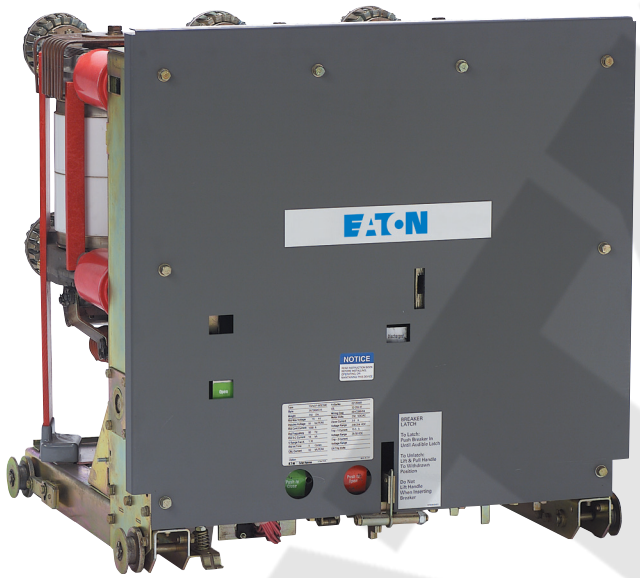
K=1.0 medium voltage vacuum circuit breakers



Eaton Corporation has dedicated years of research, design and testing to complete a family of medium voltage circuit breakers that meets and exceeds the rigorous requirements of ANSI, IEC and GB standards.

Eaton is introducing a new line of Type VCP-W medium voltage vacuum circuit breakers with K=1.0 rating tested to the latest capacitor switching standards.

Application description

The new line of Type VCP-W medium voltage vacuum circuit breakers with K=1.0 rating provides the same benefits as the standard VCP-W breakers in terms of user-friendly operation, inspection and maintenance. Additionally, the same general VCP-W product features, accessories and footprint characteristics are maintained.

Benefits

- Fixed or drawout configurations
- UL® listed ratings up to 15 kV, 3000A and 63 kA. VCP-WSE special environment circuit breakers available up to 15 kV, 3000A and 50 kA
- Optimized Eaton vacuum interrupters with K=1.0 performance with the latest vacuum technology
- Capacitor switching ratings confirmed by testing to the latest standards with C2 performance for single and back-to-back bank configurations
- Standard five-cycle (80 m-sec) or optional three-cycle (50 m-sec) clearing performance
- Standard rail or roll-on-the-floor configurations
- VCP-WC extra capability circuit breakers and VCP-WG generator circuit breakers available for special applications
- VCP-W MVA rated circuit breakers continue to be available to support customer needs

As part of the VCP-W product family, VCP-W K=1.0 breakers serve all segments of the electrical industry such as utility, commercial, industrial, mining and marine.

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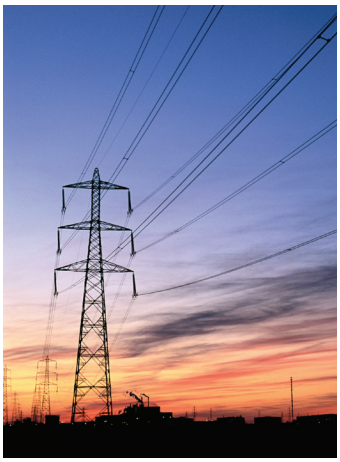

Background

MVA breaker ratings first originated many years ago to describe the preferred ratings of air-magnetic circuit breakers, which had published short-circuit current interruption ratings based on their rated maximum voltage. However, these breakers could achieve higher interruption ratings at lower operating voltages until the maximum interruption rating was exceeded. The ratio of these two interruption ratings is called Rated Voltage Range indicator (K).

The Rated Voltage Range indicator, K, is greater than 1 for MVA rated breakers. For example, a 15 kV 500 MVA rated breaker with a K=1.30 rating has a published interruption rating of 18 kA at 15 kV, but has a maximum interruption rating of 23 kA (18 kA x 1.30) at 11.5 kV (15 kV divided by 1.30).

MVA ratings do not accurately reflect the true capabilities of vacuum circuit breakers because the drop in operating voltage has little effect on interrupting capability.

Ultimately, as vacuum circuit breakers became more and more prevalent in the industry, the IEEE® C37.06-2000 standard was published to recognize both MVA and K=1.0 rated breakers.

Conversion Table—VCP-W with K=1 Ratings with Existing VCP-W MVA Breakers at 5–15 kV

Application ❶			Eaton Circuit Breakers Available		
Rated Voltage kV rms	**Rated Short-Circuit Current kA rms**	**Rated Short-Time Current kA rms**	**K>1**	**K=1**	**Continuous Current at 60 Hz**
4.76	8.8	12.0	50 VCP-W 250	50 VCP-W 25	1200A, 2000A, 3000A
	25.0	25.0	50 VCP-W 250	50 VCP-W 25	
	29.0	36.0	50 VCP-W 250	50 VCP-W 40	
	31.5	31.5	50 VCP-W 350	50 VCP-W 40	
	40.0	40.0	50 VCP-W 350	50 VCP-W 40	
	41.0	49.0	50 VCP-W 350	50 VCP-W 50	
	50.0	50.0	—	50 VCP-W 50	
	63.0	63.0	—	50 VCP-W 63	
8.25	33.0	41.0	75 VCP-W 500	75 VCP-W 40 ❷	1200A, 2000A, 3000A
	40.0	40.0	—	75 VCP-W 40	
	50.0	50.0	—	75 VCP-W 50 ❸	
15.00	18.0	23.0	150 VCP-W 500	150 VCP-W 25	1200A, 2000A, 3000A
	20.0	20.0	150 VCP-W 750	150 VCP-W 25	
	25.0	25.0	150 VCP-W 750	150 VCP-W 25	
	28.0	36.0	150 VCP-W 750	150 VCP-W 40	
	31.5	31.5	150 VCP-W 1000	150 VCP-W 40	
	37.0	48.0	150 VCP-W 1000	150 VCP-W 50	
	40.0	40.0	150 VCP-W 1500	150 VCP-W 40	
	50.0	50.0	150 VCP-W 1500	150 VCP-W 50	
	63.0	63.0	150 VCP-W 1500	150 VCP-W 63	

❶ The above guidelines are for general inquiries where only preferred standard ratings are required. This table is not intended to fully encompass all the specific requirements of customer applications. Due to the technical complexity of many applications, this chart should only be used for purchasing guidelines for ANSI standard ratings only. Please contact your local Eaton sales representative for more information and to review your specific application and required product configuration.

❷ The 75 VCP-W40 has been tested and proven for 41 kA interrupting current at 6.6 kV, 111 kA pk and 41 kA short-time current.

❸ Not a preferred rating in ANSI standards.

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