



**SIEMENS**

*Ingenuity for life*

## Medium-voltage vacuum generator circuit breakers

### Drawout type GMSG-GCB

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

Siemens type GM-SG or GM-SG-AR indoor and outdoor metal-clad switchgear can be supplied with IEEE C37.013-tested drawout vacuum generator circuit breakers. The features and benefits of metal-clad construction are available with this offering.

#### Features and benefits:

- One-high or two-high drawout construction
- Up to 50 full-fault interruptions
- Front accessible circuit breaker operating mechanism for ease of maintenance
- Closed door racking
- Floor rollout circuit breaker in lower cell without a dolly
- Visible secondary disconnect
- Circuit breaker ships inside of cell, thus reducing installation cost and potential transit damage
- Pair with Siemens protective relays to provide complete generator protection
- Drawout type GMSG-GCB vacuum generator circuit breaker with type 3AH3 operating mechanism

- Uses the latest developments in vacuum interrupter technology
- Highly reliable vacuum interrupters - MTTF over 50,000 years
- Common type 3AH3 operator platform
- Over 120,000 type 3AH3 operators produced since 1998
- Generator circuit breakers tested to IEEE C37.013/C37.013a
- 10,000 operations to overhaul
- Three-cycle interrupting time (optional)
- Meets or exceeds the latest ANSI, IEEE, and NEMA standards
- UL or C-UL Listing available
- Available in lineups of conventional type GM-SG or GM-SG-AR switchgear, indoor or outdoor
- SIERS integrated electrical-racking system available (optional)
- Optional arc-resistant construction to ANSI/IEEE C37.20.7, up to 63 kA, 0.5 sec, accessibility type 2B.

*For larger machines up to 200 MW, refer to Siemens stationary type vacuum generator circuit breaker offering.*



Rated values and related capabilities	IEEE C37.013 clause	Units	Circuit breaker type <sup>3</sup>		
			15-GMSG-GCB-40-XXXX-110	15-GMSG-GCB-50-XXXX-137	15-GMSG-GCB-63-XXXX-173
Rated maximum voltage (V)	5.1	kV	15.0	15.0	15.0
Power frequency	5.2	Hz	60	60	60
Rated continuous current	5.3	A	1,200, 2,000, 3,000, 4,000 FC	1,200, 2,000, 3,000, 4,000 FC	1,200, 2,000, 3,000, 4,000 FC
Rated dielectric strength (withstand voltage) 1. Power frequency, one minute 2. Impulse	5.4.2 C37.013a, Table 4	kV kV peak	38 95	38 95	38 95
Rated short-circuit duty cycle	5.5		CO-30 min-CO	CO-30 min-CO	CO-30 min-CO
Rated interrupting time <sup>1,2</sup>	5.6	ms	< 80 ms	< 80 ms	< 80 ms
Rated short-circuit current 1. System source (100%) (I) 2. Generator source (50%)	5.8.1 5.8.2.3	kA sym kA sym	40 20	50 25	63 31.5
dc component		%	75	64	61
Asymmetry ratio (historical "S" factor)		----	1.46	1.35	1.32
Asymmetrical interrupting (ref)		kA rms	57.9	67.5	83
Delayed current zero capability		ms	40	30	30
Close and latch capability (274% I)		kA peak	110	137	173
Short-time current carrying capability (100% I)	5.8.2.7	kA sym	40	50	63
Short-time current duration	5.8.2.7	s	3	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	27.6 (1.84 V) 3.5 9.3 (0.62 V)  27.6 (1.84 V) 1.6 20.25 (1.35 V)  39.0 (2.6 V) 3.3 13.4 (0.89 V)	27.6 (1.84 V) 4.5 7.2 (0.48 V)  27.6 (1.84 V) 1.8 18.0 (1.20 V)  39.0 (2.6 V) 4.1 10.8 (0.72 V)	27.6 (1.84 V) 4.5 7.2 (0.48 V)  27.6 (1.84 V) 1.8 18.0 (1.20 V)  39.0 (2.6 V) 4.1 10.8 (0.72 V)
Rated load-current switching capability	5.10	A	1,200, 2,000, 3,000	1,200, 2,000, 3,000, 4,000	1,200, 2,000, 3,000, 4,000
Out-of-phase current switching capability	5.12	kA	20	25	31.5
Mechanical endurance		operations	10,000	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> Interrupting time of 50 ms available, provided that the first current zero occurs no later than 50 ms after fault initiation.

<sup>3</sup> "xxxx" in type designation refers to the continuous current rating 1,200 A, 2,000 A, or 3,000 A, as appropriate. The 4,000 A fan-cooled rating is achieved using a 3,000 A circuit breaker in combination with fan cooling in the switchgear structure (indoor only). Assuming 13.8 kV generator voltage and load current of 4,000 A with fan cooling.

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Siemens Industry  
7000 Siemens Road  
Wendell, North Carolina 27591

For more information, including service and parts, please contact our Customer Support Center.  
Phone: +1 (800) 333-7421

[usa.siemens.com/mvswitchgear](http://usa.siemens.com/mvswitchgear)

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