

VFI

Vacuum Fault Interrupter  
Ready. Reset. Go.



# KYLE® VFI VACUUM FAULT INTERRUPTER

Forget about unnecessary maintenance.  
Forget about conventional fuses.  
VFI's reliable, field-proven  
resettable breaker mechanism  
speeds up service restoration,  
eliminating additional downtime  
and the expense of fuse replacement.



15, 25, 35kV

Resettable

Fast Restoration

Visible Break and Grounding Switch

Oil, Envirotemp® FR3™, R-TEMP®, SF<sub>6</sub>  
Insulation Available

Vacuum Interruption

Deadfront Construction



Kyle's VFI padmounted switchgear provides a simple, economical approach to switching and protection requirements for 15, 25, and 35kV underground systems. The modular design of VFI Vacuum Fault Interrupter switchgear allows the switching system to be tailored to specific requirements without the high cost of custom construction.

The VFI resettable breaker mechanism allows immediate service restoration, eliminating the added downtime and expenses associated with changing out conventional fuses.

VFI padmounted switchgear is versatile in application. It is suited for utility and commercial/industrial requirements, and is easily adaptable to standardized distribution systems.

VFI switchgear is a product of Cooper Power Systems, proven by years of continuous field experience.

#### **Deadfront Construction For Added Safety**

The deadfront construction of VFI padmounted switchgear offers a safety factor for utility personnel and the general public. Inside, all terminators are covered with insulating rubber. All internal parts are completely sealed in an

insulating medium to reduce maintenance and eliminate the problems of moisture, dirt, and wildlife commonly associated with air-insulated switchgear.

In addition, the VFI can be used in locations where air-insulated switchgear cannot, such as flood areas or high-contaminant industrial sites.

#### **Vacuum Technology**

Cooper Power Systems' Kyle® Distribution Switchgear products incorporate vacuum technologies which have advanced the durability and extended the application base for vacuum products.



Kyle vacuum interrupters employ axial-magnetic field contacts which keep the arc in an easier-to-interrupt diffuse mode, resulting in less power in the arc that needs to be dissipated. Furthermore, Kyle's patented design uses the entire contact surface, resulting in far less contact erosion and the longest life of any vacuum interrupter in the industry.

### Visible-Break For Positive Visual Verification of Contact Status

Kyle's Visible-Break accessory aids in contact position verification when distribution switching procedures require indication of an open circuit prior to testing and verification using Cooper Power Systems cable accessories. The Visible-Break feature enables an

operator to peer through a sealed viewing window to verify contact position. Large, easily viewed contacts show the open/close position of the Visible-Break switch. Ground position is also available.



### Tri-Phase Control For Ease of Coordination

The Tri-Phase electronic control provides easy time-current curve coordination. Just like Kyle's time-proven recloser controls, the Tri-Phase offers over 100 minimum trip settings and an assortment of time-current curves. With standard instantaneous trip and optional ground trip and minimum-response TCCs, the Tri-Phase control will satisfy all of your coordination needs. Tri-Phase is self-powered and does not require a computer to program settings.



### Distribution-Automation Accessories

DC Motor Operators and SCADA accessories are available for VFI switchgear. These accessories will allow for remote operation and monitoring of the unit, which speeds up the circuit/load reconfiguration. The motor operator control can handle up to six motors, and it has SCADA contacts for remote operation and status indication.

A SCADA accessory is also available for the Tri-Phase with Ground (TPG) control. This allows remote tripping, monitoring of fault targets, target reset and setting modifications.



VFI can be supplied with provisions for Motor Operators and SCADA at the time of order. This will allow for the addition of accessories at a later date. Auxiliary switch contacts are also available accessories.

### Three-Phase Ganged Tripping

Most commercial loads consist of large kVA three-phase transformers. When these transformers are protected with single-phase fuses, typically, only one of the fuses will open during an overcurrent condition. This "single-phases" three-phase commercial loads, and causes system overvoltage and ferroresonance problems.

The VFI solves this problem by providing three-phase ganged tripping. An overcurrent on any phase automatically opens all three phases simultaneously.

The VFI can be specified with single-phase trip, to provide individual phase protection for single-phase transformer loop applications.

### VFI, a Breaker "and" a Switch

The VFI breaker also serves as a vacuum load-break switch. Tap switching has traditionally been accomplished by pulling load-break elbows, or by load-busting fuses. With the VFI, the tap can be switched with a simple push-pull of the operation handle.

SF<sub>6</sub> Pressure Gauge or Fluid Level Indicator

SF<sub>6</sub> or Fluid-Fill Plug

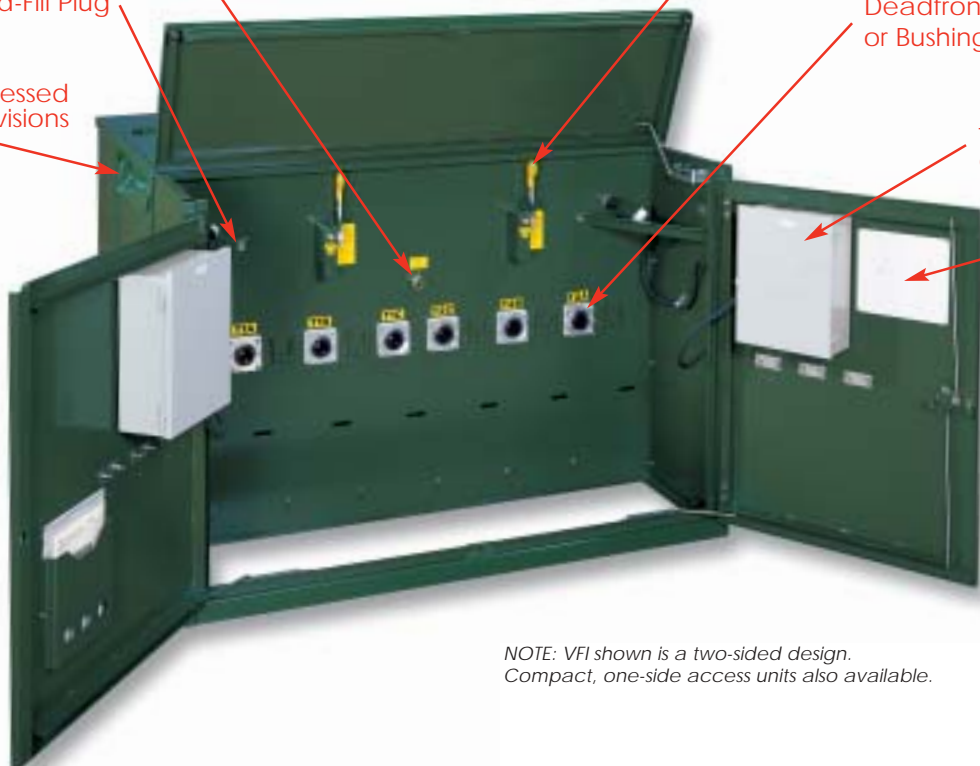
Recessed Lifting Provisions

Three-Phase 600A Load-Break Switch

Deadfront Bushings (600A) or Bushing Wells (200A)

Tri-Phase with Ground Control

Phase Diagram



NOTE: VFI shown is a two-sided design. Compact, one-side access units also available.

## RATINGS FOR VFI PADMOUNTED SWITCHGEAR

Nominal Voltage	15kV	25kV	35kV
Maximum Design Voltage, kV . . . . .	15.5	27	38
BIL, kV . . . . .	95	125	150
1-Minute Withstand, Switch and Terminators, kV . . . . .	34	40	50
Continuous Current, Amps (max.) . . . . .	600	600	600
Load Switching, Amps . . . . .	600	600	600
Momentary Current, 10 Cycles (asym.), kA . . . . .	20 or 25.8	20	20
3 Sec., Amps (sym.), kA . . . . .	12 or 16	12	12
3 Shot Make and Latch Amps (sym.), kA . . . . .	12	12	12
(asym.), kA . . . . .	20	20	20
Interrupter Rating, kA . . . . .	12 or 16	12	12

## BASIC MODELS\*

Model	One Line Diagram	Insulation Medium		Model	One Line Diagram	Insulation Medium	
		Voltage (kV)	Fluid (1) SF <sub>6</sub>			Voltage (kV)	Fluid (1) SF <sub>6</sub>
5		15	KPOVF531 KPSVF531	9T		15	KPOVF9T32 KPSVF9T32
		25	KPOVF534 KPSVF534			25	KPOVF9T35 KPSVF9T35
		35	KPOVF537 KPSVF537			35	KPOVF9T38 KPSVF9T38
6		15	KPOVF632 KPSVF632	11		15	KPOVF1132 KPSVF1132
		25	KPOVF635 KPSVF635			25	KPOVF1135 KPSVF1135
		35	KPOVF638 KPSVF638			35	KPOVF1138 KPSVF1138
7		15	KPOVF732 KPSVF732	12		15	KPOVF1232 KPSVF1232
		25	KPOVF735 KPSVF735			25	KPOVF1235 KPSVF1235
		35	KPOVF738 KPSVF738			35	KPOVF1238 KPSVF1238
9		15	KPOVF932 KPSVF932	14		15	KPOVF1432 KPSVF1432
		25	KPOVF935 KPSVF935			25	KPOVF1435 KPSVF1435
		35	KPOVF938 KPSVF938			35	KPOVF1438 KPSVF1438

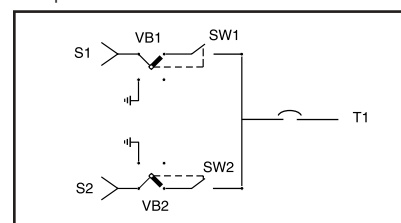
\*For different bushing amperage rating, replace last digit of the catalog number with the appropriate number from the Bushing Guide.  
(1) Envirotemp FR3, R-TEMP or oil available.

## BUSHING GUIDE

Voltage Rating	Bushing Amperage Rating (Source/Tap)		
	600A / 600A	600A / 200A(2)	200A / 200A(2)
15kV	1	2	3
25kV	4	5	6
35kV	7	8	9

(2) VFI units ordered with 15 or 25kV voltage rating are equipped with wells only on the 200A side.

Sample one-line diagram with Open/Close/Ground Visible Break



VFI Model 6

NOTE: Visible Break is available on models 5, 6 and 9, 15 - 35 kV, source/tap with fluid insulation. Contact your Cooper Power Systems representative for current availability of other models.

### ***Insulation For Different Environmental Requirements***

Fire-resistant fluids, as well as the commonly used oil and SF<sub>6</sub>, are offered as insulation media for VFI Switchgear.

R-Temp fluid, manufactured by Cooper Power Systems, has a higher fire point and higher dielectric strength than mineral oil. The fire safety record is flawless. R-TEMP fluid is Classified by Underwriters Laboratories and Approved by Factory Mutual for use in indoor or outdoor installations.

Envirotemp FR3 fluid, also a Cooper Power Systems product, is Classified by Underwriters Laboratories and is Approved by Factory Mutual for use in indoor or outdoor installations. It has an even higher fire point than R-Temp fluid. Plus, it's readily bio-degradable and is not bio-accumulating. Because it is a seed oil-based fluid, it can be differentiated from mineral oil regulation per the Edible Oil Regulatory Reform Act: Public Law 104-55. Both Envirotemp FR3 and R-TEMP are available for outdoor switchgear installations where the ambient temperature is 0° C or higher.

### ***Low Maintenance***

The internal mechanisms and bus work are insulated with Envirotemp FR3 fluid, R-Temp fluid, mineral oil, or SF<sub>6</sub> gas. These provide electrical insulation only, since both load and fault interruption takes place in sealed vacuum interrupters.

With no expulsion fuses or switching by-products to contaminate the insulation medium, maintenance intervals are greatly increased.

### ***Durable Paint Finish***

Keeping your switchgear painted in the field is important, not only because it extends the operational life of the unit, but also because customers expect you to keep equipment you install near their property looking good. With the cost of repainting, the durability of the factory finish can have a significant impact on your maintenance budget.

Painted with the most advanced coating system in the industry (similar to that used in the automotive industry), VFI Switchgear retains a like-new protective finish years after others have blistered, cracked, chalked, or rusted.

Cooper Power Systems' VFI Switchgear exceeds the requirements of ANSI C57.12.28 and C57.12.29.

### ***ANSI Padmount Switchgear Standard***

The VFI meets ANSI C37.72, which specifies complete deadfront construction. The VFI's vacuum load-break switches also meet the stringent ANSI switching duty cycle, not only at 15kV, but at 25kV and 35kV, as well.

### ***Additional Information***

*Service Information S285-10-1* installation instructions, VFI fluid-insulated padmounted vacuum switchgear.

*Service Information S285-10-2* installation instructions, VFI SF<sub>6</sub>-insulated padmounted vacuum switchgear.

*Service Information S285-75-1* installation instructions, for Tri-Phase™ electronic control.

*Service Information S285-10-4* operation instructions for the Visible-Break accessory for VFI Switchgear.

- NEW with Visible Break (Open/Close or Open/Close/Ground)
- Lower System Operating Costs and Improved System Reliability
- Distribution Automation Accessories
- Proven by Years of Continuous Field Experience
- The Quality System at Kyle Distribution Switchgear is ISO 9001 Certified

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Cooper Industries, Inc. FR3™ is a trademark of Cooper Industries, Inc.

The logo for Cooper Power Systems features the word "COOPER" in a bold, black, sans-serif font. To its right is a red graphic element consisting of two slanted parallel lines, followed by the words "Power Systems" in a smaller, black, sans-serif font.

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