

Bushing Repair

Maintenance and repair recommendations vary widely from one manufacturer to another. In all cases, the user is advised to consult the manufacturer prior to attempting any bushing repairs.

Extreme caution should be taken when working on or around damaged bushings. Many bushings are constructed with high compressive forces and can be dangerous when components are damaged. If transporting the bushing is required, check with local regulations prior to shipment to determine oil PCB level limitations.

The following are common repair needs that may be encountered by bushing users and general recommendations for each:

- a) **Damaged Porcelain** – small chips or breaks in porcelain are not detrimental to bushing performance, as modern electrical porcelain is a nonporous material. Larger chips or breaks generally will not hinder performance either but may have improved appearance by painting over the area with a suitable paint (bright colored paint is often used for safety purposes). Cracks in the main porcelain body are cause for immediate replacement. Damages to petticoats that significantly reduce creepage distances are also cause for bushing replacement or professional repair. Care should be taken when working with damaged porcelain, as broken edges are often extremely sharp.
- b) **Damaged Oil Sight Glasses** – a cracked, chipped, or shattered oil sight glass often allows moisture to enter into the bushing and is cause for bushing replacement or professional repair. To minimize damage to the bushing core, it is recommended to wrap the affected area as soon as possible. Field repairs are not recommended.
- c) **Malfunctioning Oil Level Gages** – an oil level gage that does not correctly indicate the oil level in the bushing can lead to future problems and is reason for repair. Many oil level gages can be replaced without disassembling the bushing. The mechanism that measures oil level, however, is internal to the bushing and cannot usually be replaced in the field. The manufacturer or a professional repair service should be contacted to determine if the gage design can be replaced in the field.
- d) **Leaking Seals** – loss of oil threatens the integrity of a bushing and may be cause for bushing replacement or professional repair. Some leaks may be temporarily sealed using an oil compatible sealant, but it is important to repair the seal as soon as possible. Professional repair services can often eliminate the leak by disassembling the bushing and replacing the gaskets. The manufacturer or a professional repair service should be contacted if a significant reduction in oil level has occurred.
- e) **Leaking Taps** – loss of oil into the bushing tap space can often be temporarily sealed with the provided tap cover. Some bushing taps can be replaced in the field by positioning the bushing horizontally and installing a suitable replacement. The manufacturer or a professional repair service should be contacted to determine if tap replacement is possible in the field.
- f) **Damaged Taps** – damage due to electrical activity at the bushing tap can cause high or low power factor readings and is reason for repair. Some bushing taps can be replaced in the field by positioning the bushing horizontally and installing a suitable replacement. The manufacturer or a professional repair service should be contacted to determine if tap replacement is possible in the field.
- g) **Power Factor or Capacitance Abnormalities** – significant or rapid changes to power factor or capacitance are often precursors to dielectric failure and may be cause for bushing replacement or professional repair. Investigation should follow manufacturer recommendations and the guidelines in section 10.2.1. Baking the bushing core in an oven, a popular remedy in the past, will not result in a long term improvement in power factor. Field repairs are not recommended.
- h) **Overheated Terminals** – excessive heat at bushing terminals is most often caused by loose connections or damaged threads. This situation can be corrected by tightening connections or repairing damaged threads, where needed. In these cases, consideration should be given to the duration the bushing was overheated and the impact on seals in proximity to the heat source.