

CATALOGUE 2018



ZOTUP[®]
INNOVATIVE SURGE PROTECTION



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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.



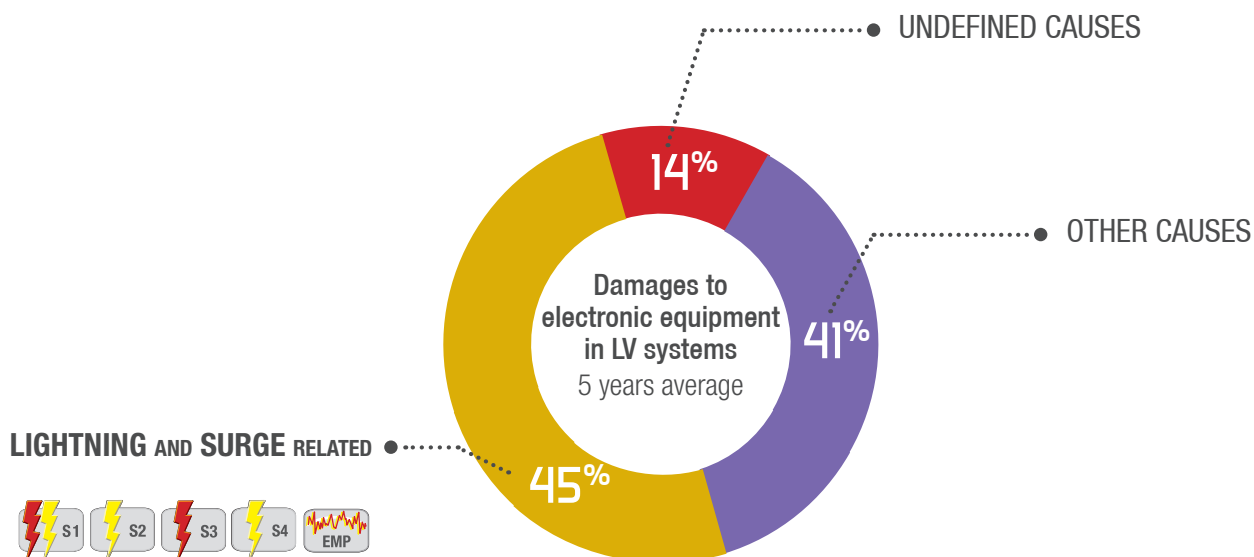
YOUR SAFETY, OUR GOAL



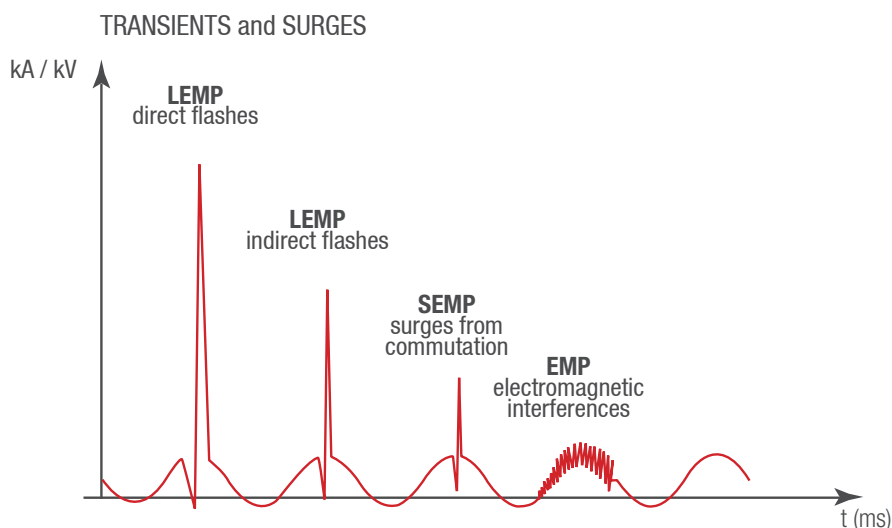
SURGE PROTECTIVE DEVICES - WHY?

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 and industrial infrastructure as well as for private premises is essential.

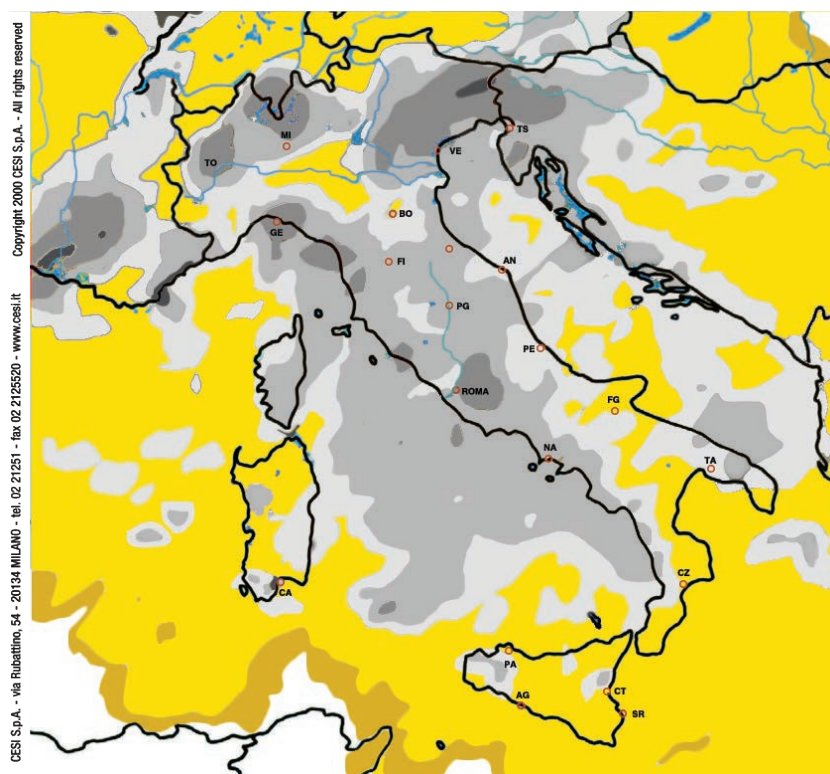


source: German Insurance Association (GDV); Berlin - 2009.





LIGHTNING GROUND FLASH DENSITY



Copyright 2000 CESI S.p.A. - All rights reserved
CESI S.p.A. - via Rubattino, 54 - 20134 MILANO - tel. 02 212520 - fax 02 212521 - www.cesi.it

100 km

Scale 1/7.000.000

Lightning flashes
to the ground/km²/year

more than 6.00

from 4.00 to 6.00

from 2.50 to 4.00

from 1.50 to 2.50

from 1.00 to 1.50

from 0.10 to 1.00

from 0.05 to 0.10

less than 0.05

source: CESI SIRF

Density of lightning flashes year 2013 in Italy

The above figure shows the result of an analysis obtained from cloud to ground lightning flashes as recorded by the Italian Lightning Recording System operated by CESI-SIRF. The data processed by CESI-SIRF are taken from year 1995 to the present. The detection system was launched in 1994 and is capable of recording lightning flashes to ground in real time and evaluating their principal electrical characteristics. It covers all Italian national territory including Sicily and Sardinia. Since 1996, the system covers mainland with a standardized detection reliability of 90% and an impact accuracy of 500m. In 1999 it was extended to cover also the islands.

Density of lightning flashes to the ground N_g

The ground flash density N_g is the number of lightning flashes per km² and year. These values are provided by the above mentioned recording system from all the flashes detected by the corresponding lightning localization 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 the SIRF database.



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 61643-21 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 61643-31 Ed. 1: 2018

Low-voltage surge protective devices -
Part 31: Requirements and tests methods for SPDs
for photovoltaic applications.

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.



EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

ICS 29.120.50

EN 50539-11

March 2013

English version

Low-voltage surge protective devices -
Surge protective devices for specific application including d.c. -
Part 11: Requirements and tests for SPDs in photovoltaic applications

Überspannungsschutzgeräte für
Photovoltaik - einschließl

Parafoudres basse tension -
Parafoudres pour applications spécifi
incluant le courant continu -
Partie 11: Exigences et essais pour
parafoudres connectés aux installa
photovoltaïque

This European Standard
with the CEN/CENELEC
the status of a national st

Up-to-date lists and
application to the CEN

This European Stan
language made by
to the CEN/CENE

CENELEC mem
the Czech Rep
Greece, Hung
Portugal, Ro

© 2013



IEC 61643-11

Edition 1.0 2011-03

INTERNATIONAL STANDARD

NORME
INTERNATIONALE



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



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.

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

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

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

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

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

SPD tested with combination wave.

Voltage switching type SPD

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.

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.

N-PE SPD

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

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 1 or type 1. The characteristic waveform of 10/350 μ s.

Nominal discharge current (I_n)

Crest value of the current through the SPD with a current waveshape of 8/20 μ s.

This characterises an SPD as test class 2 or type 2.

Discharge current (I_d)

Presumed maximum crest value of the 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} .

Open circuit voltage (U_{oc})

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



Maximum discharge current ($I_{\max}$)

Crest value of a current through the SPD having an 8/20 μ s waveshape and magnitude according to the manufacturers specification.

$I_{\max}$ is an optional parameter.

This parameter should not be considered for the selection of SPDs.

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 ($I_{\text{sc cr}}$)

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.

(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)

SPDs shall :

- withstand when subjected to overvoltages caused by faults or disturbances in the low voltage system and
- either withstand or fail in manner not creating a hazard when subjected to overvoltages caused by faults or disturbances in the high voltage system.

Pollution Degree (PD)

Numerical characterizing the expected pollution of the relevant environment.

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.



CLASSIFICATION OF SPDs

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 μ s) and with 8/20 μ s current impulses.

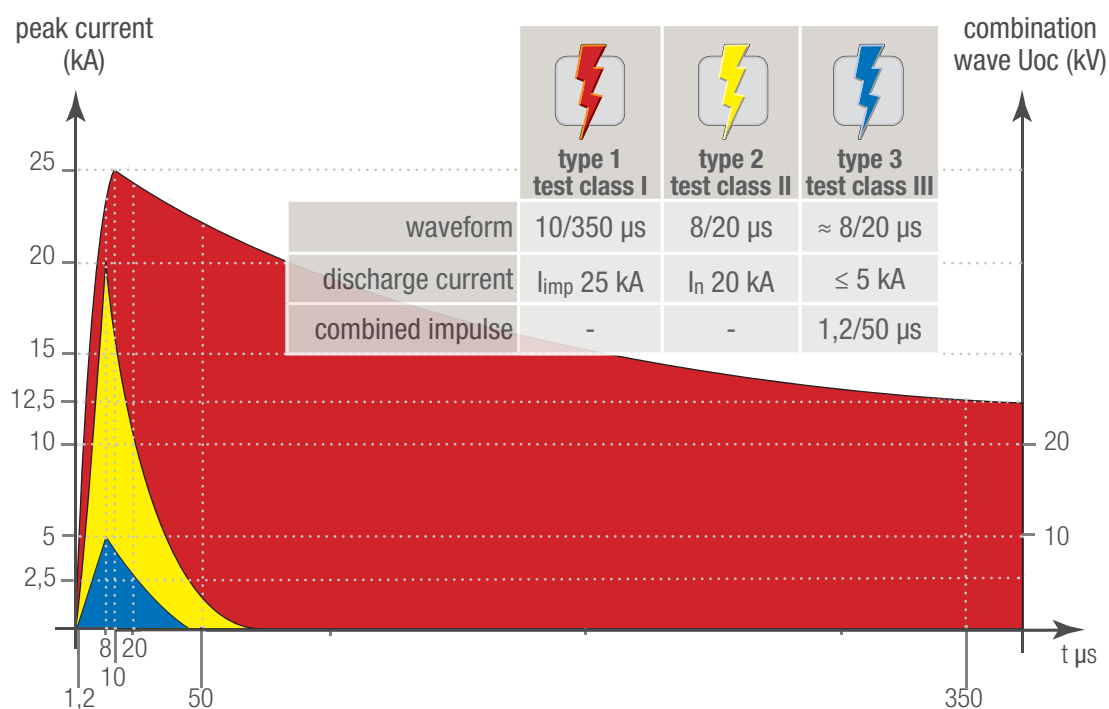
SPD type 2: tested with the nominal discharge current I_n (8/20 μ s) and optional with the maximum discharge current I_{max} (8/20 μ s).

I_{max} 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 μ s voltage impulses.

SPD type 3: tested with a combination wave generator providing an open circuit voltage U_{oc} (1,2/50 μ s) and a defined short circuit current I_{cw} (8/20 μ s) 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





PARAMETERS FOR SPD SELECTION

Discharge capability is an important parameter when choosing a suitable SPD, but there are also other parameters to be considered like:

- Maximum Continuous Operating Voltage (U_c);
- Temporary Overvoltage (TOV) Withstand;
- Type / Test class (impulse currents and voltages) **T1** **T2** **T3** ;
- Short circuit withstand capability/short circuit current rating (I_{sccr});
- Follow current interrupt rating at U_c , preferably **No follow current® (NFC)**;
- Voltage protection level (U_p);
- Response time (t_a);
- Coordination aspects;
- Noise level attenuation (dB);
- Pollution degree. SPD designed for applications in a pollution degree 3 environment (PD3).

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);
- the temporary overvoltages (TOVs) to be expected and the withstand requirements.

Immunity against commonly specified TOVs (Temporary Overvoltages) for 230/400 V low voltage systems is guaranteed by selection of the following U_c values:

SPD	TN-system	TT-system	IT-systems
phase to neutral	$U_c \geq 335 \text{ V}$	$U_c \geq 335 \text{ V}$	$U_c \geq 335 \text{ V}$ (1)
phase to earth	$U_c \geq 335 \text{ V}$	$U_c \geq 400 \text{ V}$	$U_c \geq 400 \text{ V}$
neutral to earth	-	$U_c 255 \text{ V}$ (2)	$U_c 255 \text{ V}$ (2)

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

Short circuit withstand capability (short circuit current rating I_{sccr}):

During the normal operation of overvoltage protective 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 disconnecter or in conjunction with an external disconnecter, 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 disconnecter. 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 61643-11 requires 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 μ s) for type 2 SPDs or
the residual voltage at a discharge current (8/20 μ s), with a crest value of I_{imp} for type 1 SPDs.
- For voltage switching and Combination SPDs:
the limiting voltage at 1,2/50 μ s 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 harmful 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 μ s, 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.



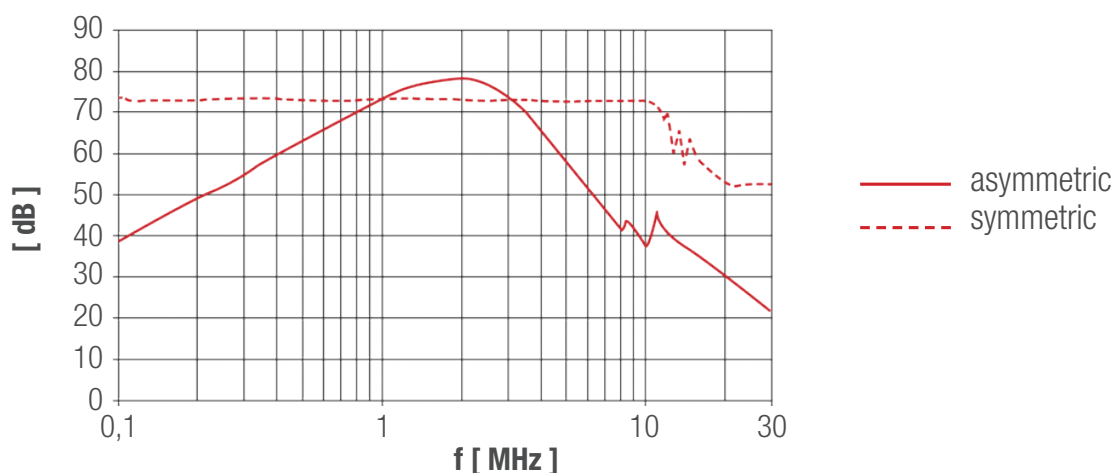
Total discharge current ($I_{\text{total 10/350}}$ and $I_{\text{total 8/20}}$):

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.



DESIGN AND CONSTRUCTION

We offer a wide range of surge protective devices with different circuit design and construction to cover the different application needs. The overview below provides a comparison of fundamental characteristics for the principle selection related to the operating conditions and protection needs.

Type IA - Voltage Switching SPD



Spark gap based SPD with trigger technology:

- high impulse current rating: (I_{imp}) 25 kA/pole 10/350 μ s; 100 kA/4 poles 10/350 μ s);
- short response time (t_a): ≤ 100 ns;
- good voltage protection level;
- no leakage currents.

Type L - Voltage Limiting SPD



Varistor based SPD:

- **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 μ s; (I_{max}) up to 100 kA/pole 8/20 μ s.

Type IL - combined Voltage Limiting and Switching SPD



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.

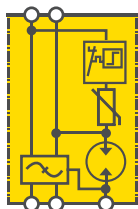
Type I - Voltage Switching SPD



GDT based SPD:

- the typical application for this device is in the N-PE mode of protection in various power distribution systems (1+1 or 3 + 1 construction, connection type CT 2 acc. HD 60364-5-534);
- high impulse current rating (I_{imp}) and (I_{max}) up to 100 kA, 10/350 μ s.

Type ILF - combined Voltage Limiting and Switching SPD plus Filter



SPD 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 capability (combination wave test at U_{oc} 10 kV 1,2/50 μ s, I_{cw} 5 kA 8/20 μ s).



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 at a medium plant size comprising a main distribution board feeding first and second level subdistribution boards.

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.

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.

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.





The standard series 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.

SPD type



Selection of SPD according to the expected impact

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 μ s 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 μ s 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 lightning current are represented by an 8/20 μ s impulse (I_n). Required SPDs are **T2** and/or **T3**.

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



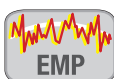
The lightning current is subdivided to both directions of the service and insulation breakdown needs to be considered. A representative current waveform is a unipolar 10/350 μ s impulse (I_{imp}). Required SPDs are **T1** and **T2**.

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 μ s 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 to 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 (S1 to S4) and the filter characteristic and mitigation level is determined by the expected interference level.

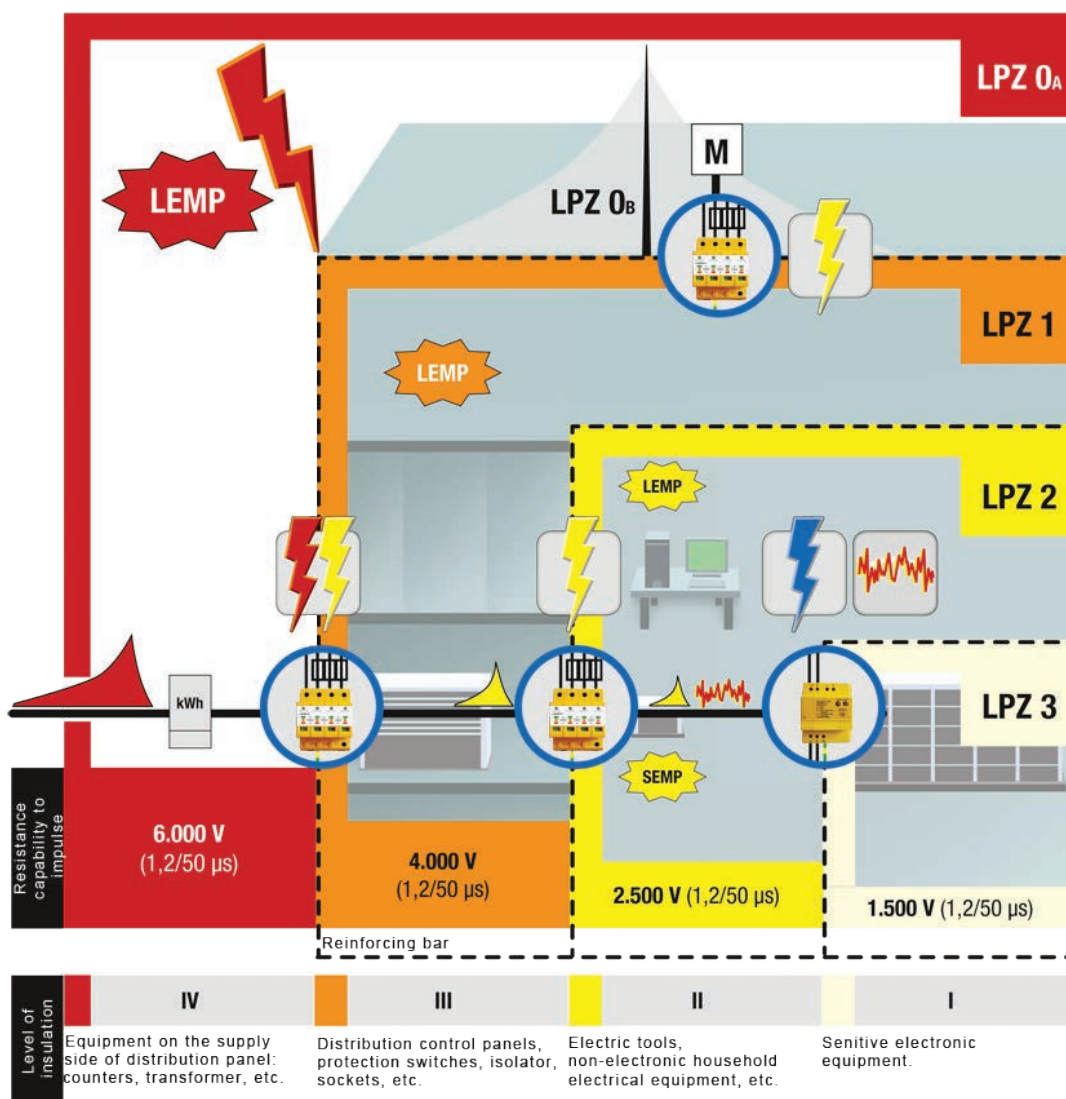


LOCATION AND ARRANGEMENT

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 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 interferences 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 0_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 0_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 THREAT PARAMETERS

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/ μ s)	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 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 telecommunications 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 $1,5 \times I_n/I_{imp}$	0,005
I + SPD with $2 \times I_n/I_{imp}$	0,002
I + SPD with $3 \times I_n/I_{imp}$	0,001

1) probability that an overvoltage damages an apparatus protected by an SPD system, expressed per cent

• 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 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 μ s, and, when connection type CT2 is applied (3+1 or 1+1 connection), a nominal discharge current $I_n \geq 20$ kA 8/20 μ s for the SPD mode connected N to PE in three-phase systems, and 10 kA 8/20 μ s in single-phase systems. Nevertheless we recommend to use SPDs with a nominal discharge current of at least 10 kA 8/20 μ s.
- For direct lightning an impulse current $I_{imp} \geq 12,5$ kA 10/350 μ s 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 μ s for the SPD mode connected N to PE in three-phase systems, and 25 kA 10/350 μ s in single-phase systems.



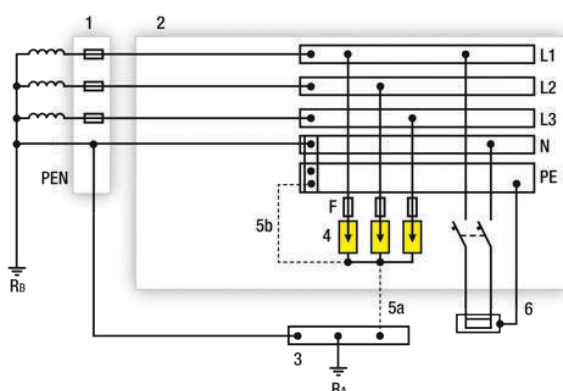
POWER DISTRIBUTION SYSTEMS

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.

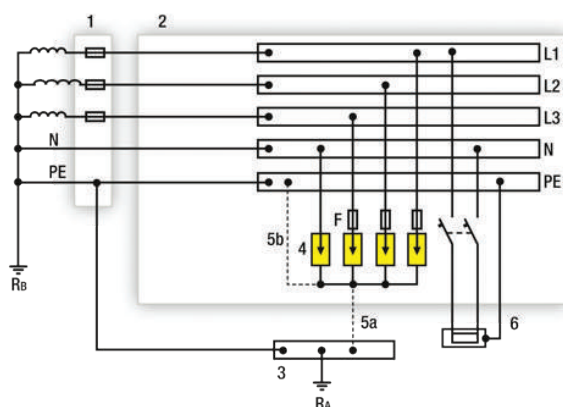
This coordination depends on the type and earthing arrangement of the power system, as there are TN-, TT- and IT-systems according to HD 60364-1 and the corresponding protective devices may be:

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



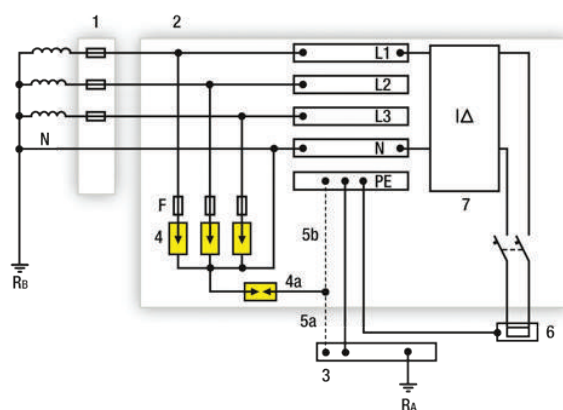
Installation of SPDs in a TN-C-system

**Connection type CT1
(3+0 connection)**



Installation of SPDs in a TN-S-system

**Connection type CT1
(4+0 connection)**

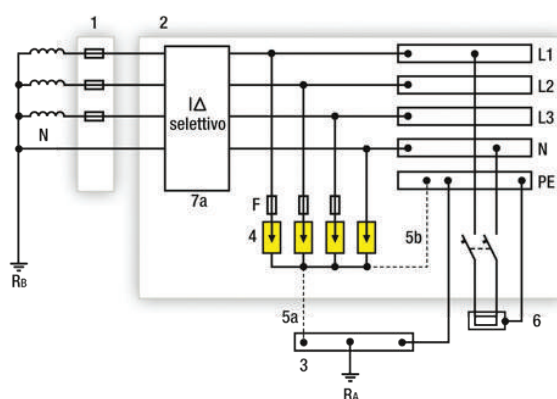


Installation of SPDs in a TT-system upstream the main residual current device

**Connection type CT2
(3+1 connection)**

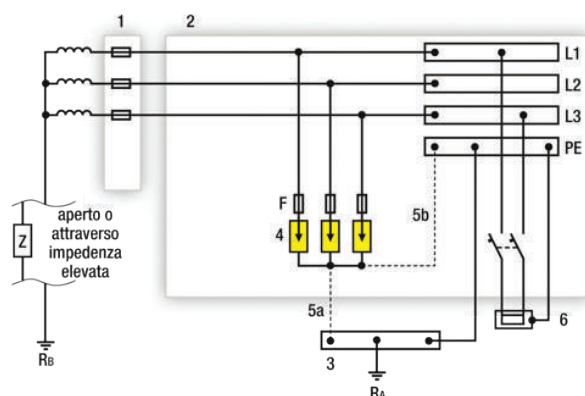


- 1: OCPD 1 OverCurrent Protective Device at the origin of the installation (e.g. in the main distribution board)
- 2: Main Distribution Board (MDB)
- 3: Main Earthing Terminal
- 4: Surge Protective Device(s) (SPDs)
- 4a: Surge Protective Device connected N to PE (N-PE SPD) when connection type CT2 (3+1 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



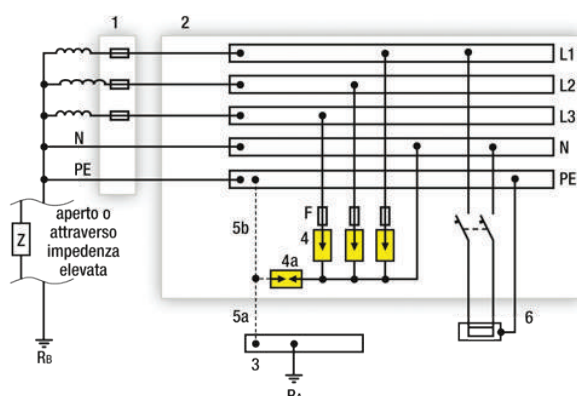
**Installation of SPDs in
a TT-system downstream
the main residual current device**

**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)**

A dramatic, high-contrast image of a stormy sky. Dark, heavy clouds are illuminated by numerous bright, jagged lightning bolts that crisscross the frame. The overall color palette is dominated by deep blues, greys, and the stark white of the lightning.

THE INNOVATIVE FEATURES OF OUR NEW PRODUCTS





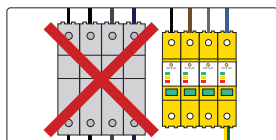
NEW ZOTUP PRODUCTS

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.

The **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 disconnecter, 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 disconnecter.

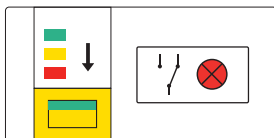
b) a "quick" or even "instant" process that depends on the overcurrent caused by a very low remaining impedance of the SPD, which causes a short circuit on the supply. The interruption of such short-circuit current is managed by an internal or external disconnecter with appropriate breaking capability, preferably a fuse.

The innovative feature from **ZOTUP** is a patented combined internal disconnecter, which is able to disconnect in both of the above mentioned cases, the "slow" and the "quick" or "instant" process. This means that the disconnecter 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 disconnecter.**

Advantages:

- Maintaining the full discharge capability of the SPD. An external fuse or disconnecter 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 disconnecter an additional external fuse is required. In such case the fuse is intrinsically selective with the internal disconnecter, safeguarding the integrity of the SPD in case of a very low impedance or even short circuit state.



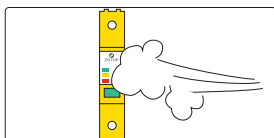
- **Progressive performance indication**

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 coastal 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 and clearance distances.

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 APP.

Main features

LOW VOLTAGE (ICONS FOR 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

LOW VOLTAGE

Typical use: in TN-C, TN-S, TT- or IT-systems with connection type CT1 (4+0 and 3+0) or with connection type CT2 (1+1 or 3+1 connection) according HD 60364-5-534 . They are generally installed as close as possible to the origin of the installation, e.g. in Main Distribution Boards (MDBs), as well as in Sub Distribution Boards (SDBs).

Features:

- They are equipped with an internal disconnector with short circuit breaking capability. Therefore in many applications they do not require a backup fuse as an external disconnector.
- They provide a progressive indicator showing the remaining performance, which simplifies maintenance and facilitates the planning of replacement during regular verifications and checks.
- They are designed for Pollution Degree 3, which makes them suitable for a wide range of applications in domestic as well as industrial installations and many other locations with increased environmental conditions.



ZOTUP SPDs for LOW VOLTAGE APP.

For 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 ff		I and II / T1 and T2	1	25 kA	60 kA	32
	L 25/100 230 ff 2		I and II / T1 and T2	2	25 kA	60 kA	33
	L 25/100 230 ff 3		I and II / T1 and T2	3	25 kA	60 kA	34
	L 25/100 230 ff 4		I and II / T1 and T2	4	25 kA	60 kA	35
	L 25/100 230 ff 1+1		I and II / T1 and T2	1+1	25 kA	60 kA	36
	L 25/100 230 ff 3+1		I and II / T1 and T2	3+1	25 kA	60 kA	37
	IA 25 230		I and II / T1 and T2	1	25 kA	25 kA	38
	IA 25 230 2		I and II / T1 and T2	2	25 kA	25 kA	39
	IA 25 230 4		I and II / T1 and T2	4	25 kA	25 kA	40
	IA 25 230 1+1		I and II / T1 and T2	1+1	25 kA	25 kA	41
	IA 25 230 3+1		I and II / T1 and T2	3+1	25 kA	25 kA	42
	I 100 N-PE		I and II / T1 and T2	1	100 kA	100 kA	43
	L 13/40 230 ff		I and II / T1 and T2	1	13 kA	35 kA	44
	L 13/40 230 ff 2		I and II / T1 and T2	2	13 kA	35 kA	45
	L 13/40 230 ff 3		I and II / T1 and T2	3	13 kA	35 kA	46
	L 13/40 230 ff 4		I and II / T1 and T2	4	13 kA	35 kA	47
	L 13/40 230 ff 1+1		I and II / T1 and T2	1+1	13 kA	35 kA	48
	L 13/40 230 ff 3+1		I and II / T1 and T2	3+1	13 kA	35 kA	49
	I 52 N-PE		I and II / T1 and T2	1	52 kA	52 kA	50



ZOTUP SPDs for LOW VOLTAGE APP.

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	51
	Prot. Box TT 40 ff			3+1			
	L 7/30 230 ff		I and II / T1 and T2	1	7 kA	30 kA	52
	L 7/30 400 ff		I and II / T1 and T2	1	7 kA	30 kA	52
	L 7/30 600 ff		I and II / T1 and T2	1	5 kA	25 kA	52
	L 7/30 750 ff		I and II / T1 and T2	1	5 kA	20 kA	52
	L 7/30 230 ff 2		I and II / T1 and T2	2	7 kA	30 kA	53
	L 7/30 230 ff 3		I and II / T1 and T2	3	7 kA	30 kA	54
	L 7/30 750 ff 3		I and II / T1 and T2	3	5 kA	20 kA	54
	L 7/30 230 ff 4		I and II / T1 and T2	4	7 kA	30 kA	55
	L 7/30 230 ff 1+1		I and II / T1 and T2	1+1	7 kA	30 kA	56
	L 7/30 230 ff 3+1		I and II / T1 and T2	3+1	7 kA	30 kA	57
	L 3/30 60 ff		II / T2	1	-	20 kA	58
	L 3/30 120 ff		II / T2	1	-	20 kA	58
	L 3/30 230 ff		II / T2	1	-	30 kA	58
	L 3/30 400 ff		II / T2	1	-	30 kA	58
	L 3/30 230 ff 2		II / T2	2	-	30 kA	59
	L 3/30 230 ff 3		II / T2	3	-	30 kA	60
	L 3/30 230 ff 4		II / T2	4	-	30 kA	61
	L 3/30 230 ff 1+1		II / T2	1+1	-	30 kA	62
	L 3/30 230 ff 3+1		II / T2	3+1	-	30 kA	63



ZOTUP SPDs for LOW VOLTAGE APP.

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		II / T2	1	-	10 kA	64
	L 2/10 230 ff 2		II / T2	2	-	10 kA	65
	L 2/10 230 ff 4		II / T2	4	-	10 kA	66
	L 2/10 230 ff 1+1		II / T2	1+1	-	10 kA	67
	L 2/10 230 ff 3+1		II / T2	3+1	-	10 kA	68
	I 12 N-PE		I and II / T1 and T2	1	12,5 kA	40 kA	69

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	70
	L 2/20 230 e		II / T2	1	-	20 kA	71
	L 2/20 230 1+1		II / T2	1+1	-	20 kA	72
	L 2/20 230 3+1		II / T2	3+1	-	20 kA	73
	IL 1/3 2P		III / T3	3	-	3 kA	74
	IL 1/10 2P M		II / T2	3	-	10 kA	74



ZOTUP SPDs for LOW VOLTAGE APP.

For applications with additional interference filtering demand

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 and III / T1, T2 and T3	3+1	12,5 kA	25 kA	76
	ILF 4P 400		I, II and III / T1, T2 and T3	3+1	12,5 kA	25 kA	76
	ILF 4P 32		III / T3	3+1	0,4 kA	3 kA	78
	ILF 4P 50		III / T3	3+1	0,4 kA	3 kA	78
	ILF 4P 80		III / T3	3+1	0,4 kA	3 kA	78
	ILF 4P 120		III / T3	3+1	0,4 kA	3 kA	78
	ILF 2P 32		III / T3	1+1	0,4 kA	3 kA	80
	ILF 2P 50		III / T3	1+1	0,4 kA	3 kA	80
	ILF 2P 80		III / T3	1+1	0,4 kA	3 kA	80
	ILF 2P 8 DIN		III / T3	1+1	0,4 kA	3 kA	82
	ILF 2P 16 DIN		III / T3	1+1	0,4 kA	3 kA	82
	ILF 2P 25 DIN		III / T3	1+1	0,4 kA	3 kA	82
	ILF 2P C 16		III / T3	3	-	3 kA	84

For wind turbine applications

SPD	Model	Application icon	Test class/ Type	Modes of protection	Impulse discharge current I_{imp}	Nominal discharge current I_n	Page
	L 7/30 600 ff		I and II / T1 and T2	1	5 kA	25 kA	52
	L 7/30 750 ff		I and II / T1 and T2	1	5 kA	20 kA	52
	L 7/30 750 ff 3		I and II / T1 and T2	3	5 kA	20 kA	54



ZOTUP SPDs for LOW VOLTAGE APP.

For direct current DC applications

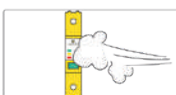
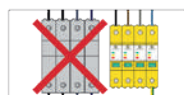
SPD	Model	Application icon	Test class/ Type	Modes of protection	Impulse discharge current I_{imp}	Nominal discharge current I_n	Page
	L 7/30 DC 60 ff		II / T2	1	-	20 kA	87
	L 7/30 DC 110 ff		II / T2	1	-	20 kA	87
	L 7/30 DC 230 ff		I and II / T1 and T2	1	7 kA	20 kA	87
	L 7/30 DC 600 ff		I and II / T1 and T2	1	7 kA	20 kA	87
	L 7/30 DC 1000 ff		I and II / T1 and T2	1	5 kA	20 kA	87

For photovoltaic applications

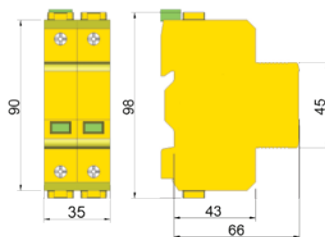
SPD	Model	Application icon	Test class/ Type	Modes of protection	Impulse discharge current I_{imp}	Nominal discharge current I_n	Page
	L 13/60 PV Y 600 ff		I and II / T1 and T2	3	7 kA	20 kA	88
	L 13/60 PV Y 1000 ff		I and II / T1 and T2	3	6 kA	20 kA	88
	L 3/40 PV Y 600 ff		II / T2	3	-	20 kA	89
	L 3/40 PV Y 1000 ff		II / T2	3	-	20 kA	89

For public lighting applications

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	1+1	7 kA	30 kA	91
	LLP 2/10 230 ff 1+1		II / T2	1+1	-	10 kA	92
	IL 1/10 2P LED		II / T2	1+1	-	10 kA	93



Surge Protective Devices: ZOTUP SPDs for low voltage



L 25/100 230 t ff

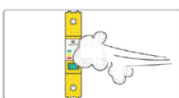
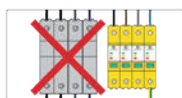
L 25/100 230 t ff is a voltage limiting SPD providing a single mode of protection, typically installed at the origin of the installation (e.g. in the Main Distribution Board (MDB)), in TN-systems or in TT-systems in combination with N-PE SPD model I 100, I 52 and with connection type CT2 (1+1 or 3+1).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

- **Impulse test classification: Test class I and II / Type 1 and 2** (according to IEC/EN 61643-11);
- 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 MCB ≤ 125 A or up to an $I_{sccr} \leq 4$ 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.**

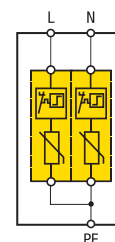
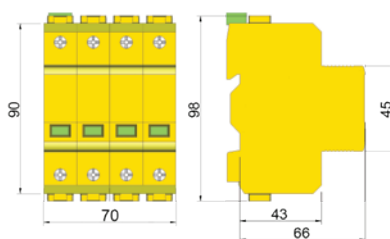
Model L 25/100 with remote signal contact

CODE		230 t ff	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 (acc. to IEC 61643-11 Ed. 1.0 2011-03)		I and II	
Type (acc. to EN 61643-11 2012-10)		T1 and T2	
Impulse discharge current (10/350 μ s)	I_{imp}	25 kA	
Charge	Q	12,5 As	
Nominal discharge current (8/20 μ s)	I_n	60 kA	
Max. discharge current (8/20 μ s)	I_{max}	100 kA	
Voltage protection level at a discharge current of:	1 kA	U_p	$\leq 0,70$ kV
	7 kA	U_p	$\leq 0,90$ kV
	13 kA	U_p	$\leq 0,95$ kV
	25 kA	U_p	$\leq 1,05$ kV
	60 kA	U_p	$\leq 1,40$ kV
Response time	t_a	≤ 25 ns	
End of Life		OCFM (Open Circuit Failure Mode)	
Temporary OverVoltage (TOV) withstand	U_T	440 V / 120 min	
Short Circuit Current rating <u>without backup protection (internal disconnector)</u>	I_{sccr}	4 kA rms	
Short Circuit Current rating with max. backup protection fuse	I_{sccr}	50 kA rms	
Max. back-up protection with up-stream MCB with a max. let-through energy of (max. prospective short circuit current depends on the MCB breaking capability)		125 A (max. $4,50 \times 10^5$ A ² s)	
Max. back-up protection with FUSE at prospective short circuit currents of		250 A gG ($> 4 \div 50$ kA rms) 160/125/100 A gG* ($> 50 \div 100$ kA rms)	
Max. overcurrent protection for through-wiring (V-connection)		100 A gG	
Rated Load Current (for V-connection)	I_L	100 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	
Busbar connections		fork-type busbar 16 mm ²	
Mounting		indoor, 35 mm top hat DIN rail	
Case material / Flammability grade		BMC / V-0 in accordance with UL 94	
Pollution degree	PD	3	
Degree of protection	IP	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	

TECHNICAL DATA



Surge Protective Devices: ZOTUP SPDs for low voltage



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:

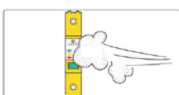
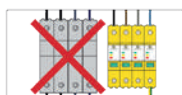
- **Impulse test classification: Test class I and II / Type 1 and 2** (according to IEC/EN 61643-11);
- L 25/100 230 t ff 2 is a voltage limiting SPD for the protection of low voltage installations and equipment against direct and indirect lightning effects;
- **Backup protection is not required with an upstream MCB ≤ 125 A or up to an $I_{sccr} \leq 4$ 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

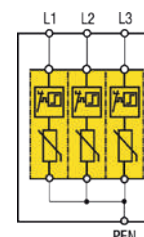
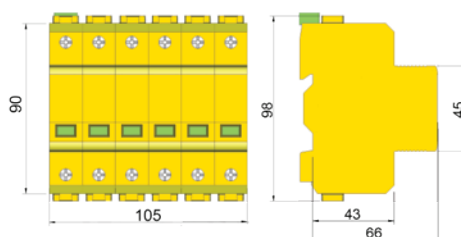
CODE		230 t ff 2	215 120
Nominal ac system voltage	U_N	230 V ac	
Modes of protection (number of poles)		2	
Max Continuous Operating Voltage	U_c	335 V ac	
Test Class (acc. to IEC 61643-11 Ed. 1.0 2011-03)		I and II	
Type (acc. to EN 61643-11 2012-10)		T1 and T2	
Impulse discharge current (10/350 μ s)	I_{imp}	25 kA	
Charge	Q	12,5 As	
Nominal discharge current (8/20 μ s)	I_n	60 kA	
Max. discharge current (8/20 μ s)	I_{max}	100 kA	
Voltage protection level at a discharge current of:			
1 kA	U_p	$\leq 0,75$ kV	
7 kA	U_p	$\leq 0,95$ kV	
13 kA	U_p	$\leq 1,10$ kV	
25 kA	U_p	$\leq 1,25$ kV	
60 kA	U_p	$\leq 1,70$ kV	
Response time	t_a	≤ 25 ns	
End of Life		OCFM (Open Circuit Failure Mode)	
Temporary OverVoltage (TOV) withstand	U_T	440 V / 120 min	
Short Circuit Current rating <u>without backup protection (internal disconnector)</u>	I_{sccr}	4 kA rms	
Short Circuit Current rating with max. backup protection fuse	I_{sccr}	50 kA rms	
Max. back-up protection with up-stream MCB with a max. let-through energy of (max. prospective short circuit current depends on the MCB breaking capability)		125 A (max. $4,50 \times 10^5$ A ² s)	
Max. back-up protection with FUSE at prospective short circuit currents of		250 A gG ($> 4 \div 50$ kA rms) 160/125/100 A gG* ($> 50 \div 100$ kA rms)	
Max. overcurrent protection for through-wiring (V-connection)		100 A gG	
Rated Load Current (for V-connection)	I_L	100 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	
Mounting		indoor, 35 mm top hat DIN rail	
Case material / Flammability grade		BMC / V-0 in accordance with UL 94	
Pollution degree	PD	3	
Degree of protection	IP	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	

TECHNICAL DATA

* 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



Surge Protective Devices: ZOTUP SPDs for low voltage



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:

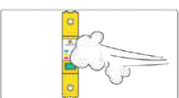
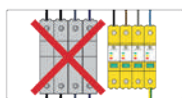
- **Impulse test classification: Test class I and II / Type 1 and 2** (according to IEC/EN 61643-11);
- L 25/100 230 t ff 3 is a voltage limiting SPD for the protection of low voltage installations and equipment against direct and indirect lightning effects;
- **Backup protection is not required with an upstream MCB ≤ 125 A or up to an $I_{sccr} \leq 4$ 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

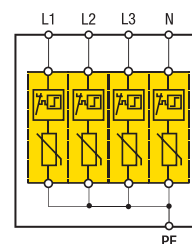
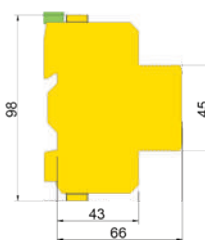
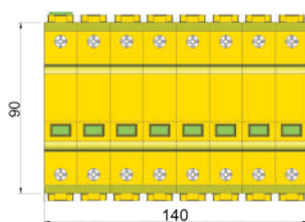
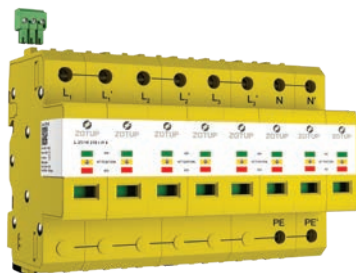
230 t ff 3

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 (acc. to IEC 61643-11 Ed. 1.0 2011-03)		I and II
Type (acc. to EN 61643-11 2012-10)		T1 and T2
Impulse discharge current (10/350 μ s)	I_{imp}	25 kA
Charge	Q	12,5 As
Nominal discharge current (8/20 μ s)	I_n	60 kA
Max. discharge current (8/20 μ s)	I_{max}	100 kA
Voltage protection level at a discharge current of:		
1 kA	U_p	$\leq 0,75$ kV
7 kA	U_p	$\leq 0,95$ kV
13 kA	U_p	$\leq 1,10$ kV
25 kA	U_p	$\leq 1,25$ kV
60 kA	U_p	$\leq 1,70$ kV
Response time	t_a	≤ 25 ns
End of Life		OCFM (Open Circuit Failure Mode)
Temporary OverVoltage (TOV) withstand	U_T	440 V / 120 min
Short Circuit Current rating <u>without backup protection (internal disconnector)</u>	I_{sccr}	4 kA rms
Short Circuit Current rating with max. backup protection fuse	I_{sccr}	50 kA rms
Max. back-up protection with up-stream MCB with a max. let-through energy of (max. prospective short circuit current depends on the MCB breaking capability)		125 A (max. $4,50 \times 10^5$ A ² s)
Max. back-up protection with FUSE at prospective short circuit currents of		250 A gG ($> 4 \div 50$ kA rms) 160/125/100 A gG* ($> 50 \div 100$ kA rms)
Max. overcurrent protection for through-wiring (V-connection)		100 A gG
Rated Load Current (for V-connection)	I_L	100 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
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	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

TECHNICAL DATA



Surge Protective Devices: ZOTUP SPDs for low voltage



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 / Type 1 and 2** (according to IEC/EN 61643-11);
- L 25/100 230 t 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 MCB ≤ 125 A or up to an $I_{sccr} \leq 4$ 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.**

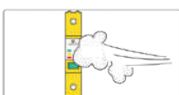
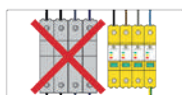
Model L 25/100 with remote signal contact

230 t ff 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 (acc. to IEC 61643-11 Ed. 1.0 2011-03)		I and II
Type (acc. to EN 61643-11 2012-10)		T1 and T2
Impulse discharge current (10/350 μ s)	I_{imp}	25 kA
Charge	Q	12,5 As
Nominal discharge current (8/20 μ s)	I_n	60 kA
Max. discharge current (8/20 μ s)	I_{max}	100 kA
Voltage protection level at a discharge current of:		
1 kA	U_p	$\leq 0,75$ kV
7 kA	U_p	$\leq 0,95$ kV
13 kA	U_p	$\leq 1,10$ kV
25 kA	U_p	$\leq 1,25$ kV
60 kA	U_p	$\leq 1,70$ kV
Response time	t_a	≤ 25 ns
End of Life		OCFM (Open Circuit Failure Mode)
Temporary OverVoltage (TOV) withstand	U_T	440 V / 120 min
Short Circuit Current rating <u>without backup protection (internal disconnector)</u>	I_{sccr}	4 kA rms
Short Circuit Current rating with max. backup protection fuse	I_{sccr}	50 kA rms
Max. back-up protection with up-stream MCB with a max. let-through energy of (max. prospective short circuit current depends on the MCB breaking capability)		125 A (max. $4,50 \times 10^5$ A ² s)
Max. back-up protection with FUSE at prospective short circuit currents of		250 A gG ($> 4 \div 50$ kA rms) 160/125/100 A gG* ($> 50 \div 100$ kA rms)
Max. overcurrent protection for through-wiring (V-connection)		100 A gG
Rated Load Current (for V-connection)	I_L	100 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
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	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

TECHNICAL DATA

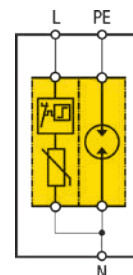
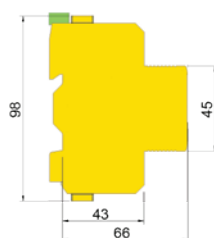
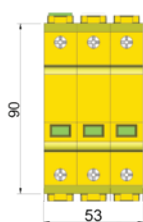
* with fuse 160 A gG I_{imp} =13 kA and I_{max} = 70 kA; with fuse 125 A gG I_{imp} = 10 kA and I_{max} = 40 kA; with fuse 100 A gG I_{imp} =9 kA and I_{max} = 30 kA



Surge Protective Devices: ZOTUP SPDs for low voltage



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, with the following features and benefits:

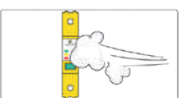
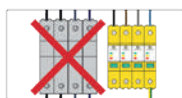
- **Impulse test classification:** Test class I and II / Type 1 and 2 (according to IEC/EN 61643-11);
- **Backup protection is not required with an upstream MCB ≤ 125 A or up to an $I_{sccr} \leq 4$ kA rms;**
- **Three colour Status Indicator with progressive indication of remaining performance.**

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 (acc. to IEC 61643-11 Ed. 1.0 2011-03)		I and II
Type (acc. to EN 61643-11 2012-10)		T1 and T2
Impulse discharge current (10/350 μ s) (L-N)	I_{imp}	25 kA
Impulse discharge current (10/350 μ s) (N-PE)	I_{imp}	52 kA
Charge (L-N)	Q	12,5 As
Charge (N-PE)	Q	26 As
Nominal discharge current (8/20 μ s) (L-N)	I_n	60 kA
Nominal discharge current (8/20 μ s) (N-PE)	I_n	52 kA
Max. discharge current (8/20 μ s) (L-N)	I_{max}	100 kA
Max. discharge current (8/20 μ s) (N-PE)	I_{max}	70 kA
Voltage protection level at a discharge current of:		
1 kA	U_p	$\leq 0,75$ kV
7 kA	U_p	$\leq 0,95$ kV
13 kA	U_p	$\leq 1,10$ kV
25 kA	U_p	$\leq 1,25$ kV
60 kA	U_p	$\leq 1,70$ kV
Voltage protection level (N-PE)	U_p	$\leq 1,50$ kV
Response time (L-N / N-PE)	t_a	≤ 25 ns / ≤ 100 ns
End of Life (L-N)		OCFM (Open Circuit Failure Mode)
Temporary OverVoltage (TOV) withstand (L-N)	U_T	440 V / 120 min
Temporary OverVoltage (TOV) withstand (N-PE)	U_T	1200 V / 200 ms
Short Circuit Current rating without backup protection (internal disconnecter)	I_{sccr}	4 kA rms
Short Circuit Current rating with max. backup protection fuse	I_{sccr}	50 kA rms
Max. back-up protection with up-stream MCB having a max. let-through energy of (max. prospective short circuit current depends on the MCB breaking capability)		125 A (max. $4,50 \times 10^5$ A ² s)
Max. back-up protection with FUSE at prospective short circuit currents of		250 A gG (> 4 $\div$ 50 kA rms) 160/125/100 A gG* (> 50 $\div$ 100 kA rms)
Max. overcurrent protection for through-wiring (V-connection)		100 A gG
Rated Load Current (for V-connection)	I_L	100 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 disconnecter operation) / N-PE (no disconnecter)		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
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	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

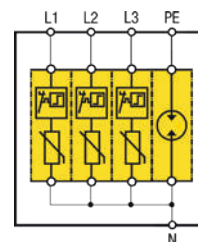
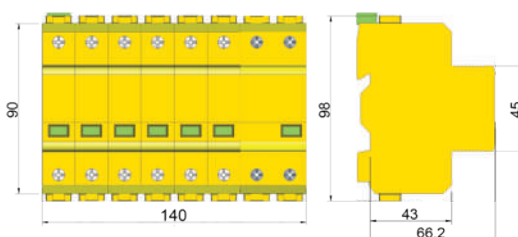
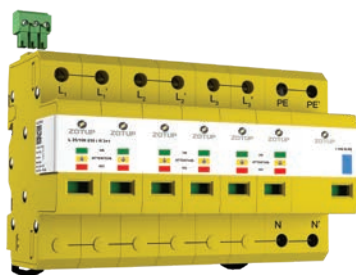
TECHNICAL DATA



Surge Protective Devices: ZOTUP SPDs for low voltage



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, with the following features and benefits:

- **Impulse test classification:** Test class I and II / Type 1 and 2 (according to IEC/EN 61643-11);
- **Backup protection is not required with an upstream MCB ≤ 125 A or up to an $I_{sccr} \leq 4$ kA rms;**
- **Three colour Status Indicator with progressive indication of remaining performance.**

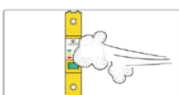
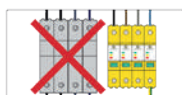
Model L 25/100 with remote signal contact

230 t ff 3+1

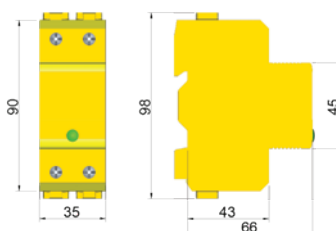
CODE		215 141
Nominal ac system voltage	U_N	230/400 V ac
Modes of protection (number of poles)		3+1 (L1/L2/L3-N + N-PE)
Max Continuous Operating Voltage (L-N)	U_c	335 V ac
Max Continuous Operating Voltage (N-PE)	U_c	255 V ac
Test Class (acc. to IEC 61643-11 Ed. 1.0 2011-03)		I and II
Type (acc. to EN 61643-11 2012-10)		T1 and T2
Impulse discharge current (10/350 μ s) (L-N)	I_{imp}	25 kA
Impulse discharge current (10/350 μ s) (N-PE)	I_{imp}	100 kA
Charge (L-N)	Q	12,5 As
Charge (N-PE)	Q	50 As
Nominal discharge current (8/20 μ s) (L-N)	I_n	60 kA
Nominal discharge current (8/20 μ s) (N-PE)	I_n	100 kA
Max. discharge current (8/20 μ s) (L-N)	I_{max}	100 kA
Max. discharge current (8/20 μ s) (N-PE)	I_{max}	150 kA
Voltage protection level at a discharge current of:		
1 kA	U_p	$\leq 0,75$ kV
7 kA	U_p	$\leq 0,95$ kV
13 kA	U_p	$\leq 1,10$ kV
25 kA	U_p	$\leq 1,25$ kV
60 kA	U_p	$\leq 1,70$ kV
Voltage protection level (N-PE)	U_p	$\leq 1,50$ kV
Response time (L-N / N-PE)	t_a	≤ 25 ns / ≤ 100 ns
End of Life (L-N)		OCFM (Open Circuit Failure Mode)
Temporary OverVoltage (TOV) withstand (L-N)	U_T	440 V / 120 min
Temporary OverVoltage (TOV) withstand (N-PE)	U_T	1200 V / 200 ms
Short Circuit Current rating without backup protection (internal disconnecter)	I_{scdr}	4 kA rms
Short Circuit Current rating with max. backup protection fuse	I_{scdr}	50 kA rms
Max. back-up protection with up-stream MCB having a max. let-through energy of (max. prospective short circuit current depends on the MCB breaking capability)		125 A (max. $4,50 \times 10^5$ A ² s)
Max. back-up protection with FUSE at prospective short circuit currents of		250 A gG ($> 4 \div 50$ kA rms) 160/125/100 A gG* ($> 50 \div 100$ kA rms)
Max. overcurrent protection for through-wiring (V-connection)		100 A gG
Rated Load Current (for V-connection)	I_L	100 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 disconnecter operation) / N-PE (no disconnecter)		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
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	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

TECHNICAL DATA

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



Surge Protective Devices: ZOTUP SPDs for low voltage



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 (1+1 or 3+1), providing the following features and benefits:

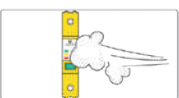
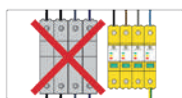
- **Impulse test classification: Test class I and II / Type 1 and 2** (according to IEC/EN 61643-11);
- IA 25 230 is a self extinguishing, spark gap based switching SPD for the protection of low voltage installations against direct and indirect lightning effects;
- Impulse discharge current of 25 kA 10/350 μ s;
- Nominal discharge current of 25 kA 8/20 μ s;
- 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

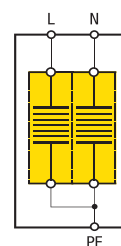
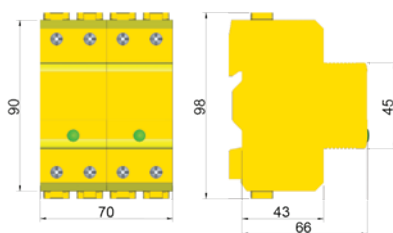
230

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 (acc. to IEC 61643-11 Ed. 1.0 2011-03)		I and II
Type (acc. to EN 61643-11 2012-10)		T1 and T2
Impulse discharge current (10/350 μ s)	I_{imp}	25 kA
Charge	Q	12,5 As
Nominal discharge current (8/20 μ s)	I_n	25 kA
Short Circuit Current rating with max. backup protection	I_{scpr}	16 kA rms
Follow current interrupt rating	I_{fi}	16 kA rms
Voltage protection level	U_p	$\leq 2,00$ kV
Max. backup protection with fuse		315 A gG*
Max. overcurrent protection for through-wiring (V-connection)		100 A gG*
Rated Load Current (for V-connection)	I_L	100 A
Temporary OverVoltage (TOV) withstand	U_T	440 V / 120 min
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 mm ² flexible
Busbar connections		fork-type busbar 16 mm ²
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	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 in distribution systems with a short circuit current higher than 16 kA rms		
Short circuit withstand current $> I_{fi}$ up to		50 kA rms (tested by CTI)
External backup fuse required		315 A gG

TECHNICAL DATA



Surge Protective Devices: ZOTUP SPDs for low voltage



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 / Type 1 and 2** (according to IEC/EN 61643-11);
- 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 μ s;
- Nominal discharge current of 25 kA 8/20 μ s;
- 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.

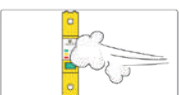
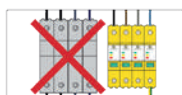
Model IA 25

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 (acc. to IEC 61643-11 Ed. 1.0 2011-03)		I and II
Type (acc. to EN 61643-11 2012-10)		T1 and T2
Impulse discharge current (10/350 μ s)	I_{imp}	25 kA
Charge	Q	12,5 As
Nominal discharge current (8/20 μ s)	I_n	25 kA
Short Circuit Current rating with max. backup protection	I_{scrr}	16 kA rms
Follow current interrupt rating	I_{fi}	16 kA rms
Voltage protection level (L / N-PE)	U_p	$\leq 2,00$ kV
Max. back-up protection with fuse (L)		315 A gG*
Max. overcurrent protection for through-wiring (V-connection)		100 A gG*
Rated Load Current (for V-connection)	I_L	100 A
Temporary OverVoltage (TOV) withstand	U_T	440 V / 120 min
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 mm ² flexible
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	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 in distribution systems with a short circuit current higher than 16 kA rms		
Short circuit withstand current > I_{fi} up to		50 kA rms (tested by CTI)
External backup fuse required		315 A gG

TECHNICAL DATA

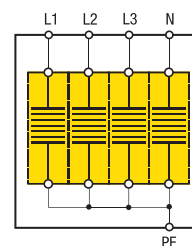
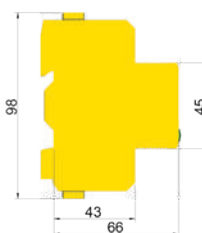
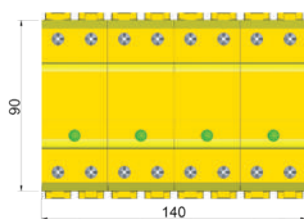
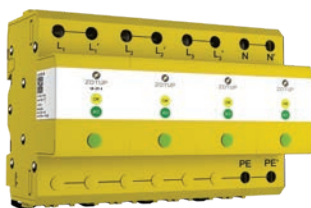
* with fuse 125 A gG I_{imp} = 10 kA and I_{max} = 40 kA; with fuse 100 A gG I_{imp} =9 kA and I_{max} = 30 kA



Surge Protective Devices: ZOTUP SPDs for low voltage



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-systems with the following features and benefits:

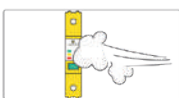
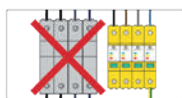
- **Impulse test classification: Test class I and II / Type 1 and 2** (according to IEC/EN 61643-11);
- IA 25 230 4 is a self extinguishing spark gap based switching SPD for the protection of low voltage installations against direct and indirect lightning effects;
- Impulse discharge current of 25 kA 10/350 μ s;
- Nominal discharge current of 25 kA 8/20 μ s;
- 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 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 (acc. to IEC 61643-11 Ed. 1.0 2011-03)		I and II
Type (acc. to EN 61643-11 2012-10)		T1 and T2
Impulse discharge current (10/350 μ s)	I_{imp}	25 kA
Charge	Q	12,5 As
Nominal discharge current (8/20 μ s)	I_n	25 kA
Short Circuit Current rating with max. backup protection	I_{scpr}	16 kA rms
Follow current interrupt rating	I_{fi}	16 kA rms
Voltage protection level (L / N-PE)	U_p	$\leq 2,00$ kV
Max. back-up protection with fuse (L)		315 A gG*
Max. overcurrent protection for through-wiring (V-connection)		100 A gG*
Rated Load Current (for V-connection)	I_L	100 A
Temporary OverVoltage (TOV) withstand	U_T	440 V / 120 min
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 mm ² flexible
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	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 in distribution systems with a short circuit current higher than 16 kA rms		
Short circuit withstand current > I_{fi} up to		50 kA rms (tested by CTI)
External backup fuse required		315 A gG

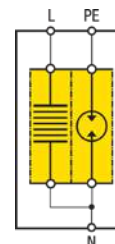
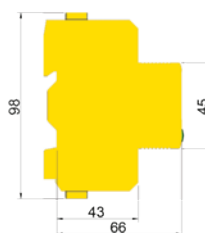
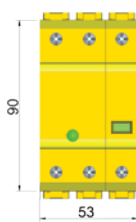
TECHNICAL DATA



Surge Protective Devices: ZOTUP SPDs for low voltage



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:

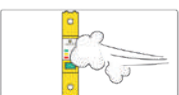
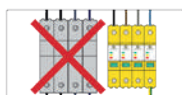
- **Impulse test classification: Test class I and II / Type 1 and 2** (according to IEC/EN 61643-11);
- IA 25 230 1+1 is a self extinguishing, spark gap and GDT based switching SPD for the protection of low voltage installations against direct and indirect lightning effects;
- Impulse discharge current (L-N) of 25 kA 10/350 μ s;
- Impulse discharge current (N-PE) of 52 kA 10/350 μ s;
- 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

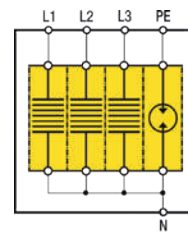
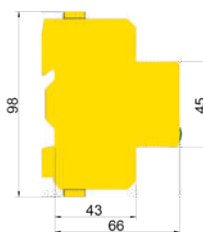
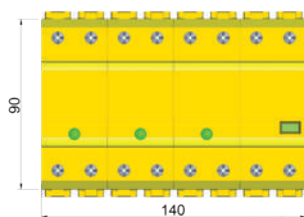
230 1+1

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 (acc. to IEC 61643-11 Ed. 1.0 2011-03)		I and II
Type (acc. 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 _{scpr}	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)	U _p	≤ 2,00 kV
Voltage protection level (N-PE)	U _p	≤ 1,50 kV
Max. overcurrent protection fuse		315 A gG*
Max. overcurrent protection for through-wiring (V-connection)		100 A gG*
Rated Load Current (for V-connection)	I _L	100 A
Temporary OverVoltage (TOV) withstand (L-N)	U _T	440 V / 120 min
Temporary OverVoltage (TOV) withstand (N-PE)	U _T	1200 V / 200 ms
Response time	t _a	≤ 100 ns
Insulation resistance	R _{ins}	≥ 1 G Ω
Status Indicator / N-PE (no disconnector)		Green LED / 2 coloured levels (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 mm ² flexible
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	20 (built-in)
Approximate weight		395 g
Dimensions: width		53 mm (3 modules)
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR
<u>Additional Technical Information:</u> for application in distribution systems with a short circuit current higher than 16 kA rms		
Short circuit withstand current > I _{fi} up to		50 kA rms (tested by CTI)
External backup fuse required		315 A gG

* 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



Surge Protective Devices: ZOTUP SPDs for low voltage



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, with the following features and benefits:

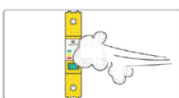
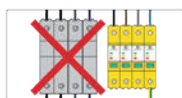
- **Impulse test classification: Test class I and II / Type 1 and 2** (according to IEC/EN 61643-11 Ed. 1.0 2011-03);
- IA 25 230 3+1 is a self extinguishing, spark gap and GDT based switching SPD for the protection of low voltage installations against direct and indirect lightning effects;
- Impulse discharge current (L-N) of 25 kA 10/350 μ s;
- Impulse discharge current (N-PE) of 100 kA 10/350 μ s;
- 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 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 (acc. to IEC 61643-11 Ed. 1.0 2011-03)		I and II
Type (acc. to EN 61643-11 2012-10)		T1 and T2
Impulse discharge current (10/350 μ s) (L-N)	I_{imp}	25 kA
Impulse discharge current (10/350 μ s) (N-PE)	I_{imp}	52 kA
Charge (L-N)	Q	12,5 As
Charge (N-PE)	Q	26 As
Nominal discharge current (8/20 μ s) (L-N)	I_n	25 kA
Nominal discharge current (8/20 μ s) (N-PE)	I_n	52 kA
Short Circuit Current rating with max. backup protection	I_{scpr}	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)	U_p	$\leq 2,00$ kV
Voltage protection level (N-PE)	U_p	$\leq 1,50$ kV
Max. back-up protection with fuse		315 A gG*
Max. overcurrent protection for through-wiring (V-connection)		100 A gG*
Rated Load Current (for V-connection)	I_L	100 A
Temporary OverVoltage (TOV) withstand (L-N)	U_T	440 V / 120 min
Temporary OverVoltage (TOV) withstand (N-PE)	U_T	1200 V / 200 ms
Response time	t_a	≤ 100 ns
Insulation resistance	R_{ins}	≥ 1 G Ω
Status Indicator / N-PE (no disconnector)		Green LED / 2 coloured levels (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 mm ² flexible
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	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 in distribution systems with a short circuit current higher than 16 kA rms		
Short circuit withstand current > I_{fi} up to		50 kA rms (tested by CTI)
External backup fuse required		315 A gG

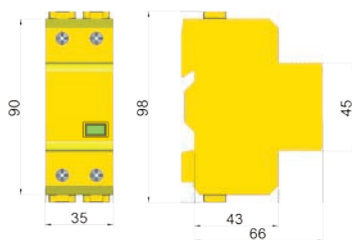
TECHNICAL DATA



Surge Protective Devices: ZOTUP SPDs for low voltage



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, with the following features and benefits:

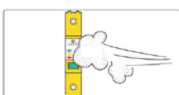
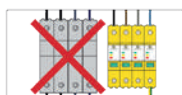
- **Impulse test classification: Test class I and II / Type 1 and 2** (according to IEC/EN 61643-11);
- I 100 N-PE is a Gas Discharge Tube (GDT) based SPD for the protection of low voltage installations and equipment against direct and indirect lightning effects;
- Impulse discharge current of 100 kA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

Model I 100 N-PE

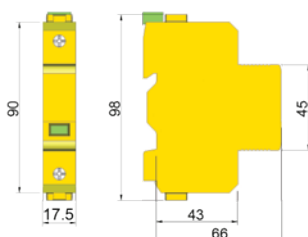
CODE		208 300
Nominal ac system voltage	U_N	230 V ac
Modes of protection (number of poles)		1 (N-PE)
Max Continuous Operating Voltage	U_c	255 V ac
Test Class (acc. to IEC 61643-11 Ed. 1.0 2011-03)		I and II
Type (acc. to EN 61643-11 2012-10)		T1 and T2
Impulse discharge current (10/350 μ s)	I_{imp}	100 kA
Charge	Q	50 As
Nominal discharge current (8/20 μ s)	I_n	100 kA
Max. discharge current (8/20 μ s)	I_{max}	150 kA
Follow current interrupt rating	I_{fi}	100 A rms
Voltage protection level	U_p	$\leq 1,50$ kV
Max. overcurrent protection for through-wiring (V-connection)		100 A gG*
Rated Load Current (for V-connection)	I_L	100 A
Response Time	t_a	≤ 100 ns
Temporary OverVoltage (TOV) withstand	U_T	1200 V / 200 ms
Status indicator (no disconnecter)		2 colour indication (green/red)
Operating temperature range / Humidity		-40 ... +80 °C (extended) / 5% ... 95%
Terminal-Conductor size		4-35 mm ² flexible
Busbar connections		fork-type busbar 16 mm ²
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	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

TECHNICAL DATA

* with fuse 100 A gG $I_{imp}=9$ kA and $I_{max}= 30$ kA



Surge Protective Devices: ZOTUP SPDs for low voltage



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 / Type 1 and 2** (according to IEC/EN 61643-11);
- 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 MCB ≤ 125 A or up to an $I_{sccr} \leq 4$ kA rms;**
- Short circuit current withstand with max. back-up fuse of 100 kA rms;
- **Three colour Status Indicator with progressive indication of remaining performance.**

Model L 13/40

230 ff

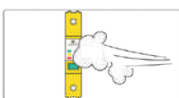
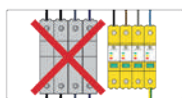
CODE		204 100
Nominal ac system voltage	U_N	230/400 V ac
Modes of protection (number of poles)		1
Max Continuous Operating Voltage	U_c	335 V ac
Test Class (acc. to IEC 61643-11 Ed. 1.0 2011-03)		I and II
Type (acc. to EN 61643-11 2012-10)		T1 and T2
Impulse discharge current (10/350 μ s)	I_{imp}	13 kA
Charge	Q	7 As
Nominal discharge current (8/20 μ s)	I_n	35 kA
Max. discharge current (8/20 μ s)	I_{max}	70 kA
Voltage protection level at a discharge current of:		
1 kA	U_p	$\leq 0,80$ kV
7 kA	U_p	$\leq 1,00$ kV
13 kA	U_p	$\leq 1,10$ kV
20 kA	U_p	$\leq 1,20$ kV
35 kA	U_p	$\leq 1,50$ kV
Response time	t_a	≤ 25 ns
End of Life		OCFM (Open Circuit Failure Mode)
Temporary OverVoltage (TOV) withstand	U_T	440 V / 120 min
Short Circuit Current rating <u>without backup protection (internal disconnector)</u>	I_{sccr}	4 kA rms
Short Circuit Current rating with max. backup protection fuse	I_{sccr}	100 kA rms
Max. back-up protection with up-stream MCB with a max. let-through energy of (max. prospective short circuit current depends on the MCB breaking capability)		125 A (max. $4,50 \times 10^5$ A ² s)
Max. back-up protection with FUSE at prospective short circuit currents of		160/125 A gG* ($> 4 \div 100$ 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
Busbar connections		fork-type busbar 16 mm ²
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	20 (built-in)
Approximate weight		140 g
Dimensions: width		17,5 mm (1 module)
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR

TECHNICAL DATA

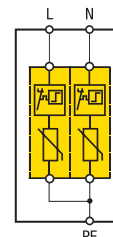
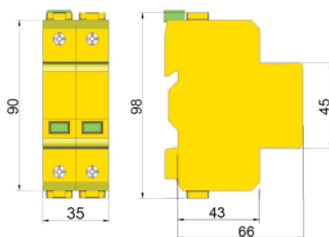
Model L 13/40 ... with remote signal contact

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



Surge Protective Devices: ZOTUP SPDs for low voltage



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 / Type 1 and 2** (according to IEC/EN 61643-11);
- 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 MCB ≤ 125 A or up to an $I_{sccr} \leq 4$ kA rms;**
- **Three colour Status Indicator with progressive indication of remaining performance.**

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 (acc. to IEC 61643-11 Ed. 1.0 2011-03)		I and II
Type (acc. to EN 61643-11 2012-10)		T1 and T2
Impulse discharge current (10/350 μ s)	I_{imp}	13 kA
Charge	Q	7 As
Nominal discharge current (8/20 μ s)	I_n	35 kA
Max. discharge current (8/20 μ s)	I_{max}	70 kA
Voltage protection level at a discharge current of:		
1 kA	U_p	$\leq 0,85$ kV
7 kA	U_p	$\leq 1,05$ kV
13 kA	U_p	$\leq 1,15$ kV
20 kA	U_p	$\leq 1,25$ kV
35 kA	U_p	$\leq 1,50$ kV
Response time	t_a	≤ 25 ns
End of Life		OCFM (Open Circuit Failure Mode)
Temporary OverVoltage (TOV) withstand	U_T	440 V / 120 min
Short Circuit Current rating <u>without backup protection (internal disconnector)</u>	I_{sccr}	4 kA rms
Short Circuit Current rating with max. backup protection fuse	I_{sccr}	100 kA rms
Max. back-up protection with up-stream MCB with a max. let-through energy of (max. prospective short circuit current depends on the MCB breaking capability)		125 A (max. $4,50 \times 10^5$ A ² s)
Max. back-up protection with FUSE at prospective short circuit currents of		160/125 A gG* ($> 4 \div 100$ 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
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	20 (built-in)
Approximate weight		280 g
Dimensions: width		35 mm (2 modules)
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR

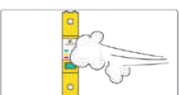
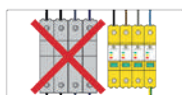
TECHNICAL DATA

Model L 13/40 ... with remote signal contact

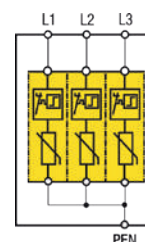
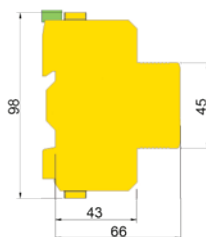
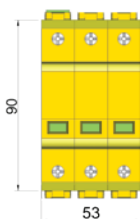
230 t ff 2

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

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



Surge Protective Devices: ZOTUP SPDs for low voltage



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 / Type 1 and 2** (according to IEC/EN 61643-11);
- 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 MCB ≤ 125 A or up to an $I_{sccr} \leq 4$ kA rms;**
- **Three colour Status Indicator with progressive indication of remaining performance.**

Model L 13/40

230 ff 3

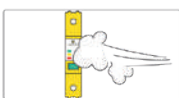
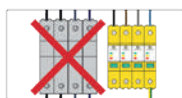
CODE		204 130
Nominal ac system voltage	U_N	230/400 V ac
Modes of protection (number of poles)		3
Max Continuous Operating Voltage	U_c	335 V ac
Test Class (acc. to IEC 61643-11 Ed. 1.0 2011-03)		I and II
Type (acc. to EN 61643-11 2012-10)		T1 and T2
Impulse discharge current (10/350 μ s)	I_{imp}	13 kA
Charge	Q	7 As
Nominal discharge current (8/20 μ s)	I_n	35 kA
Max. discharge current (8/20 μ s)	I_{max}	70 kA
Voltage protection level at a discharge current of:	1 kA	$U_p \leq 0,85$ kV
	7 kA	$U_p \leq 1,05$ kV
	13 kA	$U_p \leq 1,15$ kV
	20 kA	$U_p \leq 1,25$ kV
	35 kA	$U_p \leq 1,50$ kV
Response time	t_a	≤ 25 ns
End of Life		OCFM (Open Circuit Failure Mode)
Temporary OverVoltage (TOV) withstand	U_T	440 V / 120 min
Short Circuit Current rating <u>without backup protection (internal disconnector)</u>	I_{sccr}	4 kA rms
Short Circuit Current rating with max. backup protection fuse	I_{sccr}	100 kA rms
Max. back-up protection with up-stream MCB with a max. let-through energy of (max. prospective short circuit current depends on the MCB breaking capability)		125 A (max. $4,50 \times 10^5$ A ² s)
Max. back-up protection with FUSE at prospective short circuit currents of		160/125 A gG* ($> 4 \div 100$ 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
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	20 (built-in)
Approximate weight		420 g
Dimensions: width		53 mm (3 modules)
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR

TECHNICAL DATA

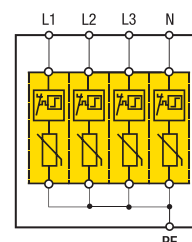
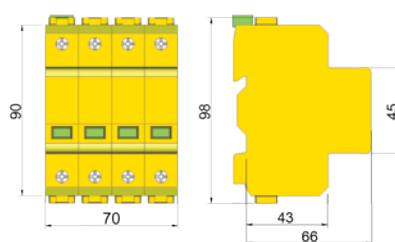
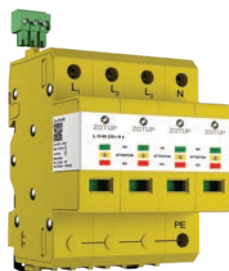
Model L 13/40 ... with remote signal contact

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



Surge Protective Devices: ZOTUP SPDs for low voltage



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 / Type 1 and 2** (according to IEC/EN 61643-11);
- 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 MCB ≤ 125 A or up to an $I_{sccr} \leq 4$ 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 (acc. to IEC 61643-11 Ed. 1.0 2011-03)		I and II
Type (acc. to EN 61643-11 2012-10)		T1 and T2
Impulse discharge current (10/350 μ s)	I_{imp}	13 kA
Charge	Q	7 As
Nominal discharge current (8/20 μ s)	I_n	35 kA
Max. discharge current (8/20 μ s)	I_{max}	70 kA
Voltage protection level at a discharge current of:	1 kA U_p	$\leq 0,85$ kV
	7 kA U_p	$\leq 1,05$ kV
	13 kA U_p	$\leq 1,15$ kV
	20 kA U_p	$\leq 1,25$ kV
	35 kA U_p	$\leq 1,50$ kV
Response time	t_a	≤ 25 ns
End of Life		OCFM (Open Circuit Failure Mode)
Temporary OverVoltage (TOV) withstand	U_T	440 V / 120 min
Short Circuit Current rating <u>without backup protection (internal disconnector)</u>	I_{sccr}	4 kA rms
Short Circuit Current rating with max. backup protection fuse	I_{sccr}	100 kA rms
Max. back-up protection with up-stream MCB with a max. let-through energy of (max. prospective short circuit current depends on the MCB breaking capability)		125 A (max. $4,50 \times 10^5$ A ² s)
Max. back-up protection with FUSE at prospective short circuit currents of		160/125 A gG* ($> 4 \div 100$ 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
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	20 (built-in)
Approximate weight		560 g
Dimensions: width		70 mm (4 modules)
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR

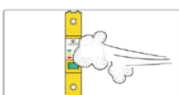
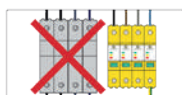
TECHNICAL DATA

Model L 13/40 ... with remote signal contact

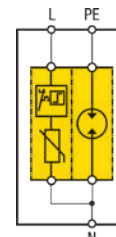
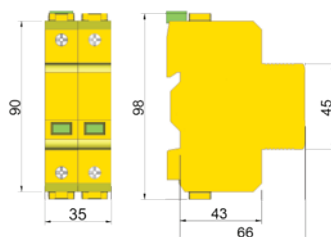
230 t ff 4

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

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



Surge Protective Devices: ZOTUP SPDs for low voltage



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, with the following features and benefits:

- **Impulse test classification: Test class I and II / Type 1 and 2** (according to IEC/EN 61643-11);
- **Backup protection is not required with an upstream MCB ≤ 125 A or up to an $I_{sccr} \leq 4$ kA rms;**
- **Three colour Status Indicator with progressive indication of remaining performance.**

Model L 13/40

230 ff 1+1

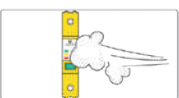
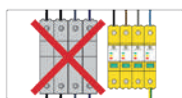
CODE		204 121
Nominal ac system voltage	U_N	230 V ac
Modes of protection (number of poles)		1+1 (L-N + N-PE)
Max Continuous Operating Voltage (L-N)	U_c	335 V ac
Max Continuous Operating Voltage (N-PE)	U_c	255 V ac
Test Class (acc. to IEC 61643-11 Ed. 1.0 2011-03)		I and II
Type (acc. to EN 61643-11 2012-10)		T1 and T2
Impulse discharge current (10/350 μ s) (L-N)	I_{imp}	13 kA
Impulse discharge current (10/350 μ s) (N-PE)	I_{imp}	52 kA
Charge (L-N)	Q	7 As
Charge (N-PE)	Q	26 As
Nominal discharge current (8/20 μ s) (L-N)	I_n	35 kA
Nominal discharge current (8/20 μ s) (N-PE)	I_n	52 kA
Max. discharge current (8/20 μ s) (L-N) and (N-PE)	I_{max}	70 kA
Voltage protection level at a discharge current of:		
1 kA	U_p	$\leq 0,85$ kV
7 kA	U_p	$\leq 1,05$ kV
13 kA	U_p	$\leq 1,15$ kV
20 kA	U_p	$\leq 1,25$ kV
35 kA	U_p	$\leq 1,50$ kV
Voltage protection level (N-PE)	U_p	$\leq 1,50$ kV
Response time (L-N / N-PE)	t_a	≤ 25 ns / ≤ 100 ns
End of Life (L-N)		OCFM (Open Circuit Failure Mode)
Temporary OverVoltage (TOV) withstand (L-N)	U_T	440 V / 120 min
Temporary OverVoltage (TOV) withstand (N-PE)	U_T	1200 V / 200 ms
Short Circuit Current rating without backup protection (internal disconnecter)	I_{sccr}	4 kA rms
Short Circuit Current rating with max. backup protection fuse	I_{sccr}	100 kA rms
Max. back-up protection with up-stream MCB with a max. let-through energy of (max. prospective short circuit current depends on the MCB breaking capability)		125 A (max. $4,50 \times 10^5$ A ² s)
Max. back-up protection with FUSE at prospective short circuit currents of		160/125 A gG* ($> 4 \div 100$ 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 disconnecter operation) / N-PE (no disconnecter)		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
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	20 (built-in)
Approximate weight		280 g
Dimensions: width		35 mm (2 modules)
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR

TECHNICAL DATA

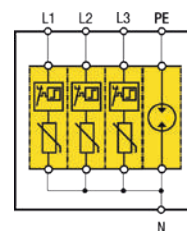
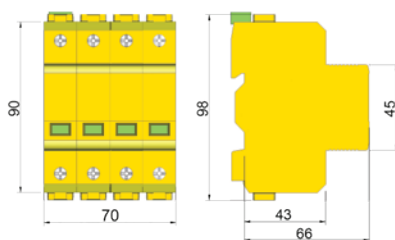
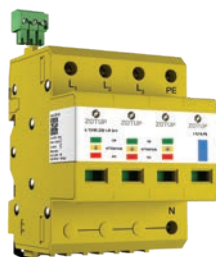
Model L 13/40 ... with remote signal contact

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



Surge Protective Devices: ZOTUP SPDs for low voltage



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, with the following features and benefits:

- **Impulse test classification: Test class I and II / Type 1 and 2** (according to IEC/EN 61643-11);
- **Backup protection is not required with an upstream MCB ≤ 125 A or up to an $I_{sccr} \leq 4$ 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 (acc. to IEC 61643-11 Ed. 1.0 2011-03)		I and II
Type (acc. to EN 61643-11 2012-10)		T1 and T2
Impulse discharge current (10/350 μ s) (L-N)	I_{imp}	13 kA
Impulse discharge current (10/350 μ s) (N-PE)	I_{imp}	52 kA
Charge (L-N)	Q	7 As
Charge (N-PE)	Q	26 As
Nominal discharge current (8/20 μ s) (L-N)	I_n	35 kA
Nominal discharge current (8/20 μ s) (N-PE)	I_n	52 kA
Max. discharge current (8/20 μ s) (L-N) and (N-PE)	I_{max}	70 kA
Voltage protection level at a discharge current of:		
1 kA	U_p	$\leq 0,85$ kV
7 kA	U_p	$\leq 1,05$ kV
13 kA	U_p	$\leq 1,15$ kV
20 kA	U_p	$\leq 1,25$ kV
35 kA	U_p	$\leq 1,50$ kV
Voltage protection level (N-PE)	U_p	$\leq 1,50$ kV
Response time (L-N / N-PE)	t_a	≤ 25 ns / ≤ 100 ns
End of Life (L-N)		OCFM (Open Circuit Failure Mode)
Temporary OverVoltage (TOV) withstand (L-N)	U_r	440 V / 120 min
Temporary OverVoltage (TOV) withstand (N-PE)	U_r	1200 V / 200 ms
Short Circuit Current rating <u>without backup protection (internal disconnecter)</u>	I_{sccr}	4 kA rms
Short Circuit Current rating with max. backup protection fuse	I_{sccr}	100 kA rms
Max. back-up protection with up-stream MCB with a max. let-through energy of (max. prospective short circuit current depends on the MCB breaking capability)		125 A (max. $4,50 \times 10^5$ A ² s)
Max. back-up protection with FUSE at prospective short circuit currents of		160/125 A gG* ($> 4 \div 100$ 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 disconnecter operation) / N-PE (no disconnecter)		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
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	20 (built-in)
Approximate weight		560 g
Dimensions: width		70 mm (4 modules)
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR

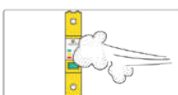
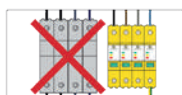
TECHNICAL DATA

Model L 13/40 ... with remote signal contact

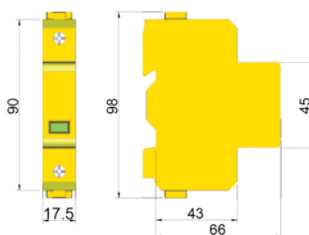
230 t ff 3+1

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

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



Surge Protective Devices: ZOTUP SPDs for low voltage



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:

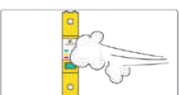
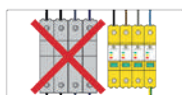
- **Impulse test classification: Test class I and II / Type 1 and 2** (according to IEC/EN 61643-11);
- I 52 N-PE is a Gas Discharge Tube (GDT) based SPD for the protection of low voltage installations and equipment against direct and indirect lightning effects;
- Impulse discharge current of 52 kA 10/350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

Model I 52 N-PE

CODE		206 300	TECHNICAL DATA
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 (acc. to IEC 61643-11 Ed. 1.0 2011-03)		I and II	
Type (acc. to EN 61643-11 2012-10)		T1 and T2	
Impulse discharge current (10/350 μ s)	I_{imp}	52 kA	
Charge	Q	26 As	
Nominal discharge current (8/20 μ s)	I_n	52 kA	
Max. discharge current (8/20 μ s)	I_{max}	70 kA	
Follow current interrupt rating	I_{fi}	100 A rms	
Voltage protection level	U_p	$\leq 1,50$ kV	
Response time	t_a	≤ 100 ns	
Temporary OverVoltage (TOV) withstand	U_T	1200 V / 200 ms	
Operating temperature range / Humidity		-40 ... +80 °C (extended) / 5% ... 95%	
Terminal-Conductor size		4-35 mm ² flexible	
Busbar connections		fork-type busbar 16 mm ²	
Mounting		indoor, 35 mm top hat DIN rail	
Case material / Flammability grade		BMC / V-0 in accordance with UL 94	
Pollution degree	PD	3	
Degree of protection	IP	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	

Model I 52 N-PE t with remote signal contact

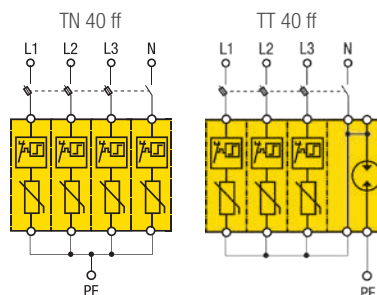
CODE		216 300
Remote signal contact		potential-free changeover contact
Terminal - conductor size for remote signal contact		max. 1,5 mm ² flexible
Switching capacity		ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A



Surge Protective Devices: ZOTUP SPDs for low voltage



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:

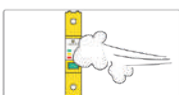
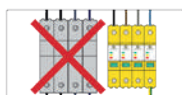
- TN 40 ff with four voltage limiting SPDs (four modes of protection), for three-phase plus neutral 230/400 V TN-systems
 - TT 40 ff with three voltage limiting and a voltage switching SPD (four modes of protection), for three-phase plus neutral 230/400 V TT-systems where connection type CT2 (3+1) is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

- These protection boxes contain SPDs according **Test class I and II / Type 1 and 2** (according to **IEC/EN 61643-11**);
- They are suitable for installation at zone boundaries up to $O_A - 2$ according to the lightning protection zones concept as defined in IEC 60305.

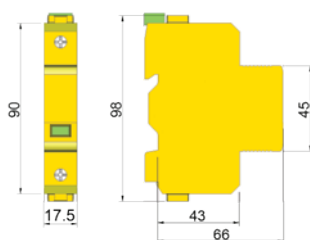
Model Protection Box ...

CODE		TN 40 ff	TT 40 ff
		244 100	245 100
Nominal ac system voltage	U_N	230/400 V ac	
Max Continuous Operating Voltage (L-N, L-PE)	U_c	335 V ac	
Max Continuous Operating Voltage (N-PE)	U_c	335 V ac	255 V ac
Test Class (acc. to IEC 61643-11 Ed. 1.0 2011-03)		I and II	
Type (acc. to EN 61643-11 2012-10)		T1 and T2	
Impulse discharge current (10/350 μ s) (L-N, L-PE)	I_{imp}	10 kA	10 kA
Impulse discharge current (10/350 μ s) (N-PE)	I_{imp}	10 kA	100 kA
Charge (L-N, L-PE)	Q	12,5 As	12,5 As
Charge (N-PE)	Q	12,5 As	50 As
Nominal discharge current (8/20 μ s) (L-N, L-PE)	I_n	40 kA	40 kA
Nominal discharge current (8/20 μ s) (N-PE)	I_n	40 kA	100 kA
Max. discharge current (8/20 μ s) (L-N, L-PE)	I_{max}	40 kA	40 kA
Max. discharge current (8/20 μ s) (N-PE)	I_{max}	40 kA	100 kA
Voltage protection level (L-N, L-PE) at a discharge current of:	1 kA U_p	$\leq 0,75$ kV	$\leq 0,75$ kV
	7 kA U_p	$\leq 0,95$ kV	$\leq 0,95$ kV
	10 kA U_p	$\leq 1,00$ kV	$\leq 1,00$ kV
	20 kA U_p	$\leq 1,15$ kV	$\leq 1,15$ kV
	40 kA U_p	$\leq 1,50$ kV	$\leq 1,50$ kV
Voltage protection level (N-PE)	U_p	-	$\leq 1,50$ 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)	
Temporary OverVoltage (TOV) withstand (L-N)	U_T	440 V / 120 min	440 V / 120 min
Temporary OverVoltage (TOV) withstand (N-PE)	U_T	440 V / 120 min	1200 V / 200 ms
Max. back-up protection with fuse (L)		125 A gG (incorporated)	
Short circuit current rating with max. back-up protection	I_{scrr}	50 kA rms	
Follow current interrupt rating (L-N, L-PE)	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 mm ² 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 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	

TECHNICAL DATA



Surge Protective Devices: ZOTUP SPDs for low voltage



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 (1+1 or 3+1). It is used also for the protection of wind turbines.

It provides the following features and benefits:

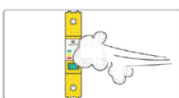
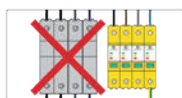
- **Impulse test classification: Test class I and II / Type 1 and 2** (according to IEC/EN 61643-11);
- **Backup protection is not required with an upstream MCB ≤ 125 A or up to an $I_{sccr} \leq 4$ kA rms (for U_n 230/400 V);**
- **Three colour Status Indicator with progressive indication of remaining performance.**

Model L 7/30 ...		Mini Wind Turbines				Wind Turbines				
		230 ff		400 ff		600 ff		750 ff		
CODE		207 100		207 104		207 106		207 107		
Nominal ac system voltage		U _N	230/400 V ac		400/690 V ac		480/831 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	
Test Class (acc. to IEC 61643-11 Ed. 1.0 2011-03)			I and II							
Type (acc. to EN 61643-11 2012-10)			T1 and T2							
Impulse discharge current (10/350 µs)		I _{imp}	7 kA				5 kA			
Charge		Q	3,6 As				2,9 As			
Nominal discharge current (8/20 µs)		I _n	30 kA				25 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		
		7 kA	U _p	≤ 1,10 kV	≤ 1,46 kV	≤ 2,15 kV		≤ 2,25 kV		
		20 kA	U _p	≤ 1,30 kV	≤ 1,90 kV	≤ 2,72 kV		≤ 2,75 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)							
Temporary OverVoltage (TOV) withstand		U _T	440 V / 120 min		797 V / 120 min		915 V / 120 min		1056 V / 120 min	
Short Circuit Current rating without backup protection (internal disconnecter)		I _{sccr}	4 kA rms		3 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	
Max. back-up protection with up-stream MCB with max. let-through energy of (max. prospective short circuit current depends on MCB breaking capability)			125 A (max.4,50x10 ⁵ A²s)		125 A (max.4,50x10 ⁵ A²s)		-		-	
Max. back-up protection with FUSE at prospective short circuit current of			125 A gG at (> 4 ÷ 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)	
Follow current interrupt rating		I _{fi}	NFC No Follow Current®							
Status indicator (indication of disconnecter operation)			3 colours with progressive performance indication							
Operating temperature range / Humidity			-40 ... +80 °C (extended) / 5% ... 95%							
Terminal - Conductor size			4-35 mm² flexible							
Busbar connections			fork-type busbar 16 mm²							
Mounting			indoor, 35 mm top hat DIN rail							
Case material / Flammability grade			BMC / V-0 in accordance with UL 94							
Pollution degree		PD	3				2			
Degree of protection		IP	20 (built-in)							
Approximate weight			130 g		175 g		180 g		190 g	
Dimensions: width			17,5 mm (1 module)							
Certifications / Quality Mark			CB, STC issued by OVE / KEMA-KEUR							

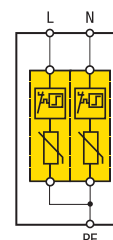
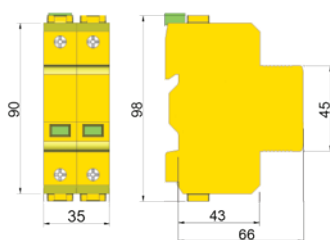
TECHNICAL DATA

Model L 7/30 ... with remote signal contact

		230 t ff	400 t ff	600 t ff	750 t ff
CODE		217 100	217 104	217 106	217 107
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			



Surge Protective Devices: ZOTUP SPDs for low voltage



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 / Type 1 and 2** (according to IEC/EN 61643-11);
- **Backup protection is not required with an upstream MCB ≤ 125 A or up to an $I_{sccr} \leq 4$ kA rms;**
- **Three colour Status Indicator with progressive indication of remaining performance.**

Model L 7/30

230 ff 2

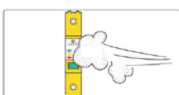
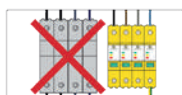
CODE		207 120
Nominal ac system voltage	U_N	230 V ac
Modes of protection (number of poles)		2
Max Continuous Operating Voltage	U_C	335 V ac
Test Class (acc. to IEC 61643-11 Ed. 1.0 2011-03)		I and II
Type (acc. to EN 61643-11 2012-10)		T1 and T2
Impulse discharge current (10/350 μ s)	I_{imp}	7 kA
Charge	Q	3,6 As
Nominal discharge current (8/20 μ s)	I_n	30 kA
Max. discharge current (8/20 μ s)	I_{max}	40 kA
Voltage protection level at a discharge current of:		
1 kA	U_p	$\leq 0,85$ kV
7 kA	U_p	$\leq 1,15$ kV
20 kA	U_p	$\leq 1,35$ kV
25 kA	U_p	$\leq 1,45$ kV
30 kA	U_p	$\leq 1,60$ kV
Response time	t_a	≤ 25 ns
End of Life		OCFM (Open Circuit Failure Mode)
Temporary OverVoltage (TOV) withstand	U_T	440 V / 120 min
Short Circuit Current rating without backup protection (internal disconnector)	I_{sccr}	4 kA rms
Short Circuit Current rating with max. backup protection fuse	I_{sccr}	100 kA rms
Max. back-up protection with up-stream MCB with a max. let-through energy of (max. prospective short circuit current depends on the MCB breaking capability)		125 A (max. $4,50 \times 10^5$ A ² s)
Max. back-up protection with FUSE at prospective short circuit currents of		125 A gG ($> 4 \div 100$ 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
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	20 (built-in)
Approximate weight		260 g
Dimensions: width		35 mm (2 modules)
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR

TECHNICAL DATA

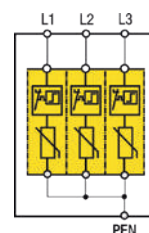
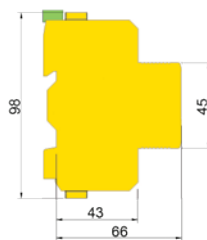
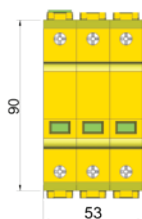
Model L 7/30 ... with remote signal contact

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



Surge Protective Devices: ZOTUP SPDs for low voltage



L 7/30 ... ff 3

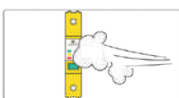
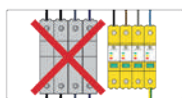
L 7/30...ff 3 is a ready to install assembly of three voltage limiting SPDs providing three modes of protection, typically installed at the origin of the installation (e.g. in the Main Distribution Board (MDB)) for three-phase TN-systems, with the following features and benefits:

- **Impulse test classification: Test class I and II / Type 1 and 2** (according to IEC/EN 61643-11);
- **Backup protection is not required with an upstream MCB ≤ 125 A or up to an $I_{sccr} \leq 4$ kA rms (for U_N 230/400 V);**
- **Three colour Status Indicator with progressive indication of remaining performance.**

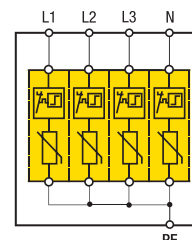
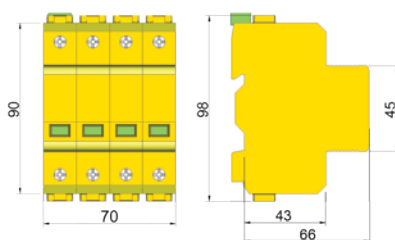
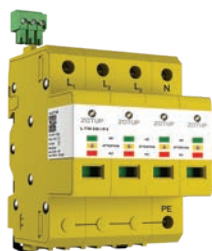
		Wind Turbines	
Model L 7/30 ...		230 ff 3	750 ff 3
CODE		207 130	207 137
Nominal ac system voltage	U_N	230/400 V ac	554/960 V ac
Modes of protection (number of poles)		3	
Max Continuous Operating Voltage	U_c	335 V ac	750 V ac
Test Class (acc. to IEC 61643-11 Ed. 1.0 2011-03)		I and II	
Type (acc. to EN 61643-11 2012-10)		T1 and T2	
Impulse discharge current (10/350 μ s)	I_{imp}	7 kA	5 kA
Charge	Q	3,6 As	2,9 As
Nominal discharge current (8/20 μ s)	I_n	30 kA	20 kA
Max. discharge current (8/20 μ s)	I_{max}	40 kA	
Voltage protection level at a discharge current of:	1 kA U_p	$\leq 0,85$ kV	$\leq 1,90$ kV
	7 kA U_p	$\leq 1,15$ kV	$\leq 2,30$ kV
	20 kA U_p	$\leq 1,35$ kV	$\leq 2,75$ kV
	25 kA U_p	$\leq 1,45$ kV	-
	30 kA U_p	$\leq 1,60$ kV	-
Response time	t_a	≤ 25 ns	
End of Life		OCFM (Open Circuit Failure Mode)	
Temporary OverVoltage (TOV) withstand	U_T	440 V / 120 min	1056 V / 120 min
Short Circuit Current rating without backup protection (internal disconnector)	I_{sccr}	4 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 MCB with max. let-through energy of (max. prospective short circuit current depends on MCB breaking capability)		125 A (max. $4,50 \times 10^5$ A ² s)	-
Max. back-up protection with FUSE at prospective short circuit current of		125 A gG at ($> 4 \div 100$ kA rms)	125 A gG at ($> 2 \div 100$ 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	
Mounting		indoor, 35 mm top hat DIN rail	
Case material / Flammability grade		BMC / V-0 in accordance with UL 94	
Pollution degree	PD	3	2
Degree of protection	IP	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	

TECHNICAL DATA

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 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	



Surge Protective Devices: ZOTUP SPDs for low voltage



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 / Type 1 and 2** (according to IEC/EN 61643-11);
- **Backup protection is not required with an upstream MCB ≤ 125 A or up to an $I_{sc} \leq 4$ kA rms;**
- **Three colour Status Indicator with progressive indication of remaining performance.**

Model L 7/30

230 ff 4

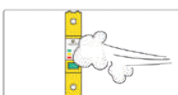
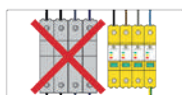
CODE		207 140
Nominal ac system voltage	U_N	230/400 V ac
Modes of protection (number of poles)		4
Max Continuous Operating Voltage	U_c	335 V ac
Test Class (acc. to IEC 61643-11 Ed. 1.0 2011-03)		I and II
Type (acc. to EN 61643-11 2012-10)		T1 and T2
Impulse discharge current (10/350 μ s)	I_{imp}	7 kA
Charge	Q	3,6 As
Nominal discharge current (8/20 μ s)	I_n	30 kA
Max. discharge current (8/20 μ s)	I_{max}	40 kA
Voltage protection level at a discharge current of:		
1 kA	U_p	$\leq 0,85$ kV
7 kA	U_p	$\leq 1,15$ kV
20 kA	U_p	$\leq 1,35$ kV
25 kA	U_p	$\leq 1,45$ kV
30 kA	U_p	$\leq 1,60$ kV
Response time	t_a	≤ 25 ns
End of Life		OCFM (Open Circuit Failure Mode)
Temporary OverVoltage (TOV) withstand	U_T	440 V / 120 min
Short Circuit Current rating <u>without backup protection (internal disconnecter)</u>	I_{sc}^{sc}	4 kA rms
Short Circuit Current rating with max. backup protection fuse	I_{sc}^{sc}	100 kA rms
Max. back-up protection with up-stream MCB with a max. let-through energy of (max. prospective short circuit current depends on the MCB breaking capability)		125 A (max. $4,50 \times 10^5$ A ² s)
Max. back-up protection with FUSE at prospective short circuit currents of		125 A gG ($> 4 \div 100$ kA rms)
Follow current interrupt rating	I_{fi}	NFC No Follow Current®
Status indicator (indication of disconnecter 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
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	20 (built-in)
Approximate weight		520 g
Dimensions: width		70 mm (4 modules)
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR

TECHNICAL DATA

Model L 7/30 ... with remote signal contact

230 t ff 4

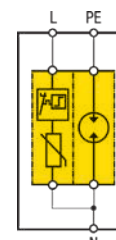
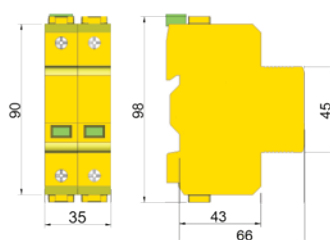
CODE		217 140
Remote signal contact		potential-free changeover contact
Terminal - conductor size for remote signal contact		max. 1,5 mm ² flexible
Switching capacity remote signal contact		ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A



Surge Protective Devices: ZOTUP SPDs for low voltage



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, with the following features and benefits:

- **Impulse test classification:** Test class I and II / Type 1 and 2 (according to IEC/EN 61643-11);
- **Backup protection is not required with an upstream MCB ≤ 125 A or up to an $I_{sccr} \leq 4$ kA rms;**
- **Three colour Status Indicator with progressive indication of remaining performance.**

Model L 7/30 ...

230 ff 1+1

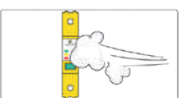
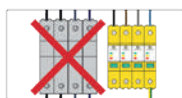
CODE		207 121
Nominal ac system voltage	U_N	230 V ac
Modes of protection (number of poles)		1+1 (L-N + N-PE)
Max Continuous Operating Voltage (L-N)	U_c	335 V ac
Max Continuous Operating Voltage (N-PE)	U_c	255 V ac
Test Class (acc. to IEC 61643-11 Ed. 1.0 2011-03)		I and II
Type (acc. to EN 61643-11 2012-10)		T1 and T2
Impulse discharge current (10/350 μ s) (L-N)	I_{imp}	7 kA
Impulse discharge current (10/350 μ s) (N-PE)	I_{imp}	52 kA
Charge (L-N)	Q	3,6 As
Charge (N-PE)	Q	26 As
Nominal discharge current (8/20 μ s) (L-N)	I_n	30 kA
Nominal discharge current (8/20 μ s) (N-PE)	I_n	52 kA
Max. discharge current (8/20 μ s) (L-N)	I_{max}	40 kA
Max. discharge current (8/20 μ s) (N-PE)	I_{max}	70 kA
Voltage protection level at a discharge current of:		
1 kA	U_p	$\leq 0,85$ kV
7 kA	U_p	$\leq 1,15$ kV
20 kA	U_p	$\leq 1,35$ kV
25 kA	U_p	$\leq 1,45$ kV
30 kA	U_p	$\leq 1,60$ kV
Voltage protection level (N-PE)	U_p	$\leq 1,50$ kV
Response time (L-N / N-PE)	t_a	≤ 25 ns / ≤ 100 ns
End of Life (L-N)		OCFM (Open Circuit Failure Mode)
Temporary OverVoltage (TOV) withstand (L-N)	U_T	440 V / 120 min
Temporary OverVoltage (TOV) withstand (N-PE)	U_T	1200 V / 200 ms
Short Circuit Current rating without backup protection (internal disconnecter)	I_{sccr}	4 kA rms
Short Circuit Current rating with max. backup protection fuse	I_{sccr}	100 kA rms
Max. back-up protection with up-stream MCB having a max. let-through energy of (max. prospective short circuit current depends on the MCB breaking capability)		125 A (max. $4,50 \times 10^5$ A ² s)
Max. back-up protection with FUSE at prospective short circuit currents of		125 A gG ($> 4 \div 100$ 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 disconnecter operation) / N-PE (no disconnecter)		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
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	20 (built-in)
Approximate weight		260 g
Dimensions: width		35 mm (2 modules)
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR

TECHNICAL DATA

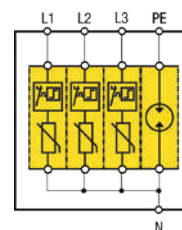
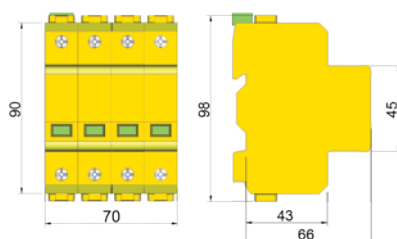
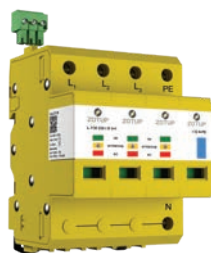
Model L 7/30 ... with remote signal contact

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



Surge Protective Devices: ZOTUP SPDs for low voltage



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, with the following features and benefits:

- **Impulse test classification: Test class I and II / Type 1 and 2** (according to IEC/EN 61643-11);
- **Backup protection is not required with an upstream MCB ≤ 125 A or up to an $I_{scsr} \leq 4$ kA rms;**
- **Three colour Status Indicator with progressive indication of remaining performance.**

Model L 7/30

230 ff 3+1

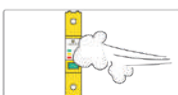
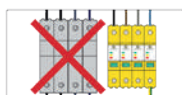
CODE		207 141
Nominal ac system voltage	U_N	230/400 V ac
Modes of protection (number of poles)		3+1 (L1/L2/L3-N + N-PE)
Max Continuous Operating Voltage (L-N)	U_c	335 V ac
Max Continuous Operating Voltage (N-PE)	U_c	255 V ac
Test Class (acc. to IEC 61643-11 Ed. 1.0 2011-03)		I and II
Type (acc. to EN 61643-11 2012-10)		T1 and T2
Impulse discharge current (10/350 μ s) (L-N)	I_{imp}	7 kA
Impulse discharge current (10/350 μ s) (N-PE)	I_{imp}	52 kA
Charge (L-N)	Q	3,6 As
Charge (N-PE)	Q	26 As
Nominal discharge current (8/20 μ s) (L-N)	I_n	30 kA
Nominal discharge current (8/20 μ s) (N-PE)	I_n	52 kA
Max. discharge current (8/20 μ s) (L-N)	I_{max}	40 kA
Max. discharge current (8/20 μ s) (N-PE)	I_{max}	70 kA
Voltage protection level at a discharge current of:		
1 kA	U_p	$\leq 0,85$ kV
7 kA	U_p	$\leq 1,15$ kV
20 kA	U_p	$\leq 1,35$ kV
25 kA	U_p	$\leq 1,45$ kV
30 kA	U_p	$\leq 1,60$ kV
Voltage protection level (N-PE)	U_p	$\leq 1,50$ kV
Response time (L-N / N-PE)	t_a	≤ 25 ns / ≤ 100 ns
End of Life (L-N)		OCFM (Open Circuit Failure Mode)
Temporary OverVoltage (TOV) withstand (L-N)	U_T	440 V / 120 min
Temporary OverVoltage (TOV) withstand (N-PE)	U_T	1200 V / 200 ms
Short Circuit Current rating without backup protection (internal disconnecter)	I_{scsr}	4 kA rms
Short Circuit Current rating with max. backup protection fuse	I_{scsr}	100 kA rms
Max. back-up protection with up-stream MCB having a max. let-through energy of (max. prospective short circuit current depends on the MCB breaking capability)		125 A (max. $4,50 \times 10^5$ A ² s)
Max. back-up protection with FUSE at prospective short circuit currents of		125 A gG ($> 4 \div 100$ 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 disconnecter operation) / N-PE (no disconnecter)		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
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	20 (built-in)
Approximate weight		520 g
Dimensions: width		70 mm (4 modules)
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR

TECHNICAL DATA

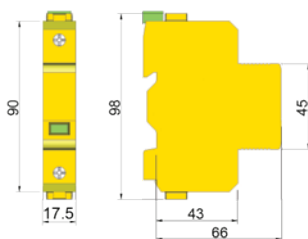
Model L 7/30 ... with remote signal contact

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



Surge Protective Devices: ZOTUP SPDs for low voltage



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 (SDB), 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 / Type 2** (according to IEC/EN 61643-11);
- 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 MCB ≤ 125 A or up to an $I_{sc} \leq 4$ 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.**

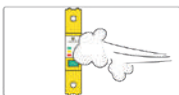
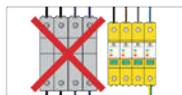
Model L 3/30 ...

		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 (acc. to IEC 61643-11 Ed. 1.0 2011-03)		II			
Type (acc. to EN 61643-11 2012-10)		T2			
Nominal discharge current (8/20 μ s)	I_n	20 kA	20 kA	30 kA	30 kA
Max. discharge current (8/20 μ s)	I_{max}	30 kA	30 kA	40 kA	40 kA
Voltage protection level at a discharge current of:	1 kA	$U_p \leq 0,22$ kV	$U_p \leq 0,42$ kV	$U_p \leq 0,85$ kV	$U_p \leq 1,20$ kV
	5 kA	$U_p \leq 0,28$ kV	$U_p \leq 0,50$ kV	$U_p \leq 1,00$ kV	$U_p \leq 1,45$ kV
	10 kA	$U_p \leq 0,36$ kV	$U_p \leq 0,60$ kV	$U_p \leq 1,20$ kV	$U_p \leq 1,58$ kV
	20 kA	$U_p \leq 0,50$ kV	$U_p \leq 0,80$ kV	$U_p \leq 1,35$ kV	$U_p \leq 1,90$ kV
	30 kA	-	-	$U_p \leq 1,50$ kV	$U_p \leq 2,15$ kV
Response time	t_a	≤ 25 ns			
End of Life		OCFM (Open Circuit Failure Mode)			
Temporary OverVoltage (TOV) withstand	U_T	115 V / 120 min	230 V / 120 min	440 V / 120 min	760 V / 120 min
Short Circuit Current rating without backup protection (internal disconnecter)	I_{sc}	4 kA rms			3 kA rms
Short Circuit Current rating with max. backup protection fuse	I_{sc}	50 kA rms			
Max. back-up protection with up-stream MCB with max. let-through energy of (max. prospective short circuit current depends on MCB breaking capability)		125 A (max. $4,80 \times 10^5$ A ² s)	125 A (max. $4,80 \times 10^5$ A ² s)	125 A (max. $4,50 \times 10^5$ A ² s)	125 A (max. $4,50 \times 10^5$ A ² s)
Max. back-up protection with FUSE at prospective short circuit current of		125 A gG at ($> 4 \div 50$ kA rms)	125 A gG at ($> 4 \div 50$ kA rms)	125 A gG at ($> 4 \div 50$ kA rms)	125 A gG at ($> 3 \div 50$ kA rms)
Follow current interrupt rating	I_{fi}	NFC No Follow Current®			
Status indicator (indication of disconnecter 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			
Busbar connections		fork-type busbar 16 mm ²			
Mounting		indoor, 35 mm top hat DIN rail			
Case material / Flammability grade		BMC / V-0 in accordance with UL 94			
Pollution degree	PD	3			
Degree of protection	IP	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			

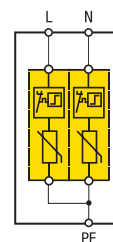
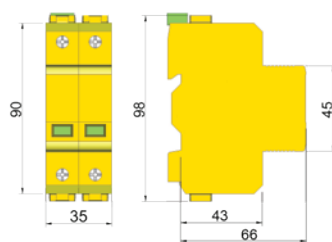
TECHNICAL DATA

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			



Surge Protective Devices: ZOTUP SPDs for low voltage



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 (SDB) for single-phase 230 V TN-systems, with the following features and benefits:

- **Impulse test classification: Test class II / Type 2** (according to IEC/EN 61643-11);
- 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 μ s;
- **Backup protection is not required with an upstream MCB ≤ 125 A or up to an $I_{sccr} \leq 4$ 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

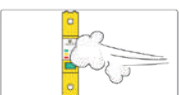
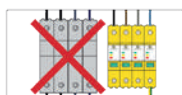
CODE		200 120
Nominal ac system voltage	U_N	230 V ac
Modes of protection (number of poles)		2
Max Continuous Operating Voltage	U_c	335 V ac
Test Class (acc. to IEC 61643-11 Ed. 1.0 2011-03)		II
Type (acc. to EN 61643-11 2012-10)		T2
Nominal discharge current (8/20 μ s)	I_n	30 kA
Max. discharge current (8/20 μ s)	I_{max}	40 kA
Voltage protection level at a discharge current of:		
1 kA	U_p	$\leq 0,90$ kV
5 kA	U_p	$\leq 1,05$ kV
10 kA	U_p	$\leq 1,25$ kV
20 kA	U_p	$\leq 1,40$ kV
30 kA	U_p	$\leq 1,60$ kV
Response time	t_a	≤ 25 ns
End of Life		OCFM (Open Circuit Failure Mode)
Temporary OverVoltage (TOV) withstand	U_T	440 V / 120 min
Short Circuit Current rating <u>without backup protection (internal disconnecter)</u>	I_{sccr}	4 kA rms
Short Circuit Current rating with max. backup protection fuse	I_{sccr}	50 kA rms
Max. back-up protection with up-stream MCB with a max. let-through energy of (max. prospective short circuit current depends on the MCB breaking capability)		125 A (max. $4,50 \times 10^5$ A ² s)
Max. back-up protection with FUSE at prospective short circuit currents of		125 A gG ($> 4 \div 50$ kA rms)
Follow current interrupt rating	I_{fi}	NFC No Follow Current®
Status indicator (indication of disconnecter 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
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	20 (built-in)
Approximate weight		240 g
Dimensions: width		35 mm (2 modules)
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR

TECHNICAL DATA

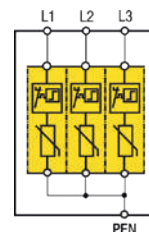
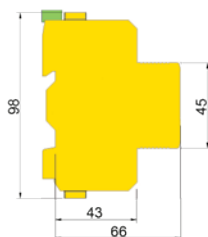
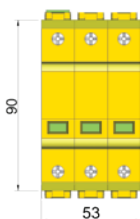
Model L 3/30 ... with remote signal contact

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



Surge Protective Devices: ZOTUP SPDs for low voltage



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 (SDB) for three-phase 230/400 V TN-systems, with the following features and benefits:

- **Impulse test classification: Test class II / Type 2** (according to IEC/EN 61643-11);
- 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 MCB ≤ 125 A or up to an $I_{sccr} \leq 4$ 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 3

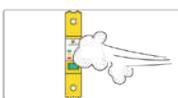
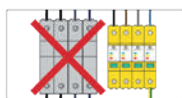
CODE		200 130
Nominal ac system voltage	U_N	230/400 V ac
Modes of protection (number of poles)		3
Max Continuous Operating Voltage	U_c	335 V ac
Test Class (acc. to IEC 61643-11 Ed. 1.0 2011-03)		II
Type (acc. to EN 61643-11 2012-10)		T2
Nominal discharge current (8/20 μ s)	I_n	30 kA
Max. discharge current (8/20 μ s)	I_{max}	40 kA
Voltage protection level at a discharge current of:	1 kA U_p	$\leq 0,90$ kV
	5 kA U_p	$\leq 1,05$ kV
	10 kA U_p	$\leq 1,25$ kV
	20 kA U_p	$\leq 1,40$ kV
	30 kA U_p	$\leq 1,60$ kV
Reaction time	t_a	≤ 25 ns
End of Life		OCFM (open circuit failure mode)
Temporary OverVoltage (TOV) withstand	U_T	440 V / 120 min
Short Circuit Current rating <u>without backup protection (internal disconnector)</u>	I_{sccr}	4 kA rms
Short Circuit Current rating with max. backup protection fuse	I_{sccr}	50 kA rms
Max. back-up protection with up-stream MCB with a max. let-through energy of (max. prospective short circuit current depends on the MCB breaking capability)		125 A (max. $4,50 \times 10^5$ A ² s)
Max. back-up protection with FUSE at prospective short circuit currents of		125 A gG ($> 4 \div 50$ 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
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	20 (built-in)
Approximate weight		350 g
Dimensions: width		53 mm (3 modules)
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR

TECHNICAL DATA

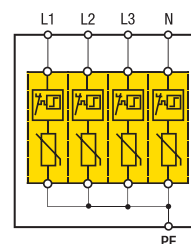
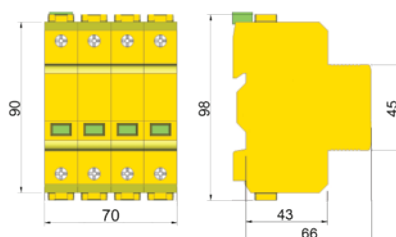
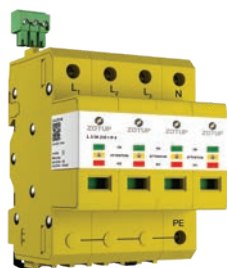
Model L 3/30 ... with remote signal contact

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



Surge Protective Devices: ZOTUP SPDs for low voltage



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 (SDB) for three-phase plus neutral 230/400 V TN-systems, with the following features and benefits:

- **Impulse test classification: Test class II / Type 2** (according to IEC/EN 61643-11);
- 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 MCB ≤ 125 A or up to an $I_{sccr} \leq 4$ 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

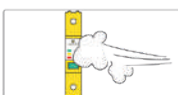
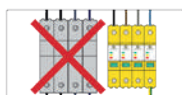
CODE		200 140
Nominal ac system voltage	U_N	230/400 V ac
Modes of protection (number of poles)		4
Max Continuous Operating Voltage	U_c	335 V ac
Test Class (acc. to IEC 61643-11 Ed. 1.0 2011-03)		II
Type (acc. to EN 61643-11 2012-10)		T2
Nominal discharge current (8/20 μ s)	I_n	30 kA
Max. discharge current (8/20 μ s)	I_{max}	40 kA
Voltage protection level at a discharge current of:		
1 kA	U_p	$\leq 0,90$ kV
5 kA	U_p	$\leq 1,05$ kV
10 kA	U_p	$\leq 1,25$ kV
20 kA	U_p	$\leq 1,40$ kV
30 kA	U_p	$\leq 1,60$ kV
Response time	t_a	≤ 25 ns
End of Life		OCFM (open circuit failure mode)
Temporary OverVoltage (TOV) withstand	U_T	440 V / 120 min
Short Circuit Current rating <u>without backup protection (internal disconnector)</u>	I_{sccr}	4 kA rms
Short Circuit Current rating with max. backup protection fuse	I_{sccr}	50 kA rms
Max. back-up protection with up-stream MCB with a max. let-through energy of (max. prospective short circuit current depends on the MCB breaking capability)		125 A (max. $4,50 \times 10^5$ A ² s)
Max. back-up protection with FUSE at prospective short circuit currents of		125 A gG ($> 4 \div 50$ 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
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	20 (built-in)
Approximate weight		480 g
Dimensions: width		70 mm (4 modules)
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR

TECHNICAL DATA

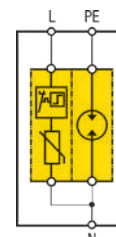
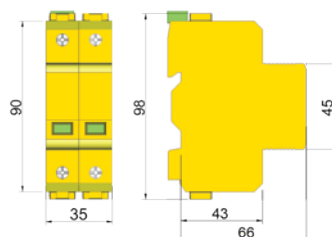
Model L 3/30 ... with remote signal contact

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



Surge Protective Devices: ZOTUP SPDs for low voltage



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 / Type 2** (according to IEC/EN 61643-11);
- **Backup protection is not required with an upstream MCB ≤ 125 A or up to an $I_{sccr} \leq 4$ kA rms;**
- **Three colour Status Indicator with progressive indication of remaining performance.**

Model L 3/30

230 ff 1+1

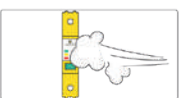
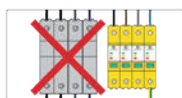
CODE		200 121
Nominal ac system voltage	U_N	230 V ac
Modes of protection (number of poles)		1+1 (L-N + N-PE)
Max Continuous Operating Voltage (L-N)	U_C	335 V ac
Max Continuous Operating Voltage (N-PE)	U_C	255 V ac
Test Class (acc. to IEC 61643-11 Ed. 1.0 2011-03)		II
Type (acc. to EN 61643-11 2012-10)		T2
Impulse discharge current (10/350 μ s) (N-PE)	I_{imp}	12,5 kA
Nominal discharge current (8/20 μ s) (L-N)	I_n	30 kA
Nominal discharge current (8/20 μ s) (N-PE)	I_n	40 kA
Max. discharge current (8/20 μ s) (L-N)	I_{max}	40 kA
Max. discharge current (8/20 μ s) (N-PE)	I_{max}	65 kA
Voltage protection level at a discharge current of:		
1 kA	U_p	$\leq 0,90$ kV
5 kA	U_p	$\leq 1,05$ kV
10 kA	U_p	$\leq 1,25$ kV
20 kA	U_p	$\leq 1,40$ kV
30 kA	U_p	$\leq 1,60$ kV
Voltage protection level (N-PE)	U_p	$\leq 1,50$ kV
Response time (L-N / N-PE)	t_a	≤ 25 ns / ≤ 100 ns
End of Life (L-N)		OCFM (open circuit failure mode)
Temporary OverVoltage (TOV) withstand (L-N)	U_T	440 V / 120 min
Temporary OverVoltage (TOV) withstand (N-PE)	U_T	1200 V / 200 ms
Short Circuit Current rating <u>without backup protection (internal disconnecter)</u>	I_{sccr}	4 kA rms
Short Circuit Current rating with max. backup protection fuse	I_{sccr}	50 kA rms
Max. back-up protection with up-stream MCB having a max. let-through energy of (max. prospective short circuit current depends on the MCB breaking capability)		125 A (max. $4,50 \times 10^5$ A ² s)
Max. back-up protection with FUSE at prospective short circuit currents of		125 A gG ($> 4 \div 50$ 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 disconnecter operation) / N-PE (no disconnecter)		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
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	20 (built-in)
Approximate weight		240 g
Dimensions: width		35 mm (2 modules)
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR

TECHNICAL DATA

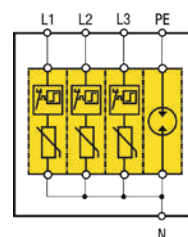
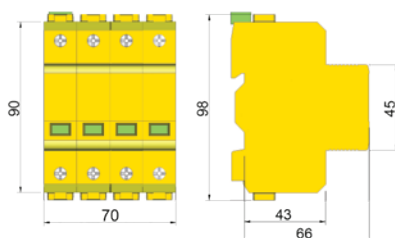
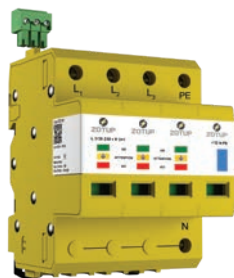
Model L 3/30 ... with remote signal contact

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



Surge Protective Devices: ZOTUP SPDs for low voltage



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 / Type 2** (according to IEC/EN 61643-11);
- **Backup protection is not required with an upstream MCB ≤ 125 A or up to an $I_{sccr} \leq 4$ kA rms;**
- **Three colour Status Indicator with progressive indication of remaining performance.**

Model L3/30

230 ff 3+1

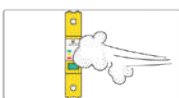
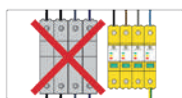
CODE		200 141
Nominal ac system voltage	U_N	230/400 V ac
Modes of protection (number of poles)		3+1 (L1/L2/L3-N + N-PE)
Max Continuous Operating Voltage (L-N)	U_c	335 V ac
Max Continuous Operating Voltage (N-PE)	U_c	255 V ac
Test Class (acc. to IEC 61643-11 Ed. 1.0 2011-03)		II
Type (acc. to EN 61643-11 2012-10)		T2
Impulse discharge current (10/350 μ s) (N-PE)	I_{imp}	12,5 kA
Nominal discharge current (8/20 μ s) (L-N)	I_n	30 kA
Nominal discharge current (8/20 μ s) (N-PE)	I_n	40 kA
Max. discharge current (8/20 μ s) (L-N)	I_{max}	40 kA
Max. discharge current (8/20 μ s) (N-PE)	I_{max}	65 kA
Voltage protection level at a discharge current of:		
1 kA	U_p	$\leq 0,90$ kV
5 kA	U_p	$\leq 1,05$ kV
10 kA	U_p	$\leq 1,25$ kV
20 kA	U_p	$\leq 1,40$ kV
30 kA	U_p	$\leq 1,60$ kV
Voltage protection level (N-PE)	U_p	$\leq 1,50$ kV
Response time (L-N / N-PE)	t_a	≤ 25 ns / ≤ 100 ns
End of Life (L-N)		OCFM (open circuit failure mode)
Temporary OverVoltage (TOV) withstand (L-N)	U_T	440 V / 120 min
Temporary OverVoltage (TOV) withstand (N-PE)	U_T	1200 V / 200 ms
Short Circuit Current rating without backup protection (internal disconnecter)	I_{sccr}	4 kA rms
Short Circuit Current rating with max. backup protection fuse	I_{sccr}	50 kA rms
Max. back-up protection with MCB having a max. let-through energy of (max. prospective short circuit current depends on the MCB breaking capability)		125 A (max. $4,50 \times 10^5$ A ² s)
Max. back-up protection with FUSE at prospective short circuit currents of		125 A gG ($> 4 \div 50$ 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 disconnecter operation) / N-PE (no disconnecter)		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
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	20 (built-in)
Approximate weight		480 g
Dimensions: width		70 mm (4 modules)
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR

TECHNICAL DATA

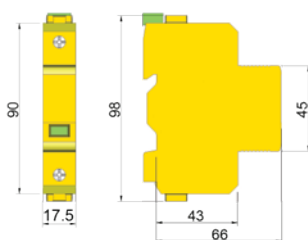
Model L 3/30 ... with remote signal contact

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



Surge Protective Devices: ZOTUP SPDs for low voltage



L 2/10 230 ff

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

- **Impulse test classification: Test class II / Type 2** (according to IEC/EN 61643-11);
- 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 μ s;
- **Backup protection is not required with an upstream MCB ≤ 125 A or up to an $I_{sccr} \leq 4$ kA rms;**
- Short circuit current withstand up to 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

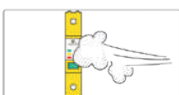
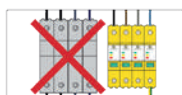
CODE		202 100
Nominal ac system voltage	U_N	230/400 V ac
Modes of protection (number of poles)		1
Max Continuous Operating Voltage	U_C	335 V ac
Test Class (acc. to IEC 61643-11 Ed. 1.0 2011-03)		II
Type (acc. to EN 61643-11 2012-10)		T2
Nominal discharge current (8/20 μ s)	I_n	10 kA
Max. discharge current (8/20 μ s)	I_{max}	20 kA
Voltage protection level at a discharge current of:		
1 kA	U_p	$\leq 0,90$ kV
5 kA	U_p	$\leq 1,05$ kV
10 kA	U_p	$\leq 1,25$ kV
Response time	t_a	≤ 25 ns
End of Life		OCFM (open circuit failure mode)
Temporary OverVoltage (TOV) withstand	U_T	440 V / 120 min
Short Circuit Current rating without backup protection (internal disconnector)	I_{sccr}	4 kA rms
Short Circuit Current rating with max. backup protection fuse	I_{sccr}	50 kA rms
Max. back-up protection with up-stream MCB with a max. let-through energy of (max. prospective short circuit current depends on the MCB breaking capability)		125 A (max. $4,50 \times 10^5$ A ² s)
Max. back-up protection with FUSE at prospective short circuit currents of		125 A gG ($> 4 \div 50$ 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
Busbar connections		fork-type busbar 16 mm ²
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	20 (built-in)
Approximate weight		110 g
Dimensions: width		17,5 mm (1 module)
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR

TECHNICAL DATA

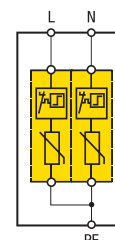
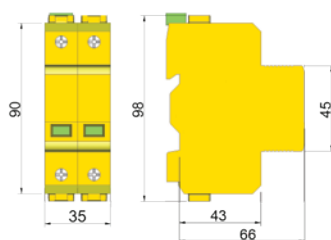
Model L 2/10 ... with remote signal contact

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



Surge Protective Devices: ZOTUP SPDs for low voltage



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 (SDB) for single-phase 230 V TN-systems, with the following features and benefits:

- **Impulse test classification: Test class II / Type 2** (according to IEC/EN 61643-11);
- 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 MCB ≤ 125 A or up to an $I_{sccr} \leq 4$ 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

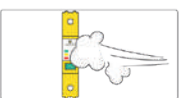
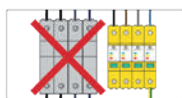
CODE		202 120
Nominal ac system voltage	U_N	230 V ac
Modes of protection (number of poles)		2
Max Continuous Operating Voltage	U_C	335 V ac
Test Class (acc. to IEC 61643-11 Ed. 1.0 2011-03)		II
Type (acc. to EN 61643-11 2012-10)		T2
Nominal discharge current (8/20 μ s)	I_n	10 kA
Max. discharge current (8/20 μ s)	I_{max}	20 kA
Voltage protection level at a discharge current of:		
1 kA	U_p	$\leq 1,00$ kV
5 kA	U_p	$\leq 1,10$ kV
10 kA	U_p	$\leq 1,30$ kV
Response time	t_a	≤ 25 ns
End of Life		OCFM (open circuit failure mode)
Temporary OverVoltage (TOV) withstand	U_T	440 V / 120 min
Short Circuit Current rating <u>without backup protection</u> (internal disconnector)	I_{sccr}	4 kA rms
Short Circuit Current rating with max. backup protection fuse	I_{sccr}	50 kA rms
Max. back-up protection with up-stream MCB with a max. let-through energy of (max. prospective short circuit current depends on the MCB breaking capability)		125 A (max. $4,50 \times 10^5$ A ² s)
Max. back-up protection with FUSE at prospective short circuit currents of		125 A gG ($> 4 \div 50$ 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
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	20 (built-in)
Approximate weight		220 g
Dimensions: width		35 mm (2 modules)
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR

TECHNICAL DATA

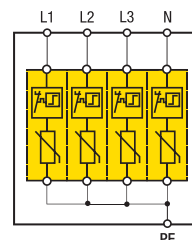
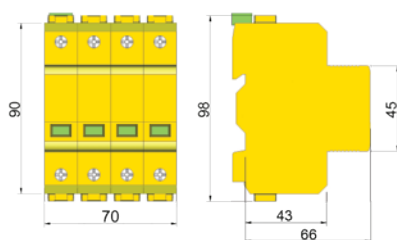
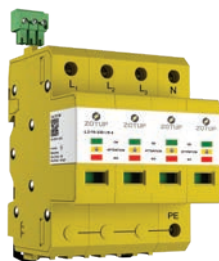
Model L 2/10 ... with remote signal contact

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



Surge Protective Devices: ZOTUP SPDs for low voltage



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 (SDB) for three-phase plus neutral 230/400 V TN-systems, with the following features and benefits:

- **Impulse test classification: Test class II / Type 2** (according to IEC/EN 61643-11);
- 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 MCB ≤ 125 A or up to an $I_{sccr} \leq 4$ 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 4

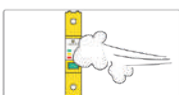
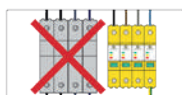
CODE		202 140
Nominal ac system voltage	U_N	230/400 V ac
Modes of protection (number of poles)		4
Max Continuous Operating Voltage	U_C	335 V ac
Test Class (acc. to IEC 61643-11 Ed. 1.0 2011-03)		II
Type (acc. to EN 61643-11 2012-10)		T2
Nominal discharge current (8/20 μ s)	I_n	10 kA
Max. discharge current (8/20 μ s)	I_{max}	20 kA
Voltage protection level at a discharge current of:	1 kA U_p	$\leq 1,00$ kV
	5 kA U_p	$\leq 1,10$ kV
	10 kA U_p	$\leq 1,30$ kV
Response time	t_a	≤ 25 ns
End of Life		OCFM (open circuit failure mode)
Temporary OverVoltage (TOV) withstand	U_T	440 V / 120 min
Short Circuit Current rating <u>without backup protection (internal disconnecter)</u>	I_{sccr}	4 kA rms
Short Circuit Current rating with max. backup protection fuse	I_{sccr}	50 kA rms
Max. back-up protection with up-stream MCB with a max. let-through energy of (max. prospective short circuit current depends on the MCB breaking capability)		125 A (max. $4,50 \times 10^5$ A ² s)
Max. back-up protection with FUSE at prospective short circuit currents of		125 A gG ($> 4 \div 50$ kA rms)
Follow current interrupt rating	I_{fi}	NFC No Follow Current®
Status indicator (indication of disconnecter 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
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	20 (built-in)
Approximate weight		440 g
Dimensions: width		70 mm (4 modules)
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR

TECHNICAL DATA

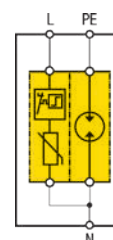
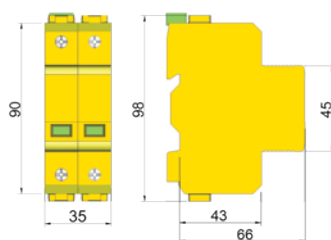
Model L 2/10 ... with remote signal contact

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



Surge Protective Devices: ZOTUP SPDs for low voltage



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 / Type 2** (according to IEC/EN 61643-11);
- **Backup protection is not required with an upstream MCB ≤ 125 A or up to an $I_{sccr} \leq 4$ 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.**

Model L 2/10

230 ff 1+1

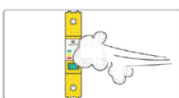
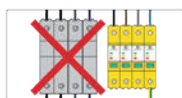
CODE		202 121
Nominal ac system voltage	U_N	230 V ac
Modes of protection (number of poles)		1+1 (L-N + N-PE)
Max Continuous Operating Voltage (L-N)	U_c	335 V ac
Max Continuous Operating Voltage (N-PE)	U_c	255 V ac
Test Class (acc. to IEC 61643-11 Ed. 1.0 2011-03)		II
Type (acc. to EN 61643-11 2012-10)		T2
Impulse discharge current (10/350 μ s) (N-PE)	I_{imp}	12,5 kA
Nominal discharge current (8/20 μ s) (L-N)	I_n	10 kA
Nominal discharge current (8/20 μ s) (N-PE)	I_n	40 kA
Max. discharge current (8/20 μ s) (L-N)	I_{max}	20 kA
Max. discharge current (8/20 μ s) (N-PE)	I_{max}	65 kA
Voltage protection level at a discharge current of:		
1 kA	U_p	$\leq 1,00$ kV
5 kA	U_p	$\leq 1,10$ kV
10 kA	U_p	$\leq 1,30$ kV
Voltage protection level (N-PE)	U_p	$\leq 1,50$ kV
Response time (L-N / N-PE)	t_a	≤ 25 ns / ≤ 100 ns
End of Life (L-N)		OCFM (open circuit failure mode)
Temporary OverVoltage (TOV) withstand (L-N)	U_r	440 V / 120 min
Temporary OverVoltage (TOV) withstand (N-PE)	U_r	1200 V / 200 ms
Short Circuit Current rating without backup protection (internal disconnecter)	I_{sccr}	4 kA rms
Short Circuit Current rating with max. backup protection fuse	I_{sccr}	50 kA rms
Max. back-up protection with up-stream MCB with a max. let-through energy of (max. prospective short circuit current depends on the MCB breaking capability)		125 A (max. $4,50 \times 10^5$ A ² s)
Max. back-up protection with FUSE at prospective short circuit currents of		125 A gG ($> 4 \div 50$ 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 disconnecter operation) / N-PE (no disconnecter)		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
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	20 (built-in)
Approximate weight		220 g
Dimensions: width		35 mm (2 modules)
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR

TECHNICAL DATA

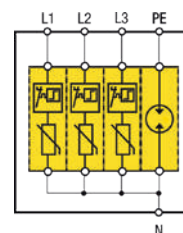
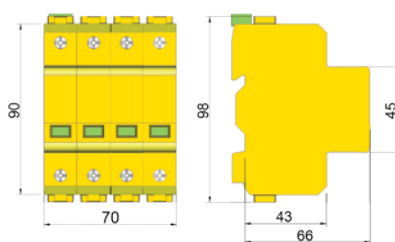
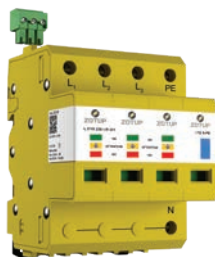
Model L 2/10 ... with remote signal contact

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



Surge Protective Devices: ZOTUP SPDs for low voltage



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 / Type 2** (according to IEC/EN 61643-11);
- **Backup protection is not required with an upstream MCB ≤ 125 A or up to an $I_{sccr} \leq 4$ 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.**

Model L 2/10

230 ff 3+1

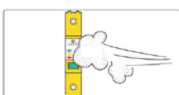
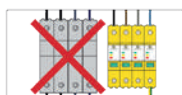
CODE		202 141
Nominal ac system voltage	U_N	230/400 V ac
Modes of protection (number of poles)		3+1 (L1/L2/L3-N + N-PE)
Max Continuous Operating Voltage (L-N)	U_c	335 V ac
Max Continuous Operating Voltage (N-PE)	U_c	255 V ac
Test Class (acc. to IEC 61643-11 Ed. 1.0 2011-03)		II
Type (acc. to EN 61643-11 2012-10)		T2
Impulse discharge current (10/350 μ s) (N-PE)	I_{imp}	12,5 kA
Nominal discharge current (8/20 μ s) (L-N)	I_n	10 kA
Nominal discharge current (8/20 μ s) (N-PE)	I_n	40 kA
Max. discharge current (8/20 μ s) (L-N)	I_{max}	20 kA
Max. discharge current (8/20 μ s) (N-PE)	I_{max}	65 kA
Voltage protection level at a discharge current of:		
1 kA	U_p	$\leq 1,00$ kV
5 kA	U_p	$\leq 1,10$ kV
10 kA	U_p	$\leq 1,30$ kV
Voltage protection level (N-PE)	U_p	$\leq 1,50$ kV
Response time (L-N / N-PE)	t_a	≤ 25 ns / ≤ 100 ns
End of Life (L-N)		OCFM (open circuit failure mode)
Temporary OverVoltage (TOV) withstand (L-N)	U_T	440 V / 120 min
Temporary OverVoltage (TOV) withstand (N-PE)	U_T	1200 V / 200 ms
Short Circuit Current rating without backup protection (internal disconnecter)	I_{sccr}	4 kA rms
Short Circuit Current rating with max. backup protection fuse	I_{sccr}	50 kA rms
Max. back-up protection with up-stream MCB having a max. let-through energy of (max. prospective short circuit current depends on the MCB breaking capability)		125 A (max. $4,50 \times 10^5$ A ² s)
Max. back-up protection with FUSE at prospective short circuit currents of		125 A gG ($> 4 \div 50$ 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 disconnecter operation) / N-PE (no disconnecter)		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
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	20 (built-in)
Approximate weight		440 g
Dimensions: width		70 mm (4 modules)
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR

TECHNICAL DATA

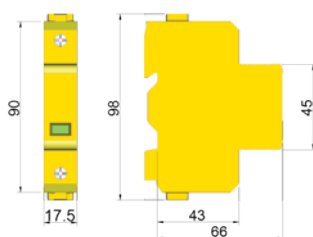
Model L 2/10 ... with remote signal contact

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



Surge Protective Devices: ZOTUP SPDs for low voltage



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 (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 / Type 1 and 2** (according to IEC/EN 61643-11);
- 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 μ s;
- Nominal discharge current of 40 kA 8/20 μ s;
- The special housing is designed for Pollution Degree 3;
- To be combined with L 3/30 and L 2/10.

Model I 12 N-PE

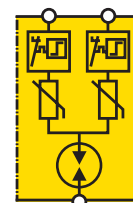
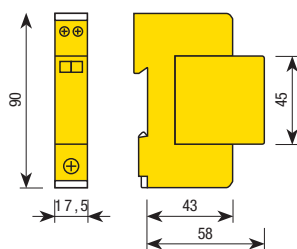
CODE		207 300	TECHNICAL DATA
Nominal ac system voltage	U_N	230 V ac	
Modes of protection (number of poles)		1 (N-PE)	
Max Continuous Operating Voltage	U_c	255 V ac	
Test Class (acc. to IEC 61643-11 Ed. 1.0 2011-03)		I and II	
Type (acc. to EN 61643-11 2012-10)		T1 and T2	
Impulse discharge current (10/350 μ s)	I_{imp}	12,5 kA	
Charge	Q	6,5 As	
Nominal discharge current (8/20 μ s)	I_n	40 kA	
Max. discharge current (8/20 μ s)	I_{max}	65 kA	
Follow current interrupt rating	I_{fi}	100 A rms	
Voltage protection level	U_p	$\leq 1,50$ kV	
Response time	t_a	≤ 100 ns	
Temporary OverVoltage (TOV) withstand	U_T	1200 V / 200 ms	
Operating temperature range / Humidity		-40 ... +80 °C (extended) / 5% ... 95%	
Terminal-Conductor size		4-35 mm ² flexible	
Busbar connections		fork-type busbar 16 mm ²	
Mounting		indoor, 35 mm top hat DIN rail	
Case material / Flammability grade		BMC / V-0 in accordance with UL 94	
Pollution degree	PD	3	
Degree of protection	IP	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	

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 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



Surge Protective Devices: ZOTUP SPDs for low voltage



IL 1/10 2P

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 systems, with the following features and benefits:

- **Impulse test classification: Test class II / Type 2** (according to IEC/EN 61643-11);
- 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;
- Provides three modes of protection in a one module housing (L-N, L-PE, N-PE);
- Leakage current free and galvanic insulation from earth due to the Gas Discharge Tube (GDT);
- Suitable for installation at zone boundaries up to $O_B - 1$ according to the lightning protection zones concept as defined in IEC 60305.

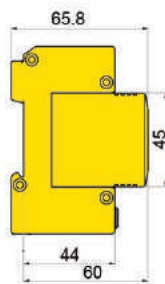
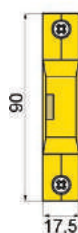
Model IL 1/10 2P

CODE (pluggable execution)		230	222 100
Nominal ac system voltage	U_N	230 V ac	
Maximum Continuous Operating Voltage	U_c	335 V ac	
Test class (acc. to IEC 61643-1+ A1(2001))		II	
Type (acc. to EN 61643-11/A11)		T2	
Nominal discharge current (8/20 μ s) (L / N-PE)	I_n	10 kA	
Maximum discharge current (8/20 μ s) (L / N-PE)	I_{max}	20 kA	
Voltage protection level at I_n	U_p	$\leq 1,50$ kV (L + N to PE)	
	U_p	$\leq 1,50$ kV (L to N)	
Response time	t_a	≤ 25 ns (L / N) - ≤ 100 ns (N / PE)	
End of Life		OCFM (open circuit failure mode)	
Temporary OverVoltage (TOV) withstand (L-N)	U_T	440 V / 120 min	
Temporary OverVoltage (TOV) withstand (L/N-PE)	U_T	(1200+230) V / 200 ms	
Insulation resistance	R_{isol}	≥ 1 G Ω	
Max. back-up protection with FUSE		32 A gG	
Short Circuit Current rating with max. backup protection with fuse	I_{scor}	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 mm ² flexible PE 2,5-16 mm ² flexible	
Busbar connection		fork-type busbar 16 mm ² (only PE)	
Mounting		indoor, 35 mm top hat DIN rail	
Enclosure material		thermoplastic	
Pollution degree	PD	2	
Degree of protection	IP	20 (built in)	
Approximate weight		100 g	
Dimension: width		17,5 mm (1 module)	

TECHNICAL DATA



Surge Protective Devices: ZOTUP SPDs for low voltage



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 (SDB), in TN-systems or in TT-systems in combination with N-PE SPD where connection type CT2 (1+1 or 3+1) is required. It provides the following features and benefits:

- **Impulse test classification: Test class II / Type 2** (according to IEC/EN 61643-11);
- L 2/20 230 e is a voltage limiting SPD (varistor based) 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 e

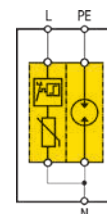
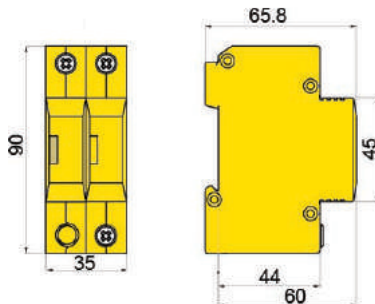
230

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 (acc. to IEC 61643-11 Ed. 1.0 2011-03)		II
Type (acc. 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 5 kA U_p 10 kA U_p 20 kA U_p	≤ 0,90 kV ≤ 1,05 kV ≤ 1,25 kV ≤ 1,40 kV
Response time	t _a	≤ 25 ns
End of Life		OCFM (open circuit failure mode)
Temporary OverVoltage (TOV) withstand	U _T	440 V / 120 min
Max. back-up protection with FUSE at prospective short circuit currents of		125 A gG (50 kA rms)
Short Circuit Current withstand with max. overcurrent protection fuse	I _{scor}	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 mm ² flexible
Busbar connections		fork-type busbar 16 mm ²
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		Polyamide PA6 / V-0 in accordance with UL 94
Pollution degree	PD	2
Degree of protection	IP	20 (built-in)
Approximate weight		100 g
Dimensions: width		17,5 mm (1 module)
3rd party testing		CTI test report

TECHNICAL DATA



Surge Protective Devices: ZOTUP SPDs for low voltage



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 / Type 2** (according to IEC/EN 61643-11);
- 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

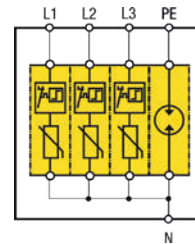
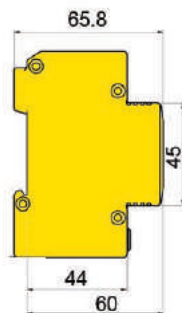
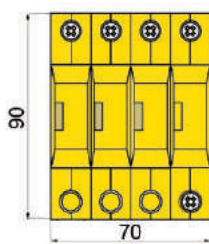
230 1+1

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 (acc. to IEC 61643-11 Ed. 1.0 2011-03)		II
Type (acc. to EN 61643-11 2012-10)		T2
Nominal discharge current (8/20 μ s) (L-N)	I_N	20 kA
Nominal discharge current (8/20 μ s) (N-PE)	I_N	40 kA
Max. discharge current (8/20 μ s) (L-N)	I_{max}	40 kA
Max. discharge current (8/20 μ s) (N-PE)	I_{max}	60 kA
Voltage protection level at a discharge current of:		
1 kA	U_p	$\leq 1,00$ kV
5 kA	U_p	$\leq 1,10$ kV
10 kA	U_p	$\leq 1,30$ kV
20 kA	U_p	$\leq 1,45$ kV
Voltage protection level (N-PE)	U_p	$\leq 1,60$ kV
Response time (L-N / N-PE)	t_a	≤ 25 ns / ≤ 100 ns
End of Life (L-N)		OCFM (open circuit failure mode)
Temporary OverVoltage (TOV) withstand (L-N)	U_T	440 V / 120 min
Temporary OverVoltage (TOV) withstand (N-PE)	U_T	1200 V / 200 ms
Short Circuit Current rating with max. backup protection with fuse	I_{scrr}	50 kA rms
Max. back-up protection with FUSE		125 A gG (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)		2 colours: transparent - OK / red - replace
Operating temperature range / Humidity		-40 ... +70 °C / 5% ... 95%
Terminal - Conductor size		4-25 mm ² flexible
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		Polyamide PA6 / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	20 (built-in)
Approximate weight		170 g
Dimensions: width		35 mm (2 modules)
3rd party testing		CTI test report

TECHNICAL DATA



Surge Protective Devices: ZOTUP SPDs for low voltage



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 / Type 2** (according to IEC/EN 61643-11);
- 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 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 (acc. to IEC 61643-11 Ed. 1.0 2011-03)		II
Type (acc. to EN 61643-11 2012-10)		T2
Nominal discharge current (8/20 μ s) (L-N)	I_n	20 kA
Nominal discharge current (8/20 μ s) (N-PE)	I_n	40 kA
Max. discharge current (8/20 μ s) (L-N)	I_{max}	40 kA
Max. discharge current (8/20 μ s) (N-PE)	I_{max}	60 kA
Voltage protection level at a discharge current of:		
1 kA	U_p	$\leq 1,00$ kV
5 kA	U_p	$\leq 1,10$ kV
10 kA	U_p	$\leq 1,30$ kV
20 kA	U_p	$\leq 1,45$ kV
Voltage protection level (N-PE)	U_p	$\leq 1,60$ kV
Response time (L-N / N-PE)	t_a	≤ 25 ns / ≤ 100 ns
End of Life (L-N)		OCFM (open circuit failure mode)
Temporary OverVoltage (TOV) withstand (L-N)	U_T	440 V / 120 min
Temporary OverVoltage (TOV) withstand (N-PE)	U_T	1200 V / 200 ms
Short Circuit Current rating with max. backup protection with fuse	I_{scrr}	50 kA rms
Max. back-up protection with FUSE		125 A gG (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)		2 colours: transparent - OK / red - replace
Operating temperature range / Humidity		-40 ... +70 °C / 5% ... 95%
Terminal - Conductor size		4-25 mm ² flexible
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		Polyamide PA6 / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	20 (built-in)
Approximate weight		360 g
Dimensions: width		70 mm (4 modules)
3rd party testing		CTI test report

TECHNICAL DATA



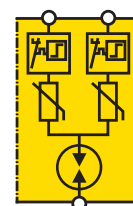
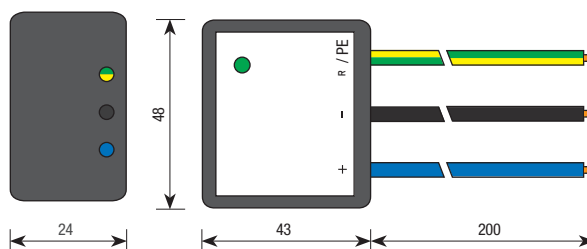
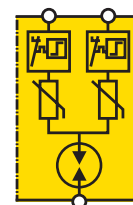
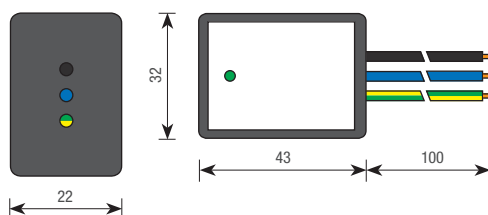
Surge Protective Devices: ZOTUP SPDs for low voltage



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 + A1) and **Type 3** (according to EN 61643 – 11/A11);
- **Impulse test classification IL 1/10 2P M: Test Class II** (according to IEC 61643 + A1) and **Type 2** (according to EN 61643 – 11/A11);
- 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.

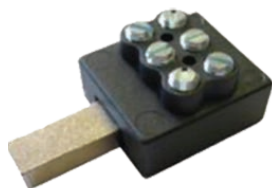
Model IL ...

CODE		1/3 2P	1/10 2P M
		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 61643-1)		III	II
Type (acc. to EN 61643-11/A11)		T3	T2
Max. backup protection with fuse, if not already installed		16 A gG	
Combination wave impulse (1,2/50 μ s, 8/20 μ s)		6 kV / 3 kA	-
Nominal discharge current (8/20 μ s) (L / N- PE)	I_n	-	10 kA
Maximum discharge current (8/20 μ s) (L / N-PE)	I_{max}	-	20 kA
Total discharge current (8/20 μ s) (L + N-PE)	I_{Total}	-	20 kA
Voltage protection level at I_n	U_p	$\leq 1,5$ kV (L-N; L / N-PE)	
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_{scor}	6 kA rms	
Follow current interrupt rating		NFC No Follow Current®	
Temporary OverVoltage (TOV) withstand (L-N)		335 V 5 s	
Temporary OverVoltage (TOV) withstand (L / N-PE)		(1200+230) V / 200 ms	
Operating temperature range		- 5 ... + 40 °C	
Operating state indicator		green LED	
Connecting wires		1,5 mm ² ; 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	PD	2	
Degree of protection	IP	20	
Approximate weight		30 g	50 g

TECHNICAL DATA



Surge Protective Devices: SPDs Accessories



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 mm ²

TECHNICAL DATA



CP 2



CP 6



CP 3



CP 7



CP 4



CP 8



CP 5

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.

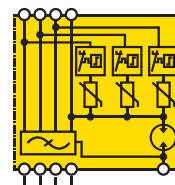
Model CP...

	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 mm ²						

TECHNICAL DATA



Surge Protective Devices: ZOTUP SPDs with interference filter for direct and indirect lightning effects



ILF 4P 250/400 is a multimode SPD for direct and indirect lightning effects with integrated interference filter for high frequency disturbances, typically installed in in three phase plus neutral TN- or TT-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) and **T1, T2 and T3** (according to EN 61643-11/A11);
- Although a special inductor ensures an effective attenuation of high frequency interferences capacity, it has an insignificant energy insertion loss if compared with the equivalent one of an insulation transformer;
- Suitable for protection of electronic equipment in harsh environments where even partial lightning currents are to be expected.

Model ILF 4P...

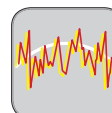
		250	400
CODE		219 374	219 344
Nominal ac system Voltage	U_N	230/400 V ac	
Maximum Continuous operating voltage	U_c	335/570 V ac	
Rated load current	I_L	250 A	400 A
Test class (acc. to IEC 61643-11 ed. 1 (2011-03))		I, II and III	
Type (acc. to EN 61643-11/A11)		T1, T2 and T3	
Total discharge current (10/350 μ s) (L1+L2+L3+N-PE)	$I_{Total\ 10/350}$	50 kA	
Impulse discharge current (10/350 μ s) (L-N)	I_{imp}	12,5 kA	
Impulse discharge current (10/350 μ s) (N-PE)	I_{imp}	50 kA	
Total discharge current (8/20 μ s) (L1+L2+L3+N-PE)	$I_{Total\ 8/20}$	100 kA	
Nominal discharge current (8/20 μ s)	I_n	25 kA	
Combination wave impulse (L1+L2+L3+N-PE)	$U_{cc\ total}$	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 μ s)	5 kA	$U_p \leq 825\ V$	$\leq 850\ V$
	12,5 kA	$U_p \leq 875\ V$	$\leq 900\ V$
	20 kA	$U_p \leq 925\ V$	$\leq 950\ V$
	25 kA	$U_p \leq 975\ V$	$\leq 1000\ V$
Voltage protection level at combination wave impulse	(L-N)	$U_p \leq 850\ V$	$\leq 900\ V$
	(N-PE)	$U_p \leq 1250\ V$	$\leq 1500\ V$
Response time (L-N)	t_a	$\leq 25\ ns$	
Response time (N-PE)	t_a	$\leq 100\ ns$	
End of Life (L-N)		OCFM (open circuit failure mode)	
Temporary OverVoltage (TOV) withstand (L-N; L/N-PE)		335 V 5 s; (1200+230) V / 200 ms	
Short Circuit Current rating with max. backup protection	I_{scor}	50 kA rms	
Follow current interrupt rating		NFC No Follow Current®	
Asymmetric attenuation 50 Ω / 50 Ω	f	at 2 MHz: $\geq 78\ dB$	at 2 MHz: $\geq 73\ dB$
Symmetric attenuation 50 Ω / 50 Ω	f	at 0,2 MHz: $\geq 73\ dB$	at 0,2 MHz: $\geq 71\ dB$
Filter components	$C_{X1\ e\ C_{X2}}$	2,2 μF	2,2 μF
	C_Y	2 x 50 nF	2 x 50 nF
	$R_X\ e\ R_Y$	1 M Ω	1 M Ω
	L_{SIM}	4,3 μH	2,4 μH
	L_{ASIM}	2,3 mH	1,1 mH
Power dissipation at 20°C (ventilated)		$\leq 160\ W$	$\leq 380\ W$
Max. back-up protection with fuse, if not already provided in the upstream installation		250 A	400 A
Operating temperature range		- 40 ... + 55 °C	
Terminal - Conductor size		35-240 mm ² (35-120 mm ² / 26 Nm; 150-240 mm / 55 Nm)	5-240 mm ² (35-120 mm ² / 26 Nm; 150-240 mm / 55 Nm)
Mounting		vertical on a panel / wall (natural convection required)	
Enclosure material		metal	
Pollution Degree	PD	2	
Degree of protection	IP	10	
Remote signal contact		NC (max. 1,5 mm ² 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	

TECHNICAL DATA

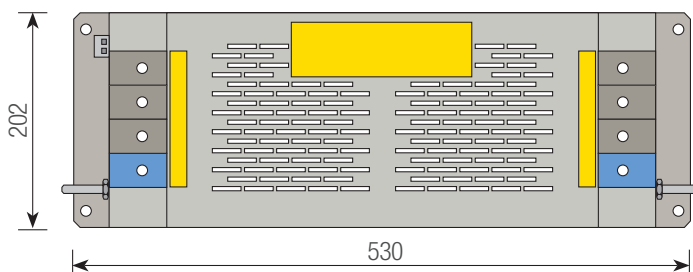
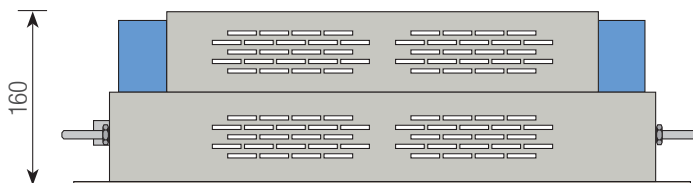
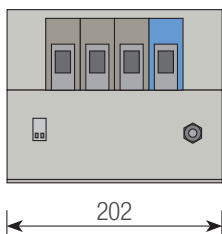
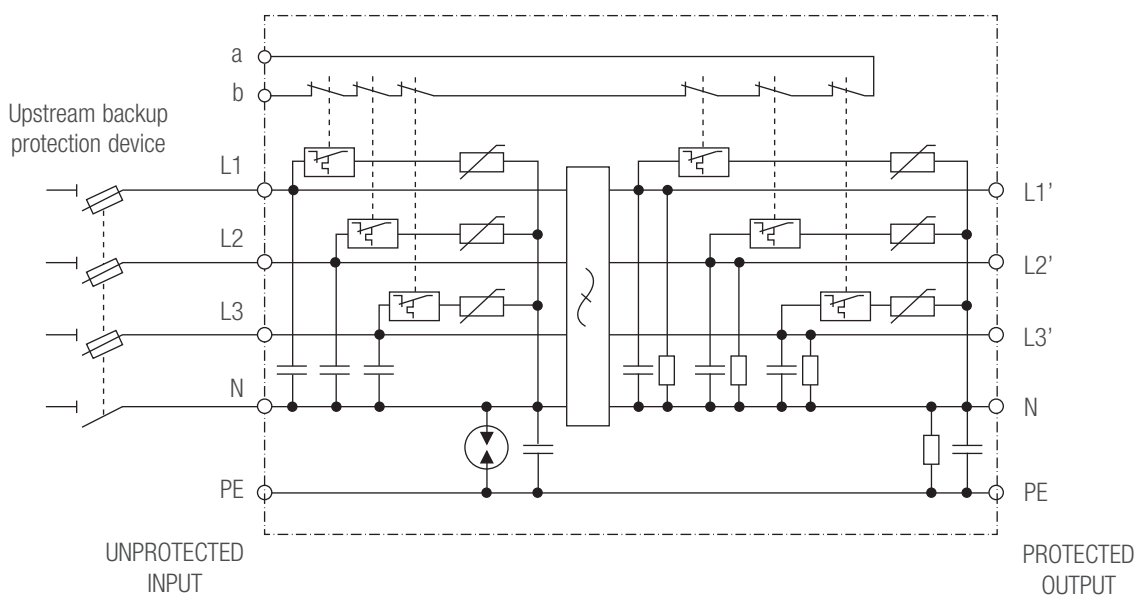
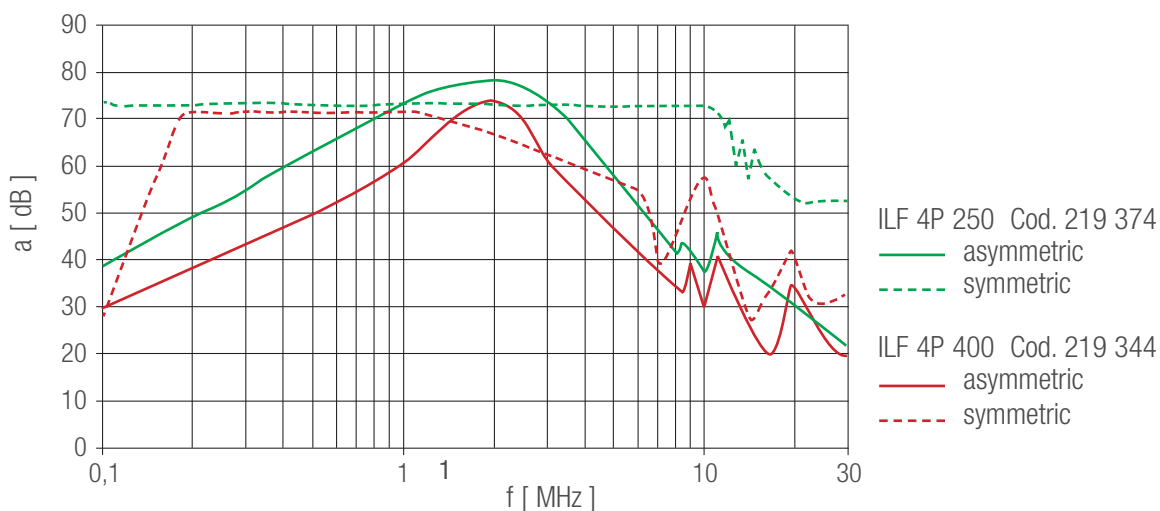
ILF 4P ...



Surge Protective Devices: ZOTUP SPDs with interference filter for direct and indirect lightning effects

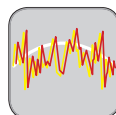


Asymmetric and symmetric attenuation characteristics

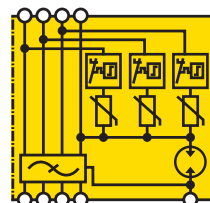




Surge Protective Devices: ZOTUP SPDs with interference filter for indirect lightning effects



ILF 4P...



ILF 4P is a multimode SPD for indirect lightning effects with integrated interference filter for high frequency disturbances, typically installed in three phase plus neutral TN- or 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 61643-1+A1**) and **Type 3** (according to **EN 61643-11/A11**);
- Protects electronic equipment (PLC or computers, etc.) from overvoltages due to indirect lightning effects and from other interferences;
- In case of an SPD failure the protection is disconnected without interrupting the downstream supply. The failure 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.

Model ILF 4P ...

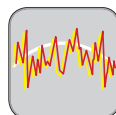
Model ILF 4P ...		32	50	80	120
CODE		219 334	219 354	219 384	219 314
Nominal ac system Voltage	U _N	230/400 V ac			
Maximum Continuous Operating Voltage	U _c	275 V ac			
Rated load current	I _L	32 A	50 A	80 A	120 A
Test class (acc. to IEC 61643-1+ A1(2001))		III			
Type (acc. to EN 61643-11/A11)		T3			
Combination wave impulse	U _{oc}	6 kV / 3 kA (L / N - PE)			
Voltage protection level	U _p	≤ 1,5 kV (L1, L2, L3, N - PE)			
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)			
Temporary OverVoltage (TOV) withstand (L-N; L/N-PE)		335 V 5 s; (1200+230) V / 200 ms			
Asymmetric attenuation		range 0,4 - 10 MHz: ≥ 40 dB / at 1,5 MHz: ≥ 80 dB			
Filter components	CX1 CX2 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	≤ 15 W	≤ 15 W	≤ 25 W
Max. back-up protection with fuse, if not already provided in the upstream installation		32 A	50 A	80 A	120 A
Operating temperature range		- 40 ... + 55 °C			
Terminal - Conductor size		10 mm ²	25 mm ²		50 mm ²
Mounting		vertical on a panel / wall			
Enclosure material		metallic			
Pollution Degree	PD	2			
Degree of protection	IP	10			
Remote signal contact		NC			
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			
Approximate weight		1400 g	1600 g	1710 g	2500 g
Dimensions		1 240 x h 130 x d 57 mm			see the drawing

TECHNICAL DATA

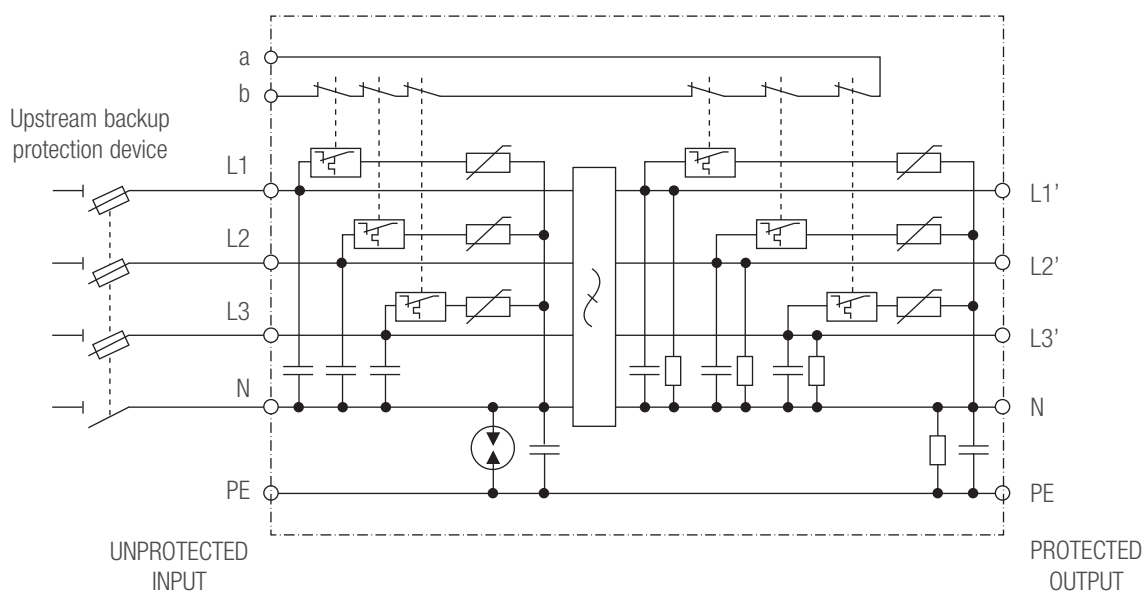
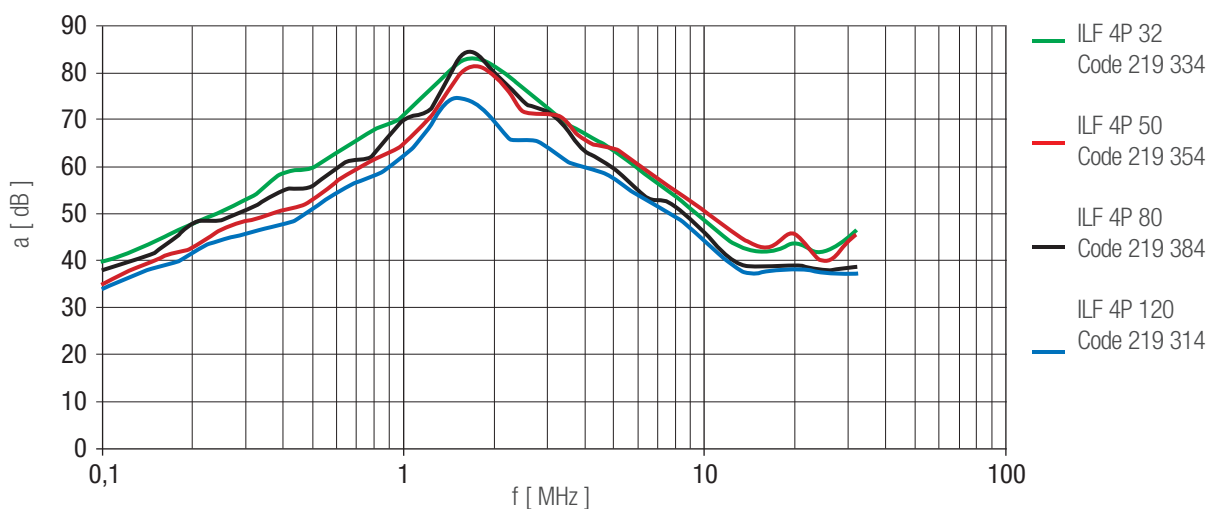
TECHNICAL DATA



Surge Protective Devices: ZOTUP SPDs with interference filter for indirect lightning effects



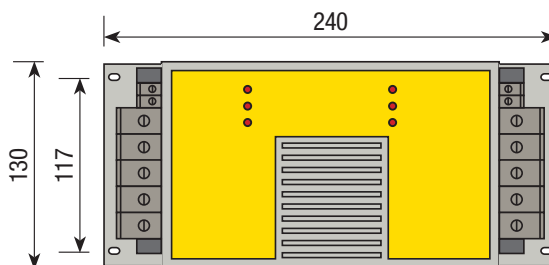
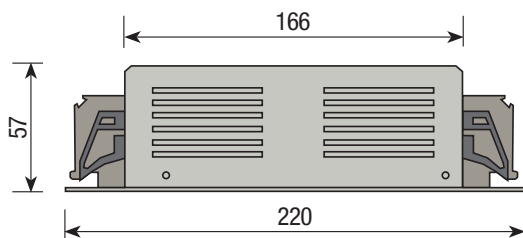
Asymmetric attenuation characteristics



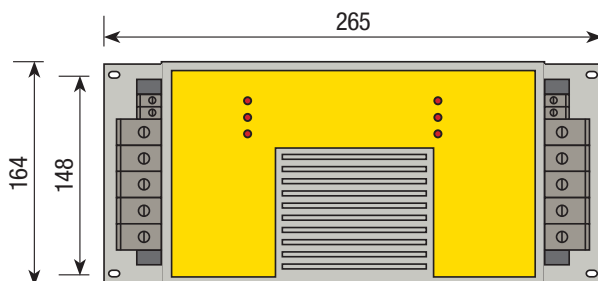
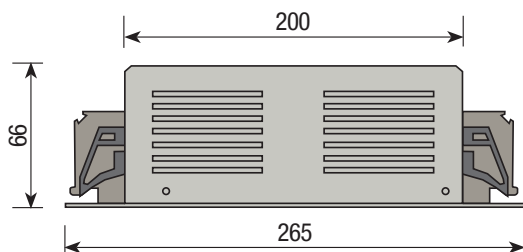
ILF 4P 32
Code 219 334

ILF 4P 50
Code 219 354

ILF 4P 80
Code 219 384

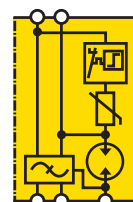
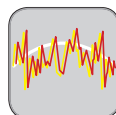


ILF 4P 120
Code 219 314





Surge Protective Devices: ZOTUP SPDs with interference filter for indirect lightning effects



ILF 2P...

ILF 2P is a multimode SPD for indirect lightning effects with integrated interference filter for high frequency disturbances, typically installed in single phase TN- or 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 61643-1+A1**) and **Type 3** (according to **EN 61643-11/A11**);
- Protects electronic equipment (PLC or computers, etc.) from overvoltages due to indirect lightning effects and from other interferences;
- In case of an SPD failure the protection is disconnected without interrupting the downstream supply. The failure 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.

Model ILF 2P ...

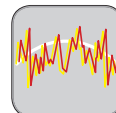
Model ILF 2P ...		32	50	80
CODE		219 330	219 350	219 380
Nominal ac system Voltage	U _N	230 V ac		
Maximum Continuous Operating Voltage	U _c	275 V ac		
Rated load current	I _L	32 A	50 A	80 A
Test class (acc. to IEC 61643-1+ A1(2001))		III		
Type (acc. to EN 61643-11/A11)		T3		
Combination wave impulse	U _{oc}	6 kV / 3 kA (L / N - PE)		
Voltage protection level	U _p	≤ 1,5 kV (L1, L2, L3, N - PE)		
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)		
Temporary OverVoltage (TOV) withstand (L-N; L/N-PE)		335 V 5 s; (1200+230) V / 200 ms		
Asymmetric attenuation		range 0,4 - 10 MHz: ≥ 50 dB / at 3 MHz: ≥ 80 dB		
Filter components	C _x	150 nF	220 nF	220 nF
	C _Y	22 nF	22 nF	22 nF
	L	2,2 mH	2,2 mH	1,4 mH
Power dissipation		≤ 5 W	≤ 7 W	≤ 12 W
Max. back-up protection with fuse, if not already provided in the upstream installation		32 A	50 A	80 A
Operating temperature range		- 40 ... + 55 °C		
Terminal - Conductor size		10 mm²	25 mm²	
Mounting		vertical on a panel / wall		
Enclosure material		metallic		
Pollution Degree	PD	2		
Degree of protection	IP	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		870 g	920 g	950 g
Dimensions		l 187 x h 97 x d 57 mm		

TECHNICAL DATA

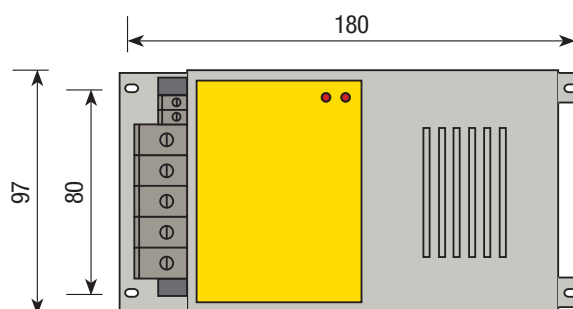
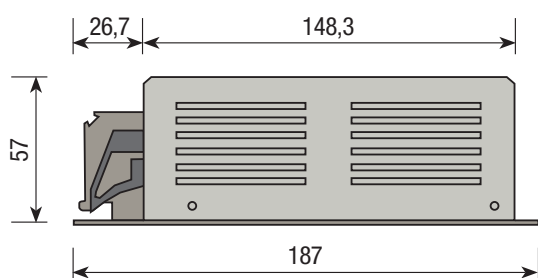
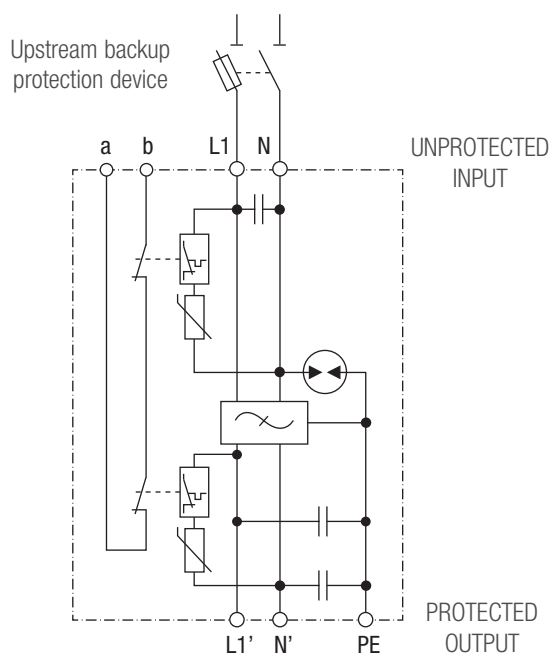
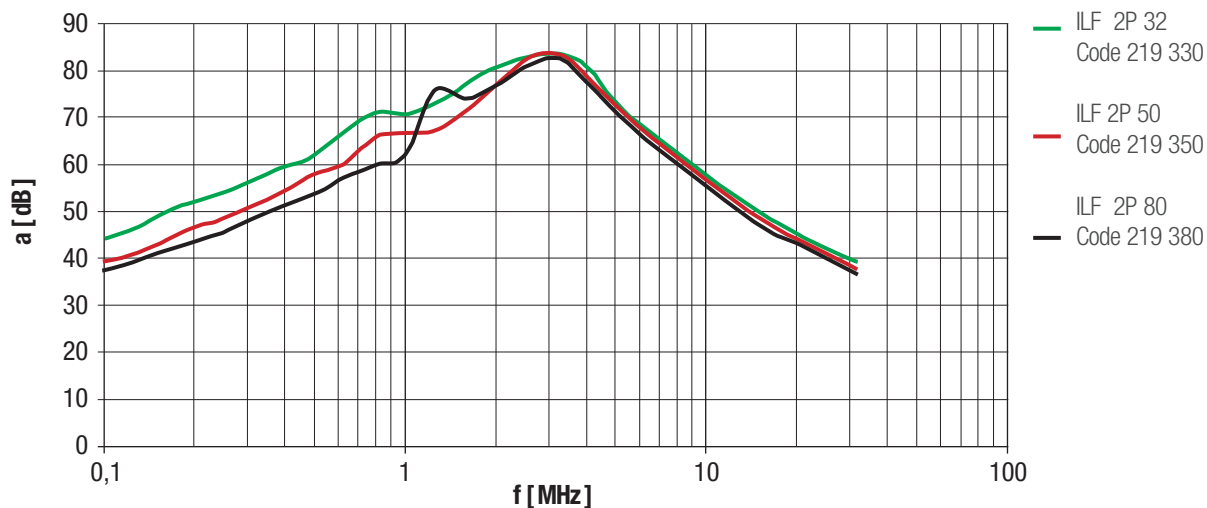
Upon request the ILF 2P type SPD can be supplied with other impulse current and voltage ratings.



Surge Protective Devices: ZOTUP SPDs with interference filter for indirect lightning effects

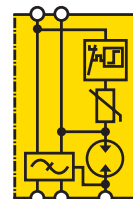
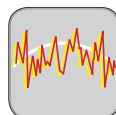


Asymmetric attenuation characteristics





Surge Protective Devices: ZOTUP SPDs with interference filter for indirect lightning effects



ILF 2P... DIN

ILF 2P DIN is a multimode SPD for indirect lightning effects with integrated interference filter for high frequency disturbances, typically installed in single phase TN- or 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 61643-1+A1) and **Type 3** (according to EN 61643-11/A11);
- Protects electronic equipment (PLC or computers, etc.) from overvoltages due to indirect lightning effects and from other interferences
- In case of an SPD failure the protection is disconnected without interrupting the downstream supply. The failure 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.

Model ILF 2P ...

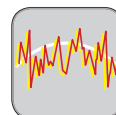
		8 DIN	16 DIN	25 DIN
CODE		209 310	209 320	209 325
Nominal ac system Voltage	U_N	230 V ac		
Maximum Continuous Operating Voltage	U_c	275 V ac		
Rated load current	I_L	8 A	16 A	25 A
Test class (acc. to IEC 61643-1+A1 (2001))		III		
Type (acc. to EN 61643-11/A11)		T3		
Combination wave impulse	U_{oc}	6 kV / 3 kA (L / N - PE)		
Voltage protection level	U_p	$\leq 1,5$ kV (L1, L2, L3, N - PE)		
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)		
Temporary OverVoltage (TOV) withstand (L-N; L/N-PE)		335 V 5 s; (1200+230) V / 200 ms		
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 μ H	19 μ H	7 μ H
Power dissipation		≤ 1 W	$\leq 1,6$ W	$\leq 1,3$ W
Max. back-up protection with fuse, if not already provided in the upstream installation		8 A	16 A	25 A
Operating temperature range		- 40 ... + 55 °C		
Terminal - Conductor size		2,5 - 4 mm ²	4 - 6 mm ²	6-16 mm ²
Mounting		DIN rail 35 mm EN 50 022		
Enclosure material		thermoplastic		
Pollution Degree	PD	2		
Degree of protection	IP	20		
Remote signal contact		NC		
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		
Approximate weight		170 g	205 g	215 g
Dimensions: Width		52,5 mm (3 modules)	70 mm (4 modules)	

TECHNICAL DATA

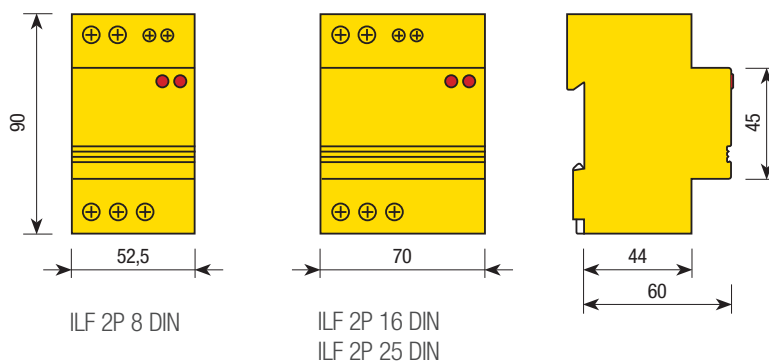
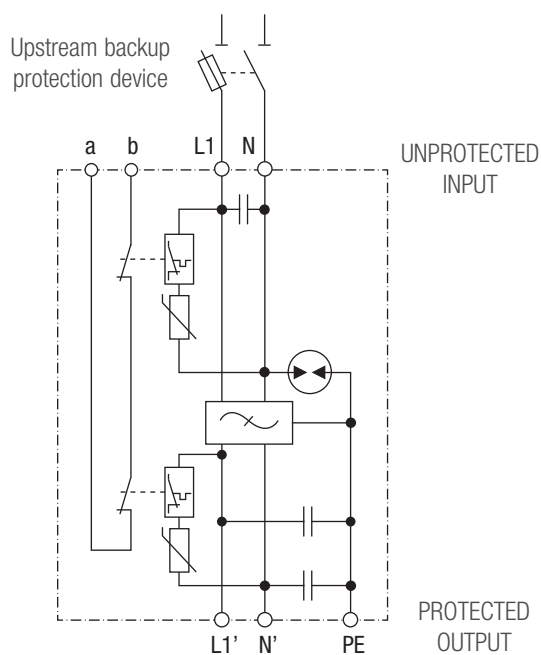
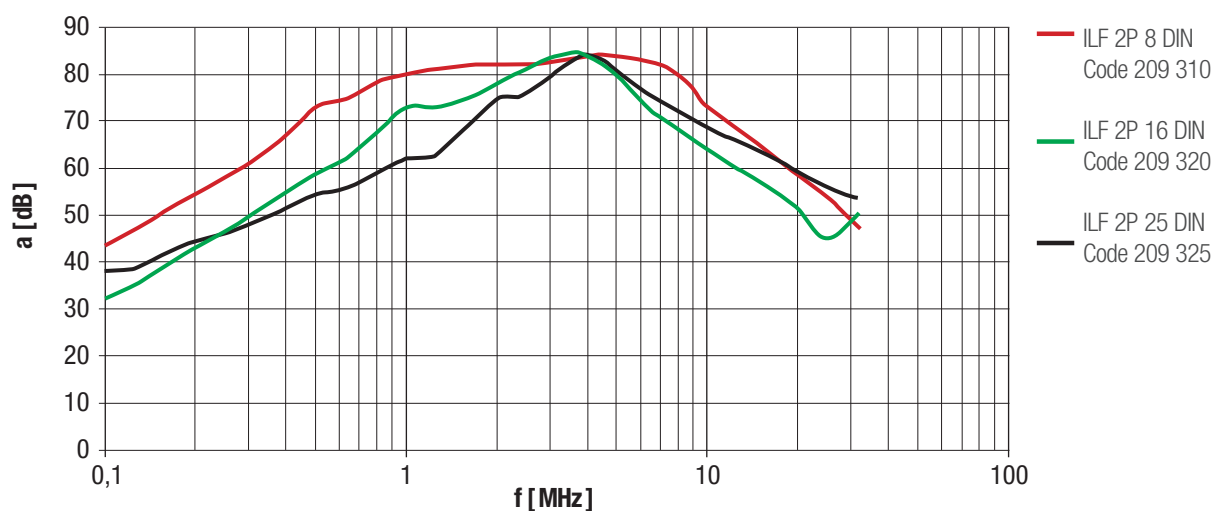
Upon request the ILF 2P type SPD can be supplied with other impulse current and voltage ratings.



Surge Protective Devices: ZOTUP SPDs with interference filter for indirect lightning effects

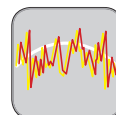


Asymmetric attenuation characteristics

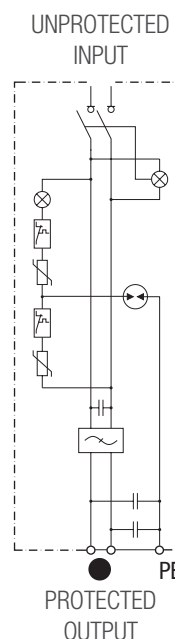
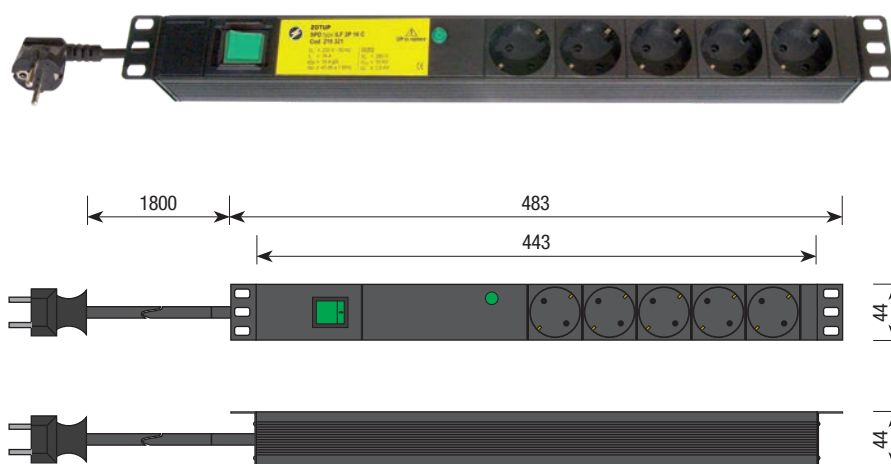




Surge Protective Devices: ZOTUP SPDs with interference filter for indirect lightning effects



ILF 2P C16



ILF 2P C 16 is a multimode SPD for indirect lightning effects with integrated interference filter for high frequency disturbances, for connection to single phase socket outlets to protect sensitive electronic equipment like computers, printers, switches, hubs, with the following features and benefits:

- **Impulse test classification: Test Class III** (according to **IEC 61643-1+A1**) and **Type 3** (according to **EN 61643-11/A11**);
- Providing 5 protected Schuko socket outlets with a maximum total load of 3.680 W;
- Visual indicator for the power ON-state (red light) and for the operating state of the protection circuitry (green LED);
- 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;
- Equipped with adjustable mounting brackets for 19" racks or panels, for easy installation on the front or on the back of 19" racks.

Model ILF 2P C16

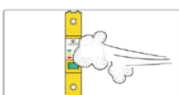
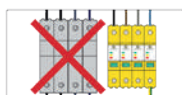
CODE		219 321
Nominal ac system Voltage	U_N	230 V ac
Maximum Continuous Operating Voltage	U_c	260 V ac
Rated load current (5 socket outlets total)	I_L	16 A
Maximum power consumption (5 socket outlets total)	P	3.680 W
Mains switch		2-pole with indicator light (green)
Protected socket outlets		5 Schuko-type rated 16 A
SPD status indicator		green LED
Test class (acc. to IEC 61643-1)		III
Type (acc. to EN 61643-11/A11)		T3
Combination wave impulse	U_{oc}	6 kV / 3 kA (L / N - PE)
Voltage protection level	U_p	$\leq 1,5$ kV (L - N; N - PE)
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)
Temporary OverVoltage (TOV) withstand (L-N; L/N-PE)		335 V 5 s; (1200+230) V / 200 ms
Asymmetric and Symmetric attenuation		≥ 43 dB at 1 MHz
Insulation resistance	R_{isol}	≥ 10 G Ω
Operating temperature range		- 25 ... + 40 °C
Enclosure material		extruded aluminium
Mounting		rack 19" or panel/desk
Pollution Degree	PD	2
Degree of protection	IP	20
Approximate weight		740 g
Dimensions		l 443 x h 44 x d 44 mm

TECHNICAL DATA

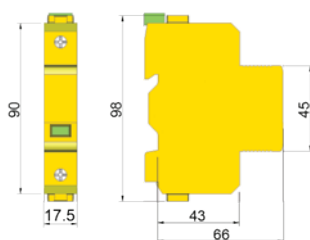




**SPDs FOR DC AND
FOR PHOTOVOLTAIC SYSTEMS**



Surge Protective Devices: ZOTUP SPDs for DC



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: Test class I and II / Type 1 and 2** (based on IEC/EN 61643-11);
- **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.**

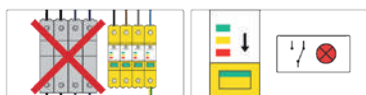
Model L 7/30 DC ...

		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 (based on IEC 61643-11 Ed. 1.0 2011-03)		II	II	I and II	I and II	I and II
Type (based on EN 61643-11 2012-10)		T2	T2	T1 and T2	T1 and T2	T1 and T2
Impulse discharge current (10/350 μ s)	I_{imp}	-	-	7 kA	7 kA	5 kA
Charge	Q	-	-	3,6 As	3,6 As	2,9 As
Nominal discharge current (8/20 μ s)	I_n	20 kA	20 kA	20 kA	20 kA	20 kA
Max. discharge current (8/20 μ s)	I_{max}	30 kA	30 kA	40 kA	40 kA	40 kA
Voltage protection level at a discharge current of:	1 kA	$U_p \leq 0,22$ kV	$\leq 0,42$ kV	$\leq 0,80$ kV	$\leq 1,20$ kV	$\leq 1,85$ kV
	7 kA	$U_p \leq 0,30$ kV	$\leq 0,55$ kV	$\leq 1,10$ kV	$\leq 1,46$ kV	$\leq 2,25$ kV
	20 kA	$U_p \leq 0,50$ kV	$\leq 0,80$ kV	$\leq 1,30$ kV	$\leq 1,90$ kV	$\leq 2,75$ kV
Response time	t_a	≤ 25 ns				
End of Life		OCFM (Open Circuit Failure Mode)				
Short Circuit Current rating without backup protection (internal disconnecter)	I_{scrr}	1000 A	1000 A	1000 A	500 A	200 A
Short Circuit Current rating with max. backup protection fuse	I_{scrr}	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 disconnecter operation)		3 colours with progressive performance indication				
Operating temperature range / Humidity		-40 ... +80 °C (extended) / 5% ... 95%				
Terminal - Conductor size		4-35 mm² flexible				
Busbar connections		fork-type busbar 16 mm²				
Mounting		indoor, 35 mm top hat DIN rail				
Case material / Flammability grade		BMC / V-0 in accordance with UL 94				
Pollution degree	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				

TECHNICAL DATA

Model L 7/30 DC ... with remote signal contact

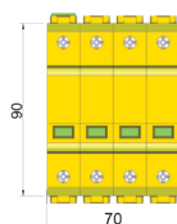
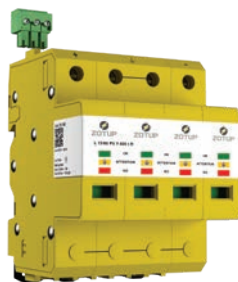
		60 t ff	110 t ff	230 t ff	600 t ff	1000 t ff
CODE		210 602	210 603	210 600	210 606	210 610
Remote signal contact		potential-free changeover contact				
Terminal - conductor size for remote signal contact		max. 1,5 mm² flexible				
Switching capacity remote signal contact		ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A				



Surge Protective Devices: ZOTUP SPDs for photovoltaic systems

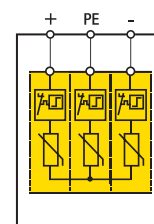
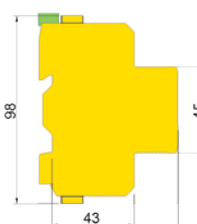


L 13/60 PV Y ... ff



Cod. 216 106

Cod. 216 110



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: Type 1 and Type 2** (according to IEC/EN 61643-31);
- **High short circuit current rating without backup protection** $I_{scpv} = 1000\text{ A}$ 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. Continuous Operating Voltage.**

Model L 13/60 PV Y ...

		600 ff		1000 ff	
CODE		216 106		216 110	
Maximum Continuous 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 μ s) (all modes)	I_{imp}	7 kA		5 kA	
Nominal discharge current (8/20 μ s) (all modes)	I_n	20,0 kA			
Total discharge current (10/350 μ s) DC+ and DC- $\rightarrow$ PE	$I_{TOTAL\ 10/350}$	13 kA		10 kA	
Total discharge current (8/20 μ s) DC+ and DC- $\rightarrow$ PE	$I_{TOTAL\ 8/20}$	40,0 kA			
Max. discharge current (8/20 μ s)	I_{max}	40,0 kA			
Voltage protection level at a discharge current of (all modes)	5 kA	U_p	$\leq 2,20\text{ kV}$	U_p	$\leq 3,00\text{ kV}$
	10 kA	U_p	$\leq 2,30\text{ kV}$	U_p	$\leq 3,30\text{ kV}$
	12,5 kA	U_p	$\leq 2,35\text{ kV}$	U_p	$\leq 3,50\text{ kV}$
	15 kA	U_p	$\leq 2,40\text{ kV}$	U_p	$\leq 3,80\text{ kV}$
	20 kA	U_p	$\leq 2,50\text{ kV}$	U_p	$\leq 5,00\text{ kV}$
Response time	t_a	$\leq 25\text{ ns}$			
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		$-40 \dots +80\text{ }^\circ\text{C}$ (extended) / 5% ... 95%			
Terminal-Conductor size		4-35 mm ² flexible			
Mounting		indoor, 35 mm top hat DIN rail			
Case material / Flammability grade		BMC / V-0 according to UL 94			
Pollution degree	PD	2			
Degree of protection	IP	20 (built-in)			
Approximate weight		450 g		640 g	
Dimensions: width		70 mm (4 moduli)			

TECHNICAL DATA

Model L 13/60 PV Y... with remote signal contact

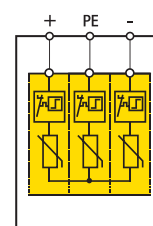
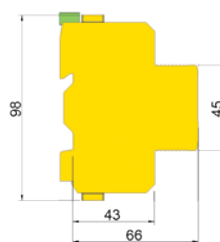
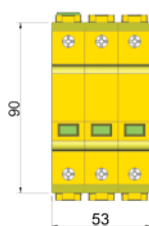
		600 t ff		1000 t ff	
CODE		216 116		216 126	
Remote signal contact		potential-free changeover contact			
Terminal - conductor size for remote signal contact		max. 1,5 mm ² flexible			
Switching capacity remote signal contact		ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A			



Surge Protective Devices: ZOTUP SPDs for photovoltaic systems



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: Type 2** (according to IEC/EN 61643-31);
- **High short circuit current rating without backup protection** $I_{scpv} = 1000 \text{ A}$ 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. Continuous Operating Voltage.**

Model L 3/40 PV Y ...

600 ff

1000 ff

CODE			210 106	210 110
Maximum Continuous 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- $\rightarrow$ PE		$I_{TOTAL \ 8/20}$	40,0 kA	
Max. discharge current (8/20 μs)		I_{max}	40,0 kA	
Voltage protection level at a discharge current of (all modes)	5 kA	U_p	$\leq 2,20 \text{ kV}$	$\leq 3,00 \text{ kV}$
	10 kA	U_p	$\leq 2,30 \text{ kV}$	$\leq 3,30 \text{ kV}$
	12,5 kA	U_p	$\leq 2,40 \text{ kV}$	$\leq 3,50 \text{ kV}$
	15 kA	U_p	$\leq 2,50 \text{ kV}$	$\leq 4,20 \text{ kV}$
	20 kA	U_p	$\leq 2,70 \text{ kV}$	$\leq 5,00 \text{ kV}$
Response time		t_a	$\leq 25 \text{ ns}$	
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			$-40 \dots +80 \text{ }^\circ\text{C}$ (extended) / 5% ... 95%	
Terminal-Conductor size			4-35 mm ² flexible	
Mounting			indoor, 35 mm top hat DIN rail	
Case material / Flammability grade			BMC / V-0 according to UL 94	
Pollution degree		PD	2	
Degree of protection		IP	20 (built-in)	
Approximate weight			330 g	450 g
Dimensions: width			53 mm (3 modules)	

TECHNICAL DATA

Model L 3/40 PV Y ...with remote signal contact

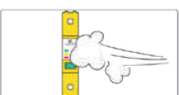
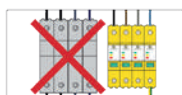
600 t ff

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 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	



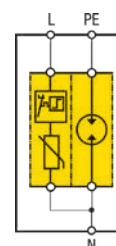
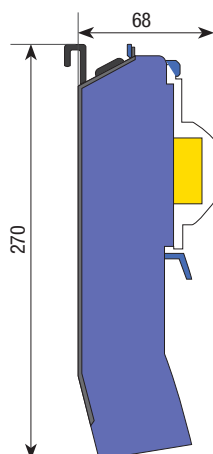
SPDs FOR PUBLIC LIGHTING



Surge Protective Devices: ZOTUP SPDs for public lighting applications



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:

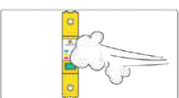
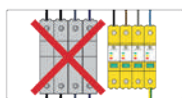
- **Impulse test classification: Test class I and II / Type 1 and 2** (according to IEC/EN 61643-11);
- Combination type SPD for the protection of street lighting luminaires against direct and indirect lightning effects;
- **Backup protection is not required with an upstream MCB ≤ 125 A or up to an $I_{sccr} \leq 4$ 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);**
- Housing providing a degree of protection equal to IP 54, equipped with a transparent viewing window that allows checking of the 3 colour status indicator with progressive performance indication;
- 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 (acc. to IEC 61643-11 Ed. 1.0 2011-03)		I and II
Type (acc. to EN 61643-11 2012-10)		T1 and T2
Impulse discharge current (10/350 μ s) (L-N)	I_{imp}	7 kA
Impulse discharge current (10/350 μ s) (N-PE)	I_{imp}	52 kA
Charge (L-N)	Q	3,6 As
Charge (N-PE)	Q	26 As
Nominal discharge current (8/20 μ s) (L-N)	I_n	30 kA
Nominal discharge current (8/20 μ s) (N-PE)	I_n	52 kA
Max. discharge current (8/20 μ s) (L-N)	I_{max}	40 kA
Max. discharge current (8/20 μ s) (N-PE)	I_{max}	70 kA
Voltage protection level (L-N) at a discharge current of	1 kA	$U_p \leq 0,85$ kV
	7 kA	$U_p \leq 1,20$ kV
	20 kA	$U_p \leq 1,35$ kV
	25 kA	$U_p \leq 1,47$ kV
	30 kA	$U_p \leq 1,60$ kV
Voltage protection level (N-PE)	U_p	$\leq 1,50$ kV
Response time (L-N / N-PE)	t_a	≤ 25 ns / ≤ 100 ns
End of life		OCFM (open circuit failure mode)
Short Circuit Current rating <u>without backup protection (internal disconnector)</u>	I_{sccr}	4 kA rms
Short Circuit Current rating with max. backup protection fuse (L)	I_{sccr}	100 kA rms
Max. back-up protection with up-stream MCB with a max. let-through energy of (max. prospective short circuit current depends on the MCB breaking capability)		≤ 125 A (max. $4,50 \times 10^5$ A ² s)
Max. back-up protection with FUSE at prospective short circuit currents of		125 A gG at >4 -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
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	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

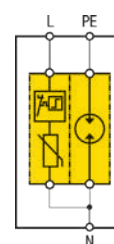
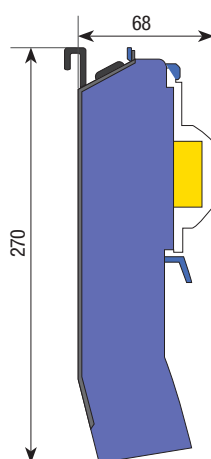
TECHNICAL DATA



Surge Protective Devices: ZOTUP SPDs for public lighting applications



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 / Type 2** (according to IEC/EN 61643-11);
- Combination type SPD for the protection of street lighting luminaires against indirect lightning effects;
- **Backup protection is not required with an upstream MCB ≤ 125 A or up to an $I_{sccr} \leq 4$ 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);**
- Housing providing a degree of protection equal to IP 54, equipped with a transparent viewing window that allows checking of the 3 colour status indicator with progressive performance indication;
- The special SPD case material allows to match with Pollution Degree 3 requirements.

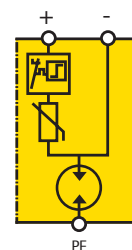
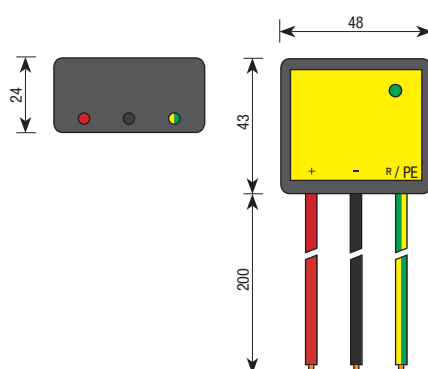
Model LLP 2/10

CODE		230 ff 1+1
		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 (acc. to IEC 61643-11 Ed. 1.0 2011-03)		II
Type (acc. to EN 61643-11 2012-10)		T2
Nominal discharge current (8/20 μ s)	I_n	10 kA
Max. discharge current (8/20 μ s)	I_{max}	20 kA
Voltage protection level (L-N) at a discharge current of	1 kA	$U_p \leq 1,00$ kV
	5 kA	$U_p \leq 1,10$ kV
	10 kA	$U_p \leq 1,25$ kV
Voltage protection level (N-PE)	U_p	$\leq 1,50$ kV
Response time (L-N / N-PE)	t_a	≤ 25 ns / ≤ 100 ns
End of life		OCFM (open circuit failure mode)
Short Circuit Current rating without backup protection (internal disconnecter)	I_{sccr}	4 kA rms
Short Circuit Current rating with max. backup protection fuse (L)	I_{sccr}	50 kA rms
Max. back-up protection with up-stream MCB with a max. let-through energy of (max. prospective short circuit current depends on the MCB breaking capability)		≤ 125 A (max. $4,50 \times 10^5$ A ² s)
Max. back-up protection with FUSE at prospective short circuit currents of		125 A gG at $>4-50$ 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 disconnecter 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
Mounting		indoor, 35 mm top hat DIN rail
Case material / Flammability grade		BMC / V-0 in accordance with UL 94
Pollution degree	PD	3
Degree of protection	IP	54 (built-in)
Approximate weight		260 g
Dimensions		168 x h 270 x d 44 mm
Certifications / Quality Mark		CB, STC issued by OVE / KEMA-KEUR

TECHNICAL DATA



Surge Protective Devices: ZOTUP SPDs for LED public lighting applications



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 61643-1 + A1**) and **Type 2** (according to **EN 61643 – 11/A11**);
- 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 $O_b - 1$ and higher according to the lightning protection zones concept.

Model IL 1/10 2P LED ...

CODE		230	320	440
		242 101	242 102	242 103
Maximum Continuous Operating Voltage	U_c	300 V dc	385 V dc	565 V dc
Test Class (acc. to IEC 61643-1 + A1-2001)		II		
Type (acc. to EN 61643-11/A11)		T2		
Total discharge current 8/20 μ s	I_{Total}	20 kA		
Nominal discharge current 8/20 μ s (+/- to PE)	I_n	10 kA		
Maximum discharge current 8/20 μ s (+/- 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 mm ² ; l = 200 mm		
Enclosure material		thermoplastic		
Pollution degree	PD	2		
Degree of protection	IP	20		
Approximate weight		60 g		
Dimensions		l 48 x h 43 x d 24 mm		

TECHNICAL DATA



SPDs for TELECOMMUNICATION and SIGNALLING

TELECOMMUNICATION and SIGNALLING SPDs (ICONS FOR SPD SELECTION)



Protection against direct and indirect lightning effects



Protection against indirect lightning effects

SPDS FOR TELECOMMUNICATION AND SIGNALLING APPLICATIONS

Typical installation: in series with the signal/telecommunication circuit for equipment 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 D1, C2 and C3 (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 accidental 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 mm top hat DIN rail and by screwless spring type termination of the cable screen.

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 TELECOMMUNICATION and SIGNALLING

SPD	Model	Application icon	Impulse rating/ Category	Impulse discharge current (10/350 μ s) per wire	Nominal discharge current (8/20 μ s) per wire	Connection technique	Page
	S-ASI 5		D1, C2	2,5 kA	10 kA	screw type terminals	96
	S-ASI 12		D1, C2	2,5 kA	10 kA	screw type terminals	96
	S-ASI 15		D1, C2	2,5 kA	10 kA	screw type terminals	96
	S-ASI 24		D1, C2	2,5 kA	10 kA	screw type terminals	96
	S-ASI 30		D1, C2	2,5 kA	10 kA	screw type terminals	97
	S-ASI 48		D1, C2	2,5 kA	10 kA	screw type terminals	97
	S-ASI 60		D1, C2	2,5 kA	10 kA	screw type terminals	97
	S-ASI 110		D1, C2	2,5 kA	10 kA	screw type terminals	97
	S-AS 2 24		C2	-	10 kA	screw type terminals	98
	S-AS 2 30		C2	-	10 kA	screw type terminals	98
	S-AS 2 48		C2	-	10 kA	screw type terminals	98
	S-AS 2 24/1		C2	-	2 kA	screw type terminals	98
	S-AS 2 48/1		C2	-	2 kA	screw type terminals	98

With Coaxial connectors

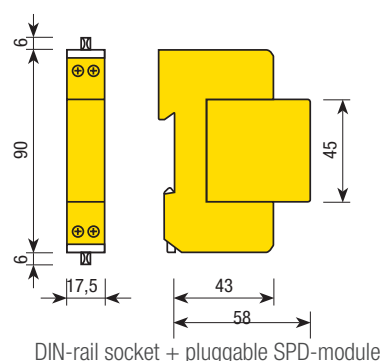
SPD	Model	Application icon	Impulse rating/ Category	Impulse discharge current (10/350 μ s) per wire	Nominal discharge current (8/20 μ s) per wire	Connector type	Page
	C 5		C2	-	5 kA	F	99
	C 6		C2	-	1 kA	BNC	100
	C 7		D1, C2	3 kA	10 kA	7/16 M/F	101
	C 8		D1, C2	2 kA	5 kA	7/16 M/F	101



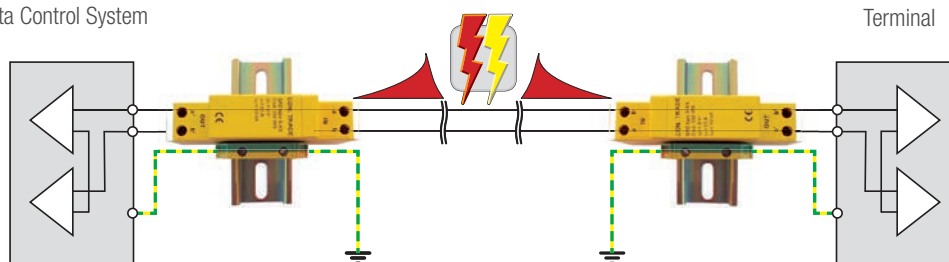
Surge Protective Devices: ZOTUP SPDs for telecommunication + signalling



S-ASI ...



Data Control System



Terminal

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

- Common mode and differential mode protection make it particularly suitable for signal circuits between equipment with reference ground;
- Providing protection against direct and indirect lightning effects;
- Earth/protective ground (PG) connection via 35 mm DIN rail (according to EN 50022) and by screwless spring type termination for the cable screen. Upon request, the SPD can be equipped with a Gas Discharge Tube (GDT) inserted in the earth/ground connection for galvanic isolation;
- Suitable for installation at LPZ boundaries up to $O_A - 2$ in accordance with the lightning protection zones concept;
- The behaviour of the SPD is in Short Circuit failure mode when reaching the end of the life;
- Note: Equipment protection at both ends of the telecommunication/signal line is essential (see above schematics).

RS 485
RS 422

4-20 mA

Model S-ASI ...

5

12

15

24

CODE		340 005	340 012	340 015	340 024
SPD impulse rating/Category		D1, C2, C3			
Nominal Voltage	U_N	5 V dc/3,7 V ac	12 V dc/9 V ac	15 V dc/12 V ac	24 V dc/18 V ac
Maximum Continuous Operating Voltage	U_c	6 V dc	15 V dc	18 V dc	28 V dc
Rated Current	I_L	1 A			
Total impulse discharge current (10/350 μ s) - category D1	$I_{Total\ 10/350}$	5 kA			
Impulse discharge current (10/350 μ s) per wire - category D1	I_{imp}	2,5 kA			
Total discharge current (8/20 μ s) - category C2	$I_{Total\ 8/20}$	20 kA			
Nominal discharge current (8/20 μ s) per wire - category C2	I_n	10 kA			
Voltage protection level at 1 kV/ μ s (all modes) - category C3	U_p	≤ 11 V	≤ 26 V	≤ 32 V	≤ 41 V
Cutoff frequency (-3 dB)		0,6 MHz	0,9 MHz	1,2 MHz	1,4 MHz
Longitudinal impedance/resistance	R	2 Ω			
Operating temperature range		-25 ... +70 °C			
Terminal - conductor size		max. 2,5 mm ² flexible			
Mounting		DIN rail 35 mm EN 5002			
Housing		thermoplastic			
Degree of protection	IP	20			
Approximate weight		50 g			
Dimension: width		17,5 mm (1 module)			

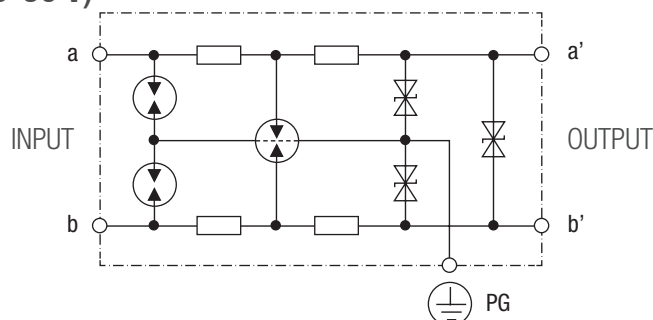
TECHNICAL DATA



Surge Protective Devices: ZOTUP SPDs for telecommunication + signalling

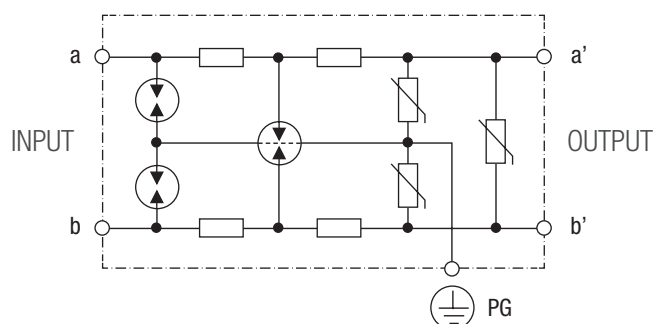


MODEL S-ASI (5-60 V)



Typical protection scheme for the following standards: RS 485 e RS 422, 24 V-, 4-20 mA. For applications where a high discharge capability is required.

MODEL S-ASI (110 V)



Typical protection scheme for TELECOM analogue signal. For applications where a high discharge capability is required.

Model S-ASI ...

CODE		30	48	60	110
SPD impulse rating / Category		340 030	340 048	340 060	340 110
Nominal Voltage	U_N	30 V dc/21 V ac	48 V dc/34 V ac	60 V dc/41 V ac	120 V dc/110 V ac
Maximum Continuous Operating Voltage	U_c	33 V dc	52 V dc	64 V dc	160 V dc
Rated Current	I_L	1A			
Total impulse discharge current (10/350 μ s) - category D1	$I_{Total\ 10/350}$	5 kA			
Impulse discharge current (10/350 μ s) per wire - category D1	I_{imp}	2,5 kA			
Total discharge current (8/20 μ s) - category C2	$I_{Total\ 8/20}$	20 kA			
Nominal discharge current (8/20 μ s) per wire - category C2	I_n	10 kA			
Voltage protection level at 1 kV/ μ s (all modes) - category C3	U_p	≤ 47 V	≤ 73 V	≤ 92 V	≤ 310 V
Cutoff frequency (-3dB)		1,8 MHz	2,29 MHz	3 MHz	8 MHz
Longitudinal impedance/resistance	R	2 Ω			
Operating temperature range		-25 ... +70 $^{\circ}$ C			
Terminal - conductor size		max. 2,5 mm ² flexible			
Mounting		DIN rail 35 mm EN 5002			
Enclosure material		thermoplastic			
Degree of protection	IP	20			
Approximate weight		50 g			
Dimesnions: width		17,5 mm (1 module)			

TELECOM
analogue

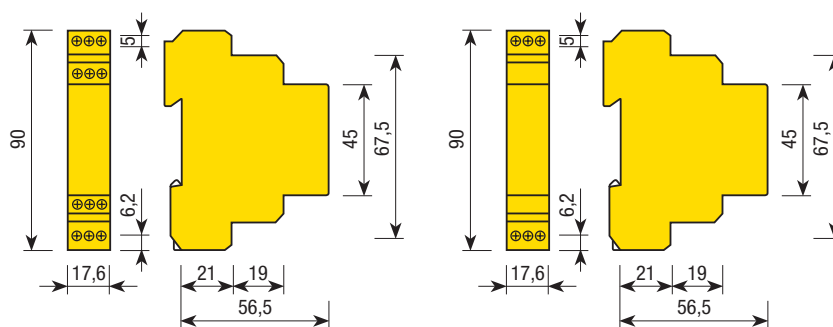
TECHNICAL DATA



Surge Protective Devices: ZOTUP SPDs for telecommunication + signalling

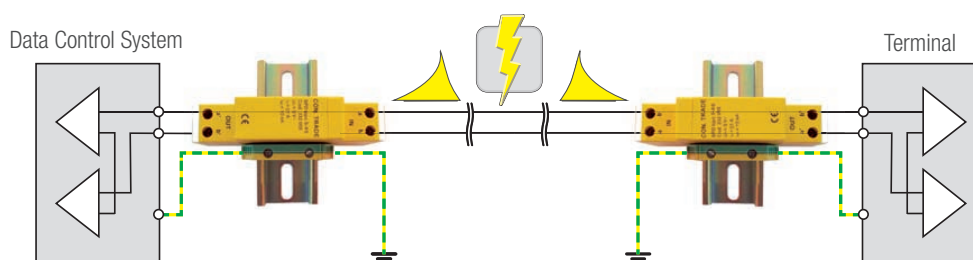


S-AS 2 ...



S-AS 2 24 Cod. 302 024
S-AS 2 30 Cod. 302 030
S-AS 2 48 Cod. 302 048

S-AS 2 24 Cod. 302 524
S-AS 2 48 Cod. 302 548



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

- Common mode and differential mode protection make it particularly suitable for signal circuits between equipment with reference ground;
- Very efficient protection providing a low voltage protection level U_p ;
- Providing protection against direct and indirect lightning effects;
- Earth/ground connection via 35 mm DIN rail (according to EN 50022) and by screwless spring type termination of the cable screen;
- Suitable for installation at LPZ boundaries up to $O_b -2$ in accordance with the lightning protection zones concept;
- The behaviour of the SPD is in Short Circuit failure mode when reaching the end of the life;
- Note: Equipment protection at both ends of the telecommunication/signal line is essential (see above schematics).

Model S-AS 2 ...

		24	30	48	24/1	48/1
CODE		302 024	302 030	302 048	302 524	302 548
SPD impulse rating/Category		C2, C3				
Protected lines		2	2	2	1	1
Nominal Voltage	U_N	24 V dc/18 V ac	30 V dc/21 V ac	48 V dc/34 V ac	24 V dc/18 V ac	48 Vdc/34 V ac
Maximum Continuous Operating Voltage	U_c	28 V dc	33 V dc	52 V dc	28 V dc	52 V dc
Rated Current	I_L	500 mA	500 mA	500 mA	5 A	5 A
Total discharge current (8/20 μ s) - category C2	$I_{Total\ 8/20}$	10 kA	10 kA	10 kA	2 kA	2 kA
Nominal discharge current (8/20 μ s) per wire - category C2	I_n	2,5 kA	2,5 kA	2,5 kA	1 kA	1 kA
Voltage protection level at 1 kV/ μ s (wire-wire) - category C3	U_p	≤ 34 V	≤ 54 V	≤ 66 V	≤ 50 V	≤ 120 V
Voltage protection level at 1 kV/ μ s (wire-PG) - category C3	U_p	≤ 500 V				
Cutoff frequency (-3 dB)		1 MHz	1 MHz	1 MHz	-	-
Longitudinal impedance/resistance	Z	5 μ H	5 μ H	5 μ H	-	-
Operating temperature range		- 40 ... + 80 °C				
Terminal - conductor size		max. 2,5 mm ² flexible				
Mounting		DIN rail 35 mm EN 50 022				
Housing		thermoplastic				
Degree of protection	IP	20				
Approximate weight		45 g				
Dimension: width		17,5 mm (1 module)				

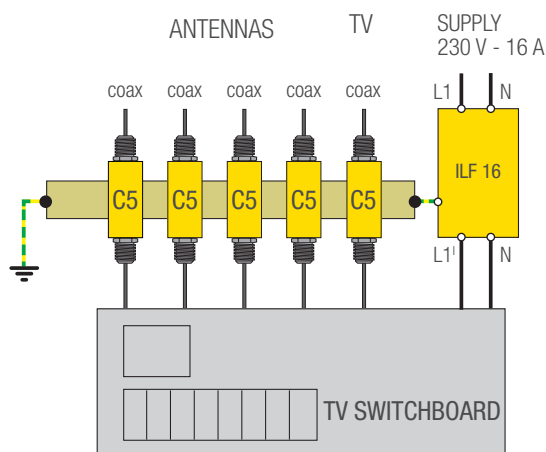
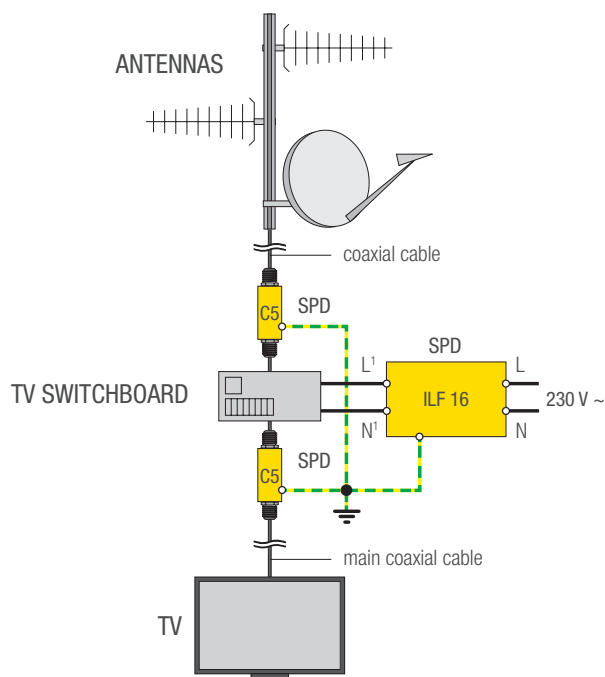
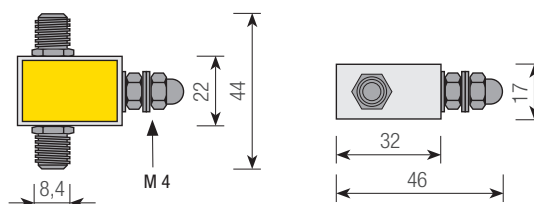
TECHNICAL DATA



Surge Protective Devices: ZOTUP SPDs for coaxial connectors



C 5



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

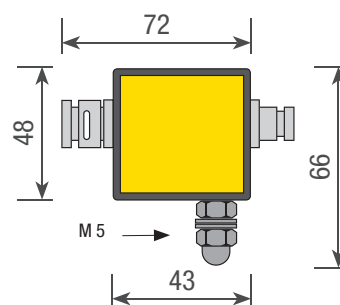
- Particularly suitable for applications with coaxial cables longer than 40 m. (cable from the antenna to the switchboard or main cable from the television to the switchboard);
- Easy to install by fixing and connecting the SPD to ground via an integrated M4 bolt (through the equipotential bonding bar);
- Suitable for installation at LPZ boundaries up to $O_b - 2$ 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 an ILF 2P 16 DIN type SPD (Code 209 320).

Model C 5

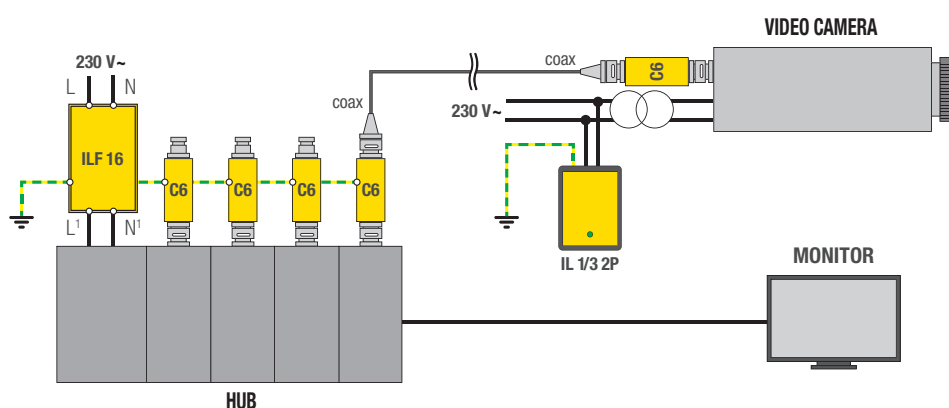
CODE		351 075	TECHNICAL DATA
SPD impulse rating/Category		C2, C3	
Impedance		75 Ω	
Frequency range	f	up to 2,15 GHz	
Maximum Continuous Operating Voltage	U_c	75 V	
Nominal discharge current (8/20 μ s) - category C2	I_n	5 kA	
Voltage protection level at 1 kV/ μ s - category C3	U_p	≤ 600 V	
Typical attenuation	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	



Surge Protective Devices: ZOTUP SPDs for coaxial connectors



C 6



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

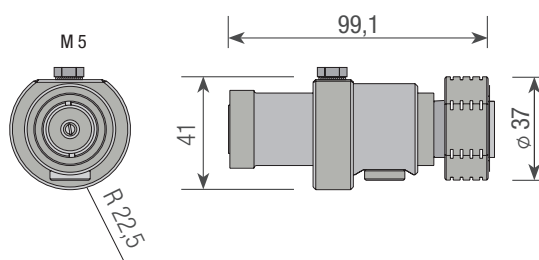
- Particularly suitable for surveillance systems with connecting cables longer than 40 m.;
- Easy to install by fixing and connecting the SPD to ground via an integrated M5 bolt;
- Suitable for installation at LPZ boundaries up to $0_B - 2$ in accordance with the lightning protection zones concept;
-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

Model C 6

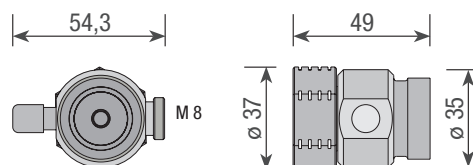
CODE		358 006	TECHNICAL DATA
SPD impulse rating/Category		C2, C3	
Video signal	U_0	1 V pp	
Maximum Continuous Operating Voltage	U_c	6 V rms	
Impedance		75 Ω	
Nominal discharge current (8/20 μ s) - category C2	I_n	1 kA	
Rated current	I_L	300 mA	
Voltage protection level at 1kV/ μ s - category C3	U_p	≤ 22 V	
Cross sectional area		≥ 1 mm ² 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	



Surge Protective Devices: ZOTUP SPDs for coaxial connectors



C7



C8

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

CODE		C 7	C 8
		352 600	352 350
SPD impulse rating/Category		D1, C2, C3	
Maximum Continuous dc Operating Voltage	U_c	600 V	350 V
Impedance		50 Ω	50 Ω
Rated current	I_L	12 A	5 A
Maximum power transmission		900 W	400 W
Impulse discharge current (10/350 μ s) - category D1	I_{imp}	3 kA	2 kA
Nominal discharge current (8/20 μ s) - category C2	I_n	10 kA	5 kA
Voltage protection level at 1kV/ μ s - category C3	U_p	≤ 950 V	
Frequency range	f	dc - 2,6 GHz	
Attenuation	a_t	$\leq 0,2$ dB	$\leq 0,5$ dB
Standing wave ratio (SWR)		≥ 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: length		99,1 mm	49 mm

TECHNICAL DATA



SPDs for DATA TRANSMISSION

DATA TRANSMISSION (ICONS FOR SPD SELECTION)



Protection against indirect lightning effects

SPDs for the protection of network equipment (HUBS/SWITCHES) in structured cabling systems according categories 5 and 6 and for the protection of telephone and ADSL-ISDN circuits.

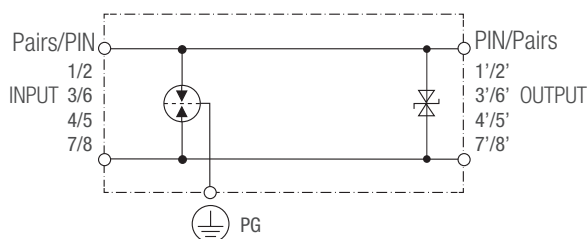
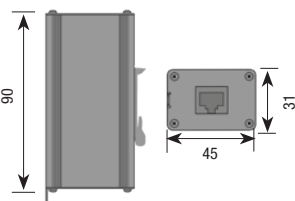
- SPDs with impulse ratings for categories C2 and C3 (according to IEC 61643-21).
- SPDs for rack and/or rail mounting to enable easy installation, even in existing systems.
- SPDs with RJ and LSA connectors.

SPD for data transmission

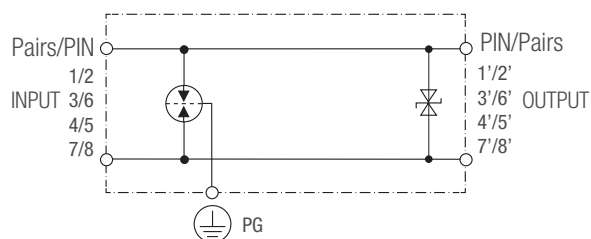
SPD	Model	Application icon	Transmission rating	SPD Impulse rating/ Category	Nominal discharge current I_n - per wire kA (8/20 μ s) / C2	Connection technique	Page
	S-F 1/6		6	C2	1	RJ 45	103
	S-F 1/48 PoE +		6 A	C2	1	RJ 45	103
	S-F 1/48 PoE + b		6 A	C2	1	RJ 45	103
	S-N 24 RJ/RJ tel		-	C2	2,5	RJ 45	104
	S-N 24 LSA/RJ tel		-	C2	2,5	LSA/RJ 45	104
	S-N 24 RJ/RJ		5	C2	2	RJ 45	105
	S-N 24 LSA/RJ		5	C2	2	LSA/RJ 45	105
	S ADSL		-	C2	2,5	RJ 45	107



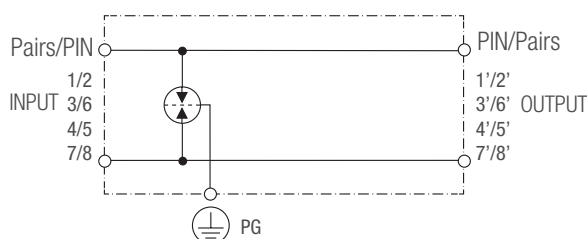
Surge Protective Devices: ZOTUP SPDs for data transmission



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



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 802.3at 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 inserted between the incoming lines and the hub/switch.

Model S-F ...		1/6	1/48 PoE+	1/48 PoE+ b
CODE		318 008	318 009	318 010
SPD impulse rating / Category		C1, C2, C3	C1, C2, C3	C1, C2, C3
Number of protected lines	n	1 (four wire pairs)	1 (four wire pairs)	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	1 A	1 A	1 A
Nominal discharge current (8/20 μs) wire-wire/ C1	I _n	150 A (300 V)	150 A (300 V)	1 kA (2 kV)
Nominal discharge current (8/20 μs) wire-PG / C2	I _n	1 kA (2 kV)	1 kA (2 kV)	1 kA (2 kV)
Max. discharge current (8/20 μs) wire-PG / C2	I _{max}	2 kA (4 kV)	2 kA (4 kV)	2 kA (4 kV)
Total discharge current (8/20 μs) all wires-PG / C2	I _{total} 8/20	10 kA (20 kV)	10 kA (20 kV)	10 kA (20 kV)
Voltage protection level at 1 kV/μs wire-wire / C3	U _p	≤ 12 V	≤ 120 V	-
Voltage protection level (1,2/50 μs) wire-wire	U _p	≤ 15 V	≤ 150 V	≤ 700 V
Voltage protection level (1,2/50 μs) wire-PG	U _p	≤ 700 V	≤ 700 V	≤ 700 V
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 capacity 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 pin		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		35 mm DIN rail EN 50 022	35 mm DIN rail EN 50 022	35 mm DIN rail EN 50 022
PE/PG connection		6,3 mm flat quick connect male tab + 1,5 mm ² cable	6,3 mm flat quick connect male tab + 1,5 mm ² cable	6,3 mm flat quick connect male tab + 1,5 mm ² cable
Approximate weight		105 g	105 g	105 g
Dimensions		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

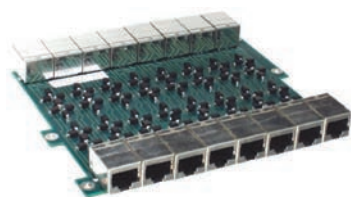
TECHNICAL DATA

S-F 1/6

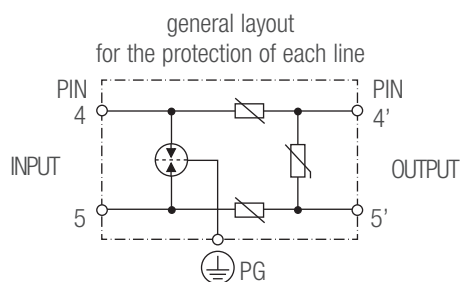
S-F 1/48 PoE+ ...



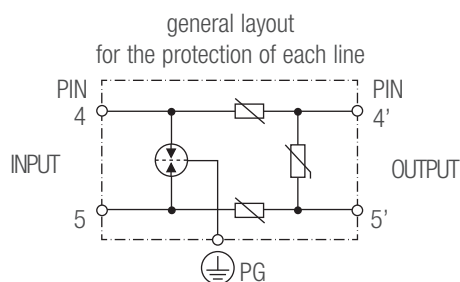
Surge Protective Devices: ZOTUP SPDs for telephone network



Protection module, 8 telephone lines, connectors RJ/RJ



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	
Total discharge current (8/20 μ s) per module (all lines - PG) - category C2	$I_{Total\ 8/20}$	5 kA	
Nominal discharge current (8/20 μ s) per wire - category C2	I_n	2,5 kA	
Voltage protection level at 1 kV/ μ s wire - wire - category C3	U_p	≤ 230 V	
Voltage protection level at 1 kV/ μ s wire - PG - category C3	U_p	≤ 600 V	
Longitudinal impedance/resistance		$9 \div 11\Omega$	
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		$- 25 \dots + 40$ °C	
Dimensions		l 145 x h 120 mm	l 145 x h 130 mm

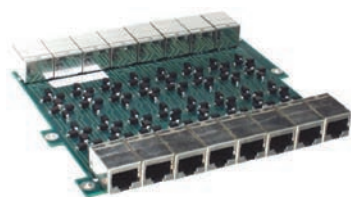
TECHNICAL DATA

S-N 24 RJ/RJ tel

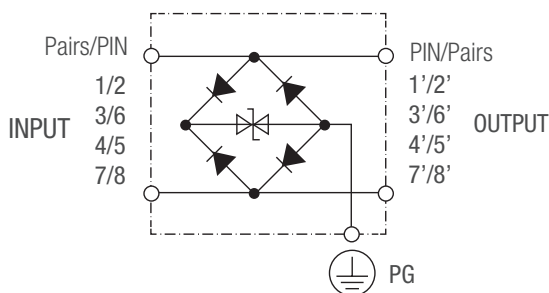
S-N 24 LSA/RJ tel



Surge Protective Devices: ZOTUP SPDs for data transmission



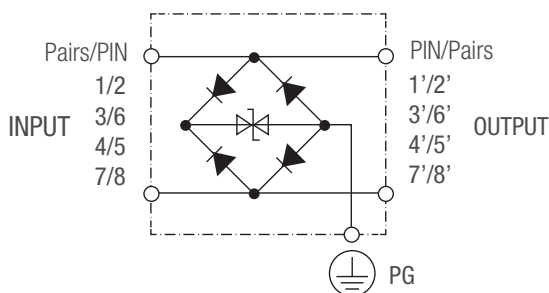
General layout for each of the four wire pairs in the line



S-N 24 RJ/RJ



General layout for each of the four wire pairs in the line



S-N 24 LSA/RJ

S-N 24 RJ/RJ and S-N 24 LSA/RJ are SPDs for the protection of equipment connected to telephone networks with category 5 cable systems according EN 50173-1, each providing protection for 8 lines with the following features and benefits:

- They can substitute the original patch panel;
- Protection of all four wire pairs in each line;
- 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).

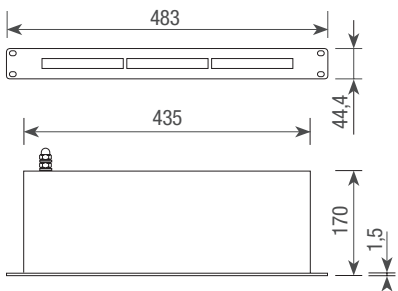
Model S-N 24 ...

CODE		RJ/RJ	LSA/RJ
		338 005	348 005
SPD impulse rating / Category		C2, C3	
Number of protected lines	n	8	
Nominal Voltage	U_N	6 V dc	
Total discharge current (8/20 μ s) per module (all lines - PG) - category C2	$I_{Total\ 8/20}$	2 kA	
Nominal discharge current (8/20 μ s) per wire - category C2	I_n	0,25 kA	
Voltage protection level at 1 kV/ μ s wire - wire - category C3	U_p	≤ 15 V	
Voltage protection level at 1 kV/ μ s wire - PG - category C3	U_p	≤ 15 V	
Category (according IEEE 802.3)		5	
Characteristic impedance		100 Ω	
Typical attenuation	a_t	4 dB a 100 MHz	
Connectors (input-output)		RJ/RJ 45 shielded	LSA/RJ 45 shielded
Protected pins		1/2, 3/6, 4/5, 7/8	
Approximate weight		100 g	
Dimension		l 145 x h 120 mm	l 145 x h 130 mm

TECHNICAL DATA



Surge Protective Devices: ZOTUP SPDs for data transmission



S-N 24 C

S-N 24 C is a mounting frame for a 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

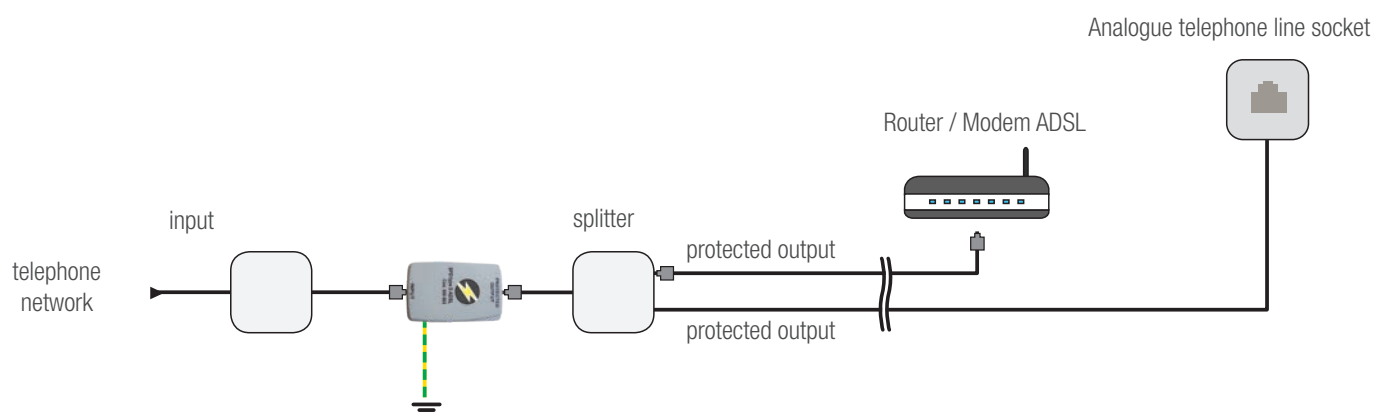
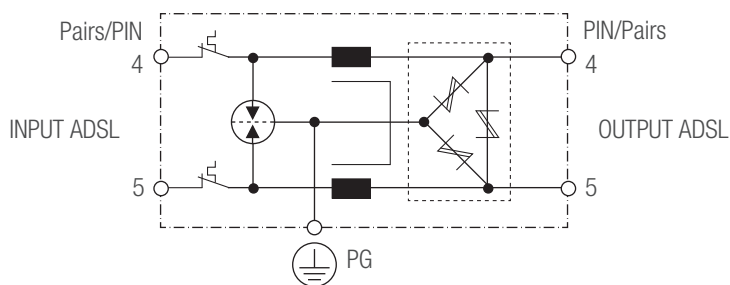
TECHNICAL DATA



Surge Protective Devices: ZOTUP SPDs for telephone and data transmission



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	TECHNICAL DATA
SPD impulse rating / Category		C2, C3	
Nominal Voltage	U_N	130 V ac	
Maximum Continuous Operating Voltage	U_c	170 V dc	
Rated current	I_L	150 mA	
Tested according to		IEC 61643-21 - EN 61643-21	
Total discharge current (8/20 μ s) per unit - category C2	I_n	5 kA	
Nominal discharge current (8/20 μ s) per wire - category C2	I_n	2,5 kA	
Voltage protection level at 1 kV/ μ s wire - wire - category C3	U_p	≤ 500 V	
Voltage protection level at 1 kV/ μ s wire - PG - category C3	U_p	≤ 1000 V	
Longitudinal impedance/resistance	Z	50 μ H / 0,3 Ω	
Transmission inductance		0,5 μ H	
Protected pins		4 - 5	
Connectors		RJ 45/RJ 45	
Cutoff frequency (-3dB)		> 25 MHz	
Operating temperature range		-25 ... + 60 $^{\circ}$ 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	



Isolating Spark Gaps (ISGs) for lightning protection systems and low-voltage limiters for use in railway systems

ISOLATING SPARK GAP (ICON FOR ISG SELECTION)



Protection against direct and indirect lightning effects

ISGs are in accordance with the standards EN 50164-3 / 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 insulating flanges of pipelines,
- in the vicinity of railway systems.

They provide the following features and benefits:

- Monolithic explosion proof protection;
- High level of protection and high isolation resistance against induced voltages or voltages injected by cathodic protection systems;
- High short circuit current withstand.

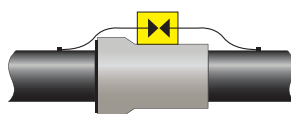
Isolating Spark Gap ISG

ISG	Model	Application Icon	Rated withstand voltage	Classification	Lightening impulse current I_{imp} (10/350 μ s)	Terminals	Page
	G 60/150 C 3		165 V AC	1L	40 kA	pigtails	109
	G 60/150 A 1		165 V AC	1L	40 kA	cable lugs M8	109
	G 100/150 A		500 V AC	H	100 kA	cable lug M12/ M8 bolt	110
	G 100/150 Ex		500 V AC	H	100 kA	cable lug M12/ connecting lug M12	110
	G 100/150 F		120 V DC	1L	40 kA	angle cleat M12/ M12 bolt	111

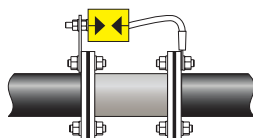
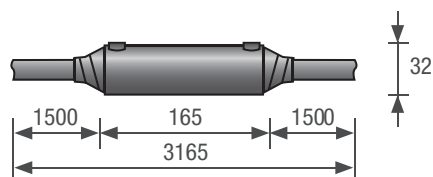


G 60/150 C 3

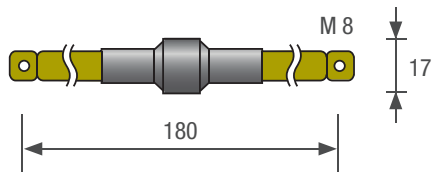
G 60/150 A 1



Monolithic insulating joint (underground)



Insulating joint air/underground with die-casted ISG



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

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

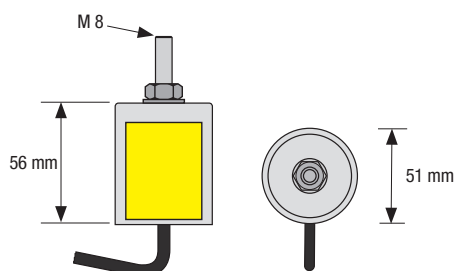
Model G 60/150...

CODE		C3	A1
		400 315	401 120
Rated power frequency withstand voltage	U_{WAC}	165 V $\pm$ 20%	
ISG Classification		1L	
Lightening discharge current (10/350 μ s)	I_{imp}	40 kA	
Nominal discharge current (8/20 μ s)	I_n	60 kA	
Rated impulse sparkover voltage (1,2 kV/50 μ s)	U_{imp}	$\leq$ 950 V	
Isolation 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 mm ²	
Terminals		pigtails	cable lugs M8
Total length		3.165 mm	180 mm

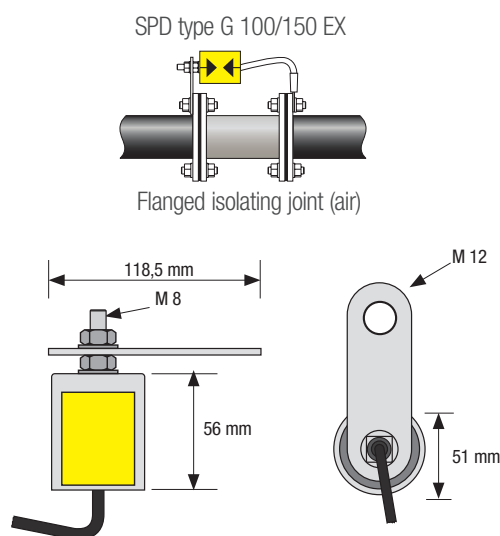
TECHNICAL DATA



ZOTUP Insulating Spark Gaps



G 100/150 A



G 100/150 EX

G 100/150 is an ISG for lightning equipotential bonding for the protection of insulating flanges in gas and oil pipelines, with the following features and benefits:

- Monolithic (EX) classified isolating;
- Tested according to EN 50014:1997 + A1:1999 + A2:1999, ATEX certified;
- Available with differing cable length upon request.

Model G 100/150...

CODE		400 340	400 360
Rated power frequency withstand voltage	U _{W AC}	500 V ± 20%	
ISG Classification		H	
Lightening discharge current (10/350 μs)	I _{imp}	100 kA	
Nominal discharge current (8/20 μs)	I _n	150 kA	
Rated impulse sparkover voltage (1,2 kV/50 μs)	U _{imp}	≤ 1500 V	
Isolation resistance at 200 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 mm ²	
Case material		steel	
Approximate weight		500 g	550 g
Terminals		cable lug M12/M8bolt	cable lug M12/connecting lug M12

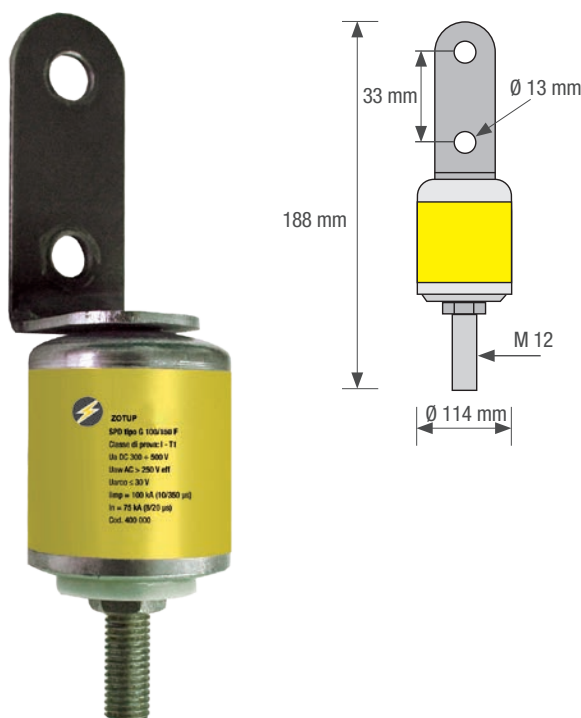
TECHNICAL DATA



ZOTUP low voltage limiters for traction systems



G 100/150 F



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

- At voltages > 120 V d.c. a reliable and stable arcing connection is provided;
- The arc voltage is approximately 30 V;
- The arcing voltage is independent from environmental conditions;
- Vertical installation is recommended;
- This device meets the requirements of EN 50123-5 2003.

Model G 100/150

CODE		F 400 000
Rated Voltage	U_r	50 V dc
Maximum continuous operating voltage	U_c	40 V dc
LVL Classification		LVL a
Lightening discharge current (10/350 μ s)	I_{imp}	40 kA
Nominal discharge current (8/20 μ s)	I_n	60 kA
Maximum discharge current (8/20 μ s)	I_{max}	70 kA
High-current impulse (4/10 μ s)		100 kA
Maximum withstand voltage	U_{WDC}	60 V dc
Maximum sparkover voltage	U_s	120 V dc
Short term withstand current		10 kA for 0,01 s
Long term withstand current (recoverability guaranteed)	I_w	300 A for 60 s
Long term withstand current (recoverability not guaranteed)	I_w	500 A for 1800 s
Maximum leakage current	I_{PE}	$\leq 5 \mu$ A
Protective voltage level	U_p	500 V
Response time		≤ 100 ns
Operating temperature range		-15 ... + 55 °C
Mounting		vertical
Case material		steel
Degree of protection		IP 67
Approximate weight		2700 g
Terminals		angle cleat M12/M12 bolt
Dimensions		188 x 114 mm

TECHNICAL DATA



SPD FOR HIGH VOLTAGE SYSTEMS



Surge protection devices for MV

HIGH VOLTAGE (ICONS FOR ARRESTERS SELECTION)



Protection against direct and indirect lightning effects

Surge Arresters are in accordance with standards IEC/EN 60099-4, 2014 and they have following typical applications: protection of transformers, switchgears and transmission lines in MV systems.

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



Surge arresters for high voltage systems

AC Systems

	Model	Application icon	System Voltage kV	Rated voltage kV	Line discharge class (IEC 60099-4 Ed. 2.2; 2009)	Max. thermal energy absorption capability kJ per kV at Ur (IEC 60099-4 Ed. 3.0; 2014)	Nominal discharge current I_n kA (8/20 μ s)	Location	Page
	ZU MV 12.2		10	12	2	4	10	indoor + outdoor	115
	ZU MV 18.2		15	18	2	4	10	indoor + outdoor	115
	ZU MV 24.2		20	24	2	4	10	indoor + outdoor	115
	ZU MV 30.2		24	30	2	4	10	indoor + outdoor	115
	ZU MV 36.2		30	36	2	4	10	indoor + outdoor	115

DC Systems

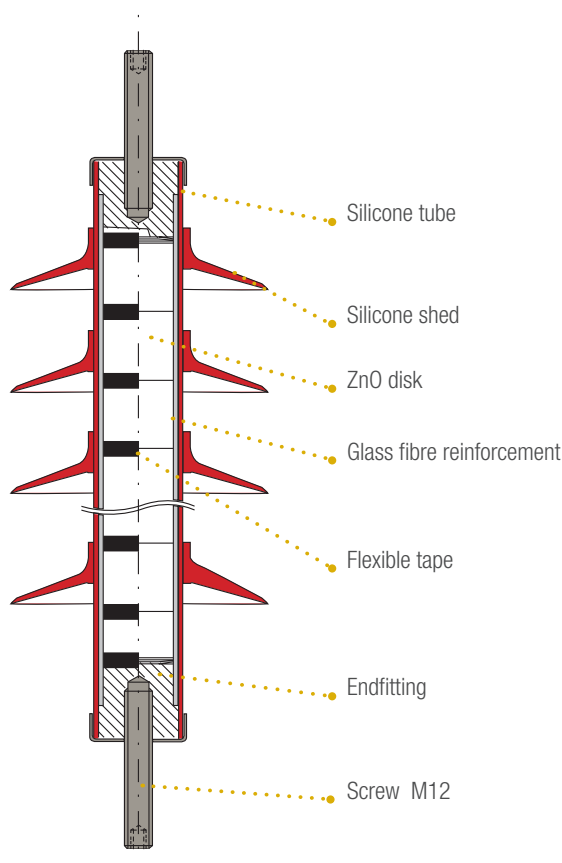
	Model	Application icon	System Voltage V	Rated voltage kV	Line discharge class (IEC 60099-4 Ed. 2.2; 2009)	Max. thermal energy absorption capability kJ per kV at Ur (IEC 60099-4 Ed. 3.0; 2014)	Nominal discharge current I_n kA (8/20 μ s)	Location	Page
	ZU MV DC 1/10		600 and 750	1,2	DC-B (4)	10	10	indoor + outdoor	120
	ZU MV DC 2/10		1500	2,4	DC-B (4)	10	10	indoor + outdoor	120
	ZU MV DC 3/10		1500	3,6	DC-B (4)	10	10	indoor + outdoor	120
	ZU MV DC 4/10		3000	4,8	DC-B (4)	10	10	indoor + outdoor	120



Surge arresters: for high voltage



ZU MV



ZU MV is a MV surge arrester for the protection of transformers, switchgear and transmission lines from atmospheric and switching overvoltages, ideal for indoor or outdoor applications and where high levels of pollution is expected, with the following features and benefits:

- Installation of these surge arresters on the MV -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 silicon rubber housing;
- Size and volume of the surge arresters based on the practical minimum for each nominal 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 terminead with stainless steel clamps, screws and washers.

Model ZU MV

Line discharge class (IEC 60099-4 Ed. 2.2; 2009)		2
Max. thermal energy absorption capability (IEC 60099-4 Ed. 3.0; 2014)		4 (4,5 kJ/kV at U_r)
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 μ s
Long duration impulse current		500 A / 2000 μ s
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		78 Nm
Bending strength		230 Nm
Tensile strength		1400 N
Insulator		silicon rubber HTV
Insulator colour		red-brown RAL 3013

TECHNICAL DATA



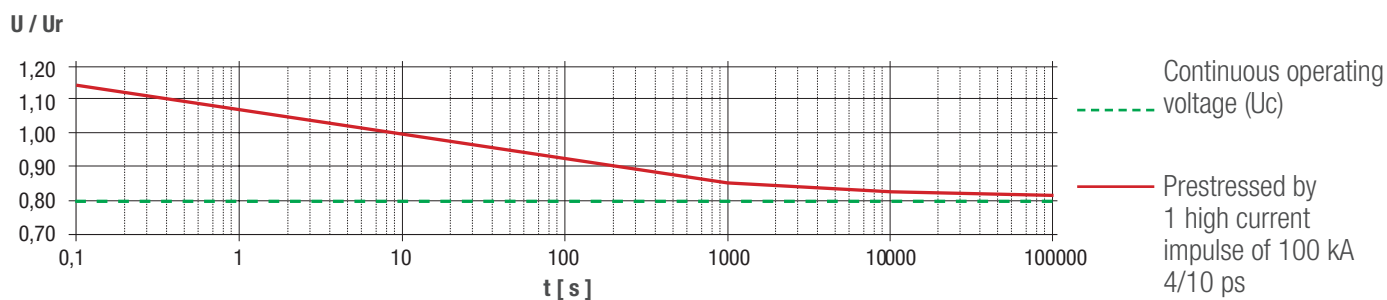
Surge arresters: for high voltage



Rated voltage	Continuous operating voltage	Temporary overvoltage TOV		Max. residual voltage / Protection level						Switching impulse residual voltage	
		1 sec. U _{1s} kV	10 sec. U _{10s} kV	10 kA (1/2 μs) STILP kV	20 kA (1/2 μs) STILP 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	74,4	80,0	88,8	100,0	58,4	62,4
33	26,4	38,0	36,0	94,2	104,6	81,8	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	84,7	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

TECHNICAL DATA

Power frequency voltage versus time characteristics (TOV) (pre-heating to 60 °C)



Definition of models

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

ZU MV

- Silicone rubber housing surge arrester.
- For voltages between 3-12 kV shed distance 45 mm.
- For voltages between 15-60 kV shed distance 30 mm.

3...60

- Rated surge arrester voltage.

.2

- Line discharge class.

NOTE:

All surge arresters ZU MV have an increased creepage distance.



Surge arresters: for high voltage

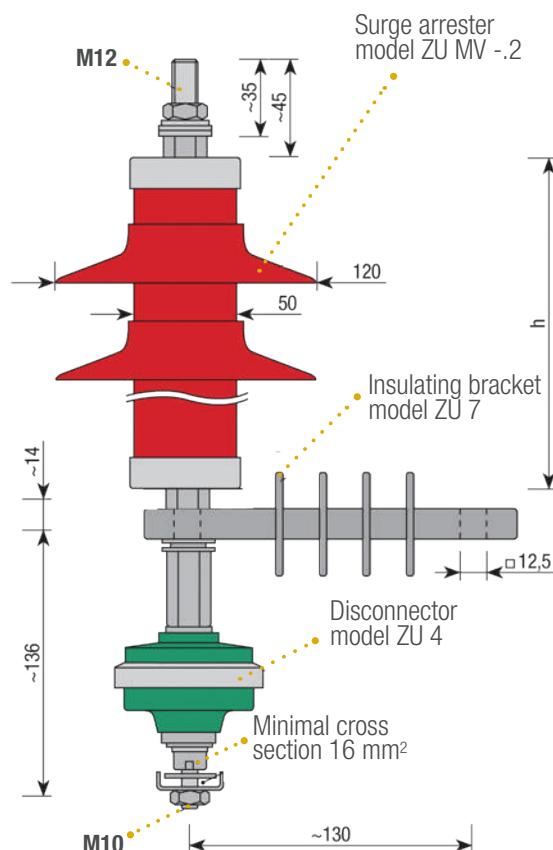


Rated voltage	Height	Weight	Creepage distance total	Surge arrester insulation			Surge arrester distance		Model	CODE
Ur kV	h mm	kg	mm	Withstand voltage (dry) Unstw kV	Withsatnd voltage (wet) Unstw kV	Lightning impulse with-stand Unsts kV	Phase/Phase LL mm	Phase/Ground LE mm	ZU MV	
3	92	0,7	143	34	22	50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

TECHNICAL DATA

In order to simplify selection and ordering, the most common configurations and system voltages on the European grid (impedance earthed neutral and protection relays 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 MV 12.2) (ZU 7) (ZU 4)	N.3 N.3 N.3	COD. 120 412 COD. 107 000 COD 104 000
For systems with operating voltage 15 kV	(ZU MV 18.2) (ZU 7) (ZU 4)	N.3 N.3 N.3	COD. 120 418 COD. 107 000 COD 104 000
For systems with operating voltage 20 kV	(ZU MV 24.2) (ZU 7) (ZU 4)	N.3 N.3 N.3	COD. 120 424 COD. 107 000 COD 104 000
For systems with operating voltage 24 kV	(ZU MV 30.2) (ZU 7) (ZU 4)	N.3 N.3 N.3	COD. 120 430 COD. 107 000 COD 104 000
For systems with operating voltage 30 kV	(ZU MV 36.2) (ZU 7) (ZU 4)	N.3 N.3 N.3	COD. 120 436 COD. 107 000 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.

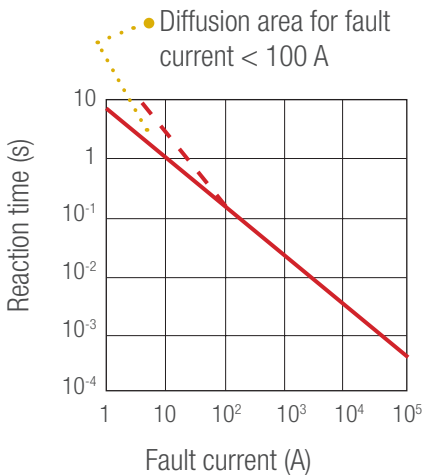
Model ZU 7

CODE	107 000
Max. applicable voltage	30 kV

TECHNICAL DATA



Disconnecter characteristic



ZU 4

Disconnecter device model ZU 4

Surge arresters for medium 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 electrical 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 characteristic 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 μ s)	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 with flexible conductors	16 mm ² flexible / 300 mm

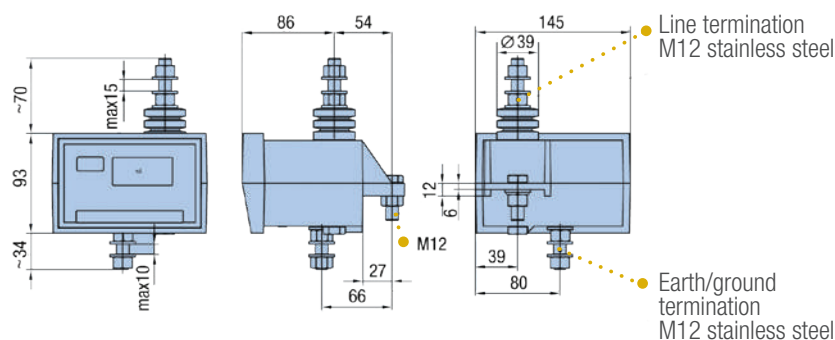
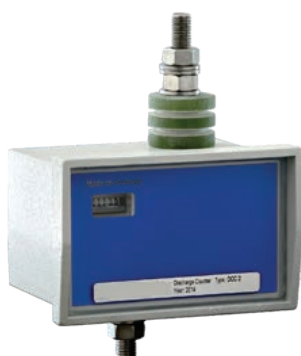
TECHNICAL DATA



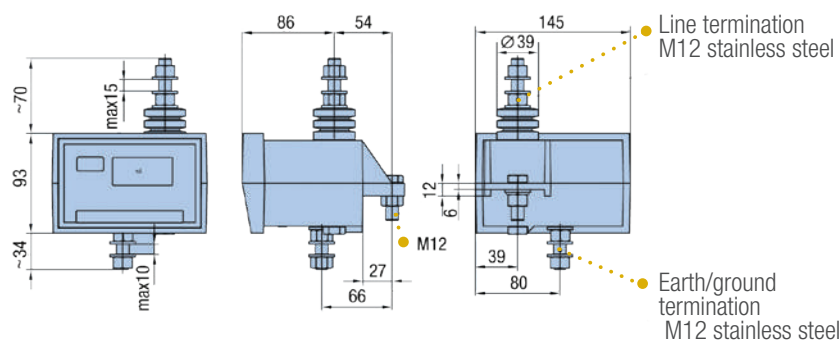
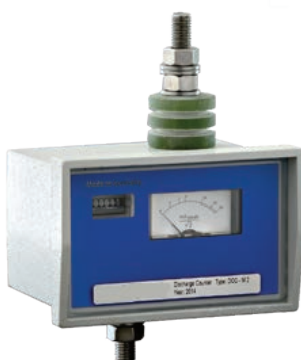
Surge arresters: for high voltage



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 surface insulator of the surge arrester.

Both models can be supplied, upon request, with an auxiliary contact for the remote monitoring of the counting.

Model		ZU SC	ZU SC-M
CODE		105 000	106 000
Classification according with IEC/EN 62561-6		Type II	Type II
Minimum discharge current counted (8/20 μ s)	$I_{n \min}$	100 A	100 A
Maximum discharge current counted (8/20 μ s)	$I_{n \max}$	100 kA	100 kA
Residual voltage at 100 kA 4/10 μ s		6 kV peak	6 kV peak
Digital indicator		6 digit	6 digit
Maximum counting frequency		5/second	5/second
Analogue indicator/meter			0-30 mA Peak/ $\sqrt{2}$

TECHNICAL DATA

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 mm ² flexible	
Switching capacity		ac: 250 V / 0,5 A – dc: 125 V / 0,2 A; 75 V / 0,5 A	



Surge arresters: for high voltage in DC



ZU MV DC

ZU MV DC is a surge arrester with the following features and benefits.

Typical usage: in direct current systems and particularly where electric traction (railway, underground) is used.

- Surge arrester type L with: limiting operation, varistor for protection against overvoltages in direct current applications, and atmospheric lightning strikes;
- This SPD is Installed in a vertical position, when hooked on overhead lines and when mounted on electric motors;
- Its high mechanical resistance to bumps and vibrations complies with the regulations of IEC/EN 60068 part 2-29;
- Its silicone rubber housing with high creepage distance allows internal or external mounting;
- Its high discharge capacity I_n is 10 kA (8/20);
- Its continuous voltage rating is from 1 to 4kV d.c.;
- Size and volume of the surge arresters based on the practical minimum for each nominal 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 terminead with stainless steel clamps, screws and washers.

Model ZU MV DC -/10

Nominal voltage	U_r	da 1,2 kV a 4,8 kV
Nominal discharge current	I_n	10 kA
High current impulse	I_{hc}	100 kA 4/10 μ s
Long duration impulse current		1000 A / 2000 μ s
Class in accordance with EN 50526-2; 2014		DC-B
Thermal energy rating kJ/kV (IEC 60099-4 Ed. 3.0; 2014)		10 (10 kJ/kV a U_r)
Line discharge class (based on IEC 60099-4 Ed. 2.2; 2009)		4
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 above sea level		up to 1000 m above sea level*
Insulator		silicon rubber HTV
Insulator colour		grey RAL 7040

TECHNICAL DATA



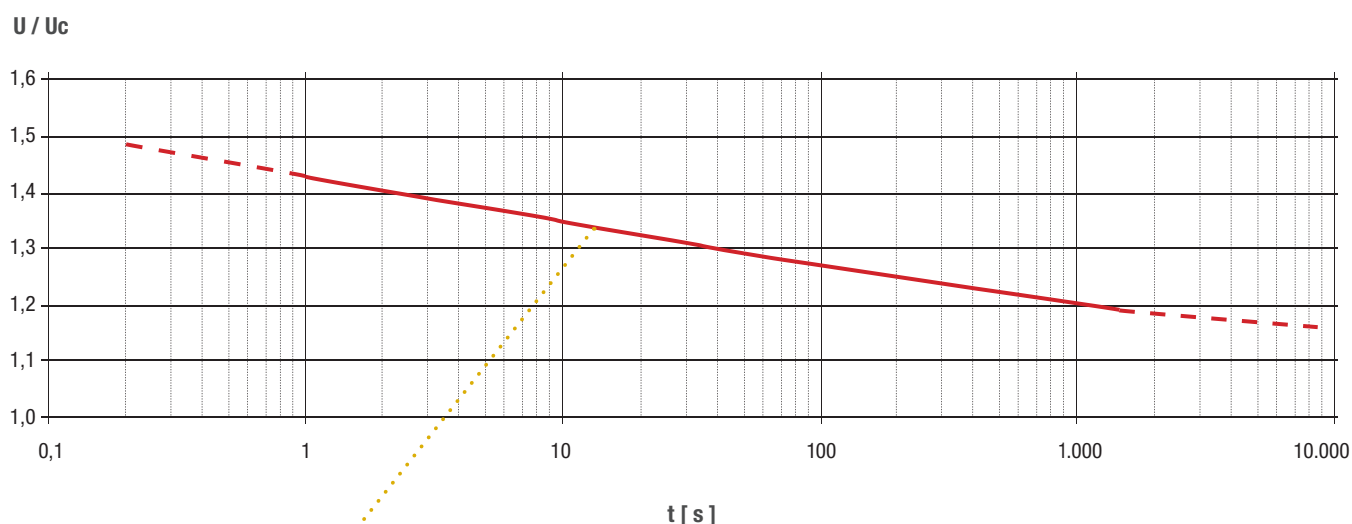
Surge arresters: for high voltage in DC



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 μ s kV	5 kA 8/20 μ s U _{pl} kV	10 kA 8/20 μ s U _{pl} kV	20 kA 8/20 μ s U _{pl} kV	250 A 30/70 μ s U _{ps} kV	500 A 30/70 μ s U _{ps} kV	1000 A 30/70 μ s U _{ps} kV	h mm	mm	kg	With-stand voltage wet Unst kV	Lightning wet impulse withstand Unsch kV	ZU MV 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

TECHNICAL DATA

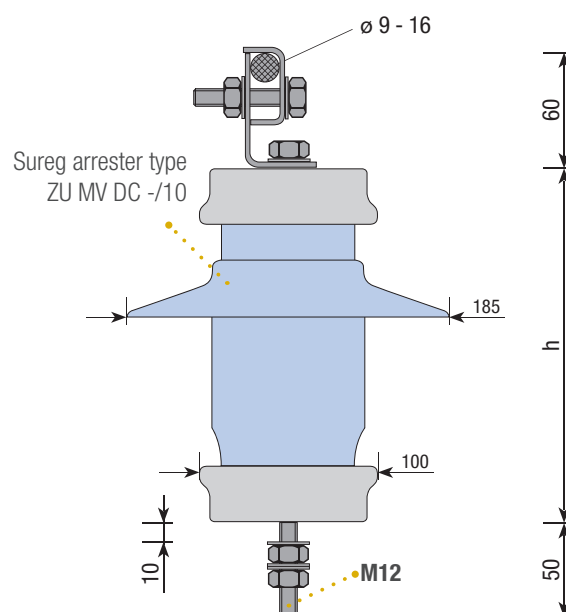
Power frequency voltage versus time characteristic (TOV) (pre heating to 60 °C)



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

Types definition

- ZU MV DC**
- Silicone rubber housing surge arrester.
- 1...4
- Continuous operating voltage.
- 10
- Nominal discharge current.







CODE	MODEL	PAGE	CODE	MODEL	PAGE
104 000	ZU 4	118	200 141	L 3/30 230 ff 3+1	63
105 000	ZU SC	119	200 600	L 7/30 DC 230 ff	87
105 001	ZU SC t	119	200 602	L 7/30 DC 60 ff	87
106 000	ZU SC-M	119	200 603	L 7/30 DC 110 ff	87
106 001	ZU SC-M t	119	200 606	L 7/30 DC 600 ff	87
107 000	ZU 7	118	200 610	L 7/30 DC 1000 ff	87
110 001	ZU MV DC 1/10	121	202 100	L 2/10 230 ff	64
110 002	ZU MV DC 2/10	121	202 120	L 2/10 230 ff 2	65
110 003	ZU MV DC 3/10	121	202 121	L 2/10 230 ff 1+1	67
110 004	ZU MV DC 4/10	121	202 140	L 2/10 230 ff 4	66
120 403	ZU MV 3.2	117	202 141	L 2/10 230 ff 3+1	68
120 406	ZU MV 6.2	117	203 100	IA 25 230	38
120 409	ZU MV 9.2	117	203 120	IA 25 230 2	39
120 412	ZU MV 12.2	117	203 121	IA 25 230 1+1	41
120 415	ZU MV 15.2	117	203 140	IA 25 230 4	40
120 418	ZU MV 18.2	117	203 141	IA 25 230 3+1	42
120 421	ZU MV 21.2	117	204 100	L 13/40 230 ff	44
120 424	ZU MV 24.2	117	204 120	L 13/40 230 ff 2	45
120 427	ZU MV 27.2	117	204 121	L 13/40 230 ff 1+1	48
120 430	ZU MV 30.2	117	204 130	L 13/40 230 ff 3	46
120 433	ZU MV 33.2	117	204 140	L 13/40 230 ff 4	47
120 436	ZU MV 36.2	117	204 141	L 13/40 230 ff 3+1	49
120 439	ZU MV 39.2	117	206 300	I 52 N-PE	50
120 442	ZU MV 42.2	117	207 100	L 7/30 230 ff	52
120 445	ZU MV 45.2	117	207 104	L 7/30 400 ff	52
120 448	ZU MV 48.2	117	207 106	L 7/30 600 ff	52
120 451	ZU MV 51.2	117	207 107	L 7/30 750 ff	52
120 454	ZU MV 54.2	117	207 120	L 7/30 230 ff 2	53
120 460	ZU MV 60.2	117	207 121	L 7/30 230 ff 1+1	56
200 023	L 2/20 230 1+1	72	207 130	L 7/30 230 ff 3	54
200 025	L 2/20 230 3+1	73	207 137	L 7/30 750 ff 3	54
200 100	L 3/30 230 ff	58	207 140	L 7/30 230 ff 4	55
200 102	L 3/30 60 ff	58	207 141	L 7/30 230 ff 3+1	57
200 103	L 3/30 120 ff	58	207 300	I 12 N-PE	69
200 104	L 3/30 400 ff	58	208 300	I 100 N-PE	43
200 120	L 3/30 230 ff 2	59	209 310	ILF 2P 8 DIN	80
200 121	L 3/30 230 ff 1+1	62	209 320	ILF 2P 16 DIN	80
200 130	L 3/30 230 ff 3	60	209 325	ILF 2P 25 DIN	80
200 140	L 3/30 230 ff 4	61	210 100	L 3/30 230 t ff	58



CODE	MODEL	PAGE	CODE	MODEL	PAGE
210 102	L 3/30 60 t ff	58	217 100	L 7/30 230 t ff	52
210 103	L 3/30 120 t ff	58	217 104	L 7/30 400 t ff	52
210 104	L 3/30 400 t ff	58	217 106	L 7/30 600 t ff	52
210 106	L 3/40 PV Y 600 ff	89	217 107	L 7/30 750 t ff	52
210 110	L 3/40 PV Y 1000 ff	89	217 120	L 7/30 230 t ff 2	53
210 116	L 3/40 PV Y 600 t ff	89	217 121	L 7/30 230 t ff 1+1	56
210 120	L 3/30 230 t ff 2	59	217 130	L 7/30 230 t ff 3	54
210 121	L 3/30 230 t ff 1+1	62	217 137	L 7/30 750 t ff 3	54
210 126	L 3/40 PV Y 1000 t ff	89	217 140	L 7/30 230 t ff 4	55
210 130	L 3/30 230 t ff 3	60	217 141	L 7/30 230 t ff 3+1	57
210 140	L 3/30 230 t ff 4	61	217 300	I 12 N-PE t	69
210 141	L 3/30 230 t ff 3+1	63	219 314	ILF 4P 120	78
210 600	L 7/30 DC 230 t ff	87	219 321	ILF 2P C16	84
210 602	L 7/30 DC 60 t ff	87	219 330	ILF 2P 32	82
210 603	L 7/30 DC 110 t ff	87	219 334	ILF 4P 32	78
210 606	L 7/30 DC 600 t ff	87	219 344	ILF 4P 400	76
210 610	L 7/30 DC 1000 t ff	87	219 350	ILF 2P 50	82
212 100	L 2/10 230 t ff	64	219 354	ILF 4P 50	78
212 120	L 2/10 230 t ff 2	65	219 374	ILF 4P 250	76
212 121	L 2/10 230 t ff 1+1	67	219 380	ILF 2P 80	82
212 140	L 2/10 230 t ff 4	66	219 384	ILF 4P 80	78
212 141	L 2/10 230 t ff 3+1	68	220 001	L 2/20 230 e	71
214 100	L 13/40 230 t ff	44	222 100	IL 1/10 2P 230	70
214 120	L 13/40 230 t ff 2	45	241 001	IL 1/3 2P	74
214 121	L 13/40 230 t ff 1+1	48	241 002	IL 1/10 2P M	74
214 130	L 13/40 230 t ff 3	46	242 101	IL 1/10 2P LED 230	93
214 140	L 13/40 230 t ff 4	47	242 102	IL 1/10 2P LED 320	93
214 141	L 13/40 230 t ff 3+1	49	242 103	IL 1/10 2P LED 440	93
215 100	L 25/100 230 t ff	32	242 190	LLP 2/10 230 ff 1+1	92
215 120	L 25/100 230 t ff 2	33	242 191	LLP 7/30 230 ff 1+1	91
215 121	L 25/100 230 t ff 1+1	36	244 100	Protection Box TN 40 ff	51
215 130	L 25/100 230 t ff 3	34	245 100	Protection Box TT 40 ff	51
215 140	L 25/100 230 t ff 4	35	249 591	CP 1	75
215 141	L 25/100 230 t ff 3+1	37	249 592	CP 2	75
216 106	L 13/60 PV Y 600 ff	88	249 593	CP 3	75
216 110	L 13/60 PV Y 1000 ff	88	249 594	CP 4	75
216 116	L 13/60 PV Y 600 t ff	88	249 595	CP 5	75
216 126	L 13/60 PV Y 1000 t ff	88	249 596	CP 6	75
216 300	I 52 N-PE t	50	249 597	CP 7	75



CODE	MODEL	PAGE
249 598	CP 8	75
302 024	S-AS 2 24	98
302 030	S-AS 2 30	98
302 048	S-AS 2 48	98
302 524	S-AS 2 24/1	98
302 548	S-AS 2 48/1	98
318 008	S-F 1/6	103
318 009	S-F 1/48 PoE+	103
318 010	S-F 1/48 PoE+ b	103
328 005	S-N 24 C	106
338 005	S-N 24 RJ/RJ	105
340 005	S-ASI 5	96
340 012	S-ASI 12	96
340 015	S-ASI 15	96
340 024	S-ASI 24	96
340 030	S-ASI 30	97
340 048	S-ASI 48	97
340 060	S-ASI 60	97
340 110	S-ASI 110	97
348 005	S-N 24 LSA/RJ	105
351 075	C 5	99
352 350	C 8	101
352 600	C 7	101
358 005	S-N 24 RJ/RJ tel	104
358 006	C 6	100
368 005	S-N 24 LSA/RJ tel	104
400 000	G 100/150 F	111
400 315	G 60/150 C3	109
400 340	G 100/150 A	110
400 360	G 100/150 Ex	110
401 120	G 60/150 A1	109
500 003	S ADSL	107

All information and illustrations contained in the Catalogue are to be considered purely indicative and they are only meant to illustrate the product, therefore, the same may at any time be subject to change in order to comply with requirements of development or regulations.e.





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