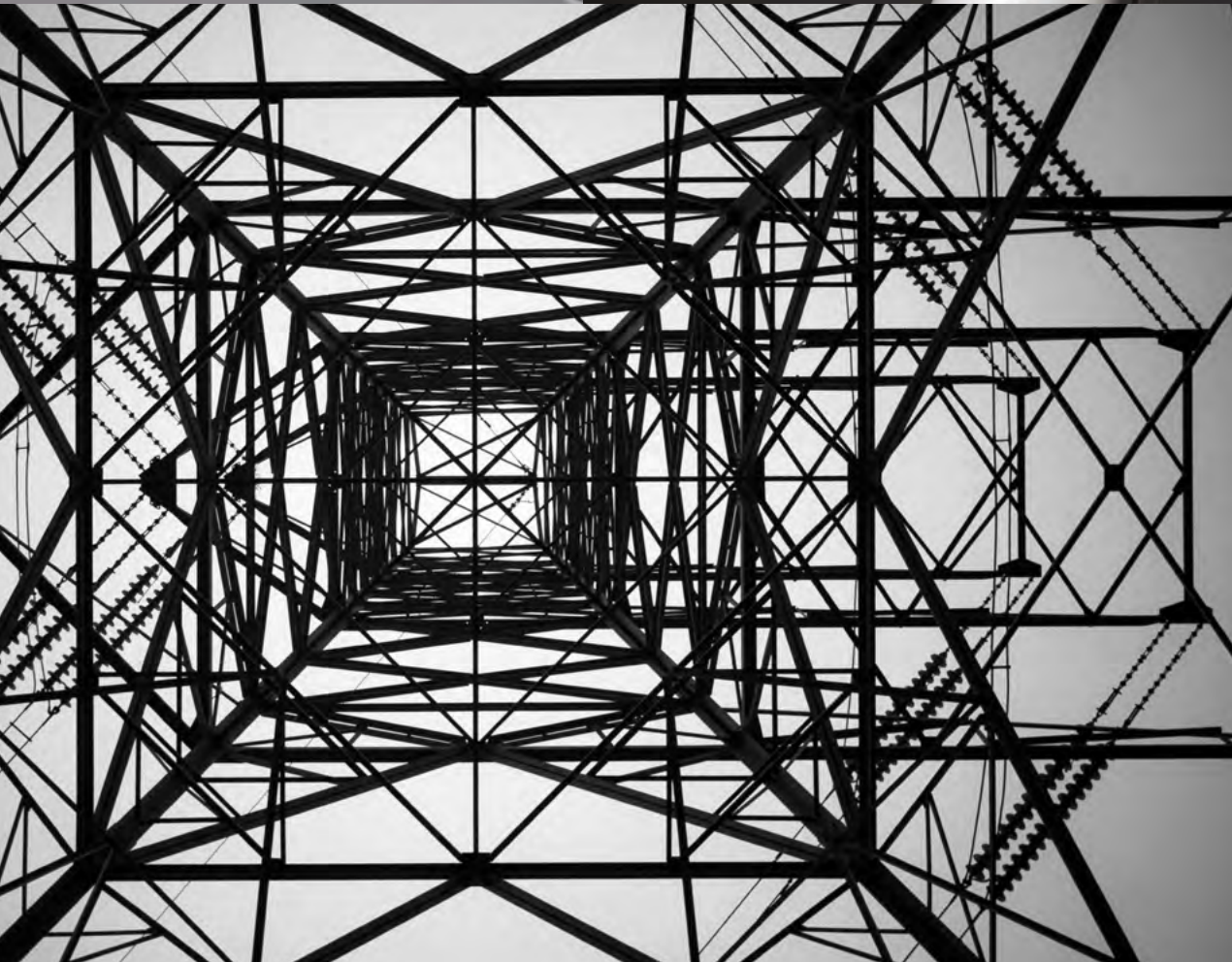
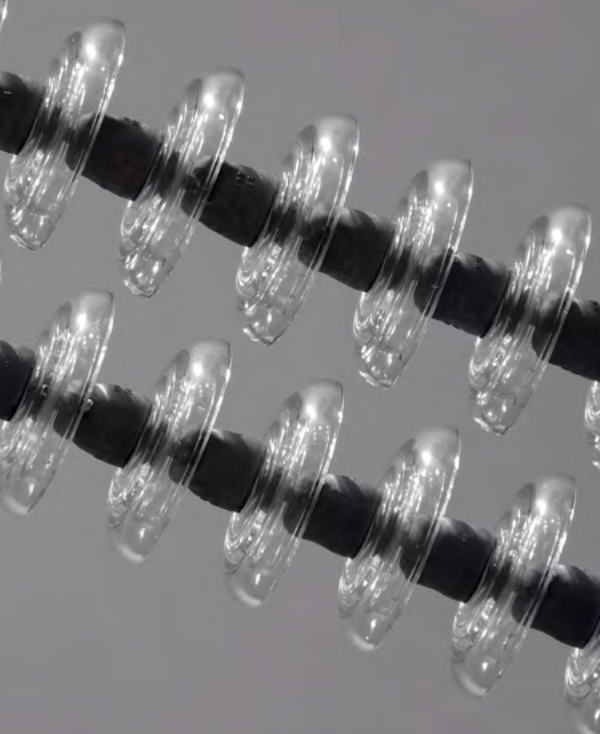


An abstract graphic featuring flowing, translucent orange and yellow shapes that create a sense of movement and depth. A prominent black diagonal line cuts across the composition, adding a sharp, geometric element to the organic forms.

**MD EQUIPOS
TECNOLÓGICOS**

PROTECTION OF ELECTRICAL, COMPUTER AND
TELECOMMUNICATION INSTALLATIONS.





MD EQUIPOS
TECNOLÓGICOS

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**EQUIPOS
TECNOLÓGICOS**



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Our company_

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Electric
Protection



Energy
Engineering



Railway



OUR COMPANY

OVERVIEW

Since 1994, as a co-founder member of the I.T.E. (Institute of Electrical Technology), MD creates an ambitious research and development project in order to resolve electrical issues.

As a result of 20 years achieved experience thru working in the electrical protection field, as well as studying and analyzing highly evolved and problematic systems, we have applied all the acquired knowledge to develop protective devices and guarantee safe and proper operation of facilities against problems derived of electric consumption.

A highly qualified professional team deals with investigation and development as the main growing engine of our company.

The following products series are available in this catalogue:

- Unified protection devices (**SPU**, in Spanish Sistemas de Protección Unificado)
- Unified protection devices with voltage stabilization (**SPE**, in Spanish Sistemas de Protección Eléctrica Unificados con Voltage stabilization)
- Electrical protection devices for High-Voltage installations (**SDK**, in Spanish Sistemas de Protección Eléctrica para instalaciones de Alta Tensión.)
- Transient overvoltage protection modular devices (**SPD**, in Spanish Sistemas de Protección Modular); power lines, photovoltaic installations, data networks, coaxial cables and other applications.
- Transient and permanent overvoltage protection modular devices (**POP**, in Spanish Equipos de protección modulares frente a sobretensiones transitorias y permanentes.
- Relays.

Besides dedicate ourselves to develop electrical protection devices, we are also experts on:

- Designing and manufacturing external lightning protection
(See [AIDITEC SYSTEMS catalog](#))
- Designing and manufacturing railway protection devices
(See [Railway Sector catalog](#))
- Supervision, advice and energy management
(See [MD ASENERVAL catalog](#))
- Electrical studies: quality of supply, land studies, differential selectivity studies, energy audits, etc.

For further information about our company, please visit our website:
www.mdtecnologicos.com

REGISTERED PATENTES

As a result of our innovative mentality and acquired experience during more than 15 years, we have developed several patents in the field of electrical protection.

Patente Nº 9500761

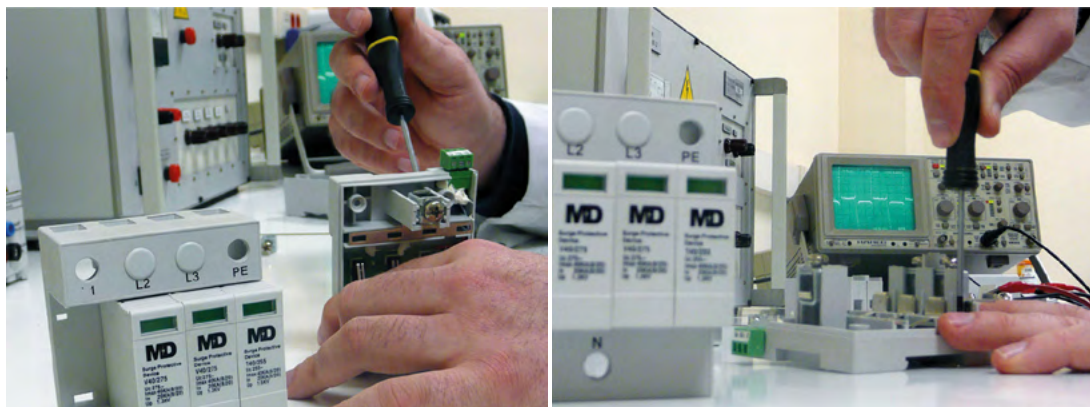
Patente Nº 200800540

Patente Nº 201300417

CUSTOMIZED SOLUTIONS

Since not all the electrical systems are equal and need to be effectively protected, it is important to adapt to their properties and customers requirements. In MD we offer the possibility to modify the features of our products to satisfy our customer's expectations. Indeed, any electronic device developed by MD is able to:

- Be adjusted to special voltage ranges (500V, 690V, etc.).
- Modify the IP grade in installation when it is needed.
- Increase energy dissipation capacity in small installations subjected to high-energy discharges.
- Increase the frequency filtering capacity.
- Be adapted to any network topology: biphasic and three-phase lines without neutral, IT, TT, etc.
- Incorporate audible alarms.



IN OUR EAGERNESS OF RESEARCH AND DEVELOPMENT TO IMPROVE IN THE FIELD OF ELECTRICAL PROTECTION, WE HAVE OBTAINED SEVERAL PATENTS AND UTILITY MODELS WHICH HAVE BECOME THE DEVICES WE CURRENTLY MANUFACTURE AND COMERCIALIZE

02

Technical
Notebook_

- 2_1. Legislation
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REGULATION OF INTERNAL PROTECTION AGAINST SURGES

Code TÉCNICO DE LA EDIFICACIÓN – SU08: Anexo B “Los sistemas de protección contra el rayo deberán constar de un sistema externo, un sistema interno y una red de puesta a tierra”. B.2 “El sistema de protección interno comprende los dispositivos que reducen los efectos eléctricos y magnéticos de la corriente de la descarga atmosférica dentro del espacio a proteger”.

En determinadas Comunidades Autónomas, el uso de dispositivos de protección contra sobretensiones, tanto permanentes como transitorias, es obligatorio de acuerdo con las normas técnicas particulares de las compañías eléctricas, reforzando el cumplimiento del artículo 16.3 del REBT 2002 incidiendo en la obligación de la instalación de protectores contra sobretensiones permanentes.

REGLAMENTO BAJA TENSIÓN – ITC BT23 artículo 16: “Los sistemas de protección para las instalaciones interiores o receptoras de baja tensión impedirán los efectos de las sobreintensidades y sobretensiones que por distintas causas cabe prever en las mismas y resguardarán a sus materiales y equipos de las acciones y efectos de los agentes externos”.

Además esta instrucción técnica complementaria del REBT, de obligado cumplimiento, indica que se precisa la protección contra sobretensiones transitorias, cuando:

- La instalación se alimente por o incluya líneas aéreas.
- Se necesite asegurar la continuidad del servicio.
- Existan equipos de alto valor económico.
- Exista la posibilidad de pérdidas irreparables.

“El nivel de sobretensiones puede controlarse mediante dispositivos de protección contra las sobretensiones colocados en las líneas aéreas o en la instalación del edificio”.

NORMA UNE 21.186: “... esta norma recomienda el montaje, en los puntos apropiados, de dispositivos de protección contra las sobretensiones.”

Para obtener un adecuado Protection level interno y dar cumplimiento a las normativas vigentes, es necesaria la aplicación de protectores en aquellas líneas o subcuadros con un riesgo más elevado de sufrir las consecuencias de las sobretensiones, a fin de reducir las incidencias de este fenómeno en la seguridad de las personas, instalaciones y equipos, así como la garantía en la continuidad de servicio.

THE ORIGIN OF OVERVOLTAGES

Overvoltages that are transmitted through distribution networks can be originated in commutation networks because of their deficiencies as well as atmospheric discharges. Furthermore, we can not ignore overvoltages caused by users of the network or its environment, electric discharge lamps, engines starts, variable speed drives, generators and power generators start and stops which cause surges and transient intensities of short duration, as well as high pick values.

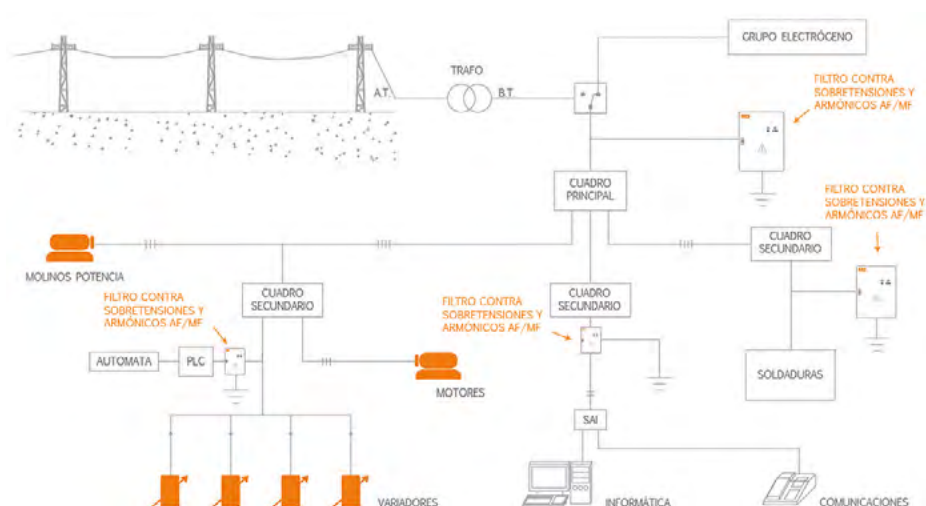
These surges are characterised nationally and internationally as 1,2 / 50 - 5/65 - 8/20 and 10/350 μ sec shock waves by the CCITT, ITU, DIN Standards. The first value of the expression makes reference to Rise time of the wave front and the second one to Fall time until middle value expressed in μ sec.

These waveforms are transmitted as high frequency currents through electrical and phone networks, railway catenary, etc., with frequency ranging between 30 and 300 kHz in highest energy components. This value depends mainly on the rise of the transient component. ITU in particular settles the maximum energetic component at a 100 kHz frequency range.

Transformers and stabilizers operate properly at industrial frequencies (50 - 60 cycles), while their behavior is completely transparent to them at a high frequency range. This is the reason why these phenomena are so destructive and reach all the connected devices to the network.

Voltage gaps and micro-interruptions are short interruptions in the power supply. Closing or opening a circuit give rise to overvoltage impulses at the beginning and at the end of the micro-interruption as a consequence of the self-induction electromotive force.

For this reason, micro-interruptions are associated to breakdowns, especially the most sensitive electronic elements.



HOW TO PROTECT AN INSTALLATION AGAINST OVERVOLTAGES OF EXTERNAL ORIGIN?

The most damaging problem in an electrical installation is an atmospheric discharge –commonly known as lightning strikes. Most of the time a lightning strike will reach the installation through the electrical connection, since the High-Voltage Transmission lines act as the the main lightning rod on the Earth's surface.

Similarly, in case a micro-interruption is originated by human maneuvers in the electrical supply, mainly by commutations of the substations, transient voltage spikes will be generated and transmitted throughout the electrical network, thus affecting all its users. Every micro-interruption is associated to voltage peaks, due to the line's self-induction. The higher a power line is charged, the greater the opposition of all the loads fed by the electrical supply. Loads of the installation behave like generators when opposing an abrupt voltage change. As a result, the number of voltage peaks will be increased.

Depending on the magnitude of the phenomenons aexposed below, they can become highly destructive. Therefore, it is recommended to protect an electrical supply against overvoltages.

On the other hand, it has to be borne in mind that telephone networks should be protected as they are also vulnerable to atmospheric discharges.



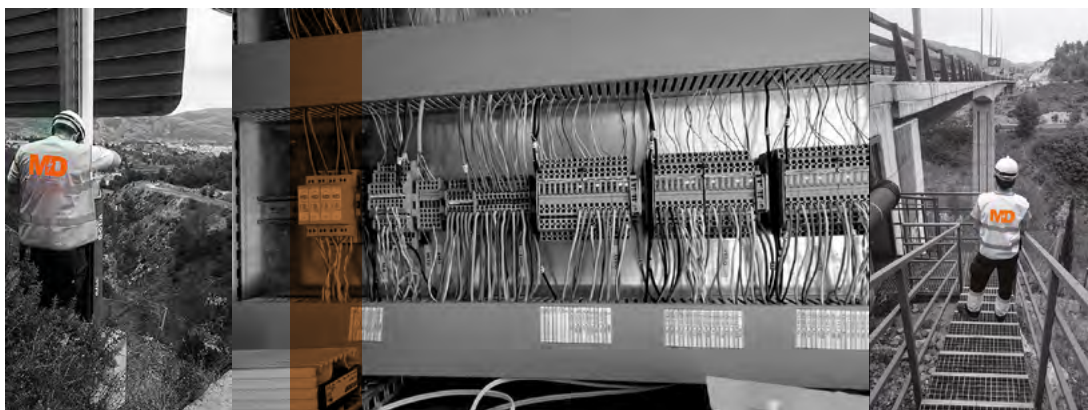
HOW TO PROTECT AN INSTALLATION AGAINST OVERVOLTAGES OF INTERNAL ORIGIN?

In small installations it is only required to settle a surge suppressor and harmonic filter in the main switchboard to protect the installation against the phenomenons described previously. Loads of the installation themselves generate the high frequency harmonics and the transient peaks. If the filter is settled distant enough from the problematic loads and especially from the critical ones to be protected, these may be affected by overvoltages and harmonics.

In large facilities it is not enough to install an unique device to allow the proper functioning of itself and avoid breakdowns in power supplies and circuit boards, deprogramming and logical failures in control and maneuvers devices, etc.

When engines start and stop, when variable-frequency drives themselves chop the sinusoidal wave, the group starts, the signal micro-interruptions (the peaks associated with micro-interruptions are not only originated by the electrical connection, all the loads inside the installation will also behave like small generators injecting voltage peaks) can produce overvoltages but in the case of internal origin they will wear the electronic equipment of the installation away slowly or quickly in case of a high overvoltage.

In addition, it is necessary to take into consideration the any type of cable, whether it is electrical, coaxial, data, telephone, etc. overvoltages can be induced. When a lightning strikes the ground, a funnel of difference in potential is generated in the installation with the resulting currents through the conductors (coaxial, data, electrical cables) that register the zones with different potentials. Obviously, in non-large installations this is not a problem because the difference in potential of all the earth network will be the same and these currents will not be originated.



HOW TO PROTECT AN INSTALLATION AGAINST MF/AF HARMONICS?

Variable frequency drives and all the elements which have a non-linear behavior that Cut-off the wave based on thyristors, rectifiers, switched sources, welding machines, etc. produce peaks and voltage harmonics multiples of their working frequency, which are transmitted through the network.

The MF/AF harmonics can affect the communication and control processes, causing deprogramming, falsification of measurements, communication failures, etc. Communication processes are carried out by high-frequency signals of very low power, so that if communication frequencies are induced on cables destined to communication (mainly generated by variable speed drives), these frequencies will mask the frequency of communication affecting the communication system.

On the other hand, devices with a high integration level that are subjected to distorted voltages by harmonics for long periods of time may present irreparable damages. These damages usually cause the total uselessness of the integrated component of the equipment itself.

Considering all the above, it is necessary to place surge and harmonic filters in those switchboards that supply control electronics, and the more critical this is for the operation of the installation, the more essential it will be to place a filter.



ASPECTS TO BE CONSIDERED WHEN CHOOSING A PROTECTIVE DEVICE

Differential protection

One of the main reasons of electronic equipment breakdowns is voltage oscillations and peaks between phases, phase and neutral. The protective devices designed by MD (SPU, SPE and SDK families) not only protect between active conductors and earth, but also between phases. On the other hand, most of the protective devices on the market -auto-valves, surge protective devices, etc.- only protect the installation in common mode (phase-earth) neglecting differential protection, in other words between own active drivers (phases).

Residual voltage

The residual voltage is the voltage that remains in the output of the overvoltage limiter, so the U_p is a very important aspect to take into consideration when protecting an installation. An overvoltage protection is efficient when the output voltage of the installation must be in accordance with the operating voltage. If the residual voltage of the limiter is greater than the insulation of the installation to protect, then the transient overvoltage will enter the installation and cause the breakdown of the electronic equipment.

Frequency response

Another fact to keep in mind is that lightnings and most of the transient phenomena are transmitted in high frequency. Specifically, the ITU states that the maximum energy component of the lightning is transmitted at 100 KHz. On the other hand, unlike what people think, transformers do not offer any kind of protection against the atmospheric discharges flowing through the High-Voltage lines.

In addition, we must also take into consideration the problem of medium and high frequency harmonics that affect the most sensitive loads, especially switchboards, causing failures and communication errors.

Discharge capacity

An efficient surge protection device, whether it is of atmospheric or industrial origin, must be able to dissipate all the energy of the surge. Keep/Bear in mind that a lightning surge (the wave front of a lightning) can reach 300KA of a 10/350 μ s waveform. Therefore, a protection that is not able of dissipating all the surge energy will let a remaining part of it get into the installation, thus affecting it.

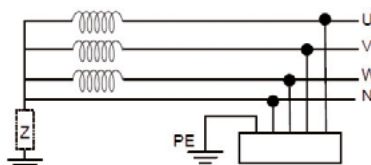
Our electrical protection devices have been designed taking into consideration the aspects above in order to protect our installations from any disturbance.

EARTH CONNECTION ACCORDING TO NETWORK TOPOLOGY

TT Systems

An TT system is usually used in Spanish Low-Voltage distribution networks, as well as the attached installations to it

La Toma de Tierra del equipo debe ir conectada a la Toma de Tierra general de la instalación.



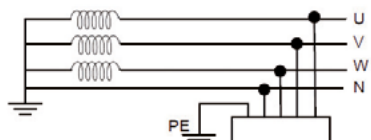
IT Systems

It is used in installations where continuity of service is critical, such as in a surgery room or industries with sensitive processes to interruption.

The neutral terminal of the transformer is isolated from earth or connected to it through a high value impedance and the metal masses are connected to an exclusive/unique earth connection.

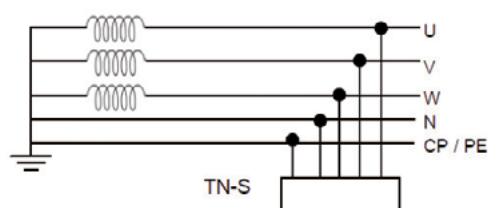
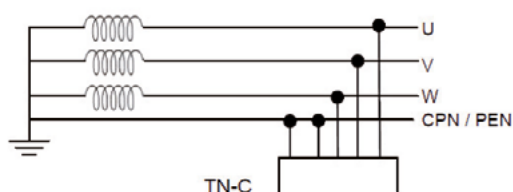
The earth connection of the device must be connected to the exclusive earth connection of the installation.

TN Systems



The protective conductor and neutral terminal can be an only common conductor (TN-C system) or there might be a different protective conductor from neutral terminal distributed along the electricity supply and connected to the earth of the transformer (System TN-S).

The device earth connection terminal must be connected to the CPN terminal (Protective conductor + neutral) of the installation in TN-C systems or to the installed CP terminal (protective conductor) in TN-S devices.



ELECTRICAL EARTH CONNECTION

Each connection terminals in every device are marked with the U, V, W and N, besides the earth sign to reduce the possibility of errors in connection.

The earth conductor must be connected to the earth of the installation to protect by using insulated green and yellow wires. The earth line must be isolated and earth resistance should be lower than 20 Ω .

Connection of the devices is different depending on each model. (See connection types in the corresponding data sheet)

Devices must be installed and protected through a proper surge and short-circuits protection device (see the data sheet of the device) such as a fuse or an MCB (Magnetothermal Circuit Breaker) according to the recommendations of the installation and should be able to disconnect the device in case of failure. This switch allows to turn off the installation in case of maintenance work. It must be indicated and located as close as possible to the protected device, as well as easily accessible to the operator.

In case of failure, surge and short circuit protection devices must not be rearmed themselves without checking that the device is in a perfect condition in order to avoid accidents. The installation, repairation and start-up of the devices must be always performed by a qualified specialized electrician according to the R.E.B.T -Reglamento Electrotécnico para Baja Tensión-, and indications given by this manual.

Multi-stage surge protective device and medium and high frequency harmonics

- 3_1. Technical description
- 3_2. Advantages and benefits of installing SPU devices
- 3_3. Installation mode
- 3_4. 2D Series data sheet
- 3_5. 4D Series data sheet
- 3_6. 2S Series data sheet
- 3_7. 4S Series data sheet
- 3_8. 2F Series data sheet
- 3_9. 3F Series data sheet



UNIFIED PROTECTIVE DEVICES SPU

MULTI-STAGE SURGE PROTECTIVE DEVICES, AS AGAINST MEDIUM AND HIGH FREQUENCY HARMONICS IN LOW-VOLTAGE AC POWER SUPPLY NETWORKS.

Unified Protective Devices (SPU, Sistemas de Protección Unificados) are made up of multiple redundant protection coordinated sets with each other and designed according to the maximum discharge capacity criteria and a minimum residual voltage. Its design allows the implementation of accessory modules, as well as their adaptation to the needs of each installation, giving preference to safety and the proper functioning of itself.

SPUs have been conceived to ensure protection of the installations against overvoltages, either atmospheric or industrial origin, MF/AF harmonics and peaks associated with micro-interruptions. Optionally, the electrical installation will be protected against surges, power interruptions and phase asymmetry effects by adding a PTR4 set. This set is time and voltage programmable.

The main features of these protective devices are:

- High current discharge capacity with 8/20 and 10/350 μ s waveforms.
- Residual values close to the Rated voltage of the protected installation.
- Frequency filtering.
- There are 3 or 4 effective and auto-coordinated protective sets each one by itself.
- Remove surges between phases, phases-earth, phases-neutral, neutral-earth.
- Response time is 0,025 μ s.
- Micro-interruptions in the order of milliseconds are removed in low power installations.
- Repairable.

MAIN FEATURES FOR DEFING THE DIFFERENT RANGE OF SPU SERIES:

	4D Series	2D Series	4S Series	2S Series	2F Series	3F Series
Installation mode	Parallel	Parallel	Series	Series	Parallel	Parallel
Rated voltage (V) (1)	230/400	230	230/400	230	230	400
Protection against industrial transient overvoltage I_{max} 8/20	✓	✓	✓	✓	✓	✓
Protection against industrial transient overvoltage Lightning type I_{max} 10/350 (2)	✓	✓	✓	✓	×	×
Permanenet overvoltages protection (3)	✓	✓	✓	✓	×	×
Undervoltage protection (3)	✓	✓	✓	✓	×	×
Phase asymmetry protection (3)	✓	✓	✓	✓	×	×
MF/AF harmonics protection	✓	✓	✓	✓	✓	✓

(1) Different voltage available under command.

(2) Depending on model.

(3) PTR4 set is required.



ADVANTAGES AND BENEFITS OF INSTALLING OUR SPU DEVICES

Our protective devices have been designed to protect every kind of electrical and electronic installations of any power, especially those which have sensitive electronic devices.

By installing a SPU system you are avoiding installations to be affected by:

Surges:

Due to SPU residual voltage can be adjusted to the max according to the voltage of the installation to protect, its high discharge capacity and differential protection (protection between active conductors) in case of lightning strike, peaks associated to micro-interruptions, start and stops of engines or any kind of overvoltage, our protective devices protect every electric and electronic device from latent breakdowns. This is reflected in a considerable reduce of a maintenance cost, loss of profits or raw material.

Permanent overvoltages

In case the neutral terminal is cut, transformer and ground phase failure or deficiencies in the electricity supply, the installation will be automatically disconnected by the SPU device when the user so wishes and it will act on the emitting coil associated to the line switch to be protected. The SPU device allows you to settle the voltage disconnection and the acting time. The addition of a PTR4/220 or PR4/220-O set is required.

Micro-interruptions:

A SPU is able to avoid shutdowns caused by micro-interruptions during production processes.

Harmonics:

They are used to eliminate MF and HF (Middle Frequency and High Frequency) harmonics, being able to remove LF (low Frequency) harmonics in low-power installations. HF harmonics, which are primarily generated by variable speed drives, might affect control and communication systems and cause an undesirable failure, therefore being deprogrammed. By installing our protective devices, you will avoid errors in communications caused by harmonics (between servers, PCs, and manoeuvres) and the scope (¿de qué?) and communication speed will be maximum.

Undervoltages

In case of voltage drops, transformer failures or deficiencies in the electrical grid, SPU devices will automatically switch the installation off when the user so wishes and act on the shunt switch associated with the line to be protected, thus avoiding failures as a consequence of overcurrents. SPUs allow to choose the voltage and time disconnection. The addition of a PTR4/220 or PR4/220-O set is required.

Phase asymmetry:

SPU devices measure the power triangle asymmetry of the power supply voltage in three-phase facilities in accordance with the EN-61000-4-30 standard. If the asymmetry exceeds the settled value, a signal that can be used to turn off the system is sent. It requires the addition of a set PR4/220 or PR4/220-O. fijado. The addition of a PR4/220 or PR4/220-O set is required.

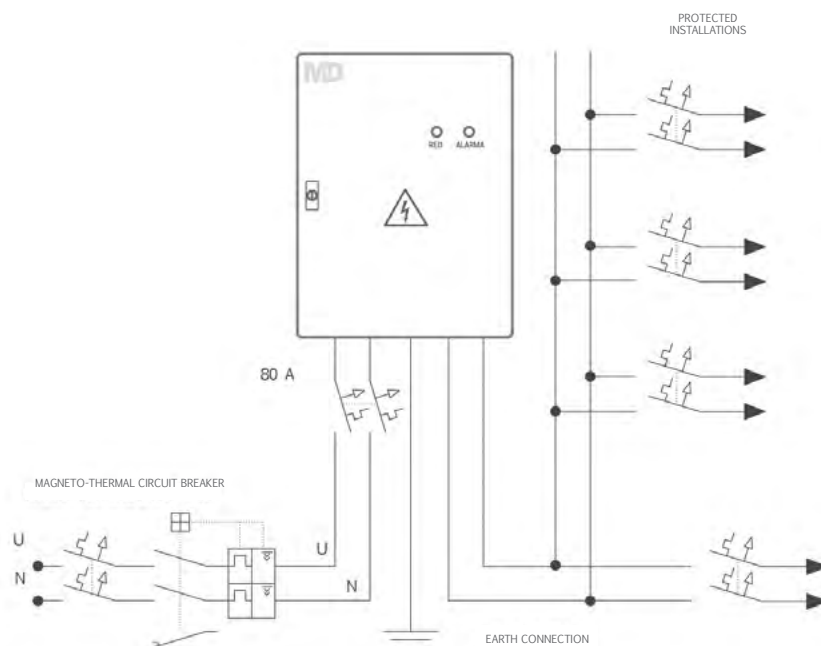
Electromagnetic compatibility

In compliance with the EMC (Electromagnetic Compatibility Directive), the radio interferences originated within protected installations by our systems do not revert to the network.

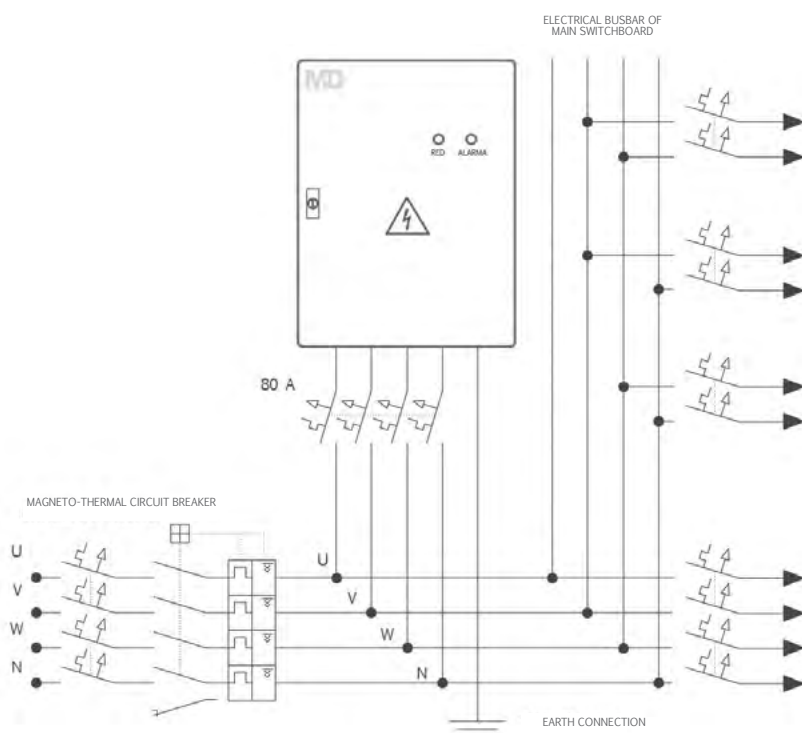


INSTALLATION MODE

SPU devices are connected to the electrical network differently according to the model. (See types of connection in the data sheet of each model).



Series connection diagram of SPU single-phase devices



Parallel connection diagram of SPU three-phase devices

**MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE
DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.**

- It is destined for low power single-phase panels.
- Ideal for sensitive loads protection.
- High discharge capacity.
- Easy supervision and maintenance.
- Both common and differential protection mode for all protective modes.
- Adjusted thresholds to the operating voltage range.
- Network indicator light plus fuses.



DEVICE MODEL	SP 2D-10
Installation mode	Parallel / Single-phase
Rated voltage / Frequency / Topology	230 V / 50-60 Hz / P+L+TT
Connection mode to the electrical supply	Power strip
Recommended power of the installation to be protected	10 kVA
Network topology	TT, IT and TN
Elements of internal disconnection	20 A fuse
Number of Indicator lights	1
Surge response	
Protection type	2
Maximum continuous operating voltage (U _c) AC	250 V _{AC}
Operation threshold (U _n)	275 V _{AC}
Response time (t _A)	25 ns
I _{Tmax} (8/20) – Differential mode (Phase – Neutral)	60 kA
I _{Tmax} (8/20) – Common mode (Phase – Earth / Neutro – Tierra)	60 kA / 60 kA
I _{Timp} (10/350) – Differential mode (Phase – Neutral)	-
I _{Timp} (10/350) – Common mode (Phase – Earth / Neutro – Tierra)	- / -
Total I _{Tmax} (8/20)	180 kA
Total I _{Timp} (10/350)	-
Number of surge protective stages	3
Frequency response (Z = 10 Ω)	
Cut-off frequency	23 kHz
Attenuation at 30 KHz	4,2 dB
Installation data	
Recommended minimum section of connecting cables	Cu 4 mm ²
Recommended protection	25 A
Enclosure material	Polycarbonate
Installation method	DIN-Rail
Operating temperature	[-10 °C ... +60°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	0,5 Kg
Dimensions (mm) (Height×Width×Depth)	90×70×60

(1) MCB: Miniature Circuit Breaker

**MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE
DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.**

- Destined to low power single-phase panels.
- Ideal for sensitive loads protection against MF and HF harmonics.
- High discharge capacity.
- Easy supervision and maintenance.
- Both common and differential protection mode for all protective modes.
- Adjusted thresholds to the operating voltage range.
- Network indicator light plus MCBs.



DEVICE MODEL	SP 2D-80
Installation mode	Parallel / Single-phase
Rated voltage / Frequency / Topology	230 V / 50-60 Hz / L+N+ETT
Connection mode to the electrical supply	Terminal blocks
Recommended power of the installation to be protected	80 kVA
Network topology	TT, IT y TN
Elements of internal disconnection	(1) MCB 80A
Number of Indicator lights	2
Surge response	
Protection type	1+2
Maximum continuous operating voltage (U_c) AC	250 V _{AC}
Operation threshold (U_n)	275 V _{AC}
Response time (t_x)	25 ns
I_{Tmax} (8/20) – Differential mode (Phase – Neutral)	470 kA
I_{Tmax} (8/20) – Common mode (Phase – Earth / Neutro – Tierra)	170 kA / 470 kA
I_{Timp} (10/350) – Differential mode (Phase – Neutral)	110 kA
I_{Timp} (10/350) – Common mode (Phase – Earth / Neutro – Tierra)	35 kA / 110 kA
Total I_{Tmax} (8/20)	1.110 kA
Total I_{Timp} (10/350)	255 kA
Number of surge protection stages	3
Frequency response ($Z = 10 \Omega$)	
Cut-off frequency	300 Hz
Attenuation at 30 KHz	40 dB
Installation data	
Recommended minimum section of connecting cables	Cu 25 mm ²
Recommended protection	80 A
Enclosure material	Metallic
Installation method	Wall Mounting method
Operating temperature	[-10 °C ... +85°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	7 Kg
Dimensions (mm) (Height•With•Depth)	400×300×150

**MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE
DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.**

- Specially designed for operating and controlling electrical switchboards protection whose power does not exceed 1 kVA.
- Ideal for sensitive loads protection against MF and HF harmonics and voltage fluctuations.
- High discharge capacity.
- Easy supervision and maintenance.
- Both common and differential protection mode for all protective modes.
- Adjusted thresholds to the operating voltage range.
- Network indicator light plus MCBs.



DEVICE MODEL	SP 2S-1000
Installation mode	Series / Single-Phase
Rated voltage / Frequency / Topology	230 V / 50-60 Hz / L+N+ETT
Connection mode to the electrical supply	Power strip
Recommended power of the installation to be protected	1 kVA
Maximum current	5 A
Network topology	TT, IT y TN
Elements of internal disconnection	2 x 20A Fuse
Number of Indicator lights	1
Surge response	
Protection type	2
Maximum voltage in continuous operation (Uc) AC	250 V _{AC}
Current threshold (U _n) / Operation threshold	275 V _{AC}
Response time (t _A)	25 ns
I _{tmax} (8/20) – Differential mode (Phase – Neutral)	60 kA
I _{tmax} (8/20) – (Phase – Earth / Neutral – Earth)	60 kA / 60 kA
I _{timp} (10/350) – Differential mode (Phase – Neutral)	-
I _{timp} (10/350) – Common mode (Phase – Earth / Neutral – Earth)	- / -
Total I _{tmax} (8/20)	180 kA
Total I _{timp} (10/350)	-
Number of surge protection stages	4
Frequency response (Z = 10 Ω)	
Cut-off frequency	20 kHz
Attenuation at 30 KHz	11 dB
Installation data	
Recommended minimum section of connecting cables	Cu 4 mm ²
Recommended protection	5 A
Enclosure material	Polycarbonate
Installation method	DIN-Rail
Operating temperature	[-10 °C ... +60°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	1 Kg
Dimensions (mm) (Height•Width•Depth)	100×160×60

**MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE
DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.**

- Specially designed for operating and controlling electrical switchboards protection whose power does not exceed 1 kVA.
- Schuko plug.
- Ideal for sensitive loads protection against MF and HF harmonics and voltage fluctuations.
- High discharge capacity.
- Easy supervision and maintenance.
- Both common and differential protection mode for all protective modes.
- Adjusted thresholds to the operating voltage range.
- Network indicator light.



DEVICE MODEL	SP 2S-1000E
Installation mode	Series / Single-Phase
Rated voltage / Frequency / Topology	230 V / 50-60 Hz / L+N+ETT
Connection mode to the electrical supply	Schuko Plug/Socket
Recommended power of the installation to be protected	1 kVA
Maximum current	5 A
Network topology	TT, IT y TN
Elements of internal disconnection	-
Number of Indicator lights	1
Surge response	
Protection type	2
Maximum voltage in continuous operation (U_c) AC	250 V _{AC}
Current threshold (I_n)/Operation threshold	275 V _{AC}
Response time (t_A)	25 ns
I_{tmax} (8/20) – Differential mode (Phase – Neutral)	60 kA
I_{tmax} (8/20) – (Phase – Earth / Neutral – Earth)	60 kA / 60 kA
I_{timp} (10/350) – Differential mode (Phase – Neutral)	-
I_{timp} (10/350) – Common mode (Phase – Earth / Neutral – Earth)	- / -
Total I_{tmax} (8/20)	180 kA
Total I_{timp} (10/350)	-
Number of surge protection stages	4
Frequency response ($Z = 10 \Omega$)	
Cut-off frequency	20 kHz
Attenuation at 30 KHz	11 dB
Installation data	
Recommended minimum section of connecting cables	-
Recommended protection	5 A
Enclosure material	Polystyrene
Installation method	Pluggable
Operating temperature	[-10 °C ... +60°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	1 Kg
Dimensions (mm) (Height•Width•Depth)	188×110×70

MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.

- Specially designed for secondary single-phase electrical switchboards protection whose power does not exceed 2 kVA.
- Ideal for sensitive loads protection against MF and HF harmonics and voltage fluctuations.
- High discharge capacity.
- Easy supervision and maintenance.
- Both common and differential protection mode for all protective modes.
- Adjusted thresholds to the operating voltage range.
- Network indicator light plus MCBs.



DEVICE MODEL	SP 2S-2000
Installation mode	Series / Single-Phase
Rated voltage / Frequency / Topology	230 V / 50-60 Hz / L+N+ETT
Connection mode to the electrical supply	Power strip
Recommended power of the installation to be protected	2 kVA
Maximum current	10 A
Network topology	TT, IT y TN
Elements of internal disconnection	2 x 20A Fuse
Number of Indicator lights	1
Surge response	
Protection type	2
Maximum voltage in continuous operation (Uc) AC	250 V _{AC}
Current threshold (Un)/Operation threshold	275 V _{AC}
Response time (t _A)	25 ns
I _{tmax} (8/20) – Differential mode (Phase – Neutral)	60 kA
I _{tmax} (8/20) – (Phase – Earth / Neutral – Earth)	60 kA / 60 kA
I _{temp} (10/350) – Differential mode (Phase – Neutral)	-
I _{temp} (10/350) – Common mode (Phase – Earth / Neutral – Earth)	- / -
Total I _{tmax} (8/20)	180 kA
Total I _{temp} (10/350)	-
Number of surge protection stages	4
Frequency response (Z = 10 Ω)	
Cut-off frequency	20 kHz
Attenuation at 30 KHz	11 dB
Installation data	
Recommended minimum section of the connecting cable	Cu 4 mm ²
Recommended protection	10 A
Enclosure material	Polycarbonate
Installation method	DIN-Rail
Operating temperature	[-10 °C ... +60°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	1 Kg
Dimensions (mm) (Height×Width×Depth)	160×100×58

**MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE
DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.**

- Specially designed for secondary single-phase electrical switchboards protection whose power does not exceed 2 kVA.
- Schuko plug.
- Ideal for sensitive loads protection against MF and HF harmonics and voltage fluctuations.
- High discharge capacity.
- Easy supervision and maintenance.
- Both common and differential protection mode for all protective modes.
- Adjusted thresholds to the operating voltage range.
- Network indicator light.



DEVICE MODEL	SP 2S-2000E
Installation mode	Series / Single-Phase
Rated voltage / Frequency / Topology	230 V / 50-60 Hz / L+N+ETT
Connection mode to the electrical supply	Schuko Plug/Socket
Recommended power of the installation to be protected	2 kVA
Network topology	10 A
Elements of internal disconnection	TT, IT y TN
Number of Indicator lights	-
Number of Indicator lights	1
Surge response	
Protection type	2
Maximum voltage in continuous operation (Uc) AC	250 V _{AC}
Current threshold (Un)/Operation threshold	275 V _{AC}
Response time (t _r)	25 ns
I _{max} (8/20) – Differential mode (Phase – Neutral)	60 kA
I _{max} (8/20) – (Phase – Earth / Neutral – Earth)	60 kA / 60 kA
I _{imp} (10/350) – Differential mode (Phase – Neutral)	-
I _{imp} (10/350) – Common mode (Phase – Earth / Neutral – Earth)	- / -
Total I _{max} (8/20)	180 kA
Total I _{imp} (10/350)	-
Number of surge protection stages	4
Surge response	
Cut-off frequency	20 kHz
Attenuation at 30 KHz	11 dB
Installation data	
Recommended minimum section of the connecting cable	-
Recommended protection	10 A
Enclosure material	Polystyrene
Installation method	Pluggable
Operating temperature	[-10 °C ... +60°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	1 Kg
Dimensions (mm) (Height•With•Depth)	188×110×70

**MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE
DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.**

- Specially designed for secondary single-phase electrical switchboards protection whose power does not exceed 5 kVA.
- Ideal for sensitive loads protection against MF and HF harmonics and voltage fluctuations.
- High discharge capacity.
- Easy supervision and maintenance.
- Both common and differential protection mode for all protective modes.
- Adjusted thresholds to the operating voltage range.
- Network indicator light plus MCBs.



DEVICE MODEL	SP 2S-3000
Installation mode	Series / Single-Phase
Rated voltage / Frequency / Topology	230 V / 50-60 Hz / L+N+ETT
Connection mode to the electrical supply	Power strip
Recommended power of the installation to be protected	5 kVA
Maximum current	25 A
Network topology	TT, IT y TN
Elements of internal disconnection	2 x 20A Fuse
Number of Indicator lights	1
Surge response	
Protection type	2
Maximum voltage in continuous operation (Uc) AC	250 V _{AC}
Current threshold (Un)/Operation threshold	275 V _{AC}
Response time (t _A)	25 ns
I _{tmax} (8/20) – Differential mode (Phase – Neutral)	60 kA
I _{tmax} (8/20) – (Phase – Earth / Neutral – Earth)	60 kA / 60 kA
I _{tmp} (10/350) – Differential mode (Phase – Neutral)	-
I _{tmp} (10/350) – Common mode (Phase – Earth / Neutral – Earth)	- / -
Total I _{tmax} (8/20)	180 kA
Total I _{tmp} (10/350)	-
Number of surge protection stages	4
Frequency response (Z = 10 Ω)	
Cut-off frequency	20 kHz
Attenuation at 30 KHz	11 dB
Installation data	
Recommended minimum section of the connecting cable	Cu 4 mm ²
Recommended protection	16 A
Enclosure material	Polycarbonate
Installation method	DIN-Rail
Operating temperature	[-10 °C ... +60°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	1 Kg
Dimensions (mm) (Height×Width×Depth)	160×100×58

**MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE
DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.**

- Specially designed for secondary single-phase electrical switchboards protection whose power does not exceed 5 kVA.
- Schuko plug.
- Ideal for sensitive loads protection against MF and HF harmonics and voltage fluctuations.
- High discharge capacity.
- Easy supervision and maintenance.
- Both common and differential protection mode for all protective modes.
- Adjusted thresholds to the operating voltage range.
- Network indicator light.



DEVICE MODEL	SP 2S-3000E
Installation mode	Series / Single-Phase
Rated voltage / Frequency / Topology	230 V / 50-60 Hz / L+N+ETT
Connection mode to the electrical supply	Schuko Plug/Socket
Recommended power of the installation to be protected	5 kVA
Network topology	25 A
Elements of internal disconnection	TT, IT y TN
Number of Indicator lights	-
Number of Indicator lights	1
Surge response	
Protection type	2
Maximum voltage in continuous operation (Uc) AC	250 V _{AC}
Current threshold (Un)/Operation threshold	275 V _{AC}
Response time (t _r)	25 ns
I _{imax} (8/20) – Differential mode (Phase – Neutral)	60 kA
I _{imax} (8/20) – (Phase – Earth / Neutral – Earth)	60 kA / 60 kA
I _{imp} (10/350) – Differential mode (Phase – Neutral)	-
I _{imp} (10/350) – Common mode (Phase – Earth / Neutral – Earth)	- / -
Total I _{imax} (8/20)	180 kA
Total I _{imp} (10/350)	-
Number of surge protection stages	4
Surge response	
Cut-off frequency	20 kHz
Attenuation at 30 KHz	11 dB
Installation data	
Recommended minimum section of the connecting cable	-
Recommended protection	16 A
Enclosure material	Polystyrene
Installation method	Pluggable
Operating temperature	[-10 °C ... +60°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	1 Kg
Dimensions (mm) (Height•With•Depth)	188×110×70

MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.

- Specially designed for operating and controlling electrical switchboards protection whose power does not exceed 6 kVA: CPA, CE, etc.
- Series impedances are included to improve the performance of the device against lightning and High Frequencies.
- High discharge capacity.
- Easy supervision and maintenance.
- Both common and differential protection mode for all protective modes.
- Adjusted thresholds to the operating voltage range.
- Network and two alarm indicator lights plus MCBs.



DEVICE MODEL	SP 2S-6R
Installation mode	Series / Single-Phase
Rated voltage / Frequency / Topology	230 V / 50-60 Hz / L+N+ETT
Connection mode to the electrical supply	Supply terminals
Recommended power of the installation to be protected	6 kVA
Maximum current	25 A
Network topology	TT, IT y TN
Elements of internal disconnection	2 x 80A MCB
Number of Indicator lights	2
Surge response	
Protection type	1+2
Maximum voltage in continuous operation (Uc) AC	250 V _{AC}
Current threshold (Un)/Operation threshold	275 V _{AC}
Response time (t _A)	25 ns
I _{tmax} (8/20) – Differential mode (Phase – Neutral)	140 kA
I _{tmax} (8/20) – (Phase – Earth / Neutral – Earth)	100 kA / 140 kA
I _{limp} (10/350) – Differential mode (Phase – Neutral)	30 kA
I _{limp} (10/350) – Common mode (Phase – Earth / Neutral – Earth)	20 kA / 30 kA
Total I _{tmax} (8/20)	380 kA
Total I _{limp} (10/350)	80 kA
Number of surge protection stages	4
Frequency response (Z = 10 Ω)	
Cut-off frequency	23 kHz
Attenuation at 30 KHz	4,2 dB
Installation data	
Recommended minimum section of the connecting cable	Cu 35 mm ²
Recommended protection	25 A
Enclosure material	-in polyurethane gasket
Installation method	Wall Mounting method
Operating temperature	[-10 °C ... +60°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	16 Kg
Dimensions (mm) (Height-Width-Depth)	400×300×150

**MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE
DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.**

- Specially designed for operating and controlling electrical switchboards protection whose power does not exceed 6 kVA in facilities exposed to atmospheric discharges.
- Series impedances are included to improve the performance of the device against lightning and High Frequencies.
- High discharge capacity.
- Easy supervision and maintenance.
- Both common and differential protection mode for all protective modes.
- Adjusted thresholds to the operating voltage range.
- Network and two alarm indicator lights plus MCBs.



DEVICE MODEL	SP 2S-6
Installation mode	Series / Single-Phase
Rated voltage / Frequency / Topology	230 V / 50-60 Hz / L+N+ETT
Connection mode to the electrical supply	Supply terminals
Recommended power of the installation to be protected	6 kVA
Maximum current	25 A
Network topology	TT, IT y TN
Elements of internal disconnection	2 x 80A MCB
Number of Indicator lights	3
Surge response	
Protection type	1+2
Maximum voltage in continuous operation (Uc) AC	250 V _{AC}
Current threshold (Un)/Operationthreshold	275 V _{AC}
Response time (t _A)	25 ns
I _{tmax} (8/20) – Differential mode (Phase – Neutral)	470 kA
I _{tmax} (8/20) – (Phase – Earth / Neutral – Earth)	470 kA / 470 kA
I _{limp} (10/350) – Differential mode (Phase – Neutral)	110 kA
I _{limp} (10/350) – Common mode (Phase – Earth / Neutral – Earth)	110 kA / 110 kA
Total I _{tmax} (8/20)	1410 kA
Total I _{limp} (10/350)	330 kA
Number of surge protection stages	4
Frequency response (Z = 10 Ω)	
Cut-off frequency	650 Hz
Attenuation at 30 KHz	36 dB
Installation data	
Recommended minimum section of the connecting cable	Cu 35 mm ²
Recommended protection	25 A
Enclosure material	-in polyurethane gasket
Installation method	Wall Mounting method
Operating temperature	[-10 °C ... +60°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	16 Kg
Dimmensions (mm) (Height•With•Depth)	400×300×200

**MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE
DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.**

- Specially designed for operating and controlling electrical switchboards protection whose power does not exceed 10 kVA: CPA, CE, etc.
- Ideal for sensitive loads protection against MF and HF harmonics and voltage fluctuations.
- High discharge capacity.
- Easy supervision and maintenance.
- Both common and differential protection mode for all protective modes.
- Adjusted thresholds to the operating voltage range.
- Network and alarm light indicators plus MCBs.



DEVICE MODEL	SP 2S-10R
Installation mode	Series / Single-Phase
Rated voltage / Frequency / Topology	230 V / 50-60 Hz / L+N+ETT
Connection mode to the electrical supply	Supply terminals
Recommended power of the installation to be protected	10 kVA
Maximum current	45 A
Network topology	TT, IT y TN
Elements of internal disconnection	2 x 80A MCB
Number of Indicator lights	2
Surge response	
Protection type	1+2
Maximum voltage in continuous operation (U_n) AC	250 V _{AC}
Current threshold (U_n)/Operation threshold	275 V _{AC}
Response time (t_A)	25 ns
I_{tmax} (8/20) – Differential mode (Phase – Neutral)	140 kA
I_{tmax} (8/20) – (Phase – Earth / Neutral – Earth)	100 kA / 140 kA
I_{timp} (10/350) – Differential mode (Phase – Neutral)	30 kA
I_{timp} (10/350) – Common mode (Phase – Earth / Neutral – Earth)	20 kA / 30 kA
Total I_{tmax} (8/20)	38 kA
Total I_{timp} (10/350)	80 kA
Number of surge protection stages	4
Frequency response ($Z = 10 \Omega$)	
Cut-off frequency	23 kHz
Attenuation at 30 KHz	4,2 dB
Installation data	
Recommended minimum section of the connecting cable	Cu 35 mm ²
Recommended protection	40 A
Enclosure material	Metallic enclosure with -in polyurethane gasket
Installation method	Wall-mounting enclosure
Operating temperature	[-10 °C ... +60°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	18 Kg
Dimensions (mm) (Height-Width-Depth)	400×300×150

**MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE
DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.**

- Specially designed for operating and controlling electrical switchboards protection whose power does not exceed 10 kVA in facilities exposed to atmospheric discharges.
- Series impedances are included to improve the performance of the device against lightning and High Frequencies.
- High discharge capacity.
- Easy supervision and maintenance.
- Both common and differential protection mode for all protective modes.
- Adjusted thresholds to the operating voltage range.
- Network and alarm indicator lights plus MCBs.



DEVICE MODEL	SP 2S-10
Installation mode	Series / Single-Phase
Rated voltage / Frequency / Topology	230 V / 50-60 Hz / L+N+ETT
Connection mode to the electrical supply	Supply terminals
Recommended power of the installation to be protected	10 kVA
Maximum current	45 A
Network topology	TT, IT y TN
Elements of internal disconnection	2 x 80A MCB
Number of Indicator lights	3
Surge response	
Protection type	1+2
Maximum voltage in continuous operation (U_c) AC	250 V _{AC}
Current threshold (U_n)/Operationthreshold	275 V _{AC}
Response time (t_A)	25 ns
I_{tmax} (8/20) – Differential mode (Phase – Neutral)	470 kA
I_{tmax} (8/20) – (Phase – Earth / Neutral – Earth)	470 kA / 470 kA
I_{timp} (10/350) – Differential mode (Phase – Neutral)	110 kA
I_{timp} (10/350) – Common mode (Phase – Earth / Neutral – Earth)	110 kA / 110 kA
Total I_{tmax} (8/20)	1.410 kA
Total I_{timp} (10/350)	330 kA
Number of surge protection stages	4
Frequency response ($Z = 10 \Omega$)	
Cut-off frequency	400 Hz
Attenuation at 30 KHz	40 dB
Installation data	
Recommended minimum section of the connecting cable	Cu 35 mm ²
Recommended protection	40 A
Enclosure material	-in polyurethane gasket
Installation method	Wall-mounting enclosure
Operating temperature	[-10 °C ... +60°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	18 Kg
Dimensions (mm) (Height•With•Depth)	400×300×200

MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.

- Specially designed for operating and controlling electrical switchboards protection whose power does not exceed 24 kVA: CPA, CE, etc.
- Ideal to protect sensitive loads against MF and HF harmonics and lightning.
- High discharge capacity.
- Easy supervision and maintenance.
- Both common and differential protection mode for all protective modes.
- Adjusted thresholds to the operating voltage range.
- Network and alarm indicator lights plus MCBs



DEVICE MODEL	SP 2S-24R
Installation mode	Series / Single-Phase
Rated voltage / Frequency / Topology	230 V / 50-60 Hz / L+N+ETT
Connection mode to the electrical supply	Supply terminals
Recommended power of the installation to be protected	24 kVA
Maximum current	100 A
Network topology	TT, IT y TN
Elements of internal disconnection	2 x 80A MCB
Number of Indicator lights	2
Surge response	
Protection type	1+2
Maximum voltage in continuous operation (Uc) AC	250 V _{AC}
Current threshold (Un)/Operation threshold	275 V _{AC}
Response time (t _A)	25 ns
I _{tmax} (8/20) – Differential mode (Phase – Phase / Phase – Neutral)	140 kA
I _{tmax} (8/20) – (Phase – Earth / Neutral – Earth)	100 kA / 140 kA
I _{tmp} (10/350) – Differential mode (Phase – Phase / Phase – Neutral)	300 kA
I _{tmp} (10/350) – Common mode (Phase – Earth / Neutral – Earth)	20 kA / 30 kA
Total I _{tmax} (8/20)	380 kA
Total I _{tmp} (10/350)	80 kA
Number of surge protection stages	4
Frequency response (Z = 10 Ω)	
Cut-off frequency	23 kHz
Attenuation at 30 KHz	4,2 dB
Installation data	
Recommended minimum section of the connecting cable	Cu 35 mm ²
Recommended protection	100 A
Enclosure material	-in polyurethane gasket
Installation method	Wall-mounting enclosure
Operating temperature	[-10 °C ... +60°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	24 Kg
Dimensions (mm) (Height×Width×Depth)	500×400×200

**MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE
DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.**

- Specially designed for operating and controlling electrical switchboards protection whose power does not exceed 24 kVA in facilities exposed to atmospheric discharges.
- Series impedances are included to improve the performance of the device against lightning and High Frequencies.
- High discharge capacity.
- Easy supervision and maintenance.
- Both common and differential protection mode for all protective modes.
- Adjusted thresholds to the operating voltage range.
- Network and alarm indicator lights plus MCBs



DEVICE MODEL	SP 2S-24
Installation mode	Series / Single-Phase
Rated voltage / Frequency / Topology	230 V / 50-60 Hz / L+N+ETT
Connection mode to the electrical supply	Supply terminals
Recommended power of the installation to be protected	24 kVA
Maximum current	100 A
Network topology	TT, IT y TN
Elements of internal disconnection	2 x 80A MCB
Number of Indicator lights	3
Surge response	
Protection type	1+2
Maximum voltage in continuous operation (U_c) AC	250 V _{AC}
Current threshold (U_n)/Operationthreshold	275 V _{AC}
Response time (t_A)	25 ns
I_{tmax} (8/20) – Differential mode (Phase – Phase / Phase – Neutral)	420 kA
I_{tmax} (8/20) – (Phase – Earth / Neutral – Earth)	470 kA / 470 kA
I_{limp} (10/350) – Differential mode (Phase – Phase / Phase – Neutral)	110 kA
I_{limp} (10/350) – Common mode (Phase – Earth / Neutral – Earth)	110 kA / 110 kA
Total I_{tmax} (8/20)	1.410 kA
Total I_{limp} (10/350)	330 kA
Number of surge protection stages	4
Frequency response (Z = 10 Ω)	
Cut-off frequency	200 Hz
Attenuation at 30 KHz	46 dB
Installation data	
Recommended minimum section of the connecting cable	Cu 35 mm ²
Recommended protection	100 A
Enclosure material	-in polyurethane gasket
Installation method	Wall-mounting enclosure
Operating temperature	[-10 °C ... +60°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	24 Kg
Dimmensions (mm) (Height•With•Depth)	500×400×200

**MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE
DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.**

- It is destined for low power three-phase panels.
- Ideal for sensitive loads protection.
- High discharge capacity.
- Easy supervision and maintenance.
- Both common and differential protection mode for all protective modes.
- Adjusted thresholds to the operating voltage range.
- Network indicator light.



DEVICE MODEL	SP 4D-10
Installation mode	Parallel / Three-Phase
Rated voltage / Frequency / Topology	230 V / 400 v / 50-60 Hz / 3L+N+PE
Connection mode to the electrical supply	Power strip
Recommended power of the installation to be protected	10 kVA
Network topology	TT, IT y TN
Elements of internal disconnection	-
Number of Indicator lights	1
Surge response	
Protection type	2
Maximum voltage in continuous operation (Uc) AC	250 / 430 V _{AC}
Current threshold (Un)/Operationthreshold	275 / 470 V _{AC}
Response time (t _A)	25 ns
I _{imax} (8/20) – Differential mode (Phase – Phase /Phase – Neutral)	35 kA / 45 kA
I _{imax} (8/20) – (Phase – Earth / Neutral – Earth)	35 kA / 45 kA
I _{imp} (10/350) – Differential mode (Phase – Phase / Phase – Neutral)	- / -
I _{imp} (10/350) – Common mode (Phase – Earth / Neutral – Earth)	- / -
I _{imax} (8/20) Total	390 kA
I _{imp} (10/350) Total	-
Number of surge protection stages	3
Frequency response (Z = 10 Ω)	
Cut-off frequency	32 kHz
Attenuation at 30 KHz	10 dB
Installation data	
Recommended minimum section of the connecting cable	Cu 4 mm ²
Recommended protection	25 A
Enclosure material	Polycarbonate
Installation method	DIN rail
Operating temperature	[-10 °C ... +85°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	1 Kg
Dimensions (mm) (Height×With×Depth)	100×160×60

**MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE
DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.**

- It is destined for low power three-phase panels.
- Ideal for sensitive loads protection.
- High discharge capacity.
- Easy supervision and maintenance.
- Both common and differential protection mode for all protective modes.
- Adjusted thresholds to the operating voltage range.
- Network indicator light.



DEVICE MODEL	SP 4D-25
Installation mode	Parallel / Three-Phase
Rated voltage / Frequency / Topology	230 V / 400 V / 50-60 Hz / 3L+N+ETT
Connection mode to the electrical supply	Power strip
Recommended power of the installation to be protected	25 kVA
Network topology	TT, IT y TN
Elements of internal disconnection	-
Number of Indicator lights	1
Surge response	
Protection type	2
Maximum voltage in continuous operation (Uc) AC	250 / 430 V _{AC}
Current threshold (Un)/Operation threshold	275 / 470 V _{AC}
Response time (t _A)	25 ns
I _{Tmax} (8/20) – Differential mode (Phase – Phase / Phase – Neutral)	45 kA / 60 kA
I _{Tmax} (8/20) – (Phase – Earth / Neutral – Earth)	45 kA / 60 kA
I _{Timp} (10/350) – Differential mode (Phase – Phase / Phase – Neutral)	- / -
I _{Timp} (10/350) – Common mode (Phase – Earth / Neutral – Earth)	- / -
I _{Tmax} (8/20) Total	510 kA
I _{Timp} (10/350) Total	-
Number of surge protection stages	3
Frequency response (Z = 10 Ω)	
Cut-off frequency	23 kHz
Attenuation at 30 KHz	4,2 dB
Installation data	
Recommended minimum section of the connecting cable	Cu 10 mm ²
Recommended protection	40 A
Enclosure material	Polycarbonate
Installation method	DIN rail
Operating temperature	[-10 °C ... +85°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	1,4 Kg
Dimensions (mm) (Height×With×Depth)	185×213×102

**MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE
DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.**

- It is destined for low power three-phase panels.
- Ideal for sensitive loads protection.
- High discharge capacity.
- Easy supervision and maintenance.
- Both common and differential protection mode for all protective modes.
- Adjusted thresholds to the operating voltage range.
- Network indicator light.



DEVICE MODEL	SP 4D-50
Installation mode	Parallel / Three-Phase
Rated voltage / Frequency / Topology	230 V / 400 v / 50-60 Hz / 3L+N+ETT
Connection mode to the electrical supply	Power strip
Recommended power of the installation to be protected	50 kVA
Network topology	TT, IT y TN
Elements of internal disconnection	-
Number of Indicator lights	1
Surge response	
Protection type	2
Maximum voltage in continuous operation (U_c) AC	250 / 430 V_{AC}
Current threshold (U_n)/Operationthreshold	275 / 470 V_{AC}
Response time (t_A)	25 ns
I_{Tmax} (8/20) – Differential mode (Phase – Phase / Phase – Neutral)	60 kA / 100 kA
I_{Tmax} (8/20) – (Phase – Earth / Neutral – Earth)	60 kA / 100 kA
I_{Timp} (10/350) – Differential mode (Phase – Phase / Phase – Neutral)	- / -
I_{Timp} (10/350) – Common mode (Phase – Earth / Neutral – Earth)	- / -
I_{Tmax} (8/20) Total	760 kA
I_{Timp} (10/350) Total	-
Number of surge protection stages	3
Frequency response ($Z = 10 \Omega$)	
Cut-off frequency	23 kHz
Attenuation at 30 KHz	4,2 dB
Installation data	
Recommended minimum section of the connecting cable	Cu 10 mm ²
Recommended protection	40 A
Enclosure material	Polycarbonate
Installation method	DIN rail
Operating temperature	[-10 °C ... +85°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	1,4 Kg
Dimmensions (mm) (Height•With•Depth)	185•213•102

**MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE
DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.**

- Specially designed for being installed in secondary industrial panels or in the head-end system of the installation.
- Ideal to protect sensitive loads against MF or HF harmonics and voltage oscillations.
- High discharge capacity.
- Easy supervision and maintenance.
- Both common and differential protection mode for all protective modes.
- Adjusted thresholds to the operating voltage range.
- Network and alarm indicator lights plus MCBs



DEVICE MODEL	SP 4D-80
Installation mode	Parallel / Three-Phase
Rated voltage / Frequency / Topology	230 V / 400 v / 50-60 Hz / 3L+N+ETT
Connection mode to the electrical supply	MCB
Recommended power of the installation to be protected	80 kVA
Network topology	TT, IT y TN
Elements of internal disconnection	80A MCB
Number of Indicator lights	1
Surge response	
Protection type	1+2
Maximum voltage in continuous operation (U_c) AC	250 / 430 V_{AC}
Current threshold (U_n)/Operationthreshold	275 / 470 V_{AC}
Response time (t_A)	25 ns
I_{Tmax} (8/20) – Differential mode (Phase – Phase / Phase – Neutral)	60 kA / 140 kA
I_{Tmax} (8/20) – (Phase – Earth / Neutral – Earth)	100 kA / 140 kA
I_{Timp} (10/350) – Differential mode (Phase – Phase / Phase – Neutral)	- / 30 kA
I_{Timp} (10/350) – Common mode (Phase – Earth / Neutral – Earth)	20 kA / 30 kA
I_{Tmax} (8/20) Total	1040 kA
I_{Timp} (10/350) Total	180 kA
Number of surge protection stages	3
Frequency response ($Z = 10 \Omega$)	
Cut-off frequency	23 kHz
Attenuation at 30 KHz	4,2 dB
Installation data	
Recommended minimum section of the connecting cable	Cu 35 mm ²
Recommended protection	80 A
Enclosure material	Metallic cabinet with foamed-in polyurethane gasket
Installation method	Wall-mounting enclosure
Operating temperature	[-10 °C ... +85°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	14 Kg
Dimensions (mm) (Height×With×Depth)	400×300×150

**MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE
DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.**

- Specially designed for being installed in secondary industrial panels or in the head-end system of the installation.
- It is ideal to protect sensitive loads against MF and HF harmonics and voltage oscillations.
- High discharge capacity.
- Easy supervising and maintenance.
- Both common and differential protection mode for all protective modes.
- Adjusted thresholds to the operating voltage range.
- Network indicator light plus MCB for internal disconnection.



DEVICE MODEL	SP 4D-100
Installation mode	Parallel / Three-Phase
Rated voltage / Frequency / Topology	230 V / 400 V / 50-60 Hz / 3L+N+PE
Connection mode to the electrical supply	MCB terminals
Recommended power of the installation to be protected	100 kVA
Network topology	TT, IT y TN
Elements of internal disconnection	80A MCB
Number of Indicator lights	1
Surge response	
Protection type	1+2
Maximum voltage in continuous operation (U_c) AC	250 / 430 V _{AC}
Current threshold (U_n)/Operationthreshold	275 / 470 V _{AC}
Response time (t_A)	25 ns
I_{Tmax} (8/20) – Differential mode (Line – Neutral)	60 kA / 140 kA
I_{Tmax} (8/20) – (Line – Protective Earth / Neutral – Protective Earth)	140 kA / 140 kA
I_{Timp} (10/350) – Differential mode (Line – Neutral)	- / 30 kA
I_{Timp} (10/350) – Common mode (Line – Earth / Neutral – Protective Earth)	30 kA / 30 kA
Total I_{Tmax} (8/20)	1160 kA
Total I_{Timp} (10/350)	210 kA
Number of surge protection stages	3
Frequency response ($Z = 10 \Omega$)	
Cut-off frequency	250 Hz
Attenuation at 30 KHz	41 dB
Installation data	
Recommended minimum section of the connecting cable	Cu 35 mm ²
Recommended protection	80 A
Enclosure material	Metallic cabinet with foamed-in polyurethane gasket
Installation method	Wall Mounting method
Operating temperature	[-10 °C ... +85°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	14 Kg
Dimensions (mm) (Height•With•Depth)	500×400×200

**MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE
DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.**

- Specially designed for being installed in Transformer Station or in powerful secondary industrial panels.
- It is ideal to protect sensitive loads against MF and HF harmonics and voltage oscillations.
- High discharge capacity.
- Easy supervising and maintenance.
- Both common and differential protection mode for all protective modes.
- Adjusted thresholds to the operating voltage range.
- Network indicator light, two alarm indicator lights plus MCB for internal disconnection.



DEVICE MODEL	SP 4D-300
Installation mode	Parallel / Three-Phase
Rated voltage / Frequency / Topology	230 V / 400 V / 50-60 Hz / 3L+N+ETT
Connection mode to the electrical supply	MCB terminals
Recommended power of the installation to be protected	300 kVA
Network topology	TT, IT y TN
Elements of internal disconnection	2 x 80A MCB
Number of Indicator lights	2
Surge response	
Protection type	1+2
Maximum voltage in continuous operation (U_c) AC	250 / 430 V _{AC}
Current threshold (I_n)/Operation threshold	275 / 470 V _{AC}
Response time (t_A)	25 ns
I_{tmax} (8/20) – Differential mode (Line – Neutral)	170 kA / 170 kA
I_{tmax} (8/20) – (Line – Protective Earth / Neutral – Protective Earth)	170 kA / 470 kA
I_{timp} (10/350) – Differential mode (Line – Neutral)	35 kA / 35 kA
I_{timp} (10/350) – Common mode (Line – Earth / Neutral – Protective Earth)	35 kA / 110 kA
Total I_{tmax} (8/20)	2000 kA
Total I_{timp} (10/350)	425 kA
Number of surge protection stages	3
Frequency response ($Z = 10 \Omega$)	
Frecuencia de corte	200 Hz
Atenuación a 30 KHz	43 dB
Installation data	
Sección mín. recomendada cables de conexión	Cu 35 mm ²
Recommended protection	80 A
Enclosure material	Metallic cabinet with foamed-in polyurethane gasket
Installation method	Wall Mounting method
Operating temperature	[-10 °C ... +85°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	14,4 Kg
Dimensions (mm) (Height×Width×Depth)	500×400×200

**MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE
DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.**

- Specially designed for being installed in the the output of Transformer Stations or in powerful secondary panels.
- It is ideal to protect sensistive loads against MF and HF harmonics and voltage oscillations.
- High discharge capacity.
- Easy supervising and maintenance.
- Both common and differential protection mode for all protective modes.
- Adjusted thresholds to the operating voltage range.
- Network and two indicator lights plus MCB for internal disconnection.



DEVICE MODEL	SP 4D-600
Installation mode	Parallel / Three-Phase
Rated voltage / Frequency / Topology	230 V / 400 V / 50-60 Hz / 3L+N+ETT
Connection mode to the electrical supply	MCB terminals
Recommended power of the installation to be protected	600 kVA
Network topology	TT, IT y TN
Elements of internal disconnection	2 x 80A MCB
Number of Indicator lights	3
Surge response	
Protection type	1+2
Maximum voltage in continuous operation (Uc) AC	250 / 430 V _{AC}
Current threshold (Un)/Operationthreshold	275 / 470 V _{AC}
Response time (t _A)	25 ns
I _{imax} (8/20) – Differential mode (Line – Neutral)	170 kA / 470 kA
I _{imax} (8/20) – (Line – Protective Earth / Neutral – Protective Earth)	170 kA / 470 kA
I _{limp} (10/350) – Differential mode (Line – Neutral)	35 kA / 110 kA
I _{limp} (10/350) – Common mode (Line – Earth / Neutral – Protective Earth)	35 kA / 110 kA
Total I _{imax} (8/20)	2900 kA
Total I _{limp} (10/350)	650 kA
Number of surge protection stages	3
Frequency response (Z = 10 Ω)	
Cut-off frequency	19 kHz
Attenuation at 30 KHz	5,5 dB
Installation data	
Recommended minimum section of the connecting cable	Cu 35 mm ²
Recommended protection	80 A
Enclosure material	Metallic cabinet with foamed-in polyurethane gasket
Installation method	Wall Mounting method
Operating temperature	[-10 °C ... +85°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	14,8 Kg
Dimmensions (mm) (Height•With•Depth)	500×400×200

**MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE
DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.**

- Specially designed for being installed in the the output of Transformer Stations or in the main switchboard.
- It is ideal to protect sensistive loads against MF and HF harmonics and voltage oscillations.
- High discharge capacity.
- Easy supervising and maintenance.
- Both common and differential protection mode for all protective modes.
- Adjusted thresholds to the operating voltage range.
- Network and two indicator lights plus MCB for internal disconnection.



DEVICE MODEL	SP 4D-800
Installation mode	Parallel / Three-Phase
Rated voltage / Frequency / Topology	230 V / 400 V / 50-60 Hz / 3L+N+ETT
Connection mode to the electrical supply	MCB terminals
Recommended power of the installation to be protected	800 kVA
Network topology	TT, IT y TN
Elements of internal disconnection	2 x 80A MCB
Number of Indicator lights	3
Surge response	
Protection type	1+2
Maximum voltage in continuous operation (Uc) AC	250 / 430 V _{AC}
Current threshold (Un)/Operationthreshold	275 / 470 V _{AC}
Response time (t _A)	25 ns
I _{imax} (8/20) – Differential mode (Line – Neutral)	170 kA / 470 kA
I _{imax} (8/20) – (Line – Protective Earth / Neutral – Protective Earth)	470 kA / 470 kA
I _{limp} (10/350) – Differential mode (Line – Neutral)	35 kA / 110 kA
I _{limp} (10/350) – Common mode (Line – Earth / Neutral – Protective Earth)	110 kA / 110 kA
Total I _{imax} (8/20)	3800 kA
Total I _{limp} (10/350)	875 kA
Number of surge protection stages	3
Frequency response (Z = 10 Ω)	
Cut-off frequency	19 kHz
Attenuation at 30 KHz	5,5 dB
Installation data	
Recommended minimum section of the connecting cable	Cu 35 mm ²
Recommended protection	80 A
Enclosure material	Metallic cabinet with foamed-in polyurethane gasket
Installation method	Wall Mounting method
Operating temperature	[-10 °C ... +85°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	14,8 Kg
Dimmensions (mm) (Height•With•Depth)	500×400×200

MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.

- Specially designed for being installed in the output of Transformer Stations or in powerful secondary panels.
- It is ideal to protect sensitive loads against MF and HF harmonics and voltage oscillations.
- High discharge capacity.
- Easy supervising and maintenance.
- Both common and differential protection mode for all protective modes.
- Adjusted thresholds to the operating voltage range.
- Network and two indicator lights plus MCB for internal disconnection.



DEVICE MODEL	SP 4D-1000
Installation mode	Parallel / Three-Phase
Rated voltage / Frequency / Topology	230 V / 400 V / 50-60 Hz / 3L+N+ETT
Connection mode to the electrical supply	MCB terminals
Recommended power of the installation to be protected	1000 kVA
Network topology	TT, IT y TN
Elements of internal disconnection	2 x 80A MCB
Number of Indicator lights	3
Surge response	
Protection type	1+2
Maximum voltage in continuous operation (U_c) AC	250 / 430 V _{AC}
Current threshold (I_n)/Operation threshold	275 / 470 V _{AC}
Response time (t_A)	25 ns
I_{Tmax} (8/20) – Differential mode (Line – Neutral)	240 kA / 540 kA
I_{Tmax} (8/20) – (Line – Protective Earth / Neutral – Protective Earth)	540 kA / 540 kA
I_{Timp} (10/350) – Differential mode (Line – Neutral)	45 kA / 120 kA
I_{Timp} (10/350) – Common mode (Line – Earth / Neutral – Protective Earth)	120 kA / 120 kA
Total I_{Tmax} (8/20)	4500 kA
Total I_{Timp} (10/350)	975 kA
Number of surge protection stages	3
Frequency response ($Z = 10 \Omega$)	
Cut-off frequency	19 kHz
Attenuation at 30 KHz	5,5 dB
Installation data	
Recommended minimum section of the connecting cable	Cu 35 mm ²
Recommended protection	80 A
Enclosure material	Metallic cabinet with foamed-in polyurethane gasket
Installation method	Wall Mounting method
Operating temperature	[-10 °C ... +85°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	14,8 Kg
Dimensions (mm) (Height•With•Depth)	500×400×200

**MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE
DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.**

- Specially designed to protect critical loads in three-phase installations which power does not exceed 17 kVA.
- Series impedances that improve the performance of the equipment against lightning and high frequencies are included.
- High discharge capacity.
- Easy supervising and maintenance.
- Both common and differential protection mode for all protective modes.
- Adjusted thresholds to the operating voltage range.
- Network and two indicator lights plus MCB for internal disconnection.



DEVICE MODEL	SP 4S-17R
Installation mode	Series / Three-Phase
Rated voltage / Frequency / Topology	230 V / 400 V / 50-60 Hz / 3L+N+ETT
Connection mode to the electrical supply	MCB terminals
Recommended power of the installation to be protected	17 kVA
Network topology	TT, IT y TN
Elements of internal disconnection	2 x 80A MCB
Number of Indicator lights	3
Surge response	
Protection type	1+2
Maximum voltage in continuous operation (U_c) AC	250 / 430 V _{AC}
Current threshold (U_n)/Operationthreshold	275 / 470 V _{AC}
Response time (t_A)	25 ns
I_{Tmax} (8/20) – Differential mode (Line – Neutral)	100 kA / 140 kA
I_{Tmax} (8/20) – (Line – Protective Earth / Neutral – Protective Earth)	100 kA / 140 kA
I_{Timp} (10/350) – Differential mode (Line – Neutral)	20 kA / 30 kA
I_{Timp} (10/350) – Common mode (Line – Earth / Neutral – Protective Earth)	20 kA / 30 kA
Total I_{Tmax} (8/20)	1160 kA
Total I_{Timp} (10/350)	240 kA
Number of surge protection stages	4
Frequency response (Z = 10 Ω)	
Cut-off frequency	21 kHz
Attenuation at 30 KHz	4,8 dB
Installation data	
Recommended minimum section of the connecting cable	Cu 16 mm ²
Recommended protection	25 A
Enclosure material	Metallic cabinet with foamed-in polyurethane gasket
Installation method	Wall Mounting method
Operating temperature	[-10 °C ... +60°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	22 Kg
Dimensions (mm) (Height•With•Depth)	600×400×200

MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.

- Specially designed to protect critical loads in 17 kVA installations which are exposed to atmospheric discharges.
- I Series impedances are included to improve the performance of the device against lightning and High Frequencies.
- High discharge capacity.
- Easy supervising and maintenance.
- Both common and differential protection mode for all protective modes.
- Adjusted thresholds to the operating voltage range.
- Network and two indicator lights plus MCB for internal disconnection.



DEVICE MODEL	SP 4S-17
Installation mode	Series / Three-Phase
Rated voltage / Frequency / Topology	230 V / 400 V / 50-60 Hz / 3L+N+ETT
Connection mode to the electrical supply	MCB terminals
Recommended power of the installation to be protected	17 kVA
Maximum current	25 A
Network topology	TT, IT y TN
Elements of internal disconnection	2 x 80A MCB
Number of Indicator lights	3
Surge response	
Protection type	1+2
Maximum voltage in continuous operation (U_c) AC	250 / 430 V _{AC}
Current threshold (U_n)/Operationthreshold	275 / 470 V _{AC}
Response time (t_A)	25 ns
I_{tmax} (8/20) – Differential mode (Phase – Phase / Phase – Neutral)	170 kA / 470 kA
I_{tmax} (8/20) – Common mode (Phase – Earth / Neutral – Earth)	170 kA / 470 kA
I_{timp} (10/350) – Differential mode (Phase – Phase / Phase – Neutral)	35 kA / 110 kA
I_{timp} (10/350) – Common mode (Phase – Earth / Neutral – Earth)	35 kA / 110 kA
Total I_{tmax} (8/20)	2900 kA
Total I_{timp} (10/350)	650 kA
Number of surge protection stages	4
Frequency response ($Z = 10 \Omega$)	
Cut-off frequency	200 Hz
Attenuation at 30 KHz	44 dB
Installation data	
Recommended minimum section of the connecting cable	Cu 16 mm ²
Recommended protection	25 A
Enclosure material	Metallic cabinet with foamed-in polyurethane gasket
Installation method	Wall Mounting method
Operating temperature	[-10 °C ... +60°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	22 Kg
Dimensions (mm) (Height•With•Depth)	600×500×200

**MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE
DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.**

- Specially designed to protect critical loads in three-phase installations which power does not exceed 30 kVA.
- Incluyen impedancias en Serie que mejoran las prestaciones del equipo frente al rayo y las altas frecuencias.
- High discharge capacity.
- Easy supervising and maintenance.
- Both common and differential protection mode for all protective modes.
- Adjusted thresholds to the operating voltage range.
- Network and two indicator lights plus MCB for internal disconnection.



DEVICE MODEL	SP 4S-30R
Installation mode	Series / Three-Phase
Rated voltage / Frequency / Topology	230 V / 400 V / 50-60 Hz / 3L+N+ETT
Connection mode to the electrical supply	MCB terminals
Recommended power of the installation to be protected	30 kVA
Maximum current	45 A
Network topology	TT, IT y TN
Elements of internal disconnection	2 x 80A MCB
Number of Indicator lights	3
Surge response	
Protection type	1+2
Maximum voltage in continuous operation (U_c) AC	250 / 430 V _{AC}
Current threshold (U_n)/Operationthreshold	275 / 470 V _{AC}
Response time (t_A)	25 ns
I_{Tmax} (8/20) – Differential mode (Phase – Phase / Phase – Neutral)	100 kA / 140 kA
I_{Tmax} (8/20) – Common mode (Phase – Earth / Neutral – Earth)	100 kA / 140 kA
I_{Timp} (10/350) – Differential mode (Phase – Phase / Phase – Neutral)	20 kA / 30 kA
I_{Timp} (10/350) – Common mode (Phase – Earth / Neutral – Earth)	20 kA / 30 kA
Total I_{Tmax} (8/20)	1160 kA
Total I_{Timp} (10/350)	240 kA
Number of surge protection stages	4
Frequency response ($Z = 10 \Omega$)	
Cut-off frequency	21 kHz
Attenuation at 30 KHz	4,8 dB
Installation data	
Recommended minimum section of the connecting cable	Cu 25 mm ²
Recommended protection	45 A
Enclosure material	Metallic cabinet with foamed-in polyurethane gasket
Installation method	Wall Mounting method
Operating temperature	[-10 °C ... +60°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	25 Kg
Dimensions (mm) (Height•With•Depth)	600×400×200

**MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE
DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.**


- Specially designed to protect critical loads in 30 kVA installations which are exposed to atmospheric discharges.
- I Series impedances are included to improve the performance of the device against lightning and High Frequencies.
- High discharge capacity.
- Easy supervising and maintenance.
- Both common and differential protection mode for all protective modes.
- Adjusted thresholds to the operating voltage range.
- Network and two indicator lights plus MCB for internal disconnection.

DEVICE MODEL	SP 4S-30
Installation mode	Series / Three-Phase
Rated voltage / Frequency / Topology	230 V / 400 V / 50-60 Hz / 3L+N+ETT
Connection mode to the electrical supply	MCB terminals
Recommended power of the installation to be protected	30 kVA
Maximum current	45 A
Network topology	TT, IT y TN
Elements of internal disconnection	2 x 80A MCB
Number of Indicator lights	3
Surge response	
Protection type	1+2
Maximum voltage in continuous operation (Uc) AC	250 / 430 V _{AC}
Current threshold (Un)/Operation threshold	275 / 470 V _{AC}
Response time (t _A)	25 ns
I _{tmax} (8/20) – Differential mode (Phase – Phase / Phase – Neutral)	170 kA / 470 kA
I _{tmax} (8/20) – Common mode (Phase – Earth / Neutral – Earth)	170 kA / 470 kA
I _{tmp} (10/350) – Differential mode (Phase – Phase / Phase – Neutral)	35 kA / 110 kA
I _{tmp} (10/350) – Common mode (Phase – Earth / Neutral – Earth)	35 kA / 110 kA
Total I _{tmax} (8/20)	2900 kA
Total I _{tmp} (10/350)	650 kA
Number of surge protection stages	4
Frequency response (Z = 10 Ω)	
Cut-off frequency	200 Hz
Attenuation at 30 KHz	44 dB
Installation data	
Recommended minimum section of the connecting cable	Cu 25 mm ²
Recommended protection	40 A
Enclosure material	Metallic cabinet with foamed-in polyurethane gasket
Installation method	Wall Mounting method
Operating temperature	[-10 °C ... +60 °C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	25 Kg
Dimensions (mm) (Height•With•Depth)	600×500×200

**MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE
DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.**

- Specially designed to protect critical loads in three-phase installations which power does not exceed 70 kVA.
- Series impedances are included to improve the performance of the device against lightning and High Frequencies.
- High discharge capacity.
- Easy supervising and maintenance.
- Both common and differential protection mode for all protective modes.
- Adjusted thresholds to the operating voltage range.
- Network and two indicator lights plus MCB for internal disconnection.



DEVICE MODEL	SP 4S-70R
Installation mode	Series / Three-Phase
Rated voltage / Frequency / Topology	230 V / 400 V / 50-60 Hz / 3L+N+ETT
Connection mode to the electrical supply	MCB terminals
Recommended power of the installation to be protected	70 kVA
Maximum current	100 A
Network topology	TT, IT y TN
Elements of internal disconnection	2 x 80A MCB
Number of Indicator lights	3
Surge response	
Protection type	1+2
Maximum voltage in continuous operation (U_c) AC	250 / 430 V_{AC}
Current threshold (U_n)/Operationthreshold	275 / 470 V_{AC}
Response time (t_A)	25 ns
I_{tmax} (8/20) – Differential mode (Phase – Phase / Phase – Neutral)	100 kA / 140 kA
I_{tmax} (8/20) – Common mode (Phase – Earth / Neutral – Earth)	100 kA / 140 kA
I_{limp} (10/350) – Differential mode (Phase – Phase / Phase – Neutral)	20 kA / 30 kA
I_{limp} (10/350) – Common mode (Phase – Earth / Neutral – Earth)	20 kA / 30 kA
Total I_{tmax} (8/20)	1160 kA
Total I_{limp} (10/350)	240 kA
Number of surge protection stages	4
Frequency response ($Z = 10 \Omega$)	
Cut-off frequency	21 kHz
Attenuation at 30 KHz	4,8 dB
Installation data	
Recommended minimum section of the connecting cable	Cu 35 mm ²
Recommended protection	100 A
Enclosure material	Metallic cabinet with foamed-in polyurethane gasket
Installation method	Montaje mural
Operating temperature	[-10 °C ... +60°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	50 Kg
Dimensions (mm) (Height•With•Depth)	700×500×250

**MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE
DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.**


- Specially designed to protect critical loads in 30 kVA installations which are exposed to atmospheric discharges.
- I Series impedances are included to improve the performance of the device against lightning and High Frequencies.
- High discharge capacity.
- Easy supervising and maintenance.
- Both common and differential protection mode for all protective modes.
- Adjusted thresholds to the operating voltage range.
- Network and two indicator lights plus MCB for internal disconnection.

DEVICE MODEL	SP 4S-70
Installation mode	Series / Three-Phase
Rated voltage / Frequency / Topology	230 V / 400 V / 50-60 Hz / 3L+N+ETT
Connection mode to the electrical supply	MCB terminals
Recommended power of the installation to be protected	70 kVA
Maximum current	100A
Network topology	TT, IT y TN
Elements of internal disconnection	2 x 80A MCB
Number of Indicator lights	3
Surge response	
Protection type	1+2
Maximum voltage in continuous operation (U_c) AC	250 / 430 V _{AC}
Current threshold (U_n)/Operation threshold	275 / 470 V _{AC}
Response time (t_A)	25 ns
I_{tmax} (8/20) – Differential mode (Phase – Phase / Phase – Neutral)	170 kA / 470 kA
I_{tmax} (8/20) – Common mode (Phase – Earth / Neutral – Earth)	170 kA / 470 kA
I_{tmp} (10/350) – Differential mode (Phase – Phase / Phase – Neutral)	35 kA / 110 kA
I_{tmp} (10/350) – Common mode (Phase – Earth / Neutral – Earth)	35 kA / 110 kA
Total I_{tmax} (8/20)	2900 kA
Total I_{tmp} (10/350)	650 kA
Number of surge protection stages	4
Frequency response ($Z = 10 \Omega$)	
Cut-off frequency	200 Hz
Attenuation at 30 KHz	44 dB
Installation data	
Recommended minimum section of the connecting cable	Cu 25 mm ²
Recommended protection	100 A
Enclosure material	Metallic cabinet with foamed-in polyurethane gasket
Installation method	Wall Mounting method
Operating temperature	[-10 °C ... +60°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	25 Kg
Dimensions (mm) (Height•With•Depth)	700×500×150

**FILTERING SYSTEM, MICRO-INTERRUPTIONS AND MIDDLE AND HIGH FREQUENCY
PROTECTIVE DEVICE IN AC LOW-VOLTAGE POWER SUPPLY NETWORKS.**

- Specially designed to protect low power operation panels against micro interruptions.
- Differential mode surge protection.
- Adjusted thresholds to the operating voltage range.
- Medium and High frequency filtering.



DEVICE MODEL	SP 2F-240 xx
(xx = 10 / 20 / 40 / 80)	
Installation mode	Parallel / Single-Phase
Rated voltage / Frequency / Topology	230 V / 50-60 Hz / L+N+ETT
Connection mode to the electrical supply	Power strip
Recommended power of the installation to be protected	300 / 400 / 500 / 600 / 700 / 800 / 1300 / 1500 / 1600 VA
Maximum current	0,8 / 1,2 / 1,6 / 2 / 2,4 / 2,8 / 3,2 / 5,2 / 6 / 6,4 A
Network topology	TT, IT
Elements of internal disconnection	–
Number of Indicator lights	0
Surge response	
Protection type	3
Maximum voltage in continuous operation (U_c) AC	250+ V_{AC}
Current threshold (I_n)/Operation threshold	275 V_{AC}
Response time (t_A)	25 ns
I_{Tmax} (8/20) – Differential mode (Phase – Neutral)	8 kA
Total I_{Tmax} (8/20)	8kA
Number of surge protection stages	2
Frequency response ($Z = 10 \Omega$)	
Cut-off frequency	1600 / 1050 / 800 / 625 / 525 / 450 / 400 / 240 / 210 / 200 Hz / F + N
Attenuation at 30 KHz	26 / 29 / 32 / 33 / 35 / 36 / 37 / 42 / 43 / 44 dB
Installation data	
Recommended minimum section of the connecting cable	Cu 2,5 mm ²
Recommended protection	According to the installation features (Look at I_{line})
Enclosure material	Polycarbonate
Installation method	DIN rail / Wall Mounting method
Operating temperature	[-5 °C ... +40°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	¿? Kg
Dimensions (mm) (Height•With•Depth)	169×90×58 for 2F-240-[10...40] models/ 188×110×69 for 2F-240-80 models

**FILTERING SYSTEM, MICRO-INTERRUPTIONS AND MIDDLE AND HIGH FREQUENCY
PROTECTIVE DEVICE IN AC LOW-VOLTAGE POWER SUPPLY NETWORKS.**

- Specially designed to protect low power operation panels against micro interruptions.
- Differential mode surge protection.
- Adjusted thresholds to the operating voltage range.
- Medium and High frequency filtering.



DEVICE MODEL	SP 3F-400 (xx)
(xx = 10 / 20 / 40 / 80)	
Installation mode	Parallel / Three-phase
Rated voltage / Frequency / Topology	400 V / 50-60 Hz / 3F+TT
Connection mode to the electrical supply	Power strip
Recommended power of the installation to be protected	1,8 / 2,7 / 3,6 / 4,5 / 5,5 / 6,5 / 7 / 12 / 13,5 / 14,5 kVA
Maximum current	2,4 / 3,6 / 4,8 / 6 / 7,2 / 8,4 / 9,5 / 15,5 / 17,9 / 19,1 A
Network topology	TT, IT
Elements of internal disconnection	–
Number of Indicator lights	0
Surge response	
Protection type	3
Maximum voltage in continuous operation (U _c) AC	460 V _{AC}
Current threshold (U _n)/Operation threshold	530 V _{AC}
Response time (t _a)	25 ns
I _{Tmax} (8/20) – Differential mode (Phase – Neutral)	8 kA
Total I _{Tmax} (8/20)	24kA
Number of surge protection stages	2
Frequency response (Z = 10 Ω)	
Cut-off frequency	1600 / 1050 / 800 / 625 / 525 / 450 / 400 / 240 / 210 / 200 Hz / F + F
Attenuation at 30 KHz	26 / 29 / 32 / 33 / 35 / 36 / 37 / 42 / 43 / 44 dB
Installation data	
Recommended minimum section of the connecting cable	Cu 2,5 mm ²
Recommended protection	According to the installation features (Look at I _{imp})
Enclosure material	Poycarbonate
Installation method	DIN rail/ Wall Mounting method
Operating temperature	[-5 °C ... +40°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	¿? Kg
Dimmensions (mm) (Height•With•Depth)	188×110×69 para 3F-400[10...20] / 220×163×101 para 3F-400 [40...80]

04

SPE_

Multi-stage surge protective device and middle and high frequency harmonics with voltage stabilization.

- 4_1. Technical description
- 4_2. Advantages and benefits of installing SPE devices
- 4_3. Installation mode
- 4_4. 1E Series data sheets
- 4_5. 3E Series data sheets



PROTECTIVE DEVICES WITH VOLTAGE STABILIZATION SPE

MULTI-STAGE SURGE PROTECTIVE DEVICES AND MIDDLE AND HIGH-FREQUENCY HARMONICS IN AC LOW-VOLTAGE SUPPLY NETWORKS

Unified Protective Systems with Stabilization Series (SPE) are protective devices against electrical voltage disturbances made up of several protective sets coordinated with each other. Its design offers adaptability according to the needs of each installation to give priority to safety and a proper functioning.

In particular, these protective devices ensure the proper operation of the installations to be protected against permanent overvoltages and undervoltages, 8/20 μ s surges, MF/AF harmonics and peaks associated to micro-interruptions.

It is recommended to install SPE devices in installations with undervoltage problems and a poor quality power supply, as well as in those installations where the perfect operation of critical loads, electric and sensitive electronic devices is essential.

Main features of these protective devices:

- Electrical protection against lightning strikes.
- Electrical protection against industrial surges.
- Protection against voltage fluctuations.
- Filtering of MF/HF harmonics.
- Protection against overvoltage and undervoltages.
- Output voltage stabilization $\pm 2\%$ ($V_{in} \pm 25\%$).
- Independent phase regulation $\pm 1\%$ ($V_{in} \pm 5\%$).
- With or without galvanic isolation transformer.
- Power until 3,000 kVA.

SPE Series main features:

	Series 1E	Series 3E
Type of installation	Parallel	Parallel
Rated voltage (V) (1)	230/400	230
Protection against industrial transient overvoltages 8/20	✓	✓
Protection against industrial transient overvoltages 8/20 lightning type 10/350	✓	✓
Permanent overvoltage protection	✓	✓
Undervoltage protection	✓	✓
MF/HF harmonics protection (3)	✓	✓

(1) Different voltage ranges are available upon request.

ADVANTAGES AND BENEFITS OF INSTALLING OUR DEVICES

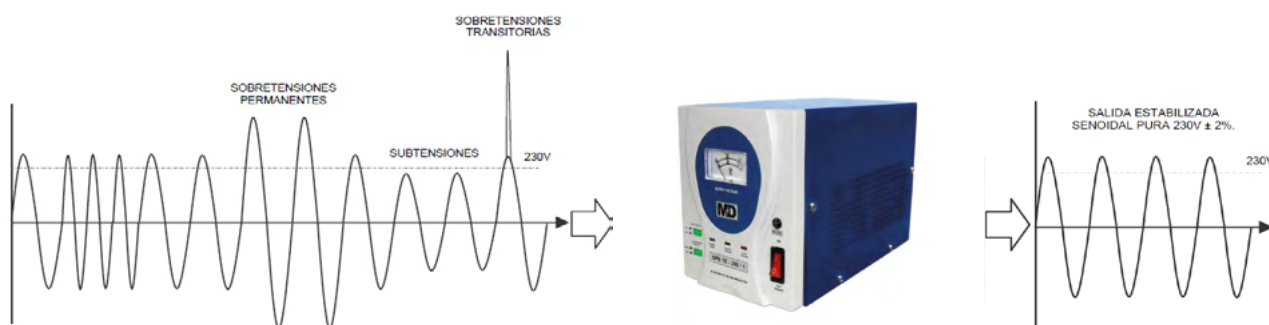
SPE protective devices series are characterised by being an integral protection against most of the disturbances of electrical origin. These perturbances can be originated both in the electrical network such as in user's installations.

SPE series is highly recommended in electrical installations with a problematic and poor quality power supply network or at the end of electrical installations, electrical panels settled far away from the transformation center, installations with a very high or low power supply, as well as in installations where it is necessary to ensure the proper operation of critical loads and the most sensitive devices.

SPE protective devices series protect loads against both transient and permanent overvoltages effects, MF/HF harmonics, as well as voltage swells and undervoltages. These devices guarantee a perfect estabilizad output voltage with a pure sine wave, and eliminate all peaks and disturbances from the electrical network or those of human origin.

In this way, SPE devices will avoid possible damages in both electrical and electronic circuits, as well as keeping safe the technical staff.

The cost of maintenance in electrical installations which are affected by overvoltages and undervoltages is significantly reduced by installing our devices, besides saving time and money.



INSTALLATION MODE

The connection of devices to the electrical network depends on the different models (see types of connection in the technical sheet of each model).

The protective devices are specifically designed to protect single-phase 230 V or three-phase 240/400 V (50 - 60 Hz) installations.

Devices must be installed in series with the installation to be protected.

The earth terminal is connected to the earthing of the installation to be protected. A two green-yellow colored insulated cable is used. The earth line must be isolated and the earth resistance must be less than 20 Ω .

In case of failure and in order to avoid an accident, overloads and short circuits protective devices should not be restarted without verifying the devices are in a perfect condition firstly.

The installation, repair and start up of the device must be always carried out by a specialized electrician respecting the R.E.B.T and following the instructions dictated by this manual.



**MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE
DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.**

- Ideal for critical loads protection that require a good quality power supply.
- Recommended for installations with voltage fluctuations, surges and undervoltages.
- Voltage stabilization with $\pm 2\%$ output voltage regulation.
- Surge protection.
- Medium and high frequencies harmonics filtering.
- Easy monitoring and maintenance.
- Two network pilot lights, two alarm pilot lights, as well as fuses and MCBs.



Device Model	SP 1E-240/0,5	SP 1E-240/1	SP 1E-240/2	SP 1E-240/3	SP 1E-240/5	SP 1E-240/10	SP 1E-240/15	SP 1E-240/20
Rated power (KVA)	0,5	1	2	3	5	10	15	20
Voltage stabilization								
Input range	160 V – 250 V							
Phase	Single-phase + N + PE							
Voltage	220 V							
Voltage accuracy	± 3%							
Frequency	50 / 60 Hz							
Overvoltage protection	Output voltage 250 V ± 5 V							
Low-voltage protection	Output voltage 183 V ± 5 V							
Power factor	0,8							
Wave form distorsion	No wave form distorsion							
Response time (t _R)	Fluctuations ± 10 % < 1s							
Insulation resistance	> 2 MΩ							
Surge response								
Protection type	2							
Protection steps	4							
Max. continuous operating voltage (U _c) AC	250 V _{AC}							
Actuation threshold (U _n)	275 V _{AC}							
I _n discharge [L–N / L–PE / N–PE]	60 / 60 / 60 kA							
I _n total discharge	180 kA							
Frequency response (Z = 10 Ω)								
Cut-off frequency	23 kHz							
Attenuation at 30 kHz	4,2 dB							
Installation data								
Input / Output connection	Supply terminals							
Minimum section cable	2 mm²							
Room temperature	[-5°C ... +40°C]							
Relative humidty	< 95%							
Operation	Continuous							
IP degree protection	IP 20 (CEI 60529)							
Location category	Indoor							
Dimensions (mm) (Depth×Width×Height)	140×190×180	160×220×210	200×240×270	250×220×300	430×240×300	450×250×300	650×330×410	
Weight (Kg)	4	6	10,5	13	27	37	64	70

MULTI-STAGE SURGE, MEDIUM AND HIGH FREQUENCY HARMONICS PROTECTIVE DEVICE IN AC LOW VOLTAGE POWER SUPPLY NETWORKS.

- Ideal for critical loads protection that require good quality power supply.
- Recommended for installations with voltage fluctuations, surges and undervoltages.
- Voltage stabilization with $\pm 2\%$ output voltage regulation.
- Surge protection.
- Medium and high frequencies harmonics filtering.
- Easy monitoring and maintenance.
- Two network pilot lights, two alarm pilot lights, as well as fuses and MCBs.



Device Model	SP 3E-400/3	SP 3E-400/6	SP 3E-400/9	SP 3E-400/15	SP 3E-400/20	SP 3E-400/30
Rated power (KVA)	3	6	9	15	20	30
Voltage stabilization						
Input range	227 V – 430V					
Phase	Three-phase + N + PE					
Voltage	220 V – 380V					
Voltage accuracy	± 3%					
Frequency	50 / 60 Hz					
Over-voltage protection	Output voltage 250 V ± 5 V					
Low-Voltage protection	Output voltage 183 V ± 5 V					
Power factor	0,8					
Wave form distortion	No wave form distortion					
Response time (t _R)	Fluctuations ± 10 % < 1s					
Insulation resistance	> 2 MΩ					
Surge response						
Protection type	2					
Protection steps	4					
Max. continuous operating voltage (U _c) AC	250 V _{AC}					
Actuation threshold (U _n)	275 V _{AC}					
I _n discharge [L–N / L–PE / N–PE]	60 / 60 / 60 kA					
I _n total discharge	510 kA					
Frequency response (Z = 10 Ω)						
Cut-off frequency	23 kHz					
Attenuation at 30 kHz	4,2 dB					
Installation data						
Input / Output connection	Supply terminals					
Minimum section cable	2 mm²					
Room temperature	[-5°C ... +40°C]					
Relative humidity	< 95%					
Operation	Continuous					
IP degree protection	IP 20 (CEI 60529)					
Location category	Indoor					
Dimensions (mm) (Depth×Width×Height)	190×380×420	680×285×375	790×330×355	800×430×385	970×515×435	
Weight (Kg)	24	40	53	86	109	12

Surge protective devices for AC High-Voltage power supply networks.

- 5_1. Technical description
- 5_2. Installation mode
- 5_3. Data sheet



PARALLEL HIGH-VOLTAGE PROTECTIVE DEVICES SDK

SURGE PROTECTIVE DEVICES IN AC HIGH-VOLTAGE SUPPLY NETWORKS

SDK protective devices have been designed to protect High-Voltage electrical installations when they can not be protected in Low-Voltage due to access and space difficulties.

SDK Series devices have been conceived under the maximum discharge capacity criteria and minimum residual voltage.

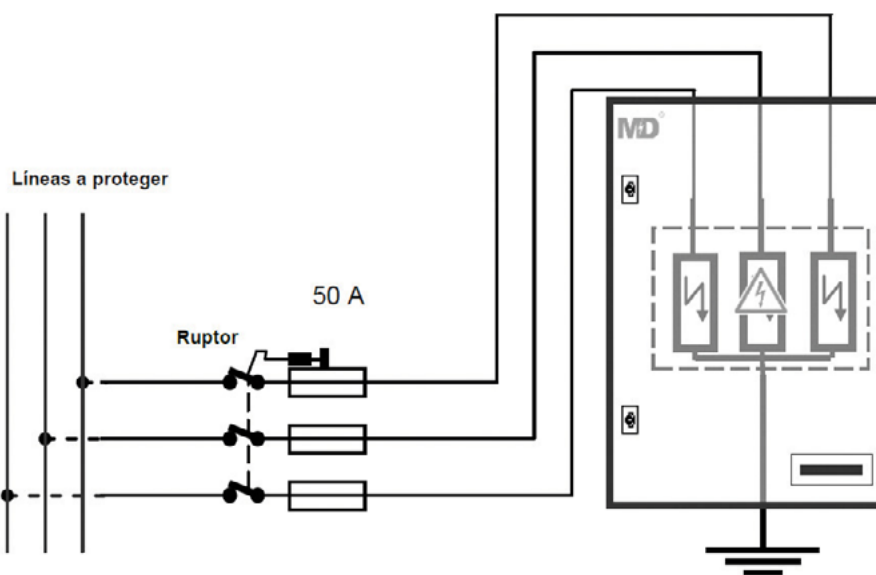
In case of lightning strikes, spikes associated with micro-interruptions, engines start and stop process or any type of transient overvoltage, our protective devices are available to avoid frank and latent breakdowns in all electrical and electronic devices. This is possible thanks to the adjustable residual voltage of the SDK to the maximum voltage of the protected installation, its high discharge capacity and differential protection- protection between active conductors.

Main technical features of SDK devices:

- High current discharge capacity with 8/20 and 10/350 μ s waveforms.
- Residual values close to the voltage of the protected installation.
- Surges are removed in both common and differential mode.
- Response speed is 0,025 μ s.
- Repairable.
- Remote signaling in case of failure.
- SDK devices can be adapted to any type of voltage.



SP 3D-K11



Connection diagram

SURGE PROTECTIVE DEVICE IN HIGH-VOLTAGE INSTALLATIONS.

- Intended for three-phase systems with no neutral terminal and 6kV between phases.
- It is also appropriated to limit voltage in the shield of a high-voltage power line connected to earth by only one end.
- High discharge capacity.
- Easy supervision and maintenance.
- Both common and differential protection for all protection modes.
- Adjusted thresholds to operating voltage.



DEVICE MODEL	SP 3D-K6
Installation mode	Parallel / Three-phase
Rated voltage / Frequency / Topology	6 kVA 50-60 KHz / 3L + TE
Connection mode to the electrical supply	Platen
Network topology	TT, IT
Surge response	
Protection type	2
Maximum continuous operating voltage (U_c) L-L (L-E)	10.3 kV L-L (6 kV _{AC} L-E)
Operation threshold (U_n)	12.1 kV _{AC} L-L (7 kV _{AC} L-E)
Response time (t_A)	25 ns
I_{tmax} (820/20) L-L	70 kA
I_{tmax} (820/20) L-E	70 kA
I_{tmax} (820/20) Total	210 kA
Protection steps	1
Installation data	
Recommended minimum section of connecting cables	Cu 35mm ²
Recommended protection	50 A
Enclosure material	Foamed-in polyurethane gasket
Installation method	Wall-mounting enclosure
Operating temperature	[-10 °C ... +85 °C]
IP protection degree	IP 66
Location category	Indoor. High-voltage cell
Weight (Kg)	-
Dimensions (mm) (Height×With×Depth)	530×430×200
Accessories	
Lightning discharge counter	Optional

SURGE PROTECTIVE DEVICE IN HIGH-VOLTAGE INSTALLATIONS.

- Intended for three-phase systems with no neutral terminal and 11kV between phases.
- It is also appropriated to limit voltage in the shield of a High-Voltage power line connected to earth by only one terminal.
- Easy maintenance.
- Adjusted thresholds to operating voltage.



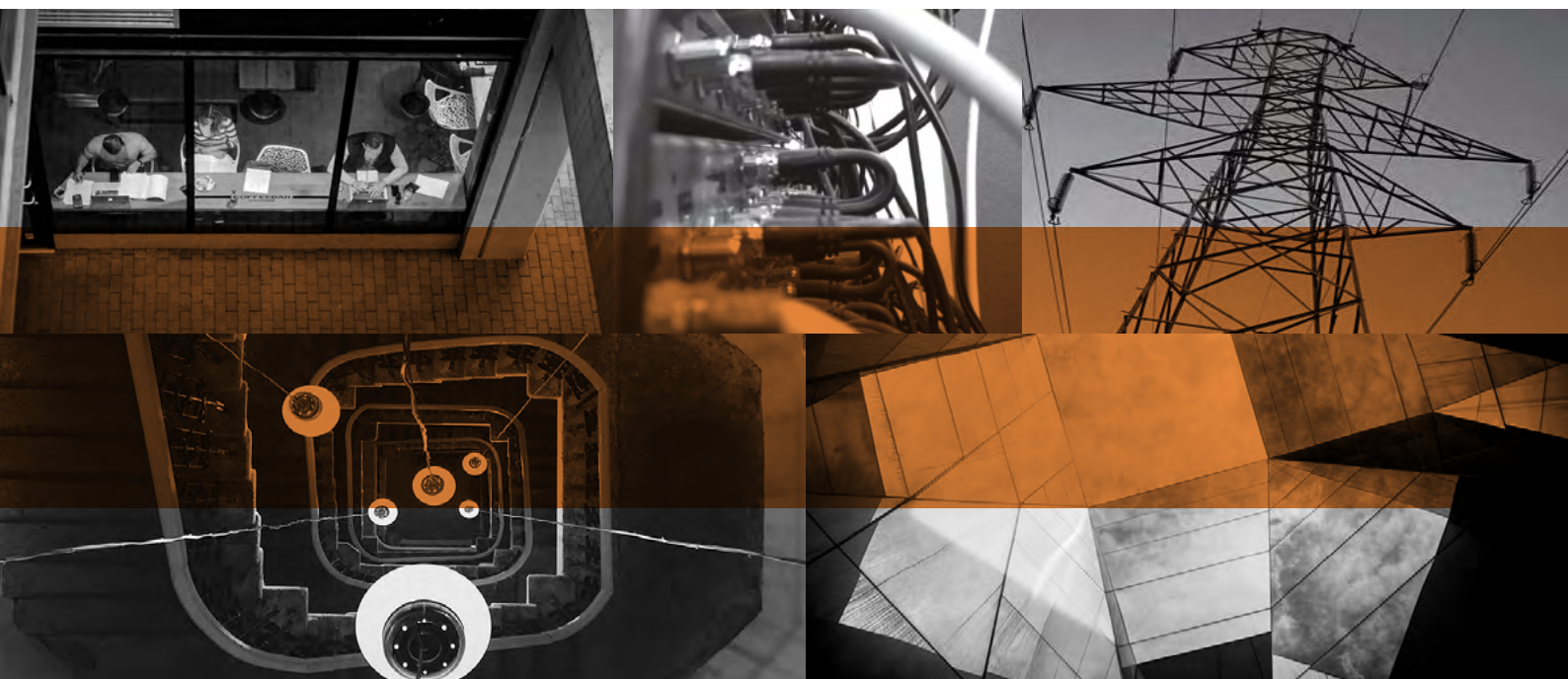
DEVICE MODEL	SP 3D-K11
Installation mode	Parallel / Three-phase
Rated voltage / Frequency / Topology	11 kVA 50-60 KHz / 3F + TT
Connection mode to the electrical supply	Platen
Network topology	TT, IT
Surge response	
Protection type	2
Maximum continuous operating voltage (U_c) L-L (L-E)	14,5 kV F-F (10,4 kV _{AC} F-T)
Operation threshold (U_n)	17,2 kV _{AC} F-F (12,3 kV _{AC} F-T)
Response time (t_A)	25 ns
I_{tmax} (820/20) L-L	140 kA
I_{tmax} (820/20) L-E	140 kA
I_{tmax} (820/20) Total	420 kA
Protection steps	1
Installation data	
Recommended minimum section of connecting cables	Cu 35mm ²
Recommended protection	50 A
Enclosure material	Foamed-in polyurethane gasket
Installation method	Anchoring on insulators
Operating temperature	[-10 °C ... +85 °C]
IP protection degree	IP 66
Location category	Indoor. High-voltage cell
Weight (Kg)	-
Dimensions (mm) (Height×Width×Depth)	815×600×140
Accesorios	
Lightning discharge counter	Optional

06

SPD_

Modular transient overvoltage protective devices in Low-Voltage power supply networks.

- 6_1. Technical description
- 6_2. Classification: Type 1, Type 2, Type 3
- 6_3. Cartridges replacement
- 6_4. Modules replacement
- 6_5. Remote signalling
- 6_6. Installation of permanent and transient overvoltages protective devices
- 6_7. Installation mode
- 6_8. Type 1 surge protective devices data sheet
- 6_9. Type 1+2 surge protective devices data sheet
- 6_10. Type 2 surge protective devices data sheet
- 6_11. Type 2+3 surge protective devices data sheet
- 6_12. Surge protective devices data sheet for photovoltaic installations
- 6_13. LED protective devices data sheet



MODULAR PROTECTIVE DEVICES SPD

SURGE PROTECTIVE DEVICES IN LOW VOLTAGE SUPPLY NETWORKS

Taking advantage from the acquired experience during the design and manufacture of the SPU and SPE series electrical protective devices we have developed the modular protective devices range. This product line is characterized by its robustness, compactness, simply assembly and high performances.

The main protective devices series we develop are:

Transient overvoltage protective devices in Low-Voltage installations:

- Type 1 surge protective devices
- Type 1+2 surge protective devices
- Type 1 surge protective devices
- Type 2+3 surge protective devices

Photovoltaic surge protective devices:

Surge protective devices specially designed for the protection of electrical generators and communication buses in photovoltaic installations.

LED surge protective devices:

Surge protective devices specially designed to protect LED installations.



AD1-400/240



BD4-100/240



BD4-60/240



CV2-10/240

CLASSIFICATION

TYPE 1 SURGE PROTECTIVE DEVICES

10/350 μ s voltage test waveform.

Type 1 surge protective devices are recommended for installations where there is a high probability of atmospheric discharges.

TYPE 1+2 SURGE PROTECTIVE DEVICES

8/20 μ s voltage test waveform. 10/350 μ s voltage test waveform.

Type 1+2 surge protective devices are installed in the head-end system of the installation to be protected. These protective devices gather both Type1 and Type 2 features.

TYPE 2 SURGE PROTECTIVE DEVICES

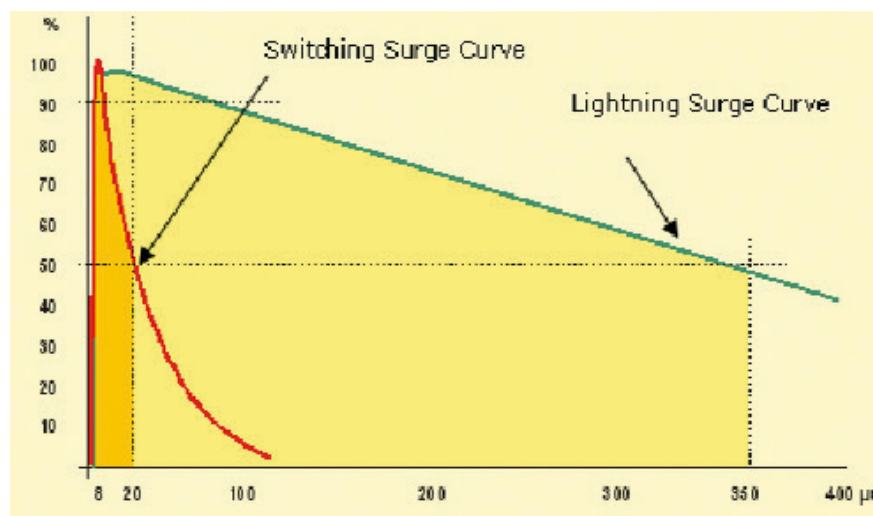
8/20 μ s voltage test waveform

Type 1+2 surge protective devices are installed in the head-end system of the installation and in secondary electrical power panels. Electronic and electric devices are protected against industrial, atmospheric and manoeuvre surges. I_{max} indicates the maximum amount of energy they are able to dissipate. The greater I_{max} , the greater degree of protection.

TYPE 3 SURGE PROTECTIVE DEVICES

8/20 μ s voltage test waveform. 1,2/50 μ s voltage test waveform.

Type 3 surge protective devices are always installed in coordination with Type 2 surge protective devices. Type 3 and Type 2 protective devices should be coordinated with each other and they are installed in the final receivers power supply.



CARTRIDGES REPLACEMENT IN PLUG-IN DEVICES

Damaged cartridges in plug-in devices must be replaced when its flag indicator turns to red. This process avoids replacing the whole surge protective device. The cartridge code is shown on the front of itself.

CARTRIDGES REPLACEMENT IN MODULAR DEVICES

When the flag of any pole in a modular surge protective device turns to red, it is required to replace uniquely the damaged pole

REMOTE ALARM TERMINAL

Signal terminals from external devices will be connected to C- closed, and NO- normally open, or to C- close, and NC, Normally Close.

All our standard protective devices destined to protect electrical installations are characterized by:

- An easy supervision thanks to the disconnection device.
- A fault indication by red flag. (See attached detail).
- A high response speed.
- An optional remote alarm terminal. (See attached detail).



Fail indicator, cartridge replacement and remote alarm.

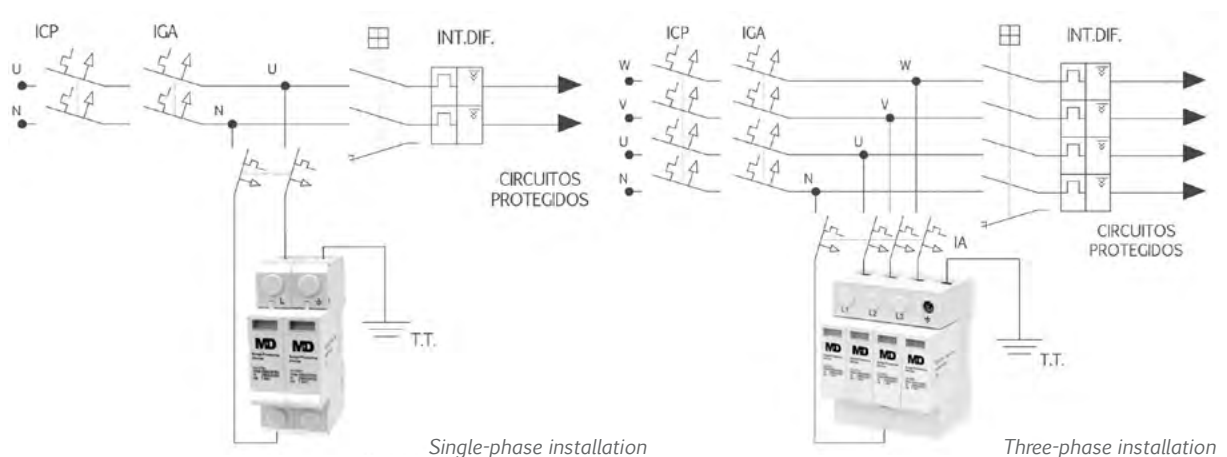
INSTALLATION MODES OF TRANSIENT AND PERMANENT OVERVOLTAGES PROTECTIVE DEVICES

In order to protect an installation against permanent overvoltages, surge protective devices must be installed just behind the head-end system or magnetothermal circuit breaker with a rated current equal to the IGA. In case of permanent overvoltage, the permanent overvoltage protective device will be disconnected automatically. The actuation threshold of the protective device is set at 275 V to allow the margin of the electric substation (EN 50160), as well as small voltage oscillations, do not affect the facilities.

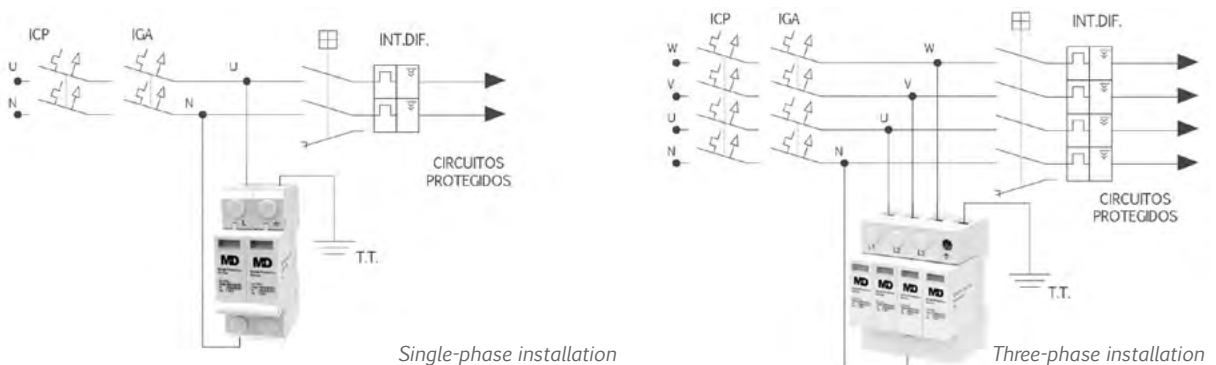
Therefore, these protective devices combine Type 2 transient overvoltages protection and protect against permanent overvoltages at the same time, for instance like the neutral terminal interruption.

These protective devices are pluggable. In case of failure, it is not necessary to replace the entire protective device but the damaged pole. Replaceable cartridges are marked with an identifier code on the front side. To protect installations with IGA greater than 100A please consult with our technicians.

Transient overvoltage protective devices installation mode



Transient and permanent overvoltage protective devices installation mode

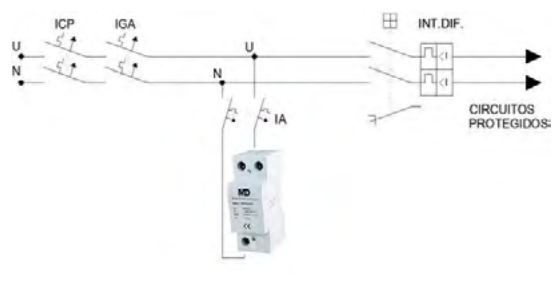


SURGE PROTECTIVE MODULES IN LOW-VOLTAGE POWER SUPPLY NETWORKS.

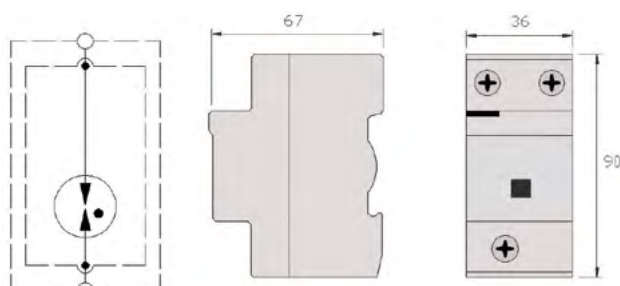
Type 1 surge protective devices are recommended for installations where there is a high probability of lightning strike.

Type 1 and Type 2 protective devices should be coordinated with each other to ensure receivers protection.

- Protection Class I in accordance with EN 61643-11.
- Protection Type I in accordance with EC 61643-1.



Circuit diagram



Electrical diagram and dimensions of AA1-25

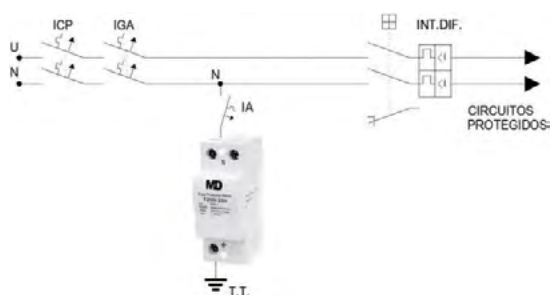
DEVICE MODEL	AA1-25/240
Connection mode	Parallel / Monopolar
Rated voltage / Frequency	240 V _{ac} / 50-60 Hz
Earthing System	TT, IT y TN
Thermal disconnection	Internal; green-normal, red-failed
Remote alarm contact	Optional: Cod. AA1-25/240-S
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Class I / Type 1
Maximum continuous operating voltage (U _c) AC	255 V _{ac}
Rated discharge current (8/20) I _n	25 kA
Maximum discharge current (8/20) I _{max}	100 kA
Lightning impulse current (10/350) I _{imp}	25 kA
Protection level U _p	1,5 kV
DC sparkover voltage	600 V
Interruption capacity of continuity current	25 kA@255V _{ac}
Response time R _t	≤100 ns
Installation data	
Recommended minimum section of connecting cables	25mm ²
Recommended protection	D Curve MCB or fuse (I _n ≤100A)
Enclosure material	Thermoplastic; UL94 V-0, Flammability Standard
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	0,26
Dimensions (mm) (Height×Wide×Depth)	2 DIN modules (90×36×67)

SURGE PROTECTIVE MODULES IN LOW-VOLTAGE POWER SUPPLY NETWORKS.

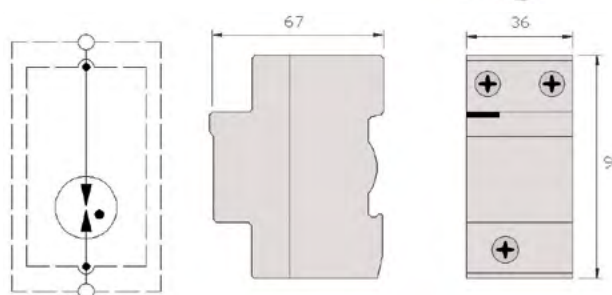
Type 1 surge protective devices are recommended for installations where there is a high probability of lightning strike.

Type 1 and Type 2 protective devices should be coordinated with each other to ensure receivers protection.

- Protection Class I in accordance with EN 61643-11.
- Protection Type I in accordance with IEC 61643-1.



Circuit diagram



AA1-100 electrical diagram and dimensions

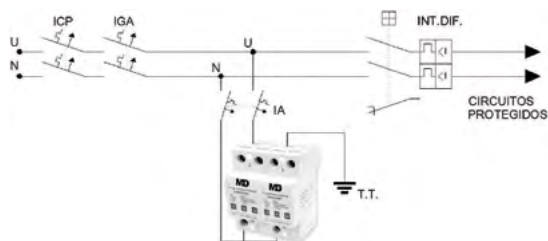
DEVICE MODEL	AA1-100/240
Connection mode	Parallel / Monopolar
Rated voltage / Frequency	240 V _{ac} / 50-60 Hz
Earthing System	TT, IT y TN
Thermal disconnection	-
Remote alarm contact	-
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Class I / Type 1
Maximum continuous operating voltage (U _c) AC	255 V _{ac}
Rated discharge current (8/20) I _n	100 kA
Maximum discharge current (8/20) I _{max}	200 kA
Lightning impulse current (10/350) I _{imp}	100 kA
Protection level U _p	1,5 kV
DC sparkover voltage	600 V
Interruption capacity of continuity current	100 A@255V _{ac}
Response time R _t	≤100 ns
Installation data	
Recommended minimum section of connecting cables	25mm ²
Recommended protection	D Curve MCB or fuse (I _n ≤100A)
Enclosure material	Thermoplastic; Flammability Standard UL94 V-0
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	0,25
Dimensions (mm) (Height×Wide×Depth)	2 DIN modules (90×36×67)

SURGE PROTECTIVE MODULES IN LOW-VOLTAGE POWER SUPPLY NETWORKS.

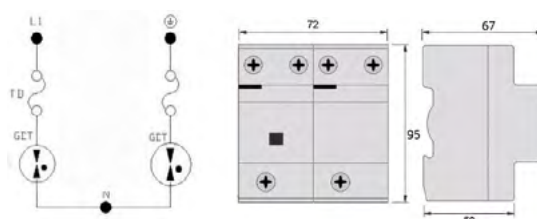
Type 1 surge protective devices are recommended for installations where there is a high probability of lightning strike.

Type 1 and Type 2 protective devices should be coordinated with each other to ensure receivers protection.

- Protection Class I in accordance with EN 61643-11.
- Protection Type I in accordance with IEC 61643-1.



Circuit diagram



AA2-H100 electrical diagram and dimensions

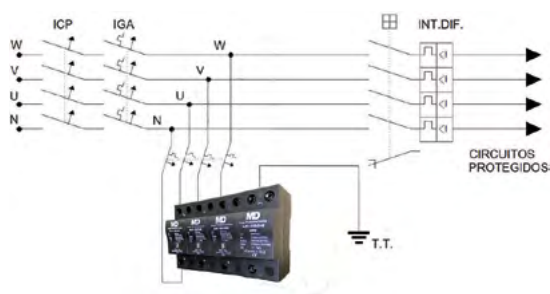
DEVICE MODEL	AA2-H100
Connection mode	Parallel / Single-Phase L+N+TE
Rated voltage / Frequency	240 V _{ac} / 50-60 Hz
Earthing System	TT, IT y TN-S
Thermal disconnection [L-N]	Internal; green-normal, red-failed
Remote alarm contact [L-N]	Optional: Cod. w-H100/240-S
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Class I / Type 1
Maximum continuous operating voltage (U _c) [L-N/N-PE] AC	255 V _{ac} / 255 V _{ac}
Rated discharge current (8/20) I _n [L-N/N-PE]	25 kA / 100 kA
Maximum discharge current (8/20) I _{max} [L-N/N-PE]	100 kA / 200 kA
Lightning impulse current (10/350) I _{imp} [L-N/N-PE]	25 kA / 100 kA
Protection level U _p [L-N/N-PE]	1.5 kV / 1.5 kV
DC sparkover voltage	600 V
Interruption capacity of continuity current [L-N/N-PE]	25 kA@255V _{ac} / 100 A@255V _{ac}
Response time R _t	≤100 ns
Installation data	
Recommended minimum section of connecting cables	25mm ²
Recommended protection	D Curve MCB or fuse (I _n ≤100A)
Enclosure material	Thermoplastic; Flammability Standard UL94 V-0
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	0,51
Dimensions (mm) (Height×Wide×Depth)	4 DIN modules (95×72×67)

SURGE PROTECTIVE MODULES IN LOW-VOLTAGE POWER SUPPLY NETWORKS.

Type 1 surge protective devices are recommended for installations where there is a high probability of lightning strike.

Type 1 and Type 2 protective devices should be coordinated with each other to ensure receivers protection.

- Protection Class I in accordance with EN 61643-11.
- Protection Type I in accordance with IEC 61643-1.



Circuit diagram



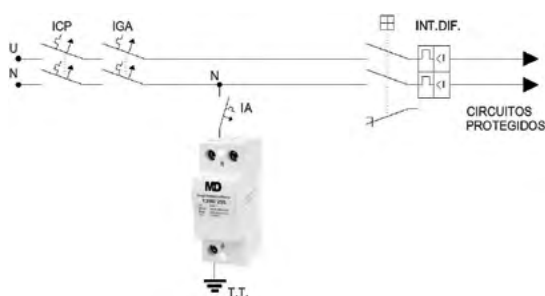
AA4-H100 electrical diagram and dimensions

DEVICE MODEL	AA4-H100/240
Connection mode	Parallel / Three Phase 3L+N+TE
Rated voltage / Frequency	240 V _{LN} - 240 V _{LL} / 50-60 Hz
Earthing System	TT, IT y TN-S
Thermal disconnection [L-N]	Internal; green-normal, red-failed
Remote alarm contact [L-N]	Optional; Cod. AA4-H100/240-S
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Class I / Type 1
Maximum continuous operating voltage (U _c) AC [L-N/N-PE]	255 V _{ac} / 255 V _{ac}
Rated discharge current (8/20) I _n [L-N/N-PE]	25 kA / 100 kA
Maximum discharge current (8/20) I _{max} [L-N/N-PE]	100 kA / 200 kA
Lightning impulse current (10/350) I _{imp} [L-N/N-PE]	25 kA / 100 kA
Protection level U _p [L-N/N-PE]	1.5 kV / 1.5 kV
DC sparkover voltage	600 V
Interruption capacity of continuity current [L-N/N-PE]	25 kA@255V _{ac} / 100 A@255V _{ac}
Response time R _t	≤100 ns
Installation data	
Recommended minimum section of connecting cables	25mm ²
Recommended protection	D Curve MCB or fuse (I _n ≤100A)
Enclosure material	Thermoplastic, Flammability Standard UL94 V-0
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	0,98
Dimensions (mm) (Height×Wide×Depth)	8 DIN modules (95×144×67)

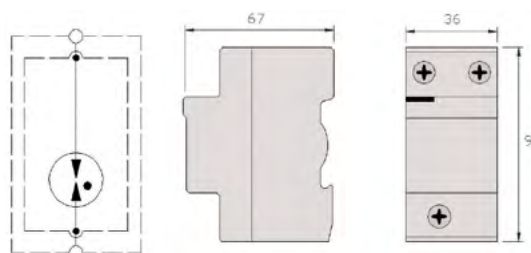
SURGE PROTECTIVE MODULES IN LOW-VOLTAGE POWER SUPPLY NETWORKS.

Type 1 single-phase surge protective devices are recommended for installations where there is a high probability of lightning strike.
Type 1 protective devices should be coordinated with Type 2 protectors to ensure receivers protection.

- Protection Class I in accordance with EN 61643-11.
- Protection Type I in accordance with IEC 61643-1.



Circuit diagram



AD1-200/240 electrical diagram and dimensions of

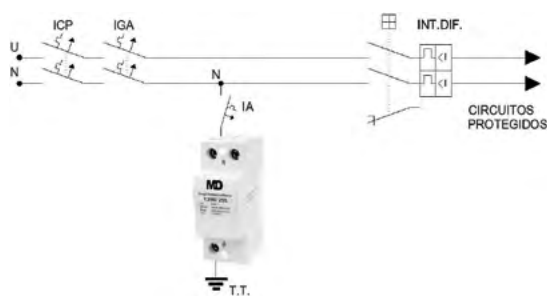
DEVICE MODEL	AD1-200/240
Connection mode	Parallel / Monopolar
Rated voltage / Frequency	240 V _{AC} / 50-60 Hz
Earthing System	TT, IT y TN
Thermal disconnection	-
Remote alarm contact	-
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Class I / Type 1
Maximum continuous operating voltage (U _c) AC	255 V _{ac}
Rated discharge current (8/20) I _n	50 kA
Maximum discharge current (8/20) I _{max}	200 kA
Lightning impulse current (10/350) I _{imp}	50 kA
Protection level U _p	1,5 kV
DC sparkover voltage	600 V
Response time R _t	100 ns
Installation data	
Recommended minimum section of connecting cables	
Recommended protection	MCB Curva D or fuse (I _n ≤ 100A)
Enclosure material	Thermoplastic
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	0,25
Dimensions (mm) (Height×Wide×Depth)	2 DIN modules (90×36×67)

SURGE PROTECTIVE MODULES IN LOW-VOLTAGE POWER SUPPLY NETWORKS.

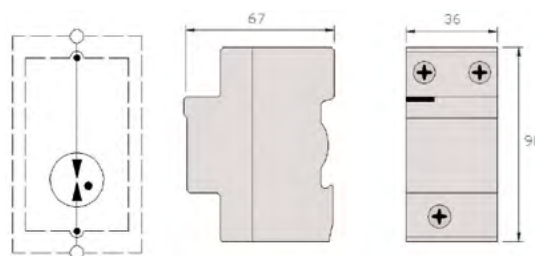
Type 1 surge protective devices are recommended for installations where there is a high probability of lightning strike.

Type 1 and Type 2 protective devices should be coordinated with each other to ensure receivers protection.

- Protection Class I in accordance with EN 61643-11.
- Protection Type I in accordance with IEC 61643-1.



LD2S-15/320 inner connection diagrams



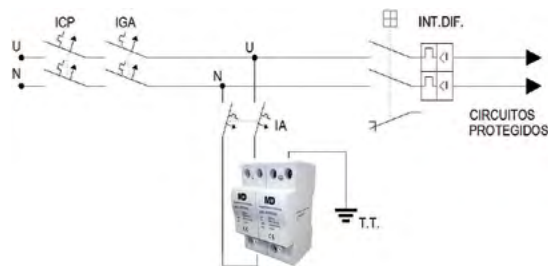
AD1-400 electrical diagram and dimension

DEVICE MODEL	AD1-400/240
Connection mode	Series
Rated voltage / Frequency	240 V _{AC} / 50-60 Hz
Nominal current I _n	
Earthing System	TT, IT y TN
Thermal disconnection	-
Remote alarm contact	-
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Class I / Type 1
Maximum continuous operating voltage (U _c) AC	255 V _{ac}
Rated discharge current (8/20) I _n	100 kA
Maximum discharge current (8/20) I _{max}	400 kA
Lightning impulse current (10/350) I _{imp}	100 kA
Protection level U _p	1,5 kV
DC sparkover voltage	600 V
Response time R _t	100 ns
Installation data	
Recommended minimum section of connecting cables	
Recommended protection	D Curve MCB or fuse (I _n ≤ 100A)
Enclosure material	Thermoplastic
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	0,26
Dimensions (mm) (Height×Wide×Depth)	2 DIN modules (90×36×67)

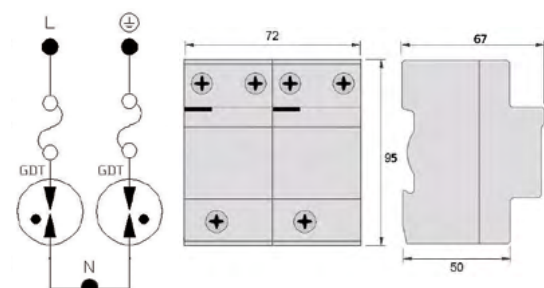
SURGE PROTECTIVE MODULES IN LOW-VOLTAGE POWER SUPPLY NETWORKS.

Type 1 single-phase surge protective devices are recommended for installations where there is a high probability of lightning strike. Type 1 protective devices should be coordinated with Type 2 protectors to ensure receivers protection.

- Protection Class I in accordance with EN 61643-11.
- Protection Type I in accordance with IEC 61643-1.



Circuit diagram



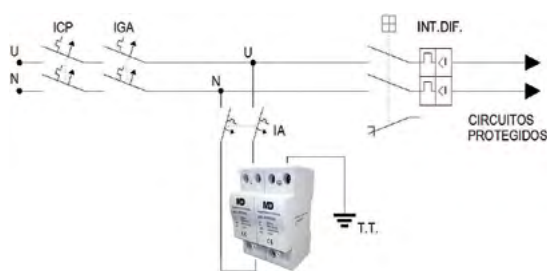
AD2-200 Electrical diagram and dimensions

DEVICE MODEL	AD2-200/240
Connection mode	Parallel / Single-Phase L+N+ET
Rated voltage / Frequency	240 V _{AC} / 50-60 Hz
Earthing System	TT, IT y TN-S
Thermal disconnection	-
Remote alarm contact	-
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Class I / Type 1
Maximum continuous operating voltage (U _c) AC	255 V _{ac}
Rated discharge current (8/20) I _n	50 kA
Maximum discharge current (8/20) I _{max}	200 kA
Lightning impulse current (10/350) I _{imp}	50 kA
Protection level U _p	1,5 kV
DC sparkover voltage	600 V
Response time R _f	100 ns
Installation data	
Recommended minimum section of connecting cables	Cu 25 mm ²
Recommended protection	D Curve MCB or fuse (I _n ≤ 100A)
Enclosure material	Thermoplastic
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	0,51
Dimensions (mm) (Height×Wide×Depth)	4 DIN modules (95×72×67)

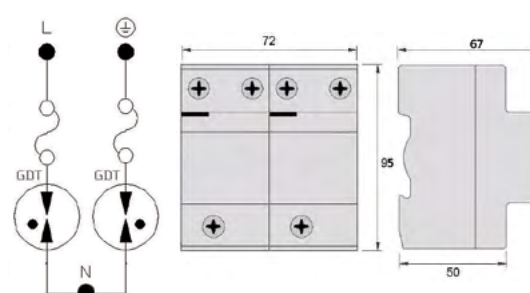
SURGE PROTECTIVE MODULES IN LOW-VOLTAGE POWER SUPPLY NETWORKS.

Type 1 single-phase surge protective devices are recommended for installations where there is a high probability of lightning strike. Type 1 protective devices should be coordinated with Type 2 protectors to ensure receivers protection.

- Protection Class I in accordance with EN 61643-11.
- Protection Type I in accordance with IEC 61643-1.



Circuit diagram



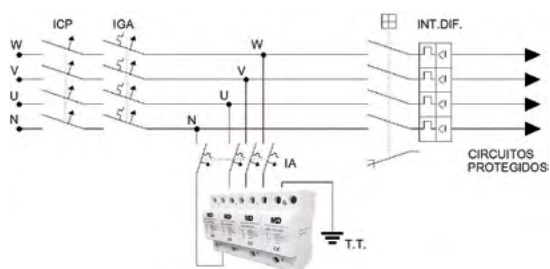
AD2-400 electrical diagram and dimensions

DEVICE MODEL	AD2-H400/240
Connection mode	Parallel / Single-Phase L+N+ET
Rated voltage / Frequency	240 V _{AC} / 50-60 Hz
Earthing System	TT, IT y TN-S
Thermal disconnection	-
Remote alarm contact	-
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Class I / Type 1
Maximum continuous operating voltage (U _c) AC [L-N/N-PE]	255 V _{AC} / 255 V _{AC}
Rated discharge current (8/20) I _n [L-N/N-PE]	50 kA / 100 kA
Maximum discharge current (8/20) I _{max} [L-N/N-PE]	200 kA / 400 kA
Lightning impulse current (10/350) I _{imp} [L-N/N-PE]	50 kA / 100 kA
Protection level U _p [L-N/N-PE]	1,5 kV / 1,5 kV
DC sparkover voltage	600 V
Response time R _i	100 ns
Installation data	
Recommended minimum section of connecting cables	Cu 25 mm ²
Recommended protection	D Curve MCB or fuse (I _n ≤ 100A)
Enclosure material	Thermoplastic
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	0,51
Dimensions (mm) (Height×Wide×Depth)	4 DIN modules (95×72×67)

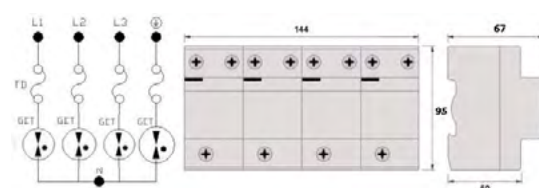
SURGE PROTECTIVE MODULES IN LOW-VOLTAGE POWER SUPPLY NETWORKS.

Type 1 three-phase surge protective devices are recommended for installations where there is a high probability of lightning strike. Type 1 protective devices should be coordinated with Type 2 protectors to ensure receivers protection.

- Protection Class I in accordance with EN 61643-11.
- Protection Type I in accordance with EC 61643-1.



Circuit diagram



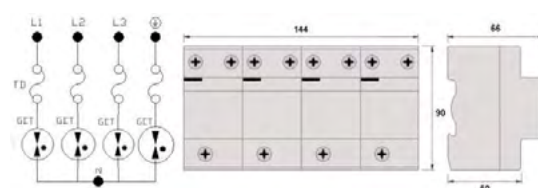
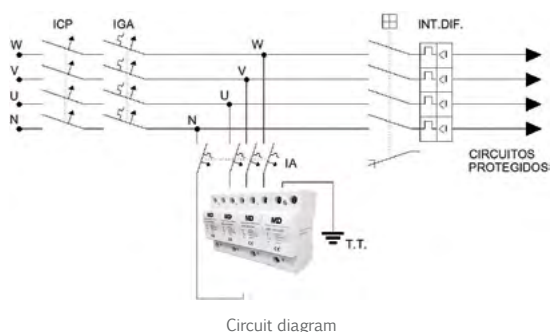
AD4-200 electrical diagram and dimensions

DEVICE MODEL	AD4-200/240
Connection mode	Parallel / Three-phase 3L+N+ET
Rated voltage / Frequency	240 V _{AC} / 50-60 Hz
Earthing System	TT, IT y TN-S
Thermal disconnection	-
Remote alarm contact	-
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Class I / Type 1
Maximum continuous operating voltage (U _c) AC [L-N/N-PE]	255 V _{AC} / 255 V _{AC}
Rated discharge current (8/20) I _n	50 kA
Maximum discharge current (8/20) I _{max}	200 kA
Lightning impulse current (10/350) I _{imp}	50 kA
DC sparkover voltage	600 kA
Protection level U _p [L-N/N-PE]	1,5 kV / 1,5 kV
Response time R _i	100 ns
Installation data	
Recommended minimum section of connecting cables	Cu 25 mm ²
Recommended protection	D Curve MCB or fuse (I _n ≤ 100A)
Enclosure material	Thermoplastic
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	1
Dimensions (mm) (Height×Wide×Depth)	8 DIN modules (95×144×67)

SURGE PROTECTIVE MODULES IN LOW-VOLTAGE POWER SUPPLY NETWORKS.

Type 1 single-phase surge protective devices are recommended for installations where there is a high probability of lightning strike. Type 1 protective devices should be coordinated with Type 2 protectors to ensure receivers protection.

- Protection Class I in accordance with EN 61643-11.
- Protection Type I in accordance with IEC 61643-1.



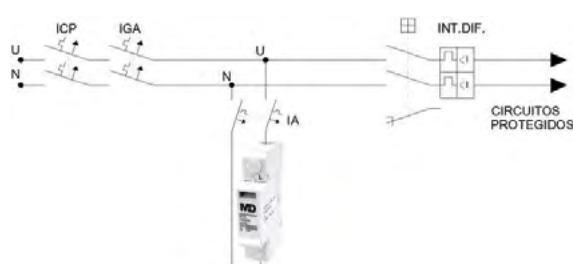
DEVICE MODEL	AD4-H400/240
Connection mode	Parallel / Three-phase 3L+N+ET
Rated voltage / Frequency	240 V _{FN} - 400 V _{FE} / 50-60 Hz
Earthing System	TT, IT y TN-S
Thermal disconnection	-
Remote alarm contact	-
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Class I / Type 1
Maximum continuous operating voltage (U _c) AC [L-N/N-PE]	255 V _{AC} / 255 V _{AC}
Rated discharge current (8/20) I _n [L-N/N-PE]	50 kA / 100 kA
Maximum discharge current (8/20) I _{max} [L-N/N-PE]	200 kA / 400 kA
Lightning impulse current (10/350) I _{imp} [L-N/N-PE]	50 kA / 100 kA
Protection level U _p [L-N/N-PE]	1,5 kV / 1,5 kV
DC sparkover voltage	600 V
Response time R _i	100 ns
Installation data	
Recommended minimum section of connecting cables	Cu 25 mm ²
Recommended protection	D Curve MCB or fuse (I _n ≤ 100A)
Enclosure material	Thermoplastic
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	1,28
Dimensions (mm) (Height×Wide×Depth)	6 DIN modules (95×144×67)

SURGE PROTECTIVE MODULES IN LOW-VOLTAGE POWER SUPPLY NETWORKS.

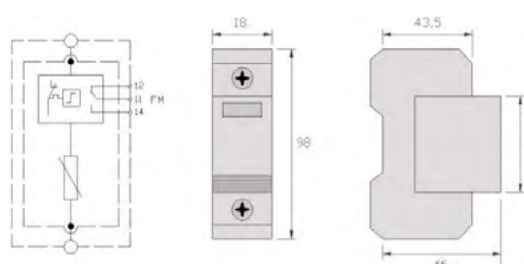
Type 1+2 surge protective devices are installed in the head-end system of the installation.

They are recommended to protect electric and electronic devices against surges of atmospheric and manoeuvres origin.

- Protection Class II in accordance with EN 61643-11.
- Protection Type 2 in accordance with IEC 61643-1.
- Easy supervision due to the disconnection device.
- Two-part design consisting of a base and a plug-in protective module.
- Fault indication by red indication flag window.
- Rapid response.
- Optional remote alarm terminal.



Circuit diagram



BV1-60 electrical diagram and dimensions

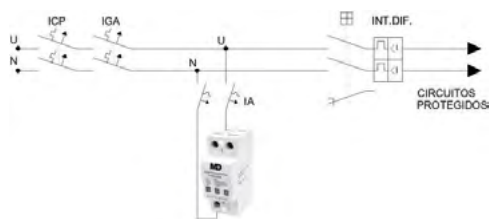
DEVICE MODEL	BV1-60/240
Connection mode	Parallel / Monopolar
Rated voltage / Frequency	240 V _{AC} / 50-60 Hz
Earthing System	TT, IT y TN-S
Thermal disconnection	Internal; green-normal, red-failed
Remote alarm contact	Optional; Cod BV1-60 / 240-S
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Class I+II / Type 1+2
Maximum continuous operating voltage (U _c) AC [L-N/N-PE]	250 V _{AC}
Rated discharge current (8/20) I _n [L-N/N-PE]	30 kA
Maximum discharge current (8/20) I _{max} [L-N/N-PE]	60 kA
Lightning impulse current (10/350) I _{imp} [L-N/N-PE]	7 kA
Protection level U _p	1,3 kV
DC sparkover voltage	-
Response time R _t	100 ns
Installation data	
Recommended minimum section of connecting cables	Cu 25 mm ²
Recommended protection	D Curve MCB or fuse (I _n ≤ 100A)
Enclosure material	Thermoplastic
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	0,15
Dimensions (mm) (Height×Wide×Depth)	1 módulo DIN (98×18×66)

SURGE PROTECTIVE MODULES IN LOW-VOLTAGE POWER SUPPLY NETWORKS.

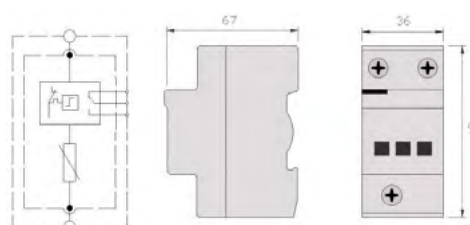
Type 1+2 surge protective devices are installed in the head-end system of the installation.

They are recommended to protect electric and electronic devices against surges of atmospheric and manoeuvres origin. by coordinating Type 1 and Type 2 features.

- Protection Class I+II in accordance with EN 61643-11.
- Protection Type 2 in accordance with IEC 61643-1.
- Easy supervision due to the disconnection device.
- Modular design.
- Fault indication by red flag window.
- Rapid response.
- Optional remote alarm terminal.



Circuit diagram



BV1-100 electrical diagram and dimensions

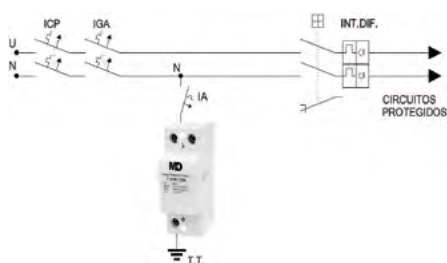
DEVICE MODEL	BV1-100/240
Connection mode	Parallel / Monopolar
Rated voltage / Frequency	240 V _{AC} / 50-60 Hz
Earthing System	TT, IT y TN
Thermal disconnection	Internal; green-normal, red-failed
Remote alarm contact	Optional; Cod BV1-100 / 240-S
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Class I+II / Type 1+2
Maximum continuous operating voltage (U _c) AC [L-N/N-PE]	250 V _{AC}
Rated discharge current (8/20) I _n	50 kA
Maximum discharge current (8/20) I _{max}	100 kA
Lightning impulse current (10/350) I _{imp}	12,5 kA
Protection level U _p	1,3 kV
DC sparkover voltage	-
Response time R _t	25 ns
Installation data	
Recommended minimum section of connecting cables	Cu 25 mm ²
Recommended protection	D Curve MCB or fuse (I _n ≤ 80A)
Enclosure material	Thermoplastic
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	0,22
Dimensions (mm) (Height×Wide×Depth)	2 DIN modules (98×36×67)

SURGE PROTECTIVE MODULES IN LOW-VOLTAGE POWER SUPPLY NETWORKS.

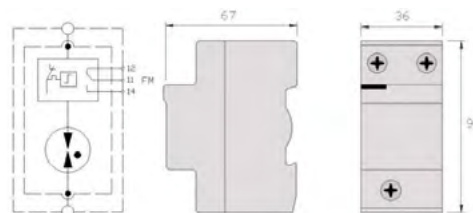
Type I+II surge protective devices are installed in the head-end system of the installation.

They are recommended to protect electric and electronic devices against surges of atmospheric and manoeuvres origin.

- Protection Class I+II in accordance with EN 61643-11.
- Protection Type 1+2 in accordance with IEC 61643-1
- Easy supervision due to the disconnection device.
- Fault indication by red flag window.
- Rapid response.
- Optional remote alarm terminal.



Circuit diagram



BD1-100 electrical diagram and dimensions

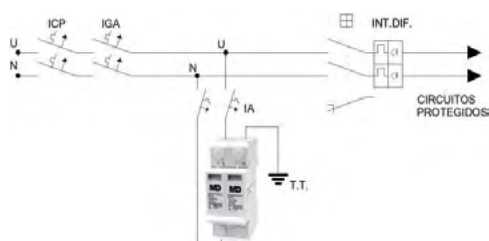
DEVICE MODEL	BD1-100/240
Connection mode	Parallel / Monopolar
Rated voltage / Frequency	240 V _{AC} / 50-60 Hz
Earthing System	TT, IT y TN
Thermal disconnection	-
Remote alarm contact	-
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Class I+II / Type 1+2
Maximum continuous operating voltage (U _c) AC [L-N/N-PE]	255 V _{AC}
Rated discharge current (8/20) I _n	50 kA
Maximum discharge current (8/20) I _{max}	100 kA
Lightning impulse current (10/350) I _{imp}	25 kA
Protection level U _p	1,5 kV
DC sparkover voltage	600 V
Response time R _t	100 ns
Installation data	
Recommended minimum section of connecting cables	Cu 25 mm ²
Recommended protection	D Curve MCB or fuse (I _n ≤ 80A)
Enclosure material	Thermoplastic
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	0,26
Dimensions (mm) (Height×Wide×Depth)	2 DIN modules (90×36×67)

SURGE PROTECTIVE MODULES IN LOW-VOLTAGE POWER SUPPLY NETWORKS.

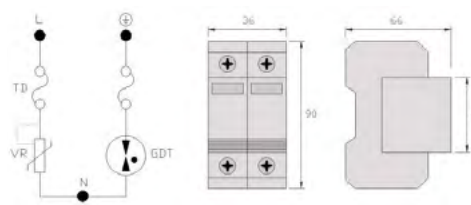
Type 1+2 surge protective devices are installed in the head-end system of the installation.

They are recommended to protect electric and electronic devices against surges of atmospheric and manoeuvres origin.

- Protection Class II in accordance with EN 61643-11.
- Protection Type 2 in accordance with IEC 61643-1.
- Easy supervision due to the disconnection device.
- Two-pole surge protective devices consisting of a base part and a plug-in protective module.
- Fault indication by red flag window.
- Rapid response.
- Optional remote alarm terminal.



Circuit diagram



BD2-60 electrical diagram and dimensions

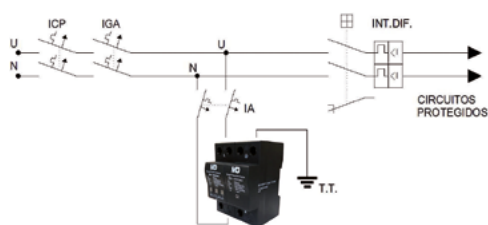
DEVICE MODEL	BD2-60/240
Connection mode	Parallel / Monopolar L+N+ET
Rated voltage / Frequency	240 V _{AC} / 50-60 Hz
Earthing System	TT, IT y TN-S
Thermal disconnection	Internal; green-normal, red-failed
Remote alarm contact	Optional; Cod BD2-60 / 240-S
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Class I+II / Type 1+2
Maximum continuous operating voltage (U _c) AC [L-N/N-PE]	250 V _{AC} / 255 V _{AC}
Rated discharge current (8/20) I _n [L-N/N-PE]	30 kA / 30 kA
Maximum discharge current (8/20) I _{max} [L-N/N-PE]	60 kA / 60 kA
Lightning impulse current (10/350) I _{imp} [L-N/N-PE]	- / 7 kA
Protection level U _p [L-N/N-PE]	1,3 kV / 1,5 kV
DC sparkover voltage [N-PE]	600 V
Response time R _i [L-N/N-PE]	25 ns / 100 ns
Installation data	
Recommended minimum section of connecting cables	Cu 25 mm ²
Recommended protection	D Curve MCB or fuse (I _n ≤ 80A)
Enclosure material	Thermoplastic
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	0,25
Dimensions (mm) (Height×Wide×Depth)	2 DIN modules (98×36×66)

SURGE PROTECTIVE MODULES IN LOW-VOLTAGE POWER SUPPLY NETWORKS.

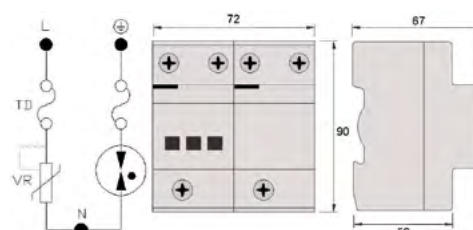
Type I+II surge protective devices are installed in the head-end system of the installation.

They are recommended to protect electric and electronic devices against surges of atmospheric and manœuvres origin.

- Protection Class I+II in accordance with EN 61643-11.
- Protection Type 1+2 in accordance with IEC 61643-1.
- Easy supervision due to the disconnection device.
- Modular design.
- Fault indication by red flag window.
- Rapid response.
- Optional remote alarm terminal.



Circuit diagram



BD2-100 electrical diagram and dimensions

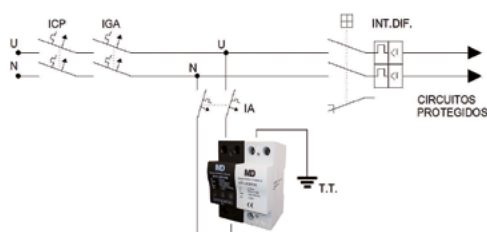
DEVICE MODEL	BD2-100/240
Connection mode	Parallel / Monopolar L+N+ET
Rated voltage / Frequency	240 V _{AC} / 50-60 Hz
Earthing System	TT, IT y TN-S
Thermal disconnection[L-N]	Internal; green-normal, red-failed
Remote alarm contact [L-N]	Optional; Cod BD2-100 / 240-S
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Class I+II / Type 1+2
Maximum continuous operating voltage (Uc) AC [L-N/N-PE]	250 V _{AC} / 255 V _{AC}
Rated discharge current (8/20) I _n [L-N/N-PE]	50 kA / 50 kA
Maximum discharge current (8/20) I _{max} [L-N/N-PE]	100 kA / 100 kA
Lightning impulse current (10/350) I _{imp} [L-N/N-PE]	12,5 kA / 25 kA
Protection level U _p [L-N/N-PE]	1,3 kV / 1,5 kV
DC sparkover voltage DC [N-PE]	600 V
Response time R _i [L-N/N-PE]	25 ns / 100 ns
Installation data	
Recommended minimum section of connecting cables	Cu 25 mm ²
Recommended protection	D Curve MCB or fuse (I _n ≤ 80A)
Enclosure material	Thermoplastic
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	0,39
Dimensions (mm) (Height×Wide×Depth)	4 DIN modules (98×72×67)

SURGE PROTECTIVE MODULES IN LOW-VOLTAGE POWER SUPPLY NETWORKS.

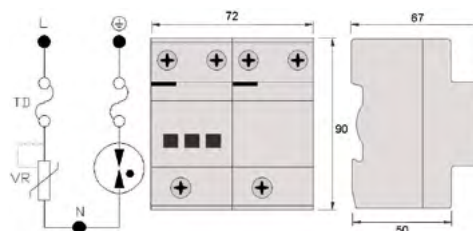
Type 1+2 surge protective devices are installed in the head-end system of the installation.

They are recommended to protect electric and electronic devices against surges of atmospheric and manoeuvres origin.

- Protection Class II in accordance with EN 61643-11.
- Protection Type 2 in accordance with IEC 61643-1.
- Easy supervision due to the disconnection device.
- Two-pole surge protective devices consisting of a base part and a plug-in protective module.
- Fault indication by red flag window.
- Rapid response.
- Optional remote alarm terminal.



Circuit diagram



BD2-40 electrical diagram and dimension

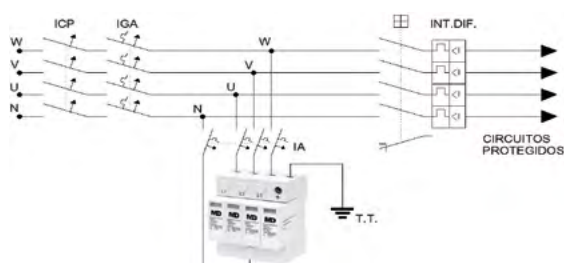
DEVICE MODEL	BD2-H200/240
Connection mode	Parallel / Monopolar L+N+ET
Rated voltage / Frequency	240 V _{AC} / 50-60 Hz
Earthing System	TT, IT y TN-S
Thermal disconnection[L-N]	Internal; green-normal, red-failed
Remote alarm contact [L-N]	Optional; Cod BD2-H200 / 240-S
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Class I+II / Type 1+2
Maximum continuous operating voltage (U _c) AC [L-N/N-PE]	250 V _{AC} / 255 V _{AC}
Rated discharge current (8/20) I _n [L-N/N-PE]	50 kA / 50 kA
Maximum discharge current (8/20) I _{max} [L-N/N-PE]	100 kA / 200 kA
Lightning impulse current (10/350) I _{imp} [L-N/N-PE]	12,5 kA / 50 kA
Protection level U _p [L-N/N-PE]	1,3 kV / 1,5 kV
DC sparkover voltage DC [N-PE]	600 V
Response time R _i [L-N/N-PE]	25 ns / 100 ns
Installation data	
Recommended minimum section of connecting cables	Cu 25 mm ²
Recommended protection	D Curve MCB or fuse (I _n ≤ 80A)
Enclosure material	Thermoplastic
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	0,64
Dimensions (mm) (Height×Width×Depth)	4 DIN modules (98×72×67)

SURGE PROTECTIVE MODULES IN LOW-VOLTAGE POWER SUPPLY NETWORKS.

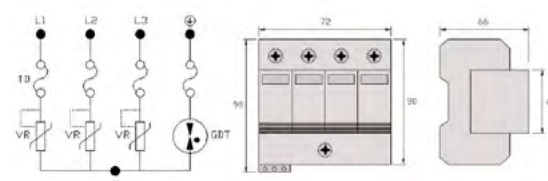
Type 1+2 surge protective devices are installed in the head-end system of the installation.

They are recommended to protect electric and electronic devices against surges of atmospheric and manoeuvres origin.

- Protection Class II in accordance with EN 61643-11.
- Protection Type 2 in accordance with IEC 61643-1.
- Easy supervision due to the disconnection device.
- Two-pole surge protective devices consisting of a base part and a plug-in protective module.
- Fault indication by red flag window.
- Rapid response.
- Optional remote alarm terminal.



Circuit diagram



BD4-60 electrical diagram and dimensions

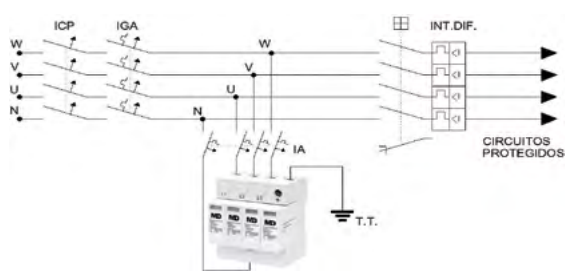
DEVICE MODEL	BD4-60/240
Connection mode	Parallel / Three-phase 3L+N+ET
Rated voltage / Frequency	240 V _{L-N} - 400 V _{L-L} / 50-60 Hz
Earthing System	TT, IT y TN-S
Thermal disconnection	Internal; green-normal, red-failed
Remote alarm contact	Optional; Cod BD4-60/240-S
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Class I+II / Type 1+2
Maximum continuous operating voltage (U _c) AC [L-N/N-PE]	255 V _{AC} / 255 V _{AC}
Rated discharge current (8/20) I _n [L-N/N-PE]	30 kA / 30 kA
Maximum discharge current (8/20) I _{max} [L-N/N-PE]	60 kA / 60 kA
Lightning impulse current (10/350) I _{imp} [L-N/N-PE]	- / 7 kA
Protection level U _p [L-N/N-T]	1,3 kV / 1,5 kV
DC sparkover voltage [N-PE]	600 V
Response time R _i [L-N/N-PE]	25 ns / 100 ns
Installation data	
Recommended minimum section of connecting cables	Cu 25 mm ²
Recommended protection	D Curve MCB or fuse (I _n ≤ 80A)
Enclosure material	Thermoplastic
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	0,44
Dimensions (mm) (Height×Width×Depth)	4 DIN modules (98×72×66)

SURGE PROTECTIVE MODULES IN LOW-VOLTAGE POWER SUPPLY NETWORKS.

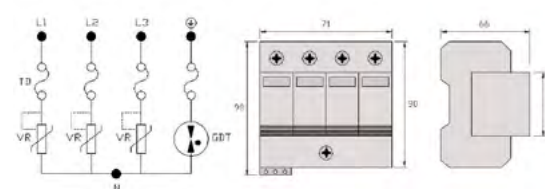
Type 1+2 three-phase surge protective devices are installed in the head-end system of the installation.

They are recommended to protect electric and electronic devices against surges of atmospheric and manoeuvres origin by coordinating Type 1 and Type 2 features.

- Protection Class I+II in accordance with EN 61643-11.
- Protection Type 2 in accordance with IEC 61643-1.
- Easy supervision due to the disconnection device.
- Modular design.
- Fault indication by red flag window.
- Rapid response.
- Optional remote alarm terminal.



Circuit diagram



BD4M-50/240 electrical diagram and dimensions

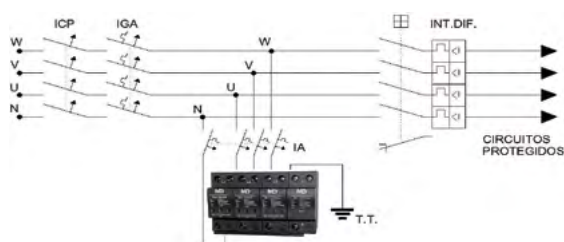
DEVICE MODEL	BD4M-50/240
Connection mode	Parallel / Three-Phase 3L+N+ET
Rated voltage / Frequency	240 V _L - 400 V _{L-L} / 50-60 Hz
Earthing System	TT, IT y TN-S
Thermal disconnection	Internal; green-normal, red-failed
Remote alarm contact	Optional; Cod BD4M-50/240-S
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Class I+II / Type 1+2
Maximum continuous operating voltage (U _c) AC [L-N/N-TE]	255 V _{AC} / 255 V _{AC}
Rated discharge current (8/20) I _n [L-N/N-TE]	20 kA / 20 kA
Maximum discharge current (8/20) I _{max} [L-N/N-TE]	50 kA / 50 kA
Lightning impulse current (10/350) I _{imp} [L-N/N-TE]	12.5 kA / 50 kA
DC sparkover voltage DC [N-PE]	600 V
Protection level U _p [L-N]	1,5 kV
Protection level U _p [N-PE]	1,5 kV
Response time R _t [L-N/N-PE]	25 ns / 100 ns
Installation data	
Recommended minimum section of connecting cables	Cu 25 mm ²
Recommended protection	D Curve MCB or fuse (I _n ≤ 80A)
Enclosure material	Thermoplastic
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	0,6
Dimensions (mm) (Height×Wide×Depth)	4 DIN modules (90×72×80)

SURGE PROTECTIVE MODULES IN LOW-VOLTAGE POWER SUPPLY NETWORKS.

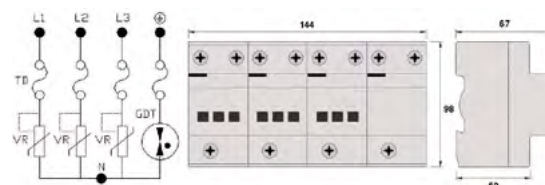
Type 1+2 surge protective devices are installed in the head-end system of the installation.

They are recommended to protect electric and electronic devices against surges of atmospheric and manoeuvres origin by coordinating Type 1 and Type 1+2 features.

- Protection Class I+II in accordance with EN 61643-11.
- Protection Type 2 in accordance with IEC 61643-1.
- Easy supervision due to the disconnection device.
- Modular design.
- Fault indication by red flag window.
- Rapid response.
- Optional remote alarm terminal.



Circuit diagram



BD4-100 electrical diagram and dimensions

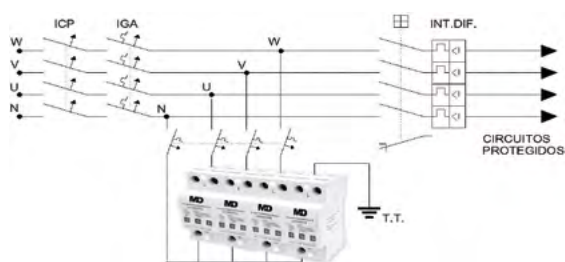
DEVICE MODEL	BD4-100/240
Connection mode	Parallel / Three-phase 3L+N+ET
Rated voltage / Frequency	240 V _{L-N} - 400 V _{L-L} / 50-60 Hz
Earthing System	TT, IT y TN-S
Thermal disconnection[L-N]	Internal; green-normal, red-failed
Remote alarm contact [L-N]	Optional; Cod BD4-100 / 240-S
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Class I+II / Type 1+2
Maximum continuous operating voltage (U _c) AC [L-N/N-PE]	275 V _{AC} / 255 V _{AC}
Rated discharge current (8/20) I _n [L-N/N-PE]	50 kA / 50 kA
Maximum discharge current (8/20) I _{max} [L-N/N-PE]	100 kA / 100 kA
Lightning impulse current (10/350) I _{imp} [L-N/N-PE]	12,5 kA / 25 kA
Protection level U _p [L-N/N-T]	2 kV / 2 kV
DC sparkover voltage [N-PE]	600 V
Response time R _i [L-N/N-PE]	25 ns / 100 ns
Installation data	
Recommended minimum section of connecting cables	Cu 25 mm ²
Recommended protection	D Curve MCB or fuse (I _n ≤ 80A)
Enclosure material	Thermoplastic
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	0,82
Dimensions (mm) (Height×Wide×Depth)	8 DIN modules (98×144×67)

SURGE PROTECTIVE MODULES IN LOW-VOLTAGE POWER SUPPLY NETWORKS.

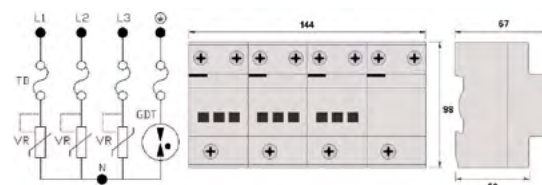
Type 1+2 surge protective devices are installed in the head-end system of the installation.

They are recommended to protect electric and electronic devices against surges of atmospheric and manoeuvres origin. by coordinating Type 1 and Type 2 features.

- Protection Class I+II in accordance with EN 61643-11.
- Protection Type 2 in accordance with IEC 61643-1.
- Easy supervision due to the disconnection device.
- Modular design.
- Fault indication by red flag window.
- Rapid response.
- Optional remote alarm terminal.



Circuit diagram



BD4-H200 electrical diagram and dimensions

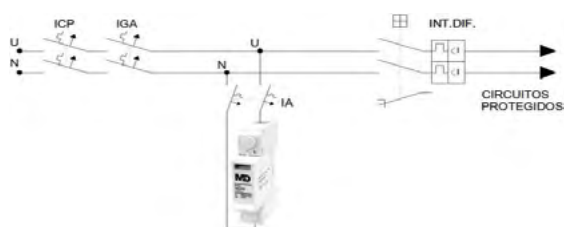
DEVICE MODEL	BD4-H200/240
Connection mode	Parallel / Three-phase 3L+N+ET
Rated voltage / Frequency	240 V _{L-N} - 400 V _{L-L} / 50-60 Hz
Earthing System	TT, IT y TN-S
Thermal disconnection[L-N]	Internal; green-normal, red-failed
Remote alarm contact [L-N]	Optional; Cod BD4-H200 / 240-S
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Class I+II / Type 1+2
Maximum continuous operating voltage (U _c) AC [L-N/N-PE]	250 V _{AC} / 255 V _{AC}
Rated discharge current (8/20) I _n [L-N/N-PE]	50 kA / 50 kA
Maximum discharge current (8/20) I _{max} [L-N/N-PE]	100 kA / 200 kA
Lightning impulse current (10/350) I _{imp} [L-N/N-PE]	12,5 kA / 50 kA
Protection level U _p [L-N/N-T]	1,3 kV / 1,5 kV
DC sparkover voltage DC [N-PE]	600 V
Response time R _i [L-N/N-PE]	25 ns / 100 ns
Installation data	
Recommended minimum section of connecting cables	Cu 25 mm ²
Recommended protection	D Curve MCB or fuse (I _n ≤ 80A)
Enclosure material	Thermoplastic
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	0,82
Dimensions (mm) (Height×Wide×Depth)	8 DIN modules (98×144×67)

SURGE PROTECTIVE MODULES IN LOW-VOLTAGE POWER SUPPLY NETWORKS.

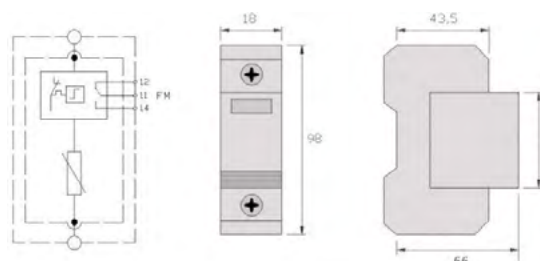
Type 2 single-phase surge protective devices are installed in the head-end system of the installation.

They are recommended to protect electric and electronic devices against surges of atmospheric and manoeuvres origin.

- Protection Class II in accordance with EN 61643-1.
- Protection Type 2 in accordance with IEC 61643-11.
- Easy supervision due to the disconnection device.
- Two-pole surge protective devices consisting of a base part and a plug-in protection module.
- Fault indication by red flag window.
- Rapid response.
- Optional remote alarm terminal.



Circuit diagram



BV1-40 electrical diagram and dimensions

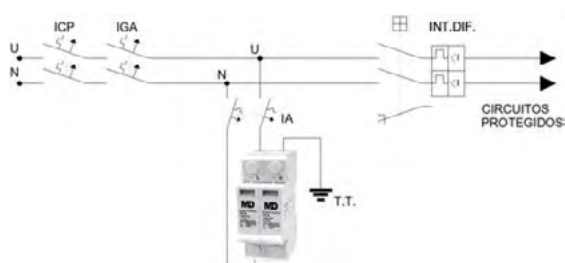
DEVICE MODEL	BV1-40/240
Connection mode	Parallel / Monopolar
Rated voltage / Frequency	240 V _{AC} / 50-60 Hz
Earthing System	TT, IT y TN
Thermal disconnection	Internal; green-normal, red-failed
Remote alarm contact	Optional; Cod BV1-40 / 240-S
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Type 2 / Class II
Maximum continuous operating voltage (U _c) AC	250 V _{AC}
Rated discharge current (8/20) I _n	20 kA
Maximum discharge current (8/20) I _{max}	40 kA
Lightning impulse current (10/350) I _{imp}	-
Protection level U _p	1,3 kV
DC sparkover voltage DC	-
Response time R _t	25 ns
Installation data	
Recommended minimum section of connecting cables	Cu 25 mm ²
Recommended protection	D Curve MCB or fuse (I _n ≤ 32A)
Enclosure material	Thermoplastic
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	0,17
Dimensions (mm) (Height×Wide×Depth)	1 módulo DIN (98×18×66)

SURGE PROTECTIVE MODULES IN LOW-VOLTAGE POWER SUPPLY NETWORKS.

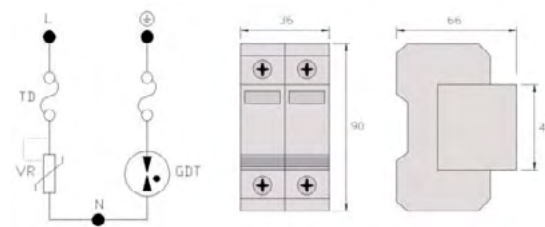
Type 2 single-phase surge protective devices are installed in the head-end system of the installation.

They are recommended to protect electric and electronic devices against surges of atmospheric and manoeuvres origin.

- Protection Class II in accordance with EN 61643-11.
- Protection Type 2 in accordance with IEC 61643-1.
- Easy supervision due to the disconnection device.
- Two-pole surge protective devices consisting of a base part and a plug-in protection module.
- Fault indication by red flag window.
- Rapid response.
- Optional remote alarm terminal.



Circuit diagram



BD2-40 electrical diagram and dimensions

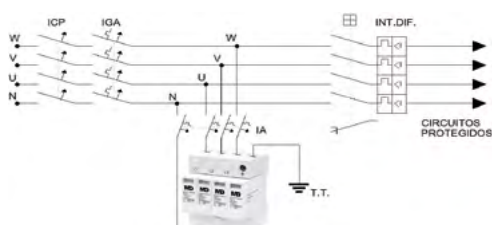
DEVICE MODEL	BD2-40/240
Connection mode	Parallel / Single-Phase L+N+ET
Rated voltage / Frequency	240 V _{AC} / 50-60 Hz
Earthing System	TT, IT y TN-S
Thermal disconnection	Internal; green-normal, red-failed
Remote alarm contact	Optional; Cod BD2-40 / 240-S
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Type 2 / Class II
Maximum continuous operating voltage (U _c) AC [L-N/N-PE]	250 V _{AC} / 255 V _{AC}
Rated discharge current (8/20) I _n	20 kA
Maximum discharge current (8/20) I _{max}	40 kA
Lightning impulse current (10/350) I _{imp}	-
Protection level U _p [L-N/N-T]	1,3 kV / 1,5 kV
DC sparkover voltage DC [N-PE]	600 V
Response time R _i [L-N/N-PE]	25 ns / 100 ns
Installation data	
Recommended minimum section of connecting cables	Cu 25 mm ²
Recommended protection	D Curve MCB or fuse (I _n ≤ 32A)
Enclosure material	Thermoplastic
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	0,19
Dimensions (mm) (Height×Wide×Depth)	2 DIN modules (98×36×66)

SURGE PROTECTIVE MODULES IN LOW-VOLTAGE POWER SUPPLY NETWORKS.

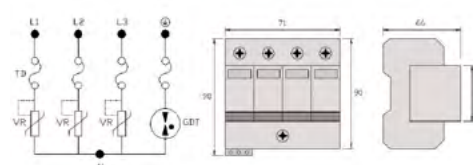
Type 2 three-phase surge protective devices are installed in the head-end system of the installation.

They are recommended to protect electric and electronic devices against surges of atmospheric and manoeuvres origin.

- Protection Class II in accordance with EN 61643-11.
- Protection Type 2 in accordance with IEC 61643-1.
- Easy supervision due to the disconnection device.
- Two-pole surge protective devices consisting of a base part and a plug-in protection module.
- Fault indication by red flag window.
- Rapid response.
- Optional remote alarm terminal.



Circuit diagram



BD4-40 electrical diagram and dimensions

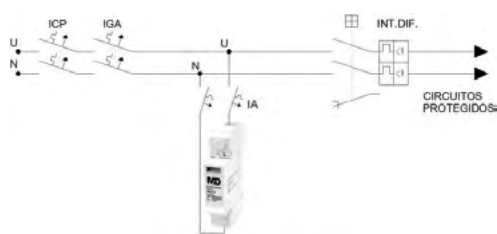
DEVICE MODEL	BD4-40/240
Connection mode	Parallel / Three-Phase 3L+N+ET
Rated voltage / Frequency	240 V _L - 400 V _{L-L} / 50-60 Hz
Earthing System	TT, IT y TN-S
Thermal disconnection	Internal; green-normal, red-failed
Remote alarm contact	Optional; Cod BD4-40/240-S
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Type 2 / Class II
Maximum continuous operating voltage (U _c) AC [L-N/N-T]	250 V _{AC} / 255 V _{AC}
Rated discharge current (8/20) I _n	20 kA
Maximum discharge current (8/20) I _{max}	40 kA
Lightning impulse current (10/350) I _{imp}	-
Protection level U _p [L-N/N-PE]	1,3 kV / 1,5 kV
DC sparkover voltage DC [N-PE]	600 V
Response time R _t [L-N/N-PE]	25 ns / 100 ns
Installation data	
Recommended minimum section of connecting cables	Cu 25 mm ²
Recommended protection	D Curve MCB or fuse (I _n ≤ 32A)
Enclosure material	Thermoplastic
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	0,39
Dimensions (mm) (Height×Wide×Depth)	4 DIN modules (98×72×66)

SURGE PROTECTIVE MODULES IN LOW-VOLTAGE POWER SUPPLY NETWORKS.

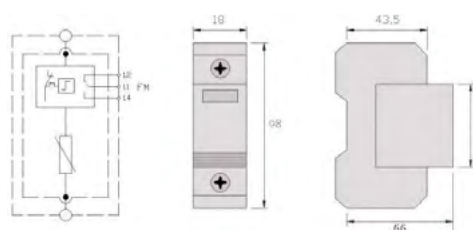
Type 2+3 single-phase surge protective devices are installed in the head-end system of the installation.

They are recommended to protect electric and electronic devices against surges of atmospheric and manoeuvres origin.

- Protection Class II+III in accordance with EN 61643-11.
- Protection Type 2+3 in accordance with IEC 61643-1.
- Easy supervision due to the disconnection device.
- Two-pole surge protective devices consisting of a base part and a plug-in protection module.
- Fault indication by red flag window.
- Rapid response.
- Optional remote alarm terminal.



Circuit diagram



BV1-25 electrical diagram and dimensions

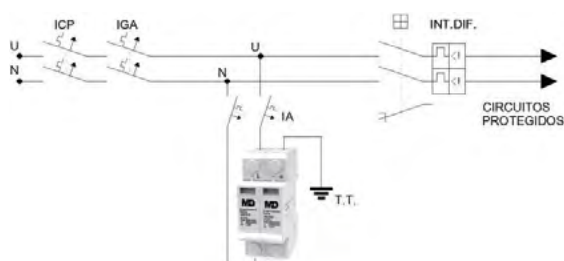
DEVICE MODEL	BV1-25/240
Connection mode	Parallel / Monopolar
Rated voltage / Frequency	240 V _{cc} / 50-60 Hz
Earthing System	TT, IT y TN
Thermal disconnection	Internal; green-normal, red-failed
Remote alarm contact	Optional; Cod BV1-25 / 240-S
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Type 2+3 / Class II
Maximum continuous operating voltage (U _c) AC [L-N/N-PE]	250 V _{cc}
Rated discharge current (8/20) I _n	10 kA
Maximum discharge current (8/20) I _{max}	25 kA
Lightning impulse current (10/350) I _{imp}	-
Protection level U _p	1,2 kV
DC sparkover voltage DC	-
Response time R _t	25 ns
Installation data	
Recommended minimum section of connecting cables	Cu 25 mm ²
Recommended protection	D Curve MCB or fuse (I _n ≤ 32A)
Enclosure material	Thermoplastic
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	0,11
Dimensions (mm) (Height×Wide×Depth)	1 módulo DIN (98×18×66)

SURGE PROTECTIVE MODULES IN LOW-VOLTAGE POWER SUPPLY NETWORKS.

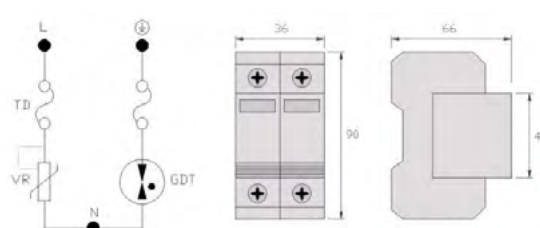
Type 2+3 single-phase surge protective devices are installed in the head-end system of the installation.

They are recommended to protect electric and electronic devices against surges of atmospheric and manoeuvres origin.

- Protection Class II+III in accordance with EN 61643-11.
- Protection Type 2+3 in accordance with IEC 61643-1.
- Easy supervision due to the disconnection device.
- Two-pole surge protective devices consisting of a base part and a plug-in protection module.
- Fault indication by red flag window.
- Rapid response.
- Optional remote alarm terminal.



Circuit diagram



BD2-20 electrical diagram and dimensions

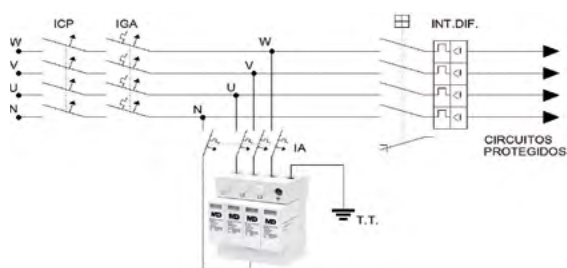
DEVICE MODEL	BD2-20/240
Connection mode	Parallel / Single-Phase L+N+ET
Rated voltage / Frequency	240 V _{AC} / 50-60 Hz
Earthing System	TT, IT y TN-S
Thermal disconnection	Internal; green-normal, red-failed
Remote alarm contact	Optional; Cod BD2-25 / 240-S
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Type 2+3 / Class II + III
Maximum continuous operating voltage (U _c) AC [L-N/N-PE]	275 V _{AC} / 255 V _{AC}
Rated discharge current (8/20) I _n	10 kA
Maximum discharge current (8/20) I _{max}	20 kA
Lightning impulse current (10/350) I _{imp}	-
Protection level U _p [L-N/N-PE]	1,2 kV / 1,2 kV
DC sparkover voltage DC [L-N]	600 V
Response time R _f [L-N/N-PE]	25 ns / 100 ns
Installation data	
Recommended minimum section of connecting cables	Cu 25 mm ²
Recommended protection	D Curve MCB or fuse (I _n ≤ 32A)
Enclosure material	Thermoplastic
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	0,22
Dimensions (mm) (Height×Wide×Depth)	2 DIN modules (98×36×66)

SURGE PROTECTIVE MODULES IN LOW-VOLTAGE POWER SUPPLY NETWORKS.

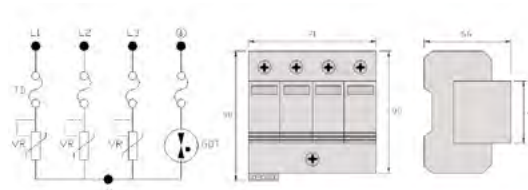
Type 2+3 single-phase surge protective devices are installed in the head-end system of the installation.

They are recommended to protect electric and electronic devices against surges of atmospheric and manoeuvres origin.

- Protection Class II+III in accordance with EN 61643-11.
- Protection Type 2+3 in accordance with IEC 61643-1.
- Easy supervision due to the disconnection device.
- Two-pole surge protective devices consisting of a base part and a plug-in protection module.
- Fault indication by red flag window.
- Rapid response.
- Optional remote alarm terminal.



Circuit diagram



BD4-20 electrical diagram and dimensions

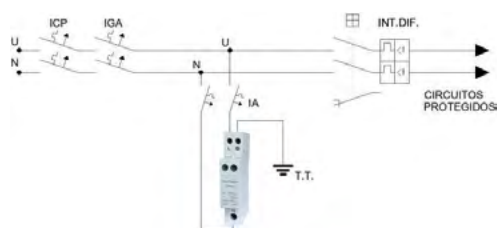
DEVICE MODEL	BD4-20/240
Connection mode	Parallel / Three-Phase 3L+N+ET
Rated voltage / Frequency	240 V _L - 400 V _{L-L} / 50-60 Hz
Earthing System	TT, IT y TN-S
Thermal disconnection	Internal; green-normal, red-failed
Remote alarm contact	Optional; Cod BD4-20/240-S
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Type 2+3 / Class II + III
Maximum continuous operating voltage (U _c) AC [L-N/N-PE]	250 V _{AC} / 255 V _{AC}
Rated discharge current (8/20) I _n	10 kA
Maximum discharge current (8/20) I _{max}	20 kA
Lightning impulse current (10/350) I _{imp}	-
Protection level U _p [L-N//N-T]	1,2 kV / 1,2 kV
DC sparkover voltage DC [N-PE]	600 V
Response time R _i [L-N/N-PE]	25 ns / 100 ns
Installation data	
Recommended minimum section of connecting cables	Cu 25 mm ²
Recommended protection	D Curve MCB or fuse (I _n ≤ 32A)
Enclosure material	Thermoplastic
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	0,36
Dimensions (mm) (Height×Wide×Depth)	4 DIN modules (98×72×66)

SURGE PROTECTIVE MODULES IN LOW-VOLTAGE POWER SUPPLY NETWORKS.

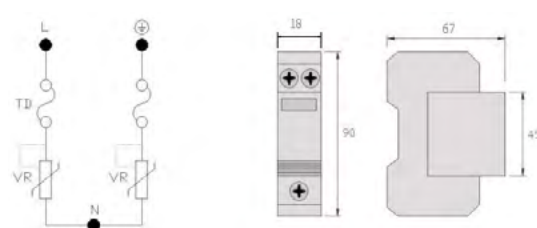
Type 2 single-phase surge protective devices are installed in the head-end system of the installation.

These protective devices are recommended to protect electric and electronic devices against surges of atmospheric and manoeuvres origin.

- Protection Class II in accordance with EN 61643-11.
- Protection Type 2 in accordance with IEC 61643-1.
- Easy supervision due to the disconnection device.
- Two-pole surge protective devices consisting of a base part and a plug-in protective module.
- Fault indication by red flag window.
- Rapid response.
- Optional remote alarm terminal.



Circuit diagram



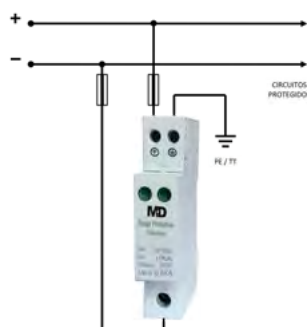
BV2M-40 electrical diagram and dimensions

DEVICE MODEL	BV2M-40/240
Connection mode	Parallel / Single-Phase L+N+PE
Rated voltage / Frequency	240 V _{AC} / 50-60 Hz
Earthing System	TT, IT y TN-S
Thermal disconnection	Inner red-failed
Remote alarm contact	-
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Class II / Type 2
Maximum continuous operating voltage (U _c) AC [L-N/N-T]	275 V _{AC}
Rated discharge current (8/20) I _n	20 kA
Maximum discharge current (8/20) I _{max}	40 kA
Lightning impulse current (10/350) I _{imp}	-
Protection level U _p [L-N/N-T]	1,2 kV / -
DC sparkover voltage DC [N-PE]	-
Response time R _f [L-N/N-PE]	25 ns
Installation data	
Recommended minimum section of connecting cables	Cu 6 mm ²
Recommended protection	D Curve MCB or fuse (I _n ≤ 32A)
Enclosure material	Thermoplastic
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +85 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	
Dimensions (mm) (Height×Width×Depth)	1 DIN module (91×18×67)

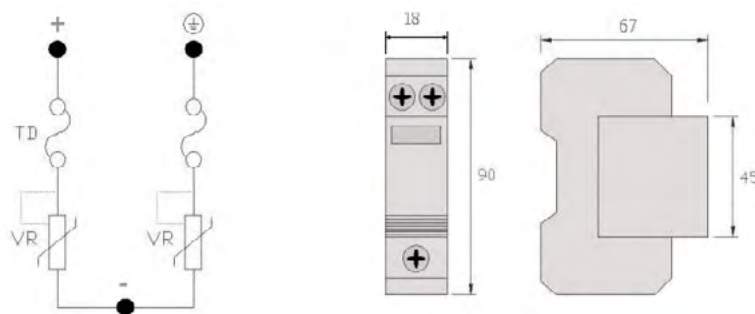
SURGE PROTECTIVE MODULES IN LOW-VOLTAGE POWER SUPPLY NETWORKS.

These protective devices are recommended to protect electric and electronic devices against surges of atmospheric and manoeuvres origin.

- Protection Class II in accordance with EN 61643-11.
- Protection Type 2 in accordance with IEC 61643-1.
- Easy supervision due to the disconnection device.
- Two-pole surge protective devices consisting of a base part and a plug-in protective module.
- Fault indication by red flag window.
- Rapid response.
- Optional remote alarm terminal.



Circuit diagram



BV2M-40/24 DC electrical diagram and dimensions

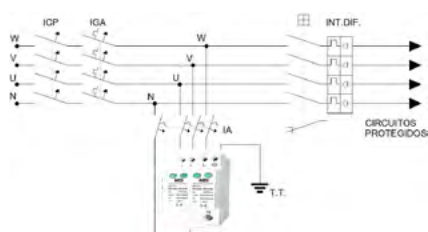
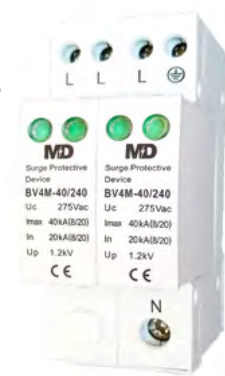
DEVICE MODEL	BV2M-40/240 DC
Connection mode	Parallel / Direct current (+), (-) y ET
Rated voltage / Frequency	24 V _{AC} / 50-60 Hz
Earthing System	TT, IT y TN-S
Thermal disconnection	Inner red-failed
Remote alarm contact	-
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Class II / Type 2
Maximum continuous operating voltage (U _c) AC [L-N/N-PE]	28 V _{DC}
Rated discharge current (8/20) I _n	20 kA
Maximum discharge current (8/20) I _{max}	40 kA
Lightning impulse current (10/350) I _{imp}	-
Protection level U _p [L-N/N-PE]	-
DC sparkover voltage DC [N-PE]	0,6 kV
Response time R _t [L-N/N-PE]	25 ns
Installation data	
Recommended minimum section of connecting cables	Cu 6 mm ²
Recommended protection	I _n ≤ 20 A
Enclosure material	Thermoplastic
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +85 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	
Dimensions (mm) (Height×Wide×Depth)	1 DIN module (91×18×67)

SURGE PROTECTIVE MODULES IN LOW-VOLTAGE POWER SUPPLY NETWORKS.

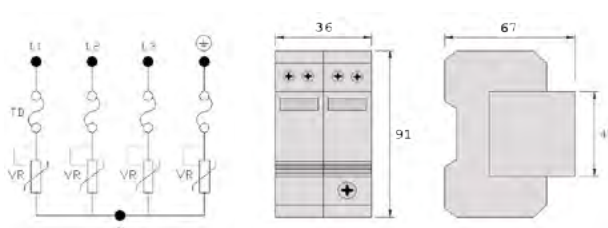
Type 2 single-phase surge protective devices are installed in the head-end system of the installation.

These protective devices are recommended to protect electric and electronic devices against surges of atmospheric and manoeuvres origin.

- Protection Class II in accordance with EN 61643-11.
- Protection Type 2 in accordance with IEC 61643-1.
- Easy supervision due to the disconnection device.
- Two-pole surge protective devices consisting of a base part and two plug-in protective modules.
- Fault indication by red flag window.
- Rapid response.
- Optional remote alarm terminal.



Circuit diagram



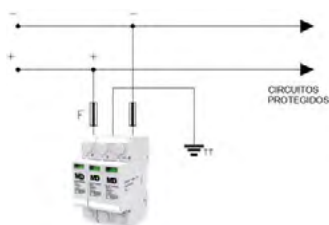
BV4M-40 electrical diagram and dimensions

DEVICE MODEL	BV4M-40/240
Connection mode	Parallel / Single-Phase 3L+N+PE
Rated voltage / Frequency	240 V _{AC} / 50-60 Hz
Earthing System	TT, IT y TN-S
Thermal disconnection	Inner red-failed
Remote alarm contact	-
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Class II / Type 2
Maximum continuous operating voltage (U _c) AC [L-N/N-T]	275 V _{AC}
Rated discharge current (8/20) I _n	20 kA
Maximum discharge current (8/20) I _{max}	40 kA
Lightning impulse current (10/350) I _{imp}	-
Protection level U _p [L-N/N-T]	1,2 kV
DC sparkover voltage DC [N-PE]	1,2 kV
Response time T _r [L-N/N-PE]	25 ns
Installation data	
Recommended minimum section of connecting cables	Cu 6 mm ²
Recommended protection	D Curve MCB or fuse (I _n ≤ 32A)
Enclosure material	Thermoplastic
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +85 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	0,27
Dimensions (mm) (Height×Width×Depth)	2 DIN modules (91×36×67)

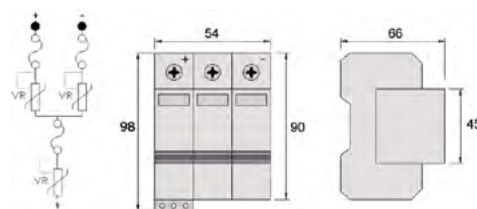
SURGE PROTECTIVE MODULES IN PHOTOVOLTAIC INSTALLATIONS.

Type 2 surge protective devices up to 600V_{cc} in DC installations. They are recommended to protect electric and electronic devices against surges of atmospheric and manoeuvres origin.

- Protection Class II in accordance with EN 61643-11.
- Protection Type 2 in accordance with IEC 61643-1.
- Easy supervision due to the disconnection device.
- Two-pole surge protective devices consisting of a base part and a plug-in protection module.
- Fault indication by red flag window.
- Rapid response.
- Optional remote alarm terminal.



Circuit diagram



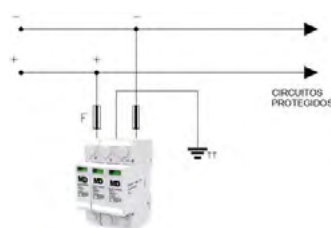
BF3-40 electrical diagram and dimensions

DEVICE MODEL	BF3-40/600
Connection mode	Parallel / DC Positivo-Negativo-T
Rated voltage / Frequency	600 V _{cc} / Corriente Continua
Earthing System	-
Thermal disconnection	Internal; green-normal, red-failed
Remote alarm contact	Optional; Cod BF3-40/600-S
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Type 2 / Class II
Maximum continuous operating voltage (U _c) DC	620 V _{DC}
Rated discharge current (8/20) I _n	20 kA
Maximum discharge current (8/20) I _{max}	40 kA
Lightning impulse current (10/350) I _{imp}	-
DC sparkover voltage DC	-
Protection level U _p	1,8 kV
Protection level U _p	-
Response time R _t	25 ns
Installation data	
Recommended minimum section of connecting cables	Cu 25 mm ²
Recommended protection	Fuse gL/gG (I _n ≤ 50A)
Enclosure material	Thermoplastic
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	0,39
Dimensions (mm) (Height×Wide×Depth)	3 DIN modules (98×54×66)

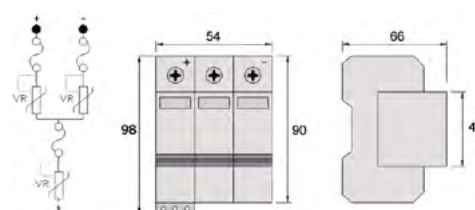
SURGE PROTECTIVE MODULES IN PHOTOVOLTAIC INSTALLATIONS.

Type 2 surge protective devices up to 1000V_{cc} in DC installations. They are recommended to protect electric and electronic devices against surges of atmospheric and manoeuvres origin.

- Protection Class II in accordance with EN 61643-11.
- Protection Type 2 in accordance with IEC 61643-1.
- Easy supervision due to the disconnection device.
- Two-pole surge protective devices consisting of a base part and a plug-in protection module.
- Fault indication by red flag window.
- Rapid response.
- Optional remote alarm terminal.



Circuit diagram



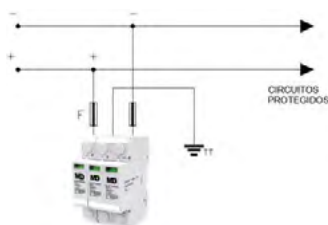
BF3-40 electrical diagram and dimensions

DEVICE MODEL	BF3-40/1000
Connection mode	Parallel / DC Positivo-Negativo-T
Rated voltage / Frequency	1000 V _{cc} / Corriente Continua
Earthing System	-
Thermal disconnection	Internal; green-normal, red-failed
Remote alarm contact	Optional; Cod BF3-40/1000-S
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Type 2 / Class II
Maximum continuous operating voltage (U _c) DC	1060 V _{DC}
Rated discharge current (8/20) I _n	20 kA
Maximum discharge current (8/20) I _{max}	40 kA
Lightning impulse current (10/350) I _{imp}	-
DC sparkover voltage DC	-
Protection level U _p	3,2 kV
Protection level U _p	-
Response time R _t	25 ns
Installation data	
Recommended minimum section of connecting cables	Cu 25 mm ²
Recommended protection	Fuse gL/gG (I _n ≤ 50A)
Enclosure material	Thermoplastic
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	0,39
Dimensions (mm) (Height×Wide×Depth)	3 DIN modules (98×54×66)

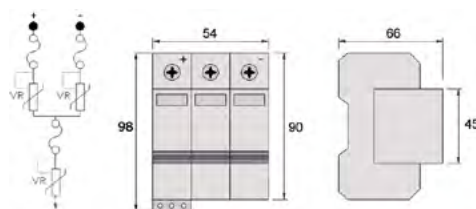
SURGE PROTECTIVE MODULES IN PHOTOVOLTAIC INSTALLATIONS.

Type 2 surge protective devices up to 1500V_{cc} in DC installations. They are recommended to protect electric and electronic devices against surges of atmospheric and manoeuvres origin.

- Protection Class II in accordance with EN 61643-11.
- Protection Type 2 in accordance with IEC 61643-1.
- Easy supervision due to the disconnection device.
- Two-pole surge protective devices consisting of a base part and a plug-in protection module.
- Fault indication by red flag window.
- Rapid response.
- Optional remote alarm terminal.



Circuit diagram



BF3-40 electrical diagram and dimensions

DEVICE MODEL	BF3-40/1500
Connection mode	Parallel / DC Positivo-Negativo-T
Rated voltage / Frequency	1500 V _{cc} / Corriente Continua
Earthing System	-
Thermal disconnection	Internal; green-normal, red-failed
Remote alarm contact	Optional; Cod BF3-40/1500-S
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Type 2 / Class II
Maximum continuous operating voltage (U _c) DC	1520 V _{DC}
Rated discharge current (8/20) I _n	20 kA
Maximum discharge current (8/20) I _{max}	40 kA
Lightning impulse current (10/350) I _{imp}	-
DC sparkover voltage DC	-
Protection level U _p	6,5 kV
Protection level U _p	-
Response time R _t	25 ns
Installation data	
Recommended minimum section of connecting cables	Cu 25 mm ²
Recommended protection	fuse gL/gG (I _n ≤ 50A)
Enclosure material	Thermoplastic
Installation method	35 mm DIN-rail
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP20
Location category	Indoor
Weight (Kg)	0.39
Dimensions (mm) (Height×Wide×Depth)	3 DIN modules (98×54×66)

CUADROS MODULARES DE PROTECCIÓN CONTRA SOBRETENSIONES Y SOBREINTENSIDADES PARA INSTALACIONES FOTOVOLTAICAS.

SPF series devices are specially designed for the protection of self-consumption solar panel installations that are connected with:

- The inner of an electrical consumption network.
- A physical electrical connection with the transport or distribution network.

These protective devices serie are built to be installed in photovoltaic systems to provide protection against overcurrents and overvoltages caused by lightning strikes on the DC input-panels section of photovoltaic installations up to 1000 Vdc.

Note: these devices are assembled according to customer requirements.



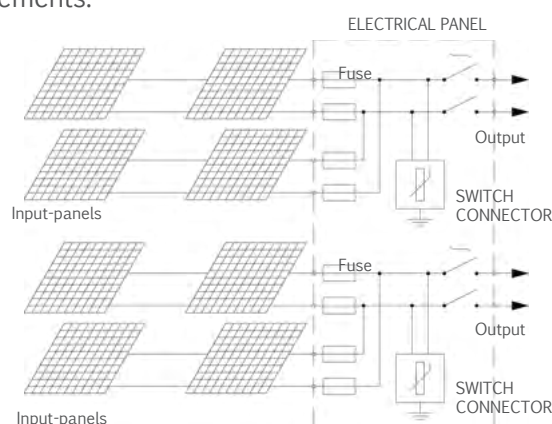
SPF1/1



SPF2/1



BF3 series SPDs



DEVICE MODEL	SPF4/4 - 40/1000/15 (121)	SPF4/4-40/1000/15 (221)	SPF4/2-40/1000/15 (121)	SPF4/2 - 40/1000/15 (221)	SPF4/2 - 40/1000/15 (121)	SPF4/2 - 40/1000/15 (221)
Number of strings	4	4	4	4	6	6
Number of outputs	4	4	2	2	2	2
Rated voltage V_{DC}	1000	1000	1000	1000	1000	1000
Fuse (A) (*)	15	15	15	15	15	15
Switch connector current, I_{sc} (A)	4×16	-	2×30	-	2×50	-
Connectors	MC4	MC4	MC4	MC4	MC4	MC4

Surge response

Protection type (EN 61643-11/IEC 61643-1)	Class II / Type 2
Max. continuous operating voltage (U_c) V_{DC}	1060 V_{DC}
Maximum discharge current (8/20) I_{max}	40 kA

Installation data

Enclosure material	PC - Polycarbonate					
Operating temperature	-40 °C ... +80 °C					
IP protection degree	IP65					
Categoría de localización	Indoor and outdoor					
Weight (Kg)	5,53	4,73	3,73	3,00	3,84	3,00
Dimensions (mm) (Height×Width×Depth)	436×418×148	436×310×148	436x310×148	286x418x148	436x310x148	286×418×148

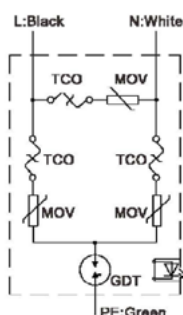
(*)

10A Fuse	SPF1/1 - 40/1000/10	SPF2/1 - 40/1000/10	SPF3/1 - 40/1000/10	SPF4/1 - 40/1000/10	SPF2/2 - 40/1000/10	SPF4/2 - 40/1000/10	SPF3/3 - 40/1000/10	SPF4/4 - 40/1000/10
12A Fuse	SPF1/1 - 40/1000/12	SPF2/1 - 40/1000/12	SPF3/1 - 40/1000/12	SPF4/1 - 40/1000/12	SPF2/2 - 40/1000/12	SPF4/2 - 40/1000/12	SPF3/3 - 40/1000/12	SPF4/4 - 40/1000/12
20A Fuse	SPF1/1 - 40/1000/20	SPF2/1 - 40/1000/20	SPF3/1 - 40/1000/20	SPF4/1 - 40/1000/20	SPF2/2 - 40/1000/20	SPF4/2 - 40/1000/20	SPF3/3 - 40/1000/20	SPF4/4 - 40/1000/20

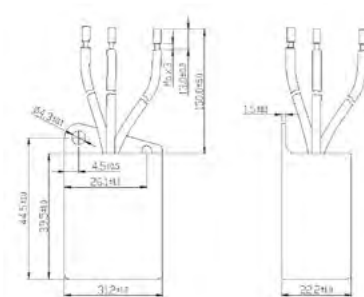
SURGE LIMITING DEVICES TYPE 2 FOR LED LIGHTING. LOW-VOLTAGE CURRENT SUPPLY LINES.

Type 2+3 surge protectors are installed next to the loads to be protected.
They are recommended to protect LED lighting devices against surges of atmospheric and manoeuvres origin.

- Protection Class II+III in accordance with IEC 61643-1/IEC 61643-1/UL1449 4th.
- Compact design.
- Rapid response.
- IP66 rated waterproof enclosure.
- Status indication via LED.



LD2-10/320 circuit diagram



LD2-10/320 dimensions

DEVICE MODEL	LD2-10/320
Connection mode	Parallel
Rated voltage / Frequency	240 V _{AC} / 50-60 Hz
Earthing System	TT, IT y TN-S
Protection Mode	L-N, L/N-PE
Visual indication of the device status	LED
Remote alarm contact	-
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Class II+III / Type 2+3
Maximum continuous operating voltage (U _c) AC	320 V _{DC}
Rated discharge current (8/20) I _n	5 kA
Maximum discharge current (8/20) I _{max}	10 kA
Combined discharge voltage (1,2/50) V _{oc}	10 kV
Protection level U _p	<1,5 kV
Response time t _r	<25 ns
Installation data	
Recommended minimum section of connecting cables	1,5mm ² flexible (L/N: Black/White; PE:Green)
Recommended protection	Fuse <25A gL/gC
Enclosure material	Thermoplastic PA6-94-V0
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP66
Location category	Indoor and outdoor
Weight (Kg)	0,060
Dimensions (mm) (Height×Wide×Depth)	
Heigh (m)	<3000
Relative humidity (mm)	<95% Non-condensing

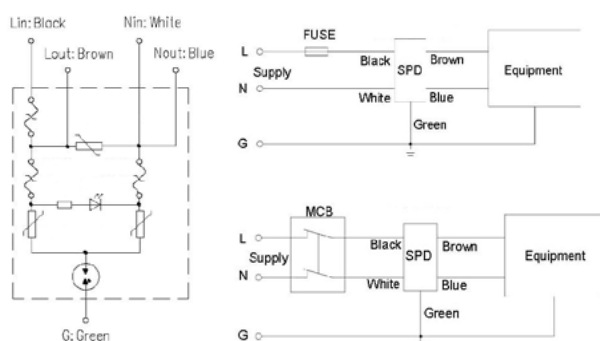
SURGE LIMITING DEVICES TYPE 3 FOR LED LIGHTING.
LOW-VOLTAGE CURRENT SUPPLY LINES.

Type 3 surge protectors are installed next to the loads to be protected.
They are recommended to protect LED lighting devices against surges of atmospheric and manoeuvres origin.

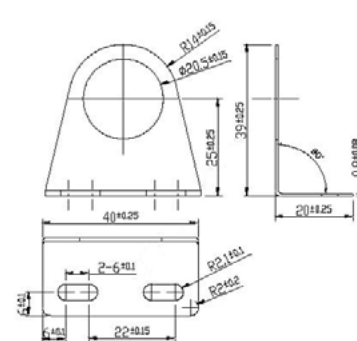
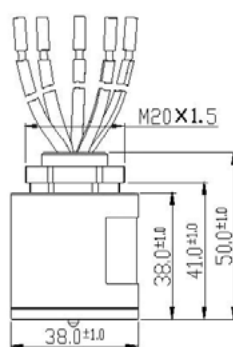
- Protection Class III in accordance with IEC 61643-1/IEC 61643-1/UL1449 4th..
- Compact design.
- Rapid response.
- IP66 rated waterproof enclosure.
- Status indication via LED.



SPD



LD2S-15/320 internal and connection diagrams



LD2S-15/320 dimensions

DEVICE MODEL	LD2S-15/320
Connection mode	Series
Rated voltage / Frequency	240 V _{AC} / 50-60 Hz
Rated current	15 A
Earthing System	TT, IT y TN-S
Protective mode	L-N, L/N-PE
Visual indication of the status of the device	LED
Surge response	
Protection type (EN 61643-11 / IEC 61643-1)	Class III / Type 3
Maximum continuous operating voltage (U _c) AC	320 V _{DC}
Rated discharge current (8/20) I _n	10 kA
Maximum discharge current (8/20) I _{max}	15 kA
Combined discharge voltage V _{oc} (1,2/50)	20 kV
Protection level U _p	2 kV
Response time R _t	<25 ns
Installation data	
Recommended minimum section of connecting cables	1,5 mm ² flexible (L _{in} :Black; N _{in} :White; PE:Green; L _{out} :Brown; N _{out} :Blue)
Recommended protection	25A Fuse
Enclosure material	-
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP66
Location category	Indoor
Weight (Kg)	0,15
Dimensions (mm) (Diameter×Heigh)	ø 38×50
Heigh (m)	<2000
Relative humidity	<95% Non-condensing

Control, data and communication lines protective devices.

7_1. Technical description

7_2. TD series protective devices data sheet



MODULAR PROTECTIVE DEVICES SPD

PROTECTIVE DEVICES IN CONTROL, DATA AND COMMUNICATION LINES.

TD series protective devices are designed to protect associated equipment with communication networks from transient overvoltages, especially those induced by lightning strikes, parasites of industrial origin, etc. and propagated by the communication networks themselves, mainly through galvanic and inductive coupling.

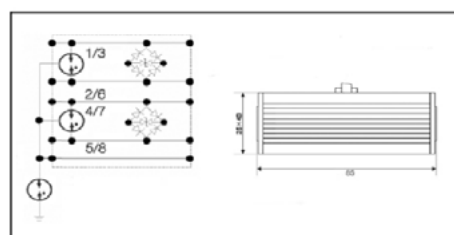
These protective devices are specially designed to protect communication lines. For this reason, the communication protocol, the number and pairs of wires to be protected and communication voltages must be considered.

These devices must be installed in series with circuits to be protected.

Surge protective devices in data lines must be installed as close as possible to the devices to be protected and always be connected to the earth terminal of the installation.

SURGE PROTECTIVE DEVICES IN DATA AND COMMUNICATION NETWORKS.

- Surge protective devices in data lines must be installed as close as possible to the devices to be protected.
- Data lines protection in accordance with IEC 61643: 21-2005.
- Two-stages protection.
- Aluminum enclosure.
- RJ45 connection for Cat5 network technology, 10 / 100BaseT.
- Simple installation.
- It is also suitable for analog protection, ISDN, DSL systems, twisted pairs Ethernet BaseT, ATM, Token Ring ring network.

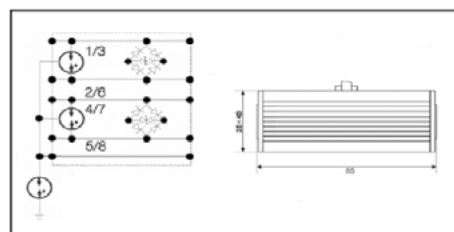


TD-RJ45H electrical diagram and dimensions

DEVICE MODEL	TD/5-RJ45H-8 Cat5
Connection mode	Series
Rated voltage / Transmission speed	5 V _{DC} / 10Mbps
Connection type / Pins	RJ45 socket connector-socket connector / 1-2, 3-6, 4-5, 7-8
Nominal current I _L	1 A
Protected lines	8 wires
Series impedance per line	-
Surge response	
Type of protection	3
Maximum continuous operating voltage (U _c)	5 V _{AC} / 6V _{DC}
Rated discharge current [L-L]/[L-G] (8/20) I _n	0,3 kA
Maximum discharge current I _{max} (8/20) [L-L]/[L-G]	10 kA
Protection level [L-L] (8/20)	≤80 V
Protection level [L-PE] (8/20)	≤600 V
Protection level [L-L] (8/20) (U _p 1kV/μs)	≤15 V
Protection level [L-PE] (8/20) (U _p 1kV/μs)	
Protection level [SG/PE] (8/20) (U _p 1kV/μs)	≤800 V
Protection steps	2
Installation data	
Enclosure material	Metallic
Installation method	35 mm DIN-rail Mounting method
Operating temperature	[-25 °C ... +70°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	0,92
Dimensions (mm) (Height×Wide×Depth)	85×25×40

SURGE PROTECTIVE DEVICES FOR DATA AND COMMUNICATION NETWORKS.

- Surge protective devices in data lines must be installed as close as possible to the devices to be protected.
- Data lines protection in accordance with IEC 61643:21-2005, EN50173 Cat6.
- Two-stage protection.
- Aluminum enclosure.
- RJ45 connection for Cat6 network technology, 10/100/1000BaseT.
- Simple installation.
- Suitable for analog protection, ISDN, DSL systems, Ethernet twisted pairs.

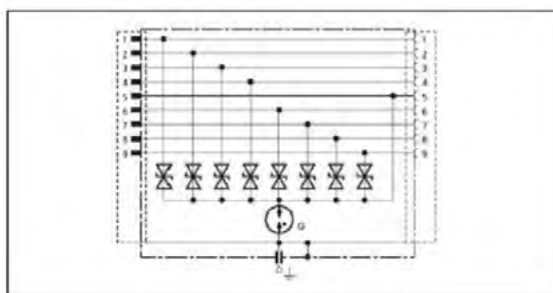


TD-RJ45H electrical diagram and dimensions

DEVICE MODEL	TD/5-RJ45H-8 Cat6
Connection mode	Series
Rated voltage / Transmission speed	5 V _{DC} / 10Mbps
Connection type / Pins	RJ45 socket connector-socket connector / 1-2, 3-6, 4-5, 7-8
Nominal current I _L	0,5 A
Protected lines	8 wires
Series impedance per line	-
Surge response	
Type of protection	3
Maximum continuous operating voltage (U _c)	5 V _{AC} / 6V _{DC}
Rated discharge current (8/20) I _n	0,1 kA
Maximum discharge current I _{max} (8/20)	0,4 kA
Protection level (U _p 1kV/μs)	≤30 V
Protection steps	1
Installation data	
Enclosure material	Metallic
Installation method	35 mm DIN-rail Mounting method
Operating temperature	[0 °C ... +40°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	0,58
Dimensions (mm) (Height×Wide×Depth)	70×25×25

SURGE PROTECTIVE DEVICES IN DATA AND COMMUNICATION NETWORKS.

- Surge protective devices in data lines must be installed as close as possible to the devices to be protected.
- Data lines protection in accordance with IEC 61643:21.
- Aluminum enclosure.
- Simple installation.
- Low protection voltage.

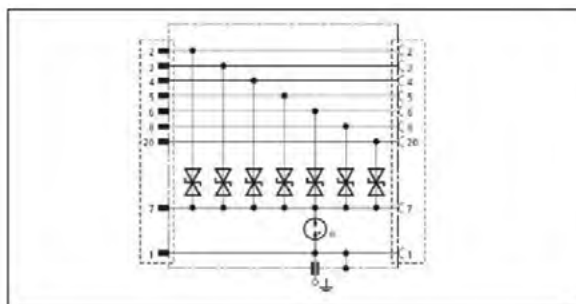


TD/6-DB9 electrical diagram

DEVICE MODEL	TD/6-B9-9
Connection mode	Series
Rated voltage / Transmission speed	6 V _{DC} / 2Mbps
Connection type / Pins	DB9 socket connector / DB9 male plug Pins: 1,2,3,4,6,7,8,9, SG:5
Nominal current I _L	0,5 A
Protected lines	9 wires
Series impedance per line	-
Surge response	
Type of protection	3
Maximum continuous operating voltage (U _C)	60V _{DC}
Rated discharge current I _n (8/20)	100 A (L-G) / 5 kA (G-T)
Maximum discharge current I _{max} (8/20)	200 A (L-G) / 10 kA (G-T)
Protection level [L-L] (8/20)	≤250 V
Protection level [L-PE] (8/20)	≤500 V
Protection level [L-L] (8/20) (U _p 1kV/μs)	≤70 V
Protection level [SG/PE] (8/20) (U _p 1kV/μs)	≤600 V
Protection steps	1
Installation data	
Enclosure material	Metallic
Installation method	Fastening by screws /35 mm DIN-rail Mounting method
Operating temperature	[-25 °C ... +70°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	-
Dimensions (mm) (Height×Wide×Depth)	50×40×25

SURGE PROTECTIVE DEVICES FOR DATA AND COMMUNICATION NETWORKS.

- Surge protective devices in data lines must be installed as close as possible to the devices to be protected.
- Data lines protection in accordance with IEC 61643:21.
- Aluminum enclosure.
- Simple installation.
- Low protection voltage.

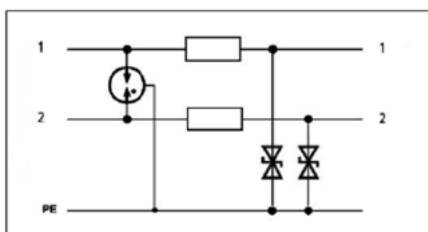


TD/12-DB25-7 electrical diagram

DEVICE MODEL	TD/12-DB25-7
Connection mode	Series
Rated voltage / Transmission speed	12 V _{DC} / 2Mbps
Connection type / Pins	DB9 socket connector / DB9 male plug Pins: 1,2,3,4,6,7,8,9, SG:7
Nominal current I _N	0,5 A
Protected lines	7 wires
Series impedance per line	-
Surge response	
Type of protection	3
Maximum continuous operating voltage (U _C)	60V _{DC}
Rated discharge current I _n (8/20)	250 A (L-SG) / 5 kA(SG-T)
Maximum discharge current I _{max} (8/20)	500 A (L-SG) / 10 kA(SG-T)
Protection level [L-L] (8/20)	≤250 V
Protection level [L-PE] (8/20)	≤500 V
Protection level [L-L] (8/20) (U _p 1kV/μs)	≤70 V
Protection level [SG/PE] (8/20) (U _p 1kV/μs)	≤600 V
Protection steps	1
Installation data	
Enclosure material	Metallic
Installation method	Fastening by screws /35 mm DIN-rail Mounting method
Operating temperature	[-40 °C ... +80°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	0,96
Dimensions (mm) (Height×Wide×Depth)	50×56×25

SURGE PROTECTIVE DEVICES IN DATA AND COMMUNICATION NETWORKS.

- Surge protective devices in data lines must be installed as close as possible to the devices to be protected.
- Data lines protection in accordance with IEC 61643:21.
- Design in two parts. Easy replacement of the protection module.
- The signal is not interrupted during the replacement of the module.
- Two-stage protection.
- Universal protection of analog telecommunications.
- 35 mm DIN-rail Mounting method.

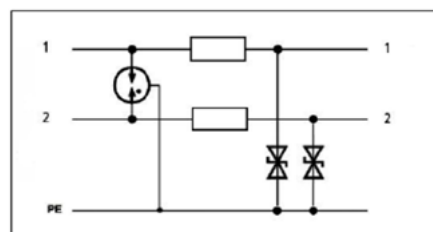


TD-B0 electrical diagram

DEVICE MODEL	TD/5-B0
Connection mode	Series
Rated voltage / Transmission speed	5 V _{DC} / 2Mbps
Connection type	Regleta
Nominal current I _N	0,5 A
Protected lines	2 wires + shielding
Series impedance per line	2,2 Ω
Surge response	
Type of protection	3
Maximum continuous operating voltage (U _c)	5 V _{AC} / 8V _{DC}
Rated discharge current (8/20) I _n	10 kA
Maximum discharge current I _{max} (8/20)	20 kA
Protection level [L-L/L-PE] (8/20)	≤80 V
Protection level [SG/PE] (8/20)	≤350 V
Protection level [L-L/L-PE] (8/20) (U _p 1kV/μs)	≤10 V
Protection level [SG/PE] (8/20) (U _p 1kV/μs)	≤600 V
Protection steps	3
Installation data	
Enclosure material	Polycarbonate UL94 V0
Installation method	35 mm DIN-rail
Operating temperature	[-40 °C ... +80°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	0,62
Dimensions (mm) (Height×Wide×Depth)	90×14×65

SURGE PROTECTIVE DEVICES FOR DATA AND COMMUNICATION NETWORKS.

- Surge protective devices in data lines must be installed as close as possible to the devices to be protected.
- Data lines protection in accordance with IEC 61643:21.
- Design in two parts. Easy replacement of the protection module.
- The signal is not interrupted during the replacement of the module.
- Two-stage protection.
- Universal protection of analog telecommunications.
- 35 mm DIN-rail Mounting method.

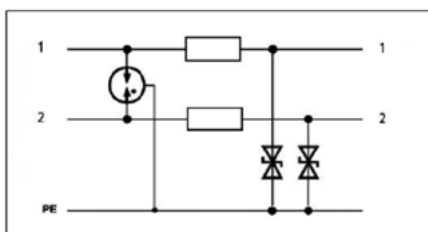


TD-B0 electrical diagram

DEVICE MODEL	TD/12-B0
Connection mode	Series
Rated voltage / Transmission speed	12 V _{DC} / 2Mbps
Connection type	Regleta
Nominal current I _N	0,5 A
Protected lines	2 wires + shielding
Series impedance per line	2,2 Ω
Surge response	
Type of protection	3
Maximum continuous operating voltage (U _c)	12 V _{AC} / 60V _{DC}
Rated discharge current (8/20) I _n	5 kA
Maximum discharge current I _m (8/20)	15 kA
Protection level [L-L/PE] (8/20)	≤250 V
Protection level [SG/PE] (8/20)	≤500 V
Protection level [L-L/PE] (8/20) (U _p 1kV/μs)	≤70 V
Protection level [SG/PE] (8/20) (U _p 1kV/μs)	≤600 V
Protection steps	3
Installation data	
Enclosure material	Polycarbonate UL94 V0
Installation method	35 mm DIN-rail
Operating temperature	[-40 °C ... +80°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	0,62
Dimensions (mm) (Height×Wide×Depth)	90×14×65

SURGE PROTECTIVE DEVICES IN DATA AND COMMUNICATION NETWORKS.

- Surge protective devices in data lines must be installed as close as possible to the devices to be protected.
- Data lines protection in accordance with IEC 61643:21.
- Design in two parts. Easy replacement of the protection module.
- The signal is not interrupted during the replacement of the module.
- Two-stage protection.
- Universal protection of analog telecommunications.
- 35 mm DIN-rail Mounting method.

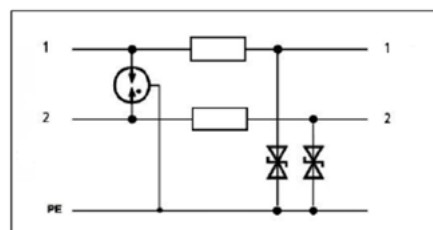


TD-B0 electrical diagram

DEVICE MODEL	TD/24-B0
Connection mode	Series
Rated voltage / Transmission speed	24 V _{DC} / 2Mbps
Connection type	Regleta
Nominal current I _N	0,5 A
Protected lines	2 wires + shielding
Series impedance per line	2,2 Ω
Surge response	
Type of protection	3
Maximum continuous operating voltage (U _c)	24 V _{AC} / 28V _{DC}
Rated discharge current (8/20) I _n	10 kA
Maximum discharge current I _{max} (8/20)	20 kA
Protection level [L-L/PE] (8/20)	≤200 V
Protection level [SG/PE] (8/20)	≤500 V
Protection level [L-L/PE] (8/20) (U _p 1kV/μs)	≤30 V
Protection level [SG/PE] (8/20) (U _p 1kV/μs)	≤600 V
Protection steps	3
Installation data	
Enclosure material	Polycarbonate UL94 V0
Installation method	35 mm DIN-rail
Operating temperature	[-40 °C ... +80°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	0,60
Dimensions (mm) (Height×Wide×Depth)	90×14×65

SURGE PROTECTIVE DEVICES FOR DATA AND COMMUNICATION NETWORKS.

- Surge protective devices in data lines must be installed as close as possible to the devices to be protected.
- Data lines protection in accordance with IEC 61643:21.
- Design in two parts. Easy replacement of the protection module.
- The signal is not interrupted during the replacement of the module.
- Two-stage protection.
- Universal protection of analog telecommunications.
- 35 mm DIN-rail Mounting method.

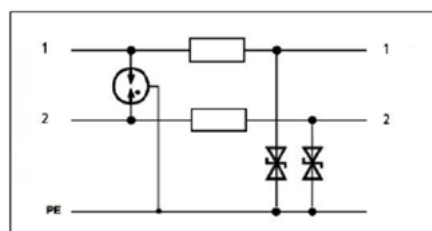


TD-B0 electrical diagram

DEVICE MODEL	TD/48-B0
Connection mode	Series
Rated voltage / Transmission speed	48 V _{DC} / 100MHz
Connection type	Regleta
Nominal current I _N	0,5 A
Protected lines	2 wires
Series impedance per line	4 Ω
Surge response	
Type of protection	3
Maximum continuous operating voltage (U _c)	48 V _{AC} / 60V _{DC}
Rated discharge current (8/20) I _n	5 kA
Maximum discharge current I _{max} (8/20)	10 kA
Protection level [L-L] (8/20)	≤250 V
Protection level [L-PE] (8/20)	≤500 V
Protection level [L-L] (U _p 1kV/μs)	≤70 V
Protection level [L-PE] (U _p 1kV/μs)	≤600 V
Protection steps	3
Installation data	
Enclosure material	Polycarbonate UL94 V0
Installation method	35 mm DIN-rail
Operating temperature	[-40 °C ... +80°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	0,57
Dimensions (mm) (Height×Wide×Depth)	90×14×65

SURGE PROTECTIVE DEVICES IN DATA AND COMMUNICATION NETWORKS.

- Surge protective devices in data lines must be installed as close as possible to the devices to be protected.
- Data lines protection in accordance with IEC 61643:21.
- Design in two parts. Easy replacement of the protection module.
- The signal is not interrupted during the replacement of the module.
- Two-stage protection.
- Universal protection of analog telecommunications.
- 35 mm DIN-rail Mounting method.

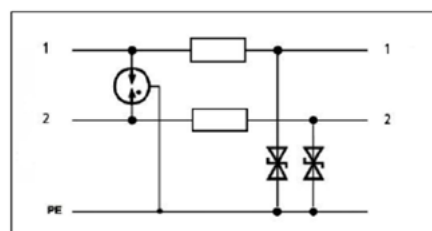


TD-A0 electrical diagram

DEVICE MODEL	TD/110-A0
Connection mode	Series
Rated voltage / Transmission speed	110 V _{DC} / 11 MHz
Connection type	Regleta
Nominal current I _N	0,5 A
Protected lines	2 wires + shielding
Series impedance per line	2,2 Ω
Surge response	
Type of protection	3
Maximum continuous operating voltage (U _c)	110 V _{AC} / 180 V _{DC}
Rated discharge current (8/20) I _n	5 kA
Maximum discharge current I _{max} (8/20)	10 kA
Protection level [L-L/L-PE] (8/20)	≤500 V
Protection level [SG/PE] (8/20)	≤500 V
Protection level [L-L/L-PE] (8/20) (U _p 1kV/μs)	≤350 V
Protection level [SG/PE] (8/20) (U _p 1kV/μs)	≤180 V
Protection steps	2
Installation data	
Enclosure material	Polycarbonate UL94 V0
Installation method	35 mm DIN-rail
Operating temperature	[-25 °C ... +70°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	0,59
Dimensions (Height×Wide×Depth)(mm)	90×14×65

SURGE PROTECTIVE DEVICES FOR DATA AND COMMUNICATION NETWORKS.

- Surge protective devices in data lines must be installed as close as possible to the devices to be protected.
- Data lines protection in accordance with IEC 61643:21.
- Design in two parts. Easy replacement of the protection module.
- The signal is not interrupted during the replacement of the module.
- Two-stage protection.
- Universal protection of analog telecommunications.
- 35 mm DIN-rail Mounting method.

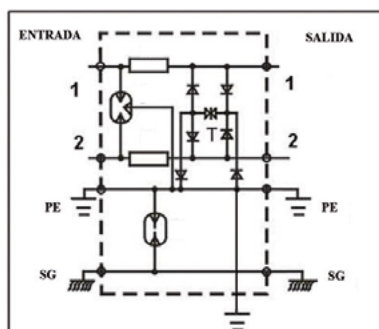


TD-A0 electrical diagram

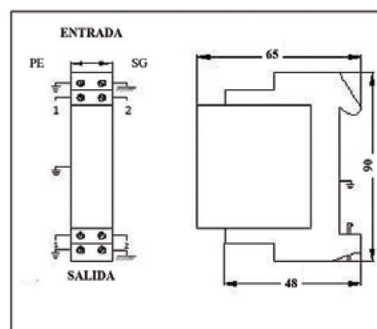
DEVICE MODEL	TD/250-A0
Connection mode	Series
Rated voltage / Transmission speed	250 V _{DC} / 11 MHz
Connection type	Regleta
Nominal current I _N	0,5 A
Protected lines	2 wires + shielding
Series impedance per line	2,2 Ω
Surge response	
Type of protection	3
Maximum continuous operating voltage (U _c)	250 V _{AC} / 280 V _{DC}
Rated discharge current (8/20) I _n	5 kA
Maximum discharge current I _{max} (8/20)	10 kA
Protection level [L-L/L-PE] (8/20)	≤1000 V
Protection level [SG/PE] (8/20)	≤750 V
Protection level [L-L/L-PE] (8/20) (U _p 1kV/μs)	≤900 V
Protection level [SG/PE] (8/20) (U _p 1kV/μs)	≤450 V
Protection steps	2
Installation data	
Enclosure material	Polycarbonate UL94 V0
Installation method	35 mm DIN-rail
Operating temperature	[-25 °C ... +70 °C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	0,59
Dimensions (mm) (Height×Wide×Depth)	90×14×65

SURGE PROTECTIVE DEVICES IN DATA AND COMMUNICATION NETWORKS.

- Surge protective devices in data lines must be installed as close as possible to the devices to be protected.
- Data lines protection in accordance with IEC 61643:21.
- Design in two parts. Easy replacement of the protection module.
- The signal is not interrupted during the replacement of the module.
- Two-stage protection.
- Universal protection of analog telecommunications.
- 35 mm DIN-rail Mounting method.



TD-C0 electrical diagram

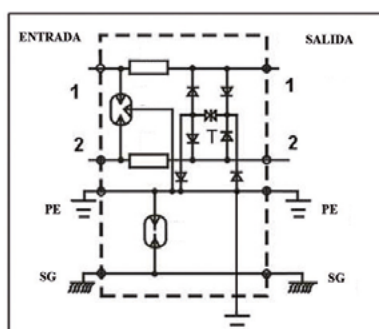


TD-C0 dimensions

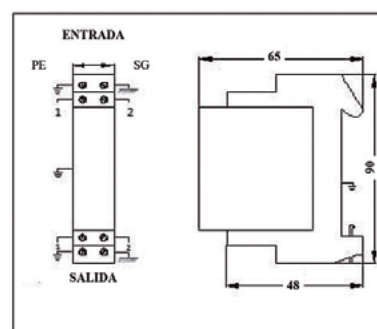
DEVICE MODEL	TD/5-C0
Connection mode	Series
Rated voltage / Transmission speed	5 V _{DC} / 2Mbps
Connection type	Regleta
Nominal current I _N	0,5 A
Protected lines	2 wires + shielding
Series impedance per line	2,2 Ω
Surge response	
Type of protection	3
Maximum continuous operating voltage (U _c)	5 V _{AC} / 8V _{DC}
Rated discharge current (8/20) I _n	10 kA
Maximum discharge current I _{max} (8/20)	20 kA
Protection level [L-L/PE] (8/20)	≤45 V
Protection level [SG/PE] (8/20)	≤500 V
Protection level [L-L/PE] (8/20) (U _p 1kV/μs)	≤38 V
Protection level [SG/PE] (8/20) (U _p 1kV/μs)	≤600 V
Protection steps	3
Installation data	
Enclosure material	Polycarbonate UL94 V0
Installation method	35 mm DIN-rail
Operating temperature	[-40 °C ... +80°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	-
Dimensions (mm) (Height×Wide×Depth)	90×14×65

SURGE PROTECTIVE DEVICES FOR DATA AND COMMUNICATION NETWORKS.

- Surge protective devices in data lines must be installed as close as possible to the devices to be protected.
- Data lines protection in accordance with IEC 61643:21.
- Design in two parts. Easy replacement of the protection module.
- The signal is not interrupted during the replacement of the module.
- Two-stage protection.
- Universal protection of analog telecommunications.
- 35 mm DIN-rail Mounting method.



TD-C0 electrical diagram

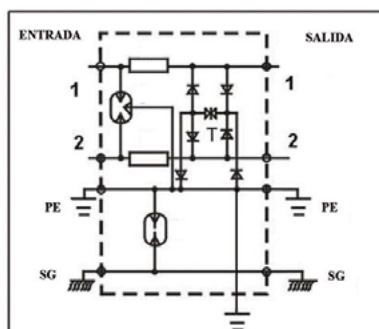


TD-C0 dimensions

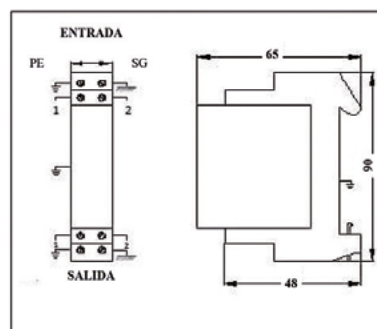
DEVICE MODEL	TD/12-C0
Connection mode	Series
Rated voltage / Transmission speed	12 V _{DC} / 2Mbps
Connection type	Regleta
Nominal current I _N	0,5 A
Protected lines	2 wires + shielding
Series impedance per line	2,2 Ω
Surge response	
Type of protection	3
Maximum continuous operating voltage (U _C)	12 V _{AC} / 15V _{DC}
Rated discharge current (8/20) I _n	10 kA
Maximum discharge current I _{max} (8/20)	20 kA
Protection level [L-L/PE] (8/20)	≤45 V
Protection level [SG/PE] (8/20)	≤500 V
Protection level [L-L/PE] (8/20) (U _p 1kV/μs)	≤38 V
Protection level [SG/PE] (8/20) (U _p 1kV/μs)	≤600 V
Protection steps	3
Installation data	
Enclosure material	Polycarbonate UL94 V0
Installation method	35 mm DIN-rail
Operating temperature	[-40 °C ... +80°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	-
Dimensions (mm) (Height×Wide×Depth)	90×14×65

SURGE PROTECTIVE DEVICES IN DATA AND COMMUNICATION NETWORKS.

- Surge protective devices in data lines must be installed as close as possible to the devices to be protected.
- Data lines protection in accordance with IEC 61643:21.
- Design in two parts. Easy replacement of the protection module.
- The signal is not interrupted during the replacement of the module.
- Two-stage protection.
- Universal protection of analog telecommunications.
- 35 mm DIN-rail Mounting method.



TD-C0 electrical diagram

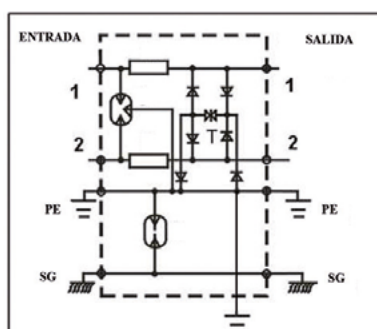


TD-C0 dimensions

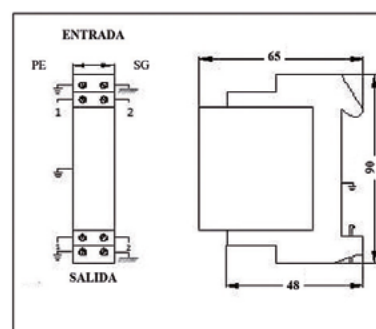
DEVICE MODEL	TD/24-C0
Connection mode	Series
Rated voltage / Transmission speed	24 V _{DC} / 2Mbps
Connection type	Regleta
Nominal current I _N	0,5 A
Protected lines	2 wires + shielding
Series impedance per line	2,2 Ω
Surge response	
Type of protection	3
Maximum continuous operating voltage (U _c)	24 V _{AC} / 28V _{DC}
Rated discharge current (8/20) I _n	10 kA
Maximum discharge current I _{max} (8/20)	20 kA
Protection level [L-L/PE] (8/20)	≤55 V
Protection level [SG/PE] (8/20)	≤500 V
Protection level [L-L/PE] (8/20) (U _p 1kV/μs)	≤48 V
Protection level [SG/PE] (8/20) (U _p 1kV/μs)	≤600 V
Protection steps	3
Installation data	
Enclosure material	Polycarbonate UL94 V0
Installation method	35 mm DIN-rail
Operating temperature	[-40 °C ... +80°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	-
Dimensions (mm) (Height×Wide×Depth)	90×14×65

SURGE PROTECTIVE DEVICES FOR DATA AND COMMUNICATION NETWORKS.

- Surge protective devices in data lines must be installed as close as possible to the devices to be protected.
- Data lines protection in accordance with IEC 61643:21.
- Design in two parts. Easy replacement of the protection module.
- The signal is not interrupted during the replacement of the module.
- Two-stage protection.
- Universal protection of analog telecommunications.
- 35 mm DIN-rail Mounting method.



TD-C0 electrical diagram



TD-C0 dimensions

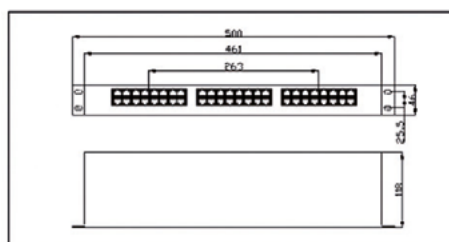
DEVICE MODEL	TD/48-C0
Connection mode	Series
Rated voltage / Transmission speed	48 V _{DC} / 2Mbps
Connection type	Regleta
Nominal current I _N	0,5 A
Protected lines	2 wires + shielding
Series impedance per line	2,2 Ω
Surge response	
Type of protection	3
Maximum continuous operating voltage (U)	48 V _{AC} / 60V _{DC}
Rated discharge current (8/20) I _n	10 kA
Maximum discharge current I _{max} (8/20)	20 kA
Protection level [L-L/PE] (8/20)	≤90 V
Protection level [SG/PE] (8/20)	≤500 V
Protection level [L-L/PE] (8/20) (U _p 1kV/μs)	≤48 V
Protection level [SG/PE] (8/20) (U _p 1kV/μs)	≤600 V
Protection steps	3
Installation data	
Enclosure material	Polycarbonate UL94 V0
Installation method	35 mm DIN-rail
Operating temperature	[-40 °C ... +80°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	-
Dimensions (mm) (Height×Wide×Depth)	90×14×65

SURGE PROTECTIVE DEVICES IN DATA AND COMMUNICATION NETWORKS.

- In data lines, surge protective devices must be installed as close as possible to the devices to be protected.
- Data lines protection in accordance with IEC 61643:21-2005.
- 16 RJ45-connector surge protective modules.
- Two-stage protection.
- 19" design suitable for standard rack.
- Transmission speed 100 Mbps.
- Specific use for Ethernet 10/100 BaseT, ATM and Token ring network protective devices.



TD-RJ45H-24P-Cat6

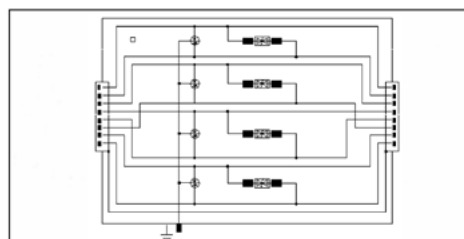


TD-RJ45H Cat6 electrical diagram and dimensions

DEVICE MODEL	TD/5-RJ45-24P Cat6
Connection mode	Series
Rated voltage / Transmission speed	5 V _{DC} / 1000 Mbps
Connection type / Pins	RJ45 socket connector-socket connector / Pins: 1-2, 3-6
Nominal current I _n	1 A
Protected lines	24 4-wires ports
Series impedance per line	-
Surge response	
Type of protection	3
Maximum continuous operating voltage (U _c)	5 V _{AC} / 6 V _{DC}
Rated discharge current [L-L] (8/20) I _n	0,1kA
Rated discharge current [L-PE] (8/20) I _n	5 kA
Maximum discharge current [L-L] (8/20) I _{max}	0,3 kA
Maximum discharge current [L-PE] (8/20) I _{max}	10 kA
Protection level [L-L] (U _p 8/20)	≤24 V
Protection level [L-PE] (U _p 8/20)	≤800 V
Protection level [L-L] (U _p 1kV/μs)	≤24 V
Protection level [L-PE] (U _p 1kV/μs)	≤800 V
Protection steps	1
Installation data	
Enclosure material	Metallic
Installation method	19-inch rack
Operating temperature	[-25 °C ... +70°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	-
Dimensions (mm) (Height×Wide×Depth)	500×118×46

SURGE PROTECTIVE DEVICES FOR DATA AND COMMUNICATION NETWORKS.

- Data lines surge protective devices must be installed as close as possible to the devices to be protected.
- Data lines protection in accordance with IEC 61643:21-2005.
- Two-stages protection.
- Aluminium enclosure.
- RJ45 connection for Cat6, 10/100/1000 T-Base and POE (Power Over Ethernet) technology.
- Simple installation.
- DIN-rail installation also available.

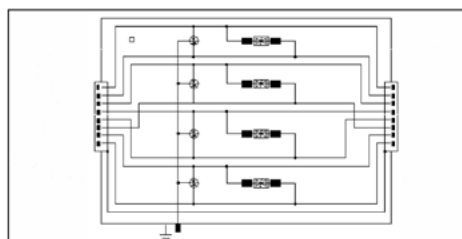


TD-RJ45 Cat6-POE electrical diagram and dimensions

DEVICE MODEL	TD/5-RJ45-8 Cat6-POE
Connection mode	Series
Rated voltage / Transmission speed	5 V _{DC} / 1 Gbps
Connection type / Pins - Pins _{POE}	RJ45 socket-socket connectors / Data: 1-2, 3-6, 4-5, 7-8 - Pins _{POE} : 1&2-3&6, 4&5-7&8
Nominal current I _L	0,8 A
Protected lines	8 wires
Series impedance per line	-
Surge response	
Type of protection	3
Maximum continuous operating voltage (U _c)	Data: 5 V _{AC} / 6V _{DC} - POE: 57V _{DC}
Rated discharge current (8/20) I _n	2,5 kA
Maximum discharge current I _{max} (8/20)	5 kA
Protection level (U _p 1kV/μs)	Data: ≤25 V POE: ≤600 V
Protection steps	2
Installation data	
Enclosure material	Metallic
Installation method	35 mm DIN-rail Mounting method
Operating temperature	[0 °C ... +40°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	0,1
Dimensions (mm) (Height×Wide×Depth)	40×82×30

SURGE PROTECTIVE DEVICES IN DATA AND COMMUNICATION NETWORKS.

- Data lines surge protective devices must be installed as close as possible to the devices to be protected.
- Data lines protection in accordance with IEC 61643:21-2005.
- Two-stages protection.
- Aluminium enclosure.
- RJ45 connection for Cat6, 10/100/1000 T-Base and POE (Power Over Ethernet) technology.
- Simple installation.
- DIN-rail installation also available.

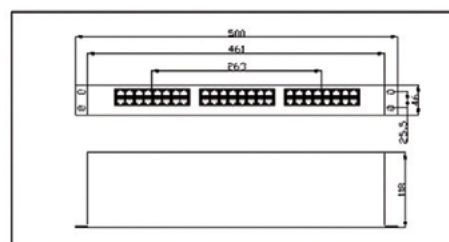


TD-RJ45 Cat6-POE electrical diagram and dimensions

DEVICE MODEL	TD/48-RJ45-8 Cat6-POE
Connection mode	Series
Rated voltage / Transmission speed	48 V _{DC} / 1Gbps
Connection type / Pins - Pins _{POE}	RJ45 socket-socket connectors / Data: 1-2, 3-6, 4-5, 7-8 - Pins _{POE} : 1&2-3&6, 4&5-7&8
Nominal current I _L	0,8 A
Protected lines	8 wires
Series impedance per line	-
Surge response	
Type of protection	3
Maximum continuous operating voltage (U _c)	Data: 48 V _{AC} / 60V _{DC} - POE: 57V _{DC}
Rated discharge current (8/20) I _n	2,5 kA
Maximum discharge current I _{max} (8/20)	5 kA
Protection level (U _p 1kV/μs)	Data: ≤70 V POE: ≤600 V
Protection steps	2
Installation data	
Enclosure material	Metallic
Installation method	35 mm DIN-rail Mounting method
Operating temperature	[0 °C ... +40°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	0,1
Dimensions (mm) (Height×Wide×Depth)	40×82×30

SURGE PROTECTIVE DEVICES FOR DATA AND COMMUNICATION NETWORKS.

- In data lines, surge protective devices must be installed as close as possible to the devices to be protected.
- Data lines protection in accordance with IEC 61643:21-2005.
- 16 RJ45-connector surge protective modules.
- Protección en dos etapas.
- 19" design suitable for standard rack.
- Transmission speed 10 Mbps.



TD-RJ11-16P electrical diagram and dimensions

DEVICE MODEL	TD/110-RJ1-16P
Connection mode	Series
Rated voltage / Transmission speed	110 V _{DC} / 10 Mbps
Connection type / Pins	RJ11 socket connector-socket connector / Pins: 3-4
Corriente nominal	0,5 A
Protected lines	16 2-wires ports
Series impedance per line	-
Surge response	
Type of protection	3
Maximum continuous operating voltage (U _c)	140 V _{AC} / 180 V _{DC}
Rated discharge current (8/20) I _n	2 kA
Corriente de descarga máxima (8/20) I _{max}	5 kA
Protection level [L-L] (8/20)	≤350 V
Protection level [L-PE] (8/20)	≤500 V
Protection level [L-L] (U _p 1kV/μs)	≤230 V
Protection level [L-PE] (U _p 1kV/μs)	≤600 V
Number of surge protection stages	2
Installation data	
Enclosure material	Metallic
Installation method	19-inch rack
Operating temperature	[-25 °C ... +70°C]
IP protection degree	IP 20
Location category	Indoor
Weight (Kg)	0,86
Dimensions (mm) (Height×Wide×Depth)	492×65×45

Protective devices in coaxial cables.

8_1. Technical description

8_2. TD series protective devices data sheet



MODULAR PROTECTIVE DEVICES SPD

PROTECTIVE DEVICES IN COAXIAL CABLES

CD series devices are designed to protect equipment associated with facilities, which use coaxial cable, from transient overvoltages produced by lightning strikes, parasites of industrial origin, etc. and propagated by the communication networks themselves through galvanic and inductive coupling.

These devices must be installed in series with circuits to be protected, such as surveillance cameras, video recorders, telemetry equipment, Optical Fiber/Coax converters, etc.

To choose the properly device to install is necessary to know the connector type, characteristic impedance and operating voltages.

Surge protective devices must be installed as close as possible to the devices to be protected and always connected to earth.

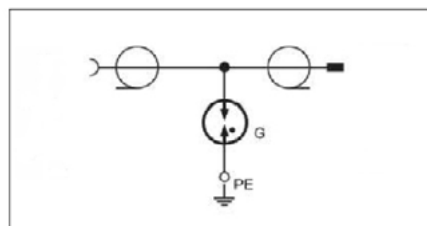
SURGE PROTECTIVE DEVICES FOR COAXIAL CABLES.

Surge protective devices for antenna coaxial lines through GDTs (Gas Discharge Tube).

- Coaxial protective device for antenna in accordance with IEC 61643-21.
- Simple installation.
- BNC type connector.
- Optimal transmission capacity.



CD Series B-50



CD-B-50 diagram

Device Model	CD/90-B-50	
Code	CD/90-F-HH-50	CD/90-F-MH-50
Connector type	BNC socket connector/socket connector	BNC male plug/socket connector
Rated voltage (V) / Frequency bands (MHz)	48 / 0 -2500	
Maximum peak power (W)	25	
Characteristic impedance / Standing-wave ratio (SWR)	50 Ω / < 1,2	
Insertion losses (dB)	< 0,2	
Surge response		
DC sparkover voltage (V)	90	
Maximum discharge current (8/20) I _{max}	20 KA	
Protection level U _p	700 V	
Insulation (GΩ)	> 10	
Installation data		
Operating temperature	-40°C ... +80°C	
Weight (Kg)	0.11	
Dimensions (mm) (Height×Wide×Depth)	30×60×28	

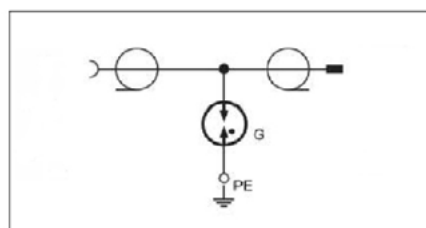
SURGE PROTECTIVE DEVICES FOR COAXIAL CABLES

Surge protective devices for antenna coaxial lines through GDTs (Gas Discharge Tube).

- Coaxial protective device for antenna in accordance with IEC 61643-21.
- Simple installation.
- BNC type connector.
- Optimal transmission capacity.



CD Series B-75



CD-B-75 diagram

Device Model	CD/90-B-75	
Code	CD/90-B-HH-75	CD/90-B-MH-75
Connector type	BNC socket connector/socket connector	BNC male plug/socket connector
Rated voltage (V) / Frequency bands (MHz)	48 / 0 -2500	
Maximum peak power (W)	15	
Characteristic impedance / Standing-wave ratio (SWR)	75 Ω / < 1,2	
Insertion losses (dB)	0,15	
Surge response		
DC sparkover voltage (V)	90	
Maximum discharge current (8/20) I _{max}	20 KA	
Protection level U _p	600 V	
Insulation (GΩ)	> 10	
Installation data		
Operating temperature	-40°C ... +80°C	
Weight (Kg)	0,11	
Dimensions (mm) (Height×Wide×Depth)	30×55×25	

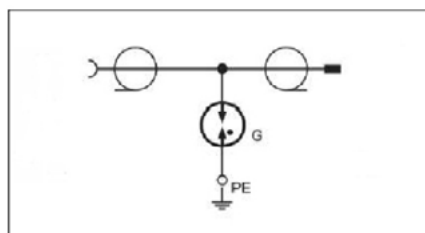
SURGE PROTECTIVE DEVICES FOR COAXIAL CABLES.

Surge protective devices for antenna coaxial lines through GDTs (Gas Discharge Tube).

- Coaxial protective device for antenna in accordance with IEC 61643-21.
- Simple installation.
- F Type connector.
- Optimal transmission capacity.



CD Series F-75



CD-F-75 diagram

Device model	CD/90-F-75	
Code	CD/90-F-HH-75	CD/90-F-MH-75
Connector type	F socket connector/socket connector	F male plug/socket connector
Rated voltage (V) / Frequency bands (MHz)	48 / 0 -2500	
Maximum peak power (W)	25	
Characteristic impedance / Standing-wave ratio (SWR)	75 Ω / < 1,3	
Insertion losses (dB)	0,5	
Surge response		
DC sparkover voltage (V)	90	
Maximum discharge current (8/20) I _{max}	20 KA	
Protection level U _p	700 V	
Insulation (GΩ)	> 10	
Installation data		
Operating temperature	-40°C ... +80°C	
Weight (Kg)		
Dimensions (mm) (Height×Wide×Depth)	30×55×25	

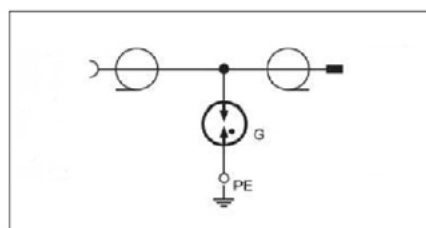
SURGE PROTECTIVE DEVICES FOR COAXIAL CABLES

Surge protective devices for antenna coaxial lines through GDTs (Gas Discharge Tube).

- Coaxial protective device for antenna in accordance with IEC 61643-21.
- Simple installation.
- TNC Type connector.
- Optimal transmission capacity.



CD Series T-50



CD-T-50 diagram

Device Model	CD/90-T-50	
Code	CD/90-NW-HH-50	CD/90-NW-MH-50
Connector type	TNC socket connector/socket connector	TNC male plug/socket connector
Rated voltage (V) / Frequency bands (MHz)	48 / 0 -2500	
Maximum peak power (W)	25	
Characteristic impedance / Standing-wave ratio (SWR)	50Ω / < 1,2	
Insertion losses (dB)	< 0,15	
Surge response		
DC sparkover voltage (V)	90	
Maximum discharge current (8/20) I _{max}	20 KA	
Protection level U _p	700 V	
Insulation (GΩ)	> 10	
Installation data		
Operating temperature	-40°C ... +80°C	
Weight (Kg)	0,11	
Dimensions (mm) (Height×Wide×Depth)	30×75×28	

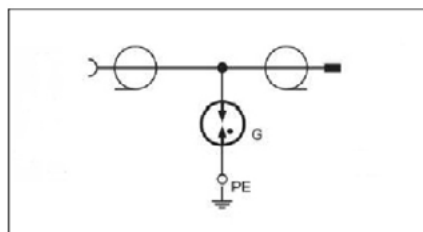
SURGE PROTECTIVE DEVICES FOR COAXIAL CABLES.

Surge protective devices for antenna coaxial lines through GDTs (Gas Discharge Tube).

- Coaxial protective device for antenna in accordance with IEC 61643-21.
- Simple installation.
- TNC Type connector.
- Optimal transmission capacity.



CD Series CD-T-75



CD-F-75 diagram

Device Model	CD/90-T-75	
Code	CD/90-T-HH-75	CD/90-T-MH-75
Connector type	TNC socket connector/socket connector	TNC male plug/socket connector
Rated voltage (V) / Frequency bands (MHz)	48 / 0 -2500	
Maximum peak power (W)	25	
Characteristic impedance / Standing-wave ratio (SWR)	75 Ω / < 1,2	
Insertion losses (dB)	0,15	
Surge response		
DC sparkover voltage (V)	90	
Maximum discharge current (8/20) I _{max}	20 KA	
Protection level U _p	700 V	
Insulation (GΩ)	> 10	
Installation data		
Operating temperature	-40°C ... +80°C	
Weight (Kg)	0,11	
Dimensions (mm) (Height×Wide×Depth)	30×55×25	

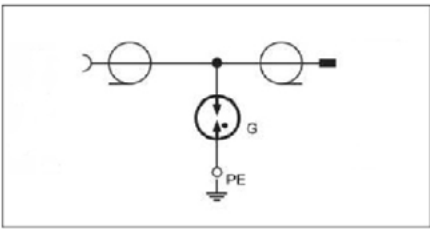
SURGE PROTECTIVE DEVICES FOR COAXIAL CABLES

Surge protective devices for antenna coaxial lines through GDTs (Gas Discharge Tube).

- Coaxial protective device for antenna in accordance with IEC 61643-21.
- Simple installation.
- N Type connector.
- Optimal transmission capacity.



CD Series N-50



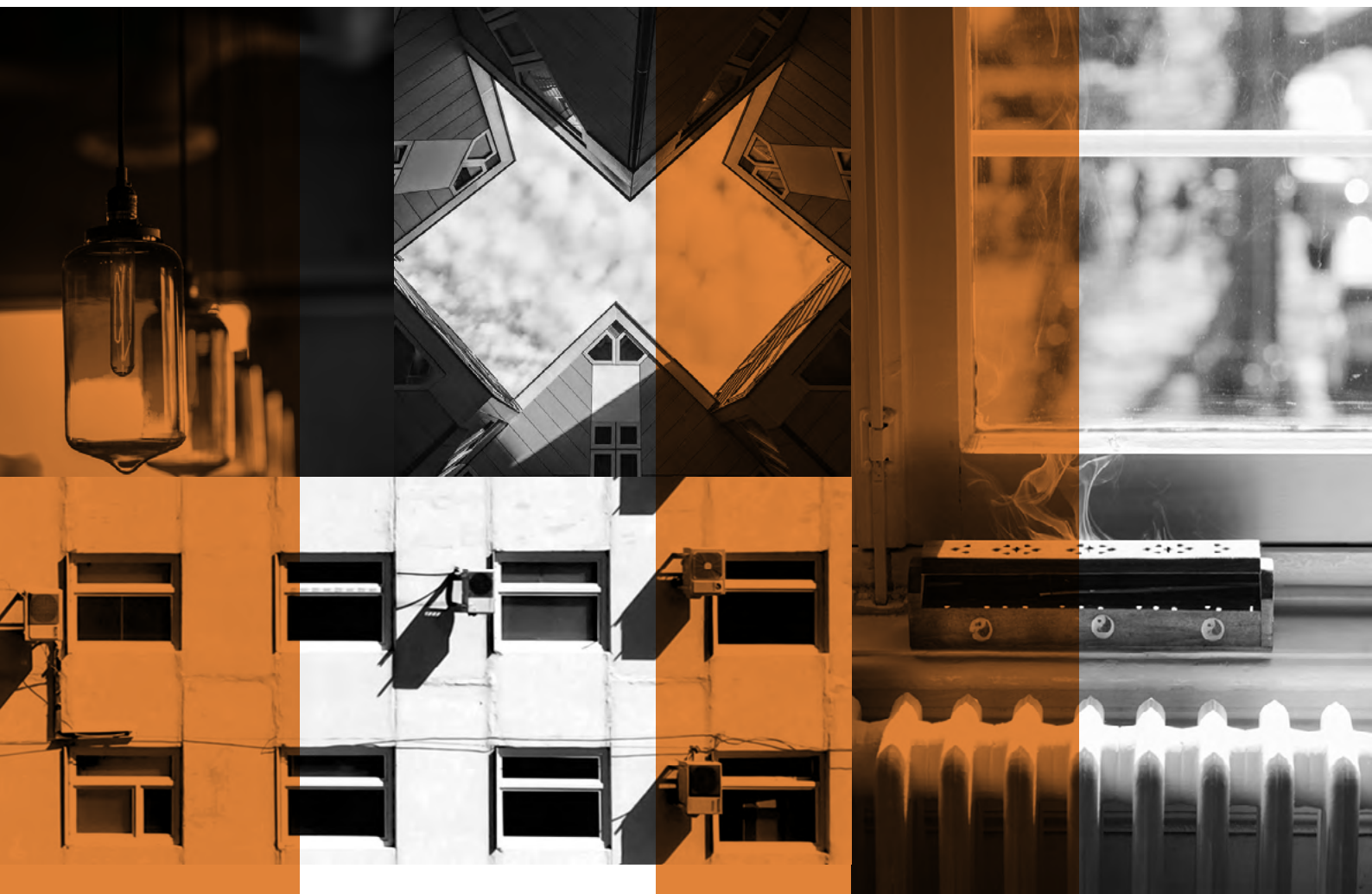
CD-N-50 diagram

DEVICE MODEL	CD/90-N-50	
Code	CD/90-N-HH-50	CD/90-N-MH-50
Connector type	N socket connector/socket connector	N male plug/socket connector
Rated voltage (V) / Frequency bands (MHz)	48 / 0 -2500	
Maximum peak power (W)	25	
Characteristic impedance / Standing-wave ratio (SWR)	50Ω / < 1,2	
Insertion losses (dB)	< 0,5	
Surge response		
DC sparkover voltage (V)	90	
Maximum discharge current (8/20) I _{max}	20 KA	
Protection level U _p	700 V	
Insulation (GΩ)	> 10	
Installation data		
Operating temperature	-40°C ... +80°C	
Weight (Kg)	0,13	
Dimensions (mm) (Height×Wide×Depth)	30×75×28	

Modular permanent overvoltage protective devices according to EN: 50550

3_1. Technical description.

3_2. POP Series protective devices data.



MODULAR PROTECTIVE DEVICES POP

MODULAR PROTECTIVE DEVICES

POP (Power frequency Overvoltage) series protective devices support the European standard EN: 50550. This standard is applied to permanent surge protective devices for domestic use in installations of 230 V_{ac} (between phase and neutral) and 50Hz frequency.

These protective devices will act on the cutting element associated with the same device at the time that a permanent overvoltage occurs and the installation will be disconnected from the electrical network to prevent the device installed downstream of the POP to be affected by overvoltage.

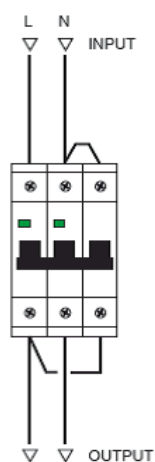
The requirements demanded by the standard EN: 50550 and which comply with our equipment are as follows::

- It is convenient to choose a POP protective device and the main protective switch from the same manufacturer to ensure proper operation.
- A voltage can not be generated in the protective conductor.
- A leakage current to activate the main switch must not be created.
- The following Tripping curve must be met:

Trigger and NON-response time curves of the POP					
	225 V	275 V	300 V	350 V	400 V
Trigger curves	No trigger	15 s	5 s	0,75 s	0,20 s
Maximum non-response time		3 s	1 s	0,25 s	0,07 s

SURGE PROTECTIVE DEVICE SET (POP). AC LOW-VOLTAGE POWER SUPPLY NETWORKS.

- Single-phase surge protective set according to network frequency and standard EN 50550.
- In case the installation is disconnected due to a permanent overvoltage, press the RESET button of the device in the first place and then rearm the magneto-thermal switch.
- A green LED light is available on the front of the device. It will remain illuminated if the device is working properly. In case of POP device failure, the LED will turn off.
- POP devices are replaceables in case of failure
- The integrated automatic circuit breaker is available for usual nominal currents: 20, 25, 32, 40, 50 and 63 A.



POP diagram

Installation mode.

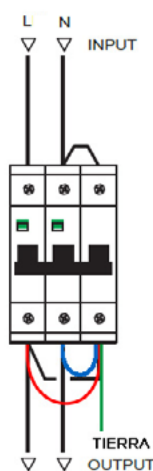
- POP are installed in the head-end system of 230V single-phase facilities.
- The device will be installed between the power control switch (ICP) and the differential switch (ID) and in series with the Low-Voltage line to be protected.
- POP module has two pre-wired connection cables that must be connected downstream of the magneto-thermal circuit breaker of the device.
- One of the wires will be connected to the phase terminal and the other one to the neutral terminal. The order of connection of the cables is indifferent.

DEVICE MODEL	POP-T 2P-20	POP-T 2P-25	POP-T 2P-32	POP-T 2P-40	POP-T 2P-50	POP-T 2P-63
Rated discharge current of IGA (I _n)	20	25	32	40	50	63
Rated AC voltage (U _n)	230					
No-trigger rated voltage	255					
Rated trigger voltage	275 V _{AC} - 3,5 s / 300 V _{AC} - 3,5 s / 350 V _{AC} - 250 ms / 400 V _{AC} - 70 ms					
Network signal indication	Green LED					
Transient overvoltage protection type	Type 2					
Maximum discharge current I _{max} (8/20)	15 kA					
Protection level U _p *	2 kV					
Automatic Magneto-Thermal Interrupter (IGA)						
Number of poles	2 (L - N)					
Tripping curve	C					
Cut-off power	6 kA @ 400 V _{AC}					
Installation data						
Dimensions (mm) (Height×Wide×Depth)	51×81×65 mm (3 DIN modules)					
Operating temperature	[-25 °C ~... +40°C]					
Mounting method	35 mm DIN rail mounted					
Enclosure material	Polycarbonate					
Protection degree	IP 20					
Standards	EN 50550; EN 61643-11; EN 60898					

* When I_n = 1 kA

TEMPORARY AND PERMANENT OVERVOTLAGES PROTECTIVE DEVICE SET (POP). AC LOW-VOLTAGE POWER SUPPLY NETWORKS.

- Single-phase surge protective set according to network frequency and standard EN 50550.
- In case of the device activity and disconnection of the installation due to permanent overvoltage, first press the RESET button, and then rearm the magneto-thermal switch.
- A green LED is available on the front of the device.
- The LED will remain illuminated if the device is working properly. In case of failure of the POP device, the LED will turn off.
- POP devices are replaceables in case of failure
- The integrated automatic circuit breaker is available for usual nominal currents: 20, 25, 32, 40, 50 and 63 A.



POP-T diagram

Installation mode.

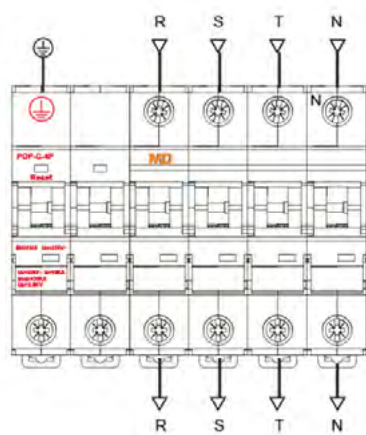
- POP are installed in the head-end system of a 230V single-phase installation.
- The device will be installed in series with the Low-Voltage line to be protected, between the power control switch (ICP) and the differential switch (ID).
- POP module has two pre-wired connection cables that must be connected downstream of the circuit breaker of the device itself.
- One of the wires will be connected to the phase terminal and the other to the neutral terminal. The order of connection of the cables is indifferent.
- POP devices must always be connected to the earth terminal of the installation.

DEVICE MODEL	POP-C 2P-20	POP-C 2P-25	POP-C 2P-32	POP-C 2P-40	POP-C 2P-50	POP-C 2P-63
Rated discharge current IGA (I _n)	20	25	32	40	50	63
Rated AC voltage (U _n)	230					
No-trigger rated voltage	255					
Rated trigger voltage	275 V _{AC} ~ 3,5 s / 300 V _{AC} ~ 3,5 s / 350 V _{AC} ~ 250 ms / 400 V _{AC} ~ 70 ms					
Network signal indication	Green LED					
Transient overvoltage protection type	Type 2					
Maximum discharge current I _{max} (8/20)	15 kA					
Protection level U _p *	2 kV					
Automatic Magneto-Thermal Interrupter (IGA)						
Number of poles	2 (L - N)					
Tripping curve	C					
Cut-off power	6 kA @ 400 V _{AC}					
Installation data						
Dimensions (mm) (Height×Wide×Depth)	51×81×65 mm (3 DIN modules)					
Operating temperature	[-25 °C ~... +40°C]					
Mounting method	35 mm DIN rail mounted					
Enclosure material	Polycarbonate					
Protection degree	IP 20					
Standards	EN 50550; EN 61643-11; EN 60898					

* When I_n = 1 kA

SURGE PROTECTIVE DEVICE SET (POP). AC LOW-VOLTAGE POWER SUPPLY NETWORKS.

- Three-phase permanent overvoltage protective set according to standard EN 50550 and three-phase surge protective set according to standard 61643-11.
- The permanent and transient overvoltage limiter set is integrated together with the circuit breaker protection with no need of any additional wiring.
- By adding this set, the installation will be protected against permanent overvoltages caused by voltage rises in three-phase installation networks with neutral. Protection against transient overvoltages caused by lightning strikes or commutations in the network is also ensured.
- The device measures the voltage in the installation and detects any increase. If this is higher than the assigned value, it acts on the IGA (Automatic General Switch) disconnecting the voltage in the installation.
- El tiempo de actuación dependerá del nivel de sobretensión detectado (conforme Norma EN50550). En el caso de que se produzca una sobretensión transitoria, el equipo la absorbe, evitando que se produzca cualquier daño en los dispositivos conectados a la red.



POP-C 4P diagram

Installation mode.

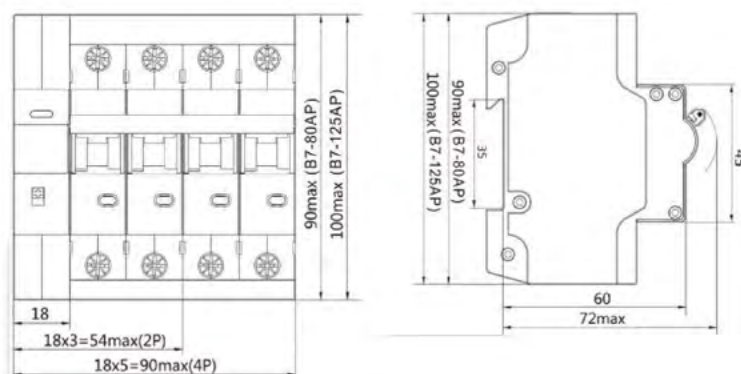
- POP are installed in the head-end system of 230V three-phase facilities.
- The device will be installed between the power control switch (ICP) and the differential switch (ID) and in series with the Low-Voltage line to be protected
- In the figure on the left you can see in detail how the device is installed. The device is powered from the top through the terminals (R, S, T, N and T) marked on the circuit breaker itself. The bottom of the device is saved for output terminals.
- When the automatic protector trips and stays open, reset it by raising the lever once the cause has been eliminated.
- POP devices must always be connected to the earth terminal of the installation.

DEVICE MODEL	POP-C 4P-25	POP-C 4P-32	POP-C 4P-40	POP-C 4P-63
Rated discharge current of IGA (I _n)	25	32	40	63
Rated voltage AC (U _n)	230 / 400			
No-trigger rated voltage [L-N]	255			
Rated voltage	According to EN 50550			
Transient overvoltage protection type	Type 2			
Max. discharge current I _{max} (8/20) [L-N / N-PE]	20 kA			
Protection level U _p *	2,0 kV			
Magneto-thermal circuit breaker (MCB)				
Number of poles	4 (R, S, T, N)			
Tripping curve	C			
Cut-off power	6 kA @ 400 V _{AC}			
Installation data				
Dimensions (mm) (Height×Wide×Depth)	108×86×77 mm (3 DIN modules)			
Operating temperature	[-25 °C ~... +40°C]			
Mounting method	35 mm DIN rail mounted			
Enclosure material	Polycarbonate			
Protection degree	IP 20			
Standards	EN 50550: EN 61643-11: EN 60898			

* When $I_n = 1$ kA

PROTECTION SET AGAINST TRANSIENT AND PERMANENT OVERVOLTAGES WITH AUTOMATIC RECONNECTION FOR ALTERNATING CURRENT SUPPLY LINES IN LOW VOLTAGE.

- Single-phase protective set against permanent and transitory overvoltages with automatic reconnection.
- The permanent and transient overvoltage limiter set is integrated together with the circuit breaker protection with no need of any additional wiring.
- By adding this set, the installation will be protected against permanent overvoltages caused by voltage rises in three-phase installation networks with neutral. Protection against transient overvoltages caused by lightning strikes or commutations in the network is also ensured.
- PTP-R devices measure and detect the voltage increase in the installation. If this is higher than the assigned value, it will disconnect the installation by acting on the IGA (Automatic General Switch). After 3 seconds, if the input voltage has been restored, the device will be automatically reconnected. The "island effect" will be avoided by delaying the reset for 3 seconds.

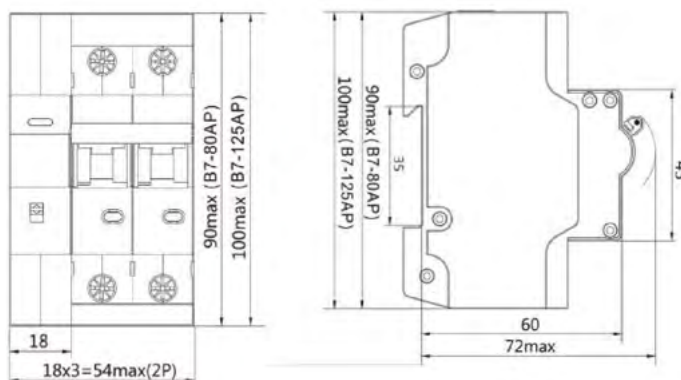


PTP-R 4P 25 diagram and dimensions

Device Model	PTP-R 4P-25	PTP-R 4P-32	PTP-R 4P-40	PTP-R 4P-63
Rated discharge current of IGA (I _n)	25	32	40	63
Rated voltage AC (U _n)	230 / 400			
No-trigger rated nvoltage [L-N]	255 V			
Overvoltage trip [L-N]	> 270 V			
Undervoltage trip [L-N]	< 170 V			
Transient overvoltage protection type	Type 2			
Maximum voltage (U _c) [L-N]	350 V			
Rated discharge current (I _n)	2 kA			
Protection level U _p	< 1,5 kV			
Magnetothermal circuit breaker (MCB)				
Number of poles	4 (R, S, T, N)			
Tripping curve	C			
Cut-off power	6 kA			
Rearm time (s)	5 ~ 10			
Set				
Dimensions (mm)	90×90×77 mm (3 DIN modules)			
Operating temperature	[-25 °C ~... +40°C]			
Mounting method	35 mm DIN rail mounted			
Enclosure material	Polycarbonate			
Protection degree	IP 20			
Standards	IEC 60898-1: EN 61643-11: EN 60898			

PROTECTION SET AGAINST TRANSIENT AND PERMANENT OVERVOLTAGES WITH AUTOMATIC RECONNECTION FOR ALTERNATING CURRENT SUPPLY LINES IN LOW VOLTAGE.

- Single-phase protective set against permanent and transitory overvoltages with automatic reconnection.
- The permanent and transient overvoltage limiter set is integrated together with the circuit breaker protection with no need of any additional wiring.
- By adding this set, the installation will be protected against permanent overvoltages caused by voltage rises in three-phase installation networks with neutral. Protection against transient overvoltages caused by lightning strikes or commutations in the network is also ensured.
- PTP-R devices measure and detect the voltage increase in the installation. If this is higher than the assigned value, it will disconnect the installation by acting on the IGA (Automatic General Switch). After 3 seconds, if the input voltage has been restored, the device will be automatically reconnected. The "island effect" will be avoided by delaying the reset for 3 seconds.



PTP-R 24 diagram and dimensions

MODELO EQUIPO	PTP-R 2P-25	PTP-R 2P-32	PTP-R 2P-40	PTP-R 2P-63
Rated discharge current of IGA (I _n)	25	32	40	63
Rated voltage AC (U _n)	230			
No-trigger rated nvoltage [L-N]	255			
Overvoltage trip [L-N]	> 270			
Undervoltage trip [L-N]	< 170			
Transient overvoltage protection type	Tipo 2			
Maximum voltage (U _c) [L-N]	350			
Rated discharge current (I _n)	2 kA			
Protection level U _p	< 1,5 kV			
Magneto-thermal circuit breaker (MCB)				
Number of poles	2 (L-N)			
Tripping curve	C			
Cut-off power	6 kA			
Rearm time (s)	5 ~ 10			
Set				
Dimensions (mm)	54x90x77 mm (3 DIN modules)			
Operating temperature	[-25 °C ~... +40°C]			
Mounting method	35 mm DIN rail mounted			
Enclosure material	Polycarbonate			
Protection degree	IP 20			
Standards	IEC 60898-1; EN 61643-11; EN 60898			

Installation mode.

- POP devices are installed in the head-end system of 230V single-phase facilities.
- The device will be installed between the power control switch (ICP) and the differential switch (ID) and in series with the Low-Voltage line to be protected
- In the figure on the left is detailed shown how the device is installed. The device is powered from the top through the terminals (L and N) marked on the circuit breaker itself. The bottom of the device is saved for output terminals.

Applications: It is ideal for the protection of electric vehicle chargers by allowing automatic resetting of the company meter with no need to access the charging panel of the vehicle.

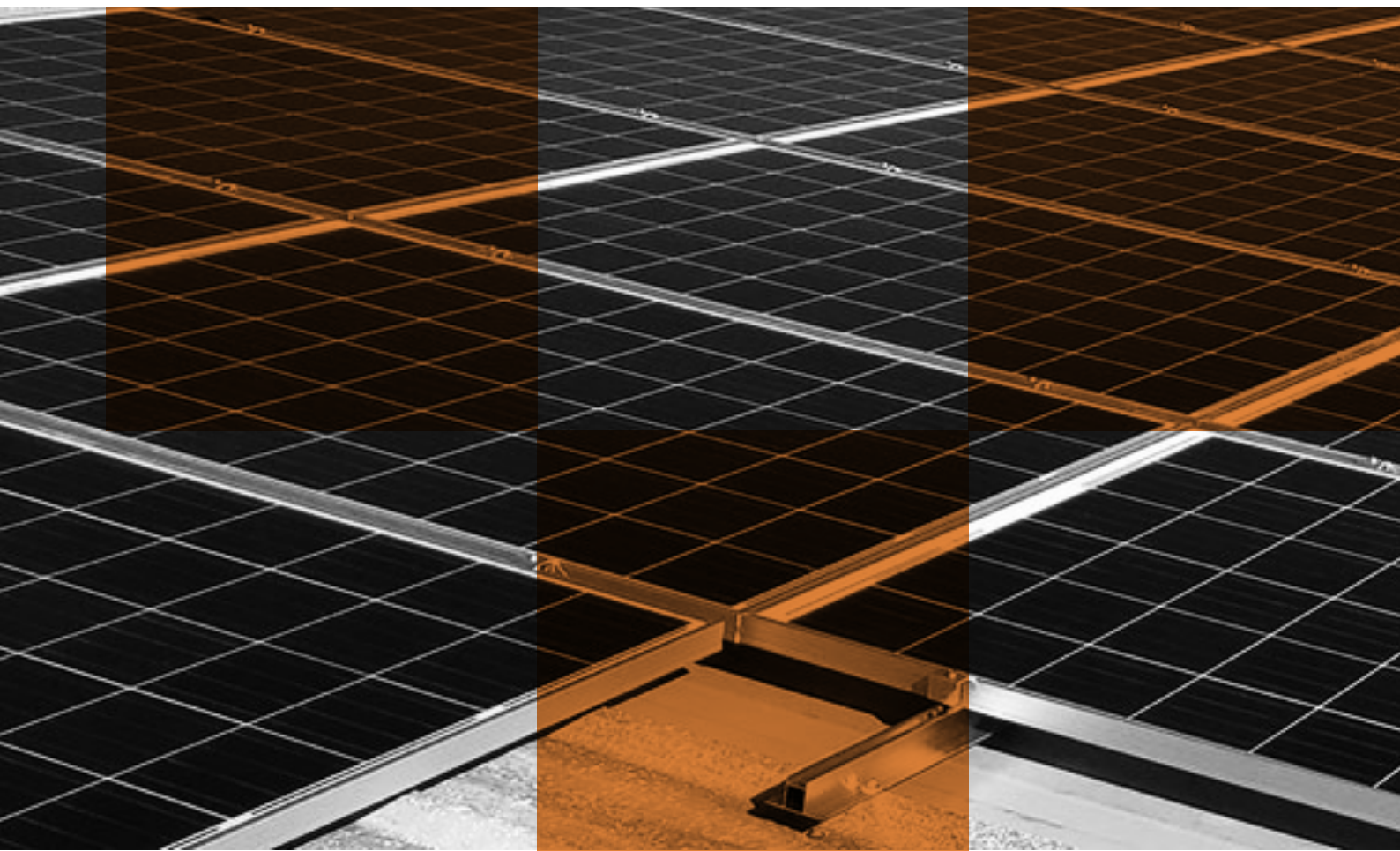
10

SPF_

Modular surge and overcurrent protective panels in photovoltaic facilities.

10_1. Technical description.

10_2. SPF series protective devices data.



MODULAR PROTECTIVE DEVICES SPF

MODULAR SURGE AND OVERCURRENT PROTECTIVE PANELS IN PHOTOVOLTAIC FACILITIES.

SPF modular protective switchboards are a compact and easy-to-install solution for the protection of solar self-consumption installations.

Due to the location of this kind of installation, the set of photovoltaic panels- aka *strings*' of a photovoltaic installation are exposed to the effects of lightning, both by direct impact and through inductions or potential funnels, which cause overcurrents and overvoltages in the installation.

SPF series devices are specially designed for the protection of solar panel installations for self-consumption that are connected to

- The inner of a consumer network.
- Adjustable voltage.
- A physical electrical connection with the transmission or distribution network.

The purpose of this photovoltaic devices series is to protect against overcurrents and surges produced by lightning strikes. These protective devices are installed between the strings and the inverter in direct current photovoltaic generating facilities up to 1500V_{dc}.

MODULAR SURGE AND OVERCURRENT PROTECTIVE SWITCHBOARDS IN PHOTOVOLTAIC INSTALLATIONS.

SPF series devices are specially designed for the protection of self-consumption solar panel installations that are connected to:

- The inside of a consumer network.
- A physical electrical connection with the transmission or distribution network.

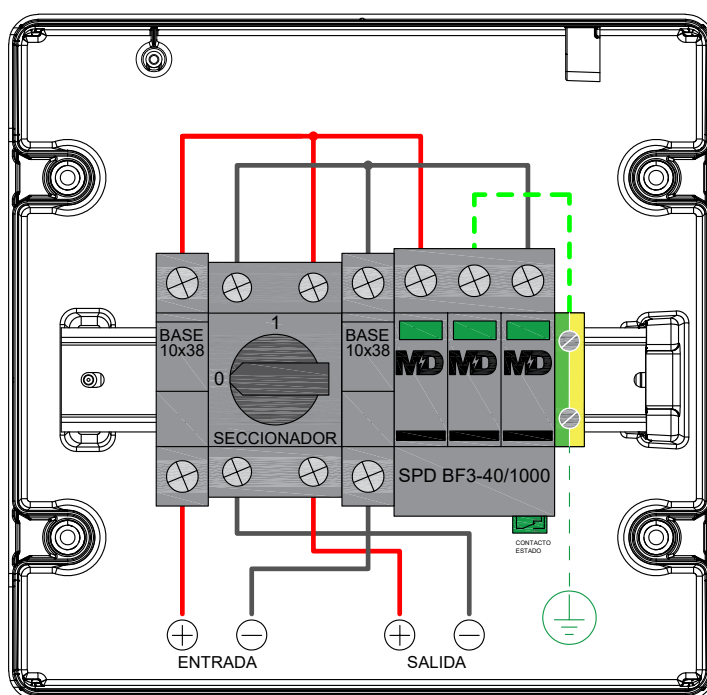
DEVICE MODEL	SPF1/1 - 40/1000/15 (121)
Nº of strings	1
Nº of outputs	1
Continuous voltage V_{dc}	1000
Fuse (A)	15
Selector switch intensity, I_{sc} (A)	16
Connectors	MC4
Surge response	
Protection type (EN 61643-11/IEC 61643-1)	Class II / Type 2
Max. continuous operating voltage (U_c) V_{dc}	1060 V_{dc}
Maximum discharge current (8/20) I_{max}	40 kA
Installation data	
Enclosure material	PC - Polycarbonate
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP65
Location category	Indoor and outdoor
Weight (Kg)	1,75
Dimensions (mm) (Height×Wide×Depth)	231×238×118

The purpose of this photovoltaic protective devices series is to protect against overcurrents and overvoltages produced by lightning strikes in the DC part of current photovoltaic power generation facilities up to 1000Vdc.

Note:

Devices are assembled according to customer requirements

- Different voltages 600 V_{cc} , 1500 V_{cc} .
- With or without DC automatic switches.
- With and without fuses.
- MC4 connectors.
- Cable glands.
- Energy meters.
- With and without isolator switch.



SPF 1/1-40/1000/15 (121) wiring diagram

MODULAR SURGE AND OVERCURRENT PROTECTIVE SWITCHBOARDS IN PHOTOVOLTAIC INSTALLATIONS.

SPF series devices are specially designed for the protection of self-consumption solar panel installations that are connected to:

- The inside of a consumer network.
- A physical electrical connection with the transmission or distribution network.

DEVICE MODEL	SPF1/1 - 40/1000/15 (221)
Nº of strings	1
Nº of outputs	1
Continuous voltage V_{cc}	1000
Fuse (A)	15
Selector switch intensity, I_{sc} (A)	-
Connectors	MC4

Surge response

Protection type (EN 61643-11/IEC 61643-1)	Class II / Type 2
Max. continuous operating voltage(U_c) V_{DC}	1060 V_{DC}
Maximum discharge current(8/20) I_{max}	40 kA

Installation data

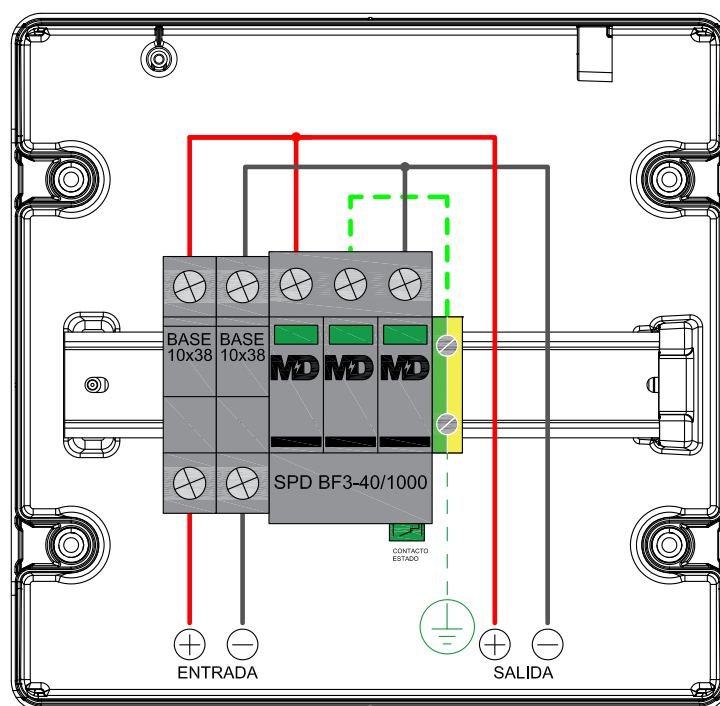
Características envolvente	PC - Polycarbonate
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP65
Location category	Indoor and outdoor
Weight (Kg)	1,44
Dimensions (mm) (Height×Wide×Depth)	231×202×113

The purpose of this photovoltaic protective devices series is to protect against overcurrents and overvoltages produced by lightning strikes in the DC part of current photovoltaic power generation facilities up to 1000Vdc.

Note:

Devices are assembled according to customer requirements

- Different voltages 600 V_{cc} , 1500 V_{cc} .
- With or without DC automatic switches.
- With and without fuses.
- MC4 connectors.
- Cable glands.
- Energy meters.
- With and without isolator switch.



SPF 1/1-40/1000/15 (221) wiring diagram

MODULAR SURGE AND OVERCURRENT PROTECTIVE SWITCHBOARDS IN PHOTOVOLTAIC INSTALLATIONS.

SPF series devices are specially designed for the protection of self-consumption solar panel installations that are connected to:

- The inside of a consumer network.
- A physical electrical connection with the transmission or distribution network.

DEVICE MODEL	SPF2/2 - 40/1000/15 (121)
Nº of strings	2
Nº of outputs	2
Continuous voltage V_{cc}	1000
Fuse (A)	15
Selector switch intensity, I_{sc} (A)	2×16
Connectors	MC4

Surge response	
Protection type (EN 61643-11/IEC 61643-1)	Class II / Type 2
Max. continuous operating voltage (U_c) V_{dc}	1060 V_{dc}
Maximum discharge current (8/20) I_{max}	40 kA

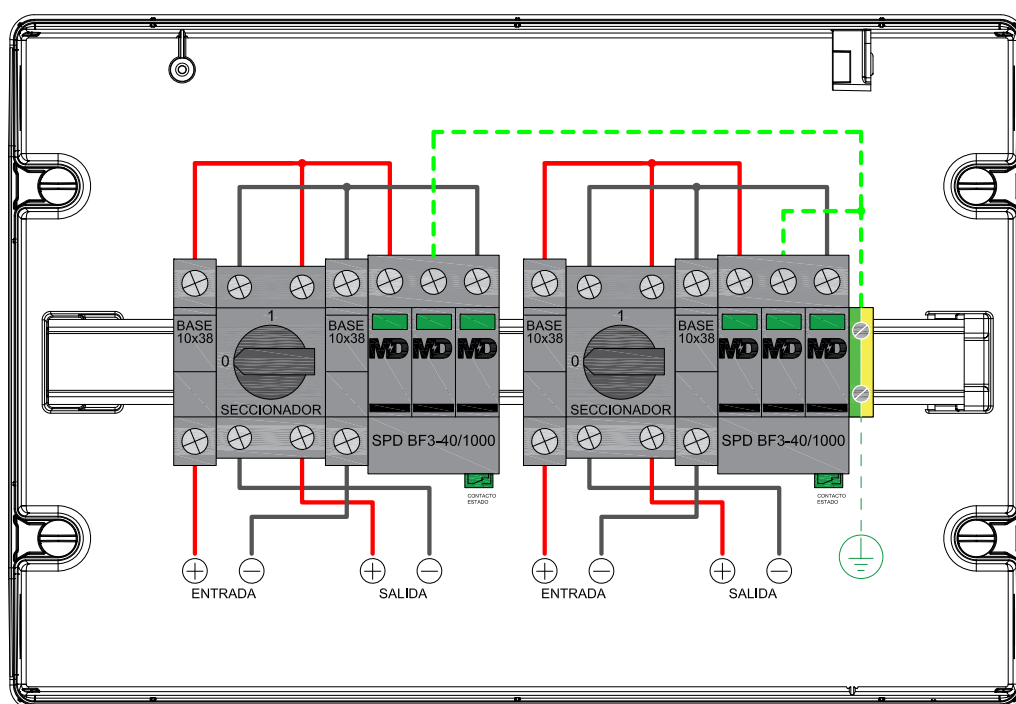
Installation data	
Características envolvente	PC - Polycarbonate
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP65
Location category	Indoor and outdoor
Weight (Kg)	3,34
Dimensions (mm) (Height×Wide×Depth)	286×418×148

The purpose of this photovoltaic protective devices series is to protect against overcurrents and overvoltages produced by lightning strikes in the DC part of current photovoltaic power generation facilities up to 1000Vdc.

Note:

Devices are assembled according to customer requirements

- Different voltages 600 V_{cc} , 1500 V_{cc} .
- With or without DC automatic switches.
- With and without fuses.
- MC4 connectors.
- Cable glands.
- Energy meters.
- With and without isolator switch.



SPF 2/2-40/1000/15 (121) wiring diagram

MODULAR SURGE AND OVERCURRENT PROTECTIVE SWITCHBOARDS IN PHOTOVOLTAIC INSTALLATIONS.

SPF series devices are specially designed for the protection of self-consumption solar panel installations that are connected to:

- The inside of a consumer network.
- A physical electrical connection with the transmission or distribution network.

DEVICE MODEL	SPF2/2 - 40/1000/15 (221)
N° of strings	2
N° of outputs	2
Continuous voltage V_{cc}	1000
Fuse (A)	15
Selector switch intensity, I_{sc} (A)	-
Connectors	MC4

Surge response

Protection type (EN 61643-11/IEC 61643-1)	Class II / Type 2
Max. continuous operating voltage (U_c) V_{DC}	1060 V_{DC}
Maximum discharge current (8/20) I_{max}	40 kA

Installation data

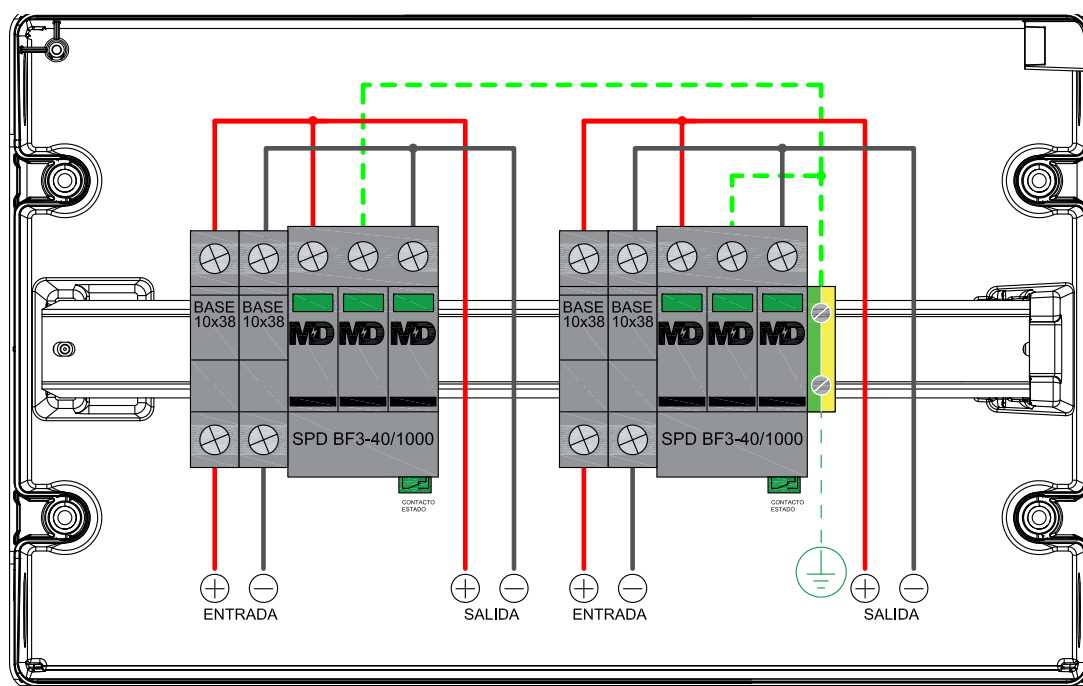
Características envolvente	PC - Polycarbonate
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP65
Location category	Indoor and outdoor
Weight (Kg)	2.94
Dimensions (mm) (Height×Wide×Depth)	246×310×148

The purpose of this photovoltaic protective devices series is to protect against overcurrents and overvoltages produced by lightning strikes in the DC part of current photovoltaic power generation facilities up to 1000Vdc.

Note:

Devices are assembled according to customer requirements

- Different voltages 600 V_{cc} , 1500 V_{cc} .
- With or without DC automatic switches.
- With and without fuses.
- MC4 connectors.
- Cable glands.
- Energy meters.
- With and without isolator switch.



SPF 2/2-40/1000/15 (221) wiring diagram

MODULAR SURGE AND OVERCURRENT PROTECTIVE SWITCHBOARDS IN PHOTOVOLTAIC INSTALLATIONS.

SPF series devices are specially designed for the protection of self-consumption solar panel installations that are connected to:

- The inside of a consumer network.
- A physical electrical connection with the transmission or distribution network.

DEVICE MODEL	SPF3/3 - 40/1000/15 (121)
Nº of strings	3
Nº of outputs	3
Continuous voltage V_{cc}	1000
Fuse (A)	15
Selector switch intensity, I_{sc} (A)	3×16
Connectors	MC4

Surge response	
Protection type (EN 61643-11/IEC 61643-1)	Class II / Type 2
Max. continuous operating voltage (U_c) V_{DC}	1060 V_{DC}
Maximum discharge current (8/20) I_{max}	40 kA

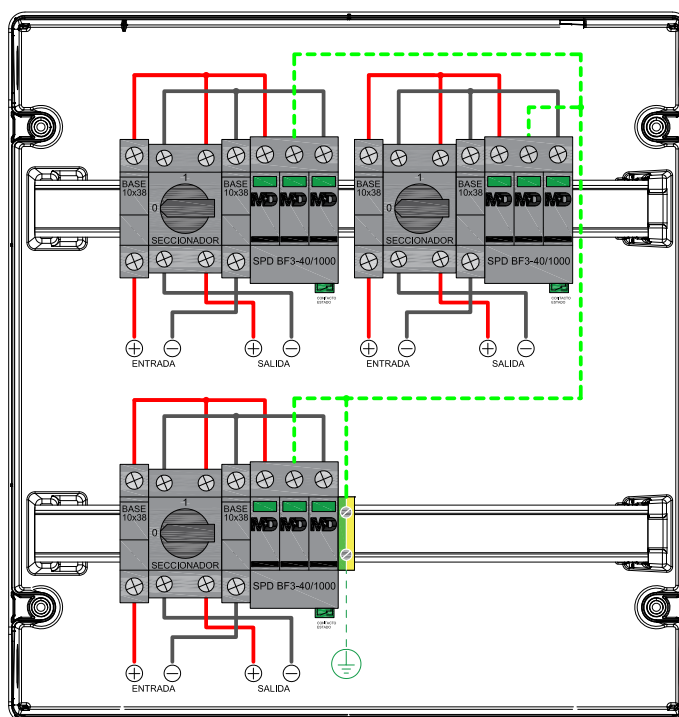
Installation data	
Características envolvente	PC - Polycarbonate
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP65
Location category	Indoor and outdoor
Weight (Kg)	4,25
Dimensions (mm) (Height×Wide×Depth)	436×418×148

The purpose of this photovoltaic protective devices series is to protect against overcurrents and overvoltages produced by lightning strikes in the DC part of current photovoltaic power generation facilities up to 1000Vdc.

Note:

Devices are assembled according to customer requirements

- Different voltages 600 V_{cc} , 1500 V_{cc} .
- With or without DC automatic switches.
- With and without fuses.
- MC4 connectors.
- Cable glands.
- Energy meters.
- With and without isolator switch.



SPF 3/3-40/1000/15 (121) wiring diagram

MODULAR SURGE AND OVERCURRENT PROTECTIVE SWITCHBOARDS IN PHOTOVOLTAIC INSTALLATIONS.

SPF series devices are specially designed for the protection of self-consumption solar panel installations that are connected to:

- The inside of a consumer network.
- A physical electrical connection with the transmission or distribution network.

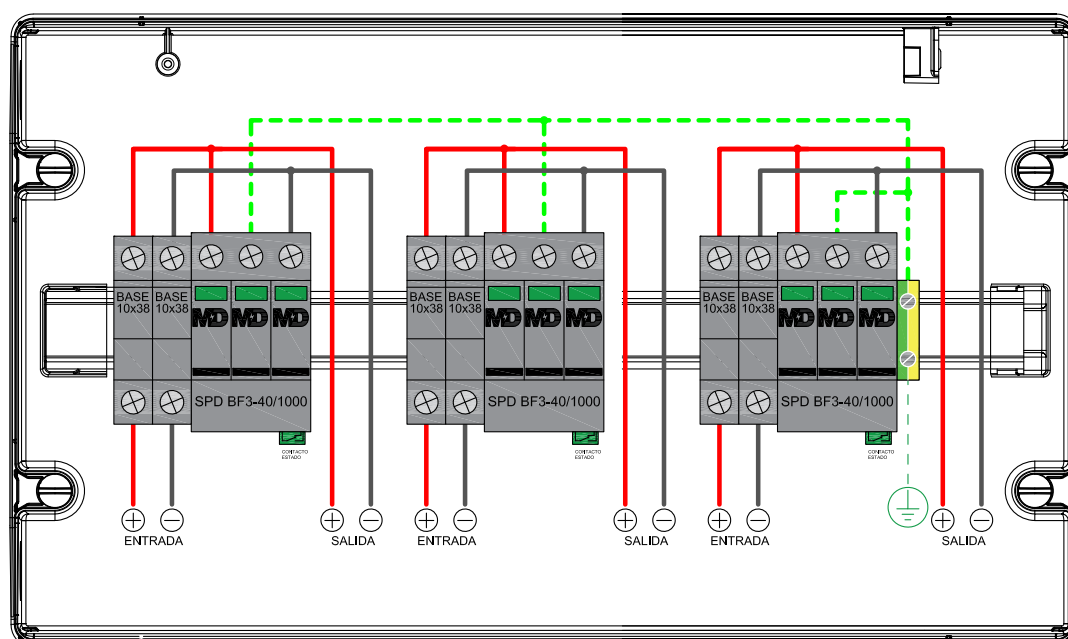
DEVICE MODEL	SPF3/3 - 40/1000/15 (221)
Nº of strings	3
Nº of outputs	3
Continuous voltage V_{cc}	1000
Fuse (A)	15
Selector switch intensity, I_{sc} (A)	-
Connectors	MC4
Surge response	
Protection type (EN 61643-11/IEC 61643-1)	Class II / Type 2
Max. continuous operating voltage(U_c) V_{DC}	1060 V_{DC}
Maximum discharge current(8/20) I_{max}	40 kA
Installation data	
Características envolvente	PC - Polycarbonate
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP65
Location category	Indoor and outdoor
Weight (Kg)	3,36
Dimensions (mm) (Height×Wide×Depth)	286×418×148

The purpose of this photovoltaic protective devices series is to protect against overcurrents and overvoltages produced by lightning strikes in the DC part of current photovoltaic power generation facilities up to 1000Vdc.

Note:

Devices are assembled according to customer requirements

- Different voltages 600 V_{cc} , 1500 V_{cc} .
- With or without DC automatic switches.
- With and without fuses.
- MC4 connectors.
- Cable glands.
- Energy meters.
- With and without isolator switch.



SPF 3/3-40/1000/15 (221) wiring diagram

MODULAR SURGE AND OVERCURRENT PROTECTIVE SWITCHBOARDS IN PHOTOVOLTAIC INSTALLATIONS.

SPF series devices are specially designed for the protection of self-consumption solar panel installations that are connected to:

- The inside of a consumer network.
- A physical electrical connection with the transmission or distribution network.

DEVICE MODEL	SPF1/1-40/1000/15 (121)
Nº of strings	4
Nº of outputs	4
Continuous voltage V_{cc}	1000
Fuse (A)	15
Selector switch intensity, I_{sc} (A)	4×16
Connectors	MC4

Surge response	
Protection type (EN 61643-11/IEC 61643-1)	Class II / Type 2
Max. continuous operating voltage (U_c) V_{DC}	1060 V_{DC}
Maximum discharge current (8/20) I_{max}	40 kA

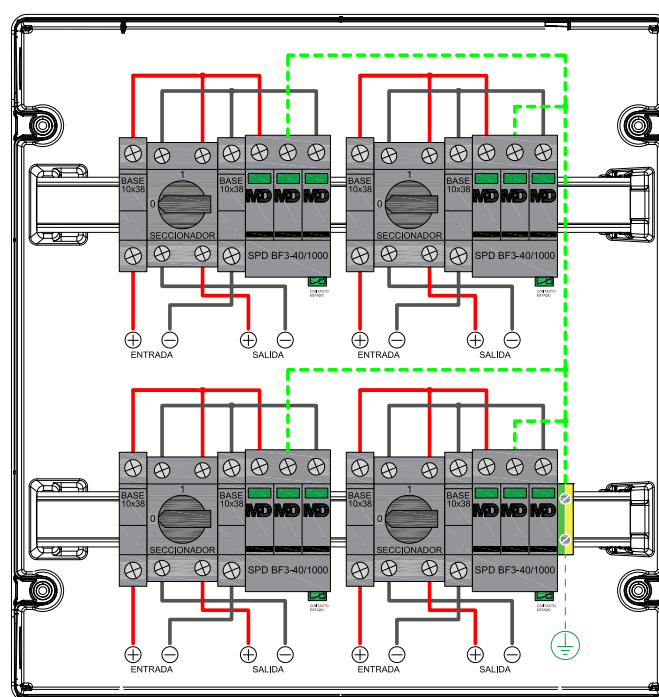
Installation data	
Características envolvente	PC - Polycarbonate
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP65
Location category	Indoor and outdoor
Weight (Kg)	5,53
Dimensions (mm) (Height×Wide×Depth)	436x418x148

The purpose of this photovoltaic protective devices series is to protect against overcurrents and overvoltages produced by lightning strikes in the DC part of current photovoltaic power generation facilities up to 1000Vdc.

Note:

Devices are assembled according to customer requirements

- Different voltages 600 V_{cc} , 1500 V_{cc} .
- With or without DC automatic switches.
- With and without fuses.
- MC4 connectors.
- Cable glands.
- Energy meters.
- With and without isolator switch.



SPF 4/4-40/1000/15 (121) wiring diagram

MODULAR SURGE AND OVERCURRENT PROTECTIVE SWITCHBOARDS IN PHOTOVOLTAIC INSTALLATIONS.

SPF series devices are specially designed for the protection of self-consumption solar panel installations that are connected to:

- The inside of a consumer network.
- A physical electrical connection with the transmission or distribution network.

DEVICE MODEL	SPF4/4 - 40/1000/15 (221)
Nº of strings	4
Nº of outputs	4
Continuous voltage V_{cc}	1000
Fuse (A)	15
Selector switch intensity, I_{sc} (A)	-
Connectors	MC4

Surge response

Protection type (EN 61643-11/IEC 61643-1)	Class II / Type 2
Max. continuous operating voltage(U_c) V_{DC}	1060 V_{DC}
Maximum discharge current(8/20) I_{max}	40 kA

Installation data

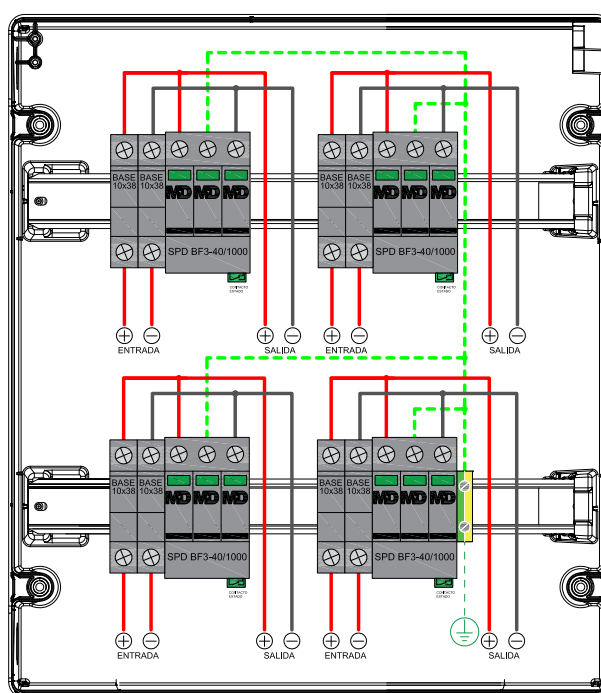
Características envolvente	PC - Polycarbonate
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP65
Location category	Indoor and outdoor
Weight (Kg)	4,73
Dimensions (mm) (Height×Wide×Depth)	436×310×148

The purpose of this photovoltaic protective devices series is to protect against overcurrents and overvoltages produced by lightning strikes in the DC part of current photovoltaic power generation facilities up to 1000Vdc.

Note:

Devices are assembled according to customer requirements

- Different voltages 600 V_{cc} , 1500 V_{cc} .
- With or without DC automatic switches.
- With and without fuses.
- MC4 connectors.
- Cable glands.
- Energy meters.
- With and without isolator switch.



SPF 4/4-40/1000/15 (221) wiring diagram

MODULAR SURGE AND OVERCURRENT PROTECTIVE SWITCHBOARDS IN PHOTOVOLTAIC INSTALLATIONS.

SPF series devices are specially designed for the protection of self-consumption solar panel installations that are connected to:

- The inside of a consumer network.
- A physical electrical connection with the transmission or distribution network.

DEVICE MODEL	SPF4/2 - 40/1000/15 (121)
Nº of strings	4
Nº of outputs	2
Continuous voltage V_{cc}	1000
Fuse (A)	15
Selector switch intensity, I_{sc} (A)	2×30
Connectors	MC4

Surge response	
Protection type (EN 61643-11/IEC 61643-1)	Class II / Type 2
Max. continuous operating voltage (U_c) V_{DC}	1060 V_{DC}
Maximum discharge current (8/20) I_{max}	40 kA

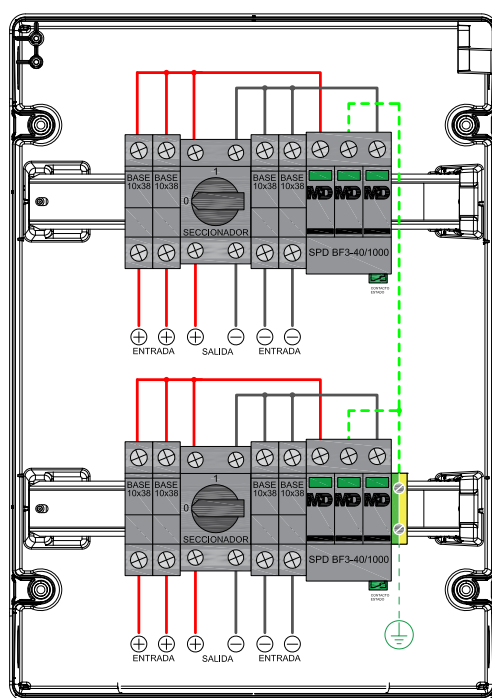
Installation data	
Características envolvente	PC - Polycarbonate
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP65
Location category	Indoor and outdoor
Weight (Kg)	3,73
Dimensions (mm) (Height×Wide×Depth)	436×310×148

The purpose of this photovoltaic protective devices series is to protect against overcurrents and overvoltages produced by lightning strikes in the DC part of current photovoltaic power generation facilities up to 1000Vdc.

Note:

Devices are assembled according to customer requirements

- Different voltages 600 V_{cc} , 1500 V_{cc} .
- With or without DC automatic switches.
- With and without fuses.
- MC4 connectors.
- Cable glands.
- Energy meters.
- With and without isolator switch.



SPF 4/2-40/1000/15 (121) wiring diagram

MODULAR SURGE AND OVERCURRENT PROTECTIVE SWITCHBOARDS IN PHOTOVOLTAIC INSTALLATIONS.

SPF series devices are specially designed for the protection of self-consumption solar panel installations that are connected to:

- The inside of a consumer network.
- A physical electrical connection with the transmission or distribution network.

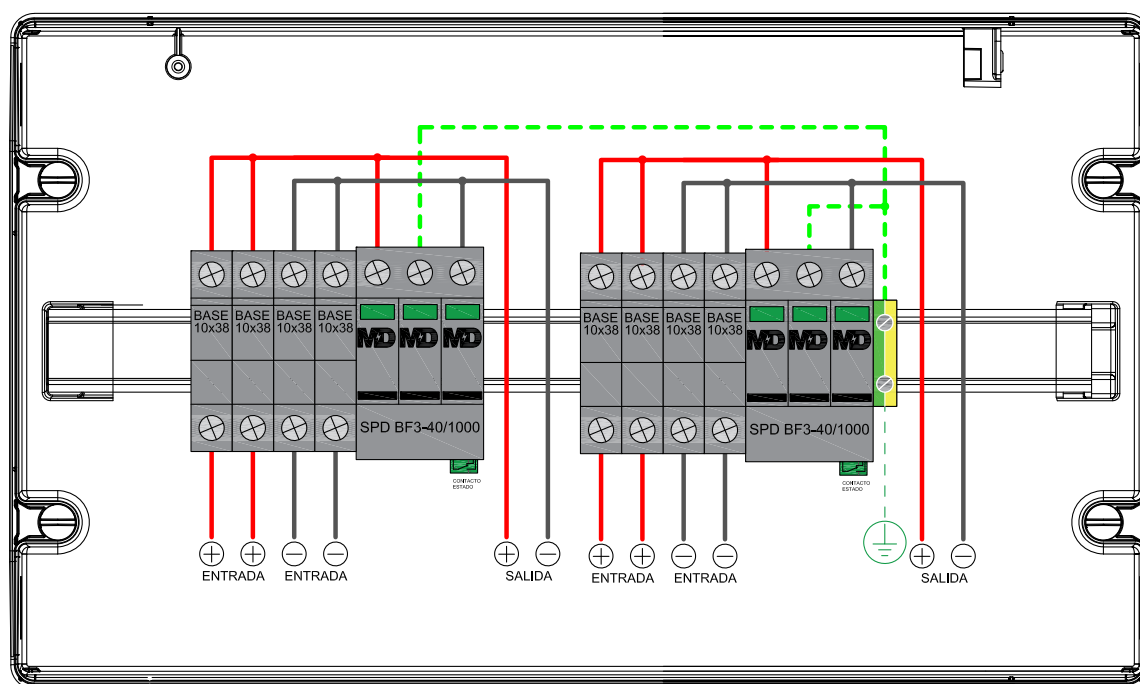
DEVICE MODEL	SPF4/2 - 40/1000/15 (221)
Nº of strings	4
Nº of outputs	2
Continuous voltage V_{cc}	1000
Fuse (A)	15
Selector switch intensity, I_{sc} (A)	-
Connectors	MC4
Surge response	
Protection type (EN 61643-11/IEC 61643-1)	Class II / Type 2
Max. continuous operating voltage(U_c) V_{DC}	1060 V_{DC}
Maximum discharge current(8/20) I_{max}	40 kA
Installation data	
Características envolvente	PC - Polycarbonate
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP65
Location category	Indoor and outdoor
Weight (Kg)	2.94
Dimensions (mm) (Height×Wide×Depth)	286×418×148

The purpose of this photovoltaic protective devices series is to protect against overcurrents and overvoltages produced by lightning strikes in the DC part of current photovoltaic power generation facilities up to 1000Vdc.

Note:

Devices are assembled according to customer requirements

- Different voltages 600 V_{cc} , 1500 V_{cc} .
- With or without DC automatic switches.
- With and without fuses.
- MC4 connectors.
- Cable glands.
- Energy meters.
- With and without isolator switch.



SPF 4/2-40/1000/15 (221) wiring diagram

MODULAR SURGE AND OVERCURRENT PROTECTIVE SWITCHBOARDS IN PHOTOVOLTAIC INSTALLATIONS.

SPF series devices are specially designed for the protection of self-consumption solar panel installations that are connected to:

- The inside of a consumer network.
- A physical electrical connection with the transmission or distribution network.

DEVICE MODEL	SPF6/2 - 40/1000/15 (121)
Nº of strings	6
Nº of outputs	2
Continuous voltage V_{cc}	1000
Fuse (A)	15
Selector switch intensity, I_{sc} (A)	2×50
Connectors	MC4

Surge response	
Protection type (EN 61643-11/IEC 61643-1)	Class II / Type 2
Max. continuous operating voltage(U_c) V_{dc}	1060 V_{dc}
Maximum discharge current(8/20) I_{max}	40 kA

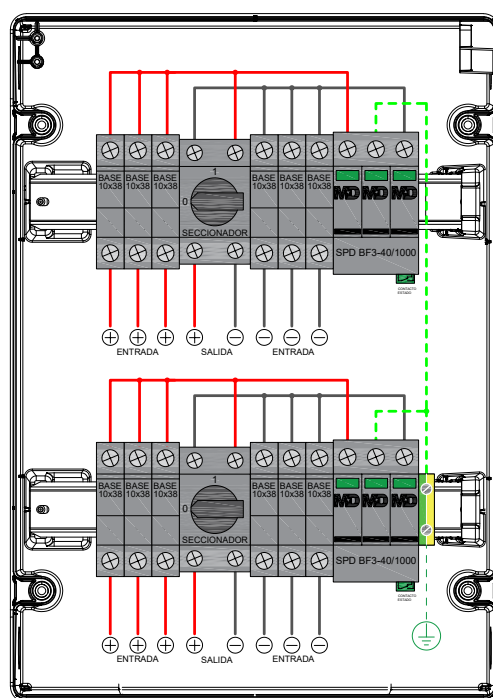
Installation data	
Características envolvente	PC - Polycarbonate
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP65
Location category	Indoor and outdoor
Weight (Kg)	3,84
Dimensions (mm) (Height×Wide×Depth)	436×310×148

The purpose of this photovoltaic protective devices series is to protect against overcurrents and overvoltages produced by lightning strikes in the DC part of current photovoltaic power generation facilities up to 1000Vdc.

Note:

Devices are assembled according to customer requirements

- Different voltages 600 V_{cc} , 1500 V_{cc} .
- With or without DC automatic switches.
- With and without fuses.
- MC4 connectors.
- Cable glands.
- Energy meters.
- With and without isolator switch.



SPF 6/2-40/1000/15 (121) wiring diagram

MODULAR SURGE AND OVERCURRENT PROTECTIVE SWITCHBOARDS IN PHOTOVOLTAIC INSTALLATIONS.

SPF series devices are specially designed for the protection of self-consumption solar panel installations that are connected to:

- The inside of a consumer network.
- A physical electrical connection with the transmission or distribution network.

DEVICE MODEL	SPF6/2 - 40/1000/15 (221)
Nº of strings	6
Nº of outputs	2
Continuous voltage V_{cc}	1000
Fuse (A)	15
Selector switch intensity, I_{sc} (A)	-
Connectors	MC4

Surge response

Protection type (EN 61643-11/IEC 61643-1)	Class II / Type 2
Max. continuous operating voltage (U_c) V_{DC}	1060 V_{DC}
Maximum discharge current (8/20) I_{max}	40 kA

Installation data

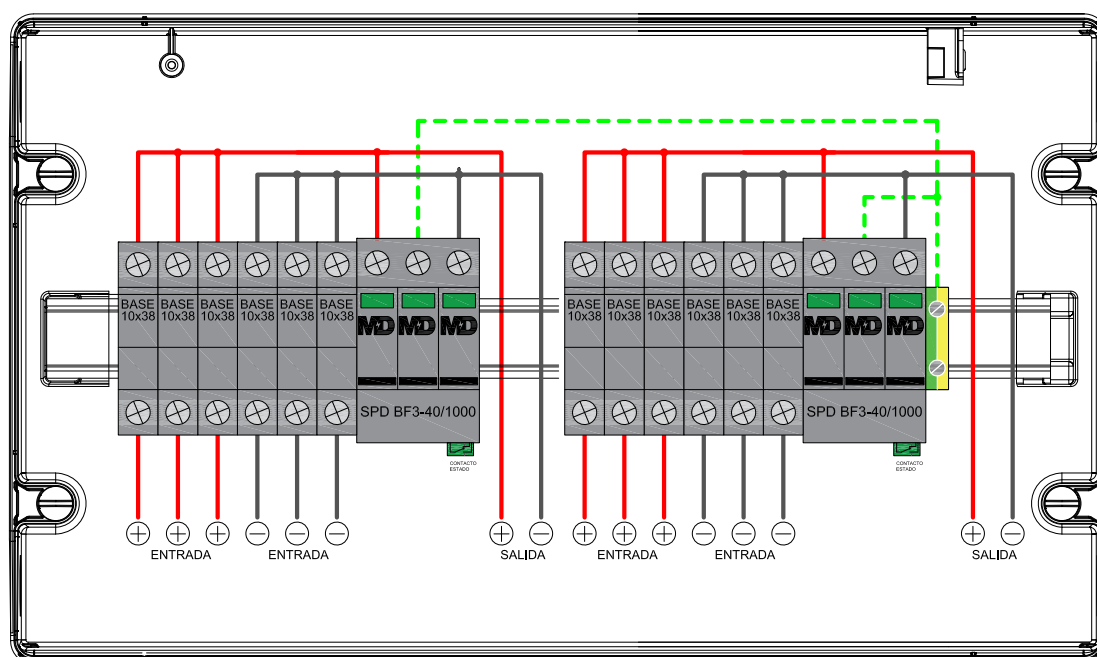
Características envolvente	PC - Polycarbonate
Operating temperature	-40 °C ... +80 °C
IP protection degree	IP65
Location category	Indoor and outdoor
Weight (Kg)	3,00
Dimensions (mm) (Height×Wide×Depth)	286×418×148

The purpose of this photovoltaic protective devices series is to protect against overcurrents and overvoltages produced by lightning strikes in the DC part of current photovoltaic power generation facilities up to 1000Vdc.

Note:

Devices are assembled according to customer requirements

- Different voltages 600 V_{cc} , 1500 V_{cc} .
- With or without DC automatic switches.
- With and without fuses.
- MC4 connectors.
- Cable glands.
- Energy meters.
- With and without isolator switch.



SPF 6/2-40/1000/15 (221) wiring diagram

11

SVE_

Modular surge and overcurrent protective switchboards in electric vehicles charge stations.

11_1. Technical description.

11_2. SPVE series protective devices data.



MODULAR PROTECTIVE DEVICES SPVE

MODULAR SURGE AND OVERCURRENT PROTECTIVE SWITCHBOARDS IN ELECTRIC VEHICLES CHARGE STATIONS.

SPVE modular protective switchboards are specially designed for the protection of electric vehicles charging stations according to the ITC-BT-52 standard.

Electric vehicles charging stations are located in different places: private homes, neighborhood communities, outdoor parking lots, hotels, shopping and leisure centers, underground parking lots, etc. Depending on where they are located, the risk of damage due to lightning strikes and surges will be higher or lower, but it is something that should be avoided in all cases.

Electric chargers are devices that integrate sensitive electronic components, such as controller, meter, communication system, etc. Any of these items can be damaged and out of service as a result of surges.

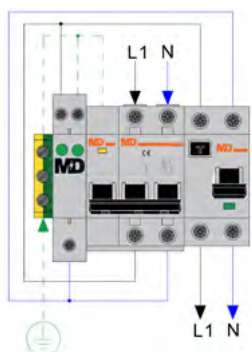
SPVE protective devices are a compact and easy-to-install solution for the protection of vehicle charging stations against overcurrents and permanent overvoltages and surges.

Protection against permanent overvoltages complies with the POP EN 50550 standard, protecting the installation against voltages higher than 275 V.

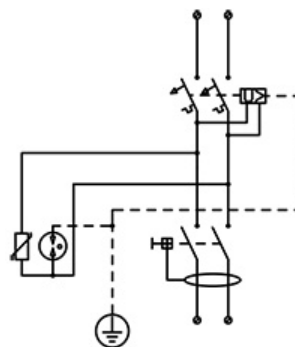
The protection against transient overvoltages will protect the loads against voltage peaks of atmospheric origin, as well as transients associated with the operations carried out in the electrical network.

MODULAR PROTECTIVE SWITCHBOARDS FOR ELECTRIC VEHICLE CHARGING STATIONS ACCORDING TO ITC-BT-52

- SPVE switchboards are specially designed to protect vehicle charging stations, as specified in ITC-BT-52.
- These switchboards protect vehicle charging stations against short circuits, earth-faults and overvoltages.
- The protection against permanent overvoltages is adjusted to the POP 50:550 standard by protecting the installation against voltages higher than 275 V.
- The protection against transient overvoltages will protect the loads against voltage peaks of atmospheric origin, as well as transients associated with the operations carried out in the electrical network.
- **Options:** They can also be supplied with lock, Schuko base, differential circuit breakers with automatic reclosing, polycarbonate enclosure and energy counter.



SPVE/2PVE series diagram

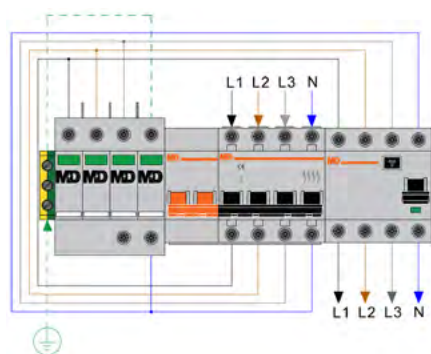


SPVE/2PVE wiring diagram

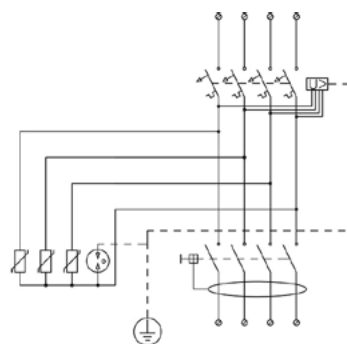
DEVICE MODEL	SPVE-2-16	SPVE-2-20	SPVE-2-25	SPVE-2-32	SPVE-2-40	SPVE-2-50	SPVE-2-63
Rated power (kW)	3,6	4,6	5,7	7,3	9,2	11,5	14,5
MCB rated current (I _n) (A)	16	20	25	32	40	50	63
Rated voltage AC (U _n)	230 V _{AC} [L - N]						
N° of poles	2						
MCB tripping curve	C-Curve						
MCB cut-off power	6 kA @ 400 V _{AC}						
Differential switch	Class A, 30 mA						
Permanent overvoltage response							
Rated trigger voltage (L-N)	275 V _{AC} - 3,5 s / 300 V _{AC} - 3,5 s / 350 V _{AC} - 250 ms / 400 V _{AC} - 70 ms						
No-trigger rated voltage (L-N)	255 V						
Transient overvoltage response							
Protection type	Type 2						
Max. discharge current I _{max} (8/20) (L-N/N-PE)	15 kA / 20kA						
Installation data							
Operating temperature	[-25 °C ~... +40°C]						
Installation method	Wall-mounting enclosure						
Enclosure material	ABS						
IP degree protection	IP65						
Standards	EN 50550; EN 61643-11; EN 60898						
Weight (Kg)	2						
Dimensions (mm) (Height×Width×Depth)	231×238×118						

MODULAR PROTECTIVE SWITCHBOARDS FOR ELECTRIC VEHICLE CHARGING STATIONS ACCORDING TO ITC-BT-52

- SPVE switchboards are specially designed to protect vehicle charging stations, as specified in ITC-BT-52.
- Estos cuadros protegen la estación de carga de vehículo frente a cortocircuitos, faltas a tierra y sobretensiones.
- The protection against permanent overvoltages is adjusted to the POP 50:550 standard by protecting the installation against voltages higher than 275 V.
- The protection against transient overvoltages will protect the loads against voltage peaks of atmospheric origin, as well as transients associated with the operations carried out in the electrical network.
- **Options:** They can also be supplied with lock, Schuko base, differential circuit breakers with automatic reclosing, polycarbonate enclosure and energy counter.



SPVE/4PVE series diagram



SPVE/4PVE wiring diagram

DEVICE MODEL	SPVE-4-16	SPVE-4-20	SPVE-4-25	SPVE-4-32	SPVE-4-40	SPVE-4-50	SPVE-4-63
Rated power (kW)	11,1	13,8	17,8	22,1	27,7	34,6	43,6
MCB rated current (I _n) (A)	16	20	25	32	40	50	63
Rated voltage AC (U _n)	230/400 V _{AC}						
N° of poles	4						
MCB tripping curve	C-Curve						
MCB cut-off power	6 kA @ 400 V _{AC}						
Differential switch	Class A, 30 mA						
Permanent overvoltage response							
Tensión nominal de disparo (L-N)	275 V _{AC} - 3,5 s / 300 V _{AC} - 3,5 s / 350 V _{AC} - 250 ms / 400 V _{AC} - 70 ms						
Tensión nominal de no-disparo (L-N)	255 V						
Transient overvoltage response							
Protection type	Type 2						
Max. discharge current I _{max} (8/20) (L-N/N-PE)	15 kA / 20kA						
Installation data							
Operating temperature	[-25 °C ~... +40°C]						
Installation method	Wall-mounting enclosure						
Enclosure material	ABS						
IP degree protection	IP65						
IP degree protection	EN 50550; EN 61643-11; EN 60898						
Weight (Kg)	3	2,50	3,12	3,63	3,83	4,41	4,91
Dimensions (mm) (Height×Width×Depth)	286×418×148						

12

RELAY_

Relay applications.

12.1 PR4 Relay. Protection against permanent overvoltages at network frequency.

12.2 PTR4 RELÉ. Protection against permanent surges, undervoltages and network asymmetry.



RELAY

PR4 & PTR4

RELAY APPLICATIONS

Relays PR4/220-O and PTR4/220 are installed in the main electric panel of 220V single-phase or 220/380 V three-phase installations with neutral terminal to be protected.

By associating a relay with a MCB through a Tripping coil and depending on the relay model, the installation is protected against permanent surges, undervoltages and phase asymmetry in three-phase systems.

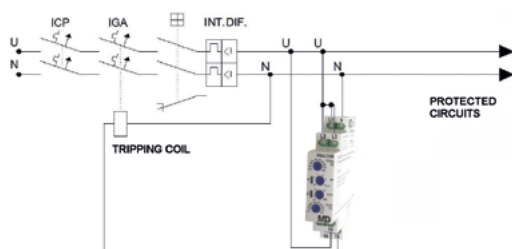
Both models are characterized by:

- Both are suitable for single-phase and three-phase installations with a neutral terminal.
- Adjustable voltage.
- Adjustable in time.
- Status contact with normally open, normally closed and common terminals.
- Easy installation.
- Small size.

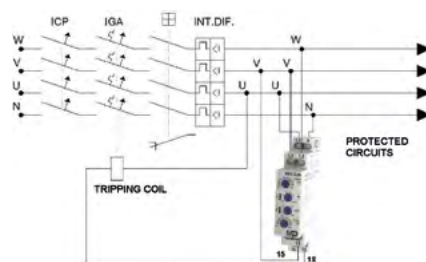
RELAYS FOR THE PROTECTION AGAINST PERMANENT OVERVOLTAGES

The PR4 /220-O monitoring relay is valid in 220V single-phase installations or three-phase 220/380V with neutral terminal. It is associated to a MCB through a trip coil that protects the installation against permanent overvoltages.

- Monitoring relay appropriate for single-phase and three-phase installations with neutral.
- Monitoring of adjustable permanent overvoltages from 225 to 265 V.
- Adjustable delay from 0 to 10s in the detection.
- Status contact with normally Open, Normally Closed and Common terminals.
- For installations using Low-Voltage coils, contact with the factory.



PR4/220-O device in single-phase installations diagram



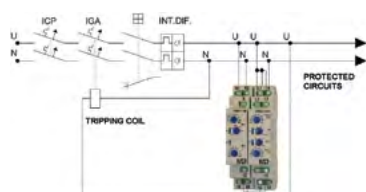
PR4/220-O device in three-phase installations diagram

MD PR4/220	
Input power / Controlled voltage	220 / 380 V _{AC} (+15%, -10%) Single-phase or Three-phase with neutral terminal
Controlled terminals	L1, L2, L3, N
Maximum consumption	1.5 VA
Time measurement	100 ms
Network indicators	Green LEDs
Remote alarm contact	Contacts 15-18 close, 15-16 open.
Overvoltage range (U _{max}) F-N	Disabled or 225 ~ 265 V
Delay in detection	Disabled 1 to 10 seconds
Undervoltage range (U _{min}) F-N	Disabled 1 to 10 seconds
Hysteresis	5%
Status contact	I _n = 8 A; V _n = 250 V _{AC} ; 2000 VA
Dimensions	90 x 18 x 65 mm (1 Polo)
Operating temperature	-20°C ~ +55°C
Connecting cable cross section	Maximum 2x1,5 mm ² ó 1x2,5 mm ²
Standards	IEC 60255-6, IEC 6101
Installation	35 mm DIN-rail mounted in accordance with IEC 60715
Enclosure material	Polycarbonate; UL94 V-0 Flammability Standard

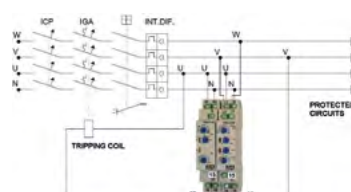
RELAY PROTECTIVE SET AGAINST PERMANENT OVERVOLTAGE AND UNDERVOLTAGE

The PTR4 /220-O protective device set is installed in 220V single-phase electric installations or three-phase 220/380V with neutral terminal. It is associated to a MCB through a trip coil that protects the installation against permanent overvoltages, undervoltages and phase asymmetry (only in three-phase systems).

- Suitable set for single-phase and three-phase installations with neutral.
- Monitoring of permanent overvoltages. Adjustable from 225 to 265V.
- Undervoltage monitoring. Adjustable from 180 to 220V.
- Phase asymmetry monitoring in three-phase installations with neutral. Adjustable from 0 to 20%.
- Adjustable delay from 0 to 10s.
- Detection of phase failure.
- Status contact with Normally Open, Normally Closed and Common terminals.
- The monitoring relay PR4 / 220 is installed in conjunction with the timer TR1-F10 (Function "F1", delay to the connection, set to 2 seconds).
- Para su instalación mediante bobinas de mínima tensión preguntar a fábrica.



PTR4/220-O device in single-phase installations diagram



PTR4/220-O device in three-phase installations diagram

MD PTR4/220	
Input power / Controlled voltage	220 / 380 V _{AC} (+15%, -10%) Single-phase or Three-phase without neutral terminal
Controlled terminals	A1, A2, L1, L2, L3, N
Maximum consumption	3 VA
Time measurement	100 ms
Timing (TR1-F10)	Yellow LED. Must be set for 2 seconds and F1 function. Contacts 15-16 close, 15-18 open.
Network indicator light	Green LEDs
Alarm indicator light (PR4/220)	Red LED; Contacts 15-16 close, 15-18 open.
Overvoltage range (U _{max}) F-N	Disabled or 225 ~ 265 V
Undervoltage range (U _{min}) F-N	Disabled or 1 to 10 seconds
Hysteresis	5%
Fallo de fase	<165 V _{AC}
Status contact	PR4/220: 1NA + 1C + 1NC TR1-F10: 1NA + 1C + 1NC
Characteristics of status contact	I _n = 8 A; V _n = 250 V _{AC} ; Maximum switching voltage 440 V _{AC} 4000 VA
Condicionantes de disparo	The trip coil features limits the possibility of Tripping the magneto-thermal circuit breaker. The voltage must not be lower than the operating voltage range of the emission coil.
Dimensions (mm) (Height×Wide×Depth)	2 polos x 90 x 18 x 65 mm
Operating temperature	-20°C ~ +55°C
Connecting cable cross section	Maximum 2x1,5 mm ² ó 1x2,5 mm ²
Standards	IEC 60255-6, IEC 6101
Mounting method	35 mm DIN-rail mounted in accordance with IEC 60715
Location category	Indoor
Enclosure material	Polycarbonate; UL94 V-0 Flammability Standard
Protection degree	IP20

Design of protective devices for the railway industry.

- 13_1. Voltage limiting devices.
- 13_2. Polarized protective devices DPPo.
- 13_3. Outdoor autovalve lightning rods.
- 13_4. Indoor autovalve lightning rods.
- 13_5. Protection of rectifier groups.
- 13_6. Parallel protection of auxiliary services transformers in three-phase installations.
- 13_7. Series protection of auxiliary services transformers in three-phase installations.
- 13_8. Series protection of interlocking cabins in single-phase installations.
- 13_9. Signaling and communications circuits protection.
- 13_10. Isolating spark gap.



RAILWAY INDUSTRY

DESIGN OF PROTECTIVE DEVICES

Such as specialists in the design and manufacture of railway protective devices, the devices developed in MD are designed under robustness and highest reliability criteria. We cooperate with engineering in the search for solutions to specific problems by developing custom-built devices. The most relevant protective devices designed and developed by MD are:

- Protective substations rectifiers groups against surges.
- Protective electronic devices of auxiliary services against surges and MF / AF harmonics
- Protective interlocking cabins against overvoltages, MF/AF harmonics and overcurrents
- Protective signaling circuits against overvoltages.
- Polarized protective devices (DPPo).
- Interval discharger.
- Protective devices against electrolytic corrosion.
- Outdoors autovalves
- Indoors autovalves with remote signaling.

For further information, please contact us at 96 370 50 97 or send an e-mail to: mdtecnologicos@mdtecnologicos.com.

TI-2000/TI-4000/TI-6000/TI-2000-S/TI-4000-S/TI-6000-S

Voltage limiting device

TI series protective devices are allocated to guarantee railway structures equipotentiality when dangerous voltages appear in DC traction installations.

These voltage increases are mainly due to catenary faults on metallic structures or high and inherent consumption to traction systems leading to an arising potential in the own structures affected by these faults or in rails.

When electrical potential differences exceeds a pre-established voltage value- generally 60V, and both structures will come into contact to guarantee the equipotentiality of the system helped by the TI protective device. When the defect disappears, TI devices return to its initial open state and would not require any kind of manual reset.



DI-2000-S

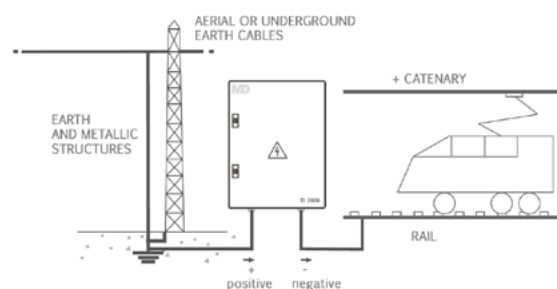
Appliances

Interval discharger

Earth-Rail protection

By installing a TI device in the earth-rail direction and in case the catenary contacts any metallic railway infrastructure connected to the earth cable such as canopies, catenary supports, etc., TI will turn on when the fault voltage exceeds Tripping coil voltage. Current will be re-directed to rail, thus guaranteeing equipotentiality between the protected structure and the rail.

Likewise, if the installation gathers the proper electrical features, the MCB of the traction substation will be automatically disconnected and all the energy will be funneled from the catenary to the rail. This will effectively reduce the impedance of the return circuit.



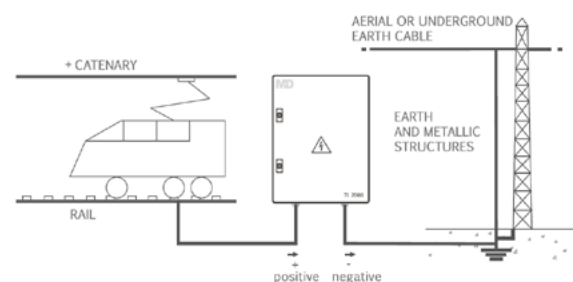
Earth-Rail connection diagram for defect detection by DUR.

On one hand, by placing the appropriate number of TI protective devices along the entire railway line, users are effectively protected in case of short circuits between the catenary and different metallic structures connected to the earth wire or guard wire.

On the other hand, if metallic structures are not connected to a common earth cable, that is to say, they have their own earth isolated earth terminal, and when a deficiency between the catenary and these structures appears- as long as the contact voltage exceeds the voltage value of the IT operation, current will be derived to rails in order to guarantee equipotentiality between the structure to be protected and the rail. It is common in metallic structures adjacent to the railway lines such as bridges, tunnels, temporary walkways, etc.

Rail-Earth-protection

In the same way and as previously mentioned, a TI protective device is installed in the lane-to-ground direction. In case the rail voltage is higher than ground voltage, equipotentiality between them is guaranteed by the IT protective device installation. This application can be very useful in passageway areas, such as the platform doors of the train, where passengers who enters the train may enter in contact with the train-platform and the train door at the same time, being susceptible to suffer a shock if the rail-earth voltage is not limited. A safety activation voltage (60V) of the TI protective device can be established to ensure equipotentiality between the rail and the ground.



Earth-Rail connection diagram for rail voltage limitation

High-voltage line shield protection

The TT interval discharger is equivalent to an IT performing bidirectionally and can be installed to limit voltage in cable shields belonging to High-Voltage lines. In this way direct earthing is avoided since permanent currents could be established in cable shields. Since this voltage must avoid the interval discharger operation, it is necessary to know the maximum voltage that can appear during the regular line operation and the threshold performance will be set at the factory according to the requirements of the line to be protected.

Main features

Internally these devices consist of a controlled high-power rectifier and a high-energy surge protective set.

TI series devices are designed to withstand elevated currents for a long period of time. (See device description).

Under standard conditions of service, TI protective devices remain inactive but when voltage exceeds the protection threshold (see technical features), the voltage limiting device starts conducting current until the disturbance disappears.

These devices are especially suitable in high keraunic level areas with reverse protection against transient overvoltages. The reverse protective threshold is $320 V_{DC}$ and can be modified according to customer requirements.

The TI-S version protective device is provided of potential-free contacts that allow remote signaling during its direct operating mode.

Device Model	TI-2000	TI-2000-S	TI-4000	TI-4000-S	TI-6000	TI-6000-S
Verified to standards	UNE EN 50122-1 UNE EN 50122-2 UNE EN 61643-11:2008					
Power supply (signaling)	--	220V (50/60 Hz)	--	220V (50/60 Hz)	--	220V (50/60 Hz)
Potential-free status contacts	--	2 contact sets	--	2 contact sets	--	2 contact sets
Maximum continuous operating voltage of catenary	3.300 VDC					
Minimum recommended section of connection cables	Cu70		Cu95		Cu120	
Protection threshold. Different voltages on demand	60V _{dc} – 45V _{ac}					
Overload current at 25 °C (600 ms)	2,8 kA _{DC}		6 kA _{DC}		9,5 kA _{DC}	
Overload current at 25 °C (1 s)	2,4 kA _{DC}		5 kA _{DC}		8,2 kA _{DC}	
Overload current at 25 °C (1 min)	1,1 kA _{DC}		2,3 kA _{DC}		3 kA _{DC}	
Overload current at 25 °C (15 min)	275 A _{DC}		29 kA		800 A _{DC}	
Permanent overload current (25 °C)	225 A _{DC}		250 A _{DC}		300 A _{DC}	
Overload current at 85 °C (1 s)	1,1 kA _{DC}		2,3 kA _{DC}		3,5 kA _{DC}	
Maximum overload peak current. Half-wave sine (t=10ms)	29 kA		64 kA		72 kA	
Maximum reverse voltage (U _c overvoltages)	320 VDC					
Residual voltage against transient overvoltages	1,2 KV					
Response time against transient overvoltages (t _A)	<25 ns					
Maximum discharge current (8/20 μs)	70 KA					
Material of connecting platens	Al					
IP protection level	[-40 oC ... +85 °C]					
Cabinet features. Enclosure	IP43					
Mounting method method	Polyester 430x330x200 mm		Duralumin cabinet 664x464x300 mm. Access with a key			
Location category	Fixed. Wall Mounting method					

Earth-rail voltage limiting device (VLD-F) or metallic-rail structure in DC traction substations.

TI series devices are destined to DC traction installations which main application is to guarantee the technology of railway structures in the moment a dangerous voltage appears.

As soon as the fault voltage exceeds the trip voltage of the TI, it would be activated itself and all current will be derived to the rail, thus guaranteeing the equipotentiality between the protected structure and the rail.



TECHNICAL SPECIFICATIONS	TI-4K
Verified to standards	ET 03.364.204.2 ADIF / UNE EN 50526-2 / UNE EN 50122-1 / UNE EN 50122-2
Power supply (signaling)	-
Potential-free status contacts	-
Rail voltage limitations	
Treshold voltage (different voltages under command)	U_{Tn} 120 V
Overload current at 25 °C (1 s) (600 ms)	7 kA
Overload current at 25 °C (1 s) (1 s)	6 kA
Overload current at 25 °C (1 s) (1 min)	1.6 kA
Overload current at 25 °C (15 min)	100 A
Overload current at 85 °C (1 s)	2.8 kA
Maximum overload peak current. Half-sine wave $t=10$ ms	64 kA
Reverse protection features	
Maximum reverse voltage (U_c overvoltages)	320 V_{cc}
Residual voltage against transient overvoltages	1.2 kV
Response time against transient overvoltages (t_r)	<25 ns
Maximum discharge current (8/20 μ s)	70 kA
Installation features	
Maximum catenary voltage	3.300 V_{cc}
Minimum recommended section of connecting cables	Cu95
Material of connecting plattern	Al
Operating temperature range	[-40°C ... +85°C]
IP protection level	IP65
Cabinet features. Enclosure. Dimmensions (mm) (Height×Width×Depth)	Polycarbonate 250[380]×160×90
Mounting method method.	Fixed. Post mounted. "+" terminal with clamping plate.

MI-400

MI-400 protective devices have been specifically designed to protect traction of train and tram facilities in DC. In order to limit overvoltages in rail-earth direction that may appear in traction installations and avoid electrolytic corrosion, as a result of stray currents flow. In addition, people and facilities are protected against dangerous voltages in the earth-rail direction that may appear.

MI-400 devices are equipped with three defined assemblies mounted on an insulating plate:

1. High-power controlled semiconductor set.
2. Overvoltage suppression set.
3. Signalling and control circuits.



The MI-400 device adapts itself to the rail-earth voltage features (return-circuit) and the earth.

Under normal conditions, if the rail voltage is higher than the earth's voltage but it does not exceed the trip threshold settings, the device will remain on stand-by and will provide a high impedance, thus avoiding the circulation of vagrant currents.

Against an overvoltage of the rail respect to the earth that exceeds the trip threshold settings, the operating mode of the device will turn on until the moment the current decreases below a certain value. Therefore, the device will be disconnected.

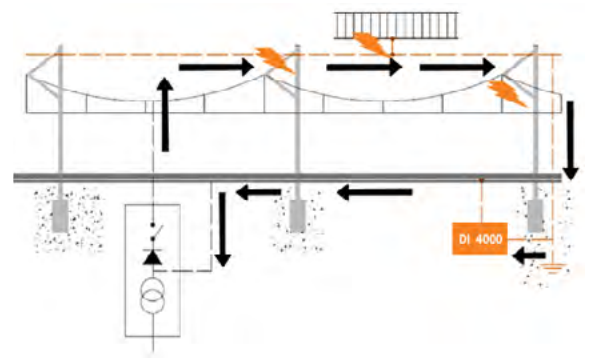
In case the earth voltage overpasses the rail voltage of the device, the operating mode will turn on thus facilitating the comeback of the existing stray currents to the rail. These currents routing will be diminished and a cathodic protection against electrolytic corrosion of the metallic structures connected will be provided.

TECHNICAL SPECIFICATIONS	MI-400/60-SV / MI-400/60-CV
Verified to standards	UNE EN 50122-1 / UNE EN 50122-2
Power supply (signalling)/Power consumption (signalling)	220 V (50/60 Hz) / 25 W
Free-potential status contacts.	Power supply and actuation alarms (Normally-open + Common + Normally-close).
Rail voltage limitations	
Treshold voltage (different voltages under command)	U_{rn} 60 V
Long-term direct current at 25 °C	400 A _{DC} (20 min) / 600 A _{DC} (7 min)
Permanent current at 25 °C	200 A _{DC} / 400 A _{DC}
Response time $t_R=10$ ms	<1 ms
Installation features	
Maximum catenary voltage / Installation type.	3.300 V _{cc} / Parallel/ DC electric traction systems (Figura 003)
Minimum recommended section of connecting cables	95 mm ² Cu
Material of connecting plattern	Al
Operating temperature range	[-40°C ... +85°C]
IP protection level	IP43
Cabinet features. Dimmensions (mm) (Height×Width×Depth)	Duraluminium. 664×464×300 mm. Access with a key
Mounting method method	Fixed. Wall or post Mounting method. Screw fastening.
Location category	Outdoor

Polarized protective devices

DI series protective devices main application is the polarized protection of railway structures for DC traction installations. DI series ensures the detection of defects caused by the fall of the catenary on metallic structures redirecting electrical currents to the rail -feedback loop, and causing safe disconnection of adjacent substations.

They prevent the circulation of stray currents in DC traction systems where it is not desirable direct earthing on rails, thereby eliminating electrolytic corrosion in both metallic structures electrically buried nearby, as well as in earth electrodes, therefore constituting an effective cathodic protective system.



Installation diagram

They are designed to be installed along the railway line between metallic structures, whether they are connected to earth or not, and the return circuit (rails). The environment of protection will depend on the electrical features of the installations.

Appliances

Polarized protection

The main appliance of these protective devices is to ensure disconnection of power substations when the catenary contacts with any metallic component of the structure connected to an earth cable, as canopies, metallic brackets, walkways, etc.

In some cases, the detection of deficiencies is not always an easy task for the circuit breaker of the power substation when the magnitude of the defect is similar to the consumption of locomotives. Additionally, when the catenary falls over a metallic structure, the protective earth connection may not be sufficient to detect it unless the rail (feedback loop) is connected to earth.

However, the freely appearance of stray currents would become a problem. In order to avoid this, DI series devices allow a polarized protection in the earth-rail direction, thus ensuring current finds its way back to rail and facilitate its detection.

For that purpose, DI series devices canalize currents from metallic structures under strain -due to contact of the catenary, to the return circuit by reducing effectively the impedance of the feedback loop and causing the disconnection of circuit breakers of the traction substations automatically.

In this way, by placing the appropriate number of devices along the whole line, people are effectively protected in case of short-circuits between the catenary and various metallic structures connected to the earth cable.

Cathodic protection

Metallic structures are those cathodic protection used against electrolytic corrosion, which is caused by currents flowing out of the metallic structure towards the earth.

By installing DI series devices you will effectively avoid metallic structures and rails from being affected by electrolytic corrosion. Any electrical potential difference between rails and earth connections of the railway structures nearby -such as tunnels, bridges, pipes, etc., the device will conduct electricity directly to the rail preventing it from flowing through the land and preventing the corrosion of metallic structures.



DI-4000 mounted on a pole

Blocking of returning currents

Another application of DI devices is to avoid failures in communication devices that occur as a result of the return of stray currents.

Many communication devices use earth terminals as a reference, therefore communication failures can be caused by the presence of stray currents coming in through these terminals.

By installing DI series devices between the earth terminal of interlock cabins and the earthing system, you will avoid electronic devices to be affected by stray currents effects. For this purpose, the proper functioning of the protection differentials must be guaranteed in case a Parallel to earth occurs.



DI-4000 indoor

Main features

DI series devices have been designed to discharge current from metal structures when the electrical potential (voltage) is higher than the rail voltage. As a result, the impedance of the circuit feedback loop is reduced and electrical currents are canalized to the negative terminal of the substation, thereby withstanding high currents over a long period of time.

These devices limit the voltage to 0.6V in the earth-to-rail direction, thus eliminating any transfer of dangerous electrical potential that may appear between the rail and adjacent structures. These devices are especially suitable for areas with high keraunic level by providing protection against any transient overvoltage in the rail-PEo-ground direction. The reverse protection threshold is 120V but can be modified according to customer requirements. DI series version DI-S has potential-free contacts that allow the remote signaling of the device at the moment that it acts in a direct direction-current flows through it in the earth-rail direction. (See features chart below).

Device Model	DI-2000-	DI-2000-S	DI-4000-	DI-4000-S
Verified to standards	UNE EN 50122-1 UNE EN 50122-2 UNE EN 61643-11:2008			
Power supply (signaling)	--	220V (50/60 Hz)	--	220V (50/60 Hz)
Potential-free status contacts	--	2 contact sets	--	2 contact sets
Maximum continuous operating voltage of catenary	3.300 V _{DC}			
Minimum recommended section of connection cables	Cu70		Cu95	
Protection threshold. Different voltages on demand	60V _{dc} – 45V _{ac}			
Overload current at 25 °C (600 ms)	2,5 kA _{DC}		5,5 kA _{DC}	
Overload current at 25 °C (1 s)	2,2 kA _{DC}		5 kA _{DC}	
Overload current at 25 °C (1 min)	900 kA _{DC}		2,3 kA _{DC}	
Overload current at 25 °C (15 min)	225 A _{DC}		700 A _{DC}	
Permanent overload current (25 °C)	200 A _{DC}		250 A _{DC}	
Overload current at 85 °C (1 s)	1 kA _{DC}		2,3 kA _{DC}	
Maximum overload peak current. Half-wave sine (t=10ms)	20 kA		45 kA	
Maximum reverse voltage (U _c overvoltages)	120 V _{DC}			
Residual voltage against transient overvoltages	800 V			
Response time against transient overvoltages (t ₉₀)	<100 ns			
Maximum discharge current (8/20 μs)	100 KA			
Material of connecting platens	Al			
Operating temperature range. Margen de temperaturas de trabajo	[-40 oC ... +85 °C]			
IP protection level	IP43			
Cabinet features. Enclosure	Polyester / 430x330x200 mm		Duralumin cabinet / 664x464x300 mm Access with a key	
Mounting method method	Fixed. Wall Mounting method			
Location category	Outdoor			

DC-750/DC-1500/DC-4000

Outdoor autovalve lightning rods

Outdoor autovalve lightning rods

DC series devices are autovalve lightning rods Specially designed to protect substations against lightning discharges which enter themselves through the catenary. The main feature of these devices is their low residual voltage U_p , which is adjusted to the maximum voltage of the catenary. In this way it is assured that residual voltage of the lightning surge arrester does not exceed the isolating voltage of the substation, therefore avoiding inside breakdowns.

Due to their great capacity to derive DC discharges to earth, their low thresholds of residual voltage, as well as their high capacity for energy dissipation, these devices are suitable for the protection bwtween feeder and catenary in traction devices.

Taking advantage of the holes in the base of the device to anchor it to earth, lightning surge arresters must be installed vertically.



DC-4000

Main features

DC series devices offer optimum protection against lightning strikes and arising problems due to its high discharge capacity ($I_{max}=140KA$ 8/20), its high energy dissipation capacity, response speed (25 ns) and its low protection threshold set to different catenary voltages to the maximum. (See the feature chart below).

In this way surge lightning rods prevent electrical and electronic circuits from being damaged, as well as the operating staff at the same time.

The enclosure of these devices is sealed and made of polyester. All materials withstand high temperatures, they are fireproof, they offer high insulation resistance, great dielectric strength and they are highly corrosion-resistant.

TECHNICAL SPECIFICATIONS	DC - 750	DC - 1500	DC - 4000
Verified to standards	UNE EN 61643-11:2008		
Rated voltage (V_n)	750 V _{cc}	1.500 V _{cc}	3.300 V _{cc}
Installation	Parallel. Feeder-Earth connection.		
Recommended cable / Connection type	Cu35 / Platterns		
Maximum operating voltage (U_o)	1.000 V _{cc}	2.150 V _{cc}	4.000 V _{cc}
Enclosure material	Polyester		
Dimmensions HxAxP mm	225 (160+plattern) x 265 (195+plattern) x 265		355 (290+plattern) x 265 (195+plattern) x 265
Leak cable	215 mm		430 mm
Flash distance	190 mm		325 mm
Cutoff frequency	1.400 V _{DC}	2.700 V _{DC}	4.500 V _{DC}
Rated discharge current (8/20 μ s) I_n	50 kA		
Max. rated discharge current (8/20 μ s) I_{max}	140 kA _{DC}		
Capacidad de absorción de energía	10 kJ	20 kJ	30 kJ
Tensión residual (U_p) para I_n	3,5 kV	6,5 kV	10,6 kV
Tiempo de respuesta frente a transitorios (t_x)	<25 ns		
Material of connecting plattern	Cu		
Material of connecting plattern	Al		
Operating temperature range	[-40 oC ... +85 °C]		
Mounting method method	Fijo. Fixed. Fastening by screws		
Rated voltage	Outdoor		



Installation and anchoring

DC-750/DC-1500/DC-4000

Indoor autovalve lightning rods

Indoor autovalve lightning arrester

DCA series devices are designed to be installed in the outpout cells of catenary feeders to ensure a safe and effective protection of the installation against any overvoltage of atmospheric origin that may appear in the catenary.

These devices have been especially developed to protect substations struck by lightning on the catenary. The main feature of these devices is their low residual voltage U_p , which is adjusted to the maximum catenary voltage. When the autovalve lightning arrester is operating, residual voltage does not exceeds the isolation voltage of the substation, therefore breakdowns in the inside are avoided.

Main features

DCA series devices offer protection against lightning and problems derived therefrom due to their high discharge capacity ($I_{max}=140 \text{ KA } 8/20$) and energy dissipation capacity, speed of response (25 ns) and low protection threshold- set to the maximum to the different voltage thresholds of the catenary.

Therefore, electric and electronic circuits, as well as technical staff, are protected from damages by these protective devices.

In case of internal breakdown caused by an extremely high-energy atmospheric discharge which exceeds the energy dissipation capacity of the device to be protected, DCA series devices have disconnection elements like fuses to cause its disconnection. Then the lightning alarm indicating disconnection will turn on.

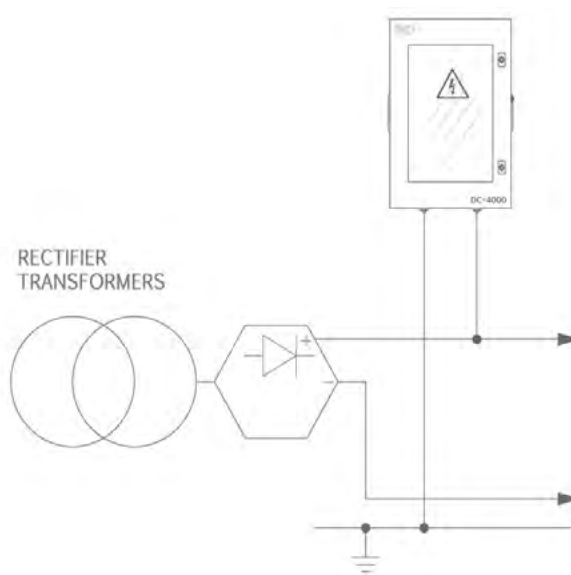
TECHNICAL SPECIFICATIONS	DC - 750	DC - 1500	DI-4000-S
Verified to standards	UNE EN 61643-11:2008		
Rated voltage (V_n)	750 V _{cc}	1.500 V _{cc}	3.300 V _{cc}
Installation	Parallel. Feeder-Earth connection.		
Recommended cable / Connection type	Cu35 / Plattern		
Maximum operating voltage U_c	1.000 V _{cc}	2.150 V _{cc}	4.000 V _{cc}
Enclosure H×W×D mm/ material (IP<20)	Cabinet 430x330x200 mm / Polyester		Cabinet 647x436x250 mm /Polyester
Internal protection	50 A Fuse		
Cutoff frequency	1.400 V _{DC}	2.700 V _{DC}	4.500 V _{DC}
Rated discharge current (8/20 μ s) I_n	50 kA		
Max. rated discharge current (8/20 μ s) I_{max}	140 kA _{DC}		
Energy absortion capacity	10 kJ	20 kJ	30 kJ
Residual voltage current I_n (U_p)	3,5 kV	6,5 kV	10,6 kV
Response time against transient overvoltages (t_A)	<25 ns		
Material of connecting plattern	Cu		
Material of connecting plattern	Al		
Operating temperature range	[-40 oC ... +85 °C]		
Mounting method method	Fixed. Fastening by screws		
Location category	Outdoor		



DCA-4000

A microswitch with voltage free contacts- both NO and NC, which allows remote signaling in case of overload, is included in the protective device.

The groove-shaped frame of the cabinet door prevents the entry of water, oil or liquid ensuring a safe IP degree of protection. Polyurethane foam ensures watertightness for years.



DCS-4000 Installation diagram at feeder output

Protection of rectifier groups

3DR series protective devices are designed to be installed in the output of transformation centres of rectifiers groups that power the catenary. These devices offer a safe and effective protection against any kind of surge- whether atmospheric or industrial origin, that may appear at the power supply line and avoid any damage of rectifier groups.

These devices are ideally suited to protect three-phase systems 1350V_{ca} and 585V with no neutral terminal which powers the rectifiers of the catenary.

They are especially suitable for areas of high keraunic level. Thanks to its technical features, it effectively prevents rectifier damages while protecting the operating staff. They offer optimal lightning protection and arising problems due to differential protection, its high capacity of energy dissipation, speed of response and its low treshold.

Main features

Protection tresholds of SP 3DR series protective devices are tight adjusted according to the operating voltage of the installation, which is usually 1350 V_{ca} or 585 V_{ca}, in order to avoid rectifiers sets to be damaged by residual voltages.

Voltage between active conductors are limited to avoid malfunction in rectifiers caused by disturbances between phase voltage

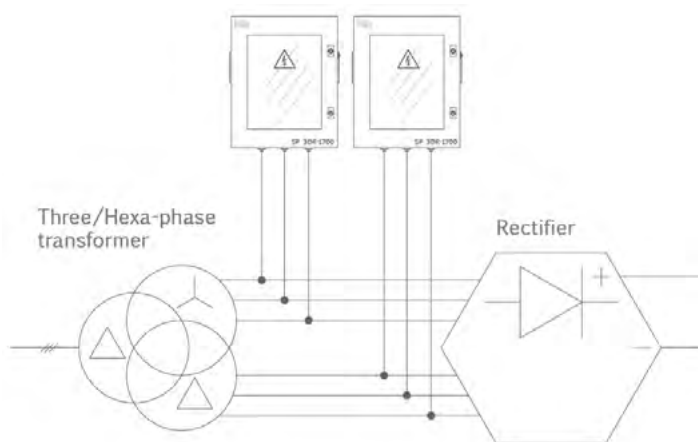
Its high discharge capacity (total I_{max}=420 KA 8/20) favours the dissipation of energy transients . These devices are not connected to earth to avoid interferences with communications circuits nearby.

Visual alarms are used to check the proper operation or malfunction of the equipment. They also allow remote monitoring when it is necessary.



SP 3DR-1700

TECHNICAL SPECIFICATIONS	SP 3DR - 750	SP 3DR - 1700
Rated voltage	880 V _{ac}	1350 V _{ac}
Freq. / topology	50-60Hz / 3L	
Installation	Parallel	
Manual cable recommended / Connection type	Cu35 / Cu plattner	
Enclosure H×W×D mm/ Material (IP<20)	530x430x200 / Polyester	647x436x250 / Polyester
Enclosure material	Polyester	
Dimensions H×W×D (mm)	225 (160+plattner) x 265 (195+ plattner) x 265	
Internal protection	100 A Fuses NH gC 690 V	125 A Fuses NH3 gTF 1.500 V
Type/Protection steps	Type 1+2 / 1 step	
U _c L-L	880 V _{ac}	1.680 V _{ac}
Maximum I _t (8/20) L-L	140 kA	
I _{total} (8/20) TOTAL	420 kA	
Mounting method	Fixed. Wall fastened.	



SP 3DR-1700 installation diagram at the transformer output that powers the rectifier.

SP 4D-300/SP 4D-100

Parallel protection of transformers in auxiliary services. Three-phase installations

SP 4D-300 protective devices are designed to be installed in transformation centres of auxiliary services to offer a safe and effective protection against transient and permanent overvoltages both of atmospheric and industrial origin, MF/HF harmonics and peaks associated with micro-interruptions with an only safe and effective device.

SP 4D-300 three-phase devices are installed in parallel with the installation to be protected. They can be designed to be connected to earth or not, depending on the customer's requirements. They can be similarly developed for different types of installations with neutral distribution, without neutral distribution, whether 220V_{AC} or 380 V_{AC}, etc.

They are especially indicated for high keraunic level areas. By installing an SP 4D-300 device, the quality and proper functioning of the installation are guaranteed, thus avoiding breakdowns due to:

- Atmospheric discharges on electrical lines.
- Commutations in Medium Voltage and High-Voltage lines.
- Defectos a tierra en la red de distribución.
- Phase imbalances.
- MF/HF harmonics.



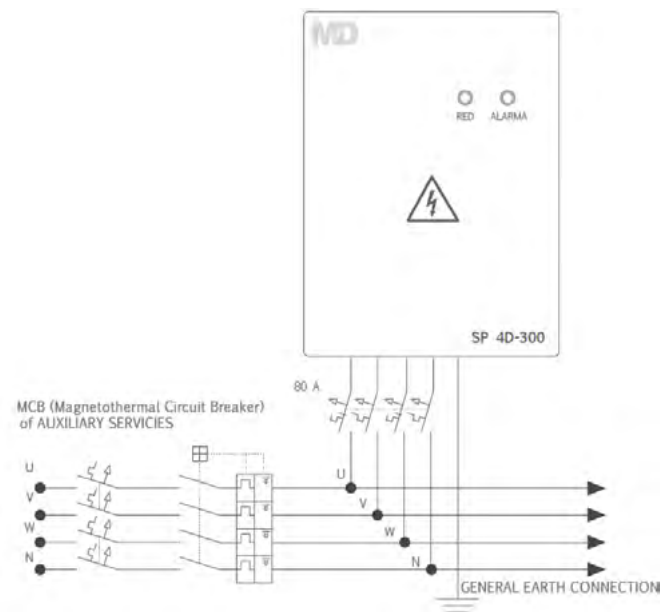
SP 4D-300

Main features

Thanks to its high discharge capacity (Total I_{max} = 2,000KA 8/20 and 410KA 10/350), the adjusted protection threshold phase-phase and phase-neutral, in common mode- phase-earth, neutral-earth, as well as frequency filtering. It should be taken into consideration that transient phenomena are transmitted in a high frequency range. These protective devices will effectively avoid most of sensitive electrical and electronic devices breakdowns.

In order to allow remote monitoring, visual alarms are included to verify the proper functioning or equipment failure.

TECHNICAL SPECIFICATIONS	DC 4D - 100	DC 4D - 300
Rated voltage / freq. / topology	230/400V / 50-60Hz / 3L+N+PE	
Recommended Power	100 kVA	300 kVA
Installation	Parallel	
Manual recommended cable / Connection type	Cu35 / MCB	Cu35 / Terminals
Enclosure H×W×D mm/ Material (IP<20)	500x400x200 / Metallic	
External overload protection / Internal protection	MCB D80A / 1 x MCB D80A	
Type / Protection steps	Type 1+2 / 3 steps	
U _c L-N (N-PE/L-PE)	250/430 (250/430)	
I _{tmax} (8/20) L-L	60 kA	170 kA
I _{tmax} (8/20) L-N	140 kA	170 kA
I _{tmax} (8/20) L-PE	140 kA	170 kA
I _{tmax} (8/20) N-PE	140 kA	470 kA
I _{timp} (10/350) L-L	-	35 kA
I _{timp} (10/350) L-N	30 kA	35 kA
I _{timp} (10/350) L-PE	30 kA	35 kA
I _{timp} (10/350) N-PE	30 kA	110 kA
TOTAL I _{max} (8/20)	1160 kA	2000 kA
TOTAL I _{imp} (10/350)	210	425
Cutoff frequency/ Att. at 30kHz, 10 Ohm	250Hz / 41dB a 30kHz	200Hz / 43dB a 30kHz



Example of downstream electrical installation of the main switch of auxiliary services

SP 4S-70/SP 4S-30/SP 4S-17

Protection of transformers of auxiliary services / Three-phase installations

4S series protective devices are designed to be installed at the output of the transformers of Low-Voltage auxiliary services in Low-Voltage or three-phase critical panels. A safe and effective protection against transient and permanent surges, whether atmospheric and industrial origin, MF / AF harmonics and peaks associated with micro interruptions is guaranteed with an unique device.

4S series devices are installed in series with the installation you wish to protect. These devices are specifically designed against lightning strike. Their response against atmospheric discharges improve thanks to the Tripping coil inside them which acts as a voltage divisor when a transient overvoltage occur by causing a voltage drop in their terminals and reducing transitional period drastically.

Accordingly they are especially indicated for high keraunic level areas. By installing an SP 4D-300 device, the quality and proper functioning of the installation are guaranteed, thus avoiding breakdowns due to:

- Atmospheric discharges on electrical lines
- Commutations in Medium and High-Voltage Lines.
- Earth deficiencies in the distribution electrical network.
- Phase imbalances.
- Medium frequencies and High frequencies.

TECHNICAL SPECIFICATIONS	SP 4S - 17	SP 4S - 30	SP 4S - 70
Rated voltage / freq./topology	230/400V / 50-60Hz / 3L+N+PE		
Recommended Power	17 kVA/25 A	30 kVA/45 A	70 kVA/100 A
Installation	Series		
Manual cable recommended / Connection type	Cu16 / Terminals	Cu25 / Terminals	Cu35 / Terminals
Enclosure HxWxD (mm)/ Material (IP<>20)	600x500x200 / Metallic		800x600x200 / Metallic
External overload protection / Internal protection	MCB D80A / 1 x MCB D80A		
Type/Protection steps	Type 1+2 / 4 steps		
Uc FN/FF (N-PE/L-PE)	250/430 (250/430)		
$I_{t_{max}}$ (8/20) L-L	140 kA	170 kA	170 kA
$I_{t_{max}}$ (8/20) L-N	470 kA	470 kA	470 kA
$I_{t_{max}}$ (8/20) L-PE	140 kA	170 kA	470 kA
$I_{t_{max}}$ (8/20) N-PE	420 kA	470 kA	470 kA
$I_{t_{imp}}$ (10/350) L-L	30 kA	35 kA	35 kA
$I_{t_{imp}}$ (10/350) L-N	110 kA	110 kA	110 kA
$I_{t_{imp}}$ (10/350) L-PE	30 kA	35 kA	110 kA
$I_{t_{imp}}$ (10/350) N-PE	110 kA	110 kA	110 kA
I_{max} (8/20) TOTAL	2720 kA	2900 kA	3800 kA
I_{imp} (10/350) TOTAL	620 kA	650 kA	875 kA
Cutoff frequency/ Att. at 30kHz,10 Ohm	200 Hz / 44dB a 30 kHz		

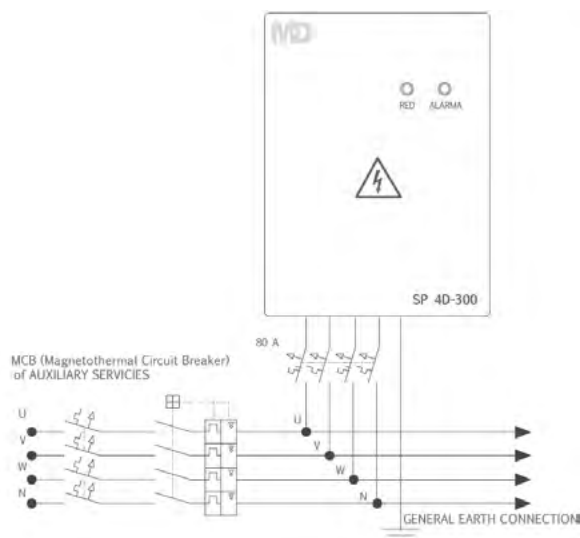


SP 4S-17

Main features

These protective devices will effectively avoid breakdowns in most of sensitive electrical and electronic devices thanks to its high discharge capacity Total $I_{max} = 1100KA$ 8/20 and 250KA 10/350, to its adjusted protection thresholds, differential protection mode- phase-phase and phase-neutral, and common mode protection- phase-earth and neutral-earth, as well as filtering frequency considering transient phenomenons are transmitted in high frequency.

Visual alarms are included in order to allow the possibility of remote monitoring and verify the proper functioning or equipment failure.



Example of electrical installation downstream of the main switch interruptor of auxiliary services

SP 2D-50

Parallel protection of interlocking cabin Single-phase installations

SP 2D-50 devices are designed to be installed in interlocking cabins to offer a safe and effective protection against transient and permanent overvoltages with an unique device wheter atmospheric and industrial origin, as well as MF/AF harmonics and peaks associated with micro-interruptions.

SP 2D-50 is a single-phase device to be installed in parallel with the installation to protect.

It is especially suitable for areas with risk of lightning strikes- high keraunic level. By installaing a SP 2D-50 device, quality and the proper functioning of the installations to be protected are guaranteed, therefore avoiding breakdowns due to:

- Atmospheric discharges on electrical lines.
- Medium-Voltage and High-Voltage commutated lines.
- Ground defects in the distribution networks.
- Phase umbalance.
- Medium-frequency and High-frequency harmonics.



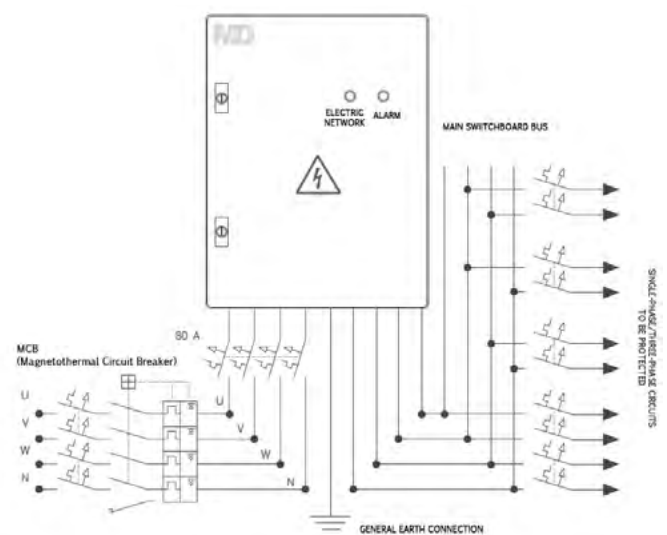
SP 2D-50

Mean features

Thanks to its high discharge capacity total $I_{max} = 1100KA \ 8/20$ and $250KA \ 10/350$, adjusted protection thresholds, differential protection mode (line-neutral) and common-mode (line-earth, neutral-earth), s well as filtering frequency- keep in mind that transient phenomenons are transmitted in high frequenc and these protective devices will effectively avoid breakdowns in most of sensitive electrical and electronic devices.

Visual alarms are included in order to allow the possibility of remote monitoring and verify the proper functioning or equipment failure.

TECHNICAL SPECIFICATIONS	SP 2D - 50
Rated voltage / freq. / topology	230/400V / 50-60Hz / L+N+PE
Recommended Power	50 kVA
Installation	Parallel - Single
Manual cable recommended / Connection type	Cu25 / Terminals
Enclosure H×W×D mm/ Material (IP<>20)	400x300x150 Metallic
External overload protection / Internal protection	MCB D80A / 1 x MCB D80A
Type / Protection steps	Type 1+2 / 3 steps
$U_c \ L-N \ (N-PE/L-PE)$	250 (250/460)
$I_{t_{max}} \ (8/20) \ L-N$	470 kA
$I_{t_{max}} \ (8/20) \ F-PE$	170 kA
$I_{t_{max}} \ (8/20) \ N-PE$	470 kA
$I_{t_{imp}} \ (10/350) \ L-N$	110 kA
$I_{t_{imp}} \ (10/350) \ L-PE$	35 kA
$I_{t_{imp}} \ (10/350) \ N-PE$	110 kA
$I_{max} \ (8/20) \ TOTAL$	1110 kA
$I_{imp} \ (10/350) \ TOTAL$	255 kA
Cutoff frequency/ Att. at 30kHz,10 Ohm	300 Hz / 40dB a 30 kHz



SP 2D-50 installation diagram downstream of the main switch of the interlocking cabin transformer.

TD SERIES

Signaling and communications circuits protection

TD series protective devices are associated with communication networks against transient overvoltages caused by lightning impact, industrial origin parasites, etc., which are propagated by communication networks themselves, mainly through galvanic and inductive couplings.

These protective devices are designed for the protection of communication lines. For this purpose, it must be taken into consideration the communication protocol, the number of wires or pair of wires to be protected, the communication voltages, etc.

TD series are installed in series with the circuits to be protected. Surge protective devices for data lines should be installed as close as possible to the equipment to be protected.

Protective devices for HDSL regenerators with metallic carrier fed with 2 and 4 wires regeneratos are available in our company.

Main features

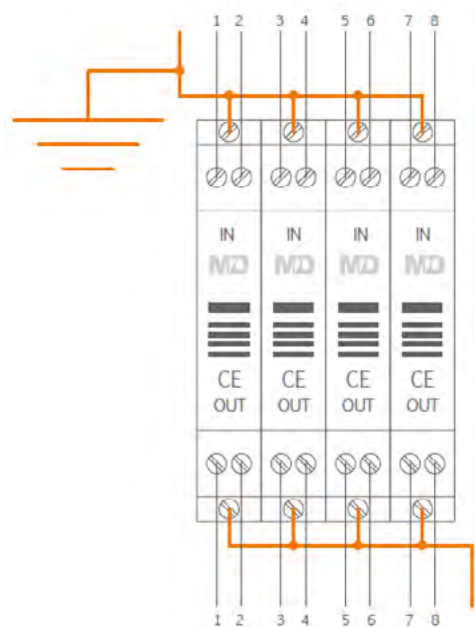
By installing TD series, communication and signaling electronic devices are protected from transient overvoltages fom atmospheric and maneuver origin. All TD series protective devices are characterised by:

- Data lines protection in accordance with IEC 61643:21.
- Two-part design: easy replacement of the protective cartridge.
- Adjusted residual voltages to the communication voltage.
- The signal is not interrupted during the cartridge replacement.
- Protection of any communication protocol.
- Protection in two steps.
- 35 mm DIN rail installation.
- Wide range of voltages.



TD_24_B0 surge protective device 1 to 4 -pairs

TECHNICAL SPECIFICATIONS	TD/5 - B0	TD/12 - B0	TD/24 - B0	TD/48 - B0	TD/110 - B0	TD/250 - A0
Rated voltage U_n	5 V	12 V	24 V	48 V	110 V	250 V
Maximum operating voltage U_c AC	5 V	12 V	24 V	48 V	140 V	190 V
Maximum operating voltage U_c AC	6 V	15 V	28 V	60 V	180 V	280 V
Rated discharge current (8/20) I_n	5 kA					
Maximum discharge current (8/20) I_{max}	10 kA					
Rated current I_L	0,5 A					
Protection level U_p [L-L] (8/20)	≤80 V	≤150 V	≤200 V	≤250 V	≤500 V	≤1000 V
Protection level U_p [L-PE] (8/20)	≤350 V	≤350 V	≤500 V	≤500 V	≤500 V	≤750 V
Protection level U_p [L-L] (1KV/μs)	≤10 V	≤18 V	≤30 V	≤70 V	≤350 V	≤900 V
Protection level U_p [L-PE] (1KV/μs)	≤600 V	≤600 V	≤600 V	≤600 V	≤180 V	≤450 V
Series impedance per line	4 Ω					
Bandwith	100 MHz				11 MHz	15 MHz
Insertion loss (100 MHz)	≤3,0 dB				≤1,0 dB	≤0,5 dB
IP protection degree	IP 20					
Mounting method method	35 mm DIN-rail					
Enclosure material	UL94 V0					
Operating temperature range	-40°C ~ +80°C					



Example of 4 TD/48 B0 modules installation to protect 4 pairs/8 wires

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Support_

Services

11.1 Technical support to engineering and installers.

11.2 Studies.



SERVICIOS TECHNICAL SUPPORT AND ANALYSIS

As a result of our dedication to the manufacture of electric protective devices, we offer technical support and engineering training to engineering firms and installer companies:

- Lightning protection.
- Surge and harmonics protection.
- Earthing systems.
- Cathodic protection.
- Electric studies and analysis.
- Customized devices development to concrete solutions.

ANALYSIS

Among the services we offer to our clients we highlight:

- Analysis and protective projects against overvoltages and harmonics of electrical installations, data and communications.
- Studies of installations with lightning rods.
- Supply quality analysis according to EN-50160.
- Energy audits according to the Real Decreto 56/2016.
- Analysis of electrical facilities.
- Harmonic analysis and personalized solutions.
- Studies of untimely tripping of differential switches.
- Earthing studies.
- Online monitoring of energy- electricity, gas, water and temperature.



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*GUARANTEE, TECHNOLOGY OF SERVICE, CONSULTANCY AND
TECHNICAL SUPPORT TO PROFESSIONALS AND ENGINEERING COMPANIES*