NEWSLETTER

Grounding for HVAC, VFD and more . . .

Where is bearing protection needed?
- HVAC units
- Pump motors
- Fans
- Air handling
- Wind Pinch Motors
- Propulsion Systems
- Compressors
- Elevators
- Data Centers
- Chillers
- Conveyors

What Causes Bearing Damage?
Variable frequency drives (VFD) used on AC motors and Pulse Wave Modulation (PWM) drives used on DC motors produce induced electrical currents on the motor shaft. This current seeks the path of least resistance to ground which is typically through the motor bearings. When the current passes through the bearings arcing takes place leading to fluting, pitting, and bearing damage. The fluted or damaged bearing surface causes noise, vibration, and premature bearing failure. Bearing failure due to these induced electrical currents is one of the most common causes of motor downtime.

PREVENT BEARING DAMAGE
Premature bearing failure is a major cause of motor downtime and costly repairs. Helwig Carbon uses carbon brush technology in a variety of bearing protection kits for motor shafts. Their kits effectively divert induced electrical currents away from the bearings, protecting them from damage and failure.

Effective bearing protection will divert the current from the motor shaft and provide the lowest resistance path to ground in an economical product. The result is the lowest shaft voltage and maximum discharge to ground through the kit rather than through the bearings or other components.
UL APPROVED HELWIG CARBON BEARING PROTECTION KITS (BPK)

Helwig BPKs fit motors of all sizes, offer several mounting options, and are easy to install and maintain. These units typically outlast the motor on which they are installed. A 3M Dual-Lock option is available for easy field installation.

Issues with Measuring Shaft Voltage with a Digital Volt Meter (DVM)

Digital Volt Meters (DVM) are not designed to measure shaft discharge voltage. Multimeters in general, even the higher end brands, display an average or Root Mean Square (RMS) voltage. They miss very fast, high duration volts/duration time (dv/dt), events. The On/Off time (Duty cycle) of typical shaft voltage has a very low duty cycle. The On time (start of discharge) is very short compared to the Off time (completion of discharge) so the average is very low.

The sampling rate of the meter and the method it uses to determine what to display as a reading, are not designed to capture the high frequency peaks generated by a PWM or VFD drives.
HELWIG CARBON BEARING PROTECTOR: BPK-AM

The Bearing Protector™ Adjustable Mount brush holders are designed to be installed using two threaded bolts supplied with the holder.

This kit consists of a silver graphite brush with constant force spring, brass holder, two mounting bolts, lock washers and nuts.

Replacement silver brush
30-783915-164-7-01

Space needed for multiple units on motor: Over 9”

HELWIG CARBON BEARING PROTECTOR: BPK-AM

BPK-AM is a large kit with adjustable mounts

Contact size:
20 x 10 mm
0.787 x 0.394 inches

Recommended shaft diameter for single contact:
>100 mm or >4.0 inches

The Bearing Protector™ is a shaft grounding assembly that diverts static and induced electrical currents in motor shafts away from the bearings.

Space needed for multiple units on motor: Over 9”

HELWIG CARBON BEARING PROTECTOR: 4 HOLE MOUNT BPK-4

This bearing protector brush holder is designed to be installed using two threaded bolts supplied with the holder.

Part Number BPK-4 (standard size).

It offers years of service while ensuring a safe path to ground and minimizing stray currents passing through the bearings. And, unlike carbon fiber rings, the Helwig Bearing Protector keeps shaft voltage to a minimum.

Recommended shaft diameter for single contact:
25 - 100 mm
1.0 - 4.0 inches

Space needed for multiple units on motor: Over 4 inches.

UL® Approved

Standard kit with optional mounts of two 10-32 UNF threaded bolts—or the Dual-Lock alternative

If needed, mounting brackets are available and sold separately. See page 6.
The Bearing Protector™ Internal Mount 2 Kit consists of a silver graphite brush with constant force spring, and stamped brass holder. Requires two 4-40 or 3 mm screws. Mounting bolts not included.

Advantages compared to the BPK-4: Less expensive, small size, designed for internal mounting.

Ideal for small motors.
Internal mount, can be used in external mount in clean environments.

Mounting bolts (not included) are part of the grounding circuit.

Contact size:
3.2 x 4.75 mm
0.125 x 0.187 inches

Recommended shaft diameter for single contact:
<50 mm
<2.0 inches

Space needed for multiple units on motor: Over 2 inches.

Enclosed kit. No replacement brushes available.

Recommended shaft diameter for single contact:
>32 mm or >1.25 inches

Self-lubricating brush

This kit consists of a ground wire, a silver graphite brush sealed within the unit along with a constant force spring, plastic holder, and a temporary brush retainer clip to be removed prior to installation.

The Bearing Protector™ Sealed Option brush holders are designed to be installed using two 10-32 socket head cap screws not supplied with the holder.

The Bearing Protector™ Internal Mount 2 Kit consists of a silver graphite brush with constant force spring, and stamped brass holder. Requires two 4-40 or 3 mm screws. Mounting bolts not included.

Advantages compared to the BPK-4: Less expensive, small size, designed for internal mounting.

Ideal for small motors.
Internal mount, can be used in external mount in clean environments.

Mounting bolts (not included) are part of the grounding circuit.

Contact size:
3.2 x 4.75 mm
0.125 x 0.187 inches

Recommended shaft diameter for single contact:
<50 mm
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Space needed for multiple units on motor: Over 2 inches.

Enclosed kit. No replacement brushes available.

Recommended shaft diameter for single contact:
>32 mm or >1.25 inches

Self-lubricating brush

This kit consists of a ground wire, a silver graphite brush sealed within the unit along with a constant force spring, plastic holder, and a temporary brush retainer clip to be removed prior to installation.

The Bearing Protector™ Sealed Option brush holders are designed to be installed using two 10-32 socket head cap screws not supplied with the holder.

Ideal for small motors.
Internal mount, can be used in external mount in clean environments.

Mounting bolts (not included) are part of the grounding circuit.

Contact size:
3.2 x 4.75 mm
0.125 x 0.187 inches

Recommended shaft diameter for single contact:
<50 mm
<2.0 inches

Space needed for multiple units on motor: Over 2 inches.

Enclosed kit. No replacement brushes available.
HELWIG AND WEG HAVE JOINED FORCES TO PROVIDE SHAFT GROUNDING SOLUTIONS

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See page 6 for additional mounting bracket designs and options.

If needed for applications other than WEG, mounting brackets are sold separately.

ONSITE BEARING PROTECTION DEMONSTRATIONS AVAILABLE

We would be happy to provide an onsite demonstration of Helwig's bearing protection kits.

Contact our office by phone 253-853-7456 or email daniel.perkins@perkinspowerproducts.com.

BEARING PROTECTION DEMONSTRATION AVAILABLE ON YOUTUBE

Helwig produced a three minute and thirty second video during an E.A.S.A. conference illustrating the differences in shaft grounding products. This video highlights the advantages of bearing protector kits when compared to carbon fiber rings.

If you would like to watch the video, it is available on YouTube under Helwig Carbon Bearing Protection EASA 2017 or via this link: https://www.youtube.com/watch?v=wc4GZFhCM8I.
BEARING PROTECTION MOUNTING SOLUTIONS

Helwig Carbon produces a variety of additional mounting brackets for your shaft grounding application because they recognize one or two mounting solutions may not fit all applications.

Below are examples of alternate mounting brackets to meet the needs of your bearing protection application. Brackets are design to use motor screws and avoid drilling and tapping.

We can help you identify the correct bracket for your application.

Top Left: Mounting brackets in the above illustration using BPK-4 from top left to bottom right: 140T, 180, 210, and 360/320 brackets.

Top Middle: BPK-AM adjustable mount works well with mounting brackets.

Top Right: BPK-SB sealed version with brass casting mounted on bracket designed for WEG motor.

Bottom Right: BPK-SB mounting options using bracket on a WEG motor.