

RAYCHEM MEDIUM VOLTAGE

OUTDOOR SURGE ARRESTERS

Raychem MV Outdoor Surge Arresters

Raychem pioneered the development of polymeric housed surge arresters in the early 1980's and since 1986 have a proven service experience across the globe, operating in the worlds toughest environments.

Raychem HDA Ethyl Vinyl Acetate (EVA) surge arresters have been designed and tested to meet our customers toughest environmental conditions and to meet the requirements of IEC60099-4.

The final HDA qualifications are performed by an independent laboratory in Europe.HDA is the latest gapless, zinc oxide arrester family from Raychem.

At the core of the Raychem HDA design is our improved ZnO varistor disk, which has superior thermal and electrical characteristics and stability.

This new varistor and HDA design combination results in superior energy handling and TOV performance.

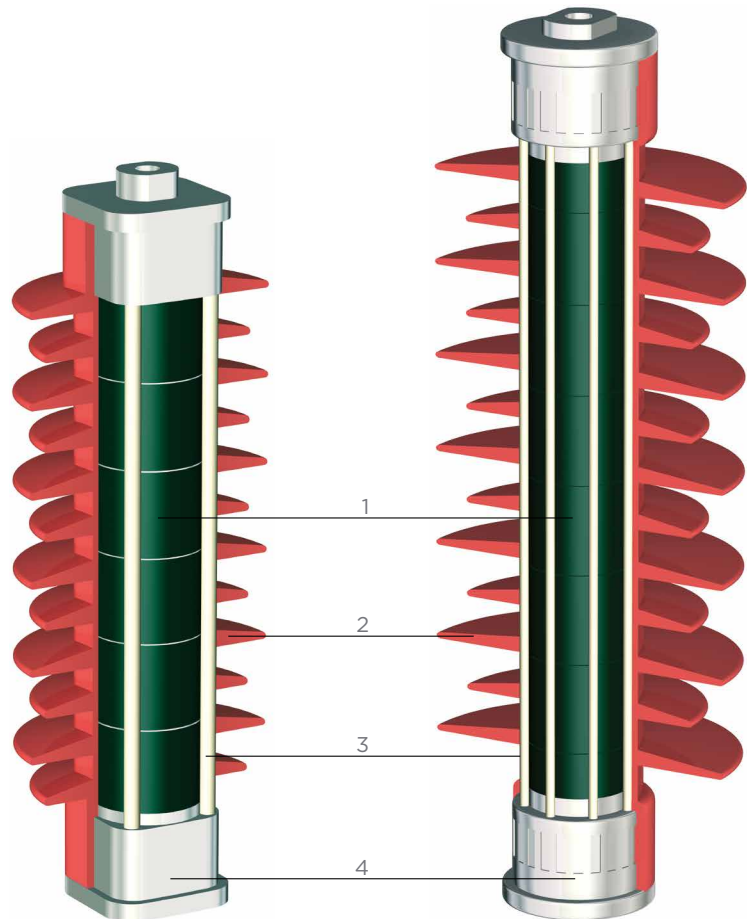
The crimped structural construction offers a light weight product with optimal mechanical strength. The manufacturing process ensures void free construction and optimum interface sealing. This is achieved by bonding the EVA housing directly to the ZnO discs and aluminium fittings using a Raychem proprietary bonding solution.

Features of our new hydrophobic silicone HDA design are:

- Alternating sheds for superior pollution flash over resistance
- Superior TERT performance
- Constant voltage: 4.5 kV, >360min
- Stepped voltage: >300min
- All eventual failures by erosion only, ie no tracking in step voltage test
- Housing tested to IEC 1000hr salt fog test

Benefits

- Superior TOV performance
- Safe, non-shattering failure in the short circuit test by pre-failing to higher fault currents
- High energy handling capability
- Tested in accordance with IEC60099-4
- Superior protection margins
- Direct molded housing to prevent moisture ingress
- Maintenance free
- Hydrophobic EVA housing
- Excellent cantilever and tensile performance
- Excellent mechanical, vibration and impact withstand capability
- Quality design and manufacturing, ISO 9001 and 14001 compliant



The construction of the HDA design comprises of:

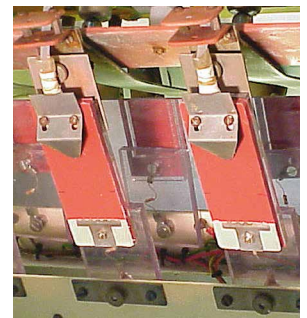
- 1 ZnO, (Zinc Oxide) varistors
- 2 Raychem HDA proprietary EVA housing
- 3 Flame retardant FRP structure
- 4 Corrosion resistant aluminium fittings



Excellent hydrophobicity



Safe non-shattering failure mode



Superior TERT performance

Discharge Class 1 Surge Arrester – HDA-MA

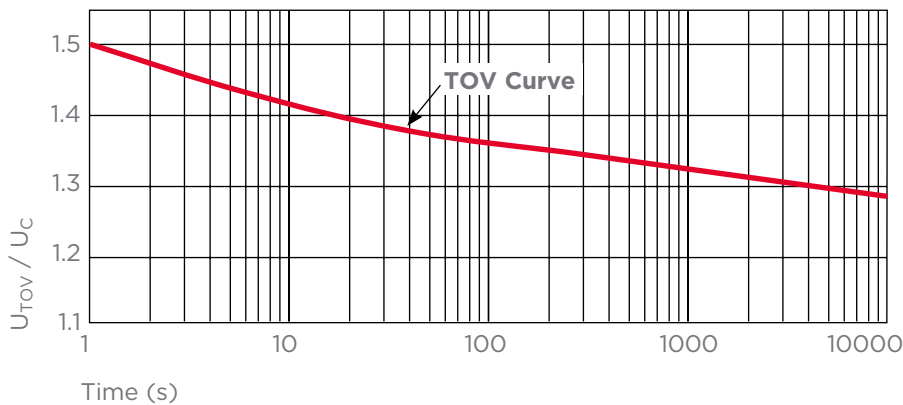
Application

Protection of MV networks and equipment from lightning and switching surge related over-voltages in areas with relatively high iso-keraunic levels. Suitable for both outdoor and indoor use to protect transformers and cable end terminations.

Generic technical data

HDA-xxMA series	3-24 kV U_c	
Rated discharge current (8/20 μ s)	10 kA	
Line discharge class according to IEC 60099-4	Class 1	
Operating duty impulse withstand current (4/10 μ s)	100 kA	
Long duration current impulse (2000 μ s)	400 A	
10 second temporary overvoltage, (U_{TOV}/U_c)	1.42	
High current short circuit: (pre-failing method) (Safe non-shattering failure mode)	40 kA	
Energy	2 long duration impulses	4.2 kJ/kV U_c
	2 high current impulses	6.8 kJ/kV U_c
Service conditions	Ambient temperature	- 60°C to + 60°C

Temporary overvoltage (TOV) of HDA-xxMA with prior energy

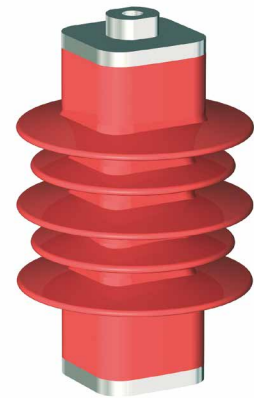


Samples are pre-heated to a temperature of 60° C according to IEC 60099-4.

Samples were subjected to a pre-stress equivalent to one high current impulse of 100kA, 4/10 μ s as per switching surge operating duty test.

U_{TOV} = TOV withstand voltage;

U_c = continuous operating voltage



Discharge Class 1 Surge Arrester - HDA-MA

HDA-MA Standard electrical data

HDA-xxMA	U continuous kV(r.m.s)	U rated kV(r.m.s)	U residual in kV when tested to the following impulse waveforms						
			Lightning (8/20µs)			Steep lightning (1/20µs)		Switching (30/60µs)	
			5 kA	10 kA	20 kA	10 kA	125 A	500 A	
03	3	3.75	9.3	9.9	10.9	10.2	7.4	7.9	
04	4	5	12.4	13.2	14.6	13.6	9.8	10.5	
06	6	7.5	18.6	19.8	21.8	20.4	14.8	15.7	
08	8	10	24.8	26.4	29.1	27.2	19.7	21	
09	9	11.25	27.9	29.7	32.8	30.6	22.1	23.6	
10	10	12.5	31	33	36.4	34	24.6	26.2	
12	12	15	37.2	39.6	43.7	40.8	29.5	31.4	
18	18	22.5	55.8	59.4	65.5	61.2	44.3	47.2	
20	20	25	62	66	72.8	68	49.2	52.4	
21	21	26.25	65.1	69.3	76.4	71.4	51.7	55	
24	24	30	74.4	79.2	87.4	81.6	59	62.9	

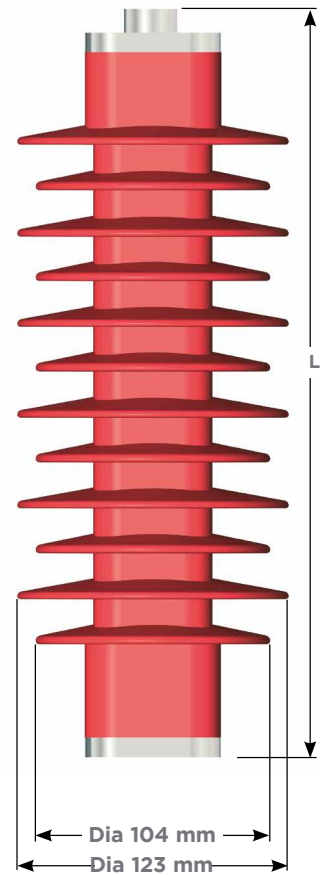
Uc: Continuous Voltage; Ur: Rated Voltage; Ures: Residual Voltage

HDA-xxMA Standard housing parameters

HDA-xxMA	Sheds	Impulse voltage 1.2/50µs (kV)	Power frequency withstand voltage, wet (kV)	Flash over distance (mm)	Creepage length (mm)	Height L (mm)	Weight (approx) (kg)
03	5	106	47	176	380	183	1.8
04	5	106	47	176	380	183	1.8
06	5	106	47	176	380	183	1.8
08	5	106	47	176	380	183	1.8
09	5	106	47	176	380	183	1.8
10	5	106	47	176	380	183	1.8
12	5	106	47	176	380	183	1.8
18	12	190	93	310	830	316	3.25
20	12	190	93	310	830	316	3.25
21	12	190	93	310	830	316	3.25
24	12	190	93	310	830	316	3.25

HDA-xxML Extended housing parameters

HDA-xxML	Sheds	Impulse voltage 1.2/50µs (kV)	Power frequency withstand voltage, wet (kV)	Flash over distance (mm)	Creepage length (mm)	Height L (mm)	Weight (approx) (kg)
03	12	190	93	310	830	316	3.25
04	12	190	93	310	830	316	3.25
06	12	190	93	310	830	316	3.25
08	12	190	93	310	830	316	3.25
09	12	190	93	310	830	316	3.25
10	12	190	93	310	830	316	3.25
12	12	190	93	310	830	316	3.25



Notes:

Mechanical strength data

Cantilever	Nm	350
Tensile	kN	2
Torque	Nm	50

For accessory and ordering information, please refer to page 7

Discharge Class 1 Surge Arrester - HDA-M

Application:

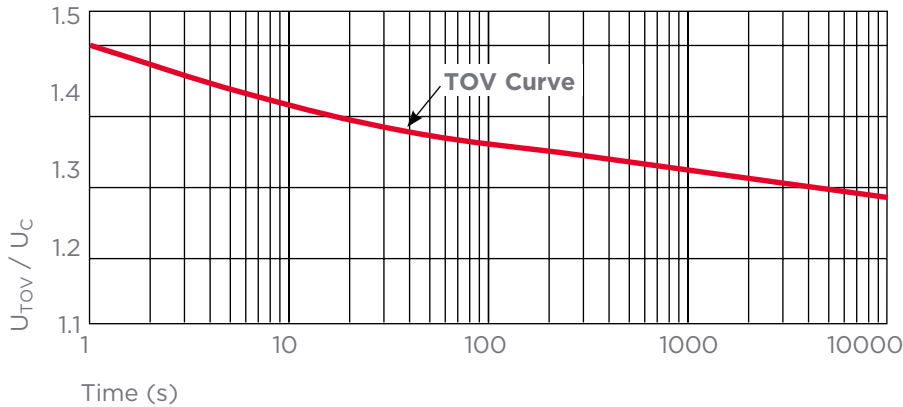
Protection of MV networks and equipment from lightning and switching surge related over-voltages in areas with relatively high iso-keraunic levels. Suitable for both outdoor and indoor use to protect transformers and cable end terminations.

Generic technical data

HDA-xxM series	26-41 kV U _c	
Rated discharge current (8/20μs)	10 kA	
Line discharge class according to IEC 60099-4	Class 1	
Operating duty impulse withstand current (4/10μs)	100k A	
Long duration current impulse (2000μs)	400 A	
10 second temporary overvoltage, (U _{TOV} /U _C)	1.42	
High current short circuit: (pre-failing method) (Safe non-shattering failure mode)	40 kA	
Energy	2 long duration impulses	4,2 kJ/kV U _c
	2 high current impulses	6.8 kJ/kV U _c
Service conditions	Ambient temperature	- 60°C to + 60°C



Temporary overvoltage (TOV) of HDA-xxM with prior energy



Samples are pre-heated to a temperature of 60° C according to IEC 60099-4. Samples were subjected to a pre-stress equivalent to one high current impulse of 100kA, 4/10 μs as per switching surge operating duty test.

U_{TOV} = TOV withstand voltage;
U_C = continuous operating voltage



Discharge Class 1 Surge Arrester - HDA-M

HDA-M Standard electrical data

HDA-xxM	U continuous kV(r.m.s)	U rated kV(r.m.s)	U residual in kV when tested to the following impulse waveforms						
			Lightning (8/20µs)			Steep lightning (1/20µs)		Switching (30/60µs)	
			5 kA	10 kA	20 kA	10 kA	125 A	500 A	
26	26	32.5	80.6	85.8	94.6	88.4	64	68.1	
27	27	33.75	83.7	89.1	98.3	91.8	66.4	70.7	
29	29	36.25	89.9	95.7	105.6	98.6	71.3	76	
30	30	37.5	93	99	109.2	102	73.8	78.6	
33	33	41.25	102	108.9	120.1	112.2	81.2	86.5	
36	36	45	112	118.8	131	122.4	88.6	94.3	
39	39	48.75	121	128.7	142	132.6	95.9	102	
40	40	50	124	132	145.6	136	98.4	105	
41	41	51.25	127	135.3	149.2	139.4	101	107	

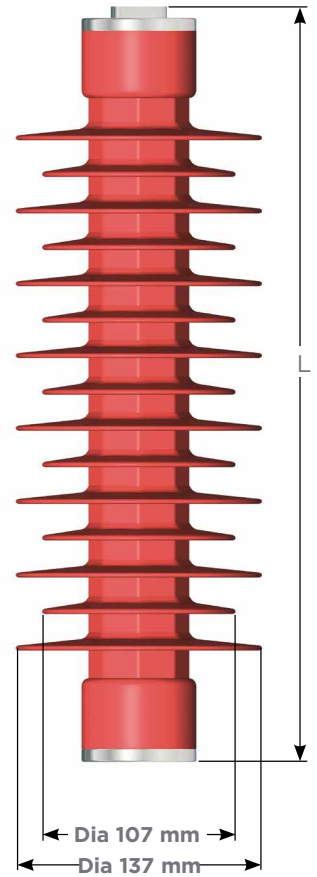
Uc: Continuous Voltage; Ur: Rated Voltage; Ures: Residual Voltage

HDA-xxM Standard housing parameters

HDA-xxM	Sheds	Impulse voltage 1.2/50µs (kV)	Power frequency withstand voltage, wet (kV)	Flash over distance (mm)	Creepage length (mm)	Height L (mm)	Weight (approx) (kg)
26	11	204	98	339	970	343	4
27	11	204	98	339	970	343	4
29	11	204	98	339	970	343	4
30	11	204	98	339	970	343	4
31	13	228	110	378	1125	383	4.5
33	13	228	110	378	1125	383	4.5
36	13	228	110	378	1125	383	4.5
39	15	250	122	418	1279	423	5
40	15	250	122	418	1279	423	5
41	15	250	122	418	1279	423	5

HDA-xxML Extended housing parameters

HDA-xxML	Sheds	Impulse voltage 1.2/50µs (kV)	Power frequency withstand voltage, wet (kV)	Flash over distance (mm)	Creepage length (mm)	Height L (mm)	Weight (approx) (kg)
26	13	228	110	378	1125	383	4.5
27	13	228	110	378	1125	383	4.5
29	13	228	110	378	1125	383	4.5
30	15	250	122	418	1279	423	5
31	15	250	122	418	1279	423	5
33	15	250	122	418	1279	423	5
36	15	250	122	418	1279	423	5



Notes:

Mechanical strength data

Cantilever	Nm	350
Tensile	kN	2
Torque	Nm	5

For accessory and ordering information, please refer to page 7

Accessories for Class 1 Surge Arrester (Type HDA)

HDA series naming and order query description:

Example:

HDA - 12MA - MEL

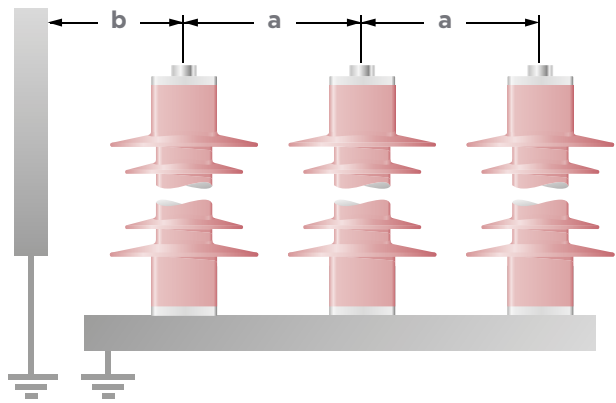
U_c: 3, 4, 6, 8, 9, 10, 12, 18, 20, 21, 24,
26, 27, 29, 30, 33, 36, 40, 41

Housing creepage:
M/MA = standard creepage
ML/LA = extended creepage

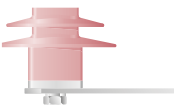
Accessory selection
M = Mounting bracket
E = Earth connection
L = Line connection

Installation Requirements

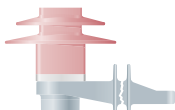
System Voltage U _m	ph/ph (a)	ph/ground (b)
12	185	165
24	315	295
36	510	490



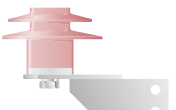
M Mounting accessories




Axx
Straight 2 hole
mounting
bracket



Bxx
Insulating
bracket



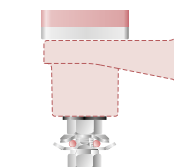
Cxx
DIN metal
bracket



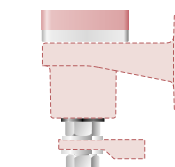
Nxx
No stud.
No accessories

HDA0- ABC

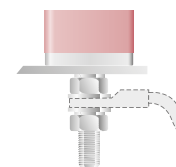
E Earth lead accessories



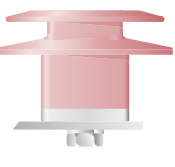
x **D** x
Disconnect
& M accessory



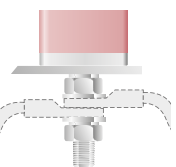
x **E** x
Disconnect
& F accessory



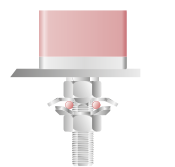
x **F** x
Exposed stud
for lug
connection



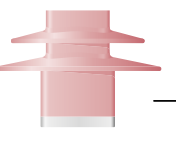
x **H** x
M12 cap screw
& spring washer



x **L** x
Exposed stud
for 2 lug
connection

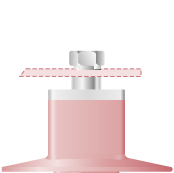


x **M** x
Exposed stud
for line lead
connection




x **N** x
No stud.
No accessories


L Line lead accessories




xx **C**
M12 cap screw
& spring
washer



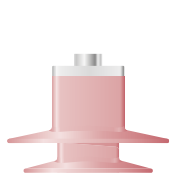
xx **E**
Exposed stud
for lug
connection




xx **H**
Exposed stud
for 2 lug
connection



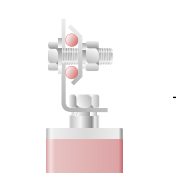
xx **M**
Exposed stud
for line lead
connection



xx **N**
No stud.
No accessories



xx **P**
S-Clamp



xx **Q**
L-Clamp

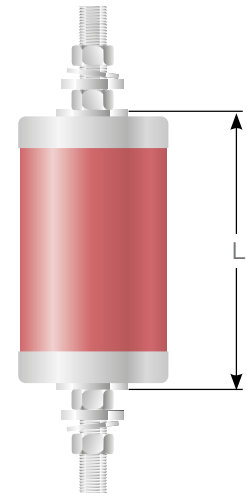
Additional accessory options available on request. Please contact: surgearresters@te.com with your specific requirement. All fasteners M12 unless stated otherwise.

Raychem MV Indoor Surge Arresters

Raychem MV Surge Arresters MPA for Indoor Applications

For motor-connection boxes

MPA type Design for the specific requirements of electric motors. A robust, non-tracking housing plus the high energy handling capabilities of the TE Connectivity arrester family make it the ideal choice for the designer.



Generic technical data

MPA-xx series		2-12 kV U _c
Rated discharge current (8/20μs)		10 kA
Line discharge class according to IEC 60099-4		Class 1
Operating duty impulse withstand current (4/10μs)		100 kA
Long duration current impulse (2000μs)		400 A
10 second temporary overvoltage (U _{TOV} /U _C)		1.3
High current short circuit: (pre-failing method) (Safe non-shattering failure mode)		16 kA
Energy	line discharge impulse	2.0 kJ/kV U _c
	high current impulse	3.2 kJ/kV U _c

MPA

Height L (mm)

MPA-02	95.5
MPA-03	107.5
MPA-04	115.5
MPA-06	137.5
MPA-07	144.5
MPA-09	166.5
MPA-10	178.5
MPA-12	198.5

Mechanical strength data

Cantilever	200 Nm
Tensile	1000 N
Torque	58 Nm

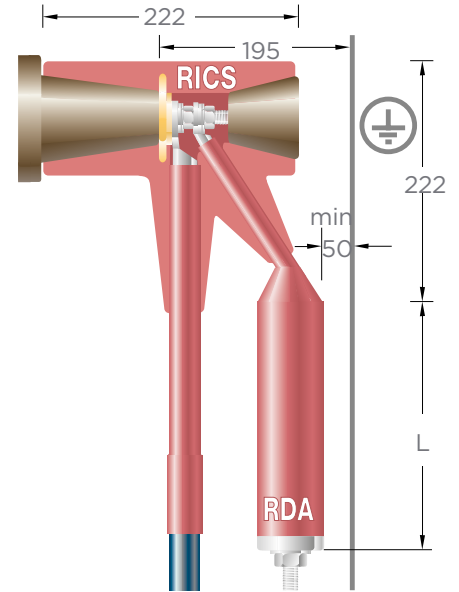
MPA Standard electrical data

MPA	U continuous kV(r.m.s)	U rated kV(r.m.s)	U residual in kV when tested to the following impulse waveforms						
			Lightning (8/20μs)				Steep lightning (1/20μs)	Switching (30/60μs)	
			5 kA	10 kA	20 kA	40 kA	10 kA	125 A	500 A
MPA-02	2	2.5	6.1	6.6	7.3	8.3	7.1	4.9	5.2
MPA-03	3	3.75	9.2	9.9	11.0	12.5	10.7	7.3	7.8
MPA-04	4	5	12.3	13.2	14.6	16.6	14.2	9.8	10.4
MPA-06	6	7.5	18.5	19.9	21.9	24.9	21.3	14.7	15.6
MPA-07	7	8.75	21.6	23.2	25.5	29.1	24.9	17.1	18.2
MPA-09	9	11.25	27.7	29.9	32.8	37.4	32.0	22.0	23.4
MPA-10	10	12.5	30.8	33.2	36.4	41.6	35.6	24.4	26.0
MPA-12	12	15	37.0	39.8	43.7	49.9	42.7	29.3	31.2

Arresters for other voltages are available on request.

Raychem MV Surge Arresters RDA for Indoor Applications

In gas-insulated switchgear systems RDA type Modern gas-insulated switchgear connected to combined underground and overhead distribution systems are sensitive to effects like transient voltage doubling. An arrester installed right at the cable end juncture will clamp the voltage to a level which does not put the switchgear at risk. The RDA surge arrester, together with the Raychem RICS connection system for gas-insulated switchgear, facilities at hermetically sealed integration of the arrester and the cable termination to be connected to a switchgear. Compact design and easy installation are the special features of this product line.



Generic technical data

RDA-xx series		6-26 kV U _c
Rated discharge current (8/20μs)		10 kA
Line discharge class according to IEC 60099-4		Class 1
Operating duty impulse withstand current (4/10μs)		100 kA
Long duration current impulse (2000μs)		400 A
10 second temporary overvoltage (U _{TOV} /U _C)		1.3
High current short circuit: (pre-failing method) (Safe non-shattering failure mode)		16 kA
Energy	line discharge impulse	2.0 kJ/kV U _c
	high current impulse	3.2 kJ/kV U _c

RDA	Height L (mm)
RDA-06	134
RDA-07	141
RDA-09	163
RDA-10	175
RDA-12	195
RDA-15	296
RDA-18	326
RDA-21	356
RDA-24	400
RDA-26	398

Mechanical strength data

Cantilever	200 Nm
Tensile	1000 N
Torque	58 Nm

RDA Standard electrical data

RDA	U continuous kV(r.m.s)	U rated kV(r.m.s)	U residual in kV when tested to the following impulse waveforms						
			Lightning (8/20μs)				Steep lightning (1/20μs)	Switching (30/60μs)	
			5 kA	10 kA	20 kA	40 kA	10 kA	125 A	500 A
RDA-06	6	7.5	18.5	19.9	21.9	24.9	21.3	14.7	15.6
RDA-07	7	8.75	21.6	23.2	25.5	29.1	24.9	17.1	18.2
RDA-09	9	11.25	27.7	29.9	32.8	37.4	32.0	22.0	23.4
RDA-10	10	12.5	30.8	33.2	36.4	41.6	35.6	24.4	26.0
RDA-12	12	15	37.0	39.8	43.7	49.9	42.7	29.3	31.2
RDA-15	15	18.75	46.2	49.8	54.6	62.4	53.4	36.6	39.0
RDA-18	18	22.5	55.4	59.8	65.5	74.9	64.1	43.9	46.8
RDA-21	21	26.25	64.7	69.7	76.4	87.4	74.8	51.2	54.6
RDA-24	24	30	73.9	79.7	87.4	99.8	85.4	58.6	62.4
RDA-26	26	32.5	80.1	86.3	94.6	108.2	92.6	63.4	67.6

Arresters for other voltages are available on request.

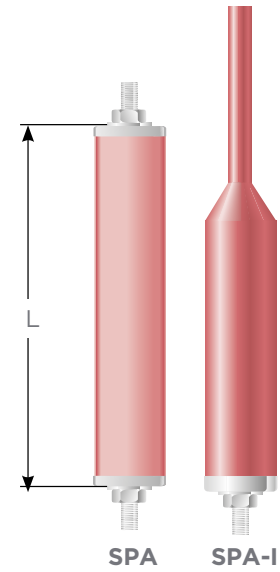
Raychem MV Surge Arresters SPA for Indoor Applications

In air-spaced insulated switchgear systems SPA type

This is a compact arrester with high mechanical strength is fully track resistant and can provide flashover resistance in damp indoor conditions.

The SPA type arrester is also available with a thick-wall insulated integrated line lead, which allows to considerably reduce the clearances between the arresters and to the earth. This line lead is available in lengths of 250mm, 500mm and 750mm.

This SPA-I type arrester is the ideal solution when retrofitting compact switchgears with arresters.



Generic technical data

SPA-xx series		6-40 kV U _c
Rated discharge current (8/20μs)		10 kA
Line discharge class according to IEC 60099-4		Class 1
Operating duty impulse withstand current (4/10μs)		100 kA
Long duration current impulse (2000μs)		400 A
10 second temporary overvoltage (U _{TOV} /U _c)		1.3
High current short circuit: (pre-failing method) (Safe non-shattering failure mode)		16 kA
Energy	line discharge impulse	2.0 kJ/kV U _c
	high current impulse	3.2 kJ/kV U _c

Mechanical strength data

Cantilever	200 Nm
Tensile	1000 N
Torque	58 Nm

CPA

Height L (mm)

SPA-06	137.5
SPA-09	166.5
SPA-12	198.5
SPA-15	299.5
SPA-18	329.5
SPA-21	359.5
SPA-24	392.5
SPA-30	520.5
SPA-33	619
SPA-36	581
SPA-40	591

SPA Standard electrical data

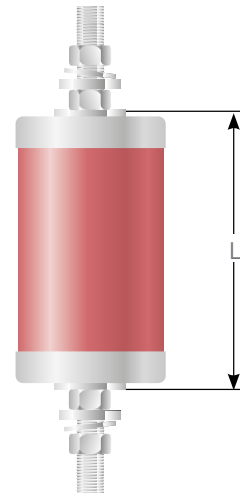
SPA / SPA-I	U continuous kV(r.m.s)	U rated kV(r.m.s)	U residual in kV when tested to the following impulse waveforms						
			Lightning (8/20μs)				Steep lightning (1/20μs) 10k A	Switching (30/60μs)	
			5 kA	10 kA	20 kA	40 kA		125 A	500 A
SPA-06	6	7.5	18.5	19.9	21.9	24.9	21.3	14.7	15.6
SPA-09	9	11.25	27.7	29.9	32.8	37.4	32.0	22.0	23.4
SPA-12	12	15	37.0	39.8	43.7	49.9	42.7	29.3	31.2
SPA-15	15	18.75	46.2	49.8	54.6	62.4	53.4	36.6	39.0
SPA-18	18	22.5	55.4	59.8	65.5	74.9	64.1	43.9	46.8
SPA-21	21	26.25	64.7	69.7	76.4	87.4	74.8	51.2	54.6
SPA-24	24	30	73.9	79.7	87.4	99.8	85.4	58.6	62.4
SPA-30	30	37.5	92.4	99.6	109.2	124.8	106.8	73.2	78.0
SPA-33	33	41.25	101.6	109.6	120.1	137.3	117.5	80.5	85.8
SPA-36	36	45	110.9	119.5	131.0	149.8	128.2	87.8	93.6
SPA-40	40	50	123.2	132.8	145.6	166.4	142.4	97.6	104.0

Arresters for other voltages are available on request.

CPA Surge Arresters for Cable Sheath Protection System

High-voltage cable sheath protection system CPA

Designed to the specific requirements in cable sheath protection. A robust, non tracking housing plus the high energy handling capabilities of the Raychem arrester family make it the ideal choice for the designer.



Generic technical data

CPA-xx series		1-8 kV U _c
Rated discharge current (8/20μs):		10 kA
Line discharge class according to IEC 60099-4		Class 1
Operating duty impulse withstand current (4/10μs):		100 kA
Long duration current impulse (2000μs):		400 A
10 second temporary overvoltage (U _{TOV} /U _c)		1.3P
Energy	line discharge impulse	2.0 kJ/kV U _c
	high current impulse	3.2 kJ/kV U _c

CPA

Height L (mm)

CPA-01	85.5
CPA-02	95.5
CPA-03	107.5
CPA-04	115.5
CPA-05	126.5
CPA-06	137.5
CPA-07	144.5
CPA-08	151.5

Mechanical strength data

Cantilever	200 Nm
Tensile	1000 N
Torque	58 Nm

CPA Standard electrical data

CPA	U continuous kV(r.m.s)	U rated kV(r.m.s)	U residual in kV when tested to the following impulse waveforms						
			Lightning (8/20μs)				Steep lightning (1/20μs) 10 kA	Switching (30/60μs)	
			5 kA	10 kA	20 kA	40 kA		125 A	500 A
CPA-01	1	1.25	3.1	3.3	3.6	4.2	3.6	2.4	2.6
CPA-02	2	2.5	6.1	6.6	7.3	8.3	7.1	4.9	5.2
CPA-03	3	3.75	9.2	9.9	11.0	12.5	10.7	7.3	7.8
CPA-04	4	5	12.3	13.2	14.6	16.6	14.2	9.8	10.4
CPA-05	5	6.25	15.4	16.6	18.2	20.8	17.8	12.2	13.0
CPA-06	6	7.5	18.5	19.9	21.9	24.9	21.3	14.7	15.6
CPA-07	7	8.75	21.6	23.2	25.5	29.1	24.9	17.1	18.2
CPA-08	8	10	24.6	26.6	29.1	33.3	28.5	19.5	20.8

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