ELEMKO

SSS
Safety & Security

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Surge Protective Devices - SPDs

SURGE PROTECTIVE DEVICES - SPDs

- Medium Voltage AC Surge Arresters
- Low Voltage AC SPDs
- Low Voltage DC & PV SPDs
- Signalling & Telecommunication SPDs
- Isolating Spark Gaps
- DC Decoupling Devices against AC Mitigation in Cathodic Protected Systems

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Meet **ELEMKO**

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HISTORY

Year of 1973 was the start of a successeful course for our company with main object the:

Global Solutions of Lightning Protection Covering:

- Protection of structures and buildings against direct lightning strike
- Surge Overvoltage Protection of electrical & electronic systems
- Earthing Systems

Over the years, ELEMKO has acquired fundamental know-how, experience and specialisation in the protection of people, structures and equipment with high specifications and demands against the catastrophic consequences of lightning.

All the above strong arms are coupled with strong financial fundamental, the sensitivity and insistence on quality, the passion and love of the people who staffed, the continuous update on all developments that concern our matters, the constant training of personnel, the transfer of knowledge and experiences to the world through technical seminars and technical books, leading developments and creating lasting relationships of trust.

The company's share capital amounts to 2.930.000€, making ELEMKO among the most financially powerful companies in Europe in our field.

ELEMKO's premises of 3.600 sqm in which are based its services and activities are housed at 24.067 sqm private land. Specifically, the company is headquartered in Metamorphosis, in Attica, while in Thiva is the "Research Center for tests and Developments", which is the largest ELEMKO's investment carried out exclusively by Elemko' s funds. Research Center for tests and Developments of our company is one of the four in all Europe and has been accredited according to standards EN - ISO/ IEC 17025.

In Thessaloniki is based the branch of the company, dedicated to serve the needs of our customers in Northern Greece more directly.

GUARANTEE

- ELEMKO's experience for more than 45 years
- The scientific and technical knowledge of ELEMKO's staff that have been acquired through continuous training.
- The results of the research we carry out at ELEMKO's Testing and Certification Research Center
- ELEMKO's long lasting cooperation with universities and private research centers in Greece, France, Belgium, Switzerland, the USA and the UK.
- The adoption and strict implementation of European and International Standards on Lightning Protection Components, Surge Protection Devices, Earthing
- The adherence to the procedures of the ISO 9001
- The accreditation of ELEMKO's laboratory according to Standard EN-ISO/IEC 17025

DESIGNS & STUDIES

ELEMKO designs and studies comply strictly with the current European and International Standards. Frequently heralded as pioneering, with a number of them having been presented at International scientific conferences, they include:

- Protection of common and special structures from lightning such as Wind Farms and Photovoltaic installations

- Surge overvoltage Protection of electrical and electronic systems.
- Surge Overvoltage Protection of telecommunications and telemetry systems.
- Earthing Systems of common and special structures such as Wind Farms and Photovoltaic installations.
- Earthing Systems of Substations according to Standards IEEE std 80 and IEEE std 81.
- Financial / technical studies of interrelated projects.
- The drawing up of technical specification of offers.

The above mentioned Elemko's services are ensured by the Quality Management System ISO 9001

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TECHNICAL SUPPORT

ELEMKO's engineers are always available to help you choose the most appropriate technical and financial solution:

- At every telephone call you make.
- At your worksite.
- At your facilities.
- In your building.

Everybody is here to help you.

INSPECTION

Applied European and International Standards require the regular inspection of installed Lightning Protection Systems (internal and external) and Surge Protection Systems, depending on the required level of protection for the structure, to guarantee their readiness and reliability.

The inspection involve checking:

- That the system satisfies applied Standards.
- That the system components are in good condition and adhere to existing Standards.
- That any new parts of the building are covered by the existing system.
- That surge overvoltage protection equipment is in good condition.
- That new machinery which has been installed is protected against surge overvoltage.

Inspections are carried out by ELEMKO's highly trained engineers and technicians, who have a complete knowledge of the applied Standards for Lightning Protection Systems and many years of experience in designing and installing them. They use highly accurate measuring instruments and devices that are regularly calibrated at special laboratories.

MANUFACTURING

All our products are of high and stable quality, thanks to the most advanced and modern equipment that the manufacturing department is equipped with.

Production quality inspections are performed in every production phase, to ensure reliability and long life to the final product.

Additional laboratory tests ensures the products' compliance to the latest international (IEC) and European (EN) standards.

The tests are performed in our laboratory, accredited according to standard ISO 17025 by the American Association for Laboratories Accreditation (A2LA).

The quality, reliability and long life of all of our components, is validated by all the above mentioned checks and tests in order to reassure that the external and internal lightning protection system that uses these products and constructed according to the International and European standards is safe and trusted.

TRAINING

One of ELEMKO's most important priority, is the training of engineers and technicians in the earthing and lightning protection fields in order to keep them updated.

Our seminars are conducted in our laboratory, in our headquarters or online via custom made webinars and they are especially designed to transfer our knowledge and experience, combining effectively theory and practice.

Additionally we provide educational and informative material (equipment, books, exhibits) to numerus educational institutes (universities, technical schools etc) thus to provide as much as possible information to the future engineers and technicians.

The purpose of the present catalogue is to become a useful tool for every designer, engineer and project supervisor and to help them select and install the surge protective devices in a suitable and safe manner.

The catalogue consist of three parts, with each one referring to:

Part A – Electrical networks surge protective devices (SPDs)
Medium voltage SPDs, industrial type SPDs, low voltage AC SPDs DC SPDs.

Part B – Surge protective devices (SPDs) for data processing systems
Telecommunication systems SPDs, analogue and digital signaling systems SPDs, high frequency & coaxial cables SPDs.

Part C – Isolating spark gaps & overvoltage protective devices for systems with cathodic protection
Isolating spark gaps, explosion proof (Ex) isolating spark gaps, AC stray currents dissipation device for systems with cathodic protection.

All the protective devices contained in this catalogue comply with the requirements of the latest editions of the applicable European (EN) and International (IEC) standards and national (ELOT) standards (up to the date of the catalogue's publication).

As new standards concerning the design of a complete lightning protection system (IEC / EN 62305 series and especially standard IEC / EN 62305–4 which refers to the design of the internal lightning protection system and the protection against surge overvoltages) were released, the publication of a specialized catalogue became necessary in order to fully cover the "protection against surge overvoltages" field.
Additionally the standards concerning the tests requirements for lightning protection system components were also revised (IEC / EN 62561 series concerning the tests to external lightning protection system components & IEC / EN 61643 series concerning the tests to surge protective devises), in order design and tests requirements to be fully harmonized.

Consistent to its commitment to training of professionals, ELEMKO S.A. is ready to update its customers on the new requirements and changes of the revised standards. Additionally, ELEMKO S.A. has available a full range of reliable and quality products to cover all your needs in the fields of earthing and lightning protection.

In the introduction of this catalogue useful information is included concerning the application of surge protective devices, but for further details the reader should refer to the current standards IEC / EN 62305 series, IEC / EN 61643 series as well as IEC HD 60364 standard.

Furthermore, ELEMKO through its technical publications, which has been revised according to latest standards' new requirements, explains in a simple and understandable manner and through numerous application examples the way to design and construct a lightning protection system, guiding the designer, engineer and project supervisor through the design of the system and the selection and installation of the components/devices in a suitable and safe manner.

Surge protective devices of ELEMKO S.A. which comply to the 35/2014 European directive (electrical equipment within certain voltage limits – 50 up to 1000 Vac and 75 up to 1500 Vdc) are certified from bodies (e.g. VDE, OVE) accredited according to standard ISO 17065 "Requirements for bodies certifying products, processes and services". These certifications overcovers the directive's requirements concerning the use of CE mark.
Moreover the certification of an accredited body according to ISO 17065 means that:

- Each product is 100% tested and evaluated from accredited laboratory according to standard ISO 17025, for safety issues concerning the use of CE mark according to European directive 35/2014 and also for the technical performance declared by the manufacturer which is not in the field of 35/2014 directive.

- The certification body performs annual inspections and quality checks on the production line, equipment and raw materials of the manufacturer.

- The certification body has continuous supervision to the product's quality through systematic testing by taking samples either from the manufacturer's production line or from the market.

The above process in conjunction with the tests performed in our accredited laboratory (according to ISO 17025 by the American Association for Laboratories Accreditation (A2LA)) and the basic certifications ISO 9001, ISO 14001 & ISO 45001 ELEMKO holds (also by accredited body – Bureau Veritas), ensure the full compliance with the requirements of the current applicable standards and stable manufacturing quality, which is a guarantee to the professional and a reassurance of safety for the final user.

ELEMKO S.A. taking under consideration the electrician's responsibility and the potential hazards to the final user, has marked (where possible) all its instructions, warranties and products with the official & international mark of standard IEC 60417 – 6182. This marking denotes that for the selection and installation of the specific product particular electrotechnical expertise is required, such as qualified electrician

ELEMKO is certified by Bureau Veritas (accredited body) for the following standards:

ISO 9001 – Quality management system

ISO 14001 – Environmental management system

ISO 45001 – Occupational Health and Safety Management

	The selection and the installation of the product must be performed only by qualified electrician
VDE	The product is certified by the German certification body, VDE
ÖVE	The product is certified by the Austrian certification body, OVE
c UL us	The product is certified by the USA certification body, UL
RoHS	The product complies to the RoHS European directive
CE	The product complies to the 35/2014 European directive

1. Introduction to surge overvoltages

Depending on their source, overvoltages have different characteristics and require different protection measures. Most of the products described in this catalogue aim to reduce the overvoltages caused by switch operations and lightning strikes. Long duration overvoltages (ms…s), are caused by the bad quality of electrical power supply and they are treated using voltage stabilizers, UPS etc. Overvoltages caused by switch operations and lightning strikes, are called surge overvoltages and they are characterized by their short duration (μs) and high voltage absolute value (kV). They are treated using surge protective devices. Most destructive and difficult to handle are the surge overvoltages caused by lightning strikes.

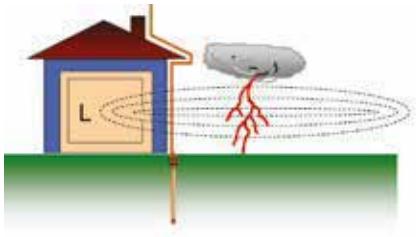
Lightning strikes, can cause instantly or gradually damage to electrical and electronic equipment in a structure, due to surge overvoltages. Surge overvoltages could be caused either by direct or indirect lightning strikes. Lightning strikes that hit directly on the structure or at the incoming conductive networks (e.g. electrical supply, telephone network) are called direct lightning strikes. Lightning strikes that hit near the structure or near the incoming conductive networks as well as the cloud to cloud lightnings, are called indirect lightning strikes. More dangerous for the electrical and electronic circuits are the direct lightning strikes, followed by the nearby lightning strikes and last the cloud to cloud lightnings.

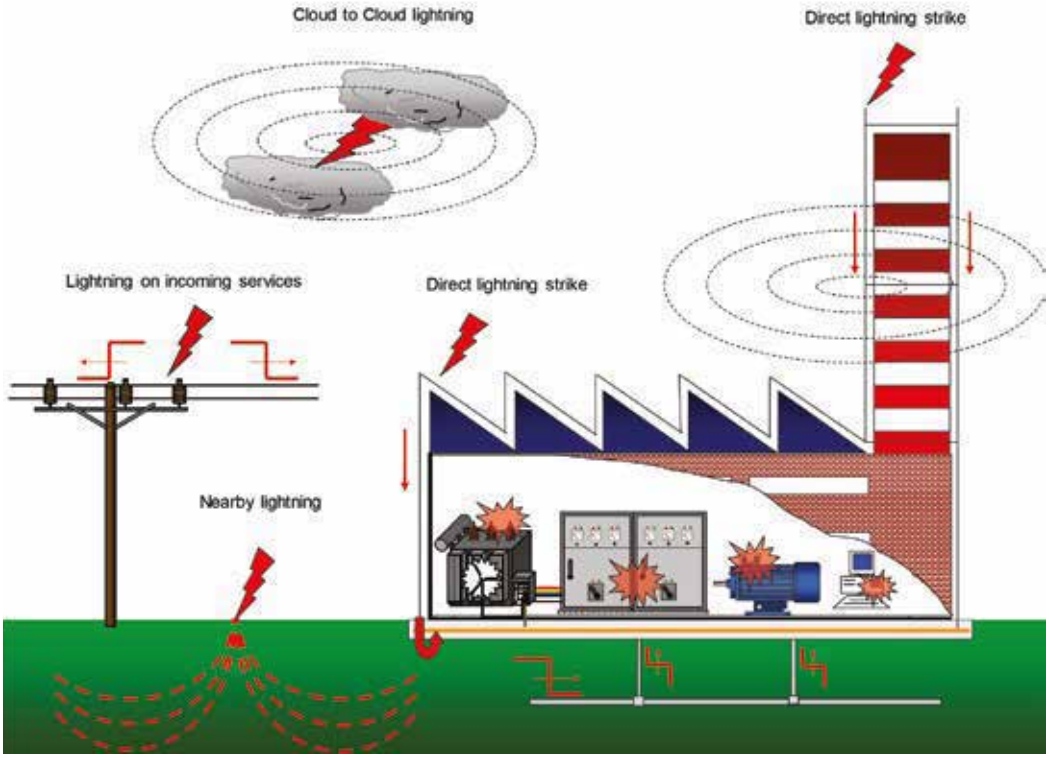
Lightning strike can cause severe damage to an electrical installation which can reach up to total destruction. The amount of damage depends basically on the maximum current conducted and the energy of the lightning. Lightning is a natural current source, the flow of which causes either ohmic or inductive (mainly) surge overvoltages. As lightning strikes are natural phenomena it is obvious that they are dissimilar, in every aspect of their characteristics (e.g. energy, wave-form). After years of research, the peak value of a lightning strike is considered the value of 200kA with impulse wave-form 10/350μs [IEC / EN 62305 – 1].

Lightning is a high frequency current source, generating surge currents up to 200kA with a high steepness up to 200kA/μs. A direct lightning may cause ohmic coupling to conductive services connected to a building, while a nearby lightning due to the high di/dt may cause severe induced effects into cables.

Direct $I_{Lightning}$: up to 200kA

Induced di/dt, $I_{Lightning}$: 200kA/μs





2. Protection of electrical installations from surge overvoltages according to series of standards IEC / HD 60364

According to standard IEC / HD 60364 – 4 – 443 protection from overvoltages of atmospheric origin is necessary when both of the following conditions are met:

I. The facility is powered by an overhead supply network (even partly)
II. The thunderstorm days (Td) in the area are more than 25 per year

Additionally calculating the risks according to IEC / EN 62305-2 in critical facilities, the operation of which should be uninterruptible, protection against surge overvoltages becomes obligatory. Such facilities are:

I. Facilities concerning human life (e.g. hospitals, health centers etc)
II. Public utilities (e.g. electricity, gas, water etc)
III. Industrial and commercial facilities (e.g. hotels, factories, malls etc)

According to IEC /EN 62305-3, protection against surge overvoltages is obligatory also to:

IV. Facilities where an external lightning protection system (LPS) is installed.

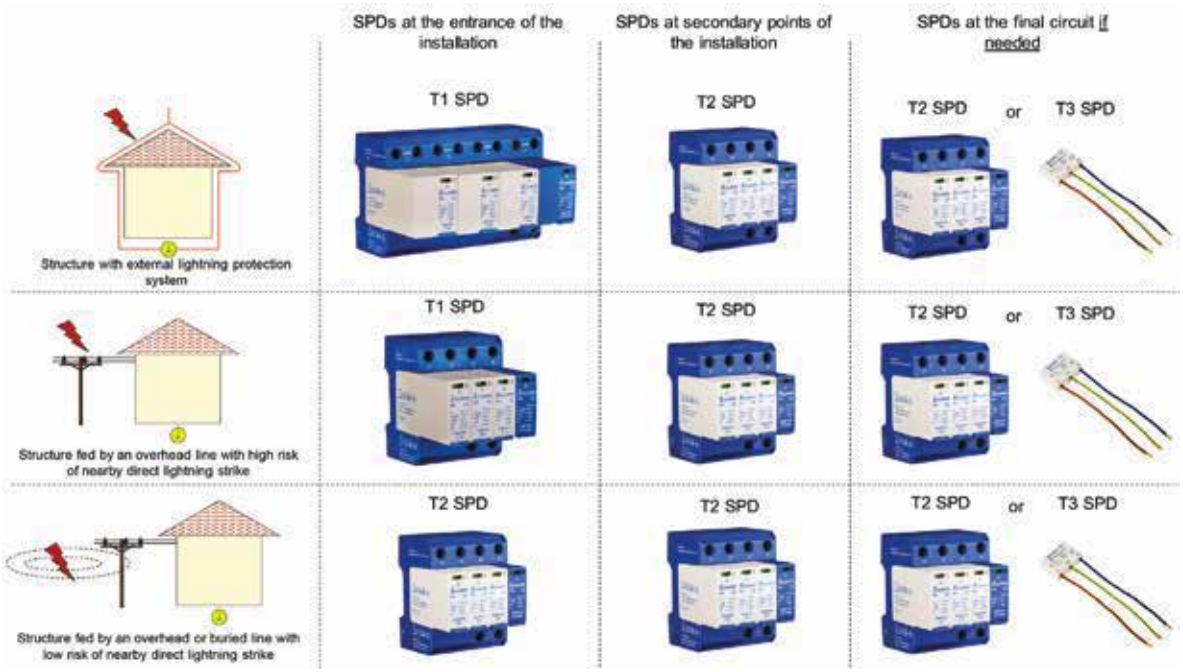
CENELEC IEC

3. Selection and installation points of power surge protective devices (SPDs)

The basic protection of an electrical installation from a lightning strike, hitting either directly to the external LPS installation or to the incoming overhead power supply, is achieved by installing type T1 surge protective devices at the main distribution board, and type T2 surge protective devices at secondary distribution boards.

In case the building is not protected by an external LPS installation but is powered by an overhead power supply, the basic protection of the electrical installation, is achieved by installing type T1 surge protective devices at the main distribution board, and type T2 surge protective devices at secondary distribution boards.

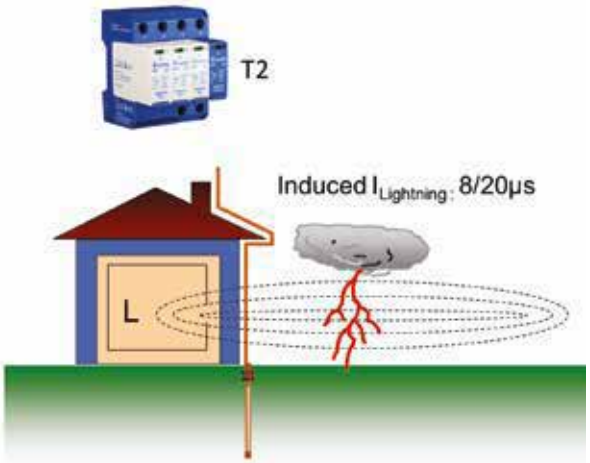
In case that an external LPS is not necessary and the building is powered by a power supply not vulnerable to direct lightning strikes (underground supply), the installation of type T2 surge protective devices at the main distribution board, is considered sufficient for the basic protection of the electrical installation.



4. Basic categories of surge protective devices (SPDs)

There are three types of surge protective devices (SPDs) for electrical networks, types T1, T2 and T3. T1 SPDs are mainly characterized by their ability to discharge high energy impulse currents of 10/350 μs waveform, resulting from direct lightning strikes. T2 SPDs have the ability to discharge surge currents of 8/20 μs waveform, resulting mainly from the electromagnetic force created from a lightning strike (indirect lightning strike).

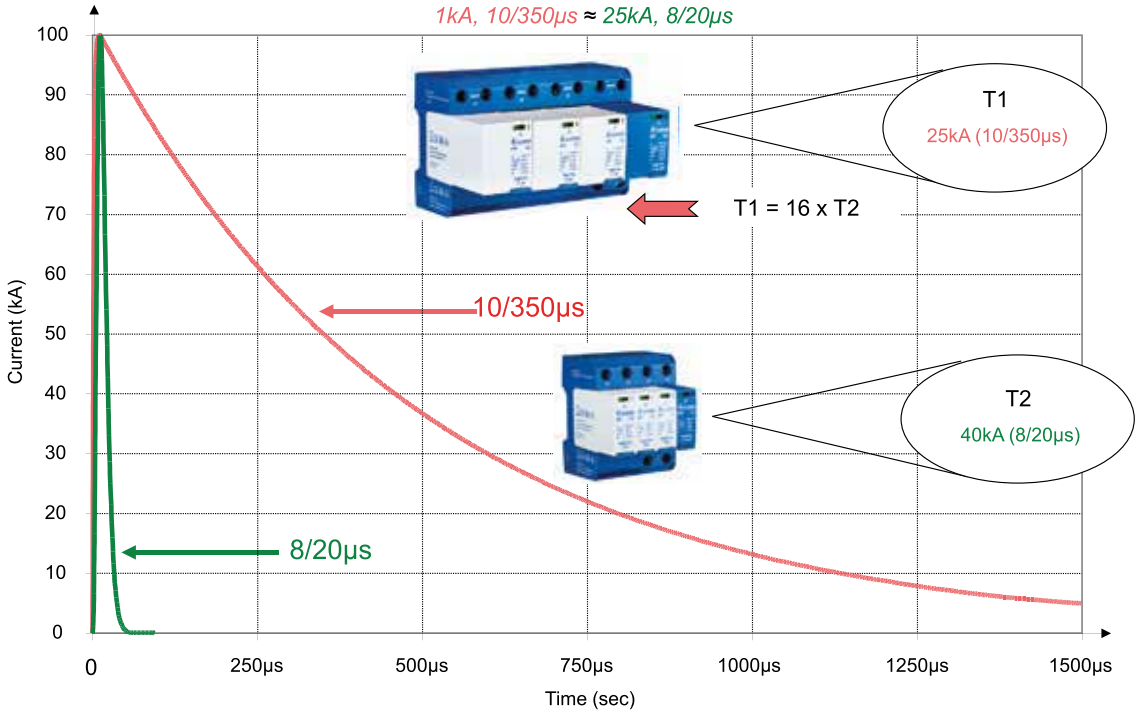
T3 SPDs are offering additional protection level to sensitive equipment, provided that they are installed downwards T1 or T2 SPDs.
Waveform 10/350 μs means that the peak current is reached at 10 μs and the time needed to fall to the half is 350 μs.
Waveform 8/20 μs means that the peak current is reached at 8 μs and the time needed to fall to the half is 20 μs.



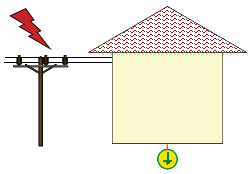
5. Basic differences between T1 and T2 surge protective devices (SPDs)

Comparing a T1 SPD, with 25 kA (10/350 μs) impulse current discharging capability, to a T2 SPD, with 40 kA (8/20 μs) surge current discharging capability, is very possible to assume that T2 SPD is stronger than T1 SPD, due to the higher absolute current value that it can withstand. This would be an incorrect assumption, as not only the absolute value of the current but also its energy plays a significant role in SPDs. The energy of a lightning current depends on its waveform.

Comparing the difference between 10/350 μs and 8/20 μs waveforms, it turns out that 10/350 μs contains about 25 times more energy and charge than 8/20 μs.

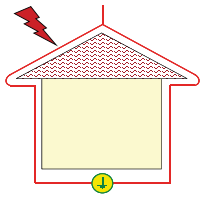


6. What should be the lightning current limp (10/350 µs) discharge capability of a T1 surge protective device (SPD)



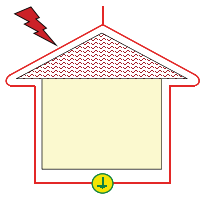
Building without external lightning protection system, powered by overhead power supply.

Defined by standard
HD 60634–5–534
limp = 12.5 kA (10/350 µs) per pole



Building with external lightning protection system – of protection levels III & IV.

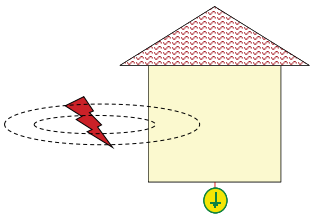
Defined by standard
EN 62305–4
limp = 12.5 kA (10/350 µs) per pole
For protection levels III & IV



Building with external lightning protection system – of protection levels I & II.

Defined by standard
EN 62305–4
limp = 25 kA (10/350 µs) per pole
For protection levels I & II

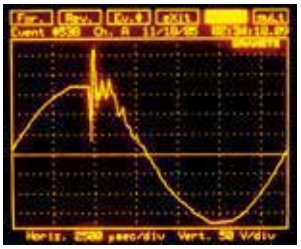
7. What should be the lightning current In (8/20 µs) discharge capability of a T2 surge protective device (SPD)



Building without external lightning protection system, powered by underground power supply.

HD 60634–5–534 requires
In = 5 kA (8/20 µs) per pole

While standards IEC / EN 62305–1 & – 4 requires In = 10 kA (8/20 µs) per pole



Characteristics of SurgeTron H T2
In = 20 kA & Imax = 50 kA
Which ensures a long lifespan of the SPD's

And additionally 6 years warranty.

8. Connection of surge protective devices (SPDs) according to the installation point & the earthing connection system

The best installation point of the SPDs, in order to protect the whole electrical installation, is immediately after the electricity meter, the main switch and the main fuses and before the central or individual RCDs.

At this point, we wish to declare, that if the earthing connection system is TT, the connection of the SPDs must be 3 + 1 (CT 2 based on HD 60364 - 5 - 534).

3 + 1 connection means that 3 SPDs are connected between each phase (L) and neutral (N) and one SPD (of different technology from L–N SPDs) is connected between neutral (N) and earth (PE).

For 1 phase systems a similar connection is performed which is called 1 + 1. In contrast, connection 4 + 0 (CT 1 based on HD 60364 - 5 – 534) means that 4 SPDs of the same technology are connected between phase/neutral and earth.

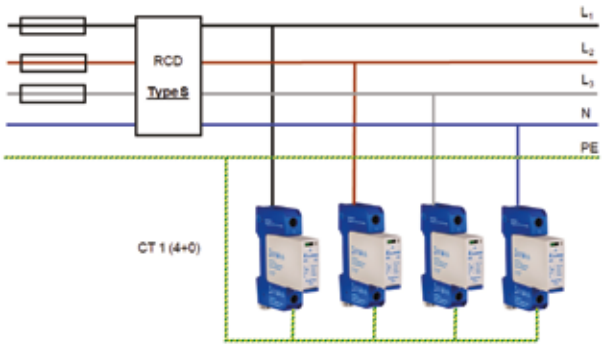
If the installation before the central RCD is not possible, the SPDs can be installed after the RCD either in 3 + 1 connection or in 4 + 0 connection (which in TT systems is allowed only after the RCD).

In this case and according to standard HD 60364 – 5 – 534 the RCD should be Type S.

Concerning the installation of the SPDs after the RCD, it should be emphasized that for surge currents greater than 3 kA (8/20 μs) there is the risk that the RCD will operate, interrupting the power supply.

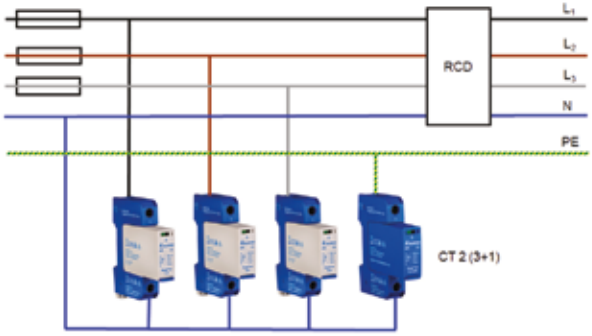
In all cases, the overcurrent protection (OCPD) should meet the requirements of the manufacturer of the SPDs and also should be selectively coordinated with the general fuses.

SPD Connection Type 1 (CT1) 4+0 wiring suitable for TN* and TT systems downstream of an RCD type S



*In TN systems CT1, 4+0 connection type may be installed upstream the RCD

SPD Connection Type 2 (CT2) 3+1 wiring suitable for all TN and TT systems upstream the RCD

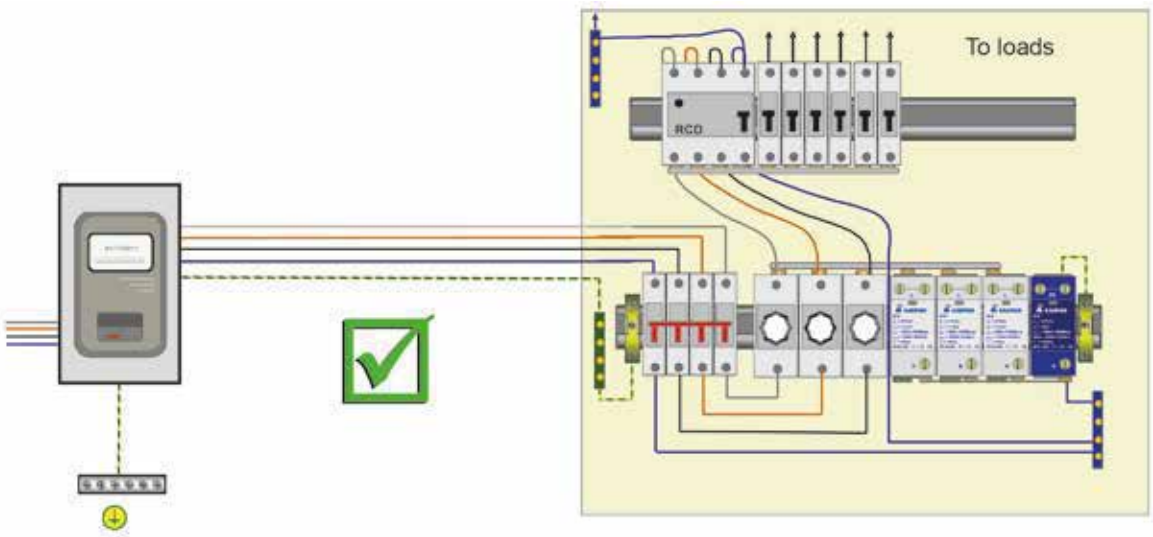


9. Cross section of connection conductor for low voltage power surge protective devices (SPDs) according to IEC / EN 62305–4

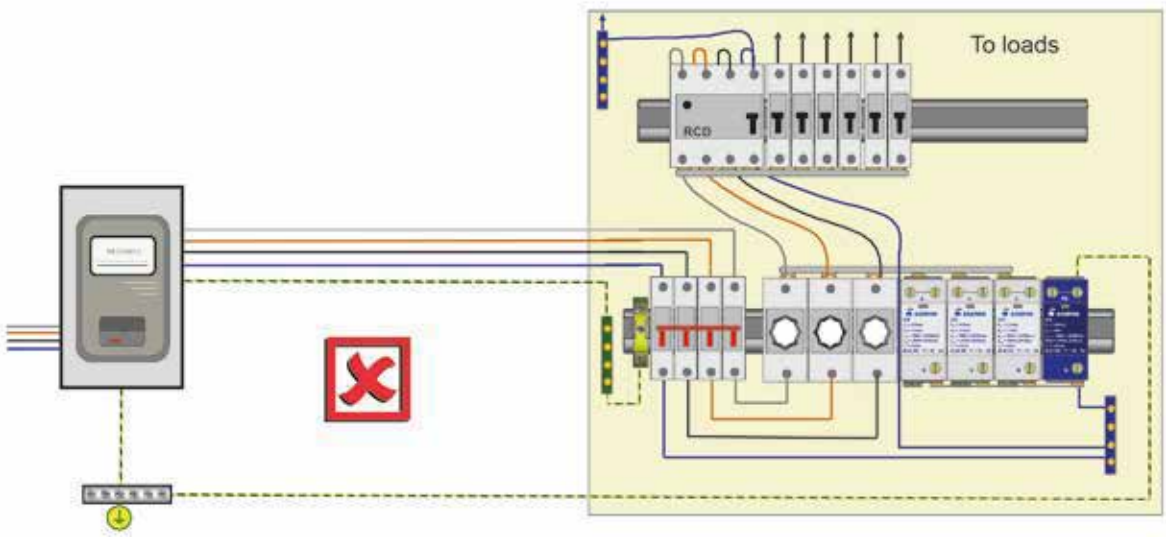
	Type of surge protective device		
	T1	T2	T3
Minimum cross section of conductor (copper)	16 mm^2	6 mm^2	1,5 mm^2
Minimum cross section of conductor (copper)	35 mm^2	35 mm^2	35mm^2
[1] For ELEMKO SPDs for installation on DIN–3 rail.			
The fuse selection should meet the specifications of the SPD as well as the requirements of standard IEC / HD 60364, concerning the connecting cable.			

10. Basic installation instructions for surge protective devices (SPDs)

According to the current standard IEC EN 62305 – 3, for an effective protection against surge overvoltages, the earth termination system of the incoming networks should be single / common. That means, that if there is an earth termination system for the electrical power supply, an earth termination system for the telecommunication network and an earth termination system for the lightning protection system, these should be con-nected to each other, in order to be equipotential.



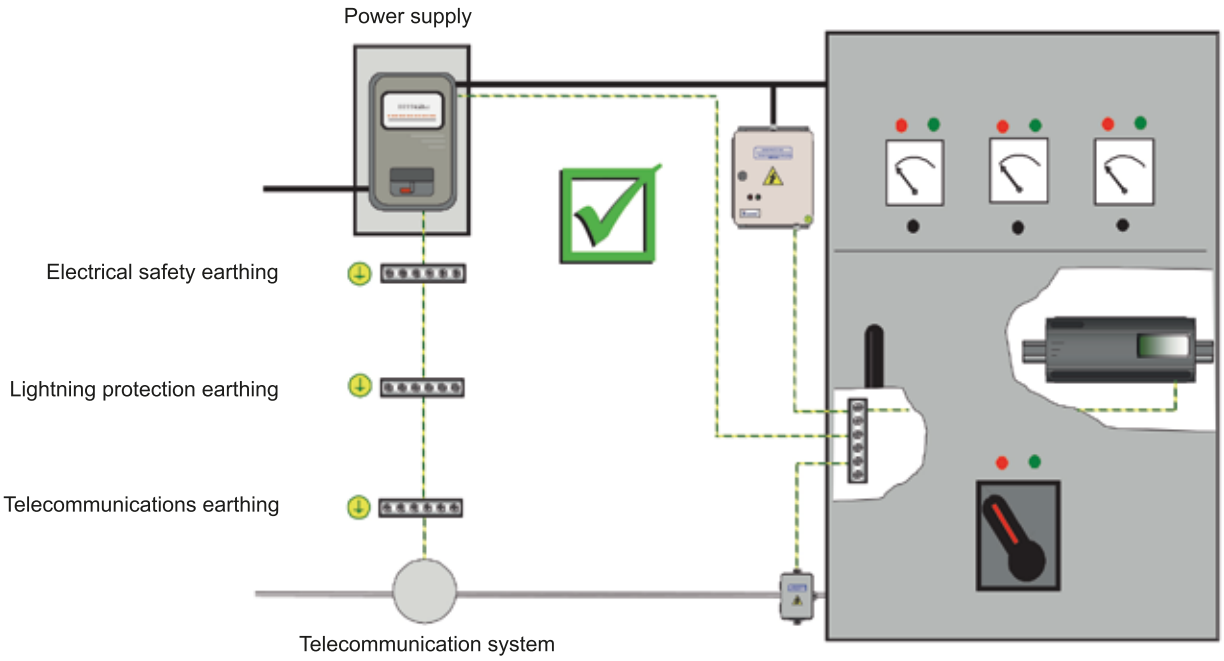
Installation of SPDs with short connecting wires (<0,5m) in total - Correct



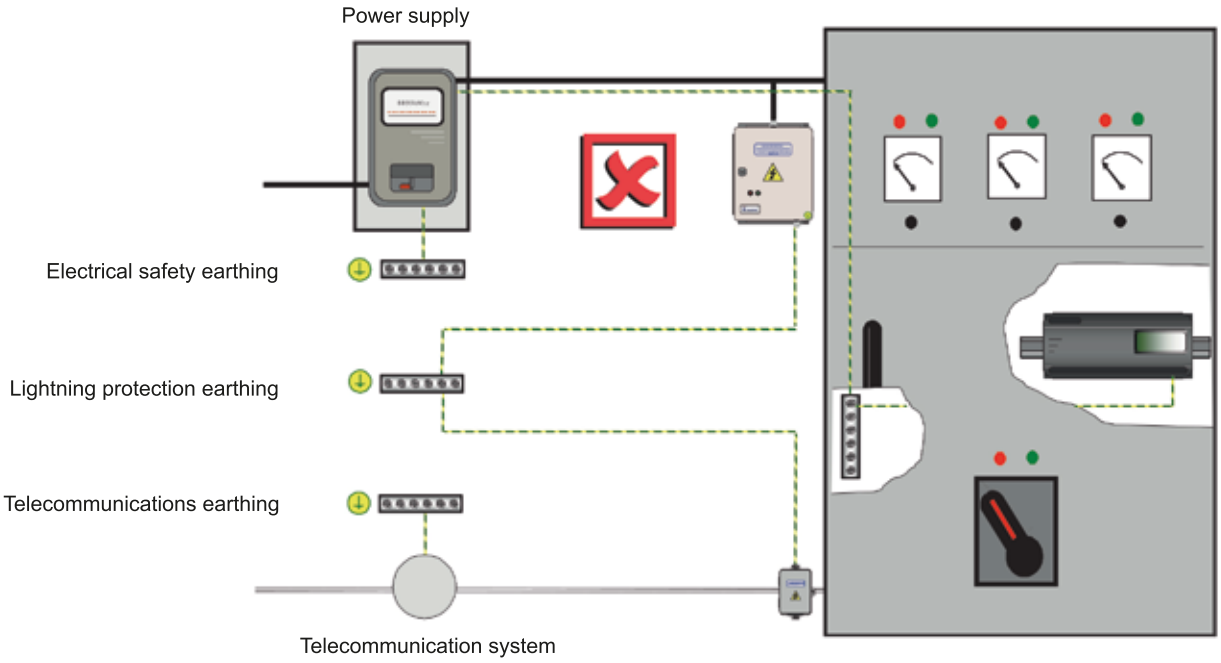
Installation of SPDs with long connecting wires (>>0,5m) in total - Wrong

11. Common earth termination system

According to the current standard IEC EN 62305 – 3, for an effective protection against surge overvoltages, the earth termination system of the incoming networks should be single / common. That means, that if there is an earth termination system for the electrical power supply, an earth termination system for the telecommunication network and an earth termination system for the lightning protection system, these should be connected to each other, in order to be equipotential.



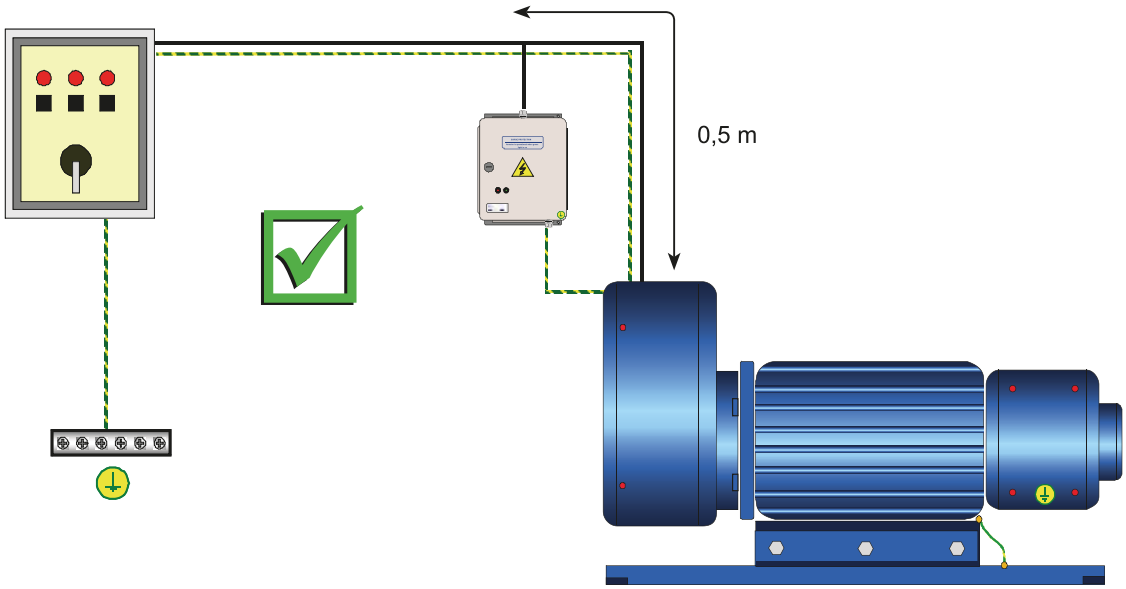
Common earthing systems - Correct



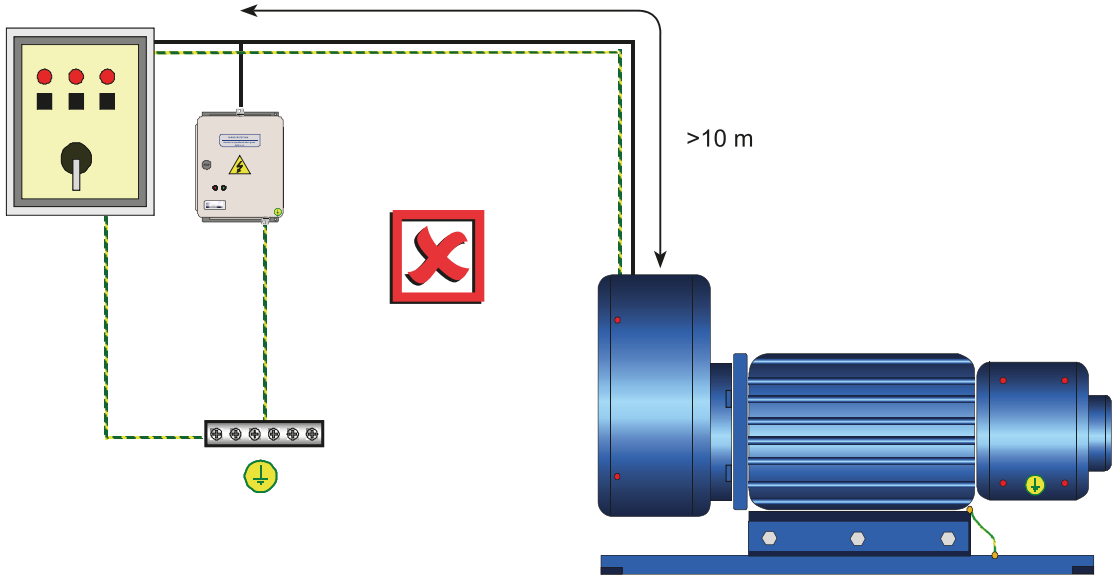
Separated earthing systems - Wrong

12. Distance between surge protective devices (SPDs) and equipment under protection

According to the current standard IEC EN 62305 – 4, for an effective protection against surge overvoltages, the SPDs should be installed close to the equipment under protection. As maximum permissible distance (cable length) between the SPDs and the equipment under protection, is defined by the standard the distance of 10 m (see figure 15). The same condition should be fulfilled and for the earthing conductor, which should connect the equipment under protection (common with the protective conductor PE) with a cable length as short as possible.



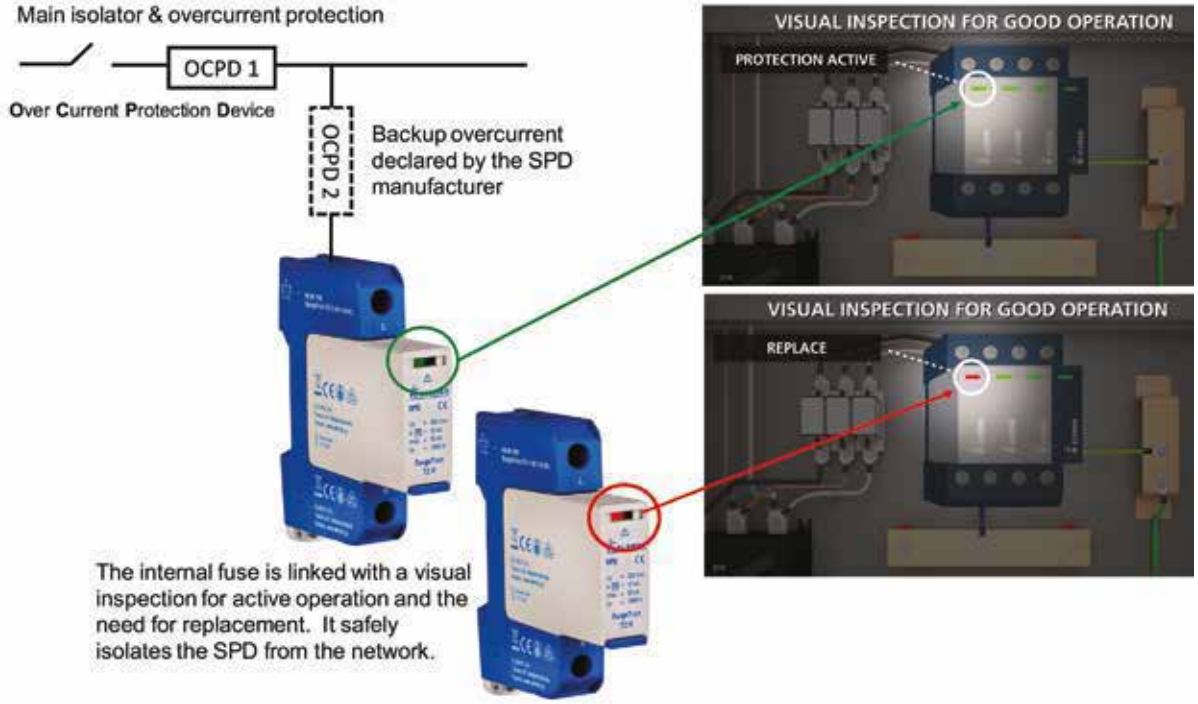
Distance between SPD and protected equipment < 10m - Correct

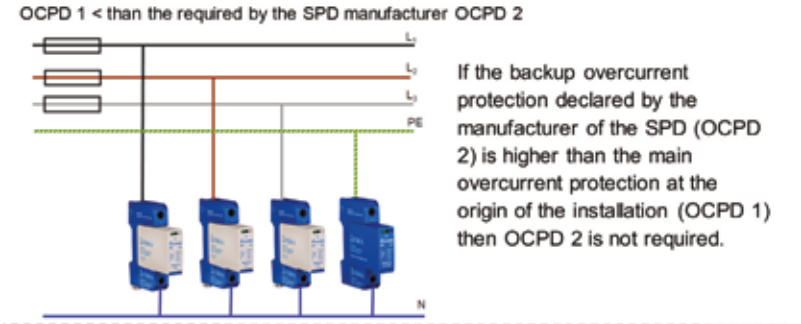


Distance between SPD and protected equipment > 10m - Not recommended

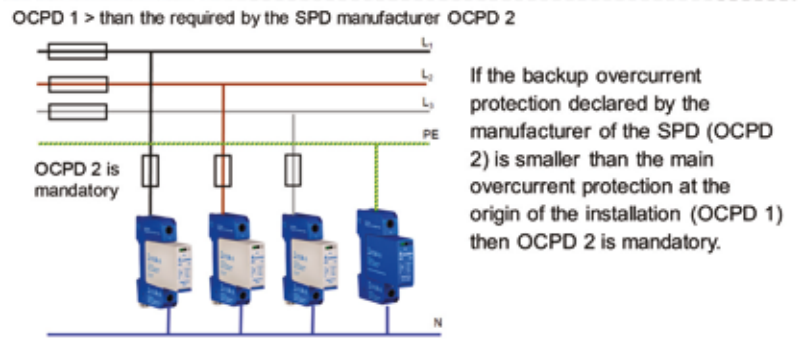
13. Choice of protection mean for the surge protective devices (SPDs)

Fuse usage for the protection of the SPD and its connection cable is an essential requirement of the standard HD 60634. The fuse to be chosen must appear good behavior to the surge current that will discharge, in order not to decrease the SPDs' effectiveness. The best fuse to use in order to withstand surge currents, is the fuse of gG operating class, as its wire is of short length and big cross sectional area, compared to the MCBs and RCDs which have coils made from wires of long length and small cross sectional area and they cannot withstand high energy surge currents. Especially the RCD, whose performance is essential for the protection of human life,is highly recommended not to be installed before the SPDs (at least at the main distribution board), as the surge current can decrease its effectiveness. The MCBs and RCDs must be installed after the surge protective devices (this applies mainly for the basic protection in the main distribution board). Fuse's characteristics depends on the technical characteristics of the SPD as well as of the cable that is going to protect.





If the backup overcurrent protection declared by the manufacturer of the SPD (OCPD 2) is higher than the main overcurrent protection at the origin of the installation (OCPD 1) then OCPD 2 is not required.



If the backup overcurrent protection declared by the manufacturer of the SPD (OCPD 2) is smaller than the main overcurrent protection at the origin of the installation (OCPD 1) then OCPD 2 is mandatory.

All ELEMKO TrigeTron and SurgeTron SPDs require a backup overcurrent protection, only if the main overcurrent protection (OCPD1) is higher than the equivalent of a fuselink 315AgG type.

14. Choosing surge protective devices (SPDs) for signal protection

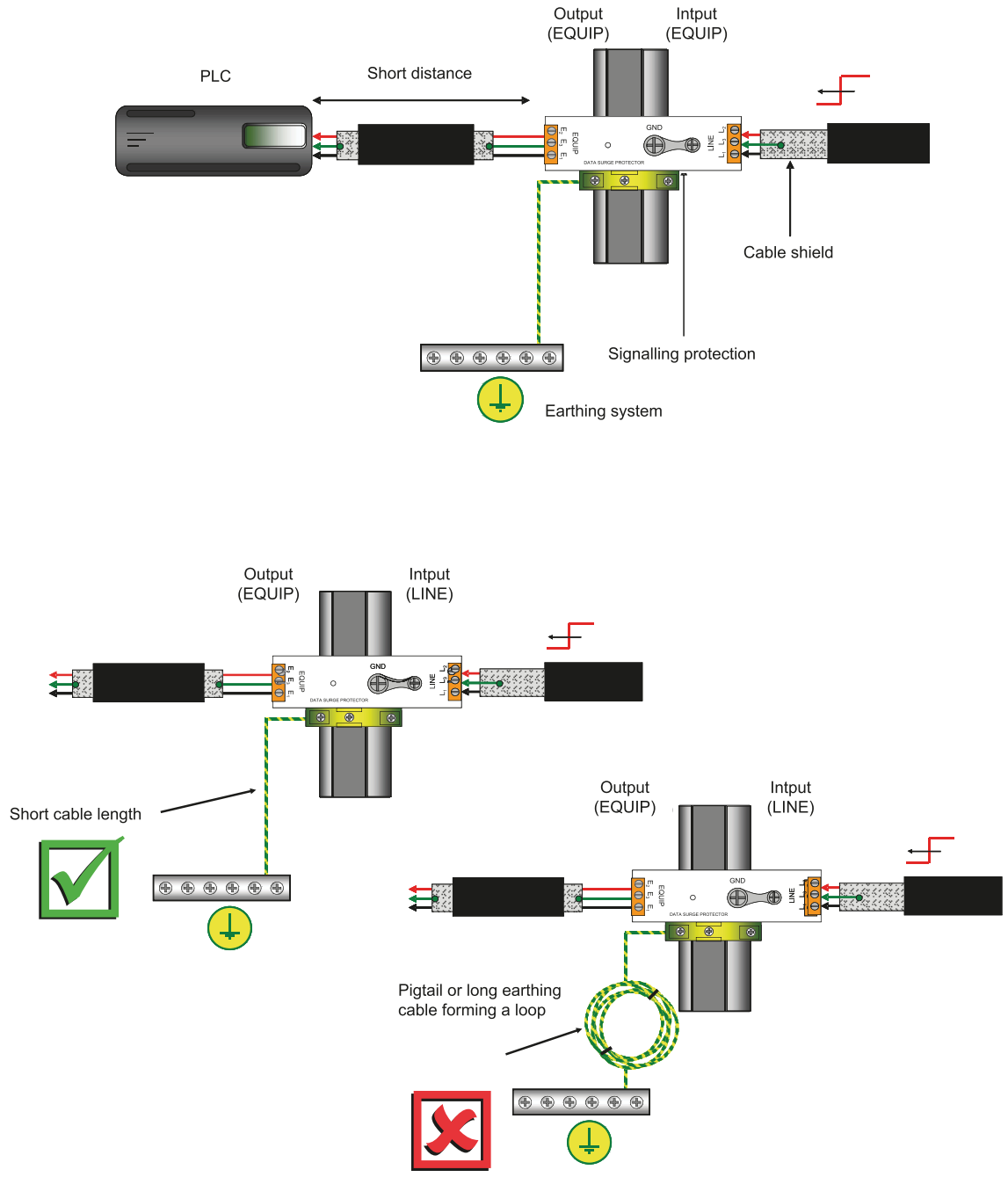
The choice of telecommunication SPDs, depends on the type of the signal which passes through the SPD. In summary the choice criteria are:

Telecommunication signals: Type of line (PTSN, ISDN, DSL), number of pairs.

Analogue and digital signals: Signal frequency (Hz), voltage (V) and current (A).

High frequency coaxial cables: Signal frequency (Hz), signal power (W), connector type(N, BNC etc), cable impedance (50Ω, 75Ω etc).

The SPDs used for the protection of equipment with incoming shielded cables, should be installed in proximity with the equipment under protection (e.g. PLC) and the cable's shield should be connected to the SPD. Ideally, the length of the connection cables of the SPDs should not be greater than 0.5 m. The same apply and for the earth conductor of the SPD (see figures 17 & 18).



Installation of SPDs in signalling and communication networks

15. ELEMKO TrigeTron HS – Hybrid Performance

16. Certification of the SPD according to IEC 61643 – 11 & EN 61643 – 11 from accredited certification body

Complete test report & quality symbol from independent certification body.


VDE Prüf- und Zertifizierungsinstitut

ZEICHENGENEHMIGUNG
MARKS APPROVAL

ELEMKO SA
Tatoiou Street 96
14452 METAMORPHOSIS, ATTIKI
Greece

Überspannungsschutzgerät
Surge protective device

VDE

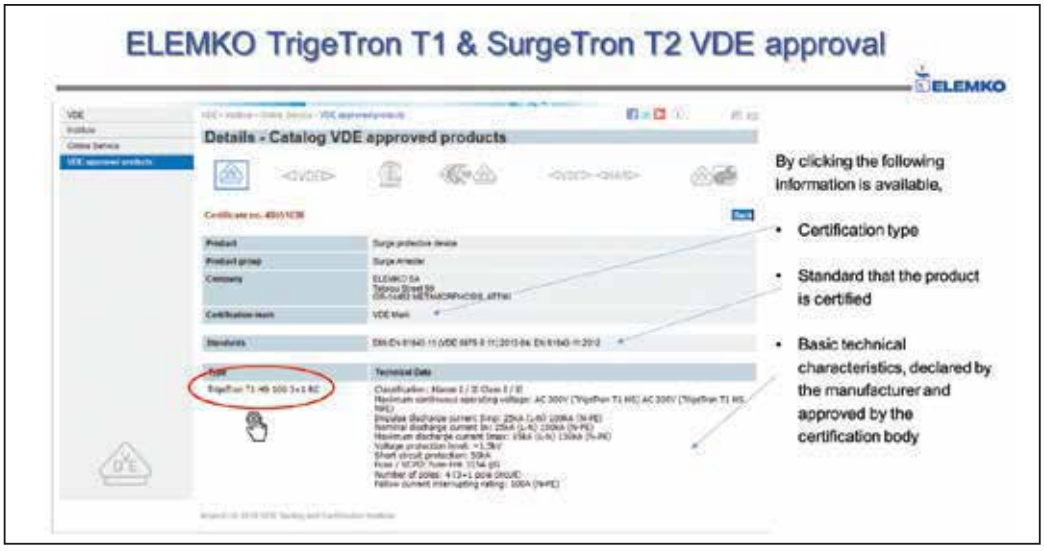

VDE Prüf- und Zertifizierungsinstitut
Zeichengenehmigung

Überspannungsschutzgerät
Surge protective device

17. Basic technical characteristics of the new series of ELEMKO SPDs TrigeTron H T1 και SurgeTron H T2

- Ability to discharge direct lightning current limp = 12,5kA (T1 - 10/350μs) and indirect surge current Imax = 65kA (T2 - 8/20μs) providing a long lifespan and resistance to multiple strikes
- Suitable for the protection of sensitive electrical and electronic equipment, due to their low residual voltage Up = 1,5kV
- No leakage current, thus providing the maximum safety to the users of the electrical installation
- Can be installed before the RCDs
- 3+1 connection suitable for TT & TN systems
- TOV withstand 440V for 120min
- VDE certification
- Pluggable module
- New technology thermal protection

- Backup fuse is optional for up to 350 A gG, reducing the cost and the required space for installation inside the electrical board
- Short circuit withstand up to 50 kA
- Protection against vibrations
- Installation on DIN rail – 4 modules width

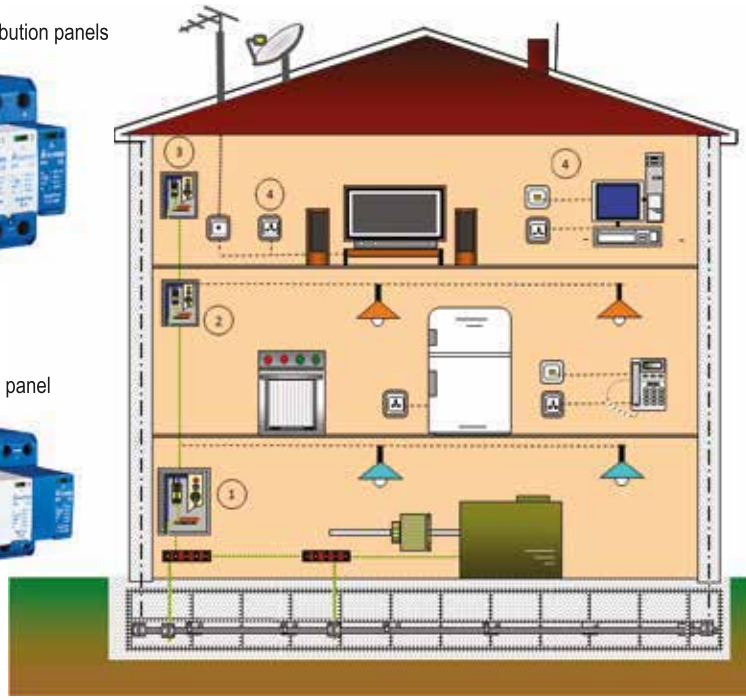


AC Low Voltage SPDs

SPD Application in a residential building

Secondary AC distribution panels

2



Protection of AC supply of main fixed equipment

3

Main AC distribution panel

1

Protection of small power supplies

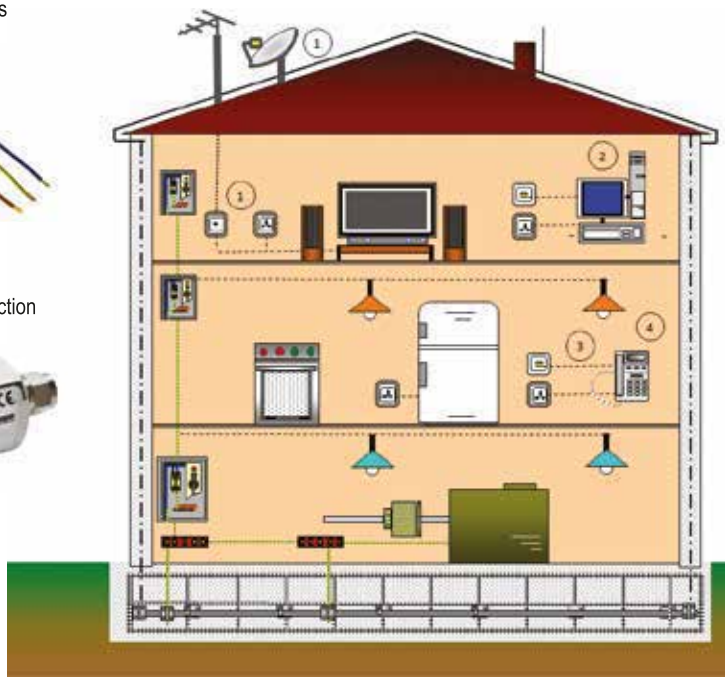
4

1	Main AC distribution panel	Page 24		3	Protection of AC supply of main fixed equipment	Page 31
2	Secondary AC distribution panels	Page 29		4	Protection of small power supplies	Page 32

Signaling & Telecom SPDs

Sensitive electronics

2



Telecom line supply protection

3

TV & Satellite protection

1

Rooter telecom supply protection

4

1	TV & Satellite protection	Page 49		3	Telecom line supply protection	Page 38
2	Sensitive electronics	Page 32		4	Rooter telecom supply protection	Page 39

SPD Application in an industrial site

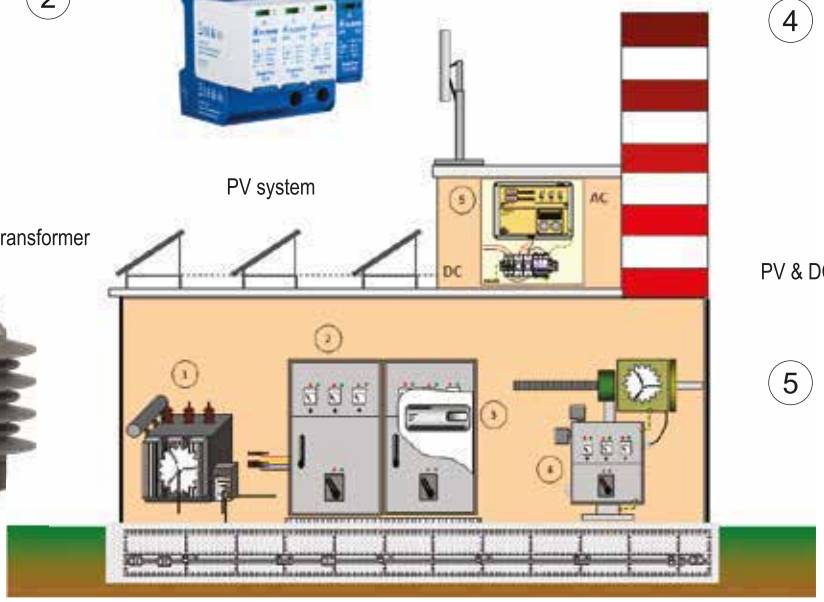
AC Medium & Low Voltage SPDs

Main AC distribution panel

Protection of AC supply of main fixed equipment

Protection of AC supply of automation & control equipment

MV side of distribution transformer



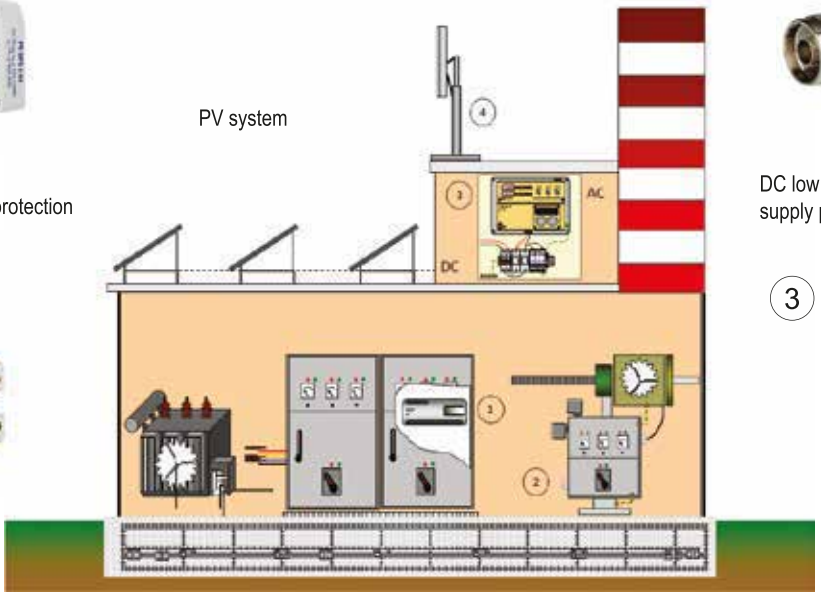
PV & DC protection

1	MV side of distribution transformer	Page 34		3	Protection of AC supply of main fixed equipment	Page 29
2	Main AC distribution panel	Page 22		4/5	Protection of AC supply of automation & control equipment and PV & DC protection	Page 31/35

Signaling & Telecom SPDs

Automation and sensors protection

Co-axial signaling and RF protection



Signaling & Control protection

DC low voltage power supply protection

1	Signaling & Control protection	Page 44		3	DC low voltage power supply protection	Page 33
2	Automation and sensors protection	Page 42		4	Co-axial signaling and RF protection	Page 50

AC Low Voltage SPDs

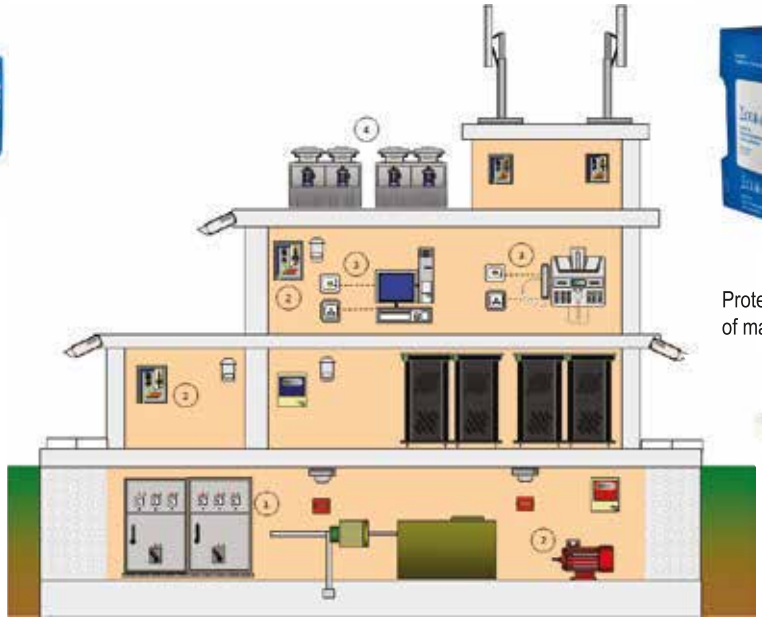
SPD application in an office Building

Secondary AC distribution panels

2

Protection of small power supplies

4



Main AC distribution panel

1

Protection of AC supply of main fixed equipment

3

1	Main AC distribution panel	Page 22		3	Protection of AC supply of main fixed equipment	Page 32
2	Secondary AC distribution panels	Page 29		4	Protection of small power supplies	Page 26

Signaling & Telecom SPDs

Ethernet networks protection

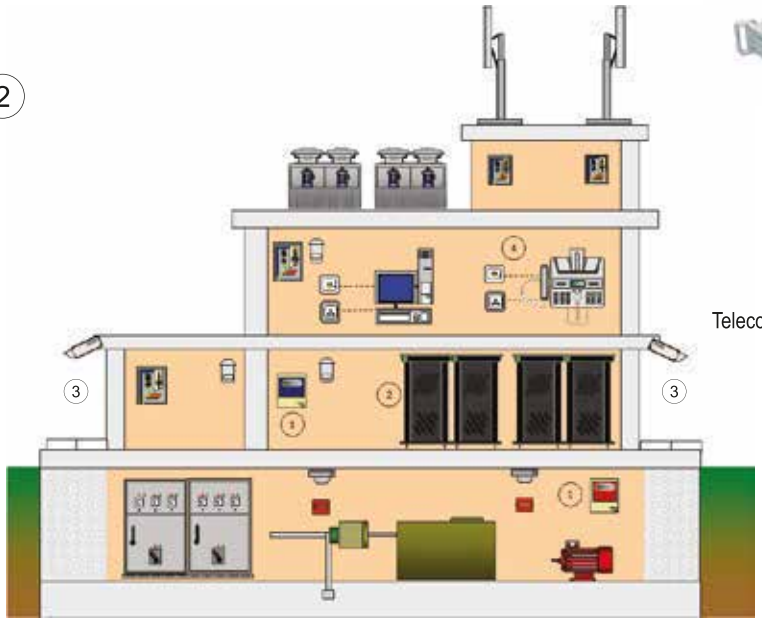
2

CCTV and DVR protection

4

Alarm and fire protection

1



Telecom lines protection

3

1	Alarm and fire protection	Page 45		3	Telecom lines protection	Page 41
2	Ethernet networks protection	Page 47		4	CCTV and DVR protection	Page 43

ELECTRICAL POWER NETWORK SURGE PROTECTIVE DEVICES

- Medium voltage AC surge protective devices
- Low voltage AC surge protective devices
- DC network surge protective devices
- Solar and Wind Renewable SPDs

SSS
Safety & Security
+961 25 803965 | +961 03 864963

Low voltage AC surge protective devices (SPDs), Type 1

Brand Name: Surge Grabber T1

DESCRIPTION

Four poles SPDs T1 (class I) in metallic enclosure with built-in fuses and indication LEDs. They are suitable for installation in TT, TN S & TN CS systems and are designed to be installed at the entrance of the distribution network 230/400V, 50Hz. They are equipped with 3 protection modules of innovative design (protection between L – N). Each L – N module combines in series a heavy duty varistor (MOV) and a spark gap, thus providing high protection against temporary overvoltages (TOV) and limiting the leakage current between phase and neutral. They are also equipped with a heavy duty spark gap, sealed into a noble gas filled cylinder (protection between N – PE), in order to prevent any leakage current to the earthing system, thus allowing their installation before the RCD, even in TT systems. The spark gap between N – PE is also providing optimum protection against temporary overvoltages (TOV) caused even by medium voltage faults. They are capable to withstand high energy lightning currents up to 25 kA (10/350 μs) per pole, 100 kA (10/350 μs) per 4 poles or 12,5 kA (10/350 μs) per pole, 50 kA (10/350 μs) per 4 poles, providing protection to structures with external lightning protection system of all classes (class IV up to class I). The residual voltage per pole is less than 1,5kV (@ 20 kA) providing optimum protection to equipment of all categories of insulation level (category IV up to category I) according to IEC 60364-4-44.

Protection type EN / IEC 61643 – 11

- T1 / Class I

Technical Characteristics

Brand name	Surge Grabber T1 H 3+1	Surge Grabber T1 HS 3+1
Code	68 05 501	68 05 500
Number of poles	4	4
Connection between terminals	L_1 – N, L_2 – N, L_3 – N, N – PE	L_1 – N, L_2 – N, L_3 – N, N – PE
Installation in	TN S, TN CS, TT	TN S, TN CS, TT
Nominal operating voltage, U_N	230/400 V, 50Hz	230/400 V, 50Hz
Maximum operating voltage, U_c	300V (L-N) / 305V (N-PE), 50Hz	300V (L-N) / 305V (N-PE), 50Hz
I_{imp}, “class I” test, (10/350μs), 1P	12,5kA (L-N) / 50kA (N-PE)	25kA (L-N) / 100kA (N-PE)
I_{max}, “class II” test, (8/20μs), 1P	65kA (L-N) / 100kA (N-PE)	65kA (L-N) / 130kA (N-PE)
I_n, “class II” test, (8/20μs), 1P	20kA (L-N) / 100kA (N-PE)	25kA (L-N) / 100kA (N-PE)
U_p, (at I_n)	<1,5kV (L-N) / <1,5kV (N-PE)	<1,5kV (L-N) / <1,5kV (N-PE)
Response time, t_A	<25ns (L-N) / <100ns (N-PE)	<25ns (L-N) / <100ns (N-PE)
Short circuit withstand, I_{scr}	25kA / 50Hz	50kA / 50Hz
Built-in fuse	125A, MCB, type C	125A, MCB, type C
Follow current interrupt rating (N–PE), I_{fi}	100A rms	100A rms
Temporary Overvoltage TOV 120min L-N	442V withstand	442V withstand
Temporary Overvoltage TOV 200ms N-PE	1200V withstand	1200V withstand
Thermal protection	YES	YES
Residual current, I_{PE}	< 5 μA	< 5 μA
Installation location	Indoor	Indoor
Protection level of housing	IP43	IP43
Dimensions WxHxD (mm)	210x480x150	210x480x150
Operating temperature	-40°C … 80°C	-40°C … 80°C
Relative humidity	5% … 95%	5% … 95%
Maximum terminal conductor	25mm²	25mm²
Combined equivalent protection as per TS 61643 – 12 & IEC 61643 -12	T1 (CAT IV) + T2 (CAT II & CAT III) + T3 (CAT I)	T1 (CAT IV) + T2 (CAT II & CAT III) + T3 (CAT I)
Certification	CE	CE
Conformity with	LVD 2014/35/EU	LVD 2014/35/EU
Installation only by qualified electrician	IEC 60417 – 6182	IEC 60417 – 6182
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001	ISO 9001, ISO 14001, ISO 45001

Low voltage AC surge protective devices (SPDs), Type 2

Brand Name: Surge Grabber T2

DESCRIPTION

Four poles SPDs T2 (class II) in metallic enclosure with built-in fuses and indication LEDs. They are suitable for installation in TT, TN S & TN CS systems and are designed to be installed at the entrance of the distribution network 230/400V, 50Hz. They are equipped with 3 protection modules of innovative design (protection between L – N). Each L – N module combines in series a heavy duty varistor (MOV) and a spark gap, thus providing high protection against temporary overvoltages (TOV) and limiting the leakage current between phase and neutral. They are also equipped with a heavy duty spark gap, sealed into a noble gas filled cylinder (protection between N – PE), in order to prevent any leakage current to the earthing system, thus allowing their installation before the RCD, even in TT systems. The spark gap between N – PE is also providing optimum protection against temporary overvoltages (TOV) caused even by medium voltage faults. They are capable to withstand surge currents up to 50 kA (8/20 μs) per pole between L–N & 65 kA (8/20 μs) per pole between N–PE. The residual voltage per pole is less than 1,5kV (@ 20 kA) providing optimum protection to equipment of all categories of insulation level (category IV up to category I) according to IEC 60364-4-44.

Protection type EN / IEC 61643 – 11

- T2 / Class II

Technical Characteristics

Brand name	Surge Grabber T2 H 3+1	Surge Grabber T2 H 1+1
Code	68 05 504	68 05 502
Number of poles	4	2
Connection between terminals	L_1 – N, L_2 – N, L_3 – N, N – PE	L_1 – N, N – PE
Installation in	TN S, TN CS, TT	TN S, TN CS, TT
Nominal operating voltage, U_N	230/400 V, 50Hz	230 V, 50Hz
Maximum operating voltage, U_c	300V (L-N) / 305V (N-PE), 50Hz	300V (L-N) / 305V (N-PE), 50Hz
$I_{max,}$ "class II" test, (8/20μs), 1P	50kA (L-N) / 65kA (N-PE)	50kA (L-N) / 65kA (N-PE)
$I_{n,}$ "class II" test, (8/20μs), 1P	20kA (L-N) / 40kA (N-PE)	20kA (L-N) / 40kA (N-PE)
$U_{p,}$ (at I_n)	<1,5kV (L-N) / <1,5kV (N-PE)	<1,5kV (L-N) / <1,5kV (N-PE)
Response time, t_A	<25ns (L-N) / <100ns (N-PE)	<25ns (L-N) / <100ns (N-PE)
Short circuit withstand, I_{scr}	25kA / 50Hz	25kA / 50Hz
Built-in fuse	125A, MCB, type C	125A, MCB, type C
Follow current interrupt rating (N–PE), I_{fi}	100A rms	100A rms
Temporary Overvoltage TOV 120min L-N	442V withstand	442V withstand
Temporary Overvoltage TOV 200ms N-PE	1200V withstand	1200V withstand
Thermal protection	YES	YES
Residual current, I_{PE}	< 5 μA	< 5 μA
Installation location	Indoor	Indoor
Protection level of housing	IP43	IP43
Dimensions WxHxD (mm)	210x480x150	210x480x150
Operating temperature	-40°C … 80°C	-40°C … 80°C
Relative humidity	5% … 95%	5% … 95%
Maximum terminal conductor	25mm²	25mm²
Combined equivalent protection as per TS 61643 – 12 & IEC 61643 -12	T2 (CAT II & CAT III) + T3 (CAT I)	T2 (CAT II & CAT III) + T3 (CAT I)
Certification	CE	CE
Conformity with	LVD 2014/35/EU	LVD 2014/35/EU
Installation only by qualified electrician	IEC 60417 – 6182	IEC 60417 – 6182
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001	ISO 9001, ISO 14001, ISO 45001

Low voltage AC surge protective devices (SPDs) Type 1

Brand Name: TrigeTron T1 HS

DESCRIPTION

Four poles SPD T1 (class I), in 3+1 wiring (3P + N) suitable for installation in TT, TN S & TN CS systems. It is equipped with 3 protection modules of innovative hybrid design (protection between L – N). Each L – N module combines in series a heavy duty varistor (MOV) and a spark gap, thus providing high protection against temporary overvoltages (TOV) and limiting the leakage current between phase and neutral. It is also equipped with a heavy duty spark gap, sealed into a noble gas filled cylinder (protection between N – PE), in order to prevent any leakage current to the earthing system, thus allowing its installation before the RCD, even in TT systems. The spark gap between N – PE is also providing optimum protection against temporary overvoltages (TOV) caused even by medium voltage faults. It is capable to withstand high energy lightning currents up to 25 kA (10/350 μs) per pole, 100 kA (10/350 μs) per 4 poles, providing protection to structures with external lightning protection system of all classes (class IV up to class I). Additionally, it is providing protection against surge currents up to 65 kA (8/20 μs) per pole. The residual voltage per pole is less than 1,5kV (@ 25 kA) providing optimum protection to equipment of all categories of insulation level (category IV up to category I) according to IEC 60364-4-44.

Protection type EN / IEC 61643 – 11

- T1 / Class I

Technical Characteristics

Brand name	TrigeTron T1 HS 3 + 1
Code	68 25 425
Number of poles	4
Connection between terminals	L_1 – N, L_2 – N, L_3 – N, N – PE
Installation in	TN S, TN CS, TT
Nominal operating voltage, U_N	230/400 V, 50Hz
Maximum operating voltage, U_c	300V (L-N) / 305V (N-PE), 50Hz
I_{imp}, "class I" test, (10/350μs), 1P	25kA (L-N) / 100kA (N-PE)
I_{max}, "class II" test, (8/20μs), 1P	65kA (L-N) / 130kA (N-PE)
I_n, "class II" test, (8/20μs), 1P	25kA (L-N) / 100kA (N-PE)
U_p, (at I_n)	<1,5kV (L-N) / <1,5kV (N-PE)
Response time, t_A	<25ns (L-N) / <100ns (N-PE)
Maximum Backup fuse	315A gG fuse
Short circuit withstand, I_{sccr}	50kA / 50Hz
Follow current interrupt rating (N–PE), I_{fi}	100A rms
Temporary Overvoltage TOV 120min L-N	442V withstand
Temporary Overvoltage TOV 200ms N-PE	1200V withstand
Thermal protection and monitoring indication	YES
Residual current, I_{PE}	< 5 μA
Installation location	Indoor
Protection level of housing	IP20 (built in)
Dimensions WxHxD (mm)	144x106x87
Operating temperature	-40°C … 80°C
Relative humidity	5% … 95%
Rail mounting	DIN-3 (TS-35/EN50022)
Maximum terminal conductor for remote contacts	1,5mm²
Combined equivalent protection as per TS 61643 – 12 & IEC 61643 -12	T1 (CAT IV) + T2 (CAT II & CAT III) + T3 (CAT I)
Certification	VDE, CE
Conformity with	LVD 2014/35/EU
Installation only by qualified electrician	IEC 60417 – 6182
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001

Low voltage AC surge protective devices (SPDs) Type 1

Brand Name: TrigeTron T1 N

DESCRIPTION

Single pole SPD T1 (class I), for connection between L–N & L–PEN and N – PE, suitable for installation in TT, TN S, TN CS & TN C systems. It is equipped with one protection module of innovative design, which includes a heavy duty varistor (MOV). Combined with a module containing spark gap, TrigeTron H NPE 50 0+1 (ELEMKO code 68 25 050) for connection between N–PE, it can be installed before the RCD, even in TT systems, providing optimum protection against temporary overvoltages (TOV) caused even by faults in medium voltage. It is capable to withstand high energy lightning currents up to 12,5 kA (10/350 μs) per pole, 50 kA (10/350 μs) per 4 poles, providing protection to structures with external lightning protection system of classes III & IV and to equipment supplied by overhead electrical network exposed to direct lightning strikes. Additionally it is providing protection against surge currents up to 50 kA (8/20 μs).

Protection type EN / IEC 61643 – 11

- T1 / Class I

Technical Characteristics

Brand name	TrigeTron T1 N 75	TrigeTron T1 N 150	TrigeTron T1 N 300	TrigeTron T1 N 350	TrigeTron T1 N 480	TrigeTron T1 N 750	TrigeTron T1 H N-PE
Code	68 26 075	68 26 150	68 26 300	68 26 350	68 26 480	68 26 750	68 25 050
Number of poles		1 (1+0)					1 (1+0)
Connection between terminals	L – N (TN & TT), L – PEN (TN C only), L/N – PE (TN only)						N – PE
Installation in	TN S, TN CS, TN C, TT						TN S, TN CS, TT
Nominal operating voltage, U_N	60V, 50Hz	120V, 50Hz	240V, 50Hz	277V, 50Hz	400V, 50Hz	600V, 50Hz	230 V (N-PE), 50Hz
Maximum operating voltage, U_c	75V, 50Hz	150V, 50Hz	300V, 50Hz	350V, 50Hz	480V, 50Hz	750V, 50Hz	305V (N-PE), 50Hz
I_{imp}, "class I" test, (10/350μs), 1P	12,5kA	12,5kA	12,5kA	12,5kA	10kA	5kA	50kA
I_{max}, "class II" test,(8/20μs), 1P	50kA	50kA	50kA	50kA	50kA	35kA	100kA
I_n, "class II" test, (8/20μs), 1P	20kA	20kA	20kA	20kA	20kA	20kA	50kA
U_p, (at I_n)	<0,7kV	<1kV	<1,5kV	<1,75kV	<2,1kV	<3,2kV	<1,5kV
Response time, t_A	<25ns	<25ns	<25ns	<25ns	<25ns	<25ns	<100ns
Maximum Backup fuse	315A gG fuse	315A gG fuse	315A gG fuse	315A gG fuse	315A gG fuse	250A gG fuse	-
Short circuit withstand, I_{scer}	25kA / 50Hz	25kA / 50Hz	25kA / 50Hz	25kA / 50Hz	25kA / 50Hz	50kA / 50Hz	-
Follow current interrupt rating (N–PE), I_{fi}	-	-	-	-	-	-	100A rms
Temporary vervoltage TOV 5s – withstand	114V	175V	337V	403V	581V	871V	-
Temporary Overvoltage TOV 120min	114V withstand	229V – fail safe	442V – fail safe	529V – fail safe	762V – fail safe	1143V – fail safe	-
Temporary Overvoltage TOV 200ms N-PE	-	-	-	-	-	-	1200V withstand
Thermal protection	YES						-
Residual current, I_{PE}	<0,6mA						< 5 μA
Installation location	Indoor						
Protection level of housing	IP20 (built in)						
Dimensions WxHxD (mm)	17,5x108x87						
Operating temperature,	-40°C … 80°C						
Relative humidity	5% … 95%						
Rail mounting	DIN-3 (TS-35/EN50022)						
Maximum terminal conductor	35mm2						
Maximum terminal conductor for remote contacts	1,5mm2						No remote contacts
Combined equivalent protection as per IEC 61643 -12	T1 (CAT IV) + T2 (CAT II & CAT III)						
Certification	VDE, CE						
Conformity with	LVD 2014/35/EU						
Installation only by qualified electrician	IEC 60417 – 6182						
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001						

Low voltage AC surge protective devices (SPDs) Type 1

Brand Name: TrigeTron T1 H

DESCRIPTION

Four poles SPD T1 (class I), in 3+1 wiring (3P + N) suitable for installation in TT, TN S & TN CS systems. It is equipped with 3 protection modules of innovative hybrid design (protection between L – N). Each module combines in series a heavy duty varistor (MOV) and a spark gap, thus providing high protection against temporary overvoltages (TOV) and limiting the leak-age current between phase and neutral. It is also equipped with a heavy duty spark gap, sealed into a noble gas filled cylinder (protection between N – PE), in order to prevent any leakage current to the earthing system, thus allowing its installation before the RCD, even in TT systems. The spark gap between N – PE is also providing optimum protection against temporary overvoltages (TOV) caused even by medium voltage faults. It is capable to with-stand high energy lightning currents up to 12,5 kA (10/350 µs) per pole, 50 kA (10/350 µs) per 4 poles, providing protection to structures with external lightning protection system of classes III and IV. Additionally, it is providing protection against surge currents up to 65 kA (8/20 µs) per pole. The residual voltage per pole is less than 1,5kV (@ 20 kA) providing optimum protection to equipment of all categories of insulation level (category IV up to category I) according to IEC 60364-4-44.

Protection type EN / IEC 61643 – 11

- T1 / Class I

Technical Characteristics

Brand name	TrigeTron T1 H 3 + 1
Code	68 25 412
Number of poles	4
Connection between terminals	L_1 – N, L_2 – N, L_3 – N, N – PE
Installation in	TN S, TN CS, TT
Nominal operating voltage, U_N	230/400 V, 50Hz
Maximum operating voltage, U_c	300V (L-N) / 305V (N-PE), 50Hz
I_{imp}, "class I" test, (10/350µs), 1P	12,5kA (L-N) / 50kA (N-PE)
I_{max}, "class II" test, (8/20µs), 1P	65kA (L-N) / 100kA (N-PE)
I_n, "class II" test, (8/20µs), 1P	20kA (L-N) / 50kA (N-PE)
U_p, (at I_n)	<1,5kV (L-N) / <1,5kV (N-PE)
Response time, t_A	<25ns (L-N) / <100ns (N-PE)
Maximum Backup fuse	315A gG fuse
Short circuit withstand, I_{sccr}	25kA / 50Hz
Follow current interrupt rating (N–PE), I_{fi}	100A rms
Temporary Overvoltage TOV 120min L-N	442V withstand
Temporary Overvoltage TOV 200ms N-PE	1200V withstand
Thermal protection and monitoring indication	YES
Residual current, I_{PE}	< 5 µA
Installation location	Indoor
Protection level of housing	IP20 (built in)
Dimensions WxHxD (mm)	72x106x87
Operating temperature	-40°C … 80°C
Relative humidity	5% … 95%
Rail mounting	DIN-3 (TS-35/EN50022)
Maximum terminal conductor for remote contacts	1,5mm²
Combined equivalent protection as per TS 61643 – 12 & IEC 61643 -12	T1 (CAT IV) + T2 (CAT II & CAT III) + T3 (CAT I)
Certification	VDE, CE
Conformity with	LVD 2014/35/EU
Installation only by qualified electrician	IEC 60417 – 6182
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001

Low voltage AC surge protective devices (SPDs) Type 1

Brand Name: TrigeTron T1 H

DESCRIPTION

Single pole SPD T1 (class I), for connection between L–N & L–PEN, suitable for installation in TT, TN S, TN CS & TN C systems. It is equipped with 1 protection module of innovative hybrid design, which combines in series a heavy duty varistor (MOV) and a spark gap, thus providing high protection against temporary overvoltages (TOV) and limiting the leakage current between phase and neutral. Combined with a module containing spark gap, TrigeTron H NPE 50 0+1 (ELEMKO code 68 25 050) for connection between N–PE, it can be installed before the RCD, even in TT systems, providing optimum protection against temporary overvoltages (TOV) caused even by faults in medium voltage. It is capable to withstand high energy lightning currents up to 12,5 kA (10/350 μs) per pole, 50 kA (10/350 μs) per 4 poles, providing protection to structures with external lightning protection system of classes III & IV and to equipment supplied by overhead electrical network exposed to direct lightning strikes. Additionally it is providing protection against surge currents up to 65 kA (8/20 μs). The residual voltage is less than 1,5kV (@ 20 kA) providing optimum protection to equipment of all categories of insulation level (category IV up to category I) according to IEC 60364-4-44.

Protection type EN / IEC 61643 – 11

- T1 / Class I

Technical Characteristics

Brand name	TrigeTron T1 H 1+0	TrigeTron T1 H NPE 0+1
Code	68 25 112	68 25 050
Number of poles	1	1
Connection between terminals	L – N / L – PEN	N – PE
Installation in	TN S, TN CS, TN C, TT	TN S, TN CS, TT
Nominal operating voltage, U_N	230/400 V, 50Hz	230/400 V, 50Hz
Maximum operating voltage, U_c	300V, 50Hz	305V, 50Hz
$I_{imp.}$ "class I" test, (10/350μs), 1P	12,5kA	50kA
$I_{max.}$ "class II" test, (8/20μs), 1P	65kA	100kA
I_n, "class II" test, (8/20μs), 1P	20kA	50kA
U_p, (at I_n)	<1,5kV	<1,5kV
Response time, t_A	<25ns	<100ns
Maximum Backup fuse	315A gG fuse	-
Short circuit withstand, I_{scr}	25kA / 50Hz	-
Follow current interrupt rating (N–PE), I_{fi}	-	100A rms
Temporary Overvoltage TOV 120min L-N	442V withstand	-
Temporary Overvoltage TOV 200ms N-PE	-	1200V withstand
Thermal protection and monitoring indication	YES	YES
Residual current, I_{PE}	< 5 μA	< 5 μA
Installation location	Indoor	Indoor
Protection level of housing	IP20 (built in)	IP20 (built in)
Dimensions WxHxD (mm)	17,5x106x87	17,5x106x87
Operating temperature	-40°C … 80°C	-40°C … 80°C
Relative humidity	5% … 95%	5% … 95%
Rail mounting	DIN-3 (TS-35/EN50022)	DIN-3 (TS-35/EN50022)
Maximum terminal conductor	35mm²	35mm²
Maximum terminal conductor for remote contacts	1,5mm²	No remote contacts
Combined equivalent protection as per TS 61643 – 12 & IEC 61643 -12	T1 (CAT IV) + T2 (CAT II & CAT III) + T3 (CAT I)	T1 (CAT IV) + T2 (CAT II & CAT III) + T3 (CAT I)
Certification	VDE, CE	VDE, CE
Conformity with	LVD 2014/35/EU	LVD 2014/35/EU
Installation only by qualified electrician	IEC 60417 – 6182	IEC 60417 – 6182
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001	ISO 9001, ISO 14001, ISO 45001

Low voltage AC surge protective devices (SPDs) Type 1

Brand Name: Monoblock 12.5/T1

DESCRIPTION

Four poles and two poles SPDs T1 (class I), in 3+1 (3L + N) and 1+1 (L + N) wiring correspondingly, suitable for installation in TT, TN S & TN CS systems. They are equipped with heavy duty varistors (protection between phases–neutral) and a spark gap (protection between neutral–protective earth). This wiring is preventing any leakage current to the earthing system, thus allowing their installation before the RCD, even in TT systems. Additionally they are especially designed to provide high protection against temporary overvoltages (TOV) caused even by medium voltage faults. They are capable to withstand high energy lightning currents up to 12,5 kA (10/350 μs) per pole, 50 kA (10/350 μs) per 4 poles, providing protection to structures with external lightning protection system of classes III & IV and to equipment supplied by overhead electrical network exposed to direct lightning strikes. The residual voltage is less than 1,5kV (@ 20 kA) providing optimum protection to equipment of all categories of insulation level (category IV up to category I) according to IEC 60364-4-44.

Protection type EN / IEC 61643 – 11

- T1 / Class I

Technical Characteristics

Brand name	Monoblock 12.5/T1 3+1	Monoblock 12.5/T1 1+1
Code	68 44 491	68 44 291
Number of poles	4	2
Connection between terminals	L_1 – N, L_2 – N, L_3 – N, N – PE	L_1 – N, N – PE
Installation in	TN S, TN CS, TT	TN S, TN CS, TT
Nominal operating voltage, U_N	230/400 V, 50Hz	230/400 V, 50Hz
Maximum operating voltage, U_c	320V (L-N) / 255V (N-PE), 50Hz	320V (L-N) / 255V (N-PE), 50Hz
$I_{imp.}$ "class I" test, (10/350μs), 1P	12,5kA (L-N) / 50kA (N-PE)	12,5kA (L-N) / 50kA (N-PE)
$I_{max.}$ "class II" test, (8/20μs), 1P	50kA (L-N) / 50kA (N-PE)	50kA (L-N) / 50kA (N-PE)
$I_{n.}$ "class II" test, (8/20μs), 1P	20kA (L-N) / 20kA (N-PE)	20kA (L-N) / 20kA (N-PE)
$U_{p.}$ (at I_n)	<1,5kV (L-N) / <1,5kV (N-PE)	<1,5kV (L-N) / <1,5kV (N-PE)
Response time, t_A	<25ns (L-N) / <100ns (N-PE)	<25ns (L-N) / <100ns (N-PE)
Maximum Backup fuse	250A gG fuse	250A gG fuse
Short circuit withstand, I_{sccr}	25kA / 50Hz	25kA / 50Hz
Follow current interrupt rating (N–PE), I_{fi}	100A rms	100A rms
Temporary Overvoltage TOV 120min L-N	440V fail safe	440V fail safe
Temporary Overvoltage TOV 5s L-N	352V withstand	352V withstand
Temporary Overvoltage TOV 200ms N-PE	1200V withstand	1200V withstand
Thermal protection and monitoring indication	YES	YES
Residual current, I_{PE}	< 5 μA	< 5 μA
Installation location	Indoor	Indoor
Protection level of housing	IP20 (built in)	IP20 (built in)
Dimensions WxHxD (mm)	72x99x71	36x99x71
Operating temperature	-40°C … 80°C	-40°C … 80°C
Relative humidity	5% … 95%	5% … 95%
Rail mounting	DIN-3 (TS-35/EN50022)	DIN-3 (TS-35/EN50022)
Maximum terminal conductor for remote contacts	No remote contacts	No remote contacts
Combined equivalent protection as per TS 61643 – 12 & IEC 61643 -12	T1 (CAT IV) + T2 (CAT II & CAT III) + T3 (CAT I)	T1 (CAT IV) + T2 (CAT II & CAT III) + T3 (CAT I)
Certification	ÖVE, CE	ÖVE, CE
Conformity with	LVD 2014/35/EU	LVD 2014/35/EU
Installation only by qualified electrician	IEC 60417 – 6182	IEC 60417 – 6182
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001	ISO 9001, ISO 14001, ISO 45001

Low voltage AC surge protective devices (SPDs) Type 2

Brand Name: SurgeTron T2 H 3+1 RC

DESCRIPTION

Four poles SPD T2 (class II), in 3+1 wiring (3L + N) suitable for installation in TT, TN S & TN CS systems. It is equipped with 3 protection modules of innovative design (protection between L – N). Each module combines in series a varistor (MOV) and a spark gap, thus providing high protection against temporary overvoltages (TOV) and limiting the leakage current between phase and neutral. It is also equipped with a heavy duty spark gap sealed into a noble gas filled cylinder (protection between N – PE), in order to prevent any leakage current to the earthing system, thus allowing its installation before the RCD, even in TT systems. The spark gap between N – PE is also providing optimum protection against temporary overvoltages (TOV) caused even by faults in medium voltage. It is providing protection against surge currents up to 50 kA (8/20 µs) per pole, 200 kA (8/20 µs) per 4 poles. The residual voltage per pole is less than 1,5kV (@ 20 kA) providing optimum protection to equipment of all categories of insulation level (category IV up to category I) according to IEC 60364-4-44.

Protection type EN / IEC 61643 – 11

- T2 / Class II

Technical Characteristics

Brand name	SurgeTron T2 H 3+1
Code	68 54 150
Number of poles	4
Connection between terminals	L_1 – N, L_2 – N, L_3 – N, N – PE
Installation in	TN S, TN CS, TT
Nominal operating voltage, U_N	230/400 V, 50Hz
Maximum operating voltage, U_c	300V (L-N) / 305V (N-PE), 50Hz
I_{imp}, "class I" test, (10/350µs), 1P	-
I_{max}, "class II" test, (8/20µs), 1P	50kA (L-N) / 65kA (N-PE)
I_n, "class II" test, (8/20µs), 1P	20kA (L-N) / 40kA (N-PE)
U_p, (at I_n)	<1,5kV (L-N) / <1,5kV (N-PE)
Response time, t_A	<25ns (L-N) / <100ns (N-PE)
Maximum Backup fuse	315A gG fuse
Short circuit withstand, I_{scr}	25kA / 50Hz
Follow current interrupt rating (N–PE), I_{fi}	100A rms
Temporary Overvoltage TOV 120min L-N	442V withstand
Temporary Overvoltage TOV 200ms N-PE	1200V withstand
Thermal protection and monitoring indication	YES
Residual current, I_{PE}	< 5 µA
Installation location	Indoor
Protection level of housing	IP20 (built in)
Dimensions WxHxD (mm)	72x105x70
Operating temperature	-40°C … 80°C
Relative humidity	5% … 95%
Rail mounting	DIN-3 (TS-35/EN50022)
Maximum terminal conductor	35mm²
Maximum terminal conductor for remote contacts	1,5mm²
Combined equivalent protection as per TS 61643 – 12 & IEC 61643 -12	T2 (CAT IV, CAT III & CAT II) + T3 (CAT I)
Certification	VDE, CE
Conformity with	LVD 2014/35/EU
Installation only by qualified electrician	IEC 60417 – 6182
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001

Low voltage AC surge protective devices (SPDs) Type 2

Brand Name: SurgeTron T2 H

DESCRIPTION

Single pole SPD T2 (class II), for connection between L–N & L–PEN, suitable for installation in TT, TN S, TN CS & TN C systems. It is equipped with 1 protection module of innovative design, which combines in series a varistor (MOV) and a spark gap, thus providing high protection against temporary overvoltages (TOV) and limiting the leakage current between phase and neutral. Combined with a module containing spark gap, SurgeTron T2 H NPE 0+1 (ELEMKO code 68 50 151) for connection between N–PE, it can be installed before the RCD, even in TT systems, providing optimum protection against temporary overvoltages (TOV) caused even by faults in medium voltage. It is providing protection against surge currents up to 50 kA (8/20 µs) per pole, 200 kA (8/20 µs) per 4 poles. The residual voltage is less than 1,5kV (@ 20 kA) providing optimum protection to equipment of all categories of insulation level (category IV up to category I) according to IEC 60364-4-44.

Protection type EN / IEC 61643 – 11

- T2 / Class II

Technical Characteristics

Brand name	SurgeTron T2 H 1+0	SurgeTron T2 H NPE 0+1
Code	68 50 150	68 50 151
Number of poles	1	1
Connection between terminals	L – N / L – PEN	N – PE
Installation in	TN S, TN CS, TN C, TT	TN S, TN CS, TT
Nominal operating voltage, U_N	230/400 V, 50Hz	230/400 V, 50Hz
Maximum operating voltage, U_c	300V (L-N) 50Hz	305V (N-PE), 50Hz
I_{imp}, "class I" test, (10/350µs), 1P	-	-
I_{max}, "class II" test, (8/20µs), 1P	50kA	65kA
I_n, "class II" test, (8/20µs), 1P	20kA	40kA
U_p, (at I_n)	<1,5kV	<1,5kV
Response time, t_A	<25ns	<100ns
Maximum Backup fuse	315A gG fuse	-
Short circuit withstand, I_{scr}	25kA / 50Hz	-
Follow current interrupt rating (N–PE), I_{fi}	-	100A rms
Temporary Overvoltage TOV 120min L-N	442V withstand	-
Temporary Overvoltage TOV 200ms N-PE	-	1200V withstand
Thermal protection and monitoring indication	YES	YES
Residual current, I_{PE}	< 5 µA	< 5 µA
Installation location	Indoor	Indoor
Protection level of housing	IP20 (built in)	IP20 (built in)
Dimensions WxHxD (mm)	17,5x106x70	17,5x106x70
Operating temperature	-40°C … 80°C	-40°C … 80°C
Relative humidity	5% … 95%	5% … 95%
Rail mounting	DIN-3 (TS-35/EN50022)	DIN-3 (TS-35/EN50022)
Maximum terminal conductor for remote contacts	1,5mm²	1,5mm²
Combined equivalent protection as per TS 61643 – 12 & IEC 61643 -12	T2 (CAT IV, CAT III & CAT II) + T3 (CAT I)	T2 (CAT IV, CAT III & CAT II) + T3 (CAT I)
Certification	VDE, CE	VDE, CE
Conformity with	LVD 2014/35/EU	LVD 2014/35/EU
Installation only by qualified electrician	IEC 60417 – 6182	IEC 60417 – 6182
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001	ISO 9001, ISO 14001, ISO 45001

Low voltage AC surge protective devices (SPDs) Type 2

Brand Name: SurgeTron T2 N

DESCRIPTION

Single pole SPD T2 (class II), for connection between L–N & L–PEN, suitable for installation in TT, TN S, TN CS & TN C systems. It is equipped with 1 protection module of innovative design varistor (MOV). Combined with a module containing spark gap, SurgeTron T2 H NPE 0+1 (ELEMKO code 68 50 151) for connection between N–PE, it can be installed before the RCD, even in TT systems, providing optimum protection against temporary overvoltages (TOV) caused even by faults in medium voltage. It is providing protection against surge currents up to 50 kA (8/20 µs) per pole, 200 kA (8/20 µs) per 4 poles.

Protection type EN / IEC 61643 – 11

- T1/ Class I

Technical Characteristics

Brand name	SurgeTron T2 N 75	SurgeTron T2 N 150	SurgeTron T2 N 300	SurgeTron T2 N 350	SurgeTron T2 N 480	SurgeTron T2 N 750	SurgeTron T2 H N - PE
Code	68 41 075	68 41 150	68 41 300	68 40 150	68 41 480	68 41 750	68 50 151
Number of poles		1 (1+0)					1 (1+0)
Connection between terminals	L – N (TN & TT), L – PEN (TN C only), L – PE (TN only)						N – PE
Installation in	TN S, TN CS, TN C, TT						TN S, TN CS, TT
Nominal operating voltage, U_N	60V, 50Hz	120V, 50Hz	240V, 50Hz	277V, 50Hz	400V, 50Hz	600V, 50Hz	230 V (N-PE), 50Hz
Maximum operating voltage, U_c	75V, 50Hz	150V, 50Hz	300V, 50Hz	350V, 50Hz	480V, 50Hz	750V, 50Hz	305V (N-PE), 50Hz
I_{imp}, "class I" test, (10/350µs), 1P	-	-	-	-	-	-	-
I_{max}, "class II" test,(8/20µs), 1P	50kA	50kA	50kA	50kA	50kA	35kA	100kA
I_n, "class II" test, (8/20µs), 1P	20kA	20kA	20kA	20kA	20kA	20kA	50kA
U_p, (at I_n)	<0,8kV	<1,25kV	<1,5kV	<1,75kV	<2,3kV	<3,4kV	<1,5kV
Response time, t_A	<25ns	<25ns	<25ns	<25ns	<25ns	<25ns	<100ns
Maximum Backup fuse	315A gG fuse	315A gG fuse	315A gG fuse	315A gG fuse	315A gG fuse	315A gG fuse	-
Short circuit withstand, I_{scr}	25kA	25kA	25kA	25kA	25kA	25kA	-
Follow current interrupt rating (N–PE), I_{fi}	-	-	-	-	-	-	100A rms
Temporary vervoltage TOV 5s – withstand	114V	229V	337V	403V	581V	871V	-
Temporary Overvoltage TOV 120min	114V withstand	229V – withstand	442V – fail safe	529V – fail safe	762V – fail safe	1143V – fail safe	-
Temporary Overvoltage TOV 200ms N-PE	-	-	-	-	-	-	1200V withstand
Thermal protection	YES						-
Residual current, I_{PE}	<0,6mA						< 5 µA
Installation location	Indoor						
Protection level of housing	IP20 (built in)						
Dimensions WxHxD (mm)	17,5x108x87						
Operating temperature,	-40°C … 80°C						
Relative humidity	5% … 95%						
Rail mounting	DIN-3 (TS-35/EN50022)						
Maximum terminal conductor	35mm²						
Maximum terminal conductor for remote contacts	No remote contacts (RC may be provided upon request)						
Combined equivalent protection as per IEC 61643 -12	T2 (CAT IV, III & II)						
Certification	VDE, CE						
Conformity with	LVD 2014/35/EU						
Installation only by qualified electrician	IEC 60417 – 6182						
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001						

Low voltage AC surge protective devices (SPDs) Type 3

Brand Name: Mini T3

DESCRIPTION

Three poles SPD suitable for installation in TT, TN S, TN CS & TN C systems, providing protection between L – N & N – PE, to sensitive electronic equipment. Its small size makes it ideal for protection of PLCs, power supplies, personal computers, telecom centres, alarm systems etc, as it can be installed very close to the equipment under protection. It is capable of discharging combined wave of surge current up to 3 kA (8/20 μs) per pole and voltage up to 6 kV (1,2/50 μs) per pole. The residual voltage per pole is less than 1,5kV (@ 3 kA) providing complete protection to equipment of category I of insulation level, according to IEC 60364-4-44. Mini T3 should be protected by an upstream T2 or T1 SPD. In order to limit the incoming surge voltages to values below 6 kV.

Protection type EN / IEC 61643 – 11

- T3 / Class III

Technical Characteristics

Brand name	Mini T3
Code	68 25 305
Number of poles	3
Connection between terminals	L – N, N – PE
Installation in	TN S, TN CS, TN C, TT
Nominal operating voltage, U_N	230/400 V, 50Hz
Maximum operating voltage, U_c	275V (L-N) / 255V (N-PE), 50Hz
I_{sc} “class III” test, (8/20μs), 1P	3kA (L-N, N - PE) / 5kA (L+N / PE)
U_{oc} “class III” test, (1,2/50μs), 1P	6kV (L-N, N - PE) / 10kV (L+N / PE)
U_p (at I_{sc})	<1,5kV (L-N) / <1,5kV (N-PE)
Response time, t_A	<25ns (L-N) / <100ns (N-PE)
Maximum Backup fuse	16A MCB Type B + 30mA RCD Type A
Short circuit withstand, I_{sccr}	1kA / 50Hz
Temporary Overvoltage TOV 120min L-N	442V fail safe
Temporary Overvoltage TOV 5s L-N	337V withstand
Temporary Overvoltage TOV 200ms N-PE	1200V fail safe
Thermal protection	YES
Residual current, I_{PE}	< 5 μA
Installation location	Indoor
Protection level of housing	IP20 (built in)
Dimensions WxHxD (mm)	35x25x12
Operating temperature	-40°C … 80°C
Relative humidity	5% … 95%
Connection conductors	1mm², Length 114mm
Good operation indication	Buzzer
Certification	CE
Conformity with	LVD 2014/35/EU
Installation only by qualified electrician	IEC 60417 – 6182
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001

SELV – PELV surge protective devices (SPDs), Type 3

Brand Name: PSDC

DESCRIPTION

PSDC (T3 / Class III) surge protective devices are suitable for AC & DC applications. They provide protection between L - N, L - PE & N - PE in AC systems and between (+) to (-), (+) to PE and (-) to PE in DC systems. They provide selective protection to sensitive electronic equipment, which operates at low voltages up to 43Vac / 60Vdc and are ideal for installation at the output of low voltage power supplies but also at the input of the power supply of sensitive equipment such as PLCs, alarm systems, cameras, BUS systems etc. They are capable of discharging combined wave of surge current 8/20 µs and voltage 1,2/50 µs, providing protection against small inductive surge currents.

Protection type EN / IEC 61643 – 11

- T3 / Class III

Technical Characteristics

Brand name	PSDC 20/24	PSDC 20/48	PSDC 20/60
Code	68 01 024	68 01 046	68 01 061
Number of poles	2 + PE	2 + PE	2 + PE
Connection between terminals	L – N / L – PE / N – PE or (-ve) – (+ve) / (-ve) – PE / (+ve) – PE	L – N / L – PE / N – PE or (-ve) – (+ve) / (-ve) – PE / (+ve) – PE	L – N / L – PE / N – PE or (-ve) – (+ve) / (-ve) – PE / (+ve) – PE
Installation in	AC & DC	AC & DC	AC & DC
Nominal operating voltage, U_o	17Vac / 24Vdc	34Vac / 48Vdc	43Vac / 60Vdc
Maximum operating voltage, U_c	24Vac / 34Vdc	48ac / 60Vdc	60Vac / 75Vdc
$I_{sc,}$ “class III” test, (8/20µs), 1P	1,2kA	1,2kA	3kA
$U_{oc,}$ “class III” test, (1,2/50µs), 1P	2,4kV	2,4kV	6kV
$U_{p,}$ (at I_{sc}) L-N	<250V	<500V	<600V
$U_{p,}$ (at I_{sc}) L-PE & N-PE	<700V	<800V	<850V
Response time, t_A, L-N	25ns	25ns	25ns
Response time, t_A, L-PE & N-PE	100ns	100ns	100ns
Maximum Backup fuse	32A gG	32A gG	32A gG
Short circuit withstand, I_{sccr} AC	2kA / 50Hz	2kA/ 50Hz	2kA/ 50Hz
Temporary Overvoltage TOV 5s	115V withstand	148V withstand	163V withstand
Thermal protection	YES	YES	YES
Monitoring indication	Green LED	Green LED	Green LED
Protection level of housing	IP20 (built in)	IP20 (built in)	IP20 (built in)
Dimensions WxHxD (mm)	18x90x66	18x90x66	18x90x66
Operating temperature	-40°C … 80°C	-40°C … 80°C	-40°C … 80°C
Relative humidity	5% … 95%	5% … 95%	5% … 95%
Rail mounting	DIN-3 (TS-35/EN50022)	DIN-3 (TS-35/EN50022)	DIN-3 (TS-35/EN50022)
Maximum terminal conductor	4mm²	4mm²	4mm²
Maximum terminal conductor for remote contacts	4mm²	4mm²	4mm²
Combined equivalent protection as per TS 61643 – 12 & IEC 61643 -12	T3 (CAT I)	T3 (CAT I)	T3 (CAT I)
Certification	CE	CE	CE
Conformity with	LVD 2014/35/EU	LVD 2014/35/EU	LVD 2014/35/EU
Installation only by qualified electrician	IEC 60417 – 6182	IEC 60417 – 6182	IEC 60417 – 6182
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001	ISO 9001, ISO 14001, ISO 45001	ISO 9001, ISO 14001, ISO 45001

Medium voltage networks surge arresters

Brand Name: ZHP MV

DESCRIPTION

Heavy duty surge arresters suitable for indoor and outdoor installation in medium voltage systems. They are providing optimum protection and can be installed inside MV transformer's switchgear or distribution boards. They contain a disconnection mechanism which disconnects the arrester from the network at the end of its lifetime. Their external housing is made out of a compound made of ethylene, propylene and polymeric synthetic material, which is resistant to water, to ultraviolet radiation and to contamination. All the raw materials and the final product are 100% tested before approval for final use. Mounting is achieved using an insulating bracket, which provides insulation between the arrester and the earthing system after the disconnection mechanism has operated.

Standards EN / IEC 60099 – 4 & IEEE C62.11

- Class 1 (IEC 60099 – 4)

Technical Characteristics

Brand name	ZHP 6	ZHP 21
Code	68 81 006	68 81 021
Number of poles	1	1
Connection between terminals	L – GND (PE)	L – GND (PE)
Nominal operating voltage, U_r (L - L)	6kV, 50Hz	21kV, 50Hz
Maximum operating voltage, MCOV, U_c	5,1kV, 50Hz	17kV, 50Hz
High current short duration 4/10μs	100kA	100kA
Switching impulse 250/2000μs	15,1kV	45,5kV
Nominal Current, I_n (IEC) 8/20μs	10kA	10kA
Duty cycle (IEC)	10kA	10kA
Short circuit withstand	20kA, 50Hz	20kA, 50Hz
Disconnection time of internal fuse at 5 Amp, 50Hz	2s	2s
Disconnection time of internal fuse at 1000 Amp, 50Hz	8ms	8ms
Residual voltage at, In (10kA)	20,7kV	62,1kV
Residual voltage at, (3kA)	17,7kV	53,2kV
Residual voltage at, (5kA)	18,8kV	56,3kV
Residual voltage at, (20kA)	23,6kV	70,9kV
Residual voltage at, (40kA)	27,7kV	83,2kV
Creepage distance (mm)	303	708
Dimensions without bracket WxH (mm)	109 x 195	109 x 311
Dimensions with bracket WxHxD (mm)	109 x 195 x 175,35	109 x 311x 211,55
Weight	1,37kg	2,68kg
Installation location	Outdoor / Indoor	Outdoor / Indoor
Operating temperature	-20°C…60°C	-20°C…60°C
Maximum terminal conductor	50mm²	50mm²
Certification	REA listed	REA listed
Installation only by qualified electrician	IEC 60417 – 6182	IEC 60417 – 6182
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001	ISO 9001, ISO 14001, ISO 45001

Photovoltaic systems surge protective devices (SPDs)

Brand Name: PVTron T1 & PVTron T2

DESCRIPTION

Three poles SPDs especially designed for surge protection of PV inverters which are widely used in photovoltaic applications. They are made out of varistor (MOV) elements and have successfully passed the requirements of European standard EN 50539 – 11 class I & II and they are classified as type 1 and type 2, providing protection to electrical systems of insulation level, category III and category IV according to IEC 60364-4-44. They are suitable for direct installation exactly at the input terminals of the inverter just after the entrance of the DC current, arriving from the photovoltaic panels. Their main advantage is that no back up fuse is required for up to 30 kADC (PVTron T1) or 11 kADC (PVTron T2) expected short circuit current.

Protection type EN 50539 – 11

- T1 / Class I & T2 / Class II

Technical Characteristics

Brand name	PVTron T1 1500 Y	PVTron T2 1500 Y
Code without remote contacts	68 52 317	68 52 315
Code with remote contacts	68 52 318	68 52 316
Number of poles	3	3
Connection between terminals	(-ve) – (+ve) / (-ve) – PE / (+ve) – PE	(-ve) – (+ve) / (-ve) – PE / (+ve) – PE
Nominal operating voltage, U_N	Up to 1500Vdc	Up to 1500Vdc
Maximum operating voltage, U_c	1500Vdc	1500Vdc
I_{imp}, "class I" test, (10/350μs), 1P / 2P	6,25kA / 12,5kA	-
I_{max}, "class II" test, (8/20μs), 1P	40kA	30kA
I_n, "class II" test, (8/20μs), 1P	20kA	20kA
U_p, (at In)	<4,5kV	<5kV
Response time, t_A	<25ns	<25ns
Maximum Backup fuse	Not required for up to 30 kADC expected short circuit current	Not required for up to 11 kADC expected short circuit current
Short circuit withstand, I_{scpv}	30kA	11kA
Thermal protection and monitoring indication	YES	YES
Residual current, I_{PE}	< 100 μA	< 100 μA
Installation location	Indoor	Indoor
Protection level of housing	IP20 (built in)	IP20 (built in)
Dimensions WxHxD (mm)	54x95x87	54x95x70
Operating temperature	-40°C … 80°C	-40°C … 80°C
Relative humidity	5% … 95%	5% … 95%
Rail mounting	DIN-3 (TS-35/EN50022)	DIN-3 (TS-35/EN50022)
Maximum terminal conductor	35mm²	35mm²
Maximum terminal conductor for remote contacts	1,5mm² Only for 68 52 318	1,5mm² Only for 68 52 316
Certification	VDE, CE	VDE, CE
Conformity with	LVD 2014/35/EU	LVD 2014/35/EU
Installation only by qualified electrician	IEC 60417 – 6182	IEC 60417 – 6182
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001	ISO 9001, ISO 14001, ISO 45001

Insulated busbars for single pole SPDs

DESCRIPTION

Insulated copper busbars used for the connection of T1 and T2 single pole SPDs. They can connect 2 single pole SPDs in 1 phase systems or 4 single pole SPDs in 3 phase systems.

Thanks to the insulation of the exposed conductive part they can be used in 3+1 (in 3P systems) or 1+1 (in 1P systems) wiring, between phase(s) and neutral.

Technical Characteristics

Product description	1+1 busbar	3+1 busbar
Code	68 02 016	68 04 016
Number of SPDs that can connect	2	4
Width of SPDs that can connect	17,5 mm	17,5 mm
Cross sectional area	16 mm^2	16 mm^2
Material	Copper	Copper
Insulated	YES	YES

SURGE PROTECTIVE DEVICES FOR DATA PROCESSING SYSTEMS

- Telecommunication systems SPDs
- Analogue and digital signalling systems SPDs
- LAN networks
- High frequency & coaxial cables SPDs

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Telecommunication systems surge protective devices (SPDs)

Brand Name: TeleTron BOX

DESCRIPTION

Surge protective device providing primary and secondary overvoltage protection to telecommunication networks and devices connected to them. It is providing primary protection against direct lightning strikes (10/350μs) on the telecommunication overhead network or on the structure it is installed. Additionally it is providing protection against induced surges (8/20μs) generated by the electromagnetic field, which is created by a nearby lightning strike. The surge protective devices are generally placed at each end of the telecom line and as close as possible to the device to be protected. It is providing protection between the pair and earth (common mode) and also between the poles of the pair (differential mode).

Protection type EN / IEC 61643 – 21

- C1, C2, C3, D2

Technical Characteristics

Brand name	TeleTron BOX
Code	68 03 410
Number of poles	2
Connection between terminals	$L_1 – L_2$, L_1 – GND, L_2 – GND
Number of protected pairs	1 (2 conductors) + GND
Nominal operating voltage, U_N	110V DC
Maximum operating voltage, U_c	120V DC
Maximum operating current, I_L	1A
Maximum signal frequency, F	10MHz
Series line resistance (input – output), R	1Ω
Line capacitance (input – output), C	90pF
I_n, D2 test, (10/350μs), 2P / 1P	2,5kA / 1,25kA
I_n, C2 test, (8/20μs), 2P / 1P	20kA / 10kA
U_p, (at I_n & 1kV/μs – C3),	< 400V
Main circuit	GDT & MOV
Response time, t_A	25ns
Connection to the network	In line
Dimensions WxHxD (mm)	17,5 x 90 x 64
Range of terminal conductors	0,75 – 4mm^2
Housing material	Polycarbonate halogen free
Protection level of housing	IP20
Operating temperature	-40^{0}C … 80^{0}C
Relative humidity	5% … 95%
Rail mounting	DIN-3 (TS-35/EN50022)
Certification	CE
Conformity with	LVD 2014/35/EU
Installation only by qualified electrician	IEC 60417 – 6182
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001

Telecommunication systems surge protective devices (SPDs)

Brand Name: TeleTron DSL

DESCRIPTION

Surge protective device providing primary and secondary overvoltage protection to telecommunication networks, DSL/ISDN lines and the devices connected to them. It is providing primary protection against surge currents caused by direct lightning strikes on the telecommunication overhead network or on the structure it is installed. Additionally it is providing protection against induced surges generated by the electromagnetic field, which is created by a nearby lightning strike. It is providing protection between the pair and earth (common mode) and also between the poles of the pair (differential mode). The surge protective devices are generally placed at each end of the telecom line and as close as possible to the device to be protected. A local earthing point is required, either the earthed metallic enclosure of the equipment or the nearest earthing point (e.g. socket).

Protection type EN / IEC 61643 – 21

- C1, C2

Technical Characteristics

Brand name	TeleTron DSL
Code	68 94 124
Number of poles	1
Input / output connector's type	RJ 11 or RJ 45
Connection between terminals	$L_1 – L_2$, L_1 – GND, L_2 – GND
Number of protected pairs	1 (2 conductors) + GND
Maximum operating voltage, U_c	175V DC
Maximum operating current, I_L	150mA
Maximum signal frequency, F	10MHz
Series line resistance (input – output), R	0,5Ω
Line inductance (input – output), L	2 x 25μH
I_n, C2 test, (8/20μs), 2P / 1P	5kA / 2,5kA
U_p, (at I_n) $L_1 – L_2$	< 300V
U_p, (at I_n) L_1 – GND, L_2 – GND	< 1000V
Main circuit	GDT & TVS diode
Response time, t_A	1ns
Connection to the network	In line
Dimensions WxHxL (mm)	54 x 30,8 x 80
Housing material	Thermopalstic V-0
Protection level of housing	IP20
Operating temperature	-40°C … 80°C
Relative humidity	5% … 95%
Certification	CE
Conformity with	LVD 2014/35/EU
Installation only by qualified electrician	IEC 60417 – 6182
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001

Telecommunication systems surge protective devices (SPDs)

Brand Name: TeleTron KRONE

DESCRIPTION

Surge protective device providing primary and secondary protection to telecommunication networks and DSL/ISDN lines, against surge currents caused by lightning to the overhead telecommunication network or by direct lightning strikes to the structure it is installed. Additionally it provides protection against surge overvoltages caused from the electromagnetic field generated from an indirect lightning strike (near to the structure or to the incoming conductive supply network). It is designed for use on telecom terminal blocks KRONE type. The surge protective device is recommended to be connected directly to the terminal blocks (even to existing installations - retrofit) providing protection between the pair and earth (common mode) as well as between the poles of the pair (differential mode). In one KRONE type terminal block can be installed up to 10 surge protective devices, ELEMKO code 68 94 106 with one earthing bar, ELEMKO code 68 94 300.

Protection type EN / IEC 61643 – 21

- C1, C2

Technical Characteristics

Brand name	TeleTron KRONE	TeleTron KRONE T10
Code	68 94 106	68 94 230
Number of poles	1	10
Suitable for	Terminal block KRONE type	Terminal block KRONE type
Connection between terminals	$L_1 – L_2$, L_1 – GND, L_2 – GND	$L_1 – L_2$, L_1 – GND, L_2 – GND
Number of protected pairs	1 (2 conductors) + GND	10 (20 conductors) + GND
Maximum operating voltage, U_c	150V DC	230V DC
Maximum operating current, I_L	145mA	1A
Maximum signal frequency, F	2MHz	100MHz
Series line resistance (input – output), R	11Ω	0.1Ω
I_n, C2 test, (8/20μs), 2P / 1P	20kA / 10kA	20kA / 10kA
U_p, (at I_n) $L_1 – L_2$	< 300V	< 1000V
U_p, (at I_n) L_1 – GND, L_2 – GND	< 1000V	< 1000V
Main circuit	GDT & TVS diode	GDT
Thermal protection	YES / PTC	NO
Response time, t_A	1ns	100ns
Connection to the network	In line	In line
Protection level of housing	IP20	IP20
Operating temperature	-40°C … 80°C	-40°C … 80°C
Relative humidity	5% … 95%	5% … 95%
Certification	CE	CE
Conformity with	LVD 2014/35/EU	LVD 2014/35/EU
Installation only by qualified electrician	IEC 60417 – 6182	IEC 60417 – 6182
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001	ISO 9001, ISO 14001, ISO 45001
An earthing bar, ELEMKO code 68 94 300 is needed, for the proper function of the SPD (1 bar for 10 SPDs)		

Product Data Sheet Surge Protective Devices (SPDs)

Brand Name: TeleTron H20

DESCRIPTION

Surge protective device providing primary and secondary overvoltage protection to Voice over Internet Protocol (VoIP) networks and devices connected to them. It is providing primary protection against direct lightning strikes (10/350μs) on the overhead network or on the structure it is installed. Additionally it is providing protection against inducted surges (8/20μs) generated by the electromagnetic field, which is created by a nearby lightning strike. The surge protective devices are generally placed at each end of the line and as possible as close to the device to be protected. It is providing protection between the pair and earth (common mode) and also between the poles of the pair (differential mode).

Protection type EN / IEC 61643 – 21

- C1, C2, C3, D1

Technical Characteristics

Brand name	TeleTron H20
Code	68 03 411
Number of Poles	2 + GND
Number of protected pairs	1 (2 cables) + GND
Connection between terminals	$L_1 – L_2$, L_1 – GND, L_2 – GND
Nominal operating voltage, UN	110 V DC
Maximum operating voltage, UC	180 V DC
Maximum operating current, IL	0,6 A
Maximum signal frequency, F	250 MHz
Series line resistance (input – output), R	1,6–2,0 Ω
Line capacitance (input – output), C	≤ 20 pF (L–L) / ≤ 10 pF (L–G)
I_n, D1 test, (10/350μs), Total	7,5 kA
I_n, C2 test, (8/20μs), Total	20 kA
U_p, (at 1 kV/μs – C3)	< 250 V (L–L) / < 550 V (L–G)
U_p, (at I_n – C2)	< 750 V (L–G)
Response time, t_A	25 ns (L) / 100 ns (G)
Main circuit	GDT + Diode block
Connection to network	In line
Protection level of housing	IP66
Dimensions W x H x D	93x93x62 mm
Operating temperature, ∂	-25°C ÷ +40°C
Relative humidity	5% ÷ 95%
Maximum conductor for terminal	0,13 – 2,5 mm² (L) / 0,2 – 2,5 mm² wire, 0,25 – 1,5 mm² ferrule (G)
Housing material	Polycarbonate halogen free
Certification	CE
Conformity with	LVD 2014/35/EU
Installation only by qualified electrician	IEC 60417 – 6182
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001

Digital and analogue signals surge protective devices (SPDs)

Brand Name: DataTron PR 4

DESCRIPTION

Surge protective devices, suitable for the protection of electrical and electronic equipment, operating at low voltage digital and analogue signals. They are providing protection to up to 2 cable pairs, against external transients and surges caused by lightning, induction and switching overvoltages. Especially designed to be installed in switchboards and control panels with limited space and where a numerous of incoming and outcoming cables are connected, such as interfaces RS 485 and RS 422. Quick and easy installation by clipping on DIN rail. They consist of a plug-in protection module and a base. The signal pass through the base in order to operate uninterruptible even with the module removed. The plug-in protection module can be replaced in no time with no need to cut-off the signal.

Protection type EN / IEC 61643 – 21

- C1, C2, C3, D1

Technical Characteristics

Brand name	DataTron PR 4-12	DataTron PR 4-24	DataTron PR 4-48	DataTron PR 4-60
Code	68 44 126	68 44 125	68 44 127	68 44 128
Number of poles	4 + GND	4 + GND	4 + GND	4 + GND
Connection between terminals	$L_1 – L_2$, L_1 – GND, L_2 – GND $L_3 – L_4$, L_3 – GND, L_4 – GND	$L_1 – L_2$, L_1 – GND, L_2 – GND $L_3 – L_4$, L_3 – GND, L_4 – GND	$L_1 – L_2$, L_1 – GND, L_2 – GND $L_3 – L_4$, L_3 – GND, L_4 – GND	$L_1 – L_2$, L_1 – GND, L_2 – GND $L_3 – L_4$, L_3 – GND, L_4 – GND
Number of protected pairs	2	2	2	2
Maximum operating voltage, U_c	15V	28V	52V	64V
Maximum operating current, I_L	1A	1A	1A	1A
Maximum signal frequency, F	30MHz	30MHz	30MHz	30MHz
Series line resistance (input – output), R	2Ω	2Ω	2Ω	2Ω
Line capacitance (input – output), C	50pF	50pF	50pF	50pF
I_{imp}, D1 test, (10/350μs), 2P / 1P	2,5kA / 1.25kA	2,5kA / 1.25kA	2,5kA / 1.25kA	2,5kA / 1.25kA
I_{imp}, D1 test, (10/350μs), 4P	5kA	5kA	5kA	5kA
I_n, C2 test, (8/20μs), 2P / 1P	20kA / 10kA	20kA / 10kA	20kA / 10kA	20kA / 10kA
U_p, (at 5kA) L – L & L – GND	< 42V	< 70V	< 140V	< 160V
U_p, C3 (at 1kV) L – L & L – GND	< 21V	< 37V	< 69V	< 84V
Main circuit	GDT + TVS	GDT + TVS	GDT + TVS	GDT + TVS
Response time, t_A	1ns	1ns	1ns	1ns
Connection to the network	In line	In line	In line	In line
Dimensions WxHxD (mm)	12x95x84,5	12x95x84,5	12x95x84,5	12x95x84,5
Range of terminal conductors	0,75 – 4mm²	0,75 – 4mm²	0,75 – 4mm²	0,75 – 4mm²
Housing material	Thermopalstic V-0	Thermopalstic V-0	Thermopalstic V-0	Thermopalstic V-0
Protection level of housing	IP20	IP20	IP20	IP20
Operating temperature	-40°C … 80°C	-40°C … 80°C	-40°C … 80°C	-40°C … 80°C
Relative humidity	5% … 95%	5% … 95%	5% … 95%	5% … 95%
Certification	CE	CE	CE	CE
Conformity with	LVD 2014/35/EU	LVD 2014/35/EU	LVD 2014/35/EU	LVD 2014/35/EU
Installation only by qualified electrician	IEC 60417 – 6182	IEC 60417 – 6182	IEC 60417 – 6182	IEC 60417 – 6182
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001	ISO 9001, ISO 14001, ISO 45001	ISO 9001, ISO 14001, ISO 45001	ISO 9001, ISO 14001, ISO 45001

Digital and analogue signals surge protective devices (SPDs)

Brand Name: DataTron PR 2

DESCRIPTION

Surge protective devices, suitable for the protection of electrical and electronic equipment, operating at low voltage digital and analogue signals. They are providing protection, to 1 cable pair and shield, against external transients and surges caused by lightning, induction and switching overvoltages. Especially designed to be installed in switchboards and control panels with limited space and where a numerous of incoming and outcoming cables are connected, such as interfaces RS 485 and RS 422. Quick and easy installation by clipping on DIN rail. They consist of a plug-in protection module and a base. The signal pass through the base in order to operate uninterruptible even with the module removed. The plug-in protection module can be replaced in no time with no need to cut-off the signal. These SPDs are providing the options to connect the cable's shield to the ground directly or through spark gap. The spark gap connects the shield to the ground only in case of overvoltage, while in normal conditions it keeps the shield ungrounded in order to reduce the noise from earth loop currents.

Protection type EN / IEC 61643 – 21

- C1, C2, C3, D1

Technical Characteristics

Brand name	DataTron PR 2-12	DataTron PR 2-24	DataTron PR 2-48	DataTron PR 2-60
Code	68 45 120	68 45 124	68 45 121	68 45 122
Number of poles	4 + GND	4 + GND	4 + GND	4 + GND
Connection between terminals	$L_1 – L_2$, L_1 – GND, L_2 – GND	$L_1 – L_2$, L_1 – GND, L_2 – GND	$L_1 – L_2$, L_1 – GND, L_2 – GND	$L_1 – L_2$, L_1 – GND, L_2 – GND
Number of protected pairs	1 + shield	1 + shield	1 + shield	1 + shield
Maximum operating voltage, Uc	15V	28V	52V	64V
Maximum operating current, I_L	1A	1A	1A	1A
Maximum signal frequency, F	30MHz	30MHz	30MHz	30MHz
Series line resistance (input – output), R	2Ω	2Ω	2Ω	2Ω
Line capacitance (input – output), C	50pF	50pF	50pF	50pF
I_{imp}, D1 test, (10/350μs), 2P / 1P	2,5 kA / 1,25 kA	2,5 kA / 1,25 kA	2,5 kA / 1,25 kA	2,5 kA / 1,25 kA
I_n, C2 test, (8/20μs), 2P / 1P	20kA / 10kA	20kA / 10kA	20kA / 10kA	20kA / 10kA
U_p, (at 5kA) L – L & L – GND	< 42V	< 70V	< 140V	< 160V
U_p, C3 (at 1kV) L – L & L – GND	< 21V	< 37V	< 69V	< 84V
U_p, C3 (at 1kV) shield - GND	< 276V	< 276V	< 276V	< 276V
Main circuit	GDT + TVS	GDT + TVS	GDT + TVS	GDT + TVS
Response time, t_A	1ns	1ns	1ns	1ns
Connection to the network	In line	In line	In line	In line
Dimensions WxHxD (mm)	12x95x84,5	12x95x84,5	12x95x84,5	12x95x84,5
Range of terminal conductors	0,75 – 4mm²	0,75 – 4mm²	0,75 – 4mm²	0,75 – 4mm²
Housing material	Thermopalstic V-0	Thermopalstic V-0	Thermopalstic V-0	Thermopalstic V-0
Protection level of housing	IP20	IP20	IP20	IP20
Operating temperature	-40°C … 80°C	-40°C … 80°C	-40°C … 80°C	-40°C … 80°C
Relative humidity	5% … 95%	5% … 95%	5% … 95%	5% … 95%
Rail mounting	DIN-3 (TS-35/EN50022)	DIN-3 (TS-35/EN50022)	DIN-3 (TS-35/EN50022)	DIN-3 (TS-35/EN50022)
Certification	CE	CE	CE	CE
Conformity with	LVD 2014/35/EU	LVD 2014/35/EU	LVD 2014/35/EU	LVD 2014/35/EU
Installation only by qualified electrician	IEC 60417 – 6182	IEC 60417 – 6182	IEC 60417 – 6182	IEC 60417 – 6182
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001	ISO 9001, ISO 14001, ISO 45001	ISO 9001, ISO 14001, ISO 45001	ISO 9001, ISO 14001, ISO 45001

Digital and analogue signals surge protective devices (SPDs)

Brand Name: DataTron LT

DESCRIPTION

Surge protective devices, suitable for the protection of electrical and electronic equipment, operating at low voltage digital and analogue signals. They are providing protection to 1 cable pair, against external transients and surges caused by induction and switching overvoltages. Especially designed to be installed in switchboards and control panels with limited space and where a numerous of incoming and outcoming cables are connected, such as interfaces RS 485 and RS 422. Quick and easy installation by clipping on DIN rail.

Protection type EN / IEC 61643 – 21

- C1, C2, C3

Technical Characteristics

Brand name	DataTron LT 5	DataTron LT 12	DataTron LT 24	DataTron LT 60
Code	68 07 005	68 07 012	68 07 024	68 07 060
Number of poles	2 + GND	2 + GND	2 + GND	2 + GND
Connection between terminals	L_1 – GND, L_2 – GND	L_1 – GND, L_2 – GND	L_1 – GND, L_2 – GND	L_1 – GND, L_2 – GND
Number of protected pairs	1	1	1	1
Maximum operating voltage, U_c	6V	15V	28V	64V
Maximum operating current, I_L	10A	10A	10A	10A
Maximum signal frequency, F	0,5MHz	1MHz	1,5MHz	3MHz
Series line resistance (input – output), R	0,1Ω	0,1Ω	0,1Ω	0.,1Ω
Line capacitance (input – output), C	7nF	3nF	1nF	1nF
I_n, C1 test, (8/20μs), 2P / 1P	1kA / 0,5kA	1kA / 0,5kA	0,5kA / 0,25kA	0,2kA / 0,1kA
U_p, (at I_n) L – GND	< 20V	< 39V	< 65V	< 150V
U_p, C3 (at 1kV) L – GND	< 10V	< 19V	< 36V	< 85V
Main circuit	TVS diode	TVS diode	TVS diode	TVS diode
Response time, t_A	1ns	1ns	1ns	1ns
Connection to the network	In line	In line	In line	In line
Dimensions WxHxD (mm)	6x68x61,3	6x68x61,3	6x68x61,3	6x68x61,3
Range of terminal conductors	0,75 – 4mm²	0,75 – 4mm²	0,75 – 4mm²	0,75 – 4mm²
Housing material	Thermopalstic V-0	Thermopalstic V-0	Thermopalstic V-0	Thermopalstic V-0
Protection level of housing	IP20	IP20	IP20	IP20
Operating temperature	-40°C … 80°C	-40°C … 80°C	-40°C … 80°C	-40°C … 80°C
Relative humidity	5% … 95%	5% … 95%	5% … 95%	5% … 95%
Rail mounting	DIN-3 (TS-35/EN50022)	DIN-3 (TS-35/EN50022)	DIN-3 (TS-35/EN50022)	DIN-3 (TS-35/EN50022)
Certification	CE	CE	CE	CE
Installation only by qualified electrician	IEC 60417 – 6182	IEC 60417 – 6182	IEC 60417 – 6182	IEC 60417 – 6182
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001	ISO 9001, ISO 14001, ISO 45001	ISO 9001, ISO 14001, ISO 45001	ISO 9001, ISO 14001, ISO 45001

Digital and analogue signals surge protective devices (SPDs)

Brand Name: DataTron PCB

DESCRIPTION

Surge protective devices, suitable for the protection of electrical and electronic equipment, operating at low voltage digital and analogue signals. They are providing protection, to 1 cable pair and shield, against external transients and surges caused by lightning, induction and switching overvoltages. Especially designed to be installed in switchboards and control panels with limited space and where a numerous of incoming and outcoming cables are connected, such as interfaces RS 485 and RS 422. Quick and easy installation by clipping on DIN rail. Thanks to their innovative design with 3 protection levels (GDT + TVD Diode + Zener) they succeed stable residual voltage, regardless the value of the surge current. In contrast with the common SPDs for signals protection, DataTron PCB coordinates the 3 protection levels through the use of MOSFETs, which are limiting the incoming current between the protection levels, ensuring this way longer life duration of the more sensitive protection levels and thus of the surge protective device.

Protection type EN / IEC 61643 – 21

- C1, C2, C3

Technical Characteristics

Brand name	DataTron PCB 05	DataTron PCB 12	DataTron PCB 15	DataTron PCB 24	DataTron PCB 30	DataTron PCB 48	DataTron PCB 60	DataTron PCB 110
Code	68 17 005	68 17 012	68 17 015	68 17 024	68 17 030	68 17 048	68 17 060	68 17 110
Number of poles	2 + GND							
Connection between terminals	$L_1 – L_2$, L_1 – GND, L_2 – GND							
Number of protected pairs	1 + GND							
Maximum operating voltage, U_c	5V	12V	15V	24V	30V	48V	60V	110V
Maximum operating current, I_L	1A							
Maximum signal frequency, F	10MHz							
Insertion losses	< 0,35dB @ 10MHz / < -3dB @ 23MHz							
Series line resistance (input – output), R	1,5Ω							
Line capacitance (input – output), C	<10nF							
I_n, C2 test, (8/20μs), 2P / 1P	10kA / 5kA							
U_p, (at I_n) L – L & L – GND	< 178V	< 185V	< 200V	< 206V	< 219V	< 226V	< 239V	< 326V
U_p, C3 (at 1kV) L – L & L – GND	< 10V	< 19V	< 27V	< 36V	< 45V	< 69V	< 82V	< 200V
Discharge capability 100A (10/1000μs), 1P	x 300 times							
Main circuit	GDT + TVS diode + Zener + MOSFET							
Response time, t_A	1ns							
Connection to the network	In line							
Dimensions WxHxL (mm)	16,2 x 22 x 87							
Range of terminal conductors	0,75 – 1,5mm^2							
Housing material	Thermopalstic V-0							
Protection level of housing	IP 00							
Operating temperature	-40^{0}C … 80^{0}C							
Relative humidity	5% … 95%							
Rail mounting	DIN-3 (TS-35/EN50022) & Busbar							
Certification	STR by ÖVE, CE							
Conformity with	LVD 2014/35/EU							
Installation only by qualified electrician	IEC 60417 – 6182							
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001							

LAN networks surge protective devices (SPDs)

Brand Name: DataTron LAN 5

DESCRIPTION

Surge protective device suitable for protection of up to 4 pairs of UTP, STP, FTP cables with terminal connector RJ45, which are used in CAT 5 LAN networks with up to 100 MHz signal frequency. It is providing protection between the pairs and earth and also between the poles of the pair from surge currents caused by direct lightning strikes on the structure it is installed and from surge overvoltages caused from the electromagnetic field generated from an indirect lightning strike (near to the structure or to the incoming conductive supply network). A local earthing point is required, either the earthed metallic enclosure of the equipment or the nearest earthing point (e.g. socket).

Protection type EN / IEC 61643 – 21

- C1, C2, C3

Technical Characteristics

Brand name	DataTron LAN 5
Code	68 02 400
Number of poles	1
Input / output connector's type	RJ 45
Number of protected pairs	4 (8 conductors)
Maximum operating voltage, U_c L – L	5V
Maximum operating current, I_L	100mA
Maximum signal frequency, F	100MHz
I_n, C2 test, (8/20μs), L – GND	1kA
U_p, C3 (at 1kV) L – L	< 35V
U_p, C3 (at 1kV) L – GND	< 350V
Main circuit	GDT + TVS
Response time, t_A	1ns
Connection to the network	In line
Dimensions WxHxD (mm)	54 x 30,8 x 80
Housing material	Thermopalstic V-0
Protection level of housing	IP20
Operating temperature	-40^{0}C … 80^{0}C
Relative humidity	5% … 95%
Certification	CE
Conformity with	LVD 2014/35/EU
Installation only by qualified electrician	IEC 60417 – 6182
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001

LAN networks surge protective devices (SPDs)

Brand Name: DataTron LAN 6

DESCRIPTION

Surge protective device suitable for protection of up to 4 pairs of UTP, STP, FTP cables with terminal connector RJ45, which are used in CAT 6 LAN networks with up to 250 MHz signal frequency. It is providing primary protection against direct lightning strikes (10/350μs) on the telecommunication overhead network or on the structure it is installed. Additionally it is providing protection against induced surges (8/20μs) generated by the electromagnetic field, which is created by a nearby lightning strike. It is providing protection between the pair and earth (common mode) and also between the poles of the pair (differential mode). The surge protective devices are generally placed at each end of the line and as close as possible to the device to be protected. Suitable and for PoE according to the requirements of standards IEEE802af & IEEE802.3at.

Protection type EN / IEC 61643 – 21

- D1, C1, C2, C3

Technical Characteristics

Brand name	DataTron LAN 6
Code	68 02 600
Number of poles	1
Input / output connector's type	RJ 45
Number of protected pairs	4 (8 conductors)
Maximum operating voltage, U_c L – L	48V
Maximum operating current, I_L	1A
Maximum signal frequency, F	250MHz
I_{imp}, D1 test, (10/350μs), L – GND	1kA
I_n, C2 test, (8/20μs), L – GND	10kA
U_p, C3 (at 1kV) L – L	< 150V
U_p, C3 (at 1kV) L – GND	< 550V
Main circuit	GDT + TVS
Response time, t_A	1ns
Connection to the network	In line
Dimensions WxHxD (mm)	19x75x45,5
Housing material	Metal
Protection level of housing	IP20
Operating temperature	-40°C … 80°C
Relative humidity	5% … 95%
Rail mounting	DIN-3 (TS-35/EN50022)
Certification	CE
Conformity with	LVD 2014/35/EU
Installation only by qualified electrician	IEC 60417 – 6182
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001

Surge protective devices (SPDs) for high frequency coaxial cables

Brand Name: CoaxTron BNC

DESCRIPTION

Surge protective device, for coaxial cables of 50 Ω impedance, suitable for indoor and outdoor installation. It can provide protection to sensitive electronic circuits and equipment such as CCTV systems, TV, VIDEO signals and generally high speed digital networks. It is installed as close as possible to the equipment to be protected. Additionally the surge protective device shall be connected to the same earthing point with the equipment. In case the surge current is higher than the SPD's capability, it remains short-circuited to the earthing system, providing that way, protection to the equipment until its replacement.

Protection type EN / IEC 61643 – 21

- C1, C2, C3

Technical Characteristics

Brand name	CoaxTron BNC
Code	68 10 213 / 68 10 363
Number of poles	1
Connector type (input – output)	BNC Female – BNC Female / BNC Female – BNC Male
Number of protected pairs	1
Maximum operating voltage, U_c	70V / 280V
Impedance, Z	50Ω
Signal frequency range	DC - 2,6GHz
Signal maximum power	40W
Insertion loss	< 0,4dB
Return loss	> 20dB
I_n, C2 test, (8/20μs)	10kA
I_{max}, test, (8/20μs)	20kA
U_p, C3 (at 1kV)	< 600V
Main circuit	GDT
Response time, t_A	100ns
Connection to the network	In line
Dimensions WxHxL (mm)	25x25x52
Housing material	Metal
Protection level of housing	IP20
Operating temperature	-40°C … 80°C
Relative humidity	5% … 95%
Certification	CE
Conformity with	LVD 2014/35/EU
Installation only by qualified electrician	IEC 60417 – 6182
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001

Surge protective devices (SPDs) for high frequency coaxial cables

Brand Name: CoaxTron F-SAT

DESCRIPTION

Surge protective device, for coaxial cables of 75 Ω impedance, suitable for indoor and outdoor installation. It can provide protection to terrestrial and satellite TV networks. It is installed as close as possible to the equipment to be protected. Additionally the surge protective device shall be connected to the same earthing point with the equipment. In case the surge current is higher than the SPD's capability, it remains short-circuited to the earthing system, providing that way, protection to the equipment until its replacement.

Protection type EN / IEC 61643 – 21

- C1, C2, C3

Technical Characteristics

Brand name	CoaxTron F-SAT
Code	68 10 076
Number of poles	1
Connector type (input – output)	F type Female – F type Male
Number of protected pairs	1
Maximum operating voltage, Uc	70V
Impedance, Z	75Ω
Signal frequency range	DC - 2GHz
Signal maximum power	40W
Insertion loss	< 0,4dB
Return loss	> 20dB
I_n, C2 test, (8/20μs)	10kA
I_{max}, test, (8/20μs)	20kA
U_p, C3 (at 1kV)	< 600V
Main circuit	GDT
Response time, t_A	100ns
Connection to the network	In line
Dimensions WxHxL (mm)	25x25x53
Housing material	Metal
Protection level of housing	IP20
Operating temperature	-40°C … 80°C
Relative humidity	5% … 95%
Certification	CE
Conformity with	LVD 2014/35/EU
Installation only by qualified electrician	IEC 60417 – 6182
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001

Surge protective devices (SPDs) for high frequency coaxial cables

Brand Name: CoaxTron N

DESCRIPTION

Surge protective device, for coaxial cables of 50 Ω impedance, suitable for indoor and outdoor installation. It can provide protection to radio-communication and broadcasting antenna systems. It is installed as close as possible to the equipment to be protected. Additionally the surge protective device shall be connected to the same earthing point with the equipment. In case the surge current is higher than the SPD's capability, it remains short-circuited to the earthing system, providing that way, protection to the equipment until its replacement.

Protection type EN / IEC 61643 – 21

- C1, C2, C3

Technical Characteristics

Brand name	CoaxTron N
Code	68 10 362
Number of poles	1
Connector type (input – output)	N type Female – N type Male
Number of protected pairs	1
Maximum operating voltage, U_c	280V
Impedance, Z	50Ω
Signal frequency range	DC – 2,6GHz
Signal maximum power	300W
Insertion loss	< 0,4dB
Return loss	> 20dB
I_n, C2 test, (8/20μs),	10kA
I_{max}, test, (8/20μs),	20kA
U_p, C3 (at 1kV)	< 900V
Main circuit	GDT
Response time, t_A	100ns
Connection to the network	In line
Dimensions WxHxL (mm)	25x25x60
Housing material	Metal
Protection level of housing	IP20
Operating temperature	-40°C … 80°C
Relative humidity	5% … 95%
Certification	CE
Conformity with	LVD 2014/35/EU
Installation only by qualified electrician	IEC 60417 – 6182
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001

ISOLATING SPARK GAPS & DC DECOUPLING DEVICES FOR SYSTEMS WITH CATHODIC PROTECTION

- Isolating spark gaps
- Explosion proof (Ex) isolating spark gaps
- AC stray currents dissipation device for systems with cathodic protection

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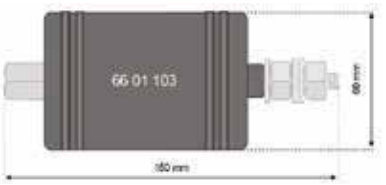
Isolating spark gaps (ISGs)

Brand Name: ISG

DESCRIPTION

The Isolating Spark Gaps ISGs are intended to provide indirectly equipotential bond between earthing systems or metalwork where direct bond is not permissible for functional reasons. They are installed between the parts to be indirectly bonded, or in case of external conductive parts connected to the structure, they are installed at the entry point in the structure. If the voltage between the parts exceeds the spark over voltage (e.g. lightning strike) of the ISG, the ISG operates causing the equalisation of the earth potentials. After the equalisation the ISG will return to normal position. They have applications mainly in the following cases:

- in earthing systems of telecommunication systems (under conditions);
- auxiliary earth electrodes of voltage operated earth fault circuit breakers;
- rail earth electrode for AC and DC railways;
- measuring earth electrodes for laboratories;
- in installations with cathodic protection and stray current systems;
- in bypass bonding of insulated flanges and insulated couplings of pipelines.



Protection type EN / IEC 62561 – 3

- N (66 01 102) & H (66 01 103)

Technical Characteristics

Brand name	ISG N	ISG H
Code	66 01 102	66 01 103
DC sparkover voltage at 100V/s	100V ± 20%	500V ± 20%
AC sparkover voltage at 50Hz	70V ± 20%	350V ± 20%
Impulse sparkover voltage 1kV/µs	950V	950V
Lightning current discharge 10/350µs, I_{imp}	3 x 75kA	3 x 100kA
DC Follow current interrupt rating after I_{imp}	150A / 0,5s	200A / 0,5s
Surge current discharge 8/20µs	10 x 100kA	10 x 100kA
High energy surge current discharge 10/45µs	20 x 60kA	20 x 60kA
AC current discharge 50Hz, t=1s	5 x 100A_{rms}	5 x 100A_{rms}
AC current discharge 50Hz, t=0,5s	1 x 200A_{rms}	1 x 200A_{rms}
AC current discharge 50Hz, t=0,25s	1 x 4000A_{rms}	1 x 4000A_{rms}
Follow current extinguish capability	at 70V < 20A_{rms}	at 230V < 100A_{rms}
Insulation resistance at 100V DC	1GΩ	1GΩ
Capacitance at 1kHz	7pF	7pF
Dimensions (Diameter / length)	25 x 88 mm	60 x 150 mm
Mounting connections	M8 thread (tightening torque 13 Nm)	M8 thread (tightening torque 13 Nm)
Housing material	Insulated Ceramic	Ceramic, EPOXY
Housing protection category	IP 67	IP 67
Operating temperature	-40°C … 80°C	-40°C … 80°C
Relative humidity	5% … 95%	5% … 95%
Classification according EN 62561 – 3	N	H
Installation only by qualified electrician	IEC 60417 – 6182	IEC 60417 – 6182
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001	ISO 9001, ISO 14001, ISO 45001

Isolating spark gaps (ISG - Ex)

Brand Name: ISG - Ex

DESCRIPTION

The Isolating Spark Gaps ISGs explosion proof type are intended to provide indirectly equipotential bond in structures which are installed in explosive environments where also direct bond is not permissible for functional reasons. They are installed between the two conductive parts that need to be bonded on different earthing systems and in the event that the potential difference between the ISGs terminals exceeds the spark over voltage of it, the ISG operates causing the equalisation of the earth potentials without allowing any arc or spark to be generated out of its chamber even at after heavy discharges. After the equalisation the ISG will return to normal position. They have applications mainly in the following cases:

- in earthing systems of oil refineries;
- in earthing systems of tanks and pipes containing explosive fuels;
- in earthing systems of natural gas applications;
- in installations with cathodic protection and stray current systems;
- in bypass bonding of insulated flanges and insulated couplings of pipelines.

Protection type EN / IEC 62561 – 3

- N

Technical Characteristics

Brand name	ISG EX
Code	66 01 101
DC sparkover voltage at 100V/s	100V ± 20%
AC sparkover voltage at 50Hz	70V ± 20%
Impulse sparkover voltage 1kV/µs	950V
Lightning current discharge 10/350µs, I_{imp}	3 x 75kA +
DC Follow current interrupt rating after I_{imp}	150A / 0,5s (Not for Ex use)
Surge current discharge 8/20µs	10 x 100kA
High energy surge current discharge 10/45µs	20 x 60kA
AC current discharge 50Hz, t=1s	5 x 100A_{rms}
AC current discharge 50Hz, t=0,5s	1 x 200A_{rms}
AC current discharge 50Hz, t=0,25s	1 x 4000A_{rms}
Follow current extinguish capability	at 70V < 20A_{rms}
Insulation resistance at 100V DC	1GΩ
Capacitance at 1kHz	20pF
Dimensions (Diameter / length)	50 x 155 mm
Mounting connections	M10 thread (tightening torque 10 Nm)
Housing material	Metal, Ceramic, EPOXY
Housing protection category	IP 67, II 2 G Ex mb IIC T4 Gb
Test report number / ATEX certification	30754 / ZELM 02 ATEX 0095X
Operating temperature	-40^{0}C … 80^{0}C
Relative humidity	5% … 95%
Classification according EN 62561 – 3	N
Installation only by qualified electrician	IEC 60417 – 6182
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001

The above isolating spark gap is available also wired with 25 mm2 copper stranded cable at each side (ELEMKO code 66 01 111). The isolating spark gap and the connections are enclosed inside polyolefin adhesive heat shrink tubing for insulation and environmental protection purposes.

DC decoupling devices for cathodic protected systems

Brand Name: DCTron

DESCRIPTION

DCTron is especially designed to dissipate AC currents in systems with cathodic protection, while blocking DC currents, where due to the cathodic protection, direct connection to the earthing system is not possible.

DCTron dissipates the AC currents while at the same time maintains the cathodic protection operational. Additionally it is providing protection against lightning and surge currents up to 100 kA (10/350 μs).

The decoupling main circuit, is consisted of a L– C filter with low AC voltage drop (<1,5 Vrms) at a maximum AC dissipation current (25 A or 50A), thus providing protection from touch and induction voltages. Also is limiting the leakage current to minimum (<1 μA) in order to maintain the cathodic protection operational. Additionally it is equipped with a DC overvoltage protection circuit in case the DC voltage exceeds the limits.

Protection type EN / IEC 62561 – 3

- H

Technical Characteristics

Brand name	DCTron 25	DCTron 50
Code		
Technical Characteristics of AC filter		
AC current permanent dissipation	25A	50A
Cathodic protection maximum voltage (-DC)	-25V	-25V
AC current dissipation (50 Hz, t=0,1 s)	3000A	5000A
Leakage current @ max DC operational voltage	< 1μA	< 1μA
Maximum capacitance	2 x 3000μF	2 x 50.000μF
Technical Characteristics of SPD		
AC sparkover voltage at 50Hz	70V ± 20%	70V ± 20%
Impulse sparkover voltage 1kV/μs	950V	950V
Lightning current discharge 10/350μs, I_{imp}	3 x 100kA	3 x 100kA
Surge current discharge 8/20μs	10 x 100kA	10 x 100kA
AC current discharge 50Hz, t=1s	1 x 200A_{rms}	1 x 200A_{rms}
AC current discharge 50Hz, t=0,25s	1 x 3000A_{rms}	1 x 3000A_{rms}
Insulation resistance at 100V DC	1GΩ	1GΩ
Dimensions WxHxD (mm)	151 x 162 x 135	151 x 162 x 135
Connection terminals	2 x 16mm^2 PVC green yellow copper	2 x 16mm^2 PVC green yellow copper
Ability of check without disconnection	Optional	Optional
Housing material	Metal	Metal
Housing protection category	IP 67	IP 67
Operating temperature	-40^{0}C … 80^{0}C	-40^{0}C … 80^{0}C
Relative humidity	5% … 95%	5% … 95%
Classification according EN 62561 – 3	H	H
Installation only by qualified electrician	IEC 60417 – 6182	IEC 60417 – 6182
ELEMKO management systems (Quality, Environment, Safety)	ISO 9001, ISO 14001, ISO 45001	ISO 9001, ISO 14001, ISO 45001

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