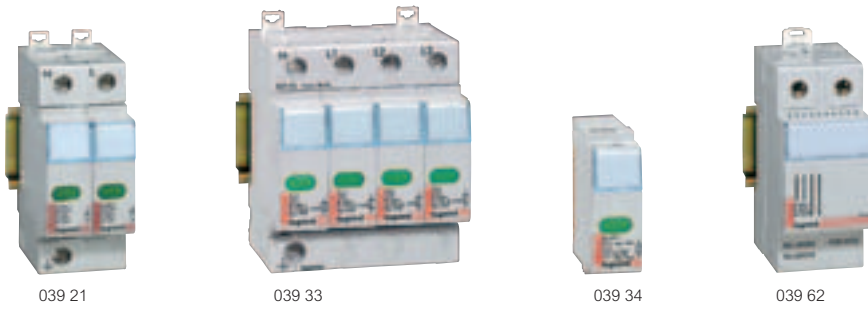


select your V.S.P. and its associated protection

		DOMESTIC HOUSES	RESIDENTIAL BUILDINGS	SMALL OFFICES		OFFICE BUILDINGS	INDUSTRIES																																				
<b>Energy network</b> 	<b>Risk level</b>	<b>Network</b>	<b>Main board: V.S.P. + associated protection</b>			<b>Network</b>	<b>Main board: V.S.P. + associated protection - Icc ≤ 10 kA<sup>(2)</sup></b>																																				
	High	1P + N	2 x 039 10 + 064 72	-	2 x 039 10 + 064 72	3P	-	3 x 039 10 + 064 92																																			
		3P + N	4 x 039 10 + 065 67	4 x 039 10 + 065 67	4 x 039 10 + 065 67	3P + N	4 x 039 10 + 065 67	4 x 039 10 + 065 67																																			
	Medium	1P + N	039 41 + 064 69	-	039 31 + 064 69	3P	-	039 22 + 064 92																																			
		3P + N	039 43 + 065 64	039 33 + 065 64	039 33 + 065 64	3P + N	039 23 + 065 67	039 23 + 065 67																																			
	Low	1P + N	039 41 + 064 69	-	039 41 + 064 69	3P	-	039 22 + 064 92																																			
		3P + N	039 43 + 065 64	039 43 + 065 64	039 43 + 065 64	3P + N	039 33 + 065 64	039 23 + 065 67																																			
				<b>Distribution board: V.S.P. + associated protection</b>				<b>Distribution board: V.S.P. + associated protection - Icc ≤ 10 kA<sup>(2)</sup></b>																																			
	All risk levels	1P + N	039 41 + 064 69	039 41 + 064 69	039 41 + 064 69	1P + N	039 41 + 064 69 <sup>(3)</sup>	039 31 + 064 69																																			
	All areas	3P	-	-	-	3P	-	039 32 + 064 89																																			
	3P + N	039 43 + 065 64	039 43 + 065 64	039 43 + 065 64	3P + N	039 43 + 065 64 <sup>(3)</sup>	039 33 + 065 64																																				
			<b>Sensitive equipments (electronic, computers): Protection of proximity</b>				<b>Sensitive equipments (electronic, computers): Protection of proximity</b>																																				
	Mosaic Cat.Nos 744 65/66	•	•	•		•	•																																				
	Multi-outlet extensions Cat.Nos 6946 40/42/44	•	•	•																																							
<b>Communication lines</b>		<b>Communication networks (telephone, data lines)</b>				<b>Communication networks (telephone, data lines)</b>																																					
	See p. 141	<b>Protection of all the lines entering the building is strongly recommended (including communication lines: telephone, data lines, ...)</b>				<b>Protection of all the lines entering the building is strongly recommended (including communication lines: telephone, data lines, ...)</b>																																					
		<b>High risk level:</b> structures equipped with a lightning protection system (LPS), metallic structures, structures localized on a crest <b>IEC 60364: VSP compulsory at the origin of the installation (main board)</b> in conjunction to a LPS				For short-circuit currents (Icc) larger than 10 kA, select the associated MCB (DX-H or DX-L) with the short circuit capacity rating adapted to your installation requirements																																					
	 or 	<b>Medium risk level:</b> structures supplied by overhead lines, structures in mountain areas, isolated areas, at the end of the line, localized nearby water plans or trees <b>AQ2 areas (keraunic level &gt; 25 days per year): VSP compulsory at the origin of the installation (main board) when supplied by overhead power lines according to IEC 60364</b>				<table border="1"> <thead> <tr> <th>V.S.P. Cat.Nos</th> <th colspan="3">039 10/20/21/22/23</th> <th colspan="3">039 30/31/32/33/40/41/43</th> </tr> <tr> <th>Icc</th> <th>2P</th> <th>3P</th> <th>4P</th> <th>2P</th> <th>3P</th> <th>4P</th> </tr> </thead> <tbody> <tr> <td>≤ 15 kA</td> <td>069 24</td> <td>069 44</td> <td>070 04</td> <td>069 21</td> <td>069 41</td> <td>070 01</td> </tr> <tr> <td>≤ 25 kA</td> <td>071 18</td> <td>071 33</td> <td>071 48</td> <td>069 21</td> <td>069 41</td> <td>070 01</td> </tr> <tr> <td>≤ 50 kA</td> <td>071 18</td> <td>071 33</td> <td>071 48</td> <td>071 15</td> <td>071 30</td> <td>071 45</td> </tr> </tbody> </table>			V.S.P. Cat.Nos	039 10/20/21/22/23			039 30/31/32/33/40/41/43			Icc	2P	3P	4P	2P	3P	4P	≤ 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	071 15	071 30	071 45
V.S.P. Cat.Nos	039 10/20/21/22/23			039 30/31/32/33/40/41/43																																							
Icc	2P	3P	4P	2P	3P	4P																																					
≤ 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	071 15	071 30	071 45																																					
		<b>Low risk:</b> structures localized in urban areas, in flat surroundings, low mountains, supplied by underground lines				<p>(1) If no V.S.P. can be installed at the origin of installation (main board), a class II V.S.P. with In ≥ 5 kA shall be installed at the origin of each private installation (residential buildings) or on each floor (office buildings, hotels)</p> <p>(2) If the local short-circuit current (Icc) is higher than 10 kA, use a DX-H or DX-L MCB (see above table)</p> <p>(3) Protection recommended of each secondary board (floor distribution boards) on each floor for buildings higher than 10 m.</p>																																					

# voltage surge protectors low voltage



Dimensions (p. 159)  
 Technical characteristics (p. 142)

Lexic voltage surge protectors (V. S. P.) for main boards, distribution boards and consumer  
 Conform to standards IEC 61643-1 and EN 61643-1  
 Class I and II V. S. P. available in 4 different impulse discharge capacity  
 Consist of a base and a plug-in replacement module provided with a status indicator (except Cat.No 039 10)

- Green: surge protector operational
- Orange: module needs replacing

Fitted with built-in thermal protection  
 Can be fitted with auxiliaries for remote monitoring purposes (except Cat.No 039 10)  
 For 230/400 V~ power supplies  
 Frequency: 50/60 Hz

Pack	Cat.Nos	Main board protection for installations equipped with lightning conductors		
		<b>Accompaniment of lightning conductors</b>		
		<b>HL - Class I - Iimp= 12.5 kA (10/350 µs wave)</b>		
		For all neutral earthing systems: TT, TN, IT		
1	039 10	1P	C type - 40A <sup>(1)</sup>	Number of modules: 1
		<b>High protection - H - Class I + II - Imax= 70 kA</b>		
		For all neutral earthing systems: TT, TN, IT		
		Iimp: 10 kA (10/350 µs wave)		
1	039 20	1P		1
1	039 21	2P	C type - 40A <sup>(1)</sup>	2
1	039 22	3P		3
1	039 23	4P		4

Pack	Cat.Nos	Distribution board protection		
		<b>Increased protection - I - Class II, Imax= 40 kA</b>		
		For all neutral earthing systems: TT, TN, IT		
1	039 30	1P	Associated protection	Number of modules: 1
1	039 31	2P	C type - 20A <sup>(1)</sup>	2
1	039 32	3P		3
1	039 33	4P		4
		<b>Standard protection - S - Class II, Imax= 15 kA</b>		
		For all neutral earthing systems: TT, TN		
1	039 40	1P		1
1	039 41	2P	C type - 20A <sup>(1)</sup>	2
1	039 43	4P		4

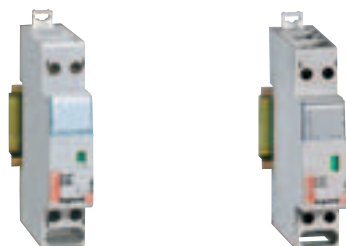
Pack	Cat.Nos	Signalling auxiliaries	
		With changeover microswitch	
		2 A - 250 V~	
		Mounted onto the base of the surge protector (except Cat.No 039 10)	
1	039 55	For 1-pole module	
1	039 56	For 2-pole module	
1	039 57	For 3-pole module	
1	039 58	For 4-pole module	

Pack	Cat.Nos	Replacement modules			
		<b>Plug-in replacement modules</b>			
		With indicator			
		Green: surge protector operational			
		Orange: module needs replacing			
		I imp (kA)	I max (kA)	UP (kV)	For surge protector
5	039 28	10	70	2.0	039 20/21/22/23
5	039 34		40	1.8	039 30/31/32/33
5	039 39		40	1.4	039 35/36/38
5	039 44		15	1.2	039 40/41/43

Pack	Cat.Nos	Decoupling inductors	
		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	
1	039 62	Module for circuit 35 A - 500 V~	Number of modules: 2
1	039 63	Module for circuit 63 A - 500 V~	4

(1) MCBs DX, DX-H, DX-L have necessary breaking capacity

## voltage surge protectors for telephone lines



038 28

038 29



Dimensions (p. 159)  
Technical characteristics (p. 142)

For protection of: telephone, fax, modem, etc., connected to the incoming telephone line, against overvoltages of atmospheric origin  
Installed in a distribution cabinet, especially the ELV/signal cabinet Cat.No 011 95 (please consult us), or terminal shield boxes 1 module (p. 164)

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

Pack	Cat.Nos	Voltage surge protector for telephone lines
1	038 28	Imax: 10 kA and In: 5 kA (8/20 $\mu$ s wave) Analogue (RTC and ADSL)
1	038 29	Digital (signal lines, current loops)

## 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 levels (types):

	Class 1	Class 2	Class 3
Type of wave	10/350 $\mu$ s	8/20 $\mu$ s	1,2/50 $\mu$ s - 8/20 $\mu$ s
Main characteristics	In, Iimp	In, Imax	Uoc

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

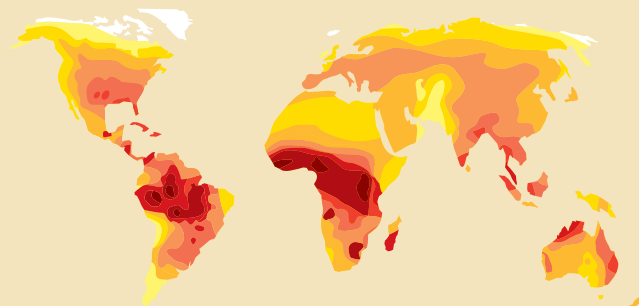
According to articles 443 and 534, the use of VSPs is required in new or renovated buildings in the following cases:

- buildings equipped with lightning conductors: type 1 VSPs with Iimp  $\geq$  12.5 kA
- 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 50 m from buildings equipped with lightning conductors

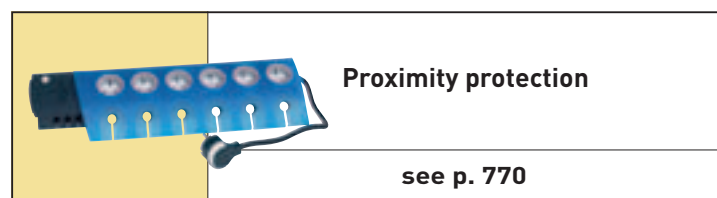
When VSPs are present on the power circuit, it is strongly advised to install a VSP on the communication circuits (telephone or data lines...)

### ■ Choice of the level lightning protection



The annual average of stormy days

0 - 1	40 - 59
2 - 4	60 - 79
5 - 9	80 - 99
10 - 19	100 - 139
20 - 39	140 - 200 +



# voltage surge protectors (continued)

## Technical characteristics

### Voltage surge protectors for power lines

Cat Nos	Accompaniment of Lightning conductor 039 10	High protection (H) 039 20/21/22/23	Increased protection (I) 039 30/31/32/33	Standard protection (S) 039 40/41/43
Neutral earthing system	TT - TN - IT	TT - TN - IT	TT - TN - IT	TT - TN
Max. steady state voltage (Uc)	440 V~	440 V~	440 V~	320 V~
Frequency	50-60 Hz			
Type	Class I	Class I + II	Class II	Class II
Max. discharge current - I <sub>max</sub> (8/20 μs)	-	70 kA	40 kA	15 kA
- I <sub>imp</sub> 10/350 μs	12.5 kA	10 kA	-	-
Nominal discharge current (I <sub>n</sub> , wave 8/20 μs)	20 kA	20 kA	15 kA	5 kA
Up protection level In	1.8 kV ; 20 kA 1.3 kV ; 5 kA	2 kV ; 20 kA 1.5 kV ; 5 kA	1.8 kV ; 15 kA 1.3 kV ; 5 kA	1.4 kV ; 15 kA 1.2 kV ; 5 kA
U <sub>r</sub>	440 V	440 V	440 V	400 V
Associated protection DX, DX-H, DX-L C curve	40 A	40 A	20 A	20 A
Leakage current at U <sub>c</sub> (I <sub>c</sub> )	< 1 mA			
Follower current (I <sub>f</sub> )	Zero			
Response time	25 ns			
Max. terminal capacity - rigid conductor - flexible conductor	25 mm <sup>2</sup> 16 mm <sup>2</sup>			
Degree of protection	IP 20			
Operating temperature	- 10 °C to + 40 °C			
Storage temperature	- 20 °C to + 70 °C			

### Voltage surge protectors for telephone lines

	Analog 038 28	Digital 038 29
Minimum voltage (U <sub>n</sub> )	170 V	48 V
Protection level (Up)	260 V	100 V
Nominal current (I <sub>n</sub> )	5 kA	
Max. terminal capacity flexible/rigid	0.5 to 2.5 mm <sup>2</sup>	
Degree of protection	IP 20	
Operating temperature	- 10 °C to + 40 °C	
Storage temperature	- 20 °C to + 70 °C	

## Installation

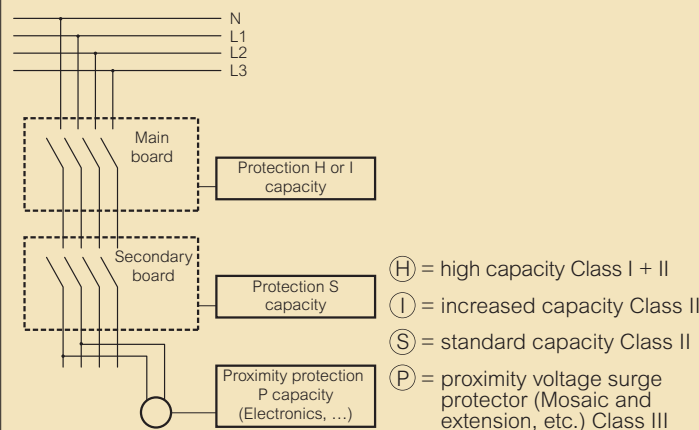
### Voltage surge protectors cascading (multi-level protection)

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.).



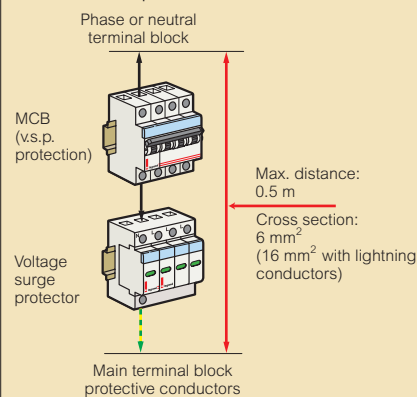
### Associated protection

The supply circuit of the VSP must be protected against short-circuits and overloads by its associated disconnector (MCB) in accordance with discrimination rules. Disconnectors meeting standards EN 61643-11 and IEC 61643-1 are described in the table of operational characteristics (above) and in the selection table (p. 138). The protection devices proposed in the selection table (p. 138) are suited to normal headline protection in the different tariffs (art. 534-1-5-3 of standard NF C 15-100).

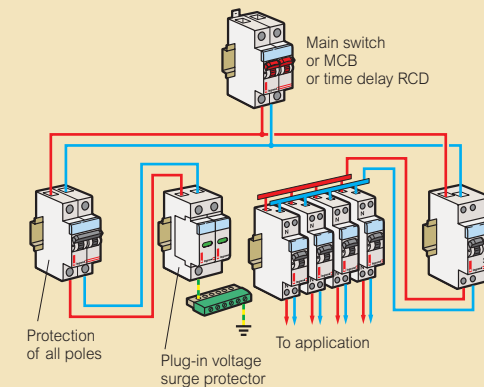
### Connection principles

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

- as a tap-off
- 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



## Connection principles (continued)



### Recommended cross-sections for conductors linking voltage surge protectors

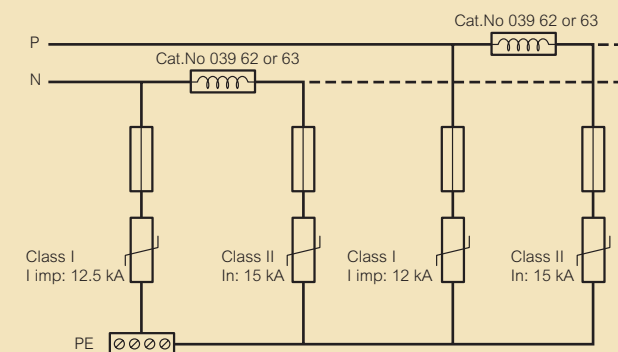
Capacity	Cross-section (mm <sup>2</sup> )
Standard (S)	6
Increased (I)	10
High (H)	16
Accompaniment of lightning conductor (HL)	16

### Minimum distances between voltage surge protectors

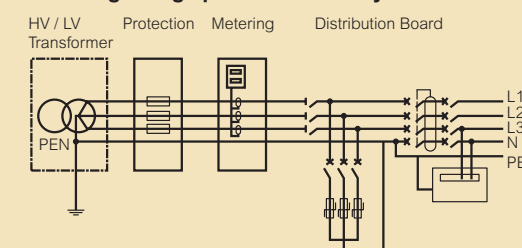
Downstream v.s.p.	Upstream v.s.p.	Distance (m)
H	I	6
	S	8
	P	10
I	S	4
	P	6
S	P	2
	Accompaniment of lightning conductor (HL)	
	I	8
	S	10

### Installation of decoupling inductors in the same board

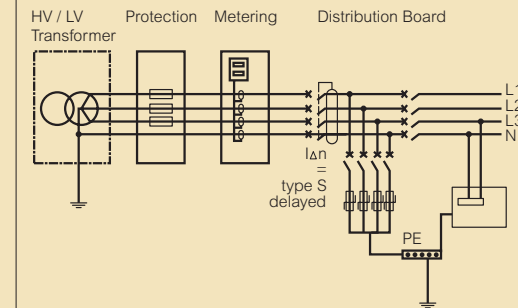
When distance cannot be respected please use decoupling inductors (see Cat.Nos p. 140), installed as follows



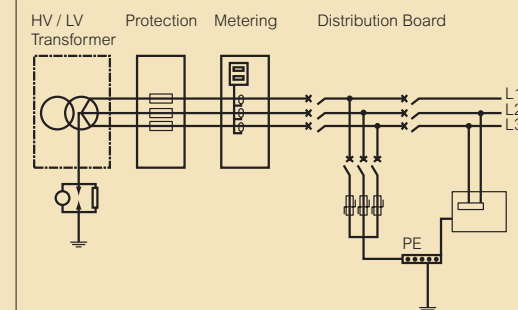
## 1 - Voltage surge protector in TN system



## 2 - Voltage surge protector in TT system



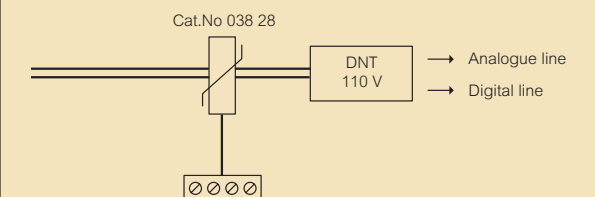
## 3 - Voltage surge protector in IT system



## Installation for telephone lines

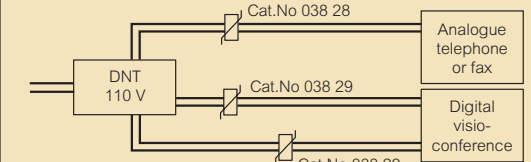
### Protection of a telephone line

- Upstream the communication distribution box

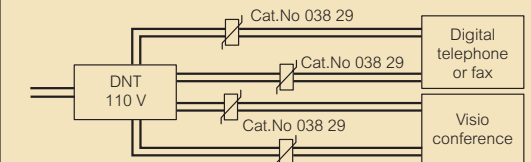


- Downstream the communication distribution box

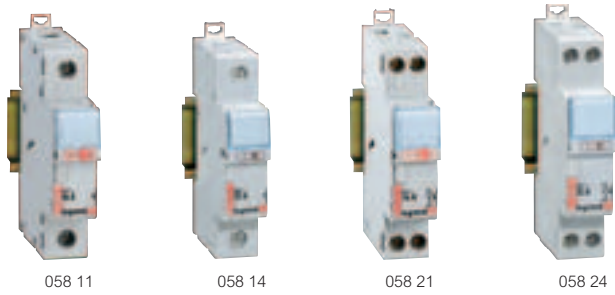
- Analogue or digital



- Digital



## domestic fuse carriers



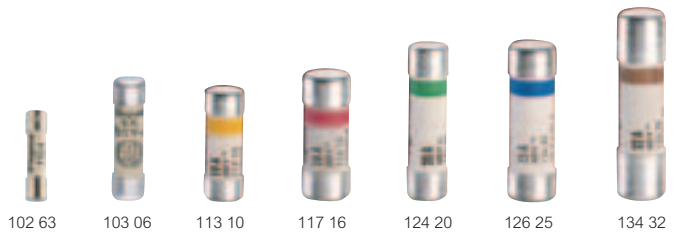
Dimensions (p. 159)

With label-holders  
With insulated carrier class II, padlockable  
Coupling via supply busbars  
Shielded terminals capacity 2 x 10 mm<sup>2</sup>  
Possibility to signal indicator blown fuse  
Fuse not supplied

Pack	Cat.Nos	For domestic cylindrical cartridge fuses		
		Conform to EN 60269-3 and IEC 60269-3 and 60269-3.1		
		<b>Single pole</b>		
		For domestic cartridges	Cartridge dimensions (mm)	Number of modules
10	058 10	10 A - 230 V~	8.5 x 23	1
10	058 11	16 A	10.3 x 25.8	1
10	058 12	20 A - 400 V~	8.5 x 31.5	1
10	058 13	25 A	10.3 x 31.5	1
10	058 14	32 A	10.3 x 38	1
		<b>Single pole + neutral</b>		
10	058 20	10 A - 230 V~	8.5 x 23	1
10	058 21	16 A	10.3 x 25.8	1
10	058 22	20 A - 400 V~	8.5 x 31.5	1
10	058 23	25 A	10.3 x 31.5	1
10	058 24	32 A	10.3 x 38	1

Pack	Cat.Nos	For miniature cylindrical cartridge fuses		
		Conform to EN 60127-6 and IEC 60127-6 To protect sensitive equipment: transformers, electronic equipment, etc.		
		<b>Single pole</b>		
		Cartridge dimensions (mm)	Voltage	Number of modules
5	058 00	5 x 20	250 V~	1
		<b>Single pole + neutral</b>		
5	058 02	5 x 20	250 V~	1

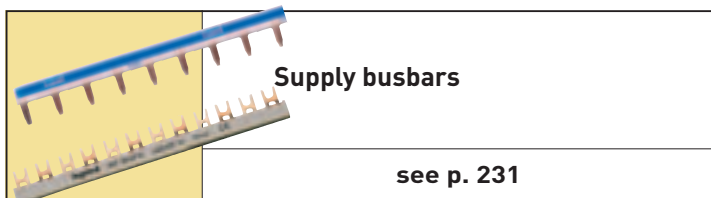
## domestic cartridge fuses



Pack	Cat.Nos	Miniature type 5 x 20		
		Instant reaction fuse - Ceramic body Conform to IEC 60127 and IEC 60127-2 - EN 60127 and EN 60127-2 - VDE 0820-1 High rupture capacity (A) For use with dimmers, Viking terminal blocks and emergency lighting units, transformers		
		Rating (Amps)	Voltage ~ (Volts)	Rupture capacity (Amps)
10	102 02	0.2	250	1500
10	102 05	0.5		
10	102 06	0.63		
10	102 10	1		
10	102 20	2		
10	102 30	3.15		
10	102 50	5		
10	102 63	6.3		
10	102 96	10		

Pack	Cat.Nos	Cylindrical								
		<b>6.3 x 23</b>								
		Rating (Amps)	Voltage ~ (Volts)	Rupture capacity (Amps) Copper	Protected section (mm <sup>2</sup> )	Color Indication				
10	103 06 <sup>(1)</sup>	6	230	6 000	1.5					
		<b>8.5 x 23</b>								
10	114 06	6	230	6 000	1.5					
10/100	113 10	10	230	6 000						
		<b>10.3 x 25.8</b>								
10	116 10 <sup>(1)</sup>	10	230	6 000	2.5					
10	116 16 <sup>(1)</sup>	16	230	6 000						
		<b>8.5 x 31.5</b>								
10	123 01	1	400	20 000	2.5					
10	123 02	2								
10	123 04	4								
10	123 06	6								
10/100	123 10	10								
10	124 10	10								
10/100	123 16	16								
10/100	123 20	20								
		<b>10.3 x 31.5</b>								
10	126 16	16					400	20 000	4	
10	126 20	20								
10	126 25	25								
		<b>10.3 x 38</b>								
10/100	133 32	32	400	20 000	6					
10	134 32	32	400	20 000						
		<b>Neutral links</b>								
10	123 00	8.5 x 31.5								
10	133 00	10 x 38								

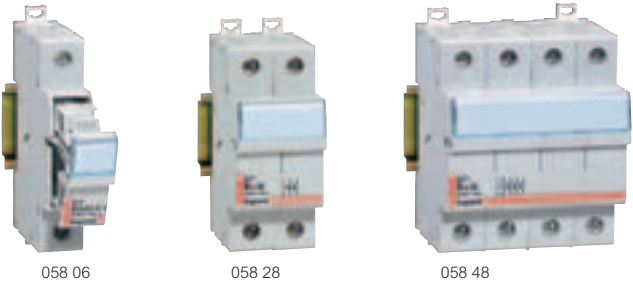
Other cartridge fuses (p. 110)



(1) Conform to BS 1361 (1971)



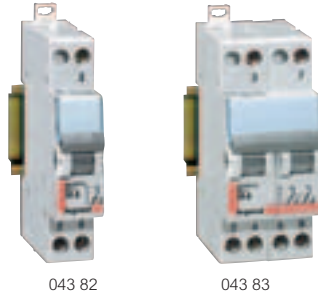
## isolating fuse carriers



Dimensions (p. 159)

Pack	Cat.Nos	For industrial cylindrical cartridge fuses type aM or gG		
		Conform to standard IEC 60269-2 and IEC 60269-2.1 Isolators conform to IEC 60947-3 Icc: - 20 kA with 8.5 x 31.5 cartridge fuse - 100 kA with 10 x 38 cartridge fuse Fuse not supplied (p. 144)		
		<b>Single pole</b>		
		Cartridge dimensions (mm)	Voltage	Number of modules
10	058 06	8.5 x 31.5	400 V~	1
10	058 08	10 x 38	500 V~	1
		<b>Single pole + neutral</b>		
10	058 16	8.5 x 31.5	400 V~	1
10	058 18	10 x 38	500 V~	1
		<b>2-pole</b>		
5	058 26	8.5 x 31.5	400 V~	2
5	058 28	10 x 38	500 V~	2
		<b>3-pole</b>		
3	058 36	8.5 x 31.5	400 V~	3
3	058 38	10 x 38	500 V~	3
		<b>3-pole + neutral</b>		
2	058 46	8.5 x 31.5	400 V~	4
2	058 48	10 x 38	500 V~	4

## changeover switches



Dimensions (p. 159)

Conform to standard IEC 60669-1  
Breaking capacity AC 22 A according to IEC 60947-3

Pack	Cat.Nos	Changeover switches		
		<b>Two-way - 250 V~</b>		
10	043 82	Nominal rating (A) 20	Connection 	Number of modules 1
		<b>Double two-way - 400 V~</b>		
5	043 83	20		2
		<b>Two-way with centre point - 250 V~</b>		
10	043 85	20		1
		<b>Double two-way with centre point - 400 V~</b>		
5	043 86	20		2

Pack	Cat.Nos	Accessories	
10	057 90	Blow-out indicator 250 V~	
1	057 96	Early break N/O + N/C contact auxiliary 5 A - 250 V~ (0.5 module)	
2	044 44	Sealable screw cover (4 separable poles)	

Supply busbars (p. 231)

**DX**  
**MCBs up to 125 A**

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**see p. 128**