VFI Underground
Distribution Switchgear

Improve safety and system reliability with environmentally preferred switchgear

Versatile in application while providing a safer, more reliable, and environmentally preferred approach to switching and protection requirements for 15, 25, and 35 kV systems.

Environmentally preferred

Climate change and the ecological impact of industrial operations have increased concerns and actions of business and government. Thought leaders are using this as an opportunity to enhance their operational performance and promote responsible corporate stewardship, increasing the demand for sustainable products and solutions. Eaton's Cooper Power Systems has been a leader in addressing these issues by developing biodegradable liquid dielectric products for more than 25 years.

Envirotemp™ FR3™ fluid is a vegetable oil-based dielectric fluid used extensively in transformer applications globally.

Biodegradable E200™ is a clear, low-viscosity fluid with excellent thermal and dielectric properties across the full temperature range for switchgear. Combined with a fire point greater than 300 °C, this makes E200 fluid ideally-suited for switchgear applications.

E200 fluid is the environmentally preferred choice for Vacuum Fault Interrupter (VFI) switchgear because it eliminates the need for SF_6 gas. Identified as one of the most potent greenhouse gases by the United States Environmental Protection Agency, one pound of SF_6 gas has the same global warming impact as 11 tons of CO_2. Relatively low emissions of SF_6 may have a large and lasting impact.

Load and fault interruption in SF_6 also produces toxic by-products. With VFI switchgear, all interruption takes place within sealed vacuum interrupters, independent of the dielectric medium. This eliminates the added cost and complexity of special safety regulations and protocols associated with SF_6 switching by-products.

Eaton's Cooper Power Systems VFI underground distribution switchgear helps avoid potential regulatory burdens and added life-cycle costs and is the responsible way to promote sustainable operations and a green supply chain.

VFI vacuum fault interrupter underground distribution switchgear

- Environmentally preferred
- E200™ fluid is the SF_6-Free dielectric medium of choice
- Obsoletes potent greenhouse gas (SF_6) equipment
- Eliminates costs of compliance with increasing government regulations
- Vacuum switching never contaminates the insulating medium
- Operator safety
- 100% dead-front construction
- Visible-break and grounding switches are available options for added safety

Cooper Power Systems
by EATON

Operator safety

The dead-front construction of VFI underground distribution switchgear provides added safety for utility and maintenance personnel. Inside, all terminations are insulated rubber connectors with surfaces at ground potential. All high voltage bus work and internal parts are completely immersed within a sealed insulating dielectric medium. This not only provides a safer working environment, but also eliminates the contamination problems of moisture, dirt, and wildlife commonly associated with air-insulated switchgear.

Available side-mounted operators eliminate the need to stand in front of equipment and limit exposure to the high-voltage compartment. Because there is no need to enter this area, routine switching can be performed without entering the high-voltage compartment. In addition, all switches, interrupters and components are hot-stick operable, increasing the distance to the high-voltage area.

The optional visible-break switch with viewing window verifies an open circuit without removing the cables. Large, easily viewed contacts show the open/close position of the visible-break switch. A switch having a cable ground position is also available. With these options, there is no doubt that a circuit is open, closed, or grounded.

Improve distribution reliability

VFI switchgear solves many distribution system reliability problems. For three-phase applications that experience single-phase fuse interruptions, the three-phase ganged-trip VFI switchgear eliminates ferroresonance and motor damage due to abnormal system voltage. An overcurrent on any phase simultaneously opens all three phases and reduces the risk of damage to connected equipment from single-phasing and associated down-time. VFI units can also be specified with single-phase trip to provide individual phase protection for true single-phase loads.

The VFI interrupter mechanism allows immediate service restoration, eliminating the expense associated with stocking and changing out fuses. The VFI interrupter also serves as a vacuum load-break switch increasing operability. These features save time and money.

Our VFI control offers overcurrent protection and coordination flexibility including multiple TCCs, variable minimum-trip settings, and instantaneous trip. Options include ground-sensing, minimum-response time adder, and a minimum-trip multiplier to solve the most complex coordination problems.

Underground distribution system automation

VFI automation speeds service restoration, system reconfiguration, fault targeting, and system monitoring through remote operation. Even more advanced protection, communication, metering, SCADA and automation capabilities are available with Smart VFI, our fully-integrated, self-contained package utilizing internal sensing and control power and Edison™ Idea™-based controls for customizable protection, SCADA and automation, and an inherently flexible upgrade path for future requirements.

Eaton's Cooper Power Systems VFI switchgear has the flexibility to be supplied with advanced automation capabilities or with provisions allowing their addition at a later date.

Field-proven dependability

All internal mechanisms and bus work are insulated within a sealed tank with a choice of dielectric media, including E200. Contrasted to air-insulated units that are open to contamination, there is no requirement to regularly clean barriers, insulators, or live parts. Because of this, maintenance costs are greatly decreased. This also allows VFI switchgear to be used in locations where air-insulated switchgear cannot, such as flood-prone areas.

Both load and fault interruption take place within the sealed vacuum interrupter with no arcing by-products to contaminate the insulating medium. The vacuum interrupters do not rely on the insulation medium for proper interruption. This gives the VFI switchgear more flexibility to fit any application by allowing different dielectric mediums to be used. Advanced technology vacuum interrupters are reliable, have long life and require no maintenance. The Eaton's Cooper Power Systems patented design reduces the arc energy—resulting in far less contact erosion and the longest life of any vacuum interrupter in the industry.

VFI distribution switchgear is available as UL listed and labeled providing a cost-effective solution which will meet state and local electrical codes as applicable.

Flexible Application

Suitable for Industrial, Commercial, and Utility Requirements.

- Lowers system operating costs through increased operating efficiency
- Improves system reliability
- Years of proven field experience
- Fast restoration for reduced downtime
- Vacuum interruption maintains dielectric integrity
- Advanced automation options for Smart Grid applications
- Available with UL listing and labeling

For Eaton's Cooper Power Systems switchgear product information, call **1-877-277-4636** or visit: **www.CooperPower.com**

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