



# Medium-voltage, vacuum, generator circuit breaker switchgear

Type HB3 – horizontal bus, phase-segregated

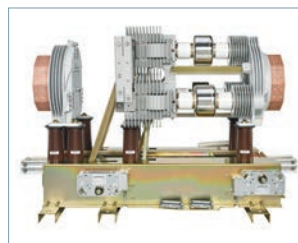
## Siemens HB3 vacuum, generator circuit breaker switchgear offering for 100 MW to 400 MW machines

Siemens offers a fully customizable stationary type vacuum, generator circuit breaker switchgear tested to IEEE C37.013. Each design is engineered to meet the specific electrical and mechanical application requirements of the project.

### Features and benefits:

- All medium-voltage switching components, including the vacuum generator circuit breaker, are mounted on a removable, fully-integrated, compact switching module for each pole
- Continuous current ratings of 6,300 A, 8,000 A, 10,000 A and 12,500 self-cooled
- Interrupting ratings of 80 kA and 100 kA
- Maximum design voltage up to 24 kV
- Tested to IEEE C37.013 standard for generator circuit breakers
- Up to 30 interruptions at rated short-circuit current
- No SF<sub>6</sub> gas for insulation or interruption
- Pair with Siemens protective relays to provide complete generator protection switchgear
- Uses the latest developments in vacuum interrupter axial-magnetic-field (AMF) technology
- Highly reliable vacuum interrupters - MTTF over 53,550 years
- Highly reliable spring-drive operating mechanism due to use of common type 3AH3 operator platform
- Over 120,000 type 3AH3 operators produced since 1998 and over 25,000 operators produced per year
- 10,000 continuous current switching operations
- Complete switchgear shipped as one final-assembled unit
- Significantly lower life-cycle costs due to:
  - Reduced inspection and maintenance costs
  - Maintenance-free, stored-energy (spring) operator
- Optional start-up disconnecter for connection to SFC
- Connections to generator and step-up transformer using isolated-phase bus (not furnished)
- Current and voltage transformers available to suit specifications
- Surge arresters and surge capacitors optionally available.

One pole of type HB3 vacuum generator circuit breaker



HB3 vacuum generator circuit breaker switchgear



Technical data				
Rated values and related capabilities	IEEE C37.013 clause	Units	Circuit breaker type	
			17.5	24.0
Rated maximum voltage (V)	5.1	kV	HB3 - 17.5	HB3 - 24.0
Power frequency	5.2	Hz	50/60	50/60
Rated continuous current (self-cooled)	5.3	A	6,300, 8,000, 10,000, 12,500	6,300, 8,000, 10,000, 12,500
Rated dielectric strength (withstand voltage) 1. Power frequency (dry) 2. Full-wave impulse (1.2 x 50)	5.4.2 C37.013a, Table 4	kV kV peak	50, 60 110, 125	60, 70 125, 145
Rated short-circuit duty cycle	5.5		CO-30 min-CO	CO-30 min-CO
Rated short-circuit current 1. System source (100%) (I) ■ dc component ■ Asymmetrical (total) 2. Generator source ■ dc component ■ Asymmetrical (total)	5.8.1  5.8.2.3	kA sym % kA rms kA sym % kA rms	80, 100 70, 75 112, 146 40, 63 130 84, 132	80, 100 65, 75 112, 146 40, 63 130 84, 132
Close and latch capability (274% I)		kA peak	219, 274	219, 274
Short-time current carrying capability (100% I)	5.8.2.7	kA sym	80, 100	80, 100
Short-time current duration	5.8.2.7	s	3	3
Transient recovery voltage (TRV) rating System source 1. E <sub>2</sub> peak voltage 2. RRRV (TRV rate) 3. T <sub>2</sub> time-to-peak  Generator source 1. E <sub>2</sub> crest voltage 2. RRRV (TRV rate) 3. T <sub>2</sub> time-to-peak  Out-of-phase 1. E <sub>2</sub> crest voltage 2. RRRV (TRV rate) 3. T <sub>2</sub> time-to-peak	5.9 C37.013a, Table 5  C37.013a, Table 6  C37.013a, Table 9	kV kV / μs μs  kV kV / μs μs  kV kV / μs μs	32.2 4.5 8.4  32.2 1.8 21  45.5 4.1 13	44.2 4.5 11.5  44.2 1.8 28.8  62.4 4.1 17.9
Rated load-current switching capability	5.10	A	6,300, 8,000, 10,000, 12,500	6,300, 8,000, 10,000, 12,500
Out-of-phase current switching capability	5.12	kA	40, 50	40, 50
Mechanical endurance		operations	10,000	10,000
Continuous current switching endurance		operations	10,000	10,000

Weight in lbs	6,300 A	15,212 (6,900)	10,000 A	16,535 (7,500)
		8,000 A	15,873 (7,200)	12,500 A

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