

Surge arresters

Product overview



Surge arresters from ABB Switzerland

ABB Switzerland Ltd has been developing and manufacturing surge arresters for over a century, metal-oxide (MO) resistors and MO arresters for worldwide use in medium-voltage installations for 25 years. ABB Switzerland is global leader in special applications for DC railroads and SF₆ gas-insulated switchgear (GIS) at all voltage levels. Development, production, sales and comprehensive quality assurance of these products are accommodated under one roof at the company's Swiss facility in Wettingen.



Certified to ISO 9001, 14001 and 18001



1898: First application of a surge arrester in Switzerland.



1980: Development of metal-oxide (MO) resistors and of metal-oxide (MO) surge arresters without spark gaps and their successful use in the power supply network.

Detailed information on the design of our products is available in the following ABB documents:

- Application guidelines for surge-voltage protection – medium voltage
- Application guidelines for surge-voltage protection – railroad installations

The information given in this document inclusive of all illustrations covers key technical data and application options. Specific technical features must be obtained in each individual case from the data sheets and must be clarified at the conclusion of the agreement.

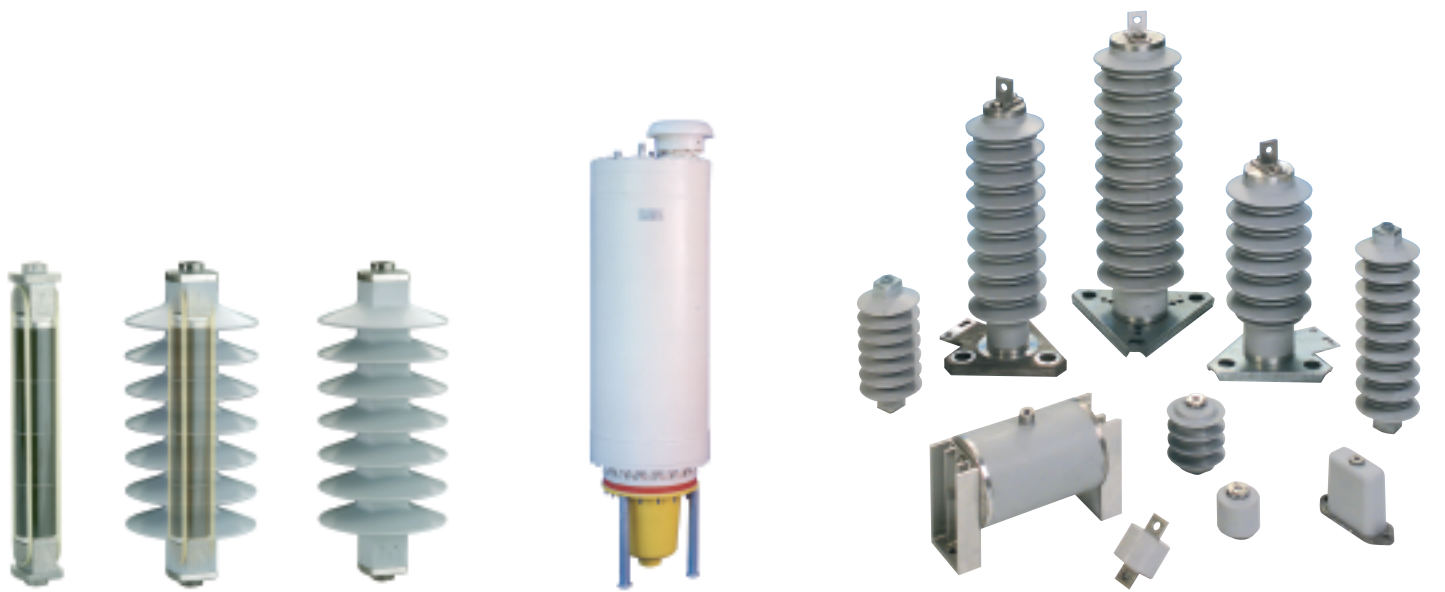
ABB reserves the right to modify the technical data or the design of its surge arresters without prior notification.



ABB facility in Wetztingen



Workshop






1985: Medium-voltage arresters with patented direct casting in silicon.

1986: Completely encapsulated MO arresters without spark gaps for all known SF₆ gas insulated switchgear (GIS) at all voltage levels.

MO arresters of all power classes with direct silicon casting for medium-voltage installations and networks. Used as surge-voltage protection in generator switches, industrial plants, railroads and other high-value equipment and installations.

Surge arresters for medium-voltage applications

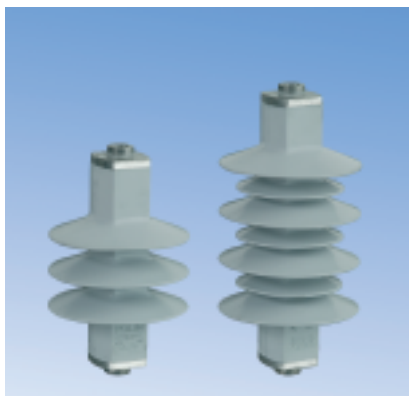
ABB Switzerland manufactures high-quality metal-oxide surge arresters for use in distributed networks to assure the protection of overhead power lines, cables, stations, transformers, generators, capacitors etc. These arresters limit dangerous voltage surges caused by lightning strikes or switching operations in the network. They also increase the availability of the power supply by reducing outages.

Type			
Application	POLIM-H . . N Surge arresters with particularly high mechanical and electrical strength. Suitable for protecting generators, transformers and arc furnaces, capacitor banks as well as other special applications. Recommended for use in railroad installations and rolling stock.	POLIM-S . . N Surge arresters with high energy-absorption capacity and good protection level in rugged mechanical construction. Typical “station class” surge arresters. Suitable for protection of cables, capacitors, railroad installations and rolling stock.	POLIM-I . . N Suitable for the protection of medium-voltage transformers and cable installations as well as railroad installations. Typical “intermediate” surge arresters in rugged mechanical construction.
Continuous operating voltage U_c	4 – 44 kV	4 – 44 kV	4 – 44 kV
8/20 μs nominal discharge current I_n	20 kA	10 kA	10 kA
High current impulse I_{hc} 4/10 μs	100 kA	100 kA	100 kA
Energy absorption capacity	13.3 kJ / kV $_{U_c}$	9.0 kJ / kV $_{U_c}$	5.5 kJ / kV $_{U_c}$
Long duration current impulse	1350 A / 2 ms	1000 A / 2 ms	550 A / 2 ms
IEC line discharge class	4	3	2
ANSI	station class high energy	station class	intermediate
Cantilever strength (withstand value 1 min.)	6000 Nm	4000 Nm	2500 Nm
MPSL (IEC 60 099-4, Ed. 2.1)	8000 N	5700 N	3500 N



POLIM-DA . . N

For protecting transformers in stations as well as overhead lines.



POLIM-D

Protection of overhead lines as well as for distribution transformers. Different housing heights and creepage distances are available in order to fulfill the most severe requirements of pollution.



MWD

MWK

Protection of transformers in stations, protection of medium-voltage cables, internal switchgear in medium-voltage networks and motors. Very high protection level. With an increased creepage distance for use in highly soiled environments. MWD for interior applications only.



POLIM-C . . N

Suitable for cable-sheath protection and for the protection of motors and switches. Very compact design.

4 – 36 kV
10 kA
100 kA
3.5 kJ / kV _{UC}
350 A / 2 ms
1
distribution, heavy duty
200 Nm
400 / 690 N

4 – 36 kV
10 kA
100 kA
3.6 / 4.2 kJ / kV _{UC}
250 A / 2 ms
1
distribution, heavy duty
200 Nm
400 / 690 N

4 – 44 kV
10 kA
100 kA
5.5 kJ / kV _{UC}
550 A / 2 ms
2
intermediate
500 Nm
280 / 850 N

0,9 – 7,5 kV
10 kA
100 kA
5.5 KJ / kV _{UC}
550 A / 2 ms
2
- / -
200 Nm
690 N

Surge arresters for railroad installations

ABB Switzerland is a specialist in metal-oxide arresters for AC and DC railroad installations, designed for fixed installations and for use on rolling stock. The electrical and mechanical design of these arresters allows them to withstand the particularly tough requirements of railroad operation. They satisfy the requirements of the A1/A2 arresters to VDV paper 525. Their use increases the availability of the power supply and of railroad operation. All ABB railroad products may be viewed on www.abb.com/railway.



Type	POLIM 4.5 ID
Application	Special surge arresters for DC railroad installations with $U_n=3$ kV. Extremely high energy absorption capability with excellent protection level. For interior applications only.
Continuous operating voltage U_c	4.5 kV / DC
Nominal discharge current I_n 8/20 μs	40 kA
High current impulse I_{hc} 4/10 μs	400 kA
Energy absorption capacity	37.8 kJ / kV U_c
Long duration current impulse	4860 A / 2 ms
IEC line discharge class following IEC 60099-4	5
ANSI	- / -
Cantilever strength (withstand value 1 min.)	- / -
MPSL (IEC 60 099-4, Ed. 2.1)	- / -

**POLIM-X . . ND**

Very powerful surge arresters for DC railroad networks up to $U_n = 3$ kV. For areas with high lightning activity and direct danger of lightning strikes. For applications with major soiling and high mechanical requirements. Vibration- and shock-tested.

1.0 – 4.7 kV / DC

20 kA

200 kA

21.0 kJ / kV U_c

2700 A / 2 ms

5

- / -

2500 Nm

16 000 N

**POLIM-H . . ND**

For use in DC railroad installations up to $U_n = 3$ kV. Protection of electric locomotives and substations. Very rugged design, developed specially for railroad operation. Can be used as A1 surge arresters. Shock- and vibration-tested.

1.0 – 4.7 kV / DC

20 kA

100 kA

10.5 kJ / kV U_c

1350 A / 2 ms

4

- / -

6000 Nm

8000 N

**POLIM-H . . SD**

For use in DC railroad installations up to $U_n = 3$ kV. Thanks to its compact design, it is particularly suitable for use in substations and trolleys. Can be used as A1 or A2 surge arresters.

1.0 – 4.7 kV / DC

20 kA

100 kA

10.5 kJ / kV U_c

1350 A / 2 ms

4

- / -

250 Nm

2500 N

**POLIM-R..-1/2 ND**

For special applications in DC networks. Very high energy-absorption capacity with simultaneously very good protection level. Can be used as A2 surge arresters.

0.14 – 1.0 kV / DC

20 kA

100 / 200 kA

10.5 / 19 kJ / kV U_c

1350 / 2400 A / 2 ms

- / -

- / -

- / -

- / -

**POLIM-C . . ND**

Protection of DC installations including railroad systems, transformers and motors. For overhead and interior applications.

1.0 – 4.2 kV / DC

10 kA

100 kA

4.3 kJ / kV U_c

550 A / 2 ms

2



- / -

200 Nm

690 N

Surge arresters for special applications

ABB Switzerland develops and manufactures surge arresters, energy absorbers and low-voltage limiters for special applications, such as for cable and cable-sheath protection as well as for contact protection in railroad installations.



Type		
Application	HVL 120-0.3 Bipolar low voltage limiter for protection against excessive contact voltages in tramways, subway and railroad installations. For limiting voltage surges in substations, level crossings and signal installations.	HVL-ED 1 Unipolar low-voltage limiter with high energy capacity for use in DC railway installations for personnel protection. For use at high energy loads in the event of lightning and short circuits. For limiting voltage surges in substations, level crossings and signal installations.
Limiting voltage (max.) U_s	120 V	125 V
Residual voltage for long-term holding current	< 3 V	< 3 V unipolar
Tested reversibility current I_{rev}	300 A / 60 s	300 A / 60 s
Long-term withstand current I_w without guaranteed reversibility	500 A / 30 min	- / -
Lightning impulse current (10/350 μs)	3 x 10 kA	3 x 25 kA
IEC line discharge class following IEC 60099-4	4	5
Nominal discharge current I_n 8/20 μs	20 kA	20 kA



Type	POLIM-D . . PI 2/3	POLIM-C . . LB / . . ID	POLIM-R..-1/-2 N
Application	Contact-safe plug-in surge arrester for use in cable installations. Can be plugged into all usual switchgear with an interior cone connector system, cones of size 2 and 3.	For special applications in medium voltage networks, for motor and cable-sheath protection. Compact design with terminals suitable for the most varied uses in cable connection cabinets. POLIM-C . . ID also for DC applications.	For the protection of electrical equipment, motors and for special applications. Very high energy absorption capability and simultaneously very good protection level.
Continuous operating voltage U_c	4 – 42 kV	ID: 1.0 – 2.2 kV / DC LB: 2.3 – 4.8 kV / AC	0.11 – 0.78 kV
Nominal discharge current I_n 8/20 μs	10 kA	10 kA	20 kA
High current impulse I_{hc} 4/10 μs	65 kA	100 kA	100 / 200 kA
Energy absorption capacity	2.6 kJ / kV $_{U_c}$	ID: 4.3 kJ / kV $_{U_c}$ LB: 5.5 kJ / kV $_{U_c}$	12/24 kJ / kV $_{U_c}$
Long duration current impulse	250 A / 2 ms	550 A / 2 ms	1350/2400 A / 2 ms
IEC line discharge class	1	2	- / -
Cantilever strength (withstand value 1 min.)	- / -	- / -	- / -
MPSL (IEC 60 099-4, Ed. 2.1)	- / -	- / -	- / -

Surge arresters for SF₆ gas-insulated switchgear

ABB Switzerland is a leading manufacturer of surge arresters in gas-insulated versions for mounting on all commercial SF₆ gas-insulated switchgear.

Type		
Application	AZ 041 Three-phase surge arresters for SF ₆ gas-insulated switchgear (GIS)	AZY 14 Three-phase surge arresters for SF ₆ gas-insulated switchgear (GIS)
System voltage U _s	170 kV	245 kV
Continuous operating voltage U _c	≤ 150 kV	≤ 174 kV
Nominal discharge current I _n 8/20 μs	10 / 20 kA	10 / 20 kA
High current impulse I _{hc} 4/10 μs	100 kA	100 kA
Energy absorption capacity	9.6 / 13.2 kJ / kV _{U_c}	9.6 / 13.2 kJ / kV _{U_c}
Long duration current impulse 2 ms	1000 / 1350 A	1000 / 1350 A
IEC line discharge class	3 / 4	3 / 4



AZ 14

Single-phase surge arresters for SF₆ gas-insulated switchgear (GIS)



AZ 14

Single-phase surge arresters for SF₆ gas-insulated switchgear (GIS)



AZ 31 A

Single-phase surge arresters for SF₆ gas-insulated switchgear (GIS)



AZ 32 G

Single-phase surge arresters for SF₆ gas-insulated switchgear (GIS)



AZ 32 A

Single-phase surge arresters for SF₆ gas-insulated switchgear (GIS)

170 kV
≤ 114 kV
10 / 20 kA
100 kA
9.1 / 13.2 kJ / kV _{U_c}
1000 / 1350 A
3 / 4

300 kV
≤ 211 kV
10 / 20 kA
100 kA
9.1 / 13.2 kJ / kV _{U_c}
1000 / 1350 A
3 / 4

420 kV
≤ 292 kV
10 / 20 kA
100 kA
9.1 / 13.2 kJ / kV _{U_c}
1350 A
4

420 kV
≤ 317 kV
20 kA
100 kA
19.8 kJ / kV _{U_c}
2000 A
5

550 kV
≤ 374 kV
20 kA
100 kA
19.8 kJ / kV _{U_c}
2000 A
5



ABB Switzerland Ltd.
High Voltage Products
Surge Arrester
Jurastrasse 45
CH-5430 Wettingen/Switzerland

Tel. +41 58 585 29 11
Fax +41 58 585 55 70
Email: sales.sa@ch.abb.com
www.abb.com/arrestersonline