NorthStar brand

Installation & Maintenance

RIM Tach® Shaft Grounding Brush

for all motor models

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CHAPTER ONE
INSTALLATION

I. Introduction

The ©NorthStar RIM Tach® Shaft Grounding Brush, used in conjunction with ©NorthStar's RIM Tach® 8500 digital tachometer, provides a low resistance, electrical contact to the motor shaft to reduce or eliminate induced shaft currents in AC and DC motors. Induced shaft currents are a major cause of premature bearing failures in large motors. Shaft voltages can discharge through motor bearings, causing material weakening and consequent pitting, fluting, or excessive wear. The addition of a shaft grounding brush to a motor provides a low electrical resistance path by which these currents can "drain", thereby protecting the motor bearings and preventing downtime. The overall operation consists of a steel shaft extension that screws into the tachometer pulse wheel, located at the end of the motor shaft, to provide a point of contact for the carbon brush. The carbon brush holder mounts in the cover plate, and the holder/cover plate assembly mounts into the standard cover recess of the RIM Tach® 8500 digital tachometer.

Figure 1: Steel Shaft Extensions for Various Motors

An example stainless steel shaft extension was chosen for the below illustrations. Different stainless steel shaft extensions are available for the following motors: General Electric 6000 Series, end-of-shaft models E01, E06, E08, E10, & 1.0", and thru-shaft models SP1, SP2, SP3, & SP4 (common for Marathon, Electric, Horsepleger, and Reliance motors).

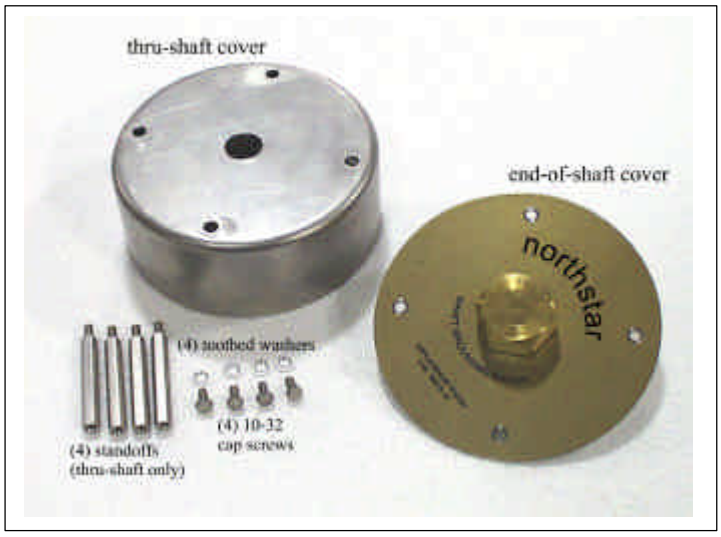


Figure 2: End-of-Shaft Cover & Thru-Shaft Cover

Both installation and maintenance instructions dictate the procedure for an end-of-shaft application. Follow the same procedure for a thru-shaft application, varying only the cover plate and accompanying standoffs (see Step 3b, page 5).

II. Description

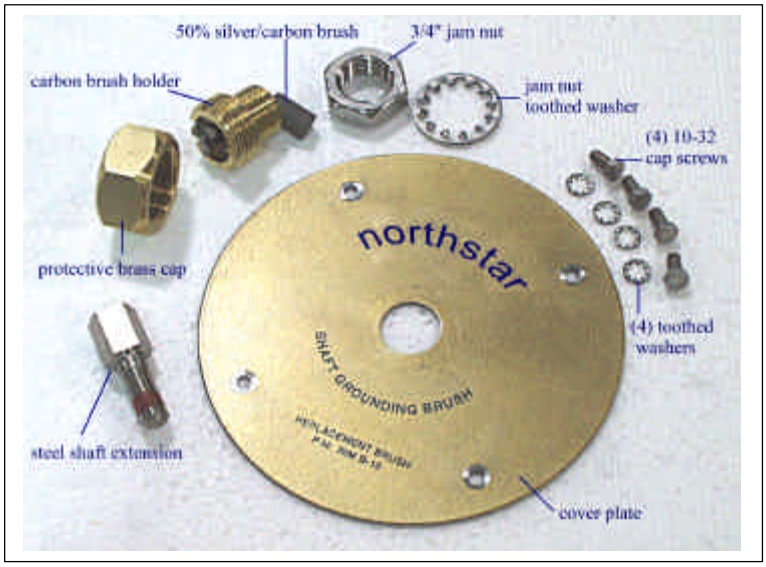


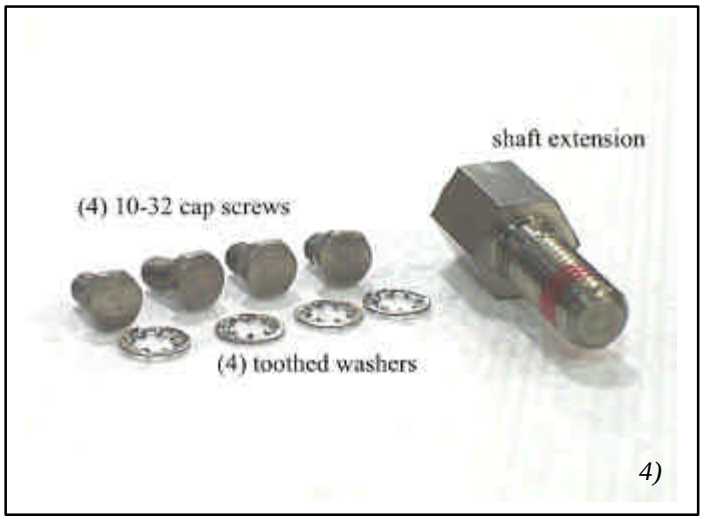
Figure 3: Components of RIM Tach â Shaft Grounding Brush Assembly (end-of-shaft)

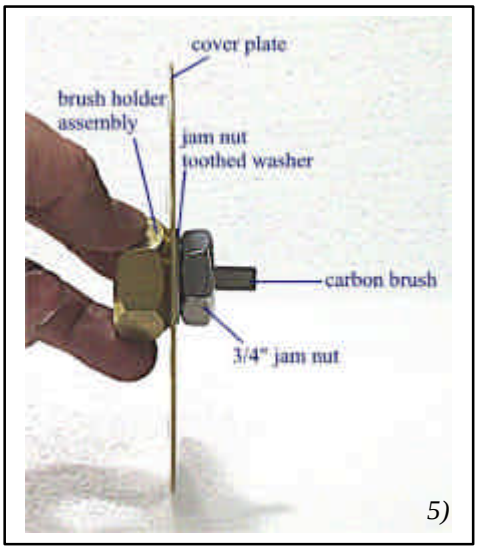
The RIM Tach â Shaft Grounding Brush consists of two basic groups:

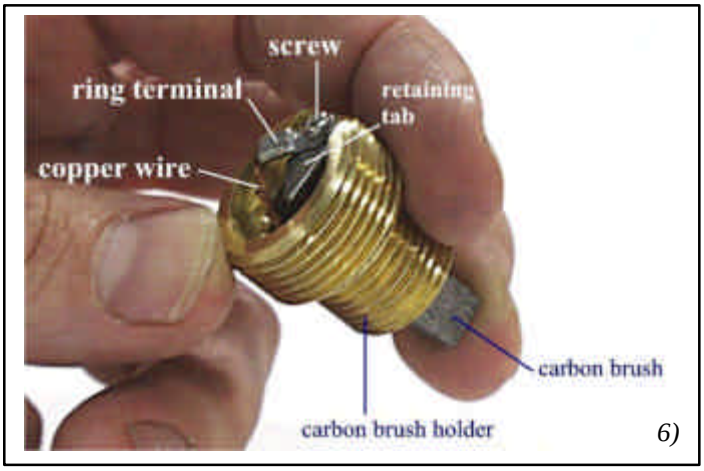
1. shaft extension, (4) 10-32 cap screws, and (4) toothed washers

2. holder/cover plate assembly

a. holder assembly







Figures: 4) shaft extension, cap screws, & toothed washers, 5) holder/cover plate assembly, 6) holder assembly

III. Installation Procedure

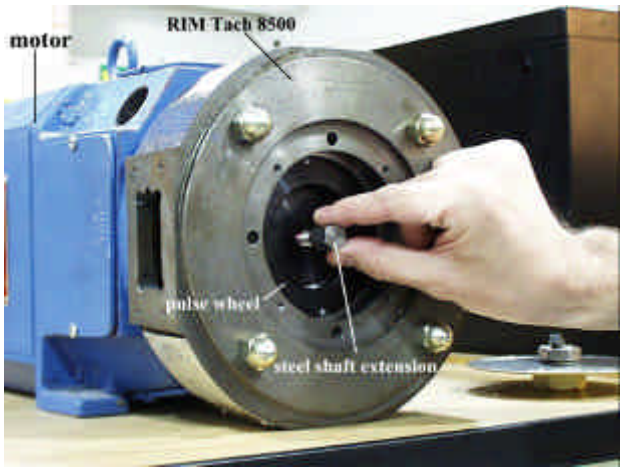


Figure 7: Installation of Shaft Extension

Step 1: **Complete RIM Tach® 8500 Tachometer Installation**

1) follow the RIM Tach® 8500 instruction manual to complete mounting of the tachometer.

Step 2: **Installation of Stainless Steel Shaft Extension**

1) remove the standard, gold-colored, cover plate (retrofits only) from the tachometer.

2) screw the shaft extension into the center hole at the end of the motor shaft, located at the center of the tachometer pulse wheel.

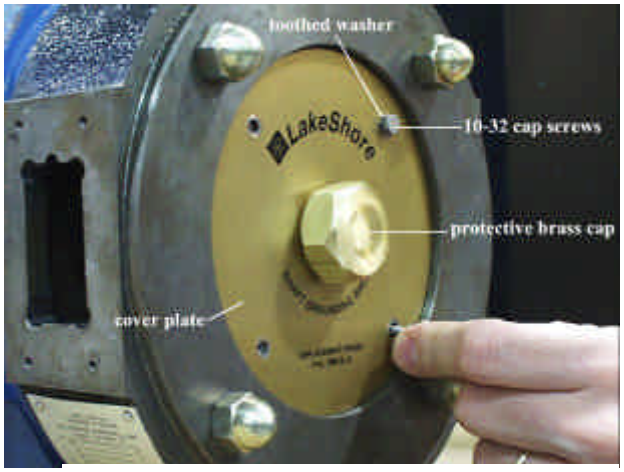


Figure 8: Securing the Holder/Cover Plate Assembly

Step 3a: **Installation of Holder/Cover Plate Assembly**

1) hold the holder/cover plate assembly by the protective brass cap

2) place assembly into the front recess of the RIM Tach® 8500.

You should feel the carbon brush contact the steel shaft extension.

3) Secure the cover plate with the (4) 10-32 cap screws, using the (4) toothed washers between the cover plate and the cap screws.

NOTE

The toothed washers ensure a good electrical contact between the carbon brush holder and the tachometer enclosure.

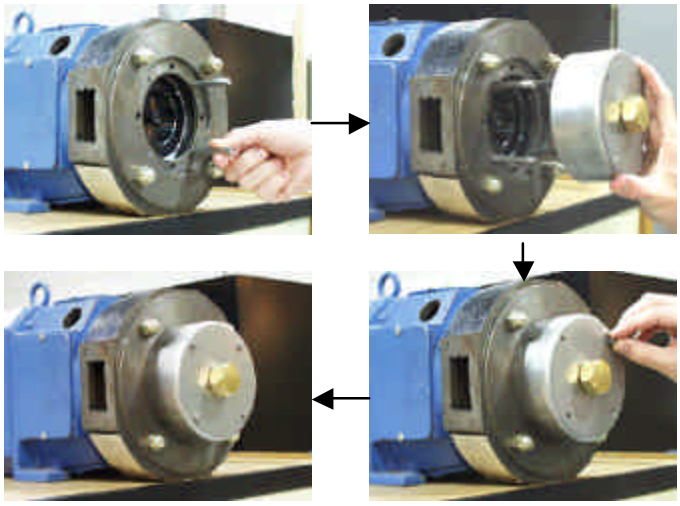


Figure 9: Thru-Shaft Installation

Step 3b: **Thru-Shaft Applications**

1) place the (4) standoffs (elongated screws) into the RIM Tach® 8500 tachometer enclosure.

2) align the four holes of the thru-shaft cover over the standoffs

3) slide the cover over the motor shaft.

4) place the (4) 10-32 cap screws into the ends of the standoffs to secure the cover.

Be sure to place the toothed washers between the cap screws and the end of the standoffs.

NOTE

New tachometers purchased with the shaft grounding brush will have the holder/ cover plate assembly already installed.

CHAPTER TWO
MAINTENANCE

I. Introduction

The carbon brush holder contains a spring and a copper wire attached to the rear of the carbon brush (see Figure 12). The fit between the carbon brush and the carbon brush holder is a slip fit. Spring tension is moderate, designed to keep the carbon brush in contact with the rotating motor shaft, but not to induce heavy wear. Under normal conditions, the carbon brush should last several years, depending on the application. It is not uncommon, however, in dirtier environments, for the shaft grounding brush assembly to require periodic cleaning and maintenance. Timely maintenance ensures both proper operation and increases operational life.

II. Maintenance Procedure

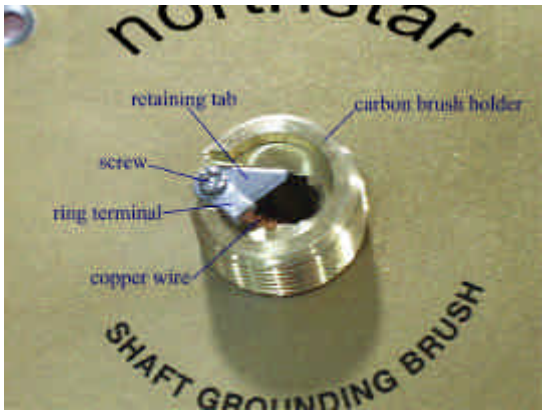


Figure 10: Close-up of Holder/Cover Plate Assembly

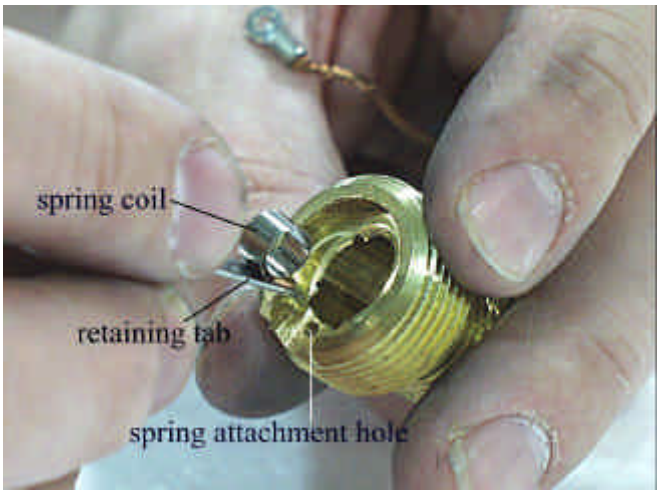


Figure 11: Close-up of Spring Coil (reference only)

Step 1: **Carbon Brush Wear Check**

1) remove the protective brass cap from the holder/cover plate assembly.

Perform Step 1 with the shaft grounding brush assembly still installed on the tachometer

2) locate the retaining tab.

3) verify that the spring coil is connected to the retaining tab and is inserted into the body of the carbon brush holder (*see Figure 11 for reference only*).

4) verify that the maximum distance of the spring coil is 5/8" (*see Figure 12 for reference only*).

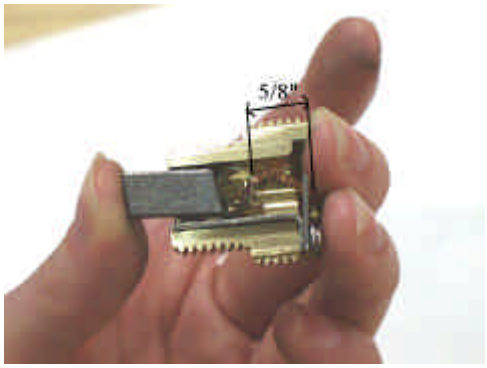


Figure 12: Correct Length of Spring Coil (reference only)

DO NOT cut or disassemble the carbon brush holder assembly to perform #3 or #4 of the carbon brush wear check.

The spring coil contacts the carbon brush inside the holder. The pressure from the carbon brush contracts the spring coil. As the carbon brush wears, the pressure against the spring coil relaxes, and the coil expands. Once the coil expands beyond 5/8", the carbon brush should be replaced.

Step 2: **Removal of Shaft Grounding Brush Assembly from Encoder/Tachometer**

1) remove the (4) 10-32 cap screws, (4) toothed washers, and the holder/cover plate assembly.

Remove the cover plate and attached carbon brush holder with the protective brass cap still on the cover plate.

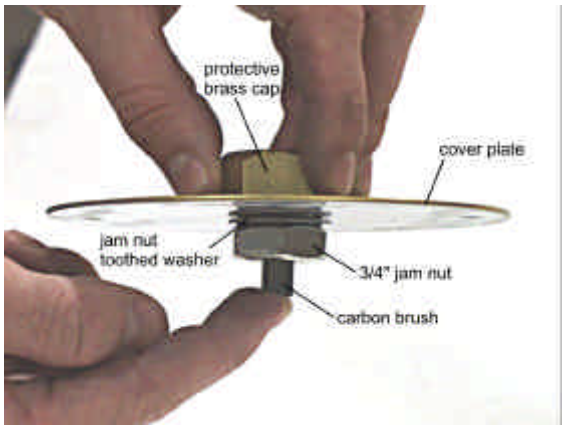


Figure 13: Carbon Brush Protrudes from Jam Nut

Step 3: **Inspection of Carbon Brush**

1) verify that length of the carbon brush protruding from the jam nut is approximately ½".

Secure the holder/cover plate assembly by the protective brass cap when performing step 3.

NOTE

A new brush will extend approximately ¾" from the carbon brush holder.

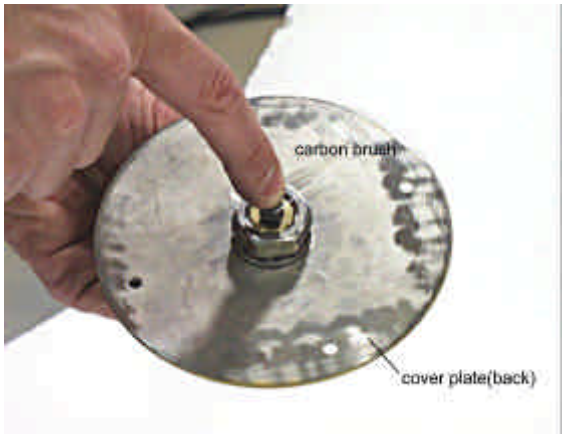


Figure 14: Carbon Brush Depression Test

Step 4: **Spring Pressure Test**

1) depress the carbon brush into the carbon brush holder several times.

NOTE

The spring pressure should be apparent. If the brush continually springs out, then the assembly should function correctly.

The following Steps 5 -7 must be performed only if any of the above maintenance steps were unsuccessful.

Step 5: **Cleaning**

1) inspect the area where the carbon brush exits the carbon brush holder for anything that may hinder the movement of the holder/cover plate assembly.

2) apply compressed air to remove all foreign material from the holder assembly.

Refrain from the use of silicon based cleaners and cleaners such as WD40, gasoline, or kerosene. Silicon will cause deterioration of the carbon brush. Some petroleum base cleaners can leave a residue that impedes transmission of electricity.

Figure 15: Orientation of Holder Components

Step 6: **Inspection of Holder Assembly**

1) holding the cover plate, remove the protective brass cap on the exterior side of the cover plate.
2) verify that the ring terminal, with the attached copper wire against the carbon brush holder's inner edge, is connected to the stainless steel retaining tab via the screw.
3) remove any foreign material.

Perform the following Steps 7-8 with the cover plate attached to the brush holder assembly. The accompanying photos do not include the cover plate only for clarity.

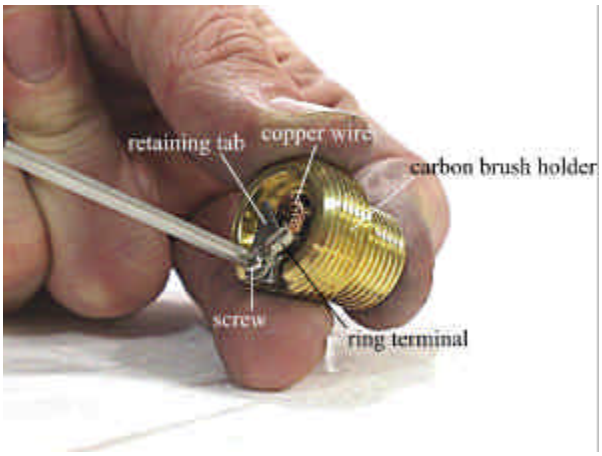


Figure 16: Disassembly of Holder Components

Step 7: **Disassembly of the Holder Assembly**

1) remove the screw that retains the spring coil (with attached retaining tab) and ring terminal.

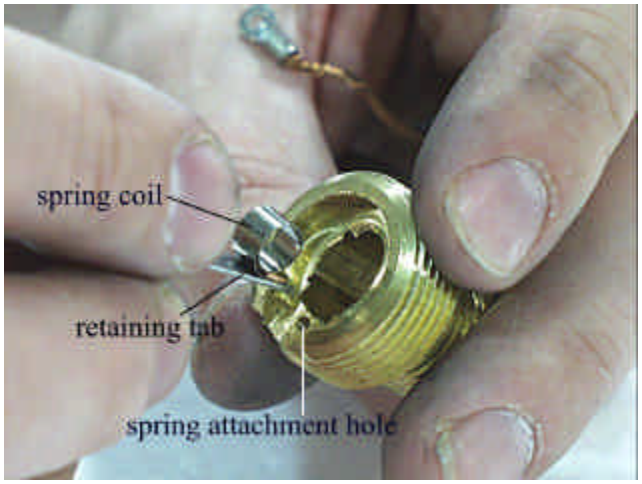


Figure 17: Close-up of Spring Coil and Retaining Tab

2) remove the copper wire and attached carbon brush from the carbon brush holder.

Remember the copper wire's orientation into the carbon brush holder for future re-assembly.

3) clean the carbon brush holder with a cotton cloth or Q-tip® style device.
4) replace the carbon brush if it is physically damaged or noticeably worn.

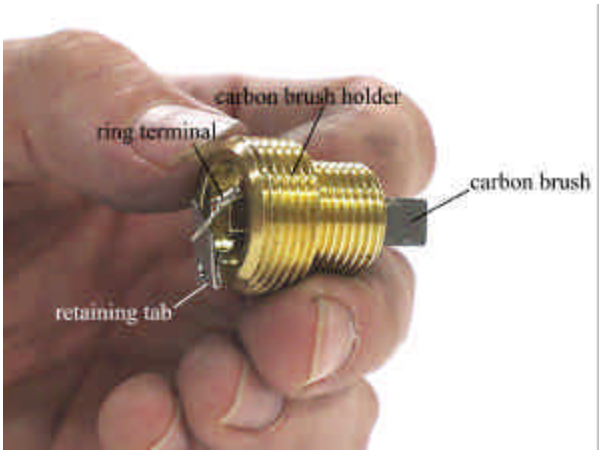


Figure 18: Proper Holder Re-Installation

Step 8: **Re-installation of the Holder Assembly**

1) insert the spring coil, with the attached retaining tab, into the carbon brush holder, near the spring attachment hole.

2) slide the carbon brush into the carbon brush holder

Perform #2 while maintaining the ring terminal near the retaining tab.

3) insert the screw through the ring terminal, retaining tab, and spring attachment hole.

4) tighten the screw.

Make certain that the copper wire does not obstruct the free movement of the carbon brush

This completes the installation of the holder assembly.

Step 9: **Re-Installation of the Holder/Cover Plate Assembly**

- **follow Steps 1-3 of the Installation.**