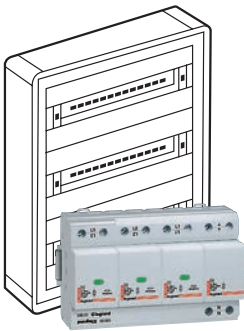
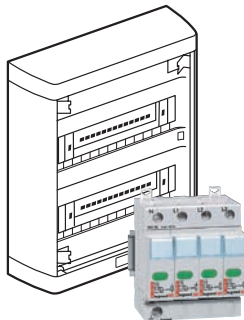
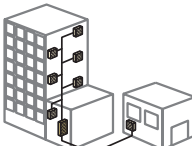
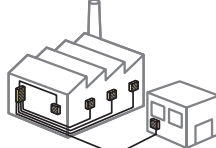


Select your V.S.P. and its associated protection

VSP - Voltage Surge Protection

STEP 1 Define the type of building	STEP 2 Define the risk level and the network type	STEP 3 + 4 Optimize protection against lightning effects (V.S.P cascading) and Protect the installation against short-circuits and overloads		
		LEVEL 1 MAIN BOARD		LEVEL 2 DISTRIBUTION BOARD
				
RESIDENTIAL BUILDINGS AND SMALL OFFICES	RISK LEVEL	NETWORK TYPE	V.S.P + ASSOCIATED PROTECTION $I_{cc} \leq 6 \text{ kA}$	V.S.P + ASSOCIATED PROTECTION $I_{cc} \leq 6 \text{ kA}$
 INDIVIDUAL HOUSES	Very high 	1P+N	2 x 039 10 + 064 72	039 41 + 064 69
		3P	3 x 039 10 + 064 92	3 x 039 40 + 064 89
		3P+N	4 x 039 10 + 065 67	039 43 + 065 64
AND				
 BLOCKS OF FLATS	High 	1P+N	039 31 + 064 69	039 41 + 064 69
		3P	039 32 + 064 89	3 x 039 40 + 064 89
		3P+N	039 33 + 065 64	039 43 + 065 64
AND				
 SMALL OFFICES	Medium 	1P+N	039 41 + 064 69	039 41 + 064 69
		3P	3 x 039 40 + 064 89	3 x 039 40 + 064 89
		3P+N	039 43 + 065 64	039 43 + 065 64
OFFICES AND INDUSTRIAL BUILDINGS	RISK LEVEL	NETWORK TYPE	V.S.P + ASSOCIATED PROTECTION $I_{cc} \leq 50 \text{ kA}$	V.S.P + ASSOCIATED PROTECTION $I_{cc} \leq 25 \text{ kA}$
 OFFICE BUILDINGS	Very high 	1P+N	-	039 31 + 069 21
		3P	030 22 + 3 x 173 65 (T1) (IT earthing system: 3 x 030 00 + 3 x 173 65 (T1))	039 32 + 069 41
		3P+N	030 23 + 3 x 173 65 (T1) (IT+N earthing system: 4 x 030 00 + 4 x 173 65 (T1))	039 33 + 070 01
AND				
 INDUSTRIAL BUILDINGS	High 	1P+N	-	039 31 + 069 21
		3P	039 22 + 071 33	039 32 + 069 41
		3P+N	039 23 + 071 48	039 33 + 070 01
	Medium 	1P+N	-	039 31 + 069 21
		3P	039 22 + 071 33	039 32 + 069 41
		3P+N	039 23 + 071 48	039 33 + 070 01

Some items sold separately

For pack quantity, please refer to numerical index pages

For trade price, please see your local HPM Legrand representative for the current price list

Select your V.S.P. and its associated protection

For a complete protection all incoming lines (entering into the buildings) should be protected with V.S.Ps.

■ Define the risk level (STEP 2)

Irrespective of the requirements in the standards, the use of a voltage surge protector is strongly recommended in most cases (continuity of service, cost of equipment, etc.). Voltage surge protectors can be chosen for any type of installation based on the risk levels, which are defined as follows:

Risk level:



- Very high risk: installation equipped with external lightning conductors (L.P.S.), with a metal structure higher than surrounding buildings (or any object that can act as a lightning conductor), an installation that is isolated and located at a high point, or an installation that has been subject to previous lightning strikes

IEC 60364: V.S.P. compulsory at the origin of the installation (main board) with L.P.S. (lightning protection system)



- High risk: installation with overhead power supply, in a mountainous area, isolated, at the end of a line, near a body of water, trees, etc.

IEC 60364: V.S.P. compulsory with overhead lines in AQ2 areas (see p. 163)



- Medium risk: other types of installation (installations in urban areas, in low, flat areas and low and medium height mountainous areas, underground power supplies, etc.)

■ Optimize protection (STEP 3)

Protection of an installation against transient overvoltages can only generally be guaranteed with several levels of voltage surge protectors used together in cascade. In addition to the energy aspect explained below, 2 or 3 levels of voltage surge protectors are in fact usually necessary in order to limit overvoltages connected with the fact that lightning is a high frequency phenomenon.

In order to limit overvoltages as much as possible, a voltage surge protector must always be installed as close as possible to the equipment to be protected. However, proximity protection (Level 3) on its own can only protect the equipment connected to it downstream, and above all, it cannot adequately limit the energy. To do this, a voltage surge protector is necessary at the head of the installation (Level 1) to shunt the majority of the energy to earth.

Likewise, a voltage surge protector on its own at the head of the installation (Level 1) cannot protect the whole installation and the equipment connected to it, due to the fact that it allows residual energy to pass and that lightning is a high frequency phenomenon. For these reasons, depending on the scale of the installation and the types of risk (exposure and sensitivity of equipment, criticality of continuity of service), circuit protection (Level 2) is necessary in addition to protection of the head of the installation

■ Protect the installation against short-circuit and overloads (STEP 3)

The supply circuit of the VSP must always be protected against short-circuits and overloads by its associated protection device in accordance with discrimination rules.

Select the associated MCB (DX, DX-H or DX-L) with the short-circuit rating adapted to your installation requirements

V.S.P. Cat. No.	039 10/20/21/22/23			039 30/31/32/33/40/41/43		
Icc	2P	3P	4P	2P	3P	4P
≤ 10 kA	064 72	064 92	065 67	064 69	064 89	065 64
≤ 15 kA	069 24	069 44	070 04	069 21	069 41	070 01
≤ 25 kA	071 18	071 33	071 48	069 21	069 41	070 01
≤ 50 kA	071 18	071 33	071 48	Not allowed	Not allowed	Not allowed

Voltage surge protectors



039 21



039 33



039 34



Technical characteristics (p. 86 - 87)



Dimension (p. 100)



Type 2 voltage surge protectors (V.S.P.) for main boards, distribution boards and consumer units

Conform to standards IEC 61643-1 and EN 61643-11

3 different impulse discharge ratings

For 230/400 VA - 50/60 Hz networks

Pack	Cat. No.	Main board protection		
		High protection - H - Class I + II I_{max} = 70 kA		
		Earthing systems: TT, TN, IT		
		Consist of a base and a plug-in replacement module provided with a status indicator		
		- Green: surge protector operational - Orange: module needs replacing		
		Can be equipped with auxiliary contacts for remote monitoring purpose (p. 108)		
		Number of poles	Associated protection	Number of modules
1	039 20 ⁽¹⁾	1P	40A - C curve	1
1	039 21 ⁽¹⁾	2P	40A - C curve	2
1	039 22 ⁽¹⁾	3P	40A - C curve	3
1	039 23 ⁽¹⁾	4P	40A - C curve	4
		Distribution board protection		
		For electrical equipment located at more than 30 m from the main distribution board		
		Consist of a base and a plug-in replacement module provided with a status indicator		
		- Green: surge protector operational - Orange: module needs replacing		
		Can be equipped with auxiliary contacts for remote monitoring purpose (p. 108)		
		Increased protection - I - Class II - I_{max} = 40 kA		
		Earthing systems: TT, TN, IT		
		Number of poles	Associated protection	Number of modules
1	039 30 ⁽¹⁾	1P	20A - C curve	1
1	039 31 ⁽¹⁾	2P	20A - C curve	2
1	039 32 ⁽¹⁾	3P	20A - C curve	3
1	039 33 ⁽¹⁾	4P	20A - C curve	4
		Standard protection - S - Class II - I_{max} = 15 kA		
		Earthing systems: TT, TN		
		Number of poles	Associated protection	Number of modules
1	039 40 ⁽¹⁾	1P	20A - C curve	1
1	039 41 ⁽¹⁾	2P	20A - C curve	2
1	039 43 ⁽¹⁾	4P	20A - C curve	4
		Replacement modules for type 2 V.S.P.		
5	039 28	For V.S.P. Cat. No. 039 20/21/22/23		
5	039 34	For V.S.P. Cat. No. 039 30/31/32/33		
5	039 44	For V.S.P. Cat. No. 039 40/41/43		
5	039 39	For V.S.P. Cat. No. 039 35/36/38 (old model voltage surge protector)		

(1) Associated protection: MCBs DX, DX-H, DX-L or equivalent ranges according to required breaking capacity

Voltage surge protectors

For telephone lines and accessories for low voltage V.S.P.



038 28



038 29



039 63



Dimensions (p. 100)
Technical characteristics (p. 86 - 87)

Pack Cat. No. Voltage surge protector for telephone lines and data networks

Recommended for complete protection of installations already equipped with low voltage V.S.P. on power lines (standard IEC 60364)
For protection of: telephone, fax, modem, etc., connected to the incoming telephone line, against overvoltages of atmospheric origin
Connected in series with the telephone line
Provided with a status indicator
• green: surge protector operational
• orange: surge protector needs replacing
Conform to standards EN 61643-21 and IEC 61643-21
Imax: 10 kA and In: 5 kA (8/20)

			Un (V)	Up (V)
1	038 28	Analogue (RTC and ADSL)	170	260
1	038 29	Digital (signal lines, current loops)	48	100

Signalling auxiliaries for low voltage V.S.P.

With changeover microswitch 2 A - 250 V~
Mounted onto the base of the surge protector (except Cat. No. 039 10)

1	039 56	For 2-pole module V.S.P.
1	039 57	For 3-pole module V.S.P.
1	039 58	For 4-pole module V.S.P.

Decoupling inductors for low voltage V.S.P.

Enable coordination between 2 V.S.P. in the same board, when minimum distance to insure proper V.S.P. coordination can not be respected
For multipole voltage surge protectors, each conductor (including the neutral conductor) must be equipped with one decoupling inductor

			Number of modules
1	039 62	Module for circuit 35 A - 500 V~	2
1	039 63	Module for circuit 63 A - 500 V~	4

Voltage surge protectors

■ Protection against lightning effects

Lightning directly or indirectly generates the following effects:

- thermal (blow-outs, fire)
- electrodynamic (loosening of terminals)
- rise in earth voltage (risk of electrocution)
- overvoltages of several thousand volts and destructive induced currents (damage to electrical and electronic equipment, interruption of operation)

Protection against the effects of lightning is based essentially on:

- catching and discharging the current to earth
- the use of voltage surge protectors
- the passive protection of the installation

Passive protection (poor, good) designates the part of the protection provided by the structure and the configuration of the installation itself (neutral earthing system, area, level of equipotentiality, etc.)

■ Voltage surge protectors and regulation

Voltage surge protector enable:

- protect sensitive devices against direct and indirect effects of lightning
- to limit harmful consequences on person security
- to insure the continuity of work

1 - Product standards EN 61643-11 and IEC 61643-1

Characterize voltage surge protectors in two main levels (types):

EN 61643-11	Type 1 (T1)	Type 2 (T2)
IEC 61643-1	Class I (T1)	Class II (T2)
VDE 0675-6 ⁽¹⁾	Class B	Class C
Type of wave	10/350 μ s	8/20 μ s
Main characteristics	limp (10/350) In (8/20)	In, Imax

(1) German standard VDE replaced by European standard EN 61643-11

2 - Installation standards: IEC 60364 (or equivalent electric national standards)

According to articles 443 and 534, the use of VSPs is required in new or renovated buildings in the following cases:

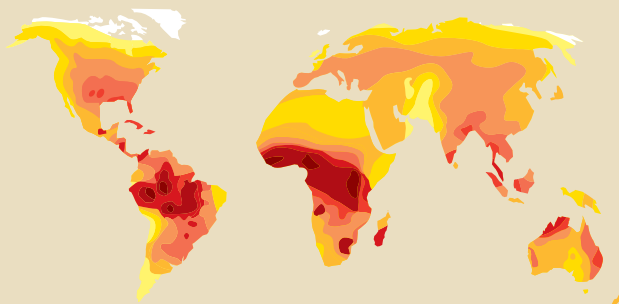
- buildings equipped with lightning conductors: type 1 VSPs
- buildings with overhead power supply in class AQ2 geographic zones (see map below: red zones): type 2 VSPs with In $\geq$ 5 kA
- buildings with medical services or equipped with safety systems (fire, etc.) in class AQ2 geographic zones: type 2 VSPs with In $\geq$ 5 kA

The use of VSPs is also strongly recommended in mountain areas, close to reaches of water or dominating structures (buildings, trees, etc.), in the cases of line end installations or installations located less than 50m from buildings equipped with lightning conductors⁽²⁾

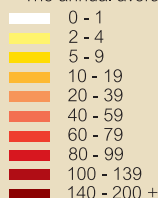
When VSPs are present on the power circuit, it is strongly advised to install a VSP on the communication circuits (telephone or data lines...)

(2) Lightning conductors: external protection of buildings against direct lightning impacts

■ Choice of the level lightning protection



The annual average of stormy days (Nk)



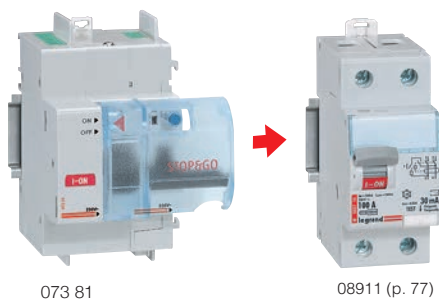
AQ2 areas : Nk > 25
IEC 60364 : V.S.P. mandatory for installations supplied with overhead low voltage lines and located in AQ2 areas

Some items sold separately

For pack quantity, please refer to numerical index pages

For trade price, please see your local HPM Legrand representative for the current price list

STOP&GO automatic resetting for DX™



073 81

08911 (p. 77)

Pack	Cat. No.	STOP&GO automatic resetting
		Clip on the left-hand side of devices Gives automatically an order of resetting of the associated device, following an unwanted tripping, caused by a temporary anomaly (such as lightning strikes) Verifies automatically the state of the installation, before resetting Visual and audible alarm signal in case of permanent fault detection (short-circuit or residual current) Compatible with the following devices: - RCDs: 2P - 2 modules - RCBOs: 2P - 2 modules - RCBOs: 2P - 4 modules - MCBs: 2P ≤ 63 A - 2 modules
1	073 81	Standard Control voltage: 230 V~
1	073 82	Autotest Periodical test of the associated RCD Control voltage: 230 V~
		Number of modules 3
		3

Voltage surge protectors (p. 82)

STOP&GO automatic resetting for DX™

Temporarily electrical disturbances and other external events can cause unwanted tripping of different devices protecting electrical installation

STOP&GO verifies automatically the state of the installation, before resetting and launches a visual and audible alarm signal in case of permanent fault detection (short-circuit or residual current)

After verifying the state of the installation, STOP&GO automatic resets the associated protection device in order to immediately re-establish power supply and avoid unwanted consequences

STOP&GO does not protect the installation against lightning strikes
For an efficient protection against lightning, use voltage surge protectors (p. 82)

The Autotest version is specially suitable for installations equipped with residual current protection devices (RCD's and RCBOs)
STOP&GO periodically does an automatic test of the functioning of residual current protection devices. The manual test is no longer needed



Installation without STOP&GO



Installation with STOP&GO

Mains fault due to temporarily electrical disturbances
Electrical devices are not powered anymore

STOP&GO automatic resets the associated protection device in order to immediately re-establish power supply



Voltage surge protectors (continued)

■ Technical characteristics

Voltage surge protectors for power lines

Networks: 230/400 VA - 50/60 Hz
Degree of protection: IP 20
Operating temperature: -10° C to +40° C
Storage temperature: -20° C to +70° C

Type 2 V.S.P. (class II)	High protection (H)	Increased protection (I)	Standard protection (S)
Cat. No.	039 20/21/22/23	039 30/31/32/33	039 40/41/43
Neutral earthing system	TT - TN - IT	TT - TN - IT	TT - TN
Max. steady state voltage (Uc)	440 VA	440 VA	320 VA
Max. discharge current			
limp (10/350)	10 kA	-	-
I _{max} (8/20)	70 kA	40 kA	15 kA
Nominal discharge current			
I _n (8/20)	20 kA	15 kA	5 kA
Protection level (Up)			
at I _n	2 kV; 20 kA	1.8 kV; 15 kA	1.4 kV; 15 kA
at 5 kA	1.5 kV; 5 kA	1.3 kV; 5 kA	1.2 kV; 5 kA
U _T	440 V	440 V	440 V
Associated protection DX, DX-H, DX-L C curve	40 A	20 A	20 A
Max. terminal capacity			
rigid conductor		25 mm ²	
flexible conductor		16 mm ²	

Voltage surge protectors for telephone lines

Degree of protection: IP 20
Operating temperature: -10° C to +40° C
Storage temperature: -20° C to +70° C

	Analog 038 28	Digital 038 29
Minimum voltage (Un)	170 V	48 V
Protection level (Up)	260 V	100 V
Nominal current (In)	5 kA	
Max. terminal capacity flexible/rigid	0.5 to 2.5 mm ²	

■ Installation

Voltage surge protectors cascading (multi-level protection)

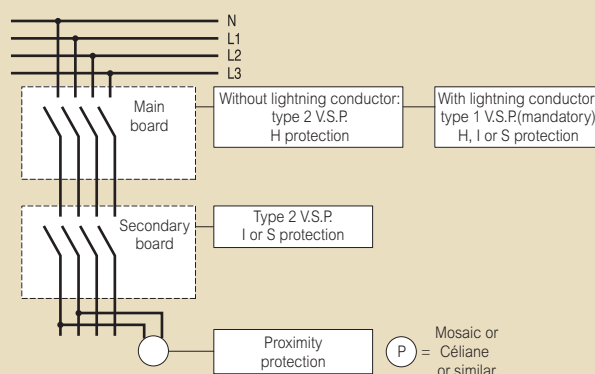
Beyond the standards requirements:

- the cost of the consequences of equipment unavailability,
 - the nature of the equipment to be protected (IT, electronics, etc.),
 - the situation of the buildings (proximity or not of a building equipped with a lightning conductor),
 - the power supply network...
- are all situations that justify the installation of VSPs.

However, the efficiency of protection against overvoltages cannot be optimally ensured with a single VSP.

This is why Legrand recommends combining several VSPs in cascade with different protection levels, from the first panel as far as the device to be protected (proximity protection of sensitive devices).

An installation will be all the more efficient if, beyond Class I and II VSPs, it comprises proximity VSPs (Class III) on sockets supplying sensitive devices (IT, electronic, etc.).



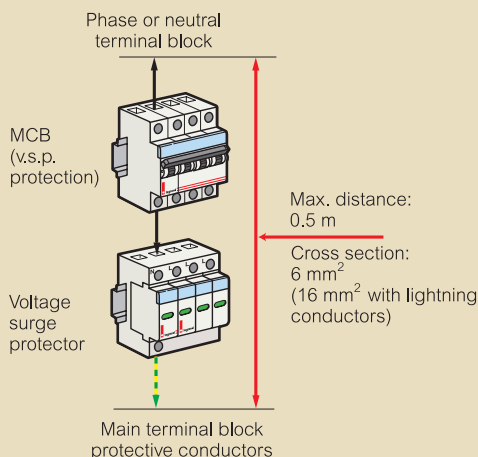
Associated protection

The supply circuit of the VSP must be protected against short-circuits and overloads by its associated disconnector (MCB) in accordance with discrimination rules.

TT earthing systems, and V.S.P.: V.S.P. always installed downstream a residual current device (RCD)

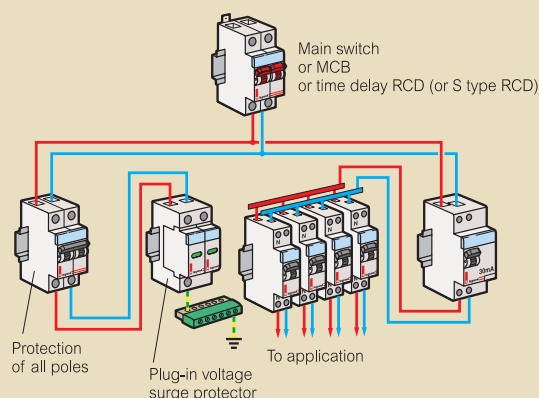
For the voltage surge protector to perform its function as well as possible, it must be installed:

- in parallel
- keeping as short a connection length as possible between the phase-neutral terminal block and the PE or PEN terminal block
- in accordance with EMC (electromagnetic compatibility) rules: avoid the loops of conductors, fix the cables against metal conductive parts



Voltage surge protectors (continued)

Connection principles (continued)



Recommended cross-sections for conductors linking voltage surge protectors

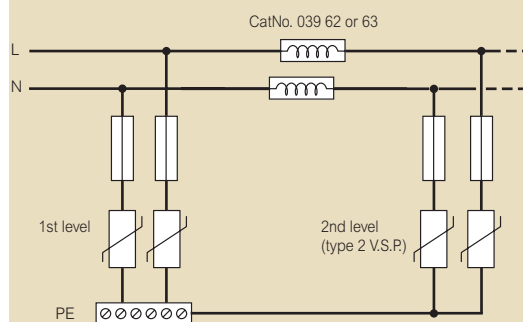
Type 2 V.S.P.	Cross section mm ²	Type 1 V.S.P.	Cross section mm ²
H level	16	H level	16
I level	10	I level	16
S level	6	S level	16

Minimum distances between voltage surge protectors

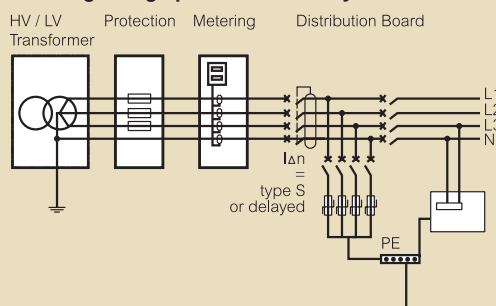
Upstream V.S.P.		Downstream V.S.P.		Distance (m)
S level	type 1	E (S)	type 2	8 (10)
H level	type 2	S (P)	type 2	8 (10)
I level	type 2	S (P)	type 2	4 (6)
S level	type 2	P	type 2	2

Installation of V.S.P. in the same board with decoupling inductors

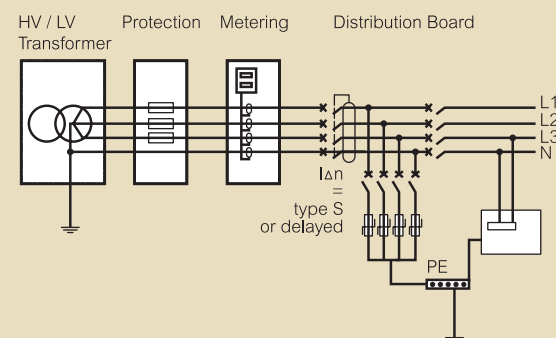
When distances cannot be respected please use decoupling inductors, installed as follows



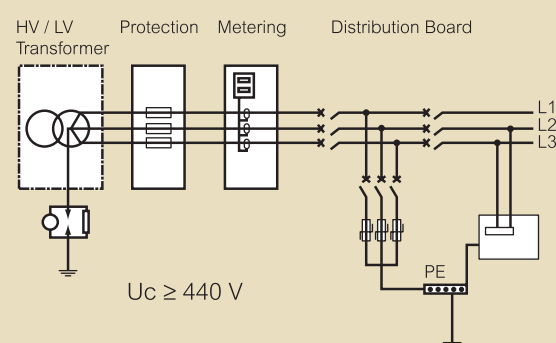
1 - Voltage surge protector in TN system



2 - Voltage surge protector in TT system



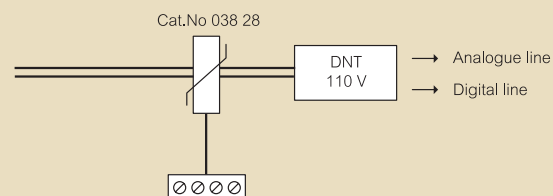
3 - Voltage surge protector in IT system



Installation for telephone lines

Protection of a telephone line

- Upstream the communication distribution box



- Downstream the communication distribution box
- Analogue or digital



- Digital

