



# Cirprotec

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## Overvoltage and Surge Protection



FIRST POWER &  
SURGE PROTECTION LTD

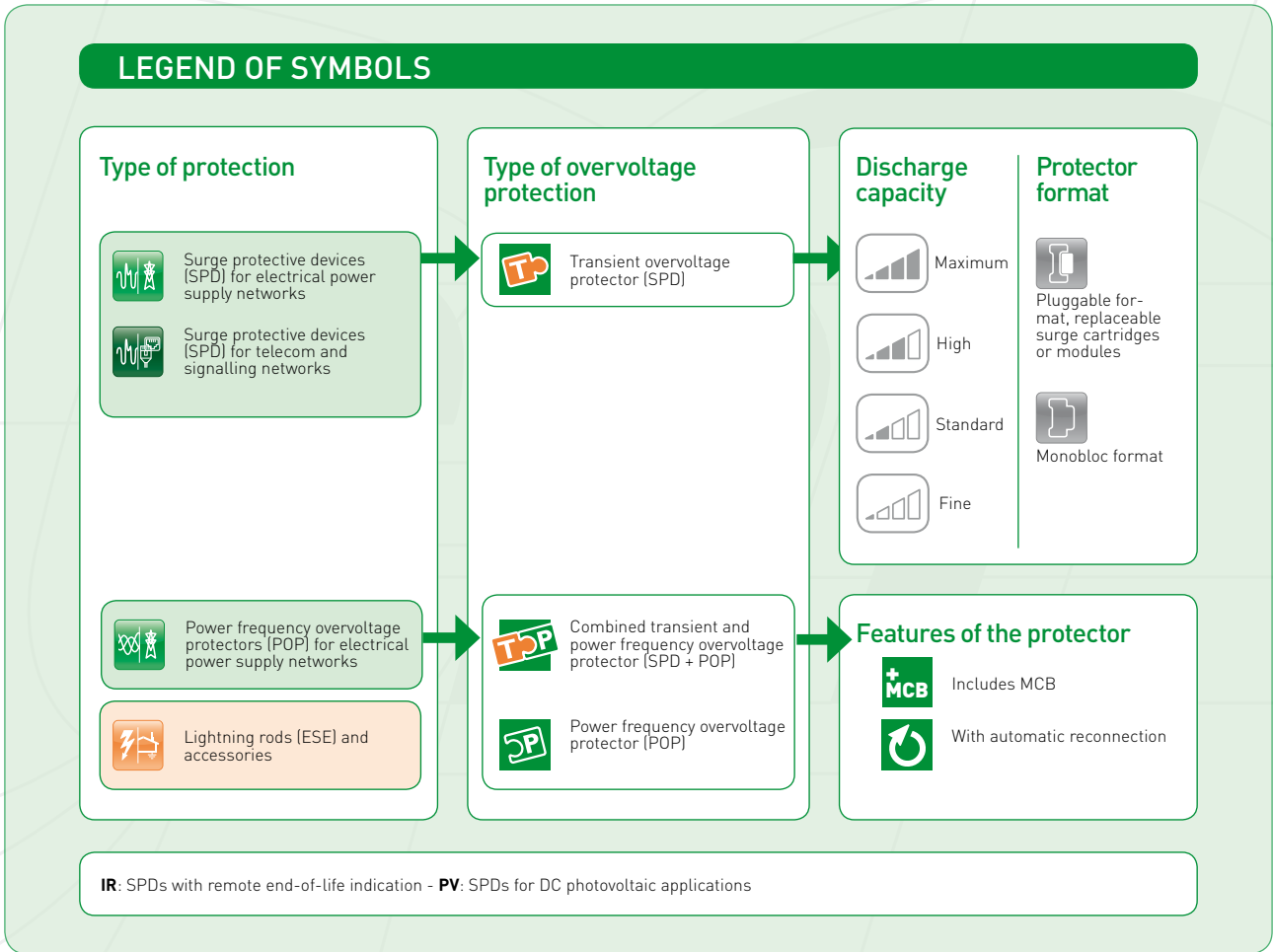
INTEGRATED WITH

**CPT** cirprotec



Transient and Power frequency Overvoltages (POP)

**CPT** cirprotec



## CIRPROTEC SOLUTION

Cirprotec, a pioneer in the design and manufacture of lightning and surge protection devices, has developed a new catalogue of solutions for complete and comprehensive protection against **voltage surges** (SPD) and **power frequency overvoltages** (POP).


In this way, and true to its usual didactic line, Cirprotec expands its **wide range of catalogues with professional solutions**, with the goal of facilitating the choice of devices for proper protection, in compliance with the current legal framework.

Ask for Cirprotec catalogues with no commitment, or if you need personalised advice, contact our technical sales department or our network of distributors.



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Electrical and electronic equipment is indispensable in the daily activities of today's businesses and individuals. Such devices are connected to the electricity grid, often exchanging data and signals through communication lines and are usually sensitive to disturbances. These interconnecting networks provide a propagation path for **overvoltages**.

Protection against lightning and overvoltages not only ensures the safety of people, goods and equipment, but also ensures continuity of installation services and meet criteria of **energy efficiency**. Overvoltage protection **extends the life of the equipment by more than 20%**, which significantly reduces the volume of electronic waste. It also reduces the power consumption of the installations, all of which translates into cost savings and environmental sustainability.

Standards committees and power generation companies, both in Spain and the rest of the world, have standardised the use of overvoltage protectors by adopting overvoltage standards and even mandatory private technical specifications.

**Cirprotec**, a pioneer in the design and manufacture of lightning and surge protection, has developed this new catalogue in order to facilitate the selection of the best protector for every need and application, based on features and technical parameters such as:

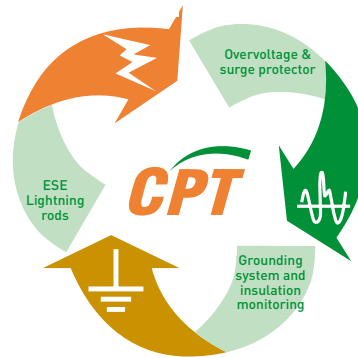
- Type of line to be protected:** electrical supply, telephone line, data line, radio frequency.
- Type of overvoltage:** transient and/or permanent overvoltages (TOV).
- Discharge capacity** of transient overvoltages.
- Standard:** IEC 61643 and UL 1449 3rd Ed.
- Protector format:** (monoblock, plug-in, DIN rail, NEMA, Schucko, etc.).
- Type of communications/data connector.**

We hope this document will be useful for your projects and we appreciate the interest taken in our solutions.

# Why Cirprotec?

## Specialists in lightning and surge protection

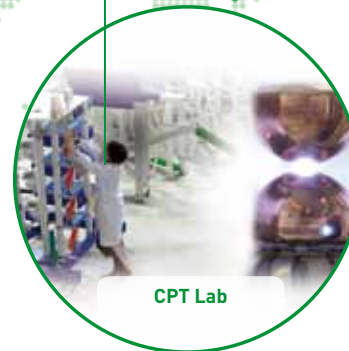
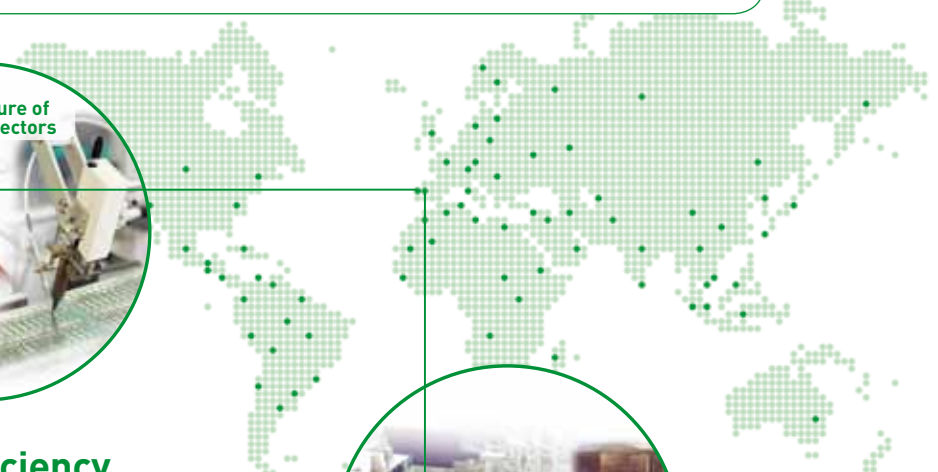
Cirprotec (CPT) is a pioneer in the design and manufacture of lightning and surge protection devices. It has an extensive network of sales offices and is present in over 60 countries.



### Comprehensive solution: protection, control and safety

CPT offers a wide range of specific products to provide a solution for any type of need in the field of lightning and surge protection.

- Internal protection (surge and overvoltage protectors)
  - External protection (ESE lightning rods and Faradisation)
  - Grounding system and insulation monitors
- Design, technical consulting and training services



### Innovation and energy efficiency

Cirprotec is committed to innovation: A highly specialised team, test laboratories, high investment in R&D&i, international patents and presence on standards committees. More efficient solutions to increase device lifetime and avoid excessive current consumption.

### Quality assurance

Cirprotec has a number of design, manufacturing and production centres and laboratories. Designed and manufactured entirely in Europe in accordance with local and international standards such as IEC, UNE, EN, NFC, VDE, UL, IEEE, always under the control of ISO 9001 quality assurance.



## What are overvoltages?

### Transient overvoltages (SPD)

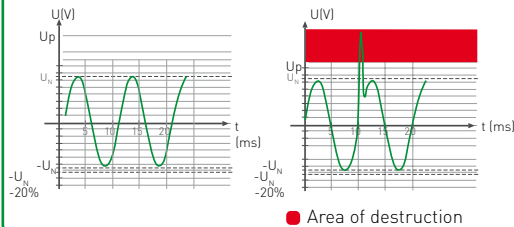
Transient overvoltages are surges that can reach tens of kilovolts with a duration of the order of microseconds. Despite their short duration, the high energy content can cause serious problems to equipment connected to the line, from premature aging to destruction, causing disruptions to service and financial loss.

This type of surge can have various different causes, including atmospheric lightning directly striking the external protection (lightning rods) on a building or transmission line or the associated induction of electromagnetic fields on metallic conductors. Outdoor and longer lines are the most exposed to these fields, which often receive high levels of induction. It is also common for non-weather phenomena, such as transformer centre switching or the disconnection of motors or other inductive loads to cause voltage spikes in adjacent lines.

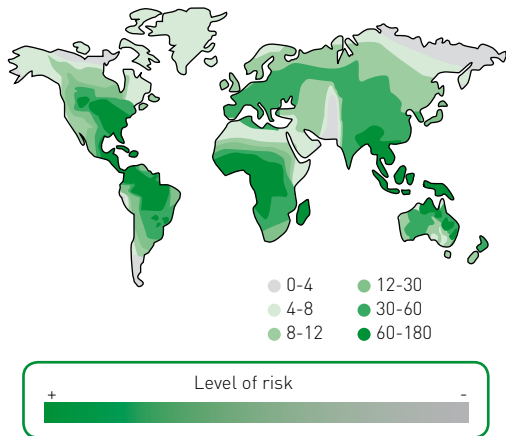
Transient overvoltages do not occur solely in power distribution lines, but are also common in any line formed by metal conductors, such as telephony, communications, measurement and data.

In all these networks, transient overvoltage protection is achieved by installing the protector or line discharger on the vulnerable line, connecting it in parallel between the line and earth. This means that in the event of a transient overvoltage, the protector will discharge excess energy to earth, thus limiting the peak voltage to a value acceptable for the electrical equipment connected.

When the peak voltage reaches a value higher than the equipment can withstand, it causes its destruction (red area).



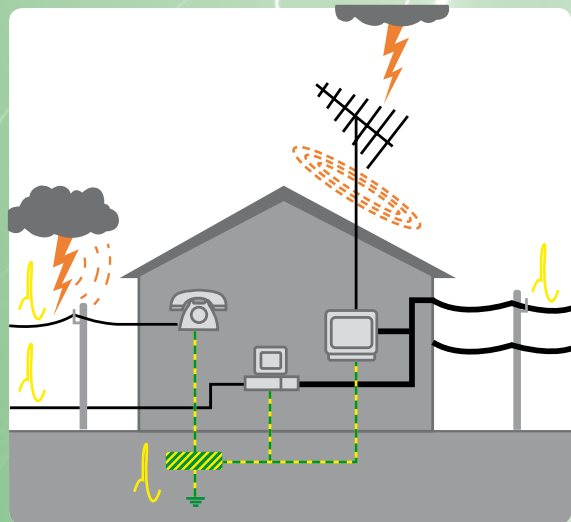
Isokeraunic map. Density of lightning strikes on the ground  $N_g$  (strikes/year · km<sup>2</sup>).



### Why protect?

Transient overvoltages are surges that reach values of tens of kilovolts with a duration of the order of microseconds. Despite their short duration, they cause the destruction of equipment connected to the network, causing:

- Serious damage or destruction.
- Service interruption.

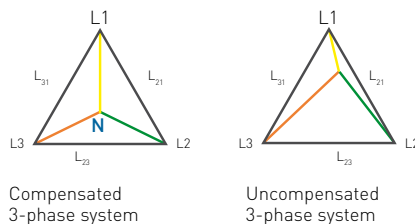
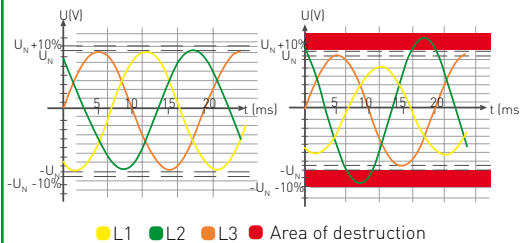


## Power frequency overvoltages (POP)\*\*

Besides the phenomenon of transient overvoltages, which may affect any type of conductor, electric transmission lines can transmit another type of overvoltage, known as power frequency overvoltages. These are considered to be any voltage increase above 10% of the effective nominal value for an indefinite period. POP overvoltages are caused by problems in the electricity distribution network or, more commonly, by bad connections or breakage of the neutral conductor.

Most electric distribution systems in the world use a neutral conductor, usually grounded, which acts as a reference for the phase voltages. The return current through this conductor allows the effective voltage between each phase and neutral (line-to-neutral voltage) to remain constant. Therefore, if this conductor should break, the line-to-neutral voltage would become decompensated; the voltage received by any installation connected between phase and neutral is floating and depends on the load imbalance in the three-phase network. An increase in effective voltage may lead to the premature aging of receivers, current consumption excess or even destruction, with the resulting fire risk.

If all or part of the installation is single phase and is connected to the L2 phase, any equipment connected to it will be destroyed (red area).

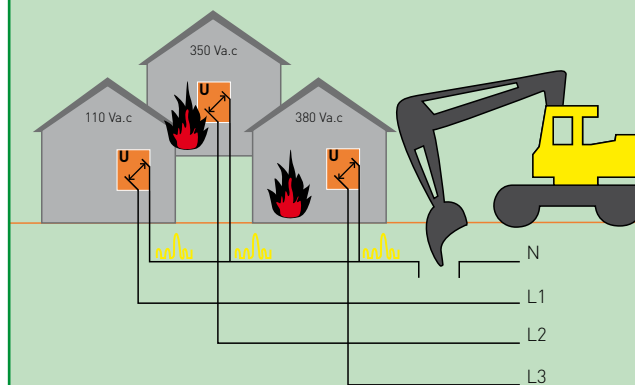


### Why protect?

POP overvoltages are voltage increases of greater than 10% of the nominal voltage for an indefinite period. Supplying equipment with a voltage higher than that for which it has been designed can lead to:

- Equipment overheating.
- Reduction of product lifetime.
- Fires.
- Destruction of equipment.
- Service interruption.

The use of these protectors is essential in areas where there are **fluctuations in the value of the supply voltage**



\*\* Power frequency overvoltages = TOV (temporary overvoltages)  
= Permanent overvoltages

# General operation and selection

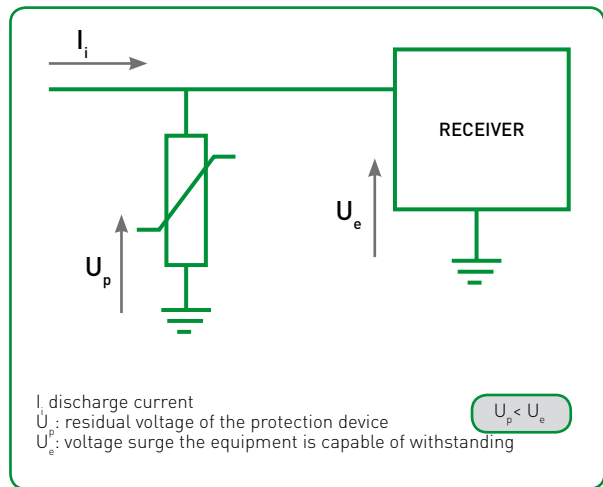
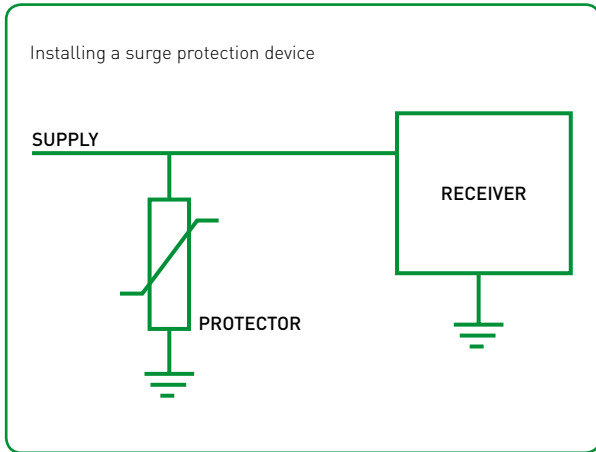
## General operation of a protector    Selecting a protector

A transient overvoltage protection device acts as a voltage controlled switch and is installed between the active conductors and ground in parallel with the equipment to be protected. When the supply voltage is lower than its activation voltage, the protector acts as a high-impedance element so that no current flows through it. By contrast, when the supply voltage is higher than the activation voltage, the protector acts as an element with an impedance close to zero, leading the overvoltage to earth and preventing it from affecting the receivers.

In selecting a surge protective device, the **network topology and the nominal voltage of the electrical supply** must be considered. In addition to the polarity of the protection, these features will condition the maximum continuous operating voltage and the safety margin of the device above the nominal voltage.

On the other hand, depending on the exposure of **the installation to the effects of lightning and transient overvoltages**, protection devices with different discharge capacities will be needed.

Another point to consider when selecting the protection device is the voltage protection level, which must be less than **the maximum voltage which can be withstood by the equipment to be protected**.



Generally, **the optimal system of protection is the staggered or cascade type**, in which successive stages are combined in the performance of high discharge capacity and devices with a low voltage protection level.

The various national and international standards classify devices into types or categories based on their discharge capacity and voltage protection level..



## Protection parameters according to IEC 61643-1

### Protector parameters



#### Up

##### LEVEL OF PROTECTION

Maximum residual voltage between the terminals of the protection device during the application of a peak current.

#### In

##### NOMINAL CURRENT

Peak current in 8/20  $\mu$ s waveform the protection device can withstand 20 times without reaching end of life.

#### Imax

##### MAXIMUM DISCHARGE CURRENT

Peak current with 8/20  $\mu$ s waveform which the protection device can withstand without reaching end of life.

#### Uc

##### MAXIMUM CONTINUOUS OPERATING VOLTAGE

Maximum effective voltage that can be applied permanently to the terminals of the protection device.

#### Iimp

##### IMPULSE CURRENT

Peak current with 10/350  $\mu$ s waveform which the protection device can withstand without reaching end of life.

### Classification of protectors

Protection devices are classified into Classes according to discharge capacity:



#### Class I

Tested with a 10/350  $\mu$ s waveform (**Class I** test), which simulates the current produced by a direct lightning strike.

Ability to discharge very high currents to earth, providing a high  $U_p$  (voltage protection level). Must be accompanied by downstream Class II protectors. Designed for use in incoming power supply panels where the risk of lightning strike is high, for example in buildings with an external protection system.

#### Class II

Tested with a 8/20  $\mu$ s waveform (**Class II** test), which simulates the current produced in the event of a switching or lightning strike on the distribution line or its vicinity.

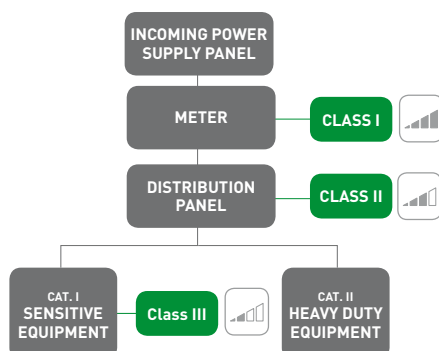
Ability to discharge high currents to earth, providing a medium  $U_p$  (voltage protection level). Designed for use in distribution panels located downstream of Class I protectors or in incoming power supply panels in areas with low exposure to lightning strikes.

#### Class III

Tested with a combined 1.2/50  $\mu$ s - 8/20  $\mu$ s waveform (**Class III** test), which simulates the current and voltage that can reach the equipment to be protected.

Ability to discharge medium currents to earth, providing a low  $U_p$  (voltage protection level). Always installed downstream of a Class II protection designed to protect sensitive equipment or equipment located more than 20m downstream of the Class II device.

Example of installation with the 3 Classes of protector



The technology can provide protection solutions that combine different types of protection: Class I+II and Class II+III.

## Selection of $U_p$ based on the category of equipment to be protected

The protection device should be selected so that the voltage protection level ( $U_p$ ) is compatible with (lower than) the value of the maximum voltage withstood by the equipment to be protected ( $U_e$ ). For the purposes of standardising design criteria and selection of protection devices, IEC standard 60364-4-443 classifies equipment into four categories, based on the impulse voltage they are capable of withstanding.

Nominal installation voltage V	Required impulse voltage withstand for kV			
	Equipment at the origin of the installation (withstands Category IV surge)	Distribution and final circuit equipment (withstands Category III overvoltage)	Appliances (withstands Category II overvoltage)	Specially protected equipment (withstands Category I overvoltage)
120-230	4	2.5	1.5	0.8
230/400 277/480	6	4	2.5	1.5
400/690	8	6	4	2.5
1000	12	8	6	4

## Selection of $U_c$ based on the topology and the nominal supply voltage

The maximum continuous operating voltage ( $U_c$ ) of a protection device should provide a safety margin above the nominal voltage of the supply in which it is installed. Supply network topology will also influence the selection, depending on this parameter. IEC standard 60364-5-534 sets the minimum allowed value of  $U_c$  depending on the system configuration.

Protectors connected between	Supply grounding arrangement			
	TN arrangement	TT arrangement	IT arrangement with distributed neutral	IT arrangement without distributed neutral
Phase conductor and neutral conductor	$1.1 U_0$	$1.1 U_0$	$1.1 U_0$	N/A
Phase conductor and PE conductor	$1.1 U_0$	$1.1 U_0$	U	$1.1 \times U$
Neutral conductor and PE conductor	$U_0^a$	$U_0^a$	$U_0^a$	N/A
Phase conductor and PEN conductor	$1.1 U_0$	N/A	N/A	N/A
Phase conductors	$1.1 U$	$1.1 U$	$1.1 U$	$1.1 U$

N/A: Not Applicable

NOTE 1:  $U_0$  is the phase to neutral voltage of the low voltage supply

NOTE 2: U is the voltage between phases of the low voltage supply

NOTE 3: This table refers to EN standard 61643 1

<sup>a</sup>These values refer to the most unfavourable conditions of the defect, so do not take into account the 10% safety margin

## Protection parameters according to UL 1449 3rd Ed

### Protector parameters



### VPR

#### VOLTAGE PROTECTION RATING

Indicates the maximum value of residual voltage across the terminals of the protection device during the application of peak current.

### MCOV

#### MAXIMUM CONTINUOUS OPERATING VOLTAGE

Indicates the maximum effective voltage that can be applied permanently to the terminals of the protection device.

### In

#### NOMINAL CURRENT

Peak current with 8/20  $\mu$ s waveform which the protection device can withstand 15 times without reaching end of life.

### Imax

#### MAXIMUM DISCHARGE CURRENT

Maximum peak current, per phase, with 8/20  $\mu$ s waveform which the protection device can withstand.

### Classification of protectors

There are two different protector classifications: according to UL1449 3rd Ed. and according to the C62.41.2-2002 IEEE guide.



#### UL 1449 3rd Ed.:

##### Type 1:

Permanently connected, designed to be installed between the service transformer station and the line (adjacent to the overvoltage device), as well as on the load side or meters.

##### Type 2:

Permanently connected, to the service load side, in distribution panels.

##### Type 3:

"Cord-connected" or "direct plug-in", installed adjacent to the equipment to be protected (about 10 meters from the service panel)

#### IEEE C62.41.2-2002:

##### Location Category C:

Subject to external transients of atmospheric origin, network switching by the power company and nearby industries, and faults in the distribution system.

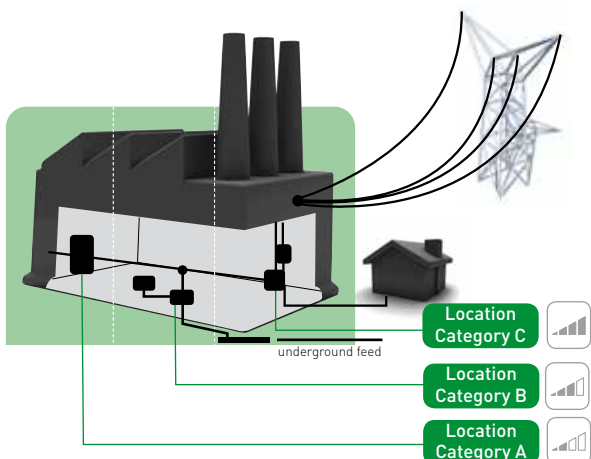
##### Location Category B:

Subject to externally generated transients as well as switching and transients in the form of a "ring wave" of internal origin. These can be caused by equipment such as motors and production and office equipment.

##### Location Category A:

Subject to a high level of switching transients and "ring waves" caused by commercial, industrial and office equipment, etc.

Example of a 3-step solution



IEEE C62.41 Location	Level of exposure	Type as per UL 1449	Imax
C	Highest	1 and 2	240 kA
C	Very high	1 and 2	200 kA
B	Medium-high	2	160 kA
B	Medium	2	100 kA
A	Medium-low	2 and 3	80 kA
A	Low	2 and 3	40 kA

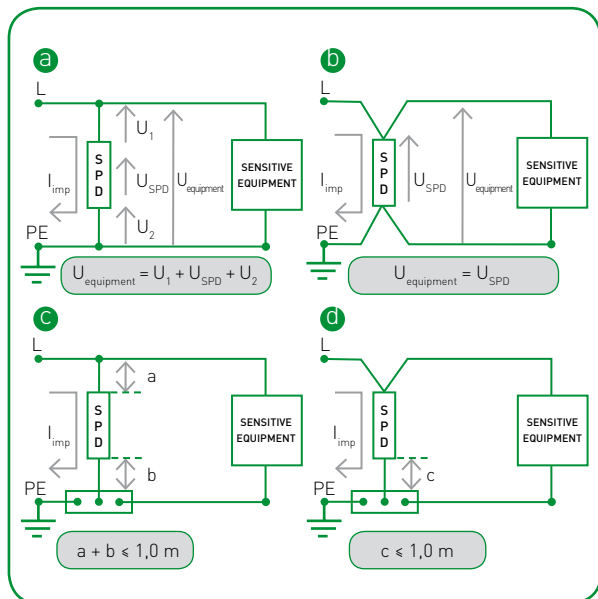
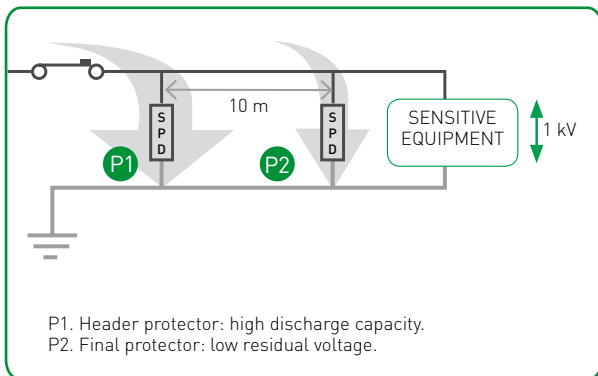
# Installation of a Surge Protector

## Coordination of protectors

Many facilities need more than one protection step. This achieves higher discharge capacity while ensuring a lower residual voltage.

To achieve the coordinated actuation of protection stages based on different technologies, a minimum clearance of 10 m must be maintained between protection devices. This ensures that the first step of protection (P1) is activated first and discharges the majority of the energy. The second step (P2) will subsequently perform the function of reducing the residual voltage at the output of the first protection device.

In panels in which the two protection steps are centralised and there is no 10 m clearance, combined protection devices must be used or decoupling coils must be fitted to simulate the cable clearance.



## Indication of end of life of the protection device

### Visual indication

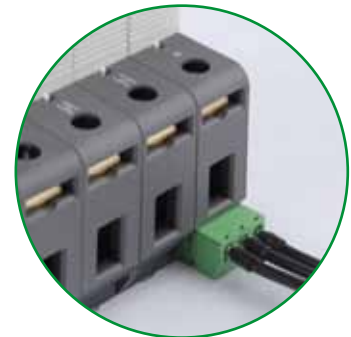
Models with visual indication feature a viewer on the front for local end-of-life signalling of the protection device.



**Visual diagnosis of the % of protection available for each mode, in this case 66%.**  
No signal or green colour: **Protector OK**  
Red signal: **End of life**

### Remote indication

Models with remote indication (IR) have a dry contact for remote signalling of the protector end of life.



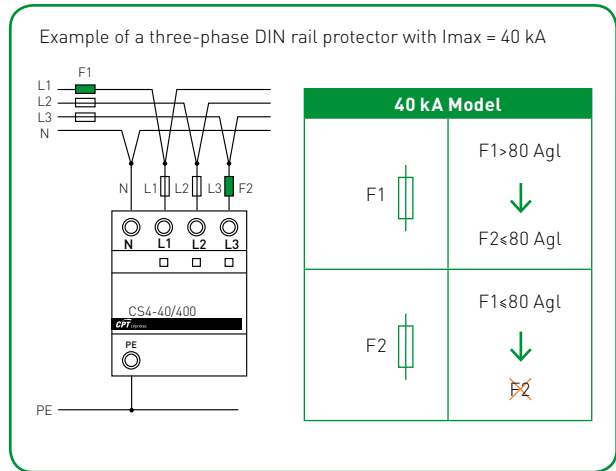
## Connection cabling

The length and type of cabling are critical for minimising the voltage received by the equipment. Increasing the length of the feed cables to the protection device reduces the effectiveness of overvoltage protection (Figure a). For optimum protection, these conductors should be as short as possible. The performance of a V-cable at the input and/or output device can help reduce this effect (Figure b).

The IEC installation directive requires that lengths a+b (Figure c) and c (Figure d) should preferably not exceed 0.5 m, and in no case should exceed 1 m.

## Back-up fuses

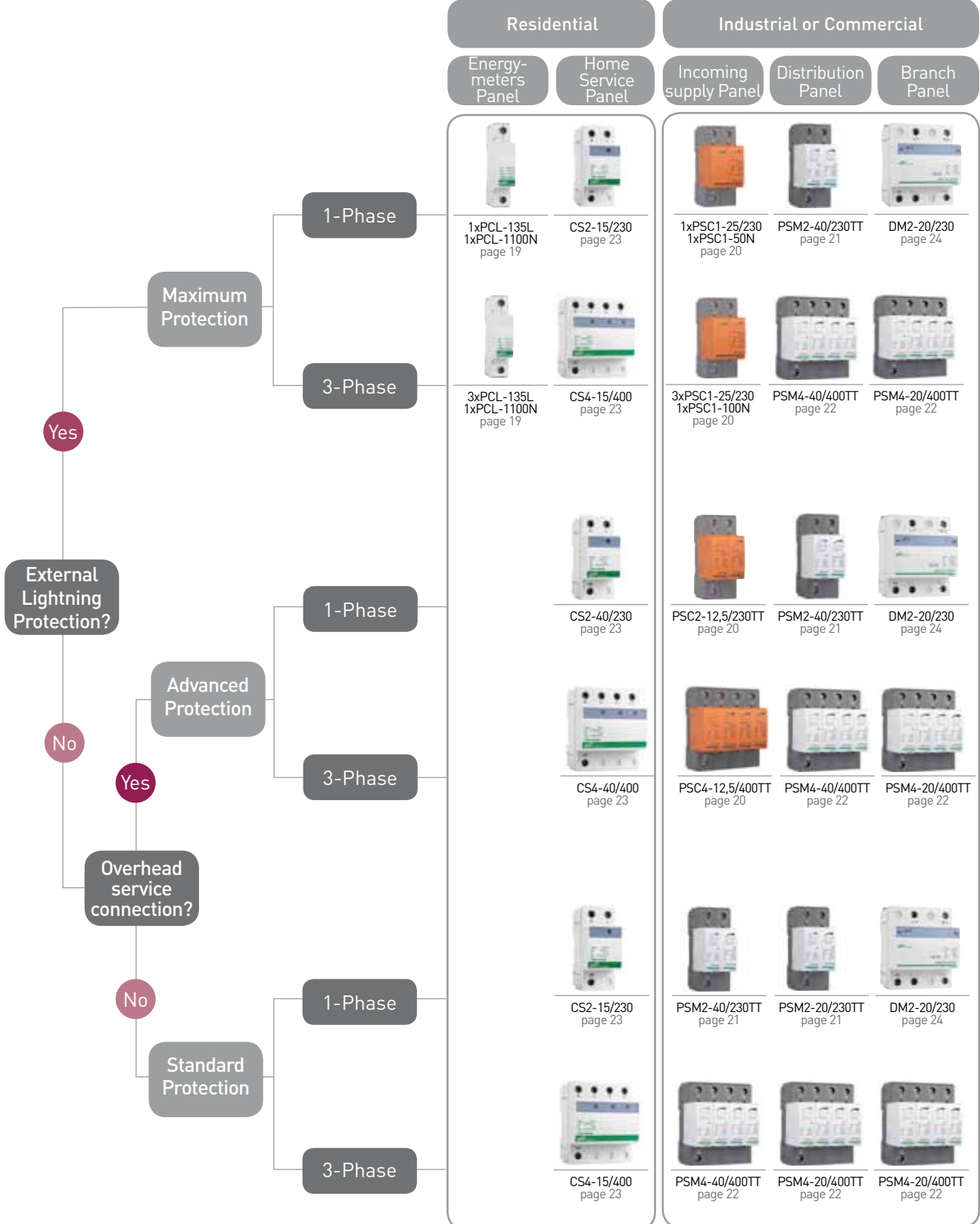
Surge protection devices are connected downstream of a circuit breaker or fuse (F1), in parallel with the installation to be protected. Depending on the size of the fuse, it may be necessary to install an additional disconnection element F2 (circuit breaker or fuse). Specifically, the installation of the F2 element is compulsory where the calibre of F1 is higher than a certain value. This value is different for each protector and is specified in its technical documentation.



## Electrical Supply



### Transient Overvoltages (according to IEC standard 61643-1)



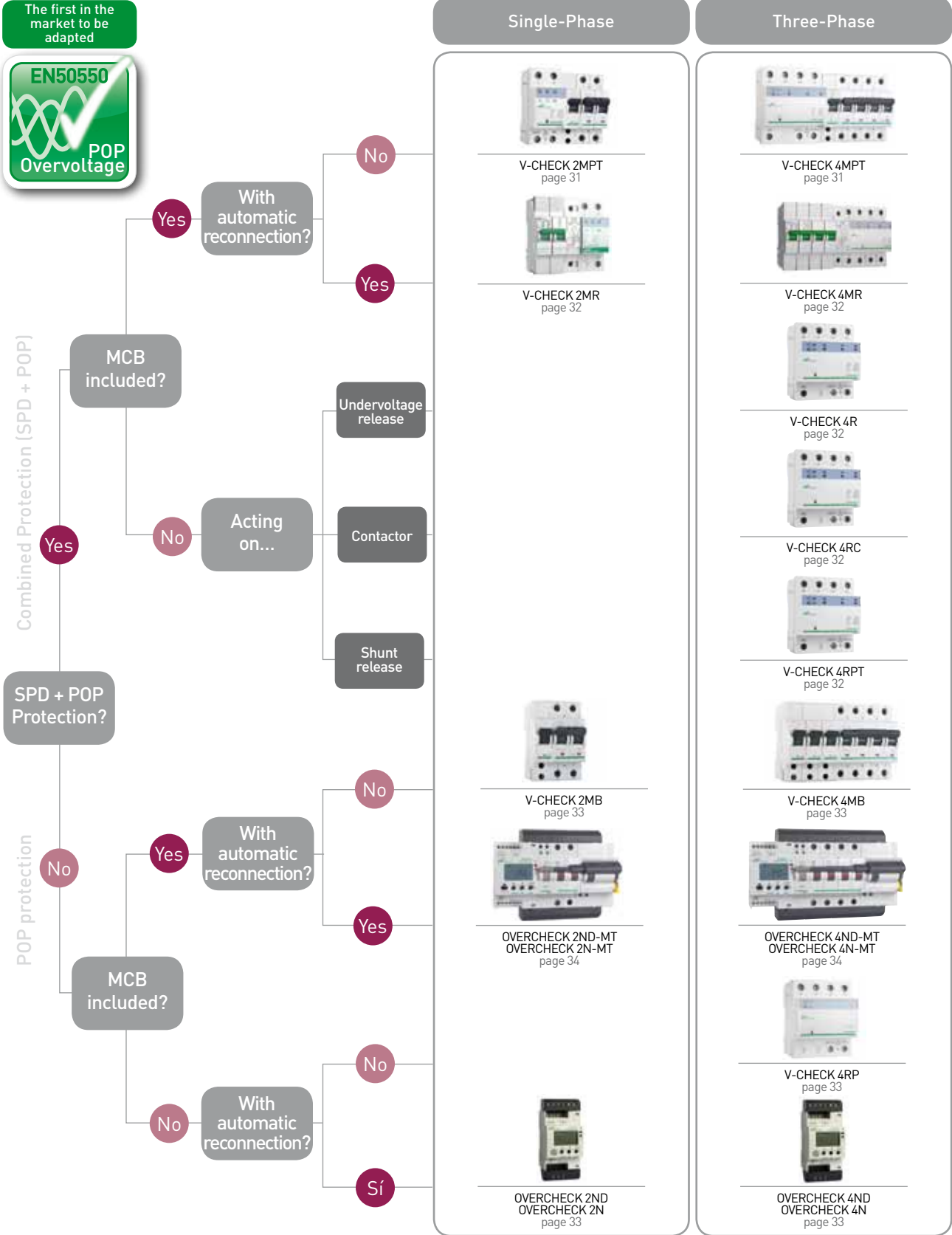
Note: indicative selection guide for TT network configurations. See pages 18-25 for other networks and voltages as well as for fine protection devices (Class III SPDs)

## Electrical Supply



### Combined Protection (Transient + Power frequency)

The first in the market to be adapted

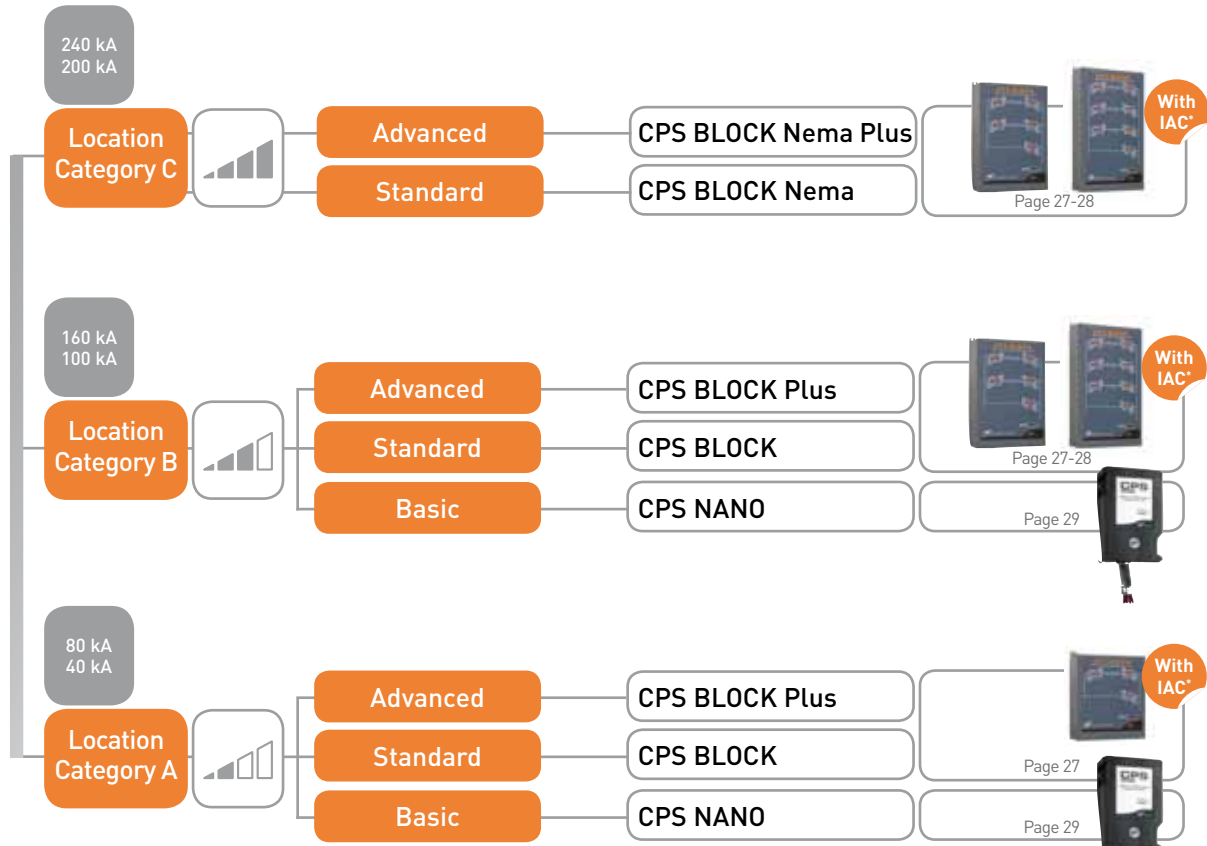


## Electrical Supply



### Transient Overvoltages Surges (Protection against Transients UL 1449 3rd Ed)

In accordance with ANSI/IEEE C62.41-2002 the table suggests the CPS series models suitable for various levels of exposure.



Discharge capacity






















\*IAC: Intelligent Aging Control (Remaining % of protection in each mode).



## Telecom and Signalling Networks



### Transient Overvoltages (according to IEC 61643-21)

Application	Signal type	Protector format	CPT Model	CPT Protector	
Telephone lines	<b>ADSL Telephony</b>	DIN	DIN-ADSL	  	
		Krone	KPL1		
		R&M	TPL1		
		Aerial	MCH		
	<b>ISDN Telephony</b>	Aerial			
	<b>PP Telephony</b>	Aerial			
		DIN	DIN-PP	<p>DIN ADSL page 36</p> <p>MCH-RDSI page 36</p> <p>KPL1 page 36</p>	
Data networks	<b>Ethernet Cat 5e</b>	1 pole	NETPRO	  	
		rack 18 poles			
		rack 24 poles			
	<b>Ethernet Cat 6</b>	1 pole			<p>NETPRO 100 BT page 36</p> <p>NETPRO CG-1P M page 36</p> <p>NETPRO CG-24P [CAT6] page 36</p>
	<b>Power over Ethernet, POE</b>	1 pole			
Measurement and Control	<b>Device NET</b>	DIN	DIN 6V		
	<b>KNX-Bus</b>	DIN	DIN 150V		BNV30 page 37
			BNV		
	<b>Modbus</b>	DIN	DIN 6V		
	<b>Profibus PA</b>	DIN	DIN 24V		DIN 12V-2C page 37
			BNV		
			DIN 24V		
		Sub-D 9	DB		
	<b>RS 232</b>	DIN	DIN 12V	 	
			BNV		DB25-V35HS page 38
			DIN 24V		DB9 12V/9HS page 38
		Sub-D	DB		
	<b>RS 485 / 422</b>	DIN	DIN 485		
		DIN 24V	DIN 24V-4G2 page 37		
		BNV			
<b>4-20 mA</b>	DIN	DIN 12V			
		DIN 24V			
		BNV			
<b>Binary signals</b>	DIN	DIN 12V	 		
		DIN 24V		DIN 485-3 page 38	
		BNV		DIN 12V-8 page 37	
<b>Temperature probe (PTC)</b>	DIN	DIN 6V			
Radio frequency	<b>Coaxial signal antennas</b>	Coaxial	CT 10	       	
	<b>CCTV</b>	Coaxial	CT 05		
	<b>Wimax</b>	Aerial	CT 30 N		



See pages 36-38 for product part numbers and selection parameters.

IEC  
61643-1  
(SPD)

## Low Voltage Electrical Supply Transient Overvoltages to IEC 61643-1

Class I



page 19

Class I+II



page 20

Class II



page 21

Class II+III



page 24

Class III



page 24

## Electrical Supply . Transient Overvoltages

### Lightning Current Arresters | Class I



#### PCL Range | Monobloc format



PCL-135L



CPCL-1100 TF

No. Prot. Poles	No. DIN modules	Un	Iimp	Up	Ifi	Code	Part number
1P	1	230 V	35 kA	< 4 kV	1,5 kA	77739600	PCL-135L
N	1	-	100 kA	< 4 kV	100 A	77739700	PCL-1100N
-	1	-	-	-	-	77739710	PCL-BP
1P+N	panel	230 V	35 kA [L-N] 100 kA [N-PE]	< 4 kV	1,5 kA [L-N] 100 A [N-PE]	7772050	CPCL-1100 MF
3P+N	panel	230/400 V	35 kA [L-N] 100 kA [N-PE]	< 4 kV	1,5 kA [L-N] 100 A [N-PE]	7772100	CPCL-1100 TF

### Lightning Current and Surge Arresters | Class I+II



#### CSC Range | Monobloc format

No. Prot. Poles	No. DIN modules	Un	I <sub>max</sub>	I <sub>imp</sub>	I <sub>n</sub>	Up	I <sub>cc</sub>	IR	Network	Code	Part number
1P	1	120 V	65 kA	7,5 kA	20 kA	≤ 0,9 kV	25 kA		TT, TNS, TNC	77738700	CSC1-7,5/120
	1	120 V	65 kA	7,5 kA	20 kA	≤ 0,9 kV	25 kA	✓	TT, TNS, TNC	77738701	CSC1-7,5/120 IR
	1	230 V	65 kA	7,5 kA	20 kA	≤ 1,5 kV	25 kA		TT, TNS, TNC	77738702	CSC1-7,5/230
	1	230 V	65 kA	7,5 kA	20 kA	≤ 1,5 kV	25 kA	✓	TT, TNS, TNC	77738703	CSC1-7,5/230 IR
	2	120 V	100 kA	15 kA	30 kA	≤ 0,9 kV	25 kA		TT, TNS, TNC	77738710	CSC1-15/120*
	2	120 V	100 kA	15 kA	30 kA	≤ 0,9 kV	25 kA	✓	TT, TNS, TNC	77738711	CSC1-15/120 IR*
	2	230 V	100 kA	15 kA	30 kA	≤ 1,3 kV	25 kA		TT, TNS, TNC	77738712	CSC1-15/230*
	2	230 V	100 kA	15 kA	30 kA	≤ 1,3 kV	25 kA	✓	TT, TNS, TNC	77738713	CSC1-15/230 IR*
	2	400 V	100 kA		30 kA	≤ 1,9 kV	25 kA		TT, TNS, TNC	77738716	CSC1-15/400*
	2	400 V	100 kA		30 kA	≤ 1,9 kV	25 kA	✓	TT, TNS, TNC	77738717	CSC1-15/400 IR*
N	1	neutro	65 kA	15 kA	20 kA	≤ 1,5 kV	25 kA		IT, TT, TNS, TNC	77738706	CSC1-15N
	2	neutro	100kA	30kA	65kA	≤ 1,5kV	25 kA		IT, TT, TNS, TNC	77738718	CSC1-30N*

CSC1-15/230

*\*CSC1-15 protectors are direct equivalents of former CS1-100 models*



## Lightning Current and Surge Arresters | Class I+II



### PSC Range | Pluggable format

												Spares *			
No. Prot. Poles	No. DIN modules	Un	I <sub>max</sub>	I <sub>imp</sub>	I <sub>n</sub>	U <sub>p</sub>	I <sub>cc</sub>	IR	Network	Code	Part number	L	N		
	1P	1	120 V	65 kA	12,5 kA	20 kA	≤ 1 kV	25 kA		TT, TNS, TNC	77738100	PSC1-12,5/120	C01		
		1	120 V	65 kA	12,5 kA	20 kA	≤ 1 kV	25 kA	✓	TT, TNS, TNC	77738101	PSC1-12,5/120IR	C01		
		1	230 V	65 kA	12,5 kA	20 kA	≤ 1,3 kV	25 kA		IT, TT, TNS, TNC	77738105	PSC1-12,5/230	C02		
		1	230 V	65 kA	12,5 kA	20 kA	≤ 1,3 kV	25 kA	✓	IT, TT, TNS, TNC	77738106	PSC1-12,5/230IR	C02		
		1	400 V	65 kA	12,5 kA	20 kA	≤ 1,8 kV	25 kA		IT, TT, TNS, TNC	77738110	PSC1-12,5/400	C03		
		1	400 V	65 kA	12,5 kA	20 kA	≤ 1,8 kV	25 kA	✓	IT, TT, TNS, TNC	77738111	PSC1-12,5/400IR	C03		
		2	120 V	100 kA	25 kA	25 kA	≤ 1,2 kV	25 kA		TT, TNS, TNC	77738120	PSC1-25/120	C04		
		2	120 V	100 kA	25 kA	25 kA	≤ 1,2 kV	25 kA	✓	TT, TNS, TNC	77738121	PSC1-25/120 IR	C04		
		2	230 V	100 kA	25 kA	25 kA	≤ 1,5 kV	25 kA		IT, TT, TNS, TNC	77738125	PSC1-25/230	C05		
		2	230 V	100 kA	25 kA	25 kA	≤ 1,5 kV	25 kA	✓	IT, TT, TNS, TNC	77738126	PSC1-25/230 IR	C05		
	2P	2	400 V	100 kA	25 kA	25 kA	≤ 2 kV	25 kA		IT, TT, TNS, TNC	77738130	PSC1-25/400	C06		
		2	400 V	100 kA	25 kA	25 kA	≤ 2 kV	25 kA	✓	IT, TT, TNS, TNC	77738131	PSC1-25/400IR	C06		
		1	neutro	65 kA	25 kA	25 kA	≤ 1,5 kV	25 kA		TT, TNS	77738180	PSC1-25N		C07	
		1	neutro	65 kA	50 kA	50 kA	≤ 1,5 kV	25 kA		TT, TNS	77738182	PSC1-50N		C08	
		2	neutro	100 kA	100 kA	50 kA	≤ 1,5 kV	25 kA		TT, TNS	77738183	PSC1-100N		C09	
		P+N	2	120 V	65 kA	125 kA (L-N) 25 kA (N-PE)	20 kA	≤ 1 kV (L-N) 1,5 kV (N-PE)	25 kA		TT, TNS	77738200	PSC2-12,5/120TT	C01	C07
			2	120 V	65 kA	125 kA (L-N) 25 kA (N-PE)	20 kA	≤ 1 kV (L-N) 1,5 kV (N-PE)	25 kA	✓	TT, TNS	77738201	PSC2-12,5/120TT IR	C01	C07
			2	230 V	65 kA	125 kA (L-N) 25 kA (N-PE)	20 kA	≤ 1,3 kV (L-N) 1,5 kV (N-PE)	25 kA		TT, TNS	77738205	PSC2-12,5/230TT	C02	C07
			2	230 V	65 kA	125 kA (L-N) 25 kA (N-PE)	20 kA	≤ 1,3 kV (L-N) 1,5 kV (N-PE)	25 kA	✓	TT, TNS	77738206	PSC2-12,5/230TT IR	C02	C07
			2P	2	120 V	65 kA	12,5 kA	20 kA	≤ 1 kV (L-PE)	25 kA		TT, TNS	77738250	PSC2-12,5/120TNS	C01
2	120 V			65 kA	12,5 kA	20 kA	≤ 1 kV (L-PE)	25 kA	✓	TT, TNS	77738251	PSC2-12,5/120TNS IR	C01		
2	230 V			65 kA	12,5 kA	20 kA	≤ 1,3 kV (L-PE)	25 kA		TT, TNS	77738255	PSC2-12,5/230TNS	C02		
	L+ / L-	3	600 Vdc	65 kA	12,5 kA	20 kA	≤ 2,6 kV	25 kA		PV	77738370	PSC3-12,5/600 PV	C10		
		3	600 Vdc	65 kA	12,5 kA	20 kA	≤ 2,6 kV	25 kA	✓	PV	77738371	PSC3-12,5/600 PV IR	C10		
		3	1.000 Vdc	65 kA	12,5 kA	20 kA	≤ 3,6 kV	25 kA		PV	77738375	PSC3-12,5/1000 PV	C11		
		3	1.000 Vdc	65 kA	12,5 kA	20 kA	≤ 3,6 kV	25 kA	✓	PV	77738376	PSC3-12,5/1000 PV IR	C11		
	3P	3	230 V	65 kA	12,5 kA	20 kA	≤ 1 kV (L-PE)	25 kA		TNC	77738320	PSC3-12,5/230TNC	C01		
		3	230 V	65 kA	12,5 kA	20 kA	≤ 1 kV (L-PE)	25 kA	✓	TNC	77738321	PSC3-12,5/230TNC IR	C01		
		3	400 V	65 kA	12,5 kA	20 kA	≤ 1,3 kV (L-PE)	25 kA		TNC	77738325	PSC3-12,5/400TNC	C02		
		3	400 V	65 kA	12,5 kA	20 kA	≤ 1,3 kV (L-PE)	25 kA	✓	TNC	77738326	PSC3-12,5/400TNC IR	C02		
	3P+N	4	120/230 V	65 kA	125 kA (L-N) 50kA (N-PE)	20 kA (L-N) 50kA (N-PE)	≤ 1 kV (L-N) 1,5 kV (N-PE)	25 kA		TT, TNS	77738400	PSC4-12,5/230TT	C01	C08	
		4	120/230 V	65 kA	125 kA (L-N) 50kA (N-PE)	20 kA (L-N) 50kA (N-PE)	≤ 1 kV (L-N) 1,5 kV (N-PE)	25 kA	✓	TT, TNS	77738401	PSC4-12,5/230TT IR	C01	C08	
		4	230/400 V	65 kA	125 kA (L-N) 50kA (N-PE)	20 kA (L-N) 50kA (N-PE)	≤ 1,3 kV (L-N) 1,5 kV (N-PE)	25 kA		TT, TNS	77738405	PSC4-12,5/400TT	C02	C08	
		4	230/400 V	65 kA	125 kA (L-N) 50kA (N-PE)	20 kA (L-N) 50kA (N-PE)	≤ 1,3 kV (L-N) 1,5 kV (N-PE)	25 kA	✓	TT, TNS	77738406	PSC4-12,5/400TT IR	C02	C08	
	4P	4	120/230 V	65 kA	12,5 kA	20 kA	≤ 1 kV (L-PE)	25 kA		TT, TNS	77738450	PSC4-12,5/230TNS	C01		
		4	120/230 V	65 kA	12,5 kA	20 kA	≤ 1 kV (L-PE)	25 kA	✓	TT, TNS	77738451	PSC4-12,5/230TNS IR	C01		
		4	230/400 V	65 kA	12,5 kA	20 kA	≤ 1,3 kV (L-PE)	25 kA		TT, TNS	77738455	PSC4-12,5/400TNS	C02		
		4	230/400 V	65 kA	12,5 kA	20 kA	≤ 1,3 kV (L-PE)	25 kA	✓	TT, TNS	77738456	PSC4-12,5/400TNS IR	C02		


PSC4-12,5/230 TT

\*See page 39 for identification of the exact ordering code and part number of the spare cartridges for L (line) and N (neutral) poles

## Surge Protective Devices | Class II



### PSM Range | Pluggable format

	No. Prot. Poles	No. DIN modules	Un	Imax	In	Up	Icc	IR	Network	Code	Part number	Spares *	
												L	N
	1P	1	120 V	20 kA	10 kA	≤ 0,8 kV	25 kA		TT, TNS, TNC	77707700	PSM1-20/120	M01	
		1	120 V	20 kA	10 kA	≤ 0,8 kV	25 kA	✓	TT, TNS, TNC	77707701	PSM1-20/120 IR	M01	
		1	230 V	20 kA	10 kA	≤ 1,4 kV	25 kA		IT, TT, TNS, TNC	77707702	PSM1-20/230	M02	
		1	230 V	20 kA	10 kA	≤ 1,4 kV	25 kA	✓	IT, TT, TNS, TNC	77707703	PSM1-20/230 IR	M02	
		1	400 V	20 kA	10 kA	≤ 2 kV	25 kA		IT, TT, TNS, TNC	77707704	PSM1-20/400	M03	
		1	400 V	20 kA	10 kA	≤ 2 kV	25 kA	✓	IT, TT, TNS, TNC	77707705	PSM1-20/400 IR	M03	
		1	120 V	40 kA	20 kA	≤ 0,9 kV	25 kA		TT, TNS, TNC	77707706	PSM1-40/120	M04	
		1	120 V	40 kA	20 kA	≤ 0,9 kV	25 kA	✓	TT, TNS, TNC	77707707	PSM1-40/120 IR	M04	
		1	230 V	40 kA	20 kA	≤ 1,3 kV	25 kA		IT, TT, TNS, TNC	77707708	PSM1-40/230	M05	
		1	230 V	40 kA	20 kA	≤ 1,3 kV	25 kA	✓	IT, TT, TNS, TNC	77707709	PSM1-40/230 IR	M05	
		1	400 V	40 kA	20 kA	≤ 2 kV	25 kA		IT, TT, TNS, TNC	77707710	PSM1-40/400	M06	
		1	400 V	40 kA	20 kA	≤ 2 kV	25 kA	✓	IT, TT, TNS, TNC	77707711	PSM1-40/400 IR	M06	
		1	690 V	30 kA	15 kA	≤ 3 kV	25 kA		TT,TNS,TNC	77707714	PSM1-30/750	M09	
		1	690 V	30 kA	15 kA	≤ 3 kV	25 kA	✓	TT,TNS,TNC	77707715	PSM1-30/750 IR	M09	
		N	1	neutro	20 kA	10 kA	≤ 1,5 kV	25 kA		TT, TNS	77707745	PSM1-20N	
1	neutro		40 kA	20 kA	≤ 1,5 kV	25 kA		TT, TNS	77707746	PSM1-40N		M11	
PSM1-40/230	P+N	2	120 V	20 kA	10 kA	≤ 0,8 kV (L-N) 1,5 kV (N-PE)	25 kA		TT, TNS	77707750	PSM2-20/120 TT	M01	M10
		2	120 V	20 kA	10 kA	≤ 0,8 kV (L-N) 1,5 kV (N-PE)	25 kA	✓	TT, TNS	77707751	PSM2-20/120 TT IR	M01	M10
		2	230 V	20 kA	10 kA	≤ 1,4 kV (L-N) 1,5 kV (N-PE)	25 kA		TT, TNS	77707752	PSM2-20/230 TT	M02	M10
		2	230 V	20 kA	10 kA	≤ 1,4 kV (L-N) 1,5 kV (N-PE)	25 kA	✓	TT, TNS	77707753	PSM2-20/230 TT IR	M02	M10
		2	120 V	40 kA	20 kA	≤ 0,9 kV (L-N) 1,5 kV (N-PE)	25 kA		TT, TNS	77707754	PSM2-40/120 TT	M04	M11
		2	120 V	40 kA	20 kA	≤ 0,9 kV (L-N) 1,5 kV (N-PE)	25 kA	✓	TT, TNS	77707755	PSM2-40/120 TT IR	M04	M11
		2	230 V	40 kA	20 kA	≤ 1,3 kV (L-N) 1,5 kV (N-PE)	25 kA		TT, TNS	77707756	PSM2-40/230 TT	M05	M11
		2	230 V	40 kA	20 kA	≤ 1,3 kV (L-N) 1,5 kV (N-PE)	25 kA	✓	TT, TNS	77707757	PSM2-40/230 TT IR	M05	M11
PSM2-40/230 TT	2P	2	120 V	20 kA	10 kA	≤ 0,8 kV	25 kA		TT, TNS	77707900	PSM2-20/120 TNS	M01	
		2	120 V	20 kA	10 kA	≤ 0,8 kV	25 kA	✓	TT, TNS	77707901	PSM2-20/120 TNS IR	M01	
		2	230 V	20 kA	10 kA	≤ 1,4 kV	25 kA		TT, TNS	77707902	PSM2-20/230 TNS	M02	
		2	230 V	20 kA	10 kA	≤ 1,4 kV	25 kA	✓	TT, TNS	77707903	PSM2-20/230 TNS IR	M02	
		2	120 V	40 kA	20 kA	≤ 0,9 kV	25 kA		TT, TNS	77707904	PSM2-40/120 TNS	M04	
		2	120 V	40 kA	20 kA	≤ 0,9 kV	25 kA	✓	TT, TNS	77707905	PSM2-40/120 TNS IR	M04	
		2	230 V	40 kA	20 kA	≤ 1,3 kV	25 kA		TT, TNS	77707906	PSM2-40/230 TNS	M05	
		2	230 V	40 kA	20 kA	≤ 1,3 kV	25 kA	✓	TT, TNS	77707907	PSM2-40/230 TNS IR	M05	

PSM2-40/230 TT

\* Spares are replacement surge cartridges for L (line) and N (neutral) poles.  
See page 39 "Accessories" for identification of the exact ordering code and part number.





PSM3-40/400 TNC

No. Prot. Poles	No. DIN modules	Un	Imax	In	Up	Icc	IR	Network	Code	Part number	Spares *	
											L	N
3P	3	230 V	20 kA	10 kA	≤ 0,8 kV	25 kA		TNC	77707860	PSM3-20/230 TNC	M01	
	3	230 V	20 kA	10 kA	≤ 0,8 kV	25 kA	✓	TNC	77707861	PSM3-20/230 TNC IR	M01	
	3	400 V	20 kA	10 kA	≤ 1,4 kV	25 kA		TNC	77707862	PSM3-20/400 TNC	M02	
	3	400 V	20 kA	10 kA	≤ 1,4 kV	25 kA	✓	TNC	77707863	PSM3-20/400 TNC IR	M02	
	3	230 V	40 kA	20 kA	≤ 0,9 kV	25 kA		TNC	77707864	PSM3-40/230 TNC	M04	
	3	230 V	40 kA	20 kA	≤ 0,9 kV	25 kA	✓	TNC	77707865	PSM3-40/230 TNC IR	M04	
	3	400 V	40 kA	20 kA	≤ 1,3 kV	25 kA		TNC	77707866	PSM3-40/400 TNC	M05	
	3	400 V	40 kA	20 kA	≤ 1,3 kV	25 kA	✓	TNC	77707867	PSM3-40/400 TNC IR	M05	
	3	690 V	30 kA	15 kA	≤ 1,3 kV	25 kA		TNC	77707870	PSM3-30/750 TNC	M09	
	3	690 V	30 kA	15 kA	≤ 1,3 kV	25 kA	✓	TNC	77707871	PSM3-30/750 TNC IR	M09	
L+ / L-	3	600 Vdc	40 kA	20 kA	≤ 2,6 kV	25 kA		PV	77707850	PSM3-40/600 PV	M07	
	3	600 Vdc	40 kA	20 kA	≤ 2,6 kV	25 kA	✓	PV	77707851	PSM3-40/600 PV IR	M07	
	3	1.000 Vdc	40 kA	20 kA	≤ 4 kV	25 kA		PV	77707852	PSM3-40/1000 PV	M08	
	3	1.000 Vdc	40 kA	20 kA	≤ 4 kV	25 kA	✓	PV	77707853	PSM3-40/1000 PV IR	M08	
3P+N	4	120/230 V	20 kA	10 kA	≤ 0,8 kV(L-N) ≤ 1,5 kV (N-PE)	25 kA		TT, TNS	77707800	PSM4-20/230 TT	M01	M10
	4	120/230 V	20 kA	10 kA	≤ 0,8 kV(L-N) ≤ 1,5 kV (N-PE)	25 kA	✓	TT, TNS	77707801	PSM4-20/230 TT IR	M01	M10
	4	230/400 V	20 kA	10 kA	≤ 1,4 kV (L-N) ≤ 1,5 kV (N-PE)	25 kA		TT, TNS	77707802	PSM4-20/400 TT	M02	M10
	4	230/400 V	20 kA	10 kA	≤ 1,4 kV (L-N) ≤ 1,5 kV (N-PE)	25 kA	✓	TT, TNS	77707803	PSM4-20/400 TT IR	M02	M10
	4	120/230 V	40 kA	20 kA	≤ 0,9 kV(L-N) ≤ 1,5 kV (N-PE)	25 kA		TT, TNS	77707804	PSM4-40/230 TT	M04	M11
	4	120/230 V	40 kA	20 kA	≤ 0,9 kV(L-N) ≤ 1,5 kV (N-PE)	25 kA	✓	TT, TNS	77707805	PSM4-40/230 TT IR	M04	M11
	4	230/400 V	40 kA	20 kA	≤ 1,3 kV (L-N) ≤ 1,5 kV (N-PE)	25 kA		TT, TNS	77707806	PSM4-40/400 TT	M05	M11
	4	230/400 V	40 kA	20 kA	≤ 1,3 kV (L-N) ≤ 1,5 kV (N-PE)	25 kA	✓	TT, TNS	77707807	PSM4-40/400 TT IR	M05	M11
4P	4	120/230 V	20 kA	10 kA	≤ 0,8 kV	25 kA		TT, TNS	77707950	PSM4-20/230 TNS	M01	
	4	120/230 V	20 kA	10 kA	≤ 0,8 kV	25 kA	✓	TT, TNS	77707951	PSM4-20/230 TNS IR	M01	
	4	230/400 V	20 kA	10 kA	≤ 1,4 kV	25 kA		TT, TNS	77707952	PSM4-20/400 TNS	M02	
	4	230/400 V	20 kA	10 kA	≤ 1,4 kV	25 kA	✓	TT, TNS	77707953	PSM4-20/400 TNS IR	M02	
	4	120/230 V	40 kA	20 kA	≤ 0,9 kV	25 kA		TT, TNS	77707954	PSM4-40/230 TNS	M04	
	4	120/230 V	40 kA	20 kA	≤ 0,9 kV	25 kA	✓	TT, TNS	77707955	PSM4-40/230 TNS IR	M04	
	4	230/400 V	40 kA	20 kA	≤ 1,3 kV	25 kA		TT, TNS	77707956	PSM4-40/400 TNS	M05	
	4	230/400 V	40 kA	20 kA	≤ 1,3 kV	25 kA	✓	TT, TNS	77707957	PSM4-40/400 TNS IR	M05	




PSM4-40/400 TT

\* Spares are replacement surge cartridges for L (line) and N (neutral) poles.  
 See page 39 "Accessories" for identification of the exact ordering code and part number.

## Surge Protective Devices | Class II



### CS Range | Monobloc format

No. Prot. Poles	No. DIN modules	Un	I <sub>max</sub>	I <sub>n</sub>	U <sub>p</sub>	I <sub>cc</sub>	IR	Code	Part number	
	1P	1	120 V	15 kA	5 kA	≤ 0,7 kV	10 kA		77705105	CS1-15/120
		1	120 V	15 kA	5 kA	≤ 0,7 kV	10 kA	✓	77705106	CS1-15/120 IR
		1	230 V	15 kA	5 kA	≤ 1,2 kV	10 kA		77705110	CS1-15/230
		1	230 V	15 kA	5 kA	≤ 1,2 kV	10 kA	✓	77705111	CS1-15/230 IR
		1	400 V	15 kA	5 kA	≤ 1,8 kV	10 kA		77705115	CS1-15/400
		1	400 V	15 kA	5 kA	≤ 1,8 kV	10 kA	✓	77705116	CS1-15/400 IR
		1	120 V	40 kA	15 kA	≤ 0,9 kV	25 kA		77705120	CS1-40/120
		1	120 V	40 kA	15 kA	≤ 0,9 kV	25 kA	✓	77705121	CS1-40/120 IR
		1	230 V	40 kA	20 kA	≤ 1,3 kV	25 kA		77705125	CS1-40/230
		1	230 V	40 kA	20 kA	≤ 1,3 kV	25 kA	✓	77705126	CS1-40/230 IR
		1	400 V	40 kA	15 kA	≤ 1,8 kV	25 kA		77705130	CS1-40/400
		1	400 V	40 kA	15 kA	≤ 1,8 kV	25 kA	✓	77705131	CS1-40/400 IR
N	1	-	15 kA	5 kA	≤ 1,5 kV	-		77705149	CS1-15N	
	1	-	40 kA	20 kA	≤ 1,5 kV	-		77705151	CS1-40N	
CS1-15/230	1P+N	2	230 V	15 kA	5 kA	≤ 1,2 kV (L-N) ≤ 1,5 kV (N-PE)	10 kA		77705211	CS2-15/230
		2	230 V	15 kA	5 kA	≤ 1,2 kV (L-N) ≤ 1,5 kV (N-PE)	10 kA	✓	77705212	CS2-15/230 IR
		2	230 V	40 kA	20 kA	≤ 1,3 kV (L-N) ≤ 1,5 kV (N-PE)	25 kA		77705241	CS2-40/230
		2	230 V	40 kA	20 kA	≤ 1,3 kV (L-N) ≤ 1,5 kV (N-PE)	25 kA	✓	77705242	CS2-40/230 IR
	2P	2	230 V	15 kA	5 kA	≤ 1,2 kV	10 kA		77705228	CS2P-15/230
		2	230 V	15 kA	5 kA	≤ 1,2 kV	10 kA	✓	77705229	CS2P-15/230 IR
		2	230 V	40 kA	15 kA	≤ 1,3 kV	25 kA		77705248	CS2P-40/230
		2	230 V	40 kA	15 kA	≤ 1,3 kV	25 kA	✓	77705249	CS2P-40/230 IR
CS2-15/230	L+ / L-	2	600 Vdc	40 kA	20 kA	≤ 2,6 kV	10 kA		77707360	CS23-40/600
		2	600 Vdc	40 kA	20 kA	≤ 2,6 kV	10 kA	✓	77707361	CS23-40/600 IR
		2	1000 Vdc	40 kA	20 kA	≤ 3,8 kV	10 kA		77707362	CS23-40/1000
		2	1000 Vdc	40 kA	20 kA	≤ 3,8 kV	10 kA	✓	77707363	CS23-40/1000 IR
CS23-40/600	3P+N	4	230/400 V	15 kA	5 kA	≤ 1,2 kV (L-N) ≤ 1,5 kV (N-PE)	10 kA		77705421	CS4-15/400
		4	230/400 V	15 kA	5 kA	≤ 1,2 kV (L-N) ≤ 1,5 kV (N-PE)	10 kA	✓	77705422	CS4-15/400 IR
		4	230/400 V	40 kA	20 kA	≤ 1,3 kV (L-N) ≤ 1,5 kV (N-PE)	25 kA		77705451	CS4-40/400
		4	230/400 V	40 kA	20 kA	≤ 1,3 kV (L-N) ≤ 1,5 kV (N-PE)	25 kA	✓	77705452	CS4-40/400 IR
	4P	4	230/400 V	15 kA	5 kA	≤ 1,2 kV	10 kA		77705428	CS4P-15/400
		4	230/400 V	15 kA	5 kA	≤ 1,2 kV	10 kA	✓	77705429	CS4P-15/400 IR
		4	230/400 V	40 kA	20 kA	≤ 1,3 kV	25 kA		77705458	CS4P-40/400
		4	230/400 V	40 kA	20 kA	≤ 1,3 kV	25 kA	✓	77705459	CS4P-40/400 IR



\* Note: The CS23 range is intended for protection in DC photovoltaic applications.

## Surge Protective Devices | Class II



### NSP Range | Aerial format



No. Prot. Poles	Un	I <sub>max</sub>	I <sub>n</sub>	U <sub>p</sub>	I <sub>cc</sub>	IR	Connection	Code	Part number
1P+N	230 V	15 kA	5 kA	≤ 1,2 kV (L-N) ≤ 1,5 kV (N-PE)	10 kA		Parallel	77705500	NSP2-15/230
	230 V	15 kA	5 kA	≤ 1,2 kV (L-N) ≤ 1,5 kV (N-PE)	10 kA	✓	Parallel	77705501	NSP2-15/230 IR
	230 V	15 kA	5 kA	≤ 1,2 kV (L-N) ≤ 1,5 kV (N-PE)	10 kA		Series	77705510	NSS2-15/230

NSP2-15/230

## Surge Protective Devices | Class II+III



### DM2 Range | With EMI filter | Connected in series



No. Prot. Poles	No. DIN modules	Un	I <sub>max</sub>	I <sub>n</sub>	U <sub>p</sub>	U <sub>oc</sub>	I <sub>N</sub>	IR	Code	Part number
L1-L2	4	120 V	20 kA	10 kA	≤ 0,8 kV	< 6 kV	20 A	✓	77702840	DM2-20A/120 IR
	4	230 V	20 kA	10 kA	≤ 1,2 kV	< 6 kV	20 A	✓	77702830	DM2-20A/230 IR

DM2-20A/230 IR

## Surge Protective Devices | Class II+III



### CS21 Range | In a single DIN module | Connected in parallel



No. Prot. Poles	No. DIN modules	Un	I <sub>max</sub>	I <sub>n</sub>	U <sub>p</sub>	U <sub>oc</sub>	IR	Code	Part number
L1-L2	1	230 V	20 kA	10 kA	≤ 1,4 kV	< 6 kV		77704111	CS21 CD/230
	1	230 V	20 kA	10 kA	≤ 1,4 kV	< 6 kV	✓	77704112	CS21 CD/230 IR

CS21-CD/230 IR

## Decoupling Inductances

### L Range | Inductances



No. DIN modules	Un	Ln	I <sub>N</sub>	Max. back-up fuse	Code	Part number
1	500 V	15 uH +/- 15%	16 A	16 A gL	77785950	L-15/16
2		15 uH +/- 15%	32 A	32 A gL	77785900	L-15/32
4		15 uH +/- 15%	63 A	63 A gL	77786000	L-15/63

L-15/32

## Surge Protective Devices | Class III



### DM1 Range | DIN rail with EMI filter



No. Prot. Poles	No. DIN modules	Un	I <sub>n</sub>	U <sub>p</sub>	U <sub>oc</sub>	I <sub>N</sub>	Code	Part number
L1-L2	3	230 V	< 5 kA	< 1 kV (L-N) < 1,2 kV (L(N)-PE)	< 10 kV (L1-N, L1(N)-PE)	8 A	77702800	DM1-230

DM1-230



## Surge Protective Devices | Class III



### RD2, RP2 and DIN Ranges | DIN rail

No. Prot. Poles	No. DIN modules	Un	In	Up	Uoc	IN	IR	Code	Part number	
L1-L2	2	12 V	< 1 kA	< 0,08 kV (L1-L2) < 0,8 kV (L1(L2)-PE)	< 2 kV (L1-L2, L1(L2)-PE)			77704055	RD2-10/12	
	2	12 V	< 1 kA	< 0,08 kV (L1-L2) < 0,8 kV (L1(L2)-PE)	< 2 kV (L1-L2, L1(L2)-PE)		✓	77704060	RD2-10/12 IR	
	2	24 V	< 1 kA	< 0,3 kV (L1-L2) < 0,8 kV (L1(L2)-PE)	< 2 kV (L1-L2, L1(L2)-PE)			77704045	RD2-10/24	
	2	24 V	< 1 kA	< 0,3 kV (L1-L2) < 0,8 kV (L1(L2)-PE)	< 2 kV (L1-L2, L1(L2)-PE)		✓	77704050	RD2-10/24 IR	
	2	48 V	< 1 kA	< 0,4 kV (L1-L2) < 0,8 kV (L1(L2)-PE)	< 2 kV (L1-L2, L1(L2)-PE)			77704035	RD2-10/48	
	2	48 V	< 1 kA	< 0,4 kV (L1-L2) < 0,8 kV (L1(L2)-PE)	< 2 kV (L1-L2, L1(L2)-PE)		✓	77704040	RD2-10/48 IR	
	2	60 V	< 2,5 kA	< 0,6 kV (L1-L2) < 0,8 kV (L1(L2)-PE)	< 5 kV (L1-L2, L1(L2)-PE)			77704025	RD2-10/60	
	2	60 V	< 2,5 kA	< 0,6 kV (L1-L2) < 0,8 kV (L1(L2)-PE)	< 5 kV (L1-L2, L1(L2)-PE)		✓	77704030	RD2-10/60 IR	
	2	120 V	< 2,5 kA	< 0,7 kV (L1-L2) < 0,8 kV (L1(L2)-PE)	< 5 kV (L1-L2, L1(L2)-PE)			77704015	RD2-10/120	
	2	120 V	< 2,5 kA	< 0,7 kV (L1-L2) < 0,8 kV (L1(L2)-PE)	< 5 kV (L1-L2, L1(L2)-PE)		✓	77704020	RD2-10/120 IR	
	2	230 V	< 3 kA	< 1,2 kV (L1-L2) < 1,5 kV (L1(L2)-PE)	< 6 kV (L1-L2, L1(L2)-PE)			77704005	RD2-10/230	
	2	230 V	< 3 kA	< 1,2 kV (L1-L2) < 1,5 kV (L1(L2)-PE)	< 6 kV (L1-L2, L1(L2)-PE)		✓	77704010	RD2-10/230 IR	
RD2-10/60	1	12 V	< 1 kA	< 0,08 kV (L1-L2) < 0,8 kV (L1(L2)-PE)	< 2 kV (L1-L2, L1(L2)-PE)			77702235	RP2-10/12	
	1	24 V	< 1 kA	< 0,2 kV (L1-L2) < 0,8 kV (L1(L2)-PE)	< 2kV (L1-L2, L1(L2)-PE)			77702230	RP2-10/24	
	1	48 V	< 1 kA	< 0,2 kV (L1-L2) < 0,8 kV (L1(L2)-PE)	< 2kV (L1-L2, L1(L2)-PE)			77702225	RP2-10/48	
	1	60 V	< 2,5 kA	< 0,6 kV (L1-L2) < 0,8 kV (L1(L2)-PE)	< 5kV (L1-L2, L1(L2)-PE)			77702220	RP2-10/60	
	1	120 V	< 2,5 kA	< 0,7 kV (L1-L2) < 0,8 kV (L1(L2)-PE)	< 5kV (L1-L2, L1(L2)-PE)			77702215	RP2-10/120	
	1	230 V	< 3 kA	< 1,2 kV (L1-L2) < 1,5 kV (L1(L2)-PE)	< 6kV (L1-L2, L1(L2)-PE)			77702210	RP2-10/230	
	1	12 V	< 5 kA		< 45 V	< 10 kV (L1-L2, L1(L2)-PE)	3 A		77840928	DIN 12V-3A
	1	24V	< 5 kA		< 45 V	< 10 kV (L1-L2, L1(L2)-PE)	3 A		77840927	DIN 24V-3A



RD2-10/60



DIN24V-3A

## Surge Protective Devices | Class III



### TM6 and NTB Ranges | Socket outlets

No. Prot. Poles	Un	Up	Uoc	IN	In	Code	Part number
L1-L2	230 V	< 1 kV	3 kV	16 A	< 3 kA	77703010	TM6-A
	230 V	< 1,2 kV (L-N) < 1,5 kV (L(N)-PE)	6 kV	6 A	< 3 kA	77703220	NTB-6 ES
	230 V	< 1,2 kV (L-N) < 1,5 kV (L(N)-PE)	6 kV	6 A	< 3 kA	77703235	NTB-6 ES/ADSL
	230 V	< 1,2 kV (L-N) < 1,5 kV (L(N)-PE)	6 kV	16 A	< 3 kA	77703260	NTB-16 ES
	230 V	< 1,2 kV (L-N) < 1,5 kV (L(N)-PE)	6 kV	16A	< 3 kA	77703275	NTB-16 ES/ADSL
	230 V	< 1,1 kV (L-N) < 1,2 kV (L(N)-PE)	6 kV	16A	< 3 kA	77703280	NTB-16 ES/TV
	120 V	< 0,7 kV	5 kV	15A	< 2,5 kA	77703325	NTB-15 US
	120 V	< 0,7 kV	5 kV	15A	< 2,5 kA	77703340	NTB-15 US/ADSL



TM6-A




NTB-16 ES/ADSL



A yellow circular logo with a white border and a white corner, containing the text "UL 1449 3rd Ed (SPD-TVSS)".

UL  
1449 3rd Ed  
(SPD-TVSS)

A background image featuring a black silhouette of a power line tower on the left and a green background with white binary code (0s and 1s) on the right.

## Low Voltage Electrical Supply Transient Overvoltages UL 1449 3rd Ed, NEMA Type

Modular panels



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Hardwired



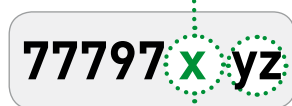
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## TVSS Surge Protective Devices | UL 1449 3rd Ed



### CPS BLOCK Range | Modular panels

Configure your code:



Value of X	1	2	3	4	5
Series	CPS BLOCK				
Version	Basic	Plus	NEMA	NEMA Plus	Spare
Surge counter		✓		✓	
EMI filter		✓		✓	
NEMA 12			✓	✓	
All Mode (CM + DM)		✓	✓	✓	
IAC	✓	✓	✓	✓	
MDS	✓	✓	✓	✓	
EPM	✓	✓	✓	✓	
IR	✓	✓	✓	✓	
Status LEDs	✓	✓	✓	✓	

Replacement surge module (one per mode)

Network / Wires	For use in electrical supplies	I <sub>max</sub>	VPR (L-N, L-PE, L-L)	VPR (N-PE)	Code	Part number *
1-Phase (2W+G)	120 V	40 kA	600 V	1200 V	77797X11	CPS BLOCK 1-Phase 40 kA 120 V
	120 V	80 kA	600 V	1200 V	77797X21	CPS BLOCK 1-Phase 80 kA 120 V
	120 V	100 kA	600 V	1200 V	77797X31	CPS BLOCK 1-Phase 100 kA 120 V
	120 V	160 kA	600 V	1200 V	77797X41	CPS BLOCK 1-Phase 160 kA 120 V
	120 V	200 kA	600 V	1200 V	77797X51	CPS BLOCK 1-Phase 200 kA 120 V
	120 V	240 kA	600 V	1200 V	77797X61	CPS BLOCK 1-Phase 240 kA 120 V
	230 V	40 kA	1200 V	1400 V	77797X12	CPS BLOCK 1-Phase 40 kA 230 V
	230 V	80 kA	1200 V	1400 V	77797X22	CPS BLOCK 1-Phase 80 kA 230 V
	230 V	100 kA	1200 V	1400 V	77797X32	CPS BLOCK 1-Phase 100 kA 230 V
	230 V	160 kA	1200 V	1400 V	77797X42	CPS BLOCK 1-Phase 160 kA 230 V
	230 V	200 kA	1200 V	1400 V	77797X52	CPS BLOCK 1-Phase 200 kA 230 V
	230 V	240 kA	1200 V	1400 V	77797X62	CPS BLOCK 1-Phase 240 kA 230 V
Split Phase (3W+G)	120 V	40 kA	600 V	1200 V	77797X13	CPS BLOCK Split Phase 40 kA 120 V
	120 V	80 kA	600 V	1200 V	77797X23	CPS BLOCK Split Phase 80 kA 120 V
	120 V	100 kA	600 V	1200 V	77797X33	CPS BLOCK Split Phase 100 kA 120 V
	120 V	160 kA	600 V	1200 V	77797X43	CPS BLOCK Split Phase 160 kA 120 V
	120 V	200 kA	600 V	1200 V	77797X53	CPS BLOCK Split Phase 200 kA 120 V
3-Phase WYE (4W+G)	120 V	40 kA	600 V	1200 V	77797X14	CPS BLOCK 3-Phase WYE 40 kA 120 V
	120 V	80 kA	600 V	1200 V	77797X24	CPS BLOCK 3-Phase WYE 80 kA 120 V
	120 V	100 kA	600 V	1200 V	77797X34	CPS BLOCK 3-Phase WYE 100 kA 120 V
	120 V	160 kA	600 V	1200 V	77797X44	CPS BLOCK 3-Phase WYE 160 kA 120 V
	120 V	200 kA	600 V	1200 V	77797X54	CPS BLOCK 3-Phase WYE 200 kA 120 V
	120 V	240 kA	600 V	1200 V	77797X64	CPS BLOCK 3-Phase WYE 240 kA 120 V
	230 V	40 kA	1200 V	1400 V	77797X15	CPS BLOCK 3-Phase WYE 40 kA 230 V
	230 V	80 kA	1200 V	1400 V	77797X25	CPS BLOCK 3-Phase WYE 80 kA 230 V
	230 V	100 kA	1200 V	1400 V	77797X35	CPS BLOCK 3-Phase WYE 100 kA 230 V
	230 V	160 kA	1200 V	1400 V	77797X45	CPS BLOCK 3-Phase WYE 160 kA 230 V
	230 V	200 kA	1200 V	1400 V	77797X55	CPS BLOCK 3-Phase WYE 200 kA 230 V
	230 V	240 kA	1200 V	1400 V	77797X65	CPS BLOCK 3-Phase WYE 240 kA 230 V
	277 V	40 kA	1200 V	1400 V	77797X16	CPS BLOCK 3-Phase WYE 40 kA 277 V
	277 V	80 kA	1200 V	1400 V	77797X26	CPS BLOCK 3-Phase WYE 80 kA 277 V
	277 V	100 kA	1200 V	1400 V	77797X36	CPS BLOCK 3-Phase WYE 100 kA 277 V
	277 V	160 kA	1200 V	1400 V	77797X46	CPS BLOCK 3-Phase WYE 160 kA 277 V
	277 V	200 kA	1200 V	1400 V	77797X56	CPS BLOCK 3-Phase WYE 200 kA 277 V
	277 V	240 kA	1200 V	1400 V	77797X66	CPS BLOCK 3-Phase WYE 240 kA 277 V



3-PHASE      SPLIT-PHASE      1-PHASE

\*To generate the complete Part Number, choose one of the following "versions": Basic, Plus, Nema, Nema Plus. Configure the "X" value according to the table.

- IAC:** Visual indicator of **intelligent aging control** (protection % remaining in each mode).
- EPM:** **Efficient preventive maintenance** with replaceable suppression modules per mode.
- MDS:** **Multidischarge system** with individual disconnection of each varistor.
- IR:** Remote Indication.

Configure your code:

**77797**X**yz**

Value of X	1	2	3	4	5
Series	CPS BLOCK				
Version	Basic	Plus	NEMA	NEMA Plus	Spare
Surge counter		✓		✓	
EMI filter		✓		✓	
NEMA 12			✓	✓	
All Mode (CM + DM)		✓	✓	✓	
IAC	✓	✓	✓	✓	
MDS	✓	✓	✓	✓	
EPM	✓	✓	✓	✓	
IR	✓	✓	✓	✓	
Status LEDs	✓	✓	✓	✓	

Replacement surge module (one per mode)

Network / Wires	For use in electrical supplies	Imax	VPR (L-N, L-PE, L-L)	VPR (N-PE)	Code	Part number *
3-Phase Delta (3W+G)	230 V	40 kA	1200 V	1400 V	77797X17	CPS BLOCK 3-Phase Delta 40 kA 230 V
	230 V	80 kA	1200 V	1400 V	77797X27	CPS BLOCK 3-Phase Delta 80 kA 230 V
	230 V	100 kA	1200 V	1400 V	77797X37	CPS BLOCK 3-Phase Delta 100 kA 230 V
	230 V	160 kA	1200 V	1400 V	77797X47	CPS BLOCK 3-Phase Delta 160 kA 230 V
	230 V	200 kA	1200 V	1400 V	77797X57	CPS BLOCK 3-Phase Delta 200 kA 230 V
	230 V	240 kA	1200 V	1400 V	77797X67	CPS BLOCK 3-Phase Delta 240 kA 230 V
	400 V	40 kA	1200 V	1400 V	77797X18	CPS BLOCK 3-Phase Delta 40 kA 400 V
	400 V	80 kA	1200 V	1400 V	77797X28	CPS BLOCK 3-Phase Delta 80 kA 400 V
	400 V	100 kA	1200 V	1400 V	77797X38	CPS BLOCK 3-Phase Delta 100 kA 400 V
	400 V	160 kA	1200 V	1400 V	77797X48	CPS BLOCK 3-Phase Delta 160 kA 400 V
	400 V	200 kA	1200 V	1400 V	77797X58	CPS BLOCK 3-Phase Delta 200 kA 400 V
	400 V	240 kA	1200 V	1400 V	77797X68	CPS BLOCK 3-Phase Delta 240 kA 400 V
	480 V	40 kA	1425 V	2850 V	77797X19	CPS BLOCK 3-Phase Delta 40 kA 480 V
	480 V	80 kA	1425 V	2850 V	77797X29	CPS BLOCK 3-Phase Delta 80 kA 480 V
	480 V	100 kA	1425 V	2850 V	77797X39	CPS BLOCK 3-Phase Delta 100 kA 480 V
	480 V	160 kA	1425 V	2850 V	77797X49	CPS BLOCK 3-Phase Delta 160 kA 480 V
480 V	200 kA	1425 V	2850 V	77797X59	CPS BLOCK 3-Phase Delta 200 kA 480 V	
480 V	240 kA	1425 V	2850 V	77797X69	CPS BLOCK 3-Phase Delta 240 kA 480 V	
High Leg Delta (4W+G)	120 V	40 kA	1200 V	1400 V	77797X10	CPS BLOCK High Leg Delta 40 kA 120 V
	120 V	80 kA	1200 V	1400 V	77797X20	CPS BLOCK High Leg Delta 80 kA 120 V
	120 V	100 kA	1200 V	1400 V	77797X30	CPS BLOCK High Leg Delta 100 kA 120 V
	120 V	160 kA	1200 V	1400 V	77797X40	CPS BLOCK High Leg Delta 160 kA 120 V
	120 V	200 kA	1200 V	1400 V	77797X50	CPS BLOCK High Leg Delta 200 kA 120 V
	120 V	240 kA	1200 V	1400 V	77797X60	CPS BLOCK High Leg Delta 240 kA 120 V

\*To generate the complete Part Number, choose one of the following "versions": Basic, Plus, Nema, Nema Plus. Configure the "X" value according to the table.



3-PHASE HIGH LEG DELTA

**IAC:** Visual indicator of **intelligent aging control** (protection % remaining in each mode).

**EPM:** **Efficient preventive maintenance** with replaceable suppression modules per mode.

**MDS:** **Multidischarge system** with individual disconnection of each varistor.





**IR:** Remote Indication.

## TVSS Surge Protective Devices | UL 1449 3rd Ed



### CPS NANO Range | Hardwired format

FEATURES	
All Mode (CM + DM)	✓
NEMA 4	✓
MDS	✓
Status LED's	✓

	Network / Wires	For use in electrical supplies	I <sub>max</sub>	VPR (L-N, L-PE, L-L)	VPR (N-PE)	Code	Part number
	1-Phase (2W+G)	120 V	40 kA	500 V	1000 V	77797611	CPS NANO 1-Phase 40 kA 120 V
		120 V	60 kA	500 V	1000 V	77797621	CPS NANO 1-Phase 60 kA 120 V
		120 V	80 kA	500 V	1000 V	77797631	CPS NANO 1-Phase 80 kA 120 V
		120 V	120 kA	500 V	1000 V	77797641	CPS NANO 1-Phase 120 kA 120 V
		230 V	40 kA	1000 V	2000 V	77797612	CPS NANO 1-Phase 40 kA 230 V
		230 V	60 kA	1000 V	2000 V	77797622	CPS NANO 1-Phase 60 kA 230 V
		230 V	80 kA	1000 V	2000 V	77797632	CPS NANO 1-Phase 80 kA 230 V
	Split Phase (3W+G)	120 V	40 kA	500 V	1000 V	77797613	CPS NANO Split Phase 40 kA 120 V
		120 V	60 kA	500 V	1000 V	77797623	CPS NANO Split Phase 60 kA 120 V
		120 V	80 kA	500 V	1000 V	77797633	CPS NANO Split Phase 80 kA 120 V
		120 V	120 kA	500 V	1000 V	77797643	CPS NANO Split Phase 120 kA 120 V
	3-Phase WYE (4W+G)	120 V	40 kA	500 V	1000 V	77797614	CPS NANO 3-Phase WYE 40 kA 120 V
		120 V	60 kA	500 V	1000 V	77797624	CPS NANO 3-Phase WYE 60 kA 120 V
		120 V	80 kA	500 V	1000 V	77797634	CPS NANO 3-Phase WYE 80 kA 120 V
		120 V	120 kA	500 V	1000 V	77797644	CPS NANO 3-Phase WYE 120 kA 120 V
		230 V	40 kA	1000 V	2000 V	77797615	CPS NANO 3-Phase WYE 40 kA 230 V
		230 V	60 kA	1000 V	2000 V	77797625	CPS NANO 3-Phase WYE 60 kA 230 V
		230 V	80 kA	1000 V	2000 V	77797635	CPS NANO 3-Phase WYE 80 kA 230 V
		230 V	120 kA	1000 V	2000 V	77797645	CPS NANO 3-Phase WYE 120 kA 230 V
		277 V	40 kA	1000 V	2000 V	77797616	CPS NANO 3-Phase WYE 40 kA 277 V
		277 V	60 kA	1000 V	2000 V	77797626	CPS NANO 3-Phase WYE 60 kA 277 V
		277 V	80 kA	1000 V	2000 V	77797636	CPS NANO 3-Phase WYE 80 kA 277 V
	High Leg Delta (4W+G)	120 V	40 kA	1200 V	2400 V	77797610	CPS NANO High Leg Delta 40 kA 120 V
		120 V	60 kA	1200 V	2400 V	77797620	CPS NANO High Leg Delta 60 kA 120 V
		120 V	80 kA	1200 V	2400 V	77797630	CPS NANO High Leg Delta 80 kA 120 V
		120 V	120 kA	1200 V	2400 V	77797640	CPS NANO High Leg Delta 120 kA 120 V



**MDS: Multidischarge system** with individual disconnection of each varistor.

EN  
50550  
(POP)

## Low Voltage Electrical Supply

Power frequency Overvoltages (POP)  
to EN 50550

SPD + POP  
w/MCB



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SPD + POP w/MCB and  
auto. reconnection



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SPD + POP w/out  
MCB,  $I_n > 63$  A



page 32

POP w/MCB



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Programmable Line  
Control Unit



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## Electrical Supply . Combined Protection (SPD + POP)

### Combined overvoltage protectors (SPD + POP)



V-CHECK MPT Range | Includes MCB |  $I_{n(MCB)} \leq 63 \text{ A}$



V-CHECK 2MPT-40



V-CHECK 4MPT-40

No. Prot. Poles	No. DIN modules	Un	POP Protector		SPD Protector Class II			MCB		Code	Part number
			Ua	Imax	In	Up	In C curve	Breaking capacity			
P+N	5	230 V	>275V	15 kA	3 kA	≤ 1,5 kV	25 A	6 kA*	77706451	V-CHECK 2MPT-25	
	5	230 V	>275V	15 kA	3 kA	≤ 1,5 kV	32 A	6 kA*	77706452	V-CHECK 2MPT-32	
	5	230 V	>275V	15 kA	3 kA	≤ 1,5 kV	40 A	6 kA*	77706453	V-CHECK 2MPT-40	
	5	230 V	>275V	15 kA	3 kA	≤ 1,5 kV	50 A	6 kA*	77706454	V-CHECK 2MPT-50	
	5	230 V	>275V	15 kA	3 kA	≤ 1,5 kV	63 A	6 kA*	77706455	V-CHECK 2MPT-63	
3P+N	9	230/400V	>275V	15 kA	3 kA	≤ 1,5 kV	10 A	6 kA* - 10 kA**	77706477	V-CHECK 4MPT-10	
	9	230/400V	>275V	15 kA	3 kA	≤ 1,5 kV	16 A	6 kA* - 10 kA**	77706478	V-CHECK 4MPT-16	
	9	230/400V	>275V	15 kA	3 kA	≤ 1,5 kV	20 A	6 kA* - 10 kA**	77706476	V-CHECK 4MPT-20	
	9	230/400V	>275V	15 kA	3 kA	≤ 1,5 kV	25 A	6 kA* - 10 kA**	77706471	V-CHECK 4MPT-25	
	9	230/400V	>275V	15 kA	3 kA	≤ 1,5 kV	32 A	6 kA* - 10 kA**	77706472	V-CHECK 4MPT-32	
	9	230/400V	>275V	15 kA	3 kA	≤ 1,5 kV	40 A	6 kA* - 10 kA**	77706473	V-CHECK 4MPT-40	
	9	230/400V	>275V	15 kA	3 kA	≤ 1,5 kV	50 A	6 kA* - 10 kA**	77706474	V-CHECK 4MPT-50	
	9	230/400V	>275V	15 kA	3 kA	≤ 1,5 kV	63 A	6 kA* - 10 kA**	77706475	V-CHECK 4MPT-63	
	9	230/400V	>275V	40 kA	15 kA	≤ 1,8 kV	10 A	6 kA* - 10 kA**	77706467	V-CHECK 4MPT-10 PLUS	
	9	230/400V	>275V	40 kA	15 kA	≤ 1,8 kV	16 A	6 kA* - 10 kA**	77706468	V-CHECK 4MPT-16 PLUS	
	9	230/400V	>275V	40 kA	15 kA	≤ 1,8 kV	20 A	6 kA* - 10 kA**	77706466	V-CHECK 4MPT-20 PLUS	
	9	230/400V	>275V	40 kA	15 kA	≤ 1,8 kV	25 A	6 kA* - 10 kA**	77706461	V-CHECK 4MPT-25 PLUS	
	9	230/400V	>275V	40 kA	15 kA	≤ 1,8 kV	32 A	6 kA* - 10 kA**	77706462	V-CHECK 4MPT-32 PLUS	
	9	230/400V	>275V	40 kA	15 kA	≤ 1,8 kV	40 A	6 kA* - 10 kA**	77706463	V-CHECK 4MPT-40 PLUS	
	9	230/400V	>275V	40 kA	15 kA	≤ 1,8 kV	50 A	6 kA* - 10 kA**	77706464	V-CHECK 4MPT-50 PLUS	
9	230/400V	>275V	40 kA	15 kA	≤ 1,8 kV	63 A	6 kA* - 10 kA**	77706465	V-CHECK 4MPT-63 PLUS		

Complies with EN 50550

\* According to UNE-EN 60898

\*\* According to UNE-EN 60947-2



## Combined overvoltage protectors (SPD + POP)



**V-CHECK MR Range | Includes MCB |  $I_{n(MCB)} \leq 63 \text{ A}$  | With automatic reconnection**



No. Prot. Poles	No. DIN modules	POP Protector		SPD Protector Class II			MCB		Code	Part number
		$U_n$	$U_a$	$I_{max}$	$I_n$	$U_p$	In C curve	Breaking capacity		
P+N	5	230 V	> 275V	15 kA	3 kA	$\leq 1,5 \text{ kV}$	6 A	10 kA	77706256	V-CHECK 2MR-6
	5	230 V	> 275V	15 kA	3 kA	$\leq 1,5 \text{ kV}$	10 A	10 kA	77706257	V-CHECK 2MR-10
	5	230 V	> 275V	15 kA	3 kA	$\leq 1,5 \text{ kV}$	25 A	10 kA	77706250	V-CHECK 2MR-25
	5	230 V	> 275V	15 kA	3 kA	$\leq 1,5 \text{ kV}$	40 A	10 kA	77706255	V-CHECK 2MR-40
3P+N	9	230/400V	> 275V	20 kA	5 kA	$\leq 1,5 \text{ kV}$	10 A	6 kA* - 10 kA**	77706267	V-CHECK 4MR-10
	9	230/400V	> 275V	20 kA	5 kA	$\leq 1,5 \text{ kV}$	16 A	6 kA* - 10 kA**	77706268	V-CHECK 4MR-16
	9	230/400V	> 275V	20 kA	5 kA	$\leq 1,5 \text{ kV}$	20 A	6 kA* - 10 kA**	77706266	V-CHECK 4MR-20
	9	230/400V	> 275V	20 kA	5 kA	$\leq 1,5 \text{ kV}$	25 A	6 kA* - 10 kA**	77706261	V-CHECK 4MR-25
	9	230/400V	> 275V	20 kA	5 kA	$\leq 1,5 \text{ kV}$	32 A	6 kA* - 10 kA**	77706262	V-CHECK 4MR-32
	9	230/400V	> 275V	20 kA	5 kA	$\leq 1,5 \text{ kV}$	40 A	6 kA* - 10 kA**	77706263	V-CHECK 4MR-40
	9	230/400V	> 275V	20 kA	5 kA	$\leq 1,5 \text{ kV}$	50 A	6 kA* - 10 kA**	77706264	V-CHECK 4MR-50
	9	230/400V	> 275V	20 kA	5 kA	$\leq 1,5 \text{ kV}$	63 A	6 kA* - 10 kA**	77706265	V-CHECK 4MR-63



V-CHECK 2MR-40



V-CHECK 4MR-40

Complies with EN 50550

\* According to UNE-EN 60898

\*\* According to UNE-EN 60947-2

## Combined overvoltage protectors (SPD + POP)



**V-CHECK RPT Range | MCB not included**

No. Prot. Poles	No. DIN modules	POP Protector		SPD Protector Class II			Acting on			Code	Part number
		$U_n$	$U_a$	$I_{max}$	$I_n$	$U_p$	Under-voltage release	Shunt release	Contactors		
3P+N	4	230/400V	> 275 V	40 kA	15 kA	$\leq 1,8 \text{ kV}$	✓			77706400	V-CHECK 4R
	4	230/400V	> 275 V	40 kA	15 kA	$\leq 1,8 \text{ kV}$		✓		77706415	V-CHECK 4RPT
	4	230/400V	> 275 V	40 kA	15 kA	$\leq 1,8 \text{ kV}$			✓	77706417	V-CHECK 4RC



V-CHECK 4RPT







## Electrical Supply . Power frequency Overvoltages (POP)

### Power frequency Overvoltage Protectors (POP)




**V-CHECK MB Range | Includes MCB |  $I_{n(MCB)} \leq 63 \text{ A}$**

No. Prot. Poles	No. DIN modules	Un	POP Protector		MCB		Code	Part number
			Ua	In C curve	Breaking capacity			
 V-CHECK 2MB-40	3	230 V	> 255 V	25 A	6 kA	77706238	V-CHECK 2MB-25	
	3	230 V	> 255 V	32 A	6 kA	77706239	V-CHECK 2MB-32	
	3	230 V	> 255 V	40 A	6 kA	77706240	V-CHECK 2MB-40	
	3	230 V	> 255 V	50 A	6 kA	77706241	V-CHECK 2MB-50	
	3	230 V	> 255 V	63 A	6 kA	77706242	V-CHECK 2MB-63	
 V-CHECK 4MB-40	7	230/400 V	> 255 V	20 A	6 kA	77706349	V-CHECK 4MB-20	
	7	230/400 V	> 255 V	25 A	6 kA	77706350	V-CHECK 4MB-25	
	7	230/400 V	> 255 V	32 A	6 kA	77706351	V-CHECK 4MB-32	
	7	230/400 V	> 255 V	40 A	6 kA	77706352	V-CHECK 4MB-40	
	7	230/400 V	> 255 V	50 A	6 kA	77706353	V-CHECK 4MB-50	
	7	230/400 V	> 255 V	63 A	6 kA	77706354	V-CHECK 4MB-63	

### Power frequency Overvoltage Protectors (POP)



**V-CHECK RP Range | MCB not included**

No. Prot. Poles	No. DIN modules	Un	POP Protector		Code	Part number
			Ua			
 V-CHECK 4RP	3P+N	4	230/400V	> 275 V	77706640	V-CHECK 4RP

### Power frequency Overvoltage Protectors (POP)



**OVERCHECK | Programmable, w/ auto. reconnection | MCB not included**



No. Prot. Poles	No. DIN modules	Un	Earth leakage protection	Phase sequence fault	Code	Part number
	P+N	3	230V		77762560	OVERCHECK 2N/230
	3P+N	3	230/400 V	✓	77762640	OVERCHECK 4ND/230
		3	230/400 V		77762660	OVERCHECK 4N/230

Complies with EN 50550

## Power frequency Overvoltage Protectors (POP)



**OVERCHECK | Programmable, w/ auto. reconnection | Includes MCB |  $I_{n(MCB)} \leq 63 A$**



OVERCHECK 4ND/230 - MT40

Complies with EN 50550

### POP Protection

- Undervoltage threshold: 170 – 200 V
- Overvoltage threshold: 250 – 350 V

### Overcurrent Protection

- Breaking capacity: 6 kA (EN 60898) - 10 kA (EN 60947-2)

### Earth leakage protection

- Sensitivity: 30 – 1000 mA
- Reconnection delay
- Class A

### Programmable

All values are adjustable

### Voltage control:

- Reconnection delay: 3 – 250 s
- No. reconnections: user defined

### Overcurrent protection:

- Reconnection delay: 1 – 60 min
- No. reconnections: 0 – 3

### Earth leakage protection:

- Reconnection delay: 3 – 250 s
- No. reconnections: 0 – 3
- Trip delay: 20 – 3.000 ms
- Sensitivity adjustment: 30 – 3.000 mA

### Phase sequence fault:

- No. reconnections: user defined

No. Prot. Poles	No. DIN modules	Un	Nominal current (MCB)	Earth leakage protection	Phase sequence fault	Code	Part number
P+N	9	230 V	6A	✓		77762541	OVERCHECK 2ND/230 - MT-6
	9	230 V	10A	✓		77762542	OVERCHECK 2ND/230 - MT10
	9	230 V	16A	✓		77762543	OVERCHECK 2ND/230 - MT16
	9	230 V	20A	✓		77762544	OVERCHECK 2ND/230 - MT20
	9	230 V	25A	✓		77762545	OVERCHECK 2ND/230 - MT25
	9	230 V	32A	✓		77762546	OVERCHECK 2ND/230 - MT32
	9	230 V	40A	✓		77762547	OVERCHECK 2ND/230 - MT40
	9	230 V	50A	✓		77762548	OVERCHECK 2ND/230 - MT50
	9	230 V	63A	✓		77762549	OVERCHECK 2ND/230 - MT63
	9	230 V	6A		✓	77762561	OVERCHECK 2N/230 - MT6
	9	230 V	10A		✓	77762562	OVERCHECK 2N/230 - MT10
	9	230 V	16A		✓	77762563	OVERCHECK 2N/230 - MT16
	9	230 V	20A		✓	77762564	OVERCHECK 2N/230 - MT20
	9	230 V	25A		✓	77762565	OVERCHECK 2N/230 - MT25
	9	230 V	32A		✓	77762566	OVERCHECK 2N/230 - MT32
	9	230 V	40A		✓	77762567	OVERCHECK 2N/230 - MT40
	9	230 V	50A		✓	77762568	OVERCHECK 2N/230 - MT50
	9	230 V	63A		✓	77762569	OVERCHECK 2N/230 - MT63
	3P+N	11	230/400V	10A	✓	✓	77762642
11		230/400V	16A	✓	✓	77762643	OVERCHECK 4ND/230 - MT16
11		230/400V	20A	✓	✓	77762644	OVERCHECK 4ND/230 - MT20
11		230/400V	25A	✓	✓	77762645	OVERCHECK 4ND/230 - MT25
11		230/400V	32A	✓	✓	77762646	OVERCHECK 4ND/230 - MT32
11		230/400V	40A	✓	✓	77762647	OVERCHECK 4ND/230 - MT40
11		230/400V	50A	✓	✓	77762648	OVERCHECK 4ND/230 - MT50
11		230/400V	63A	✓	✓	77762649	OVERCHECK 4ND/230 - MT63
11		230/400V	10A		✓	77762662	OVERCHECK 4N/230 - MT10
11		230/400V	16A		✓	77762663	OVERCHECK 4N/230 - MT16
11		230/400V	20A		✓	77762664	OVERCHECK 4N/230 - MT20
11		230/400V	25A		✓	77762665	OVERCHECK 4N/230 - MT25
11		230/400V	32A		✓	77762666	OVERCHECK 4N/230 - MT32
11		230/400V	40A		✓	77762667	OVERCHECK 4N/230 - MT40
11		230/400V	50A		✓	77762668	OVERCHECK 4N/230 - MT50
11		230/400V	63A		✓	77762669	OVERCHECK 4N/230 - MT63

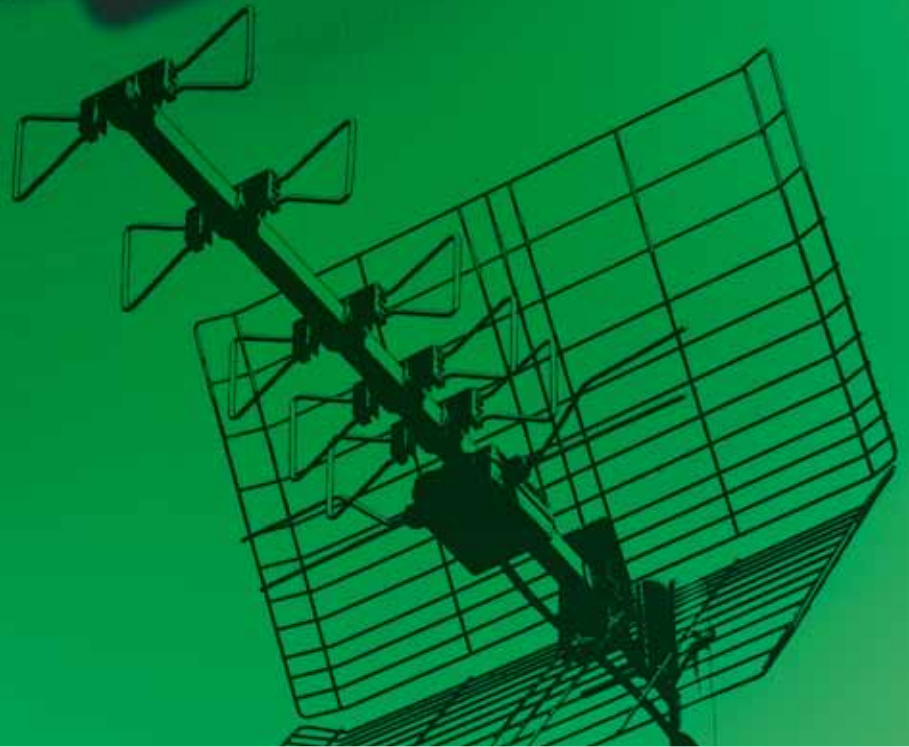
## Earth leakage toroid



TOCK-30

Usable cross-section	Code	Part number
20mm	77762401	TOCK-20
30mm	77762402	TOCK-30

IEC  
61643-21  
(SPD)



## Telecom and Signalling Networks Transient Overvoltages to IEC 61643-21

Telephone Lines



page 36

Data Networks



page 36

Measurement and  
Control



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Radiofrequency



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## Telecom and Signalling Networks

### Telephone lines



#### DIN rail format



No. Protected Pairs	No. DIN modules	Un	Uc	I <sub>max</sub>	In	Up	Code	Part number
1	1	50 V	180 V	10 kA	5 kA	< 200 V	77840115	DIN-ADSL
	1	5 V	7 V	10 kA	5 kA	< 10 / 20 V	77840120	DIN-PP

DIN-ADSL



#### Aerial format



No. Protected Pairs	Uc	I <sub>max</sub>	In	Up	Code	Part number
2	18/56 V	10 kA	5 kA	< 27 / 75 V	77834010	MCH-RDSI
1	180 V	10 kA	5 kA	< 200 V	77834020	MCH-ADSL
	7 V	10 kA	5 kA	< 10 / 20 V	77834025	MCH-PP

MCH-ADSL



#### Format for MDF Main Distribution Frame disconnection terminal blocks



No. Protected Pairs	Un	Uc	I <sub>max</sub>	In	Up	Terminal block type (not included)		Code	Part number
						Krone	R&M		
1	110 V	180 V	15 kA	5 kA	< 350 V		✓	77830050	TPL1 CG
	110 V	180 V	2,4 kA	1 kA	< 575 V		✓	77830060	TPL1 SG
	110 V	180 V	15 kA	5 kA	< 350 V	✓		77830070	KPL1 CG
	110 V	180 V	2,4 kA	1 kA	< 575 V	✓		77830080	KPL1 SG

KPL1 SG

### Data networks



#### Aerial or Rack format | Ethernet Cat. 5 E and 6



No. Protected Pairs	Un	Uc	In	Up	Bandwidth	Category	Code	Part number
4x18	5 V	6 V	250 A	< 35 V	250 MHz	Cat. 6	77811933	NETPRO CG18P (CAT. 6)
4x24	5 V	6 V	250 A	< 35 V	250 MHz	Cat. 6	77811935	NETPRO CG-24P (CAT6)
	5 V	6 V	250 A	< 35 V	100 MHz	Cat. 5.E	77811940	NETPRO CG-24P (CAT5.E)
4	5 V	6 V	250 A	< 35 V	100 MHz	Cat. 5.E	77811900	NETPRO 100 BT
	5 V	6 V	250 A	< 35 V	250 MHz	Cat. 6	77811930	NETPRO CG1P
	5 V	6 V	250 A	< 35 V	250 MHz	Cat. 6	77811945	NETPRO CG-1P M
	5 V* 48 V**	6 V	250 A	130 V (L-L / signal) 35 V (L-L / power)	250 MHz	Cat. 6	77811931	NETPRO 1P POE (CAT. 6)

NETPRO 100 BT

\* Signal / pairs 1-2-3-6  
\*\*Power / pairs 4-5-7-8

POE

## Measurement and Control



### Protection of analog signals 12 V or 24 V



No. Protected Wires	No. DIN modules	Un	Uc	I <sub>max</sub>	In	Up	Code	Part number
2+GND	2	12 V	16 V	10 kA	5 kA	< 45 V (L-PE) < 27 V (L-GND)	77840710	DIN 12V-3
4+GND	2	12 V	16 V	10 kA	5 kA	< 45 V (L-PE) < 27 V (L-GND)	77840721	DIN 12V-5N
7+GND	2	12 V	16 V	10 kA	5 kA	< 45 V (L-PE) (L-L) < 27 V (L-GND)	77840735	DIN 12V-8
2+GND	2	24 V	30 V	10 kA	5 kA	< 90 V (L-PE) < 45 V (L-GND)	77840760	DIN 24V-3
4+GND	2	24 V	30 V	10 kA	5 kA	< 67 V (L-PE) < 45 V (L-GND)	77840771	DIN 24V-5N
7+GND	2	24 V	30 V	10 kA	5 kA	< 67 V (L-L) (L-PE) < 39 V (L-GND)	77840785	DIN-24V-8

DIN 12V-8



### Protection of lines of 1 pair of wires



No. Protected Wires	No. DIN modules	Un	Uc	I <sub>max</sub>	In	Up	Code	Part number
1	2	6 V	7 V	10 kA	5 kA	< 10 V	77840905	DIN 6V-2C
	2	12 V	16 V	10 kA	5 kA	< 20 V	77840910	DIN 12V-2C
	2	24 V	27 V	10 kA	5 kA	< 40 V	77840915	DIN 24V-2C
	2	48 V	56 V	10 kA	5 kA	< 70 V	77840920	DIN 48V-2C
	2	150 V	180 V	10 kA	5 kA	< 200 V	77840925	DIN 150V-2C

DIN 12V-2C



### Protection of lines of 2 pairs of wires



No. Protected Wires	Un	Uc	I <sub>max</sub>	In	Up	Code	Part number
4	24 V	30 V	10 kA	5 kA	≤ 60 V (L-PE) ≤ 120 V (L-L)	77840545	DIN 24V-4G1
2 pares de hilos	24 V	30 V	10 kA	5 kA	≤ 600 V (L-PE) ≤ 60 V (L-L)	77840565	DIN 24V-2G2

DIN 24V-4G1



### Protection of modular terminal blocks with integrated disconnection



No. Protected Wires	Un	Uc	I <sub>max</sub>	In	Up	Code	Part number
24 V	24 V	30 V	5 kA	5 kA	≤ 45 V (L-PE)	77850655	BNV 30
110 V	110 V	130 V	5 kA	5 kA	≤ 260 V	77850660	BNV 110

BNV 110





## Protection of RS 485 communications



No. Protected Wires	No. DIN modules	Un	Uc	Imax	In	Up	Code	Part number
1	2	12 V	16 V	10 kA	5 kA	< 20 V	77840805	DIN 485-2C
2+GND	2	12 V	16 V	10 kA	5 kA	< 45 V (L-PE) < 27 V (L-L)	77840810	DIN 485-3
4+GND	2	12 V	16 V	10 kA	5 kA	< 45 V (L-PE) < 27 V (L-L)	77840816	DIN 485-5N

DIN 485-3



## Protection of RS 232 communications



No. Protected Wires	Un	Uc	Imax	In	Up	Code	Part number
7+GND	12 V	16 V	0,5 kA	0,5 kA	< 100 V (L-PE) < 25 V (L-GND)	77820135	DB25-232/8HS
23+GND	12 V	16 V	0,5 kA	0,5 kA	< 100 V (L-PE) < 25 V (L-GND)	77820140	DB25-12V/25HS
7+GND	12 V	16 V	0,5 kA	0,5 kA	< 500 V (L-PE) < 25 V (L-GND)	77820145	DB9-12V/9HS
2+GND	5 V	6 V	5 kA	2 kA	< 20 V (L-L) < 50 V (L-PE)	77820153	DB9-PFB/2HS
17+GND	12 V	16 V	0,5 kA	0,5 kA	< 100 V (L-PE) < 25 V (L-GND)	77820160	DB25-V24HS
14+GND	12V	16V	0,5kA	0,5kA	< 100V (L-PE) < 25V (L-GND)	77820800	DB15-12V/15HS

DB25-12V/25HS

## Radiofrequency



### Protection of coaxial cables



Uc	Imax	In	Up	Type of connector (I/O)	Code	Part number
24 V	2 kA	1,5 kA	< 45 V	BNC (Male-Female)	77801671	CT 05 CCTV
120 V	20 kA	10 kA	< 600 V	TNC (Male-Female)	77801680	CT 10 TNC
135 V	5 kA	1 kA	< 750 V	N (Male-Female)	77801652	CT 30 N
230 V	20 kA	10 kA	< 600 V	N (Male-Female)	77801650	CT 10 N
	20 kA	10 kA	< 600 V	BNC (Male-Female)	77801655	CT 10 BNC
	20 kA	10 kA	< 600 V	F (Female-Female)	77801660	CT 10 F
	20 kA	10 kA	< 600 V	TV (Male-Female)	77801665	CT 10 TV
	20 kA	10 kA	< 600 V	N (Female-Female)	77801685	CT 10 NW
	20 kA	10 kA	< 600 V	UHF (Male-Female)	77801690	CT 10 UHF

CT 05 CCTV



## Replacement Cartridges for PS surge protectors | Class I+II; II

### PS Range | Plug-in Cartridges

	Range	No. DIN modules	PS cartridge Identification code *	Code	Part number
	PSC	1	C01	77738600	PSC 12,5/120
		1	C02	77738601	PSC 12,5/230
		1	C03	77738602	PSC 12,5/400
		2	C04	77738610	PSC 25/120
		2	C05	77738611	PSC 25/230
		1	C06	77738612	PSC 25/400
		1	C07	77738613	PSC 25N
		1	C08	77738614	PSC 50N
		2	C09	77738619	PSC 100N
		1	C10	77738630	PSC 12,5/600 PV
		1	C11	77738631	PSC 12,5/1000 PV
	PSM	1	M01	77707650	PSM-20/120
		1	M02	77707651	PSM-20/230
		1	M03	77707652	PSM-20/400
		1	M04	77707653	PSM-40/120
		1	M05	77707654	PSM-40/230
		1	M06	77707655	PSM-40/400
		1	M07	77707656	PSM-40/600 PV
		1	M08	77707657	PSM-40/1000 PV
		1	M09	77707668	PSM-30/750
		1	M10	77707663	PSM-20N
		1	M11	77707664	PSM-40N

\* These short codes are referred to on page 20-22 of the present catalogue to identify what cartridges are used in each PSC and PSM surge protector.

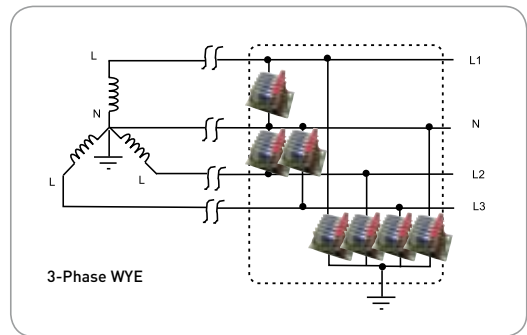
## Replacement Blocks for TVSS Modular Panels | UL 1449 3rd Ed

### CPS BLOCK Range | Surge Suppression Modules (per mode)

77797 5 Y Z

z	Network	VLN
1	1-Phase	120 V
2	1-Phase	230 V
3	Split Phase	120 V
4	3-Phase WYE	120 V
5	3-Phase WYE	230 V
6	3-Phase WYE	277 V
7	3-Phase Delta	240 V
8	3-Phase Delta	400 V
9	3-Phase Delta	480 V
0	High Leg Delta	120 V

y	I <sub>max</sub> /Phase
1	40 kA
2	80 kA
3	100 kA
4	160 kA
5	200 kA
6	240 kA



**Example:**  
For product code 77797265 with part number CPS BLOCK Plus 3-Phase WYE 240 kA 230 V, the replacement surge module would have: code 77797565 and part number CPS BLOCK Rpl 3-Phase WYE 240 kA 230 V.

## Replacement Module for CCTV Coaxial SPD | Fine Protection

### CT05 CCTV | Surge Module

Full product*		Spare	
Code	Part number	Code	Part number
77801671	CT05 CCTV	77801641	PROT-MODULE CT2

\* PROT-MODULE CT2 is the replacement surge module of CT05 CCTV

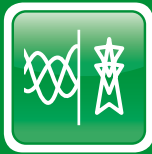


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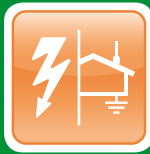
Surge Protection  
(Electrical Supply)



POP Power frequency  
Overvoltage  
Protection  
(Electrical Supply)



Surge Protection  
(Telecom and Signalling  
Networks)



External  
Lightning  
Protection



Monitoring  
of Grounding  
Systems



Insulation  
Monitoring



Beacon  
Systems



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