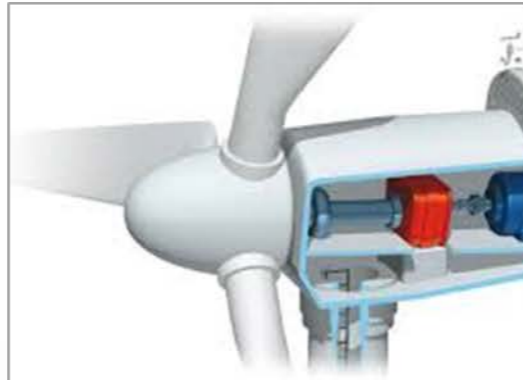
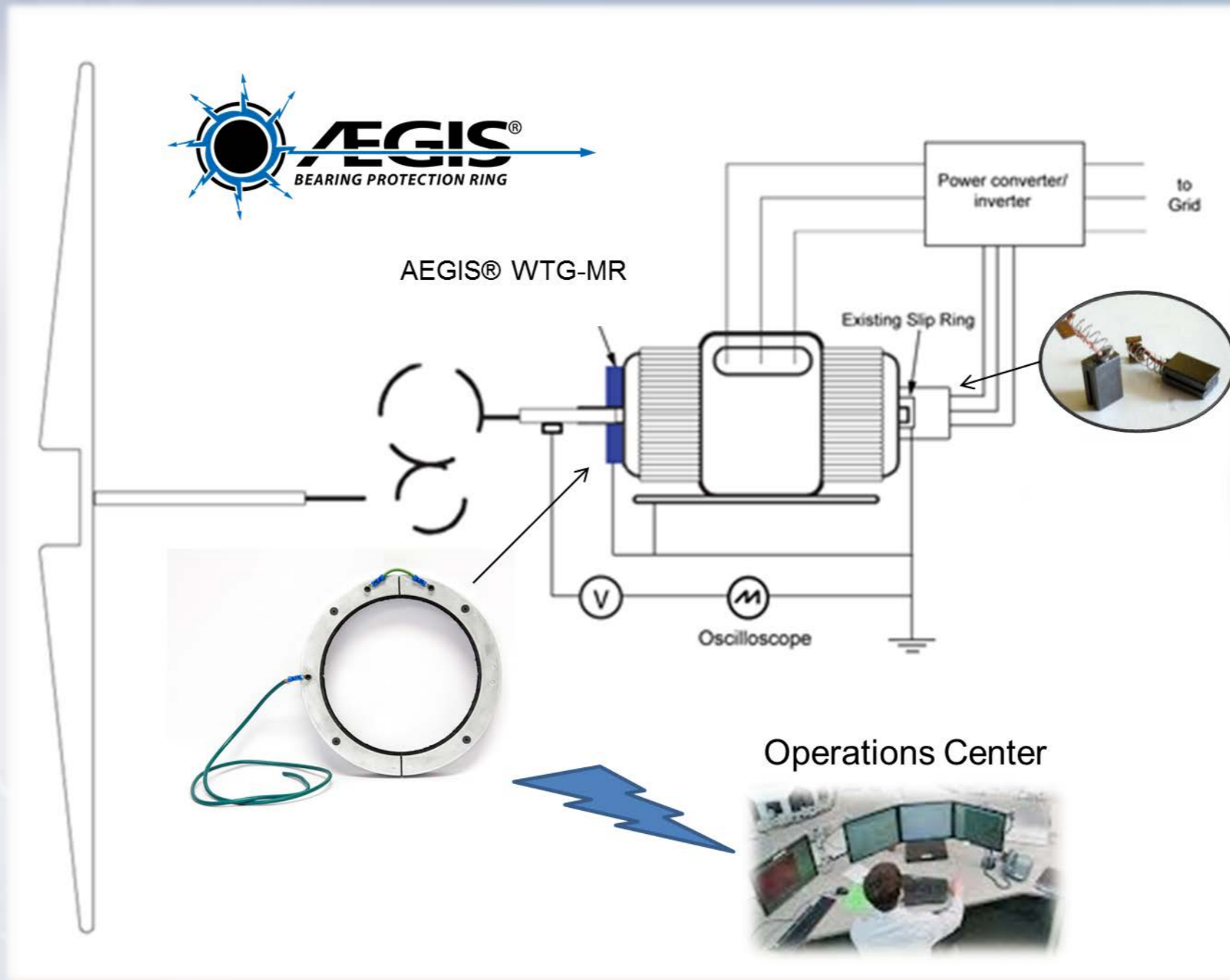


Installation of WTG-MR

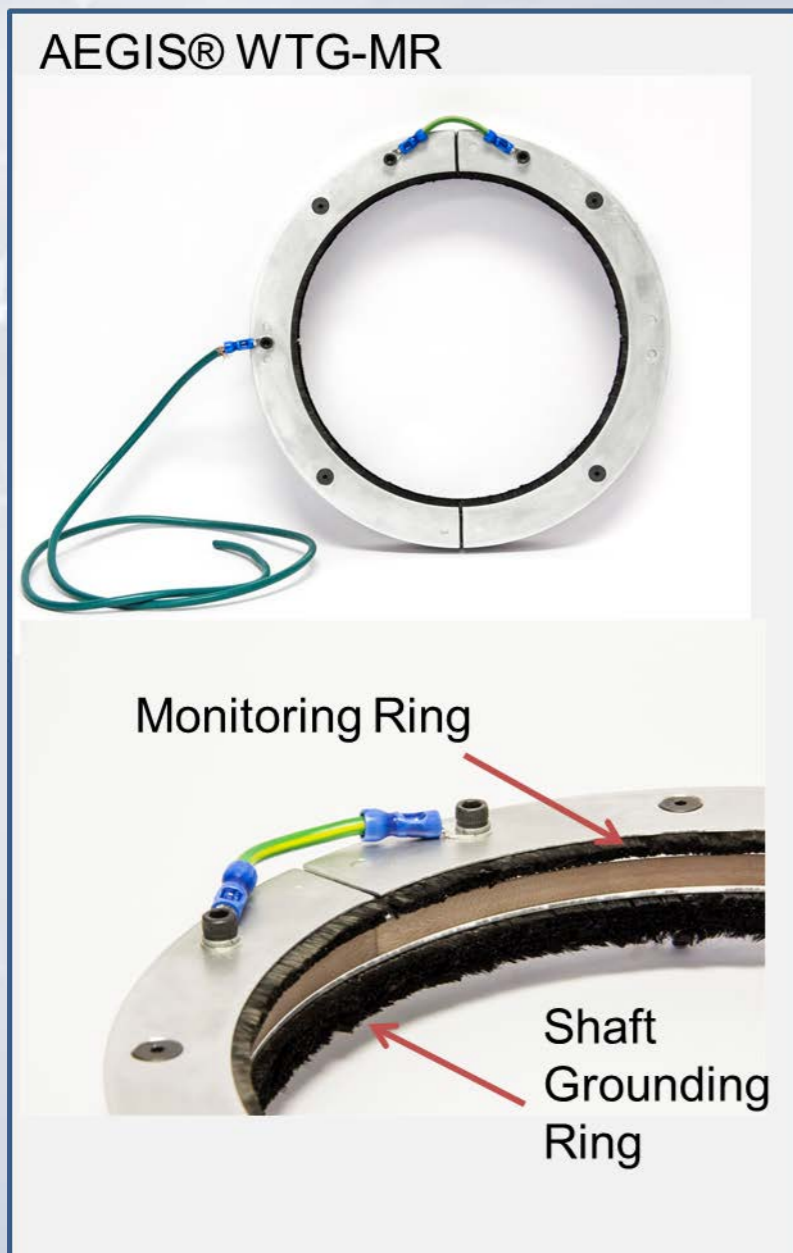
Wind Turbine Grounding Ring with Monitoring Ring



It's better to know...

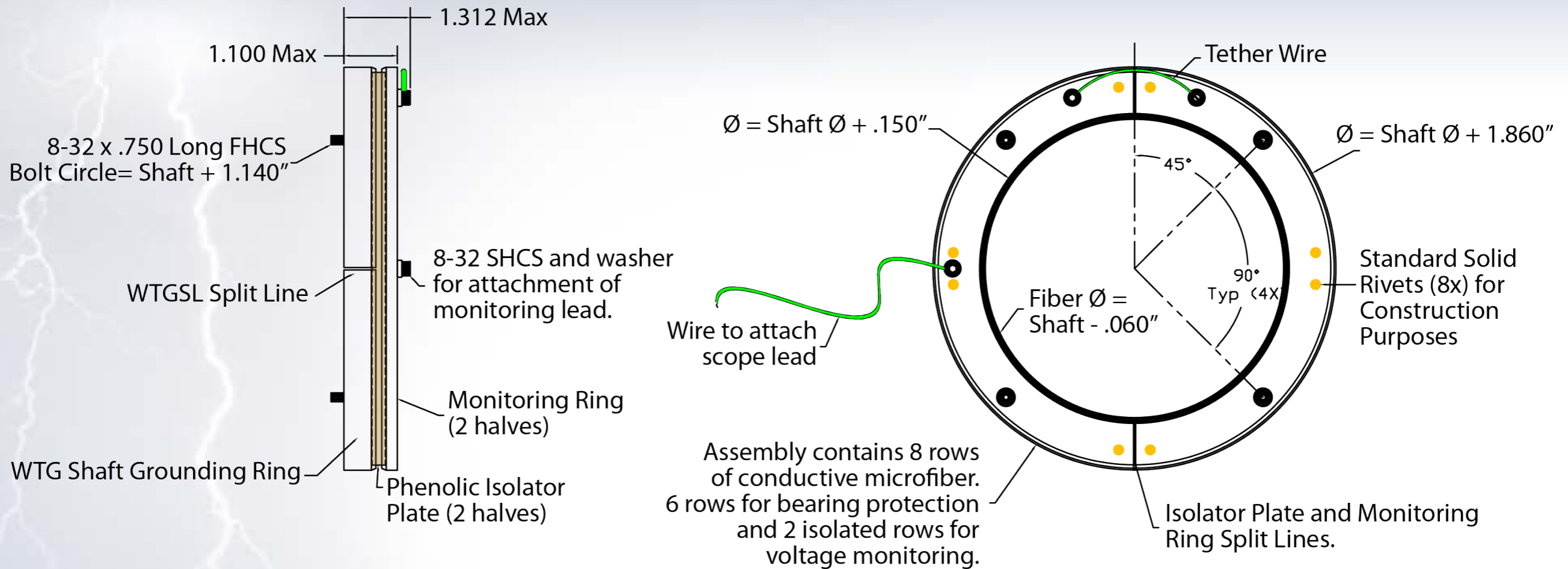


AEGIS® WTG-MR Adds Up Tower Monitoring



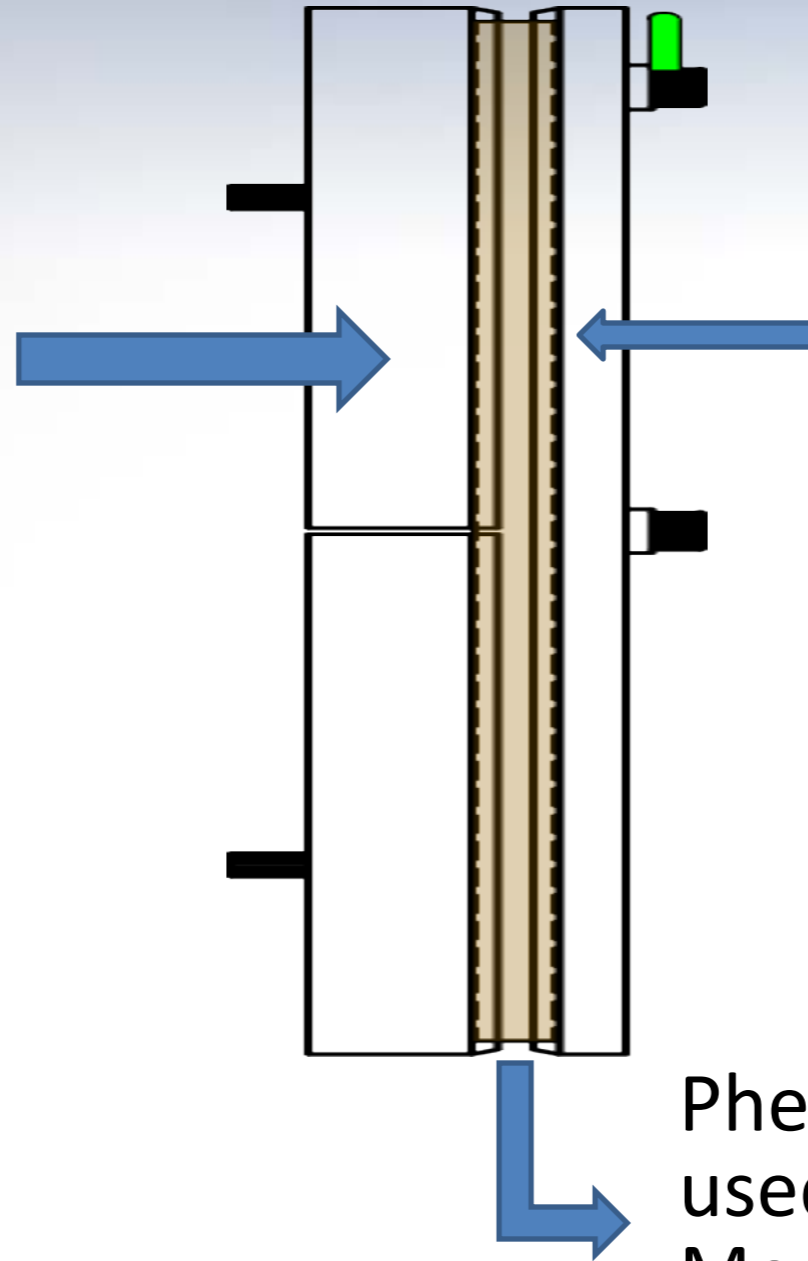
- Install AEGIS® WTG-MR shaft grounding and monitoring ring
- **Monitor shaft voltage condition**
- Prevent bearing failure in generator and gear box
- **Avoid repair expenses and lost production**

WTG-MR Drawing Template



AEGIS® WTG-MR Layers

WTG Grounding Ring channels high frequency voltages and currents safely away from the bearings to ground.

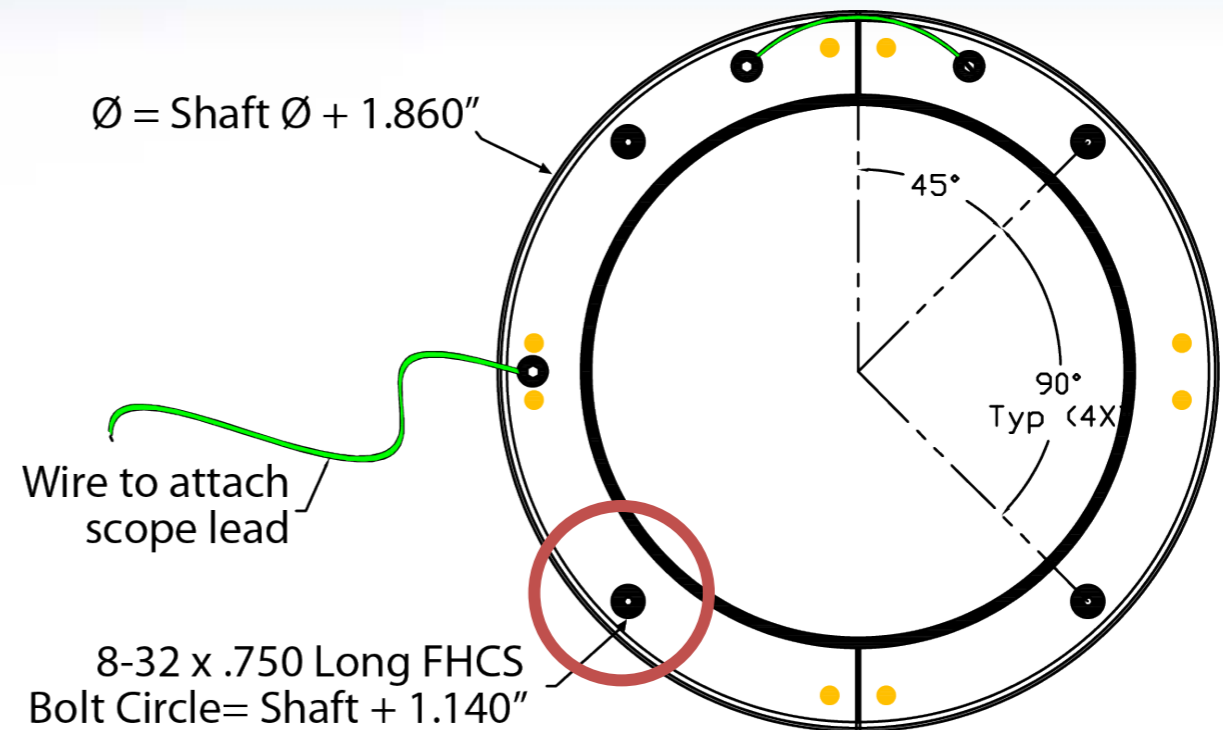


Monitoring Ring measures voltage on the shaft and is grounded through the monitoring device.

Phenolic plate is used to isolate the Monitoring Ring.

Ordering a WTG-MR

1. Shaft Diameter in inches x.xxx (extend to 3 decimal places).
2. Mounting – WTG-MR is supplied with bolt through mounting hardware. Custom mounting brackets may be required.



Tools Needed for Installation

For Shaft Prep:

- ✓ Emery cloth or Scotch-Brite™
- ✓ Non-petroleum based solvent to remove any residue on the shaft
- ✓ Heat gun
- ✓ Allen wrenches (standard ring uses 3/32, 5/64, 9/64)
- ✓ Other tools needed to mount ring with custom hardware
- ✓ Tools to secure monitoring wire to monitoring device

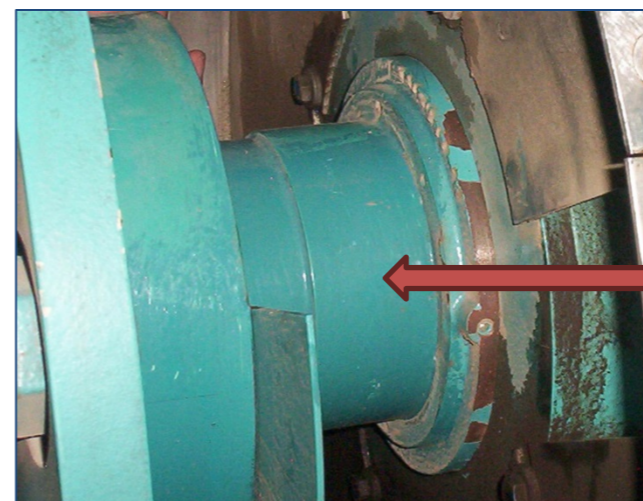
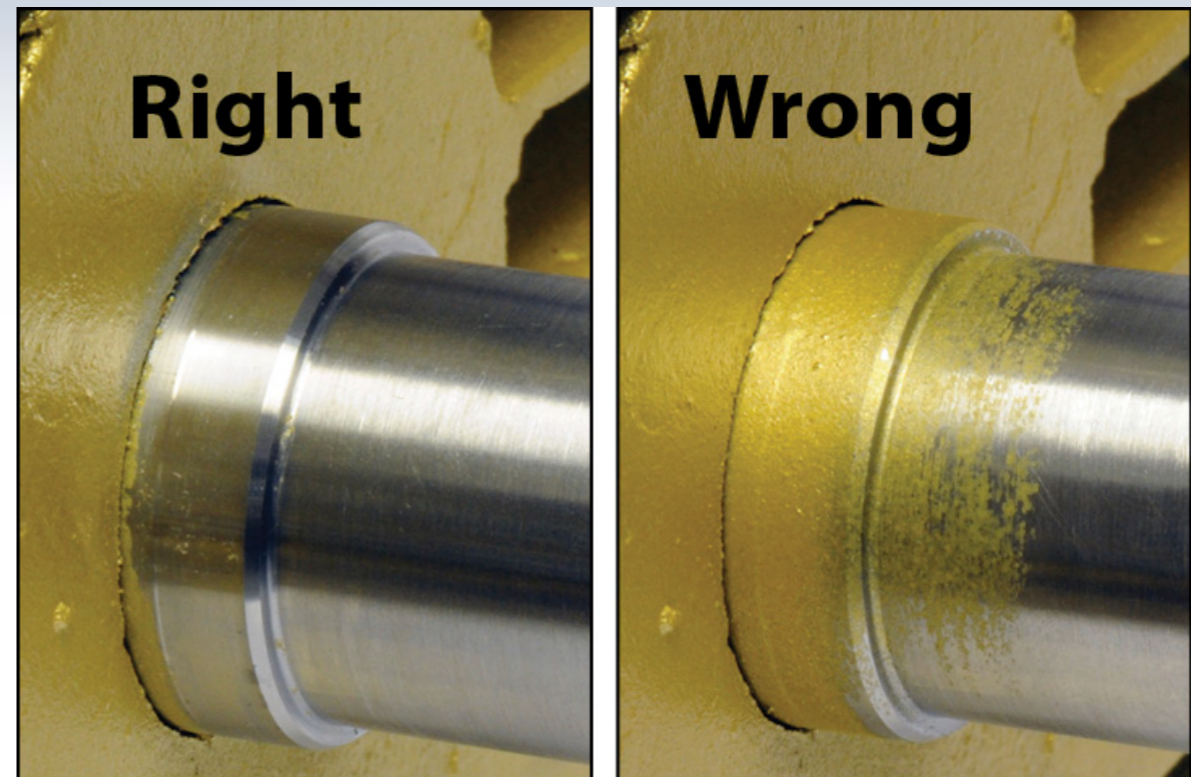
Shaft Preparation

Motor shaft must be conductive:

Shaft must be clean and free of any coatings, paint, or other nonconductive material (clean to bare metal).

Depending on the condition of the shaft, it may require using emery cloth or Scotch-Brite™.

If the shaft is visibly clean, a non petroleum based solvent may be used to remove any residue.



Remove
paint!

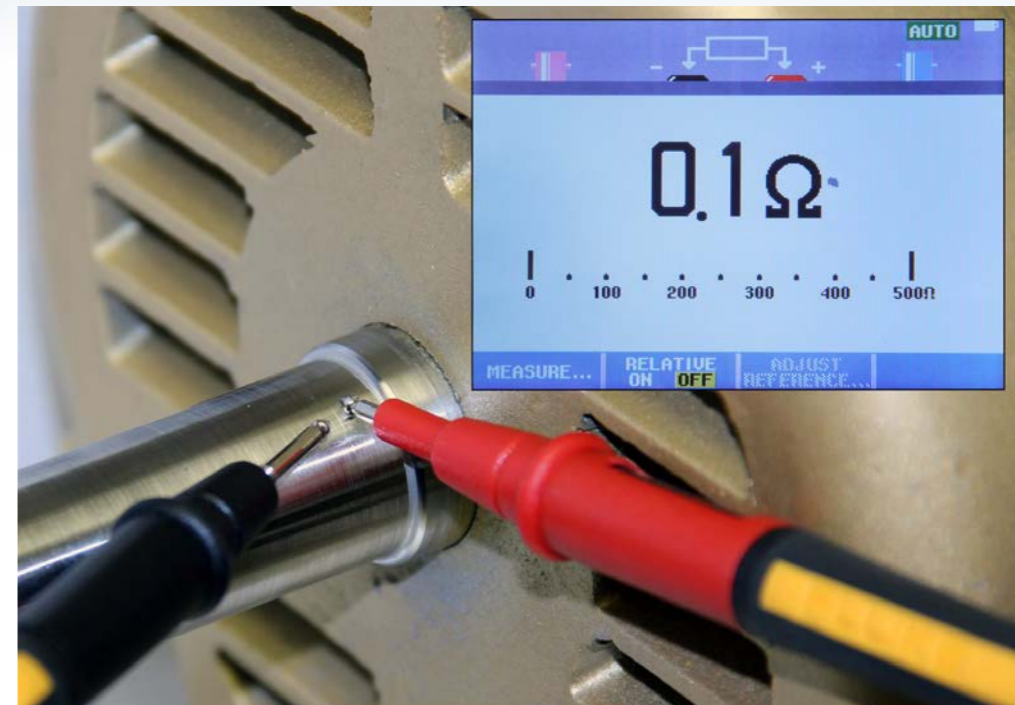
Shaft Preparation

Ohms test:

Place the positive and negative meter leads on the shaft at a place where the microfibers will contact the shaft.

Each motor will have a different reading but in general you should have a maximum reading of less than 2 ohms.

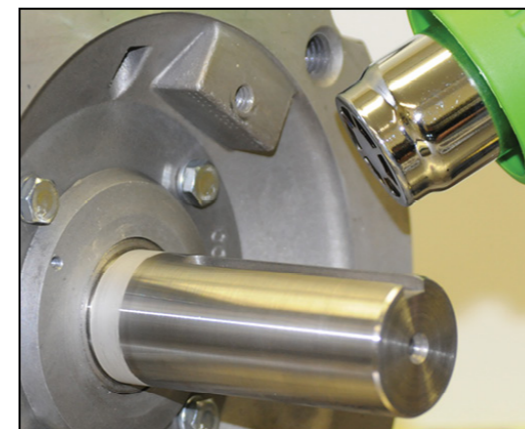
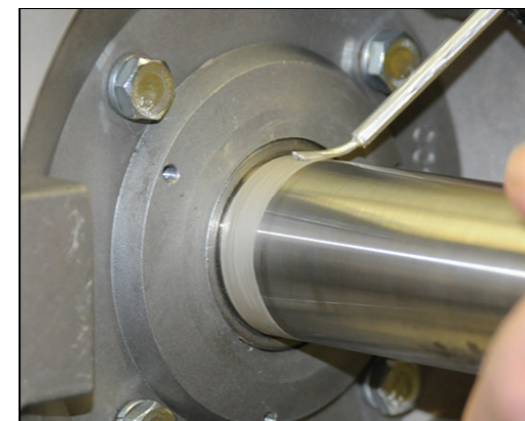
If the reading is higher, clean the shaft again and retest.



Shaft Preparation

Colloidal Silver Shaft Coating (CS015) is recommended for all applications. The silver coating enhances the conductivity of the shaft and also lessens the amount of corrosion that can impede the grounding path.

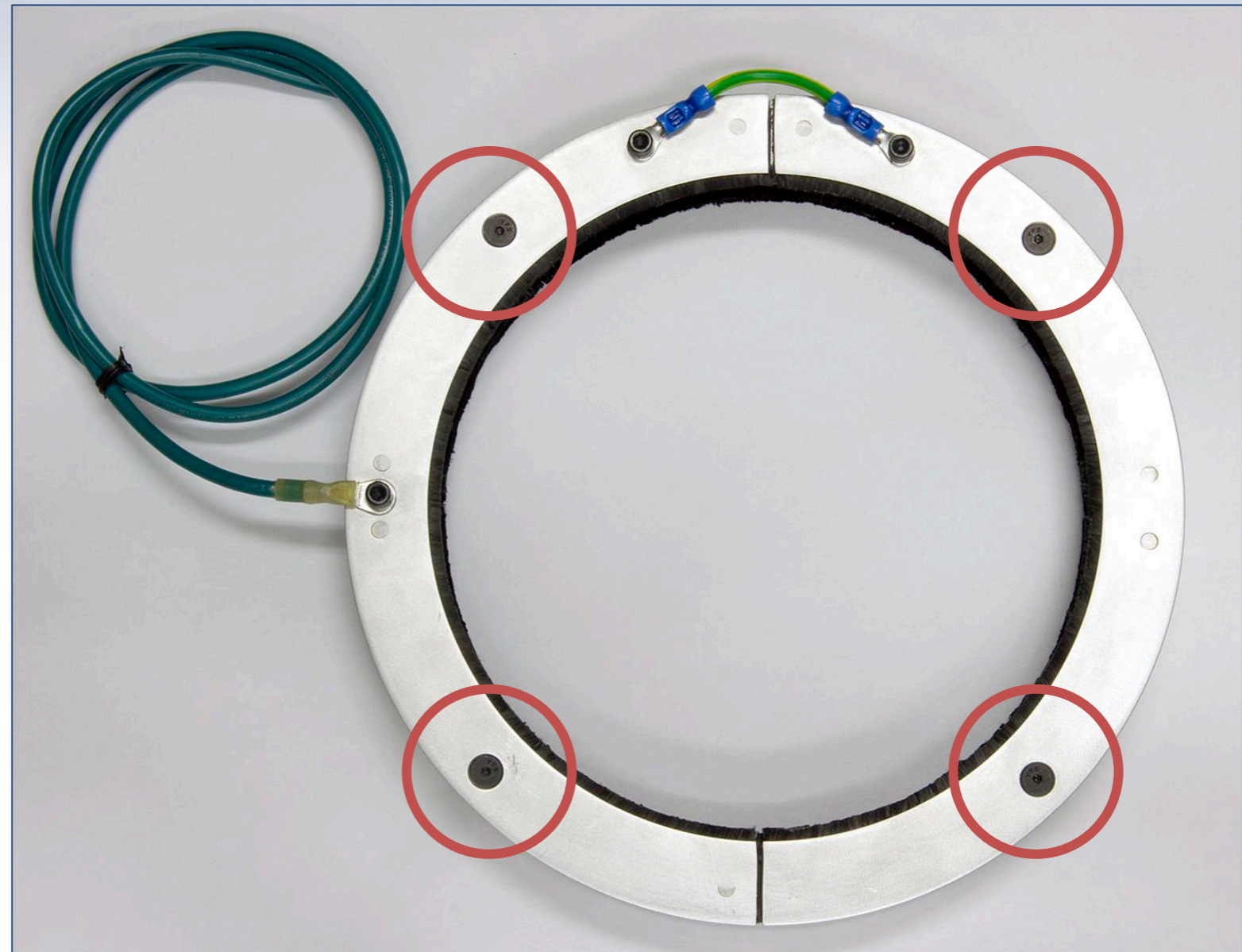
1. Shaft must be clean and free of any coatings, paint, or other non-conductive material. The shaft must be clean to bare metal.
2. Thoroughly stir the silver coating. Apply a light coat of the AEGIS® Colloidal Silver Coating to the area where the AEGIS® microfibers are in contact with the motor shaft. Apply evenly all around the shaft. Allow to dry. Coating will cure at room temperature in 16-20 hours or in 30 minutes at 120-200°C. A heat gun will cure the material in seconds.
3. Apply a second coat for best coverage. Allow to dry. After coating is dry, install the AEGIS® WTG-MR.
4. Follow all safety precautions. MSDS for CS015 available for download at www.est-aegis.com.



Colloidal
Silver Shaft
Coating
PN# CS015

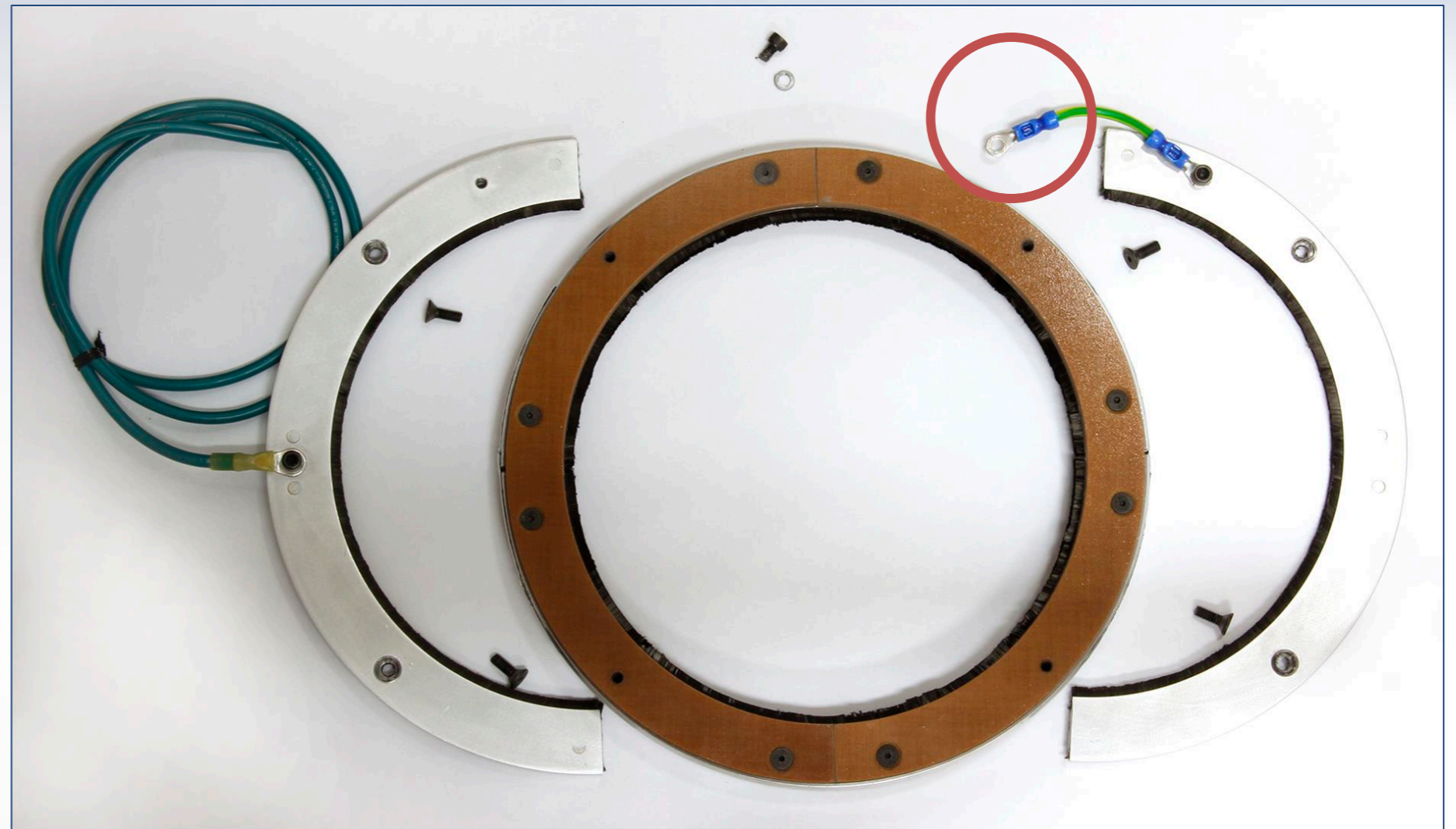
Disassemble the WTG-MR

Remove 8-32
FHCS (4x) using
3/32 allen
wrench.



Disassemble the WTG-MR

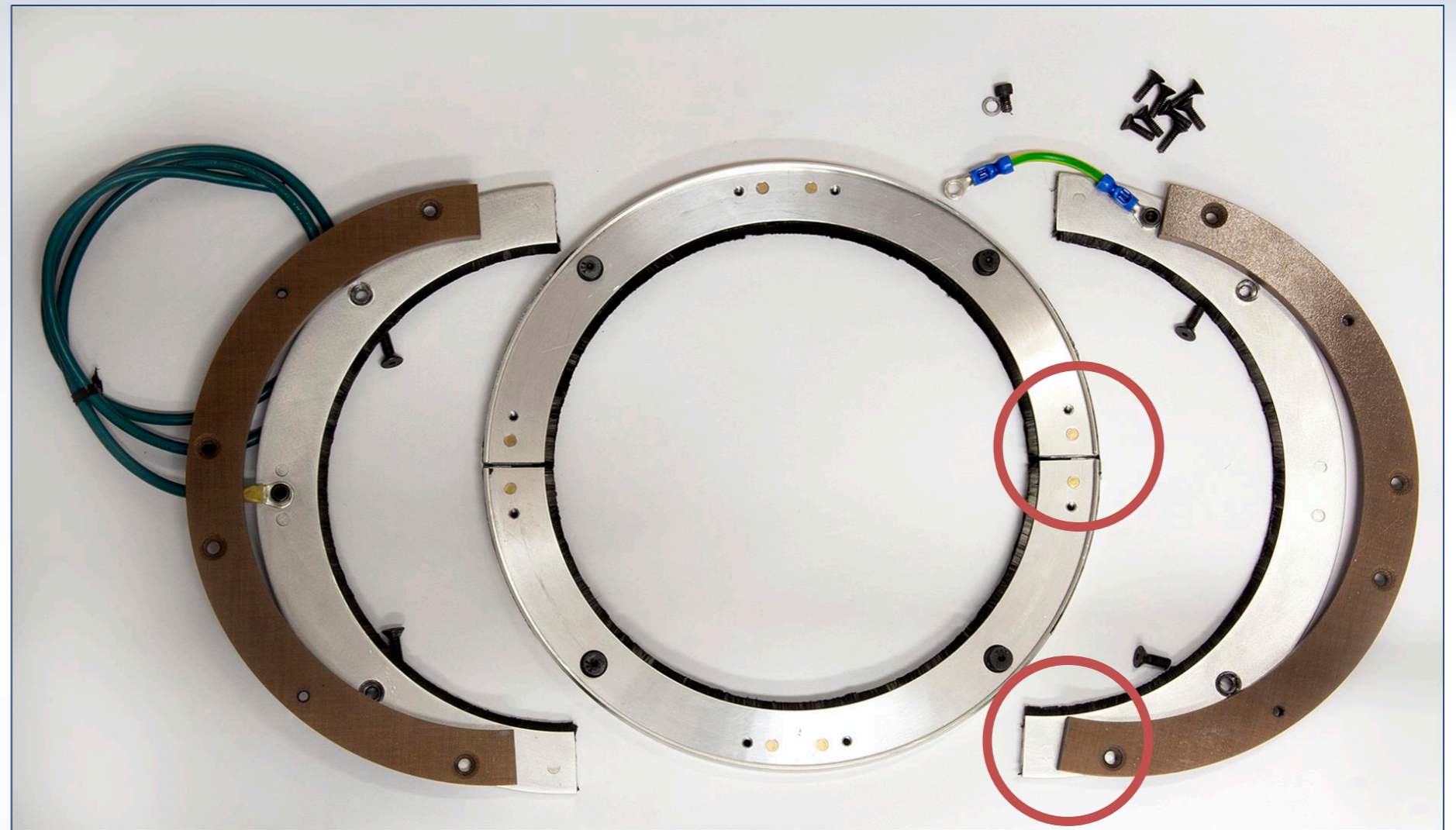
Remove
tether wire
from one
side using
9/64 allen
wrench.



Disassemble the WTG-MR

Remove phenolic ring using 5/64 allen wrench.

Notice top monitoring ring and phenolic ring are split at the top and bottom. The grounding ring is split left and right. Ring should be reassembled in the same way to maintain roundness of the ring.

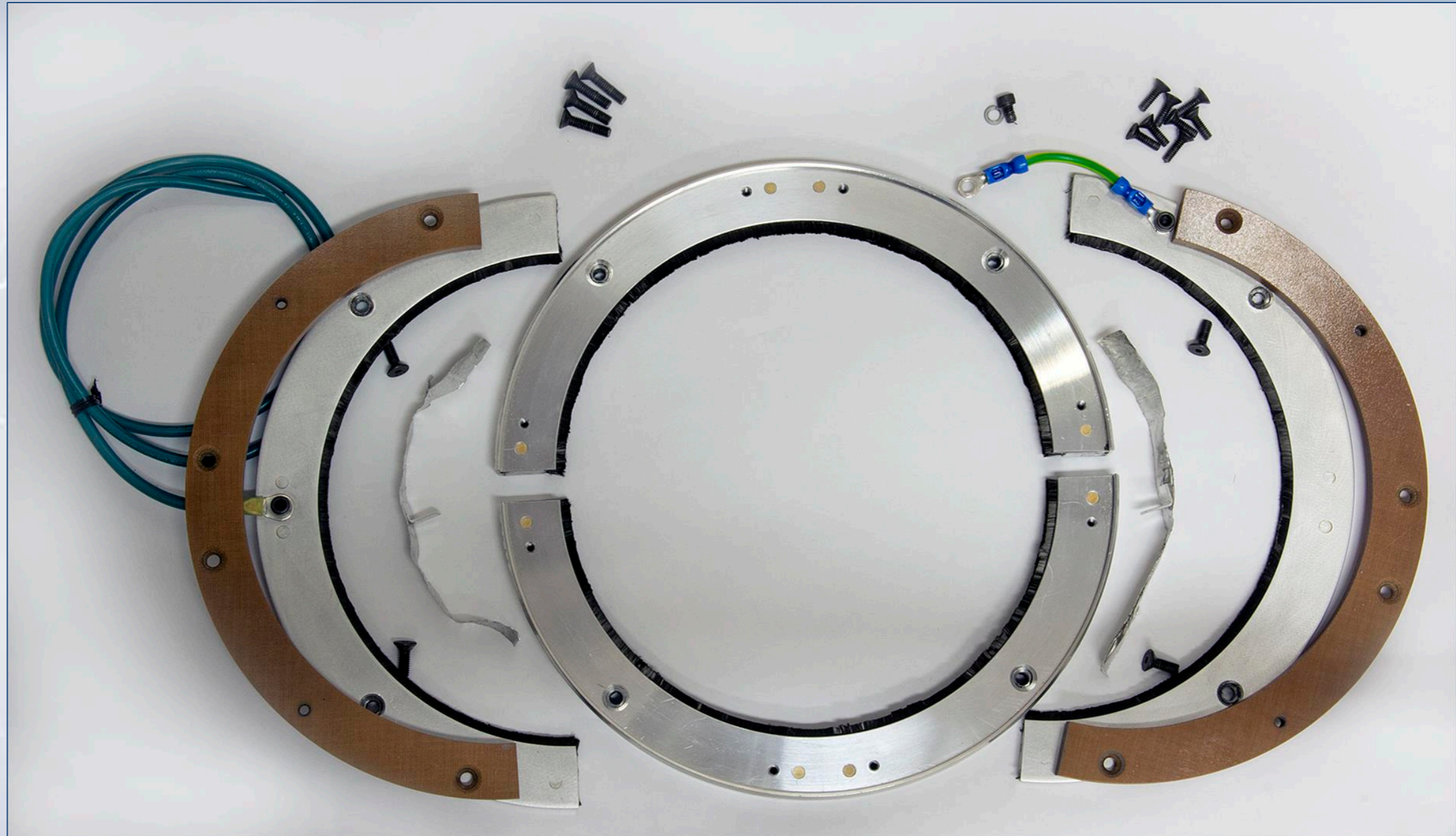


Disassemble the WTG-MR

On each side of the grounding ring, there is a silver tape holding a spacer. This is used to maintain roundness during installation. Remove the tape from both sides to separate the ring.



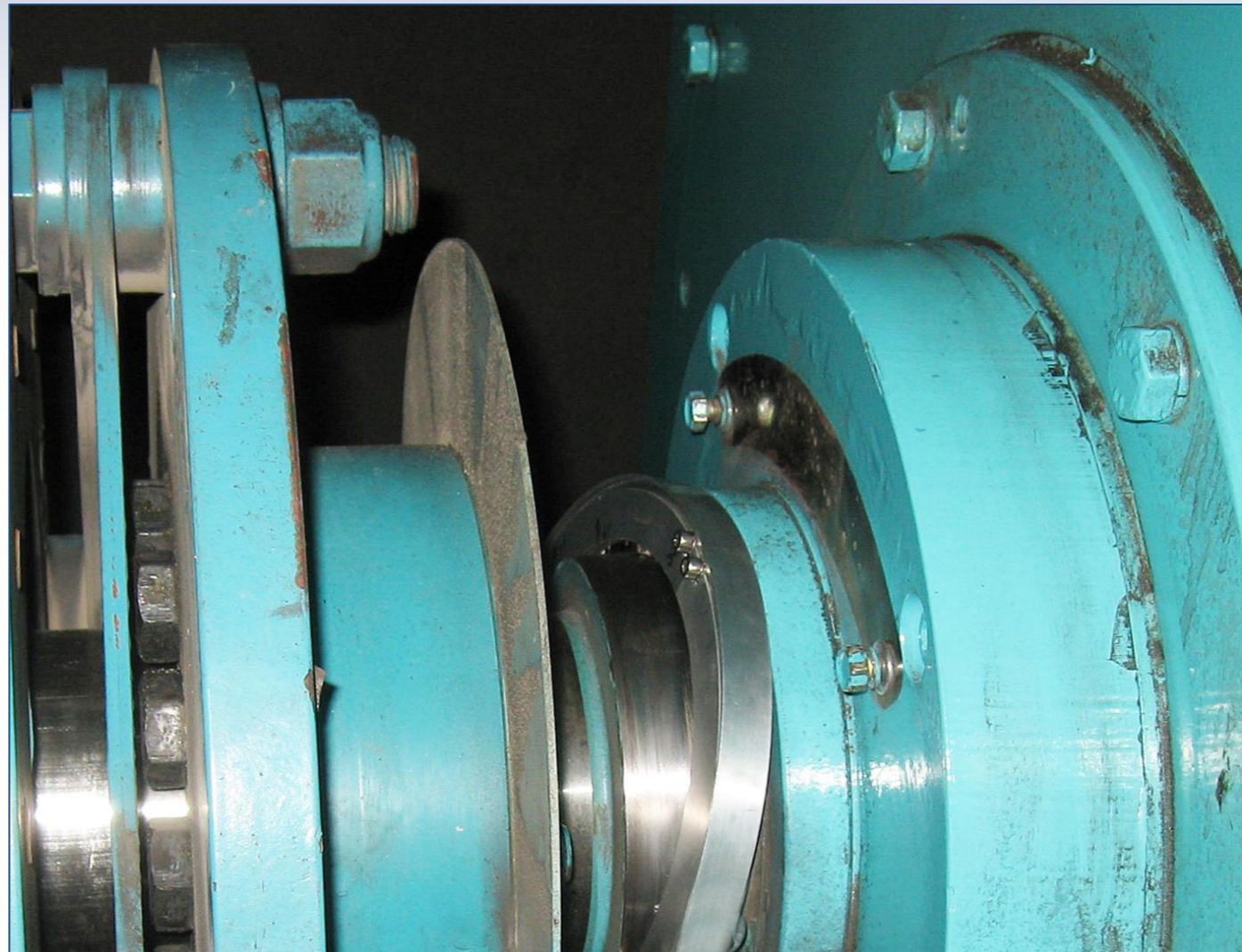
Disassemble the WTG-MR



Prepare Generator End Bracket

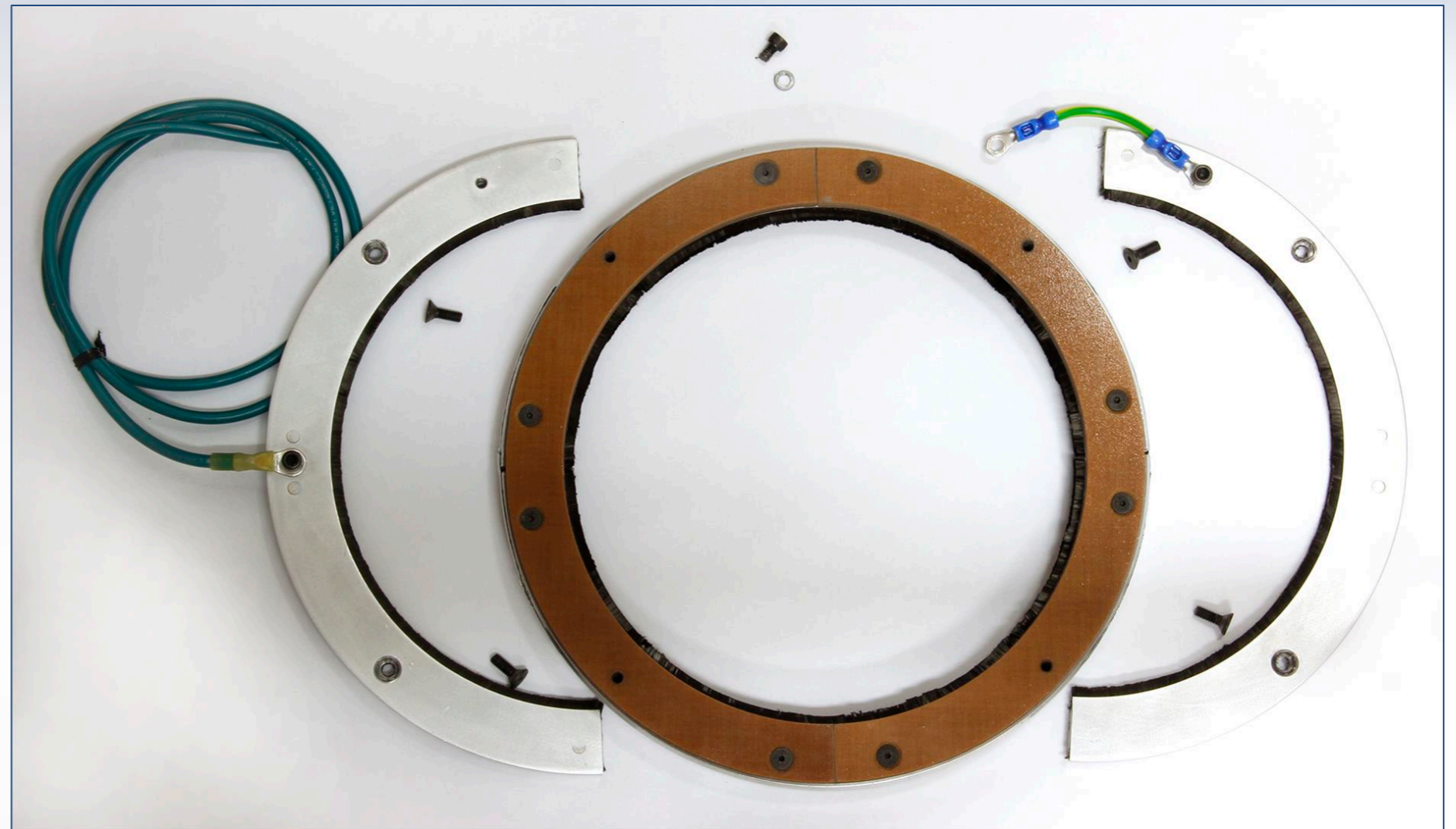
Prepare generator end bracket for installation.

Ensure hole/ mounting bracket placement, proper grounding, and shaft preparation.



Reassemble the WTG-MR

Reassemble the ring around the shaft in the opposite order of disassembly.



Reassemble the WTG-MR

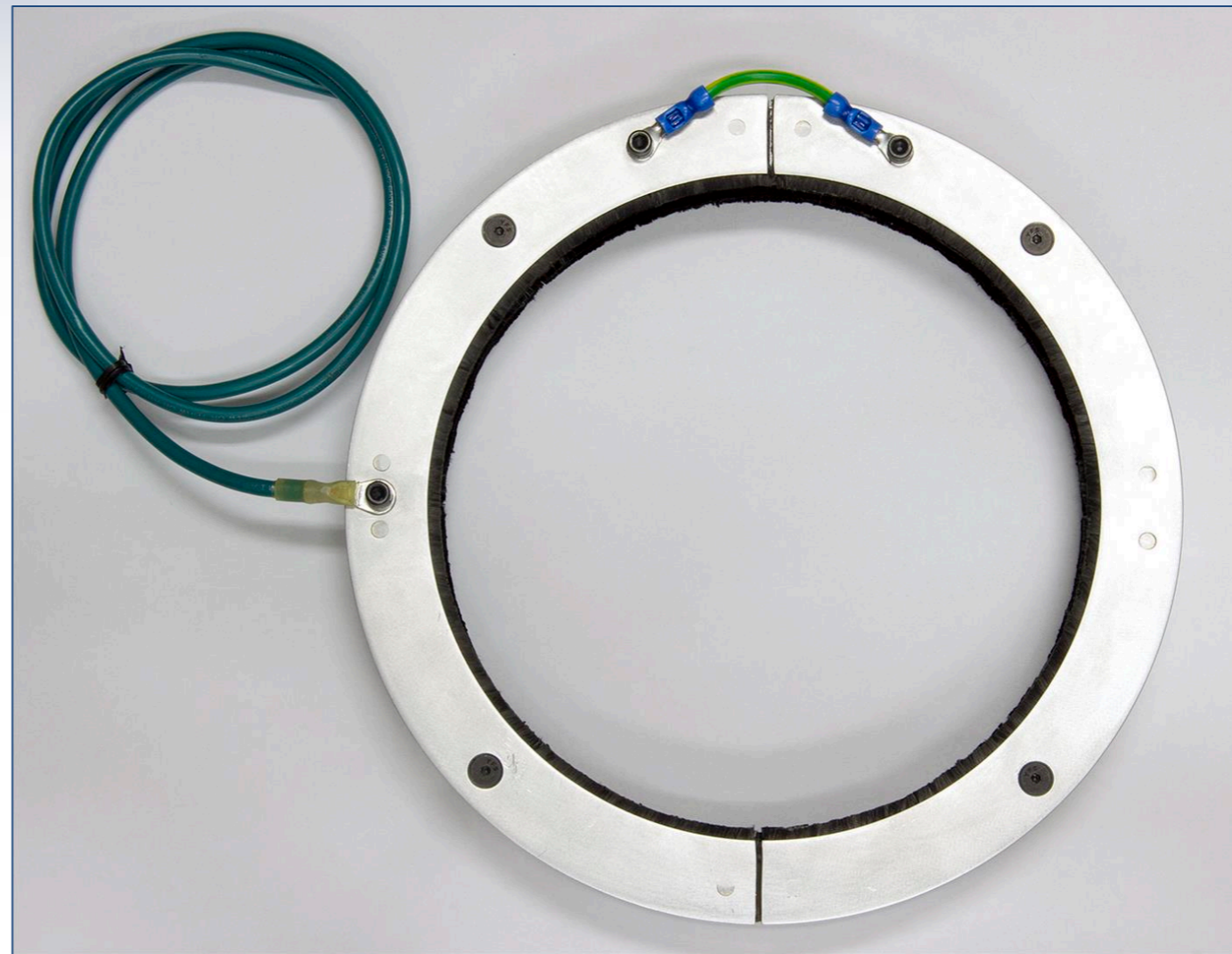
After the WTG-MR is in place, remove the silver tape and spacers and discard them.



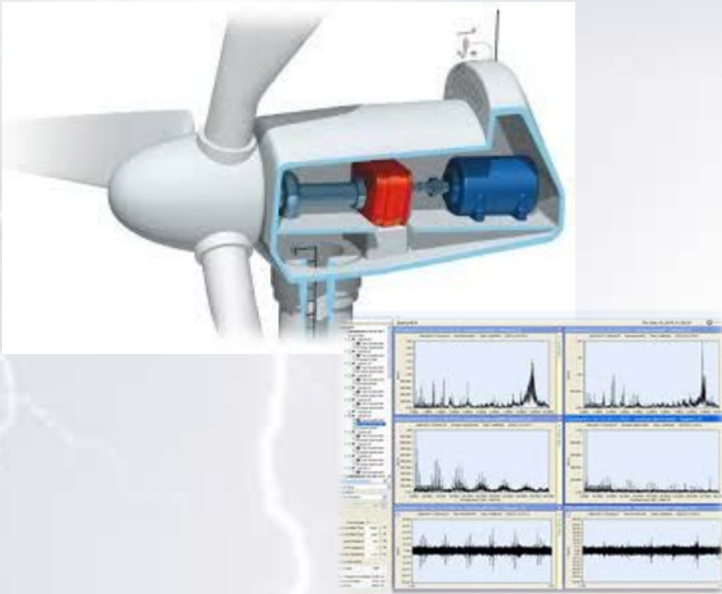
Monitoring Wire

Connect the green monitoring wire to the monitoring device.

For best results, wire should not be longer than 3-4 feet.



Monitoring System Compatibility



- Third party shaft voltage monitoring system
 - Module connects to the AEGIS® WTG-MR
 - Translates shaft voltage readings to data
 - Sends data stream to operations center



- Test equipment
 - Oscilloscope that can record readings
 - Conduct on-site monitoring

Required Maintenance

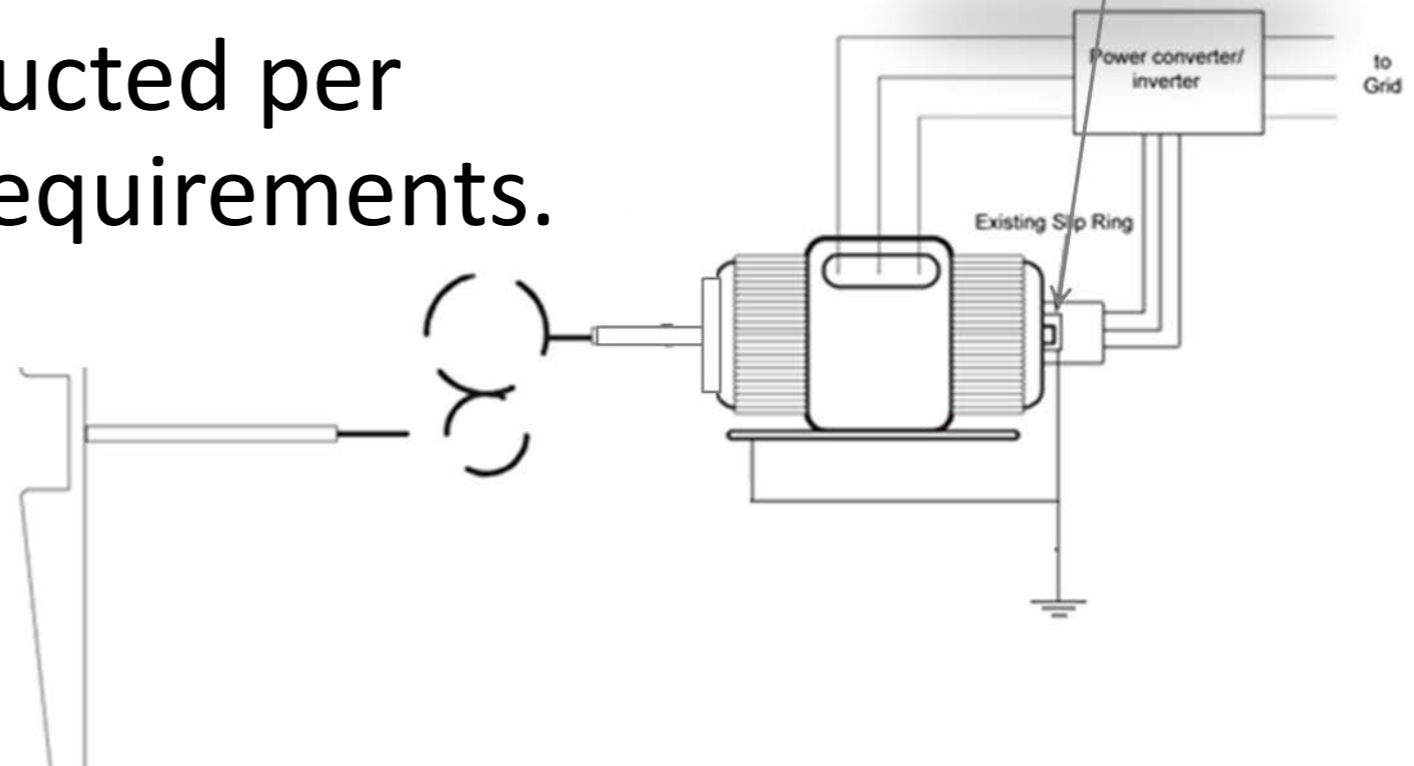
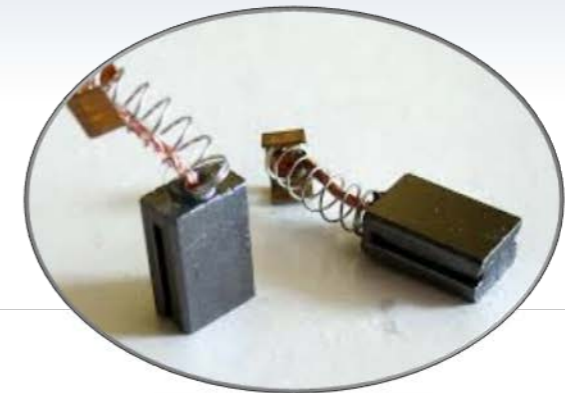
For Best Results:

Inspect and clean shaft every six months. Remove AEGIS® WTG-MR from shaft and clean any corrosion or material from shaft surface to bare metal using solvent and/or fine grit sandpaper. Reapply AEGIS® Colloidal Silver Shaft Coating (CS015).

The benefit of having a monitoring device is that voltage levels can be easily measured and the shaft maintenance can be done as needed.

Carbon Block on Slip Ring (NDE of wind turbine)

- Carbon block slip ring system should not be removed from the generator.
- Inspection and maintenance should be conducted per manufacturer requirements.



Optional Custom Mounting Brackets

In some cases the bolt through mounting will not support the needs of the generator end bracket and custom brackets are needed.

Contact EST Engineering for a custom design.



Conclusions

- Without shaft voltage monitoring, the installed systems can fail ***and you may not know it!***
- Installing AEGIS® WTG-MR is the best practice for ensuring uptime and reliability.
- Tells you that systems are working properly and alerts you potential problems
- Combines AEGIS® shaft grounding technology with 24/7 condition monitoring capability
- ***Pays for its self*** by reducing downtime, repair costs and maintenance.

AEGIS[®] Award Winning Technology

2007	FROST & SULLIVAN
	North American Motors & Drives Product Value Leadership of the Year Award

CONSULTING - SPECIFYING
engineer

2011
PRODUCT OF THE YEAR

Gold

