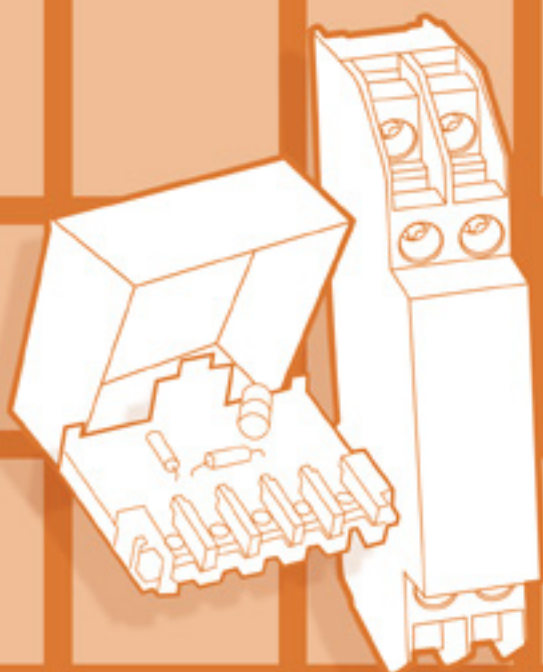




CITEL



TELEPHONE LINE

Surge protectors



Telephone-Data surge protectors

Introduction

Telecommunication and data transmission devices (PBX, modems, data terminals etc..) are becoming increasingly vulnerable to lightning-induced voltage surges.

These devices are becoming more complex, sensitive and share a common grounding connection with other networks. This situation increases the risk for these sensitive devices to be stressed by destructive surge voltages, induced by lightning or by electrical switching operations.

Moreover, these devices are nowadays installed at every level of every installation (industrial, commercial and residential buildings), making these possible disturbances unacceptable and/or costly.

To make this telecom or data equipment sufficiently reliable, the installation of a dedicated surge protector, against transient overvoltages, is highly recommended.

Surge protectors for telecom and data transmission terminals could be divided in 3 types :

- Surge protectors for telecom networks
- Surge protectors for industrial networks
- Surge protectors for Local Area Networks (LANs)

CITEL products differ by their electrical diagrams and their mechanical configurations, adapted to the need of each type of network.

Reminder:

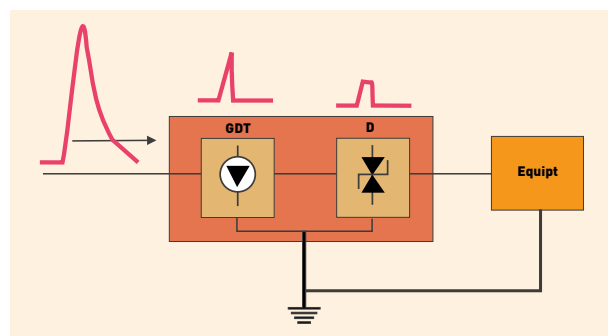
Devices connected to telecom or data networks, are also connected to the AC distribution network : in order to ensure a coordinated protection, surge protectors must be installed on each inter-connected networks.

Technology of surge protectors

All Citel telephone and data line surge protectors are based on reliable multistage hybrid design that combines a high discharge current capacity with fast response time.

All Citel telephone and data line surge protectors use a combination of a 3-electrode gas discharge tube and fast clamping diodes, in order to provide:

- A nominal discharge current (repeated without destruction) greater than 5 kA @ 8/20 μ s impulse
- An ultrafast response time < 1 ns
- Safety operation in end of life
(Fail-safe behaviour) (end of life Mode 2 following EN 61643-21)
- Low insertion losses to not disturb the transmission signal.



The systematic use of 3-electrode discharge tubes provides optimum protection through simultaneous sparkover.

This set of characteristics is essential for optimum reliability of the protected equipment whatever the incident or disturbance.

Various protection diagrams are available according to requirements and the type of network to be protected:

- Standard protection, used mainly for the analog telecom network (PSTN)
- Enhanced protection, for very low voltage transmission lines.
- Line+Shield Protection : Transmission and protection for the shield wire.
- «K20» protection complying with the ITU-T K20 International recommendation
- «Low capacitance» protection for high bit rate links (> 1 Mbit/s)
- «Cat 5» or «Cat 6» surge protection : designed for very high bitrate LAN (up to 10 Gbit/s).

See list of diagrams, page 98.

Standards

Tests procedures and installation recommendations for communication line surge protectors must comply the following standards:

International:

- IEC 61643-21 : Tests of surge protectors for communication lines.
- IEC 61643-22 : Choice/installation of surge protectors for communication lines.

France:

- NF EN 61643-21 : Essais applicables aux parafoudres de communication.
- Guide UTE C 15-443 : Choice/installation of surge protectors

Specific tests following EN 61643-21 standard:

Surge protectors for communication lines must be tested following various categories in order to declare their impulse durability :

- C2 Category : 10 x 8/20µs current impulses from 1 to 5 kA
- C3 Category: 300 x 10/1000µs current impulses from 10 to 100 A
- D1 Category: 2 x 10/350µs current impulses from 0.5 to 2.5 kA

Moreover, fault modes on AC or impulse stress must be tested and declared :

- Mode 1 : disconnected SPD but line transmission still active
- Mode 2 : short-circuited SPD, so line transmission off.
- Mode 3 : Failed SPD and line transmission off (in-line cutoff).

Use of surge protectors

In areas where standards are lacking or non-existent, the decision to use surge protectors on telecom and data lines can be taken by the following:

- the recommendation of the equipment manufacturer
- preventative action following equipment damage due to transients a simplified risk assessment

Risk assessment

In order to assess quickly the probability of the lightning surges and theirs consequences, a simplified risk analysis could be performed following the table below.

Parameters	Low Risk	High Risk
Lightning density (Ng)	< 2,5	> 2,5
Site configuration	Single building	Multiple buildings
Transmission length	Short	Long
External lines distribution	Underground	Overhead
Electrical disturbances	Low	High
Existing lightning rod	No	Yes
Lightning events	Never	Already
Equipment sensitivity	Low	High
Equipment costs	Low	High
Downtime costs	Low or acceptable	Expensive or unacceptable

The level of recommendation (from «no recommendation» to «highly recommended») of using surge protectors increase with the number of parameters classified as «high risk» on the table.

A more detailed risk analysis is available on the IEC 61643-22 standard.

Surge Protection parameters

In choosing surge protection for your installation, bear the following in mind :

- The type of line : There is an appropriate level of protection and protection diagram for each type of line.
- The site configuration: Number of lines to be protected.
- The requested type of installation :

The CITEL line provides the following possibilities :

- Installation in wall-mounted box, plug mounting, on distribution frame - various types of connection (screw, spring contact, connectors...)

- Features

Some surge protectors are equipped with pluggable modules (E280, DLA).

Installation

To be effective, surge protectors must be installed in accordance with the following principles :

- The earth point of the surge protector and of the protected equipment must be interconnected.
- The protection is installed on the network entrance, to divert impulse currents as fast as possible.
- The protected equipment must be nearby (protector/equipment distance less than 10 m long). If this rule cannot be followed, «secondary» protection must be installed near the equipment (coordinated surge protection).
- The grounding conductor (between the earth output of the SPD and the installation bonding circuit) must be as short as possible (less than 0.50 m) and have a cross-sectional area of at least 2.5 mm².
- The earth resistance must comply with the standards in force (no special earthing requested).
- Protected and unprotected cables must be kept well apart to limit coupling.

Maintenance

CITEL data line surge protectors require no maintenance or replacement. They are designed to withstand repeated and heavy impulse currents without damage.

Nevertheless a controlled fail-safe mode (short circuit to earth) is planned in case of surges exceeding the parameters of the surge protectors:

Protective short-circuit occurs in the following cases :

- Prolonged contact of a low current line with a power line (AC overstress test with alternating current, in accordance with EN 61643-21)
- Exceptionally violent «lightning» strike (impulse overstress test in accordance with EN 61643-21).

In these cases, the surge protector definitively short-circuits, which indicates to the user the functional destruction through a transmission cut, while protecting the terminal equipment (Mode 2 default in accordance with EN 61643-21).The specific version DLAS provides a different failure mode : opening the line and switching a indicator in the front face of SPD.

In all these cases, to reactive the line, the user must replace the surge protector or or replace the removable module for pluggable versions.

The basic parameters of the surge protector for datalines could be controlled with dedicated testers.

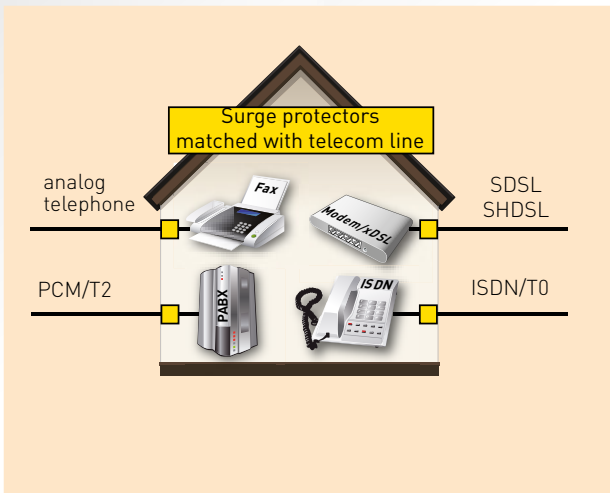
Special condition : Lightning rod

If the installation to be protected is equipped with LPS (lightning rod), the surge protectors for telecom or datalines, connected on external lines must be able to conduct 10/350 µs surge current with a rating up to 2.5 kA minimum (D1 category test in IEC 61643-21 standard).

Telephone-Data surge protectors

Protecting telecommunication equipment

Telecom devices (PBX, Modems, Terminals..) are especially exposed to lightning surges. CITEL offers a range of surge protectors dedicated to the protecting of these types of telecommunication networks :



For each type of telecom line, an adapted protection scheme must be used:

Lines	Voltage		Diagram
	Nominal	Residual	
Switched telephone /ADSL	170 V	210 V	Standard protection
ISDN, T0 primary access	48 V	70 V	Enhanced protection
ISDN, T2 primary access	6 V	25 V	Enhanced Protection Low capacitance
SDSL, SHDSL	170 V	210 V	Enhanced protection

The decision whether or not to use surge protection would be determined by taking a simplified risk assessment (see «Risk analysis» paragraph), or by detailed risk assessment (as the one included in IEC 61643-22 standard), or by specific installation conditions as :

Conditions	Recommendation
External telecom lines	Systematic protection
Lines downstream PBX	Protection in long or inter-building lines
Existing AC surge protector	Systematic protection

CITEL range

Surge protectors for telecom networks are designed to fit into existing installations. So, CITEL surge protectors are available with many different mounting options:

- Mounting on telecom MDF
- Mounting on DIN rail
- Insertion in connection strips
- Wall mounting
- Plug-in on termination outlets

B180 - B280 - B480



Wall mounting
Screw connection
1 to 4 pairs

MJ6 - MJ8



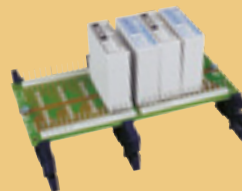
RJ11 or RJ45
1 to 4 pairs

DLC - DLA - DLU



DIN mounting
Screw or spring connection
1 or 2 pairs
Pluggable (opt.)

E280



DIN mounting or connector strip
Multipairs
Plug-in module
Screw connection

Protecting industrial networks

Industrial installations, businesses or smart buildings are packed with an increasing quantity of control equipment, measurement, control and supervisory equipment.

These systems are built with controller cards, probes, sensors and various sensitive electronic components: downtime on the operation on this equipment can be costly.

Thus, it is increasingly vital to guarantee a relevant level of reliability to these systems: this can be obtained by installing dataline surge protection.

Equipment to be protected

Industrial or business installations are equipped with many different types of sensitive terminals, which must be protected against transient voltages, such as:

- Industrial process equipment
- SCADA systems (Supervisory Control And Data Acquisition)
- Transmission systems
- I/O cards
- Interfaces, converters
- Probes
- Actuators
- Access control system
- Fire detection system, Displays




Many data transmissions (or fieldbus) exist on the market. The table below provides relevant CITEL surge protector model (DLA series : Din rail pluggable module, and DLU series : Din rail monobloc module) in relation to the type of data transmission.

Network	Wiring	DLC	DLU	DLA
4-20 mA	1 pair	DLC-24D3	DLU-24D3	DLA-24D3
Profibus-FMS	1 pair+Shield	DLC-12D3	DLU-12D3	DLA-12D3
Profibus-PA	1 pair+Shield	DLC-48D3	DLU-48D3	DLA-48D3
Profibus-DP	1 pair+Shield	DLC-12DBC	DLU-12DBC	DLA-12DBC
Interbus	1 pair+Shield	DLC-12D3	DLU-12D3	DLA-12D3
Foundation Fieldbus-H1	1 pair+Shield	DLC-12D3	DLU-12D3	DLA-12D3
Foundation Fieldbus-H2	1 pair+Shield	DLC-48DBC	DLU-48DBC	DLA-48DBC
WorldFIP	1 pair+Shield	DLC-48DBC	DLU-48DBC	DLA-48DBC
Fipway	1 pair+Shield	DLC-48DBC	DLU-48DBC	DLA-48DBC
LONworks	1 pair+Shield	DLC-48DBC	DLU-48DBC	DLA-12DBC
Batibus	1 pair+Shield	DLC-12D3	DLU-12D3	DLA-12D3
RS485	1 pair+Shield	DLC-12D3	DLU-12D3	DLA-12D3
RS422	2 pairs	-	DLU2-06D3	DLA2-06D3
RS232	4 wires	-	DLU2-12D3	DLA2-12D3

CITEL range

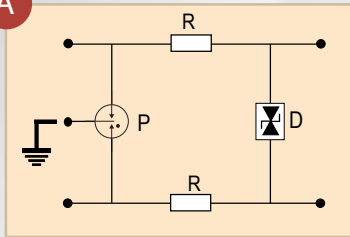
CITEL surge protectors for industrial data networks are designed to fit on symmetrical DIN rail. In order to offer a large range of solutions, the surge protectors are available in various configurations :

- Number of protected wires : from 1 wire to 2 pairs.
- Transmission and protection of the shield wire
- Compactness (DLC)
- Plug-in modules : Fixed version (DLU, DLU2) or Version with removable module (DLA, DLA2) to ease the maintenance process.

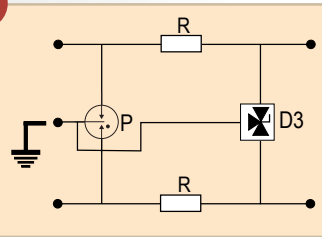
DLA - DLA2 - DLAS 	Pluggable 1 or 2 pairs Screw connection Imax 20 kA
DLU - DLU2 	Monobloc 1 or 2 pairs Screw connection Imax 20 kA
DLC 	Compact Monobloc 1 pair Spring connection Imax 10 kA

Typical diagrams (for 1 pair)

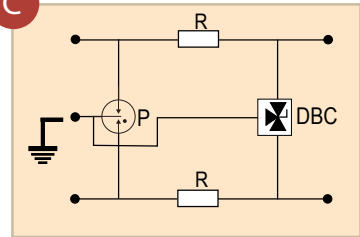
A Standard Protection



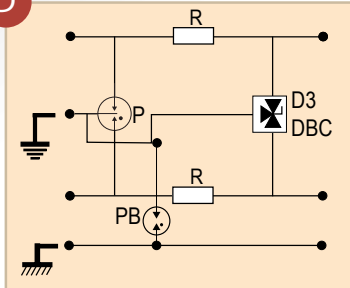
B Reinforced Protection



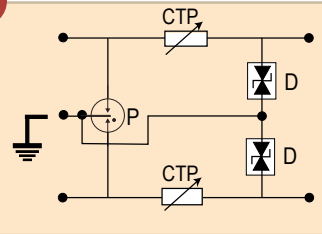
C Low capacitance Protection



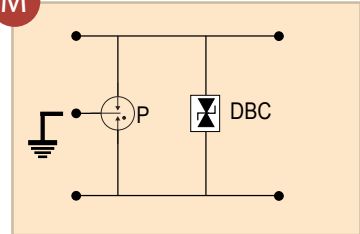
D Protection + Shield



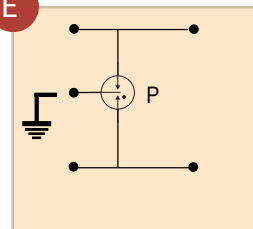
K1 «K20» type Protection



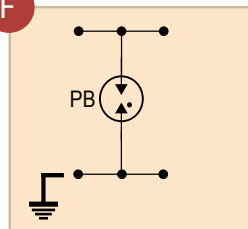
M High bit-rate Protection



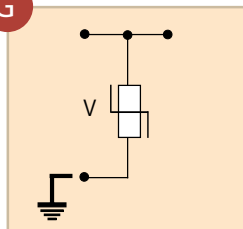
E 3-electrode GDT Protection



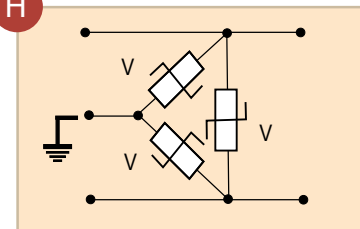
F 2-electrode GDT Protection



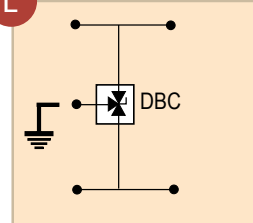
G 2-pole MOV Protection



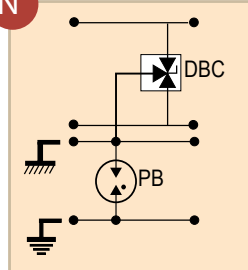
H 3-pole MOV Protection



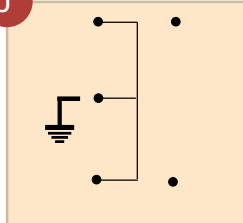
L Low capacitance 3-pole diode



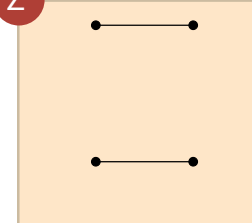
N «CAT6» Protection



J Grounding

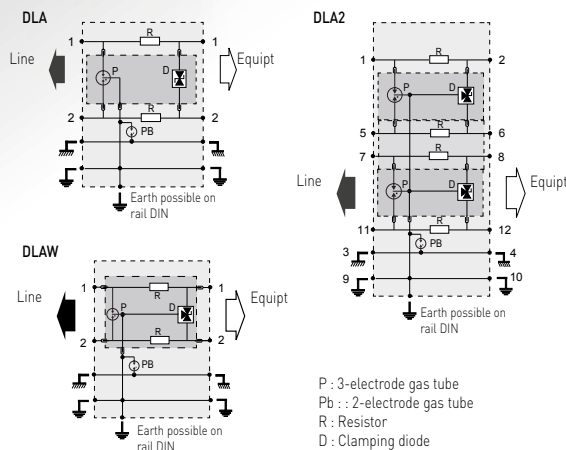
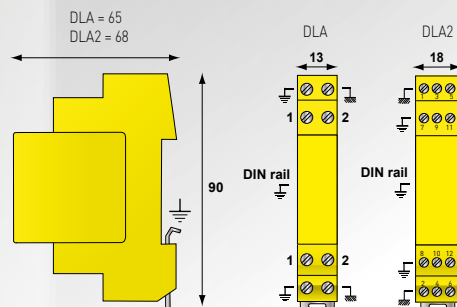


Z Line continuity

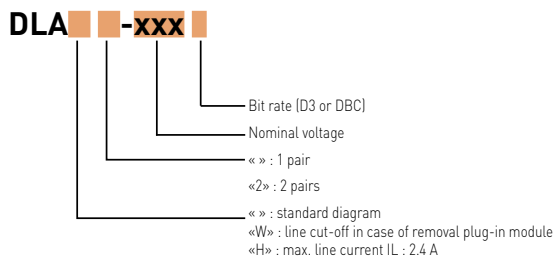


P : 3-pole gas tube
 PB : 2-pole gas tube
 R : Line resistor
 D : Fast Clamping Diode
 D3 : 3-pole Clamping Diode
 DBC : Low capacitance clamping diode
 V : MOV
 CTP : PTC

DIN rail plug-in Surge Protector for dataline/telecom DLA, DLA2 series



- Pluggable surge protection for «DIN» mounting
- All types of Telephone and Data Lines
- Shield wire protection
- Without line cut-off (DLA) or with (DLAW)
- 2- pair version (DLA2)
- IEC 61643-21 compliance
- UL497 A approved

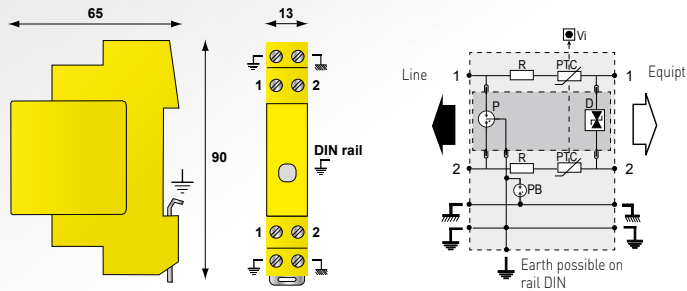


Characteristics

CITEL Model	DLA-170 DLA2-170	DLA-48DBC DLA2-48DBC	DLA-48D3 DLA2-48D3	DLA-24D3 DLA2-24D3	DLA-12D3 DLA2-12D3	DLA-06DBC DLA2-06DBC	DLA-06D3 DLA2-06D3	
Description	Telecom/Data SPD- 1 or 2-pair -DIN mounting - Pluggable							
Network	Telephone line, ADSL2, SDSL	Fipway, WorldFIP, FieldBus-h2	ISDN-T0, 48 V line	4-20 mA	RS232, RS485	MIC/T2, 10BaseT	RS422, RS485*	
SPD configuration	DLA 1-pair + shielded	1-pair + shielded	1-pair + shielded	1-pair + shielded	1-pair + shielded	1-pair + shielded	1-pair + shielded	
	DLA2 2-pair + shielded	2-pair + shielded	2-pair + shielded	2-pair + shielded	2-pair + shielded	2-pair + shielded	2-pair + shielded	
Nominal line voltage	Un	150 V	48 V	48 V	24 V	12 V	6 V	
Max. DC operating voltage	Uc	170 V	53 V	53 V	28 V	15 V	8 V	
Max. Load current	IL	300 mA	300 mA	300 mA	300 mA	300 mA	300 mA	
Max. frequency	f max	> 10 MHz	> 20 MHz	> 3 MHz	> 3 MHz	> 20 MHz	> 3 MHz	
Insertion loss		< 1 dB	< 1 dB	< 1 dB	< 1 dB	< 1 dB	< 1 dB	
Nominal discharge current <i>8/20µs Test x 10 - C2 Category</i>	In	5 kA	5 kA	5 kA	5 kA	5 kA	5 kA	
Max. discharge current <i>-max. withstand I0 8/20 µs by pole</i>	Imax	20 kA	20 kA	20 kA	20 kA	20 kA	20 kA	
Impulse current <i>2 x 10/350µs Test - D1 Category</i>	Iimp	5 kA	5 kA	5 kA	5 kA	5 kA	5 kA	
Protection level	Up	220 V	75 V	70 V	40 V	30 V	25 V	
Failsafe behavior		Short-circuit	Short-circuit	Short-circuit	Short-circuit	Short-circuit	Short-circuit	
Mechanical characteristics								
Dimensions	see diagram							
Format	Plug-in DIN box							
Connection to Network	screw terminal - cross section 0.4-1.5 mm ²							
Disconnection indicator	transmission interrupt - Default Mode 2							
Mounting	Symmetrical rail 35 mm (EN60715)							
Operating temperature	-40/+85°C							
Protection rating	IP20							
Housing material	Thermoplastic UL94-V0							
Spare module for DLA	DLAM-170	DLAM-48DBC	DLAM-48D3	DLAM-24D3	DLAM-12D3	DLAM-06DBC	DLAM-06D3	
Spare module for DLA2	DLA2M-170	DLA2M-48DBC	DLA2M-48D3	DLA2M-24D3	DLA2M-12D3	DLA2M-06DBC	DLA2M-06D3	
Versions	DLA-xxx : standard version 1-pair (line continuity in case of removal of plug-in module) DLA2-xxx : standard version 2-pairs (line continuity in case of removal of plug-in module) DLAW-xxx : specific version 1-pair (line cut-off in case of removal plug-in module) DLAH-xxx : «remote supply» version 1-pair (max. line current IL = 2,4 A)							
Standards compliance	IEC 61643-21 / EN 61643-21 / UL497A							
Part number								
DLA range	6406011	640421	6403021	6403011	6402011	640121	6401011	
DLAH range	641005	641014	641004	641003	641002	641011	641001	
DLAW range	640805	-	640804	640803	640802	640811	640801	
DLA2 range	640611	-	640312	640311	640211	640131	640111	

DIN rail plug-in Surge Protector for 1-pair dataline/telecom with failure indicator

DLAS series



- 1-pair SPD for dataline
- Visual indicator in failsafe behaviour
- Line voltage from 6 to 48 Vdc
- Pluggable module
- DIN rail mounting , Screw terminal wirings
- Discharge currents I_{max}/I_n : 20 kA/ 5kA
- IEC/EN 61643-21 compliance

DLAS-xxxD3

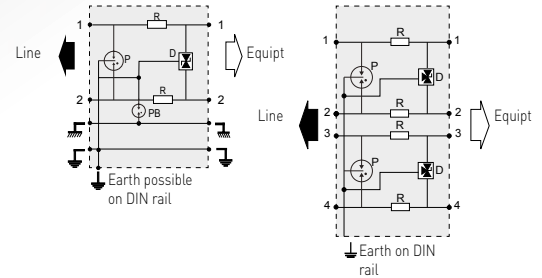
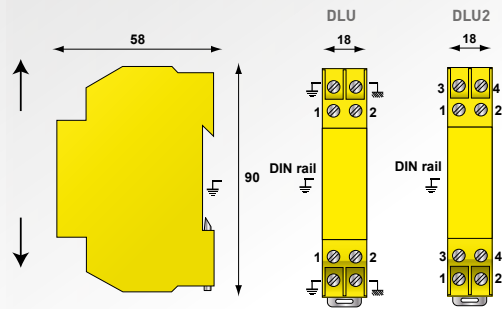


Characteristics

CITEL Model	DLAS-48D3	DLAS-24D3	DLAS-12D3	DLAS-06D3
Description	Telecom/Data SPD- 1-pair -DIN mounting - Pluggable			
Network	ISDN-T0, 48 V line	4-20 mA	RS232, RS485	RS422, RS485
SPD configuration	1-pair + shielded	1-pair + shielded	1-pair + shielded	1-pair + shielded
Nominal line voltage	Un 48 V	24 V	12 V	6 V
Max. DC operating voltage	Uc 53 V	28 V	15 V	8 V
Max. Load current	IL 300 mA	300 mA	300 mA	300 mA
Max. frequency	f max > 3 MHz	> 3 MHz	> 3 MHz	> 3 MHz
Insertion loss	< 1 dB	< 1 dB	< 1 dB	< 1 dB
Nominal discharge current - 8/20µs Test x 10 - C2 Category	In 5 kA	5 kA	5 kA	5 kA
Max. discharge current -max. withstand @ 8/20 µs by pole	I _{max} 20 kA	20 kA	20 kA	20 kA
Impulse current - 2 x 10/350µs Test - D1 Category	I _{imp} 5 kA	5 kA	5 kA	5 kA
Protection level	Up 70 V	40 V	30 V	20 V
Failsafe behavior	Opening line + indication			
Mechanical characteristics				
Dimensions	see diagram			
Format	Plug-in DIN box			
Connection to Network	screw terminal - cross section 0.4-1.5 mm ²			
End of life	transmission interrupt - default mode 3			
Disconnection indicator	Red indicator			
Mounting	Symmetrical rail 35 mm (EN60715)			
Operating temperature	-40/+85°C			
Protection rating	IP20			
Housing material	Thermoplastic UL94-V0			
Spare module	DLASM-48D3	DLASM-24D3	DLASM-12D3	DLASM-06D3
Standards compliance	IEC 61643-21 / EN 61643-21 / UL497A			
Part number	641304	641303	641302	641301

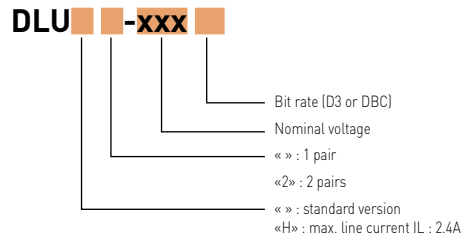
DIN rail Surge Protector for dataline/telecom

DLU, DLU2 series



P : 3-electrode gas tube
 Pb : 2-electrode gas tube
 R : Resistor (or L : inductor for DLUH version)
 D : Clamping diode

- For «DIN» rail mounting
- All types of Telephone and Data lines
- Monobloc housing
- 2-pair version (DLU2)
- Transmission and protection of shield wire (DLU)
- IEC 61643-21 compliance
- UL497 A approved



Characteristics

CITEL Model	DLU-170	DLU-48DBC	DLU-48D3	DLU-24D3	DLU-12D3	DLU-06DBC	DLU-06D3
	DLU2-170	DLU2-48DBC	DLU2-48D3	DLU2-24D3	DLU2-12D3	DLU2-06DBC	DLU2-06D3
Description	Telecom/Data SPD- 1 or 2-pair -DIN mounting - Monobloc						
Network	Telephone line, ADSL, SDSL, SHDSL VDSL2	Fipway, WorldFIP, FieldBus-H2,	48V line, ISDN-T0, Profibus-PA	4-20mA, 24V line	Profibus-FMS, Interbus, FieldBus-H1, Batibus, RS232, RS485	6V line, High bitrate, MIC/T2, 10BaseT	RS422 RS485*
SPD configuration	DLU 1-pair + shielded	1-pair + shielded	1-pair + shielded	1-pair + shielded	1-pair + shielded	1-pair + shielded	1-pair + shielded
	DLU2 2 pairs	2 pairs	2 pairs	2 pairs	2 pairs	2 pairs	2 pairs
Nominal line voltage	Un 150 V	48 V	48 V	24 V	12 V	6 V	6 V
Max. DC operating voltage	Uc 170 V	53 V	53 V	28 V	15 V	10 V	10 V
Max. Load current	IL 300 mA	300 mA	300 mA	300 mA	300 mA	300 mA	300 mA
Max. frequency	f max > 10 MHz	> 20 MHz	> 3 MHz	> 3 MHz	> 3 MHz	> 20 MHz	> 3 MHz
Insertion loss	< 1 dB	< 1 dB	< 1 dB	< 1 dB	< 1 dB	< 1 dB	< 1 dB
Nominal discharge current	In 5 kA	5 kA	5 kA	5 kA	5 kA	5 kA	5 kA
8/20µs Test x 10 - C2 Category							
Max. discharge current -max. withstand @ 8/20 µs by pole	Imax 20 kA	20 kA	20 kA	20 kA	20 kA	20 kA	20 kA
Impulse current	Iimp 5 kA	5 kA	5 kA	5 kA	5 kA	5 kA	5 kA
2 x 10/350µs Test - D1 Category							
Protection level	Up 220 V	75 V	70 V	40 V	30 V	25 V	20 V
Failsafe behavior	Short-circuit	Short-circuit	Short-circuit	Short-circuit	Short-circuit	Short-circuit	Short-circuit

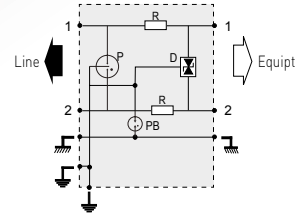
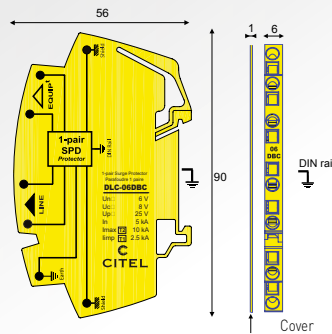
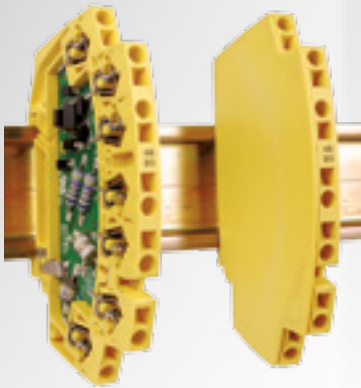
Mechanical characteristics

Dimensions	see diagram
Format	DIN box
Connection to Network	screw terminal - cross section 0.4-1.5 mm ²
Disconnection indicator	transmission interrupt - default mode 2
Mounting	Symmetrical rail 35 mm
Operating temperature	-40/+85°C
Protection rating	IP20
Housing material	Thermoplastic UL94-V0
Versions	DLU-xxx : version 1 pair DLU2-xxx : version 2 pairs DLUH-xxx : «remote supply» version 1-pair (max. line current IL = 2,4 A) DLUH2-xxx : «remote supply» version 2 pairs (max. line current IL = 2,4 A)
Standards compliance	IEC 61643-21 / EN 61643-21 / UL497A

Part number

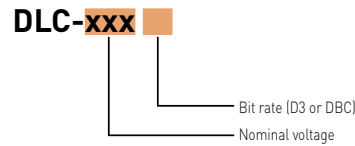
DLU range	640505	640514	640504	640503	640502	640511	640501
DLUH range	640705	640714	640704	640703	640702	640711	640701
DLU2 range	640405	640434	640404	640401	640403	640431	640402
DLUH2 range	-	640744	640734	640733	640732	640741	640731

1-pair DIN rail Surge Protector for dataline/telecom DLC series



P : 3-electrode gas tube
PB : 2-electrode gas tube
R : Resistor
D : Clamping diode

- For «DIN» rail mounting
- All types of Telephone and Data lines
- Monobloc housing and very compact
- Protection of shield wire
- IEC 61643-21 compliance



Characteristics

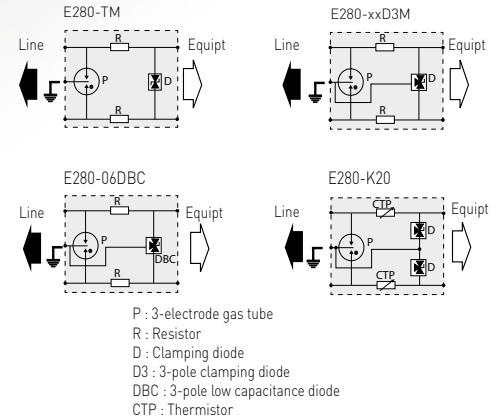
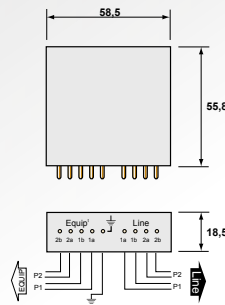
CITEL Model	DLC-170	DLC-48DBC	DLC-48D3	DLC-24D3	DLC-12D3	DLC-06DBC	DLC-06D3
Description	1-pair monobloc Telecom surge protector						
Network	Telephone line, ADSL2, SDSL	Fipway, WorldFIP, FieldBus-H2	RNIS-T0, Line 48V	LS, 4-20mA	RS232, RS485	MIC/T2, 10BaseT	RS422, RS485*
SPD configuration	1-pair + shielded	1-pair + shielded	1-pair + shielded	1-pair + shielded	1-pair + shielded	1-pair + shielded	1-pair + shielded
Nominal line voltage	Un 150 V	48 V	48 V	24 V	12 V	6 V	6 V
Max. DC operating voltage	Uc 170 V	53 V	53 V	28 V	15 V	8 V	8 V
Max. Load current	IL 300 mA	300 mA	300 mA	300 mA	300 mA	300 mA	300 mA
Max. frequency	f max > 10 MHz	> 20 MHz	> 3 MHz	> 3 MHz	> 3 MHz	> 20 MHz	> 3 MHz
Insertion loss	< 1 dB	< 1 dB	< 1 dB	< 1 dB	< 1 dB	< 1 dB	< 1 dB
Nominal discharge current 8/20µs Test x 10 - C2 Category	In 5 kA	5 kA	5 kA	5 kA	5 kA	5 kA	5 kA
Max. discharge current -max. withstand 8/20 µs by pole	Imax 10 kA	10 kA	10 kA	10 kA	10 kA	10 kA	10 kA
Impulse current 2 x 10/350µs Test - D1 Category	Iimp 2.5 kA	2.5 kA	2.5 kA	2.5 kA	2.5 kA	2.5 kA	2.5 kA
Protection level	Up 220 V	70 V	70 V	40 V	30 V	25 V	25 V
Failsafe behavior	Short-circuit	Short-circuit	Short-circuit	Short-circuit	Short-circuit	Short-circuit	Short-circuit
Mechanical characteristics							
Dimensions	see diagram						
Format	DIN box						
Connection to Network	by spring - max. cross section 1.5 mm ²						
Disconnection indicator	transmission interrupt - default mode 2						
Mounting	Symmetrical rail DIN 35 mm (EN60715)						
Operating temperature	-40/+85°C						
Protection rating	IP20						
Housing material	Thermoplastic UL94-V0						
Standards compliance	IEC 61643-21 / EN 61643-21 / UL497A						
Part number	641105	641114	641104	641103	641102	641111	641101



* usable on RS485 line with operating voltage < 6V

2-pair plug-in Surge Protector

E280 series



- 2 pairs plug-in module
- Optimized modularity and maintenance
- Can be adapted to all types of line
- Gas tube / diode combination
- EN 61643-21 compliance

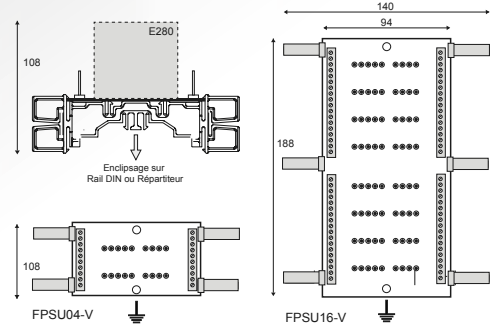
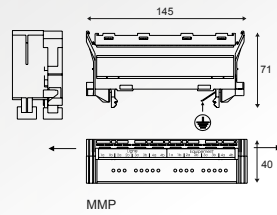
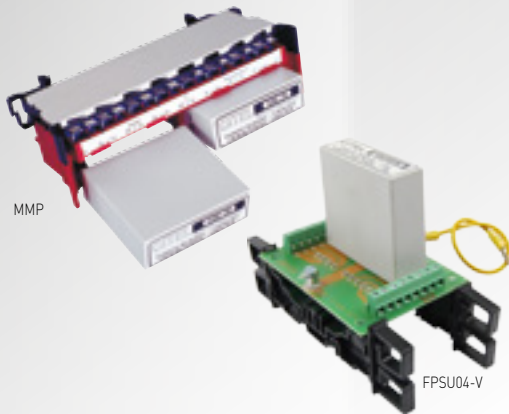
Characteristics

CITEL Model		E280-TM	E280-K20	E280-48D3M	E280-48DBC	E280-24D3M	E280-12D3M	E280-06D3M	E280-06DBC
Description		2-pair plug-in surge protector							
Network		Telephone line, ADSL, SDSL, SHDSL	Telephone line K20 standard	ISDN-T0, 48 V line	RNIS-T0, 48 V line	LS, 4-20mA	RS232,RS485	RS422, RS485*	MIC/T2, 10BaseT
Nominal line voltage	Un	150 V	150 V	48 V	48 V	24 V	12 V	6 V	6 V
Max. DC operating voltage	Uc	170 V	190 V	53 V	53 V	28 V	15 V	8 V	8 V
Max. Load current	IL	300 mA	150 mA	300 mA	300 mA	300 mA	300 mA	300 mA	300 mA
Max. frequency	f max	10 MHz	3 Mhz	3 MHz	20 MHz	3 MHz	3 MHz	3 MHz	20 MHz
Insertion loss		< 1 dB	< 1 dB	< 1 dB	< 1 dB	< 1 dB	< 1 dB	< 1 dB	< 1 dB
Nominal discharge current	In	5 kA	5 kA	5 kA	5 kA	5 kA	5 kA	5 kA	5 kA
8/20µs Test x 10 - C2 Category									
Max. discharge current -max. withstand @ 8/20 µs by pole	Imax	10 kA	10 kA	10 kA	10 kA	10 kA	10 kA	10 kA	10 kA
Impulse current	Iimp	2.5 kA	2.5 kA	2.5 kA	2.5 kA	2.5 kA	2.5 kA	2.5 kA	2.5 kA
2 x 10/350µs Test - D1 Category									
Protection level	Up	220 V	260 V	70 V	75 V	40 V	30 V	20 V	25 V
Failsafe behavior		Short-circuit	Short-circuit	Short-circuit	Short-circuit	Short-circuit	Short-circuit	Short-circuit	Short-circuit
Mechanical characteristics									
Dimensions		see diagram							
Format		plug-in modul on support							
Disconnection indicator		transmission interrupt - default mode 2							
Mounting		on support type BN, FPSU, MMP							
Operating temperature		-40/+85°C							
Protection rating		IP20							
Housing material		Thermoplastic UL94-V0							
Standards compliance		IEC 61643-21 / EN 61643-21 / UL497A							
Certification		UL listed							
Part number		71186	71192	71184	71174	71183	71182	71181	71171

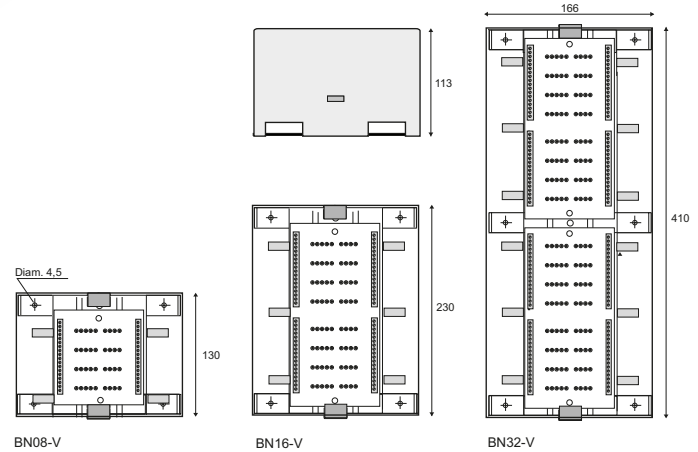


* usable on RS485 line with operating voltage < 6V

Support for E280 plug-in modules BN , FPSU , MMP



- Support for E280 plug-in modules
- BN series : metal enclosures for 8, 16 or 32 pairs
- FPSU series : MDF or DIN rail mounting for 4 or 16 pairs
- FP series : Wall mounting plate for 10 or 25 pairs
- MMP module : Connector strip for 4 pairs

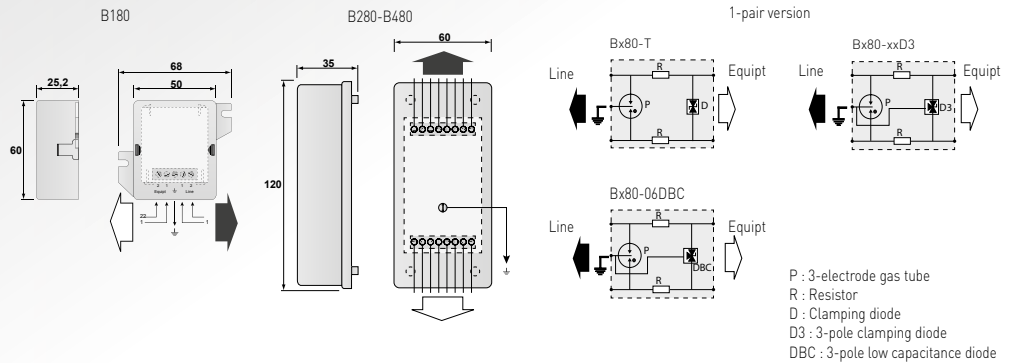
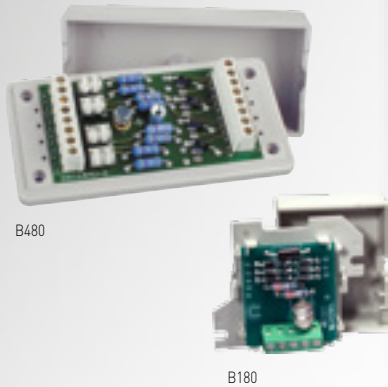


Characteristics

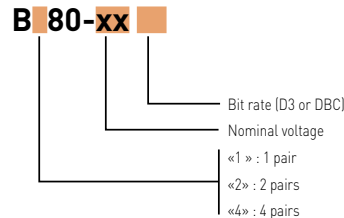
CITEL Model		BN08-V	BN16-V	BN32-V	FPSU04-V	FPSU16-V	FP10-QC	FP25-QC	MMP
Description		Support for E280 plug-in modules	Support for E280 plug-in modules	Support for E280 plug-in modules	Support for E280 plug-in modules	Support for E280 plug-in modules	Support for E280 plug-in modules	Support for E280 plug-in modules	Support for E280 plug-in modules
SPD configuration		8 pairs max	16 pairs max	32 pairs max	4 pairs max	16 pairs max	10 pairs max	25 pairs max	4 pairs max
Max. number of E280s		4	8	16	2	8	5	13	2
Max. Load current	IL	10 A	10 A	10 A	10 A	10 A	10 A	10 A	5 A
Max. frequency	f max	20 MHz	20 MHz	20 MHz	20 MHz	20 MHz	20 MHz	20 MHz	20 MHz
Insertion loss		< 1 dB	< 1 dB	< 1 dB	< 1 dB	< 1 dB	< 1 dB	< 1 dB	< 1 dB
Nominal discharge current	In	5 kA	5 kA	5 kA	5 kA	5 kA	5 kA	5 kA	5 kA
8/20µs Test x 10 - C2 Category									
Max. discharge current -max.	Imax	10 kA	10 kA	10 kA	10 kA	10 kA	10 kA	10 kA	10 kA
withstand @ 8/20 µs by pole									
Impulse current	Iimp	2.5 kA	2.5 kA	2.5 kA	2.5 kA	2.5 kA	2.5 kA	2.5 kA	2.5 kA
2 x 10/350µs Test - D1 Category									
Mechanical characteristics									
Dimensions		see diagram							
Connexion		screw terminal - max. section 1,5 mm ²			Screw terminal - section max. 1,5 mm ²	connector QC 66			connector CAD
Mounting		Wall			MDF Din rail	Wall			MDF
Operating temperature		-40/+85°C			-40/+85°C	-40/+85°C			-40/+85°C
Protection rating		IP20			IP20	IP20			IP20
Housing material		Metal			-	-			Thermoplastic UL94-V0
Part number		71347	71356	71377	71442	71472	71435	71475	71480

*] Compatible with MDF profile : PA015001 (Infra+), HPU (3M-Pouyet), 09649 (Alcatel) and CITEL profile

1,2 and 4-pair Surge Protectors B180, B280, B480 series



- 1 to 4-pair surge protection units
- All types of telephone and data lines
- Removable protection circuit
- Wall mounting and screw connection
- IEC 61643-21 compliance
- UL497 A

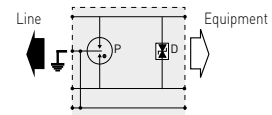
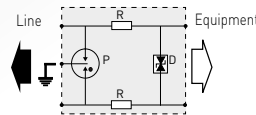
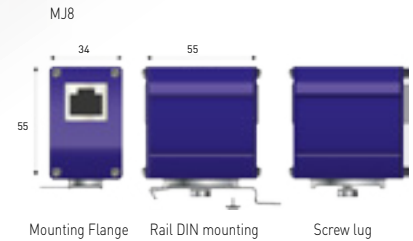
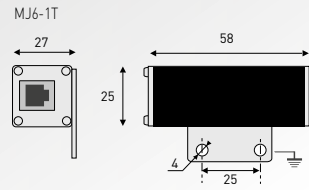


Characteristics

CITEL Model	B180-T	B180-48D3	B180-48DBC	B180-24D3	B180-12D3	B180-06D3	-	
	B280-T	B280-48D3	B280-48DBC	B280-24D3	B280-12D3	B280-06D3	B280-06DBC	
	B480-T	B480-48D3	B480-48DBC	B480-24D3	B280-12D3	B480-06D3	B480-06DBC	
Description	Surge protector box - 1, 2 or 4 pairs							
Network	Tephone line, ADSL, SDSL, SHDSL	ISDN-T0, 48 V line	RNIS-T0, 48 V line	LS, 4-20 mA	RS232, RS485	RS422 RS485*	MIC/T2, 10BaseT	
SPD configuration	B180 B280 B480	1 pair 2 pairs 4 pairs	1 pair 2 pairs 4 pairs	1 pair 2 pairs 4 pairs	1 pair 2 pairs 4 pairs	1 pair 2 pairs 4 pairs	- 2 pairs 4 pairs	
Nominal line voltage	Un	150 V	48 V	48 V	24 V	12 V	6 V	
Max. DC operating voltage	Uc	170 V	53 V	53 V	28 V	15 V	8 V	
Max. Load current	IL	300 mA	300 mA	300 mA	300 mA	300 mA	300 mA	
Max. frequency	f max	10 MHz	3 MHz	20 MHz	3 MHz	3 MHz	20 MHz	
Insertion loss		< 1 dB	< 1 dB	< 1 dB	< 1 dB	< 1 dB	< 1 dB	
Nominal discharge current <i>8/20µs Test x 10 - C2 Category</i>	In	5 kA	5 kA	5 kA	5 kA	5 kA	5 kA	
Max. discharge current <i>max. withstand @ 8/20 µs by pole</i>	Imax	20 kA	20 kA	20 kA	20 kA	20 kA	20 kA	
Impulse current <i>2 x 10/350µs Test - D1 Category</i>	Iimp	2.5 kA	2.5 kA	2.5 kA	2.5 kA	2.5 kA	2.5 kA	
Protection level	Up	220 V	70 V	75 V	40 V	30 V	20 V	
Failsafe behavior		Short-circuit	Short-circuit	Short-circuit	Short-circuit	Short-circuit	Short-circuit	
Mechanical characteristics								
Dimensions	see diagram							
Format	wall mounting box							
Disconnection indicator	transmission interrupt - default mode 2							
Mounting	wall (screws non included)							
Operating temperature	-40/+85°C							
Protection rating	IP20							
Housing material	Thermoplastic UL94-V0							
Spare unit	S180-T	S180-48D3	S180-48DBC	S180-24D3	S180-12D3	S180-06D3	-	
Spare unit	S280-T	S280-48D3	S280-48DBC	S280-24D3	S280-12D3	S280-06D3	S280-06DBC	
Spare unit	S480-T	S480-48D3	S480-48DBC	S480-24D3	S280-12D3	S480-06D3	S480-06DBC	
Standards compliance	IEC 61643-21 / EN 61643-21 / UL497A							
Certification	UL listed							
Part number								
B180 range	510602	510402	510412	510302	510202	510102	-	
B280 range	72726	72774	72754	72773	72772	72771	72751	
B480 range	72746	72794	72800	72793	72772	72791	72798	

Telecom Surge Protectors

MJ8, MJ6-1T



P : 3-pole gas tube
R : Resistor
D : Clamping Diode

- Protection for one telephone line
- For PSTN, ISDN, ADSL lines
- Quick installation
- RJ11 or RJ45 connectors
- IEC 61643-21 compliance
- UL497A

Characteristics

CITEL Model		MJ6-1T	MJ8-ISDN	MJ8-170V
Description		RJ11 surge protector for 1 telephone line	RJ45 surge protector for 1 ISDN line	Surge protector for telephone line 1 to 4-pairs
Network		RTC, ADSL2, SDSL, 1 pair	ISDN	RTC, ADSL2, SDSL, SHDSL, VDSL2 - 4 pairs
Max. data rate		30 Mbps	30 Mbps	30 Mbps
SPD configuration		1-pair + shielded	2 pairs + shielded	4 pairs + shielded
Pin outs		1-pair (3-4)	2-pairs (3-6)(4-5)	4-pairs (1-2)(3-6)(4-5)(7-8)
Nominal line voltage	Un	150 V	48 Vdc	150 Vdc
Max. DC operating voltage	Uc	170 Vdc	60 Vdc	170 Vdc
Max. Load current (if connection serie)	IL	300 mA	1000 mA	1000 mA
Max. frequency	f max	10 MHz	10 MHz	10 MHz
Insertion loss		< 1 dB	< 1 dB	< 1 dB
Line/Ground Nominal discharge current	In	2500 A	2000 A	2000 A
<i>8/20µs Test x 10 - C2 category</i>				
Nominal discharge current Line/Line	In	2500 A	500 A	500 A
<i>8/20µs Test x 10 - C2 category</i>				
Impulse current - 2 x 10/350µs Test - D1 Category	Iimp	500 A	500 A	500 A
Protection level	Up	220 V	70 V	220 V
Failsafe behavior		Short-circuit	Short-circuit	Short-circuit
Mechanical characteristics				
Dimensions		see diagram		
Format		RJ11 Connector	RJ45 connector	
Connection to Network		RJ11 connector female input/output	RJ45 connector female input/output	
Disconnection indicator		transmission interrupt - default mode 2		
Mounting		Mounting flange, Screw lug	Mounting flange, Screw lug, DIN Rail	
Operating temperature		-40/+85°C		
Protection rating		IP20		
Housing material		Aluminium		
Standards compliance		IEC 61643-21 / EN 61643-21 / UL497A		
Part number		560402	560209	560203

