

HC

Sheath Voltage Limiters



TRIDELTA Parafoudres S.A.

A member of the TRIDELTA group



With 50 years of experience in surge protection, AREVA provides products suitable to the user's expectations.

HC sheath voltage limiters are surge arresters required for the reliability of electrical sections built with underground cables.

The overvoltage protection provided by a surge arrester ensures both personnel and equipment safety, thus optimizing operating costs.

THE RIGHT SURGE ARRESTER AT THE RIGHT PLACE !

Our HC surge arresters are designed for overvoltage protection of Power Distribution or Power Transmission underground cables sheathes.

Their composite technology provides both high electrical performance and optimized conditions for implementation.

Two ranges of products are available : VARISIL™ HC surge arresters for connection to single point bonded sections and RNL HC surge arresters for use inside cross-bonding cabinets.

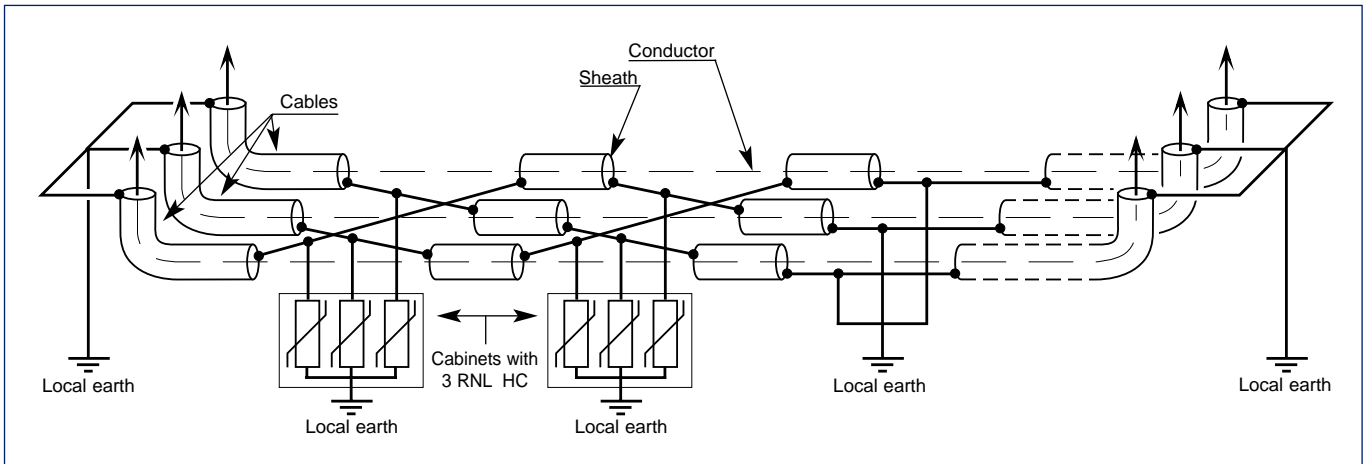
The features of HC sheath voltage limiters are in accordance with CIGRE recommendations and IEC 60099-4 principles.



Customer benefits :

- System reliability
- Easy to install
- Enhanced safety

RNL HC



Dimensions and fittings

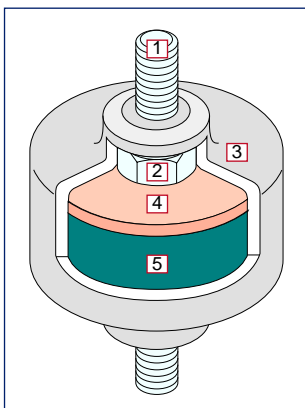
Reference		HC 1	HC 2	HC 3	HC 6
L1 (± 1.5 mm)		31.5	39,5	51	63
L2 (± 2 mm)	b0	69.5	77.5	89	101
	b1	55.5	63.5	75	87
	b2	106.5	114.5	126	138
	b3	81.5	89.5	101	113
d x L (mm)	b0	14 x 18			
	b1	13 x 26			
	b2	10 x 25			
	b3	18 x 38			
L3 (± 2.5 mm)	b0	107.5	115.5	127	139
	b1	91.5	99.5	111	123
	b2	143.5	151.5	163	175
	b3	139.5	17.5	159	171
H (mm)	b0/b2/b3	59			
	b1	80			
P (mm)	b0	48			
	b1/b2/b3	40			
e (mm)	b0/b1/b2	2			
	b3	3			
Approximate weight (kg)		0.3	0.35	0.45	0.6

Electrical features

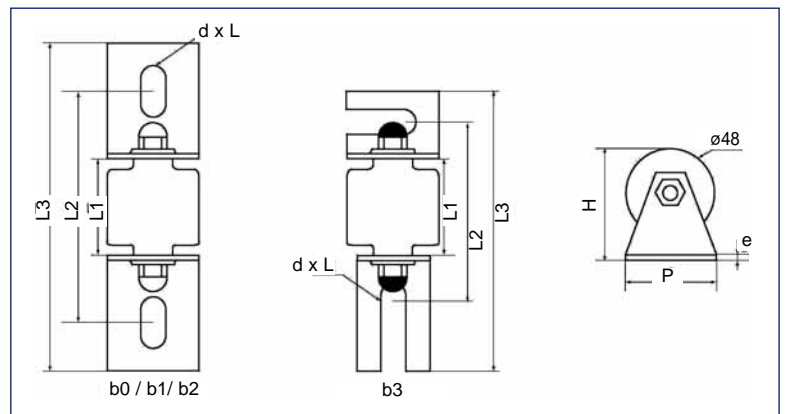
Reference	HC 1	HC 2	HC 3	HC 6
Rated voltage U_r (kV rms)	1	2	3,3	6
Continuous operating voltage U_c (kV rms)	0.8	1.6	2.7	4.8
Nominal discharge current I_n (kA 8/20)	10	10	10	10
High current impulse withstand (kA 4/10)	65	65	65	65
Long duration current withstand (A 2000 μ s)	150	150	150	150
Maximum residual voltage at 10 kA 8/20 = protective level (kV peak)	3	6	10	18

Mounting options

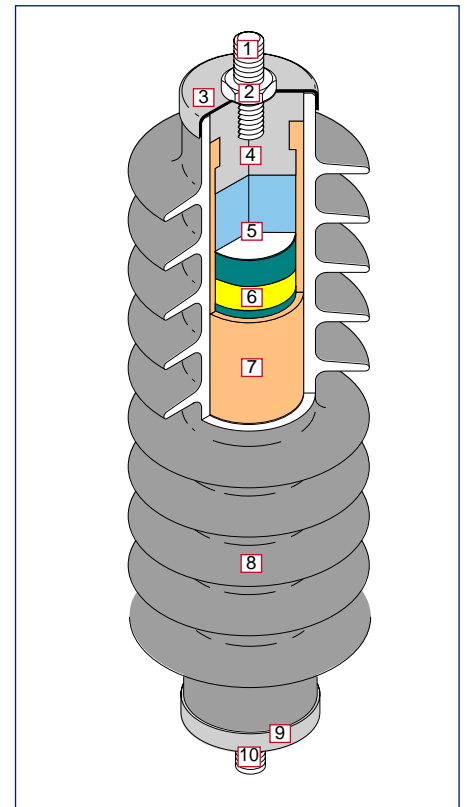
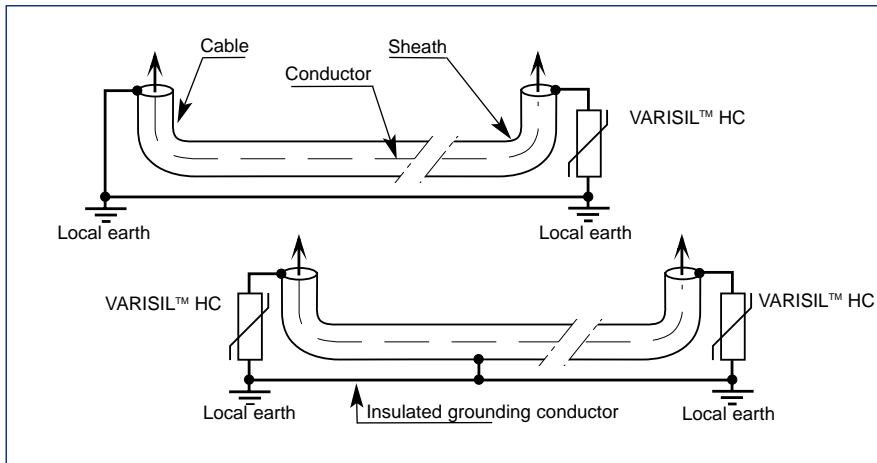
b0 : medium brackets
 b1 : short brackets
 b2 : long brackets
 b3 : asymmetrical brackets



- 1 - End stud
- 2 - Locking nut
- 3 - Synthetic housing
- 4 - Contact disk
- 5 - Metal oxide varistor



VARISIL™ HC



- 1 - Stainless steel top stud
- 2 - Securing nut
- 3 - Stainless steel top cap
- 4 - Aluminium electrode
- 5 - Metal oxide varistor
- 6 - Synthetic tape
- 7 - Composite wrapping
- 8 - Silicone rubber housing
- 9 - Stainless steel bottom cap
- 10 - Stainless steel bottom stud

Electrical features

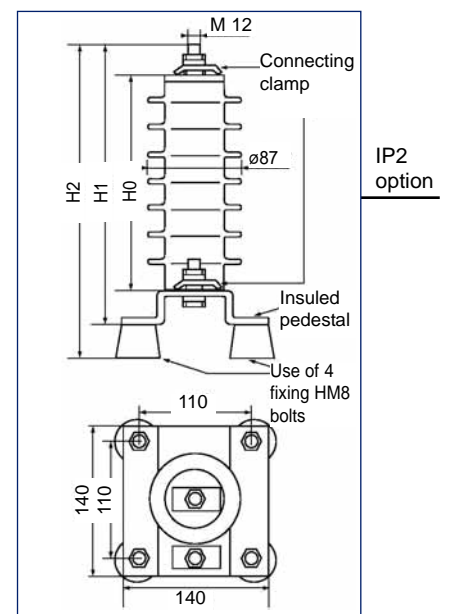
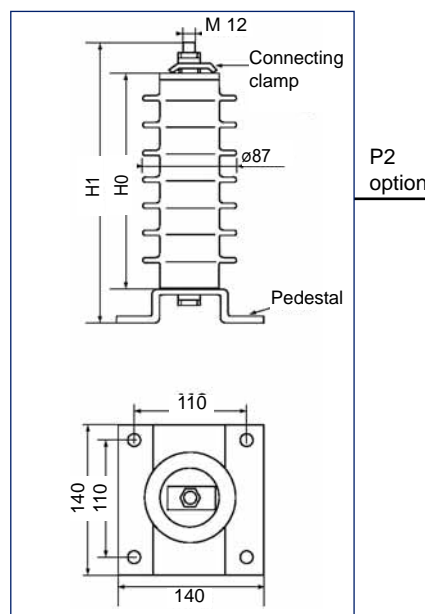
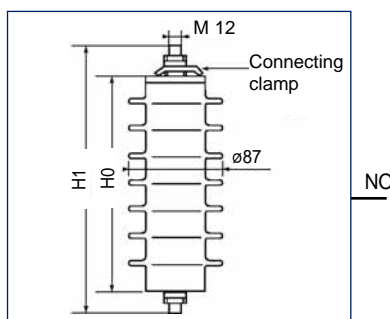
Reference	HC 05	HC 10	HC 12	HC 15	HC 18
Rated voltage U_r (kV rms)	5	10	12	15	18
Continuous operating voltage U_c (kV rms)	4	8	9.6	12	14.4
Nominal discharge current I_n (kA 8/20)	10	10	10	10	10
High current impulse withstand (kA 4/10)	65	65	65	65	65
Long duration current impulse withstand (A 2000 μ s)	150	150	150	150	150
Short circuit withstand (kA rms/0.2 s)	31.5	31.5	31.5	31.5	31.5
Maximum residual voltage at 10 kA 8/20 = protective level (kV peak)	14	28	34	42	51
Nominal creepage distance (mm)	380	380	380	380	380

Dimensions and fittings

Reference	HC 05	HC 10	HC 12	HC 15	HC 18
H0 (mm)	195	195	195	195	195
H1 (mm)	255	255	255	255	255
H2 (mm)	290	290	290	290	290
Weight no version (kg)	1.4	1.6	1.7	1.8	1.9

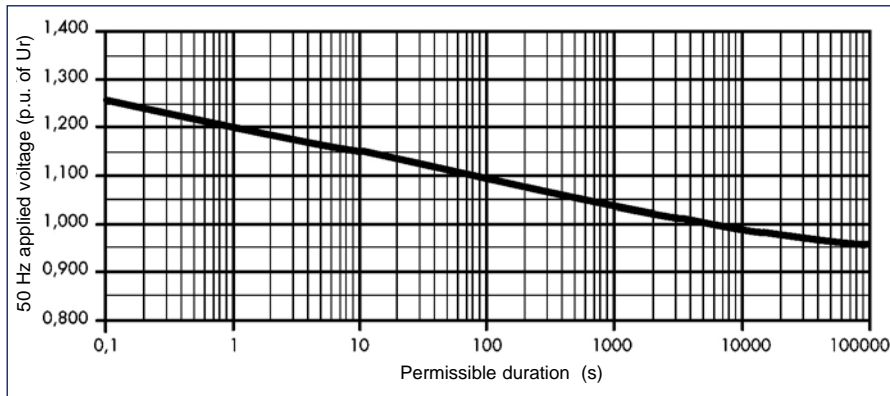
Mounting options

- NO : basic version
- P2 : with square pedestal (+ 0.7 kg)
- IP2 : with insulated square pedestal (+ 1.0 kg)



Note : connection via terminal lugs or connecting clamp if conductor diameter < 18 mm .

HC



The choice of the range must be made according to the application :

- RNL HC range for mounting in cabinets with crossbonding,
- VARISIL™ HC for mounting at ends of single point bonded sections.

The selection of the appropriate reference within the range is based on two considerations having opposite impacts :

- the 1.2/50 lightning impulse withstand level of the sheath, which depends on the external insulation of the cable, tends to minimize the required protective level,
- the voltage induced at the connecting point of the device in case of short circuit on the main conductor, which depends on the short circuit power and on the length of the cable to be protected, leads to maximize the rated voltage.

A protective margin greater than 20 % is recommended between the protective level of the surge arrester (U_p) and the lightning impulse withstand level of the sheath (U_w). On the other hand, the level/time values (U_{sc}/T) of the voltage induced on the sheath in case of short circuit must be below the minimum voltage vs time characteristic curve of the surge arrester.

Whenever several references meet both requirements, the final choice will be made by the user with respect to operation requirements and priorities.

Basically, the surge arrester with lower rated voltage will provide improved protection whereas the surge arrester with higher rated voltage will better withstand short circuit stresses. Any surge arrester in-between will be a compromise.

Should no reference fulfil both requirements, the protection should be achieved at shorter intervals so as to allow the use of a surge arrester having a lower rated voltage.

Example

- Cable features :
- single point bonded cable
 - $U_w = 55$ kV
 - $usc = 300$ V/kA/km
 - $I_{sc} = 31.5$ kA / 1 s
 - $L = 1.8$ km

Sheath voltage limiter selection :

a) VARISIL™ HC

b) 20% protective margin :
 $U_p < U_w/1.2$ so that $U_p < 46$ kV

c) voltage withstand under short circuit conditions :
 $U_{sc} = usc \times I_{sc} \times L = 17$ kV
and $U(T = 1 \text{ s}) = 1.2 \times U_r$ according to the above curve give $1.2 \times U_r > 17$ so that $U_r > 14.2$ kV.

Here, the calculations lead to VARISIL™ HC 15 model.

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