IEC Corporation

Slip Ring Preventative Maintenance Guide

Please follow the guided instructions closely to ensure the slip ring is properly disassembled and can be cleaned thoroughly.

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Introduction

Preventative Maintenance (PM) is a critical aspect of owning and operating a slip ring. The purpose of PM is to remove the accumulated brush dust and keep internal components as clean as possible. Brush dust is caused by the sliding friction between the brush and the conductor ring. It is conductive and can lead to your slip ring arcing-over if not removed.

Establishing a PM schedule can be essential to lengthening the intervals between the IEC provided refurbishment or repairs. IEC strongly recommends creating a PM schedule that follows your operating parameters. These parameters will help determine the appropriate intervals between your slip ring PM. Operating rotations per minute (RPM) directly affects the amount of brush dust accumulated due to the higher rotational speed. If the RPM increases, the formation of brush dust also increases. Operating amperage/voltage will also affect the intervals between when PM is necessary. The increase in operating amperage/voltage will enhance the likelihood of your slip ring arcing-over between conductors.

With these parameters in mind, you should be able to establish a good baseline of how often PM should be facilitated. A PM schedule is based upon the total number of revolutions your slip ring has endured since its procurement, last refurbishment/repair, or previous PM. To maintain consistent intervals, it is important to protect the slip ring from environmental damage. Exposure to high humidity, salt water, or other harsh environments can lead to corrosion and decrease the time between required PM. To mitigate these risks, it is important to keep the slip ring as dry as possible and prevent internal moisture, which can cause arc-over or irreversible damage. If your slip ring operates in such environments, an oil-filled slip ring may be more suitable for your application.

IEC strongly recommends all customers maintain a spare slip ring to minimize downtime in the event of a failure. We know how critical minimal downtime is to your operation, and by having a spare you are able to interchange slip rings when an IEC provided repair is necessary.

Please note: Due to the many variations in slip ring designs and applications, PM intervals may vary. The charts on the following page provide a general guide for estimating PM intervals.

Preventative Maintenance Schedule Guideline

Standard Flange Mount Slip Rings:

RMP	Revolutions before PM (≤ 7.5A)	Revolutions before PM (>7.5A)
1-5	5,000,000+	4,000,000+
6-15	4,000,000	3,200,000
16-30	3,200,000	2,880,000
31-50	2,880,000	2,590,000
51-100	2,590,000	2,350,000
101-200	2,350,000	2,100,000
201-350	2,100,000	1,900,000
351-500	1,900,000	1,700,000
501-1000	1,700,000	1,550,000
1001-1501	1,550,000	1,395,000
1501-2000	1,395,000	1,250,000
2001-2500	1,250,000	1,150,000

Shown above is a table that serves as a guideline for standard flange mount PM intervals. This table shows total revolution quantities that are based on the operating RPM and amperage of your slip ring. Once your slip ring reaches the amount of revolutions based on your application, PM should be facilitated to remove accumulated brush dust.

Standard Oil-Filled Flange Mount Slip Rings:

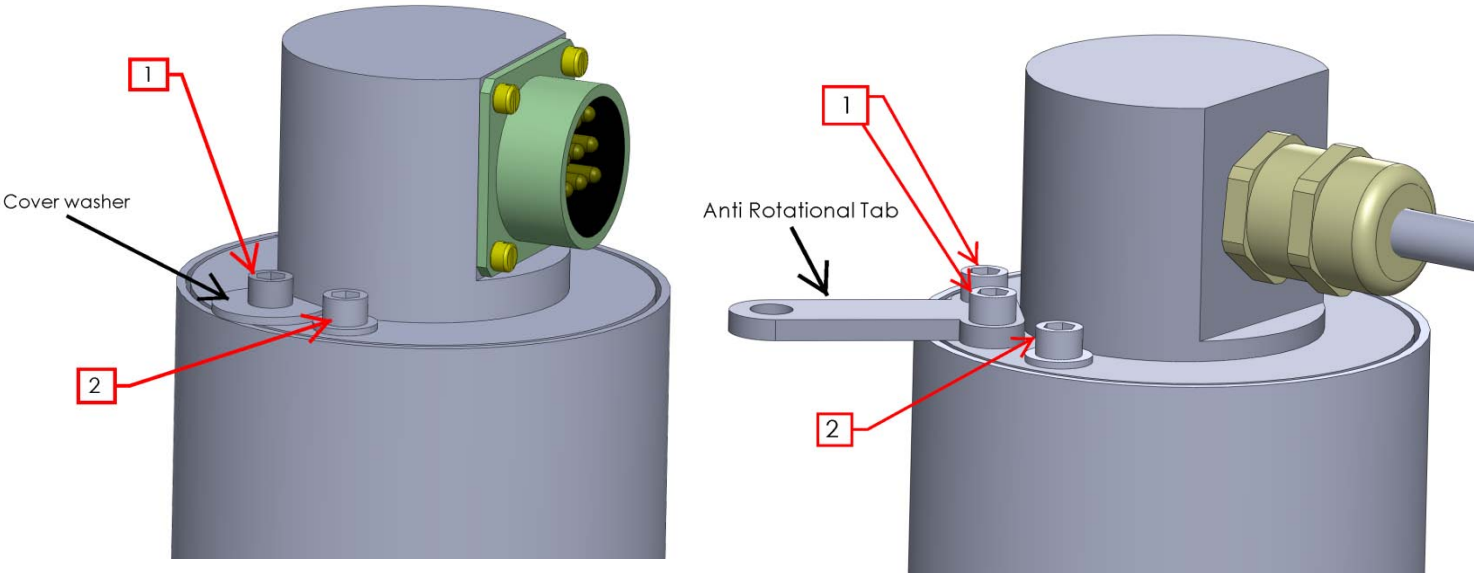
RMP	Revolutions before PM (≤ 7.5A)	Revolutions before PM (>7.5A)
1-5	5,000,000+	4,000,000+
6-15	4,000,000	3,200,000
16-30	3,200,000	2,550,000
31-50	2,550,000	2,100,000
51-75	2,100,000	1,750,000
76-100	1,750,000	1,400,000

Shown above is a table that should be referenced for PM intervals if your slip ring is filled with synthetic oil. Oil-filled slip rings have a maximum RPM of 100. If RPM exceeds 100, the brush will hydroplane on the conductor ring and lose contact. Similar to non oil-filled slip rings, there are many variations that can affect the number of revolutions before PM is recommended.

****Note: This is only a guideline and IEC will not be held liable for slip rings that fail using the charts above****

Standard Flange Mount Slip Rings:

1. **Removal of Cover**



PT Series Connector PG-16 Cable Gland

Figure 1

The standard flange mount model can have many different modifications on the stationary side such as, but not limited to, connectors, leads, and leads that are potted with a PG gland. Figure 1 shows two variations of a standard flange mount slip ring: A slip ring equipped with a PT series connector, and a slip ring that utilizes a PG cable gland to support leads. The slip ring with the PT series connector utilizes a 'cover washer' that is used to fasten the cover in position. The slip ring with the PG cable gland utilizes an 'anti-rotational tab'. Using the information provided, it is important to only remove the cap screw(s) labeled (1). **Do NOT remove the cap screw(s) labeled (2)**. Removal of cap screw (2) can induce a misalignment if not properly replaced.

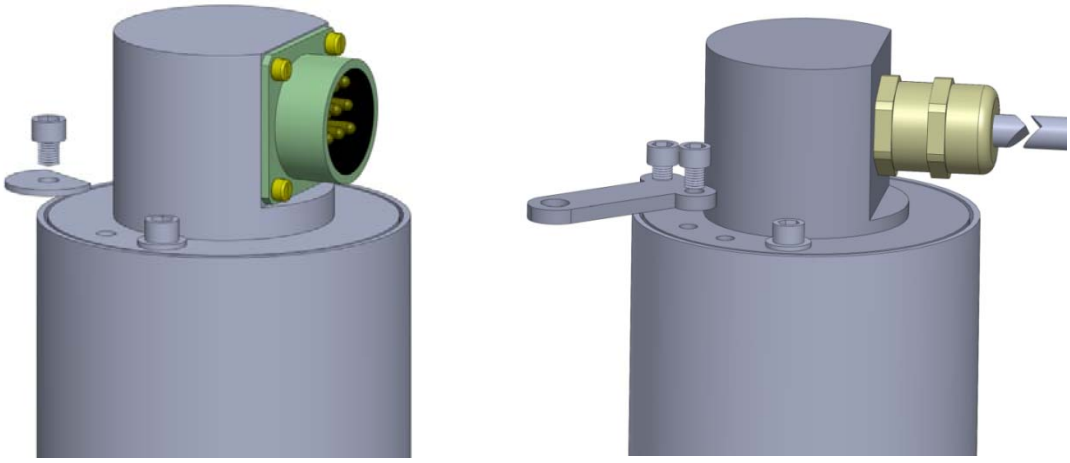


Figure 2

Figure 2 depicts the disassembly process for a cover washer and anti-rotational tab. Using a 9/64" allen key, carefully remove the cap screws. Wipe off any excess grease or loctite on the cap screws. This will mitigate particles from entering the slip ring when re-assembled.

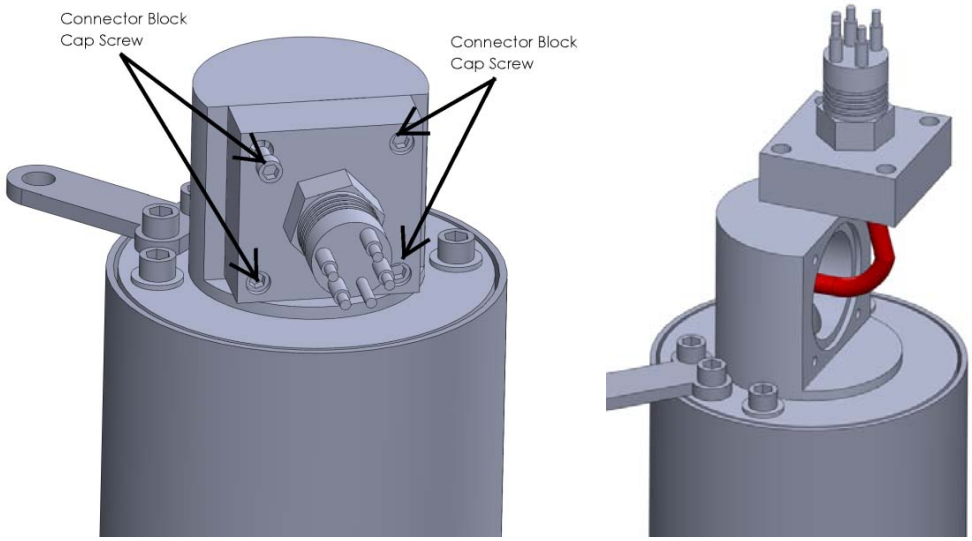


Figure 3

If your slip ring utilizes a connector block, as shown in Figure 3, please be mindful when disassembling to avoid damaging wires. Using a 3/32" allen key, remove the cap screws on the connector block. Once the connector block is detached, carefully maneuver the detached piece as shown above. DO NOT remove the connector from the block.

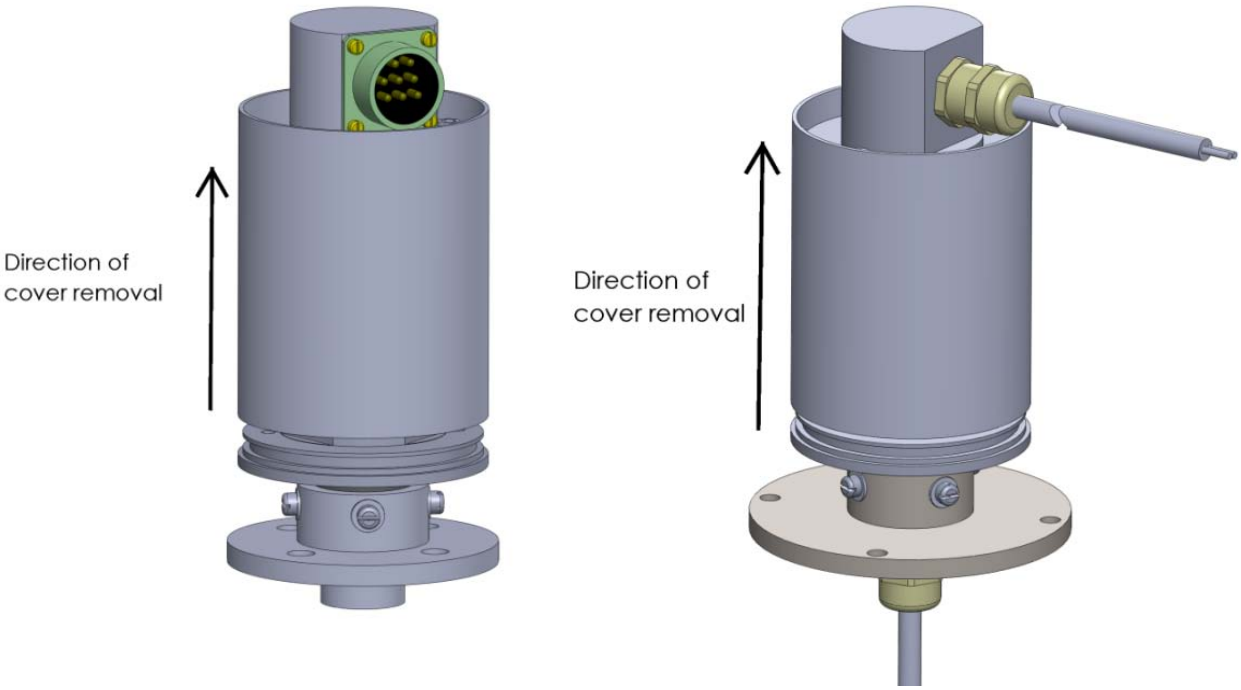


Figure 4

Shown in Figure 4 is the direction of cover removal. When removing the cover with leads, it is important to avoid damaging the wires. In some instances, a PG-gland will interfere with the cover removal. Unscrew the exterior portion of the PG-gland from the slip ring to provide clearance as shown in Figure 5 below.

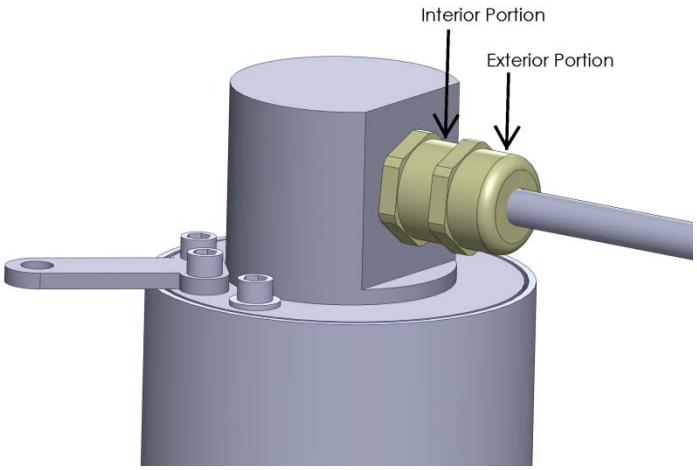


Figure 5

2. Cleaning procedure

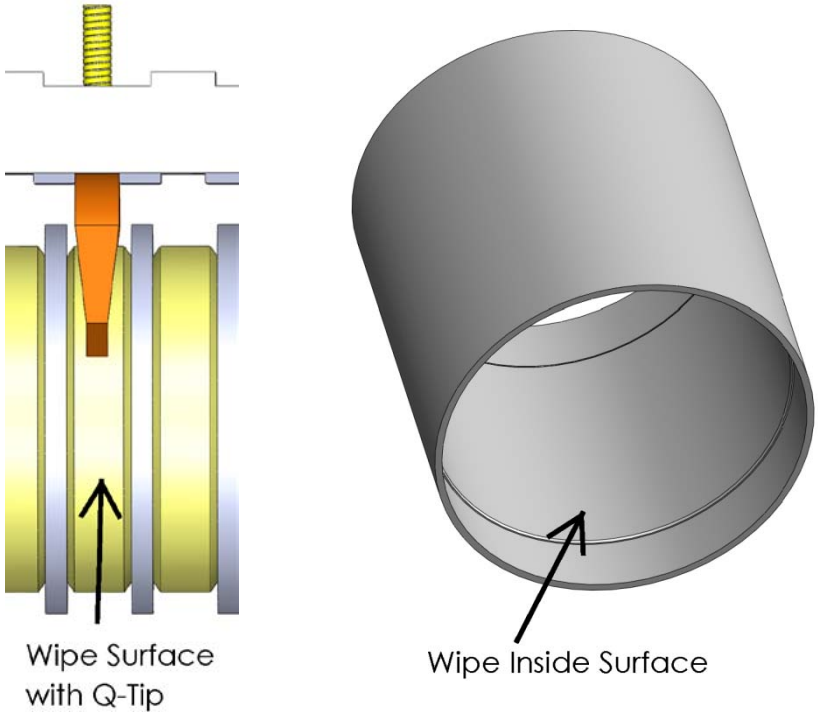


Figure 6

Once the cover is removed, the inside of your slip ring will look similar to Figure 6. Using dry compressed air, blow directly onto major components to clean the brush dust that has accumulated. Once this is done, use a Q-Tip dampened with 100% isopropyl alcohol to clean the brush dust from the surface of the rings. Continue using dampened Q-tips on all major internal components for thorough cleaning of your slip ring. **Use care to avoid getting the isopropyl alcohol in the bearings.** Additionally, using 100% isopropyl alcohol, wipe the brush dust accumulated on the inside of the cover shown above.

3. Reassemble

There are a few steps when replacing the cover that will ensure solid contact and preserve the strength of the enclosure. Add a minimal about of lubricant paste (Molykote 111 compound if available) to both O-Rings. Use loctite or equivalent on cap screw threads to re-fasten the cover washer or anti-rotation tab.

Standard Oil-Filled Flange Slip Rings:

IEC offers a variety of oil-filled flange mount slip rings. Oil-filled slip rings are essential to your operation when exposed to wet/humid environments. PM for an oil-filled slip ring is focused on the filtration/replacement of the synthetic oil.

To ensure thorough PM, it is recommended to remove your slip ring from its application. If your application no longer requires the slip ring to be oil-filled, please consider an IEC provided refurbishment.

1. Removal of NPT Oil Plug

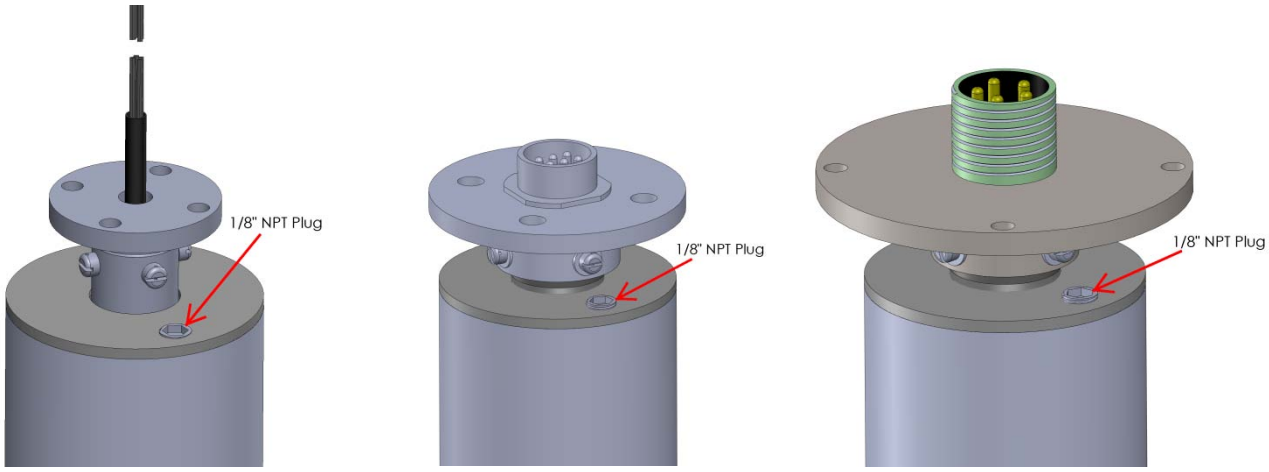


Figure 7

Using a 3/16” allen key, carefully remove the NPT plug with the rotational side of the slip ring facing upwards as shown in Figure 7.

2. Draining of Oil

IEC uses Dow Corning 200-100-CST oil. Listed below are two methods for PM on oil-filled slip rings:

1: Drain the oil from the NPT plug, and strain the oil using a coffee filter. This will separate brush dust accumulated in the oil.

2: Drain the oil from the NPT plug, and replace the oil with new Dow Corning 200-100-CST oil. This specific oil can be purchased at Esco Products, Inc. The SKU number for a pint is RF2001001PT. For reference on the quantity of oil for replacement, please see the chart below.

Number of Conductors	US Customary (Cup)	Metric (ml)
2	~1/2	~125
4	~3/4	~180
6	~1	~250
8	~1 ¼	~300
12	~1 ½	~375

3. Reassemble

Before re-filling the slip ring, remove excess sealant from the NPT plug and screw hole. After this, carefully pour the oil into the slip ring. **Please note:** the oil level should be as high as possible without over-flowing the slip ring. Using a pipe sealant with PTFE (Loctite 567 for example) coat the NPT plug threads prior to reassembling.