (mm)		85 X 25 X 40			
Operating temperature range		- 40°C ~ + 80°C			



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