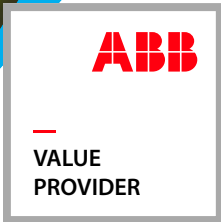




PowerClad 5 kV Metal-Clad Medium Voltage Switchgear

Spike Electric offers a range of medium voltage solutions within the 5 kV category, designed to accommodate both indoor and outdoor settings, including non-walk-in and fully enclosed outdoor types. Our 5 kV switchgear, mechanically ready and rated for ~~40kA~~ **25 kA thru 63 kA**, comes with the option for CSA certification when necessary. Additionally, it undergoes rigorous testing in accordance with ASCE7-10 standards to ensure it surpasses the expectations set by IBC & CBC regulations.



Valued Partner Acknowledgment Statement: Spike Electric Controls has partnered with ABB as a Value Add Partner, blending ABB's cutting-edge technology with our expertise in electrical solutions to elevate industry standards. This partnership aims to globally enhance system efficiency, reliability, and sustainability, delivering sophisticated electrification solutions to our customers. Additionally, this alliance includes dual branding of our Switchgear products and extends ABB's warranties through Spike's comprehensive Switchgear solutions, ensuring quality and reliability.



- Superior cycloaliphatic epoxy insulation—a void-free insulating material with outstanding electrical and mechanical characteristics, such as track resistance, dielectric strength, and fungus resistance, even in harsh industrial environment—is used throughout the circuit breaker as primary phase-to-phase and phase-to-ground insulation.
- Axial-magnetic, copper-chrome contacts are used in 5 kV vacuum interrupters to provide superior dielectric strength, better performance characteristics, and lower chop current.
- High power laboratory tests prove ADVAC breakers are capable of 50 to 200 full fault current interruptions
- Easy inspection and accessibility is afforded by front mounted stored energy operating mechanism. The same basic mechanism is used on all ratings, which requires a minimum investment in spare parts.
- All 5 kV circuit breakers are horizontal drawout design, which provide connect, test and disconnect position. A latch secures the breaker in the connected and disconnected/test position. The circuit breaker is designed to roll directly on the floor.
- Circuit breaker compartment is designed to interface with type ADVAC 5 kV circuit breaker. It includes floor-mounted breaker pan assembly (levering assembly) with all safety interlocks required by the metal-clad design. Cell mounted guide rails accurately guide the breaker into the cell during levering, and ensure correct alignment of the circuit breaker primary disconnects with the cell primary contacts when breaker reaches connected position.
- Coding plates are provided to ensure only correct breaker rating can be installed in the cell.
- Automatic steel shutters cover cell primary contacts when circuit breaker is withdrawn from its connected position, to prevent persons from accidentally touching the stationary primary cell contacts. Each shutter can be padlocked in the closed or open position. It can also be manually latched open as required for maintenance.
- A separate control compartment is provided for installation of protection, metering and control devices. No devices are located on circuit breaker compartment door.
- Rear of the switchgear is divided in main bus and cable compartments, isolated from each other by grounded metal barriers. Sufficient space is available for customer's top or bottom entry power cables. Bus duct terminations can also be supplied. A bare copper ground bus is provided along the entire lineup, with an extension in each cable compartment for termination of power cable shields.

General Description:

5 kV Metal-Clad Switchgear:

Spike Electric Controls PowerClad switchgear family is designed for use in applications with distribution voltages up to 5 kV maximum. Typical applications include not only new construction but also replacement for older air-break, minimum oil or SF6 switchgear. The circuit breaker and switchgear will meet industry requirements for greater safety, quality, superior reliability and minimal maintenance while providing higher insulation levels in less space than other breaker types, thus reducing overall switchgear size for significant space savings.

Ratings:

- Maximum rated voltage: 5 kV rms
- BIL withstand: ~~150 kV peak~~ **60**
- Maximum symmetrical interrupting with K = 1: 16 kA, 25 kA, 31.5 kA, 40 kA rms, and 35 kA rms (21 kA rating with K = 1.65)
- Continuous current: **1200**
Circuit breakers - up to **2500 A**
Switchgear main bus - up to 3000 A

Features:

5 kV Vacuum Circuit Breaker:

- Corona-free design increases circuit breaker reliability and in-service life by maintaining insulation integrity.

5 kV Switchgear Assembly:

- The 5 kV switchgear assembly is a corona-free, metal-clad design. It integrates many features and advantages from the ~~5, 15, and 27 kV~~ **38** PowerClad designs, with additional modifications necessary for 5 kV applications.
- Industry-leading cycloaliphatic epoxy supports are used for primary phase-to-phase and phase-to-ground insulation throughout, providing ~~150 kV BIL~~ **60** and 80 kV (1 minute) power frequency withstand capability.
- All primary bus conductors are insulated for full 5 kV by fluidized epoxy coating. All buses are fabricated from 100% conductivity copper. Bus joints are silver- or tin-plated as required, and covered with Spike Electric Control's pre-formed insulating boots to maintain metal-clad integrity.





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Optional Accessories and Features:

- UL / cUL listing
- Copper tin-plated bus
- Insulated bus and bus boots over joints
- 80kA momentary bus rating
- Automatic transfer switch
- Weather resistant
- Dust resistant
- NEMA 2 drip-proof enclosure
- Rear doors (full height or double)
- Vertical barriers
- Rodent barriers
- Bottom closure plates
- Seismic Zone 4 bracing
- Tamper resistant hardware
- Auxiliary switches (2NO-2NC)
- Thermostat
- Space heater (standard on outdoor, optional on indoor)
- Porcelain insulators
- Customer metering
- Surge arresters
- Mimic bus
- Space heater switch
- Ground studs
- Convenience light
- Duplex receptacle
- Top hat
- Run back bus
- And more!

Features Cont:

- Ampacity: 1200A, 2000A, 3000A
- Basic Insulation Level (BIL): 150kV (Breaker 170kV BIL)
- Advanced ABB vacuum circuit breaker technology.
- Indoor/outdoor compatibility.
- Metal-clad Switchgear, compartmentalized structure.
- Rear connection access.
- Main-tie-main automatic transfer configurations available.
- Breaker & draw out PT integration in feeder sections.
- ~~5 kV voltage, 1200A - 3000 Ampacity.~~
- BIL: 150kV (Breaker 170kV BIL).
- Breaker interrupter up to 40kAIC.

ANSI/IEEE C37.04

Rating Structure for High Voltage Circuit Breakers

ANSI/IEEE C37.54

Indoor HV Breakers in Metal Enclosure Conformance Test

ANSI/IEEE C37.55

Medium Voltage Metal-Clad Assemblies

ANSI/IEEE C37.09

Test Procedure for AC HV Breakers on Sym Current basis

ASCE7-10 Standards

Compliance for structural design.

IBC & CBC

Compliance with building codes.

Buy American Act

Certification available upon request.

CSA Certified

COMPLIANCES:

ANSI/IEEE C37.20.2

Metal-Clad Switchgear



iStock
Credit: Alexey Tolmachov



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- 75% lower power consumption accessories for reduced battery bank systems.
- Global 24hour Service and support.
- Breaker + cassette solutions available for a faster engineering design.

Maximize Your Output:

- 50% less maintenance time with modular accessory replacement.
- Smart Coil accessories provide fast, low energy response with intelligent coil monitoring.
- ABB EL spring mechanism used on over 2 million breakers installed globally, modular design that is readily accessible and easily maintained to reduce downtime.
- Voltage transformers are equipped with integral top-mounted primary fuses and installed in an auxiliary compartment. Two auxiliary compartments can be provided in one vertical section. Each auxiliary compartment can be supplied with 1, 2 or 3 VTs, and can be connected to bus or line, as required for a given application. The VTs assembly is located behind a fixed bolted panel, and provided with mechanism for

moving it between connected and disconnected position. The VT assembly is interlocked with the fixed bolted panel such that the panel cannot be removed unless the VTs are withdrawn to disconnected position. A shutter assembly covers the primary stabs when VTs are withdrawn to disconnected position. A mechanism is also provided to automatically discharge VT primary fuses as the VTs are withdrawn from connected to disconnected position.

- Ring type current transformers are installed over bus or line side primary insulating bushings, located behind the steel shutters, in the breaker compartment. In this design, the CTs are easily accessible from the front, after removal of the circuit breaker. The front accessibility permits adding or changing the CTs when the equipment is de-energized, but without removal of high-voltage joints or primary insulation. The design allows install a- tions of two sets of standard or one set of high accuracy CTs on each side of the circuit breaker.

About:

The ADVAC Medium Voltage Mechanical Vacuum Circuit Breaker series is a complete line of IEEE-rated vacuum circuit breakers with a spring-charged mechanism and three position electric racking, offering customers the advantages of the latest technology with a modular design that is easily maintainable.

Help Keep Personnel Safe:

- Safety and protection of personnel and equipment with enclosed mechanism housing and embedded pole technology.
- Roll-on-floor (ROF) caster design offers ease of use.
- Three position remote motorized racking options available.

Protect Your Assets:

- Built-in truck interlocks for a compact and robust solution.
- Maintenance-free embedded pole design helps protect vacuum interrupters from contamination, moisture, damage, and improving tracking resistance.

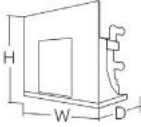
Optimizing Investments:

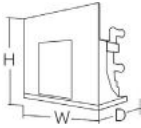
- Lowest power consumption accessories for reduced battery bank systems.
- The integrated racking mechanism (truck) is designed to 180 ftlbs of torque for increased reliability and reduced maintenance costs.
- Highest quality and short lead times through automated production process.



iStock
Credit: Yelantsev

Technical characteristic

Circuit breaker	AMVAC 05			AMVAC 08				
Rated insulation voltage	[kV]	4.76			8.25			
Impulse withstand voltage	[kV]	60			95			
Rated frequency	[Hz]	60			60			
Execution		Fixed / ADVANCE / Safegear			Fixed / ADVANCE / Safegear			
Rated normal current (40 °C)	[A]	1200	2000	3000	1200	2000	3000	
Rated breaking capacity and rated short-time withstand current (3s)	[kA]	25	25	25	40	40	40	
		32	32	32				
		40	40	40				
		50	50	50				
		65	65	65				
Making capacity	[kA]	82	82	82	140	140	140	
		104	104	104				
		130	130	130				
Operation sequence		[O - 0.3 s - CO - 3 min - CO]			[O - 0.3 s - CO - 3 min - CO]			
Interrupting time	[ms]	50-83			50-83			
Closing time	[ms]	35 ... 60			35 ... 60			
Overall dimensions (fixed version)		H	18.68 ...	23.68 ...	23.68 ...	23.17 ...	23.68 ...	23.68 ...
		[inches]	25.1	26.4	27	25.1	26.2	27
		W	27.55 ...	27.55 ...	29.53 ...	27.56 ...	29.53 ...	29.53 ...
		[inches]	31	31	31	31	31	31
		D	15.16 ...	15.16 ...	15.93 ...	15.16 ...	15.93 ...	15.93 ...
[inches]	26	26	26.1	25.9	26	23.1		
Weight	[lb]	410	410	420	410	420	460	

Circuit breaker	AMVAC 15			AMVAC 27			
Rated insulation voltage	[kV]	15			27		
Impulse withstand voltage	[kV]	95			125		
Rated frequency	[Hz]	60			60		
Execution		Fixed / ADVANCE / Safegear / Safegear HD			Fixed / ADVANCE		
Rated normal current (40 °C)	[A]	1200	2000	3000	1200	2000	
Rated breaking capacity and rated short-circuit withstand current (3s)	[kA]	25	25	25	16	16	
		32	32	32	25	25	
		40	40	40	-	-	
		50	50	50	-	-	
		65	65	65	42	42	
Making capacity	[kA]	82	82	82	65	65	
		104	104	104	-	-	
		130	130	130	-	-	
Operation sequence		[O - 0.3 s - CO - 3 min - CO]			[O - 0.3 s - CO - 3 min - CO]		
Interrupting time	[ms]	50	50	50	83	83	
Closing time	[ms]	35 ... 60			35 ... 60		
Overall dimensions (fixed version)		H	18.68 ...	23.68 ...	23.68 ...	24.72 ...	25.47 ...
		[inches]	25.1	26.4	27	26.8	27.4
		W	27.55 ...	27.55 ...	29.53 ...	29.53 ...	29.53 ...
		[inches]	31	31	31	31	31
		D	15.16 ...	15.16 ...	15.93 ...	15.93 ...	15.93 ...
[inches]	26	26	26.1	25.9	26.1		
Weight	[lb]	360 ...	410 ...	430 ...	-	-	
		510	510	510	410	410	

* For more details check the overall dimension



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5 kV Metal-Clad
Medium Voltage Switchgear



⁶⁰
~~5 kV, 150 kV BIL Design—Available Enclosures (42-inch, 48-inch and 60-inch Wide Structures are Available)~~



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5 kV Metal-Clad
Medium Voltage Switchgear



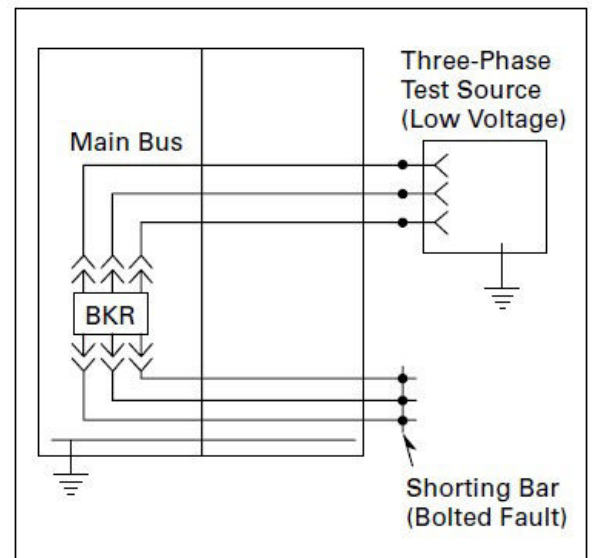
Standard Metal-Clad Switchgear Assembly Ratings

PowerClad-W metal-clad switchgear is available for application at voltages up to 5 kV, 50 or 60 Hz. Refer to the table below for complete list of available ratings.

Table 5.6-1. Standard VCP-W (Non-Arc-Resistant) metal-clad Switchgear Ratings Per IEEE C37.20.2-2015 ab

Rated Maximum Voltage	(Ref.) Rated Voltage Range Factor K	(Ref.) Rated Short-Circuit Current I	Insulation Level		Rated Main Bus Continuous Current ③④ Amperes	Rated Short-Time Short-Circuit Current Withstand (2-Second) K*I ⑤	Rated Momentary Short-Circuit Current Withstand (10-Cycle) (167 ms)	
			Power Frequency Withstand Voltage, 60 Hz, 1 Minute kV rms	Lightning Impulse Withstand Voltage [LIWV] (BIL) kV Peak			2.7 *K*I ⑥	1.6 *K*I ⑦ (Ref. only)
kV rms		kA rms	kV rms	kV Peak		kA rms Sym.	kA Crest	kA rms Asym.
4.76	1	25	19	60	1200, 2000, 3000, 4000	25	68	40
	1.24	29			1200, 2000, 3000, 4000	36	97	58
	1	40			1200, 2000, 3000, 4000	40	108	64
	1.19	41			1200, 2000, 3000, 4000	49	132	78
	1	50			1200, 2000, 3000, 4000	50	135	80
	1	63			1200, 2000, 3000, 4000	63	170	101
8.25	1.25	33	36	95	1200, 2000, 3000, 4000	41	111	66
	1	50			1200, 2000, 3000, 4000	50	135	80
15	1.3	18	36	95	1200, 2000, 3000, 4000	23	62	37
	1	25			1200, 2000, 3000, 4000	25	68	40
	1.3	28			1200, 2000, 3000, 4000	36	97	58
	1	40			1200, 2000, 3000, 4000	40	108	64
	1.3	37			1200, 2000, 3000, 4000	48	130	77
	1	50			1200, 2000, 3000, 4000	50	135	80
	1	63			1200, 2000, 3000, 4000	63	170	101
27	1	16	60	125	1200, 2000, 2500, 2700	16	43	26
	1	22			1200, 2000, 2500, 2700	22	60	35
	1	25			1200, 2000, 2500, 2700	25	68	40
	1	31.5			1200, 2000, 2500, 2700	31.5	85	51
	1	40			1200, 2000, 2500, 2700	40	108	64
	1	50			1200, 2000, 2500, 2700	50	135	80
38	1	16	80	150 ⑧	1200, 2000, 2500, 3000	16	43	26
	1	25			1200, 2000, 2500, 3000	25	68	40
	1	31.5			1200, 2000, 2500, 3000	31.5	85	51
	1.65	23			1200, 2000, 2500, 3000	35	95	56
	1	40			1200, 2000, 2500, 3000	40	108	64

- The switchgear assembly is designed for use with type VCP-W, VCP-WC and VCP-WG circuit breakers. However, please note that certain VCP-WC circuit breakers may have higher capabilities than required by ANSI standards. In such cases, switchgear assembly ratings as given in this table will apply.
- Switchgear assemblies can be supplied with UL/CSA label. Contact Spike Electric Controls for availability.
- Circuit breaker requires forced air cooling to carry 4000 A at 4.76, 8.25 and 15 kV, and 3000 A at 5 kV.
- 27 kV 2500 A and 2700 A main bus ratings are available in two-high design configurations only.
- Please note that use of certain current transformers (for example, bar type CTs) and protective devices may limit the duration to a value less than 2 seconds.
- These values exceed 2.6*K*I required by IEEE C37.20.2-2015.
- These values exceed 1.55*K*I required by IEEE C37.20.2-2015.
- This is a standard IEEE C37.20.2 rating for 5 kV Class of switchgear.



Metal-clad Switchgear Short-Circuit and Momentary Withstand Tests



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Unusual & Usual Service Conditions:

Unusual Service Conditions:

Applications of metal-clad switchgear at other than usual altitude or temperature, or where solar radiation is significant, require special consideration. Other unusual service conditions that may affect design and application include:

- Exposure to salt air, hot or humid climate, excessive dust, dripping water, falling dirt, or other similar conditions.
- Unusual transportation or storage conditions.
- Switchgear assemblies when used as the service disconnecting means when used as a means of service disconnection.
- Installations accessible to the general public.
- Exposure to seismic shock.
- Exposure to nuclear radiation.

Usual Service Conditions:

Usual service conditions for operation of metal-clad switchgear are as follows:

- Altitude does not exceed 3300 feet(1000 m).
- Ambient temperature within the limits of -30 °C and +40 °C (-22 °F and +104 °F).
- The effect of solar radiation is not significant.

Applications:

Above 3300 Ft (1006m):

Equipment utilizing sealed interrupting devices (such as vacuum interrupters) does not require derating of rated maximum voltage. The rated one-minute power frequency withstand voltage, the impulse withstand voltage and the continuous current rating must be multiplied by the appropriate correction factor in Table 5.6-4 to obtain modified ratings that must equal or exceed the application requirements.

Table 5.6-2. Derating Factors

Interrupting Current Derating Factors			
50 Hz	25 Hz	16 Hz	12 Hz
None	0.65	0.52	0.45

Note: Intermediate values may be obtained by interpolation.

Above or Below 40 °C Ambient:

Refer to ANSI C37.20.2, Section 8.4 for load current-carrying capabilities under various conditions of ambient temperature and load.

At Frequencies Less Than 60 Hz:

Rated Short-Circuit Current Based on series of actual tests performed on Type VCP-W circuit breakers and analysis of these test data and physics of vacuum interrupters, it has been found that the current interruption limit for Type VCP-W circuit breakers is proportional to the square root of the frequency. Table 5.6-2 provides derating factors, which must be applied to breaker interrupting current at various frequencies.

Rated

Short-Time & Close & Latch Currents:

No derating is required for short time and close and latch current at lower frequency.

Continuous Current:

Because the effective resistance of circuit conductors is less at lower frequency, continuous current through the circuit can be increased somewhat. Table 5.6-3 provides nominal current rating for VCP-W breakers when operated at frequencies below 60 Hz.

Table 5.6-3. Current Ratings

Rated Continuous Current at 60 Hz	Nominal Current at Frequency Below 60 Hz			
	50 Hz	25 Hz	16 Hz	12 Hz
1200 A	1243	1410	1519	1589
2000 A	2075	2374	2573	2703
3000 A	3119	3597	3923	4139



Green Energy Efficient: The PowerClad 5 kV Metal-Clad MV Switchgear is designed with energy efficiency at its core, incorporating several features that minimize power usage and enhance sustainability. It employs advanced ABB vacuum circuit breaker technology, renowned for its low power consumption, which significantly reduces the overall energy requirements of the system. Additionally, the switchgear is equipped with accessories that are specifically designed for the lowest possible power consumption, drastically cutting down on the energy used by battery bank systems. Its integrated racking mechanism, which uses only 180 ft-lbs of torque, optimizes mechanical efficiency and lowers the energy needed for operation. Furthermore, the switchgear's 75% reduction in power consumption through its innovative accessories underscores its commitment to energy efficiency, promoting a reduced environmental footprint while maintaining high performance in electrical distribution.



BUY AMERICAN



BUY AMERICAN ACT CERTIFICATE

ATTENTION: Engineers, Channel Partners, Building Officials, and Inspectors

SUBJECT: U.S.A Manufacturing

Spike Electric Controls is committed to American craftsmanship. Every product we offer is manufactured within the United States using raw materials sourced from trusted U.S. steel & copper mills. This commitment not only ensures superior quality but also aligns with the principles of the Buy American Act.

We understand the importance of transparency and are always open to discussing our manufacturing process or the origins of our materials. For any questions or additional information, please feel free to contact me.

Thank you,

Cole Attaway, CEO

Mobile: 832.720.4598

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PowerClad

5 kV Metal-Clad
Medium Voltage Switchgear



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Valued Partner Acknowledgment Statement: Spike Electric Controls has partnered with ABB as a Value Add Partner, blending ABB's cutting-edge technology with our expertise in electrical solutions to elevate industry standards. This partnership aims to globally enhance system efficiency, reliability, and sustainability, delivering sophisticated electrification solutions to our customers. Additionally, this alliance includes dual branding of our Switchgear products and extends ABB's warranties through Spike's comprehensive Switchgear solutions, ensuring quality and reliability.