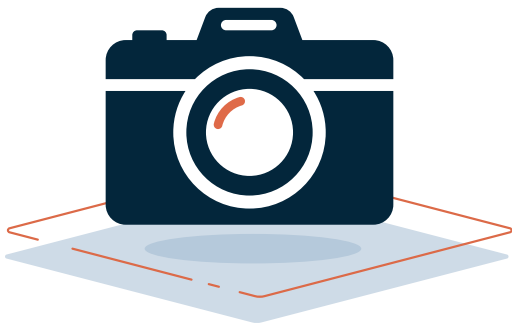


# BGB REPAIRS & REFURBISHMENTS



# BGB REPAIR - SERVICE



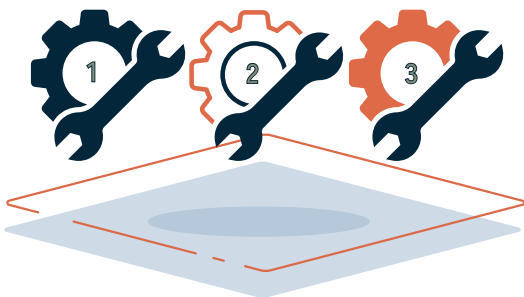
**1.** Send BGB photos of the item(s) to be repaired for a quick assessment



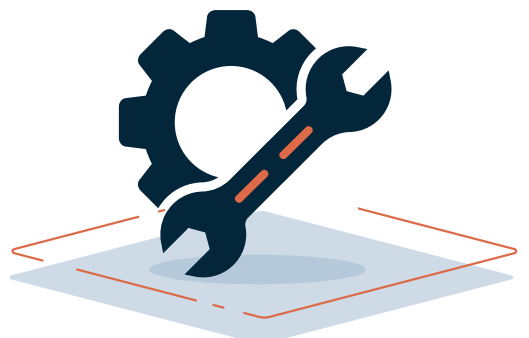
**2.** Complete a BGB 'Return Form' including a provisional PO number



**3.** Ship the products into BGB  
(\*EU ship as 'Temporary Export')



**4.** BGB will assess the unit(s) and provide you with a quote based on our graded system



**5.** BGB will repair the units within 30 days of receipt of the PO  
(You must amend / raise the PO to the correct value)



**6.** BGB will advise when items are ready to be collected

# BGB REPAIR – GRADING

## Typical Grading Structure:



### Grade 1 (Warranty 12 months)

- > Administration (Goods Audit / Commercial Invoice / Product Passport)
- > Product Diagnostics:
  - \* Cleaning
  - \* Measurement Checks
  - \* Product & Insulation Test
- > Machining
- > Minor Component Replacement
- > Product Assessment
  - \* Measurement Checks
  - \* Product & Insulation Integrity Retest
- > Balancing



### Grade 2 (Warranty 12 months)

#### As Per Grade 1 +

- > Disassemble
  - \* Modular Process
  - \* Moulding Process
- > Reassemble or Mould
  - \* Replacement of Components with Reclaimed Parts
  - \* Basic Rewiring
  - \* Soldering Upgrade Where Needed
  - \* Modular or Moulding



### Grade 3 (Warranty 24 months)

#### As Per Grade 2 +

- > One or More Replacements of:
  - \* Rings
  - \* Bearings
  - \* Major Rewire
  - \* Seals
  - \* Brushes
  - \* PCB's
  - \* Housing
  - \* Silver Plating (where necessary)



Beyond repair?  
We could buy it from you

Note: Slip ring repair only, \*Kit sets can be replaced at extra cost.  
Any slip ring not listed as a Grade can be repaired and quoted on a case by case basis.  
\*Kit sets defined as "Selected ancillary components to the parent unit"

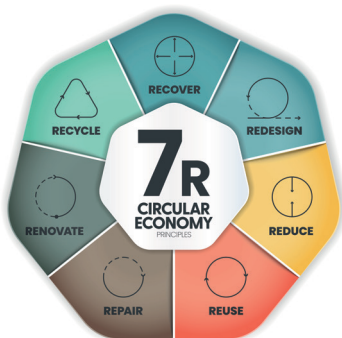
# BGB REPAIR - THEORY

## The Inertia Principle

The Renewables industry should, by its nature, be leading the way in the development and implementation of Sustainable practices. In support of such principles and to ensure we meet our moral and social requirements we apply the Inertia Principle to our Repairs service. The key elements are;

1. We do not Repair what is not broken
2. We do not Remanufacture what can be Repaired
3. We do not Recycle what can be Remanufactured

Additionally, if we see an opportunity for items to be Repurposed then this also takes the lead on Recycling of goods.

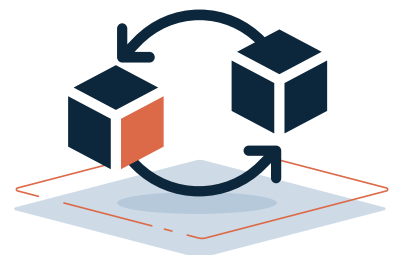


## Circular Economy

These ethical processes start at the Product Development process with our Design Engineering teams thinking Circular. This results in the manufacture of more robust products, thus increasing the time necessary between service intervals. Additionally, we make sure that new products lend themselves to being repaired and where possible, most, if not all of the material is recyclable. This again supports Sustainable practices and moves us from a traditional linear model of Make, Use, Dispose to one of Circular thinking where we make, use, repair, remanufacture, repurpose or recycle.

## Repairs Exchange

We understand that down time is extremely expensive. Consequently, we have developed a Stock and Exchange practice to significantly reduce the leadtime on repairs, allowing for a rapid return. This offering may not be for all clients, as there is often an initial investment to buy and stock products. As soon as a Repaired unit is received or upon the Customer calling off their stock, items will be dispatched within 24 hours. Overall minimum stock quantities are to be agreed but is all included in the price of the service.



# BGB REPAIR - PROCESS

## Procurement of Scrap Units

In the unlikely event that the product is beyond economical repair, it could be that we offer you the price of the scrap value from your next repair or purchase of either a new or refurbished unit, subject to availability. This not only supports our clients environmental credentials but it also removes any administrative burden and costs for logistics.



There could be occasions where an assessment fee is chargeable. This is typical when a grading structure is not yet in place. Without such a structure, the product in for repair will require one of our engineers to investigate any faults and if feasible, source and secure component parts. In these situations, we take the client through our process, keeping them up to date on progress.

## Assessment

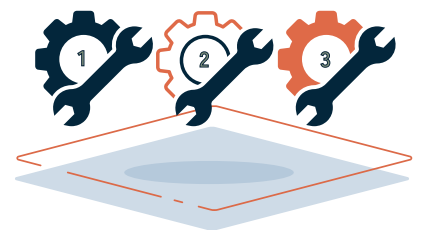
## Grading & Pricing Options

To ensure our clients receive great value, we typically operate on a 3 tier grading system:

**Grade 1** consists of a full strip down of a product, deep clean, ring maintenance, wiring inspection, reassemble, balance and test.

**Grade 2** is the same as Grade 1 but with the inclusion of minor component parts being replaced.

**Grade 3** is the same as Grades 1 and 2 but with the replacement of critical component parts being replaced and potential ring replating.



# BGB REPAIR - QUALITY

## Peace of Mind

Our Brand reputation speaks for itself, as do our accreditation to industry standards for, Quality (ISO9001), Environmental (ISO 14001) and Health & Safety standards (ISO 45001). We Repair and Remanufacture with great pride and precision. Not only that, but every repair is subject to appropriate tests and quality inspections prior to dispatch, giving the customer complete peace of mind. Warranties are offered on each grade of repair.



### Did You Know?

BGB has provided slip ring systems to many wind OEMs since the early 1990's and have produced **over 1 Million** rotary solutions for the wind industry in the past 10 years





# BGB REPAIRS & REFURBISHMENTS

OEM Turbines



Refurbishments: **Wind**

# Gamesa – Slip Ring Repair



BGB has repaired a vast amount of pitch control and generator slip rings for the Gamesa platform. With BGB's US and UK manufacturing and repairs facilities it leverages its locations to support wind farms that have strayed from ideal fair-weather climates.

The most common failure mode observed is from **oil ingress** or from damaged gold wire brushes.

BGB has over 30 years in the wind industry and has the skills, experience and supply chain to restore failed slip ring units, recover structural elements, and replace wearing and compromised parts.

**PLATFORMS: G5X, G8X, G9X**

**REPAIR CATEGORY:** Pitch Control Slip Rings

**MODEL REPAIR REFERENCE:**

- > Label: SLIP RING ASSY G8 6P4020200 LA  
Gamesa Part No: GP000322
- > Cobham: SLIP RING ASSY G8 6P4016211 CO  
Gamesa Part No: GP127960 / 6P4016211

**REPAIR CATEGORY:** Generator Slip Rings

**MODEL REPAIR REFERENCE:**

Generator: **CANTAREY**

SLIP RING 850 KW GEN G5X - GP038507

SLIP RING GEN CANTAREY CR3X G5

SLIP RING 2MW GEN CANTAREY CWS

Generator: **ABB**

G8X SLIP RING: GP024559

Generator: **INDAR**

G52 IND.G.0021 COLLECTOR RINGS

G5X INDAR GP050057

G8X INDAR GP029507 / 50935

Generator: **LOHER/WINERGY**

G8X Loher GP024281



Refurbishments: **Wind**

# Senvion – Slip Ring Repair



BGB has repaired many pitch control and generator slip rings for the Senvion platform. Since Senvion filed for liquidation in 2019, BGB has worked with its customer base to ensure continuity of supply through repairing existing units and provision of new generator slip rings.

The most common failure mode observed is from **water ingress** during storms. During stop, the rotor is stationary which leads to water leaking from the hub through the hollow shaft into the slip ring on the 400V channels.

**PLATFORMS: MD70, MM82, MM92**

**REPAIR CATEGORY:** Pitch Control Slip Rings

**MODEL REPAIR REFERENCE:**

- > Slip Ring 5K0 1818 03-B SCHLEIF
- > Slip Ring BODY FC.13063.99 VEM
- > Slip Ring UNIT 65A 400V SAF/SK0247601 EBC
- > Slip Ring UNIT USDK264 A9BSEN28836 3.XM

**REPAIR CATEGORY:** Generator Slip Rings

**MODEL REPAIR REFERENCE:**

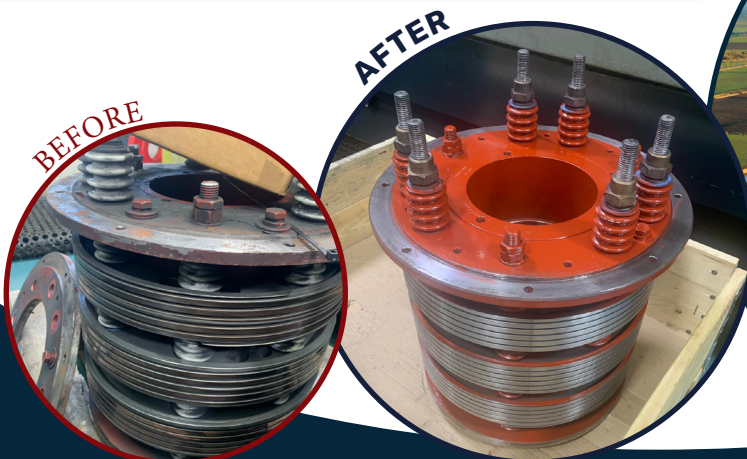
Generator: VEM DASAA 5025-4UA

Slip Ring: FC.13234.99/29024

Winergy JFEB-500SS-04

**NEW SLIP RINGS – IN STOCK**

BGB leverage's over 30 years in the wind industry. Within our unmatched skills and supply chain we have the ability to restore failed slip ring units recovering structural elements and replacing wearing and compromised parts.



Refurbishments: **Wind**

# Enercon - Slip Ring Repair



BGB has developed its repair capabilities for the Enercon pitch control slip rings over recent years. The pitch control slip rings mounted in the hub see a lot of rainfall, are heavy and expensive. They use either gold wire or carbon brushes and owners can expect significant cost savings when they repair these units.

The most common failure modes are encoders, brush damage, connector damage and ring contamination.

Dust build up is common on the power rings from the metal graphite brushes. Gold wire slip rings also suffer from contamination and broken brushes. As a slip ring manufacturer BGB has a developed supply chain and engineering capabilities to recreate broken components, including replacing brushes, bearings and seals.



**PLATFORMS: E48, E70, E82**

**REPAIR CATEGORY:** Pitch Control Slip Rings

**MODEL REPAIR REFERENCE:**

**60533/ 95291** - Slip ring unit

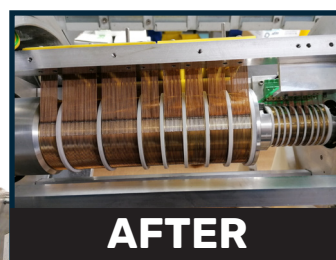
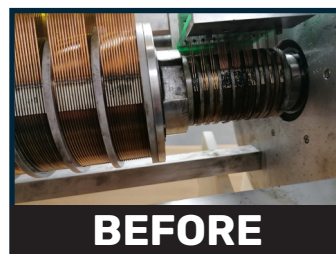
LABEL V3 E70/4 no attach.

**65830 / 71695 / 622127** - Slip Ring Unit

COBHAM V5 E48

**94665 / 546688** - Slip ring unit

COBHAM V6 E82 no att.w.h.



BGB leverages over 30 years in the wind industry. Within our unmatched skills and supply chain we have the ability to restore failed slip ring units recovering structural elements and replacing wearing and damaged parts.

Refurbishments: **Wind**

# Vestas - Slip Ring Repair



BGB has been repairing NEG Micon and Vestas slip rings since 1994. With well over 1000 units repaired to date, we take pride in supporting legacy wind turbines through the repair process as the original equipment manufacturer.

The NEG Micon slip rings were designed with circular economy in mind, and most slip rings, despite their age, see good results from a refurbishment service. The typical failure mode is oil ingress from the gearbox and with access to all components, BGB is able to offer a high yield, low cost service with a fast turnaround.

The Vestas generator slip rings often exhibit wear damage from copper brushes, earth ring damage or general wear. As the original manufacturer, BGB has the ability to replace all wearing and structural parts with new if required.



**PLATFORMS: NN48-70, V52-V90**

**REPAIR CATEGORY:** Pitch Control Slip Rings

**MODEL REPAIR REFERENCE:**

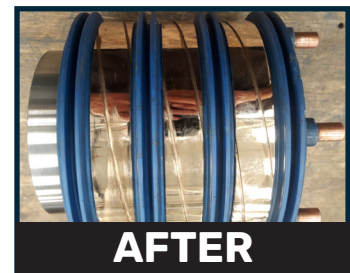
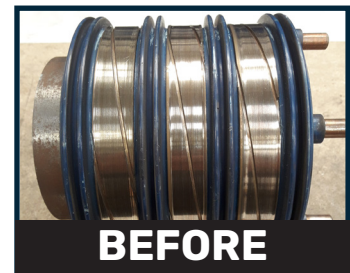
**NEG Micon: 10 way** - 60061413 / 60061414 / 2712500 / 1985700

**NEG Micon: 18 way** - 60079296

**NEG Micon: 23 way** - SA4763R

**V82: 17 way** - 60093429

**V112: 14 way** - 10207792



**PLATFORMS: V52, V80, V90-3, V90-2**

**REPAIR CATEGORY:** Generator Slip Rings

**MODEL REPAIR REFERENCE:**

**V52/V80:** 753265 / 753895

**V90-2MW:** 753917

**V90-3MW:** 753257 / 753770 / 753780

BGB leverages over 30 years in the wind industry. Within our unmatched skills and supply chain we have the ability to restore failed slip ring units recovering structural elements and replacing wearing and damaged parts.

**New and refurbished  
slip rings in stock**

Refurbishments: **Wind**

# GE - Slip Ring Repair

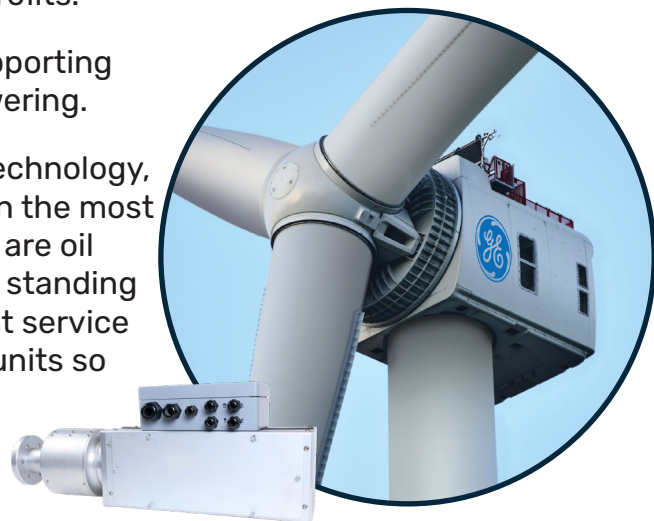


BGB has been involved in the GE WTG market for over a decade. Since manufacturing the units for the OEM at our facility in Virginia we have been active in supporting our wind farm owners in improving robustness and reliability through FORJ retrofits.

Our service can help reduce waste and cost whilst supporting legacy machines as they approach end of life or repowering.

The GE pitch control slip rings use gold wire contact technology, carbon and even fibre optics. We are able to repair even the most damaged slip rings. Typical failure modes for slip rings are oil ingress, carbon dust build up, damaged bearings from standing and broken brushes. We can offer a high yield, low-cost service with a fast turnaround. We also carry stock of certain units so that downtime is minimised whilst you wait for your repair.

Power and signal cables can often give high resistance readings so BGB changes where required so that the slip ring can easily be connected back into service.



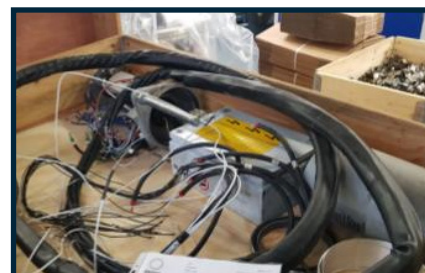
**PLATFORMS: GE1.X, GE2.X**

**REPAIR CATEGORY:** Pitch Control Slip Rings

**MANUFACTURERS:** UEA, Stemman Technik, Moog, BGB, Mersen

**COMMON TYPES:** 25 WAY / 30 WAY ESS / 35 WAY NON-ESS

**PART NUMBERS:** 107W2218P001 ,  
104W9344P001, 105W1765G001,  
107W5487P001, 104W5966P001  
108W4372P001



**BEFORE**



**AFTER**

New and refurbished  
slip rings in stock

**PLATFORMS: GE1.X, GE2.X**

**REPAIR CATEGORY:** Generator Slip Rings

**MODEL REPAIR REFERENCE:**

**Hitachi, VEM, Toshiba, Winergy**

Refurbishments: **Wind**

# Nordex Acciona - Slip Ring Repair



BGB has developed its repair capabilities for the Nordex and Acciona pitch control and generator slip rings over recent years. They use a combination of different contact technologies and owners can expect significant cost savings when they send to repair.

The most common failure modes are brush damage, connector damage and ring contamination. Dust build up is common on the power rings from the metal graphite power brushes. Gold wire slip rings also suffer from contamination and broken brushes. As a slip ring manufacturer BGB has a developed supply chain and engineering capabilities to recreate broken components, replace bearings and seals.



**PLATFORMS: AW1500, AW3000, N80**

**REPAIR CATEGORY:** Pitch Control Slip Rings

**MODEL REPAIR REFERENCE:**

**1040052** - Electric Rotary Joint Deublin

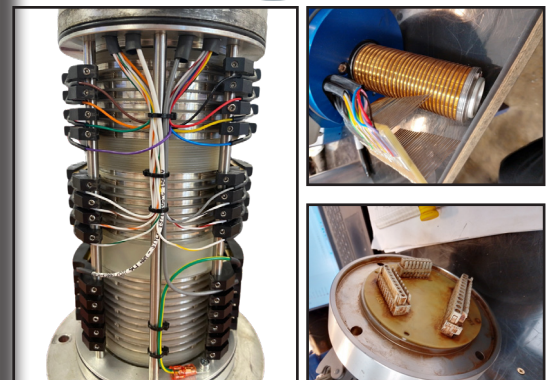
**1009329** - Electric Rotary Joint LTN

**1009422** - Rotary Joint Slip Ring Acciona  
for AW1500

**702208/ 32577** - Rotary Joint Assembly Moog

**27835** - Pitch Control Slip Ring

**Rotary Joint** for AW3000



**REPAIR CATEGORY:** Generator Slip Rings

**MODEL REPAIR REFERENCE:**

**491003** - Junta rotativa 15 anillos eolicos

**7004075/2000557** - Slip Ring Assy INDAR

**REPAIR CATEGORY:** Hydraulic Rotary Joints

**MODEL REPAIR REFERENCE:**

**1040053** - Deublin Hydra Rotary Union

**1009328-2** - Hydraulic Rotary Joint

BGB leverages over 30 years in the wind industry. Within our unmatched skills and supply chain we have the ability to restore failed slip ring units recovering structural elements and replacing wearing and damaged parts.



**PROVIDING ENGINEERING SOLUTIONS SINCE 1976**

**BGB Repair Team**  
1-2 Turnpike Close,  
Grantham, Lincolnshire  
NG31 7XU  
United Kingdom



**North & South America**

**Tel: +1 804 451 5211**

**Europe And Rest Of World**

**Tel: +44 (0) 1476 576 280**

**[sales@bgbinnovation.com](mailto:sales@bgbinnovation.com)**



**@bgbinnovation**