

isoelectric

ZINC OXIDE SURGE ARRESTER M.V. and H.V. HOUSED IN SILICONE

The continued research for protection equipment's on the electrical apparatus in order to contain voltage surges, which can occur in M.V. and H.V. transmission and distribution networks, has induced **isoelectric** engineers to develop a zinc oxide (ZnO) surge arrester with electrical performance, high mechanical strength, seismic performance and explosion proof.

The silicone housing of surge arresters (SILIC. 1.75) gives it all the improved service requirements and reliability for the networks where it is installed.

ZnO surge arresters provide primary protection against voltage surges caused by external agents or by disturbances in the transmission system such as the opening and closing of switches, earth faults, mishandling of equipment etc.

If these surges exceed the insulation level (BIL = Basic Insulation Level) the equipment's can be damaged.

Surge arresters limit these surges to a safety level (less than the BIL of the equipment) thus protecting the station equipment.

The maximum voltage that the arresters can transmit to the station it is connected with, is called the "Level of protection of the surge arrester".

The difference between the BIL and the "level of protection of the surge arrester" is called the "margin of protection".

The **isoelectric** zinc oxide (ZnO) surge arresters, compared with the earlier silicon carbide resistor types, are able, from an operational point of view, to discharge energy associated with a surge wave by means of an earth phase connection of very low independence, drastically delimiting, in this way, the subsequent current.

One of the most important differences between the silicon carbide arrester SiC and the zinc oxide arrester ZnO, is that at the same operation voltage (MCOV) the leakage current varies notably (from 30 μ A for ZnO to 300 A for SiC).

An important quantity of the ZnO arrester is its capacity to withstand transitory over-voltages and other disturbances in the system.

The zinc oxide elements have an extremely non linear current voltage characteristic and an excellent capacity for energy dissipation that allow the elements to guarantee the functions:

- ✎ Level protection, defined in the field of high current (1-20 kA) and from the capacity to withstand over-voltage in the field of low currents (less than 1 A) and coincides with the phase-earth operating voltage of the system where it is installed.
- ✎ Such intervention so as not to produce system disturbances that could prejudice the continuity of the service and abnormal stresses on the components of the network.
- ✎ Capacity to withstand any energy based stress associated without damage or changes in operating characteristics.
- ✎ Ability to limit over-voltage and to absorb associated energy.
- ✎ Capacity to absorb high intensity currents of short and long duration.
- ✎ Elimination of slow intervention to the service voltage in the presence of the phenomenon of pollution on the external surface of the arresters exemplary internal structure.

CHOICE OF THE ZINC OXIDE ZnO SURGE ARRESTER

The choice of the correct rated voltage of a surge arrester is a compromise between the level of protection and the capacity to withstand over-voltage in the system.

Knowing the earthing data and the values of the transient over-voltage one can determine the value of the rated voltage of the surge arrester.

- ✎ Raising the rated voltage increases the capacity of the surge arrester to withstand temporary over-voltages, however it reduces the protection margin. Therefore it is necessary to choose an arrester with the minimum permissible voltage using a pitch apparatus system.
- ✎ Lowering the rated voltage increases the dangers of failure during the operation.

CORRECT INSTALLATION OF THE ZINC OXIDE ZnO SURGE ARRESTER.

The protection against over-voltages in a station for direct lightning strikes, is not based solely on the correct choice of a surge arrester but also on a number of important elements:

- ✎ Decreasing the distance between the arrester and the equipment to be protected.
- ✎ Installing further surge arresters at the entrance of the lines.
- ✎ Correct calculation of the discharge current at the presence of lightning because lightning can cause currents with steeper fronts.
- ✎ Precise verification of the perfect installation of the ZnO surge arrester and the resistance of the earth system.

GENERAL

isoelectric is the first company to produce surge arresters housed in silicone rubber and it is the only company to cover all the system voltages, from low voltage (L.V.) to distribution (M.V.), to transmission (H.V.).

From a continuous development programme **isoelectric** has produced three series of Zinc Oxide Surge Arresters housed in silicone which are certified from CESI laboratory according to the IEC 99-4 (1998).

We can also produce according to ANSI/IEEE C.62 11.

The surge arresters described in this brochure are the following:

ISI-EG* series: Rated voltage : from 6 kV to 36 kV.
Nominal discharge current : 5 kA.
Standard : IEC 99-4 1998

ISI-HE* series: Rated voltage : from 6 kV to 36 kV.
Nominal discharge current : 10 kA.
Standard : IEC 99-4 1998
Line discharge class: 1, for particular application we can made line discharge class 2.

ISI-2P* series: Rated voltage : from 36 kV to 165 kV.
Nominal discharge current : 10 kA.
Standard : IEC 99-4 1998
Line discharge class: 3

ISI-3P*, 4P*, 5P* series: Rated voltage : from 108 kV to 468 kV.
Nominal discharge current :
☞ ISI-3P* 10 kA
☞ ISI-4P* 20 kA
☞ ISI-5P* 30 kA
Standard : IEC 99-4 1998
Line discharge class:
☞ ISI-3P* 3 and 4
☞ ISI-4P* 4 and 5
☞ ISI-5P* 5

The different line discharge class and nominal discharge current are obtained by series and parallel construction comprises individual surge arrester units rated from 27 to 36 kV interconnected by means of a corona aluminium alloy intermediate rings.

CONSTRUCTION

The construction of this range is well proved and the service performance has been well tested in climates ranging from the arctic circle with an average variable temp. of +60°. The ZnO block is composed of a series of non linear resistors achieved by means of a sintering process of extremely compacted ceramic dust, made up of principally Zinc Oxide and small quantities of other metal oxides such as bismuth, cobalt, antimony and manganese oxide.

The method of the internal construction is composed of a high strength bond in an uniform manner in order to avoid condensation and entrapment of air voids.

isoelectric surge arresters are built according to a stringent quality control procedure and all the material and construction methods are subject to 100% checks.

The advantage of the reduced weight with respect to the porcelain housed arresters has recently grown from an intrinsic service safety point of view.

This range of silicone housed surge arresters has been subjected to water-proofs tests according to discharge pressure test requirements for greater safety of personnel in areas of high seismic risk.

APPLICATIONS

This range of surge arresters in silicone has the unique characteristic of a higher resistance to bending breaking point such that series ISI-EG* and ISI-HE* surge arresters can be used to substitute cable support insulators on H.V. terminals with reduced cost, the result is more aesthetically acceptable and it should be noted that this type of installation cannot be achieved with arresters of a lower construction strength.

The vandal proof, non-explosive failure mode, low weight, small size, suitable for installation in heavy salt coastal environments, resistant to transport damage, careless handling and easy to install, they all are additional positive characteristics of our arresters.

POLLUTION PERFORMANCE

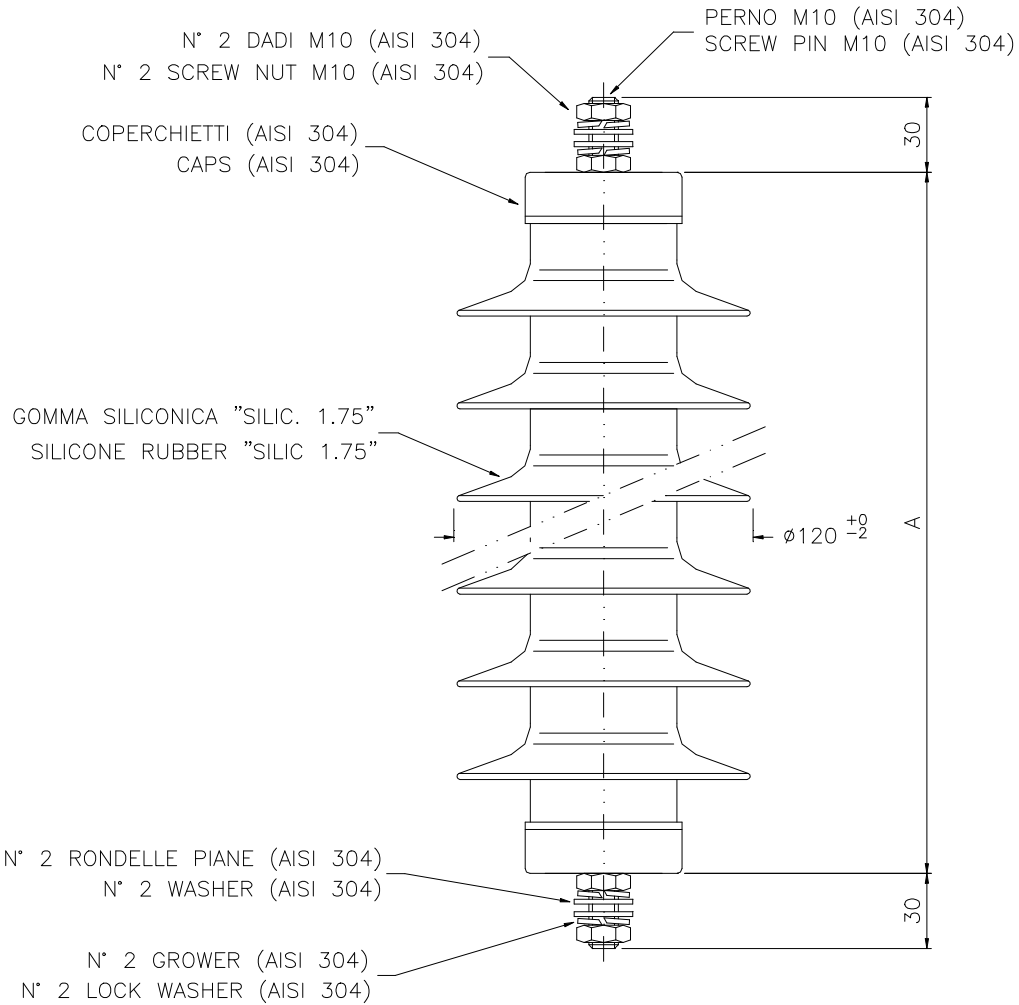
Global pollution is becoming an enormous problem.

This range of silicone surge arresters can be used in highly polluted regions including coastal areas with saline fog conditions, without any their protection characteristics the housing material used by **isoelectric** "SILIC. 1.75" has complete tests documentation according to all the standards in force.

For this problems, we have made two different types of housing sheds, the first for normal pollution and the second for high pollution.

ZINC OXIDE POLYMERIC ARRESTERS 5 kA type ISI-EG*

NORMAL POLLUTION SHEDS



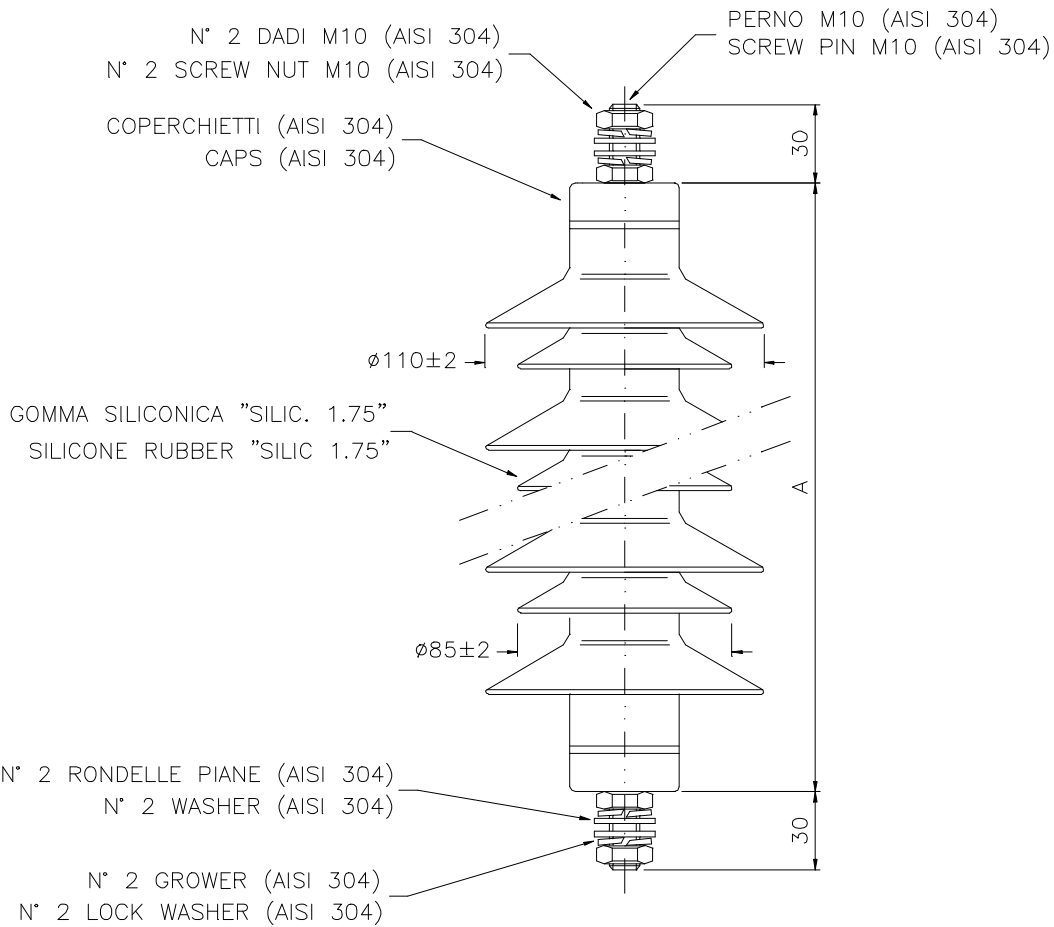
Nominal Discharge Current : 5 kA peak
 High Current Operation Duty : 65 kA peak

Long Duration Current : 125 A peak / 2000 ?sec
 Pressure Relief : 16 kA

| type | Rated Voltage Ur kV rms | Max cont. Operating Voltage MCOV kV rms | Temporary over-voltage for 1 sec. TOV kV rms | Max residual voltage with current wave (kV peak) 8/20 ?s at: | | | | | | | | | | Switching 30/90 ?s 125 Ap 500 Ap | Steep 1/2 ?s 10 kAp | height (A) ± 20 mm | Leak. dist. mm | Net weight approx Kg |
|-----------|-------------------------------|---|--|---|---------|---------|-------|--------|--------|------|------|------|-----|---|---------------------------|--------------------------|-------------------|-------------------------|
| | | | | 100 Ap | 1.5 kAp | 2.5 kAp | 5 kAp | 10 kAp | 20 kAp | | | | | | | | | |
| ISI-EGA06 | 6 | 4.80 | 7.00 | 15.0 | 17.5 | 18.5 | 19.5 | 22.0 | 25.5 | 15.0 | 15.5 | 23.0 | 185 | 390 | 1.6 | | | |
| ISI-EGA09 | 9 | 7.20 | 10.5 | 22.5 | 26.5 | 27.5 | 29.0 | 32.5 | 37.5 | 22.5 | 23.0 | 34.5 | 185 | 390 | 1.7 | | | |
| ISI-EGA10 | 10.5 | 8.20 | 12.0 | 27.0 | 31.0 | 33.5 | 34.0 | 38.5 | 44.5 | 26.5 | 27.5 | 40.5 | 185 | 390 | 1.8 | | | |
| ISI-EGA12 | 12 | 9.60 | 14.0 | 30.0 | 35.0 | 36.5 | 39.0 | 43.5 | 50.5 | 30.0 | 31.0 | 46.0 | 185 | 390 | 1.9 | | | |
| ISI-EGA15 | 15 | 12.0 | 17.5 | 37.5 | 43.5 | 45.5 | 48.5 | 54.0 | 62.0 | 37.5 | 38.5 | 57.5 | 185 | 390 | 2.1 | | | |
| ISI-EGB18 | 18 | 14.4 | 21.0 | 45.0 | 52.5 | 54.5 | 58.5 | 65.0 | 75.0 | 45.0 | 46.0 | 69.0 | 245 | 500 | 2.5 | | | |
| ISI-EGB21 | 21 | 16.8 | 24.5 | 52.5 | 61.0 | 63.5 | 65.0 | 75.5 | 86.5 | 52.5 | 53.5 | 80.5 | 245 | 500 | 2.6 | | | |
| ISI-EGB24 | 24 | 19.2 | 28.0 | 60.0 | 69.5 | 73.0 | 78.5 | 86.5 | 99.5 | 60.0 | 61.5 | 92.0 | 265 | 500 | 2.8 | | | |
| ISI-EGC27 | 27 | 21.6 | 31.5 | 67.5 | 78.5 | 82.0 | 88.5 | 97.0 | 112 | 67.5 | 69.0 | 104 | 305 | 690 | 2.9 | | | |
| ISI-EGC30 | 30 | 24.0 | 35.0 | 74.5 | 87.0 | 91.0 | 97.5 | 108 | 124 | 74.5 | 76.5 | 115 | 330 | 690 | 3.1 | | | |
| ISI-EGC33 | 33 | 26.4 | 38.5 | 82.0 | 95.5 | 100 | 108 | 119 | 137 | 82.0 | 84.5 | 127 | 380 | 940 | 3.2 | | | |
| ISI-EGC36 | 36 | 28.8 | 42.0 | 89.5 | 105 | 109 | 114 | 130 | 150 | 89.5 | 92.0 | 138 | 380 | 940 | 3.4 | | | |

ZINC OXIDE POLYMERIC ARRESTERS 5 kA type ISI-EG*

HIGH POLLUTION SHEDS



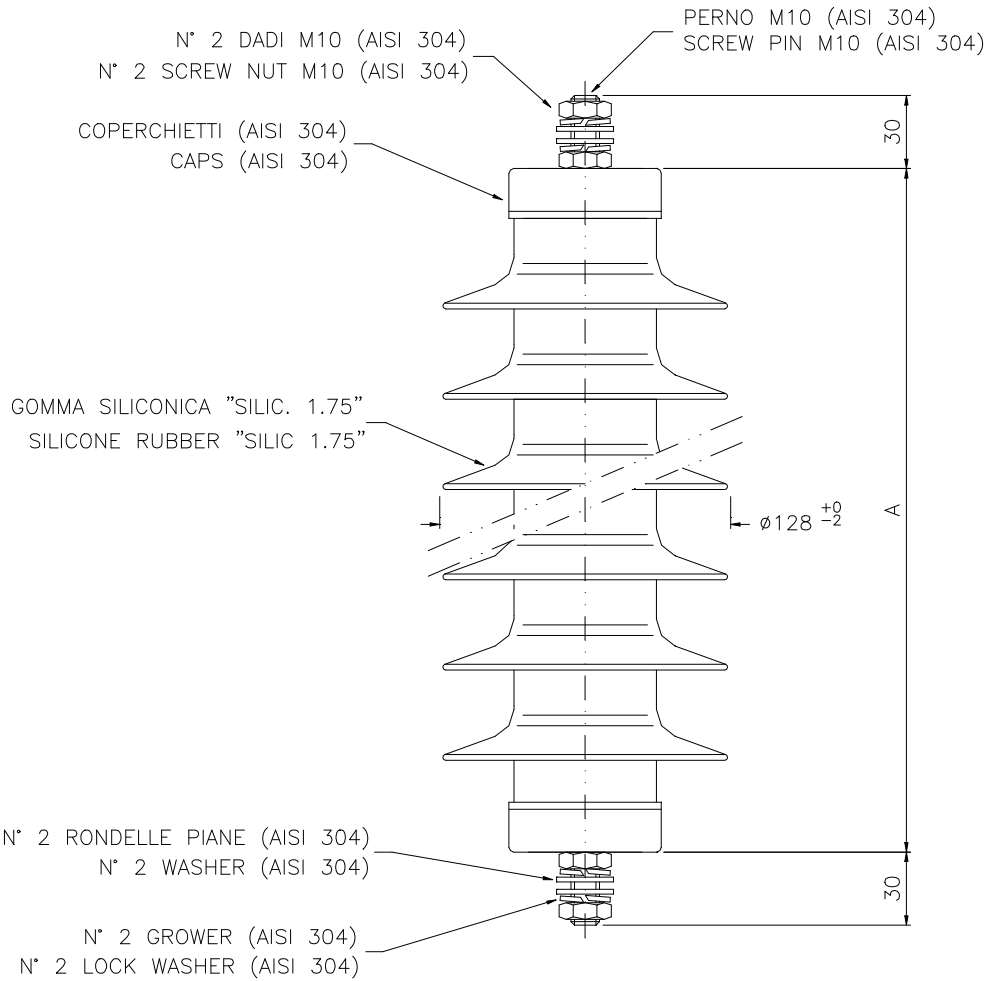
Nominal Discharge Current : 5 kA peak
 High Current Operation Duty : 65 kA peak

Long Duration Current : 125 A peak / 2000 ?sec
 Pressure Relief : 16 kA

| type | Rated voltage Ur kV rms | Max cont. operating voltage MCOV kV rms | Temporary over-voltage for 1 sec. TOV kV rms | Max residual voltage with current wave (kV peak) 8/20 ?s at: | | | | | | | | | | Switching 30/90 ?s Ap | Steep 1/2 ?s kAp | height (A) ± 20 mm | Leak. dist. mm | Net weight approx Kg |
|-----------|-------------------------------|---|--|---|------------|------------|----------|-----------|-----------|-----------|-----------|-----------|-----|-----------------------------|------------------------|-----------------------------|-------------------|-------------------------|
| | | | | 100 Ap | 1.5 kAp | 2.5 kAp | 5 kAp | 10 kAp | 20 kAp | 125 Ap | 500 Ap | 10 kAp | | | | | | |
| ISI-EGA06 | 6 | 4.80 | 7.00 | 15.0 | 17.5 | 18.5 | 19.5 | 22.0 | 25.5 | 15.0 | 15.5 | 23.0 | 185 | 400 | 1.6 | | | |
| ISI-EGA09 | 9 | 7.20 | 10.5 | 22.5 | 26.5 | 27.5 | 29.0 | 32.5 | 37.5 | 22.5 | 23.0 | 34.5 | 185 | 400 | 1.7 | | | |
| ISI-EGA10 | 10.5 | 8.20 | 12.0 | 27.0 | 31.0 | 33.5 | 34.0 | 38.5 | 44.5 | 26.5 | 27.5 | 40.5 | 185 | 400 | 1.8 | | | |
| ISI-EGA12 | 12 | 9.60 | 14.0 | 30.0 | 35.0 | 36.5 | 39.0 | 43.5 | 50.5 | 30.0 | 31.0 | 46.0 | 185 | 400 | 1.9 | | | |
| ISI-EGA15 | 15 | 12.0 | 17.5 | 37.5 | 43.5 | 45.5 | 48.5 | 54.0 | 62.0 | 37.5 | 38.5 | 57.5 | 185 | 400 | 2.1 | | | |
| ISI-EGB18 | 18 | 14.4 | 21.0 | 45.0 | 52.5 | 54.5 | 58.5 | 65.0 | 75.0 | 45.0 | 46.0 | 69.0 | 245 | 620 | 2.5 | | | |
| ISI-EGB21 | 21 | 16.8 | 24.5 | 52.5 | 61.0 | 63.5 | 65.0 | 75.5 | 86.5 | 52.5 | 53.5 | 80.5 | 245 | 620 | 2.6 | | | |
| ISI-EGB24 | 24 | 19.2 | 28.0 | 60.0 | 69.5 | 73.0 | 78.5 | 86.5 | 99.5 | 60.0 | 61.5 | 92.0 | 265 | 620 | 2.8 | | | |
| ISI-EGC27 | 27 | 21.6 | 31.5 | 67.5 | 78.5 | 82.0 | 88.5 | 97.0 | 112 | 67.5 | 69.0 | 104 | 305 | 760 | 2.9 | | | |
| ISI-EGC30 | 30 | 24.0 | 35.0 | 74.5 | 87.0 | 91.0 | 97.5 | 108 | 124 | 74.5 | 76.5 | 115 | 330 | 760 | 3.1 | | | |
| ISI-EGC33 | 33 | 26.4 | 38.5 | 82.0 | 95.5 | 100 | 108 | 119 | 137 | 82.0 | 84.5 | 127 | 380 | 1040 | 3.2 | | | |
| ISI-EGC36 | 36 | 28.8 | 42.0 | 89.5 | 105 | 109 | 114 | 130 | 150 | 89.5 | 92.0 | 138 | 380 | 1040 | 3.4 | | | |

ZINC OXIDE POLYMERIC ARRESTERS 10 kA type ISI-HE*

NORMAL POLLUTION SHEDS



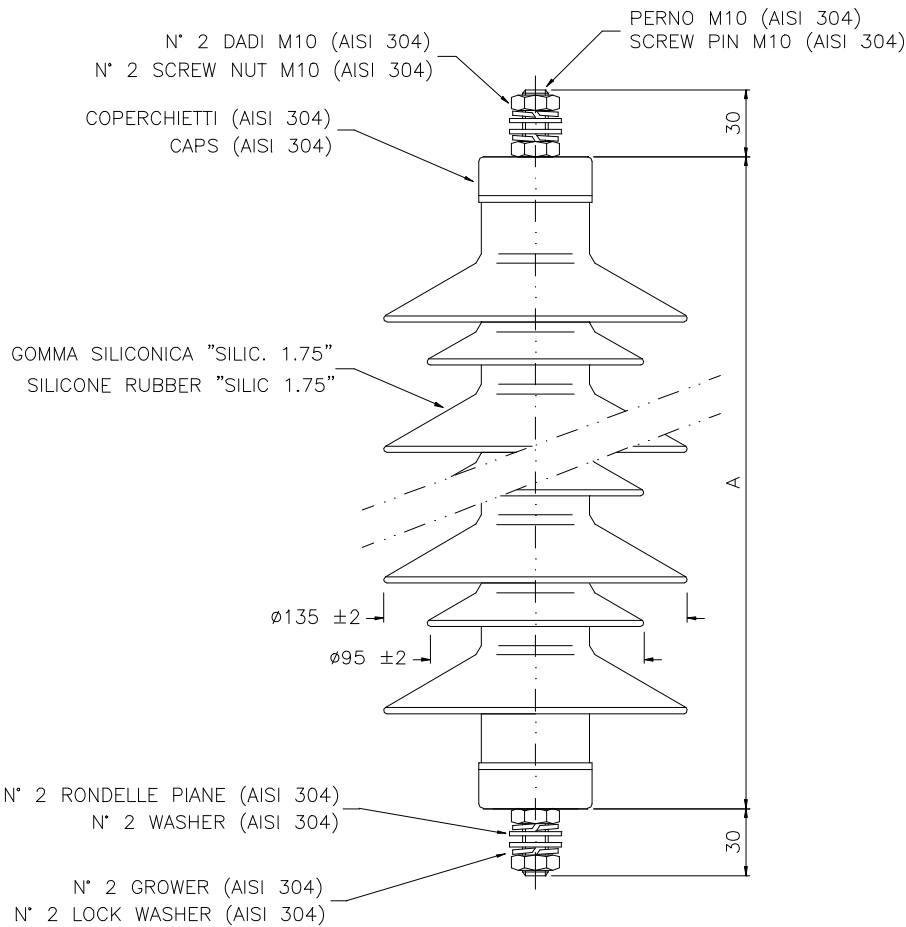
Energy Withstand : 4,1 kJ/kV @ 2000 ?sec
 Nominal Discharge Current : 10 kA peak
 High Current Operation Duty : 100 kA peak

Line Discharge Class : 1
 Long Duration Current : 250 A peak / 2000 ?sec
 Pressure Relief : 20 kA

| type | Rated voltage Ur kV rms | Max cont. operating voltage MCOV kV rms | Temporary over-voltage for 1 sec. TOV kV rms | Max residual voltage with current wave (kV peak) 8/20 ?s at: | | | | | | | | | | Steep 1/2 ?s 10 kAp | height (A) ± 20 mm | Leak. dist. mm | Net weight approx Kg |
|-----------|-------------------------------|---|--|---|------------|------------|----------|-----------|-----------|-----------|-----------|------|-----|------------------------------|-----------------------------|----------------------|----------------------------|
| | | | | 100 Ap | 1.5 kAp | 2.5 kAp | 5 kAp | 10 kAp | 20 kAp | 125 Ap | 500 Ap | | | | | | |
| ISI-HEA06 | 6 | 4.80 | 7.00 | 14.5 | 16.5 | 17.5 | 18.5 | 20.0 | 25.0 | 14.5 | 15.0 | 23.0 | 185 | 360 | 2.1 | | |
| ISI-HEA09 | 9 | 7.20 | 10.5 | 21.5 | 25.0 | 26.0 | 28.0 | 30.0 | 36.0 | 21.5 | 22.0 | 34.5 | 185 | 360 | 2.2 | | |
| ISI-HEA10 | 10.5 | 8.20 | 12.0 | 23.0 | 28.5 | 30.5 | 33.5 | 38.5 | 43.0 | 25.5 | 25.0 | 40.0 | 185 | 360 | 2.4 | | |
| ISI-HEA12 | 12 | 9.60 | 14.0 | 26.5 | 33.0 | 34.5 | 37.0 | 43.5 | 48.5 | 28.5 | 29.5 | 46.0 | 185 | 360 | 2.6 | | |
| ISI-HEA15 | 15 | 12.0 | 17.5 | 35.5 | 41.5 | 43.5 | 46.0 | 53.5 | 59.5 | 34.5 | 36.5 | 57.5 | 185 | 360 | 2.8 | | |
| ISI-HEB18 | 18 | 14.4 | 21.0 | 43.0 | 50.0 | 52.0 | 55.5 | 61.5 | 68.5 | 43.0 | 44.0 | 69.0 | 245 | 460 | 3.2 | | |
| ISI-HEB21 | 21 | 16.8 | 24.5 | 50.0 | 57.5 | 60.5 | 64.5 | 71.5 | 86.5 | 50.0 | 51.5 | 80.5 | 245 | 460 | 3.4 | | |
| ISI-HEB24 | 24 | 19.2 | 28.0 | 57.0 | 66.0 | 69.0 | 74.0 | 81.0 | 90.0 | 57.0 | 58.5 | 92.0 | 270 | 460 | 3.6 | | |
| ISI-HEC27 | 27 | 21.6 | 31.5 | 64.0 | 74.0 | 78.0 | 83.0 | 92.5 | 104 | 64.0 | 66.0 | 104 | 305 | 635 | 4.2 | | |
| ISI-HEC30 | 30 | 24.0 | 35.0 | 71.0 | 83.0 | 87.5 | 92.0 | 100 | 112 | 71.0 | 73.5 | 115 | 330 | 635 | 4.4 | | |
| ISI-HEC33 | 33 | 26.4 | 38.5 | 78.5 | 91.0 | 96.0 | 102 | 110 | 123 | 78.5 | 80.5 | 127 | 380 | 905 | 4.6 | | |
| ISI-HEC36 | 36 | 28.8 | 42.0 | 85.5 | 99.0 | 104 | 111 | 117 | 133 | 85.5 | 88.0 | 138 | 380 | 905 | 5.2 | | |

ZINC OXIDE POLYMERIC ARRESTERS 10 kA type ISI-HE*

HIGH POLLUTION SHEDS



Energy Withstand : 4,1 kJ/kV @ 2000 ?sec

Nominal Discharge Current : 10 kA peak

High Current Operation Duty : 100 kA peak

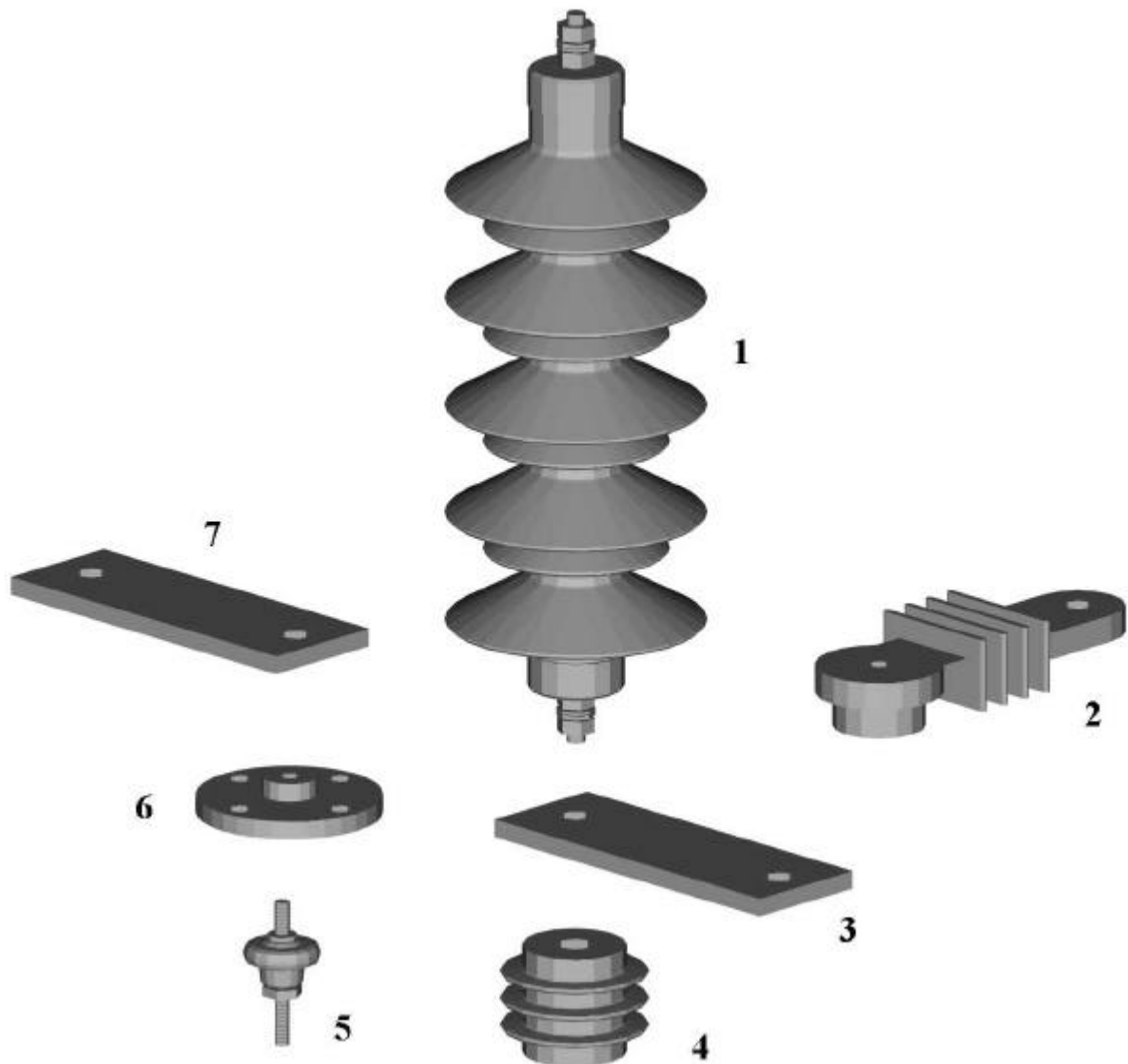
Line Discharge Class : 1

Long Duration Current : 250 A peak / 2000 ?sec

Pressure Relief : 20 kA

| type | Rated voltage Ur kV rms | Max cont. operating voltage MCOV kV rms | Temporary over-voltage for 1 sec. TOV kV rms | Max residual voltage with current wave (kV peak) 8/20 ?s at: | | | | | | | | | | Switching 30/90 ?s Ap | Steep 1/2 ?s 10 kAp | height (A) ± 20 mm | Leak. dist. mm | Net weight approx Kg |
|-----------|-------------------------------|---|--|---|------------|------------|----------|-----------|-----------|-----------|-----------|------|-----|-----------------------------|------------------------------|-----------------------------|-------------------|-------------------------|
| | | | | 100 Ap | 1.5 kAp | 2.5 kAp | 5 kAp | 10 kAp | 20 kAp | 125 Ap | 500 Ap | | | | | | | |
| ISI-HEA06 | 6 | 4.80 | 7.00 | 14.5 | 16.5 | 17.5 | 18.5 | 20.0 | 25.0 | 14.5 | 15.0 | 23.0 | 185 | 370 | 2.1 | | | |
| ISI-HEA09 | 9 | 7.20 | 10.5 | 21.5 | 25.0 | 26.0 | 28.0 | 30.0 | 36.0 | 21.5 | 22.0 | 34.5 | 185 | 370 | 2.2 | | | |
| ISI-HEA10 | 10.5 | 8.20 | 12.0 | 23.0 | 28.5 | 30.5 | 33.5 | 38.5 | 43.0 | 25.5 | 25.0 | 40.0 | 185 | 370 | 2.4 | | | |
| ISI-HEA12 | 12 | 9.60 | 14.0 | 26.5 | 33.0 | 34.5 | 37.0 | 43.5 | 48.5 | 28.5 | 29.5 | 46.0 | 185 | 370 | 2.6 | | | |
| ISI-HEA15 | 15 | 12.0 | 17.5 | 35.5 | 41.5 | 43.5 | 46.0 | 53.5 | 59.5 | 34.5 | 36.5 | 57.5 | 185 | 370 | 2.8 | | | |
| ISI-HEB18 | 18 | 14.4 | 21.0 | 43.0 | 50.0 | 52.0 | 55.5 | 61.5 | 68.5 | 43.0 | 44.0 | 69.0 | 245 | 570 | 3.2 | | | |
| ISI-HEB21 | 21 | 16.8 | 24.5 | 50.0 | 57.5 | 60.5 | 64.5 | 71.5 | 86.5 | 50.0 | 51.5 | 80.5 | 245 | 570 | 3.4 | | | |
| ISI-HEB24 | 24 | 19.2 | 28.0 | 57.0 | 66.0 | 69.0 | 74.0 | 81.0 | 90.0 | 57.0 | 58.5 | 92.0 | 270 | 570 | 3.6 | | | |
| ISI-HEC27 | 27 | 21.6 | 31.5 | 64.0 | 74.0 | 78.0 | 83.0 | 92.5 | 104 | 64.0 | 66.0 | 104 | 305 | 765 | 4.2 | | | |
| ISI-HEC30 | 30 | 24.0 | 35.0 | 71.0 | 83.0 | 87.5 | 92.0 | 100 | 112 | 71.0 | 73.5 | 115 | 330 | 765 | 4.4 | | | |
| ISI-HEC33 | 33 | 26.4 | 38.5 | 78.5 | 91.0 | 96.0 | 102 | 110 | 123 | 78.5 | 80.5 | 127 | 380 | 1000 | 4.6 | | | |
| ISI-HEC36 | 36 | 28.8 | 42.0 | 85.5 | 99.0 | 104 | 111 | 117 | 133 | 85.5 | 88.0 | 138 | 380 | 1000 | 5.2 | | | |

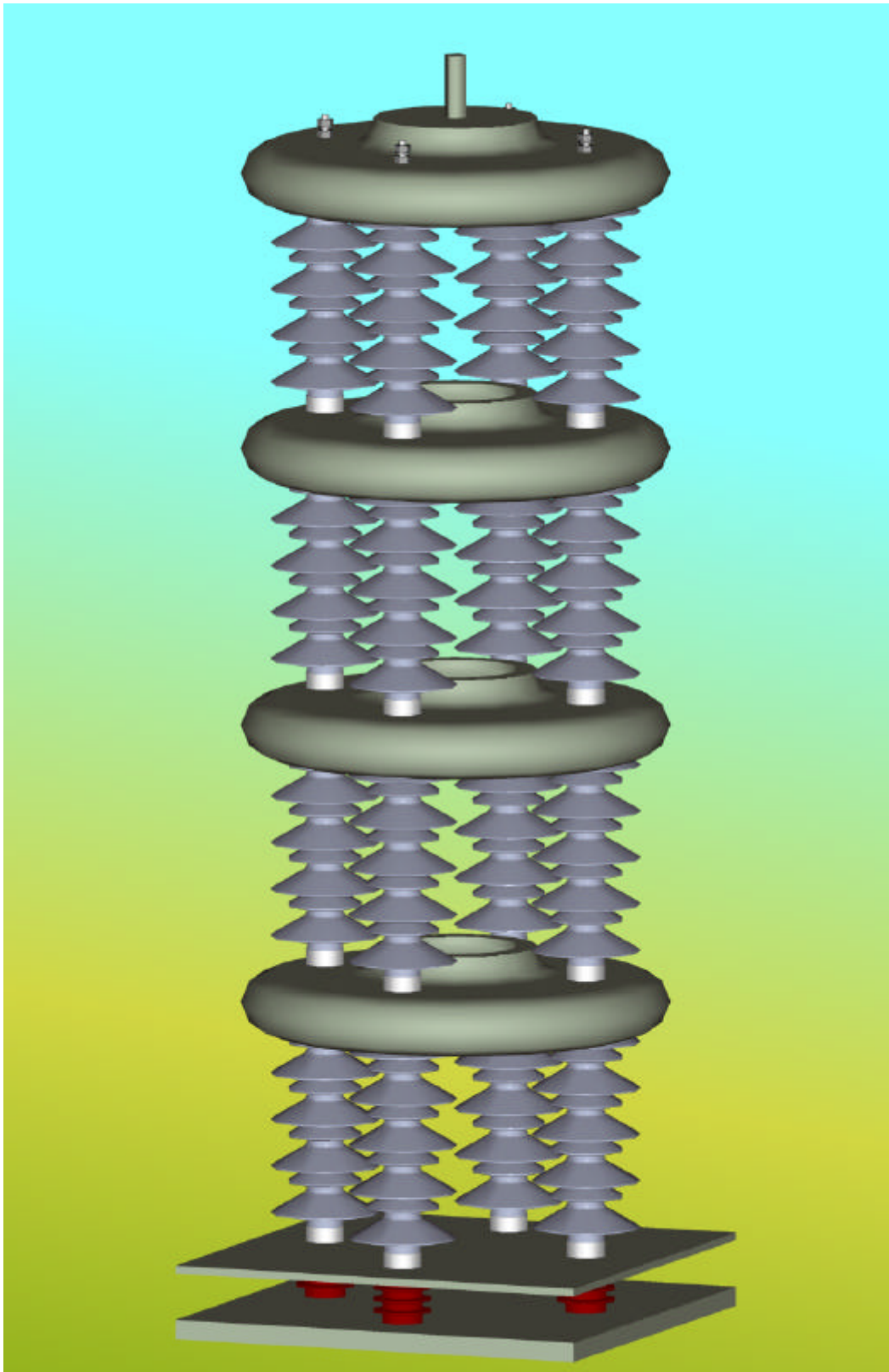
ACCESSORIES FOR ARRESTERS type ISI-EG* and ISI-HE*



1. Polymeric surge arrester housed in silicone rubber type **ISI-EG*** or **ISI-HE***
2. Insulated mounting bracket
3. Earth strap with M12 holes
4. Epoxy cycloaliphatic resin insulator with M12 fixing
5. Disconnector
6. Metallic base pedestal
7. Metallic mounting bracket with M12 holes

PICTURE OF THE OUR H.V. ARRESTER

Type ISI-3P*; ISI-4P*; ISI-5P*



ZINC OXIDE POLYMERIC ARRESTERS type ISI-2P*

HIGH POLLUTION SHEDS

ISI-2P*

Nominal Discharge Current :
10 kA peak

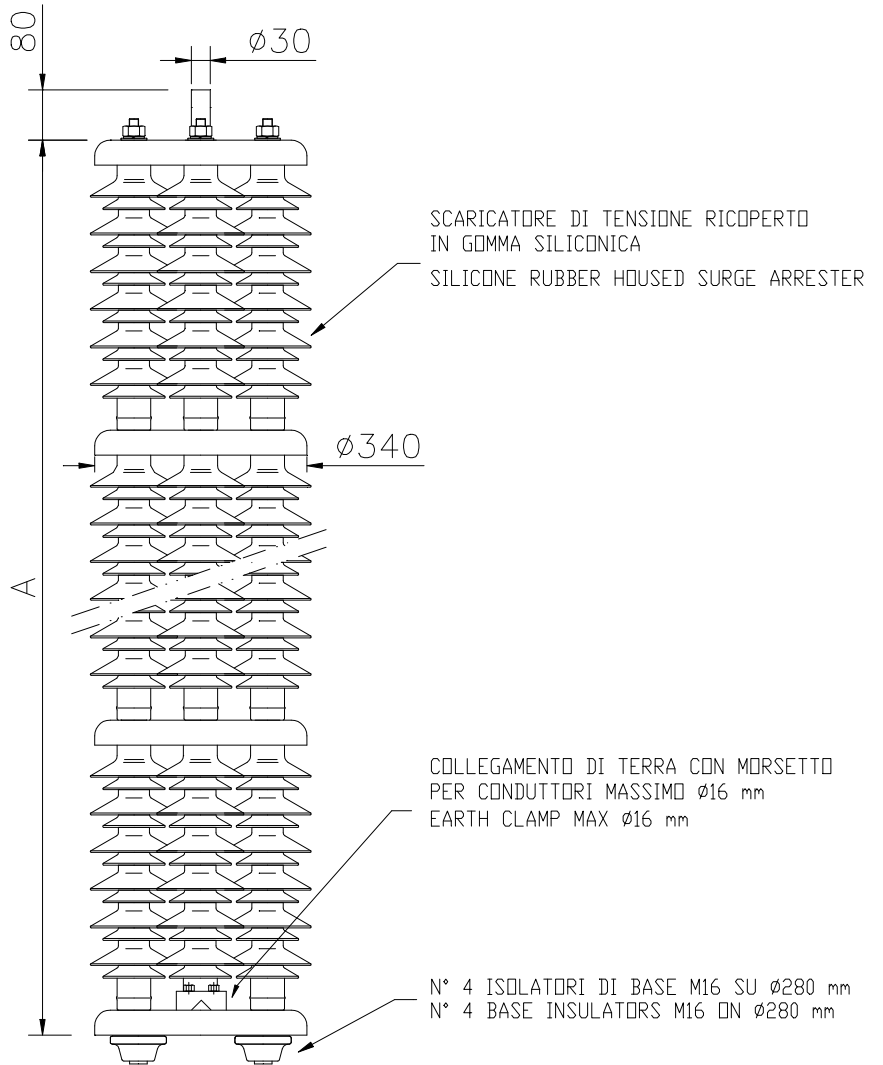
High Current Operation Duty :
100 kA peak

Long Duration Current :
500 A peak / 2000 ?sec

Pressure Relief :
20 kA

Energy Withstand :
8,0 kJ/kV @ 2000 ?sec

Line Discharge Class :
2



| type | Rated voltage U_r kV rms | Max cont. operating voltage MCOV kV rms | Temporary over-voltage for 1 sec. TOV kV rms | Max residual voltage with current wave (kV peak) | | | | | | height (A) ± 20 mm | Leakage Distance mm | Recomm. minimum dist. line to earth mm | Net weight approx. Kg |
|-------------|----------------------------------|---|--|--|--------|--------|--------------------|--------|--------------|---------------------------|------------------------|---|--------------------------|
| | | | | 8/20 ?s at: | | | Switching 30/90 ?s | | Steep 1/2 ?s | | | | |
| | | | | 5 kAp | 10 kAp | 20 kAp | 125 Ap | 500 Ap | | | | | |
| ISI-2P1S036 | 36 | 28.8 | 42.0 | 111 | 117 | 133 | 85.5 | 88.0 | 138 | 430 | 1000 | 250 | 20 |
| ISI-2P2S054 | 54 | 43.2 | 63.0 | 166 | 185 | 208 | 128 | 132 | 208 | 820 | 2000 | 300 | 35 |
| ISI-2P2S060 | 60 | 48.0 | 70.0 | 184 | 200 | 224 | 142 | 147 | 230 | 820 | 2000 | 350 | 38 |
| ISI-2P2S072 | 72 | 57.6 | 84.0 | 222 | 234 | 266 | 171 | 176 | 276 | 820 | 2000 | 420 | 41 |
| ISI-2P3S084 | 84 | 67.2 | 98.0 | 258 | 285 | 320 | 199 | 206 | 323 | 1210 | 3000 | 470 | 50 |
| ISI-2P3S096 | 96 | 76.8 | 112.0 | 296 | 320 | 358 | 228 | 235 | 369 | 1210 | 3000 | 550 | 53 |
| ISI-2P3S108 | 108 | 86.4 | 126.0 | 333 | 351 | 399 | 257 | 264 | 414 | 1210 | 3000 | 620 | 56 |
| ISI-2P4S120 | 120 | 96.0 | 140.0 | 368 | 400 | 448 | 284 | 294 | 460 | 1600 | 4000 | 670 | 65 |
| ISI-2P4S132 | 132 | 105.6 | 154.0 | 408 | 440 | 492 | 314 | 322 | 508 | 1600 | 4000 | 750 | 68 |
| ISI-2P4S144 | 144 | 115.2 | 168.0 | 444 | 468 | 532 | 342 | 352 | 552 | 1600 | 4000 | 800 | 71 |
| ISI-2P5S150 | 150 | 120.0 | 175.0 | 460 | 500 | 560 | 355 | 368 | 575 | 1990 | 5000 | 850 | 85 |
| ISI-2P5S165 | 165 | 132.0 | 192.5 | 510 | 550 | 615 | 393 | 403 | 635 | 1990 | 5000 | 900 | 88 |

ZINC OXIDE POLYMERIC ARRESTERS type ISI-3P*; ISI-4P*; ISI-5P* HIGH POLLUTION SHEDS

High Current Operation Duty :
100 kA peak
Pressure Relief :
20 kA

ISI-3P*

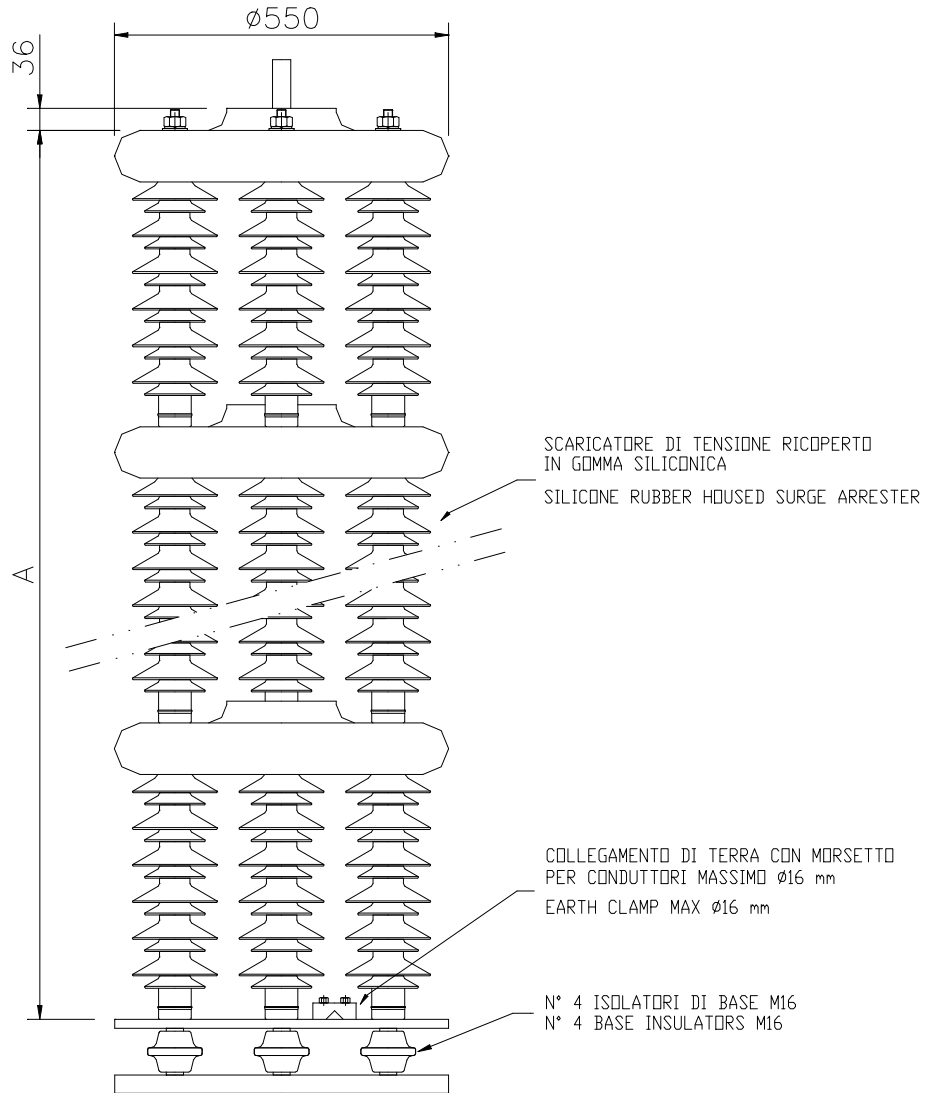
Nominal Discharge Current :
10 kA peak
Long Duration Current :
750 A peak / 2000 ?sec
Energy Withstand : 10 kJ/kV

ISI-4P*

Nominal Discharge Current :
20 kA peak
Long Duration Current :
1000 A peak / 2000 ?sec
Energy Withstand : 13 kJ/kV

ISI-5P*

Nominal Discharge Current :
30 kA peak
Long Duration Current :
1250 A peak / 2000 ?sec
Energy Withstand : 16 kJ/kV



| type | Rated voltage Ur kV rms | Max cont. operating voltage MCOV kV rms | Temporary over-voltage for 1 sec. TOV kV rms | Max residual voltage with current wave (kV peak) | | | | | | height (A) ± 20 mm | Leakage Distance mm | Recomm. minimum dist. line to earth mm | Net weight approx. Kg |
|--------------|-------------------------------|---|--|--|--------|--------|-----------------------|--------|-----------------|-----------------------|------------------------|---|--------------------------|
| | | | | 8/20 ?s at: | | | Switching 30/90 ?s | | Steep 1/2 ?s | | | | |
| | | | | 5 kAp | 10 kAp | 20 kAp | 125 Ap | 500 Ap | | | | | |
| ISI-3P3S108 | 108 | 86.4 | 126 | 333 | 351 | 399 | 257 | 264 | 414 | 1170 | 3000 | 650 | 65 |
| ISI-3P4S132 | 132 | 105.6 | 154 | 408 | 440 | 492 | 314 | 322 | 508 | 1560 | 4000 | 750 | 85 |
| ISI-3P5S150 | 150 | 120 | 175 | 460 | 500 | 560 | 355 | 368 | 575 | 1950 | 5000 | 850 | 105 |
| ISI-3P6S198 | 198 | 158.4 | 231 | 612 | 660 | 738 | 471 | 483 | 762 | 2340 | 6000 | 1100 | 125 |
| ISI-3P6S216 | 216 | 172.8 | 252 | 666 | 702 | 798 | 513 | 528 | 828 | 2340 | 6000 | 1200 | 135 |
| ISI-3P7S250 | 250 | 201.6 | 294 | 777 | 819 | 931 | 599 | 616 | 966 | 2730 | 7000 | 1350 | 155 |
| ISI-4P9S324 | 324 | 259.2 | 378 | 999 | 1053 | 1197 | 770 | 792 | 1242 | 3510 | 9000 | 1750 | 195 |
| ISI-4P10S345 | 345 | 273.6 | 399 | 1053 | 1120 | 1267 | 812 | 837 | 1311 | 3900 | 10000 | 1900 | 215 |
| ISI-4P10S360 | 360 | 288 | 420 | 1110 | 1170 | 1330 | 855 | 880 | 1380 | 3900 | 10000 | 2000 | 225 |
| ISI-4P11S396 | 396 | 316.8 | 462 | 1221 | 1287 | 1463 | 940 | 968 | 1518 | 4290 | 11000 | 2200 | 245 |
| ISI-5P12S432 | 432 | 345.6 | 504 | 1332 | 1404 | 1596 | 1026 | 1056 | 1656 | 4680 | 12000 | 2400 | 265 |
| ISI-5P13S468 | 468 | 374.4 | 546 | 1443 | 1521 | 1729 | 1112 | 1144 | 1794 | 5070 | 13000 | 2600 | 290 |