Stearns® *Industrial Clutches and Brakes*

P/N 8-078-800-04
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Installation and Service Instructions for Electromagnetic CFCBC and Tor-ac® CFCBC Clutch-Brakes

Important

Please read these instructions carefully before installing, operating, or servicing your Stearns clutch, brake or clutch-brake. Failure to comply with these instructions could cause injury to personnel and/or damage to property if the brake is installed or operated incorrectly. For definition of limited warranty/liability, contact Rexnord, Industries, Inc., Stearns Division, 5150 S. International Dr., Cudahy, Wisconsin 53110 (414) 272-1100.

OEM's and subsystem suppliers, please forward these instructions with your components to the final user.

Caution

1. Servicing shall be in compliance with applicable local safety codes including Occupational Safety and Health Act (OSHA). All wiring and electrical connections must comply with the National Electric Code (NEC) and local electric codes in effect.
2. To prevent an electrical hazard, disconnect power source before working on the clutch, brake or clutch-brake. If power disconnect point is out of sight, lock disconnect in the off position and tag to prevent accidental application of power.
3. Be careful when touching the exterior of an operating unit. Allow sufficient time to cool before disassembly. Surface may be hot enough to be painful or cause injury.

General Description

The CFCBC clutch-brakes are designed as a packaged unit that is assembled between a NEMA C-face motor and a mating gearbox. The output shaft from the CFCBC is bearing supported. A terminal box is cast integral with the housing and provides for the electrical connections protection.

Installation

CFCBC units are shipped from the factory with all the parts restrained to the housing, some disassembly may be required as follows:

Size 5.5 - Remove only the clutch side adapter plate for mounting onto the motor.

Size 5 - Remove shipping screws that are holding the adapters in place.

Size 3 - No disassembly required.

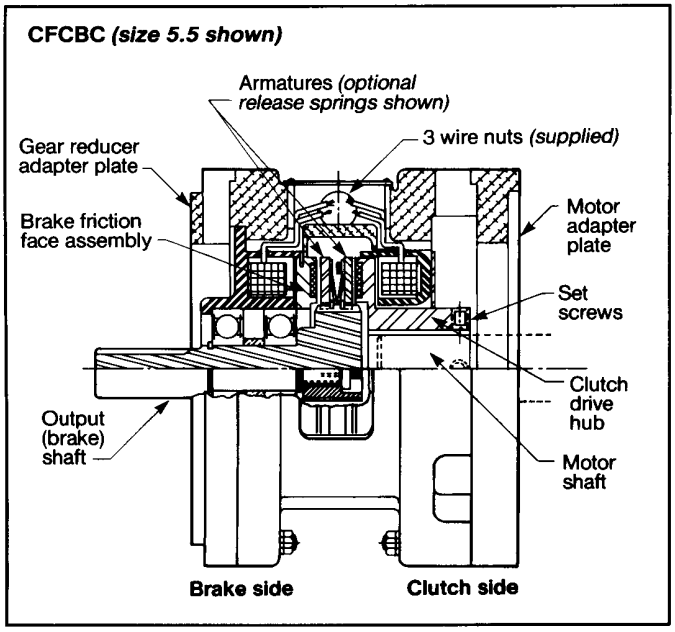

Figure A

1. Mount the motor adapter plate on the motor "C" flange.

   Size 5.5 - Use four (4) flat head bolts ½" diameter. Socket type recommended. Torque these bolts to the manufacturer's specifications.

   Size 5 - Position and hold the adapter in place until CFCBC housing is bolted up to the motor.

   Size 3 - Omit this step as no adapter is provided.

2. Prepare to mount the clutch-brake by inserting .015 to .020 inch thick metallic shim stock or feeler gauges, between the clutch side armature and the drive hub accessible through the vents in the housing. Two separate pieces of metallic shim stock are recommended so that one on each side, 180° apart, can be used for even air gap adjustment. Make sure that the set screws are backed out sufficiently to clear the key and shaft.
3. Position the CFCBC so as to slide the CFCBC drive hub onto the motor shaft and key (this should be a slip fit with no excessive force required) until the housing contacts the C-face register and can be bolted to the motor flange (⅜" diameter bolts size 3 and 5) or the nuts can be tightened up on the adapter plate studs.

Note: Stearns advises against using oil, grease or oil based anti-seize compounds on the motor shaft - drive hub interface.

4. Securely tighten the bolts and/or nuts at this motor - CFCBC interface. Torque these fasteners to the manufacturer's specifications (103 lb-ft recommended for the size 5.5 nuts).
5. Check the clutch side air gap and adjust as needed, by moving the drive hub along the motor shaft. Both feeler gauges or pieces of shim stock should have the same "feel" to them as they are moved back and forth in between the air gap.
6. Securely tighten both clutch drive hub set screws when the air gap is adjusted.

   Recommended set screw torque:
   270 lb-in size(s) 5.5 and 5 CFCBC
   33 lb-in size 3 CFCBC

   In addition, when a properly adjusted armature - drive hub air gap exists, the running clearance from the magnet body to the back side of the drive hub is also set.

7. Remove the feeler gauges or shim stock.
8. Rotate the motor shaft - drive hub and the brake output shaft to insure they turn freely without rubbing or binding. The motor shaft - drive hub should rotate just as freely as the motor shaft alone did, before the installation of the CFCBC.

   The end of the motor shaft should be flush or below the recessed portion of the clutch drive hub as illustrated in Figure A.

9. For mounting the CFCBC to C-face gearbox or reducer, the brake side adapter plate must be positioned as follows:

   Size 5.5 - Factory mounted, **do not** remove from CFCBC housing.

   Size 5 - Size 5 - Position and hold the adapter in place until CFCBC housing is bolted up to the gearbox.

   Size 3 - Omit this step, as no adapter is provided.

10. Position the CFCBC so as to slide the output shaft into the gearbox with a key in position, until the CFCBC housing can be bolted to the gearbox flange.
11. Securely tighten the bolts and/or nuts at this CFCBC - gearbox interface. Torque these fasteners to the manufacturer's specifications.
12. Test the motor - CFCBC - gearbox assembly to be certain no rubbing occurs within the CFCBC housing and to be sure the assembly functions properly.
13. Consult the factory for other methods of mounting, if necessary.

Electrical Connection(s)

The voltage to be applied is determined by the rating shown on the nameplate.

A common way to provide control voltage for a unit is to use a full wave rectifier control. Connection diagrams provided with these rectifiers will depict the proper electrical connections. Due to technical advances in electronics, many rectifier controls with a 115 VAC, 60 Hz input are able to deliver an output of approximately 103 VDC when connected to a coil. This is not harmful to a 90-100 VDC rated coil in a clutch or brake.

For Stearns Tor-ac® units, the leads provided by the Tor-ac module should be connected to a fused relay or switching control source of 105 to 125 VAC, 50-60 Hz. See Figure B for a typical wiring connection of Tor-ac controlled units.

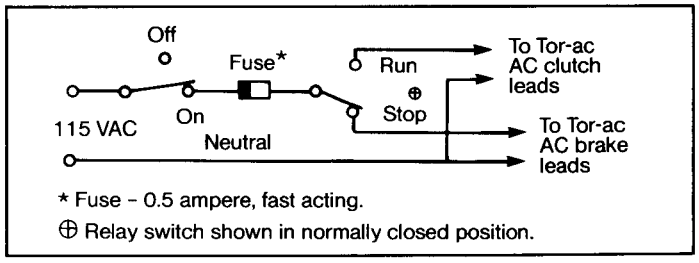

Figure B

Enclosure

Normally in indoor uses, the CFCBC housing provides sufficient enclosure. Care must be taken to protect the unit from grease, oil, dirt, or other airborne materials which would cause slippage or prevent normal armature movement. Excess heating, slippage and damage may result if a proper environment is not provided.

Care should be taken that excessive high ambient temperatures do not exist. Provide for proper ventilation.

Burnishing

Full torque of a new unit will not develop until the mating friction surfaces have been burnished or *run-in*. Burnishing can be accomplished by cycling the clutch-brake under normal operating conditions. Burnishing may also be accomplished by slipping under load at reduced voltage for short periods of time. Consult factory for additional burnishing instructions. If normal cycling does not provide for sufficient burnishing in your application, be prepared to discuss specifics, such as, horsepower, rpm, position and environment when talking to factory personnel.

Maintenance

The CFCBC clutch-brake is designed so as to require a minimum amount of attention during the wear life of the unit. Remove the accumulated wear particles occasionally and check both clutch side and brake side armature engagement. The armatures can be observed through the vent holes in the housing. The wear particles may be removed by vacuuming or brushing. Removal of other dusts and dirt will help prolong the units life.

When the air gaps, the space between the armature and friction faces of either side of the CFCBC exceeds ⅛" or at the time the unit fails to engage, with its coil still in good condition, the following parts are to be replaced: Armatures, both clutch and brake. Clutch side - drive hub assembly. Brake side - friction face assembly.

Other components which are to be replaced when they become worn or malfunction: Ball bearings. Managet body and coil assemblies. Splined hub and/or output shaft.

Troubleshooting for CFCBC Clutch-Brakes

Note: If DC voltage is measured without the coil being connected, a misleadingly high reading results due to a capacitor in the arc suppression network used with the rectifier.

A. Overheating, coil burned-out or loss of torque

1. On CFCBC units, clutch coil burnout has been typically caused by improper position of the drive hub or insufficient tightening of the set screws in the drive hub, which thereby allowed the drive hub to rub on the magnet body causing excessive heat and eventually clutch coil burnout. See installation instructions for correct air gap adjustment and set screw torque recommendations.
2. Check ambient temperature. Is it above 40°C? Consult factory for assistance.
3. Check thermal capacity of unit versus actual heat dissipation requirements. See Catalog 500 for specifications.
4. Check voltage supply as close to coil as feasible. Compare to nameplate data, if incorrect apply proper voltage.

   For Tor-ac units, check voltage supply as close to the Tor-ac module as possible. If this value is not between 105-125 VAC (if variable voltage input is not being used), correct the voltage source and replace burnt-out parts.
5. Is coil resistance correct? Resistance of the 90-100 VDC coils and Tor-ac coils are tabulated in Table 1. For others, contact factory.

Table 1

Size/Style	90-100 VDC and 115 VAC Tor-ac Coil Resistances ohms (nominal value)
3 CFCBC	850
5 CFCBC	418
5.5 CFCBC	316

6. Start time or stop time on clutch-brakes normally should not exceed one second. If excessive, recheck torque rating versus load characteristics.
7. On release springs, check for broken, missing or substituted springs not of our manufacture.
8. Check for oil/grease on friction elements. If this is found, replacement is recommended of complete unit or affected elements.
9. Are control (limit) switches operating properly and set in proper place? A switch malfunction may appear to be loss of torque.
10. Is unit fully burnished? If not, see *Burnishing Instructions.*
11. On horizontal or vertical applications does the armature(s) drag excessively on the friction surface(s) when that side is de-energized? Check for correct air gap, adjust if necessary or convert (use) to a spring release version if not furnished.
12. Unit worn excessively? Replace unit or worn parts.

B. Loss of torque

1. Check all items above.
2. Check for oil/grease on friction elements. If this is found, replacement is recommended of complete unit or affected elements.
3. Is unit fully burnished? See *Burnishing Instructions.*
4. Are control (limit) switches operating properly and set in proper place? A switch malfunction may appear to be loss of torque.

C. Fuse in DC power supply blows

1. Never put in a higher rating fuse or replace with a slo-blow type.
2. Check resistance of coil(s), if shorted, replace magnet body and coil assembly.

   Check for grounded lead wire(s) between coil and power supply. If grounded, correct problem. In above, correct problem before installing a new fuse.
3. If cause was not found in Step 2 above, check rectifier bridge by removing all loads and replacing fuse. If fuse blows when AC is applied to rectifier, bridge is shorted. Replace bridge if feasible or discard control and replace.

D. Fuse in line before Tor-ac® module blows

1. Never put in a higher rated fuse than suggested or replace with a slo-blow or time delay fuse.
2. Check the Tor-ac module by removing all loads (disconnect from the coils and insulate output leads), and replace the fuse. If the fuse now blows when AC power is applied, the module is defective or damaged. Replace the module after locating the cause of damage.

E. Unit fails to engage

1. See Items under A, B, C and D of the *Troubleshooting* Section.
2. Check armature(s) for free axial movement on the splined hub.