

Medium-Voltage Substation Circuit Breakers

Powersub Type FVR
Vacuum Circuit Breaker



Advanced Technology for Improved Reliability

For more than four decades, Myers Power Products has led the switchgear market in quality for the electric industry, delivering highly reliable products for utilities and other high demand industries. By combining the latest developments in circuit breaker technology with world-renowned quality, the Powersub™ Type FVR Vacuum Substation Circuit Breakers from Myers Controlled Power are the most advanced medium-voltage circuit breakers available.

- **Compliance to ANSI standards**
Designed and tested to comply with IEEE/ANSI standards for outdoor circuit breakers.
- **ISO 9001 certification**
Designed and manufactured in a facility that is Quality Systems Certified by Underwriters Laboratories, Inc. to ISO 9001.
- **Arc-resistant construction**
As standard, the 600 - 2000 A ratings of the FVR have arc-resistant construction in accordance with EEMAC and IEC standards for Type B enclosures.

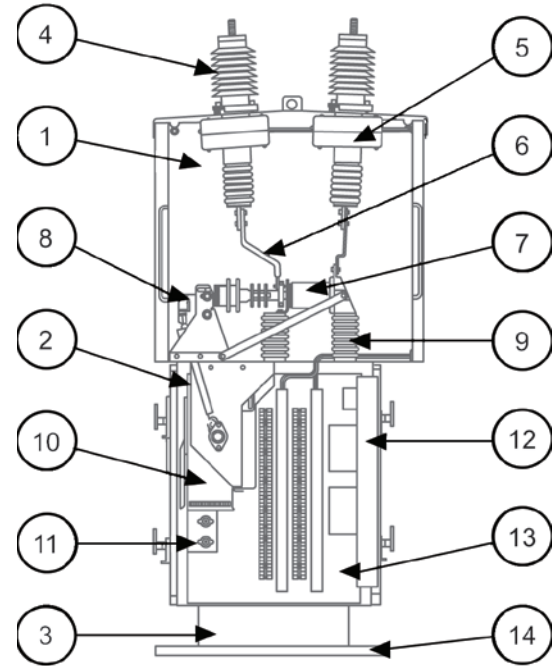
Benefits

- **High-speed operation** - Interrupting time of three cycles or less.
- **Long life** - Hermetically sealed interrupters protect contacts from corroding elements and contamination.
- **Ease of maintenance** - Interrupter assemblies and contact wear indicators accessible via a bolted panel.
- **Reliability** - A minimum of moving parts on the proven motor-driven, spring-charged Type RI mechanism.
- **Durability** - Robust design tested to the highest IBC-2000 seismic standard.
Other seismic standards may be evaluated upon request.
- **Flexibility** - Breaker height is adjustable from minimum to maximum in 3 in. increments.

Standard Features

- Window for viewing status indicators and operation counter.
- Ground pads located on both sides of enclosure. A #4 cable connects from the roof and HV/LV compartment to the ground pads to ensure a solidly grounded enclosure.
- Painted adjustable legs with galvanized base channels.
- All external hardware is stainless steel.
- Optimized relay panel (32 5/8 in. W x 33 7/8 in. H) for instrumentation.
- 12-pole auxiliary switch (6 'a' & 6 'b' contacts), latch check switch and emergency cutout switch standard.
- All outer doors latch open at approximately 160 degrees, except the 200 kV BIL unit, which latch open to 120 degrees.
- Type RI mechanism with integral manual charging handle.

**FVR Breaker Detail
110, 125, 150, & 200kV BIL**



1. High-voltage compartment
2. Low-voltage compartment
3. Adjustable legs
4. Entrance bushings
5. Current transformers
6. Flexible connector
7. Vacuum interrupter bottle
8. Drive bar assembly
9. Stand off insulator
10. Mechanism
11. Auxiliary switches
12. Relay and instrument door
13. Control mounting panel
14. Galvanized base channel

Additional Features & Ratings

- 15-38 kV, 1200-4000 A, up to 50 kA.
- Self-cooled up through 3000 A (no fan circuitry).
- High-voltage panels are light (~251bs) for ease of removal and reinstallation.
- Height adjustable range of 24 in. for 110/125 kV BIL and 21 in. for 150/200 kV BIL.
- Two pad-lockable handles on each outer door.
- Hinged doors utilized on common access areas.
- Optional adjustable stainless steel legs available.
- Local mounting of lightning arresters available.

FVR Vacuum Circuit Breaker Ratings

| Substation Circuit Breaker Catalog Number | Voltage Max. kV rms | Continuous Current at Hz, A, rms | Insulation Level Test Voltage | | Short Circuit Current kA rms at Max. kV | Max. Symmetrical Interrupting Capability kA rms | Rated Permissible Tripping Delay Y Seconds | Three-second Current Carrying Capability kA rms | Close and Latching Capability kA Peak |
|---|---------------------|----------------------------------|-------------------------------|------------------|---|---|--|---|---------------------------------------|
| | | | 60 Low Frequency kV rms | Impulse kV Crest | | | | | |
| FVR 1 06 11 12A | 15.5 | 600 | 50 | 110 | 12 | 12 | 2 | 12 | 32 |
| FVR 1 08 11 16A | | 800 | | | 16 | 16 | | 16 | 43 |
| FVR 1 12 11 12A | 15.5 | 1200 | 50 | 110 | 12 | 12 | 2 | 12 | 32 |
| FVR 1 12 11 16A | | | | | 16 | 16 | | 16 | 43 |
| FVR 1 12 11 20A | | | | | 20 | 20 | | 20 | 54 |
| FVR 1 12 11 25A | | | | | 25 | 25 | | 25 | 68 |
| FVR 1 12 11 31A | | | | | 31.5 | 31.5 | | 31.5 | 85 |
| FVR 1 12 11 40A | | | | | 40 | 40 | | 40 | 108 |
| FVR 1 20 11 12A | | | | | 15.5 | 2000 | | 50 | 110 |
| FVR 1 20 11 16A | 16 | 16 | 16 | 43 | | | | | |
| FVR 1 20 11 20A | 20 | 20 | 20 | 54 | | | | | |
| FVR 1 20 11 25A | 25 | 25 | 25 | 68 | | | | | |
| FVR 1 20 11 31A | 31.5 | 31.5 | 31.5 | 85 | | | | | |
| FVR 1 20 11 40A | 40 | 40 | 40 | 108 | | | | | |
| FVR 1 30 11 12A | 15.5 | 3000 | 50 | 110 | | | 12 | | |
| FVR 1 30 11 16A | | | | | 16 | 16 | 16 | 43 | |
| FVR 1 30 11 20A | | | | | 20 | 20 | 20 | 54 | |
| FVR 1 30 11 25A | | | | | 25 | 25 | 25 | 68 | |
| FVR 1 30 11 31A | | | | | 31.5 | 31.5 | 31.5 | 85 | |
| FVR 1 30 11 40A | | | | | 40 | 40 | 40 | 108 | |
| FVR 1 30 11 50A | | | | | 50 | 50 | 50 | 130 | |
| FVR 1 35 11 20A | 15.5 | 3500 | 50 | 110 | 20 | 20 | 2 | 20 | 54 |
| FVR 1 35 11 25A | | | | | 25 | 25 | | 25 | 68 |
| FVR 1 35 11 31A | | | | | 31.5 | 31.5 | | 31.5 | 85 |
| FVR 1 35 11 40A | | | | | 40 | 40 | | 40 | 108 |
| FVR 1 40 11 20A | 15.5 | 4000 | 50 | 110 | 20 | 20 | 2 | 20 | 54 |
| FVR 1 40 11 25A | | | | | 25 | 25 | | 25 | 68 |
| FVR 1 40 11 31A | | | | | 31.5 | 31.5 | | 31.5 | 85 |
| FVR 1 40 11 40A | | | | | 40 | 40 | | 40 | 108 |
| FVR 2 12 12 12A | 27 | 1200 | 60 | 125 (150) | 12 | 12 | 2 | 12 | 32 |
| FVR 2 12 12 16A | | | | | 16 | 16 | | 16 | 43 |
| FVR 2 12 12 20A | | | | | 20 | 20 | | 20 | 54 |
| FVR 2 12 12 25A | | | | | 25 | 25 | | 25 | 68 |
| FVR 2 20 12 12A | 27 | 2000 | 60 | 125 (150) | 12 | 12 | 2 | 12 | 32 |
| FVR 2 20 12 16A | | | | | 16 | 16 | | 16 | 43 |
| FVR 2 20 12 20A | | | | | 20 | 20 | | 20 | 54 |
| FVR 2 20 12 25A | | | | | 25 | 25 | | 25 | 68 |
| FVR 2 12 15 31A | 27 | 1200 | 80 | 150 | 31.5 | 31.5 | 2 | 31.5 | 85 |
| FVR 2 20 15 31A | | 2000 | | | | | | | |
| FVR 3 12 15 12A | 38 | 1200 | 80 | 150 | 12 | 12 | 2 | 12 | 32 |
| FVR 3 12 15 16A | | | | | 16 | 16 | | 16 | 43 |
| FVR 3 12 15 20A | | | | | 20 | 20 | | 20 | 54 |
| FVR 3 12 15 25A | | | | | 25 | 25 | | 25 | 68 |
| FVR 3 12 15 31A | | | | | 31.5 | 31.5 | | 31.5 | 85 |
| FVR 3 20 15 12A | 38 | 2000 | 80 | 150 | 12 | 12 | 2 | 12 | 32 |
| FVR 3 20 15 16A | | | | | 16 | 16 | | 16 | 43 |
| FVR 3 20 15 20A | | | | | 20 | 20 | | 20 | 54 |
| FVR 3 20 15 25A | | | | | 25 | 25 | | 25 | 68 |
| FVR 3 20 15 31A | | | | | 31.5 | 31.5 | | 31.5 | 85 |
| FVR 3 12 20 12A | 38 | 1200 | 80 | 200 | 12 | 12 | 2 | 12 | 32 |
| FVR 3 12 20 16A | | | | | 16 | 16 | | 16 | 43 |
| FVR 3 12 20 20A | | | | | 20 | 20 | | 20 | 54 |
| FVR 3 12 20 25A | | | | | 25 | 25 | | 25 | 68 |

All ratings are based on three-cycle interrupting time and voltage range factor, k = 1.0

Type
FVR – Vacuum

Voltage class
1 – 15.5 kV
2 – 27 kV
3 – 38 kV

Continuous current rating
06 – 600 A
08 – 800 A
12 – 1200 A
20 – 2000 A
30 – 3000 A
35 – 3500 A
40 – 4000 A

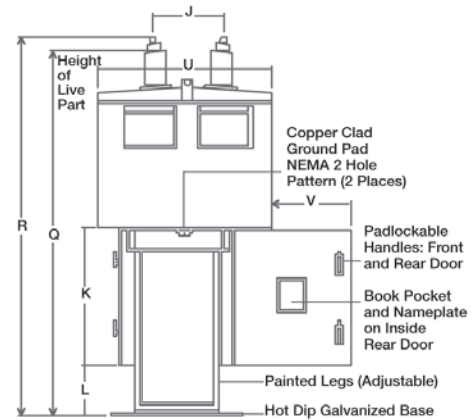
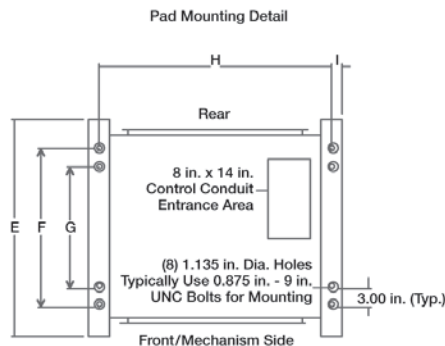
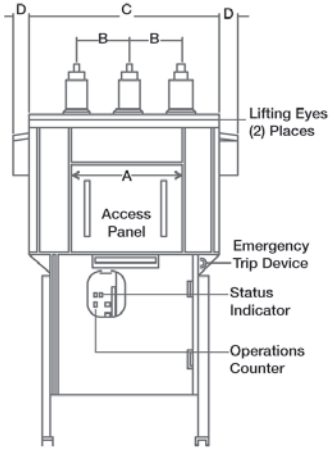
BIL rating
11 – 110 kV
12 – 125 kV
15 – 150 kV
20 – 200 kV

Interrupting rating
12 – 12 kA
16 – 16 kA
20 – 20 kA
25 – 25 kA
31 – 31.5 kA
40 – 40 kA
50 – 50 kA

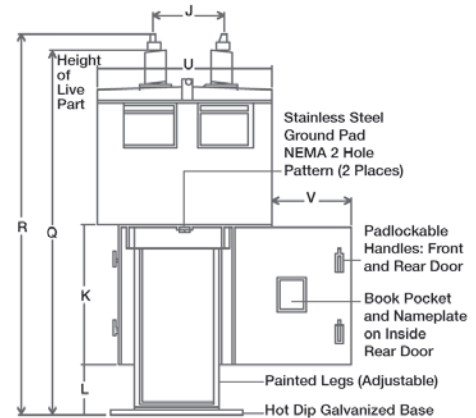
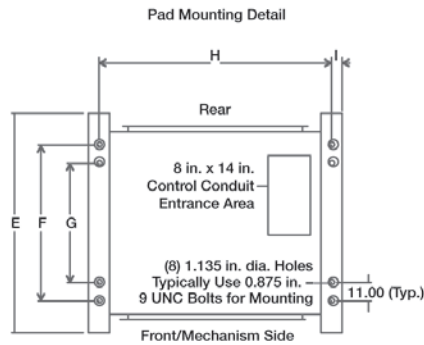
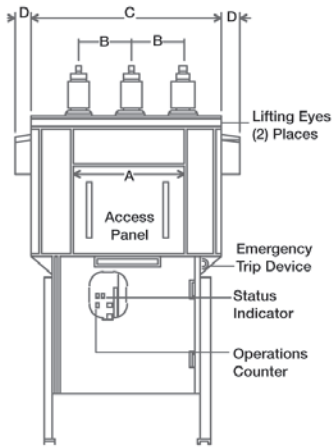
() Indicates optional BIL ratings.

Dimensions 15, 27, and 38 kV Type FVR

FVR = 110, 125, 150 kV BIL



FVR = 200 kV BIL



200 kV BIL

| Breaker Type | A | B | C | D* | E | F | G | H | I | J | K | L (Max) | L (Min) | Q (Max) | Q (Min) | R (Max) | R (Min) | U | V |
|-------------------|-------|-------|-------|------|-------|-------|-------|-------|------|-------|-------|---------|---------|---------|---------|---------|---------|-------|-------|
| 110 kV BIL | 32.62 | 15.00 | 55.50 | 4.25 | 38.00 | 27.00 | 21.00 | 44.00 | 2.00 | 20.00 | 39.12 | 31.94 | 7.94 | 122.38 | 98.38 | 125.88 | 101.88 | 44.00 | 31.75 |
| 125 kV BIL | 32.62 | 15.00 | 55.50 | 4.25 | 38.00 | 27.00 | 21.00 | 44.00 | 2.00 | 20.00 | 39.12 | 31.94 | 7.94 | 122.38 | 98.38 | 125.88 | 101.88 | 44.00 | 31.75 |
| 150 kV BIL | 32.62 | 17.00 | 63.50 | 4.25 | 38.00 | 27.00 | 21.00 | 52.50 | 1.75 | 17.25 | 39.12 | 25.94 | 4.94 | 122.75 | 101.75 | 126.25 | 105.25 | 50.75 | 27.00 |
| 200 kV BIL | 38.50 | 19.50 | 74.00 | 4.25 | 54.00 | 43.00 | 21.00 | 52.50 | 1.75 | 29.50 | 39.12 | 25.94 | 4.94 | 137.75 | 116.75 | 140.75 | 119.75 | 68.50 | 22.85 |

D* = 13.00 for 3000 A, 3500 A & 4000 A (110 kV BIL)

Note: Dimensions subject to change and not for construction. All dimensions are approximate and are in inches.

For more information call 866-MY-MYERS or visit us online at www.myerspowerproducts.com

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Why Choose Myers Power Products?

Myers Power Products offers a broad range of service solutions to support any manufacturers' electrical distribution equipment. Whether the solution is refurbishment, replacement, maintenance, or recommendations to optimize your existing system, our nationwide network of qualified experts offers a complete service package.