



**Magnetic Power Systems, Inc.**

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## **INSTRUCTION MANUAL GLOBAL SERIES BRAKE MODELS: GBA, GBAM, GBB, GBBM, GBC, GBCM, GBD, GBDM**

### THEORY OF OPERATION

The brake construction consists of two stators, a rotor, a coil assembly, magnetic powder, and two bearings. The bearings support and align the rotor with the stators, and allow the rotor to rotate within the brake assembly. The magnetic powder occupies the space between the stators and the rotor, and represents a key element in the operation of the brake.

The stators are connected to the machine frame through a torque arm and remain stationary. The rotor is connected to a rotating machine shaft, which supports the weight of the brake. The magnetic powder functions as the adjustable bond or link between the stators and the rotor. It is the medium for the transmission of torque.

An electric current in the coil creates a magnetic field (flux), which passes through the stators, magnetic powder, and the rotor. The flux aligns the powder particles, forming a bond or link between the stators and the rotor. The strength of the bonding action (torque) is proportional to the amount of current in the coil. The torque is transmitted to the rotating shaft through the rotor.

### MECHANICAL INSTALLATION

1. The rotor shaft of the brake must be mounted within 30° of the horizontal plane.
2. Prior to installation, manually check the rotation of the rotor to observe that it is smooth and free of binding or scraping.
3. Mount the brake on the shaft and tighten the two set screws.
4. Attach a torque arm between the extension bolt and the machine frame with a “loose” or “floating” mount to prevent binding forces on the brake bearings. The torque arm will prevent the rotation of the brake stators.

**CAUTION:** This product contains rotating parts which could cause injury. At time of installation, appropriate protective guards should be installed by the user according to his use of this product.

### ELECTRICAL INSTALLATION

For 24 vdc devices connect the two wires in the junction box to the 24 vdc power source.

For 90 vdc devices:

1. Connect 90 vdc power source to the terminals marked 1,2.
2. Connect protective grounding circuit to the terminal marked with the P.E. symbol 

Model	Maximum Current, adc			
	Supply Voltage, vdc			
	0 - 24		0 - 90	
	C	C	C	C
GBA, GBAM	0.94	1.28	0.25	0.28
GBB, GBBM	1.06	1.70	0.28	0.37
GBC, GBCM	1.56	2.06	0.42	0.55
GBD, GBDM	2.03	2.68	0.54	0.69

Model	M c			
	Supply Voltage, vdc			
	0 - 24		0 - 90	
	C	C	C	C
GCA, GCAM	0.94	1.28	0.25	0.28
GCB, GCBM	1.06	1.70	0.28	0.37
GCC, GCCM	1.56	2.06	0.42	0.55
GCD, GCDM	2.03	2.68	0.54	0.69

## ENVIRONMENTAL SPECIFICATIONS

### Temperature Range:

Operating 0°C to 40°C  
Storage -30° to +80°C

Relative Humidity: 5% to 85%

Pollution Degree: 2 (IEC664-1)

Altitude: 0 to 2000 meters

## MAINTENANCE

Due to its small number of moving components and its basic design, maintenance of the brake is generally necessary only after extended service. When a problem appears in the system, ensure that all couplings, belts, etc., and the control device are functioning properly. Use the Troubleshooting guide below to determine the cause of the problem. For general maintenance, the brakes can be rebuilt with a repair kit. A repair kit includes a new powder charge and the appropriate bearings, seals and snap rings generally needed to rebuild the unit.

NOTE: When ordering parts not contained in the kit, provide the model number, serial number and parts list item number and description from Figure 1.

## TROUBLESHOOTING

Problem	Possible Cause	Action
Load is not controlled by brake	Power supply voltage output low	Replace or repair control
	Magnetic powder has deteriorated	Overhaul the brake
	Coil is open	Replace coil
Load operates in an intermittent manner with proper voltage	Coil is intermittently open	Replace coil
Brake is noisy and has vibration	Bearings are worn	Overhaul brake using repair kit

## DISASSEMBLY (Refer to Figure 1)

1. Remove the set screws and collar from the rotor shaft.
2. Remove the external snap rings from both sides of the rotor shaft.
3. Remove the three screws which hold the left and right stators together.

4. Separate the stator frames by tapping on the end of the rotor with a soft mallet. Tap on the right stator side first. The rotor will remain attached to the left stator.

NOTE: Removal of the junction box and cover are not required.

CAUTION: Do not attempt to pry the left and right stators apart with a screwdriver or wedge.

5. Remove the coil and the coil gaskets from the stators.
6. Remove the rotor from the left stator by tapping on the rotor shaft with a soft mallet from the left stator side.
7. Remove the powder seals from the stators by prying around the inner lip with a screwdriver.
8. Remove the internal snap rings from both stators.
9. Press the bearing out of each stator.
10. Remove the powder fill screw (and washer for GBA, GBAM, GBB & GBBM only) from the right stator.

NOTE: Discard all bearings, powder seals, gaskets, snap rings and magnetic powder. These parts must be replaced, and are included in the repair kit.

#### RE-ASSEMBLY

IMPORTANT: Re-assembly of the brake must be performed in a clean, dry area. The brake components must be cleaned with solvent, and must be dry and totally free of grease and oil. Grease or oil on brake parts will cause failure when the unit is rebuilt.

CAUTION: Do not immerse the coil in solvent.

1. Install the internal snap rings in the stators.
2. Press the new powder seals into the left and right stators. The powder seals will bottom on the internal snap rings.

NOTE: The seal lip must face toward the inside of the brake.

3. Support the rotor on a bench with the cross-drilled holes facing down. Wrap a 6" x 6" (152 mm x 152 mm) piece of stiff paper, thin plastic, or shim stock around the rotor shaft forming a sleeve. This will allow the powder seal to slide over the end of the rotor shaft and the external snap ring groove.
4. Slide the left stator and powder seal over the thin sleeve until it bottoms on the rotor. Pull the sleeve off the end of the rotor shaft.
5. Press one bearing onto the end of the rotor shaft until it seats against the internal snap ring of the left stator.

NOTE: The seal side of the bearing must face the inside of the brake.

6. Apply 2 or 3 drops of wicking Loctite to the inner and outer race of both bearings. Wait ten seconds and wipe off the excess Loctite.
7. Install the external snap ring on the rotor shaft.
8. Turn this assembly over.

9. Install the left side coil gasket.

NOTE: For Models GBA, GBAM, GBB AND GBBM: Install the coil gasket into the slot in the left stator. Insure that the coil gasket is evenly seated all the way around the stator slot.

NOTE: For Models GBC, GBCM, GBD and GBDM: Install the coil gasket into the slot in the coil bobbin. Insure that the coil gasket is evenly seated all the way around the bobbin slot.

10. Place the coil into the left stator with the leads exiting through the slot into the junction box.

10. Install the right side coil gasket.

NOTE: For Models GBA, GBAM, GBB AND GBBM: Install the coil gasket into the slot in the right stator. Insure that the gasket is evenly seated all the way around the stator slot.

NOTE: For Models GBC, GBCM, GBD AND GBDM: Install the coil gasket into the slot in the coil bobbin. Insure that the coil gasket is seated evenly all the way around the bobbin slot.

11. Support the left stator assembly on a bench with the cross-drilled holes facing up. Wrap a 6" x 6" (152 mm x 152 mm) piece of stiff paper, thin plastic, or shim stock around the rotor shaft, forming a sleeve. This will allow the powder seal to slide over the end of the rotor shaft and the external snap ring groove. Slide the right stator and powder seal over the thin sleeve until it bottoms on the left stator assembly. Pull the sleeve off the end of the rotor shaft.

12. Install the three stator screws, split lockwashers, and nuts loosely.

NOTE: The long stator screw should be installed 180° from the junction box.

13. Press the other bearing onto the end of the rotor shaft until it seats against the internal snap ring of the right stator.

NOTE: The seal side of the bearing must face the inside of the brake.

14. Tighten the stator screws evenly until the left and right stators are clamped together.

15. Apply 2 or 3 drops of wicking Loctite to the inner and outer race of both bearings. Wait ten seconds and wipe off the excess Loctite.

16. Install the other external snap ring on the rotor shaft against the bearing. This step is made easier by supporting the brake on the opposite end of the rotor shaft.

NOTE: Insure that the right bearing is seated against the internal snap ring before attempting to install the external snap ring.

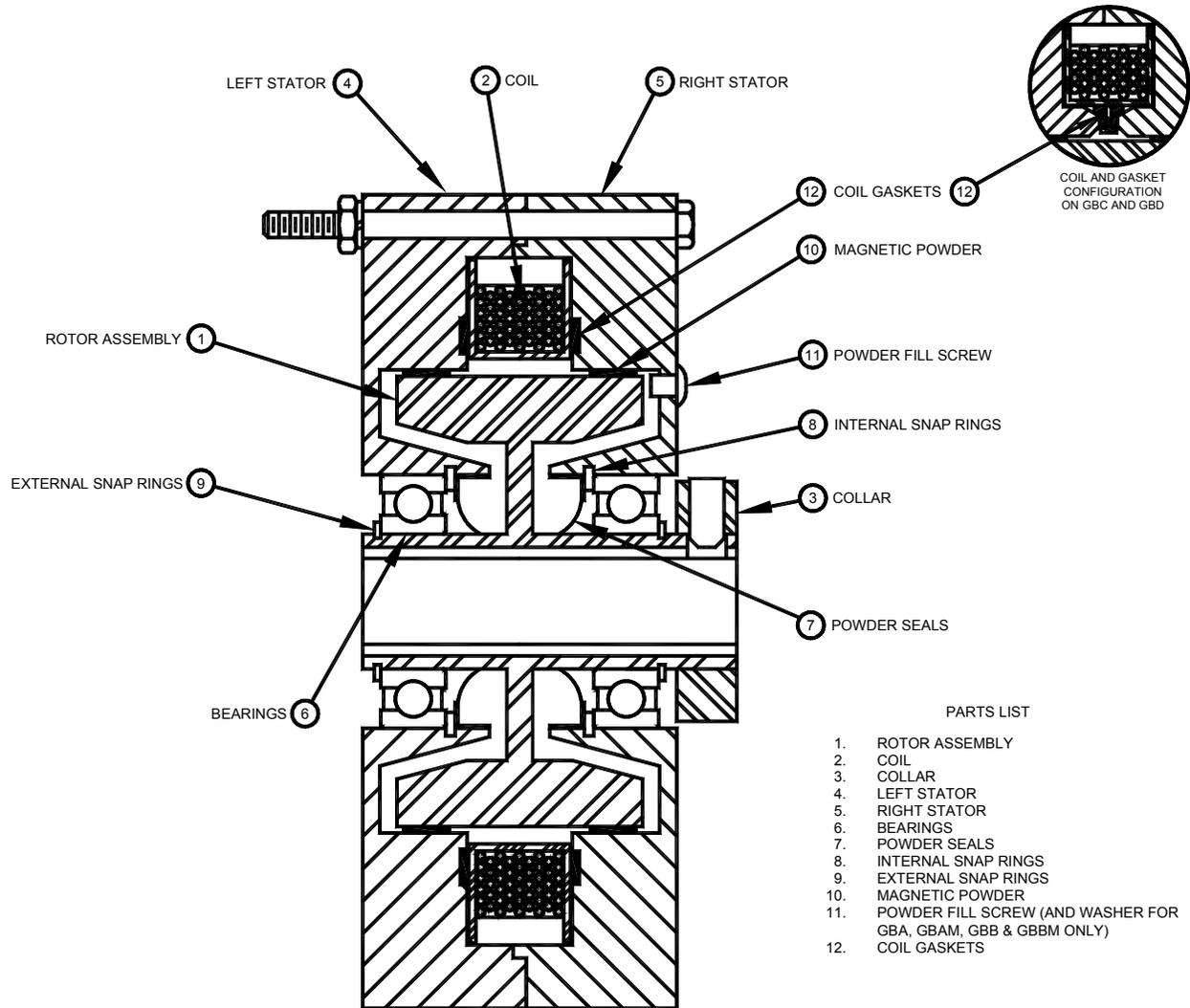
17. Manually rotate the rotor shaft to insure smooth operation of the rotating parts.

18. Place the brake on a clean piece of paper. Support the brake at 45° so that the cross-drilled holes are facing up. Fill the brake with all of the magnetic powder supplied in the repair kit. While filling, slowly rotate the rotor to evenly distribute the magnetic powder.

NOTE: Collect any spilled magnetic powder from the clean paper and pour it into the brake.

19. Install the powder fill screw (and washer for GBA, GBAM, GBB & GBBM only) into the right stator.

20. Install the collar and set screws onto the rotor shaft.



**BRAKE CROSS SECTIONAL VIEW**