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# Medium-voltage, vacuum generator circuit breakers

## Drawout type GMSG-GCB

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

Siemens type GM-SG 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 57,000 years
- Common type 3AH3 operator platform

- Over 60,000 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 switchgear, indoor or outdoor.

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



**Answers for infrastructure.**

Rated values and related capabilities	IEEE C37.013 clause	Units	Circuit breaker type <sup>2</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</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  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	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> "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. Assuming 13.8 kV generator voltage and load current of 4,000 A with fan cooling.

The information provided in this document contains merely general descriptions or characteristics of performance which in case of actual use do not always apply as described or which may change as a result of further development of the products. An obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of contract.

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Siemens Industry, Inc.  
7000 Siemens Road  
Wendell, NC 27591

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For more information, contact: +1 (800) 347-6659

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