

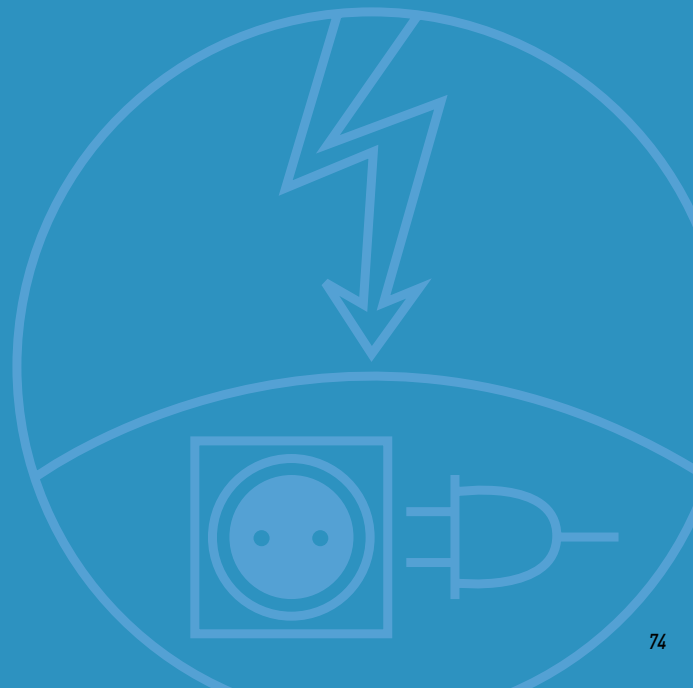


CITEL



AC POWER

Surge Protectors



AC Surge Protectors Hard-wired Units and Combiner boxes



CITEL offers a line of surge protectors for the single and three phase AC networks connected to sensitive equipment. These products, are available in various formats:

- Hard-wired units single-phase (MSB, MLP)
- Hard-wired units and combiner box for US market (M serie)




Hard-wired surge protector

MSB series

SPDs Type 2 or 3 for effective protection of sensitive equipment, in addition to the surge protector installation (coordination surge protector). Recommended installation near a sensitive equipment away from the surge protector (> 10 m). These surge protectors utilize a compact and economical scheme based varistors, to obtain a power flow relevant for secondary protection. They are more in accordance with NF EN 61643-11, equipped with internal security which will disconnect the product of their networks for end of life. The operating condition of the arrester is signaled by light (or buzzer for version MSB6). Available in screw terminal connectors or son.

MLP / MLPC series

Complete ranges of compact surge protectors specifically designed for the protection of outdoor lighting equipment with LED technology (see page 83).

Series		Description	Characteristics	Page
MSB		Hard-wired surge protector Type 2 or 3	compact	77-78
M50		Hard-wired surge protector US market	Single-phase or 3-phase	79
M MDS		Surge protector combiner boxes US market	Compliance UL1449 80 to 200 kA	80-81

Metallic enclosure stand alone SPD

M series

M series surge protection devices (M50, M100, M200 and MDS) in metal enclosures belong to a complete family of surge protection devices specifically designed to meet the requirements of the North American surge protection standards: USA and Canada. Respectively, the UL1449 ed4 standard and the C22.2 No.269.1-22.2 No.269.5 standards. These standards define different categories of surge protection devices (SPD) and unfortunately use very close or identical terms compared to the SPD classification used in international and European standards. It is therefore crucial not to confuse these terms and understand their meaning based on the reference standards.

UL Standards

Type 1 - Permanently connected surge protection devices to be installed both, on the supply side and the load side of the equipment main overcurrent protective device. The surge protection devices are supposed to be self-protected against short circuits and do not require external protection.

Type 2 - Permanently connected surge protection devices to be installed on the load side of the equipment main overcurrent protective device. This surge protection device requires an external short circuit protection device.

Type 3 - Surge protection devices installed at a conductor length of 10 meters or greater from the electrical panel. For example, the mobile surge protectors (that can be plugged into the outlet such as a multiple power outlet etc.). They can also be directly installed on the equipment to be protected.

Type 4 « Component Assemblies » - Component Assemblies consisting of one or more Type 5 components and a disconnect complying with the limited end-of-life short circuit current tests (0.5A, 2.5A, 5A and 10A).

Type 1, 2, 3 « Component Assemblies » - Type 4 Component Assemblies having, in addition to the limited end-of-life short circuit current tests, passed all the other end-of-life tests (under the short circuit current of 100A, 500A, 1000A and SCCR) and also with (2CA) or without (1CA) external short circuit protection

Type 5 - Discrete component surge suppressors, such as MOVs, Diode or GDT that may be mounted on a PWB, connected by its leads or provided within an enclosure with mounting means and wiring terminations.

It is therefore clear from these definitions that Type 1 and Type 2 surge protection devices (according to the US-accepted terminology) are not necessarily linked to potential surge hazard as it is in the European approach. Type 1 and Type 2 surge protection devices are determined by the fact whether or not they need a short circuit protection. However, depending on the impulse tests, the minimum levels required for a Type 1, Type 2 and Type 3 surge protection devices are as follows :

Type 1 – 10kA or 20kA 8/20

Type 2 – 3kA, 5kA, 10kA or 20kA 8/20

Type 3 – 6kV/3kA 1,2/50-8/20

It is also understood that the location of the surge protection device imposed by its type is related to a certain stress level naturally being such that: the closer the surge protection device is to the mains connection point the greater its ability to withstand the surge.

Note that the maximum nominal discharge current is set at 20 kA (equivalent to European nominal discharge current (In) but it has no limitation and much lower in energy than the maximum impulse current (Iimp) of European Type 1).

Also important to remember that even if it is very tempting to compare the American voltage protection rating (VPR) and the European voltage protection level (Up), they are not (yet) comparable. The VPR is determined for any type of American SPD by using by a 6 kV, 3 kA combination waveform generator. However, it should be noted that the European Type 3 and the American Type 3 have a lot of similarities.

The concept of “Listed” or “Recognized”

is important to understand particularly regarding the installation according to the American installation rules. A listed product is a device that any electrician can install on an installation (on site) without compromising safety. A recognized device cannot be installed on an installation. It can only be installed on a piece of equipment or a system (e.g. electrical cabinet) by professionals, at the factory, following certain rules and may be a subject to additional tests.

Another disconcerting and confusing aspect is the maximum discharge current (Imax) values indicated for American surge protection devices:

- For an European surge protection device, the Imax value is defined by standards and must be tested if declared.

- For an American surge protection device, Imax has no official definition and completely open to various interpretations by users and manufacturers.

The easiest interpretation is that the Imax does not represent a maximum single shock that the surge protection device can withstand but reflects its durability. This Imax is the algebraic sum of the individual Imax values of possible multiple varistors connected in parallel for each declared protection mode.

For example, if the protection mode (common in the United States) phase with the neutral and the ground connected (usually called “per phase”) consists of 5 varistors between the line and the neutral and 5 varistors between the line and the earth (each varistor having an individual Imax value of 40kA), the final declared Imax value will be 5x40+5x40=400kA...

This type of value totally escapes the European logic but is useful information for American users as it gives an idea of the surge protection device capacity in terms of its service life.

Other example, a surge protection device with a In of 20kA and declared Imax of 40kA will not be able to withstand more than 20 shocks of 20kA. On the other hand, a surge protection device having the same In of 20kA and declared Imax of 400kA will be able to withstand more than 2000 shocks of 20kA!

Conversely, the European Type 1 design with its characteristic of 10/350 wave maximum impulse current (Iimp) is completely unknown (and rejected) in America.

4th Edition	Line Side of Main Disconnect	Load Side of Main Disconnect	Local Equipment	Surge component + Thermal Disconnect (component assembly)	Surge Component Only
	<i>No upstream fuse requested</i>	<i>Upstream fuse requested</i>	<i>Upstream fuse requested + distant 30ft from main panel</i>	<i>To be used in equipment/panel. UL additional tests expected</i>	<i>To be used in equipment UL additional test expected</i>
Listed	Type 1	Type 2	Type 3	-	-
Listed + condition (enclosure) (a)	Open- Type 1	Open- Type 2	Open- Type 3	-	-
Recognized (b)	Type 1CA	Type 2CA	Type 3CA	Type 4CA	Type 5
Required Tests	- SCCR - Intermediate - Limited (10, 5, 2.5 , 0.5 A) - VPR at 6kV/3kA - Nominal Discharge Current (15 x In: 10, 20 kA) - -	- SCCR - Intermediate - Limited (10, 5, 2.5 , 0.5 A) - VPR at 6kV/3kA - Nominal Discharge Current (15 x In: 3, 5, 10, 20 kA) - -	- - - Limited (10, 5, 2.5 , 0.5 A) - VPR at 6kV/3kA - - Operating Duty Cycle (6kV/3kA x 15) -	- - - Limited (10, 5, 2.5 , 0.5 A) - VPR at 6kV/3kA - Nominal Discharge Current (15 x In: 10, 20 kA) - - MLV at In	- - - - Nominal Discharge Current (15 x In: 10, 20 kA) - - MLV at In
Optional Tests			- Nominal Discharge Current (In x 15)		

(a) field wiring. Can be installed by any electrician on field

(b) factory wiring/use. Cannot be installed on field. Must be installed in certified factory in products (Listed or recognised)