# IEEE Standards Interpretations for IEEE Std C37.013™-1997 IEEE Standard for AC High-Voltage Generator Circuit Breakers Rated on a Symmetrical Current Basis



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**Interpretation Request #1**
Does the Scope of IEEE Std C37.013-1997 include the generator circuit breakers for an application of this nature? A review of the Standard would suggest not for the following reasons:

1) Subclass 5.3 Rated continuous current. This subclause states that typical values are 6.3kA, 8kA,……20kA, etc. In the application under consideration, the circuit breaker rated current is 0.63kA.

2) Subclause 5.8.1 Rated short-circuit current. This subclause states that typical values are 63kA, 80kA, ……160kA, etc. In the application under consideration, the circuit breaker rated short-circuit current is 25kA.

3) Subclause 5.8.2.5 Required interrupting capability for single-phase-to-ground faults. This subclause states that: "Generator circuit breakers are designed for use on high-impedance grounded systems where the single phase-to ground short-circuit current will not exceed 50 A. In no case are the capabilities for single phase-to-ground faults required to exceed this value." As is quite often the case with diesel-driven generator applications, we propose low resistance grounding of the Generator neutral, as allowed for in IEEE Std 143™ Application Guide for Grounding of Synchronous Generator Systems. The current would not be limited to 50 A, as required by this subclause.

4) Subclause 6.3.3.5 Interrupting capability for single-phase-to-ground faults. This subclause states that: "As all known applications of generator circuit breakers are for high-impedance grounded systems, the single-phase-to-ground short-circuit current is

always significantly lower than the three-phase short-circuit current and its demonstration is included with the three-phase short-circuit current test defined in 6.2.3.1." The application would not be high impedance grounded as already stated in item 3) above.

5) Clause 7. Application guide. This Clause refers to a typical example in Annex A. This example shows a Generator unit rated 588 MVA; a factor of 100 times the rating of the Generator in the application under consideration.

**Interpretation Response**
The original document was aimed at circuit breakers for protecting generators and main step-up unit transformers like those applied in the largest power generating stations. This was mostly because the engineers who developed the original IEEE Std C37.013 document had experience mainly with the larger applications and they had little experience with the smaller applications. The result was that there is too little information specifically about Gen. CBs for use with smaller generators. Concerns similar to yours have been addressed in the new supplement to IEEE Std C37.013, which is identified as PC37.013a, and is titled "Draft Standard for AC High Voltage Generator Circuit Breakers Rated on a Symmetrical Current Basis – Amendment 1: Supplement for use with Generators Rated 10-100 MVA."

IEEE PC37.013a is focused on breakers for generators rated in the 10-100 MVA range, though your concern is for breakers applied with machines smaller than that, it is getting closer, and would be within the right "order of magnitude