

VACpac<sup>®</sup>  
Vacuum Switchgear  
The Building Blocks of Protection.



# VACpac® VACUUM SWITCHGEAR

Here's a switch. A real switching solution, in fact, for a wide array of system applications - VACpac from Cooper Power Systems. VACpac's solid construction, vacuum interruption and gas insulation provide a compact and lightweight solution to protection.



15, 25, 35kV

Flexible

Installs Anywhere In Any Position

Submersible

Welded Construction

Vacuum Interruption

Multiple Applications



VACpac® provides switching solutions for a wide variety of system applications up to 35kV. Welded construction, combined with vacuum interruption and gas insulation, makes VACpac a versatile, compact and lightweight alternative to underground systems sectionalizing and protection.

Cooper Power Systems VACpac switchgear may be used to switch or sectionalize load, loop underground systems, perform source transfers, provide tap overcurrent protection, provide protection for transformer networks, and for co-generation applications, among others.

#### **Application Flexibility**

VACpac units have found great acceptance by utility, industrial and commercial users. Installations include underground vaults, submersible installations, high-rise building installations, URD, mining operations, campus installations and computer-controlled switching.

#### **VACpac Benefits**

**COMPACT** – With vacuum-sealed switching and an SF<sub>6</sub> self-contained insulation medium (the largest unit fits through manhole openings). Its size is approximately one-fifth that of equivalent oil switches.

**LIGHTWEIGHT** – Weighing approximately 100 lbs. per 3-phase way or one-seventh of an equivalent oil switch, it's easy to install.

**FLEXIBLE** – Not position sensitive. It can be mounted on floors, from walls or ceilings with complete operating flexibility.

**QUICK INSTALLATION** – Less than half the time when compared with oil switches.

**MAINTENANCE-FREE** – All switches, the mechanism and the bus work are hermetically sealed within a corrosion-resistant 300 series stainless steel enclosure in an inert SF<sub>6</sub> environment. The vacuum interrupter, housed in a sealed environment, is essentially maintenance-free throughout its lifetime.

**SAFE** – Operation is in a self-contained, fireproof medium, with elbow terminations, and remote switching options.

**SUBMERSIBLE** – VACpac exceeds the rigorous triple-contingency fault-switching requirements for underground operations as posed by ANSI C37.71.

**UPGRADABLE** – Externally mounted operators allow flexibility to upgrade over time.

### Product Design

VACpac units are designed specifically with versatility in mind. Space requirements are minimal as VACpac units may be mounted from walls or ceilings. The compact profile of VACpac also facilitates convenient installation in manholes and vaults through the access ports. Special building requirements for liquid containment would not apply to an SF<sub>6</sub> insulating medium.



The use of SF<sub>6</sub> insulating gas provides additional benefit in the way of safety. Nominal load switching is not affected in the remote possibility of a loss of SF<sub>6</sub> insulating gas pressure.

The hermetically sealed 300 Series stainless steel unit

provides a controlled atmosphere which is corrosion resistant and maintenance free.

VACpac designs include a short operating stroke requiring little force. This permits the use of a wide variety of remote and automatic operators.

Welded universal bushing wells are used to terminate 200A circuit ways, and welded universal stud bushings for 600A ways. These will accept standard 200 and 600A EPDM rubber connectors. All operating equipment is top-mounted on the VACpac tank. Appropriate nameplate and schematic diagrams are secured to the tank top.

### Vacuum Technology

The axial-magnetic field vacuum interrupter, designed and manufactured by Kyle Distribution Switchgear, is the most advanced vacuum interrupter in the world. You can rely on Kyle vacuum interrupters to provide

dependable operation for the life of the switchgear. VACpac products incorporate vacuum interrupter technology for switching and fault interruption. Specifically, Cooper Power Systems' patented vacuum interrupter design is used on the protected taps of VACpac switchgear.

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.



### Controls and VACop Operators

Operator control functions include automatic transfer, automatic fault interruption, a combination automatic transfer and fault isolation, and remote control switching. Switching can be accomplished manually, automatically or remotely from the VACpac switch. Available controls include electrically controlled or mechanically controlled remote switching. These control systems are housed in separate switch panels and connected to the operators by means of appropriate cable controls (submersible control housings are available). Switching intelligence for automatic switching comes from standard relay packages and/or Sigma Fault Detector and/or Elbow Potential Voltage Sensing Signals.

There are four basic operators which can be coupled to any operating shaft on a VACpac switch. These operators may be used singly or in combination, depending on the switching requirements. Consult the Operator Application Guide for assistance. The operators are identified as follows:



**VACop I** - A 240V, ac, linear electric motor operator.

**VACop VI** - A 48V, dc, battery-powered solenoid operator.

*(NOTE: Battery-powered operations require ac control power for battery charger circuit.)*



**VACop III** - A single-shot, "open," stored energy spring operator with manual reset.



**VACop IV** - A manual remote cable operator.

## Ratings for VACpac Switchgear

Nominal Voltage	15kV	25kV	35kV
Maximum Design Voltage, kV.....	15.5	27	38
BIL, kV.....	95	125	150
Continuous Current, Amps (max.).....	200/600	200/600	200/600
Load Switching, Amp.....	200/600	200/600	200/600
Interrupting Rating (kA).....	2/12	2/12	0.6/10
Momentary Current, 10 Cycles (asym.), kA.....	20	20	20
Make and Latch (asym.), kA.....	20	20	20
Make and Latch (asym.), kA*.....	64	64	64


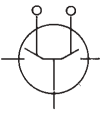
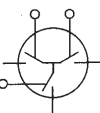
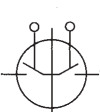
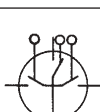
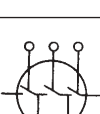
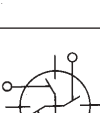
\* With Kearney C.L. fuses

## The “Building Blocks” of VACpac (Application Examples)

Application	Components	One-Line Diagram
Source Transfer Package with One Overcurrent Protected Load	<ul style="list-style-type: none"> <li>3-way VACpac 33VP-95-666-12T</li> <li>One VACop I Operator on Each Source for Open/Close</li> <li>One VACop III Operator on the Protected Tap for Tripping</li> <li>Three PTs per Source (V Sensing)</li> <li>Three CTs on the Tap (I Sensing)</li> <li>Source Transfer Control</li> <li>Cooper Overcurrent Protection Relay IM30</li> </ul>	
Source Transfer with Tie Switch	<ul style="list-style-type: none"> <li>4-way VACpac 44TVP-95-6666-2</li> <li>One VACop I Operator on Each Source and on Tie Switch for Open/Close</li> <li>Source Transfer Control with Fault Block Sensor to Prevent Transfer if Overcurrent is Present on Tap</li> <li>PTs on Sources (V Sensing)</li> <li>Fault Circuit Indicators on Taps (I Sensing)</li> </ul>	
3-Way VACpac with One Overcurrent Protected Load	<ul style="list-style-type: none"> <li>3-way VACpac 33VP-95-626-12T</li> <li>One VACop III on Protected Tap for Tripping</li> <li>Bushing Current Transformers on TAP</li> <li>Cooper Overcurrent Protection Relay IM30</li> </ul> <p>NOTE: Source switches are manually operated. This scheme can also be used in a loop configuration.</p>	

NOTE: This table shows a sample of VACpac packages currently being used by customers. Please contact your Cooper Power Systems representative for information on other applications.

## Basic Models – Three-Phase

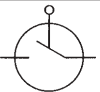
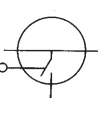
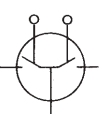
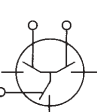
Single Line Diagram	15kV-95kV BIL Catalog Number	25kV-125kV BIL Catalog Number	35kV-150kV BIL Catalog Number
	<b>2-Way</b>	<b>2-Way</b>	<b>2-Way</b>
	21VP95-22 21VP95-66	21VP125-22 21VP125-66	21VP150-22 21VP150-66
	<b>3-Way w/Solid Tap</b>	<b>3-Way w/Solid Tap</b>	<b>3-Way w/Solid Tap</b>
	32VP95-222 32VP95-262 32VP95-626 32VP95-666	32VP125-222 32VP125-262 32VP125-626 32VP125-666	32VP150-222 32VP150-666
	<b>3-Way All Switched</b>	<b>3-Way All Switched</b>	<b>3-Way All Switched</b>
	33VP95-222 33VP95-262 33VP95-626 33VP95-666	33VP125-222 33VP125-262 33VP125-626 33VP125-666	33VP150-222 33VP150-666
	<b>4-Way 2 Solid Taps</b>	<b>4-Way 2 Solid Taps</b>	<b>4-Way 2 Solid Taps</b>
	42VP95-2222 42VP95-6226 42VP95-6662 42VP95-6666	42VP125-2222 42VP125-6226 42VP125-6662 42VP125-6666	Consult Factory
	<b>4-Way 3 Switches</b>	<b>4-Way 3 Switches</b>	<b>4-Way 3-Switches</b>
	43VP95-2222 43VP95-6226 43VP95-6662 43VP95-6666	43VP125-2222 43VP125-6226 43VP125-6662 43VP125-6666	Consult Factory
	<b>4-Way w/Tie Switch</b>	<b>4-Way w/Tie Switch</b>	<b>4-Way w/Tie Switch</b>
	4TVP95-2222 4TVP95-6226 4TVP95-6662 4TVP95-6666	4TVP125-2222 4TVP125-6226 4TVP125-6662 4TVP125-6666	Consult Factory
	<b>4-Way All Switched</b>	<b>4-Way All Switched</b>	<b>4-Way All Switched</b>
	44VP95-2222 44VP95-6226 44VP95-6662 44VP95-6666	44VP125-2222 44VP125-6226 44VP125-6662 44VP125-6666	Consult Factory

Notes: Catalog numbers interpretation, example: 42VP95-6666, read as 4 - Four-phase circuit ways, 2 - Two-ways switched, VACpac, 95 BIL, 6666 - 600 A terminations each way.

For automatic fault interrupting applications: A special 12 kA symmetrical vacuum interrupter is required and available at 15, 27, 10 kA @ 38 kV (actually 34.5); this is needed only when using VACop III, and VI controllers for automatic fault interruption. Specify if applicable.

Please contact your Cooper Power Systems representative for information on other configurations.

## Basic Models – Single-Phase

Single Line Diagram	15kV-95kV BIL Catalog Number	25kV-125kV BIL Catalog Number	35kV-150kV BIL Catalog Number
	<b>2-Way</b>	<b>2-Way</b>	<b>2-Way</b>
	121VP95-22 121VP95-66	121VP125-22 121VP125-66	121VP150-22 121VP150-66
	<b>3-Way 1 Switched Tap</b>	<b>3-Way 1 Switched Tap</b>	<b>3-Way 1 Switched Tap</b>
	131VP95-222 131VP95-262 131VP95-626 131VP95-666	131VP125-222 131VP125-262 131VP125-626 131VP125-666	131VP150-222 131VP150-262 131VP150-626 131VP150-666
	<b>3-Way w/Solid Tap</b>	<b>3-Way w/Solid Tap</b>	<b>3-Way w/Solid Tap</b>
	132VP95-222 132VP95-262 132VP95-626 132VP95-666	132VP125-222 132VP125-262 132VP125-626 132VP125-666	132VP150-222 132VP150-262 132VP150-626 132VP150-666
	<b>3-Way All Switched</b>	<b>3-Way All Switched</b>	<b>3-Way All Switched</b>
	133VP95-222 133VP95-262 133VP95-626 133VP95-666	133VP125-222 133VP125-262 133VP125-626 133VP125-666	133VP150-222 133VP150-262 133VP150-626 133VP150-666

Notes: Catalog numbers interpretation, example: 121VP125-22, read as 1 - single-phase switch, VACpac, 125 BIL, 22 - 200 A terminations.

For automatic fault interrupting applications: A special 12 kA symmetrical vacuum interrupter is required and available at 15, 27, 10 kA @ 38 kV (actually 34.5); this is needed only when using VACop III, and VI controllers for automatic fault interruption. Specify if applicable.

Please contact your Cooper Power Systems representative for information on other configurations.

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The logo for Cooper Power Systems features the word "COOPER" in a bold, black, sans-serif font. Above the letter "P" in "COOPER" is a red parallelogram. To the right of "COOPER" is the text "Power Systems" in a smaller, black, sans-serif font.

**COOPER** Power Systems

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