Use of PowlVac® Circuit Breakers for Continuous Currents Above 3000 Amperes

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In accordance with ANSI/IEEE Standard C37.06, the highest continuous current rating of our standard line of PowlVac® circuit breakers is 3000 A. For systems that require continuous current ratings above 3000 A, we can offer two possible solutions.

First, we can offer our standard 3000 A circuit breaker with cooling fans. We have a design that has been successfully tested at 3750 A, and the results of that test indicate that the fan-cooled breaker may be applied at 4000 A without overheating. This design requires a unit somewhat wider than the standard 36-inch switchgear unit to include the necessary air ducts. The standard fan control equipment includes a current-actuated control to start the fans at about 2500 A and an alarm circuit which uses air flow switches to detect and alarm loss of cooling air at currents above this level. A completely redundant second set of fans can be furnished if desired. Fan cooling is our preferred method of obtaining higher continuous current ratings.

A second method of providing for high continuous currents is to parallel two circuit breakers. Using this approach, we can provide for continuous currents of about 3500 A by paralleling two 2000 A breakers and about 5000 A by paralleling two 3000 A breakers. When breakers are paralleled, the interrupting rating is neither increased nor decreased. Precise timing in closing or opening the two paralleled breakers is not critical, as whichever breaker closes first can carry the continuous current for the few milliseconds until the second breaker closes, and the last breaker to open has the capability of interrupting the full fault current. Paralleling of breakers does require special circuitry to balance the currents between the two breakers and individual overcurrent protection for each breaker as well as combined overcurrent protection for the entire circuit. Main bus construction must also be very carefully balanced to insure equal impedance in both legs of the circuit. Parallel breakers should only be used for a user who refuses to use fan cooled circuit breakers.

Regardless of which breaker uprating method is used, special attention must be given to the design of any portions of the switchgear bus which are rated over 3000 A. If the main bus exceeds 3000 A, standard PowlVac® bus cannot be used, and the required special bus design limits the switchgear to one-high construction.

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