

Underground Surge Arresters

Our Metal Oxide Varistor Elbow (M.O.V.E.[™]) and Parking Stand Arresters are used in pad-mounted transformer and entry cabinets, vaults, switching enclosures and other installations to provide shielded deadfront arrester protection. These arresters are designed for use with 200 A loadbreak interfaces to limit overvoltages to acceptable levels, protect equipment and extend cable life.

The gapped structure of our VariGAP[®] M.O.V.E. Arrester provides excellent temporary overvoltage (TOV) characteristics while the MOV disks offer rapid front-of-wave response with virtually no power follow current. Extensive laboratory testing and over 15 years of field history have proven the hybrid VariGAP design offers the following advantages over standard ungapped MOV arresters:

- Lower Discharge Voltage Characteristics
- Increased Thermal Capacity
- Improved Front-of-Wave Response
- Higher Temporary Overvoltage Capability

To experience the benefits of our VariGAP M.O.V.E. Arrester, see the following specification information.



TABLE 1
Commonly Applied Voltage Ratings of M.O.V.E.[™] and Parking Stand Arresters

System Voltage (V rms)		Commonly Applied Arrester Duty-cycle (MCOV) Voltage Rating (kV rms) on Distribution Systems		
Nominal Voltage	Maximum Voltage	4-Wire Multigrounded Neutral Wye	3-Wire Low Impedance Grounded	Delta and 3-Wire High Impedance Grounded
2400	2540	–	–	3 (2.55)
4160 Y/2400	4400 Y/2540	3 (2.55)	6 (5.1)	6 (5.1)
4260	4400	–	–	6 (5.1)
4800	5080	–	–	6 (5.1)
6900	7260	–	–	9 (7.65)
8320 Y/4800	8800 Y/5080	6 (5.1)	9 (7.65)	–
12000 Y/6930	12700 Y/7330	9 (7.65)	12 (10.2)	–
12470 Y/7200	13200 Y/7620	9 (7.65) or 10 (8.4)	15 (12.7)	–
13200 Y/7620	13970 Y/8070	10 (8.4)	15 (12.7)	–
13800 Y/7970	14520 Y/8388	10 (8.4) and 12 (10.2)	15 (12.7)	–
13800	14520	–	–	18 (15.3)
20780 Y/12000	22000 Y/12700	15 (12.7)	21 (17.0)	–
22860 Y/12000	22000 Y/12700	15 (12.7)	21 (17.0)	–
24940 Y/14400	26400 Y/15240	18 (15.3)	27 (22.0)	–
27600 Y/15935	29255 Y/16890	21 (17.0)	–	–
34500 Y/19920	36510 Y/21080	27 (22.0) or 30 (24.4)	–	–

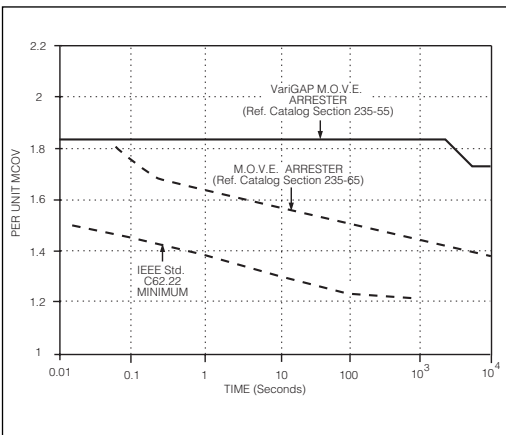
VariGAP[®] M.O.V.E.[™] Arrester Specification Information

- Total compliance to **IEEE Std 386[™]**.
- Total compliance to **IEEE Std C62.11[™]**, including full certification to the deadfront arrester failure mode safety test.
- Specify a maximum discharge voltage equal to the VariGAP published data (see Table 3).

Example: for a 10 kV arrester, specify discharge voltage for a 20 kA 8/20 μ s current wave to be 35 kV crest.

- Specify a minimum temporary overvoltage rating higher than 1.8 per unit for at least 1000 seconds.

Example: for a 10 kV arrester, specify a TOV recovery voltage of at least $8.4 * 1.8 = 15.12$ kV for 1000 seconds at 85° C.

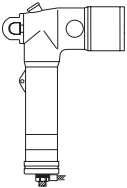
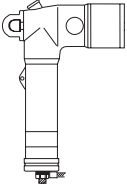
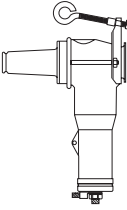
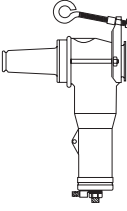


Temporary overvoltage curve. No prior duty at 85° C ambient.

TABLE 2
M.O.V.E.[™] and Parking Stand Arrester Protective Characteristics

Duty Cycle Voltage Rating (kV)	MCOV (kV)	Equivalent Front-of-Wave (kV crest)*	Maximum Discharge Voltage (kV crest) 8/20 μ s Current Wave				
			1.5 kA	3 kA	5 kA	10 kA	20 kA
3	2.55	13.7	10.7	12.0	12.8	13.4	15.7
6	5.1	27.4	21.9	24.5	26.2	28.6	34.9
9	7.65	37.4	27.4	29.9	31.4	34.7	38.4
10	8.4	39.7	28.4	30.6	32.9	36.7	40.4
12	10.2	56.1	41.1	44.8	47.1	52.0	57.6
15	12.7	63.0	45.0	49.2	52.5	57.8	66.0
18	15.3	74.8	54.7	59.7	62.7	69.3	76.8
21	17.0	81.7	58.7	64.2	68.2	75.2	85.2
24	19.5	95.8	69.7	76.1	80.2	88.6	98.8
27	22.0	105.0	75.0	82.0	87.4	96.2	110.0
30	24.4	112.0	79.5	85	91.8	100.0	115.0

* Equivalent front-of-wave voltage is the expected discharge voltage of the arrester when tested with a 5 kA current surge cresting in 0.5 μ s.

Catalog Section	Description	kV Class	Base Part Number	MCOV (kV)	
	VariGAP Metal Oxide Varistor Elbow (M.O.V.E.) Arrester	15 kV	3238118C09M	7.65	
			3238118C10M	8.40	
			3238118C12M	10.2	
			3238118C15M	12.7	
			3238118C18M	15.3	
	235-55		25 kV	3238119C09M	7.65
				3238119C10M	8.40
				3238119C12M	10.2
				3238119C15M	12.7
				3238119C18M	15.3
			35 kV (Interface 1A Large Interface per IEEE Std. 386™)	3238120C18M	15.3
				3238120C21M	17.0
				3238120C24M	19.5
				3238120C27M	22.0
	Metal Oxide Elbow (M.O.V.E.) Arrester	15 kV	3238018C03M	2.55	
			3238018C06M	5.10	
			3238018C09M	7.65	
			3238018C10M	8.40	
			3238018C12M	10.2	
	235-65		25 kV	3238019C09M	7.65
				3238019C10M	8.40
				3238019C12M	10.2
				3238019C15M	12.7
				3238019C18M	15.3
			35 kV (Interface 1A Large Interface per IEEE Std. 386™)	3238020C18M	15.3
				3238020C21M	17.0
				3238020C24M	19.5
				3238020C27M	22.0
				3238020C30M	24.4
	VariGAP Metal Oxide Varistor (MOV) Parking Stand Arrester	15 kV	3238104C09M	7.65	
			3238104C10M	8.40	
			3238104C12M	10.2	
			3238104C15M	12.7	
			3238104C18M	15.3	
	235-58		25 kV	3238105C09M	7.65
				3238105C10M	8.40
				3238105C12M	10.2
				3238105C15M	12.7
				3238105C18M	15.3
			35 kV (Interface 1A Large Interface per IEEE Std. 386™)	3238105C21M	17.0
	Metal Oxide (MOV) Parking Stand Arrester	15 kV	3237686C03M	2.55	
			3237686C06M	5.10	
			3237686C09M	7.65	
			3237686C10M	8.40	
			3237686C12M	10.2	
	235-68		25 kV	3237686C15M	12.7
				3237686C18M	15.3
				3237758C09M	7.65
				3237758C10M	8.40
				3237758C12M	10.2
			35 kV (Interface 1A Large Interface per IEEE Std. 386™)	3237758C15M	12.7
				3237758C18M	15.3
				3237758C21M	17.0

The following notes apply to all part numbers on this page.

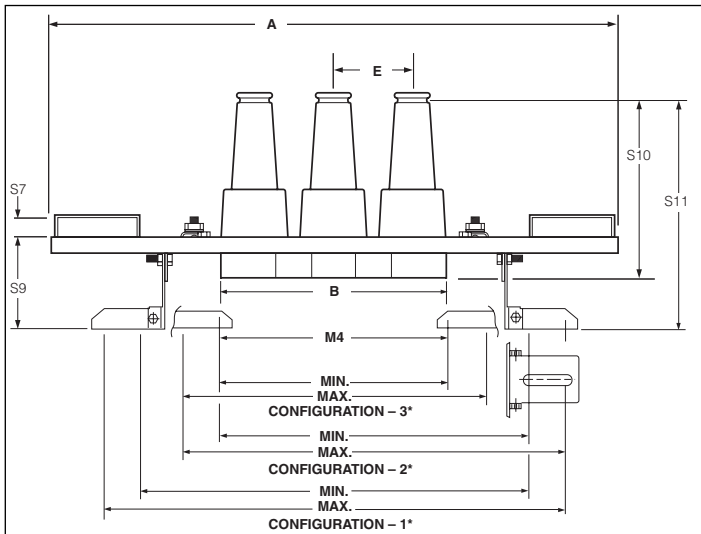
■ Digits 9 & 10 designate duty cycle voltage rating. For other protective characteristics, refer to Table 2 for M.O.V.E. and Parking Stand Arresters and Table 3 for VariGAP M.O.V.E. and Parking Stand Arresters.

■ Refer to page 15 for dimensional information.

TABLE 3
VariGAP® M.O.V.E.™ and Parking Stand Arrester Protective Characteristics

Duty Cycle Voltage Rating (kV)	MCOV (kV)	Minimum 60 Hz Sparkover (kV crest/√2)	Front-of-Wave Protective Level* (kV crest)	Maximum Discharge Voltage 8/20 μs Current Wave (kV crest)						Maximum 1.2/50 μs Sparkover (kV crest)
				0.5 kA	1.5 kA	3 kA	5 kA	10 kA	20 kA	
9	7.65	13.5	25.8/28.5	19.5	21.2	23.8	24.7	28.5	33.3	24.2
10	8.4	15.0	27.1/30.0	20.5	22.3	25.0	26.0	30.0	35.0	25.5
12	10.2	18.0	35.5/39.5	25.0	27.0	29.6	31.4	36.8	43.2	31.3
15	12.7	22.5	37.8/41.0	30.0	31.3	33.7	36.2	40.4	44.5	36.0
18	15.3	27.0	48.8/59.3	35.8	40.2	44.4	46.8	49.4	60.5	42.8
21	17.0	31.5	60.1/65.3	39.4	44.3	48.9	51.5	54.4	66.6	51.3
24	19.5	36.0	64.4/70.0	44.1	47.3	51.7	55.2	60.7	69.4	55.0
27	22.0	40.5	70.9/79.0	49.8	54.0	57.9	62.8	73.4	86.2	62.5

* First number is the value of the sparkover of the gap assembly based on a wave rising 100 kV per μs per 12 kV of arrester rating. Second number is based on 5 kA current impulse that results in a discharge voltage cresting in 0.5 μs.



Dim.	15 kV	25 kV	35 kV
E	3.25" (83 mm)	4.0" (102 mm)	5.0" (127 mm)
S7	0.75" (19 mm)	0.75" (19 mm)	1.02" (26 mm)
S9	4.38" (111 mm)	4.38" (111 mm)	5.46" (139 mm)
S10	6.77" (172 mm)	8.34" (212 mm)	11.8" (299 mm)
S11	9.20" (234 mm)	10.77" (274 mm)	13.9" (163 mm)
M4	See Table 15 kV	See Table 25 kV	See Table 35 kV

TABLE 15 kV

Number of Interfaces	Physical Dimensions in./mm		M4 Mounting Dimensions in./mm					
			Configuration 1		Configuration 2		Configuration 3	
	A	B	Min.	Max.	Min.	Max.	Min.	Max.
2	12.5" (318 mm)	6.0" (152 mm)	10.8" (275 mm)	14.4" (366 mm)	7.2" (183 mm)	10.8" (275 mm)	3.6" (92 mm)	7.2" (183 mm)
3	19.6" (498 mm)	9.2" (230 mm)	14.7" (374 mm)	18.3" (465 mm)	11.1" (282 mm)	14.7" (374 mm)	7.4" (188 mm)	11.1" (282 mm)
4	22.9" (582 mm)	12.4" (315 mm)	17.9" (455 mm)	21.5" (547 mm)	14.3" (364 mm)	17.9" (455 mm)	10.7" (272 mm)	14.3" (364 mm)

Configuration 1. Both feet turned out.
 Configuration 2. One foot turned out, one in.
 Configuration 3. Both feet turned in.

TABLE 25 kV

Number of Interfaces	Physical Dimensions in./mm		M4 Mounting Dimensions in./mm					
			Configuration 1		Configuration 2		Configuration 3	
	A	B	Min.	Max.	Min.	Max.	Min.	Max.
2	14.2" (361 mm)	6.7" (170 mm)	11.9" (302 mm)	15.6" (396 mm)	8.0" (203 mm)	11.7" (297 mm)	4.2" (107 mm)	7.8" (198 mm)
3	23.0" (584 mm)	10.7" (272 mm)	16.8" (427 mm)	20.4" (518 mm)	12.9" (328 mm)	16.5" (419 mm)	9.0" (229 mm)	12.6" (320 mm)
4	27.0" (686 mm)	14.7" (373 mm)	20.8" (528 mm)	24.4" (620 mm)	16.9" (429 mm)	20.5" (521 mm)	13.0" (330 mm)	16.6" (422 mm)

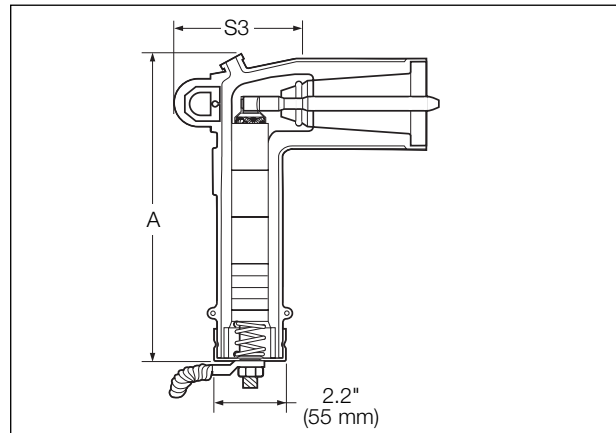
Configuration 1. Both feet turned out.
 Configuration 2. One foot turned out, one in.
 Configuration 3. Both feet turned in.

TABLE 35 kV

Number of Interfaces	Mounting Dimensions in./mm			
	A	B	C	D
2	23.1" (587 mm)	8.8" (223 mm)	**	**
3	33.3" (846 mm)	13.8" (350 mm)	**	**
4	38.5" (978 mm)	18.8" (477 mm)	**	**

** Refer to Catalog Section 500-51 for detailed drawing of 35 kV junction.

Loadbreak Junctions (15 kV shown)



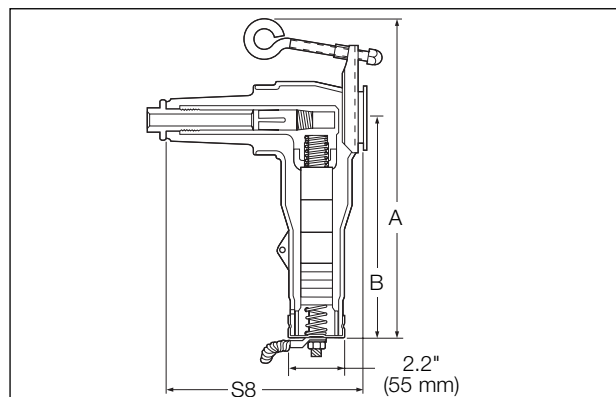
VariGAP® M.O.V.E.™ Arrester

Dim.	Duty Cycle (kV)	15 kV/25 kV	35 kV
A	9-15	8.5" (216 mm)	-
	18-27	10.9" (276 mm)	13.3" (338 mm)
S3	9-27	4.2" (107 mm)	4.7" (120 mm)

M.O.V.E. Arrester

Dim.	Duty Cycle (kV)	15 kV/25 kV	35 kV
A	3-27	8.5" (216 mm)	13.3" (338 mm)
S3	3-27	4.2" (107 mm)	4.7" (120 mm)

Underground Surge Arresters



VariGAP MOV Parking Stand Arrester

Dim.	Duty Cycle (kV)	15 kV	25 kV
A	9-15	11.9" (302 mm)	11.9" (302 mm)
	18-21	14.5" (368 mm)	14.5" (368 mm)
B	9-15	8.0" (203 mm)	8.0" (203 mm)
	18-21	10.6" (269 mm)	10.6" (269 mm)
S8	9-21	7.4" (188 mm)	7.4" (188 mm)

MOV Parking Stand Arrester

Dim.	Duty Cycle (kV)	15 kV	25 kV
A	3-21	11.9" (302 mm)	11.9" (302 mm)
B	3-21	8.0" (203 mm)	8.0" (203 mm)
S8	3-21	7.4" (188 mm)	7.4" (188 mm)

Parking Stand Arresters