PRODUCT BROCHURE

elastimold®

Shielded surge arresters

Elastimold® shielded surge arresters

Fully shielded, fully submersible lightning and switching surge protection

Cost-efficient solution for all underground medium voltage applications.

— 01 200 amp elbow arrester

Lightning and switching surges are the most common causes of electrical failure of distribution transformers. Surges also lead to the progressive weakening of the cable insulation and ultimately its failure when an overvoltage exceeds the cable basic insulation level (BIL) withstand rating.

Voltage surges that exceed the BIL rating of the distribution system components will cause damage to the installed equipment. To protect against voltage surges such as those induced by lightning overhead surge arresters are widely used on overhead lines and equipment.

The use of overhead arresters alone, however, will not guarantee proper protection of the insulation in the underground portion of an electrical distribution system. The let-through surge from the riser-pole arresters into the underground systems could be enough to cause damage to aging equipment's insulation.

For complete protection of padmount transformers, install Elastimold shielded surge arresters for underground distribution systems, junctions and switchgear.

Key features and advantages

- Molded EPDM rubber arrester housing is fully shielded and fully submersible for a variety of applications.
- IEEE 386 interfaces provide convenient energized connection with other 200 amp and 600 amp components.
- Three arrester styles — elbow (ESA™), parking (PSA™) and bushing (BSA™) — permit direct connection to transformers, eliminating the need to purchase and install additional accessories.
- Elastimold shielded surge arresters fully conform to the safe-failure mode specified by the IEEE C62.11-2012 standard.
- Ground lead attached to the housing restrains the end plug when ejected, preventing uncontrolled trajectory, and maintains the housing shield ground connection after failure.
- #4 AWG flexible copper ground lead tethered to jacket withstands 10,000 amps for 10 cycles without fusing.

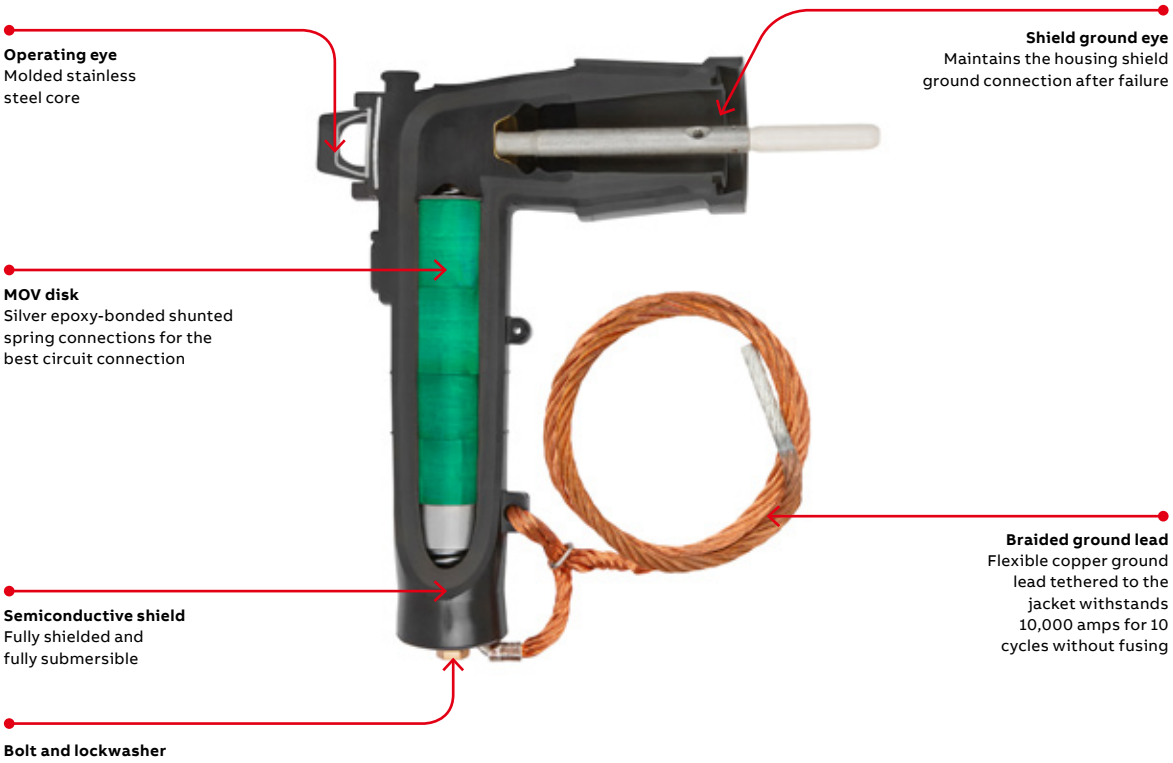
Standards compliance

- IEEE C62.11-2012 standard for metal-oxide surge arresters for AC power circuits (>1 kV)
- IEEE 386 standard for separable insulated connector systems for power distribution systems above 600 V

— 01

Reliable, safe and cost-efficient solution

Elastimold® shielded surge arresters cover all underground medium-voltage applications. Three different styles allow for direct connection to equipment, saving time and money.



Reliable
Elastimold shielded surge arresters provide lightning and switching surge protection for transformers, cable, equipment and other components on underground power distribution systems.

Flexible
Elastimold shielded surge arresters are available for all applications — 200 amps and 600 amps at 15 kV, 25 kV and 35 kV —in elbow, parking stand and bushing styles to allow for direct connection to equipment, eliminating the need to purchase and install additional connection accessories.

Safe
Elastimold shielded surge arresters have been verified to meet the IEEE C62.11–2012 safe-failure mode test. The ground lead design controls the end plug when ejected, preventing uncontrolled trajectory, and maintains the housing shield ground connection after failure.

Surge arresters installation options

Dead-front loop-feed circuit — type 2 single-phase transformers

01 Elbow arrester

02 Elbow arrester and parking stand arrester

03 Bushing arrester and parking stand arrester

01

Two elbow arresters and a feed-through
This approach uses elbow arresters only. (One of the elbow arresters could be mounted on the H1A bushing if operating procedures permit.)

02

Elbow arrester and parking stand arrester
This approach can reduce overcrowding (by eliminating the feed-through device). This is desirable in a mini-pad transformer.

03

Bushing arrester and parking stand arrester*
This approach is best for increasing operability and reducing transformer overcrowding. The bushing arrester enables the source cable to be positioned on H1A, which conforms with some operating practices.

A bushing arrester mounted on H1A can be directed downward without interference. Potential interference between an elbow arrester on H1B and a cable parked on P is eliminated. The bushing arrester requires significantly less space than an elbow arrester used with a feed-through insert. Operability is enhanced because the open point can be closed by moving the parked cable to H1B without removing an arrester.

*Transformers must be specified with bushing wells

Surge arresters installation options

Dead-front loop-feed circuit — type 2 single-phase transformers

Additional margin of protection
An additional margin of protection may be gained by adding an arrester at the next transformer upstream on each side of the open point. This application is dependent on the system voltage and condition of the cable. If an additional arrester is added in the circuit, it can be an elbow arrester in combination with a feed-through insert or it can be a bushing arrester. Use of a bushing arrester will reduce transformer faceplate overcrowding.

Other configurations
Other configurations are possible, such as specifying a bushing arrester on every transformer. This enables the open point to be quickly and easily moved to any point in the circuit while maintaining the surge protection (without moving all of the portable surge arresters). The externally mounted bushing arrester provides the surge protection benefits without the negative factors of an under-oil arrester.

Dead-front loop-feed circuit (end point) — type 2 single-phase transformers

Single-bushing transformer
To add surge protection to a single-bushing transformer, use a bushing arrester or an elbow arrester with a feed-through insert.

Two-bushing transformer
To add surge protection to a two-bushing transformer at the end point of a radial-feed circuit, add an elbow arrester to the unoccupied bushing or use a bushing arrester.

Conversion of a radial-feed transformer to a loop-feed, open-point transformer
To convert a single-bushing transformer to a loop-feed, open-point transformer, add a parking stand arrester and an elbow arrester in combination with a feed-through insert.

Protective characteristics and product selection

01 200 amp elbow arrester (ESA)
02 200 amp bushing arrester (BSA)
03 200 amp parking arrester (PSA)
04 600 amp elbow arrester (ESA)

01

02

03

04

Protective characteristics are determined to protect the equipment/cable BIL. Elastimold arresters are suitable for application on systems whose line-to-ground voltage under normal conditions does not exceed the arrester's maximum continuous operating voltage (MCOV).

Selection of the arrester size is based upon the MCOV line-to-ground that is applied across the arrester in service.

For a given system voltage, determine the appropriate MCOV by using the following table according to whether the grounding condition is a solidly grounded neutral circuit or a 3-wire ungrounded circuit.

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Protective characteristics

Voltage class (kV)	MCOV (kV RMS)	Duty cycle rating (kV RMS)	Maximum discharge voltage (kV crest) 8 x 20 microsecond current wave				
			1.5 kA	3 kA	5 kA	10 kA	20 kA
15	2.55	3	8.06	8.48	8.74	9.36	10.4
	5.1	6	16.12	16.95	17.47	18.72	20.8
	7.6	9	24.18	25.42	26.2	28.08	31.2
	8.4	10	28.21	29.66	30.57	32.76	36.4
	10.2	12	32.24	33.9	34.94	37.44	41.6
	12.7	15	40.3	42.38	43.68	46.8	52
	15.3	18	48.36	50.85	52.41	56.16	62.4
25	2.55	3	8.06	8.48	8.74	9.36	10.4
	5.1	6	16.12	16.95	17.47	18.72	20.8
	7.6	9	24.18	25.42	26.2	28.08	31.2
	8.4	10	28.21	29.66	30.57	32.76	36.4
	10.2	12	32.24	33.9	34.94	37.44	41.6
	12.7	15	40.3	42.38	43.68	46.8	52
	15.3	18	48.36	50.85	52.41	56.16	62.4
	17.0	21	56.42	59.32	61.14	65.52	72.8
35	8.4	10	28.21	29.66	30.57	32.76	36.4
	15.3	18	48.36	50.85	52.41	56.16	62.4
	17.0	21	56.42	59.32	61.14	65.52	72.8
	19.5	24	64.48	67.8	69.88	74.88	83.2
	22.0	27	72.54	76.28	78.62	84.24	93.6
	24.4	30	80.6	84.75	87.35	93.6	104
	26.8	33	88.66	93.23	96.09	102.96	114.4
	29.0	36	96.72	101.7	104.82	112.32	124.8
	32.5	40.5	108.81	114.41	117.92	126.36	140.4

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Arrester application table

Voltage class (kV)	System line-to-line voltage (kV RMS)		MCOV* kV RMS	
	Nominal	Maximum	Solidly grounded neutral circuits	3-Wire ungrounded circuits
15	2.40	2.54	2.55	2.55
	4.16	4.40	2.55	5.10
	4.80	5.08	5.10	5.10
	6.90	7.26	5.10	8.40
	8.32	8.80	5.10	8.40
	12.47	13.20	8.40	15.30
	13.20	13.97	8.40	15.30
	13.80	14.50	8.40**	15.30
	13.80	14.50	10.20	15.30
25	6.90	7.26	5.10	8.40
	8.32	8.80	5.10	8.40
	12.47	13.20	8.40	15.30
	13.20	13.97	8.40	15.30
	13.80	14.50	8.40**	15.30
	13.80	14.50	10.20	15.30
	20.78	22.00	12.70	–
	20.78	22.00	15.30**	–
	23.00	24.34	15.30	–
	24.94	26.40	15.30	–
	24.94	26.40	17.00**	–
	28.00	29.80	17.00	–
35	23.00	24.34	–	22.00
	34.50	36.51	22.00**	–
	34.50	36.51	24.40	29.00

* MCOV = maximum continuous operating voltage. The MCOV rating of a metal-oxide arrester is the maximum designated RMS value of power-frequency voltage (at maximum temperature levels as indicated in IEEE standard C62.11-2005) that may be applied continuously between the terminals of the arrester.
** Preferred arrester MCOV for this system voltage.

Selection chart

With the MCOV selected from the previous table, choose the part number that fits the design requirement from the following options.

200 amp shielded surge arresters

Voltage class (kV)	MCOV (kV RMS)	Bushing arrester BSA See notes 1–4	Elbow arrester ESA See notes 1, 2, 5	Parking arrester PSA See notes 1–3
15	2.55	167BSA-3	167ESA-3	167PSA-3
	5.1	167BSA-6	167ESA-6	167PSA-6
	7.6	167BSA-9	167ESA-9	167PSA-9
	8.4	167BSA-10	167ESA-10	167PSA-10
	10.2	167BSA-12	167ESA-12	167PSA-12
	12.7	167BSA-15	167ESA-15	167PSA-15
	15.3	167BSA-18	167ESA-18	167PSA-18
25	2.55	273BSA-3	273ESA-3	273PSA-3
	5.1	273BSA-6	273ESA-6	273PSA-6
	7.6	273BSA-9	273ESA-9	273PSA-9
	8.4	273BSA-10	273ESA-10	273PSA-10
	10.2	273BSA-12	273ESA-12	273PSA-12
	12.7	273BSA-15	273ESA-15	273PSA-15
	15.3	273BSA-18	273ESA-18	273PSA-18
	17.0	273BSA-21	273ESA-21	273PSA-21
35	8.4	375BSA-10	375ESA-10	375PSA-10
	15.3	375BSA-18	375ESA-18	375PSA-18
	17.0	375BSA-21	375ESA-21	375PSA-21
	19.5	375BSA-24	375ESA-24	375PSA-24
	22.0	375BSA-27	375ESA-27	375PSA-27
	24.4	375BSA-30	375ESA-30	375PSA-30
	29.0	–	375ESA-36	–

Note: 1. Elastimold PSA and BSA arresters are equipped with a fully rated 200 amp switching and fault-close loadbreak bushing.
2. Elastimold arresters use high strength, silver epoxy-bonded MOV blocks and shunted spring connections for the best circuit connection.
3. A 36" #4 AWG ground lead is provided with each unit.
4. BSA installed by turning internal hex bolt (accessed through the 200 amp bushing interface) with a 5/16" hex wrench and bent-wire torque wrench supplied with each unit.
5. For 15 kV and 25 kV class deadbreak system elbow arresters, use catalog number 156ESA with the appropriate duty cycle rating.

600 amp shielded surge arresters

Voltage class (kV)	MCOV kV RMS	Elbow arrester ESA
15/25	8.4	K655ESA-10
	10.2	K655ESA-12
	12.7	K655ESA-15
	15.3	K655ESA-18
	17.0	K655ESA-21
35	15.3	755ESA-18
	19.5	755ESA-24
	22.0	755ESA-27
	24.4	755ESA-30
	26.8	755ESA-33
	29.0	755ESA-36
	32.5	755ESA-40.5

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