

How do you avoid loosening a comm when you take it apart? And why is it important?

It's important because a loose commutator will cause no end of problems in operation. High bars, chipped brushes, and poor commutation make your job of checking for commutator tightness an important part of routine maintenance.

How is tightness built into a commutator?

In manufacturing, the copper and mica segments are assembled in a circular form. The resulting "segment pack" is checked for skew and angle. A steel ring which has been machined to the rough OD of the commutator, is then compressed over the segment pack in a press. The tonnage used will vary depending on the size of the comm, but can easily range from 10 tons to 90 tons. The resulting compression provides the commutator tightness which all following procedures are designed to maintain. In some instances, the commutator may be banded to obtain additional stability.

What keeps a v-ring commutator tight?

The dovetail angles that are cut into the segment pack are the foundation for keeping the commutator tight. With the compression ring still in place, the segment pack is assembled to the steel caps and hub, and insulated with mica v-rings. The caps seat against the internal angle (typically 30°) and retain the compression after a series of thermal closings under torque and tonnage. When the compression ring is removed, this assembly keeps the commutator tight. In effect, we have created a spring, which is held tight by the pressure exerted internally.

How do you take a comm apart without releasing the tightness?

Since the steel caps are keeping the commutator tight, removing the outboard cap will immediately release this pressure, loosening the comm. It is almost impossible to get the compression back in the segment pack once it has been released. Before pulling a commutator cap, always band the brush track, preferably with a resiglass tape, applied hot and cured (see banding material specifications for temperatures). You should be applying the tape at 300-400 psi, covering approximately 3/4 of the brush surface, and building it up to about 1/4" per side. To finish, wrap 8-10 wraps over your tucking loop to ensure that the banding stays in place. Alternatively (though not preferred), a steel ring machined to between 0.010" and 0.020" smaller than the brush diameter (depending on the size of the unit) can be heated and applied over a nomex sleeve covering the brush track. The ring should be first measured cold before installation, and then measured again once cooled after installation to ensure that sufficient fit has been obtained. With banding or a ring in place, the cap can now be safely removed, and the v-rings replaced or other maintenance performed.

Checking for tightness

During routine maintenance, bolt and nut v-ring commutators can be checked for tightness by applying a specific torque to the bolts, or to the nut with a spanner wrench. Typically, torque values are approximately 50% of the maximum rating for the bolt grade and size. If you have questions regarding a specific unit, call us for a recommendation.

