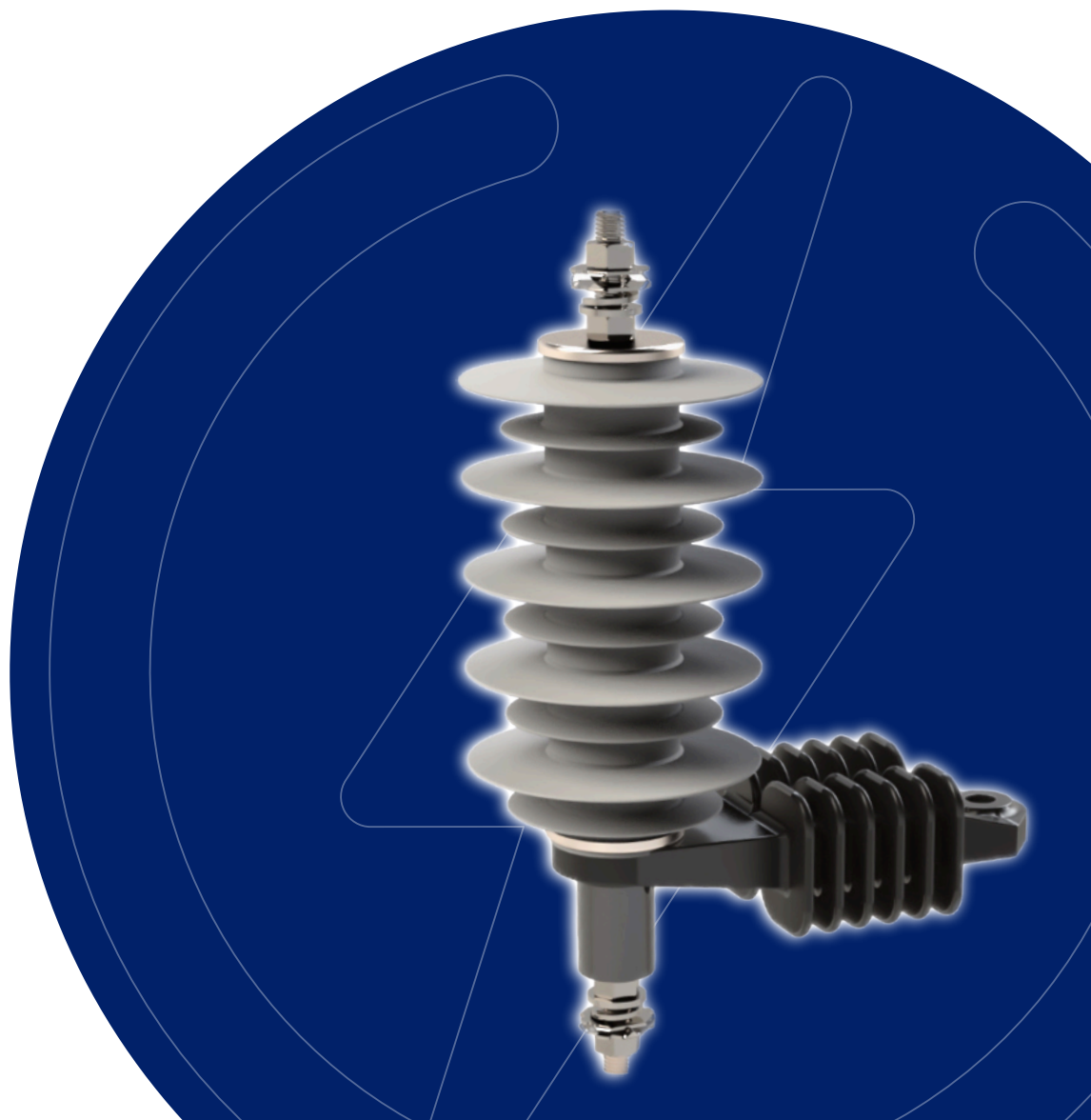


ARRESTERS FOR DISTRIBUTION OVERHEAD LINES

ZEUSPROTEC

SECONDARY DISTRIBUTION OVERHEAD LINES



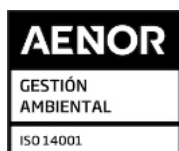
Safety and Guarantees

9001



50 years protecting equipment and systems, ensuring the safety of people and the environment, and testing our products in the main European laboratories, such as: Labein Tecnalia, ITE, LCOE, EDF Les Renardieres, CESI, KEMA, ... We have a quality management system certified according to ISO 9001 to guarantee the quality of the products we design and manufacture in all processes.

14001



Iberapa supplies equipment and solutions for the development of new renewable energy sources and smart grids, which help in the better conservation of the world we want to leave to our generations. We carry our environmental commitment, certifying ourselves with an environmental management system according to the international standard ISO14001.

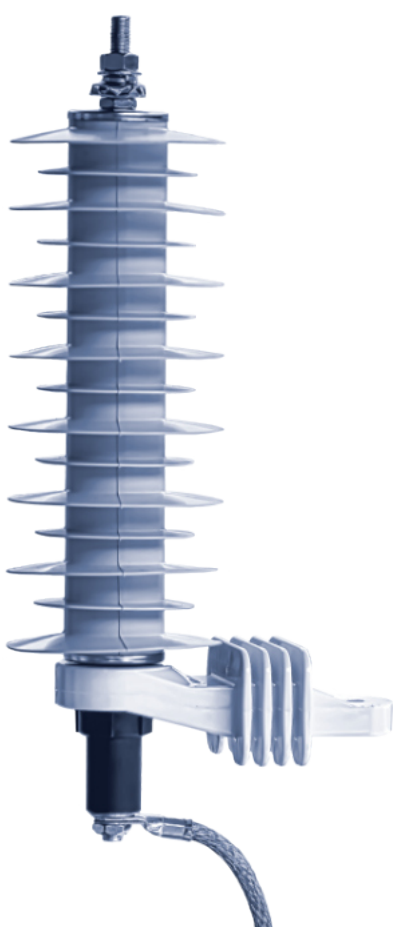
45001



Committed to the united nations global compact, we adapt our objectives in areas related to human rights, labor, environment and the fight against corruption. At iberapa, a key pillar of the organization is our people, and we implement an occupational health and safety certification system based on the international standard ISO45001.



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IMPORTANT REMARK: Due to technological improvements, the data contained in this catalog are subject to change, which IBERAPA reserves the right to do.



Iberapa

We are ...
PEOPLE ON POWER SOLUTIONS

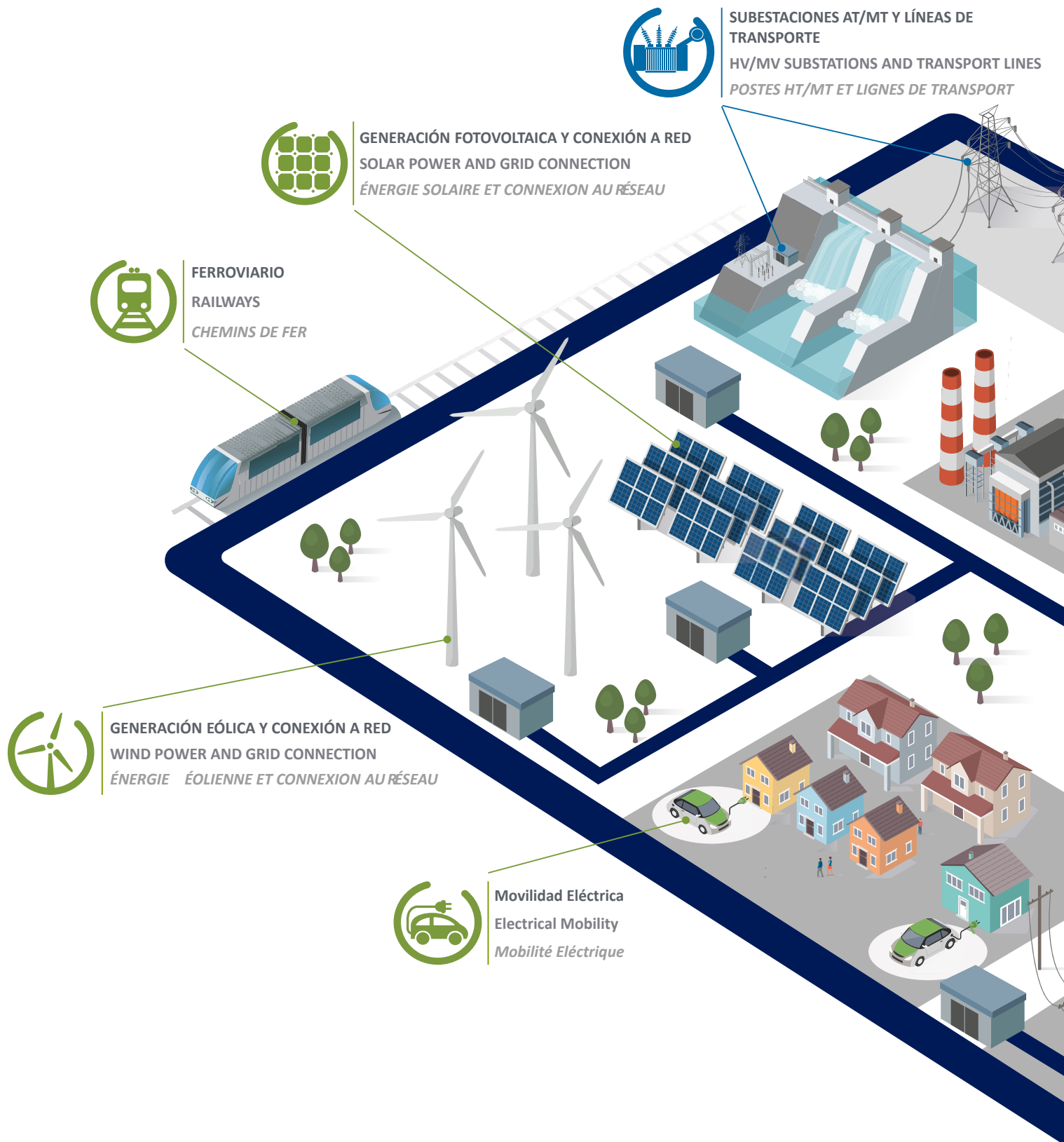
A company expert in efficient, sustainable and reliable solutions for the generation, transmission and distribution of electrical energy, with more than 50 years of experience, within an industrial group with 3 industrial facilities in Spain, and global locations that help us to meet the needs of our customers in more than 40 countries.

We are equipped with our own electrical testing laboratory, and a skilled team of people with a common objective, to advance in the improvement of the quality of service and power supply in our society, through the development and implementation of equipment and solutions of high technological value, flexible and personalized, together with our suppliers and customers.

Our highly valuable human team imagines, designs and develops reliable solutions for the electrical industry, always focusing on the customer and involving suppliers, employees, shareholders and our society as a whole. Iberapa specializes in the manufacture and supply of prefabricated medium voltage switchgear and transformer stations.



Iberapa Solutions



People on power solutions
Experts in power transr



mission and distribution

Overview and details

ZeusProtec are protection devices that limit surges in the equipment they are protecting, by deviating the overvoltage current to ground and bringing the device back to its original state. For their correct application, they must be placed on both sides of the equipment to be protected, and close to them, efficiently grounded.

ZeusProtec have an active part of MOV blocks arranged in series (metal oxide varistors), which in case of an overvoltage reaching the arrester, the current grows according to the time-current curve continuously, which causes the limiting device to pass to a conductive state, conducting it to ground, and once the overvoltage decreases, the current becomes smaller again, generating a residual voltage.

Operation of the disconnecting device

In some cases of very high lightning surges, the arrester may get short circuited to the ground. If the arrester were still connected to phase and ground it would not be possible to reconnect the line, and it is in this case when the disconnecter works to prevent this, performing two functions: allowing the line to be reconnected and indicating that the arrester must be replaced. Inside the base there is a device that, if necessary, will cause the lightning arrester's grounding conductor to detach, and the arrester will remain hanging as a visual indication. Under normal service conditions the disconnecter does not operate, which is defined in the applicable standards. The operating time of the disconnecter is a function of the current amplitude and it is verified in samples applying currents from 20 to 800 A.

Description of components

■ Varistors



The metal oxide blocks are made from a raw material mixture of metal oxide powders (mostly zinc) and sintered in a high temperature furnace, after which they are checked one by one in a final quality control.

■ Housing and core



The core is formed by a string of varistors, which give the electrical characteristics of the arresters, integrated in a double ZERO AIR encapsulation and with fixed aluminum terminals at the ends.

The housing of the arrester is made of polymeric material with a high hydrophobic silicone content, which is embedded on the inner core, repelling water and any contamination deposits during its entire service life. This material is very light and resistant to extreme climates and large temperature variations, as well as to ultraviolet radiation and ozone, and to organic and inorganic solvents or cleaning agents.

■ Insulating base and disconnecter

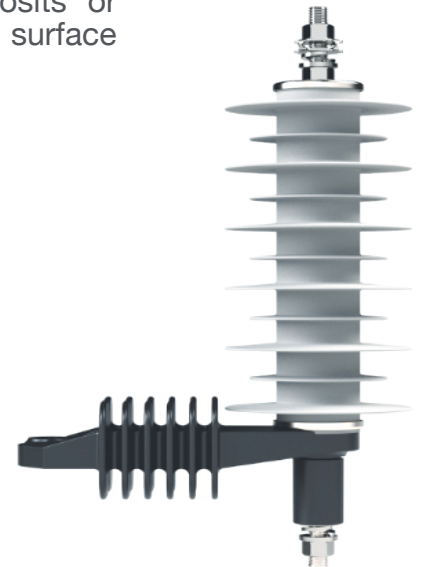


The insulating base made of a special material, very resistant mechanically and anti "UV", is prepared to resist very well to the ageing caused by exposure to ultraviolet radiation. A disconnecting device can be incorporated in this insulating base. This device maintains an independent connection to the body of active elements of the arrester, and when operating it is able to disconnect the short-circuited arrester from the system, clearing the permanent fault.

Technologies and features

In addition to being highly resistant to all types of environmental pollution, its ground fault performance and excellent short-circuit characteristics are second to none. The silicone covering the lightning conductors is made by iberapa and prevents the accumulation of contamination deposits or moisture layers due to its high hydrophobic properties. As a result, surface currents due to contamination are practically non-existent.

The **ZeusProtec** are light, solid and very resistant thanks to their special “Zero Air” design. Their double core sealing, prevents the ingress of humidity and the presence of air inside, offering better reliability compared to other existing designs.



Zero Air Tech

ZeusProtec is constructed with high-energy metal oxide varistors (MOVs), encapsulated in a core, and finally wrapped in silicon rubber. The use of raw materials with excellent electrical and mechanical properties, enables the products to be made more compact, thus saving overall resources and limiting waste. If necessary, the different components can be separated quite easily and quickly for end-of-life management and disposal.

ZERO AIR TECH is a technology developed by iberapa, that avoids degradation problems due to the entry of moisture and particles inside the arrester body, that affects the performance of the varistors. With **ZERO AIR TECH** your distribution lines and associated switchgear will have a higher service reliability, being better protected since this iberapa technology provides an excellent sealing against moisture ingress and partial discharges.



Operation and service conditions

The typical service conditions for an arrester are listed in the IEC 60099-4 standard, and IBERAPA ZEUSPROTEC arresters are tested according to this standard.

- Ambient temperature within the range of -40°C to +40°C / up to +55°C in option¹.
- Radiación solar de 1.1 kW / m².
- Altitude not exceeding 1,000 m above sea level.
- AC voltage frequency of 48 Hz to 62 Hz.
- A supply frequency voltage at the arrester terminal not exceeding the U_c voltage of the arrester in continuous operation.

¹ Special attention should be taken when there are extreme service conditions, in this case please contact IBERAPA for the most appropriate selection of the ZEUSPROTEC model.

■ Performance under overload

ZEUSPROTEC arresters with directly molded, reinforced stack housings do not run the risk of explosion or violent rupture in case of an overload. With Zero Air technology, there is no air gap between the active part of the arrester and its outer insulation; therefore, there is no space for pressure to build up. The arc that is produced is released from the outer insulation as soon as it happens and is exhausted. Due to their special construction, arresters are protected from violent destruction up to the highest short-circuit currents and are self-extinguishing according to the standard (less than 2 minutes).

■ Altitude adjustment of the arrester housing

In accordance with the recommendations of the IEC standards, typical service conditions are applicable up to 1,000 m above sea level. Above these “standard altitudes” an adjustment of the arrester housing according to the applicable standard and altitude should be considered.

■ Energy absorption capacity

The “station” and “distribution” class arresters are now classified according to the recommendation of IEC 60099-4 edition 3.0 (before numerical by class), as shown in Table 1. The class letters correspond to “D” for distribution and “S” for station. Additionally, the letters “H”, “M” and “L” are the designation that stands for “high”, “medium” and “low” service or performance, respectively. In medium voltage systems, mainly distribution arresters are used. For specific applications, where higher power requirements apply, such as cables, motors, capacitor banks or others, station class arresters for medium voltage systems may also be required.

ZEUSPROTEC Advantages

M12 stainless steel threaded upper terminal with nut and washers.

Stainless steel connecting clamp.

Zero Air core with the absence of air. Silicone grease is applied between the core and the silicone insulator housing, the same as in the cable end terminations.

External housing made of high purity silicone rubber with high creepage distances.

Insulating fixing bracket made of special plastic material, highly resistant to mechanical stress and UV radiation.

Stainless steel protective cover with engraved specifications.

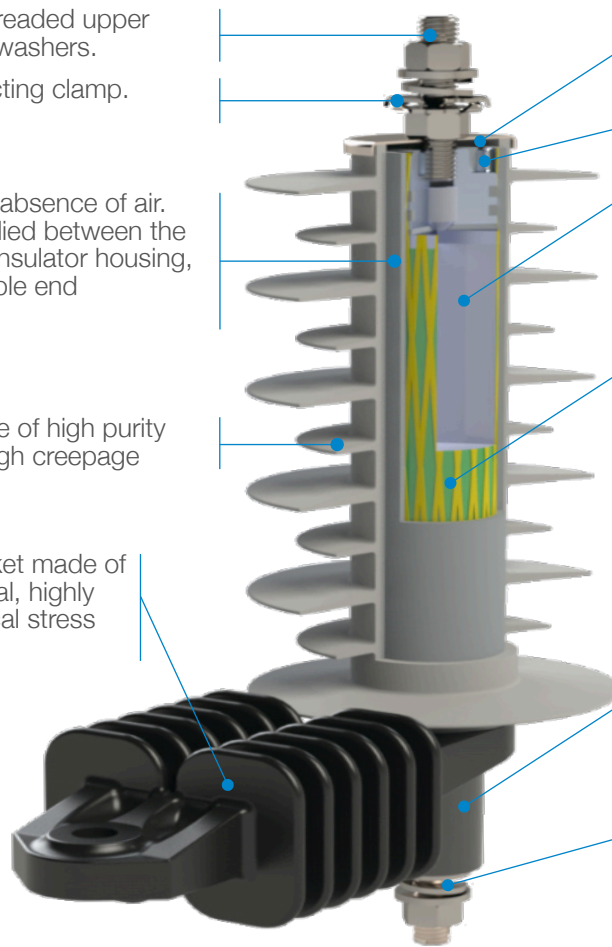
Aluminum terminal.

Zinc oxide varistors.

Internal stack, reinforced with double sealing system. Greater safety and guarantees. Optimized design, each lightning arrester has the exact height it requires, there are no separators in the stack that make the product more expensive or increase the residual stress and weaken it structurally as there are more joints between pieces.

End-of-life disconnection system, according to IEC 60099-4 including thermal cycling tests and tightness test.

M12 stainless steel threaded lower terminal with nut and clamps.



PZDH lightning arresters are very light, but very strong at the same time, so they are less expensive to transport, easier to handle and better resistant to vandalism.

Short-circuit tests according to IEC 60099-4. Excellent mechanical characteristics.

Bending moment testing according to IEC 60099-4. The bending curve remains always positive, without dips.

Ability to perform all standard tests with the exception of short-circuit tests at our facilities.

Main electrical characteristics

Technical characteristics ZeusProtec Distribution type DH

- Distribution Class “High” or DH according to standard, see Table 1.
- Standard UNE - EN- 60099-4 / CEI 60099-4 edition 3.0
- Temporary overvoltage capacity : 1,38 Uc
- Rated short-circuit current: 20 kA
- Rated nominal discharge current [In]: 10 kA
- Rated large-amplitude impulse current: 100 kA
- Rated load transfer (Qrs): 0.4
- Rated thermal load transfer (Qth): 1.1

The latest version of IEC 60099-4 edition 3.0, in distribution differentiates between DH (Distribution High), Dm (Distribution Medium) and DL (Distribution Low), establishing qualitative parameters. In substations, it eliminates the concept of “class” of the arrester, which was not well standardized and led to various interpretations by each manufacturer, and replaces it with Qrs and Qth. The higher their value, the more resistant the arrester is to atmospheric discharges.



Table 1. - Classification of Lightning Arresters CEI 60099-4 edition 3.0.

Arrester Class	Station			Distribution		
Designation	SH	SM	SL	DH	DM	DL
Rated discharge current	20kA	10kA	10 kA	10kA	5kA	2,5kA
Rated discharge impulse current	2 kA	1kA	1kA	-	-	-
Q (rs)	≥ 2,4	≥ 1,6	≥ 1,0	≥ 0,4	≥ 0,2	≥ 0,1
W (KJ/KV)	≥ 10	≥ 7	≥ 4	-	-	-
Q (th)				≥ 1,1	≥ 0,7	≥ 0,45

NOTE: The letters “H”, “M”, and “L” are designations for “High”, “Medium”, and “Low”, respectively.

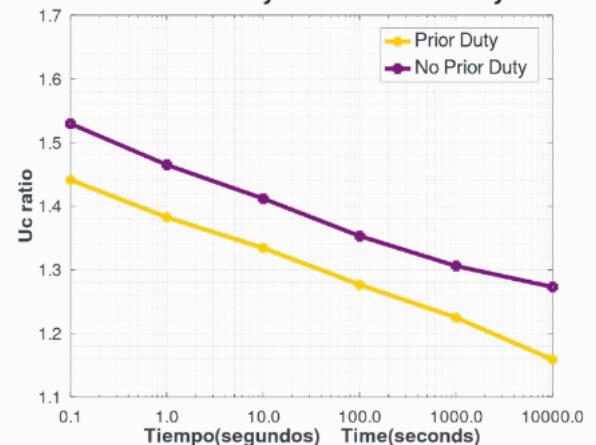
Transient overvoltage curves of ZeusProtec lightning arresters type DH

Curves according to IEC 60099-4 edition 3.0.

Prior-duty curve means that the arrester is already “aged” and non-prior-duty means that the arrester is “new”. The actual curve of the lightning arrester will therefore be somewhere in between.

In addition, the concept of Energy in Kj/KV in distribution lightning arresters, which was not standardized and has historically been applied unevenly by each manufacturer, disappears.

Combined Prior Duty and No Prior Duty Curves



Technical data tables

Table 2. Values depending on models, and residual voltage values.

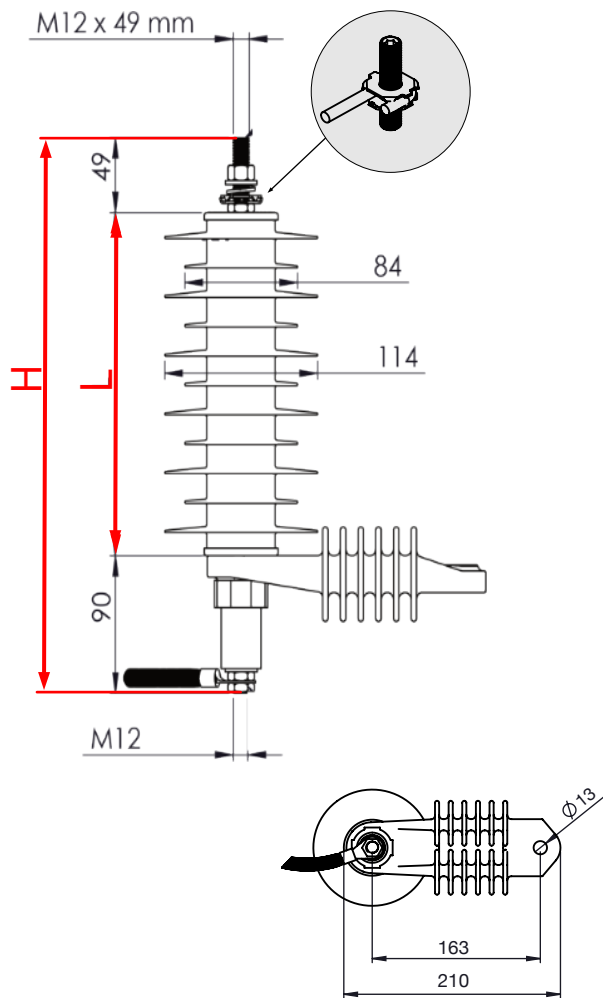
References	U _r (kV)	U (kV)	Arc Distance (mm)	Creepage Distance* (mm)	Residual Voltage (Vp)			Residual Voltage max. wave 8/20 µs				
					FOW Steep 1/20 µs (kV)	30/60 µs 125A (kV)	30/60 µs 500A (kV)	1 kA	3 kA	5 kA	10 kA	20 kA
PZDH1 / 06	6	5,1	142	344	19,3	11,8	12,7	13,3	14,4	15,3	16,8	18,3
PZDH1 / 09	9	7,7	152	394	29	17,7	19,1	19,9	21,7	23	25,2	27,5
PZDH1 / 12	12	10,2	178	470	38,6	23,6	25,4	26,5	28,9	30,6	33,6	36,6
PZDH1 / 15	15	12,8	199	520	48,4	29,5	31,7	33,2	36,2	38,3	42	45,8
PZDH1 / 18	18	15,3	215	598	58	35,4	38	39,8	43,3	45,9	50,4	54,9
PZDH1 / 21	21	17,9	230	654	70,6	41,3	44,4	46,5	50,6	53,5	58,8	64,1
PZDH1 / 24	24	20,4	256	725	80,6	47,2	50,7	53,1	57,8	61,1	67,2	73,2
PZDH1 / 27	27	23	269	774	90,8	53,1	57,1	59,8	65,1	68,8	75,6	82,5
PZDH1 / 30	30	25,5	296	852	109,2	59	63,4	66,4	72,2	76,4	84	91,6
PZDH1 / 33	33	28,1	306	901	120,2	64,9	69,8	73	79,5	84,1	92,4	100,8
PZDH1 / 36	36	30,6	335	980	131	70,8	76,1	79,6	86,7	91,7	100,8	109,9
PZDH1 / 39	39	33,2	365	1028	142	76,7	82,5	86,3	93,9	99,4	109,2	119,1
PZDH1 / 42	42	35,7	395	1105	152,9	82,6	88,8	92,9	101,1	107	117,6	128,2
PZDH1 / 45	45	38,3	425	1156	163,9	88,5	95,2	99,6	108,4	114,7	126	137,4

* Other special creepage distances for even higher pollution levels can be supplied upon request.

Table 3. Dielectric and mechanical values.

References	Maximum Admissible Voltage (kV)	Lightning impulses withstand voltage 1.2/50µs (kV)	Industrial frequency withstand voltage wet 1min. (kV)	Assigned short-term load SSD (Newton)	Assigned long-term load SLD (Newton)	Recommended phase-to-phase distance (mm)	Recommended phase-to-ground distance (mm)
PZDH1 / 06	6	82	38,7	3080	2183	137	86
PZDH1 / 09	9	88	41,5	2875	2037	152	102
PZDH1 / 12	12	103,3	48,2	2670	1892	191	140
PZDH1 / 15	15	115,6	54	2464	1746	216	165
PZDH1 / 18	18	124,8	58,1	2259	1601	241	191
PZDH1 / 21	21	133,5	61,9	2054	1455	254	203
PZDH1 / 24	24	148,6	68,9	1848	1310	305	254
PZDH1 / 27	27	155,6	72,7	1643	1164	330	279
PZDH1 / 30	30	171,4	80	1438	1019	356	305
PZDH1 / 33	33	177,2	82,7	1232	873	419	368
PZDH1 / 36	36	193,9	90,6	1027	728	457	404
PZDH1 / 39	39	210	98,5	821	582	494	443
PZDH1 / 42	42	226,1	106,4	616	437	536	486
PZDH1 / 45	45	242,2	114,3	411	291	580	527

Overall dimensions



Flat washer for conductor up to 35 mm²

All dimensions in mm.

References	Height H (mm)	Length L (mm)	Weight (Kg)	Creepage Distance (mm)	Arc Distance (mm)
PZDH1 / 06	245	106	1,3	344	142
PZDH1 / 09	266	127	1,4	394	152
PZDH1 / 12	285	145	1,6	470	178
PZDH1 / 15	304	164	1,7	520	199
PZDH1 / 18	326	187	1,9	598	215
PZDH1 / 21	342	203	2,1	654	230
PZDH1 / 24	365	225	2,23	725	256
PZDH1 / 27	381	242	2,4	774	269
PZDH1 / 30	401	261	2,6	852	296
PZDH1 / 33	420	280	2,7	901	306
PZDH1 / 36	439	300	2,9	980	335
PZDH1 / 39	459	319	3,1	1028	365
PZDH1 / 42	477	338	3,2	1105	395
PZDH1 / 45	497	358	3,34	1156	425

The connection terminal and the ground terminal accept terminals with an M-12 threaded bolt hole.

Available accessories

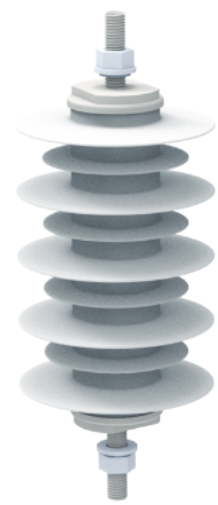
Protective caps to prevent birds from electrocution when perching on lightning rods.

Metal fittings depending on customer's requirements or standards, e.g. NEMA type B fittings.

On request, lightning arresters can be supplied without insulating bases and disconnector.

It is possible to designate different types of terminals, ground wires and pole mountings, the customer must specify the exact requirements.

Discharge meters are available as an option.



Selection guide



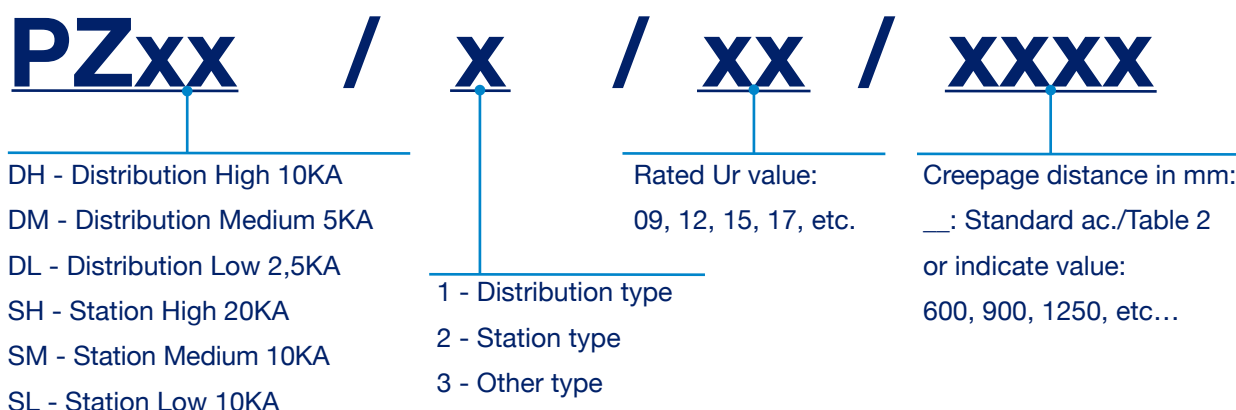
ZEUSPROTEC standard equipment

LINE TERMINAL: Adequate to accept copper or aluminum conductors.

EARTH DISCONNECTOR: Prevents power failure on the line by automatically disconnecting the lightning arrester in short circuit from the line. It also provides an unequivocal visual indication of the lightning arrester failure, allowing its quick detection and replacement.

INSULATING BRACKET: The lightning arrester is completed with an insulating bracket made of a special high-strength material. This bracket provides insulation between the lightning arrester and ground, after the disconnector has been triggered, in the rare case of lightning arrester failure.

Order coding



Naturgy (UFD) approved references	Naturgy	IBERAPA reference
200091 PARARRAYOS EXTERIOR DE ÓXIDO METÁLICO 17,5 KV/10 KA		PZDH1/18-598/UF
200075 PARARRAYOS EXTERIOR DE ÓXIDO METÁLICO 24 KV/10 KA		PZDH1/24- 725/UF

Iberdrola (I-DE) approved references	Iberdrola	IBERAPA reference
7530002 / POM-P 15/10		PZDH1 / 15
7530004 / POM-P 21/10		PZDH1 / 21
7530007 / POM-P 33/10		PZDH1 / 33

Example: PZDH1/36/1250

ZeusProtec lightning arrester for distribution lines, type Distribution “High” of 10KA, Ur = 36KV, with a special creepage distance of 1250mm (standard 980mm)

In case of any doubt, please contact us and let us know your requirements.

