

# Underground surge arresters

Eaton provides shielded deadfront arrester protection with its Cooper Power series metal oxide varistor elbow (M.O.V.E.) and parking stand arresters used in pad-mounted transformer and entry cabinets, vaults, switching enclosures and other installations. These arresters are designed for use with 200 A loadbreak interfaces to limit overvoltages to acceptable levels, protect equipment and extend cable life.

## POSI-BREAK M.O.V.E. elbow arrester

The POSI-BREAK M.O.V.E. arrester provides the same safety benefits of the POSI-BREAK connector system with over-voltage protection. Eaton is the only manufacturer to offer a solution to the partial vacuum flashover in elbow arresters.

The POSI-BREAK M.O.V.E. arrester is available for 9-21 kV for 25 kV class interfaces.

## M.O.V.E. DirectConnect elbow arrester

M.O.V.E. DirectConnect elbow arresters are used on underground systems in pad-mounted transformer and entry cabinets, vaults, switching enclosures and other installations to provide shielded deadfront arrester protection. They are designed for use with 600 A, 35 kV Class deadbreak interfaces that conform to IEEE Std 386™ standard to limit overvoltages to acceptable levels, protect equipment and extend cable life.



### M.O.V.E. DirectConnect elbow arrester specification information

#### Design Tests

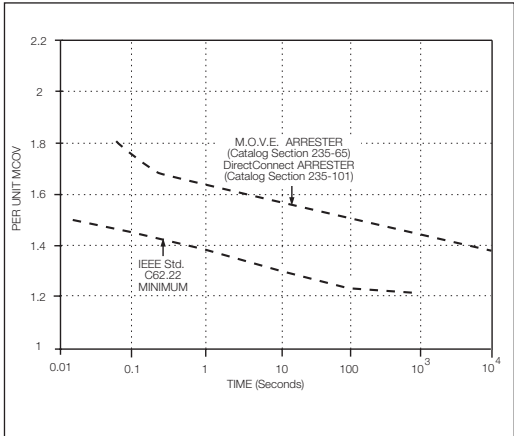
- IEEE Std 386™ standard, Separable Insulated Connector Systems
- IEEE Std C62.11 standard, Metal Oxide Surge Arresters for AC Power Circuits



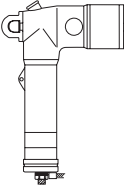
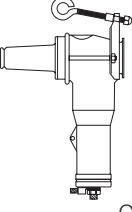
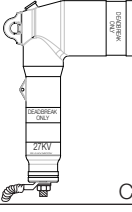
DirectConnect elbow arrester.

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)                                                                      | —                             | —                                        |
| 46000 Y/26600          | 48300 Y/28000   | 36 (29.0)                                                                                   | —                             | —                                        |



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

| Catalog Section                                                                    | Description                                                           | kV Class | Base Part Number | MCOV (kV) |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------|------------------|-----------|
|   | Metal Oxide Elbow (M.O.V.E.) Arrester                                 | 15 kV    | 3238018C03M      | 2.55      |
|                                                                                    |                                                                       |          | 3238018C06M      | 5.1       |
|                                                                                    |                                                                       |          | 3238018C09M      | 7.65      |
|                                                                                    |                                                                       |          | 3238018C10M      | 8.4       |
|                                                                                    |                                                                       |          | 3238018C12M      | 10.2      |
|                                                                                    |                                                                       |          | 3238018C15M      | 12.7      |
|                                                                                    |                                                                       |          | 3238018C18M      | 15.3      |
|                                                                                    |                                                                       | 25 kV    | 3238019C09M      | 7.65      |
|                                                                                    |                                                                       |          | 3238019C10M      | 8.4       |
|                                                                                    |                                                                       |          | 3238019C12M      | 10.2      |
|                                                                                    |                                                                       |          | 3238019C15M      | 12.7      |
|                                                                                    |                                                                       |          | 3238019C18M      | 15.3      |
|                                                                                    |                                                                       |          | 3238019C21M      | 17.0      |
|                                                                                    | 25 kV POSI-BREAK Elbow Arrester                                       | 25 kV    | PLEA225N03       | 2.55      |
|                                                                                    |                                                                       |          | PLEA225N06       | 5.1       |
|                                                                                    |                                                                       |          | PLEA225N09       | 7.65      |
|                                                                                    |                                                                       |          | PLEA225N10       | 8.4       |
|                                                                                    |                                                                       |          | PLEA225N12       | 10.2      |
|                                                                                    |                                                                       |          | PLEA225N15       | 12.7      |
|                                                                                    |                                                                       |          | PLEA225N18       | 15.3      |
|                                                                                    |                                                                       |          | PLEA225N21       | 17.0      |
|                                                                                    | 35 kV (Interface 1A Large Interface per IEEE Std 386™ -2006 standard) | 35 kV    | 3238020C18M      | 15.3      |
|                                                                                    |                                                                       |          | 3238020C21M      | 17.0      |
|                                                                                    |                                                                       |          | 3238020C24M      | 19.5      |
|                                                                                    |                                                                       |          | 3238020C27M      | 22.0      |
|                                                                                    |                                                                       |          | 3238020C30M      | 24.4      |
|                                                                                    |                                                                       |          | 3238020C33M      | 27        |
| CA235025EN                                                                         |                                                                       |          | 3238020C36M      | 29        |
|   | Metal Oxide (MOV) Parking Stand Arrester                              | 15 kV    | 3237686C03M      | 2.55      |
|                                                                                    |                                                                       |          | 3237686C06M      | 5.1       |
|                                                                                    |                                                                       |          | 3237686C09M      | 7.65      |
|                                                                                    |                                                                       |          | 3237686C10M      | 8.4       |
|                                                                                    |                                                                       |          | 3237686C12M      | 10.2      |
|                                                                                    |                                                                       |          | 3237686C15M      | 12.7      |
|                                                                                    |                                                                       |          | 3237686C18M      | 15.3      |
|                                                                                    |                                                                       | 25 kV    | 3237758C09M      | 7.65      |
|                                                                                    |                                                                       |          | 3237758C10M      | 8.4       |
|                                                                                    |                                                                       |          | 3237758C12M      | 10.2      |
|                                                                                    |                                                                       |          | 3237758C15M      | 12.7      |
|                                                                                    |                                                                       |          | 3237758C18M      | 15.3      |
|                                                                                    |                                                                       |          | 3237758C21M      | 17.0      |
| CA235027EN                                                                         |                                                                       |          |                  |           |
|  | M.O.V.E. DirectConnect Elbow Arrester                                 | 35 kV    | DCEA635M27       | 22.0      |
|                                                                                    |                                                                       |          | DCEA635M30       | 24.4      |
|                                                                                    |                                                                       |          | DCEA635M33       | 27.0      |
|                                                                                    |                                                                       |          | DCEA635M36       | 29.0      |
| CA235026EN                                                                         |                                                                       |          |                  |           |

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 DirectConnect elbow arresters.
- Refer to page 17 for dimensional information or referenced catalog section.

**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)<br>8/20 $\mu$ s Current Wave |      |      |       |       |
|--------------------------------|-----------|--------------------------------------|-------------------------------------------------------------------|------|------|-------|-------|
|                                |           |                                      | 1.5 kA                                                            | 3 kA | 5 kA | 10 kA | 20 kA |
| 3                              | 2.55      | 11                                   | 9                                                                 | 9.7  | 10.7 | 11.4  | 13    |
| 6                              | 5.1       | 22                                   | 18.0                                                              | 19.4 | 20.8 | 22.7  | 26    |
| 9                              | 7.65      | 31.7                                 | 26                                                                | 28   | 30   | 32.8  | 37.4  |
| 10                             | 8.4       | 33                                   | 27                                                                | 29.1 | 31.2 | 34.1  | 38.9  |
| 12                             | 10.2      | 41.5                                 | 33.9                                                              | 36.6 | 39.2 | 42.9  | 48.9  |
| 15                             | 12.7      | 51.8                                 | 42.4                                                              | 45.7 | 49   | 53.6  | 61.1  |
| 18                             | 15.3      | 62.2                                 | 50.9                                                              | 54.9 | 58.8 | 64.3  | 73.4  |
| 21                             | 17.0      | 66                                   | 54.0                                                              | 58.2 | 62.4 | 68.2  | 77.9  |
| 24                             | 19.5      | 77                                   | 63.0                                                              | 67.9 | 72.8 | 79.6  | 90.8  |
| 27                             | 22.0      | 87.2                                 | 71.4                                                              | 76.9 | 82.4 | 90.1  | 103   |
| 30                             | 24.4      | 97.1                                 | 79.5                                                              | 85.7 | 91.8 | 100.0 | 115.0 |
| 33                             | 27        | 108                                  | 87.8                                                              | 95.1 | 102  | 112   | 127   |
| 36                             | 29        | 116                                  | 95.3                                                              | 103  | 110  | 120   | 137   |

\* 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  $\mu$ s.

**TABLE 3**  
M.O.V.E. DirectConnect Elbow Arrester Electrical Ratings and Characteristics

| Duty Cycle Voltage Rating (kV) | MCOV (kV) | Front-of-Wave Protective Level* (kV crest) | Maximum Discharge Voltage 8/20 $\mu$ s Current Wave (kV crest) |      |      |       |       |
|--------------------------------|-----------|--------------------------------------------|----------------------------------------------------------------|------|------|-------|-------|
|                                |           |                                            | 1.5 kA                                                         | 3 kA | 5 kA | 10 kA | 20 kA |
| 27                             | 22.0      | 105.0                                      | 75.0                                                           | 82.0 | 87.4 | 96.2  | 110.0 |
| 30                             | 24.4      | 112.0                                      | 79.5                                                           | 85.7 | 91.8 | 100.0 | 115.0 |
| 33                             | 27        | 108                                        | 87.8                                                           | 95.1 | 102  | 112   | 127   |
| 36                             | 29        | 116                                        | 95.3                                                           | 103  | 110  | 120   | 137   |

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