

# Medium-voltage, vacuum generator circuit breakers

## Stationary type

### Siemens vacuum generator circuit breakers offering for 10 MW to 80 MW machines

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

#### Features and benefits

- Continuous ratings of 3,000 A, 4,000 A, 5,000 A and 6,000 A
- Interrupting ratings of 50 kA, 63 kA and 72 kA
- Maximum design voltage up to 24 kV
- Tested to IEEE C37.013 and C37.013a standard for generator circuit breakers
- Meets or exceeds the latest ANSI, IEEE and NEMA standards
- Up to 50 full-fault interruptions
- No SF<sub>6</sub> gas for insulation or interruption
- Pair with Siemens protective relays to provide complete generator protection
- Uses the latest developments in vacuum interrupter technology
- Highly reliable vacuum interrupters - MTTF over 57,000 years
- Common type 3AH3 operator platform
- Over 60,000 type 3AH3 operators produced since 1998

- Five-cycle interrupting time; three-cycle interrupting time optional
- Complete enclosure shipped as a unit
- Stationary (fixed) mounted construction with disconnect and/or grounding switches on transformer side and generator side
- Front-accessible circuit breaker operating mechanism for ease of maintenance
- Self-cooled ratings available to 4,000 A and higher (ratings dependent)
- Arrangements available for typical non-segregated phase bus duct connections
- Optional arrangements for segregated-phase bus duct, cable duct or other connections
- Current and voltage transformers available to suit specifications.

*For smaller machines under 80 MW, refer to Siemens drawout type vacuum generator circuit breaker offering.*



Rated values and related capabilities	IEEE C37.013 clause	Units	Circuit breaker type <sup>2</sup>	
			17.5	24.0
Rated maximum voltage (V)	5.1	kV	17.5	24.0
Power frequency	5.2	Hz	60	60
Rated continuous current	5.3	A	3,000, 4,000, 5,000, 6,000	3,000, 4,000, 5,000, 6,000
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	50 110	60 125
Rated short-circuit duty cycle	5.5		CO-30 min-CO	CO-30 min-CO
Rated interrupting time <sup>1</sup>	5.6	ms	83	83
Rated closing time	5.7	ms	< 80	< 80
Rated short-circuit current 1. System source (100%) (I) 2. Generator source (50%)	5.8.1 5.8.2.3	kA sym kA sym	50/63/72 25/31.5/36	50/63/72 25/31.5/36
dc component		%	75/65/65	50/63/72
Asymmetry ratio (historical "S" factor)		----	1.45/1.36/1.36	25/31.5/36
Asymmetrical interrupting (ref)		kA rms	73/86/98	73/86/98
Delayed current zero capability		ms	40/40/25	30/30/25
Close and latch capability (274% I)		kA peak	137/173/198	137/173/198
Short-time current carrying capability (100% I)	5.8.2.7	kA sym	50/63/72	50/63/72
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  Generator source 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	32.2/32.2/31.0 4.5 8.4  32.2/32.2/31.0 1.6 23.6  45.5/45.5/45.5 3.3 18.5	44.2 4.5 11.5  44.2 1.6 32.4  62.4 3.3 25.4
Rated load-current switching capability	5.10	A	3,000, 4,000, 5,000, 6,000	3,000, 4,000, 5,000, 6,000
Out-of-phase current switching capability	5.12	kA	25/31.5/36	25/31.5/36
Mechanical endurance		operations	10,000	10,000

**Footnotes:**

<sup>1</sup> Interrupting time is based on the first current zero occurring not later than 66 ms after fault initiation, for example, %dc component <100.

<sup>2</sup> Type testing to be completed.

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Order No.: E50001-F710-A357-V1-4A00  
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