

Global Series Clutch Instruction Manual

Models GCA, GCAM, GCB, GCBM, GCC, GCCM, GCD, GCDM



This product contains rotating parts that could cause injury at time of installation. Appropriate protective guards should be installed by the user according to his use of this product.

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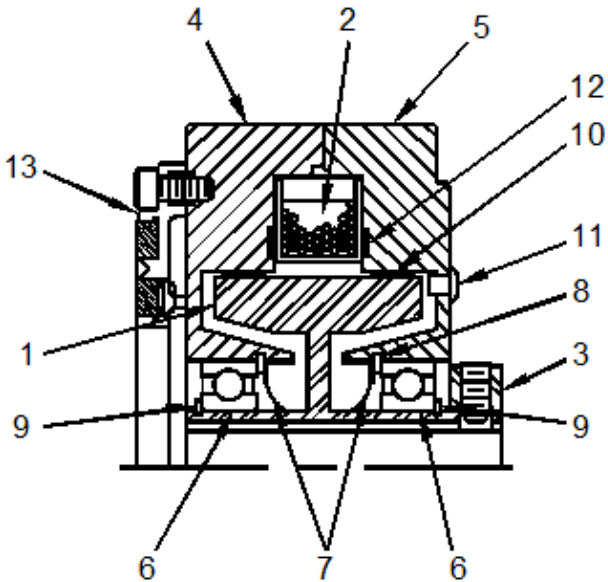
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Theory of operation

The clutch construction consists of two stators, a rotor, a coil assembly, a slip ring, magnetic powder and two bearings. The bearings support and align the rotor within the stators, and allow the rotor to rotate within the clutch assembly. The stator is also allowed to rotate via the slip rings. The magnetic powder occupies the space between the stator and the rotor, and represents a key element in the operation of the clutch.

The right stator is connected to the driving input member. The rotor is connected to a rotating machine shaft. The magnetic powder functions as the adjustable bond or link between the stators and the rotor, and is the medium for the transmission of torque.

An electric current in the coil creates a magnetic flux field, which passes through the stator, 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.



1	Rotor assembly
2	Coil
3	Collar
4	Left stator
5	Right stator
6	Bearings
7	Powder seal
8	Internal snap rings
9	External snap rings
10	Magnetic powder
11	Powder fill screw *
12	Coil gaskets
13	Slip ring assembly

* and washer for models GCA, GCAM, GCB and GCBM only

Mechanical installation

The rotor shaft centerline must be mounted within 30° of the horizontal plane.

1. Prior to installation, manually check the rotation of the rotor, and observe that it is smooth and free of binding or scraping.
2. Mount the clutch on the shaft and tighten the two set screws.
3. Attach a drive mechanism to the right stator via the mounting rabbet and bolt pattern.
4. Position the brush block assembly so that the brushes are centered on the slip rings. There should be a .06 to .125 inch [1.5 to 3.2 mm] gap between the slip ring surface and the brush block housing.

Electrical installation

Connect the control output wires to the brush block assembly per the Brush Block Instruction Manual.

Note: The clutch coil system has been changed from Class A to Class F. Refer to the nameplate on your unit to determine which insulation class you have. If you have Class F insulation, the nameplate will denote Class F. If you have Class A, there will be no notation on the nameplate.

Model	MAXIMUM CURRENT, ADC			
	Supply Voltage, vdc			
	0 - 24		0 - 90	
	Class A	Class F	Class A	Class F
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°C to +80°C

Relative Humidity: 5% to 80%

Pollution Degree: 2 (IEC664-1)

Altitude: 0-2000 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 on next page to determine the cause of the problem.

The clutches can be rebuilt with a repair kit which puts it into “as new” condition. A repair kit includes a new powder charge and the appropriate bearings, seals and snap rings which are 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.

Troubleshooting

PROBLEM	POSSIBLE CAUSE	ACTION
Insufficient Torque	Power supply voltage output low. Magnetic powder has been worn excessively.	Replace or repair control. Overhaul clutch using repair kit.
Load operates in an intermittent manner with proper voltage	Coil is intermittently open.	Replace coil.
Clutch is noisy and has vibration.	Bearings are worn.	Overhaul clutch 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 Slip Ring to the Left Stator.
 4. Remove the two screws which hold the lead wires to the back of the Slip Ring. Straighten the ends of the lead wires.
 5. Remove the three screws which hold the Left and Right Stators together. For model numbers GCA and GCAM these three screws were removed in step 3.
 6. 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.
- CAUTION:** Do not attempt to pry the left and right stators apart with a screwdriver or wedge.
7. Remove the Coil and the Coil Gaskets from the stators
 8. Remove the rotor from the Left Stator by tapping on the rotor shaft with a soft mallet from the Left Stator side.
 9. Remove the Powder Seals from the stators by prying around the inner lip with a screwdriver.
 10. Remove the Internal Snap Rings from both stators
 11. Press the Bearing out of each stator.
 12. Remove the Powder Fill Screw (and washer for GCA, GCAM, GCB and GCBM only) from the Right Stator.

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

Reassembly

IMPORTANT: Reassembly of the clutch must be performed in a clean, dry area. The clutch components must be cleaned with solvent, and must be dry and totally free of grease and oil. Grease or oil on the clutch 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 clutch.
3. Support the rotor on a bench with the cross-drilled holes facing down. Wrap a 6" x 6" (152mm x 152mm) 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.
Note: The seal lip must face the rotor when installing the stator.
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 clutch.
6. Install the External Snap Ring on the rotor shaft.
7. Turn this assembly over.
8. Install the left side Coil Gasket.
 - **For Models GCA, GCAM, GCB, and GCBM:**
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.
 - **For Models GCC, GCCM, GCD, and GCDM:**
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.
9. Bend the coil lead wires perpendicular to the coil surface. Feed the lead wires through the holes in the Left Stator frame until the Coil seats against the left stator. Bend the lead wires against the Left Stator to hold the Coil in place for further assembly.
10. Install the Right Side Coil Gasket.
 - **For models GCA, GCAM, GCB, and GCBM:**
Install the coil gasket into the slot in the right stator. Insure that the coil gasket is evenly seated all the way around the stator slot.
 - **For models GCC, GCCM, GCD, and GCDM:**
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.
11. Support the left stator assembly (steps 1-10) on a bench with the cross-drilled holes facing up. Wrap a 6" x 6" (152mm x 152mm) 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.
12. 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.
Note: The powder seal lip must face the rotor when installing the right stator assembly.
13. Follow the steps in the column for your model

Models GCB, GCBM, GCC, GCCM, GCD, GCDM:

- a. Install the three stator screws loosely.
- b. 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 clutch.
- c. Tighten the stator screws evenly until the left and right stators are clamped together.
- d. 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.
- e. Install the other external snap ring on the rotor shaft against the bearing. This step is made easier by supporting the clutch on the opposite end of the rotor shaft.
Note: Ensure that the right bearing is seated against the internal snap ring before attempting to install the external snap ring.
- f. Proceed to step 14.

Models GCA, GCAM

- a. 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 clutch.
- b. 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.
Note: Ensure that the right bearing is seated against the internal snap ring before attempting to install the external snap ring.
- c. Proceed to step 14.

14. Ensure that the left stator frame side of the clutch is facing up and the cross-drilled shaft side is down.
15. Rotate the assembly such that the coil lead wires are at three and nine o'clock. One of the tapped holes should be facing twelve o'clock.
16. Bend a loop in the stripped end of the lead wires to fit under the slip ring screws.
17. Hold the molded slip ring so that the back side is facing the lead wires. Attach the lead wire at nine o'clock to the inner tapped hole (aligned with the through hole and counterbore) with the screw. Attach the other lead wire to the outer tapped hole with the other screw.
Note: The wires must be attached so that when the slip ring is rotated 90° counterclockwise, the lead wires point in the direction of rotation. This will prevent bulging and kinking when the slip ring is attached to the stator housing.
18. Place the three bushings in the matching counterbores of the Left Stator frame.
19. Rotate the Slip Ring 90° counterclockwise and align with the three bushings. Place the Slip Ring over the bushings and make sure that the lead wires are not pinched.
20. **Models GCA, GCAM only:** Insert the three screws through the Slip Ring and tighten evenly to 20 lb-in.
Note: On Model GCA, these screws also hold the stator frames together.
21. Install the other External Snap Ring on the rotor shaft against the Bearing. This step is made easier by supporting the clutch on the opposite end of the rotor shaft.
22. Manually rotate the rotor shaft to insure smooth operation of the rotating parts.
23. Place the clutch on a clean piece of paper. Support the clutch at 45° so that the cross-drilled holes are facing up. Fill the clutch 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 Magnetic Powder spilled on the clean paper and pour it into the clutch.
24. Install the Powder Fill Screw (and washer for GCA, GCAM, GCB & GCBM only) into the Right Stator.
25. Install the collar and set screws on the rotor shaft.
26. Hold the complete clutch assembly at a 45° angle and rotate the rotor to distribute the Magnetic Powder.



AMERICAS

Tel +1.405.755.1600
Fax +1.405.755.8425
sales@maxcessintl.com
www.maxcessintl.com

**EUROPE, MIDDLE EAST
AND AFRICA**

Tel +49.6195.7002.0
Fax +49.6195.7002.933
sales@maxcess.eu
www.maxcess.eu

CHINA

Tel +86.756.881.9398
Fax +86.756.881.9393
info@maxcessintl.com.cn
www.maxcessintl.com.cn

INDIA

Tel +91.22.27602633
Fax +91.22.27602634
india@maxcessintl.com
www.maxcess.in

JAPAN

Tel +81.43.421.1622
Fax +81.43.421.2895
japan@maxcessintl.com
www.maxcess.jp

**KOREA, TAIWAN,
AND SE ASIA**

asia@maxcessintl.com
www.maxcess.asia