

Powell Apparatus Service Division

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SERVICE ADVISORY

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The PowlVac[®] vacuum circuit breaker has earned an excellent reputation for reliability over the past 15 years. This notice is intended to help our customers maximize the operating life of the equipment.

PRODUCT: PowlVac[®] vacuum circuit breakers with ratings of; 5kV, 350 MVA, 3000 amp; 7.5kV, 500 MVA, 3000 amp; and 15kV, 1000 MVA, 3000 amp; 3750 amp and 4000 amp forced air cooled PowlVac breakers.

CONDITION: Powell Electrical Manufacturing Co. has identified a possible operating condition of the PowlVac[®] circuit breaker which may require further field inspection. The possible condition involves a fracture or deformation of one of its primary insulating support components known as the main insulating support or "wishbone". This condition is most readily observed by a reduction of pushrod over travel or "nut gap".

Six epoxy wishbone supports are the structural insulating components on which the three vacuum interrupters and primary disconnect assemblies mount. The lower wishbone assembly is our main area of concern. In rare cases, a fracture or deformation has been observed across the bottom of the lower bushing insert, through which the stab bus assembly is bolted. The anomaly is typically very small. Where the problem has been detected, the breakers have continued to operate normally without incident. No breaker failures have been attributed to this event.

CAUSE: The cause of the fracture is related to the forces exerted on the wishbone inserts, as the breaker is closed. Normal closing forces compress one insert while tensioning the other. Epoxy samples of fractured components have been analyzed and found to be within the original manufacturing specifications. The combination of tolerances between the wishbone, breaker frame, conductors, vacuum interrupter, closing forces and complicated by thermal effects in varying degrees, may also be factors in this premature failure of the wishbone. Although these conditions have not been accurately reproduced under laboratory conditions, field reports indicate a greater than acceptable failure occurrence rate.

INSPECTION: The field inspection requirement is classified as low priority. The occurrence of this condition should be checked during a routine maintenance period as recommended in the PowlVac instruction

bulletin. This period should be established by specific application and experience. The general rule however, is once annually or every 1000 operations, whichever occurs first.

The abnormality is not always visually apparent due to its location. A check of the push rod "nut gap" with the breaker closed is recommended. Any drastic variance will indicate the presence of a problem.

REFER TO THE POWLVAC INSTRUCTION BULLETIN FOR PERFORMING THIS CHECK.

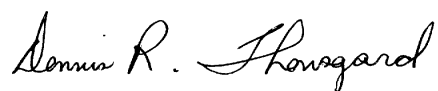
CORRECTIVE ACTION: If a fracture or deformation is detected, the wishbone should be replaced immediately. The breaker may appear to operate properly, but VI contact resistance and consequently the continuous rating of the breaker, could be affected. This component can be field installed by an experienced technician and returned to service within two to three hours. Reference measurements of the breaker's VI stroke and over travel gap must be recorded prior to disassembly.

During our extensive investigation and analysis of this problem, a solution to further reduce the possibility of the causes of the condition was developed. This solution consists of adding insulated tension struts between the upper and lower wishbone of each phase. A kit has been developed to facilitate easy implementation of this modification. While our recommendation presently focuses on 3000 amp breakers, which may be operated at or above its intended rating, this kit may be used on any PowlVac breaker to increase the mechanical life of the insulating supports.

SAFETY: The breaker must be removed from service prior to maintenance. Only qualified personnel should attempt performing maintenance on any power circuit breaker. Do not reach into the breaker mechanism with the operating springs in the "charged" position or with the breaker in the closed position. The high mechanical forces required to operate the breaker can cause serious injury.

Please contact PASD for wishbone replacement and upgrade kit information or other questions concerning this issue.

Sincerely,



DENNIS R. THONSGARD
MANAGER - POWELL APPARATUS SERVICE DIVISION