



Bearing Protection



HELWIG CARBON PRODUCTS, INC.

- Family-Owned Company since 1928
- Dominant Source for Replacement Carbon Brushes and Brush Holders in North America
- Major OEM Brush Supplier
- Supplier of Brush holders, Springs, Bearing Protection, and Mechanical Carbons
- One of the last major American owned carbon companies
- Diverse, Dedicated Workforce of over 250 Caring People



MODERN PRODUCTION FACILITY IN MILWAUKEE, WI, USA
135,000 sq. Feet 12,500 sq. Meters



HELWIG CARBON'S PRODUCT LINE



CARBON BRUSHES
BRUSH HOLDERS
BEARING PROTECTION

- VANES
- SEALS
- BEARINGS
- BUSHINGS

QUALITY ISO 9001:2008

Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 9001:2008

This is to certify that:

Helwig Carbon Products, Inc.
 8900 W. Tower Avenue
 Milwaukee
 Wisconsin
 53224-2849
 USA

Holds Certificate No: FM 56120
and operates a Quality Management System which complies with the requirements of ISO 9001:2008 for the following scope:

The design, manufacture, and testing of carbon brushes, brush holders, spring assemblies, mechanical carbons, and related electrical carbon materials and components.

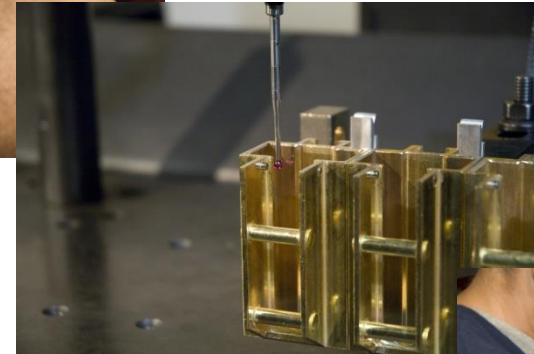
For and on behalf of BSI:

 President, BSI America, Inc.

Originally Registered: 09/26/2000 Latest Issue: 09/30/2009 Expiry Date: 10/16/2012

Page: 1 of 1

This certificate remains the property of BSI and shall be returned immediately upon request.
 An electronic certificate can be authenticated online. Printed copies can be validated at www.bsigroup.com/ClientDirectory.
 To be read in conjunction with the scope above or the attached appendix.
 America Headquarters: 12110 Sunset Hills Road, Suite 200, Reston, VA 20190, USA.



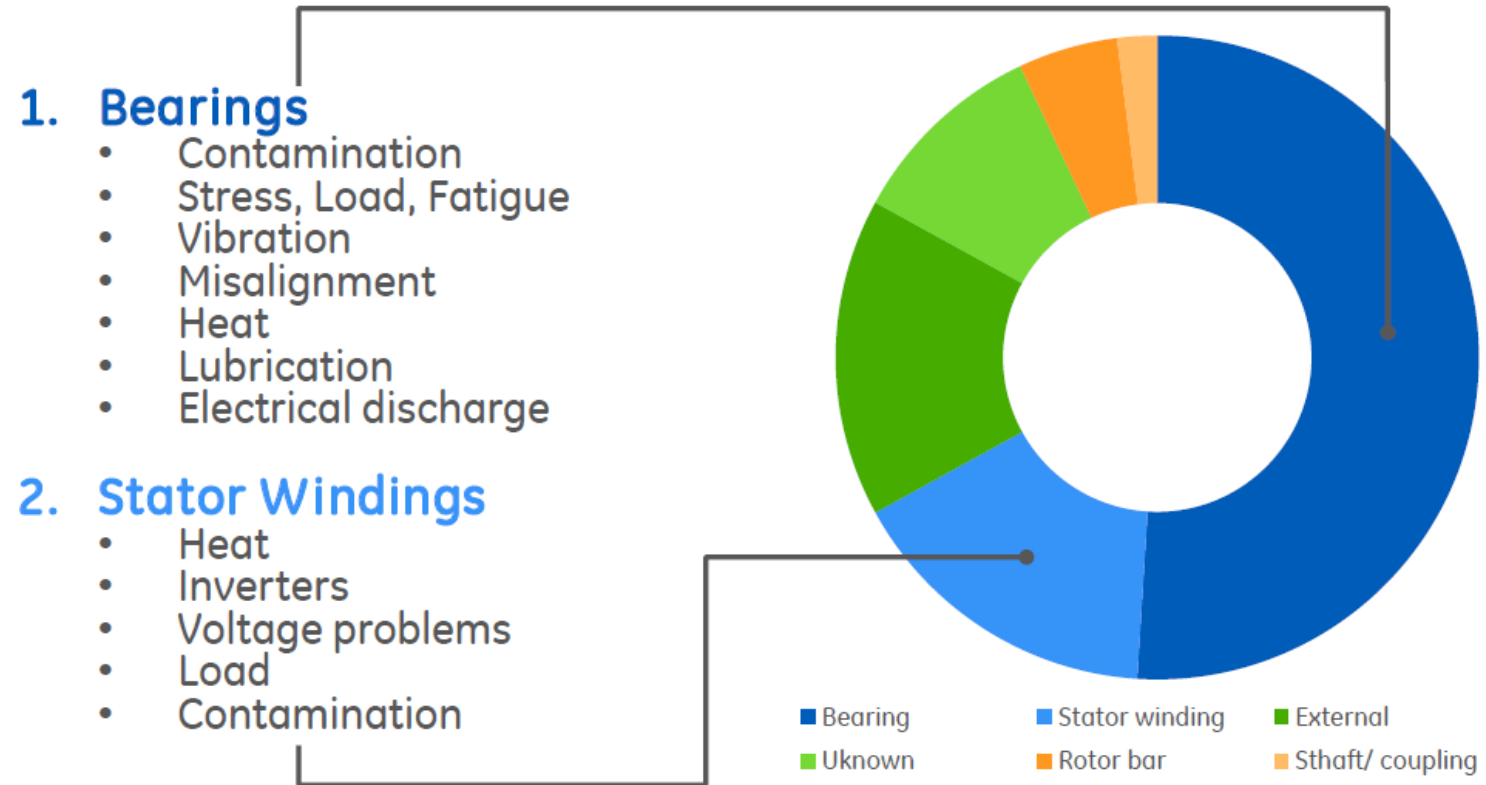
BEARING PROTECTION

WWOA – Southeast Regional Meeting

March 2019

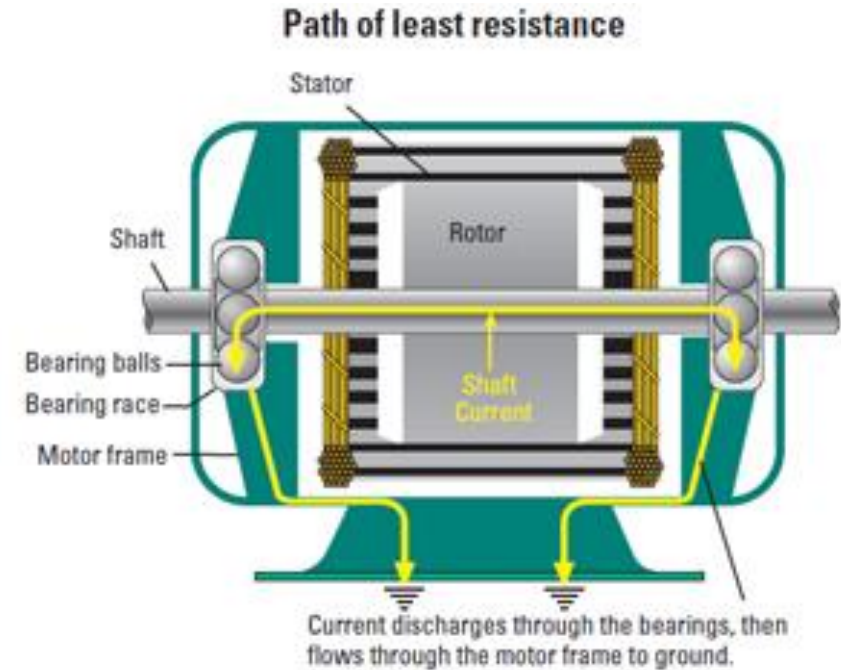


The leading cause of electric motor failures are the bearings, followed by the stator windings.



PROBLEM:

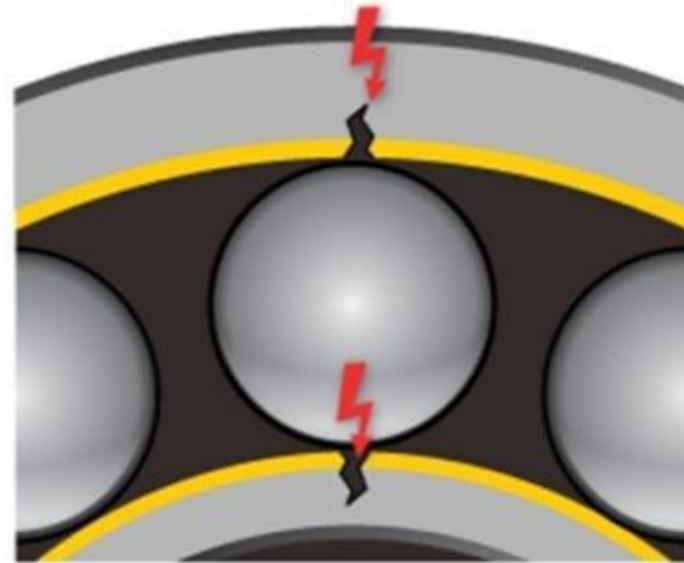
- **VFDs induce common mode voltage on the motor shaft**
- **Current passes from the motor shaft to the bearings to ground**
- **Pitting and Fluting leads to bearing failure and costly repairs**



PROBLEM:

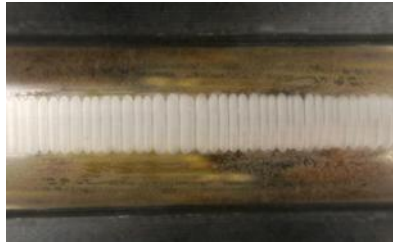
- **Accumulated voltage seeks path of least resistance to ground**
- **Often path leads through motor bearings and bearing race**
- **Voltage discharges greater than 2V will cause bearing damage.**

↓ damage at the surfaces resulting from electrical discharging

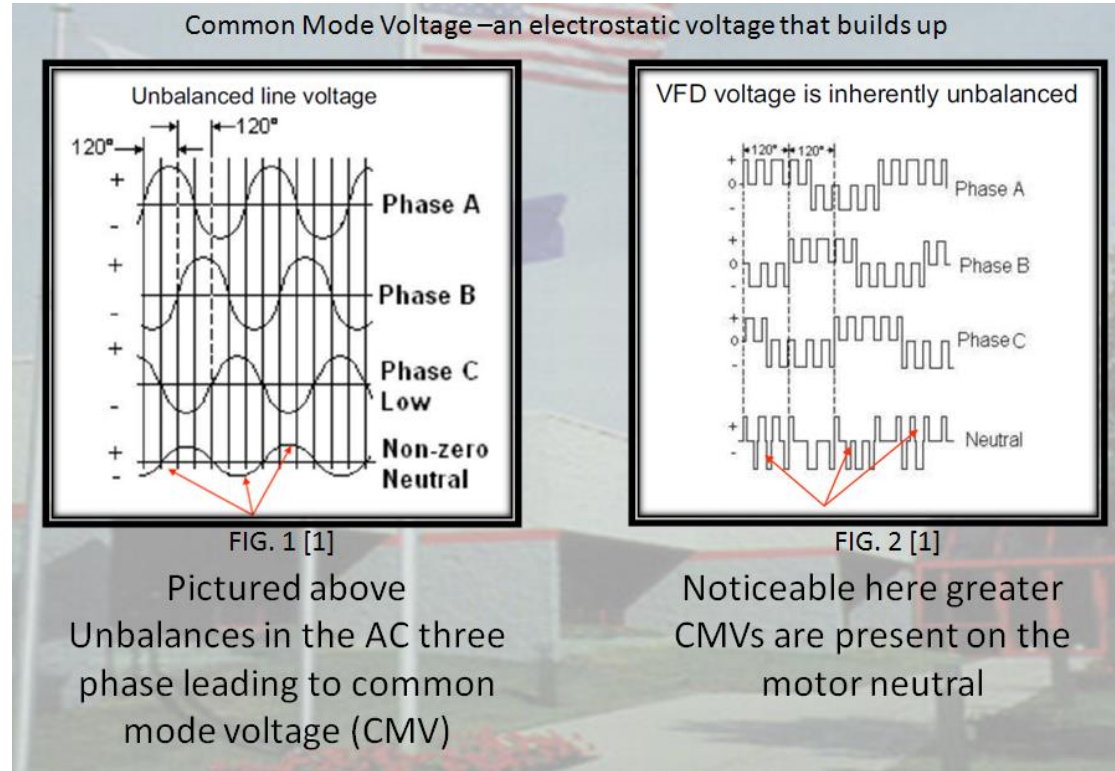


DAMAGE:

This damage is often a fluted pattern, pitting, etc. The resulting irregular surface on the bearing causes noise, vibration, and premature bearing failure.



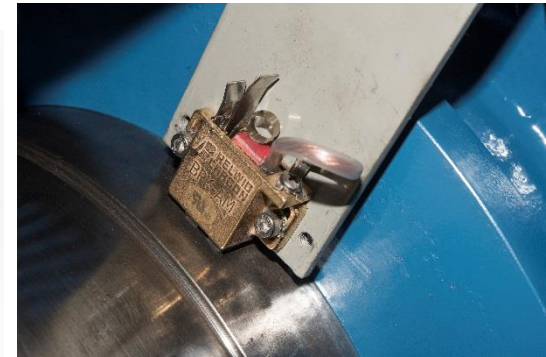
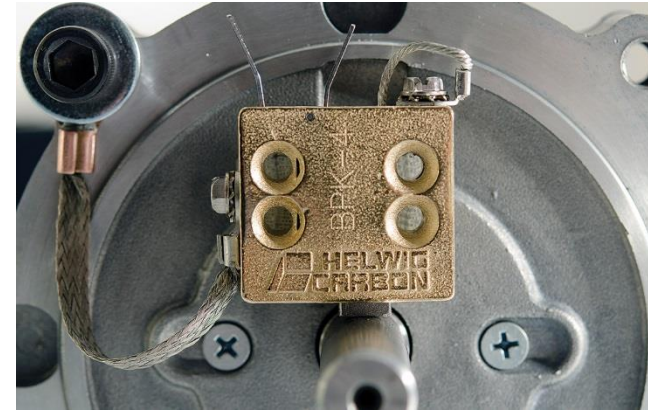
ROOT CAUSES FOR BEARING CURRENT:



OPTIONS:

- **Insulated Bearings: Very expensive with significant lead times**
- **Inductive Choke: Expensive & only partially effective**
- **Conductive Grease: Not an accepted viable solution**
- **Shaft Grounding Fiber Ring: Only reduces the current flow. Difficult to install**
- **Helwig Carbon Bearing Protection Kit: Affordable. Provides low resistant path to ground – less than 1 volt.**

HELWIG CARBON BPK SOLUTIONS:



HOW DOES IT WORK?

- **Silver Graphite Brush provides least resistant path to ground**
- **Constant Force Spring keeps brush in contact with the shaft**
- **Very little electrical wear – almost all mechanical**
- **Extra long life!**
- **Engineered Silver Graphite material is self-lubricating, low maintenance**



UNPROTECTED VFD MOTOR

Shaft Voltage Unprotected



FIBER RING INSTALLED

Shaft Voltage with Fiber Ring



BPK INSTALLED

Shaft Voltage BPK

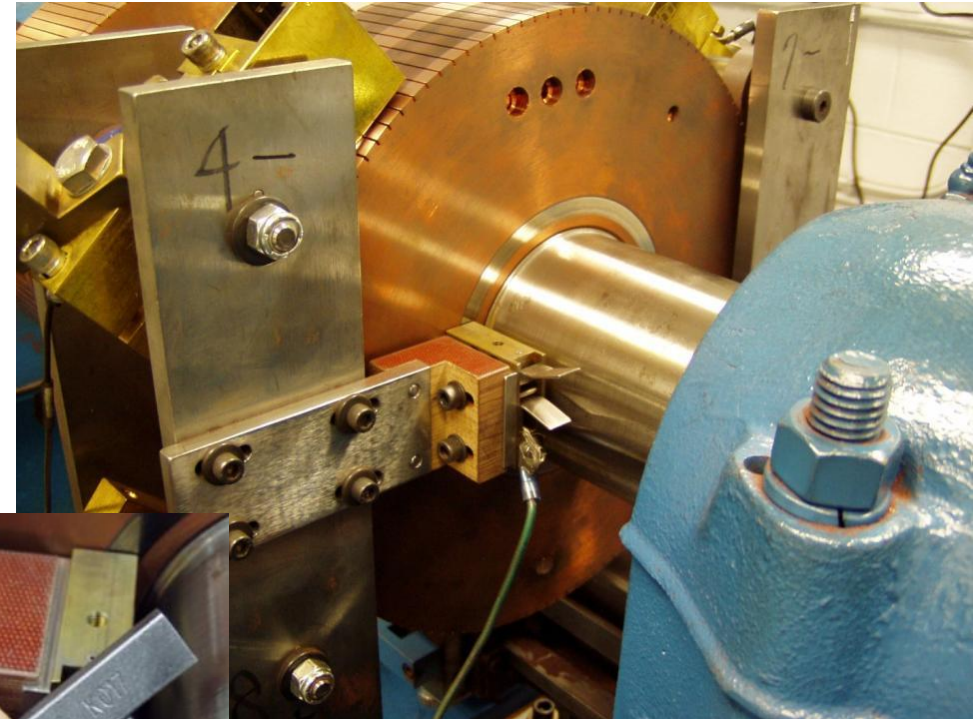


SUMMARY and COMPARISON

Technology	Cost	Ease of Installation	Comments
Insulated Bearings	\$\$\$\$	Difficult	Motor needs to be designed to facilitate insulation
Ceramic Bearings	\$\$\$\$	Difficult	Best done on new motor
Conductive Grease	\$	Simple	Conductive particles increase bearing wear
Metal Fiber Brushes	\$\$\$	Moderate to Simple	Can have very high wear rates Debris between fibers render useless Can carry significant current
Carbon Fiber Brushes	\$\$\$	Moderate	Motor needs to be uncoupled to mount Need different size for each shaft size Needs silver epoxy to enhance the performance Cannot carry higher current Leaves some potential on shaft
Helwig Bearing Protector	\$\$	Moderate to Simple	Can mount without removing motor Universal shaft size Unlimited current carrying capacity Lower inventory Many years of service from a single brush

LONGEVITY TESTING:

- **This brush is running 24-7 for last 10 years**
- **With ZERO bearing failures reported**
- **Still has some brush life left**



ULR COMPLIANT

CERTIFICATE OF COMPLIANCE

Certificate Number 20170223-E485288
Report Reference E485288-20160715
Issue Date 2017-FEBRUARY-23

Issued to: HELWIG CARBON PRODUCTS INC
8900 W TOWER AVENUE
MILWAUKEE WI 53224

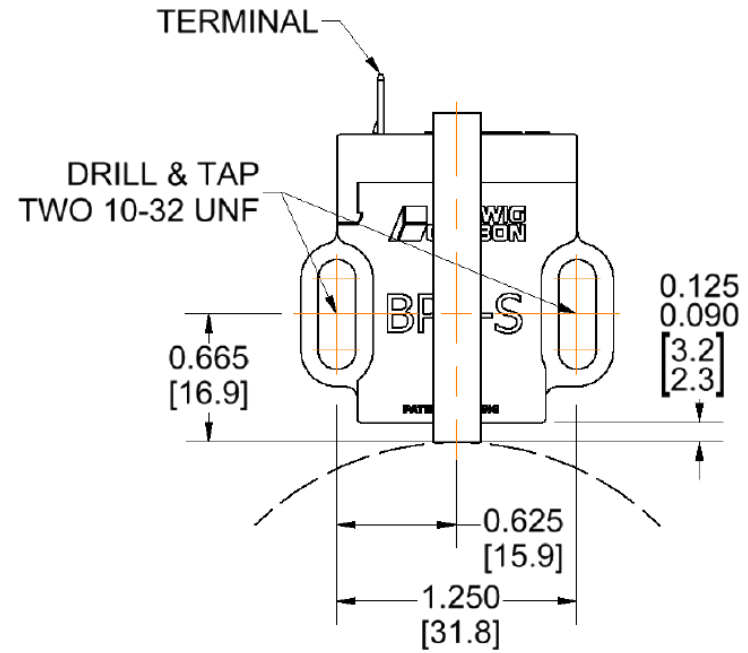
**This is to certify that
representative samples of** COMPONENT - INCOMPLETE ROTATING MACHINES
AND ROTATING MACHINE PARTS

Shaft Grounding Kit, Models BPK-4, BPK-AM, BPK-IM2, BPK-S

Have been investigated by UL in accordance with the
Standard(s) indicated on this Certificate.

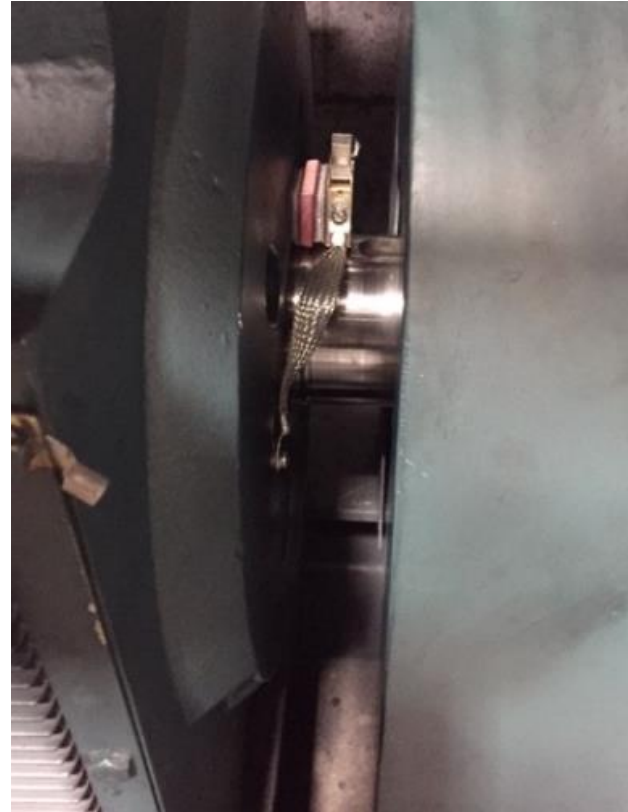
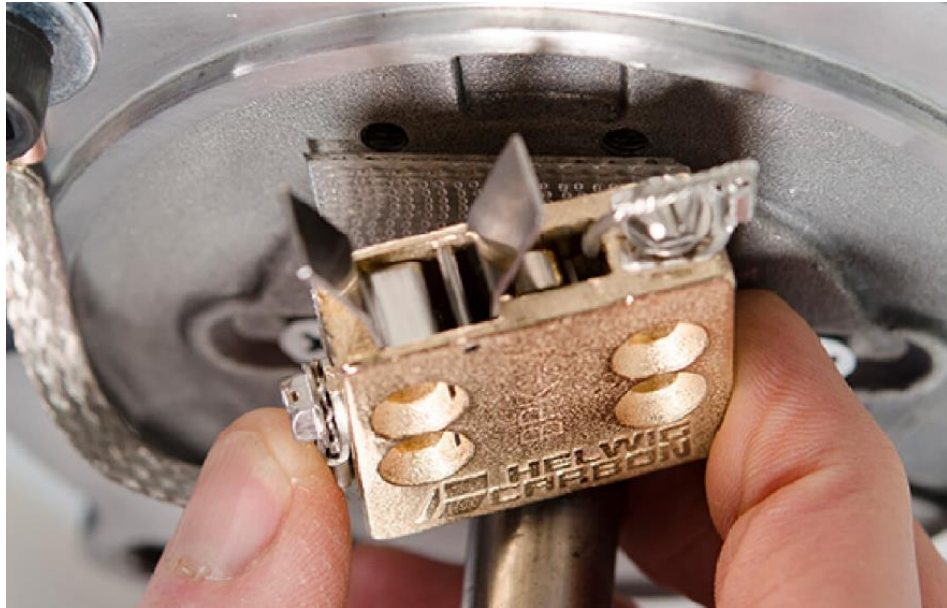
MOUNTING OPTIONS

* Drill & Tap



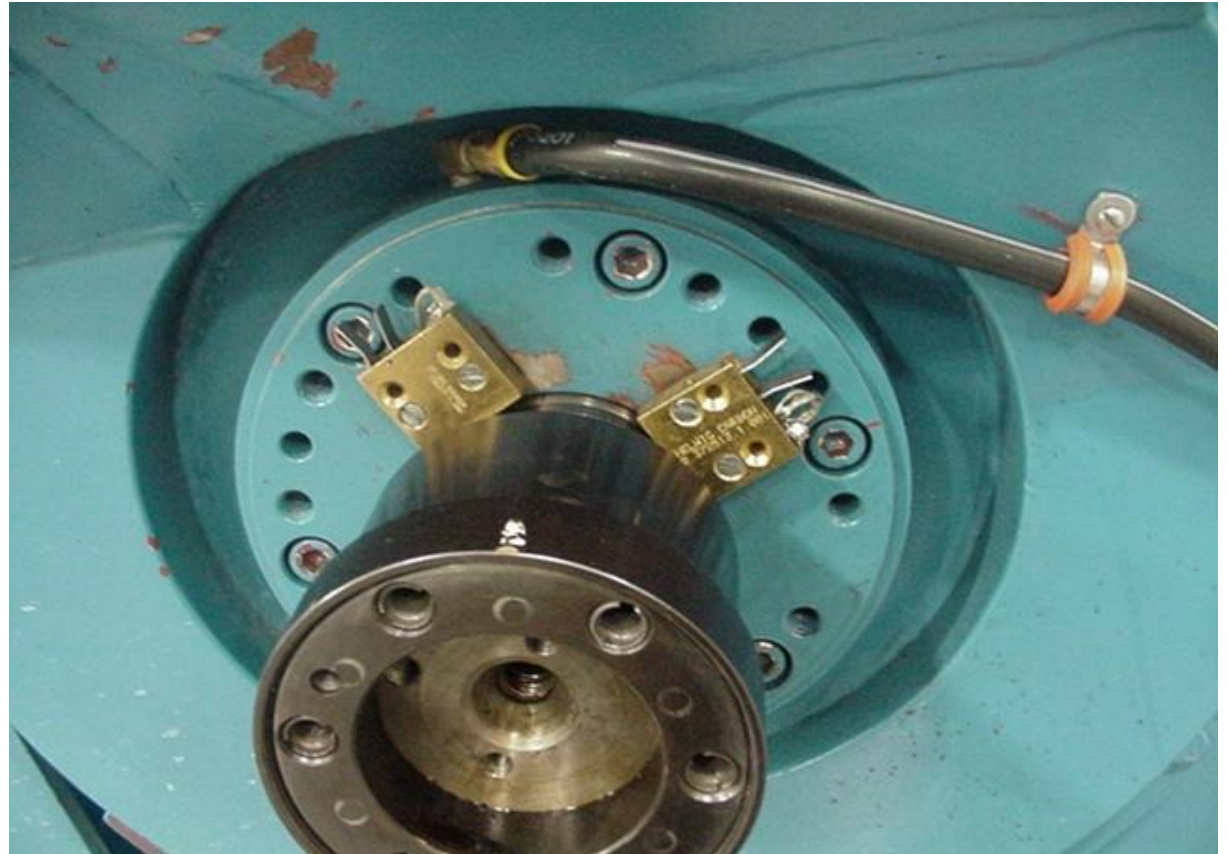
MOUNTING OPTION

*** 3M Dual Lock with Ground Wire**



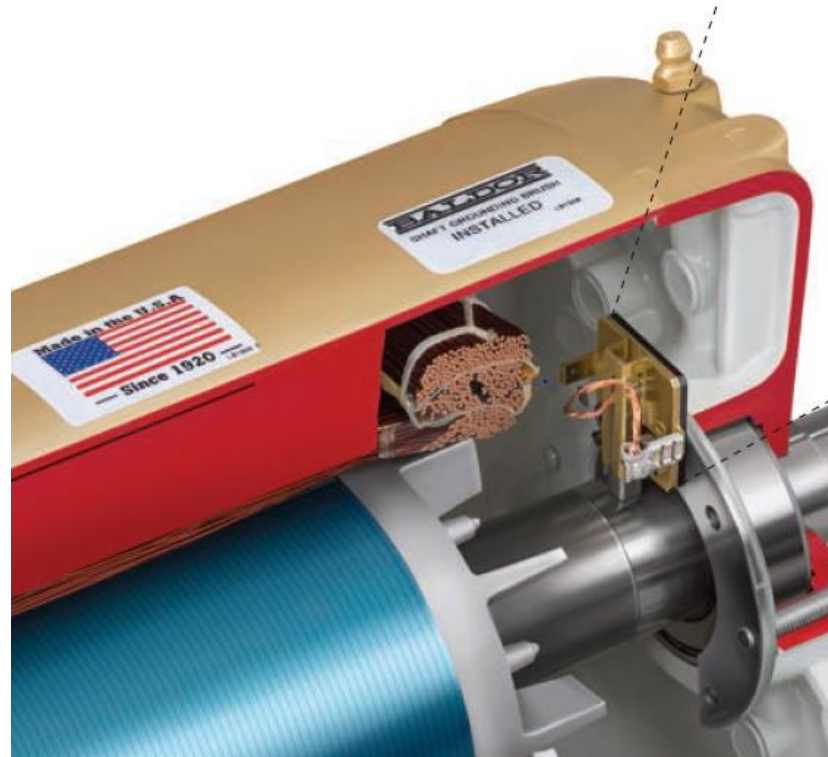
More than 1 kit used on larger shafts than 4"
(Avoid 180 degree mounting)

- **This option is used by GE**
- **On Industrial Motors for 24 years**
- **And still remains successful**

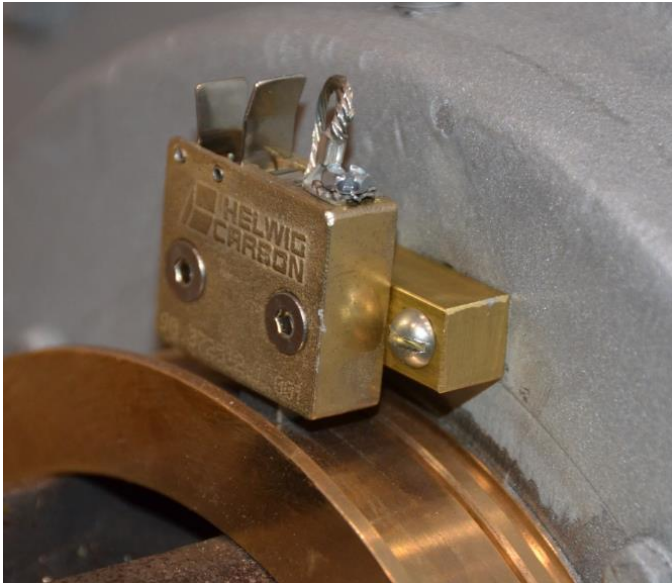


MOUNTING OPTION

* Internal Mount



SLEEVE & SHIM



SELECTING THE RIGHT BPK

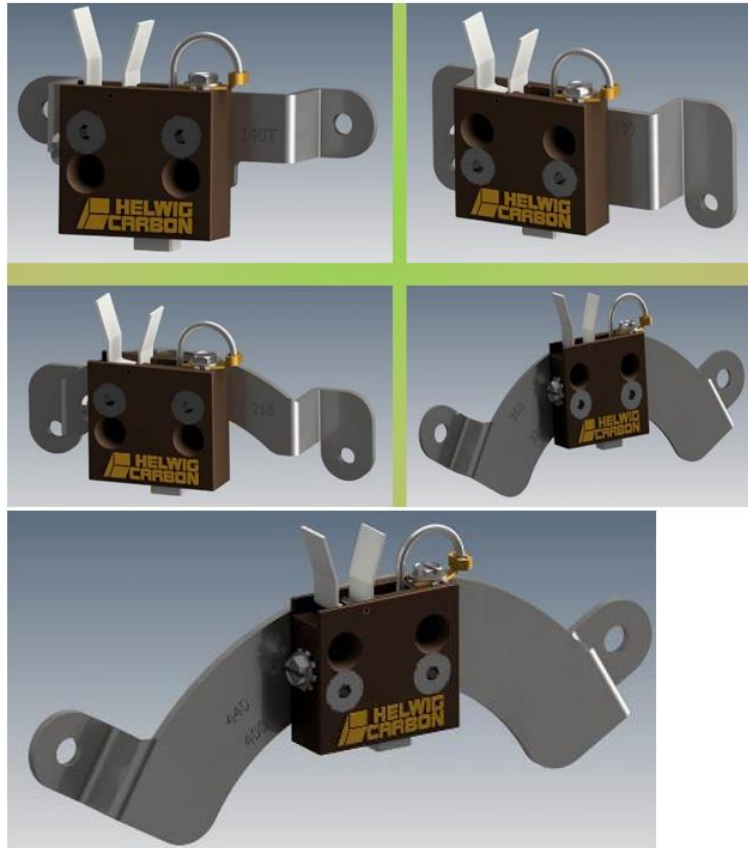


BPK KIT SELECTION GUIDE

Shaft Diameter	0" / 0mm	1.25" / 32mm	2" / 50mm	3" / 75mm	4" / 100mm	5" / 125mm	6" / 150mm	7" / 175mm	8" / 200mm	9" / 225mm
BPK-IM 2	Single Kit									
BPK-4/BPK-5/BPK-SB		Single Kit				2 Kits			3 Kits	
BPK-AM						Single Kit			2 Kits	

Mount 2 kits at 90° —or 3 kits at 120° —for reliable contact in the case of vibration.
 For larger diameter shafts, the contact area can be increased with more kits or a larger kit.
 More contact surfaces provide assurance of optimal grounding protection.

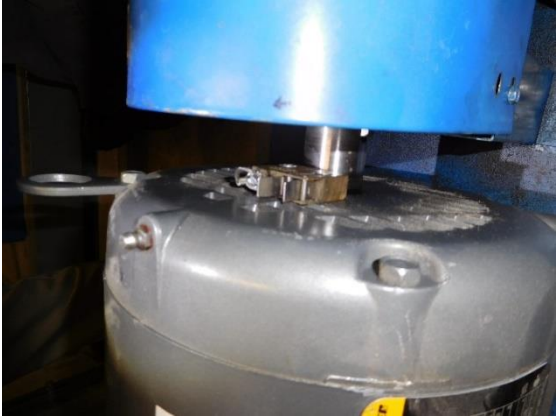
CUSTOM MOUNTING BRACKETS



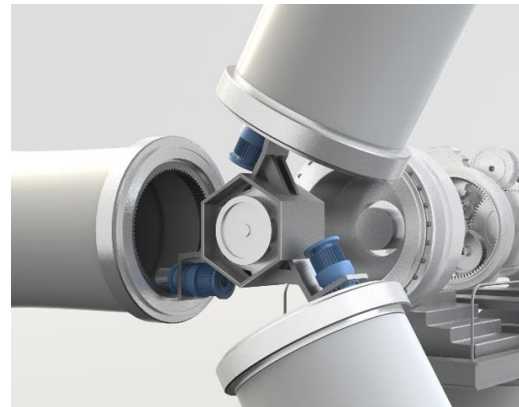
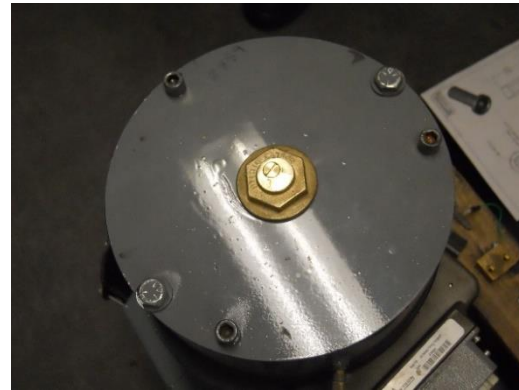
APPLICATION: FAN/BLOWER



APPLICATION: HYDRONIC PUMP



APPLICATION: WIND PITCH MOTOR



TRANE – Lexington Facility



OEM: BALDOR ABB

Super-E[®] Motors with Baldor Shaft Grounding Brush 1/2 – 50 HP, 56C thru 326T



NEMA
Premium

Applications:

Heating, ventilation and air conditioning blower and fan motors, pump motors, and other general purpose applications using an adjustable speed drive.

Features:

- Baldor shaft grounding brush installed internally
- Compact, rugged, spring loaded carbon brush
- Choice of TEFC or ODP enclosures available
- Variety of 2, 4 and 6 pole designs
- 1 – 50 HP standard T frames

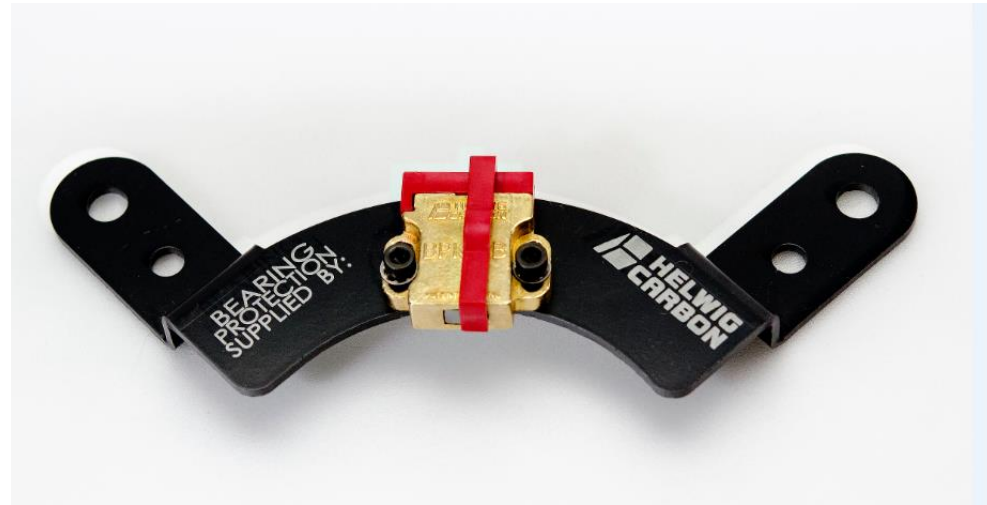


OEM: WEG



Providing

Industry Leading
shaft grounding solution!



OEM: WEG

WEG's Bearing Protection Kits fit a variety of motor frame sizes / shafts and bearing caps. These Bearing Protection Kits will deliver years of superior performance.

Bearing Protection Kits to fit the following motor frame sizes:

Frame Size	Bearing Cap	Order by Number
364_5TS	6314	90.372512.1.907
404_5TS	6314	
364_5T	6314	
444_5TS	6314	
445_7TS	6314	
447_9TS	6314	
586_7TS	6314	
588_9TS	6314	
L447_9TS	6314	

404_5T	6316	90.372512.1.910
445_7T	6319	90.372512.1.905
447_9T	6322	
444_5T	6319	
L447_9T	6322	
586_7T	6322	
588_9T	6322	



OEM: BROOK CROMPTON



OEM: WORLDWIDE HYUNDAI



**HYUNDAI SEVERE DUTY
LARGE FRAME MOTORS**

HYUNDAI Severe Duty Large Frame Motors are designed for high reliability in severe industrial applications while delivering the performance and efficiency you demand.




- **Durable.** 4140 high tensile strength steel shafts on L449T frame, 1800 and 1200 RPM motors.
- **Severe Duty.** Cast iron TEFC enclosure, IP55 degree of protection.
- **Sealed.** Metal, pressed-on slinger creates a labyrinth-type fit. No seals to tear or wear out.
- **Protected.** Frame mounted grounding pad with copper fixing plate.
- **Flexible.** Two heavy duty lifting lugs can be positioned at all four corners for greater flexibility.
- **Prevent Bearing Damage** with Helwig Carbon® Bearing Protection Kits available for all models. Simple installation, no drilling or tapping. **In stock and ready to be shipped with the motor!**




▪ **Bearing Protection**

- Helwig Carbon® Bearing Protection Kits available for all models
- Simple installation, no drilling or tapping
- In stock and ready to be shipped with the motor



ed applications
nd bearing

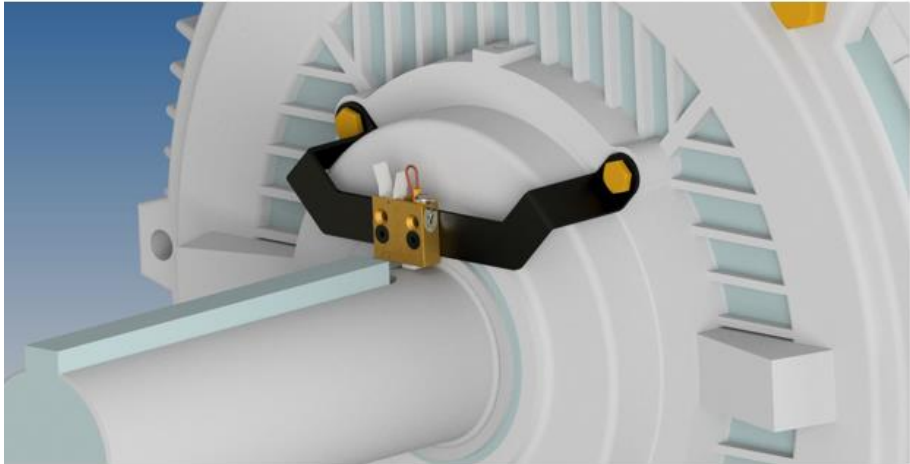


WA

PRO033MDWAE3217

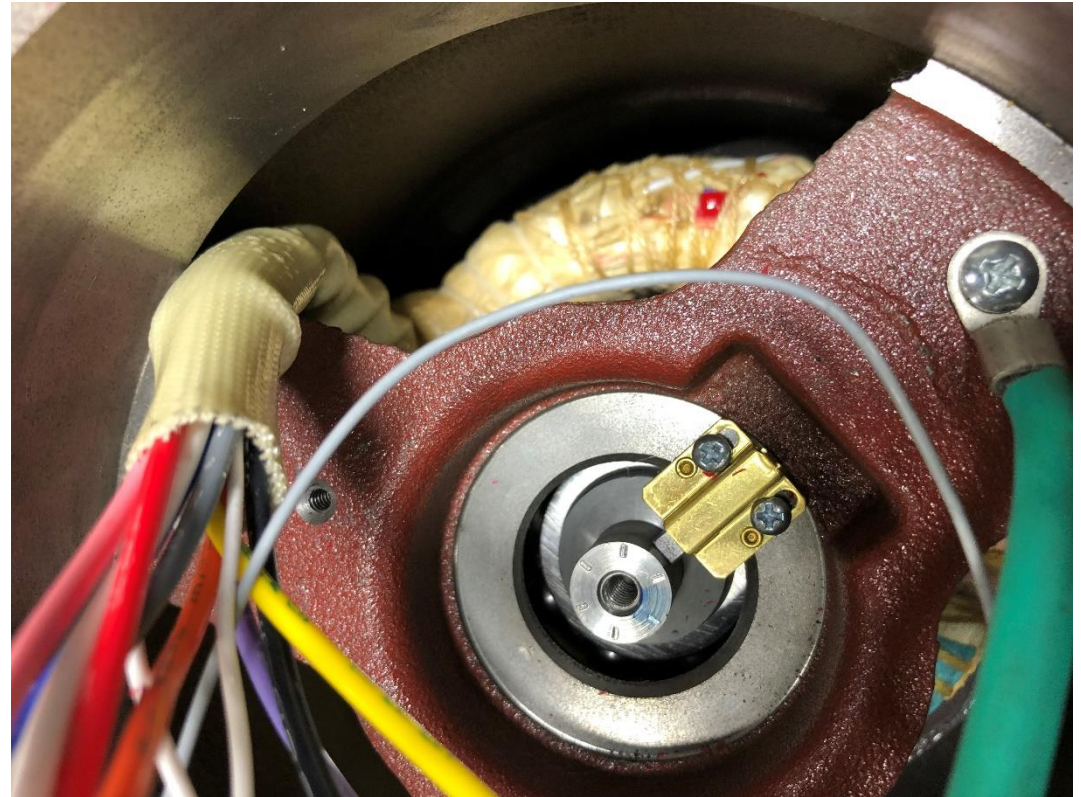
OEM: WORLDWIDE HYUNDAI

HSD-5008-9
BPK-4-OEM02



HSD-5010-11
BPK-4-OEM02





RECOMMENDATIONS:

- **The brush should ride perpendicular to the shaft**
- **The Kit should be as close as possible to the bearing**
- **The brush track should be free of keyways, scratches, nicks, or defects of any kind**
- **Ideal shaft surface should have a finish between 10 and 63 RMS**
- **For 2 or more kits, mount at 90° not 180°**
- **Do not use any external lubrication**
- **There is no need to apply silver epoxy on the shaft**
- **Per Electric motor industry standards insulated bearing is needed on ODE (Opposite Drive End) for motors above 100 HP**

BPK LABELS

* Included with every BPK kit.



Helwig Bearing Protection Kit Advantages:

- **Effective and reliable long-term performance**
- **One size fits a wide range of motor frame sizes**
- **Easy to install**
- **Maintains positive contact through life of the silver graphite brush**
- **Long life – almost no electrical wear just mechanical. Silver Graphite material provides low friction and no need for silver epoxy paint on shaft**
- **Cost effective alternative to other options**



THANK YOU

Jay Koenitzer

Sales & Service Representative
414-362-6256

Jay.koenitzer@helwigcarbon.com

www.helwigcarbon.com