CATALOGUE 2020/2021

ZOTUP®

INNOVATIVE SURGE PROTECTION

MADE IN ITALY

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THE COMPANY

ZOTUP is our company. Since 1986 we focus our efforts on the development of solutions for surge protection and on the production of Surge Protective Devices. We strive to serve our customers with highest quality products and services.

ZOTUP's values are pure and simple.

SAFETY Our ambition and goal is to provide products that **protect people, their property and their working environment.**

QUALITY Only through the **quality of our products** we can meet our promise.

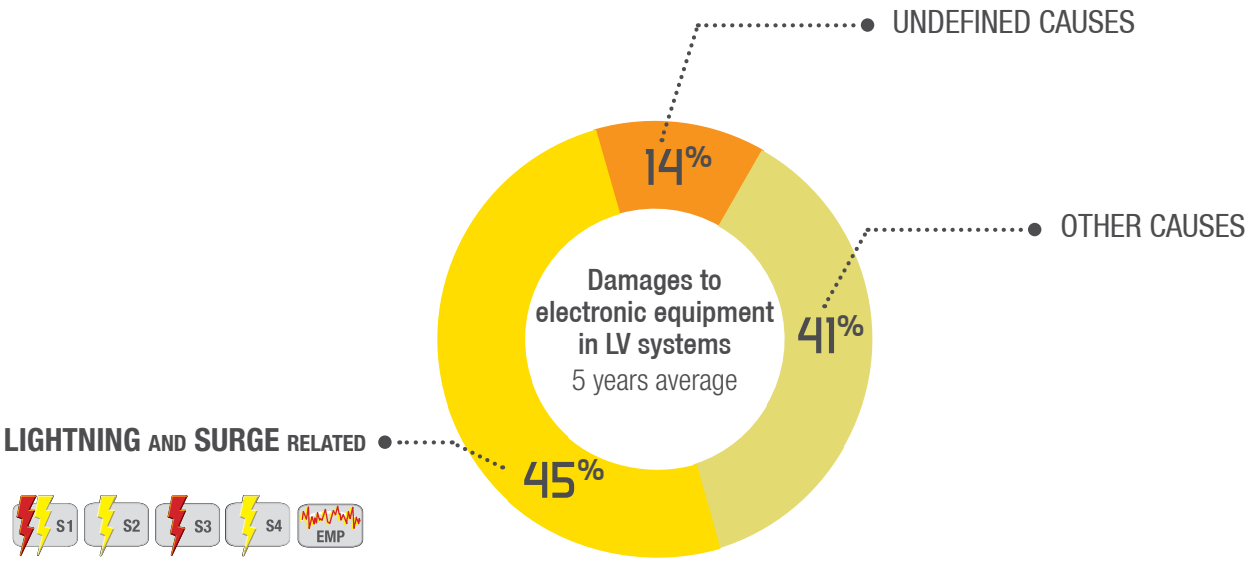
INNOVATION Continuous further development is the heartbeat of **ZOTUP**. Cutting -edge products are the answer to our customers needs.

By means of these values, we at **ZOTUP** want to keep track with the market, today and tomorrow.

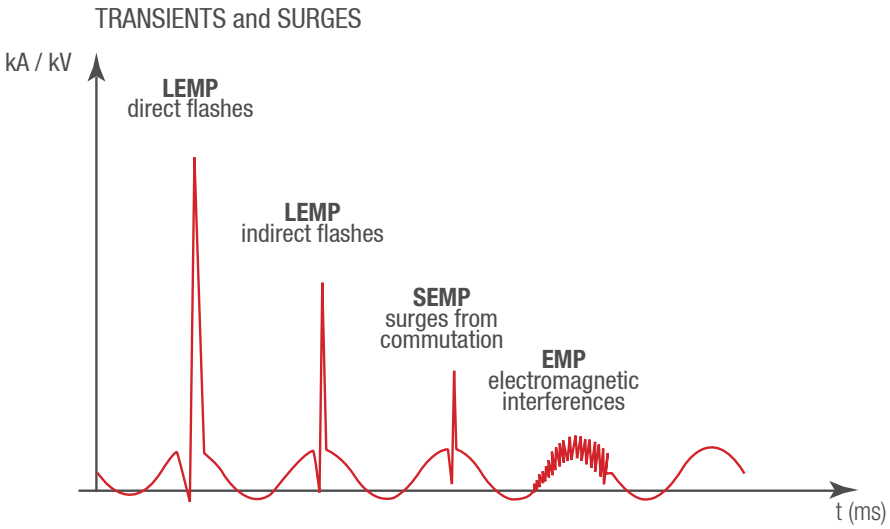
SURGE PROTECTIVE DEVICES - WHY?

REQUIRED BY HD 60364-4-443 AND BY THE EN 62305 SERIES OF STANDARDS FOR PROTECTION AGAINST TRANSIENT OVERVOLTAGES OF ATMOSPHERIC ORIGIN.

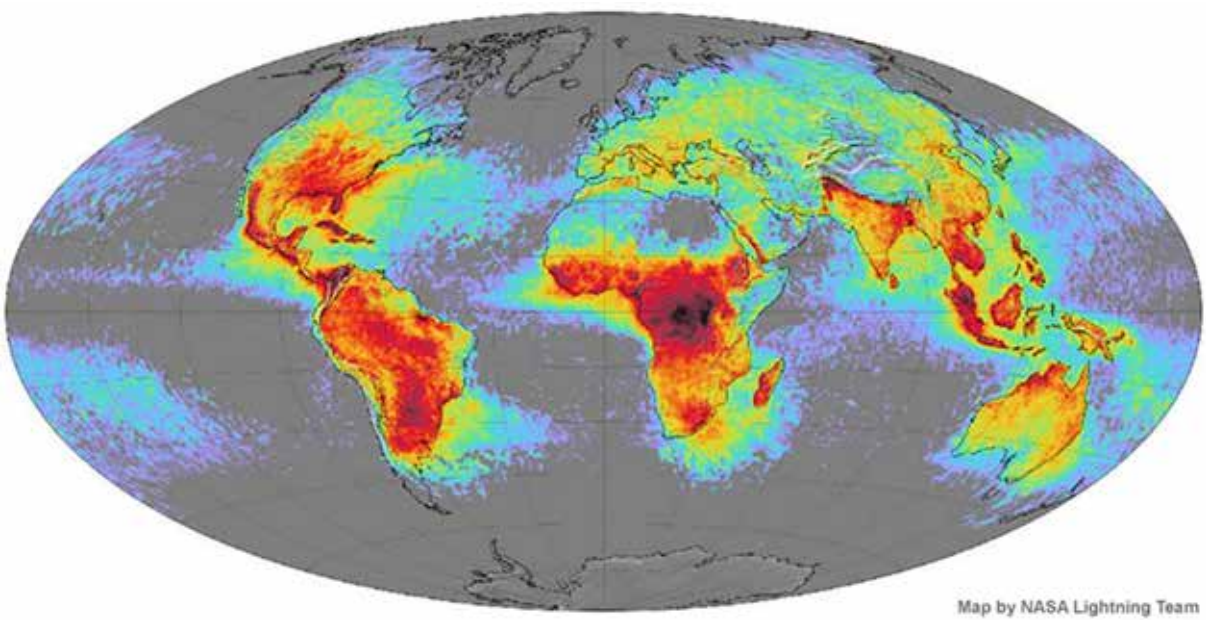
In the Internet era and with the exponentially increasing use of electrical and electronic equipment containing sensitive integrated circuits and semi-conductors with high cost implication in case of damage, increasing attention to transient phenomena of atmospheric origin and to the resulting surges within the electric distribution systems and installations is required. The statistical analysis of damages published by insurance companies irrefutably demonstrates the dimension of the problem. The costs of damage and downtime due to these transient effects has the same order of magnitude as the costs of civil crime.
To prevent damages to people and equipment, to ensure continuity of the electrical supply and of communication services and to avoid the corresponding economic loss due to presence of such interferences, the realisation of highly effective protection measures for structures and buildings in the public, industrial and tertiary care infrastructure as well as for private premises is essential.



source: German Insurance Association (GDV); Berlin - 2009.



LIGHTNING GROUND FLASH DENSITY



Source: Article by Hobart M. King.

NASA has satellites orbiting the Earth with sensors designed to detect lightning and collect data, which is transmitted to Earth, plotted geographically and used to construct a geographic record of lightning activity over time. The map above shows the average yearly counts of lightning per square kilometer based on data collected by NASA's Lightning Imaging Sensor on the Tropical Rainfall Measuring Mission satellite between 1995 and 2002. Places where less than one lightning occurred (on average) each year are gray or light purple; places with the largest number of lightning flash are deep red, grading to black.
Globally, there are about 40 to 50 lightning every second, or nearly 1.4 billion of lightning per year. These electrical discharges are powerful and deadly. Each year, lightning not only kill people and wildlife but are also responsible for billions of dollars in damage to buildings, communication systems, power lines, electrical equipment and billions of dollars per year in flight rerouting and delays. Thus, maps showing the distribution of lightning across the Earth – which is far from uniform - are important for economic, environmental and safety reasons. The ideal conditions for the appearance of lightning and associated thunderstorms occur where warm, moist air rises and mixes with cold air above: the heated land surface warms the air above it, and that warm air rises to encounter cold air aloft. The interaction between air masses of different temperature stimulates thunderstorms and lightning. These conditions occur almost daily in many regions on Earth, but only rarely in other regions. Moreover, much more lightning occurs over land than over the ocean because daily sunshine heats the land surface faster than the ocean. More lightning occurs near the equator than at the poles because not only the latter's frozen surfaces are not effectively warmed by the sun to produce convection but also there is very little moisture in polar air.

DENSITY OF LIGHTNING FLASHES TO THE GROUND N_G

The ground flash density N_G is the number of lightning flashes per km^2 per year. These values are provided by recording of all the flashes detected by the corrresponding lightning location system (LLS) that covers the territory. The detection data registered by the LLS must be collected and processed, in order to calculate the annual number of dangerous events N_x according to EN 62305-2. It is sufficient to provide the geographical coordinates (latitude/longitude) to retrieve the corresponding value of N_G. The ground flash density values are drawn from National databases where available. Where no such database is available, the standard IEC 62858 Ed.2 (2019-10) recommends to obtain the N_G by multiplying the N_t (total density of optical recorded flashes per km^2 per year from NASA website) by 0,25.

REFERENCE STANDARDS

Awareness, that transient surges are the main influencing factor of the MTBF (Mean Time Between Failures) of systems and equipment, is driving all manufacturers in the area of surge protection to continuously develop new overvoltage protective devices with increasing features and in compliance with the actual national and International standards.
The following is a list of the key standards involved:

IEC 61643-11 Ed. 1 (2011-03)
EN 61643-11 (2012-10)

Low-voltage surge protective devices:

Part 11: Surge protective devices connected to low-voltage power systems.

Requirements and test methods.

IEC 61643-12 Ed. 3 (2020-05)
CLC/TS 61643-12 (2009)

Surge protective devices connected to low-voltage power systems. Selection and application principles.

IEC 61643-21 Ed. 1.2 (2012-07)
EN 61643-21 +A1 +A2 (2001/2009/2013)

Low-voltage surge protective devices.

Part 21: Surge protective devices connected to telecommunications and signalling networks. Performance requirements and testing methods.

IEC 61643-22 Ed. 2 (2015-06)
CLC/TS 61643-22 (2016)

Surge protective devices connected to telecommunications and signalling networks. Selection and application principles.

IEC 61643-31 Ed. 1 (2018-01)
EN 61643-31 (2019-10)

Surge protective devices.

Part 31: SPDs connected to the c.c. side of photovoltaic applications. Requirements and tests methods.

IEC 61643-32 (2017-09)
CLC/TS 51543-32 (2020)

Low-voltage surge protective devices connected to the c.c. side of photovoltaic installations. Selection and application principles.

IEC 62305 series Ed. 2 (2010-12)
EN 62305 series (2011/2012)

Protection against lightning.

Part 1: General principles;
Part 2: Risk management;
Part 3: Physical damage to structures and life hazard;
Part 4: Electrical and electronic systems within structures.

IEC 60364-5-534 (2015-09)
HD 60364-5-534 (2016-02)

Low-voltage electrical installations.

Part 5-53: Selection and erection of electrical equipment. Isolation, switching and control. Clause 534: Devices for protection against transient overvoltages.

IEC 61000-4-5 Ed. 3 (2014-05)
EN 61000-4-5 (2014)

Electromagnetic compatibility (EMC).

Part 4-5: Testing and measurement techniques. Surge immunity test.

IEC 61439 series
EN 61439 series

Low-voltage switchgear and controlgear assemblies.

IEC 61439-1(2020) / EN 61439-1 (2011)
Part 1: General rules.

IEC 61439-2 (2011) / EN 62439-2 (2011)
Part 2: Power switchgear and controlgear assemblies.

IEC 61439-3 (2012) / EN 62439-3 (2012)+AC (2019)
Part 3: Distribution boards intended to be operated by ordinary persons (DBO).

IEC 61439-4 (2012) / EN 62439-4 (2013)
Part 4: Particular requirements for assemblies for construction sites (ACS).

IEC 61439-7 (2018) / EN IEC 61439-7 (2020)
Part 7: Assemblies for specific applications such as marinas camping sites, market squares, electric vehicle charging stations.

IEC 61643-31

Edition 1.0 2018-01

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Low-voltage surge protective devices –
Part 31: Requirements and test methods for SPDs for photovoltaic installations

Parafoudres basse tension
pécifique y compris en courant continu –
arafoudres pour installations

HARMONIZATION DOCUMENT
DOCUMENT D'HARMONISATION
HARMONISIERUNGSDOKUMENT

HD 60364-5-53

November 2015

ICS 91.140.50, 29.120.50

Supersedes HD 50573-5-57:2014, HD 60364-5-53:2015

English Version

Low-voltage electrical installations - Part 5-53: Selection and erection of electrical equipment - Switchgear and controlgear

Installations électriques basse tension - Partie 5-
et mise en œuvre des matériels électriques - A

Errichten von Niederspannungsanlagen - Teil 5-53:
Errichtung elektrischer Betriebsmittel - Schalt-
Steuergeräte

This Harmonization Document was approve
CEN/CENELEC Internal Regulations which

Up-to-date lists and bibliographical refere
CENELEC Management Centre or to an

This Harmonization Document exists i

CENELEC members are the nationa
Denmark, Estonia, Finland, Former
Lithuania, Luxembourg, Malta, the
Turkey and the United Kingdom.

© 20

IEC 61643-11

Edition 1.0 2011-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Low-voltage surge protective devices –
Part 11: Surge protective devices connected to low-voltage power systems –
Requirements and test methods

Parafoudres basse tension –
Partie 11: Parafoudres connectés aux systèmes basse tension – Exigences et méthodes d'essai

TERMINOLOGY

Knowledge of some basic technical terms and definitions associated with SPDs will facilitate an understanding of the contents of this catalogue.
Please find below a selection of the most important.

TT System

Technique for the protection of persons: the exposed conductive parts are earthed and residual current devices (RCDs) are used.

TN System

Technique for the protection of persons: interconnection and earthing of exposed conductive parts and the neutral are mandatory.

IT System

Technique for the protection of persons:

- Interconnection and earthing of exposed conductive parts;
- Indication of the first fault by an insulation monitoring device (IMD);
- Interruption for the second fault using overcurrent protection (circuit-breakers or fuses).

SPD test class I (IEC) or Type 1 (EN)

SPD tested with nominal discharge current I_n and with impulse current I_{imp}.

SPD test class II (IEC) or Type 2 (EN)

SPD tested with nominal discharge current I_n and with max. discharge current I_{max} (optional).

SPD test class III (IEC) or Type 3 (EN)

SPD tested with combination wave.

Voltage switching type SPD (GAP)

SPD that has a high impedance when no surge is present, but can have a sudden change in impedance to a low value in response to a voltage surge. Common examples of components used in such SPDs are spark gaps, gas tubes and thyristors.

Voltage limiting type SPD

SPD that has a high impedance when no surge is present, but will reduce it continuously with increased surge current and voltage.
Common examples of components used in such SPDs are varistors and avalanche diodes.

Combination type SPD

SPD that incorporates both, voltage switching components and voltage limiting components.
The SPD may exhibit voltage switching, limiting or both.

N-PE SPD

SPD intended exclusively for application between N and PE conductors in an installation.

Mode of protection (of a SPD)

An intended current path, between terminals that contains protective components, e.g. line-to line, line-to-earth, line-to-neutral, neutral-to-earth.

Multipole SPD

SPD with more than one mode of protection, or a combination of electrically interconnected SPDs offered as a unit.

Maximum Continuous Operating Voltage (U_c)

Maximum r.m.s. voltage, which may be continuously applied to the SPD's mode of protection. This is comparable to the nominal voltage of other installation devices.

Impulse discharge current (I_{imp})

Crest value of a discharge current through the SPD with specified charge transfer Q and specified energy W/R in the specified time.
This characterises an SPD as test class I or type 1. The characteristic waveform is 10/350 µs.

Nominal discharge current (I_n)

Crest value of the current through the SPD with a current waveshape of 8/20 µs.This characterises an SPD as test class II or type 2.

Maximum discharge current (I_{max})

Crest value of a current through the SPD having an 8/20 µs waveshape and magnitude according to the manufacturers specification.
Imax is an optional parameter.
This parameter should not be considered for the selection of SPDs.

Discharge current (I_d)

Presumed maximum crest value of the current through the SPD when subjected to a combination wave with an open circuit voltage equal to U_{oc}.
The real current through the SPD will always be lower than I_{SC}.

Total discharge current (I_{Total})

Current which flows through the PE or PEN terminal of a multipole SPD during the total discharge current test.

Short-circuit current rating (I_{sccr})

Maximum prospective short-circuit current from the power system for which the SPD, in conjunction with the disconnector specified, is rated.

Follow current (I_f)

Peak current supplied by the electrical power system and flowing through the SPD after a discharge current impulse.

Follow current interrupt rating (I_{fi})

Prospective short-circuit current that an SPD is able to interrupt without operation of a disconnector.

No Follow Current® (NFC)

An SPD design not causing any follow current.
SPDs with NFC-technology avoid any undesired current stress to disconnectors and protective devices upstream the SPD.

Open circuit voltage (U_{oc})

Open circuit voltage of the combination wave generator at the point of connection of the device under test.

(Voltage) protection Level (U_p)

Maximum voltage to be expected at the SPD terminals due to an impulse stress with defined voltage steepness and an impulse stress with a discharge current with given amplitude and waveshape.

Noise level attenuation (dB)

Reduction of the noise caused by electromagnetic interferences, both in common and differential mode.

Temporary Overvoltage (TOV)

Power frequency overvoltage of relatively long duration. A temporary overvoltage is undamped or weakly damped.

SPD behaviour in case of Temporary Overvoltages TOV (U_T)

- Withstand without damage: withstand (W);
- or fail in a safe way, maintaining its IP degree: safe (S).

Status Indicator

Device that indicates the operational status of an SPD or a part of an SPD. Such indicator may be local visual and may have remote signalling and output contact capability. Intermediate stages of the status indicator may also be provided e.g. for preventive maintenance, before it has reached its end of life.

Pollution Degree (PD)

Numeral characterizing the expected pollution of the relevant environment.

P.D. 1: No pollution or only dry, non-conductive pollution.

P.D. 2: Only non-conductive pollution, except an occasionally temporary conductivity caused by condensation.

P.D. 3: Conductive pollution or dry non-conductive pollution which becomes conductive due to expected condensation.

PARAMETERS FOR SPD SELECTION

The parameters to be considered for SPD selection are many. The main ones are:

- Suitability for the power distribution system (TN, TT, IT);
- Maximum Continuous Operating Voltage (U_C);
- Behaviour in case of TOV (U_T);
- SPD Type (and impulse current / voltage) T1 T2 T3;
- Short circuit current rating (I_{sccr});
- Back-up protection OCPD (fuse);
- Follow current interrupt rating (I_{fi});
- Voltage protection level (U_p);
- Pollution Degree;
- Response time (t_a).

Maximum Continuous Operating Voltage U_c:

This is the maximum r.m.s. voltage, which may be continuously applied to the SPD's mode of protection.
It is selected depending on:

- the nominal voltage of the circuit to be protected;
- the low voltage distribution system (TN, TT, IT);
- the required modes of protection (phase to earth; phase to neutral; neutral to earth).

Recommended U_c values for 230/400 V plants in the different power distribution systems.

By respecting these values, the behaviour of failure mode in caso of TOV improves.

SPD	TN-system	TT-system	IT-systems
phase to neutral	Uc ≥ 335 V	Uc ≥ 335 V	Uc ≥ 335 V (1)
phase to earth	Uc ≥ 335 V	Uc ≥ 400 V	Uc ≥ 400 V
neutral to earth	-	Uc 255 V (2)	Uc 255 V (2)

(1) only for systems with distribuited neutral - (2) tested for a TOV of 1200 V for 200 ms

Behaviour in case of Temporary Overvoltage TOV (U_T), in accordance with IEC 61643-11:

Application	Test parameters of the TOV		
SPDs connected to:	For t_T = 5 s (Faults within the LV-system in the consumer installation) (requirements in 7.2.8.1 and test in 8.3.8.1)	For t_T = 120 min (Faults within the LV-system in the distribution system) (requirements in 7.2.8.1 and test in 8.3.8.1)	For t_T = 200 ms (Faults within the HV system) (requirements in 7.2.8.2 and test in 8.3.8.2)
	Withstand* mode required	**Withstand*** mode or **safe**** failure mode	**Withstand*** mode or **safe**** failure mode
	Test values of the TOV U_T (V)		
TN Systems			
Connected L-(PE)N o L-N	1,32 x U_{REF}	√ 3 x U_{REF}	-
Connected N-PE	-	-	-
Connected L-L	-	-	-
TT Systems			
Connected L-PE	√ 3 x U_{REF}	1,32 x U_{REF}	1200 + U_{REF}
Connected L-N	1,32 x U_{REF}	√ 3 x U_{REF}	-
Connected N-PE	-	-	1200
Connected L-L	-	-	-
IT Systems			
Connected L-PE	-	-	1200 + U_{REF}
Connected L-N	1,32 x U_{REF}	√ 3 x U_{REF}	-
Connected N-PE	-	-	1200 + U_{REF}
Connected L-L	-	-	-

*** Withstand mode (W):** the SPD withstands without being damaged! This is the optimal condition.

**** Safe failure mode (S):** the SPD is damaged and behaves in a safe way, without burning and maintaining its IP degree. This is the minimum acceptable condition, which involves the loss of the protection.

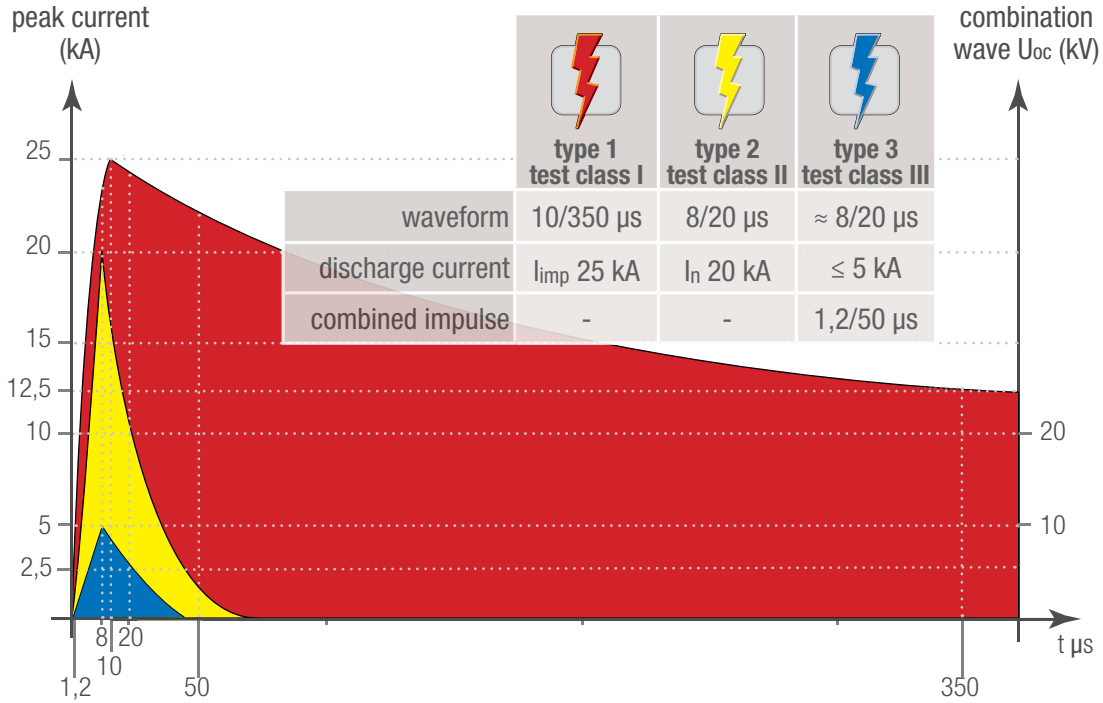
SPD test classes I, II, III / Types T1 T2 T3

Surge protective devices are tested in accordance with the classification and parameters provided by the manufacturer. Depending on the intended application, according to HD 60364-5-534 or the EN 62305 series, there are three different test classes corresponding to three types of SPDs:

Type of SPD	IEC 61643-11 (2011-03)	EN 61643-11 (2012-10)	SPD icon
SPD for lightning equipotential bonding	SPD test class I	SPD type 1 T1	
SPDs for protection against transient overvoltages	SPD test class II	SPD type 2 T2	
SPDs for protection against transient overvoltages and for equipment protection	SPD test class III	SPD type 3 T3	
SPDs with filter for enhanced equipment protection	IEC 61000-4-5	EN 61000-4-5	

- SPD type 1: tested with the impulse discharge current I_{imp} (typically 10/350 µs) and with 8/20 µs current impulses;
- SPD type 2: tested with the nominal discharge current I_n (8/20 µs) and optional with the maximum discharge current I_{max} (8/20 µs). *Imax should not be considered for choosing an SPD.* When containing any voltage switching components SPDs type 1 and type 2 are additionally tested with 1,2/50 µs voltage impulses;
- SPD type 3: tested with a combination wave generator providing an open circuit voltage U_{oc} (1,2/50 µs) and a defined short circuit current I_{cw} (8/20 µs) with a fictive nominal output impedance of 2 Ω.

Maximum preferred discharge current values for type 1, type 2 and type 3 SPDs in accordance with EN 61643-11



Short circuit withstand capability (short circuit current rating I_{sccr}):
During the normal operation of overvoltage protectiove devices, the SPD provides a high impedance at nominal system voltage and rated frequency. In case an SPD reaches its end-of-life in a low impedance state, the resulting short-circuit current must be interrupted. This interruption may be provided by an SPD internal disconnector or in conjunction with an external disconnector, e.g. a fuse.
When the SPD manufacturer provides information about a maximum allowed backup fuse rating, any alternative overcurrent protective device, like e.g. MCBs or circuit breakers, must be considered very carefully, because such devices may not provide the required impulse withstand, specifically in applications where type 1 SPDs are required and partial lightning currents are to be expected.
If other kinds overcurrent protective devices than the ones recommended by the SPD manufacturer are used, this is under the full responsibility of the installer. Furthermore the higher internal impedance of such other devices compared to a fuse may add to the voltage drop under surge conditions and may therefore worsen the effective voltage protection level for the installation and equipment.

Follow current interrupt rating I_{fi}:
This rating only exists in the IEC 61643-11 and relates to SPD constructions, which generally cause a follow current from the power supply after discharge current flow, and describes the ability of such SPDs to self-extinguish such follow current without operation or alteration of any disconnector. Important for correct understanding is, that this parameter does not provide a real current value that gets interrupted by the SPD, but the maximum prospective short circuit current that may be available at the SPD's point of installation, at which any expected follow current will be self-extinguished by the SPD.
While IEC 61643-11 allows this follow current interrupt rating I_{fi} to be lower than the short-circuit current rating I_{sccr}, EN 61643-11requires this rating to be equal to the short-circuit current rating I_{sccr}. But both installation rules, IEC 60364-5-534 as well as HD 60364-5-534, require that the follow current interrupt rating must be equal or higher than the maximum available short circuit current from the power system at the SPD's point of installation.

NFC No Follow Current®:
Thanks to their design characteristics, SPDs with **No Follow Current®** technology **(NFC)**, completely avoid the flow of follow currents from the power system at all, and therefore also limit the impulse stress to disconnectors (e.g. fuses) and upstream protective devices in the installation to a minimum. Thus resulting in a lower risk of supply outages.

Voltage Protection level U_p:
This parameter is defined as the maximum instantaneous voltage value at the SPD's terminals during its intended operation under defined impulse stress conditions. Depending on the construction and the type of components used in the SPD this protection level corresponds to:

- for voltage Limiting SPDs: the residual voltage at nominal discharge current (8/20 µs) for type 2 SPDs or the residual voltage at a discharge current (8/20 µs), with a crest value of I_{imp} for type 1 SPDs;
- for voltage switching and combination SPDs: the limiting voltage at 1,2/50 µs voltage impulses and the residual voltage as above, whatever is higher, or the limiting voltage at hybrid generator impulses.

The protection level provided by SPDs must be compared to the impulse voltage withstand of the equipment to be protected, also taking into consideration the distances between these SPDs and the equipment.

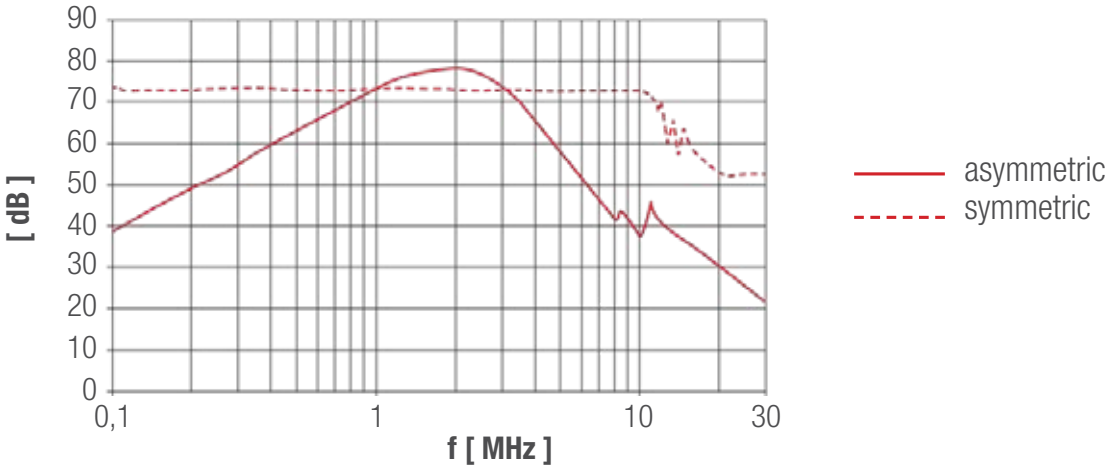
Response time t_a:
In EN 61643-11 the response time of SPDs is not directly addressed, but only an implicit factor when testing for the limiting voltage of voltage switching or combination SPDs. However, for semiconductors even very short peaks can be harmfull and therefore the response time of SPDs is not of secondary importance. The phenomena of transient overvoltages in equipment is usually in the order of some ten **µs**, the response time of voltage limiting SPDs is in the order of some to some ten **ns**, but the time before damage may occur to some categories of semiconductors is in the order of **ps**.
This leads to the simple statement: the shorter the SPDs response time is, the better is the overall protection function the SPD provides.

Coordination of SPDs:
The best effectiveness of SPDs can only be ensured through appropriate coordination of all SPDs with regard to the voltage protection level and the energy absorption. The necessary information to enable such coordination of SPDs can only be provided by the manufacturer, because the specific SPD design and construction may have a significant influence here. The larger an electrical system is, the more difficult and complex it is to achieve proper coordination because of the increasing distances, and therefore increasing conductor length and impedances, between the SPDs and the parts of the installation and the equipment to be protected, which may cause the various SPDs installed to operate independently from each other.

Total discharge current (I_{total} 10/350 and I_{total} 8/20):
This parameter is intended to specify and test for the maximum surge current stress in the terminal and related components of a multipole SPD, which are connected to PE. This is necessary to check for the accumulating effects and stress factors when several or even all modes of protection of an SPD are operated, because all other tests are performed on single modes of protection, only I_{total} is particularly important for SPDs of type 1 as the stresses expected in a lightning equipotential bonding system are common mode, meaning impulse currents flowing simultaneously in all active conductors, as indicated in EN 62305-1 and -4.

Noise level attenuation:
This is realised by filters for limiting the electromagnetic interferences in the range of 150 kHz – 30 MHz, both in common and line to line mode, which show a specific characteristic to reach that protective behaviour. Such filters are added as an additional feature to advanced SPD designs for providing extensive protection against transients and all kinds of conducted interferences, with the aim of reaching electromagnetic compatibility (EMC) in a wide frequency range.

Filter characteristics showing the asymmetric and the symmetric attenuation curve



Pollution Degree:
The basic safety publication EN 60664-1 for insulation coordination for equipment within low voltage systems specifies and classifies four pollution degrees, whereby the micro-environmental conditions of the insulation must be taken into account for construction. Micro environment in this context means the immediate environment of the insulation, as compared to the macro environment, which describes the environment of the room or location where the equipment is installed. The micro environment often depends primarily on the macro environment and they are essentially identical.
Classification of pollution degrees (PDs):
PD 1: No pollution or only dry, non-conductive pollution.
PD 2: Only non-conductive pollution, except an occasionally temporary conductivity caused by condensation.
PD 3: Conductive pollution or dry non-conductive pollution which becomes conductive due to expected condensation.
This design parameter of an SPD should be thoroughly checked to determine its suitability for a specific application. As a general guideline for domestic applications pollution degree 2 applies and for industrial applications pollution degree 3 applies. It may require particular attention in outdoor locations or under severe environmental conditions. e.g. for photovoltaic installations, public lighting and wind farms, industrial environments such as steel mills, cement factories.

SELECTION OF SPDs ACCORDING TO THE EXPECTED IMPACT

The standard series IEC and EN 62305 defines lightning flashes to various points as so called sources of damage. Such damage may e.g. be to a structures, to services, to installations or equipment. The installation of SPDs within the electric distribution system can significantly reduce the risk of such damages to services, to installations or equipment. Electromagnetic interferences are also a potential source of damage, the risk of which can be reduced by the installation of SPDs with additional filter.

Source of damage	Source of damage	Effect Icon	Selection of SPD
Flash to the structure	S1		T1 and T2
Flash near the structure	S2		T2 and/or T3
Direct flash to the service	S3		T1 and T2
Indirect flash to the service	S4		T2 and/or T3
Interference on the service	EMP		T1 and/or T2 and/or T3 +FILTER

SPD type

- SPD Type 1 and 2 T1 T2
- SPD Type 2 T2
- SPD Type 3 T3
- SPD with additional filter

SELECTION OF SPDs ACCORDING TO THE EXPECTED IMPACT IN ACCORDANCE WITH IEC AND EN 62305-2

Lightning flash to the structure - direct flash (source of damage S1):

The lightning current flowing to earth is subdivided directly and via SPDs between the earthing system and all metal structures entering, including any electric services. A representative current waveform is a unipolar 10/350 µs impulse (I_{imp}). In the event of a direct lightning flash to a structure there will also be induced currents represented by an 8/20 µs impulse (I_n). Required SPDs are **T1** and **T2**.

Lightning flash near the structure - indirect flash (Source of damage S2):

The impulses caused by induction effects from magnetic fields generated by the lighting current are represented by an 8/20 µs impulse (I_n).
Required SPDs are **T2** and/or **T3**.

Lightning flash to a service - direct flash (Source of damage S3):

The lightning current is subdivided to both directions of the service and insulation breakdown needs to be considered. A representative current waveform is a unipolar 10/350 µs impulse (I_{imp}). Required SPDs are **T1** and **T2**.

Lightning flash close to a service - indirect flash (Source of damage S4):

The impulses caused by induction effects from magnetic fields generated by the lightning current are represented by an 8/20 µs impulse (I_n).
Required SPDs are **T2** and/or **T3**.

SELECTION OF SPDs ACCORDING TO THE EXPECTED IMPACT IN ACCORDANCE WITH HD 60364-4-443

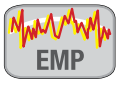
Lightning flash to a service - direct flash (Source of damage S3):

The lightning current is subdivided to both directions of the service and insulation breakdown needs to be considered. A representative current waveform is a unipolar 10/350 µs impulse (I_{imp}). Required SPDs are **T1** and **T2**.

Lightning flash close to a service - indirect flash (Source of damage S4):

The impulses caused by induction effects from magnetic fields generated by the lightning current are represented by an 8/20 µs impulse (I_n).
Required SPDs are **T2** and/or **T3**.

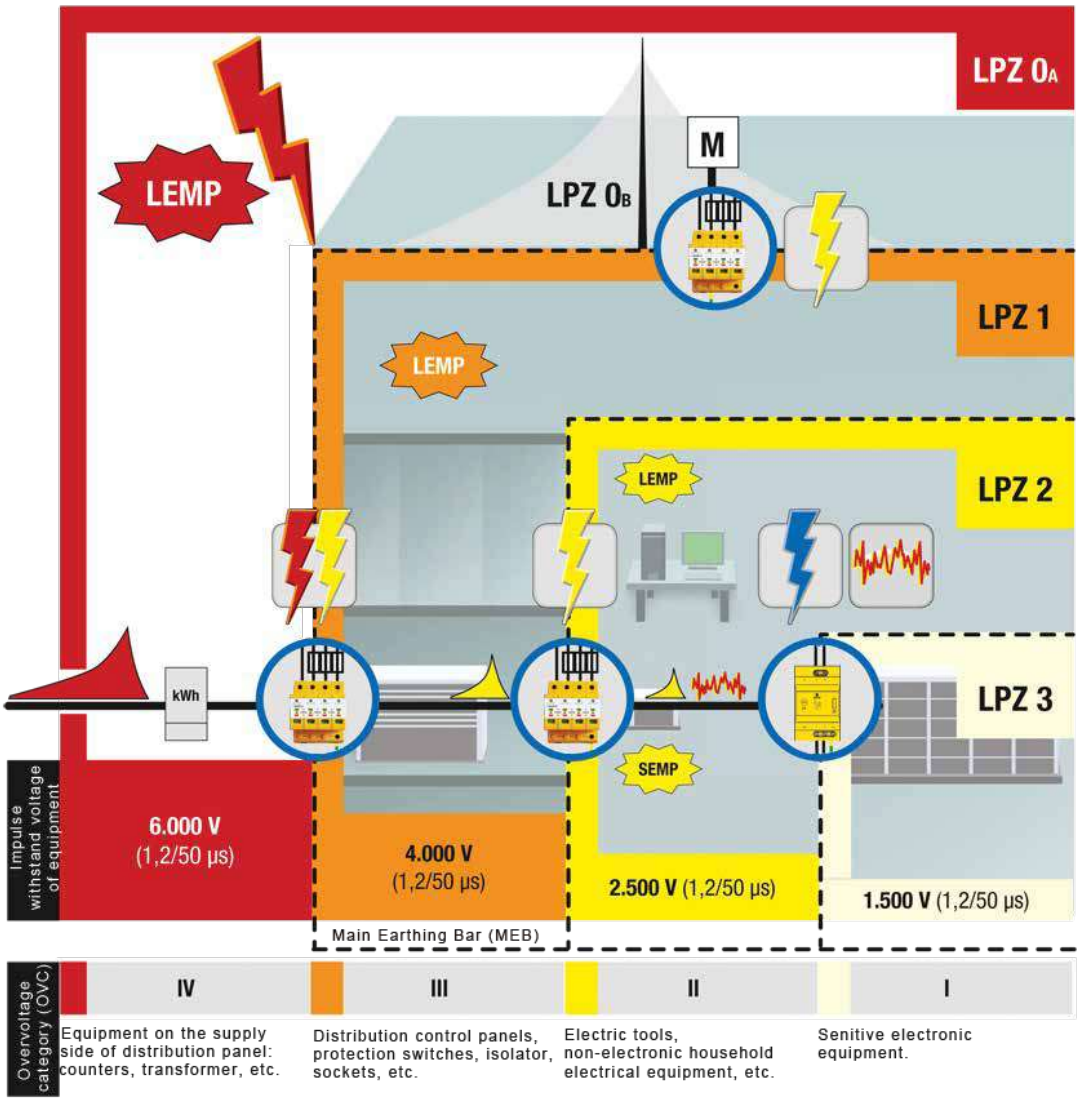
Electromagnetic interferences conducted by the service:



Conducted electromagnetic interferences may appear in common mode (all active conductors versus earth) or in differential mode (between active conductors) and are mostly in the range of 150 kHz to 30 MHz.
Such interferences can cause damage to equipment and service outage.
It is recommended to apply SPDs with interference filter. The required discharge capability is determined depending on the source of damage to be expected (S2 and S4) and the filter characteristic and mitigation level is determined by the expected interference level.

SELECTION OF SPDs ACCORDING TO THE LIGHTNING PROTECTION ZONE (LPZ) CONCEPT

SPDs shall be selected and installed in accordance with the requirements of the HD 60364-4-443 and the IEC and EN 62305 series of standards respectively, and the HD 60364-5-534. The primary SPDs shall be located as close as possible to the origin of the installation. In many cases this will be the Main Distribution Board (MDB). Further SPDs will most likely be located in Sub Distribution Boards (SDBs).
Following the philosophy of the lightning protection zone concept right from the planning phase of an installation, it is first necessary to define and separate into areas (so called zones) within a structure, which require a certain level of protection, depending on the resistivity and immunity of the equipment installed and used there. The higher the protection requirements are, the higher is the corresponding Zone number.
Based on that the progressive attenuation of transients and electromagnetic inteferences is achieved through the installation of coordinated SPDs at the boundaries of the zones defined.
The objective is to reach a fully compatible system, where all electric and electronic equipment is sufficiently protected not to face any transients or interference it is not able to withstand. By doing this service continuity and the integrity of equipment should be guaranteed.



Classification of LPZs:
LPZ O_A Zone where the threat is due to the direct lightning flash and the full lightning electromagnetic field. The internal system may be subjected to full or partial lightning surge current;
LPZ O_B Zone protected against direct lightning flashes but where the threat is the full lightning electromagnetic field. The internal system may be subjected to partial lightning surge current;
LPZ 1 Zone where the surge current is limited by current sharing and by isolating interfaces and/or SPDs at the boundary. Spatial shielding may attenuate the lightning electromagnetic field;
LPZ 2, ..., n Zone where the surge current may be further limited by current sharing and by isolating interfaces and/or additional SPDs at the boundary. Additional spatial shielding may be used to further attenuate the lightning electromagnetic field.

LIGHTNING PROTECTION LEVELS (LPLs) AND SPD DISCHARGE CAPABILITY

The Standard series EN 62305 classifies a set of four Lightning Protection Levels with decreasing efficiency. The table below briefly outlines the details and threat parameters for these levels.

Lightning protection level LPL	Total efficiency	Capture efficiency	Dimensioning efficiency	Values of protection parameters chosen for LPS dimensioning					
				I_{max} (kA)	I_{min} (kA)	$\Delta i/\Delta t$ (kA/µs)	Q_{tot} (C)	Q_{imp} (C)	E_{sp} (kJ/Ω)
I	98%	99%	**99%**	**200**	3	200	300	100	10.000
II	95%	97%	**98%**	**150**	5	150	225	75	5.600
III	90%	95%	**95%**	**100**	7	100	150	50	2.500
IV	80%	85%	**95%**	**100**	16	100	150	50	2.500

• Discharge capability requirements according to IEC and EN 62305

In order to choose the correct value for the SPD discharge capability, it is necessary to determine the expected impulse current at the SPDs point of installation. This value depends on the strike point of the lightning flash and on the current sharing and distribution within the structure and the electric system and wiring.

The EN 62305 series of standards provides the information necessary to calculate these parameters for source of damage S1. For sources of damage S2, S3 and S4, the standard provides the values to be applied. The standard also provides appropriate information for telecommunication systems, because discharge parameters are an important factor there as well.

According to EN 62305-2 (Risk Analysis) the SPDs discharge capability is quite important and provides an indication for the overall protection level of the SPD system installed (see table beside).

In some cases, the standard recommends the choice of SPDs with very high capabilities in order to reduce the risk of explosion (increase of I_{imp}, I_n capabilities corresponding to LPL I requirements).

Choosing SPDs with a high discharge capability (I_{imp}) is important, but it should be considered that other SPD parameters, like the protection level (U_p), must be superior too then.

LPL + SPD Rating	P_{SPD} 1)
none / no coordinated SPD	1
III-IV + SPD with I_n/I_{imp}	0,05
II + SPD with I_n/I_{imp}	0,02
I + SPD with I_n/I_{imp}	0,01
I + SPD with 1,5 x I_n/I_{imp}	0,005
I + SPD with 2 x I_n/I_{imp}	0,002
I + SPD with 3 x I_n/I_{imp}	0,001

1) probability that an overvoltage damages an apparatus protected by an SPD system, expressed in %

• Discharge capability requirements according to HD 60364-5-534

The standard HD 60364-5-534 provides some minimum requirements regarding the discharge capability of SPDs in case of indirect lightning, but also in case of direct lightning when there is not sufficient data available to calculate the parameters based on IEC and EN 62305-2. Depending on the mode of protection, these minimum requirements are:

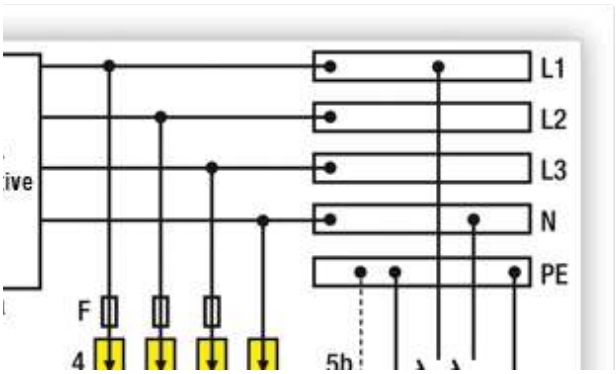
- For indirect lightning a nominal discharge current $I_n \geq 5$ kA 8/20 µs, and, when connection type CT2 is applied (3+1 or 1+1 connection), a nominal discharge current $I_n \geq 20$ kA 8/20 µs for the SPD mode connected N to PE in three-phase systems, and 10 kA 8/20 µs in single-phase systems. Nevertheless we recommend to use SPDs with a nominal discharge current of at least 10 kA 8/20 µs.

- For direct lightning an impulse current $I_{imp} \geq 12,5$ kA 10/350 µs for LPL III and IV, and, when connection type CT2 is applied (3+1 or 1+1 connection), an impulse current $I_{imp} \geq 50$ kA 10/350 µs for the SPD mode connected N to PE in three-phase systems, and 25 kA 10/350 µs in single-phase systems.

INSTALLATION OF SPDs IN TN-, TT-, AND IT-SYSTEMS ACCORDING TO HD 60364-5-534

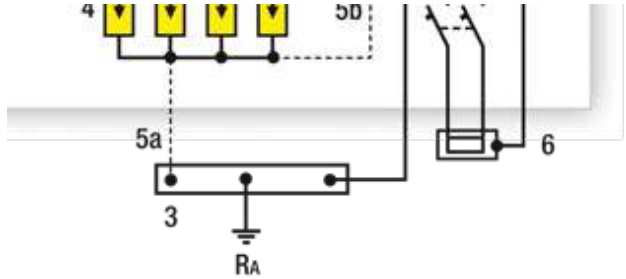
The installation of SPDs in a specific power distribution system must be coordinated with the protective measures against indirect contact (fault protection) and with the corresponding protective devices and their capability to withstand impulse currents.
This coordination depends on the type and earthing arrangement of the power system, as there are TN-, TT- and IT-systems according to HD 60364-1 and the corresponding protective devices may be:

- overcurrent protective devices;
- residual current protective devices;
- insulation monitoring devices.



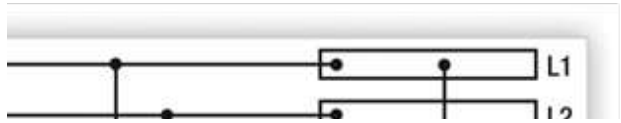
Installation of SPDs in a TN-C-system

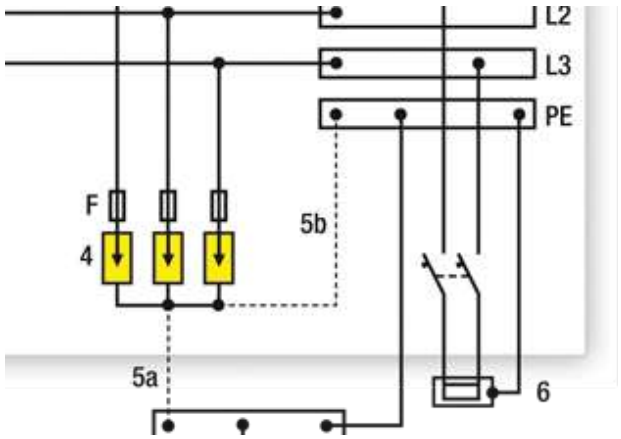
Connection type CT1 (3+0 connection)



Installation of SPDs in a TN-S-system

Connection type CT1 (4+0 connection)

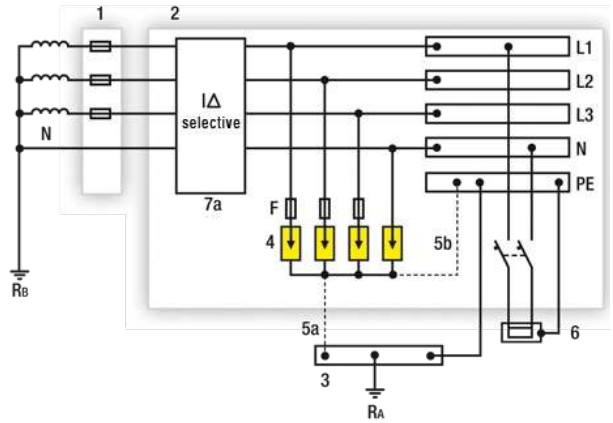




Installation of SPDs in a TT-system upstream the main residual current device

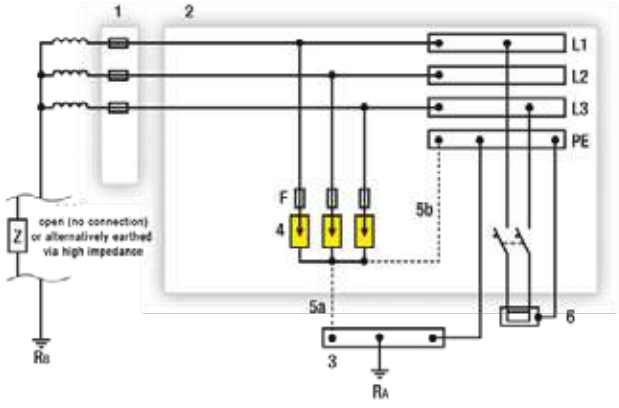
Connection type CT2 (3+1 connection)

1: OCPD 1 OverCurrent Protective Device at the origin of the installation (e.g. in the main distribution board)
2: Main Distribution Board (MDB)
3: Main Earthing Terminal
4: Surge Protective Device(s) (SPDs)
4a: Surge Protective Device connected N to PE (N-PE SPD) when connection type CT2 (3+1 connection) is applied
5a/5b: Alternative connections to PE (preferably the shortest route, or even both connections as required in some countries)
6: Equipment to be protected
7: Residual Current Device (RCD) (in most cases this will be a RCCB or a RCBO)
7a: Selective Residual Current Device (e.g. type S RCD)
F: OCPD 2 OverCurrent Protective Device required by the SPD manufacturer
RA: Earthing resistance of the (consumers) installation
RB: Earthing resistance of the power supply system



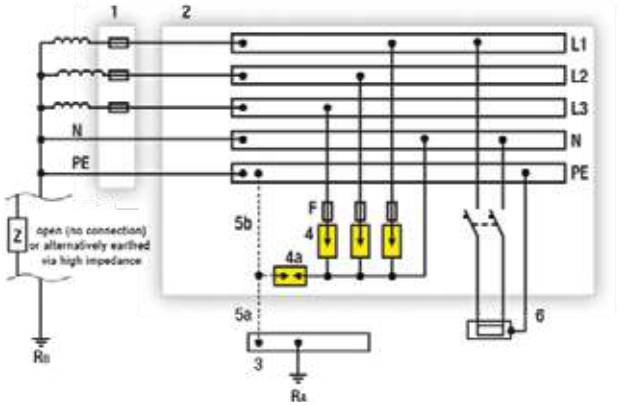
Installation of SPDs in a TT-system downstream the main residual current device

Connection type CT1 (4+0 connection)



Installation of SPDs in an IT-system without distributed neutral

Connection type CT1 (3+0 connection)



Installation of SPDs in an IT-system with distributed neutral

Connection type CT2 (3+1 connection)

ICONS FOR A QUICK SPD SELECTION


Protection against direct and indirect lightning effects (combined Type 1 and 2)


Protection against indirect lightning effects (Type 2)


Protection against induced overvoltages (Type 3)


Protection against electro-magnetic interferences on the line including transient surge suppression

ZOTUP SPD TAXONOMY

L - ZOTUPLIMITER

Varistor based SPDs:

- **NFC No Follow Current®**
- very short response time (t_a): ≤ 25 ns;
- very good voltage protection level even at certain impulse overcurrent;
- high impulse current rating: (I_{imp}) up to 25 kA/pole, 10/350 µs; (I_{max}) up to 100 kA/pole 8/20 µs.

The wide range of **limiting SPDs** with **NFC No Follow Current®** technology allows optimum protection in most applications, also in large installations, where SPDs often operate independent from each other, and where reliable protection and high performance are required.

IL - ZOTUPCOMB

Combined Voltage Limiting and Switching SPD with varistor and GDT connected in series:

- **NFC No Follow Current®** as a result of the combination;
- short response time (t_a): ≤ 100 ns;
- good voltage protection level;
- no leakage currents.

Combined SPDs make use of GDT and varistor elements, with voltage switching and with voltage limiting function. In our production range, these SPDs have been optimized for those applications where no really high discharge capability is required, as for example residential applications.

IA - I - G - ZOTUPGAP

- **Type IA - Voltage Switching Spark gap based SPDs with trigger technology:**
  - high impulse current rating: (I_{imp}) 25 kA/pole 10/350 µs; 100 kA/4 poles 10/350 µs);
  - short response time (t_a): ≤ 100 ns;
  - good voltage protection level;
  - no leakage currents.

SPDs with spark gap and trigger technology are intended for primary protection applications where the prospective short circuit current of the power distribution system at the installation point of the SPDs is lower than or equal to I_{fi} and for installations where coordinated SPDs with very short response time are provided for secondary protection. A typical application is e.g. in a TT system of a medium plant size comprising a main distribution board feeding first and second level subdistribution boards.

- **Type I - Voltage Switching GDT based SPDs:**
  - the typical application for this device is in the N-PE mode of protection in TT distribution systems (1+1 or 3 + 1 construction, connection type CT 2 according to HD 60364-5-534);
  - high impulse current rating (I_{imp}) and (I_{max}) up to 100 kA, 10/350 µs.

- **Type G - Isolating Spark Gap ISG SPDs:**

These devices are used to indirectly connect an LPS to nearby metal structures which cannot be directly connect for functional reasons.

- Monolithic explosion proof protection;
- Good protection level;
- High insulation resistance;
- High discharge capability (I_{imp}).

ILF - ZOTUPFILTER

Combined Voltage Limiting and Switching SPD plus Filter with varistor and GDT comprising an additional filter:

- effective noise level attenuation by use of additional high frequency bandpass filters;
- high level interference protection for sensitive equipment with limited resistivity and immunity characteristics;
- high discharge capabilty (combination wave test at U_{oc} 10 kV 1,2/50 µs, I_{cw} 5 kA 8/20 µs).

Combined SPDs with additional filter are used where high continuity of service is required like data centers, DCS (distributed control systems), etc.. These SPDs do not only protect against transients due to lightning, but also against high frequency conducted interferences. They are applied where Electromagnetic Compatibility (EMC) is an issue and requires improvement of the system immunity.

ZOTUPBOX

Protection boxes with an IP65 enclosure which provide a compact and preinstalled solution for applications in Power Centers.

ZOTUPACCESSORIES

CPs are fork-type busbars with 2 up to 8 connection points. Typical application: to provide a common PE connection for several SPDs.

LLP - ZOTUPLED

SPD LED Lighting Protection Systems
A ready to install assembly of a voltage limiting and a voltage switching SPD providing two modes of protection.

S - ZOTUPSIGNAL

SPDs for Signalling, telecommunication and data transmission.
These SPDs are connected in series with low resistivity electronic equipments, like analog interfaces and data networks.

C - ZOTUPCOAX

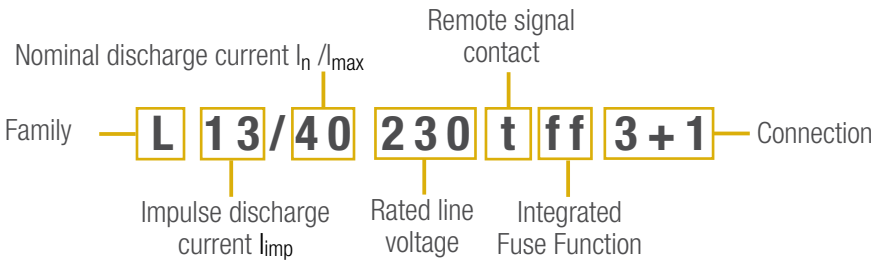
Specific SPDs with coaxial connectors for protecting TV switchboards, satellite antenna or wideband transmission equipment and remote systems.
Particularly suitable for applications with long coaxial cables which are exposed to electromagnetic interference.

ZU - ZOTUPHV

Surge Arresters for high voltage systems (HV) with typical applications: protection of transformers, switchgears and transmission lines in HV systems.

- Surge Arresters with silicone rubber housing providing big internal and external creepage distances suitable for all applications with high level of pollution.
- Surge Arresters available with disconnector device, which is activated by and increase in internal preassure with a reliable operating mechanism and stable characteristic even over long time.
- Additional lightning strike counters and lightning strike counters with measurement for indication of the total leakage current (internal and external dispersion) are also available.
- Surge Arresters with a higher thermal energy rating than 4,5 kJ/kV are available upon request.

Ordering code Example for Low Voltage SPDs:



ZOTUP SPDs FOR LOW VOLTAGE SYSTEMS

SPDs FOR LOW VOLTAGE ALTERNATING CURRENT (AC) APPLICATIONS

- L ... – ZOTUPLIMITER
- IA ... – ZOTUPGAP (SPARK GAPS WITH TRIGGER TECHNOLOGY)
- I ... – ZOTUPGAP (SPARK GAPS N-PE)
- IL ... – ZOTUPCOMB
- PB ... – ZOTUPBOX
- CP ... – ZOTUPACCESSORIES

SPDs FOR ALTERNATING CURRENT (AC) WITH ADDITIONAL FILTER

- ILF ... – ZOTUPFILTER

SPDs FOR DIRECT CURRENT (DC) AND PHOTOVOLTAIC APPLICATIONS

- L 7/30 DC … ff – ZOTUPLIMITER
- L 13/60 PVY … ff – ZOTUPLIMITER
- L 3/40 PVY … ff – ZOTUPLIMITER

SPDs FOR LED LIGHTING

- LLP ... – ZOTUPLED
- IL 1/10 2P LED – ZOTUPCOMB

ZOTUP SPDs FOR SIGNALLING, TELECOMMUNICATION AND DATA TRANSMISSION

SPDs FOR SIGNALLING AND TELECOMMUNICATION NETWORKS

- S (S-ASI L/R; S-AS2; S-N) – ZOTUPSIGNAL
- C ... – ZOTUPCOAX

SPDs FOR DATA TRANSMISSION

- S (S-ASI B/G; S-F; S ADSL) – ZOTUPSIGNAL

ZOTUP ISOLATING SPARK GAPS

ISOLATING SPARK GAPS

- G ... – ZOTUPGAP

ZOTUP SURGE ARRESTERS FOR HIGH VOLTAGE SYSTEMS (HV)

SURGE ARRESTERS FOR HIGH VOLTAGE SYSTEMS

- ZU ... – ZOTUPHV

THE WEBAPP

Choosing the right SPD is essential as well as demanding: there are many parameters to take into account. On the occasion of the latest publication of the new standard **HD 60364-5-534**, ZOTUP presents the new WEBAPP, a new digital tool totally free of charge and designed to help the user choosing the right SPD.

HOW TO INSTALL IT

Totally free of charge, by clicking this link: **webapp.zotup.it.**
It is required to register only when accessing the first time.

HOW IT WORKS

Easy multiple-choice questions will guide the user to select the right SPD.

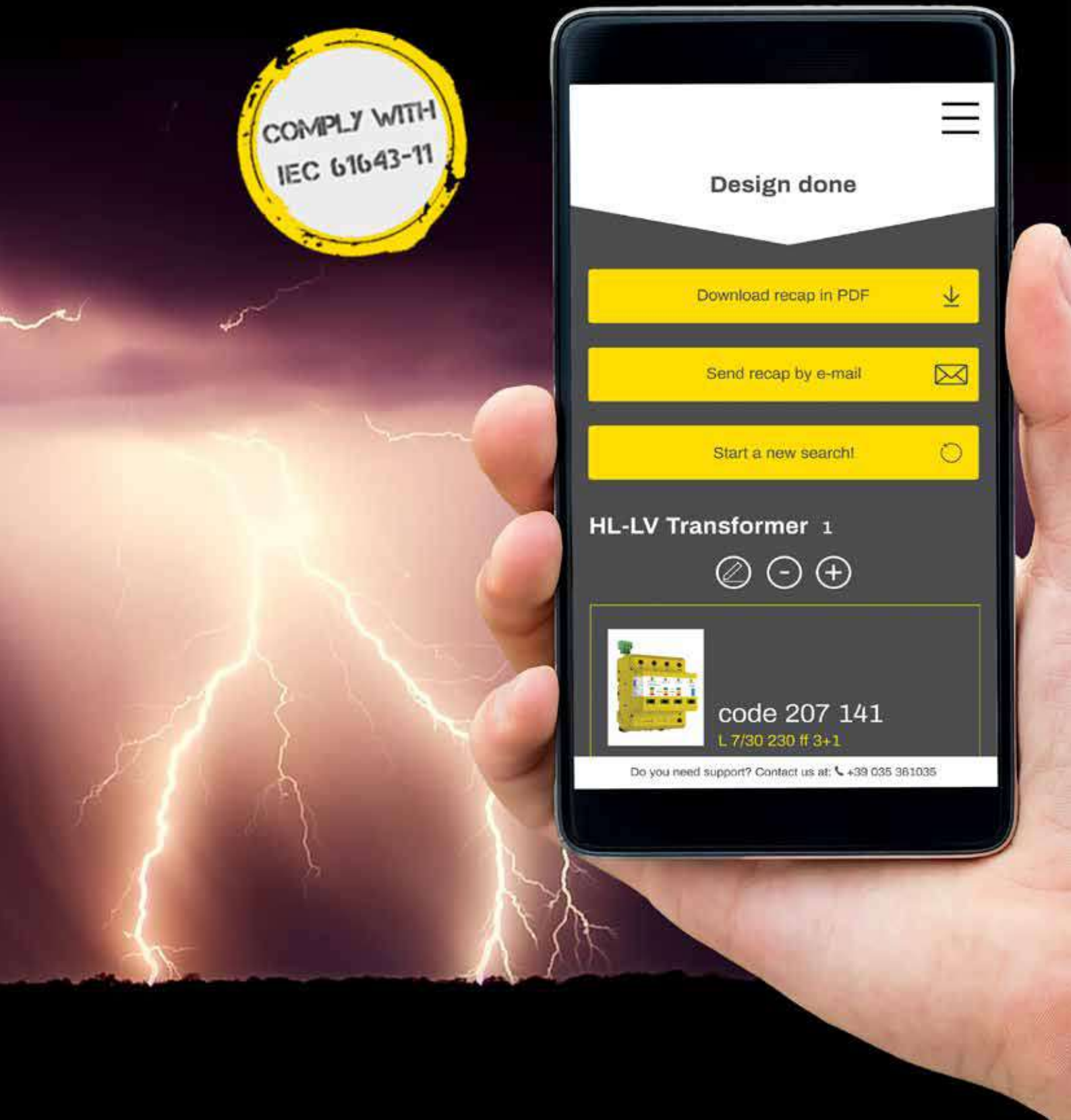
RESULTS

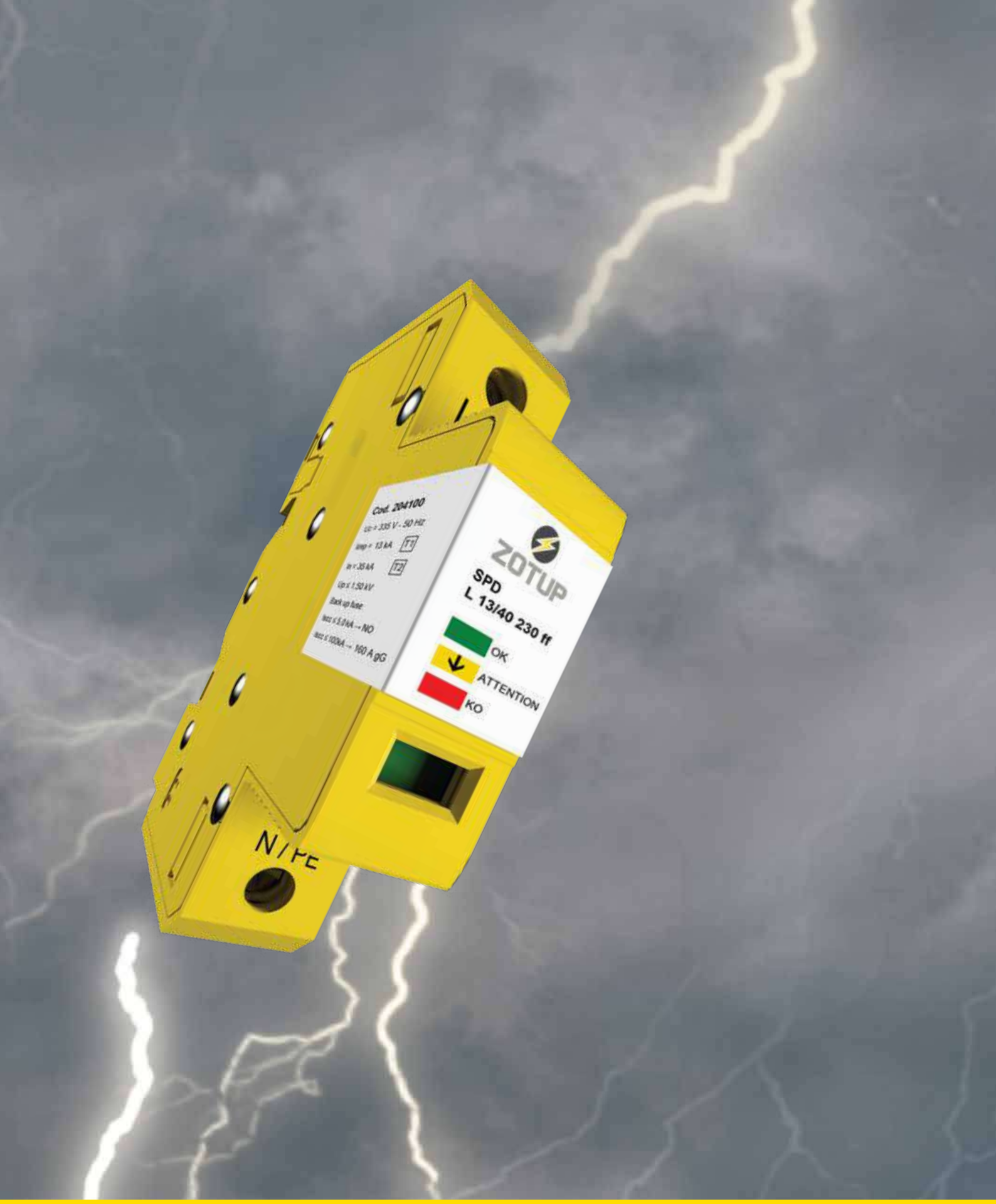
The most suitable SPD for the protection needs will be identified together with all the technical info. Moreover, there is also the possibility of saving search results and/or downloading them.

ONGOING SUPPORT

The ZOTUP team is available for an ongoing support when using the app and for choosing the right SPD.

Design your plant for free with ZOTUP WEBAPP.
Install it on your smartphone or on your pc desktop.



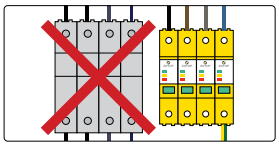


THE INNOVATIVE FEATURES OF OUR NEW PRODUCTS

MAIN FEATURES

ZOTUP brings to the market a new technology after 4,5 years of intensive research and development activities. These new products are supported by more than 330 laboratory tests and the technology behind is protected by four international patents. Herewith **ZOTUP** is standing for new state of the art surge protection for low voltage power systems. **ZOTUP** products represent an outstanding innovation on the market of surge protection with regard to performance, safety, easiness of installation and reliability. All these quality attributes are now available in a single product.

The unique technical features putting our products to the top are:



- **Integrated Fuse Function (ff)**

in case the SPD reaches its end of life in a short circuit state.
According to the product standard EN 61643-11 SPDs are classified according to their behavior when reaching end of life.
There are two types of failure modes:

- OCFM (Open Circuit Failure Mode);
- SCFM (Short Circuit Failure Mode).

An SPD with OCFM must disconnect from the power supply when reaching end of life. The disconnection operation can be performed by an internal or an external disconnector, or by a combination of these two.

The standard differentiates between two distinct processes:

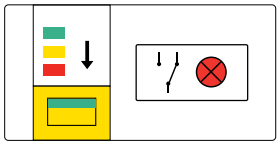
a) **a "slow" process** that depends on the degradation of voltage limiting components, e.g. in MOV-based SPDs, leading to thermal runaway. In such case the disconnection is generally ensured by an internal thermal operated disconnector.

b) **a "quick" or even "instant" process** that depends on the overcurrent caused by a very low remaining impedance of the SPD, which causes a short circuit on the supply. The interruption of such short-circuit current is managed by an internal or external disconnector with appropriate breaking capability, preferrably a fuse. The innovative feature from **ZOTUP** is a patented combined internal disconnector, which is able to disconnect in both of the above mentioned cases, the "slow" and the "quick" or "instant" process. This means that the disconnector used in **ZOTUP** products provides an Integrated Fuse Function (ff). Therefore, as long as certain short circuit current values are not exceeded, our products do not require any additional external disconnector.

Advantages:

- Maintaining the full discharge capability of the SPD. An external fuse or disconnector may influence/limit this capability;
- The overall voltage drop across the SPD branch circuit and therefore the effective voltage protection level for the installation and equipment is kept to a minimum, as there are no additional devices and the wiring can be kept very short;
- No additional costs for external disconnectors, less time for cabling and a smaller ecologic footprint.

If the short circuit current at the point of installation exceeds the breaking capability of that internal disconnector an additional external fuse is required. In such case the fuse is intrinsically selective with the internal disconnector, safeguarding the integrity of the SPD in case of a very low impedance or even short circuit state.

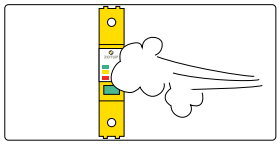


• Progressive performance indication

The new design of ZOTUP makes regular checks of the SPDs status and system verification very easy. Periodic verification is generally required by regulations on national level. The new **ZOTUP** SPD range displays its performance status by a change of color in the Status Indicator window. The transition from the initial green color (full performance) to the totally yellow (minimum performance) is **progressive/analog**. The colour in the window indicates the actual remaining performance of the SPD, thus providing comprehensive information rather than a simple good versus out of order message for attention.
After that a red indication follows, showing the SPD has reached its end of life.

Advantages:

- **Progressive indication** of the reduction in performance of the SPD allows preventive maintenance and optimization of replacement decisions;
- **Remote indication** for SPDs incorporating a changeover contact is activated when the performance reaches its minimum state (totally yellow). Therefore the remote alarm is preventive, because the SPD is still operational and still able to protect at minimum performance level.



• For applications with high pollution (PD 3) and for extended temperature range (-40°/+80°C)

The increasing application of SPDs under "heavy" environmental conditions (such as traffic light controls, cellular radio and mobile phone stations, outdoor public lighting and street lighting systems) has highlighted the need for more stringent requirements on resistivity to pollution.

Installation of SPDs in costal areas with a high rate of salinity and/or in locations with increased condensation effects due to rapid changes in temperature, e.g. in photovoltaic (PV) installations and power plants or in Wind Turbines, has shown that increased distances are necessary to sufficiently prevent from electric tracking on insulating materials on a long term view.

ZOTUP deals with the issue of pollution and uses firm materials and applies adequate design features to achieve Pollution Degree 3 for all internal and external creepage distances and clearances.
Keeping an emphasis on environmental aspects our products are designed and classified for the highest level of temperature range, which goes even beyond the so called extended range in the product standard.

Advantages:

- Improved reliability when installed in "heavy" environments;
- Enabling applications that cannot be covered with a lower pollution degree or normal temperature range.

ZOTUP SPDs FOR LOW VOLTAGE SYSTEMS

SPDs FOR LOW VOLTAGE ALTERNATING CURRENT (AC) APPLICATIONS

SPDs FOR LOW VOLTAGE ALTERNATING CURRENT (AC) APPLICATIONS

SPD	Model	Application icon	Test class/ Type	Modes of protection	Impulse discharge current I_{imp}	Nominal discharge current I_n	Page
	L 25/100 230 t ff		I and II / T1 and T2	1	25 kA	60 kA	36
	L 25/100 230 t ff 2		I and II / T1 and T2	2	25 kA	60 kA	37
	L 25/100 230 t ff 3		I and II / T1 and T2	3	25 kA	60 kA	38
	L 25/100 230 t ff 4		I and II / T1 and T2	4	25 kA	60 kA	39
	L 25/100 230 t ff 1+1		I and II / T1 and T2	2	25 kA	60 kA	40
	L 25/100 230 t ff 3+1		I and II / T1 and T2	4	25 kA	60 kA	41
	IA 25 230		I and II / T1 and T2	1	25 kA	25 kA	42
	IA 25 230 2		I and II / T1 and T2	2	25 kA	25 kA	43
	IA 25 230 4		I and II / T1 and T2	4	25 kA	25 kA	44
	IA 25 230 1+1		I and II / T1 and T2	2	25 kA	25 kA	45
	IA 25 230 3+1		I and II / T1 and T2	4	25 kA	25 kA	46
	I 100 N-PE		I and II / T1 and T2	1	100 kA	100 kA	47
	L 13/40 230 ff		I and II / T1 and T2	1	13 kA	35 kA	48
	L 13/40 230 ff 2		I and II / T1 and T2	2	13 kA	35 kA	49
	L 13/40 230 ff 3		I and II / T1 and T2	3	13 kA	35 kA	50
	L 13/40 230 ff 4		I and II / T1 and T2	4	13 kA	35 kA	51
	L 13/40 230 ff 1+1		I and II / T1 and T2	2	13 kA	35 kA	52
	L 13/40 230 ff 3+1		I and II / T1 and T2	4	13 kA	35 kA	53
	I 52 N-PE		I and II / T1 and T2	1	52 kA	52 kA	54

SPD	Model	Application icon	Test class/ Type	Modes of protection	Impulse discharge current I_{imp}	Nominal discharge current I_n	Page
	Prot. Box TN 40 ff		I and II / T1 and T2	4	10 kA	40 kA	55
	Prot. Box TT 40 ff			4			
	L 7/30 230 ff		I and II / T1 and T2	1	8 kA	30 kA	56
	L 7/30 400 ff		I and II / T1 and T2	1	7 kA	30 kA	56
	L 7/30 1000 ff		I and II / T1 and T2	1	2 kA	20 kA	56
	L 7/30 230 ff 2		I and II / T1 and T2	2	8 kA	30 kA	57
	L 7/30 230 ff 3		I and II / T1 and T2	3	8 kA	30 kA	58
	L 7/30 230 ff 4		I and II / T1 and T2	4	8 kA	30 kA	59
	L 7/30 230 ff 1+1		I and II / T1 and T2	2	8 kA	30 kA	60
	L 7/30 230 ff 3+1		I and II / T1 and T2	4	8 kA	30 kA	61
	L 3/30 60 ff		II /T2	1	-	20 kA	62
	L 3/30 120 ff		II /T2	1	-	20 kA	62
	L 3/30 230 ff		II /T2	1	-	30 kA	62
	L 3/30 400 ff		II /T2	1	-	30 kA	62
	L 3/30 230 ff 2		II /T2	2	-	30 kA	63
	L 3/30 230 ff 3		II /T2	3	-	30 kA	64
	L 3/30 230 ff 4		II /T2	4	-	30 kA	65
	L 3/30 230 ff 1+1		II /T2	2	-	30 kA	66
	L 3/30 230 ff 3+1		II /T2	4	-	30 kA	67
	L 2/10 230 ff		II /T2	1	-	10 kA	68

SPD	Model	Application icon	Test class/ Type	Modes of protection	Impulse discharge current I_{imp}	Nominal discharge current I_n	Page
	L 2/10 230 ff 2		II /T2	2	-	10 kA	69
	L 2/10 230 ff 4		II /T2	4	-	10 kA	70
	L 2/10 230 ff 1+1		II /T2	2	-	10 kA	71
	L 2/10 230 ff 3+1		II /T2	4	-	10 kA	72
	L 2/10 230 ff 2 TT		II /T2	2	-	10 kA	73
	L 2/10 230 ff 4 TT		II /T2	4	-	10 kA	74
	I 12 N-PE		I and II / T1 and T2	1	12,5 kA	40 kA	75

FOR BASIC AC APPLICATIONS

SPD	Model	Application icon	Test class/ Type	Modes of protection	Impulse discharge current I_{imp}	Nominal discharge current I_n	Page
	IL 1/10 2P		II / T2	3	-	10 kA	76
	L 2/20 230 e		II / T2	1	-	20 kA	77
	L 2/20 230 1+1		II / T2	2	-	20 kA	78
	L 2/20 230 3+1		II / T2	4	-	20 kA	79
	IL 1/3 2P		III / T3	3	-	3 kA	80
	IL 1/10 2P M		II / T2	3	-	10 kA	80

FOR WIND TURBINE APPLICATIONS IN AC

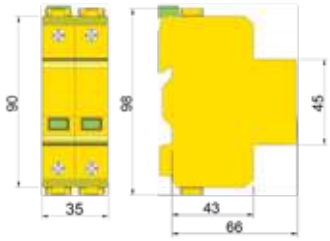
SPD	Model	Application icon	Test class/ Type	Modes of protection	Impulse discharge current I_{imp}	Nominal discharge current I_n	Page
	L 7/30 600 ff		I and II / T1 and T2	1	5 kA	25 kA	56
	L 7/30 750 ff		I and II / T1 and T2	1	5 kA	20 kA	56
	L 7/30 750 ff 3		I and II / T1 and T2	3	5 kA	20 kA	58

ACCESSORIES

Item	Model	Application icon	Test class/ Type	Modes of protection	Impulse discharge current I_{imp}	Nominal discharge current I_n	Page
	CP 1	-	-	-	-	-	81
	CP 2	-	-	-	-	-	81
	CP 3	-	-	-	-	-	81
	CP 4	-	-	-	-	-	81
	CP 5	-	-	-	-	-	81
	CP 6	-	-	-	-	-	81
	CP 7	-	-	-	-	-	81
	CP 8	-	-	-	-	-	81

TN

TT



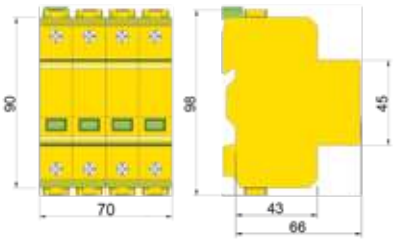
L 25/100 230 t ff

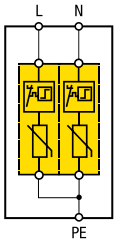
L 25/100 230 t ff is a voltage limiting SPD providing a single mode of protection, typically installed at the origin of the installation, e.g. in the Main Distribution Board (MDB), in TN-systems or in TT-systems in combination with N-PE SPD model I 100, I 52 and with connection type CT2 (3+1 or 1+1). It provides the following features and benefits:

- **Impulse test classification: Test class I and II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 1 and 2** according to **EN 61643-11 (2012-10)**;
- L 25/100 230 t ff is a voltage limiting SPD for the protection of low voltage installations and equipment against direct and indirect lightning effects;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms;**
- The impulse current is divided into two independent branch circuits, each branch providing its own disconnector and Status Indicator;
- **Three colour Status Indicator with progressive indication of remaining performance.**

Model L 25/100 ... with remote signal contact			230 t ff
CODE			**215 100**
Nominal ac system voltage		U_N	230/400 V ac
Modes of protection (number of poles)			1
Max Continuous Operating Voltage		U_c	335 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)			I and II
Type according to EN 61643-11 (2012-10)			T1 and T2
Impulse discharge current (10/350 µs)		I_{imp}	25 kA
Charge		Q	12,5 As
Nominal discharge current (8/20 µs)		I_n	60 kA
Max. discharge current (8/20 µs)		I_{max}	100 kA
Voltage protection level at a discharge current of:	1 kA	U_p	≤ 0,70 kV
	5 kA	U_p	≤ 0,82 kV
	13 kA	U_p	≤ 0,95 kV
	25 kA	U_p	≤ 1,05 kV
	60 kA	U_p	≤ 1,40 kV
Response time		t_a	≤ 25 ns
End of Life			OCFM (Open Circuit Failure Mode)
Behaviour in case of Temporary Overvoltage (TOV)		U_T	440 V / 120 min, withstand (W)
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	5 kA rms
Short Circuit Current rating with max. backup protection fuse		I_{sccr}	50 kA rms
Max. back-up protection with up-stream CB with a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability).			160 A (max. 4,50 x 10^5 A^2s)
Max. back-up protection with FUSE at prospective short circuit currents of			250 A gG (> 5 ÷ 50 kA rms) 160/125/100 A gG* (> 50 ÷ 100 kA rms)
Max. overcurrent protection for through-wiring (V-connection)			125 A gG
Rated Load Current (for V-connection)		I_L	125 A
Follow current interrupt rating		I_{fi}	NFC No Follow Current®
Status indicator (indication of disconnector operation)			3 colours with progressive performance indication
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%
Terminal - Conductor size (double clamps for V-connection)			4-35 mm^2 flexible / 4-50 mm^2 semi rigid
Busbar connections			fork-type busbar 16 mm^2
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715
Case material / Flammability grade			BMC / V-0 in accordance with UL 94
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)
Approximate weight			305 g
Dimensions: width			35 mm (2 modules)
Remote signal contact			potential-free changeover contact
Terminal - conductor size for remote signal contact			max. 1,5 mm^2 flexible
Switching capacity remote signal contact			ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR
GTIN (EAN)			8054890321365

* with fuse 160 A gG I_{imp}=13 kA and I_{max}= 70 kA; with fuse 125 A gG I_{imp}= 10 kA and I_{max}= 40 kA; with fuse 100 A gG I_{imp}=9 kA and I_{max}= 30 kA





L 25/100 230 t ff 2

L 25/100 230 t ff 2 is a ready to install assembly of two voltage limiting SPDs providing two modes of protection, typically installed at the origin of the installation, e.g. in the Main Distribution Board (MDB), for single-phase 230 V TN-systems, with the following features and benefits:

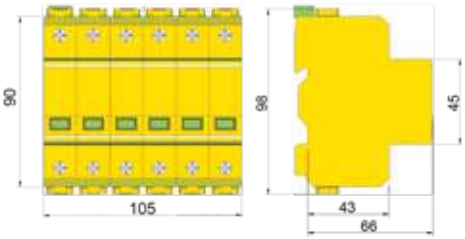
- **Impulse test classification: Test class I and II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 1 and 2** according to **EN 61643-11 (2012-10)**;
- L 25/100 230 t ff 2 is a voltage limiting SPD for the protection of low voltage installations and equipment against direct and indirect lightning effects;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms;**
- The impulse current is divided into two independent branch circuits, each branch providing its own disconnector and Status Indicator;
- **Three colour Status Indicator with progressive indication of remaining performance.**

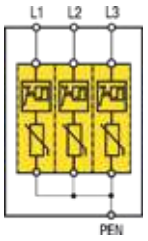
TECHNICAL DATA

Model L 25/100 ... with remote signal contact			230 t ff 2
CODE			**215 120**
Nominal ac system voltage		U_N	230 V ac
Modes of protection (number of poles)			2
Max Continuous Operating Voltage		U_c	335 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)			I and II
Type according to EN 61643-11 (2012-10)			T1 and T2
Impulse discharge current (10/350 µs)		I_{imp}	25 kA
Charge		Q	12,5 As
Nominal discharge current (8/20 µs)		I_n	60 kA
Max. discharge current (8/20 µs)		I_{max}	100 kA
Voltage protection level (L/N-PE) at a discharge current of:	1 kA	U_p	≤ 0,75 kV
	5 kA	U_p	≤ 0,85 kV
	13 kA	U_p	≤ 1,10 kV
	25 kA	U_p	≤ 1,25 kV
	60 kA	U_p	≤ 1,70 kV
Response time		t_a	≤ 25 ns
End of Life			OCFM (Open Circuit Failure Mode)
Behaviour in case of Temporary OverVoltage (TOV):	L/N-PE	U_T	440 V / 120 min, withstand (W)
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	5 kA rms
Short Circuit Current rating with max. backup protection fuse		I_{sccr}	50 kA rms
Max. back-up protection with up-stream CB with a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability).			160 A (max. 4,50 x 10^5 A^2s)
Max. back-up protection with FUSE at prospective short circuit currents of			250 A gG (> 5 ÷ 50 kA rms) 160/125/100 A gG* (> 50 ÷ 100 kA rms)
Max. overcurrent protection for through-wiring (V-connection)			125 A gG
Rated Load Current (for V-connection)		I_L	125 A
Follow current interrupt rating		I_{fi}	NFC No Follow Current®
Status indicator (indication of disconnector operation)			3 colours with progressive performance indication
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%
Terminal - Conductor size (double clamps for V-connection)			4-35 mm^2 flexible / 4-50 mm^2 semi rigid
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715
Case material / Flammability grade			BMC / V-0 in accordance with UL 94
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)
Approximate weight			630 g
Dimensions: width			70 mm (4 modules)
Remote signal contact			potential-free changeover contact
Terminal - conductor size for remote signal contact			max. 1,5 mm^2 flexible
Switching capacity remote signal contact			ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR
GTIN (EAN)			8054890321372

* with fuse 160 A gG I_{imp}=13 kA and I_{max}= 70 kA; with fuse 125 A gG I_{imp}= 10 kA and I_{max}= 40 kA; with fuse 100 A gG I_{imp}=9 kA and I_{max}= 30 kA

TN





L 25/100 230 t ff 3

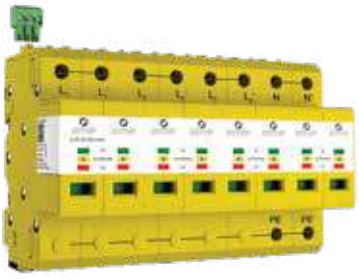
L 25/100 230 t ff 3 is a ready to install assembly of three voltage limiting SPDs providing three modes of protection, typically installed at the origin of the installation, e.g. in the Main Distribution Board (MDB), for three-phase 230/400 V TN-systems, with the following features and benefits:

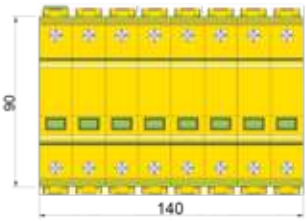
- **Impulse test classification: Test class I and II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 1 and 2** according to **EN 61643-11 (2012-10)**;
- L 25/100 230 t ff 3 is a voltage limiting SPD for the protection of low voltage installations and equipment against direct and indirect lightning effects;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms;**
- The impulse current is divided into two independent branch circuits, each branch providing its own disconnector and Status Indicator;
- **Three colour Status Indicator with progressive indication of remaining performance.**

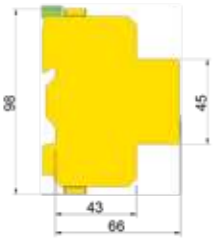
TECHNICAL DATA

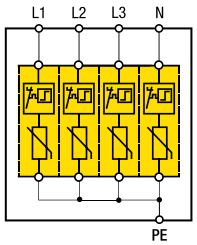
Model L 25/100 ... with remote signal contact			230 t ff 3
CODE			**215 130**
Nominal ac system voltage		U_N	230/400 V ac
Modes of protection (number of poles)			3
Max Continuous Operating Voltage		U_c	335 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)			I and II
Type according to EN 61643-11 (2012-10)			T1 and T2
Impulse discharge current (10/350 µs)		I_{imp}	25 kA
Charge		Q	12,5 As
Nominal discharge current (8/20 µs)		I_n	60 kA
Max. discharge current (8/20 µs)		I_{max}	100 kA
Voltage protection level (L-PEN) at a discharge current of:	1 kA	U_p	≤ 0,75 kV
	5 kA	U_p	≤ 0,85 kV
	13 kA	U_p	≤ 1,10 kV
	25 kA	U_p	≤ 1,25 kV
	60 kA	U_p	≤ 1,70 kV
Response time		t_a	≤ 25 ns
End of Life			OCFM (Open Circuit Failure Mode)
Behaviour in case of Temporary OverVoltage (TOV):	L-PEN	U_T	440 V / 120 min, withstand (W)
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	5 kA rms
Short Circuit Current rating with max. backup protection fuse		I_{sccr}	50 kA rms
Max. back-up protection with up-stream CB with a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability). Max. back-up protection with FUSE at prospective short circuit currents of			160 A (max. 4,50 x 10^5 A^2s) 250 A gG (> 5 ÷ 50 kA rms) 160/125/100 A gG* (> 50 ÷ 100 kA rms)
Max. overcurrent protection for through-wiring (V-connection)			125 A gG
Rated Load Current (for V-connection)		I_L	125 A
Follow current interrupt rating		I_{fi}	NFC No Follow Current®
Status indicator (indication of disconnector operation)			3 colours with progressive performance indication
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%
Terminal - Conductor size (double clamps for V-connection)			4-35 mm^2 flexible / 4-50 mm^2 semi rigid
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715
Case material / Flammability grade			BMC / V-0 in accordance with UL 94
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)
Approximate weight			915 g
Dimensions: width			105 mm (6 modules)
Remote signal contact			potential-free changeover contact
Terminal - conductor size for remote signal contact			max. 1,5 mm^2 flexible
Switching capacity remote signal contact			ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR
GTIN (EAN)			8054890321396

* with fuse 160 A gG I_{imp}=13 kA and I_{max}= 70 kA; with fuse 125 A gG I_{imp}= 10 kA and I_{max}= 40 kA; with fuse 100 A gG I_{imp}=9 kA and I_{max}= 30 kA









L 25/100 230 t ff 4

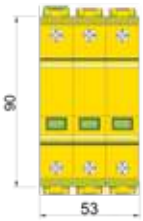
L 25/100 230 t ff 4 is a ready to install assembly of four voltage limiting SPDs providing four modes of protection, typically installed at the origin of the installation, e.g. in the Main Distribution Board (MDB), for three-phase plus neutral 230/400 V TN-systems, with the following features and benefits:

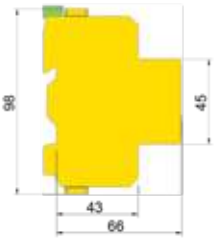
- **Impulse test classification: Test class I and II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 1 and 2** according to **EN 61643-11 (2012-10)**;
- L 25/100 230 t ff 4 s a voltage limiting SPD for the protection of low voltage installations and equipment against direct and indirect lightning effects;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms;**
- The impulse current is divided into two independent branch circuits, each branch providing its own disconnector and Status Indicator;
- **Three colour Status Indicator with progressive indication of remaining performance.**

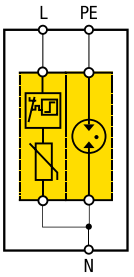
TECHNICAL DATA

Model L 25/100 ... with remote signal contact			230 t ff 4
CODE			**215 140**
Nominal ac system voltage		U_N	230/400 V ac
Modes of protection (number of poles)			4
Max Continuous Operating Voltage		U_c	335 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)			I and II
Type according to EN 61643-11 (2012-10)			T1 and T2
Impulse discharge current (10/350 µs)		I_{imp}	25 kA
Charge		Q	12,5 As
Nominal discharge current (8/20 µs)		I_n	60 kA
Max. discharge current (8/20 µs)		I_{max}	100 kA
Voltage protection level (L/N-PE) at a discharge current of:	1 kA	U_p	≤ 0,75 kV
	5 kA	U_p	≤ 0,85 kV
	13 kA	U_p	≤ 1,10 kV
	25 kA	U_p	≤ 1,25 kV
	60 kA	U_p	≤ 1,70 kV
Response time		t_a	≤ 25 ns
End of Life			OCFM (Open Circuit Failure Mode)
Behaviour in case of Temporary OverVoltage (TOV):	L/N-PE	U_T	440 V / 120 min, withstand (W)
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	5 kA rms
Short Circuit Current rating with max. backup protection fuse		I_{sccr}	50 kA rms
Max. back-up protection with up-stream CB with a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability).			160 A (max. 4,50 x 10^5 A^2s)
Max. back-up protection with FUSE at prospective short circuit currents of			250 A gG (> 5 ÷ 50 kA rms) 160/125/100 A gG* (> 50 ÷ 100 kA rms)
Max. overcurrent protection for through-wiring (V-connection)			125 A gG
Rated Load Current (for V-connection)		I_L	125 A
Follow current interrupt rating		I_{fi}	NFC No Follow Current®
Status indicator (indication of disconnector operation)			3 colours with progressive performance indication
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%
Terminal - Conductor size (double clamps for V-connection)			4-35 mm^2 flexible / 4-50 mm^2 semi rigid
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715
Case material / Flammability grade			BMC / V-0 in accordance with UL 94
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)
Approximate weight			1260 g
Dimensions: width			140 mm (8 modules)
Remote signal contact			potential-free changeover contact
Terminal - conductor size for remote signal contact			max. 1,5 mm^2 flexible
Switching capacity remote signal contact			ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR
GTIN (EAN)			8054890321402

* with fuse 160 A gG I_{imp}=13 kA and I_{max}= 70 kA; with fuse 125 A gG I_{imp}= 10 kA and I_{max}= 40 kA; with fuse 100 A gG I_{imp}=9 kA and I_{max}= 30 kA







L 25/100 230 t ff 1+1

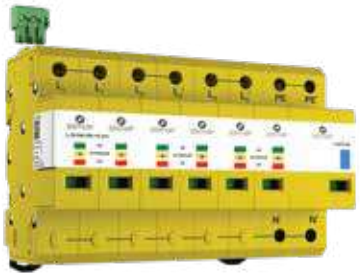
L 25/100 230 t ff 1+1 is a ready to install assembly of a voltage limiting and a voltage switching SPD providing two modes of protection, typically installed in single-phase 230 V TT-systems where connection type CT2 (1+1) is required according to HD 60364-5-534, e.g. in the Main Distribution Board (MDB), with the following features and benefits:

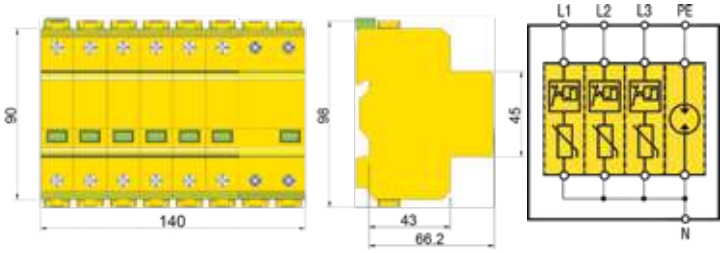
- **Impulse test classification: Test class I and II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 1 and 2** according to **EN 61643-11 (2012-10)**;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms;**
- **Three colour Status Indicator with progressive indication of remaining performance.**

Model L 25/100 ... with remote signal contact			230 t ff 1+1	
CODE			**215 121**	
Nominal ac system voltage		U_N	230 V ac	
Modes of protection (number of poles)			1+1 (L-N + N-PE)	
Max Continuous Operating Voltage (L-N)		U_c	335 V ac	
Max Continuous Operating Voltage (N-PE)		U_c	255 V ac	
Test Class according to IEC 61643-11 Ed.1 (2011-03)			I and II	
Type according to EN 61643-11 (2012-10)			T1 and T2	
Impulse discharge current (10/350 µs) (L-N)		I_{imp}	25 kA	
Impulse discharge current (10/350 µs) (N-PE)		I_{imp}	52 kA	
Charge (L-N)		Q	12,5 As	
Charge (N-PE)		Q	26 As	
Nominal discharge current (8/20 µs) (L-N)		I_n	60 kA	
Nominal discharge current (8/20 µs) (N-PE)		I_n	52 kA	
Max. discharge current (8/20 µs) (L-N)		I_{max}	100 kA	
Max. discharge current (8/20 µs) (N-PE)		I_{max}	70 kA	
Voltage protection level (L-N, L-PE) at a discharge current of:	1 kA	U_p	≤ 0,75 kV	≤ 1,50 kV
	5 kA	U_p	≤ 0,85 kV	≤ 1,50 kV
	13 kA	U_p	≤ 1,10 kV	≤ 1,50 kV
	25 kA	U_p	≤ 1,25 kV	≤ 1,50 kV
	60 kA	U_p	≤ 1,70 kV	≤ 1,70 kV
Voltage protection level (N-PE)		U_p	≤ 1,50 kV	
Response time (L-N / N-PE)		t_a	≤ 25 ns / ≤ 100 ns	
End of Life (L-N)			OCFM (Open Circuit Failure Mode)	
Behaviour in case of Temporary Overvoltage (TOV):	L-N	U_T	440 V / 120 min, withstand (W)	
	N-PE	U_T	1200 V / 200 ms, withstand (W)	
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	5 kA rms	
Short Circuit Current rating with max. backup protection fuse		I_{sccr}	50 kA rms	
Max. back-up protection with up-stream CB having a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability).			160 A (max. 4,50 x 10^5 A^2s)	
Max. back-up protection with FUSE at prospective short circuit currents of			250 A gG (> 5 ÷ 50 kA rms) 160/125/100 A gG* (> 5 ÷ 100 kA rms)	
Max. overcurrent protection for through-wiring (V-connection)			125 A gG	
Rated Load Current (for V-connection)		I_L	125 A	
Follow current interrupt rating (L-N)		I_{fi}	NFC No Follow Current®	
Follow current interrupt rating (N-PE)		I_{fi}	100 A rms	
Status indicator (indication of disconnector operation) / N-PE (no disconnector)			3 colours with progressive performance indication / 2 colours for N-PE	
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%	
Terminal - Conductor size (double clamps for V-connection on L-terminals)			4-35 mm^2 flexible / 4-50 mm^2 semi rigid	
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715	
Case material / Flammability grade			BMC / V-0 in accordance with UL 94	
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)	
Approximate weight			435 g	
Dimensions: width			53 mm (3 modules)	
Remote signal contact			potential-free changeover contact	
Terminal - conductor size for remote signal contact			max. 1,5 mm^2 flexible	
Switching capacity remote signal contact			ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A	
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR	
GTIN (EAN)			8054890321389	

* with fuse 160 A gG I_{imp}=13 kA and I_{max}= 70 kA; with fuse 125 A gG I_{imp}= 10 kA and I_{max}= 40 kA; with fuse 100 A gG I_{imp}=9 kA and I_{max}= 30 kA

TT





L 25/100 230 t ff 3+1

L 25/100 230 t ff 3+1 is a ready to install assembly of three voltage limiting and a voltage switching SPD providing four modes of protection, typically installed in three-phase plus neutral 230/400 V TT-systems where connection type CT2 (3+1) is required according to HD 60364-5-534, e.g. in the Main Distribution Board (MDB), with the following features and benefits:

- **Impulse test classification: Test class I and II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 1 and 2** according to **EN 61643-11 (2012-10)**;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms;**
- **Three colour Status Indicator with progressive indication of remaining performance.**

Model L 25/100 ... with remote signal contact			230 t ff 3+1	
CODE			**215 141**	
Nominal ac system voltage		U_N	230/400 V ac	
Modes of protection (number of poles)			3+1 (L1/L2/L3-N + N-PE)	
Max Continuous Operating Voltage (L-N)		U_c	335 V ac	
Max Continuous Operating Voltage (N-PE)		U_c	255 V ac	
Test Class according to IEC 61643-11 Ed.1 (2011-03)			I and II	
Type according to EN 61643-11 (2012-10)			T1 and T2	
Impulse discharge current (10/350 µs) (L-N)		I_{imp}	25 kA	
Impulse discharge current (10/350 µs) (N-PE)		I_{imp}	100 kA	
Charge (L-N)		Q	12,5 As	
Charge (N-PE)		Q	50 As	
Nominal discharge current (8/20 µs) (L-N)		I_n	60 kA	
Nominal discharge current (8/20 µs) (N-PE)		I_n	100 kA	
Max. discharge current (8/20 µs) (L-N)		I_{max}	100 kA	
Max. discharge current (8/20 µs) (N-PE)		I_{max}	150 kA	
Voltage protection level (L-N, L-PE) at a discharge current of:	1 kA	U_p	≤ 0,75 kV	≤ 1,50 kV
	5 kA	U_p	≤ 0,85 kV	≤ 1,50 kV
	13 kA	U_p	≤ 1,10 kV	≤ 1,50 kV
	25 kA	U_p	≤ 1,25 kV	≤ 1,50 kV
	60 kA	U_p	≤ 1,70 kV	≤ 1,70 kV
Voltage protection level (N-PE)		U_p	≤ 1,50 kV	
Response time (L-N / N-PE)		t_a	≤ 25 ns / ≤ 100 ns	
End of Life (L-N)			OCFM (Open Circuit Failure Mode)	
Behaviour in case of Temporary Voltage (TOV):	L-N	U_T	440 V / 120 min, withstand (W)	
	N-PE	U_T	1200 V / 200 ms, withstand (W)	
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	5 kA rms	
Short Circuit Current rating with max. backup protection fuse		I_{sccr}	50 kA rms	
Max. back-up protection with up-stream CB having a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability).			160 A (max. 4,50 x 10^5 A^2s)	
Max. back-up protection with FUSE at prospective short circuit currents of			250 A gG (> 5 ÷ 50 kA rms) 160/125/100 A gG* (> 5 ÷ 100 kA rms)	
Max. overcurrent protection for through-wiring (V-connection)			125 A gG	
Rated Load Current (for V-connection)		I_L	125 A	
Follow current interrupt rating (L-N)		I_{fi}	NFC No Follow Current®	
Follow current interrupt rating (N-PE)		I_{fi}	100 A rms	
Status indicator (indication of disconnector operation) / N-PE (no disconnector)			3 colours with progressive performance indication / 2 colours for N-PE	
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%	
Terminal - Conductor size (double clamps for V-connection)			4-35 mm^2 flexible / 4-50 mm^2 semi rigid	
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715	
Case material / Flammability grade			BMC / V-0 in accordance with UL 94	
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)	
Approximate weight			1260 g	
Dimensions: width			140 mm (8 modules)	
Remote signal contact			potential-free changeover contact	
Terminal - conductor size for remote signal contact			max. 1,5 mm^2 flexible	
Switching capacity remote signal contact			ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A	
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR	
GTIN (EAN)			8054890321419	

* with fuse 160 A gG I_{imp}=13 kA and I_{max}= 70 kA; with fuse 125 A gG I_{imp}= 10 kA and I_{max}= 40 kA; with fuse 100 A gG I_{imp}=9 kA and I_{max}= 30 kA

TN

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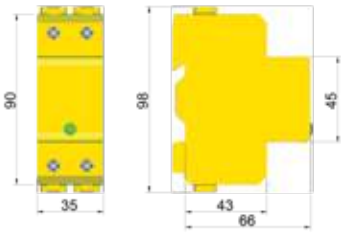


IA 25 230

IA 25 230 is a voltage switching SPD with a single mode of protection, typically installed at the origin of the installation, e.g. in the Main Distribution Board (MDB), in TN-systems or in TT-systems in combination with N-PE SPD model I 100, I 52 and with connection type CT2 (3+1 or 1+1), providing the following features and benefits:

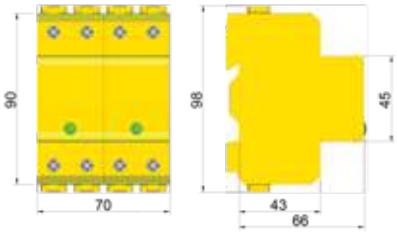
- **Impulse test classification: Test class I and II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 1 and 2** according to **EN 61643-11 (2012-10)**;
- IA 25 230 is a self extinguishing spark gap based switching SPD, for the protection of low voltage installations against direct and indirect lightning effects;
- Impulse discharge current of 25 kA 10/350 µs;
- Nominal discharge current of 25 kA 8/20 µs;
- High self extinguishing capability of 16 kA rms (follow current interrupt rating);
- **Green LED Status Indicator**;
- The special housing is designed for "Pollution Degree 3".

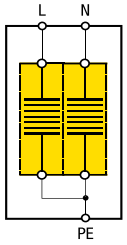
TECHNICAL DATA

Model IA 25 ...		230
CODE		**203 100**
Nominal ac system voltage	U_N	230/400 V ac
Modes of protection (number of poles)		1
Max Continuous Operating Voltage	U_c	255 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)		I and II
Type according to EN 61643-11 (2012-10)		T1 and T2
Impulse discharge current (10/350 µs)	I_{imp}	25 kA
Charge	Q	12,5 As
Nominal discharge current (8/20 µs)	I_n	25 kA
Short Circuit Current rating with max. backup protection	I_{sccr}	16 kA rms
Follow current interrupt rating	I_{fi}	16 kA rms
Voltage protection level	U_p	≤ 2,00 kV
Max. backup protection with fuse		315 A gG*
Max. overcurrent protection for through-wiring (V-connection)		125 A gG*
Rated Load Current (for V-connection)	I_L	125 A
Behaviour in case of Temporary OverVoltage (TOV)	U_T	440 V / 120 min, withstand (W)
Response time	t_a	≤ 100 ns
Insulation resistance	R_{ins}	≥ 1 G Ω
Status Indicator		Green LED
Operating temperature range / Humidity		-40 … +80 °C (extended) / 5% ... 95%
Terminal-Conductor size (double clamps for V-connection)		4-35 mm² flexible / 4-50 mm² semi rigid
Busbar connections		fork-type busbar 16 mm²
Mounting		indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree / Degree of protection	PD / IP	3 / 20 (built-in)
Approximate weight		265 g
Dimensions: width		35 mm (2 modules)
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR
Additional Technical Information: for application at locations with a prospective short circuit current higher than the follow current interrupt rating I_{fi}		
Max. prospective short circuit current at the SPD's point of installation		50 kA rms (tested by CTI)
External backup fuse required		315 A gG
GTIN (EAN)		8054890320566

* with fuse 125 A gG I_{imp}= 10 kA and I_{max}= 40 kA; with fuse 100 A gG I_{imp}=9 kA and I_{max}= 30 kA

TN





IA 25 230 2

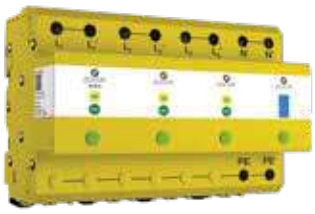
IA 25 230 2 is a ready to install assembly of two voltage switching SPDs providing two modes of protection, typically installed at the origin of the installation, e.g. in the Main Distribution Board (MDB), for single-phase 230 V TN-systems with the following features and benefits:

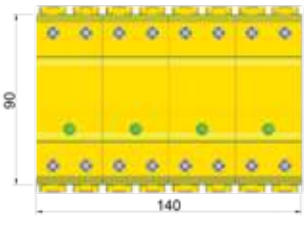
- **Impulse test classification: Test class I and II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 1 and 2** according to **EN 61643-11 (2012-10)**;
- IA 25 230 2 is a self extinguishing spark gap based switching SPD, for the protection of low voltage installations against direct and indirect lightning effects;
- Impulse discharge current of 25 kA 10/350 µs;
- Nominal discharge current of 25 kA 8/20 µs;
- High self extinguishing capability of 16 kA rms (follow current interrupt rating);
- **Green LED Status Indicator**;
- The special housing is designed for "Pollution Degree 3".

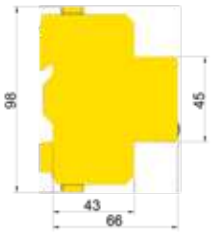
Model IA 25 ...		230 2
CODE		**203 120**
Nominal ac system voltage	U_N	230 V ac
Modes of protection (number of poles)		2
Max Continuous Operating Voltage	U_c	255 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)		I and II
Type according to EN 61643-11 (2012-10)		T1 and T2
Impulse discharge current (10/350 µs)	I_{imp}	25 kA
Charge	Q	12,5 As
Nominal discharge current (8/20 µs)	I_n	25 kA
Short Circuit Current rating with max. backup protection	I_{sccr}	16 kA rms
Follow current interrupt rating	I_{fi}	16 kA rms
Voltage protection level	U_p	≤ 2,00 kV
Max. back-up protection with fuse (L)		315 A gG*
Max. overcurrent protection for through-wiring (V-connection)		125 A gG*
Rated Load Current (for V-connection)	I_L	125 A
Behaviour in case of Temporary OverVoltage (TOV)	U_T	440 V / 120 min, withstand (W)
Response time	t_a	≤ 100 ns
Insulation resistance	R_{ins}	≥ 1 G Ω
Status Indicator		Green LED (L-N)
Operating temperature range / Humidity		-40 … +80 °C (extended) / 5% ... 95%
Terminal-Conductor size (double clamps for V-connection)		4-35 mm² flexible / 4-50 mm² semi rigid
Mounting		indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree / Degree of protection	PD / IP	3 / 20 (built-in)
Approximate weight		530 g
Dimensions: width		70 mm (4 modules)
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR
Additional Technical Information: for application at locations with a prospective short circuit current higher than the follow current interrupt rating I_{fi}		
Max. prospective short circuit current at the SPD's point of installation		50 kA rms (tested by CTI)
External backup fuse required		315 A gG
GTIN (EAN)		8054890320573

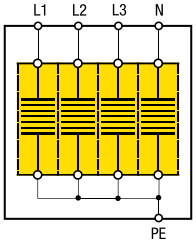
* with fuse 125 A gG I_{imp}= 10 kA and I_{max}= 40 kA; with fuse 100 A gG I_{imp}=9 kA and I_{max}= 30 kA

TN









IA 25 230 4

IA 25 230 4 is a ready to install assembly of four voltage switching SPDs providing four modes of protection, typically installed at the origin of the installation, e.g. in the Main Distribution Board (MDB), for three-phase plus neutral 230/400 V TN-S systems with the following features and benefits:

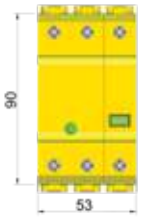
- **Impulse test classification: Test class I and II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 1 and 2** according to **EN 61643-11 (2012-10)**;
- IA 25 230 4 is a self extinguishing spark gap based switching SPD, for the protection of low voltage installations against direct and indirect lightning effects;
- Impulse discharge current of 25 kA 10/350 µs;
- Nominal discharge current of 25 kA 8/20 µs;
- High self extinguishing capability of 16 kA rms (follow current interrupt rating);
- **Green LED Status Indicator**;
- The special housing is designed for "Pollution Degree 3".

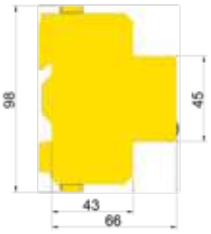
TECHNICAL DATA

Model IA 25 ...		230 4
CODE		**203 140**
Nominal ac system voltage	U_N	230/400 V ac
Modes of protection (number of poles)		4
Max Continuous Operating Voltage	U_c	255 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)		I and II
Type according to EN 61643-11 (2012-10)		T1 and T2
Impulse discharge current (10/350 µs)	I_{imp}	25 kA
Charge	Q	12,5 As
Nominal discharge current (8/20 µs)	I_n	25 kA
Short Circuit Current rating with max. backup protection	I_{sccr}	16 kA rms
Follow current interrupt rating	I_{fi}	16 kA rms
Voltage protection level	U_p	≤ 2,00 kV
Max. back-up protection with fuse (L)		315 A gG*
Max. overcurrent protection for through-wiring (V-connection)		125 A gG*
Rated Load Current (for V-connection)	I_L	125 A
Behaviour in case of Temporary OverVoltage (TOV)	U_T	440 V / 120 min, withstand (W)
Response time	t_a	≤ 100 ns
Insulation resistance	R_{ins}	≥ 1 G Ω
Status Indicator		Green LED (L-N)
Operating temperature range / Humidity		-40 … +80 °C (extended) / 5% ... 95%
Terminal-Conductor size (double clamps for V-connection)		4-35 mm² flexible / 4-50 mm² semi rigid
Mounting		indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree / Degree of protection	PD / IP	3 / 20 (built-in)
Approximate weight		1060 g
Dimensions: width		140 mm (8 modules)
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR
Additional Technical Information: for application at locations with a prospective short circuit current higher than the follow current interrupt rating I_{fi}		
Max. prospective short circuit current at the SPD's point of installation		50 kA rms (tested by CTI)
External backup fuse required		315 A gG
GTIN (EAN)		8054890320597

* with fuse 125 A gG I_{imp}= 10 kA and I_{max}= 40 kA; with fuse 100 A gG I_{imp}=9 kA and I_{max}= 30 kA

TT





IA 25 230 1+1

IA 25 230 1+1 is a ready to install assembly of two voltage switching SPDs providing two modes of protection, typically installed at the origin of the installation, e.g. in the Main Distribution Board (MDB), in single-phase 230 V TT-systems where connection type CT2 (1+1) is required according to HD 60364-5-534, with the following features and benefits:

- **Impulse test classification: Test class I and II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 1 and 2** according to **EN 61643-11 (2012-10)**;
- IA 25 230 1+1 is a self extinguishing spark gap and GDT based switching SPD, for the protection of low voltage installations against direct and indirect lightning effects;
- Impulse discharge current (L-N) of 25 kA 10/350 µs;
- Impulse discharge current (N-PE) of 52 kA 10/350 µs;
- High self extinguishing capability of 16 kA rms (follow current interrupt rating L-N);
- **Green LED Status Indicator**;
- The special housing is designed for "Pollution Degree 3".

Model IA 25 ...			230 1+1		
CODE			**203 121**		
Nominal ac system voltage		U_N	230 V ac		
Modes of protection (number of poles)			1+1 (L-N + N-PE)		
Max Continuous Operating Voltage		U_c	255 V ac		
Test Class according to IEC 61643-11 Ed.1 (2011-03)			I and II		
Type according to EN 61643-11 (2012-10)			T1 and T2		
Impulse discharge current (10/350 µs) (L-N)		I_{imp}	25 kA		
Impulse discharge current (10/350 µs) (N-PE)		I_{imp}	52 kA		
Charge (L-N)		Q	12,5 As		
Charge (N-PE)		Q	26 As		
Nominal discharge current (8/20 µs) (L-N)		I_n	25 kA		
Nominal discharge current (8/20 µs) (N-PE)		I_n	52 kA		
Short Circuit Current rating with max. backup protection		I_{sccr}	16 kA rms		
Follow current interrupt rating (L-N)		I_{fi}	16 kA rms		
Follow current interrupt rating (N-PE)		I_{fi}	100 A rms		
Voltage protection level (L-N, N-PE, L-PE)		U_p	≤ 2,00 kV	≤ 1,50 kV	≤ 2,00 kV
Max. overcurrent protection fuse			315 A gG*		
Max. overcurrent protection for through-wiring (V-connection)			125 A gG*		
Rated Load Current (for V-connection)		I_L	125 A		
Behaviour in case of Temporary OverVoltage (TOV):	L-N	U_T	440 V / 120 min, withstand (W)		
	N-PE	U_T	1200 V / 200 ms, withstand (W)		
Response time		t_a	≤ 100 ns		
Insulation resistance		R_{ins}	≥ 1 G Ω		
Status Indicator / N-PE (no disconnector)			Green LED / 2 colour indication (green/red) for N-PE		
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%		
Terminal-Conductor size (double clamps for V-connection on L-terminal)			4-35 mm² flexible / 4-50 mm² semi rigid		
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715		
Case material / Flammability grade			BMC / V-0 in accordance with UL 94		
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)		
Approximate weight			395 g		
Dimensions: width			53 mm (3 modules)		
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR		
Additional Technical Information: for application at locations with a prospective short circuit current higher than the follow current interrupt rating I_{fi}					
Max. prospective short circuit current at the SPD's point of installation			50 kA rms (tested by CTI)		
External backup fuse required			315 A gG		
GTIN (EAN)			8054890320580		

* with fuse 125 A gG I_{imp}= 10 kA and I_{max}=40 kA, with fuse 100 A gG I_{imp}=9 kA and I_{max}= 30 kA

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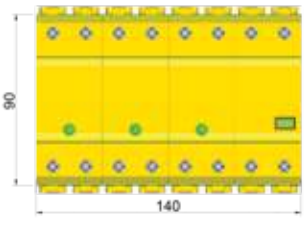
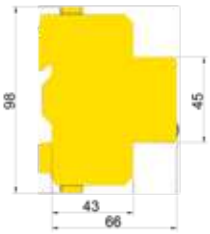
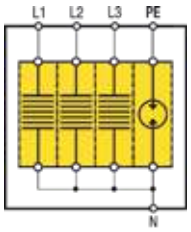






IA 25 230 3+1

IA 25 230 3+1 is a ready to install assembly of four voltage switching SPDs providing four modes of protection, typically installed in three-phase plus neutral 230/400 V TT-systems where connection type CT2 (3+1) is required according to HD 60364-5-534, e.g. in the Main Distribution Board (MDB), with the following features and benefits:

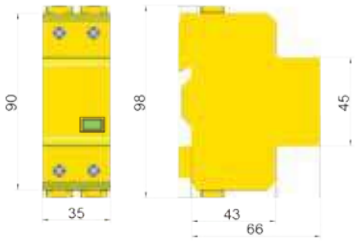
- **Impulse test classification: Test class I and II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 1 and 2** according to **EN 61643-11 (2012-10)**;
- IA 25 230 3+1 is a self extinguishing spark gap and GDT based switching SPD, for the protection of low voltage installations against direct and indirect lightning effects;
- Impulse discharge current (L-N) of 25 kA 10/350 µs;
- Impulse discharge current (N-PE) of 100 kA 10/350 µs;
- High self extinguishing capability of 16 kA rms (follow current interrupt rating L-N);
- **Green LED Status Indicator**;
- The special housing is designed for "Pollution Degree 3".

TECHNICAL DATA

Model IA 25 ...			230 3+1		
CODE			**203 141**		
Nominal ac system voltage		U_N	230/400 V ac		
Modes of protection (number of poles)			3+1 (L1/L2/L3-N + N-PE)		
Max Continuous Operating Voltage		U_c	255 V ac		
Test Class according to IEC 61643-11 Ed.1 (2011-03)			I and II		
Type according to EN 61643-11 (2012-10)			T1 and T2		
Impulse discharge current (10/350 µs) (L-N)		I_{imp}	25 kA		
Impulse discharge current (10/350 µs) (N-PE)		I_{imp}	52 kA		
Charge (L-N)		Q	12,5 As		
Charge (N-PE)		Q	26 As		
Nominal discharge current (8/20 µs) (L-N)		I_n	25 kA		
Nominal discharge current (8/20 µs) (N-PE)		I_n	52 kA		
Short Circuit Current rating with max. backup protection		I_{sccr}	16 kA rms		
Follow current interrupt rating (L-N)		I_{fi}	16 kA rms		
Follow current interrupt rating (N-PE)		I_{fi}	100 A rms		
Voltage protection level (L-N, N-PE, L-PE)		U_p	≤ 2,00 kV	≤ 1,50 kV	≤ 2,00 kV
Max. back-up protection with fuse			315 A gG*		
Max. overcurrent protection for through-wiring (V-connection)			125 A gG*		
Rated Load Current (for V-connection)		I_L	125 A		
Behaviour in case of Temporary OverVoltage (TOV):	L-N	U_T	440 V / 120 min, withstand (W)		
	N-PE	U_T	1200 V / 200 ms, withstand (W)		
Response time		t_a	≤ 100 ns		
Insulation resistance		R_{ins}	≥ 1 G Ω		
Status Indicator / N-PE (no disconnector)			Green LED / 2 colour indication (green/red) for N-PE		
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%		
Terminal-Conductor size (double clamps for V-connection)			4-35 mm² flexible / 4-50 mm² semi rigid		
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715		
Case material / Flammability grade			BMC / V-0 in accordance with UL 94		
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)		
Approximate weight			1060 g		
Dimensions: width			140 mm (8 modules)		
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR		
Additional Technical Information: for application at locations with a prospective short circuit current higher than the follow current interrupt rating I_{fi}					
Max. prospective short circuit current at the SPD's point of installation			50 kA rms (tested by CTI)		
External backup fuse required			315 A gG		
GTIN (EAN)			8054890320603		

* with fuse 125 A gG I_{imp}= 10 kA and I_{max}=40 kA; with fuse 100 A gG I_{imp}=9 kA and I_{max}= 30 kA

TT



I 100 N-PE

I 100 N-PE is a voltage switching SPD providing a single mode of protection, typically installed in TT-systems between neutral conductor N and protective earth PE, where connection type CT2 (1+1 or 3+1) is required according to HD 60364-5-534, e.g. in the Main Distribution Board (MDB), with the following features and benefits:

- **Impulse test classification: Test class I and II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 1 and 2** according to **EN 61643-11 (2012-10)**;
- I 100 N-PE is a Gas Discharge Tube (GDT) based SPD, for the protection of low voltage installations and equipment against direct and indirect lightning effects;
- Impulse discharge current of 100 kA 10/350 µs;
- Nominal discharge current of 100 kA 8/20 µs;
- The special housing is designed for "Pollution Degree 3";
- To be combined with IA 25 or L 25/100 230 ff.

Model I 100 N-PE

CODE		208 300
Nominal ac system voltage	U_N	230 V ac
Modes of protection (number of poles)		1 (N-PE)
Max Continuous Operating Voltage	U_c	255 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)		I and II
Type according to EN 61643-11 (2012-10)		T1 and T2
Impulse discharge current (10/350 µs)	I_{imp}	100 kA
Charge	Q	50 As
Nominal discharge current (8/20 µs)	I_n	100 kA
Max. discharge current (8/20 µs)	I_{max}	150 kA
Follow current interrupt rating	I_{fi}	100 A rms
Voltage protection level	U_p	≤ 1,50 kV
Max. overcurrent protection for through-wiring (V-connection)		125 A gG*
Rated Load Current (for V-connection)	I_L	125 A
Response Time	t_a	≤ 100 ns
Behaviour in case of Temporary OverVoltage (TOV)	U_T	1200 V / 200 ms, withstand (W)
Status indicator (no disconnector)		2 colour indication (green/red)
Operating temperature range / Humidity		-40 … +80 °C (extended) / 5% ... 95%
Terminal-Conductor size		4-35 mm² flexible / 4-50 mm² semi rigid
Busbar connections		fork-type busbar 16 mm²
Mounting		indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree / Degree of protection	PD / IP	3 / 20 (built-in)
Approximate weight		240 g
Dimensions: width		35 mm (2 modules)
To be combined with		IA 25 or L 25/100 230 ff
Switching capacity remote signal contact		ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR
GTIN (EAN)		8054890320870

* with fuse 125 A gG I_{imp}= 10 kA and I_{max}= 40 kA; with fuse 100 A gG I_{imp}=9 kA and I_{max}= 30 kA

TN

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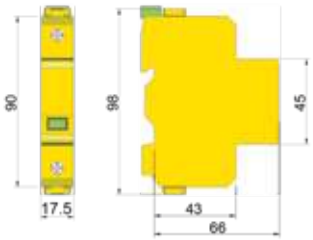
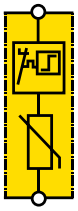




L 13/40 230 ff

L 13/40 230 ff is a voltage limiting SPD providing a single mode of protection, typically installed at the origin of the installation, e.g. in the Main Distribution Board (MDB), in TN-systems or in TT-systems in combination with N-PE SPD model I 100, I 52 and with connection type CT2 (1+1 or 3+1). It provides the following features and benefits:

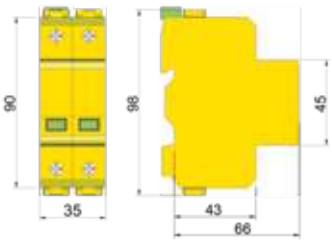
- **Impulse test classification: Test class I and II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 1 and 2** according to **EN 61643-11 (2012-10)**;
- L 13/40 230 ff is a voltage limiting SPD, for the protection of low voltage installations and equipment against direct and indirect lightning effects;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms;**
- Short circuit current withstand of 100 kA rms with max. back-up fuse;
- **Three colour Status Indicator with progressive indication of remaining performance.**

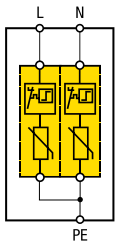
Model L 13/40 ...			230 ff
CODE			**204 100**
Nominal ac system voltage		U_N	230/400 V ac
Modes of protection (number of poles)			1
Max Continuous Operating Voltage		U_c	335 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)			I and II
Type according to EN 61643-11 (2012-10)			T1 and T2
Impulse discharge current (10/350 µs)		I_{imp}	13 kA
Charge		Q	6,5 As
Nominal discharge current (8/20 µs)		I_n	35 kA
Max. discharge current (8/20 µs)		I_{max}	70 kA
Voltage protection level at a discharge current of:	1 kA	U_p	≤ 0,79 kV
	5 kA	U_p	≤ 0,90 kV
	13 kA	U_p	≤ 1,10 kV
	20 kA	U_p	≤ 1,20 kV
	35 kA	U_p	≤ 1,50 kV
Response time		t_a	≤ 25 ns
End of Life			OCFM (Open Circuit Failure Mode)
Behaviour in case of Temporary OverVoltage (TOV)		U_T	440 V / 120 min, withstand (W)
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	5 kA rms
Short Circuit Current rating with max. backup protection fuse		I_{sccr}	100 kA rms
Max. back-up protection with up-stream CB with a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability)			160 A (max. 4,50 x 10^5 A^2s)
Max. back-up protection with FUSE at prospective short circuit currents of			160/125 A gG* (> 5 ÷ 100 kA rms)
Follow current interrupt rating		I_{fi}	NFC No Follow Current®
Status indicator (indication of disconnector operation)			3 colours with progressive performance indication
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%
Terminal - Conductor size			4-35 mm^2 flexible / 4-50 mm^2 semi rigid
Busbar connections			fork-type busbar 16 mm^2
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715
Case material / Flammability grade			BMC / V-0 in accordance with UL 94
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)
Approximate weight			140 g
Dimensions: width			17,5 mm (1 module)
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR
GTIN (EAN)			8054890320658

Model L 13/40 ... with remote signal contact		230 t ff
CODE		**214 100**
Remote signal contact		potential-free changeover contact
Terminal - conductor size for remote signal contact		max. 1,5 mm^2 flexible
Switching capacity remote signal contact		ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
GTIN (EAN)		8054890321235

*with fuse 125 A gG I_{imp}= 10 kA and I_{max}= 40 kA

TN





L 13/40 230 ff 2

L 13/40 230 ff 2 is a ready to install assembly of two voltage limiting SPDs providing two modes of protection, typically installed at the origin of the installation, e.g. in the Main Distribution Board (MDB), for single-phase 230 V TN-systems, with the following features and benefits:

- **Impulse test classification: Test class I and II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 1 and 2** according to **EN 61643-11 (2012-10)**;
- L 13/40 230 ff 2 is a voltage limiting SPD, for the protection of low voltage installations and equipment against direct and indirect lightning effects;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms;**
- **Three colour Status Indicator with progressive indication of remaining performance.**

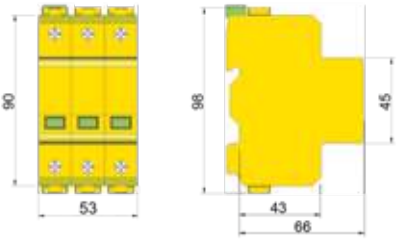
TECHNICAL DATA

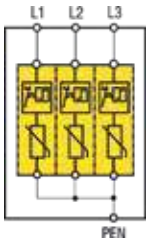
Model L 13/40 ...			230 ff 2
CODE			**204 120**
Nominal ac system voltage		U_N	230 V ac
Modes of protection (number of poles)			2
Max Continuous Operating Voltage		U_c	335 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)			I and II
Type according to EN 61643-11 (2012-10)			T1 and T2
Impulse discharge current (10/350 µs)		I_{imp}	13 kA
Charge		Q	6,5 As
Nominal discharge current (8/20 µs)		I_n	35 kA
Max. discharge current (8/20 µs)		I_{max}	70 kA
Voltage protection level at a discharge current of:	1 kA	U_p	≤ 0,80 kV
	5 kA	U_p	≤ 0,93 kV
	13 kA	U_p	≤ 1,15 kV
	20 kA	U_p	≤ 1,25 kV
	35 kA	U_p	≤ 1,50 kV
Response time		t_a	≤ 25 ns
End of Life			OCFM (Open Circuit Failure Mode)
Behaviour in case of Temporary OverVoltage (TOV)		U_T	440 V / 120 min, withstand (W)
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	5 kA rms
Short Circuit Current rating with max. backup protection fuse		I_{sccr}	100 kA rms
Max. back-up protection with up-stream CB with a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability)			160 A (max. 4,50 x 10^5 A^2s)
Max. back-up protection with FUSE at prospective short circuit currents of			160/125 A gG* (> 5 ÷ 100 kA rms)
Follow current interrupt rating		I_{fi}	NFC No Follow Current®
Status indicator (indication of disconnector operation)			3 colours with progressive performance indication
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%
Terminal - Conductor size			4-35 mm^2 flexible / 4-50 mm^2 semi rigid
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715
Case material / Flammability grade			BMC / V-0 in accordance with UL 94
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)
Approximate weight			280 g
Dimensions: width			35 mm (2 modules)
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR
GTIN (EAN)			8054890320665

Model L 13/40 ... with remote signal contact		230 t ff 2
CODE		**214 120**
Remote signal contact		potential-free changeover contact
Terminal - conductor size for remote signal contact		max. 1,5 mm^2 flexible
Switching capacity remote signal contact		ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
GTIN (EAN)		8054890321280

*with fuse 125 A gG I_{imp}= 10 kA and I_{max}= 40 kA

TN





L 13/40 230 ff 3

L 13/40 230 ff 3 is a ready to install assembly of three voltage limiting SPDs providing three modes of protection, typically installed at the origin of the installation, e.g. in the Main Distribution Board (MDB), for three-phase 230/400 V TN-systems, with the following features and benefits:

- **Impulse test classification: Test class I and II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 1 and 2** according to **EN 61643-11 (2012-10)**;
- L 13/40 230 ff 3 is a voltage limiting SPD, for the protection of low voltage installations and equipment against direct and indirect lightning effects;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms;**
- **Three colour Status Indicator with progressive indication of remaining performance.**

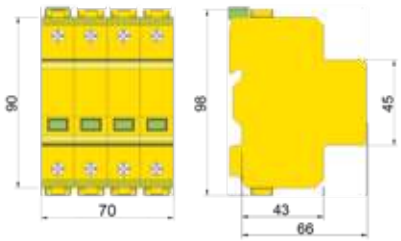
TECHNICAL DATA

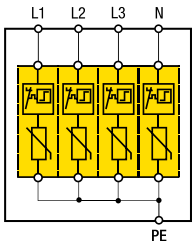
Model L 13/40 ...			230 ff 3
CODE			**204 130**
Nominal ac system voltage		U_N	230/400 V ac
Modes of protection (number of poles)			3
Max Continuous Operating Voltage		U_c	335 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)			I and II
Type according to EN 61643-11 (2012-10)			T1 and T2
Impulse discharge current (10/350 µs)		I_{imp}	13 kA
Charge		Q	6,5 As
Nominal discharge current (8/20 µs)		I_n	35 kA
Max. discharge current (8/20 µs)		I_{max}	70 kA
Voltage protection level at a discharge current of:	1 kA	U_p	≤ 0,80 kV
	5 kA	U_p	≤ 0,93 kV
	13 kA	U_p	≤ 1,15 kV
	20 kA	U_p	≤ 1,25 kV
	35 kA	U_p	≤ 1,50 kV
Response time		t_a	≤ 25 ns
End of Life			OCFM (Open Circuit Failure Mode)
Behaviour in case of Temporary OverVoltage (TOV)		U_T	440 V / 120 min, withstand (W)
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	5 kA rms
Short Circuit Current rating with max. backup protection fuse		I_{sccr}	100 kA rms
Max. back-up protection with up-stream CB with a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability)			160 A (max. 4,50 x 10^5 A^2s)
Max. back-up protection with FUSE at prospective short circuit currents of			160/125 A gG* (> 5 ÷ 100 kA rms)
Follow current interrupt rating		I_{fi}	NFC No Follow Current®
Status indicator (indication of disconnector operation)			3 colours with progressive performance indication
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%
Terminal - Conductor size			4-35 mm^2 flexible / 4-50 mm^2 semi rigid
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715
Case material / Flammability grade			BMC / V-0 in accordance with UL 94
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)
Approximate weight			420 g
Dimensions: width			53 mm (3 modules)
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR
GTIN (EAN)			8054890320689

Model L 13/40 ... with remote signal contact		230 t ff 3
CODE		**214 130**
Remote signal contact		potential-free changeover contact
Terminal - conductor size for remote signal contact		max. 1,5 mm^2 flexible
Switching capacity remote signal contact		ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
GTIN (EAN)		8054890321310

*with fuse 125 A gG I_{imp}= 10 kA and I_{max}= 40 kA

TN





L 13/40 230 ff 4

L 13/40 230 ff 4 is a ready to install assembly of four voltage limiting SPDs providing four modes of protection, typically installed at the origin of the installation, e.g. in the Main Distribution Board (MDB), for three-phase plus neutral 230/400 V TN-systems, with the following features and benefits:

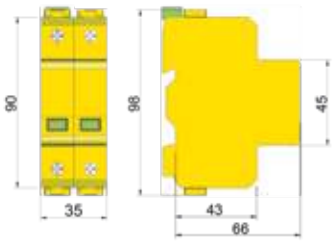
- **Impulse test classification: Test class I and II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 1 and 2** according to **EN 61643-11 (2012-10)**;
- L 13/40 230 ff 4 is a voltage limiting SPD, for the protection of low voltage installations and equipment against direct and indirect lightning effects;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms;**
- **Three colour Status Indicator with progressive indication of remaining performance.**

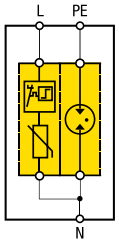
Model L 13/40 ...			230 ff 4
CODE			**204 140**
Nominal ac system voltage		U_N	230/400 V ac
Modes of protection (number of poles)			4
Max Continuous Operating Voltage		U_c	335 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)			I and II
Type according to EN 61643-11 (2012-10)			T1 and T2
Impulse discharge current (10/350 µs)		I_{imp}	13 kA
Charge		Q	6,5 As
Nominal discharge current (8/20 µs)		I_n	35 kA
Max. discharge current (8/20 µs)		I_{max}	70 kA
Voltage protection level at a discharge current of:	1 kA	U_p	≤ 0,80 kV
	5 kA	U_p	≤ 0,93 kV
	13 kA	U_p	≤ 1,15 kV
	20 kA	U_p	≤ 1,25 kV
	35 kA	U_p	≤ 1,50 kV
Response time		t_a	≤ 25 ns
End of Life			OCFM (Open Circuit Failure Mode)
Behaviour in case of Temporary OverVoltage (TOV)		U_T	440 V / 120 min, withstand (W)
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	5 kA rms
Short Circuit Current rating with max. backup protection fuse		I_{sccr}	100 kA rms
Max. back-up protection with up-stream CB with a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability)			160 A (max. 4,50 x 10^5 A^2s)
Max. back-up protection with FUSE at prospective short circuit currents of			160/125 A gG* (> 5 ÷ 100 kA rms)
Follow current interrupt rating		I_{fi}	NFC No Follow Current®
Status indicator (indication of disconnector operation)			3 colours with progressive performance indication
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%
Terminal - Conductor size			4-35 mm^2 flexible / 4-50 mm^2 semi rigid
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715
Case material / Flammability grade			BMC / V-0 in accordance with UL 94
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)
Approximate weight			560 g
Dimensions: width			70 mm (4 modules)
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR
GTIN (EAN)			8054890320696

Model L 13/40 ... with remote signal contact			230 t ff 4
CODE			**214 140**
Remote signal contact			potential-free changeover contact
Terminal - conductor size for remote signal contact			max. 1,5 mm^2 flexible
Switching capacity remote signal contact			ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
GTIN (EAN)			8054890321334

*with fuse 125 A gG I_{imp}= 10 kA and I_{max}= 40 kA

TT





L 13/40 230 ff 1+1

L 13/40 230 ff 1+1 is a ready to install assembly of a voltage limiting and a voltage switching SPD providing two modes of protection, typically installed in single-phase 230 V TT-systems where connection type CT2 (1+1) is required according to HD 60364-5-534, e.g. in the Main Distribution Board (MDB), with the following features and benefits:

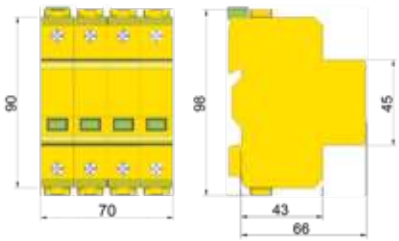
- **Impulse test classification: Test class I and II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 1 and 2** according to **EN 61643-11 (2012-10)**;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms;**
- **Three colour Status Indicator with progressive indication of remaining performance.**

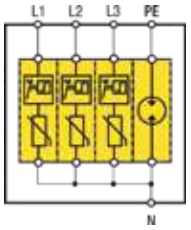
TECHNICAL DATA

Model L 13/40 ...			230 ff 1+1	
CODE			**204 121**	
Nominal ac system voltage		U_N	230 V ac	
Modes of protection (number of poles)			1+1 (L-N + N-PE)	
Max Continuous Operating Voltage (L-N)		U_c	335 V ac	
Max Continuous Operating Voltage (N-PE)		U_c	255 V ac	
Test Class according to IEC 61643-11 Ed.1 (2011-03)			I and II	
Type according to EN 61643-11 (2012-10)			T1 and T2	
Impulse discharge current (10/350 µs) (L-N)		I_{imp}	13 kA	
Impulse discharge current (10/350 µs) (N-PE)		I_{imp}	52 kA	
Charge (L-N)		Q	6,5 As	
Charge (N-PE)		Q	26 As	
Nominal discharge current (8/20 µs) (L-N)		I_n	35 kA	
Nominal discharge current (8/20 µs) (N-PE)		I_n	52 kA	
Max. discharge current (8/20 µs) (L-N) and (N-PE)		I_{max}	70 kA	
Voltage protection level (L-N, L-PE) at a discharge current of:	1 kA	U_p	≤ 0,80 kV	≤ 1,50 kV
	5 kA	U_p	≤ 0,93 kV	≤ 1,50 kV
	13 kA	U_p	≤ 1,15 kV	≤ 1,50 kV
	20 kA	U_p	≤ 1,25 kV	≤ 1,50 kV
	35 kA	U_p	≤ 1,50 kV	≤ 1,50 kV
Voltage protection level (N-PE)		U_p	≤ 1,50 kV	
Response time (L-N / N-PE)		t_a	≤ 25 ns / ≤ 100 ns	
End of Life (L-N)			OCFM (Open Circuit Failure Mode)	
Behaviour in case of Temporary OverVoltage (TOV):	L-N	U_T	440 V / 120 min, withstand (W)	
	N-PE	U_T	1200 V / 200 ms, withstand (W)	
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	5 kA rms	
Short Circuit Current rating with max. backup protection fuse		I_{sccr}	100 kA rms	
Max. back-up protection with up-stream CB with a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability)			160 A (max. 4,50 x 10^5 A^2s)	
Max. back-up protection with FUSE at prospective short circuit currents of			160/125 A gG* (> 5 ÷ 100 kA rms)	
Follow current interrupt rating (L-N)		I_{fi}	NFC No Follow Current®	
Follow current interrupt rating (N-PE)		I_{fi}	100 A rms	
Status indicator (indication of disconnector operation) / N-PE (no disconnector)			3 colours with progressive performance indication / 2 colours for N-PE	
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%	
Terminal - Conductor size			4-35 mm^2 flexible / 4-50 mm^2 semi rigid	
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715	
Case material / Flammability grade			BMC / V-0 in accordance with UL 94	
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)	
Approximate weight			280 g	
Dimensions: width			35 mm (2 modules)	
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR	
GTIN (EAN)			8054890320672	

Model L 13/40 ... with remote signal contact	230 t ff 1+1
CODE	**214 121**
Remote signal contact	potential-free changeover contact
Terminal - conductor size for remote signal contact	max. 1,5 mm^2 flexible
Switching capacity remote signal contact	ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
GTIN (EAN)	8054890321297

*with fuse 125 A gG I_{imp}= 10 kA and I_{max}= 40 kA





L 13/40 230 ff 3+1

L 13/40 230 ff 3+1 is a ready to install assembly of three voltage limiting and a voltage switching SPD providing four modes of protection, typically installed in three-phase plus neutral 230/400 V TT-systems where connection type CT2 (3+1) is required according to HD 60364-5-534, e.g. in the Main Distribution Board (MDB), with the following features and benefits:

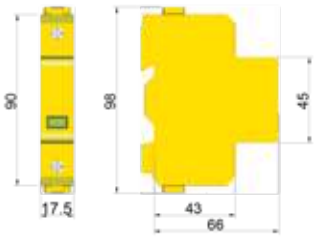
- **Impulse test classification: Test class I and II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 1 and 2** according to **EN 61643-11 (2012-10)**;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms;**
- **Three colour Status Indicator with progressive indication of remaining performance.**

Model L 13/40 ...			230 ff 3+1	
CODE			**204 141**	
Nominal ac system voltage		U_N	230/400 V ac	
Modes of protection (number of poles)			3+1 (L1/L2/L3-N + N-PE)	
Max Continuous Operating Voltage (L-N)		U_c	335 V ac	
Max Continuous Operating Voltage (N-PE)		U_c	255 V ac	
Test Class according to IEC 61643-11 Ed.1 (2011-03)			I and II	
Type according to EN 61643-11 (2012-10)			T1 and T2	
Impulse discharge current (10/350 µs) (L-N)		I_{imp}	13 kA	
Impulse discharge current (10/350 µs) (N-PE)		I_{imp}	52 kA	
Charge (L-N)		Q	6,5 As	
Charge (N-PE)		Q	26 As	
Nominal discharge current (8/20 µs) (L-N)		I_n	35 kA	
Nominal discharge current (8/20 µs) (N-PE)		I_n	52 kA	
Max. discharge current (8/20 µs) (L-N) and (N-PE)		I_{max}	70 kA	
Voltage protection level (L-N, L-PE) at a discharge current of:	1 kA	U_p	≤ 0,80 kV	≤ 1,50 kV
	5 kA	U_p	≤ 0,93 kV	≤ 1,50 kV
	13 kA	U_p	≤ 1,15 kV	≤ 1,50 kV
	20 kA	U_p	≤ 1,25 kV	≤ 1,50 kV
	35 kA	U_p	≤ 1,50 kV	≤ 1,50 kV
Voltage protection level (N-PE)		U_p	≤ 1,50 kV	
Response time (L-N / N-PE)		t_a	≤ 25 ns / ≤ 100 ns	
End of Life (L-N)			OCFM (Open Circuit Failure Mode)	
Behaviour in case of Temporary OverVoltage (TOV):	L-N	U_T	440 V / 120 min, withstand (W)	
	N-PE	U_T	1200 V / 200 ms, withstand (W)	
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	5 kA rms	
Short Circuit Current rating with max. backup protection fuse		I_{sccr}	100 kA rms	
Max. back-up protection with up-stream CB with a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability)			125 A (max. 4,50 x 10^5 A^2s)	
Max. back-up protection with FUSE at prospective short circuit currents of			160/125 A gG* (> 5 ÷ 100 kA rms)	
Follow current interrupt rating (L-N)		I_{fi}	NFC No Follow Current®	
Follow current interrupt rating (N-PE)		I_{fi}	100 A rms	
Status indicator (indication of disconnector operation) / N-PE (no disconnector)			3 colours with progressive performance indication / 2 colours for N-PE	
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%	
Terminal - Conductor size			4-35 mm^2 flexible / 4-50 mm^2 semi rigid	
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715	
Case material / Flammability grade			BMC / V-0 in accordance with UL 94	
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)	
Approximate weight			560 g	
Dimensions: width			70 mm (4 modules)	
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR	
GTIN (EAN)			8054890320702	

Model L 13/40 ... with remote signal contact	230 t ff 3+1
CODE	**214 141**
Remote signal contact	potential-free changeover contact
Terminal - conductor size for remote signal contact	max. 1,5 mm^2 flexible
Switching capacity remote signal contact	ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
GTIN (EAN)	8054890321341

*with fuse 125 A gG I_{imp}= 10 kA and I_{max}= 40 kA

TT



I 52 N-PE

I 52 N-PE is a voltage switching SPD providing a single mode of protection, typically installed in TT-systems between neutral conductor N and protective earth PE, where connection type CT2 (1+1 or 3+1) is required according to HD 60364-5-534, with the following features and benefits:

- **Impulse test classification: Test class I and II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 1 and 2** according to **EN 61643-11 (2012-10)**;
- I 52 N-PE is a Gas Discharge Tube (GDT) based SPD, for the protection of low voltage installations and equipment against direct and indirect lightning effects;
- Impulse discharge current of 52 kA 10/350 µs;
- Nominal discharge current of 52 kA 8/20 µs;
- The special housing is designed for "Pollution Degree 3";
- To be combined with L 25/100 230 ff or IA 25 230 for single-phase 230 V TT-systems and with L 13/40 230 ff or L 7/30 230 ff for single-phase and three-phase plus neutral 230/400 V TT-systems.

TECHNICAL DATA

Model I 52 N-PE

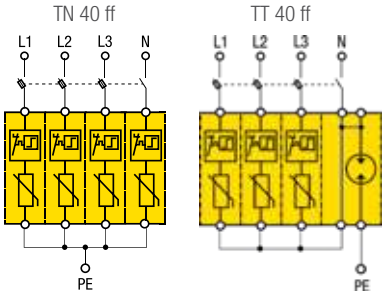
CODE		206 300
Nominal ac system voltage	U_N	230 V ac
Modes of protection (number of poles)		1 (N-PE)
Max Continuous Operating Voltage	U_c	255 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)		I and II
Type according to EN 61643-11 (2012-10)		T1 and T2
Impulse discharge current (10/350 µs)	I_{imp}	52 kA
Charge	Q	26 As
Nominal discharge current (8/20 µs)	I_n	52 kA
Max. discharge curret (8/20 µs)	I_{max}	70 kA
Follow current interrupt rating	I_{fi}	100 A rms
Voltage protection level	U_p	≤ 1,50 kV
Response time	t_a	≤ 100 ns
Behaviour in case of Temporary Overvoltage (TOV)	U_T	1200 V / 200 ms, withstand (W)
Operating temperature range / Humidity		-40 … +80 °C (extended) / 5% ... 95%
Terminal-Conductor size		4-35 mm² flexible / 4-50 mm² semi rigid
Busbar connections		fork-type busbar 16 mm²
Mounting		indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree / Degree of protection	PD / IP	3 / 20 (built-in)
Approximate weight		130 g
Dimensions: width		17,5 mm (1 module)
In bundle with		L 13/40 230 ff and L 7/30 230 ff
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR
GTIN (EAN)		8054890320726

Model I 52 N-PE t with remote signal contact

CODE		216 300
Remote signal contact		potential-free changeover contact
Terminal - conductor size for remote signal contact		max. 1,5 mm² flexible
Switching capacity		ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
GTIN (EAN)		8054890321488

TN

TT



Protection Box ...

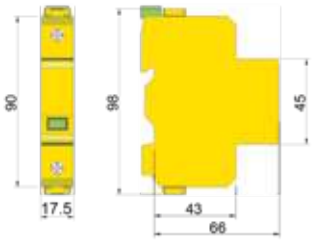
These Protection Boxes with an IP65 enclosure provide a compact and preinstalled solution for applications in Power Centers, when there is no remaining space in existing distribution boards, for outdoor applications as well as for line termination at or close to the origin of the installation where the lines may be subject to direct lightning strikes.
They are available as:

- **TN 40 ff with four voltage limiting SPDs (four modes of protection), for three-phase plus neutral 230/400 V TN-systems;**
- **TT 40 ff with three voltage limiting and a voltage switching SPD (four modes of protection), for three-phase plus neutral 230/400 V TT-systems where connection type CT2 (3+1) is required according to HD 60364-5-534.**

They provide the following features and benefits:

- **Impulse test classification: Test class I and II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 1 and 2** according to **EN 61643-11 (2012-10)**;
- They are suitable for installation at zone boundaries up to 0_A – 2 according to the lightning protection zones concept as defined in IEC 62305.

Model Protection Box ...			TN 40 ff	TT 40 ff	
CODE			**244 100**	**245 100**	
Nominal ac system voltage		U_N	230/400 V ac		
Max Continuous Operating Voltage		U_c	335 V ac	-	
Max Continuous Operating Voltage (L-N, L-PE)		U_c	-	335 V ac	255 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)			I and II		
Type according to EN 61643-11 (2012-10)			T1 and T2		
Impulse discharge current (10/350 µs) (L-N, L-PE)		I_{imp}	5 kA	10 kA	
Impulse discharge current (10/350 µs) (N-PE)		I_{imp}	5 kA	100 kA	
Charge (L-N, L-PE)		Q	12,5 As	5 As	
Charge (N-PE)		Q	12,5 As	50 As	
Nominal discharge current (8/20 µs) (L-N, L-PE)		I_n	40 kA	40 kA	
Nominal discharge current (8/20 µs) (N-PE)		I_n	40 kA	100 kA	
Max. discharge current (8/20 µs) (L-N, L-PE)		I_{max}	40 kA	40 kA	
Max. discharge current (8/20 µs) (N-PE)		I_{max}	40 kA	100 kA	
Voltage protection level at a discharge current of:			(L-PE)	(L-N)	(L-PE)
	1 kA	U_p	≤ 0,75 kV	≤ 0,75 kV	≤ 1,50 kV
	5 kA	U_p	≤ 0,85 kV	≤ 0,85 kV	≤ 1,50 kV
	10 kA	U_p	≤ 1,00 kV	≤ 1,00 kV	≤ 1,50 kV
	20 kA	U_p	≤ 1,15 kV	≤ 1,15 kV	≤ 1,50 kV
	40 kA	U_p	≤ 1,50 kV	≤ 1,50 kV	≤ 1,50 kV
Voltage protection level (N-PE)		U_p	≤ 1,50 kV	≤ 1,50 kV	
Response time (L-N , L-PE / N-PE)		t_a	≤ 25 ns	≤ 25 ns / ≤ 100 ns	
End of Life			OCFM (Open Circuit Failure Mode)		
Behaviour in case of Temporary Overvoltage (TOV):	L-N	U_T	440 V / 120 min, withstand (W)	440 V / 120 min, withstand (W)	
	N-PE	U_T	440 V / 120 min, withstand (W)	1200 V / 200 ms, withstand (W)	
Max. back-up protection with fuse (L)			125 A gG (incorporated)		
Short circuit current rating with max. back-up protection		I_{sccr}	50 kA rms		
Follow current interrupt rating (L-N)		I_{fi}	NFC No Follow Current®	NFC No Follow Current®	
Follow current interrupt rating (N-PE)		I_{fi}	NFC No Follow Current®	100 A rms	
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%		
Terminal-Conductor size			16 mm² flexible		
Approximate weight			2460 g		
Size			l 300 x h 400 x d 140 mm		
Degree of protection		IP	65 (enclosure)		
Remote signal contact			changeover contact		
Terminal - conductor size for remote signal contact			max. 1,5 mm² flexible		
Switching capacity remote signal contact			ac: 250 V / 0,5 A - dc: 125 V / 0,2 A; 75 V / 0,5 A		
GTIN (EAN)			8054890321846	8054890321860	



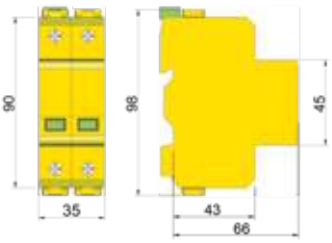
L 7/30 ... ff

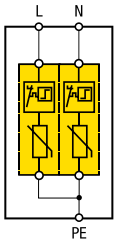
L 7/30 ... ff is a voltage limiting SPD providing a single mode of protection, typically installed at the origin of the installation, e.g. in the Main Distribution Board (MDB), in TN-systems or in TT-systems in combination with N-PE SPD model I 100, I 52 and with connection type CT2 (3+1 or 1+1). Additional models are also available for the protection of wind turbines.
It provides the following features and benefits:

- **Impulse test classification: Test class I and II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 1 and 2** according to **EN 61643-11 (2012-10)**;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms (for U_N 230/400 V)**;
- **Three colour Status Indicator with progressive indication of remaining performance.**

				Mini Wind Turbines	Wind Turbines	
Model L 7/30 ...		230 ff	400 ff	600 ff	750 ff	1000 ff
CODE		**207 100**	**207 104**	**207 106**	**207 107**	**207 110**
Nominal ac system voltage	U_N	230/400 V ac	400/690 V ac	480/830 V ac	554/960 V ac	554/960 V ac
Modes of protection (number of poles)		1				
Max Continuous Operating Voltage	U_c	335 V ac	460 V ac	690 V ac	750 V ac	1000 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)		I and II				
Type according to EN 61643-11 (2012-10)		T1 and T2				
Impulse discharge current (10/350 µs)	I_{imp}	8 kA	7 kA	5 kA		2 kA
Charge	Q	4,0 As	3,5 As	2,5 As		1 As
Nominal discharge current (8/20 µs)	I_n	30 kA		25 kA	20 kA	20 kA
Max. discharge current (8/20 µs)	I_{max}	40 kA				
Voltage protection level at a discharge current of: 1 kA	U_p	≤ 0,80 kV	≤ 1,20 kV	≤ 1,75 kV	≤ 1,85 kV	≤ 3,00 kV
5 kA	U_p	≤ 0,96 kV	≤ 1,46 kV	≤ 2,15 kV	≤ 2,25 kV	≤ 3,50 kV
15 kA	U_p	≤ 1,30 kV	≤ 1,90 kV	≤ 2,72 kV	≤ 2,75 kV	≤ 4,20 kV
20 kA	U_p	≤ 1,35 kV	≤ 1,95 kV	≤ 2,80 kV	≤ 2,85 kV	≤ 4,40 kV
25 kA	U_p	≤ 1,40 kV	≤ 2,03 kV	≤ 2,90 kV	-	-
30 kA	U_p	≤ 1,50 kV	≤ 2,15 kV	-	-	-
Response time	t_a	≤ 25 ns				
End of Life		OCFM (Open Circuit Failure Mode)				
Behaviour in case of Temporary OverVoltage (TOV) 5 s	U_T	440 V, (W)	581 V, (W)	697 V, (W)	805 V, (W)	1452 V, (W)
withstand (W) / safe (S): 120 min	U_T	440 V, (W)	797 V, (S)	915 V, (S)	1056 V, (S)	1930 V, (S)
Short Circuit Current rating without backup protection (internal disconnector)	I_{sccr}	5 kA rms	3 kA rms	2 kA rms	2 kA rms	2 kA rms
Short Circuit Current rating with max. backup protection fuse	I_{sccr}	100 kA rms	100 kA rms	100 kA rms	100 kA rms	100 kA rms
Max. back-up protection with up-stream CB with max. let-through energy of (max. prospective short circuit current depends on CB breaking capability)		160 A (max.4,5x10^5 A^{2}s)	160 A (max.4,5x10^5 A^{2}s)	-	-	-
Max. back-up protection with FUSE at prospective short circuit current of		125 A gG at (>5÷100 kA rms)	125 A gG at (>3÷100 kA rms)	125 A gG at (>2÷100 kA rms)	125 A gG at (>2÷100 kA rms)	100 A aM (>2÷100 kA rms)
Follow current interrupt rating	I_{fi}	NFC No Follow Current®				
Status indicator (indication of disconnector operation)		3 colours with progressive performance indication				
Operating temperature range / Humidity		-40 … +80 °C (extended) / 5% ... 95%				
Terminal - Conductor size		4-35 mm^2 flexible / 4-50 mm^2 semi rigid				
Busbar connections		fork-type busbar 16 mm^2				
Mounting		indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715				
Case material / Flammability grade		BMC / V-0 in accordance with UL 94				
Pollution degree / Degree of protection	PD/IP	3 / 20 (built-in)		2 / 20 (built-in)		
Approximate weight		130 g	175 g	180 g	190 g	190 g
Dimensions: width		17,5 mm (1 module)				
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR				CTI Test Report
GTIN (EAN)		8054890320733	8054890320740	8054890320757	8054890320764	8054890321778

Model L 7/30 ... with remote signal contact		230 t ff	400 t ff	600 t ff	750 t ff	1000 t ff
CODE		**217 100**	**217 104**	**217 106**	**217 107**	**217 110**
Remote signal contact		potential-free changeover contact				
Terminal - conductor size for remote signal contact		max. 1,5 mm^2 flexible				
Switching capacity remote signal contact		ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A				
GTIN (EAN)		8054890321495	8054890321501	8054890321518	8054890321525	8054890321785





L 7/30 230 ff 2

L 7/30 230 ff 2 is a ready to install assembly of two voltage limiting SPDs providing two modes of protection, typically installed at the origin of the installation, e.g. in the Main Distribution Board (MDB), for single-phase 230 V TN-systems, with the following features and benefits:

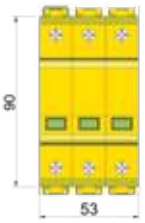
- **Impulse test classification: Test class I and II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 1 and 2** according to **EN 61643-11 (2012-10)**;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms;**
- **Three colour Status Indicator with progressive indication of remaining performance.**

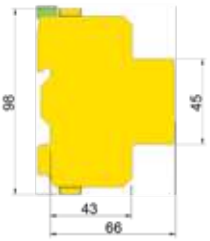
TECHNICAL DATA

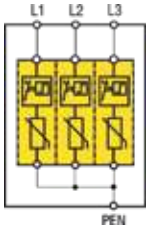
Model L 7/30 ...			230 ff 2
CODE			**207 120**
Nominal ac system voltage		U_N	230 V ac
Modes of protection (number of poles)			2
Max Continuous Operating Voltage		U_c	335 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)			I and II
Type according to EN 61643-11 (2012-10)			T1 and T2
Impulse discharge current (10/350 µs)		I_{imp}	8 kA
Charge		Q	4 As
Nominal discharge current (8/20 µs)		I_n	30 kA
Max. discharge current (8/20 µs)		I_{max}	40 kA
Voltage protection level at a discharge current of:	1 kA	U_p	≤ 0,81 kV
	5 kA	U_p	≤ 0,98 kV
	20 kA	U_p	≤ 1,35 kV
	25 kA	U_p	≤ 1,45 kV
	30 kA	U_p	≤ 1,60 kV
Response time		t_a	≤ 25 ns
End of Life			OCFM (Open Circuit Failure Mode)
Behaviour in case of Temporary OverVoltage (TOV)		U_T	440 V / 120 min, withstand (W)
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	5 kA rms
Short Circuit Current rating with max. backup protection fuse		I_{sccr}	100 kA rms
Max. back-up protection with up-stream CB with a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability)			160 A (max. 4,50 x 10^5 A^2s)
Max. back-up protection with FUSE at prospective short circuit currents of			125 A gG (> 5 ÷ 100 kA rms)
Follow current interrupt rating		I_{fi}	NFC No Follow Current®
Status indicator (indication of disconnector operation)			3 colours with progressive performance indication
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%
Terminal - Conductor size			4-35 mm^2 flexible / 4-50 mm^2 semi rigid
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715
Case material / Flammability grade			BMC / V-0 in accordance with UL 94
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)
Approximate weight			260 g
Dimensions: width			35 mm (2 modules)
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR
GTIN (EAN)			8054890320771

Model L 7/30 ... with remote signal contact		230 t ff 2
CODE		**217 120**
Remote signal contact		potential-free changeover contact
Terminal - conductor size for remote signal contact		max. 1,5 mm^2 flexible
Switching capacity remote signal contact		ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
GTIN (EAN)		8054890321532

TN







L 7/30 ... ff 3

L 7/30...ff 3 is a ready to install assembly of three voltage limiting SPDs providing three modes of protection, typically installed at the origin of the installation, e.g. in the Main Distribution Board (MDB), for three-phase TN systems, with the following features and benefits:

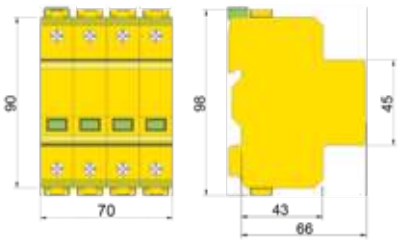
- **Impulse test classification: Test class I and II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 1 and 2** according to **EN 61643-11 (2012-10)**;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms (for U_N 230/400 V);**
- **Three colour Status Indicator with progressive indication of remaining performance.**

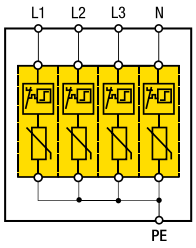
TECHNICAL DATA

			Wind Turbines
Model L 7/30 ...		230 ff 3	750 ff 3
CODE		**207 130**	**207 137**
Nominal ac system voltage	U_N	230/400 V ac	554/960 V ac
Modes of protection (number of poles)		3	
Max Continuous Operating Voltage	U_c	335 V ac	750 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)		I and II	
Type according to EN 61643-11 (2012-10)		T1 and T2	
Impulse discharge current (10/350 µs)	I_{imp}	8 kA	5 kA
Charge	Q	4 As	2,5 As
Nominal discharge current (8/20 µs)	I_n	30 kA	20 kA
Max. discharge current (8/20 µs)	I_{max}	40 kA	
Voltage protection level at a discharge current of: 1 kA	U_p	≤ 0,81 kV	≤ 1,90 kV
5 kA	U_p	≤ 0,98 kV	≤ 2,30 kV
20 kA	U_p	≤ 1,35 kV	≤ 2,75 kV
25 kA	U_p	≤ 1,45 kV	-
30 kA	U_p	≤ 1,60 kV	-
Response time	t_a	≤ 25 ns	
End of Life		OCFM (Open Circuit Failure Mode)	
Behaviour in case of Temporary OverVoltage (TOV)	U_T	440 V / 5 s, (W)	805 V / 5 s, (W)
withstand (W) / safe (S):	U_T	440 V / 120 min, (W)	1056 V / 120 min, (S)
Short Circuit Current rating without backup protection (internal disconnector)	I_{sccr}	5 kA rms	2 kA rms
Short Circuit Current rating with max. backup protection fuse	I_{sccr}	100 kA rms	100 kA rms
Max. back-up protection with up-stream CB with max. let-through energy of (max. prospective short circuit current depends on CB breaking capability)		160 A (max.4,50x10^5 A^{2}s)	-
Max. back-up protection with FUSE at prospective short circuit current of		125 A gG at (> 5 ÷ 100 kA rms)	125 A gG at (> 2 ÷ 100 kA rms)
Follow current interrupt rating	I_{fi}	NFC No Follow Current®	
Status indicator (indication of disconnector operation)		3 colours with progressive performance indication	
Operating temperature range / Humidity		-40 … +80 °C (extended) / 5% ... 95%	
Terminal - Conductor size		4-35 mm² flexible / 4-50 mm² semi rigid	
Mounting		indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715	
Case material / Flammability grade		BMC / V-0 in accordance with UL 94	
Pollution degree / Degree of protection	PD / IP	3 / 20 (built-in)	2 / 20 (built-in)
Approximate weight		491 g	582 g
Dimensions: width		53 mm (3 modules)	
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR	
GTIN (EAN)		8054890320795	8054890320801

Model L 7/30 ... with remote signal contact		230 t ff 3	750 t ff 3
CODE		**217 130**	**217 137**
Remote signal contact		potential-free changeover contact	
Terminal - conductor size for remote signal contact		max. 1,5 mm² flexible	
Switching capacity remote signal contact		ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A	
GTIN (EAN)		8054890321556	8054890321563

TN





L 7/30 230 ff 4

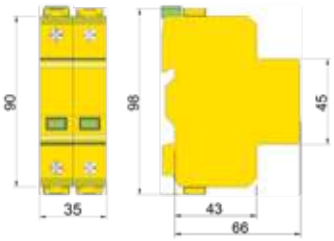
L 7/30 230 ff 4 is a ready to install assembly of four voltage limiting SPDs providing four modes of protection, typically installed at the origin of the installation, e.g. in the Main Distribution Board (MDB), for three-phase plus neutral 230/400 V TN-systems, with the following features and benefits:

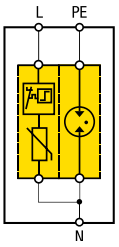
- **Impulse test classification: Test class I and II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 1 and 2** according to **EN 61643-11 (2012-10)**;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms;**
- **Three colour Status Indicator with progressive indication of remaining performance.**

TECHNICAL DATA

Model L 7/30 ...			230 ff 4
CODE			**207 140**
Nominal ac system voltage		U_N	230/400 V ac
Modes of protection (number of poles)			4
Max Continuous Operating Voltage		U_c	335 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)			I and II
Type according to EN 61643-11 (2012-10)			T1 and T2
Impulse discharge current (10/350 µs)		I_{imp}	8 kA
Charge		Q	4 As
Nominal discharge current (8/20 µs)		I_n	30 kA
Max. discharge current (8/20 µs)		I_{max}	40 kA
Voltage protection level at a discharge current of:	1 kA	U_p	≤ 0,81 kV
	5 kA	U_p	≤ 0,98 kV
	20 kA	U_p	≤ 1,35 kV
	25 kA	U_p	≤ 1,45 kV
	30 kA	U_p	≤ 1,60 kV
Response time		t_a	≤ 25 ns
End of Life			OCFM (Open Circuit Failure Mode)
Behaviour in case of Temporary OverVoltage (TOV)		U_T	440 V / 120 min, withstand (W)
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	5 kA rms
Short Circuit Current rating with max. backup protection fuse		I_{sccr}	100 kA rms
Max. back-up protection with up-stream CB with a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability)			160 A (max. 4,50 x 10^5 A^2s)
Max. back-up protection with FUSE at prospective short circuit currents of			125 A gG (> 5 ÷ 100 kA rms)
Follow current interrupt rating		I_{fi}	NFC No Follow Current®
Status indicator (indication of disconnector operation)			3 colours with progressive performance indication
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%
Terminal - Conductor size			4-35 mm^2 flexible / 4-50 mm^2 semi rigid
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715
Case material / Flammability grade			BMC / V-0 in accordance with UL 94
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)
Approximate weight			520 g
Dimensions: width			70 mm (4 modules)
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR
GTIN (EAN)			8054890320818

Model L 7/30 ... with remote signal contact			230 t ff 4
CODE			**217 140**
Remote signal contact			potential-free changeover contact
Terminal - conductor size for remote signal contact			max. 1,5 mm^2 flexible
Switching capacity remote signal contact			ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
GTIN (EAN)			8054890321570





L 7/30 230 ff 1+1

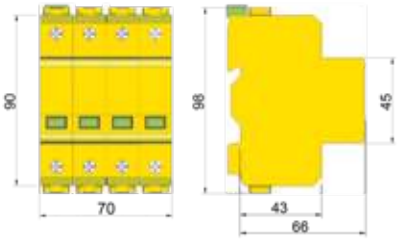
L 7/30 230 ff 1+1 is a ready to install assembly of a voltage limiting and a voltage switching SPD providing two modes of protection, typically installed in single-phase 230 V TT-systems where connection type CT2 (1+1) is required according to HD 60364-5-534, e.g. in the Main Distribution Board (MDB), with the following features and benefits:

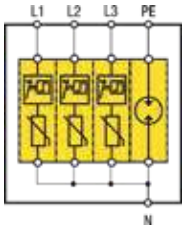
- **Impulse test classification: Test class I and II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 1 and 2** according to **EN 61643-11 (2012-10)**;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms;**
- **Three colour Status Indicator with progressive indication of remaining performance.**

Model L 7/30 ...			230 ff 1+1	
CODE			**207 121**	
Nominal ac system voltage		U_N	230 V ac	
Modes of protection (number of poles)			1+1 (L-N + N-PE)	
Max Continuous Operating Voltage (L-N)		U_c	335 V ac	
Max Continuous Operating Voltage (N-PE)		U_c	255 V ac	
Test Class according to IEC 61643-11 Ed.1 (2011-03)			I and II	
Type according to EN 61643-11 (2012-10)			T1 and T2	
Impulse discharge current (10/350 µs) (L-N)		I_{imp}	8 kA	
Impulse discharge current (10/350 µs) (N-PE)		I_{imp}	52 kA	
Charge (L-N)		Q	4 As	
Charge (N-PE)		Q	26 As	
Nominal discharge current (8/20 µs) (L-N)		I_n	30 kA	
Nominal discharge current (8/20 µs) (N-PE)		I_n	52 kA	
Max. discharge current (8/20 µs) (L-N)		I_{max}	40 kA	
Max. discharge current (8/20 µs) (N-PE)		I_{max}	70 kA	
Voltage protection level (L-N, L-PE) at a discharge current of:	1 kA	U_p	≤ 0,81 kV	≤ 1,50 kV
	5 kA	U_p	≤ 0,98 kV	≤ 1,50 kV
	20 kA	U_p	≤ 1,35 kV	≤ 1,50 kV
	25 kA	U_p	≤ 1,45 kV	≤ 1,50 kV
	30 kA	U_p	≤ 1,60 kV	≤ 1,60 kV
Voltage protection level (N-PE)		U_p	≤ 1,50 kV	
Response time (L-N / N-PE)		t_a	≤ 25 ns / ≤ 100 ns	
End of Life (L-N)			OCFM (Open Circuit Failure Mode)	
Behaviour in case of Temporary OverVoltage (TOV)	L-N	U_T	440 V / 120 min, withstand (W)	
	N-PE	U_T	1200 V / 200 ms, withstand (W)	
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	5 kA rms	
Short Circuit Current rating with max. backup protection fuse		I_{sccr}	100 kA rms	
Max. back-up protection with up-stream CB having a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability)			160 A (max. 4,50 x 10^5 A^2s)	
Max. back-up protection with FUSE at prospective short circuit currents of			125 A gG (> 5 ÷ 100 kA rms)	
Follow current interrupt rating (L-N)		I_{fi}	NFC No Follow Current®	
Follow current interrupt rating (N-PE)		I_{fi}	100 A rms	
Status indicator (indication of disconnector operation) / N-PE (no disconnector)			3 colours with progressive performance indication / 2 colours for N-PE	
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%	
Terminal - Conductor size			4-35 mm^2 flexible / 4-50 mm^2 semi rigid	
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715	
Case material / Flammability grade			BMC / V-0 in accordance with UL 94	
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)	
Approximate weight			260 g	
Dimensions: width			35 mm (2 modules)	
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR	
GTIN (EAN)			8054890320788	

Model L 7/30 ... with remote signal contact		230 t ff 1+1
CODE		**217 121**
Remote signal contact		potential-free changeover contact
Terminal - conductor size for remote signal contact		max. 1,5 mm^2 flexible
Switching capacity remote signal contact		ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
GTIN (EAN)		8054890321549

TT





L 7/30 230 ff 3+1

L 7/30 230 ff 3+1 is a ready to install assembly of three voltage limiting and a voltage switching SPD providing four modes of protection, typically installed in three-phase plus neutral 230/400 V TT-systems where connection type CT2 (3+1) is required according to HD 60364-5-534, e.g. in the Main Distribution Board (MDB), with the following features and benefits:

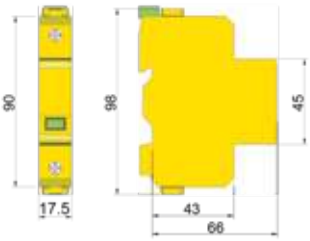
- **Impulse test classification: Test class I and II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 1 and 2** according to **EN 61643-11 (2012-10)**;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms;**
- **Three colour Status Indicator with progressive indication of remaining performance.**

Model L 7/30 ...			230 ff 3+1	
CODE			**207 141**	
Nominal ac system voltage		U_N	230/400 V ac	
Modes of protection (number of poles)			3+1 (L1/L2/L3-N + N-PE)	
Max Continuous Operating Voltage (L-N)		U_C	335 V ac	
Max Continuous Operating Voltage (N-PE)		U_C	255 V ac	
Test Class according to IEC 61643-11 Ed.1 (2011-03)			I and II	
Type according to EN 61643-11 (2012-10)			T1 and T2	
Impulse discharge current (10/350 µs) (L-N)		I_{imp}	8 kA	
Impulse discharge current (10/350 µs) (N-PE)		I_{imp}	52 kA	
Charge (L-N)		Q	4 As	
Charge (N-PE)		Q	26 As	
Nominal discharge current (8/20 µs) (L-N)		I_n	30 kA	
Nominal discharge current (8/20 µs) (N-PE)		I_n	52 kA	
Max. discharge current (8/20 µs) (L-N)		I_{max}	40 kA	
Max. discharge current (8/20 µs) (N-PE)		I_{max}	70 kA	
Voltage protection level (L-N, L-PE) at a discharge current of:	1 kA	U_p	≤ 0,81 kV	≤ 1,50 kV
	5 kA	U_p	≤ 0,98 kV	≤ 1,50 kV
	20 kA	U_p	≤ 1,35 kV	≤ 1,50 kV
	25 kA	U_p	≤ 1,45 kV	≤ 1,50 kV
	30 kA	U_p	≤ 1,60 kV	≤ 1,60 kV
Voltage protection level (N-PE)		U_p	≤ 1,50 kV	
Response time (L-N / N-PE)		t_a	≤ 25 ns / ≤ 100 ns	
End of Life (L-N)			OCFM (Open Circuit Failure Mode)	
Behaviour in case of Temporary OverVoltage (TOV):	L-N	U_T	440 V / 120 min, withstand (W)	
	N-PE	U_T	1200 V / 200 ms, withstand (W)	
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	5 kA rms	
Short Circuit Current rating with max. backup protection fuse		I_{sccr}	100 kA rms	
Max. back-up protection with up-stream CB having a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability)			160 A (max. 4,50 x 10^5 A^2s)	
Max. back-up protection with FUSE at prospective short circuit currents of			125 A gG (> 5 ÷ 100 kA rms)	
Follow current interrupt rating (L-N)		I_{fi}	NFC No Follow Current®	
Follow current interrupt rating (N-PE)		I_{fi}	100 A rms	
Status indicator (indication of disconnector operation) / N-PE (no disconnector)			3 colours with progressive performance indication / 2 colours for N-PE	
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%	
Terminal - Conductor size			4-35 mm^2 flexible / 4-50 mm^2 semi rigid	
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715	
Case material / Flammability grade			BMC / V-0 in accordance with UL 94	
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)	
Approximate weight			520 g	
Dimensions: width			70 mm (4 modules)	
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR	
GTIN (EAN)			8054890320825	

Model L 7/30 ... with remote signal contact		230 t ff 3+1
CODE		**217 141**
Remote signal contact		potential-free changeover contact
Terminal - conductor size for remote signal contact		max. 1,5 mm^2 flexible
Switching capacity remote signal contact		ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
GTIN (EAN)		8054890321587

TN

TT



L 3/30 ... ff

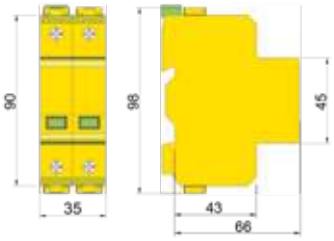
L 3/30 ... ff is a voltage limiting SPD providing a single mode of protection, typically installed in Sub Distribution Boards (SDBs), in TN-systems or in TT-systems in combination with N-PE SPD model I 100, I 52 or I 12 and with connection type CT2 (1+1 or 3+1). It provides the following features and benefits:

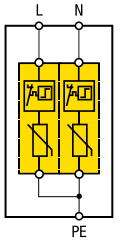
- **Impulse test classification: Test class II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 2** according to **EN 61643-11 (2012-10)**;
- L 3/30 ... ff is a voltage limiting SPD, for the protection of low voltage installations and equipment against indirect lightning effects;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms (for U_N 230/400 V);**
- Short circuit current withstand of 50 kA rms with max. back-up fuse;
- **Three colour Status Indicator with progressive indication of remaining performance.**

Model L 3/30 ...		60 ff	120 ff	230 ff	400 ff
CODE		**200 102**	**200 103**	**200 100**	**200 104**
Nominal ac system voltage	U_N	60/104 V ac	120/208 V ac	230/400 V ac	400/690 V ac
Modes of protection (number of poles)		1			
Max Continuous Operating Voltage	U_c	75 V ac	150 V ac	335 V ac	460 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)		II			
Type according to EN 61643-11 (2012-10)		T2			
Nominal discharge current (8/20 µs)	I_n	20 kA	20 kA	30 kA	30 kA
Max. discharge current (8/20 µs)	I_{max}	30 kA	30 kA	40 kA	40 kA
Voltage protection level at a discharge current of: 1 kA	U_p	≤ 0,22 kV	≤ 0,42 kV	≤ 0,81 kV	≤ 1,20 kV
5 kA	U_p	≤ 0,28 kV	≤ 0,50 kV	≤ 1,00 kV	≤ 1,45 kV
10 kA	U_p	≤ 0,36 kV	≤ 0,60 kV	≤ 1,20 kV	≤ 1,58 kV
20 kA	U_p	≤ 0,50 kV	≤ 0,80 kV	≤ 1,35 kV	≤ 1,90 kV
30 kA	U_p	-	-	≤ 1,50 kV	≤ 2,15 kV
Response time	t_a	≤ 25 ns			
End of Life		OCFM (Open Circuit Failure Mode)			
Behaviour in case of Temp. OverVoltage (TOV)	U_T	87 V / 5 s, (W)	174 V / 5 s, (W)	440 V / 5 s, (W)	607 V / 5 s, (W)
withstand (W)/safe (S):	U_T	115 V / 120 min, (W)	230 V / 120 min, (S)	440 V / 120min, (W)	760 V / 120 min, (S)
Short Circuit Current rating without backup protection (internal disconnector)	I_{sccr}	5 kA rms			3 kA rms
Short Circuit Current rating with max. backup protection fuse	I_{sccr}	50 kA rms			
Max. back-up protection with up-stream CB with max. let-through energy of		160 A	160 A	160 A	160 A
(max. prospective short circuit current depends on CB breaking capability)		(max.4,80x10^5 A^{2}s)	(max.4,80x10^5 A^{2}s)	(max.4,50x10^5 A^{2}s)	(max.4,50x10^5 A^{2}s)
Max. back-up protection with FUSE at prospective short circuit current of		125 A gG at (> 5 ÷ 50 kA rms)	125 A gG at (> 5 ÷ 50 kA rms)	125 A gG at (> 5 ÷ 50 kA rms)	125 A gG at (> 3 ÷ 50 kA rms)
Follow current interrupt rating	I_{fi}	NFC No Follow Current®			
Status indicator (indication of disconnector operation)		3 colors with progressive performance indication			
Operating temperature range / Humidity		-40 … +80 °C (extended) / 5% ... 95%			
Terminal - Conductor size		4-35 mm^2 flexible / 4-50 mm^2 semi rigid			
Busbar connections		fork-type busbar 16 mm^2			
Mounting		indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715			
Case material / Flammability grade		BMC / V-0 in accordance with UL 94			
Pollution degree / Degree of protection	PD/IP	3 / 20 (built-in)			
Approximate weight		120 g	140 g	160 g	175 g
Dimensions: width		17,5 mm (1 module)			
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR			
GTIN (EAN)		8054890320405	8054890320412	8054890320399	8054890320429

Model L 3/30 ... with remote signal contact		60 t ff	120 t ff	230 t ff	400 t ff
CODE		**210 102**	**210 103**	**210 100**	**210 104**
Remote signal contact		potential-free changeover contact			
Terminal - conductor size for remote signal contact		max. 1,5 mm^2 flexible			
Switching capacity remote signal contact		ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A			
GTIN (EAN)		8054890320993	8054890321006	8054890320986	8054890321013

TN





L 3/30 230 ff 2

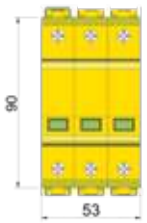
L 3/30 230 ff 2 is a ready to install assembly of two voltage limiting SPDs, providing two modes of protection, typically installed in Sub Distribution Boards (SDBs) for single-phase 230 V TN-systems, with the following features and benefits:

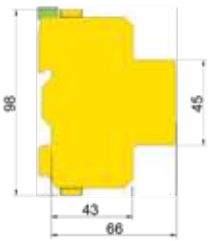
- **Impulse test classification: Test class II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 2** according to **EN 61643-11 (2012-10)**;
- L 3/30 230 ff 2 is a voltage limiting SPD, for the protection of low voltage installations and equipment against indirect lightning effects;
- Nominal discharge current of 30 kA 8/20 µs;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms;**
- Short circuit current withstand of 50 kA rms with max. back-up fuse;
- **Three colour Status Indicator with progressive indication of remaining performance.**

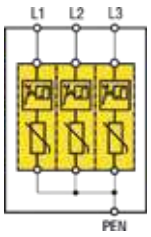
Model L 3/30 ...			230 ff 2
CODE			**200 120**
Nominal ac system voltage		U_N	230 V ac
Modes of protection (number of poles)			2
Max Continuous Operating Voltage		U_c	335 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)			II
Type according to EN 61643-11 (2012-10)			T2
Nominal discharge current (8/20 µs)		I_n	30 kA
Max. discharge current (8/20 µs)		I_{max}	40 kA
Voltage protection level at a discharge current of:	1 kA	U_p	≤ 0,82 kV
	5 kA	U_p	≤ 1,00 kV
	10 kA	U_p	≤ 1,25 kV
	20 kA	U_p	≤ 1,40 kV
	30 kA	U_p	≤ 1,60 kV
Response time		t_a	≤ 25 ns
End of Life			OCFM (Open Circuit Failure Mode)
Behaviour in case of Temporary OverVoltage (TOV)		U_T	440 V / 120 min, withstand (W)
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	5 kA rms
Short Circuit Current rating with max. backup protection fuse		I_{sccr}	50 kA rms
Max. back-up protection with up-stream CB with a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability)			160 A (max. 4,50 x 10^5 A^2s)
Max. back-up protection with FUSE at prospective short circuit currents of			125 A gG (> 5 ÷ 50 kA rms)
Follow current interrupt rating		I_{fi}	NFC No Follow Current®
Status indicator (indication of disconnector operation)			3 colours with progressive performance indication
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%
Terminal - Conductor size			4-35 mm^2 flexible / 4-50 mm^2 semi rigid
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715
Case material / Flammability grade			BMC / V-0 in accordance with UL 94
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)
Approximate weight			240 g
Dimensions: width			35 mm (2 modules)
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR
GTIN (EAN)			8054890320436

Model L 3/30 ... with remote signal contact			230 t ff 2
CODE			**210 120**
Remote signal contact			potential-free changeover contact
Terminal - conductor size for remote signal contact			max. 1,5 mm^2 flexible
Switching capacity remote signal contact			ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
GTIN (EAN)			8054890321068

TN







L 3/30 230 ff 3

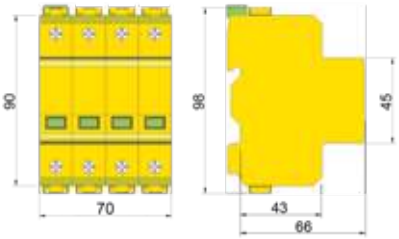
L 3/30 230 ff 3 is a ready to install assembly of three voltage limiting SPDs providing three modes of protection, typically installed in Sub Distribution Boards (SDBs) for three-phase 230/400 V TN-systems, with the following features and benefits:

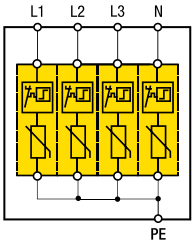
- **Impulse test classification: Test class II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 2** according to **EN 61643-11 (2012-10)**;
- L 3/30 230 ff 3 is a voltage limiting SPD, for the protection of low voltage installations and equipment against indirect lightning effects;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms;**
- Short circuit current withstand of 50 kA rms with max. back-up fuse;
- **Three colour Status Indicator with progressive indication of remaining performance.**

TECHNICAL DATA

Model L 3/30 ...			230 ff 3
CODE			**200 130**
Nominal ac system voltage		U_N	230/400 V ac
Modes of protection (number of poles)			3
Max Continuous Operating Voltage		U_c	335 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)			II
Type according to EN 61643-11 (2012-10)			T2
Nominal discharge current (8/20 µs)		I_n	30 kA
Max. discharge current (8/20 µs)		I_{max}	40 kA
Voltage protection level at a discharge current of:	1 kA	U_p	≤ 0,82 kV
	5 kA	U_p	≤ 1,00 kV
	10 kA	U_p	≤ 1,25 kV
	20 kA	U_p	≤ 1,40 kV
	30 kA	U_p	≤ 1,60 kV
Reaction time		t_a	≤ 25 ns
End of Life			OCFM (open circuit failure mode)
Behaviour in case of Temporary OverVoltage (TOV)		U_T	440 V / 120 min, withstand (W)
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	5 kA rms
Short Circuit Current rating with max. backup protection fuse		I_{sccr}	50 kA rms
Max. back-up protection with up-stream CB with a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability)			160 A (max. 4,50 x 10^5 A^2s)
Max. back-up protection with FUSE at prospective short circuit currents of			125 A gG (> 5 ÷ 50 kA rms)
Follow current interrupt rating		I_{fi}	NFC No Follow Current®
Status indicator (indication of disconnector operation)			3 colours with progressive performance indication
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%
Terminal - Conductor size			4-35 mm^2 flexible / 4-50 mm^2 semi rigid
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715
Case material / Flammability grade			BMC / V-0 in accordance with UL 94
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)
Approximate weight			350 g
Dimensions: width			53 mm (3 modules)
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR
GTIN (EAN)			8054890320450

Model L 3/30 ... with remote signal contact			230 t ff 3
CODE			**210 130**
Remote signal contact			potential-free changeover contact
Terminal - conductor size for remote signal contact			max. 1,5 mm^2 flexible
Switching capacity remote signal contact			ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
GTIN (EAN)			8054890321099





L 3/30 230 ff 4

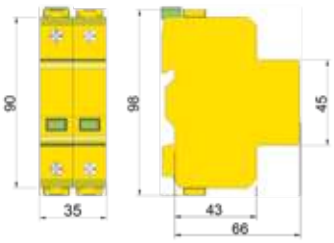
L 3/30 230 ff 4 is a ready to install assembly of four voltage limiting SPDs providing four modes of protection, typically installed in Sub Distribution Boards (SDBs) for three-phase plus neutral 230/400 V TN-systems, with the following features and benefits:

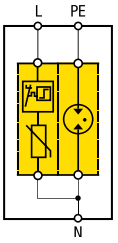
- **Impulse test classification: Test class II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 2** according to **EN 61643-11 (2012-10)**;
- L 3/30 230 ff 4 is a voltage limiting SPD, for the protection of low voltage installations and equipment against indirect lightning effects;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms;**
- Short circuit current of 50 kA rms with max. back-up fuse;
- **Three colour Status Indicator with progressive indication of remaining performance.**

Model L 3/30 ...			230 ff 4
CODE			**200 140**
Nominal ac system voltage		U_N	230/400 V ac
Modes of protection (number of poles)			4
Max Continuous Operating Voltage		U_c	335 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)			II
Type according to EN 61643-11 (2012-10)			T2
Nominal discharge current (8/20 µs)		I_n	30 kA
Max. discharge current (8/20 µs)		I_{max}	40 kA
Voltage protection level at a discharge current of:	1 kA	U_p	≤ 0,82 kV
	5 kA	U_p	≤ 1,00 kV
	10 kA	U_p	≤ 1,25 kV
	20 kA	U_p	≤ 1,40 kV
	30 kA	U_p	≤ 1,60 kV
Response time		t_a	≤ 25 ns
End of Life			OCFM (open circuit failure mode)
Behaviour in case of Temporary OverVoltage (TOV)		U_T	440 V / 120 min, withstand (W)
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	5 kA rms
Short Circuit Current rating with max. backup protection fuse		I_{sccr}	50 kA rms
Max. back-up protection with up-stream CB with a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability)			160 A (max. 4,50 x 10^5 A^2s)
Max. back-up protection with FUSE at prospective short circuit currents of			125 A gG (> 5 ÷ 50 kA rms)
Follow current interrupt rating		I_{fi}	NFC No Follow Current®
Status indicator (indication of disconnector operation)			3 colours with progressive performance indication
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%
Terminal - Conductor size			4-35 mm^2 flexible / 4-50 mm^2 semi rigid
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715
Case material / Flammability grade			BMC / V-0 in accordance with UL 94
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)
Approximate weight			480 g
Dimensions: width			70 mm (4 modules)
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR
GTIN (EAN)			8054890320467

Model L 3/30 ... with remote signal contact			230 t ff 4
CODE			**210 140**
Remote signal contact			potential-free changeover contact
Terminal - conductor size for remote signal contact			max. 1,5 mm^2 flexible
Switching capacity remote signal contact			ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
GTIN (EAN)			8054890321112

TT





L 3/30 230 ff 1+1

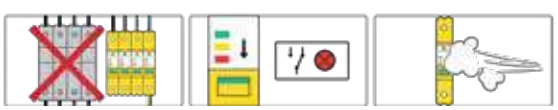
L 3/30 230 ff 1+1 is a ready to install assembly of a voltage limiting and a voltage switching SPD providing two modes of protection, typically installed in Sub Distribution Boards (SDBs) for single-phase 230 V TT-systems where connection type CT2 (1+1) is required according to HD 60364-5-534, with the following features and benefits:

- **Impulse test classification: Test class II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 2** according to **EN 61643-11 (2012-10)**;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms;**
- **Three colour Status Indicator with progressive indication of remaining performance.**

TECHNICAL DATA

Model L 3/30 ...			230 ff 1+1	
CODE			**200 121**	
Nominal ac system voltage		U_N	230 V ac	
Modes of protection (number of poles)			1+1 (L-N + N-PE)	
Max Continuous Operating Voltage (L-N)		U_C	335 V ac	
Max Continuous Operating Voltage (N-PE)		U_C	255 V ac	
Test Class according to IEC 61643-11 Ed.1 (2011-03)			II	
Type according to EN 61643-11 (2012-10)			T2	
Nominal discharge current (8/20 µs) (L-N)		I_n	30 kA	
Nominal discharge current (8/20 µs) (N-PE)		I_n	40 kA	
Max. discharge current (8/20 µs) (L-N)		I_{max}	40 kA	
Max. discharge current (8/20 µs) (N-PE)		I_{max}	65 kA	
Voltage protection level (L-N, L-PE) at a discharge current of:	1 kA	U_p	≤ 0,82 kV	≤ 1,50 kV
	5 kA	U_p	≤ 1,00 kV	≤ 1,50 kV
	10 kA	U_p	≤ 1,25 kV	≤ 1,50 kV
	20 kA	U_p	≤ 1,40 kV	≤ 1,50 kV
	30 kA	U_p	≤ 1,60 kV	≤ 1,60 kV
Voltage protection level (N-PE)		U_p	≤ 1,50 kV	
Response time (L-N / N-PE)		t_a	≤ 25 ns / ≤ 100 ns	
End of Life (L-N)			OCFM (open circuit failure mode)	
Behaviour in case of Temporary OverVoltage (TOV):	L-N	U_T	440 V / 120 min, withstand (W)	
	N-PE	U_T	1200 V / 200 ms, withstand (W)	
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	5 kA rms	
Short Circuit Current rating with max. backup protection fuse		I_{sccr}	50 kA rms	
Max. back-up protection with up-stream CB having a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability)			160 A (max. 4,50 x 10^5 A^2s)	
Max. back-up protection with FUSE at prospective short circuit currents of			125 A gG (> 5 ÷ 50 kA rms)	
Follow current interrupt rating (L-N)		I_{fi}	NFC No Follow Current®	
Follow current interrupt rating (N-PE)		I_{fi}	100 A rms	
Status indicator (indication of disconnector operation) / N-PE (no disconnector)			3 colours with progressive performance indication / 2 colours for N-PE	
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%	
Terminal - Conductor size			4-35 mm^2 flexible / 4-50 mm^2 semi rigid	
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715	
Case material / Flammability grade			BMC / V-0 in accordance with UL 94	
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)	
Approximate weight			240 g	
Dimensions: width			35 mm (2 modules)	
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR	
GTIN (EAN)			8054890320443	

Model L 3/30 ... with remote signal contact	230 t ff 1+1
CODE	**210 121**
Remote signal contact	potential-free changeover contact
Terminal - conductor size for remote signal contact	max. 1,5 mm^2 flexible
Switching capacity remote signal contact	ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
GTIN (EAN)	8054890321075



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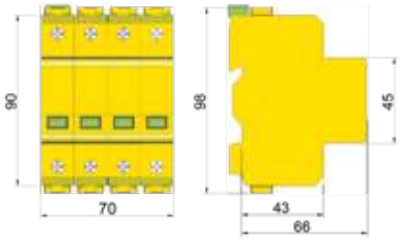
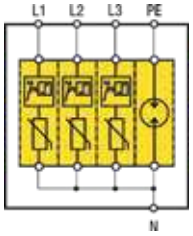




L 3/30 230 ff 3+1

L 3/30 230 ff 3+1 is a ready to install assembly of three voltage limiting and a voltage switching SPD providing four modes of protection, typically installed in Sub Distribution Boards (SDBs) for three-phase plus neutral 230/400 V TT-systems where connection type CT2 (3+1) is required according to HD 60364-5-534, with the following features and benefits:

- **Impulse test classification: Test class II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 2** according to **EN 61643-11 (2012-10)**;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms;**
- **Three colour Status Indicator with progressive indication of remaining performance.**

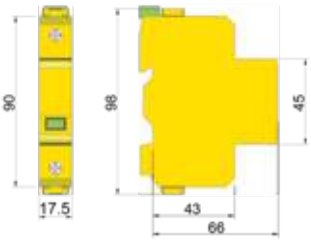
Model L3/30 ...			230 ff 3+1	
CODE			**200 141**	
Nominal ac system voltage		U_N	230/400 V ac	
Modes of protection (number of poles)			3+1 (L1/L2/L3-N + N-PE)	
Max Continuous Operating Voltage (L-N)		U_C	335 V ac	
Max Continuous Operating Voltage (N-PE)		U_C	255 V ac	
Test Class according to IEC 61643-11 Ed.1 (2011-03)			II	
Type according to EN 61643-11 (2012-10)			T2	
Nominal discharge current (8/20 µs) (L-N)		I_n	30 kA	
Nominal discharge current (8/20 µs) (N-PE)		I_n	40 kA	
Max. discharge current (8/20 µs) (L-N)		I_{max}	40 kA	
Max. discarge current (8/20 µs) (N-PE)		I_{max}	65 kA	
Voltage protection level (L-N, L-PE) at a discharge current of:	1 kA	U_p	≤ 0,82 kV	≤ 1,50 kV
	5 kA	U_p	≤ 1,00 kV	≤ 1,50 kV
	10 kA	U_p	≤ 1,25 kV	≤ 1,50 kV
	20 kA	U_p	≤ 1,40 kV	≤ 1,50 kV
	30 kA	U_p	≤ 1,60 kV	≤ 1,60 kV
Voltage protection level (N-PE)		U_p	≤ 1,50 kV	
Response time (L-N / N-PE)		t_a	≤ 25 ns / ≤ 100 ns	
End of Life (L-N)			OCFM (open circuit failure mode)	
Behaviour in case of Temporary OverVoltage (TOV):	L-N	U_T	440 V / 120 min, withstand (W)	
	N-PE	U_T	1200 V / 200 ms, withstand (W)	
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	5 kA rms	
Short Circuit Current rating with max. backup protection fuse		I_{sccr}	50 kA rms	
Max. back-up protection with CB having a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability)			160 A (max. 4,50 x 10^5 A^2s)	
Max. back-up protection with FUSE at prospective short circuit currents of			125 A gG (> 5 ÷ 50 kA rms)	
Follow current interrupt rating (L-N)		I_{fi}	NFC No Follow Current®	
Follow current interrupt rating (N-PE)		I_{fi}	100 A rms	
Status indicator (indication of disconnector operation) / N-PE (no disconnector)			3 colours with progressive performance indication / 2 colours for N-PE	
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%	
Terminal - Conductor size			4-35 mm^2 flexible / 4-50 mm^2 semi rigid	
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715	
Case material / Flammability grade			BMC / V-0 in accordance with UL 94	
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)	
Approximate weight			480 g	
Dimensions: width			70 mm (4 modules)	
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR	
GTIN (EAN)			8054890320474	

Model L 3/30 ... with remote signal contact		230 t ff 3+1
CODE		**210 141**
Remote signal contact		potential-free changeover contact
Terminal - conductor size for remote signal contact		max. 1,5 mm^2 flexible
Switching capacity remote signal contact		ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
GTIN (EAN)		8054890321129

L 2/10 230 ff

TN

TT



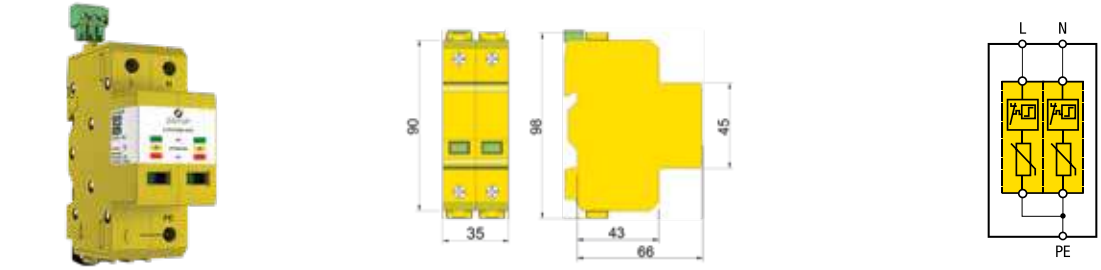
L 2/10 230 ff is a voltage limiting SPD providing a single mode of protection, typically installed in Sub Distribution Boards (SDBs), in TN-systems or in TT-systems in combination with N-PE SPD model I 52 or I 12 and where connection type CT2 (3+1 or 1+1) is required according to HD 60364-5-534. It provides the following features and benefits:

- L 2/10 230 ff is a voltage limiting SPD for the protection of low voltage installations and equipment against indirect lightning effects;
- Nominal discharge current of 10 kA 8/20 µs;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms;**
- Short circuit current withstand of 50 kA rms with max. back-up fuse;
- **NFC No Follow Current®** technology, there are no follow currents drawn from the power supply system after operation;
- **Three colour Status Indicator with progressive indication of remaining performance.**

TECHNICAL DATA

Model L 2/10 ...			230 ff
CODE			**202 100**
Nominal ac system voltage		U_N	230/400 V ac
Modes of protection (number of poles)			1
Max Continuous Operating Voltage		U_C	335 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)			II
Type according to EN 61643-11 (2012-10)			T2
Nominal discharge current (8/20 µs)		I_n	10 kA
Max. discharge current (8/20 µs)		I_{max}	20 kA
Voltage protection level at a discharge current of:	1 kA	U_p	≤ 0,82 kV
	5 kA	U_p	≤ 1,00 kV
	10 kA	U_p	≤ 1,25 kV
Response time		t_a	≤ 25 ns
End of Life			OCFM (open circuit failure mode)
Behaviour in case of Temporary OverVoltage (TOV)		U_T	440 V / 120 min, withstand (W)
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	5 kA rms
Short Circuit Current rating with max. backup protection fuse		I_{sccr}	50 kA rms
Max. back-up protection with up-stream CB with a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability).			160 A (max. 4,50 x 10^5 A^2s)
Max. back-up protection with FUSE at prospective short circuit currents of			125 A gG (> 5 ÷ 50 kA rms)
Follow current interrupt rating		I_{fi}	NFC No Follow Current®
Status indicator (indication of disconnector operation)			3 colours with progressive performance indication
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%
Terminal - Conductor size			4-35 mm^2 flexible / 4-50 mm^2 semi rigid
Busbar connections			fork-type busbar 16 mm^2
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715
Case material / Flammability grade			BMC / V-0 in accordance with UL 94
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)
Approximate weight			110 g
Dimensions: width			17,5 mm (1 module)
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR
GTIN (EAN)			8054890320504

Model L 2/10 ... with remote signal contact		230 t ff
CODE		**212 100**
Remote signal contact		potential-free changeover contact
Terminal - conductor size for remote signal contact		max. 1,5 mm^2 flexible
Switching capacity remote signal contact		ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
GTIN (EAN)		8054890321143



L 2/10 230 ff 2

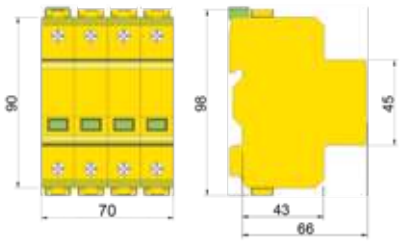
L 2/10 230 ff 2 is a ready to install assembly of two voltage limiting SPDs providing two modes of protection, typically installed in Sub Distribution Boards (SDBs) for single-phase 230 V TN-systems, with the following features and benefits:

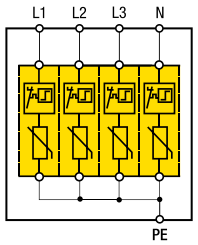
- **Impulse test classification: Test class II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 2** according to **EN 61643-11 (2012-10)**;
- L 2/10 230 ff 2 is a voltage limiting SPD for the protection of low voltage installations and equipment against indirect lightning effects;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms;**
- Short circuit current withstand of 50 kA rms with max. back-up fuse;
- **NFC No Follow Current®** technology, there are no follow currents drawn from the power supply system after operation;
- **Three colour Status Indicator with progressive indication of remaining performance.**

Model L 2/10 ...			230 ff 2
CODE			**202 120**
Nominal ac system voltage		U_N	230 V ac
Modes of protection (number of poles)			2
Max Continuous Operating Voltage		U_C	335 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)			II
Type according to EN 61643-11 (2012-10)			T2
Nominal discharge current (8/20 µs)		I_n	10 kA
Max. discharge current (8/20 µs)		I_{max}	20 kA
Voltage protection level at a discharge current of:	1 kA	U_p	≤ 0,83 kV
	5 kA	U_p	≤ 1,00 kV
	10 kA	U_p	≤ 1,25 kV
Response time		t_a	≤ 25 ns
End of Life			OCFM (open circuit failure mode)
Behaviour in case of Temporary OverVoltage (TOV)		U_T	440 V / 120 min, withstand (W)
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	5 kA rms
Short Circuit Current rating with max. backup protection fuse		I_{sccr}	50 kA rms
Max. back-up protection with up-stream CB with a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability)			160 A (max. 4,50 x 10^5 A^2s)
Max. back-up protection with FUSE at prospective short circuit currents of			125 A gG (> 5 ÷ 50 kA rms)
Follow current interrupt rating		I_{fi}	NFC No Follow Current®
Status indicator (indication of disconnector operation)			3 colours with progressive performance indication
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%
Terminal - Conductor size			4-35 mm^2 flexible / 4-50 mm^2 semi rigid
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715
Case material / Flammability grade			BMC / V-0 in accordance with UL 94
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)
Approximate weight			220 g
Dimensions: width			35 mm (2 modules)
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR
GTIN (EAN)			8054890320511

Model L 2/10 ... with remote signal contact			230 t ff 2
CODE			**212 120**
Remote signal contact			potential-free changeover contact
Terminal - conductor size for remote signal contact			max. 1,5 mm^2 flexible
Switching capacity remote signal contact			ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
GTIN (EAN)			8054890321150

TN





L 2/10 230 ff 4

L 2/10 230 ff 4 is a ready to install assembly of four voltage limiting SPDs providing four modes of protection, typically installed in Sub Distribution Boards (SDBs) for three-phase plus neutral 230/400 V TN-systems, with the following features and benefits:

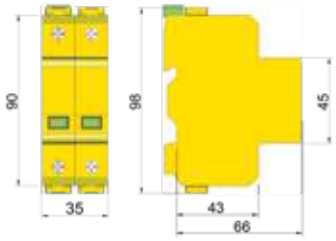
- **Impulse test classification: Test class II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 2** according to **EN 61643-11 (2012-10)**;
- L 2/10 230 ff 4 is a voltage limiting SPD for the protection of low voltage installations and equipment against indirect lightning effects;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms;**
- Short circuit current withstand of 50 kA rms with max. back-up fuse;
- **NFC No Follow Current®** technology, there are no follow currents drawn from the power supply system after operation;
- **Three colour Status Indicator with progressive indication of remaining performance.**

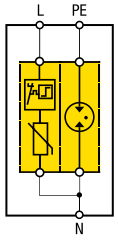
TECHNICAL DATA

Model L 2/10 ...			230 ff 4
CODE			**202 140**
Nominal ac system voltage		U_N	230/400 V ac
Modes of protection (number of poles)			4
Max Continuous Operating Voltage		U_C	335 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)			II
Type according to EN 61643-11 (2012-10)			T2
Nominal discharge current (8/20 µs)		I_n	10 kA
Max. discharge current (8/20 µs)		I_{max}	20 kA
Voltage protection level at a discharge current of:	1 kA	U_p	≤ 0,83 kV
	5 kA	U_p	≤ 1,00 kV
	10 kA	U_p	≤ 1,25 kV
Response time		t_a	≤ 25 ns
End of Life			OCFM (open circuit failure mode)
Behaviour in case of Temporary OverVoltage (TOV)		U_T	440 V / 120 min, withstand (W)
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	5 kA rms
Short Circuit Current rating with max. backup protection fuse		I_{sccr}	50 kA rms
Max. back-up protection with up-stream CB with a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability).			160 A (max. 4,50 x 10^5 A^2s)
Max. back-up protection with FUSE at prospective short circuit currents of			125 A gG (> 5 ÷ 50 kA rms)
Follow current interrupt rating		I_{fi}	NFC No Follow Current®
Status indicator (indication of disconnector operation)			3 colours with progressive performance indication
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%
Terminal - Conductor size			4-35 mm^2 flexible / 4-50 mm^2 semi rigid
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715
Case material / Flammability grade			BMC / V-0 in accordance with UL 94
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)
Approximate weight			440 g
Dimensions: width			70 mm (4 modules)
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR
GTIN (EAN)			8054890320535

Model L 2/10 ... with remote signal contact		230 t ff 4
CODE		**212 140**
Remote signal contact		potential-free changeover contact
Terminal - conductor size for remote signal contact		max. 1,5 mm^2 flexible
Switching capacity remote signal contact		ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
GTIN (EAN)		8054890321174

TT





L 2/10 230 ff 1+1

L 2/10 230 ff 1+1 is a ready to install assembly of a voltage limiting and a voltage switching SPD providing two modes of protection, typically installed in Sub Distribution Boards (SDBs) for single-phase 230 V TT-systems where connection type CT2 (1+1) is required according to HD 60364-5-534, with the following features and benefits:

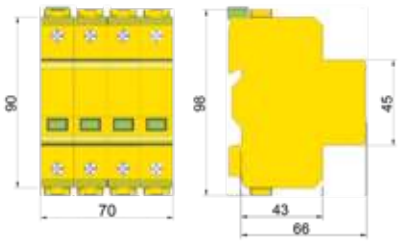
- **Impulse test classification: Test class II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 2** according to **EN 61643-11 (2012-10)**;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms;**
- **NFC No Follow Current®** technology, there are no follow currents drawn from the power supply system after operation;
- **Three colour Status Indicator with progressive indication of remaining performance.**

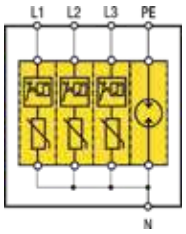
TECHNICAL DATA

Model L 2/10 ...			230 ff 1+1	
CODE			**202 121**	
Nominal ac system voltage		U_N	230 V ac	
Modes of protection (number of poles)			1+1 (L-N + N-PE)	
Max Continuous Operating Voltage (L-N)		U_C	335 V ac	
Max Continuous Operating Voltage (N-PE)		U_C	255 V ac	
Test Class according to IEC 61643-11 Ed.1 (2011-03)			II	
Type according to EN 61643-11 (2012-10)			T2	
Nominal discharge current (8/20 µs) (L-N)		I_n	10 kA	
Nominal discharge current (8/20 µs) (N-PE)		I_n	40 kA	
Max. discharge current (8/20 µs) (L-N)		I_{max}	20 kA	
Max. discharge current (8/20 µs) (N-PE)		I_{max}	65 kA	
Voltage protection level (L-N, L-PE) at a discharge current of:	1 kA	U_p	≤ 0,83 kV	≤ 1,50 kV
	5 kA	U_p	≤ 1,00 kV	≤ 1,50 kV
	10 kA	U_p	≤ 1,25 kV	≤ 1,50 kV
Voltage protection level (N-PE)		U_p	≤ 1,50 kV	
Response time (L-N / N-PE)		t_a	≤ 25 ns / ≤ 100 ns	
End of Life (L-N)			OCFM (open circuit failure mode)	
Behaviour in case of Temporary OverVoltage (TOV):	L-N	U_T	440 V / 120 min, withstand (W)	
	N-PE	U_T	1200 V / 200 ms, withstand (W)	
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	5 kA rms	
Short Circuit Current rating with max. backup protection fuse		I_{sccr}	50 kA rms	
Max. back-up protection with up-stream CB with a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability).			160 A (max. 4,50 x 10^5 A^2s)	
Max. back-up protection with FUSE at prospective short circuit currents of			125 A gG (> 5 ÷ 50 kA rms)	
Follow current interrupt rating (L-N)		I_{fi}	NFC No Follow Current®	
Follow current interrupt rating (N-PE)		I_{fi}	100 A rms	
Status indicator (indication of disconnector operation) / N-PE (no disconnector)			3 colours with progressive performance indication / 2 colours for N-PE	
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%	
Terminal - Conductor size			4-35 mm^2 flexible / 4-50 mm^2 semi rigid	
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715	
Case material / Flammability grade			BMC / V-0 in accordance with UL 94	
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)	
Approximate weight			220 g	
Dimensions: width			35 mm (2 modules)	
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR	
GTIN (EAN)			8054890320528	

Model L 2/10 ... with remote signal contact		230 t ff 1+1
CODE		**212 121**
Remote signal contact		potential-free changeover contact
Terminal - conductor size for remote signal contact		max. 1,5 mm^2 flexible
Switching capacity remote signal contact		ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
GTIN (EAN)		8054890321167

TT





L 2/10 230 ff 3+1

L 2/10 230 ff 3+1 is a ready to install assembly of three voltage limiting and a voltage switching SPD providing four modes of protection, typically installed in Sub Distribution Boards (SDBs) for three-phase plus neutral 230/400 V TT-systems where connection type CT2 (3+1) is required according to HD 60364-5-534, with the following features and benefits:

- **Impulse test classification: Test class II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 2** according to **EN 61643-11 (2012-10)**;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms;**
- **NFC No Follow Current®** technology, there are no follow currents drawn from the power supply system after operation;
- **Three colour Status Indicator with progressive indication of remaining performance.**

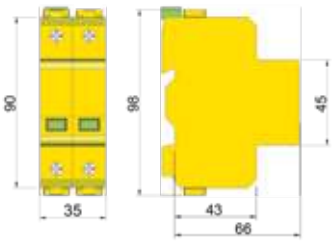
TECHNICAL DATA

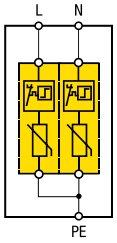
Model L 2/10 ...			230 ff 3+1	
CODE			**202 141**	
Nominal ac system voltage		U_N	230/400 V ac	
Modes of protection (number of poles)			3+1 (L1/L2/L3-N + N-PE)	
Max Continuous Operating Voltage (L-N)		U_C	335 V ac	
Max Continuous Operating Voltage (N-PE)		U_C	255 V ac	
Test Class according to IEC 61643-11 Ed.1 (2011-03)			II	
Type according to EN 61643-11 (2012-10)			T2	
Nominal discharge current (8/20 µs) (L-N)		I_n	10 kA	
Nominal discharge current (8/20 µs) (N-PE)		I_n	40 kA	
Max. discharge current (8/20 µs) (L-N)		I_{max}	20 kA	
Max. discharge current (8/20 µs) (N-PE)		I_{max}	65 kA	
Voltage protection level (L-N, L-PE) at a discharge current of:	1 kA	U_p	≤ 0,83 kV	≤ 1,50 kV
	5 kA	U_p	≤ 1,00 kV	≤ 1,50 kV
	10 kA	U_p	≤ 1,25 kV	≤ 1,50 kV
Voltage protection level (N-PE)		U_p	≤ 1,50 kV	
Response time (L-N / N-PE)		t_a	≤ 25 ns / ≤ 100 ns	
End of Life (L-N)			OCFM (open circuit failure mode)	
Behaviour in case of Temporary OverVoltage (TOV):	L-N	U_T	440 V / 120 min, withstand (W)	
	N-PE	U_T	1200 V / 200 ms, withstand (W)	
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	5 kA rms	
Short Circuit Current rating with max. backup protection fuse		I_{sccr}	50 kA rms	
Max. back-up protection with up-stream CB having a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability)			160 A (max. 4,50 x 10^5 A^2s)	
Max. back-up protection with FUSE at prospective short circuit currents of			125 A gG (> 5 ÷ 50 kA rms)	
Follow current interrupt rating (L-N)		I_{fi}	NFC No Follow Current®	
Follow current interrupt rating (N-PE)		I_{fi}	100 A rms	
Status indicator (indication of disconnector operation) / N-PE (no disconnector)			3 colours with progressive performance indication / 2 colours for N-PE	
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%	
Terminal - Conductor size			4-35 mm^2 flexible / 4-50 mm^2 semi rigid	
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715	
Case material / Flammability grade			BMC / V-0 in accordance with UL 94	
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)	
Approximate weight			440 g	
Dimensions: width			70 mm (4 modules)	
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR	
GTIN (EAN)			8054890320542	

Model L 2/10 ... with remote signal contact	230 t ff 3+1
CODE	**212 141**
Remote signal contact	potential-free changeover contact
Terminal - conductor size for remote signal contact	max. 1,5 mm^2 flexible
Switching capacity remote signal contact	ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
GTIN (EAN)	8054890321181

L 2/10 230 ff 2 TT

TT





L 2/10 230 ff 2 TT is a ready to install assembly of two voltage limiting SPDs providing two modes of protection, typically installed in Sub Distribution Boards (SDBs) for single-phase 230 V TT-systems downstream a RCD where connection type CT1 is applied according to HD 60364-5-534. This SPD is also suitable for single-phase 230 V TN-systems, when high resistability against TOVs is required. It provides the following features and benefits:

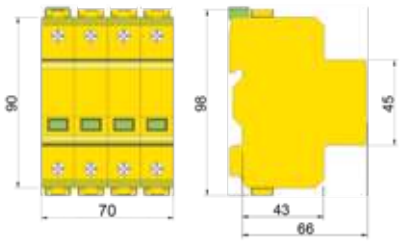
- **Impulse test classification: Test class II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 2** according to **EN 61643-11 (2012-10)**;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms;**
- **Three colour Status Indicator with progressive indication of remaining performance.**

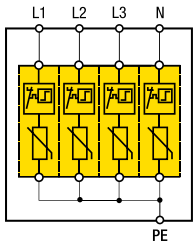
TECHNICAL DATA

Model L2/10 ...			230 ff 2 TT
CODE			**202 220**
Nominal ac system voltage		U_N	230 V ac
Modes of protection (number of poles)			2
Max Continuous Operating Voltage		U_c	335 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)			II
Type according to EN 61643-11 (2012-10)			T2
Nominal discharge current (8/20 µs) (the upstream RCD may trip when discharge currents exceed 3 kA 8/20 µs)		I_n	10 kA
Max. discharge current (8/20 µs) (the upstream RCD may trip when discharge currents exceed 3 kA 8/20 µs)		I_{max}	20 kA
Voltage protection level at a discharge current of:	1 kA 5 kA 10 kA	U_p U_p U_p	≤ 0,83 kV ≤ 1,00 kV ≤ 1,25 kV
Response time		t_a	≤ 25 ns
End of Life			OCFM (Open Circuit Failure Mode)
Behaviour in case of Temporary OverVoltage (TOV):	L-PE N-PE	U_T U_T	440 V / 120 min, withstand (W); 1.455 V / 200 ms, safe (S) 1.200 V / 200 ms, withstand (W)
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	5 kA rms
Short Circuit Current rating with max. backup protection fuse		I_{sccr}	50 kA rms
Max. back-up protection with up-stream CB with a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability). Max. back-up protection with FUSE at prospective short circuit currents of			160 A (max. 4,50 x 10^5 A^2s) 125 A gG (> 5 ÷ 50 kA rms)
Follow current interrupt rating		I_{fi}	NFC No Follow Current®
Status indicator (indication of disconnector operation)			3 colours with progressive performance indication
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%
Terminal - Conductor size			4-35 mm^2 flexible / 4-50 mm^2 semi rigid
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715
Case material / Flammability grade			BMC / V-0 in accordance with UL 94
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)
Approximate weight			240 g
Dimensions: width			35 mm (2 modules)
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR
GTIN (EAN)			8054890321723

Model L 2/10 ... with remote signal contact			230 t ff 2 TT
CODE			**212 220**
Remote signal contact			potential-free changeover contact
Terminal - conductor size for remote signal contact			max. 1,5 mm^2 flexible
Switching capacity remote signal contact			ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
GTIN (EAN)			8054890321754

TT





L 2/10 230 ff 4 TT

L 2/10 230 ff 4 TT is a ready to install assembly of four voltage limiting SPDs providing four modes of protection, typically installed in Sub Distribution Boards (SDBs) for three-phase plus neutral 230/400 V TT-systems downstream a RCD where connection type CT1 is applied according to HD 60364-5-534. This SPD is also suitable for three-phase plus neutral 230/400 V TN-systems, when high resistability against TOVs is required.
It provides the following features and benefits:

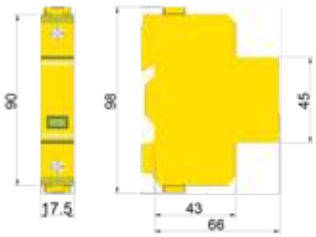
- **Impulse test classification: Test class II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 2** according to **EN 61643-11 (2012-10)**;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms;**
- **Three colour Status Indicator with progressive indication of remaining performance.**

TECHNICAL DATA

Model L 2/10 ...			230 ff 4 TT
CODE			**202 240**
Nominal ac system voltage		U_N	230/400 V ac
Modes of protection (number of poles)			4
Max Continuous Operating Voltage		U_c	335 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)			II
Type according to EN 61643-11 (2012-10)			T2
Nominal discharge current (8/20 µs) (the upstream RCD may trip when discharge currents exceed 3 kA 8/20 µs)		I_n	10 kA
Max. discharge current (8/20 µs) (the upstream RCD may trip when discharge currents exceed 3 kA 8/20 µs)		I_{max}	20 kA
Voltage protection level at a discharge current of:	1 kA 5 kA 10 kA	U_p U_p U_p	≤ 0,83 kV ≤ 1,00 kV ≤ 1,25 kV
Response time		t_a	≤ 25 ns
End of Life			OCFM (open circuit failure mode)
Behaviour in case of Temporary OverVoltage (TOV) withstand (W) / safe (S):	L-PE N-PE	U_T U_T	440 V / 120 min, (W); 1.455 V / 200 ms, (S) 1200 V / 200 ms, (W)
Short Circuit Current rating without backup protection (internal disconnector) Short Circuit Current rating with max. backup protection fuse		I_{sccr} I_{sccr}	5 kA rms 50 kA rms
Max. back-up protection with up-stream CB with a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability). Max. back-up protection with FUSE at prospective short circuit currents of			160 A (max. 4,50 x 10^5 A^2s) 125 A gG (> 5 ÷ 50 kA rms)
Follow current interrupt rating		I_{fi}	NFC No Follow Current®
Status indicator (indication of disconnector operation)			3 colours with progressive performance indication
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%
Terminal - Conductor size			4-35 mm^2 flexible / 4-50 mm^2 semi rigid
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715
Case material / Flammability grade			BMC / V-0 in accordance with UL 94
Pollution degree / Degree of protection		PD / IP	3 / 20 (built-in)
Approximate weight			480 g
Dimensions: width			70 mm (4 modules)
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR
GTIN (EAN)			8054890321730

Model L 2/10 ... with remote signal contact			230 t ff 4 TT
CODE			**212 240**
Remote signal contact			potential-free changeover contact
Terminal - conductor size for remote signal contact			max. 1,5 mm^2 flexible
Switching capacity remote signal contact			ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
GTIN (EAN)			8054890321761

TT



I 12 N-PE

I 12 N-PE is a voltage switching SPD providing a single mode of protection, typically installed in TT-systems between neutral conductor N and protective earth PE, where connection type CT2 (3+1 or 1+1) is required according to HD 60364-5-534, with the following features and benefits:

- **Impulse test classification: Test class I and II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 1 and 2** according to **EN 61643-11 (2012-10)**;
- I 12 N-PE is a Gas Discharge Tube (GDT) based SPD for protection of low voltage installations and equipment against direct and indirect lightning effects;
- Impulse discharge current of 12,5 kA 10/350 µs;
- Nominal discharge current of 40 kA 8/20 µs;
- The special housing is designed for "Pollution Degree 3";
- To be combined with L 3/30 230 ff or L 2/10 230 ff.

Model I 12 N-PE

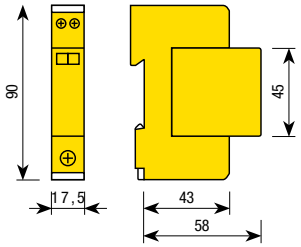
CODE		207 300
Nominal ac system voltage	U_N	230 V ac
Modes of protection (number of poles)		1 (N-PE)
Max Continuous Operating Voltage	U_c	255 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)		I and II
Type according to EN 61643-11 (2012-10)		T1 and T2
Impulse discharge current (10/350 µs)	I_{imp}	12,5 kA
Charge	Q	6,25 As
Nominal discharge current (8/20 µs)	I_n	40 kA
Max. discharge current (8/20 µs)	I_{max}	65 kA
Follow current interrupt rating	I_{fi}	100 A rms
Voltage protection level	U_p	≤ 1,50 kV
Response time	t_a	≤ 100 ns
Behaviour in case of Temporary OverVoltage (TOV)	U_T	1200 V / 200 ms, withstand (W)
Operating temperature range / Humidity		-40 … +80 °C (extended) / 5% ... 95%
Terminal-Conductor size		4-35 mm² flexible / 4-50 mm² semi rigid
Busbar connections		fork-type busbar 16 mm²
Mounting		indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree / Degree of protection	PD / IP	3 / 20 (built-in)
Approximate weight		120 g
Dimensions: width		17,5 mm (1 module)
In bundle with		L 3/30 230 ff and L 2/10 230 ff
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR
GTIN (EAN)		8054890320849

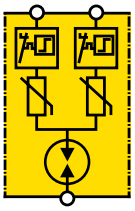
Model I 12 N-PE t with remote signal contact

CODE		217 300
Remote signal contact		potential-free changeover contact
Terminal - conductor size for remote signal contact		max. 1,5 mm² flexible
Switching capacity remote signal contact		ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
GTIN (EAN)		8054890321594

IL 1/10 2P 230

TT





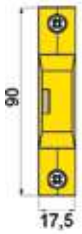
IL 1/10 2P is a combined voltage limiting and voltage switching SPD providing three modes of protection, typically installed in Sub Distribution Boards (SDBs) or control boards for single-phase 230 V TT-systems, with the following features and benefits:

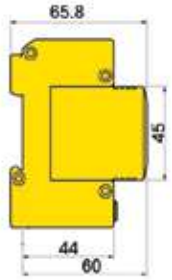
- **Impulse test classification: Test class II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 2** according to **EN 61643-11 (2012-10)**;
- IL 1/10 2P is a varistor and GDT based combination SPD for the protection of low voltage installations against indirect lightning effects;
- **NFC No Follow Current®** technology, there are no follow currents drawn from the power supply system after operation;
- Two colour Status Indicator (green / red);
- Provides three modes of protection in a one module housing (L-N, L-PE, N-PE);
- Leakage current free and providing galvanic isolation from earth due to the Gas Discharge Tube (GDT);
- Suitable for installation at zone boundaries up to 0_B – 1 according to the lightning protection zones concept as defined in IEC 62305.

TECHNICAL DATA

Model IL 1/10 2P ...			230
CODE (pluggable execution)			**222 100**
Nominal ac system voltage		U_N	230 V ac
Maximum Continuous Operating Voltage		U_c	335 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)			II
Type according to EN 61643-11 (2012-10)			T2
Nominal discharge current (8/20 µs) (L / N-PE)		I_n	10 kA
Maximum discharge current (8/20 µs) (L / N-PE)		I_{max}	20 kA
Impulse discharge current (10/350 µs) for (L / N-PE)		I_{imp}	1 kA
Voltage protection level at I_n		U_p U_p	≤ 1,50 kV (L/N - PE) ≤ 1,50 kV (L - N)
Response time		t_a	≤ 25 ns (L - N) - ≤ 100 ns (L/N - PE)
End of Life			OCFM (open circuit failure mode)
Behaviour in case of Temporary OverVoltage (TOV):	L-N L-PE N-PE	U_T U_T U_T	335 V / 5 s, withstand (W); 440 V / 120 min, withstand (W) 1455 V / 200 ms, safe (S) 1200 V / 200 ms, withstand (W)
Insulation resistance		R_{isol}	≥ 1 GΩ
Max. back-up protection with FUSE			32 A gG
Short Circuit Current rating with max. backup protection with fuse		I_{sccr}	20 kA rms
Follow current interrupt rating			NFC No Follow Current®
Operating temperature range			- 40 ... + 70 °C
Terminal-Conductor size			L / N 1,5-4 mm² flexible PE 2,5-16 mm² flexible
Busbar connection			fork-type busbar 16 mm² (only PE)
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715
Enclosure material			thermoplastic
Pollution degree / Degree of protection		PD / IP	2 / 20 (built-in)
Approximate weight			100 g
Dimension: width			17,5 mm (1 module)
GTIN (EAN)			8054890321747

TN





L 2/20 230 e

L 2/20 230 e is a pluggable execution, voltage limiting SPD, providing a single mode of protection, typically installed in Sub Distribution Boards (SDBs) in TN-systems. It provides the following features and benefits:

- **Impulse test classification: Test class II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 2** according to **EN 61643-11 (2012-10)**;
- L 2/20 230 e is a voltage limiting varistor based SPD, for the protection of low voltage installations and equipment against indirect lightning effects;
- Short circuit current withstand of 50 kA rms with max. back-up fuse;
- **NFC No Follow Current®** technology, there are no follow currents drawn from the power supply system after operation.

Model L 2/20 ...			230 e
CODE			**220 001**
Nominal ac system voltage		U_N	230/400 V ac
Modes of protection (number of poles)			1
Max Continuous Operating Voltage		U_C	335 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)			II
Type according to EN 61643-11 (2012-10)			T2
Nominal discharge current (8/20 µs)		I_n	20 kA
Max. discharge current (8/20 µs)		I_{max}	40 kA
Voltage protection level at a discharge current of:	1 kA	U_p	≤ 0,90 kV
	5 kA	U_p	≤ 1,05 kV
	10 kA	U_p	≤ 1,25 kV
	20 kA	U_p	≤ 1,40 kV
Response time		t_a	≤ 25 ns
End of Life			OCFM (open circuit failure mode)
Behaviour in case of Temporary OverVoltage (TOV)		U_T	335 V / 5 s, withstand (W); 440 V / 120 min, safe (S)
Max. back-up protection with FUSE			125 A gG
Short Circuit Current rating with max. backup protection with fuse		I_{sccr}	50 kA rms
Follow current interrupt rating		I_{fi}	NFC No Follow Current®
Status indicator (indication of disconnector operation)			2 colours: transparent - OK / red - replace
Operating temperature range / Humidity			-40 … +70 °C / 5% ... 95%
Terminal - Conductor size			4-25 mm² flexible / 4-25 mm² semi rigid
Busbar connections			fork-type busbar 16 mm²
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715
Case material / Flammability grade			Polyamide PA6 / V-0 in accordance with UL 94
Pollution degree / Degree of protection		PD / IP	2 / 20 (built-in)
Approximate weight			100 g
Dimensions: width			17,5 mm (1 module)
Certifications			CB, STC issued by OVE
GTIN (EAN)			8054890322324

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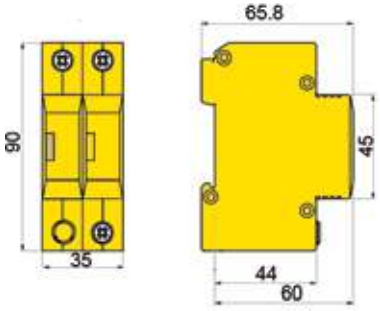
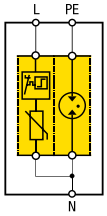




L 2/20 230 1+1

L 2/20 230 1+1 is a ready to install assembly of a voltage limiting and a voltage switching SPD providing two modes of protection, typically installed in Sub Distribution Boards (SDBs) for single-phase 230 V TT-systems where connection type CT2 (1+1) is required according to HD 60364-5-534, with the following features and benefits:

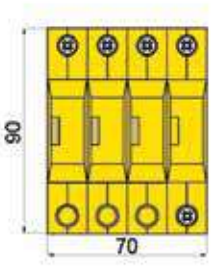
- **Impulse test classification: Test class II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 2** according to **EN 61643-11 (2012-10)**;
- Short circuit current withstand of 50 kA rms with max. back-up fuse;
- **NFC No Follow Current®** technology, there are no follow currents drawn from the power supply system after operation.

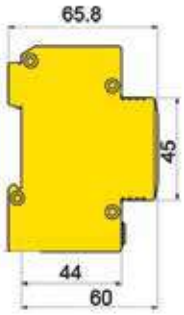
TECHNICAL DATA

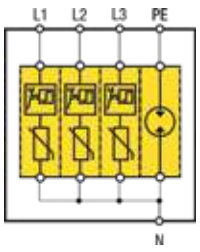
Model L 2/20 ...			230 1+1	
CODE			**200 023**	
Nominal ac system voltage		U_N	230 V ac	
Modes of protection (number of poles)			1+1 (L-N + N-PE)	
Max Continuous Operating Voltage (L-N)		U_C	335 V ac	
Max Continuous Operating Voltage (N-PE)		U_C	255 V ac	
Test Class according to IEC 61643-11 Ed.1 (2011-03)			II	
Type according to EN 61643-11 (2012-10)			T2	
Nominal discharge current (8/20 µs) (L-N)		I_n	20 kA	
Nominal discharge current (8/20 µs) (N-PE)		I_n	40 kA	
Max. discharge current (8/20 µs) (L-N)		I_{max}	40 kA	
Max. discharge current (8/20 µs) (N-PE)		I_{max}	60 kA	
Voltage protection level (L-N, L-PE) at a discharge current of:	1 kA	U_p	≤ 1,00 kV	≤ 1,60 kV
	5 kA	U_p	≤ 1,10 kV	≤ 1,60 kV
	10 kA	U_p	≤ 1,30 kV	≤ 1,60 kV
	20 kA	U_p	≤ 1,45 kV	≤ 1,60 kV
Voltage protection level (N-PE)		U_p	≤ 1,60 kV	
Response time (L-N / N-PE)		t_a	≤ 25 ns / ≤ 100 ns	
End of Life (L-N)			OCFM (open circuit failure mode)	
Behaviour in case of Temporary OverVoltage (TOV):	L-N	U_T	335 V / 5 s, withstand (W); 440 V / 120 min, safe (S)	
	N-PE	U_T	1200 V / 200 ms, withstand (W)	
Short Circuit Current rating with max. backup protection with fuse		I_{sccr}	50 kA rms	
Max. back-up protection with FUSE			125 A gG	
Follow current interrupt rating (L-N)		I_{fi}	NFC No Follow Current®	
Follow current interrupt rating (N-PE)		I_{fi}	100 A rms	
Status indicator (indication of disconnector operation)			2 colours: transparent - OK / red - replace	
Operating temperature range / Humidity			-40 … +70 °C / 5% ... 95%	
Terminal - Conductor size			4-25 mm² flexible / 4-40 mm² semi rigid	
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715	
Case material / Flammability grade			Polyamide PA6 / V-0 in accordance with UL 94	
Pollution degree / Degree of protection		PD / IP	2 / 20 (built-in)	
Approximate weight			170 g	
Dimensions: width			35 mm (2 modules)	
Certifications			CB, STC issued by OVE	
GTIN (EAN)			8054890322331	

Model L 2/20 ... with remote signal contact	230 t 1+1
CODE	**210 023**
Remote signal contact	potential-free changeover contact
Terminal - conductor size for remote signal contact	max. 1,5 mm² flexible
Switching capacity remote signal contact	ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
GTIN (EAN)	8054890321266

TT







L 2/20 230 3+1

L 2/20 230 3+1 is a ready to install assembly of three voltage limiting and a voltage switching SPD providing four modes of protection. Typically installed in Sub Distribution Boards (SDBs) for three-phase plus neutral 230/400 V TT-systems where connection type CT2 (3+1) is required according to HD 60364-5-534, with the following features and benefits:

- **Impulse test classification: Test class II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 2** according to **EN 61643-11 (2012-10)**;
- Short circuit current withstand of 50 kA rms with max. back-up fuse;
- **NFC No Follow Current®** technology, there are no follow currents drawn from the power supply system after operation.

TECHNICAL DATA

Model L 2/20 ...			230 3+1	
CODE			**200 025**	
Nominal ac system voltage		U_N	230/400 V ac	
Modes of protection (number of poles)			3+1 (L1/L2/L3-N + N-PE)	
Max Continuous Operating Voltage (L-N)		U_C	335 V ac	
Max Continuous Operating Voltage (N-PE)		U_C	255 V ac	
Test Class according to IEC 61643-11 Ed.1 (2011-03)			II	
Type according to EN 61643-11 (2012-10)			T2	
Nominal discharge current (8/20 µs) (L-N)		I_n	20 kA	
Nominal discharge current (8/20 µs) (N-PE)		I_n	40 kA	
Max. discharge current (8/20 µs) (L-N)		I_{max}	40 kA	
Max. discharge current (8/20 µs) (N-PE)		I_{max}	60 kA	
Voltage protection level (L-N, L-PE) at a discharge current of:	1 kA	U_p	≤ 1,00 kV	≤ 1,60 kV
	5 kA	U_p	≤ 1,10 kV	≤ 1,60 kV
	10 kA	U_p	≤ 1,30 kV	≤ 1,60 kV
	20 kA	U_p	≤ 1,45 kV	≤ 1,60 kV
Voltage protection level (N-PE)		U_p	≤ 1,60 kV	
Response time (L-N / N-PE)		t_a	≤ 25 ns / ≤ 100 ns	
End of Life (L-N)			OCFM (open circuit failure mode)	
Behaviour in case of Temporary OverVoltage (TOV):	L-N	U_T	335 V / 5 s, withstand (W); 440 V / 120 min, safe (S)	
	N-PE	U_T	1200 V / 200 ms, withstand (W)	
Short Circuit Current rating with max. backup protection with fuse		I_{sccr}	50 kA rms	
Max. back-up protection with FUSE			125 A gG	
Follow current interrupt rating (L-N)		I_{fi}	NFC No Follow Current®	
Follow current interrupt rating (N-PE)		I_{fi}	100 A rms	
Status indicator (indication of disconnector operation)			2 colours: transparent - OK / red - replace	
Operating temperature range / Humidity			-40 … +70 °C / 5% ... 95%	
Terminal - Conductor size			4-25 mm² flexible / / 4-40 mm² semi rigid	
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715	
Case material / Flammability grade			Polyamide PA6 / V-0 in accordance with UL 94	
Pollution degree / Degree of protection		PD / IP	2 / 20 (built-in)	
Approximate weight			360 g	
Dimensions: width			70 mm (4 modules)	
Certifications			CB, STC issued by OVE	
GTIN (EAN)			8054890322348	

Model L 2/20 ... with remote signal contact		230 t 3+1
CODE		**210 025**
Remote signal contact		potential-free changeover contact
Terminal - conductor size for remote signal contact		max. 1,5 mm² flexible
Switching capacity remote signal contact		ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A
GTIN (EAN)		8054890320856

TN

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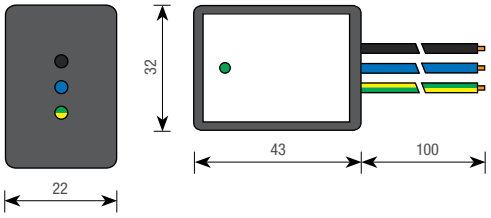
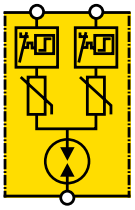
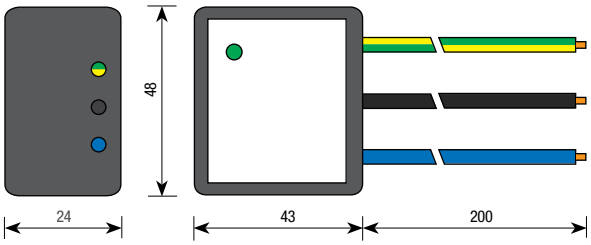
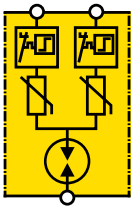




IL 1/3 2P





IL 1/10 2P M

IL 1/3 2P and IL 1/10 2P M are combined voltage limiting and voltage switching SPDs providing three modes of protection, typically installed in single-phase 230 V socket outlets or within equipment with the following features and benefits:

- **Impulse test classification IL 1/3 2P: Test Class III** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 3** according to **EN 61643-11 (2012-10)**;
- **Impulse test classification IL 1/10 2P M: Test Class II** according to **IEC 61643-11 Ed. 1 (2011-03)** and **Type 2** according to **EN 61643-11 (2012-10)**;
- Equipped with a thermal disconnector, which interrupts the phase or neutral to ground path in case of an SPD failure, and with a green LED operating state indicator;
- Provided with pigtail connections to enable the IL 1/3 2P to be installed at equipment terminals or e.g. socket outlets, LED power supplies, CCTVs, intruder alarms;
- Suitable for installation at LPZ boundaries 2 – 3 or higher according to the lightning protection zones concept and in coordination with other SPDs.

Model IL ...			1/3 2P	1/10 2P M
CODE			**241 001**	**241 002**
Nominal ac system Voltage		U_N	230 V ac	
Maximum Continuous Operating Voltage		U_c	275 V ac	335 V ac
Test Class according to IEC 61643-11 Ed.1 (2011-03)			III	II
Type according to EN 61643-11 (2012-10)			T3	T2
Max. backup protection with fuse, if not already installed			16 A gG	
Combination wave impulse (1,2/50 µs, 8/20 µs)			6 kV / 3 kA	-
Nominal discharge current (8/20 µs) (L / N- PE)		I_n	-	10 kA
Maximum discharge current (8/20 µs) (L / N-PE)		I_{max}	-	20 kA
Total discharge current (8/20 µs) (L + N-PE)		I_{Total}	-	20 kA
Voltage protection level (L-N; L / N-PE)		U_p	≤ 1,5 kV	
Response time		t_a	≤ 25 ns (L-N); ≤ 100 ns (L / N-PE)	
End of Life			OCFM (open circuit failure mode)	
Short circuit current rating with max. backup protection with fuse		I_{sccr}	6 kA rms	
Follow current interrupt rating			NFC No Follow Current®	
Behaviour in case of Temporary OverVoltage (TOV):	L-N	U_T	335 V / 5 s, withstand (W); 440 V / 120 min, withstand (W)	
	L-PE	U_T	1455 V / 200 ms, safe (S)	
	N-PE	U_T	1200 V / 200 ms, withstand (W)	
Operating temperature range			- 40 ... + 70 °C	
Operating state indicator			green LED	
Connecting wires			1,5 mm²; l=100 mm	
Enclosure material			thermoplastic	
Dimensions			l 43 x h 32 x d 22 mm	l 48 x h 43 x d 24 mm
Pollution Degree / Degree of protection		PD / IP	2 / 20	
Approximate weight			30 g	50 g
GTIN (EAN)			8054890320375	8054890320382

TECHNICAL DATA

CP 1

CP 1 is an insulated extension clamp with 3 wire terminations and enables a V-connection even if the SPD is not equipped with double clamps. **CP1** can be assembled on the SPD's PE terminal as well as on phase or neutral terminals.

Model CP 1

CODE	**249 591**
Wire terminations per unit	1 ~ 3
Nominal current	125 A
Material	copper
max. conductor size	3 x 16 mm²
GTIN (EAN)	8054890321105

TECHNICAL DATA

CP 2

CP 3

CP 4

CP 5

CP 6

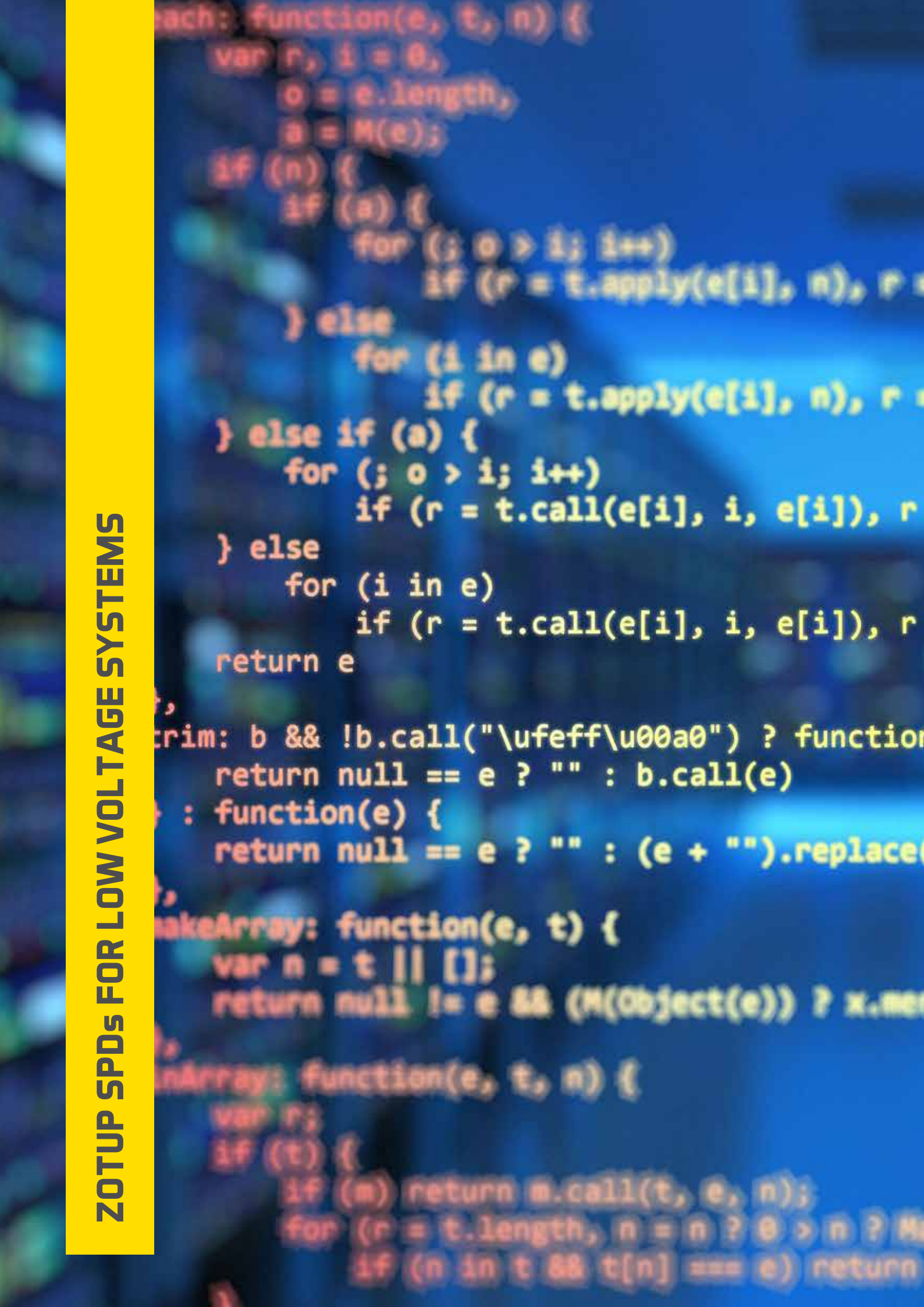
CP 7

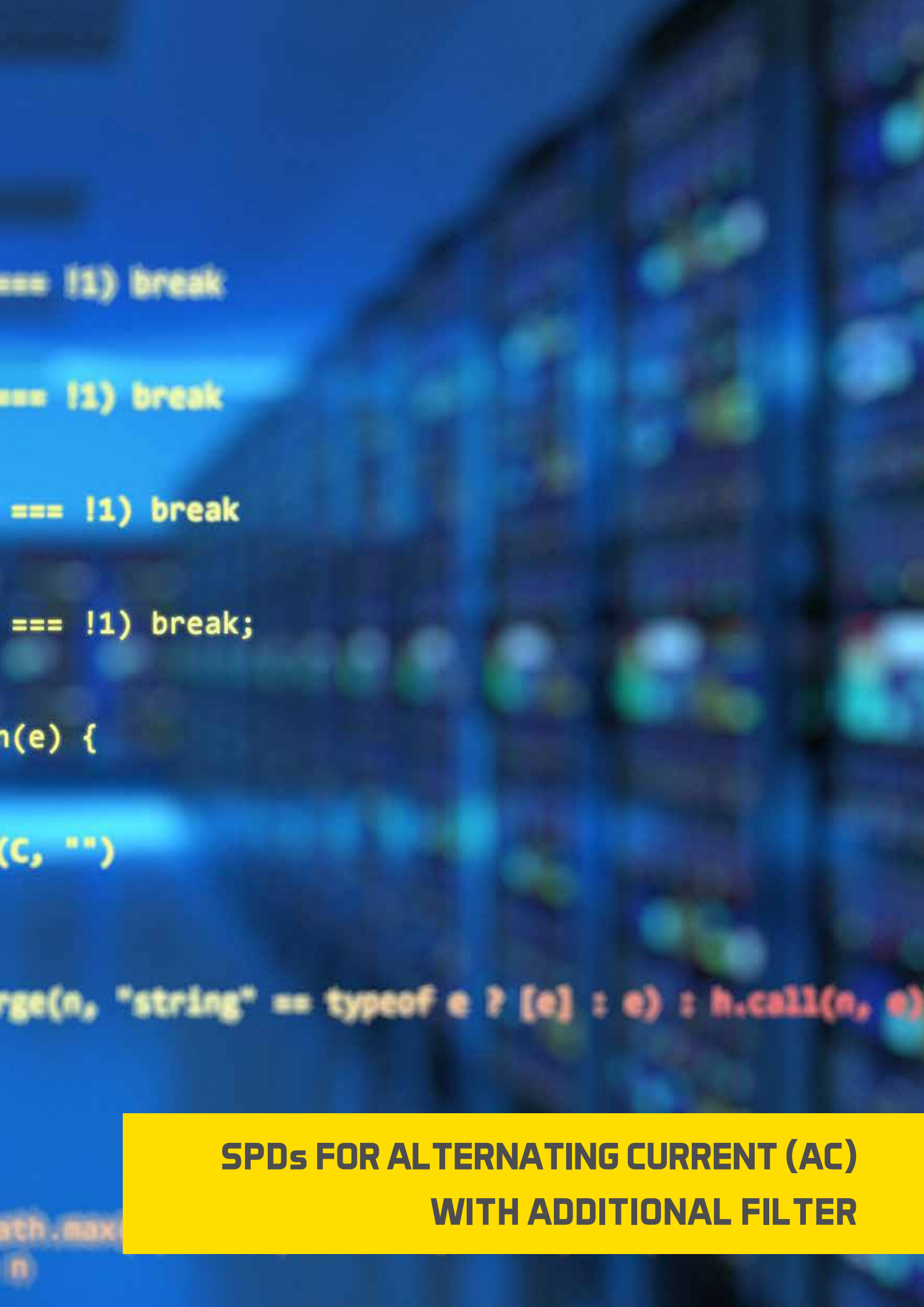
CP 8

CP2 to CP8 are fork-type busbars with 2 up to 8 connection points. Typical application: to provide a common PE connection for several SPDs. In TT system applications these busbars can also be used to provide a common neutral point connection to N-PE SPDs type I 12, I 52 and I 100.

Model CP ...	2	3	4	5	6	7	8
CODE	**249 592**	**249 593**	**249 594**	**249 595**	**249 596**	**249 597**	**249 598**
Number of connection points	2	3	4	5	6	7	8
Nominal current	125 A						
Material	copper						
Cross section	16 mm²						
GTIN (EAN)	8054890321136	8054890321198	8054890321204	8054890321211	8054890321228	8054890320719	8054890320832

TECHNICAL DATA


ZOTUP SPDs FOR LOW VOLTAGE SYSTEMS



SPDs FOR ALTERNATING CURRENT (AC) WITH ADDITIONAL FILTER

SURGE PROTECTION FROM DIRECT AND INDIRECT LIGHTNING EFFECTS WITH ADDITIONAL FILTER FOR REDUCTION OF HIGH FREQUENCY ELECTROMAGNETIC INTERFERENCES. IDEAL FOR DATA CENTER, CED AND DCS PROTECTION.

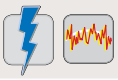
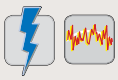
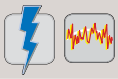
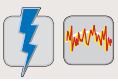
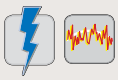
The impact of data center outages or even damages demands to adopt comprehensive protection measures. Atmospheric overvoltages and high frequence electromagnetic interference can cause "catastrophic" incidences, thus good and effective protection is essential. The tremendous costs caused by data center blackouts have made it necessary to carry out specific studies towards this issue. Statistical reporting of the costs, which are generally expressed in Amount Lost for Record (Setting), has been ongoing for several years in the USA and in UK.
In 2019 the Ponemon Institute of Michigan estimated a loss of € 240- Amount Lost for Record. On the occurrence of the worst event, the total loss was estimated at € 8.200.000,- in USA and at € 4.490.000,- in UK. The same Institute, based on an item by item analysis of 51 cases of blackouts in medium to large size data centers that are operating in 15 different industrial and service sectors, has found that the average downtime is about 130 minutes and costs businesses up to € 540.000- each, equal to a loss of € 4.150 per minute. For businesses operating in the area of telecommunications and E-commerce, losses can be even higher. These numbers speak for themselves and clearly explain why protection must be achieved at the maximum level possible and needs to be considered right from the planning phase.

Data Center Protection realised with 4 parallel connected ILF 4P 400 SPDs.

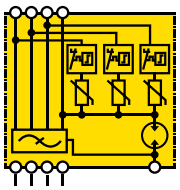
Data Center Protection realised with an ILF 4P 250, installed in the course of refurbishment.

Direct Lightning phenomena are the main cause of disastrous events, while indirect lightning effects and electrical high frequency interferences are also a source of damage whose origin is often not easy to identify, but their destructive effects are terrible for facilities where availability and reliability is crucial.
All these phenomena need to be identified in order to properly protect facilities connected to the power system and to ensure integrity and continuty of operation. This aspect is particularly relevant in the protection of servers located in Data Centers, CED, TLC or DCS plants and for the control of industrial processes.
Due to all these aspects, it is necessary to use protective devices in such facilities and plants, which are not only designed to protect from direct or indirect lightning effects (high performance SPDs), but which also provide addictional filtering that is able to significantly reduce electromagnetic interference. Based on conservative consideration such filters are required to cover a frequecy range from 150 kHz up to 30 MHz.

SPDs FOR ALTERNATING CURRENT (AC) WITH ADDITIONAL FILTER

SPD	Model	Application icon	Test class/ Type	Modes of protection	Impulse discharge current I_{imp}	Nominal discharge current I_n	Page
	ILF 4P 250		I, II, III / T1, T2, T3	4	12,5 kA	25 kA	86
	ILF 4P 400		I, II, III / T1, T2, T3	4	12,5 kA	25 kA	86
	ILF 4P 40		III / T3	4	-	3 kA	88
	ILF 4P 63		III / T3	4	-	3 kA	88
	ILF 4P 80		III / T3	4	-	3 kA	88
	ILF 4P 125		III / T3	4	-	3 kA	88
	ILF 2P 40		III / T3	2	-	3 kA	90
	ILF 2P 63		III / T3	2	-	3 kA	90
	ILF 2P 80		III / T3	2	-	3 kA	90
	ILF 2P 10 DIN		III / T3	2	-	3 kA	92
	ILF 2P 16 DIN		III / T3	2	-	3 kA	92
	ILF 2P 25 DIN		III / T3	2	-	3 kA	92

TN



ILF 4P 250/400 is a multimode SPD against direct and indirect lightning effects with integrated interference filter for high frequency disturbances, typically installed in in three phase plus neutral TN systems for the protection of Control Rooms, Data Centers or EDPs, with the following features and benefits:

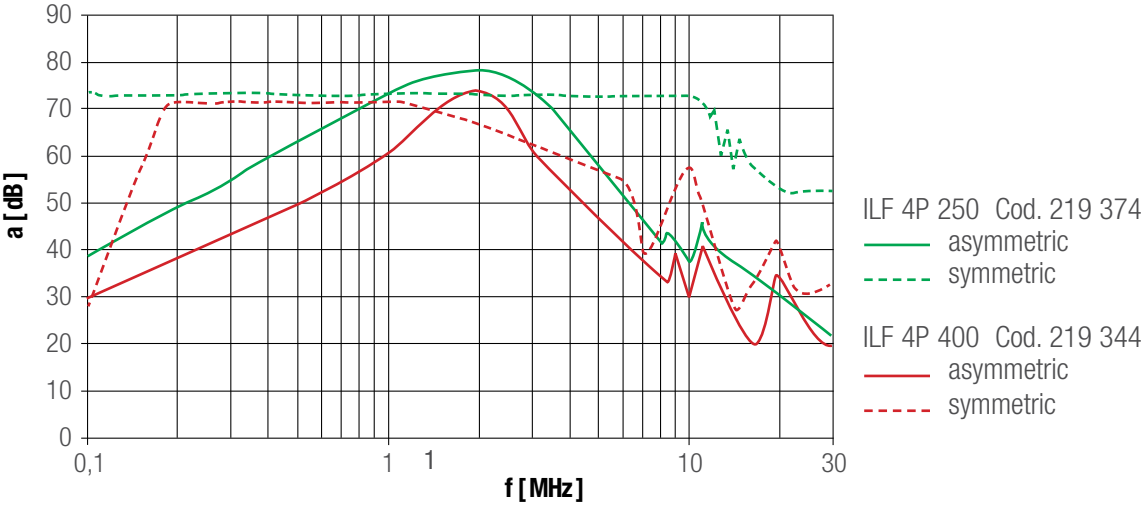
- **Impulse test classification: Test Class I, II and III** according to **IEC 61643-11 Ed.1 (2011-03)** and **Type 1, Type 2 and Type 3** according to **EN 61643-11(2012-10)**;
- Although a special inductor ensures an effective attenuation of high frequency interferences, it has an insignificant energy insertion loss as compared to the no-load losses and the efficiency of an insulation transformer.

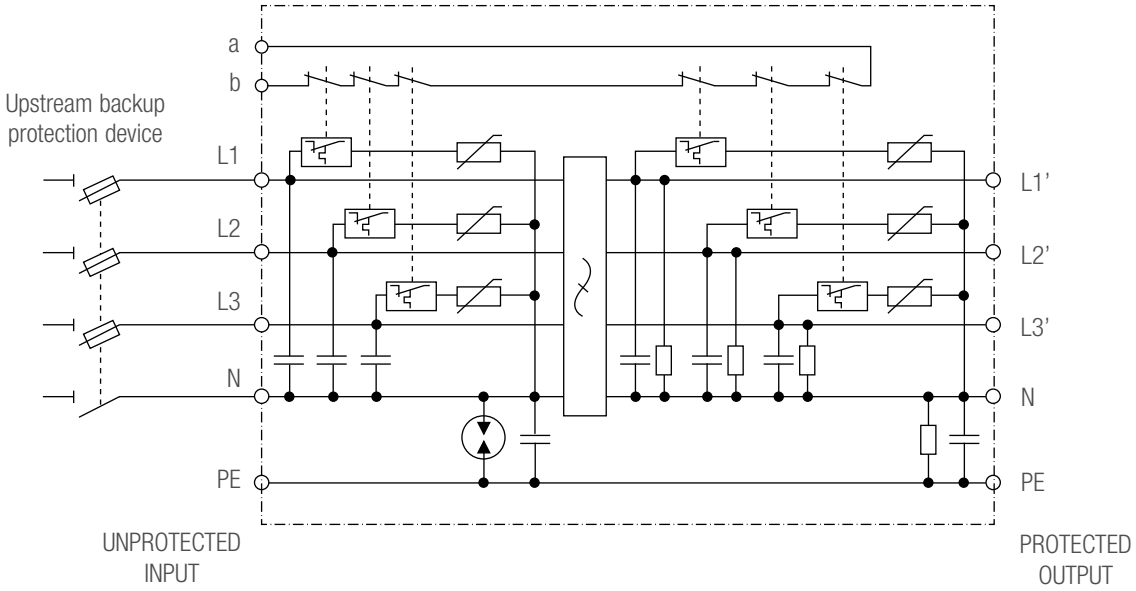
ILF 4P...

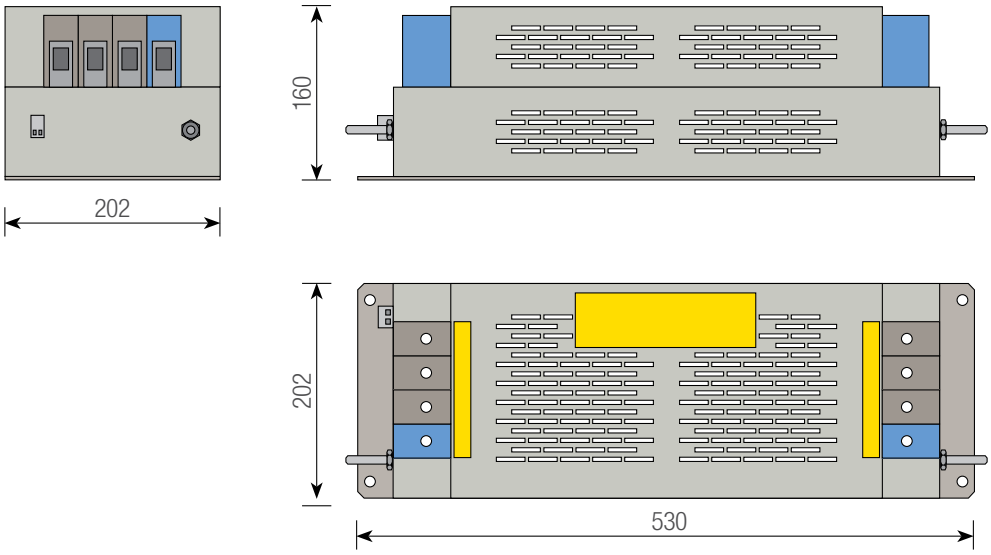
TECHNICAL DATA

Model ILF 4P ...			250	400
CODE			**219 374**	**219 344**
Nominal ac system Voltage		U_N	230/400 V - 50 Hz	
Maximum Continuous operating voltage		U_c	335/570 V ac	
Rated load current		I_L	250 A	400 A
Test Class according to IEC 61643-11 Ed.1 (2011-03)			I, II and III	
Type according to EN 61643-11 (2012-10)			T1,T2 and T3	
Total discharge current (10/350 µs) (L1+L2+L3+N-PE)		$I_{Total\ 10/350}$	50 kA	
Impulse discharge current (10/350 µs) (L-N)		I_{imp}	12,5 kA	
Impulse discharge current (10/350 µs) (N-PE)		I_{imp}	50 kA	
Total discharge current (8/20 µs) (L1+L2+L3+N-PE)		$I_{Total\ 8/20}$	100 kA	
Nominal discharge current (8/20 µs)		I_n	25 kA	
Combination wave impulse (L/N-PE)		U_{cc}	6 kV / 3 kA	
Combination wave impulse (L-N)		U_{cc}	6 kV / 3 kA	
Voltage protection level at a discharge current of (8/20 µs)	1kA	U_p	≤ 800 V	≤ 825 V
	5 kA	U_p	≤ 825 V	≤ 850 V
	12,5 kA	U_p	≤ 875 V	≤ 900 V
	20 kA	U_p	≤ 925V	≤ 950 V
	25 kA	U_p	≤ 975V	≤ 1000 V
Voltage protection level at combination wave impulse	(L-N)	U_p	≤ 850 V	≤ 900 V
	(N-PE)	U_p	≤ 1250V	≤ 1500V
Response time (L-N)		t_a	≤ 25 ns	
Response time (N-PE)		t_a	≤ 100 ns	
End of Life (L-N)			OCFM (open circuit failure mode)	
Behaviour in case of Temporary OverVoltage (TOV):	L/N-PE	U_T	335 V / 5 s, withstand (W); 440 V / 120 min, safe (S)	
Short Circuit Current rating with max. backup protection		I_{sccr}	50 kA rms	
Follow current interrupt rating			NFC No Follow Current®	
Asymmetric attenuation 50 Ω / 50 Ω		f	at 2 MHz: ≥ 78 dB	at 2 MHz: ≥ 73 dB
Symmetric attenuation 50 Ω / 50 Ω		f	at 0,2 MHz: ≥ 73 dB	at 0,2 MHz: ≥ 71 dB
Filter components		C_{X1}, C_{X2}	2,2 µF	2,2 µF
		C_Y	2 x 50 nF	2 x 50 nF
		R_x , R_y	1 MΩ	1 MΩ
		L_{SYM}	4,3 µH	2,4 µH
		L_{ASYM}	2,3 mH	1,1 mH
Power dissipation at 20°C (ventilated)			≤ 160 W	≤ 380 W
Max. back-up protection with fuse, if not already provided in the upstream installation			250 A gG	400 A gG
Operating temperature range			- 40 … + 55 °C	
Terminal - Conductor size			35-240 mm² (35-120 mm² / 26 Nm; 150-240 mm / 55 Nm)	5-240 mm² (35-120 mm² / 26 Nm; 150-240 mm / 55 Nm)
Mounting			vertical on a panel / wall (natural convection required)	
Enclosure material			metal	
Pollution Degree / Degree of protection		PD / IP	2 / 10	
Remote signal contact			NC (max. 1,5 mm² flexible; ac: 250 V/0,5 A; dc: 125 V/0,2 A; 75 V/0,5 A)	
Approximate weight			9,6 kg	11 kg
Dimensions			l 530 x h 202 x d 160 mm	
GTIN (EAN)			8054890320955	8054890320924

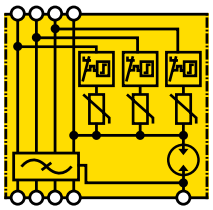
Asymmetric and symmetric attenuation characteristics







TN



ILF 4P...

ILF 4P is a multimode SPD against indirect lightning effects with integrated interference filter for high frequency disturbancies, typically installed in three phase plus neutral TN-systems close to equipment or machinery, particularly in industrial automation environment, with the following features and benefits:

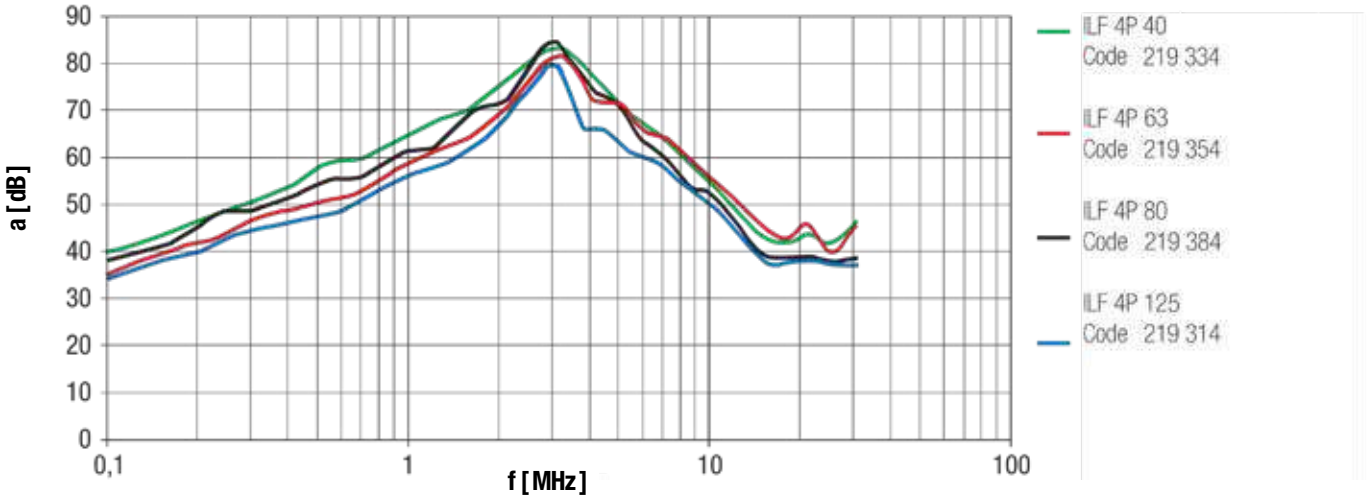
- **Impulse test classification: Test Class III** according to **IEC 61643-11 Ed.1 (2011-03)** and **Type 3** according to **EN 61643-11(2012-10)**;
- Protects electronic equipment (PLC or computers, etc.) from overvoltages due to indirect lightning effects and from other interferences;
- In case of an SPD reaching its end of life the protection is disconnected without interrupting the downstream supply. This is indicated locally by an optical indicator and via a remote signal contact;
- It is suitable for installation at LPZ boundaries 2 -3 and higher, in accordance with the lightning protection zones concept and in coordination with other SPDs.

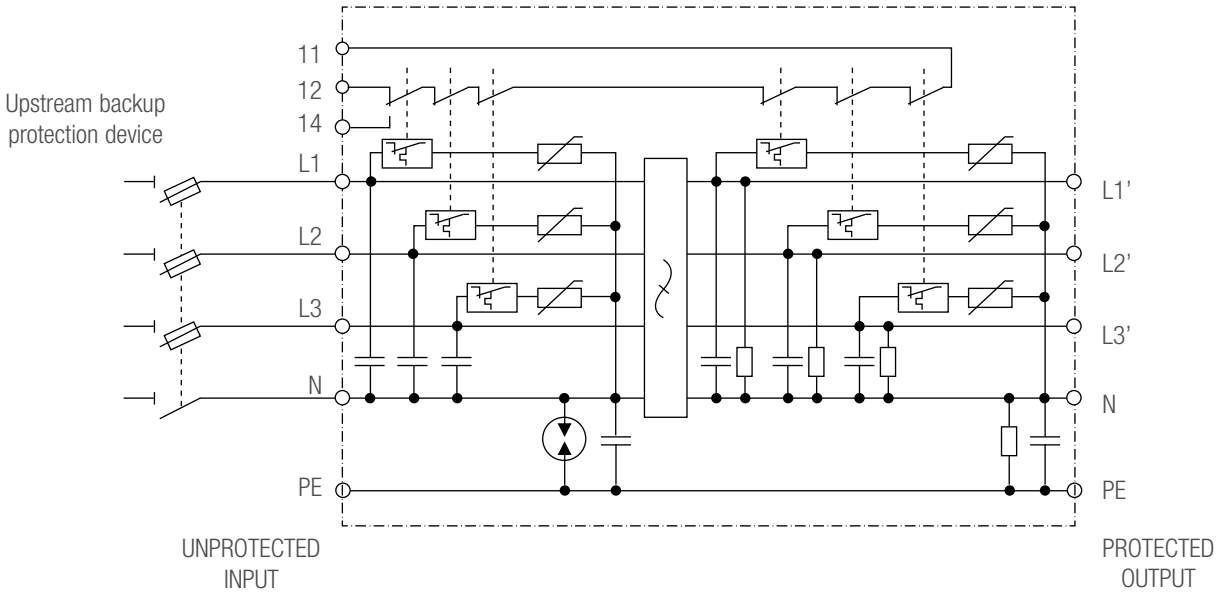
TECHNICAL DATA

Model ILF 4P ...		40	63	80	125
CODE		**219 334**	**219 354**	**219 384**	**219 314**
Nominal ac system Voltage	U_N	230/400 V - 50 Hz			
Maximum Continuous Operating Voltage	U_c	275/480 V ac			
Rated load current	I_L	40 A	63 A	80 A	125 A
Test Class according to IEC 61643-11 Ed.1 (2011-03)		III			
Type according to EN 61643-11 (2012-10)		T3			
Combination wave impulse (L/N-PE)	U_{oc}	6 kV / 3 kA			
Voltage protection level (L/N-PE)	U_p	≤ 1,5 kV			
Response time (L-N) Response time (N-PE)	t_a t_a	≤ 25 ns ≤ 100 ns			
End of Life (L-N)		OCFM (open circuit failure mode)			
Behaviour in case of Temporary OverVoltage (TOV): L/N-PE	U_T	335 V / 5 s, withstand (W); 440 V / 120 min, safe (S)			
Asymmetric attenuation		range 0,4 - 10 MHz: ≥ 40 dB / at 3 MHz: ≥ 80 dB			
Filter components	C_{X1} C_{X2} C_Y L	150 nF 680 nF 2 x 47 nF 8 µH	150 nF 680 nF 2 x 47 nF 6 µH	150 nF 680 nF 2 x 47 nF 1,4 mH	150 nF 680 nF 2 x 47 nF 1,0 mH
Power dissipation		≤ 8 W	≤ 12 W	≤ 15 W	≤ 20 W
Max. back-up protection with fuse, if not already provided in the upstream installation		40 A gG	63 A gG	80 A gG	125 A gG
Status indicator (indication of disconnector operation)		LED off - OK; Red LED - replace			
Operating temperature range		- 40 … + 55 °C			
Terminal - Conductor size		10 mm²	10 mm²	25 mm²	35 mm²
Mounting		vertical on a panel / wall			
Enclosure material		metallic			
Pollution Degree / Degree of protection	PD/IP	2 / 10			
Remote signal contact		NC			
Terminal - Conductor size for remote signal contact		max. 1,5 mm² flexible			
Switching capacity remote signal contact		ac: 250 V / 0,5 A - dc: 125 V / 0,2 A; 75 V / 0,5 A			
Approximate weight		1590 g	1700 g	1950 g	2820 g
Dimensions		l 250 x h 150 x d 65 mm		l 290 x h 180 x d 75 mm	
GTIN (EAN)		8054890320917	8054890320948	8054890320979	8054890320887

Upon request the ILF 4P type SPD can be supplied with other impulse current and voltage ratings.

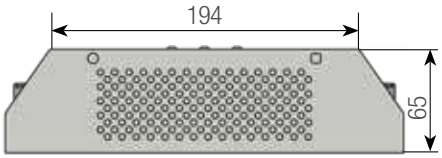
Asymmetric attenuation characteristics

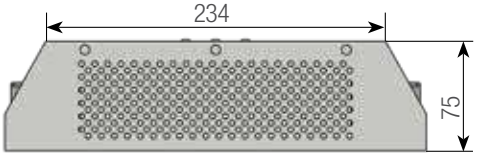




ILF 4P 40
Code 219 334

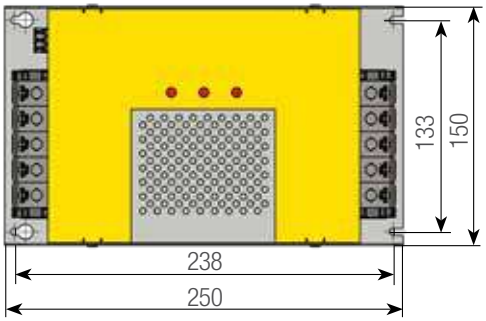
ILF 4P 63
Code 219 354

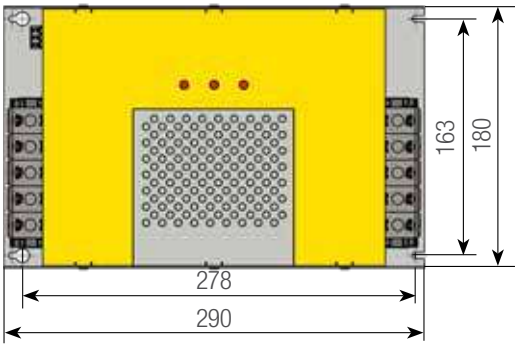




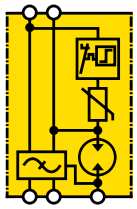
ILF 4P 80
Code 219 384

ILF 4P 125
Code 219 314





TN



ILF 2P...

ILF 2P is a multimode SPD against indirect lightning effects with integrated interference filter for high frequency disturbancies, typically installed in single phase TN-systems close to equipment or machinery, particularly in industrial automation environment, with the following features and benefits:

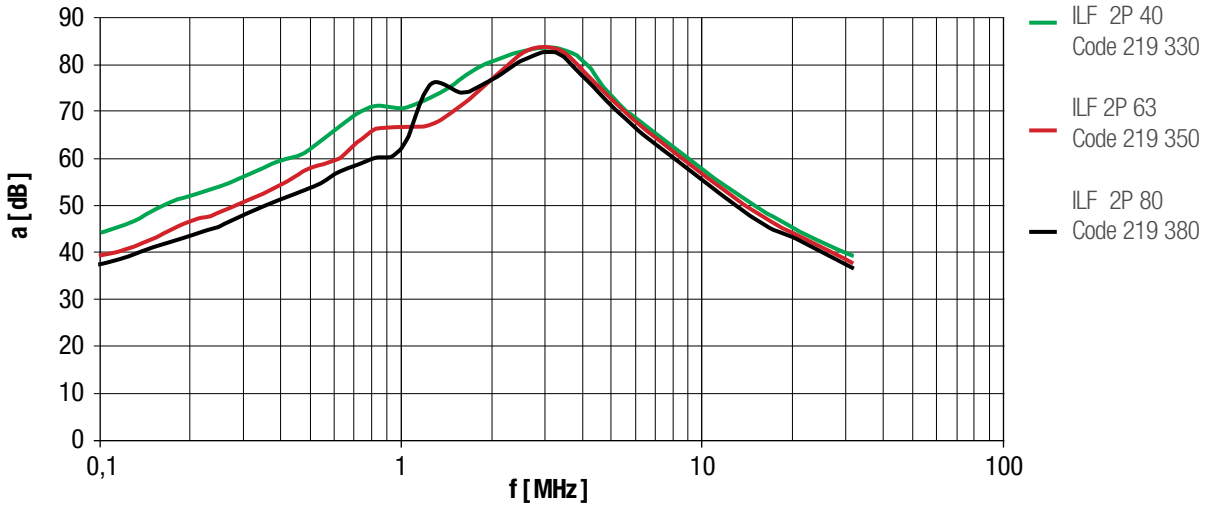
- **Impulse test classification: Test Class III** according to **IEC 61643-11 Ed.1 (2011-03)** and **Type 3** according to **EN 61643-11(2012-10)**;
- Protects electronic equipment (PLC or computers, etc.) from overvoltages due to indirect lightning effects and from other interferences;
- In case of an SPD reaching its end of life the protection is disconnected without interrupting the downstream supply. This is indicated locally by an optical indicator and via a remote signal contact;
- It is suitable for installation at LPZ boundaries 2 -3 and higher, in accordance with the lightning protection zones concept and in coordination with other SPDs.

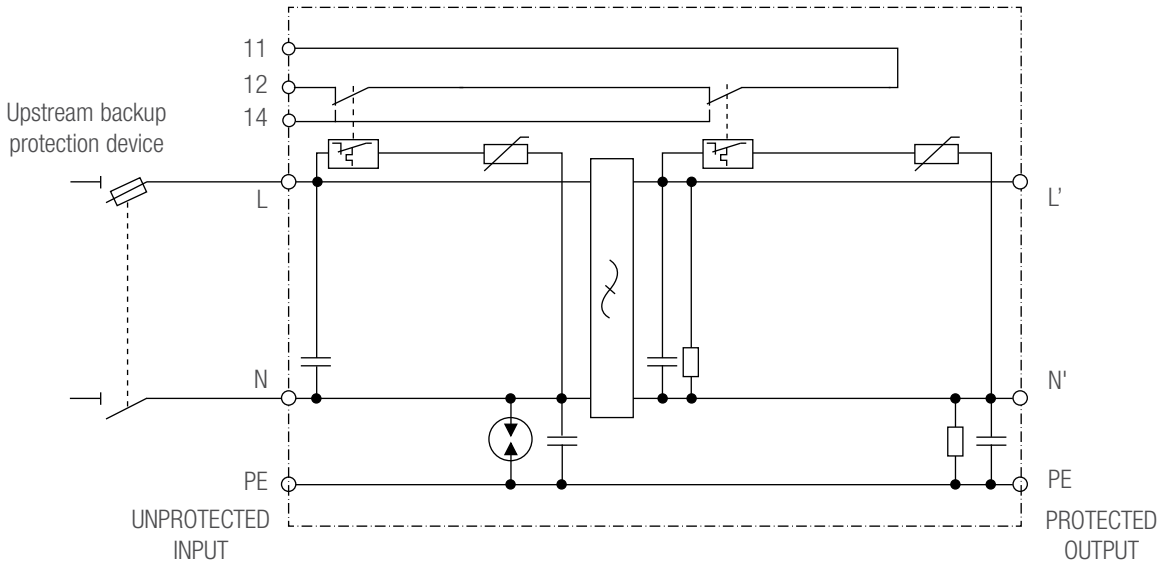
TECHNICAL DATA

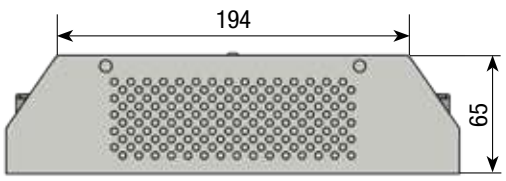
Model ILF 2P ...		40	63	80
CODE		**219 330**	**219 350**	**219 380**
Nominal ac system Voltage	U_N	230 V - 50 Hz		
Maximum Continuous Operating Voltage	U_c	275 V ac		
Rated load current	I_L	40 A	63 A	80 A
Test Class according to IEC 61643-11 Ed.1 (2011-03)		III		
Type according to EN 61643-11 (2012-10)		T3		
Combination wave impulse (L/N-PE)	U_{oc}	6 kV / 3 kA		
Voltage protection level (L/N-PE)	U_p	≤ 1,5 kV		
Response time (L-N) Response time (N-PE)	t_a t_a	≤ 25 ns ≤ 100 ns		
End of Life (L-N)		OCFM (open circuit failure mode)		
Behaviour in case of Temporary OverVoltage (TOV): L/N-PE	U_T	335 V / 5 s, withstand (W); 440 V / 120 min, safe (S)		
Asymmetric attenuation		range 0,4 - 10 MHz: ≥ 50 dB / at 3 MHz: ≥ 80 dB		
Filter components	C_X C_Y L	150 nF 22 nF 2,2 mH	220 nF 22 nF 2,2 mH	220 nF 22 nF 1,4 mH
Power dissipation		≤ 4 W	≤ 9 W	≤ 12 W
Max. back-up protection with fuse, if not already provided in the upstream installation		40 A gG	63 A gG	80 A gG
Operating temperature range		- 40 … + 55 °C		
Terminal - Conductor size		10 mm²	10 mm²	25 mm²
Mounting		vertical on a panel / wall		
Enclosure material		metallic		
Pollution Degree / Degree of protection	PD / IP	2 / 10		
Remote signal contact		NC		
Terminal - Conductor size for remote signal contact		max. 1,5 mm² flexible		
Switching capacity remote signal contact		ac: 250 V / 0,5 A - dc: 125 V / 0,2 A; 75 V / 0,5 A		
Approximate weight		720 g	1450 g	1520 g
Dimensions		l 250 x h 150 x d 65 mm		
GTIN (EAN)		8054890320900	8054890320931	8054890320962

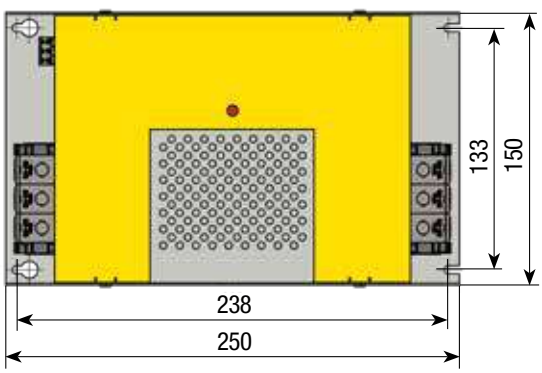
Upon request the ILF 2P type SPD can be supplied with other impulse current and voltage ratings.

Asymmetric attenuation characteristics



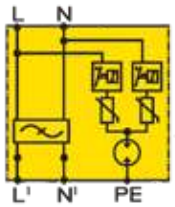






TN

TT



ILF 2P... DIN

ILF 2P ... DIN is a multimode SPD against indirect lightning effects with integrated interference filter for high frequency disturbancies, typically installed in single phase TN and TT systems close to equipment or machinery, particularly in industrial automation environment, with the following features and benefits:

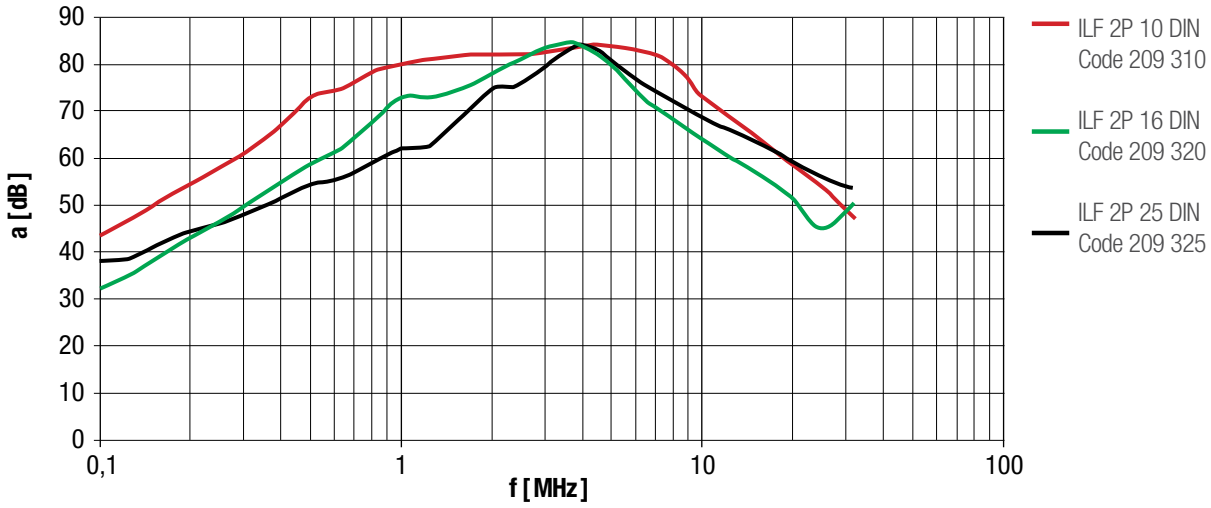
- **Impulse test classification: Test Class III** according to **IEC 61643-11 Ed. 1 (2011-03) and Type 3** according to **EN 61643–11 (2012-10)**;
- Protects electronic equipment (PLC or computers, etc.) from overvoltages due to indirect lightning effects and from other interferences;
- In case of an SPD reaching its end of life the protection is disconnected without interrupting the downstream supply. This is indicated locally by two colours status indicator and via a remote signal contact;
- It is suitable for installation at LPZ boundaries 2 -3 and higher, in accordance with the lightning protection zones concept and in coordination with other SPDs;
- Upon request, ILF 2P ... DIN SPDs type can be supplied with other voltages and currents rating.

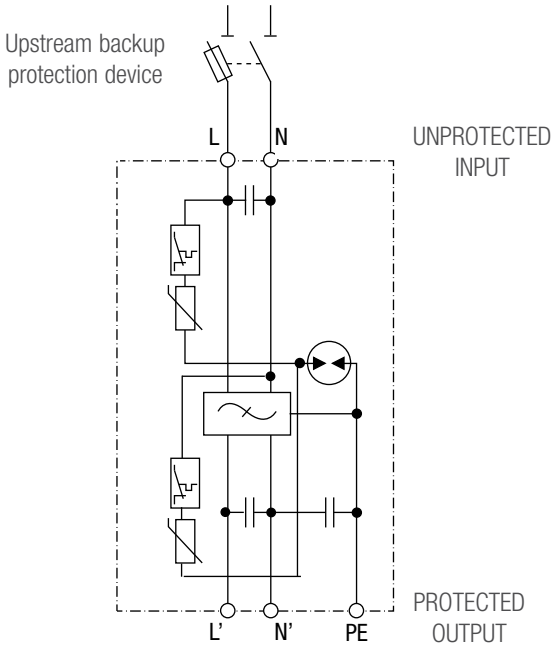
TECHNICAL DATA

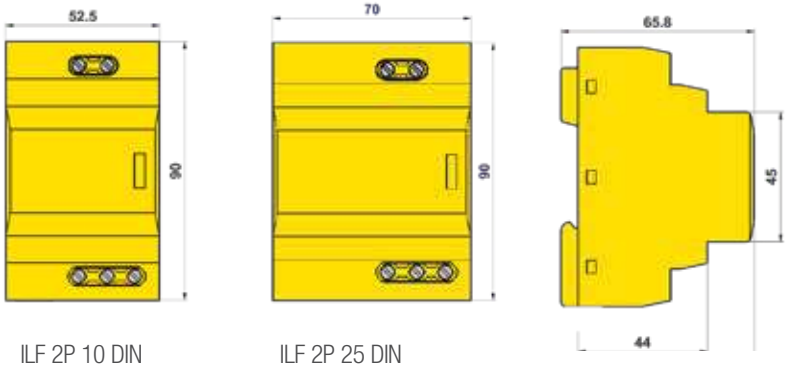
Model ILF 2P ...			10 DIN	16 DIN	25 DIN
CODE			**209 310**	**209 320**	**209 325**
Nominal ac system Voltage		U_N	230 V - 50 Hz		
Maximum Continuous Operating Voltage		U_c	275 V ac		
Rated load current		I_L	10 A	16 A	25 A
Test Class according to IEC 61643-11 Ed.1 (2011-03)			III		
Type according to EN 61643-11 (2012-10)			T3		
Combination wave impulse (L/N-PE)		U_{oc}	6 kV / 3 kA		
Voltage protection level		U_p	≤ 800 V (L-N); ≤ 1,5 kV (L/N-PE)		
Response time (L-N)		t_a	≤ 25 ns		
Response time (L/N-PE)		t_a	≤ 100 ns		
End of life			OCFM (open circuit failure mode)		
Behaviour in case of Temporary OverVoltage (TOV):	L-N	U_T	335 V / 5 s, withstand (W); 440 V / 120 min, safe (S)		
	N-PE	U_T	1200 V / 200 ms, withstand (W)		
Asymmetric attenuation			range 0,4 - 20 MHz: ≥ 50 dB / at 4 MHz: ≥ 80 dB		
Filter components		C_X	150 nF	220 nF	220 nF
		C_Y	22 nF	22 nF	22 nF
		L	36 µH	19 µH	7 µH
Power dissipation			≤ 2,5 W	≤ 3,5 W	≤ 4 W
Max. back-up protection with fuse, if not already provided in the upstream installation			10 A gG	16 A gG	25 A gG
Status indicator			2 colours: transparent - OK / red - to replace		
Operating temperature range			- 40 ... + 55 °C		
Terminal - Conductor size			2,5 - 4 mm²	2,5 - 4 mm²	6-16 mm²
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715		
Enclosure material			PA6 / V-0 Polyamide according to UL 94		
Pollution Degree / Degree of Protection		PD / IP	2 / 20 (built-in)		
Approximate weight			170 g	190 g	220 g
Dimensions: Width			52,5 mm (3 modules)	52,5 mm (3 modules)	70 mm (4 modules)
GTIN (EAN)			8054890320344	8054890320351	8054890320368

Model ILF 2P ... with remote signal contact		10 t DIN	16 t DIN	25 t DIN
CODE		**219 310**	**219 320**	**219 325**
Remote signal contact		potential-free changeover contact		
Terminal - conductor size for remote signal contact		max. 1,5 mm² flexible		
Switching capacity remote signal contact		ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A		
GTIN (EAN)		8054890322218	8054890322225	8054890322232

Asymmetric attenuation characteristics







ILF 2P 10 DIN
Code 209 310

ILF 2P 16 DIN
Code 209 320

ILF 2P 25 DIN
Code 209 325

ZOTUP SPDs FOR LOW VOLTAGE SYSTEMS

SPDs FOR DIRECT CURRENT (DC) AND PHOTOVOLTAIC APPLICATIONS

SPDs FOR DIRECT CURRENT (DC) APPLICATIONS

SPD	Model	Application icon	Test class/ Type	Modes of protection	Impulse discharge current I_{imp}	Nominal discharge current I_n	Page
	L 7/30 DC 60 ff		II / T2	1	-	20 kA	97
	L 7/30 DC 110 ff		II / T2	1	-	20 kA	97
	L 7/30 DC 230 ff		I and II / T1 and T2	1	8 kA	30 kA	97
	L 7/30 DC 600 ff		I and II / T1 and T2	1	7 kA	30 kA	97
	L 7/30 DC 1000 ff		I and II / T1 and T2	1	5 kA	20 kA	97

SPDs FOR PHOTOVOLTAIC APPLICATIONS

SPD	Model	Application icon	Test class/ Type	Modes of protection	Impulse discharge current I_{imp}	Nominal discharge current I_n	Page
	L 13/60 PV Y 600 ff		I and II / T1 and T2	3	7 kA	20 kA	98
	L 13/60 PV Y 1000 ff		I and II / T1 and T2	3	5 kA	20 kA	98
	L 3/40 PV Y 600 ff		II / T2	3	-	20 kA	99
	L 3/40 PV Y 1000 ff		II / T2	3	-	20 kA	99

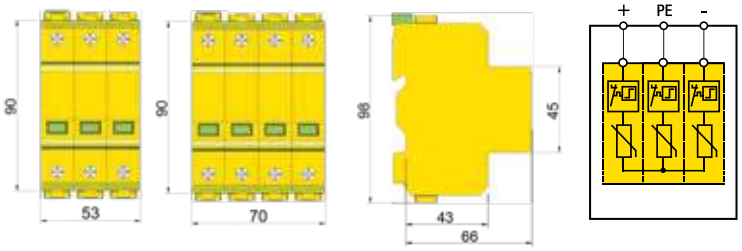
L 7/30 DC ...ff

L 7/30 DC ... ff is a voltage limiting SPD providing a single mode of protection, typically installed in DC Distribution Boards (DB) with the following features and benefits:

- **Impulse test classification for 230, 600 and 1000 V DC: Test Class I** and **II** according to **IEC 61643-11(2011-03) and Type 1** and **Type 2** according to **EN 61643–11 (2012-10)**;
- **Impulse test classification for 60 and 110 V DC: Test Class II** according to **IEC 61643-11(2011-03)** and **Type 2** according to **EN 61643–11 (2012-10)**;
- **Backup protection is not required up to a prospective DC short circuit current of 1000 A (for U_N up to 230 V)**;
- **Three colour Status Indicator with progressive indication of remaining performance;**
- Pollution Degree 3 up to Un 230 V DC.

Model L 7/30 DC ...			60 ff	110 ff	230 ff	600 ff	1000 ff
CODE			**200 602**	**200 603**	**200 600**	**200 606**	**200 610**
Nominal dc system voltage		U_N	60 V DC	110 V DC	230 V DC	600 V DC	1000 V DC
Modes of protection (number of poles)			1				
Max Continuous Operating Voltage		U_c	100 V DC	200 V DC	420 V DC	895 V DC	1000 V DC
Test Class according to IEC 61643-11 Ed.1 (2011-03)			II	II	I and II	I and II	I and II
Type according to EN 61643-11 (2012-10)			T2	T2	T1 and T2	T1 and T2	T1 and T2
Impulse discharge current (10/350 µs)		I_{imp}	-	-	8 kA	7 kA	5 kA
Charge		Q	-	-	4 As	3,6 As	2,9 As
Nominal discharge current (8/20 µs)		I_n	20 kA	20 kA	30 kA	30 kA	20 kA
Max. discharge current (8/20 µs)		I_{max}	30 kA	30 kA	40 kA	40 kA	40 kA
Voltage protection level at a discharge current of:	1 kA	U_p	≤ 0,22 kV	≤ 0,42 kV	≤ 0,81 kV	≤ 1,20 kV	≤ 1,85 kV
	5 kA	U_p	≤ 0,28 kV	≤ 0,50 kV	≤ 1,00 kV	≤ 1,46 kV	≤ 2,25 kV
	10 kA	U_p	≤ 0,36 kV	≤ 0,60 kV	≤ 1,20 kV	≤ 1,58 kV	≤ 2,60 kV
	20 kA	U_p	≤ 0,50 kV	≤ 0,80 kV	≤ 1,35 kV	≤ 1,95 kV	≤ 2,85 kV
	30 kA	U_p	-	-	≤ 1,50 kV	≤ 2,15 kV	-
Response time		t_a	≤ 25 ns				
End of Life			OCFM (Open Circuit Failure Mode)				
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	1000 A	1000 A	1000 A	500 A	200 A
Short Circuit Current rating with max. backup protection fuse		I_{sccr}	30 kA	30 kA	30 kA	30 kA	30 kA
Max. back-up protection with fuse (DC)			200 A gPV	200 A gPV	200 A gPV	200 A gPV	200 A gPV
Follow current interrupt rating		I_{fi}	NFC No Follow Current®				
Status indicator (indication of disconnector operation)			3 colours with progressive performance indication				
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%				
Terminal - Conductor size			4-35 mm² flexible / 4-50 mm² semi rigid				
Busbar connections			fork-type busbar 16 mm²				
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715				
Case material / Flammability grade			BMC / V-0 in accordance with UL 94				
Pollution degree / Degree of protection		PD	3	3	3	2	2
Degree of protection		IP	20 (built-in)				
Approximate weight			120 g	150 g	170 g	175 g	190 g
Dimensions: width			17,5 mm (1 module)				
3rd party testing			CTI test report				
GTIN (EAN)			8054890320306	8054890320313	8054890320290	8054890320320	8054890320337

Model L 7/30 DC ... with remote signal contact		60 t ff	110 t ff	230 t ff	600 t ff	1000 t ff
CODE		**210 602**	**210 603**	**210 600**	**210 606**	**210 610**
Remote signal contact		potential-free changeover contact				
Terminal - conductor size for remote signal contact		max. 1,5 mm² flexible				
Switching capacity remote signal contact		ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A				
GTIN (EAN)		8054890320610	8054890320627	8054890320559	8054890320634	8054890320641



Code 216 106 Code 216 110

L 13/60 PV Y ... ff

L 13/60 PV Y ... ff is a voltage limiting SPD for photovoltaic systems providing three modes of protection, typically installed close to the PV inverter, close to the PV generator and/or in the junction box, with the following features and benefits:

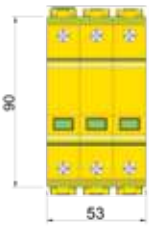
- **Impulse test classification: Test Class I** and **II** according to **IEC 61643-31 Ed.1 (2018-01)** and **Type 1 and Type 2** according to **EN 61643-31 (2019-05)**;
- **High short circuit current rating without backup protection Iscpv = 1000 A according to IEC 61643-31;**
- **High short circuit current rating without backup protection, additionally tested based on IEC/EN 61643-11;**
- **Three colour Status Indicator with progressive indication of remaining performance;**
- **Upon request the L 13/60 PV Y ... ff type SPD can be supplied with other ratings for discharge current and Max. Continous Operating Voltage.**

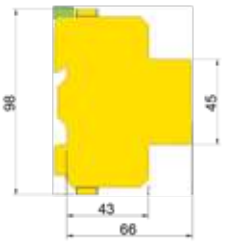
TECHNICAL DATA

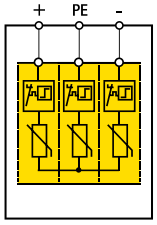
Model L 13/60 PV Y ...			600 ff	1000 ff
CODE			**216 106**	**216 110**
Maximum Continous Operating Voltage (all modes)		U_{CPV}	600 V	1000 V
Modes of protection (number of poles)			3	
Type (acc. to IEC/EN 61643-31)			T1+T2	
Impulse discharge current (10/350 µs) (all modes)		I_{imp}	7 kA	5 kA
Nominal discharge current (8/20 µs) (all modes)		I_n	20,0 kA	
Total discharge current (10/350 µs) DC+ and DC- to PE		$I_{Total\ 10/350}$	13 kA	10 kA
Total discharge current (8/20 µs) DC+ and DC- to PE		$I_{Total\ 8/20}$	35,0 kA	40,0 kA
Max. discharge current (8/20 µs)		I_{max}	70,0 kA	
Voltage protection level at a discharge current of (all modes)	1 kA	U_p	≤ 1,60 kV	≤ 2,60 kV
	5 kA	U_p	≤ 1,90 kV	≤ 3,10 kV
	10 kA	U_p	≤ 2,10 kV	≤ 3,30 kV
	15 kA	U_p	≤ 2,40 kV	≤ 4,00 kV
	20 kA	U_p	≤ 2,50 kV	≤ 4,20 kV
Response time		t_a	≤ 25 ns	
End of life			OCFM (open circuit failure mode)	
Short-circuit current rating (acc. to IEC 61643-31)		I_{SCPV}	1000 A	
Short-circuit current rating (based on IEC/EN 61643-11)		I_{SCCR}	500 A	200 A
Follow current interrupt rating			NFC No Follow Current®	
Status indicator			3 colours with progressive performance indication	
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%	
Terminal-Conductor size			4-35 mm² flexible / 4-50 mm² semi rigid	
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715	
Case material / Flammability grade			BMC / V-0 according to UL 94	
Pollution degree / Degree of protection		PD / IP	2 / 20 (built-in)	
Approximate weight			420 g	700 g
Dimensions: width			53 mm (3 modules)	70 mm (4 modules)
GTIN (EAN)			8054890321242	8054890321259

Model L 13/60 PV Y ... with remote signal contact	600 t ff	1000 t ff
CODE	**216 116**	**216 126**
Remote signal contact	potential-free changeover contact	
Terminal - conductor size for remote signal contact	max. 1,5 mm² flexible	
Switching capacity remote signal contact	ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A	
GTIN (EAN)	8054890321273	8054890321303

L 3/40 PV Y ... ff







L 3/40 PV Y ... ff is a voltage limiting SPD for photovoltaic systems providing three modes of protection, typically installed close to the PV inverter, close to the PV generator and/or in the junction box, with the following features and benefits:

- **Impulse test classification: Test Class II** according to **IEC 61643-31 Ed.1 (2018-01)** and **Type 2** according to **EN 61643-31 (2019-05)**;
- **High short circuit current rating without backup protection Iscpv = 1000 A according to IEC 61643-31;**
- **High short circuit current rating without backup protection, additionally tested based on IEC/EN 61643-11;**
- **Three colour Status Indicator with progressive indication of remaining performance;**
- **Upon request the L 13/60 PV Y ... ff type SPD can be supplied with other ratings for discharge current and Max. Continous Operating Voltage.**

TECHNICAL DATA

Model L 3/40 PV Y ...			600 ff	1000 ff
CODE			**210 106**	**210 110**
Maximum Continous Operating Voltage (all modes)		U_{CPV}	600 V	1000 V
Modes of protection (number of poles)			3	
Type (acc. to IEC/EN 61643-31)			T2	
Nominal discharge current (8/20 µs) (all modes)		I_n	20,0 kA	
Total discharge current (8/20 µs) DC+ and DC- to PE		$I_{Total\ 8/20}$	30,0 kA	
Max. discharge current (8/20 µs)		I_{max}	40,0 kA	
Voltage protection level at a discharge current of (all modes)	1 kA	U_p	≤ 1,70 kV	≤ 2,70 kV
	5 kA	U_p	≤ 2,10 kV	≤ 3,20 kV
	10 kA	U_p	≤ 2,50 kV	≤ 3,40 kV
	15 kA	U_p	≤ 2,70 kV	≤ 4,10 kV
	20 kA	U_p	≤ 2,80 kV	≤ 4,30 kV
Response time		t_a	≤ 25 ns	
End of life			OCFM (open circuit failure mode)	
Short-circuit current rating (acc. to IEC 61643-31)		I_{SCPV}	1000 A	
Short-circuit current rating (based on IEC/EN 61643-11)		I_{SCCR}	500 A	200 A
Follow current interrupt rating			NFC No Follow Current®	
Status indicator			3 colours with progressive performance indication	
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%	
Terminal-Conductor size			4-35 mm² flexible / 4-50 mm² semi rigid	
Mounting			indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715	
Case material / Flammability grade			BMC / V-0 according to UL 94	
Pollution degree / Degree of protection		PD / IP	2 / 20 (built-in)	
Approximate weight			330 g	450 g
Dimensions: width			53 mm (3 modules)	
GTIN (EAN)			8054890321020	8054890321037

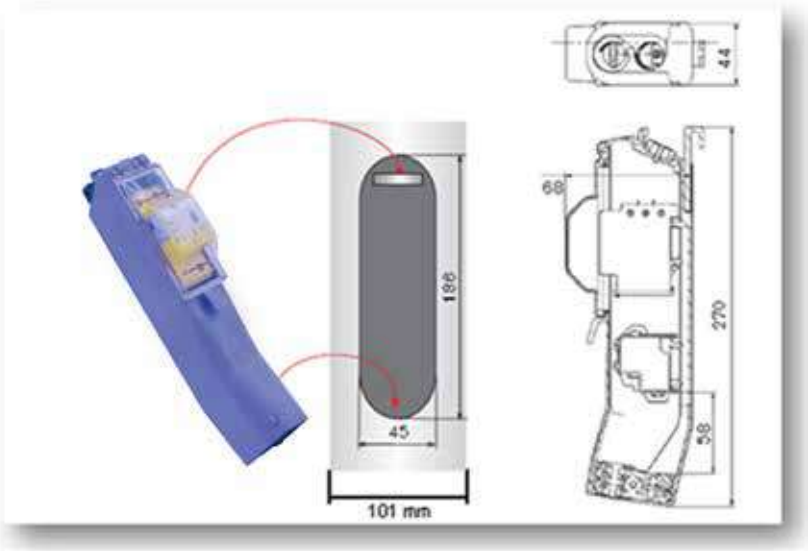
Model L 3/40 PV Y ... with remote signal contact		600 t ff	1000 t ff
CODE		**210 116**	**210 126**
Remote signal contact		potential-free changeover contact	
Terminal - conductor size for remote signal contact		max. 1,5 mm² flexible	
Switching capacity remote signal contact		ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A	
GTIN (EAN)		8054890321051	8054890321082

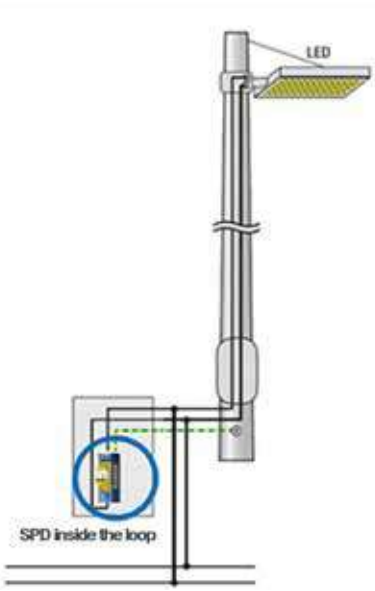
ZOTUP SPDs FOR LOW VOLTAGE SYSTEMS

SPDs FOR LED LIGHTING

ZOTUP SPDs FOR LED LIGHTING IN LOW VOLTAGE SYSTEMS

SPD	Model	Application icon	Test class/Type	Modes of protection	Impulse discharge current I_{imp}	Nominal discharge current I_n	Page
	LLP 7/30 230 ff 1+1		I and II / T1 and T2	2	8 kA	30 kA	103
	LLP 2/10 230 ff 1+1		II / T2	2	-	10 kA	104
	IL 1/10 2P LED		II / T2	2	-	10 kA	105





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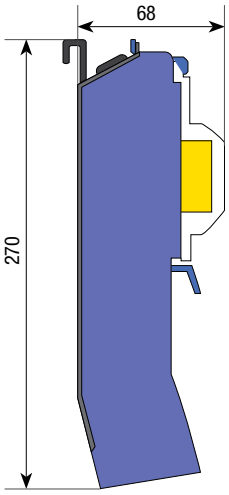

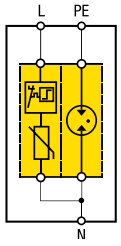

LLP 7/30 230 ff 1+1

LLP (LED Lighting Protection) systems is a ready to install assembly of a voltage limiting and a voltage switching SPD providing two modes of protection in a protective housing for mounting inside the opening at the pole base, with the following features and benefits:

- Combination type SPD for the protection of street lighting luminaires against direct and indirect lightning effects;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms**;
- **Easy wiring inside of the openings at the pole base with a size of 186 x 45 mm (minimum diameter of the pole 101 mm);**
- The special SPD case material allows to match with "Pollution Degree 3" requirements.

Model LLP 7/30 ...			230 ff 1+1	
CODE			**242 191**	
Nominal AC system voltage		U_N	230/400 V AC	
Modes of protection (number of poles)			1+1 (L-N + N-PE)	
Max Continuous Operating Voltage		U_c	335 V AC	
Test Class according to IEC 61643-11 Ed.1 (2011-03)			I and II	
Type according to EN 61643-11 (2012-10)			T1 and T2	
Impulse discharge current (10/350 µs) (L-N)		I_{imp}	8 kA	
Impulse discharge current (10/350 µs) (N-PE)		I_{imp}	52 kA	
Charge (L-N)		Q	3,6 As	
Charge (N-PE)		Q	26 As	
Nominal discharge current (8/20 µs) (L-N)		I_n	30 kA	
Nominal discharge current (8/20 µs) (N-PE)		I_n	52 kA	
Max. discharge current (8/20 µs) (L-N)		I_{max}	40 kA	
Max. discharge current (8/20 µs) (N-PE)		I_{max}	70 kA	
Voltage protection level (L-N, L-PE) at a discharge current of	1 kA	U_p	≤ 0,83 kV	≤ 1,50 kV
	5 kA	U_p	≤ 1,00 kV	≤ 1,50 kV
	20 kA	U_p	≤ 1,35 kV	≤ 1,50 kV
	25 kA	U_p	≤ 1,45 kV	≤ 1,50 kV
	30 kA	U_p	≤ 1,60 kV	≤ 1,60 kV
Voltage protection level (N-PE)		U_p	≤ 1,50 kV	
Response time (L-N / N-PE)		t_a	≤ 25 ns / ≤ 100 ns	
End of life			OCFM (open circuit failure mode)	
Behaviour in case of Temporary OverVoltage (TOV):	L-N	U_T	440 V / 120 min, withstand (W)	
	N-PE	U_T	1200 V / 200 ms, withstand (W)	
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	5 kA rms	
Short Circuit Current rating with max. backup protection fuse (L)		I_{sccr}	100 kA rms	
Max. back-up protection with up-stream CB with a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability).			160 A (max. 4,50 x 10^5 A^2s)	
Max. back-up protection with FUSE at prospective short circuit currents of			125 A gG (5 ÷ 100 kA rms)	
Follow current interrupt rating			NFC No Follow Current®	
Status indicator (indication of disconnector operation)			3 colours with progressive performance indication	
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%	
Terminal-Conductor size			4-35 mm^2 flexible / 4-50 mm^2 semi rigid	
Mounting			35 x 7,5 mm top hat DIN rail IEC/EN 60715	
Case material / Flammability grade			BMC / V-0 in accordance with UL 94	
Pollution degree / Degree of protection		PD / IP	3 / 54 (built-in)	
Approximate weight			300 g	
Dimensions			l 68 x h 270 x d 44 mm	
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR	
GTIN (EAN)			8054890321822	

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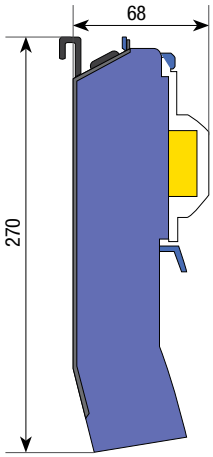
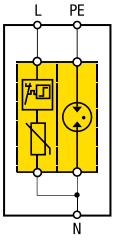




LLP 2/10 230 ff 1+1

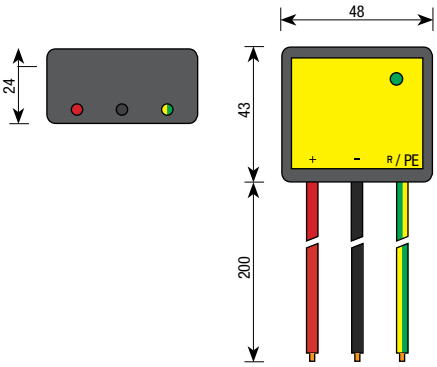
LLP (LED Lighting Protection) systems is a ready to install assembly of a voltage limiting and a voltage switching SPD providing two modes of protection in a protective housing, with the following features and benefits:

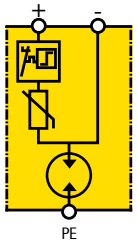
- **Impulse test classification: Test Class II** according to **IEC 61643-11(2011-03) and Type 2** according to **EN 61643–11 (2012-10)**;
- Combination type SPD for the protection of street lighting luminaires against indirect lightning effects;
- **Backup protection is not required with an upstream CB ≤ 160 A or up to an Isccr ≤ 5 kA rms**;
- **Easy wiring inside of the openings at the pole base with a size of 186 x 45 mm (minimum diameter of the pole 101 mm);**
- The special SPD case material allows to match with "Pollution Degree 3" requirements.

TECHNICAL DATA

Model LLP 2/10 ...			230 ff 1+1	
CODE			**242 190**	
Nominal AC system voltage		U_N	230/400 V AC	
Modes of protection (number of poles)			1+1 (L-N + N-PE)	
Max Continuous Operating Voltage (L-N)		U_C	335 V AC	
Max Continuous Operating Voltage (N-PE)		U_C	255 V AC	
Test Class according to IEC 61643-11 Ed.1 (2011-03)			II	
Type according to EN 61643-11 (2012-10)			T2	
Nominal discharge current (8/20 µs) (L-N)		I_n	10 kA	
Nominal discharge current (8/20 µs) (N-PE)		I_n	40 kA	
Max. discharge current (8/20 µs) (L-N)		I_{max}	20 kA	
Max. discharge current (8/20 µs) (N-PE)		I_{max}	65 kA	
Voltage protection level (L-N, L-PE) at a discharge current of	1 kA	U_p	≤ 0,87 kV	≤ 1,50 kV
	5 kA	U_p	≤ 1,00 kV	≤ 1,50 kV
	10 kA	U_p	≤ 1,25 kV	≤ 1,50 kV
Voltage protection level (N-PE)		U_p	≤ 1,50 kV	
Response time (L-N / N-PE)		t_a	≤ 25 ns / ≤ 100 ns	
End of life			OCFM (open circuit failure mode)	
Behaviour in case of Temporary OverVoltage (TOV):	L-N	U_T	440 V / 120 min, withstand (W)	
	N-PE	U_T	1200 V / 200 ms, withstand (W)	
Short Circuit Current rating without backup protection (internal disconnector)		I_{sccr}	5 kA rms	
Short Circuit Current rating with max. backup protection fuse (L)		I_{sccr}	100 kA rms	
Max. back-up protection with up-stream CB with a max. let-through energy of (max. prospective short circuit current depends on the CB breaking capability).			160 A (max. 4,50 x 10^5 A^2s)	
Max. back-up protection with FUSE at prospective short circuit currents of			125 A gG (> 5 ÷ 100 kA rms)	
Follow current interrupt rating (L-N)		I_{fi}	NFC No Follow Current®	
Follow current interrupt rating (N-PE)		I_{fi}	100 A rms	
Status indicator (indication of disconnector operation)			3 coloured levels with progressive performance indication	
Operating temperature range / Humidity			-40 … +80 °C (extended) / 5% ... 95%	
Terminal-Conductor size			4-35 mm^2 flexible / 4-50 mm^2 semi rigid	
Mounting			35 x 7,5 mm top hat DIN rail IEC/EN 60715	
Case material / Flammability grade			BMC / V-0 in accordance with UL 94	
Pollution degree / Degree of protection		PD / IP	3 / 54 (built-in)	
Approximate weight			260 g	
Dimensions			l 68 x h 270 x d 44 mm	
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR	
GTIN (EAN)			8054890321815	

IL 1/10 2P LED





IL 1/10 2P LED is a combined voltage limiting and voltage switching SPDs providing two modes of protection, typically installed at the LED driver DC output terminals and/or close to the LED panels/bars, with the following features and benefits:

- **Impulse test classification: Test Class II** according to **IEC 61643-11(2011-03) and Type 2** according to **EN 61643–11 (2012-10)**;
- Allows the application of LED lighting systems in outdoor locations where a high level of exposure to surges is expected;
- Reduces maintenance costs and extends the lifetime of the lighting system;
- Applicable to lighting systems with protection class I and II and with protective separation of the DC circuitry, provided there is a reliable PE-connection at the point of installation;
- The pigtail connections allow quick installation in both new and existing installations;
- Local optical indication of operating status;
- Suitable for installation at LPZ boundaries 0_B - 1 and higher according to the lightning protection zones concept.

Model IL 1/10 2P LED ...		230	320	440
CODE		**242 101**	**242 102**	**242 103**
Maximum Continuous Operating Voltage	U_c	300 V DC	385 V DC	565 V DC
Test Class according to IEC 61643-11 Ed.1 (2011-03)		II		
Type according to EN 61643-11 (2012-10)		T2		
Total discharge current 8/20 µs	I_{Total}	20 kA		
Nominal discharge current 8/20 µs (+/- to PE)	I_n	10 kA		
Maximum discharge current 8/20 µs (+/- to PE)	I_{max}	25 kA		
Voltage protection level (all modes)	U_p	≤ 1500 V	≤ 1700 V	≤ 2100 V
Response time (+ to -)	t_a	≤ 25 ns		
Response time (+/- to PE)	t_a	≤ 100 ns		
End of life		OCFM (open circuit failure mode)		
Status indicator		green LED		
Max. back-up protection, if not already provided in the upstream installation		16 A gG / C 16 A		
Operating temperature range		- 40 ... + 60 °C		
Connecting wires		1,5 mm² ; l = 200 mm		
Enclosure material		thermoplastic		
Pollution degree / Degree of protection	PD / IP	2 / 20		
Approximate weight		60 g		
Dimensions		l 48 x h 43 x d 24 mm		
GTIN (EAN)		8054890321044	8054890320481	8054890320498

ZOTUP SPDs FOR SIGNALLING, TELECOMMUNICATION AND DATA TRANSMISSION

SPDs FOR SIGNALLING AND TELECOMMUNICATION

SPDs FOR SIGNALLING AND TELECOMMUNICATION APPLICATIONS

Typical installation: in series with the signalling/telecommunication circuits for equipments with "low resistability" according Recommendation ITU-T K.45 / "low surge immunity" according IEC/EN 61000-4-5.

Features:

- SPDs with impulse ratings for categories C1, C2, C3 and D1 (according to IEC/EN 61643-21).
- SPDs with common mode and differential mode protection against symmetrical and/or asymmetrical disturbances.
- SPDs with disconnecting means in case of accidential contact between the signal/telecommunication circuit and a power line (e.g. 230/400V a.c.) due to insulation faults.
- SPDs with integrated earth/protective ground connection via the 35 x 7,5 mm top hat DIN rail according IEC/EN 60715 and by screwless spring type termination of the cable screen.
- SPDs with RJ and LSA connectors.

Specific SPDs with coaxial connectors

Typical installation: for the protection of TV switchboards, satellite antenna or wideband transmission equipment and remote systems. Particularly suitable for applications with long coaxial cables which are exposed to electromagnetic interference.

Features:

- SPDs with type F connectors for the protection of antenna circuits used in civil applications.
- SPDs with BCN type connectors for CCTV circuits.
- SPDs with 7/16 M/F type connection for coaxial cables of antenna circuits and telecommunication systems (4 and 3G).
- SPDs with special connectors/connection can be supplied upon request.

SPDs FOR SIGNALLING AND TELECOMMUNICATION

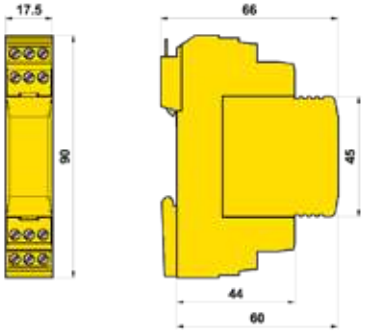
SPD	Model	Application icon	Impulse rating/ Category	Category D1 Impulse discharge current (10/350 µs) per wire	Category C2 Nominal discharge current (8/20 µs) per wire	Connection technique	Page
	S-ASI 1 L 6		C1, C2, C3, D1	2,5 kA	15 kA	screw type terminals	112
	S-ASI 1 L 12		C1, C2, C3, D1	2,5 kA	15 kA	screw type terminals	112
	S-ASI 1 L 24		C1, C2, C3, D1	2,5 kA	15 kA	screw type terminals	112
	S-ASI 1 L 48		C1, C2, C3, D1	2,5 kA	15 kA	screw type terminals	112
	S-ASI 2 L 6		C1, C2, C3, D1	2,5 kA	15 kA	screw type terminals	113
	S-ASI 2 L 12		C1, C2, C3, D1	2,5 kA	15 kA	screw type terminals	113
	S-ASI 2 L 24		C1, C2, C3, D1	2,5 kA	15 kA	screw type terminals	113
	S-ASI 2 L 48		C1, C2, C3, D1	2,5 kA	15 kA	screw type terminals	113
	S-ASI 1 R 6		C1, C2, C3, D1	2,5 kA	15 kA	screw type terminals	114
	S-ASI 1 R 12		C1, C2, C3, D1	2,5 kA	15 kA	screw type terminals	114
	S-ASI 1 R 24		C1, C2, C3, D1	2,5 kA	15 kA	screw type terminals	114
	S-ASI 1 R 48		C1, C2, C3, D1	2,5 kA	15 kA	screw type terminals	114
	S-ASI 2 R 6		C1, C2, C3, D1	2,5 kA	15 kA	screw type terminals	115
	S-ASI 2 R 12		C1, C2, C3, D1	2,5 kA	15 kA	screw type terminals	115
	S-ASI 2 R 24		C1, C2, C3, D1	2,5 kA	15 kA	screw type terminals	115
	S-ASI 2 R 48		C1, C2, C3, D1	2,5 kA	15 kA	screw type terminals	115

SPD	Model	Application icon	Impulse rating/ Category	Category D1 Impulse discharge current (10/350 µs) per wire	Category C2 Nominal discharge current (8/20 µs) per wire	Connection technique	Page
	S-AS 2 24/1		C2, C3	-	1 kA	screw type terminals	116
	S-AS 2 48/1		C2,C3	-	1 kA	screw type terminals	116
	S-N 24 RJ/RJ tel		C2, C3	-	2,5 kA	RJ 45	117
	S-N 24 LSA/RJ tel		C2, C3	-	2,5 kA	LSA/RJ 45	117
	S-N 24 C		-	-	-	-	118

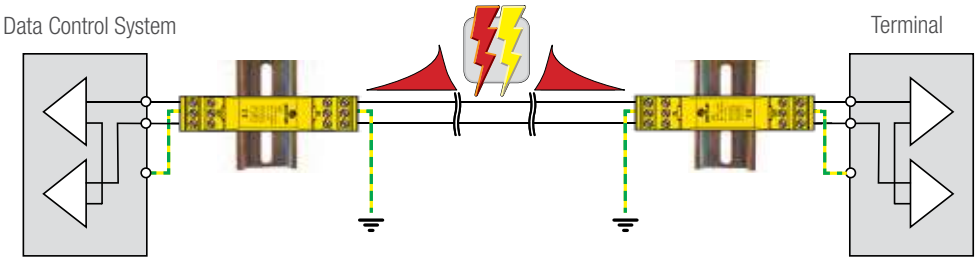
SPECIFIC SPDs WITH COAXIAL CONNECTORS

SPD	Model	Application icon	Impulse rating/ Category	Category D1 Impulse discharge current (10/350 µs) per wire	Category C2 Nominal discharge current (8/20 µs) per wire	Connection technique	Page
	C 5		C2, C3, D1	2 kA	5 kA	F	119
	C 6		C2, C3	-	1 kA	BNC	120
	C 7		C2, C3, D1	2 kA	10 kA	7/16 M/F	121
	C 8		C2, C3, D1	2 kA	5 kA	7/16 M/F	121

S-ASI ... L ...



DIN-rail socket + pluggable SPD-module

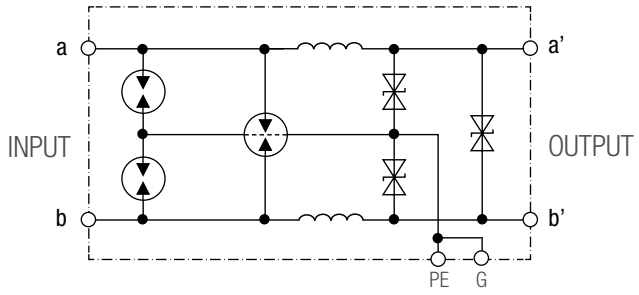


S-ASI ... L ... is an SPD for installations in series with the telecommunication/signalling circuits to protect sensitive equipment with low resistability/immunity, providing the following features and benefits:

- Classification for impulse test: categories C1, C2, C3, D1 (in accordance with IEC/EN 61643-21);
- S-ASI ... SPDs represent a pluggable execution and they provide continuity of the signal circuits. They do not interrupt when the plug in module is pulled out;
- Offers sensitive common and differential mode protection to connected devices;
- Providing protection against direct and indirect lightning effects;
- The end of the life behaviour of the SPD is Short Circuit Failure Mode (SCFM);
- The connection is made by screw type terminals providing best connection reliability;
- With integrated earth/protective ground connection via the top hat DIN rail and by screw type terminations PE and G.

				4-20 mA	Konnex
Model S-ASI 1 L ...		6	12	24	48
CODE		**341 006**	**341 012**	**341 024**	**341 048**
Number of protected Lines		1			
SPD impulse rating/Category		C1, C2, C3, D1			
Nominal Voltage	U_N	6 V dc/ 4,2 V ac	12 V dc/9 V ac	24 V dc/18 V ac	48 V dc/39 V ac
Maximum Continuous Operating Voltage	U_c	7,2 V dc	14,4 V dc	28,8 V dc	57,6 V dc
Rated Current	I_L	1,5 A			
Category C1 - Nominal discharge current (8/20 µs) per wire	I_n	1 kA			
Category C1 - Voltage protection level at I_n (all modes)	U_p	30 V dc	50 V dc	65 V dc	80 V dc
Category C2 - Nominal discharge current (8/20 µs) per wire	I_n	15 kA			
Category C2 - Voltage protection level at I_n (all modes)	I_n	40 V dc	55 V dc	70 V dc	120 V dc
Category C3 - Voltage protection level at 1 kV/µs (all modes)	U_p	≤ 15 V	≤ 28 V	≤ 64 V	≤ 85 V
Category D1 - impulse discharge current (10/350 µs) per wire	$I_{imp\ 10/350}$	2,5 kA			
Category D1 - Total discharge current (10/350 µs)	$I_{Total\ 10/350}$	5 kA			
Response time	t_a	≤ 1ns			
Longitudinal impedance/resistance		2,2 µH			
Parasitic capacitance	C	1,5 nF			
Operating temperature range		-25 ... +70 °C			
Terminal - conductor size		max. 1,5 mm² flexible			
Mounting		indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715			
Housing		thermoplastic			
Degree of protection	IP	20			
Approximate weight		50 g			
Dimension: width		17,5 mm (1 module)			
GTIN (EAN)		8054890321839	8054890321853	8054890321877	8054890321884

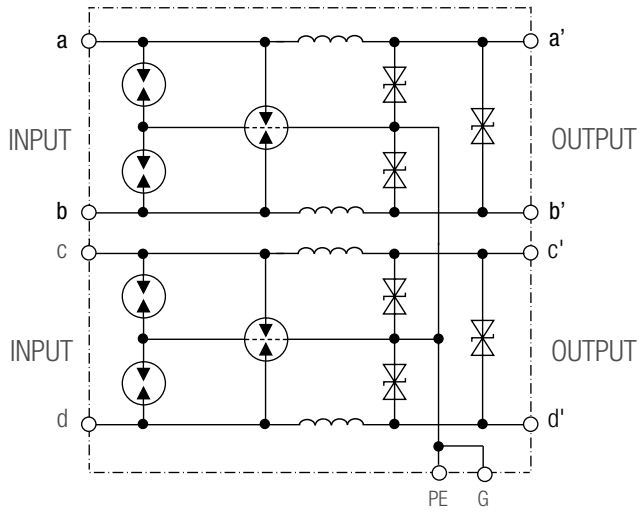
MODEL S-ASI 1 L ...



Typical protection scheme for applications using 6, 12, 24 or 48 V DC-, 4-20 mA or Konnex .

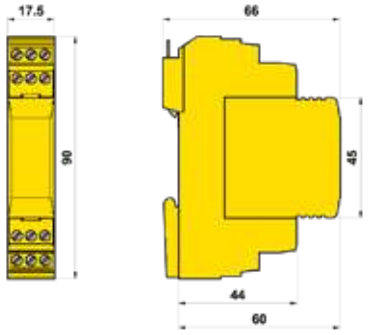
For applications where a high discharge capability and a significant rated load current are required.

MODEL S-ASI 2 L ...

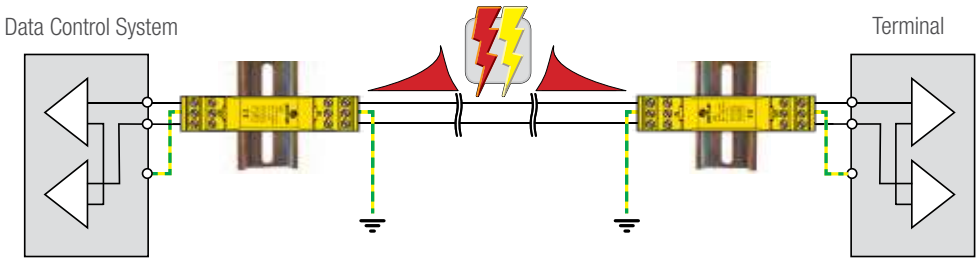


				4-20 mA	Konnex
Model S-ASI 2 L ...		6	12	24	48
CODE		**341 206**	**341 212**	**341 224**	**341 248**
Number of protected Lines		2			
SPD impulse rating/Category		C1, C2, C3, D1			
Nominal Voltage	U_N	6 V dc/ 4,2 V ac	12 V dc/9 V ac	24 V dc/18 V ac	48 V dc/39 V ac
Maximum Continuous Operating Voltage	U_c	7,2 V dc	14,4 V dc	28,8 V dc	57,6 V dc
Rated Current	I_L	1,5 A			
Category C1 - Nominal discharge current (8/20 µs) per wire	I_n	1 kA			
Category C1 - Voltage protection level at I_n (all modes)	U_p	30 V dc	50 V dc	65 V dc	80 V dc
Category C2 - Nominal discharge current (8/20 µs) per wire	I_n	15 kA			
Category C2 - Voltage protection level at I_n (all modes)	I_n	40 V dc	55 V dc	70 V dc	120 V dc
Category C3 - Voltage protection level at 1 kV/µs (all modes)	U_p	≤ 15 V	≤ 28 V	≤ 64 V	≤ 85 V
Category D1 - impulse discharge current (10/350 µs) per wire	$I_{imp\ 10/350}$	2,5 kA			
Category D1 - Total discharge current (10/350 µs) per line	$I_{Total\ 10/350}$	5 kA			
Response time	t_a	≤ 1ns			
Longitudinal impedance/resistance		2,2 µH			
Parasitic capacitance	C	1,5 nF			
Operating temperature range		-25 ... +70 °C			
Terminal - conductor size		max. 1,5 mm² flexible			
Mounting		indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715			
Housing		thermoplastic			
Degree of protection	IP	20			
Approximate weight		50 g			
Dimension: width		17,5 mm (1 module)			
GTIN (EAN)		8054890321891	8054890321907	8054890321914	8054890321921

S-ASI ... R ...



DIN-rail socket + pluggable SPD-module

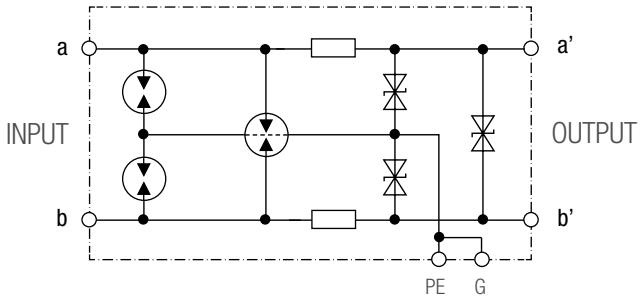


S-ASI ... R ... is an SPD for installation in series with the telecommunication/signalling circuits to protect sensitive equipment with low resistability/immunity, providing the following features and benefits:

- Classification for the impulse test: categories C1, C2, C3, D1 (in accordance with IEC/EN 61643-21);
- S-ASI ... SPDs represent a pluggable execution and they provide continuity of the signal circuits. They do not interrupt when the plug in module is pulled out;
- Offers sensitive common and differential mode protection to connected devices;
- Providing protection against direct and indirect lightning effects;
- The end of the life behaviour of the SPD is Short Circuit Failure Mode (SCFM);
- The connection is made by screw type terminals providing best connection reliability;
- With integrated earth/protective ground connection via the top hat DIN rail and by screw type terminations PE and G.

		RS 485 / RS 422 CAN - Bus			
Model S-ASI 1 R ...		6	12	24	48
CODE		**342 006**	**342 012**	**342 024**	**342 048**
Number of protected Lines		1			
SPD impulse rating/Category		C1, C2, C3, D1			
Nominal Voltage	U_N	6 V dc/ 4,2 V ac	12 V dc/9 V ac	24 V dc/18 V ac	48 V dc/39 V ac
Maximum Continuous Operating Voltage	U_C	7,2 V dc	14,4 V dc	28,8 V dc	57,6 V dc
Rated Current	I_L	0,5 A			
Category C1 - Nominal discharge current (8/20 µs) per wire	I_n	1 kA			
Category C1 - Voltage protection level at I_n (all modes)	U_p	30 V dc	50 V dc	65 V dc	80 V dc
Category C2 - Nominal discharge current (8/20 µs) per wire	I_n	15 kA			
Category C2 - Voltage protection level at I_n (all modes)	I_n	40 V dc	55 V dc	70 V dc	120 V dc
Category C3 - Voltage protection level at 1 kV/µs (all modes)	U_p	≤ 15 V	≤ 28 V	≤ 64 V	≤ 85 V
Category D1 - impulse discharge current (10/350 µs) per wire	$I_{imp\ 10/350}$	2,5 kA			
Category D1 - Total discharge current (10/350 µs)	$I_{Total\ 10/350}$	5 kA			
Response time	t_a	≤ 1ns			
Bandwidth		1 MHz			
Data Rate		1 Mbit/s			
Longitudinal impedance/resistance		1,8 Ω			
Parasitic capacitance	C	1,5 nF			
Operating temperature range		-25 ... +70 °C			
Terminal - conductor size		max. 1,5 mm² flexible			
Mounting		indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715			
Housing		thermoplastic			
Degree of protection	IP	20			
Approximate weight		50 g			
Dimension: width		17,5 mm (1 module)			
GTIN (EAN)		8054890321938	8054890321945	8054890321952	8054890321969

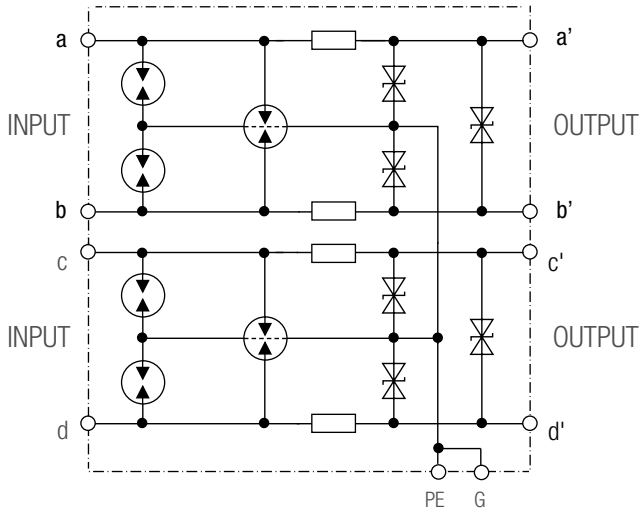
MODEL S-ASI 1 R ...



Typical protection scheme for applications according to the following standards:
RS 485, RS 422, CAN-Bus
and for 6, 12, 24 and 48 V DC.

The protection allows a data transmission up to 1 Mbit/s.
The voltage protection level provided by these devices is not affected by the steepness of the transient.

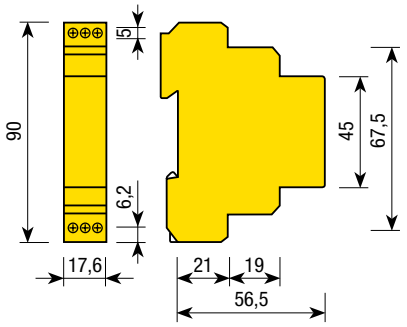
MODEL S-ASI 2 R ...

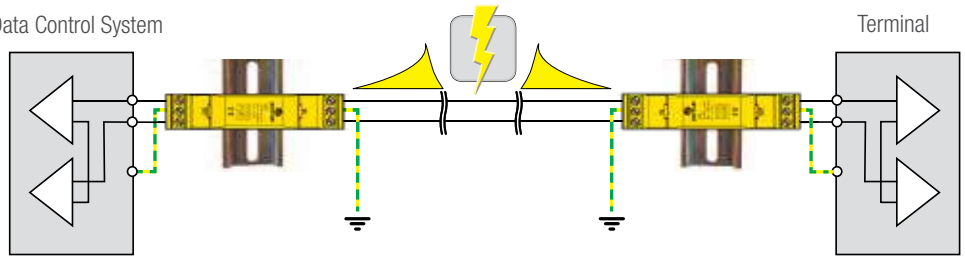


RS 485 / RS 422
CAN - Bus

Model S-ASI 2 R ...		6	12	24	48
CODE		**342 206**	**342 212**	**342 224**	**342 248**
Number of protected Lines		2			
SPD impulse rating/Category		C1, C2, C3, D1			
Nominal Voltage	U_N	6 V dc/ 4,2 V ac	12 V dc/9 V ac	24 V dc/18 V ac	48 V dc/39 V ac
Maximum Continuous Operating Voltage	U_c	7,2 V dc	14,4 V dc	28,8 V dc	57,6 V dc
Rated Current	I_L	0,5 A			
Category C1 - Nominal discharge current (8/20 µs) per wire	I_n	1 kA			
Category C1 - Voltage protection level at I_n (all modes)	U_p	30 V dc	50 V dc	65 V dc	80 V dc
Category C2 - Nominal discharge current (8/20 µs) per wire	I_n	15 kA			
Category C2 -Voltage protection level at I_n (all modes)	I_n	40 V dc	55 V dc	70 V dc	120 V dc
Category C3 - Voltage protection level at 1 kV/µs (all modes)	U_p	≤ 15 V	≤ 28 V	≤ 64 V	≤ 85 V
Category D1 - Impulse discharge current (10/350 µs) per wire	$I_{imp\ 10/350}$	2,5 kA			
Category D1 - Total discharge current (10/350 µs) per line	$I_{Total\ 10/350}$	5 kA			
Response time	t_a	≤ 1ns			
Bandwidth		1 MHz			
Data Rate		1 Mbit/s			
Longitudinal impedance/resistance		1,8 Ω			
Parasitic capacitance	C	1,5 nF			
Operating temperature range		-25 ... +70 °C			
Terminal - conductor size		max. 1,5 mm² flexible			
Mounting		indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715			
Housing		thermoplastic			
Degree of protection	IP	20			
Approximate weight		50 g			
Dimension: width		17,5 mm (1 module)			
GTIN (EAN)		8054890321976	8054890321983	8054890321990	8054890322003

S-AS 2 ...





S-AS 2 is an SPD for installation in series with the telecommunication/signalling circuits to protect sensitive equipment with low resistability/immunity, providing the following features and benefits:

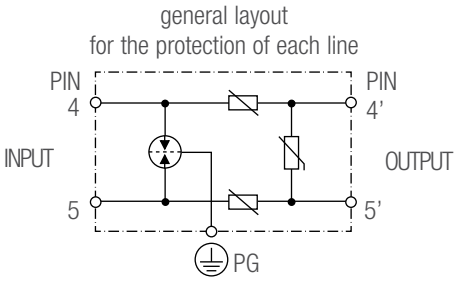
- Offers sensitive common and differential mode protection to connected devices;
- Very efficient protection providing a low voltage protection level U_p;
- Providing protection against indirect lightning effects;
- Suitable for installation at LPZ boundaries up to 0_B -2 in accordance with the lightning protection zones concept;
- The end of the life behaviour of the SPD is Short Circuit Failure Mode (SCFM);
- Earth/ground connection is made via screw type terminals.

Note: Equipment protection at both ends of the telecommunication/signal line is essential for an efficient protection system (see above schematics).

Modello S-AS 2 ...		24/1	48/1
CODE		**302 524**	**302 548**
SPD impulse rating/Category		C2, C3	
Number of protected Lines		1	
Nominal voltage	U_N	24 V dc/18 V ac	48 V dc/34 V ac
Maximum Continuous Operating Voltage	U_c	29 V dc	58 V dc
Rated Current	I_L	5 A	5 A
Category C2 - Total Discharge Current (8/20 µs)	$I_{Total\ 8/20}$	2 kA	2 kA
Category C2 - Nominal Discharge Current (8/20 µs) per wire	I_n	1 kA	1 kA
Category C2 - Voltage Protection level at I_n (all modes)	U_p	≤ 90 V	≤ 170 V
Category C3 - Voltage Protection level at 1 kV/µs wire (all modes)	U_p	≤ 51 V	≤ 118 V
Response time	t_a	≤ 25 ns	
Parasitic Capacitance	C	10 nF	
Operating temperature range		- 40 ... + 80 °C	
Terminal - conductor size		max. 2,5 mm² flexible	
Mounting		indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715	
Housing		thermoplastic	
Degree of protection	IP	20	
Approximate weight		45 g	
Dimension: width		17,5 mm (1 module)	
GTIN (EAN)		8054890321327	8054890321358

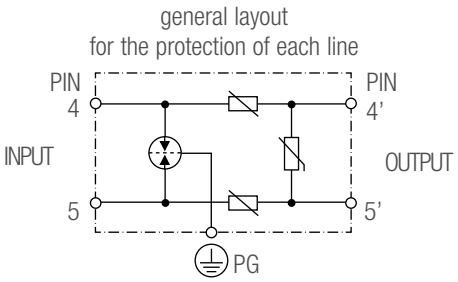
S-N 24 RJ/RJ tel

Protection module, 8 telephone lines, connectors RJ/RJ



S-N 24 LSA/RJ tel

Protection module, 8 telephone lines , connectors LSA/RJ

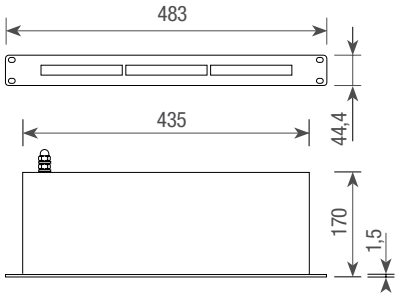


S-N 24 RJ/RJ tel and S-N 24 LSA/RJ tel are SPDs for the protection of equipment connected to telephone networks, each providing protection for 8 lines with the following features and benefits:

- They can substitute the original patch panel;
- They provide protection of the central PINs 4 and 5 of the connector;
- For the input connection on the back side of the module (unprotected side) either LSA connectors or RJ connectors are available, offering fast installation (LSA/RJ) or major flexibility (RJ/RJ);
- They are designed as current limiting devices.

Model S-N 24 ...		RJ/RJ tel	LSA/RJ tel
CODE		**358 005**	**368 005**
SPD impulse rating / Category		C2, C3	
Number of protected lines	n	8	
Nominal Voltage	U_N	110 V dc	
Maximum Continuous Operating Voltage	U_c	180 V dc	
Category C2 - Nominal Discharge Current (8/20 µs) per wire	I_n	2,5 kA	
Category C2 - Voltage Protection level at I_n (all modes)	U_p	≤ 230 V	
Category C3 - Voltage Protection level at 1 kV/µs (all modes)	U_p	≤ 600 V	
Longitudinal impedance/resistance		10 Ω	
Cutoff frequency (-3 dB)		> 10 MHz	
Connectors (input-output)		RJ/RJ 45 shielded	LSA/RJ 45 shielded
Protected pins		4/5	
Approximate weight		100 g	
Operating Temperature range		- 25 ... + 40 °C	
Dimensions		l 145 x h 120 mm	l 145 x h 130 mm
GTIN (EAN)		8054890321631	8054890321655

S-N 24 C



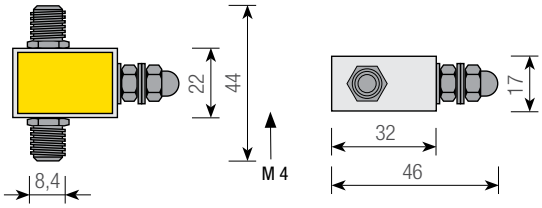
S-N 24 C is a mounting frame for 19" racks able to carry 3 protection modules, whereby each module protects up to 8 lines, providing an easy-fitting solution for up to 24 lines in one frame.

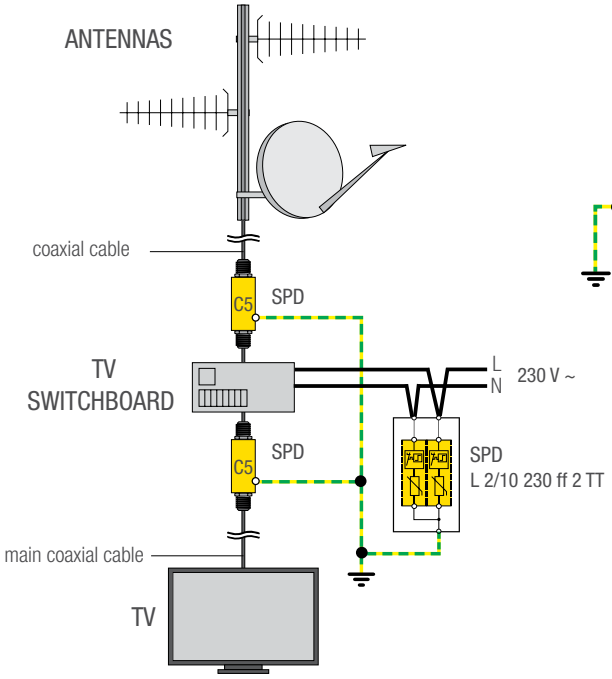
- The output (protected side) is located on the front allowing easy and quick connection to the HUB/SWITCH via appropriate patch cables.

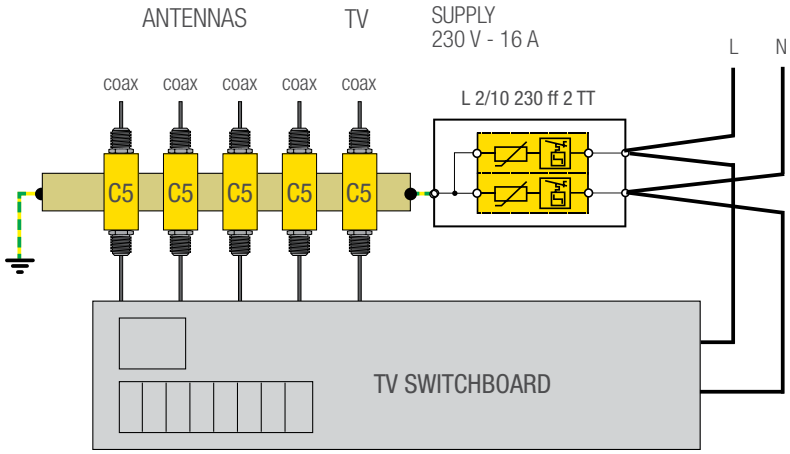
Model S-N 24 ...		C
CODE		**328 005**
Mounting frame capacity		3 slots (3 protection modules)
Metal case 19"		1 unit (HE)
Dimensions		l 482,6 x h 170 x d 44,4 mm
Approximate weight		300 g
GTIN (EAN)		8054890321457

TECHNICAL DATA

C5







C 5 is an SPD for the protection of TV switchboards with ground or satellite antennas.
It provides the following features and benefits:

- Particularly suitable for applications with coaxial cables longer than 40 m. (cable from the antenna to the switchboard or main cable from the television to the switchboard);
- Easy to install by fixing and connecting the SPD to ground via an integrated M4 bolt (e.g. directly to the equipotential bonding bar);
- Suitable for installation at LPZ boundaries up to 0_B - 2 in accordance with the lightning protection zones concept.

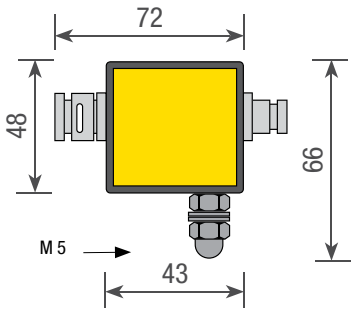
Note: To complete the protection of the TV switchboard an adequate protection should also be provided on the power supply circuit, for example by installation of the L 2/10 230 ff 2 TT type SPD, code 202 220.

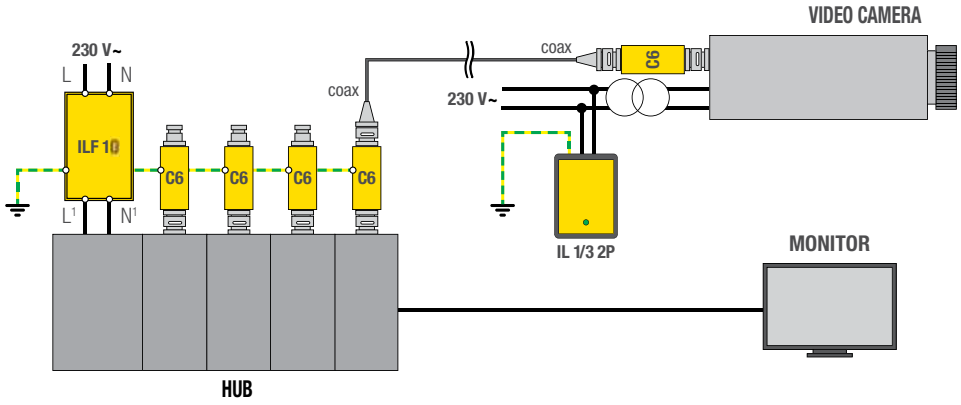
Model C 5

CODE		**351 075**
SPD impulse rating/Category		C2, C3, D1
Impedance		75 Ω
Frequency range	f	up to 2,15 GHz
Maximum Continuous Operating Voltage	U_c	90 V dc
Category C2 - Nominal Discharge Current (8/20 µs)	I_n	5 kA
Category C2 - Voltage Protection level at I_n	U_p	≤ 600 V
Category C3 - Voltage Protection level at 1 kV/µs	U_p	≤ 600 V
Category D1 - Impulse discharge current (10/350 µs)	$I_{imp\ 10/350}$	2 kA
Typical attenuation	a_t	0,5 dB
Maximum power transmission		50 W
Connector type		F
Housing		metal
PG/PE-terminal		M4 bolt
Operating temperature range		- 25 ... + 55°C
Approximate weight		25 g
Dimensions		l 32 x h 22 x d 17 mm
GTIN (EAN)		8054890321600

TECHNICAL DATA

C6





C 6 is an SPD for the protection of CCTV circuits, typilcally installed on each line close to the HUB and close to the video cameras, providing the following features and benefits:

- Particularly suitable for surveillance systems with connecting cables longer than 40 m.;
- Easy to install by fixing and connecting the SPD to ground via an integrated M5 bolt;
- Suitable for installation at LPZ boundaries up to 0_B - 2 in accordance with the lightning protection zones concept.

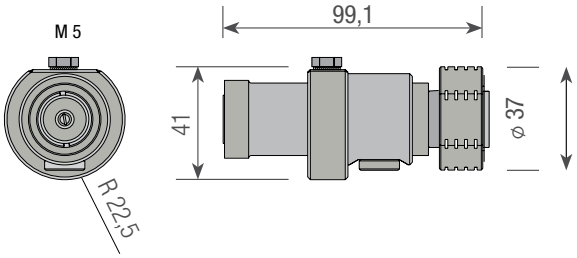
Note: To complete the protection of the HUB an adequate protection should also be provided on the power supply circuit, for example by installation of an ILF 2P type SPD (Code 209 310). Protection of the video camera power supply can be provided e.g. by a type IL 1/3 2P SPD (code 241 001) close to the input terminals of the camera power supply (see above schematic).

Model C 6

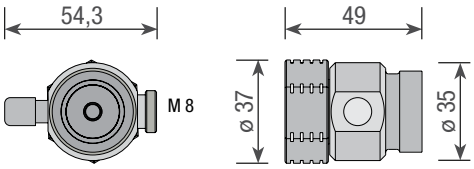
CODE		358 006
SPD impulse rating/Category		C2, C3
Video signal	U_o	1 V pp
Maximum Continuous Operating Voltage	U_c	6 V pp
Rated current	I_L	300 mA
Impedance		75 Ω
Category C2 - Nominal Discharge Current (8/20 µs)	I_n	1 kA
Category C2 - Voltage Protection level at I_n	U_p	≤ 22 V
Category C3 - Voltage Protection level at 1 kV/µs	U_p	≤ 22 V
Cross sectional area		≥ 1 mm² flexible
Housing		thermoplastic
Operating temperature range		- 25 ... + 55 °C
Connector type		BNC female (input not protected) BNC male (output protected)
PG/PE-terminal		M5 bolt
Approximate weight		50 g
Dimensions		l 43 x h 48 x d 22 mm
GTIN (EAN)		8054890321648

TECHNICAL DATA

C 7



C 8



C 7 and C 8 are SPDs for the protection of wideband transmission equipment and remote systems, providing the following features and benefits:

- Application with antenna and mobile telephony coaxial cables in 4 and 3G systems;
- Tested according to IEC/EN 61643-21.

Model C ...		7	8
CODE		**352 600**	**352 350**
SPD impulse rating/Category		C2, C3, D1	
Impedance		50 Ω	
Frequency range	f	up to 2,6 GHz	
Maximum Continuous Operating Voltage	U_c	350 V dc	350 V dc
Rated current	I_L	12 A	5 A
Maximum power transmission		900 W	400 W
Category C2 - Nominal Discharge Current (8/20 µs)	I_n	10 kA	5 kA
Category C2 - Voltage Protection level at I_n	U_p	≤ 850 V	
Category C3 - Voltage Protection level at 1 kV/µs	U_p	≤ 950 V	
Category D1 - Impulse discharge current (10/350 µs)	I_{imp}	2 kA	
Attenuation	a_t	≤ 0,2 dB	≤ 0,5 dB
Standing wave ratio (ROS)		≥ 20 dB	≥ 15 dB
Connector type		7/16 M/F	
Material		steel	
PG/PE-terminal		M 5 bolt	M 8 bolt
Approximate weight		510 g	175 g
Dimension: lenght		99,1 mm	49 mm
GTIN (EAN)		8054890321624	8054890321617

ZOTUP SPDs FOR SIGNALLING, TELECOMMUNICATION AND DATA TRANSMISSION

SPDs FOR DATA TRANSMISSION

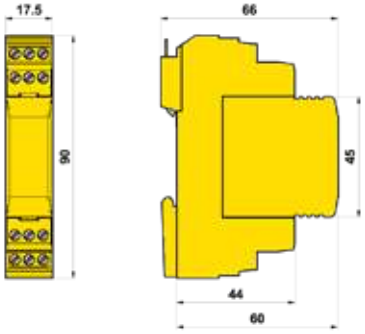
SPDs FOR DATA TRANSMISSION

SPDs for the protection of network equipment (HUBs/SWITCHES) in structured cabling systems in category 6.

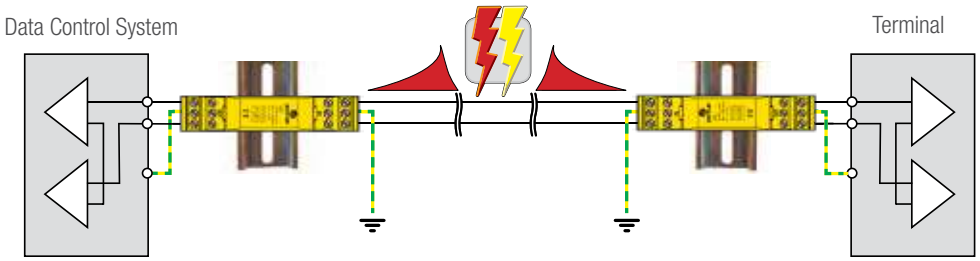
- SPDs with impulse ratings for categories C1, C2, C3 and D1 (according to IEC/EN 61643-21).
- SPDs for rack and/or rail mounting to enable easy installation, even in existing systems.

SPD	Model	Application icon	Impulse rating/ Category	Transm. rating	Category D1 Impulse discharge current (10/350 µs) per wire	Category C2 Nominal discharge current C2 (8/20 µs) per wire	Connection technique	Page
	S-ASI 1 B 6		C1, C2, C3, D1	-	2,5 kA	15 kA	screw type terminals	126
	S-AS 1 B 12		C1, C2, C3, D1	-	2,5 kA	15 kA	screw type terminals	126
	S-ASI 1 B 24		C1, C2, C3, D1	-	2,5 kA	15 kA	screw type terminals	126
	S-ASI 1 B 48		C1, C2, C3, D1	-	2,5 kA	15 kA	screw type terminals	126
	S-ASI 2 B 6		C1, C2, C3, D1	-	2,5 kA	15 kA	screw type terminals	127
	S-ASI 2 B 12		C1, C2, C3, D1	-	2,5 kA	15 kA	screw type terminals	127
	S-ASI 2 B 24		C1, C2, C3, D1	-	2,5 kA	15 kA	screw type terminals	127
	S-ASI 2 B 48		C1, C2, C3, D1	-	2,5 kA	15 kA	screw type terminals	127
	S-ASI 1 G 48		C1, C2, C3, D1	-	2,5 kA	15 kA	screw type terminals	128
	S-ASI 1 G 110		C1, C2, C3, D1	-	2,5 kA	20 kA	screw type terminals	128
	S-ASI 2 G 48		C1, C2, C3, D1	-	2,5 kA	15 kA	screw type terminals	129
	S-ASI 2 G 110		C1, C2, C3, D1	-	2,5 kA	20 kA	screw type terminals	129
	S-F 1/6		C2, C3	6	-	1 kA	RJ 45	130
	S-F 1/48 PoE +		C2, C3	6 A	-	1 kA	RJ 45	130
	S-F 1/48 PoE + b		C2, C3	6 A	-	1 kA	RJ 45	130
	S ADSL		C2, C3	-	-	2,5 kA	RJ 45	131

S-ASI ... B ...



DIN-rail socket + pluggable SPD-module

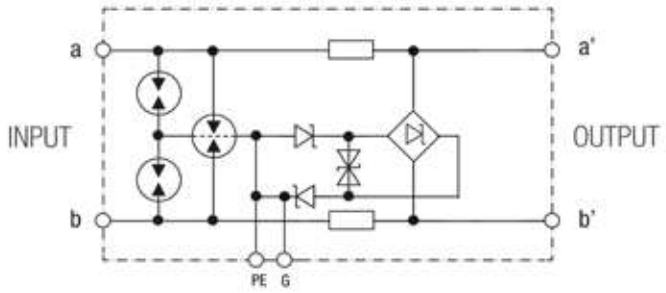


S-ASI ... B ... is an SPD for installation in series with the telecommunication/signalling circuits to protect sensitive equipment with low resistability/immunity, providing the following features and benefits:

- Classification for the impulse test: categories C1, C2, C3, D1 (in compliance with IEC/EN 61643-21);
- S-ASI ... SPDs represent a pluggable execution and they provide continuity of the signal circuits. They do not interrupt when the plug in module is pulled out;
- Offers sensitive common and differential mode protection to connected devices;
- Providing protection against direct and indirect lightning effects;
- The end of the life behaviour of the SPD is Short Circuit Failure Mode (SCFM);
- The connection is made by screw type terminals providing best connection reliability;
- With integrated earth/protective ground connection via the top hat DIN rail and by screw type terminations PE and G.

		PROFIBUS			
Model S-ASI 1 B ...		6	12	24	48
CODE		**343 006**	**343 012**	**343 024**	**343 048**
Number of protected Lines		1			
SPD impulse rating/Category		C1, C2, C3, D1			
Nominal Voltage	U_N	6 V dc/ 4,2 V ac	12 V dc/9 V ac	24 V dc/18 V ac	48 V dc/39 V ac
Maximum Continuous Operating Voltage	U_c	7,2 V dc	14,4 V dc	28,8 V dc	57,6 V dc
Rated Current	I_L	0,5 A			
Category C1 - Nominal discharge current (8/20 µs) per wire	I_n	1 kA			
Category C1 - Voltage protection level at I_n (all modes)	U_p	70 V dc	80 V dc	150 V dc	220 V dc
Category C2 - Nominal discharge current (8/20 µs) per wire	I_n	15 kA			
Category C2 - Voltage protection level at I_n (all modes)	U_p	110 V dc	130 V dc	180 V dc	260 V dc
Category C3 - Voltage protection level at 1 kV/µs (all modes)	U_p	≤ 45 V	≤ 50 V	≤ 50 V	≤ 70 V
Category D1 - Impulse discharge current (10/350 µs) per wire	$I_{imp\ 10/350}$	2,5 kA			
Category D1 - Total discharge current (10/350 µs)	$I_{Total\ 10/350}$	5 kA			
Response time	t_a	≤ 1ns			
Bandwidth		100 MHz			
Data Rate		100 Mbit/s			
Longitudinal impedance/resistance		1,8 Ω			
Parasitic capacitance	C	1,5 nF			
Operating temperature range		-25 ... +70 °C			
Terminals - conductor size		max. 1,5 mm² flexible			
Mounting		indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715			
Housing		thermoplastic			
Degree of protection	IP	20			
Approximate weight		50 g			
Dimension: width		17,5 mm (1 module)			
GTIN (EAN)		8054890322010	8054890322027	8054890322034	8054890322041

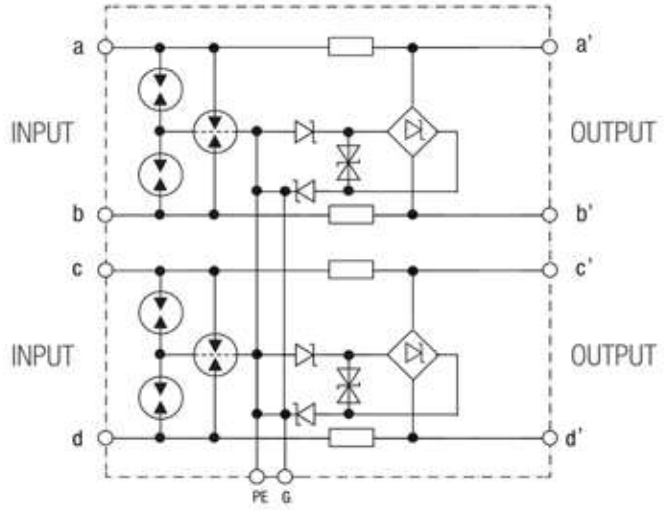
MODEL S-ASI 1 B ...



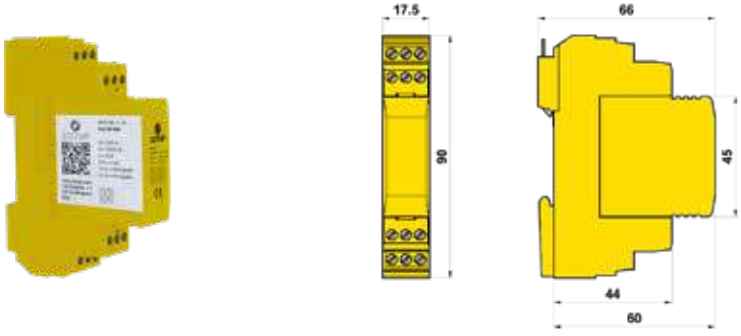
Typical protection scheme for high frequency data transmission interfaces. The protection allows data transmission up to 100 Mbit/s.

The voltage protection level provided by these devices is not affected by the steepness of the transient.

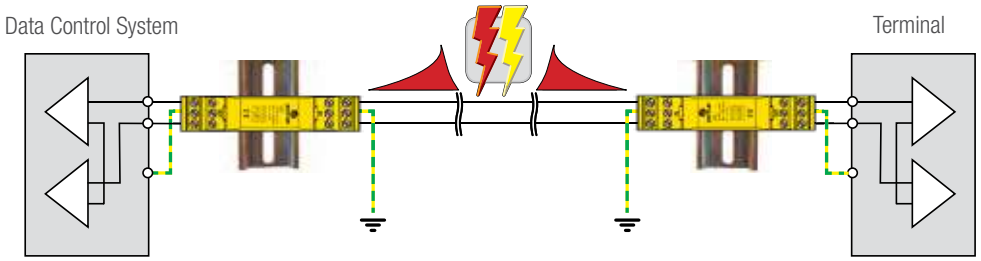
MODEL S-ASI 2 B ...



		PROFIBUS			
Model S-ASI 2 B ...		6	12	24	48
CODE		**343 206**	**343 212**	**343 224**	**343 248**
Number of protected Lines		2			
SPD impulse rating/Category		C1, C2, C3, D1			
Nominal Voltage	U_N	6 V dc/ 4,2 V ac	12 V dc/9 V ac	24 V dc/18 V ac	48 V dc/39 V ac
Maximum Continuous Operating Voltage	U_c	7,2 V dc	14,4 V dc	28,8 V dc	57,6 V dc
Rated Current	I_L	0,5 A			
Category C1 - Nominal discharge current (8/20 µs) per wire	I_n	1 kA			
Category C1 - Voltage protection level at I_n (all modes)	U_p	70 V dc	80 V dc	150 V dc	220 V dc
Category C2 - Nominal discharge current (8/20 µs) per wire	I_n	15 kA			
Category C2 - Voltage protection level at I_n (all modes)	U_p	110 V dc	130 V dc	180 V dc	260 V dc
Category C3 - Voltage protection level at 1 kV/µs (all modes)	U_p	≤ 45 V	≤ 50 V	≤ 50 V	≤ 70 V
Category D1 - Impulse discharge current (10/350 µs) per wire	$I_{imp\ 10/350}$	2,5 kA			
Category D1 - Total discharge current (10/350 µs) per line	$I_{Total\ 10/350}$	5 kA			
Response time	t_a	≤ 1ns			
Bandwidth		100 MHz			
Data Rate		100 Mbit/s			
Longitudinal impedance/resistance		1,8 Ω			
Parasitic capacitance	C	1,5 nF			
Operating temperature range		-25 ... +70 °C			
Terminals - conductor size		max. 1,5 mm^2 flexible			
Mounting		indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715			
Housing		thermoplastic			
Degree of protection	IP	20			
Approximate weight		50 g			
Dimension: width		17,5 mm (1 module)			
GTIN (EAN)		8054890322058	8054890322065	8054890322072	8054890322089



DIN-rail socket + pluggable SPD-module

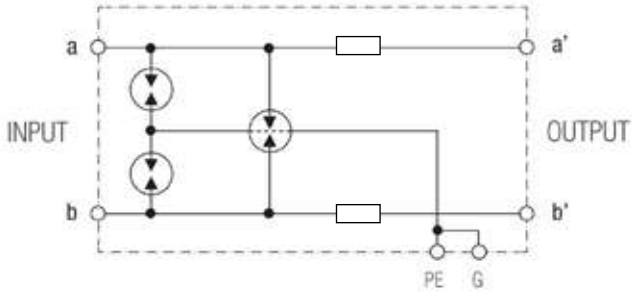


S-ASI ... G ... is an SPD for installation in series with the telecommunication/signalling circuits to protect sensitive equipment with low resistability/immunity, providing the following features and benefits:

- Classification for the impulse test: categories C1, C2, C3, D1 (comply with IEC/EN 61643-21);
- S-ASI ... SPDs represent a pluggable execution and they provide continuity of the signal circuits. They do not interrupt when the plug in module is pulled out;
- Offers sensitive common and differential mode protection to connected devices;
- Providing protection against direct and indirect lightning effects;
- The connection is made by screw type terminals providing best connection reliability;
- With integrated earth/protective ground connection via the top hat DIN rail and by screw type terminations PE and G.

		CAMERAS	TELECOM analog
Model S-ASI 1 G ...		48	110
CODE		**344 048**	**344 011**
Number of protected Lines		1	
SPD impulse rating/Category		C1, C2, C3, D1	
Nominal Voltage	U_N	48 V dc/39 V ac	110 V dc/78 V ac
Maximum Continuous Operating Voltage	U_c	57,6 V dc	132 V dc
Rated Current	I_L	0,5 A	
Category C1 - Nominal discharge current (8/20 µs) per wire	I_n	1 kA	
Category C1 - Voltage protection level at I_n (all modes)	U_p	≤ 500 V	≤ 550 V
Category C2 - Nominal discharge current (8/20 µs) per wire	I_n	15 kA	
Category C2 - Voltage protection level at I_n (all modes)	U_p	≤ 600 V	≤ 650 V
Category C3 - Voltage protection level at 1 kV/µs (all modes)	U_p	≤ 550 V	≤ 600 V
Category D1 - Impulse discharge current (10/350 µs) per wire	$I_{imp\ 10/350}$	2,5 kA	
Category D1 - Total discharge current (10/350 µs) per line	$I_{Total\ 10/350}$	5 kA	
Response time	t_a	≤ 100 ns	
Bandwidth		100 MHz	
Data Rate		100 Mbit/s	
Longitudinal impedance/resistance		0,8 Ω	
Parasitic capacitance	C	1,5 nF	
Operating temperature range		-25 ... +70 °C	
Terminals - conductor size		max. 1,5 mm² flexible	
Mounting		indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715	
Housing		thermoplastic	
Degree of protection	IP	20	
Approximate weight		50 g	
Dimension: width		17,5 mm (1 module)	
GTIN (EAN)		8054890322096	8054890322188

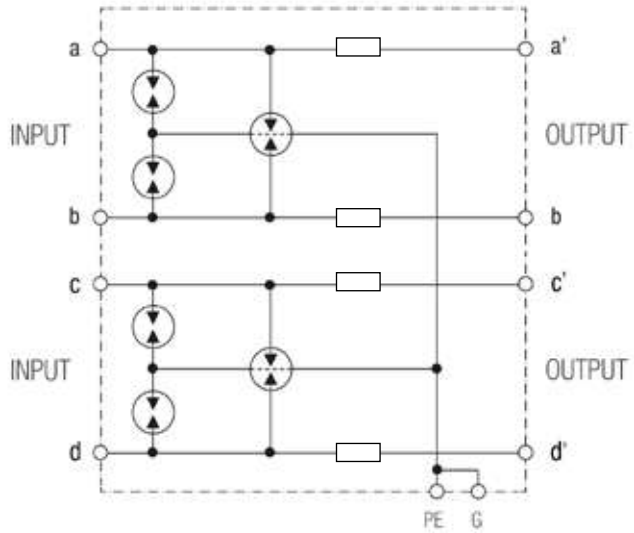
MODEL S-ASI 1 G ...



Typical protection scheme with high discharge capability for high frequency data transmission interfaces and *for applications in telecommunications.*

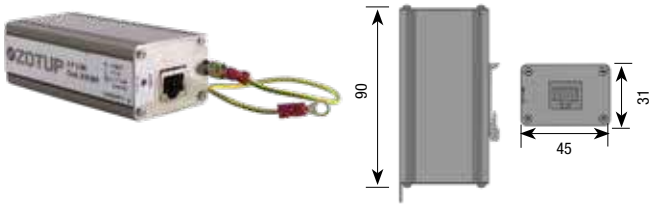
The protection allows a data transmission up to100 Mbit/s. The protection is equipped with decoupling resistances between the protection and the output circuit.

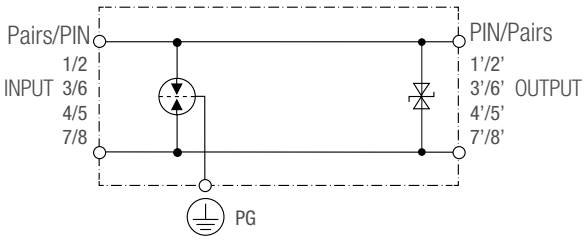
MODEL S-ASI 2 G ...



		CAMERAS	TELECOM analog
Model S-ASI 2 G ...		48	110
CODE		**344 248**	**344 211**
Number of protected Lines		2	
SPD impulse rating/Category		C1, C2, C3, D1	
Nominal Voltage	U_N	48 V dc/39 V ac	110 V dc/78 V ac
Maximum Continuous Operating Voltage	U_c	57,6 V dc	132 V dc
Rated Current	I_L	0,5 A	
Category C1 - Nominal discharge current (8/20 µs) per wire	I_n	1 kA	
Category C1 - Voltage protection level at I_n (all modes)	U_p	≤ 500 V	≤ 550 V
Category C2 - Nominal discharge current (8/20 µs) per wire	I_n	15 kA	
Category C2 - Voltage protection level at I_n (all modes)	U_p	≤ 600 V	≤ 650 V
Category C3 - Voltage protection level at 1 kV/µs (all modes)	U_p	≤ 550 V	≤ 600 V
Category D1 - Impulse discharge current (10/350 µs) per wire	$I_{imp\ 10/350}$	2,5 kA	
Category D1 - Total discharge current (10/350 µs) per line	$I_{Total\ 10/350}$	5 kA	
Response time	t_a	≤ 100 ns	
Bandwidth		100 MHz	
Data Rate		100 Mbit/s	
Longitudinal impedance/resistance		0,8 Ω	
Parasitic capacitance	C	1,5 nF	
Operating temperature range		-25 ... +70 °C	
Terminals - conductor size		max. 1,5 mm² flexible	
Mounting		indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715	
Housing		thermoplastic	
Degree of protection	IP	20	
Approximate weight		70 g	
Dimension: width		17,5 mm (1 module)	
GTIN (EAN)		8054890322195	8054890322201

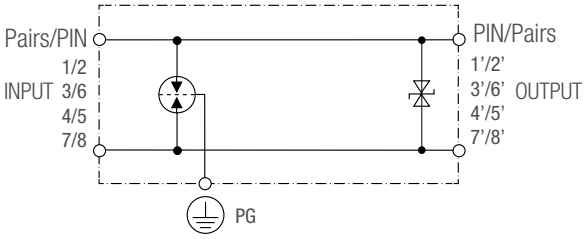
S-F 1/6



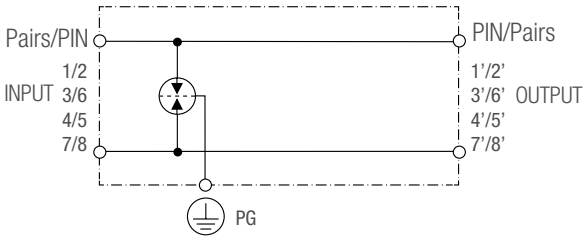


model S-F 1/6 Code 318 008
general layout for each of
the four wire pairs in the line

S-F 1/48 PoE+ ...



model S-F 1/48 PoE+ Code 318 009
general layout for each of
the four wire pairs in the line



model S-F 1/48 PoE+ b Code 318 010
general layout for each of
the four wire pairs in the line

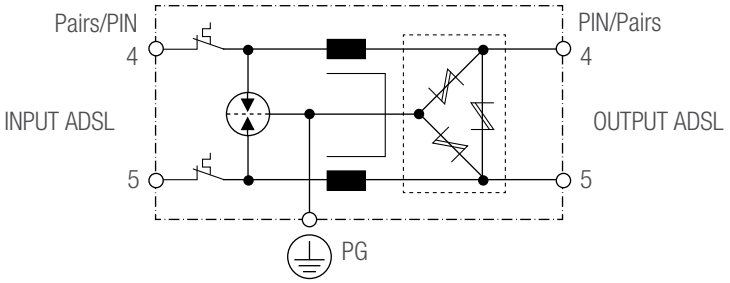
S-F 1/6 is an SPD for the protection of equipment connected to Category 6 A cable systems according to EN 50173-1.
S-F 1/48 PoE+ and S-F 1/48 PoE+ b are SPDs for the protection of equipment connected to Category 6 A cable systems according IEEE 802.3 at and ISO/IEC 11801 for 10 GB applications.
They are equipped with RJ 45 female connectors. Typical applications are for the protection of cameras or CCTV systems connected via Ethernet cables, providing the following features and benefits:

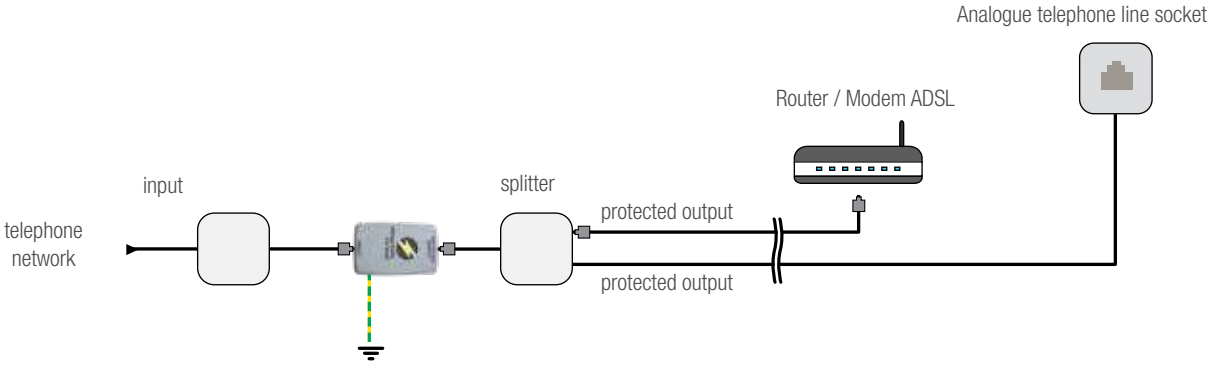
- Suitable for installation at boundaries 1 – 2 and higher, in accordance with the lightning protection zones concept;
- Protection of all four wire pairs in each line;
- In patch panel boards the S-F 1/6 or S-F 1/48 PoE is installed between the incoming lines and the hub/switch.

TECHNICAL DATA

Model S-F ...		1/6	1/48 PoE+	1/48 PoE+ b
CODE		**318 008**	**318 009**	**318 010**
SPD impulse rating / Category		C2, C3		
Number of protected lines	n	1 (four wire pairs)		
Nominal dc Voltage	U_N	6 V	48 V	48 V
Max. Continuous Operating Voltage (dc)	U_c	7,2 V	58 V	58 V
Rated Line Current	I_L	100 mA	1 A	1 A
Category C2 - Nominal Discharge Current (8/20 µs) per wire	I_n	1 kA	1 kA	1 kA
Category C2 - Voltage Protection level at I_n (all modes)	U_p	≤ 15 V	≤ 120 V	≤ 600 V
Category C3 - Voltage Protection level at 1 kV/µs (all modes)	U_p	≤ 9 V	≤ 120 V	≤ 600 V
Data rate		100 Mbit/s	250 Mbit/s	250 Mbit/s
Category (according IEEE 802.3 at)		6	6 A	6 A
Bandwidth	f	500 MHz	500 MHz	500 MHz
Typical attenuation at 500 MHz	a_E	2,7 dB	2,7 dB	2,7 dB
Maximum capacitance wire-wire	C	≤ 50 pF	≤ 50 pF	≤ 50 pF
Operating temperature range		-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
Connectors (input and output)		RJ 45 female	RJ 45 female	RJ 45 female
Protected pairs		1/2, 3/6, 4/5, 7/8	1/2, 3/6, 4/5, 7/8	1/2, 3/6, 4/5, 7/8
Mounting		indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715	indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715	indoor, 35 x 7,5 mm top hat DIN rail IEC/EN 60715
PE/PG connection		6,3 mm flat quick connect male tab + 1,5 mm² cable	6,3 mm flat quick connect male tab + 1,5 mm² cable	6,3 mm flat quick connect male tab + 1,5 mm² cable
Approximate weight		105 g	105 g	105 g
Dimentions		l 45 x h 31 x w 90 mm	l 45 x h 31 x w 90 mm	l 45 x h 31 x w 90 mm
GTIN (EAN)		8054890321426	8054890321433	8054890321440

S ADSL





S ADSL is an SPD for the protection of routers, ADSL units and modems linked to or incorporated in computers.

- Suitable for the protection of ADSL equipment;
- Suitable for installation at boundaries up to 2 – 3, in accordance with the lightning protection zones concept;
- Low volume and flat/wall mounting;
- Tested according to EN 61643-21.

Model S ADSL

CODE		500 003
SPD impulse rating / Category		C2, C3
Nominal Voltage	U_N	130 V dc
Maximum Continuous Operating Voltage	U_c	156 V dc
Rated current	I_L	150 mA
Tested according to		IEC 61643-21 and EN 61643-21
Category C2 - Nominal Discharge Current (8/20 µs) per wire	I_n	2,5 kA
Category C2 - Voltage Protection level at I_n (all modes)	U_p	≤ 600 V
Category C3 - Voltage Protection level at 1 kV/µs (all modes)	U_p	≤ 600 V
Longitudinal impedance/resistance	Z	50 µH / 0,3 Ω
Transmission inductance		0,5 µH
Protected pins		4 - 5
Connectors		RJ 45 - RJ 11/12
Bandwidth		> 25 MHz
Operating temperature range		-25 … + 60 °C
Housing		thermoplastic
Cable RJ 45/RJ 45 with l= 30 cm		included
PE/PG connection		250 mm x 1,5 mm^2
Approximate weight		55 g
Dimensions		l 81 x h 50 x p 29 mm
GTIN (EAN)		8054890322317

ZOTUP ISOLATING SPARK GAPS

ISOLATING SPARK GAPS

ISOLATING SPARK GAPS (ISG) FOR LIGHTNING PROTECTION SYSTEMS AND LOW-VOLTAGE LIMITERS FOR USE IN RAILWAY SYSTEMS AND CATHODIC PROTECTION

ISGs are in accordance with the standards EN 62561-3 / IEC 62561-3 and used for indirect bonding of a lightning protection system to nearby metal systems, where a direct bond is not permissible for functional reasons, e.g.:

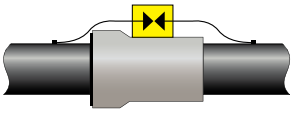
- for the protection of isolating joints in systems provided with cathodic protection or stray current systems;
- for service entry masts for low voltage overhead lines;
- for the protection of electrically insulated flanges of pipelines;
- in the vicinity of railway systems.

They provide the following features and benefits:

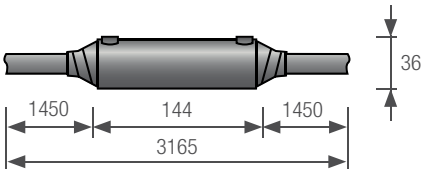
- monolithic explosion proof protection;
- good protection level and high insulation resistance to avoid any current flow due to induced voltages or voltages injected by cathodic protection systems;
- high short circuit current withstand.

ISG	Model	Application Icon	Rated withstand voltage	Classification	Lightning impulse current I_{imp} (10/350 µs)	Terminals	Page
	G 60/150 C 3		165 V AC	1L	40 kA	pigtails	135
	G 60/150 A 1		165 V AC	1L	40 kA	cable lugs M8	135
	G 100/150 A		255 V AC	H	100 kA	cable lug M12/ M8 bolt	136
	G 100/150 Ex		255 V AC	H	100 kA	cable lug M12/ connecting lug M12	136
	G 100/150 F		120 V DC	H	150 kA	angle cleat M12/ M12 bolt	137

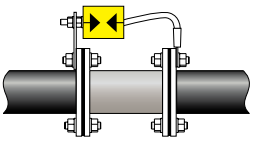
G 60/150 C3



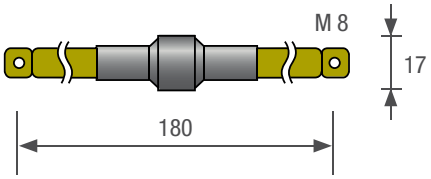
Monolithic isolating joint
(underground)



G 60/150 A1



Isolating joint
air/underground with die
casted ISG



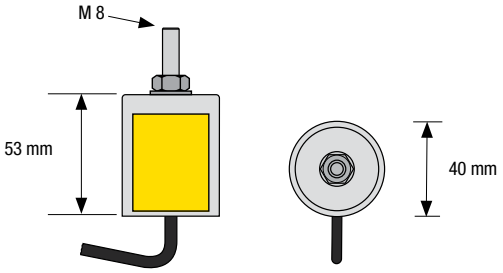
G 60/150 is an ISG for lightning equipotential bonding for the protection of electrically insulated flanges in gas and oil pipelines, with the following features and benefits:

- Designed either as an underground monolithic isolating joint with pigtail connections or as die casted isolating joint with cable lugs for M8 screws;
- Available with differing cable length upon request.

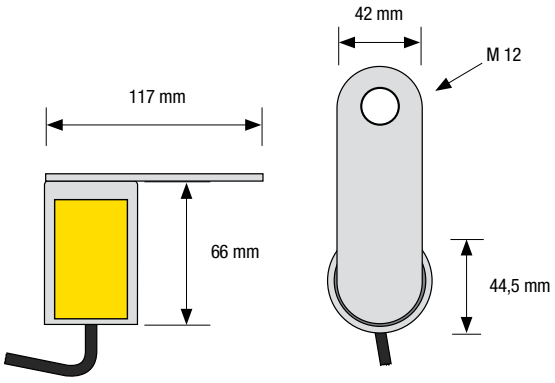
Model G 60/150 ...		C3	A1
CODE		**400 315**	**401 120**
Rated power frequency withstand voltage at 50/60 Hz	$U_{W\,AC}$	165 V ± 20%	
ISG Classification		1L	
Lightning impulse current (10/350 µs)	I_{imp}	40 kA	
Nominal discharge current (8/20 µs) based on IEC/EN 61643-11	I_n	60 kA	
Rated impulse sparkover voltage (1,2 kV/50 µs)	U_{imp}	≤ 950 V	
Insulation resistance at 100 V/dc	R_{isol}	> 1G Ω	
Power frequency withstand current (50 Hz, 1s, 5 times)	I_{W50Hz}	100 A	
Degree of protection	IP	66	
Cross section of connecting wires		16 mm²	
Terminals		pigtails	cable lugs M8
Total lenght		3165 mm	180 mm
GTIN (EAN)		8054890321679	8054890321716

TECHNICAL DATA

G 100/150 A

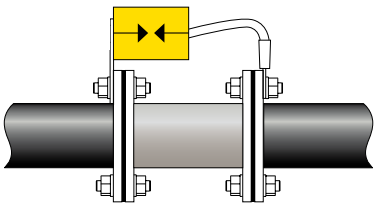


G 100/150 Ex



ISG model G 100/150 Ex

electrically insulated flanges (air)

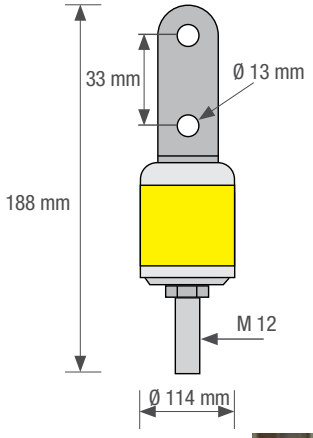


G 100/150 is an ISG for lightning equipotential bonding, for the protection of electrically insulated flanges in gas and oil pipelines. It provides the following features and benefits:

- Monolithic (Ex) classified isolating joint;
- Available with differing cable length upon request.

Model G 100/150 ...		A	Ex
CODE		**400 340**	**400 360**
Rated DC sparkover voltage		450 - 750 V dc	
Classification based on EN 62561-3 EC exame certificate		H (Heavy Duty)	II 2G Ex mb IIC T6 Gb II 2D Ex mb IIIC 180 °C Db
Certification		-	FTZU 04 ATEX 0255X
Rated power frequency withstand voltage at 50/60 Hz	$U_{W\,AC}$	255 V	
Maximum withstand voltage (DC)	$U_{W\,DC}$	350 V	
Lightning impulse current (10/350 µs)	I_{imp}	100 kA	
Charge	Q	50 As	
Nominal discharge current (8/20 µs) based on IEC/EN 61643-11	I_n	75 kA	
Maximum Discharge Current (8/20 µs) based on IEC/EN 61643-11	I_{max}	100 kA	
Rated impulse sparkover voltage (1,2/50 µs)	$U_{r\,imp}$	≤ 1400 V	
Protection level at I_{imp} based on IEC/EN 61643-11	U_p	≤ 1 kV	
Insulation resistance at 100 V/dc	R_{iso}	> 1 GΩ	
Nominal discharge current	Ieff	2,9 kA, 100 ms	
Charge (50/60 Hz)	Q	350 As	
Capacitance at 1 MHz	C	25 pF	
Degree of protection	IP	66	67
Operating Temperature range		-40 ... +90 °C	-
Operating temperature range class T6 class T5 classes T1-T4		- - -	-20 ... +30 °C -20 ... +45 °C -20 ... +80 °C
Cross section of connecting wire		16 mm² / 200 mm	
Case material		steel	
Approximate weight		330 g	550 g
Terminals		cable lug M12/bolt M8	cable lug M12/connecting lug M12
GTIN (EAN)		8054890321686	8054890321693

G 100/150 F



G 100/150 F is a low-voltage limiter (LVL) for bonding in the vicinity of DC railway systems, with the following features and benefits:

- At voltages > 120 V DC a reliable and stable arcing connection is provided;
- The arcing voltage is approximately 30 V;
- The protection is independent from environmental conditions;
- Vertical installation is recommended;
- This device meets the requirements of EN 50526-2 (2014).

Model G 100/150 ...		F
CODE		**400 000**
Classification based on EN 62561-3		H (Heavy Duty)
Sparkover voltage DC		300 ... 500 V dc
Sparkover voltage AC		≥ 250 V rms
Sparkover voltage with 6 kV (1,2/50 µs) impulse		≤ 1200 V
Response time		≤ 100 ns
Lightning impulse current (10/350 µs) based on IEC/EN 61643-11	I_{imp}	150 kA
Charge	Q	75 As
Nominal discharge current (8/20 µs) based on IEC/EN 61643-11	I_n	100 kA
Maximum discharge current (8/20 µs) based on IEC/EN 61643-11	I_{max}	200 kA
End of Life behaviour based on IEC/EN 61643-11		SCFM (short circuit failure mode)
Short Circuit Current withstand DC	I_{sccr}	20 kA (30 ms)
Short Circuit Current withstand AC	I_{sccr}	8 kA rms (100 ms)
Insulation resistance at 200 V/dc	R_{iso}	> 1 GΩ
Capacitance at 1 MHz	C	35 pF
Operating temperature range		-40 ... + 90 °C
Climatic category according IEC 60068-1		40/90/21
Mounting		vertical
Case material		steel
Degree of protection		IP 66
Approximate weight		950 g
Terminals		angle cleat M12/M12 bolt
Dimensions		188 x 114 mm
GTIN (EAN)		8054890321662

ZOTUP SURGE ARRESTERS FOR HIGH VOLTAGE SYSTEMS (HV)

SURGE ARRESTERS
FOR HIGH VOLTAGE SYSTEMS (HV)

Surge Arresters are in accordance with IEC/EN 60099-4:2014 and their typical application is in the high voiltage distribution system for the protection of transformers, switchgear and transmission lines.

- Surge Arresters with a higher thermal energy rating than 4,5 kJ/kV are available upon request.
- Surge Arresters with silicone rubber housing providing big internal and external creepage distances suitable for all applications even with a high level of pollution.
- Surge Arresters available with external disconnector device, which is activated by an increase in internal pressure with a reliable operating mechanism and providing a stable characteristic even over long time.
- Additional impulse counters and impulse counters with analog meter for indication of the total leakage current (internal and external dispersion) are available.

SURGE ARRESTERS
FOR HIGH VOLTAGE SYSTEMS (HV)

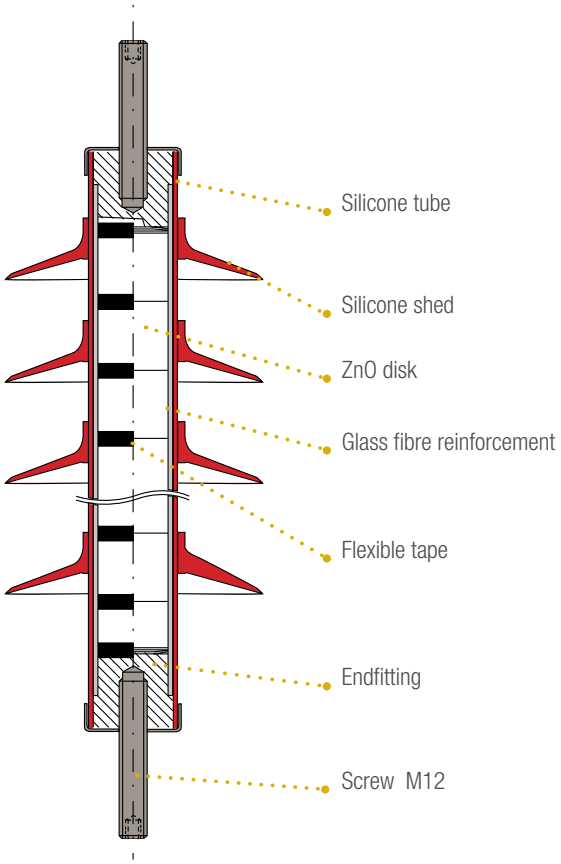
Alternating Current Systems (AC)

	Model	Application icon	System Voltage kV	Rated voltage kV	Line discharge class (IEC 60099-4 Ed. 2.2; 2009)	Thermal energy rating kJ/kV of Ur (IEC 60099-4 Ed. 3.0; 2014)	Nominal discharge current I_n kA (8/20 µs)	Location	Page
	ZU HV 12.2		10	12	2	4,5	10	indoor + outdoor	143
	ZU HV 18.2		15	18	2	4,5	10	indoor + outdoor	143
	ZU HV 24.2		20	24	2	4,5	10	indoor + outdoor	143
	ZU HV 30.2		24	30	2	4,5	10	indoor + outdoor	143
	ZU HV 36.2		30	36	2	4,5	10	indoor + outdoor	143

Direct Current Systems (DC)

	Model	Application icon	System Voltge V	Rated voltage kV	Line discharge class (IEC 60099-4 Ed. 2.2; 2009)	Thermal energy rating kJ/kV of Ur (IEC 60099-4 Ed. 3.0; 2014)	Nominal discharge current I_n kA (8/20 µs)	Location	Page
	ZU HV DC 1/10		600 and 750	1,2	DC-B (4)	10	10	indoor + outdoor	147
	ZU HV DC 2/10		1500	2,4	DC-B (4)	10	10	indoor + outdoor	147
	ZU HV DC 3/10		1500	3,6	DC-B (4)	10	10	indoor + outdoor	147
	ZU HV DC 4/10		3000	4,8	DC-B (4)	10	10	indoor + outdoor	147

ZU HV



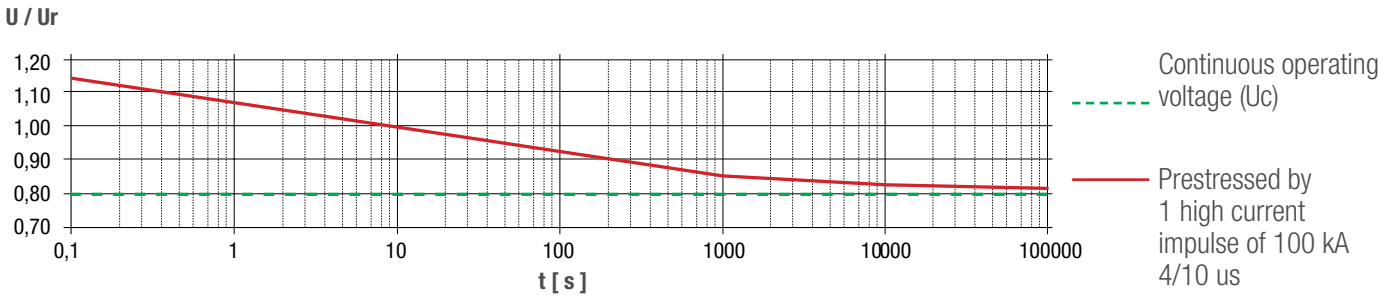
ZU HV is a High Voltage surge arrester for the protection of transformers, metalclad switchgear and transmission lines against atmospheric and switching overvoltages, ideal for indoor or outdoor applications and where a high level of pollution is expected, with the following features and benefits:

- Installation of these surge arresters on the HV -side simplifies the selection of the surge protective devices on the low voltage side (in TN or TT systems) which are intended to protect against transient phenomena coming from the line;
- Compliant with IEC/EN 60099-4;
- State of the art metal oxide surge arresters without a spark gap and with silicone rubber housing;
- Size and volume of the surge arresters based on the practicable minimum for each nominal voltage;
- The housing and insulator construction of the surge arrester minimises tracking;
- The construction and manufacturing process prevent partial discharges;
- Sealed with aluminium fittings and terminated with stainless steel bolts, including nuts and washers.

Model ZU HV		
Line discharge class (IEC 60099-4 Ed. 2.2; 2009)		2
Thermal energy rating (IEC 60099-4 Ed. 3.0; 2014)		4,5 kJ/kV
Nominal discharge current	I_n	10 kA
Rated voltage	U_r	from 3 kV to 60 kV
Rated frequency		from 16 Hz to 62 Hz
High current impulse		100 kA (4/10 µs)
Long duration current impulse		500 A / 2000 µs
Short circuit current performance		design B (20 kA / 0,2 s)
Ambient temperature range		- 40 ... + 55 °C
Altitude		up to 1000 m above sea level
Torsional strength		80 Nm
Bending strength		250 Nm
Tensile strength		1400 N
Insulator		silicone rubber HTV
Insulator colour		red-brown RAL 3013

Rated voltage	Continous operating voltage	Temporary overvoltage TOV		Max. residual voltage / Protection level						Switching impulse residual voltage	
Ur kV	Uc kV	1 sec. U1s kV	10 sec. U10s kV	10 kA (1/2 µs) STIPL kV	20 kA (1/2 µs) STIPL kV	5 kA (8/20 µs) LIPL (U_{pl}) kV	10 kA (8/20 µs) LIPL (U_{pl}) kV	20 kA (8/20 µs) LIPL (U_{pl}) kV	40 kA (8/20 µs) LIPL (U_{pl}) kV	125 A (30/75 µs) SIPL (U_{ps}) kV	500 A (30/75 µs) SIPL (U_{ps}) kV
3	2,4	3,5	3,3	10,7	11,9	9,3	10,0	11,1	12,5	7,3	7,8
6	4,8	6,9	6,5	19,3	21,4	16,7	18,0	20,0	22,5	13,1	14,0
9	7,2	10,4	9,8	28,9	32,1	25,1	27,0	30,0	33,8	19,7	21,1
12	9,6	13,8	13,1	37,5	41,6	32,6	35,0	38,9	43,8	25,6	27,3
15	12,0	17,3	16,4	42,8	47,5	37,2	40,0	44,4	50,0	29,2	31,2
18	14,4	20,7	19,6	52,4	58,2	45,6	49,0	54,4	61,3	35,8	38,2
21	16,8	24,2	22,9	62,1	68,9	53,9	58,0	64,4	72,5	42,3	45,2
24	19,2	27,6	26,2	70,6	78,4	61,4	66,0	73,3	82,5	48,2	51,5
27	21,6	31,1	29,4	80,3	89,1	69,8	75,0	83,3	93,8	54,8	58,5
30	24,0	34,5	32,7	85,6	95,0	84,4	80,0	88,8	100,0	58,4	62,4
33	26,4	38,0	36,0	94,2	104,6	71,8	88,0	97,7	110,0	64,2	68,6
36	28,8	41,4	39,2	104,9	116,4	91,1	98,0	108,8	122,5	71,5	76,4
39	31,2	44,9	42,5	114,5	128,0	99,5	107,0	118,8	133,8	78,7	83,5
42	33,6	48,3	45,8	124,1	137,8	107,9	116,0	128,8	145,0	74,7	90,5
45	36,0	51,8	49,1	128,4	142,5	111,6	120,0	133,2	150,0	87,6	93,6
48	38,4	55,2	52,3	141,2	156,7	122,8	132,0	146,5	165,0	96,4	103,0
51	40,8	58,7	55,6	147,7	164,0	128,3	138,0	153,2	172,5	100,7	107,6
54	43,2	62,1	58,9	156,2	173,4	135,8	146,0	162,1	182,5	106,6	113,9
60	48,0	69,0	65,4	171,2	190,0	148,8	160,0	177,6	200,0	116,8	124,8

Power frequency voltage versus time characteristcs (TOV) (pre-heated to 60 °C)



Selection of surge arresters must be carried out in accordance with IEC/EN 60099-5

Ordering code:

ZU HV • surge arrester with silicone rubber housing

• For rated voltages from 3 to 12 kV the shed distance is 45 mm.

• For rated voltages from 15 to 60 kV the shed distance is 30 mm.

3…60 • Rated surge arrester voltage.

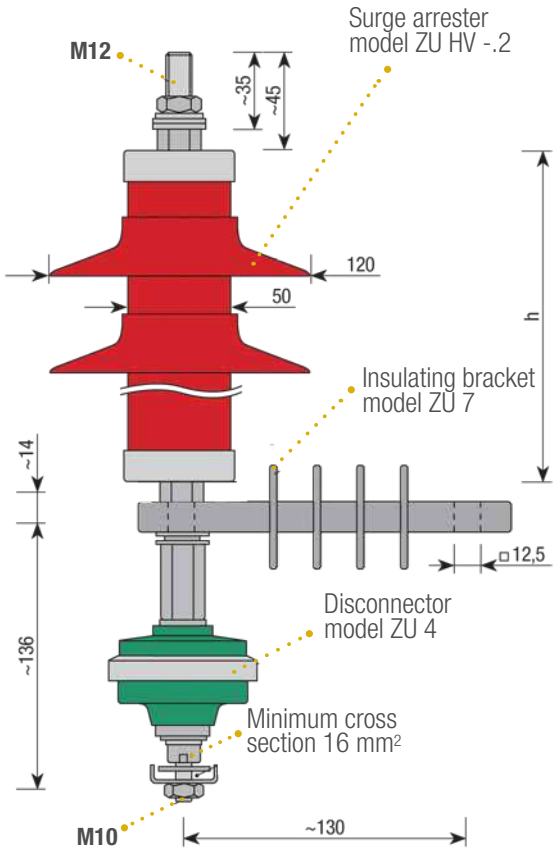
.2 • Line discharge class.

NOTE:
All surge arresters ZU HV have an increased creepage distance.

Rated voltage	Height	Weight	Creepage distance total	Surge arrester insulation			Surge arrester distance		Model	CODE	GTIN (EAN)
Ur kV	h mm	kg	mm	Withstand voltage (dry) Unstw kV	Withstand voltage (wet) Unstw kV	Lightning impulse withstand Unsts kV	Phase/ Phase LL mm	Phase/ Ground LE mm	ZU HV		
3	92	0,7	143	34	22	50	125	105	3.2	**120 403**	8054890320108
6	112	0,9	163	42	26	60	150	125	6.2	**120 406**	8054890320115
9	132	1,0	183	48	32	70	175	145	9.2	**120 409**	8054890320122
12	152	1,2	278	56	39	82	195	165	12.2	**120 412**	8054890320139
15	162	1,3	363	60	40	86	215	180	15.2	**120 415**	8054890320146
18	182	1,5	383	64	42	92	240	200	18.2	**120 418**	8054890320153
21	204	1,7	480	70	46	104	260	220	21.2	**120 421**	8054890320160
24	224	1,8	575	78	52	114	285	240	24.2	**120 424**	8054890320177
27	244	2,0	595	82	54	120	305	255	27.2	**120 427**	8054890320184
30	254	2,1	680	94	62	136	325	275	30.2	**120 430**	8054890320191
33	274	2,4	775	100	66	146	350	295	33.2	**120 433**	8054890320207
36	362	3,0	1013	126	84	184	375	315	36.2	**120 436**	8054890320214
39	384	3,2	1110	134	88	194	390	330	39.2	**120 439**	8054890320221
42	406	3,4	1132	142	94	206	415	350	42.2	**120 442**	8054890320238
45	414	3,6	1215	152	100	222	440	370	45.2	**120 445**	8054890320245
48	446	3,8	1322	156	104	226	465	390	48.2	**120 448**	8054890320252
51	456	4,0	1407	168	112	246	480	405	51.2	**120 451**	8054890320269
54	648	4,9	1836	266	176	386	505	425	54.2	**120 454**	8054890320276
60	648	5,0	1836	266	176	386	555	465	60.2	**120 460**	8054890320283

In order to simplify selection and ordering, the most common configurations and system voltages on the European grid (impedance earthed neutral and protection relyas for the elimination of the earth faults) are indicated below. This recommended dimensioning is also suitable for system configurations as indicated in Italian CEI 0-16.

For systems with operating voltage 10 kV	(ZU HV 12.2)	N.3	COD. 120 412
	(ZU 7)	N.3	COD. 107 000
	(ZU 4)	N.3	COD 104 000
For systems with operating voltage 15 kV	(ZU HV 18.2)	N.3	COD. 120 418
	(ZU 7)	N.3	COD. 107 000
	(ZU 4)	N.3	COD 104 000
For systems with operating voltage 20 kV	(ZU HV 24.2)	N.3	COD. 120 424
	(ZU 7)	N.3	COD. 107 000
	(ZU 4)	N.3	COD 104 000
For systems with operating voltage 24 kV	(ZU HV 30.2)	N.3	COD. 120 430
	(ZU 7)	N.3	COD. 107 000
	(ZU 4)	N.3	COD 104 000
For systems with operating voltage 30 kV	(ZU HV 36.2)	N.3	COD. 120 436
	(ZU 7)	N.3	COD. 107 000
	(ZU 4)	N.3	COD 104 000



ZU 7

Insulating bracket model ZU 7

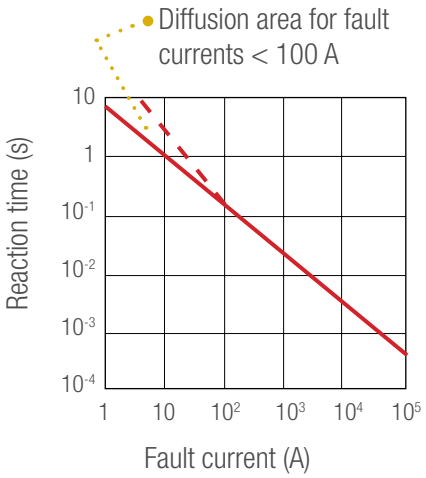
This insulating support is necessary to support the lower arrester end, when the disconnector device model ZU 4 is applied. This fixes the arrester and avoids leakage currents to ground.

Model ZU 7

CODE	107 000
Max. applicable voltage	30 kV
GTIN (EAN)	8054890320054

ZU 4

Disconnector characteristic



Disconnector device model ZU 4

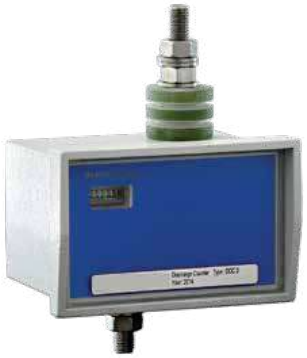
Surge arresters for high voltage systems are often equipped with a disconnector that permits the disconnection of the surge arrester in case of an internal fault. This disconnection prevents a persistent fault in the network and provides a visual indication that the surge arrester is defect. The disconnector is activated by an increase in internal pressure due to the electric arc caused by the sublimation of the internal connecting wire as a result of the fault current. The operating mechanism is very reliable and the characteristc remains constant even over long time.

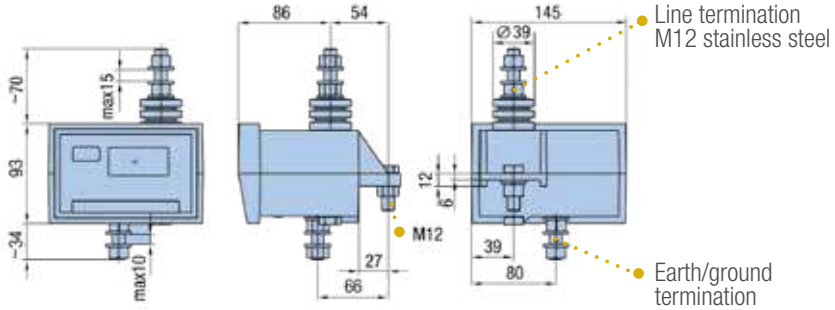
NOTE: It is important to ensure that sufficient insulating distance is kept for parts remaining energised after the detachment of the lower part of the disconnector.

Model ZU 4

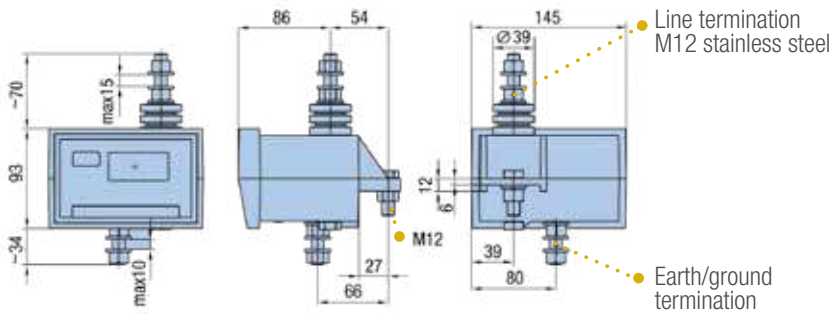
CODE	104 000
Nominal discharge current (8/20 µs)	10 kA
Frequency	48 - 62 Hz
Altitude	Up to 3000 m above sea level
Housing	Polyethylene with a low pressure rating, stabilized against UV
Minimum cross section and lenght for connection	16 mm^2 flexible / 300 mm
GTIN (EAN)	8054890320009

ZU SC





ZU SC-M



Lightning surge counter models ZU SC and ZU SC-M
In compliance with the standards IEC/EN 62561-6.
The installation of the lightning surge counter must be combined with a surge arrester mounted with an insulating support.
Lightning surge counters do not require a power supply, they are installed at the earth/ground terminal of a single surge arrester or at the common earth/ground connection of a group of arresters.
The ZU SC model is capable of counting surges to ground.
The ZU SC-M model counts surges to ground and provides an indication of the total leakage current via an analogue meter.
A significant change in the value of the indicated current after installation shows a deterioration of the surge arrester or an increased level of pollution on its outer insulator surface.
Both models can, upon request, be supplied with an auxiliary contact for remote monitoring of the counting.

Model		ZU SC	ZU SC-M
CODE		**105 000**	**106 000**
Classification according to IEC/EN 62561-6		Type II	Type II
Minimum discharge current counted (8/20 µs)	$I_{n\,min}$	100 A	100 A
Maximum discharge current counted (8/20 µs)	$I_{n\,max}$	100 kA	100 kA
Residual voltage at 100 kA 4/10 µs		6 kV peak	6 kV peak
Surge counter		6 digit	6 digit
Maximum counting frequency		5/second	5/second
Analogue leakage current meter		-	0-30 mA Peak/√2
GTIN (EAN)		8054890320016	8054890320030

Model … with remote signal contact		ZU SC t	ZU SC-M t
CODE		**105 001**	**106 001**
Remote signal contact		Potential free normally open contact	
Terminal-conductor size for remote signal contact		max. 1,5 mm² flexible	
Switching capacity		ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A	
GTIN (EAN)		8054890320023	8054890320047

ZU HV DC

ZU HV DC is a surge arrester for application in direct current systems and particularly for electric traction systems (railway, underground).

It provides the following features and benefits:

- varistor based surge arrester with limiting operation for protection of direct current systems against overvoltages, able to withstand lightning currents;
- This SPD is Installed in a vertical position, either hooked on overhead lines or mounted on electric motors;
- Its high mechanical resistance to bumps and vibrations complies with IEC/EN 60068 part 2-29;
- Its silicone rubber housing with long creepage distance allows indoor and outdoor mounting;
- Its nominal discharge capability I_n is 10 kA (8/20);
- It is available with continuous operating voltages from 1 to 4kV DC.;
- Size and volume of the surge arresters based on the practicable minimum for each rated voltage;
- The insulator of the surge arrester is characterized by the absence of junction lines;
- The construction and manufacturing process prevent partial discharges;
- Sealed with aluminium fittings and terminated with stainless steel clamps, screws and washers.

Model ZU HV DC -/10

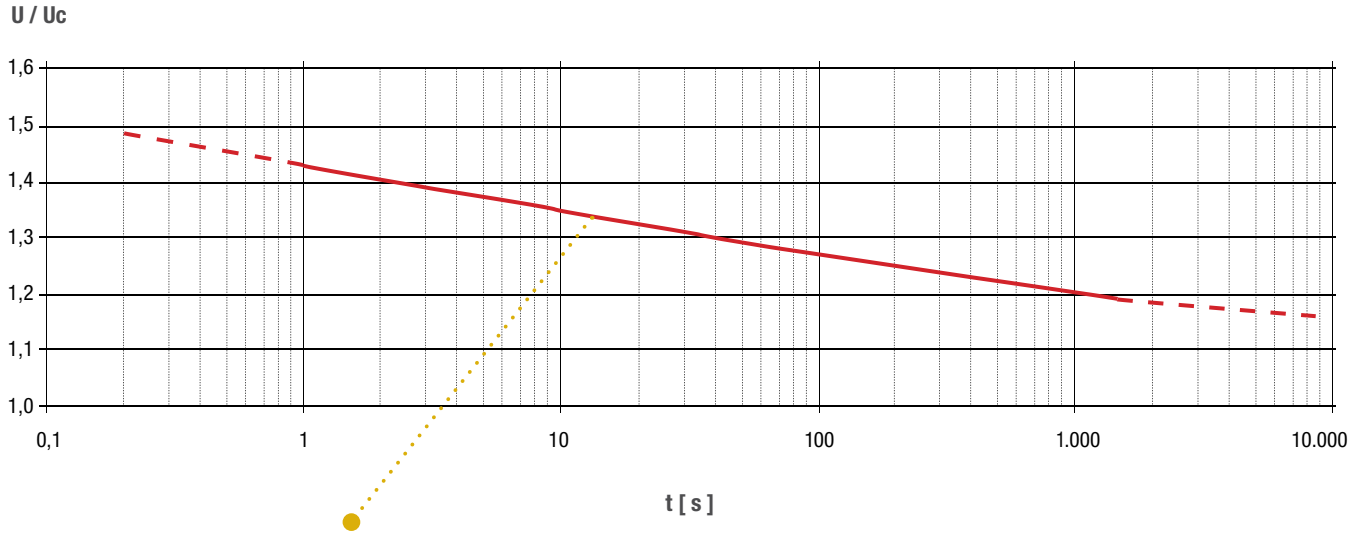
Rated voltage	U_r	from 1,2 kV to 4,8 kV
Nominal discharge current	I_n	10 kA
High current impulse	I_{hc}	100 kA 4/10 µs
Long duration impulse current		1000 A / 2 ms
Arrestor class in accordance with EN 50526-1; 2012		DC-B
Thermal energy rating kJ/kV (IEC 60099-4 Ed. 3.0; 2014)		10 (10 kJ/kV a Ur)
Line discharge class (based on IEC 60099-4 Ed. 2.2; 2009)		4
Rated short circuit current		40 kA / 0,2 s
Resistance to mechanical impact, according IEC/EN 60068 part 2-29		15 g
Resistance to vibration IEC/EN 60068 part 2-6		3 g (10 - 500 Hz)
Ambient temperature range		- 40 ... + 55 °C
Altitude		up to 1000 m above sea level*
Insulator		silicone rubber HTV
Insulator colour		grey RAL 7040

* for application at altitudes above 1000 m apply apply altitude correction factors according IEC

Rated voltage	Continuous operating voltage	Max. residual voltage / Protection level							Height	Total creepage distance	Weight	Surge arrester insulation		Model	CODE
Ur kV	Uc kV	10 kA 1/2 µs kV	5 kA 8/20 µs U_{pl} kV	10 kA 8/20 µs U_{pl} kV	20 kA 8/20 µs U_{pl} kV	250 A 30/70 µs U_{ps} kV	500 A 30/70 µs U_{ps} kV	1000 A 30/70 µs U_{ps} kV	h mm	mm	kg	With-stand voltage wet Unst kV	Lightning impulse withstand wet Unsch kV	ZU HV DC	
1,2	1	2,9	2,5	2,6	2,9	2,1	2,2	2,3	173	230	3	≥ 40	≥ 50	1/10	**110 001**
2,4	2	5,5	4,8	5	5,5	4	4,1	4,2	180	237	3	≥ 40	≥ 50	2/10	**110 002**
3,6	3	8,3	7,3	7,6	8,3	6,1	6,2	6,4	187	244	3	≥ 40	≥ 50	3/10	**110 003**
4,8	4	10,9	9,5	10	10,9	7,9	8,1	8,3	193	250	3	≥ 40	≥ 50	4/10	**110 004**

CODE	GTIN (EAN)
110 001	8054890320061
110 002	8054890320078
110 003	8054890320085
110 004	8054890320092

Power frequency voltage versus time characteristic (TOV) (pre heated to 60 °C)



Pre stressed by 1 high current impulse of
100 kA 4/10 µs

Ordering code:

ZU HV DC • surge arrester with silicone rubber housing

1…4 • Continuous operating voltage.

10 • Nominal discharge current.