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Application Engineering Technical Bulletin

SRB Guidelines (Surface Rounding Brushes)

SRB's are a great tool to help in the commutator maintenance effort for motors and generators. Commutators are usually the roundest when new or just after a turn and undercut at the repair shop. Every day of operation after that, the commutator is losing this perfectly round status. Actually, no commutator or slip ring is ever perfectly round, about the closest they ever get to perfect is .0004" TIR (Total Indicated Runout).

As the motor or generator rotates and performs its daily function; vibration, contamination, heat, sparking and the thousands of miles of sliding contact under pressure are working together to wear away the brushes and the commutator. Unfortunately they do not wear uniformly and over a period of time will degrade the .0004" TIR to .002" , .004" or worse.

SRB's are a tool to be used occasionally to help maintain the commutator or slip ring closer to the desired .0004" TIR. SRB's are not a miracle brush and if the commutator is already so rough that brushes are breaking then the SRB's will probably break too. If a commutator has a .006" TIR then it's probably too late to expect the SRB to bring a commutator back into acceptable limits. SRB's should be used at the first sight of increased sparking, or first indication of increased roughness as felt with a "Feeler Stick " or at the first audible indication of brush clatter or commutator roughness.

Unfortunately, SRB's are usually considered once the commutator is quite rough, and they are used only to help the motor or generator limp along until the next scheduled down day so more in depth maintenance can be performed or the machine gets changed out.

The length of time to leave SRB's installed depends on many factors. It may be as short as a couple of days or as long as a couple of months. In all cases, one needs to monitor the process and make the decision before too much copper has been ground away. SRB's work well between 900 and 2500 RPM, faster RPM is possible but should have almost hourly monitoring because of the high surface speeds and higher rates of copper removal. As a starting place, the standard 1750 RPM motor may require the SRB's to be used for 2 weeks, while the time for the 900 RPM unit is 4 weeks, and the 2500 RPM unit is 1 week. Remember; do not discard the SRB's since they should be able to be used several times before they are worn out. A feeler stick is a valuable tool to help judge when to remove the SRB's. There will be obvious accumulation of copper dust as the SRB's do their rounding job, so vacuuming or blowing out the machine afterwards is recommended.

Commutator repair indicators:

Situation	TIR Runout	Bar to Bar variance	Undercut Depth
NEW	Less than .0015"	Less than .0002"	.050" or more
In Service	Less than .003"	Less than .0003"	.020" or more
Needs Repair	More than .003"	More than .0003"	.010" or less

Remember the purpose of a brush is to conduct electrical current to each and every commutator segment. If the commutator is so rough that the brush cannot intimately contact each segment then the current will still flow but it will go thru air which is sparking. Sparking will cause the brush and the commutator to wear away at an accelerated rate.

Note: SRB's should not be used in leading or stubbing brush holder orientation !!



A National Maintenance Tool

Surface Rounding Brush

National Surface Rounding Brushes Help Prevent Unscheduled Downtime.

National Surface Rounding Brushes or SRBs can extend the productivity of your DC motor or generator between major overhauls. That's because SRBs prevent or repair many commutator and collector ring troubles for you, significantly reducing both the frequency and the duration of unscheduled downtime for maintenance.

National SRBs:

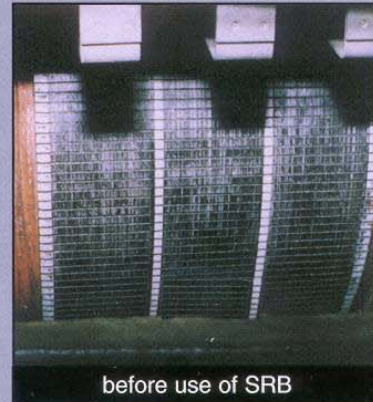
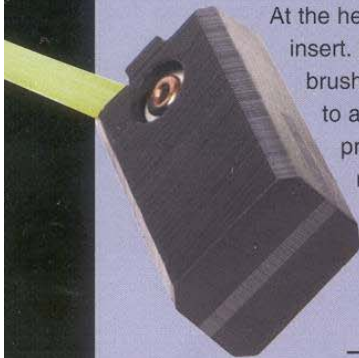
Intensive Care For Your Commutators

Use National SRBs as a preventive maintenance tool: they gently remove rough spots and non-conductive films (caused by contamination) from a commutator or collector ring while your DC motor or generator is running.

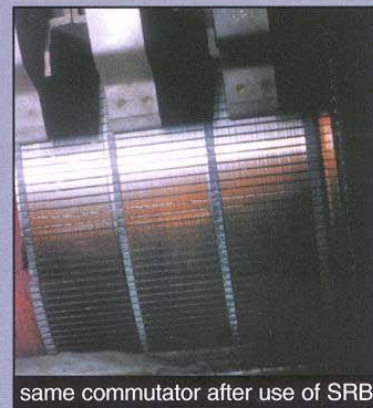
National SRBs:

The Good Stuff's Inside

At the heart of every SRB is a conductive abrasive insert. National formulates and positions the carbon brush and the insert to make each SRB compatible to almost every application. This way, your production continues while the SRB maintains or repairs the commutator.

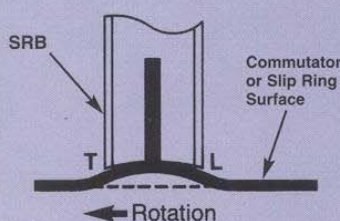


before use of SRB



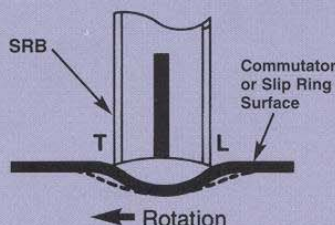
same commutator after use of SRB

How National SRBs Work



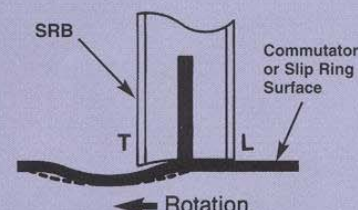
High Spot

The concave surface rides the high so the insert can wear it down.



Low Spot

The L and T edges keep the insert from contacting the cavity.



Lip

As the SRB passes the cavity, the insert bears on the lip.

The concave working surface is an important design feature. It forms the leading (L) and trailing (T) edges that allow the abrasive to hone down the highs and pass over the lows.

National SRBs can be reused on the same machine, or in other machines with the same brush characteristics, until the depth of the abrasive insert is worn away.



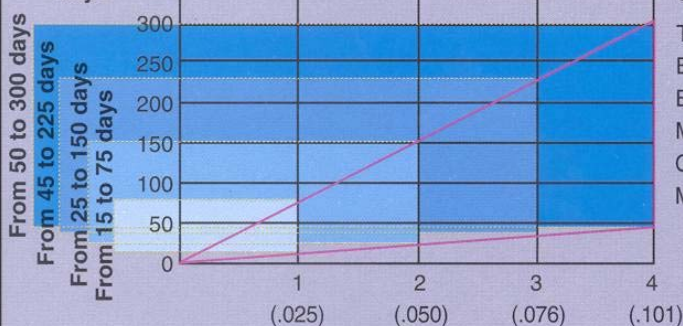
S R B

Does Your Motor or Generator Need National SRBs?

Check your DC motors and generators periodically so you can apply SRBs at the first signs of commutator or ring troubles. Some of the typical symptoms that indicate you need SRB maintenance include:

- Noisy brushes
- Rough commutator or collector ring
- Sudden appearance of brush sparking or arcing
- Destructive slot bar-marking or pitch bar-marking
- Periodic burning or roughing of commutator caused by excessive loading or contamination

Estimated
Time In
Days



National SRBs Will Reduce Commutator Runout

SRB Use Will Reduce Commutator Runout.

The graph is based on the following information:

Brush Pressure	5lb/sq in (351 g/sq cm)
Brush Size	0.75 x 1.5 inches (1.90 x 3.81 cm)
Machine Speed	1800 RPM
Commutator Diameter	10 inches (25.4 cm)
Machine Operation	24 hrs/day

COMMUTATOR RUNOUT IN MILS (millimeters).

Due to the amount of copper that needs to be removed, the time to reduce commutator runout depends upon the type of eccentricity. For example, the amount of time it takes to correct a few high bars is less than the time required to correct a few low bars.

Installation is Simple

Installation is simple; just replace a standard brush with a compatible National SRB. Usually adding one SRB per brush path will maintain or repair the commutator. If the commutator or collector ring is very large or has severe problems, more than one SRB per brush path may be installed.

Be sure to monitor the progress of SRB performance and reinstall the standard brush(es) as soon as the surface has been restored. For easy recognition, National SRBs have a yellow sleeve. Don't forget, SRBs can be reused in other machines using the same grade of brush on similar size commutators.

Ordering Is Easy

National maintains an inventory of the most popular SRBs for quick shipment; if the SRB you need is not in stock, National can make it. Be sure to order SRBs that properly match your motors or generators. If you're not sure, call your National Sales Representative with complete information about your motor or generator. They will assist you in making sure you order the right SRB for your machine.

Call 1-800-543-6322 to order your National SRBs today!



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Toll Free: 1-800-395-7776 • Fax: 1-864-281-0180

visit our web site at www.nationalelectrical.com

**ATTENTION ALL
MAINTENANCE AND
OPERATION PERSONNEL:**

WARNING!

Avoid electrical shock that can kill or injure you. Do not remove, install or replace SRBs or standard brushes while a motor or generator is energized and/or rotating.