Installation and Service Instructions for Electromagnetic Clutch Couplings

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 CCC Clutch. Clutch Couplings are designed to be assembled on adjacent shafts. It transmits rotational motion when energized by coupling these shafts together.

Through an electromagnetic force, the drive hub will attract the armature and the driving torque developed between these components effectively couples the shafts together. This torque or power flow is developed whether the driving force is on the driven hub or on the drive hub assembly. Our standard terms are used to help identify the parts for descriptive purposes only.

Installation

The magnet and rotor assembly are mounted on one shaft, normally the drive shaft. Be certain that the key is in place in the keyway and push the assembly on the shaft until the end of the shaft is flush or nearly flush with the counter bore in the rotor face. Do not have shaft extend beyond the counter bore in the rotor face. The splined driven hub with armature is mounted on the adjacent shaft. Maintain the air gap per Table A between the rotor and armature (open magnet - armature gap). Proper positioning can be checked by this air gap with the coil de-engergized. Setting the intial starting gap near .010" will provide for slightly longer life from the clutch with spring release.

Fasten restraining bracket in a manner that prevents the magnet body from rotating. **Caution!** Do not overtighten the bracket, as this preloads the bearing.

Electrical Connection

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 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.

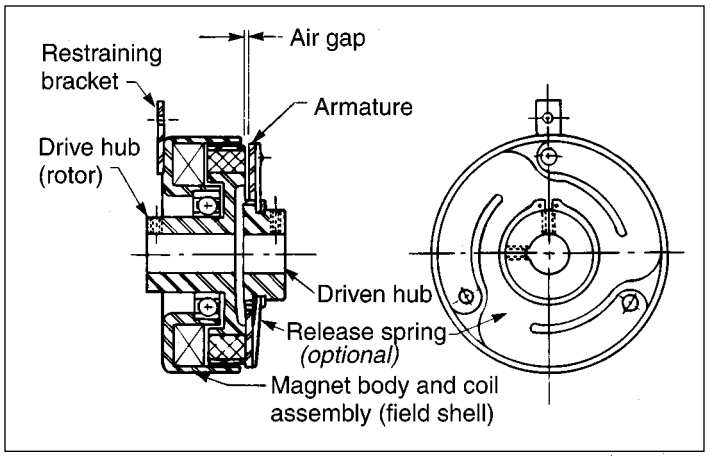

Figure A

Table A

Size	Hub-Rotor Gap (reference) (inches)	Open Magnet-Armature Gap (inches)	Maximum Allowed Misalignment (inches)	
			Parallel	Angular
3	1/32	.010 to .030	.005	.003
3.5	1/16	.010 to .030	.005	.003
5	3/32	.010 to .030	.005	.003
5.5	1/16	.010 to .030	.005	.003
8	1/8	.010 to .030	.005	.003

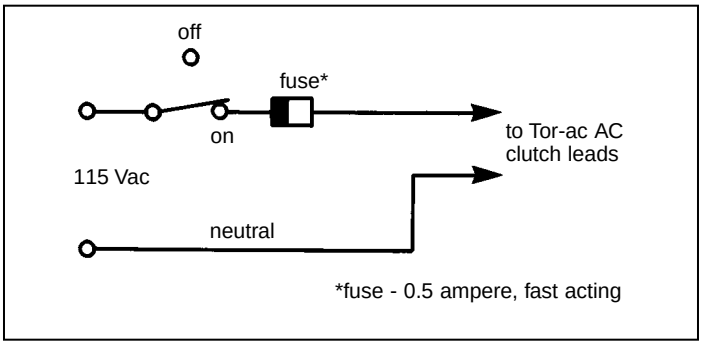

Figure B

On units with cord grips do not remove cap or turn hex portion of fitting. Wires may be twisted and torn off if attempted.

Enclosure

Normally, the machine housing provides sufficient enclosure. Care must be taken to protect unit from grease, oil or airborne materials. Slippage and excess heating of the unit may result if proper protection is not provided.

Care should be taken that high ambient temperatures do not exist. Provide proper ventilation and cooling.

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 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.

Component Descriptions

After proper installation, no further adjustment should be required for the life of the unit.

Rotor or drive hub
The rotor is constructed to be mounted and keyed to a rotating shaft and held in place with set screws or other means of fastening. An outer pole and inner pole are separated by friction material. A ball bearing is mounted on the rotor shaft for the purpose of providing support to the magnet and maintaining proper air gaps on this assembly.

Driven hub
The driven hub is to be mounted to a separate shaft. It is to be keyed and held in place with set screws or other means of fastening. A spline on the outside diameter of this hub on which the clutch armature is to be assembled. A retaining ring is normally placed on the hub to act as a stop for the armature to prevent an excessive air gap between the armature and rotor face.

Armature
The armature has splines on its inside diameter which mate with splines on the driven hub. The armature is spaced on the driven hub so it can move laterally on the splines between the retaining ring stop and the face of the drive hub or rotor.

Rotor and armature faces
Normally, the wear rate will be the same on both surfaces. it is recommended that both elements be changed at the same time. Due to the metal-to-metal contact of rotor and armature, grooves will occur in armature face during normal service life.

Repairs
When the wear between the armature and friction face of the rotor exceeds 3/32", or at the time the clutch fails to engage, the following parts are to be replaced:

Armature
Rotor assembly

Other parts which are to be replaced when they become worn or malfunction:

Ball bearings
Magnet and coil assembly
Splined driven hub

Troubleshooting for Industrial Type Clutches

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. Check ambient temperature. Is it above 40°C? Consult factory for assistance.
2. Check thermal capacity of unit versus actual heat dissipation requirements. See Catalog 500 for specifications.
3. 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.
4. Is coil resistance correct? Resistance of the 90 VDC coils and Tor-ac coils are tabulated in Table B. For others, contact factory.

Table B

Size/Style	90-100 Vdc and 115 Vac Tor-ac Coil Resistances
	ohms (nominal value)
3/CCC-30	904
3.5/CCC-35	869
5/CCC-50	459
5.5/CCC-55	316
8/CCC-80	232

5. Start time on clutches normally should not exceed 1 second. If excessive, recheck torque rating versus load characteristics.
6. On release springs, check for broken, missing or substituted springs not of our manufacture.
7. Check for oil/grease on friction elements. If this is found, replacement is recommended of complete unit or affected elements.
8. Are control (limit) switches operating properly and set in proper place? A switch malfunction may appear to be loss of torque.
9. Is unit fully burnished? If not, see *Burnishing* instructions.
10. Check that the restraining bracket is properly secured. See Step 3 of *Installation*.
11. During the life of the unit, friction material and metal dusts accumulate due to normal cycling. This dust may be removed by vacuuming or brushing. Removal of accumulated dusts and dirt will prolong the unit life.

B. Fuse in power supply blows

1. Never put in a higher rating fuse or replace with a slo-blow type.
2. Check resistance of coil, if shorted, replace magnet body and coil assembly. If not shorted, obtain actual coil resistance and compare to reading in Table B, or value obtained from factory.

   Check for grounded lead wire(s) between unit and fuse. If grounded, correct problem. In above, correct problem before installing a new fuse.
3. If cause was not found in Step 2 above:
   a) Check Tor-ac module by removing all loads and replacing fuse. If fuse blows when AC is applied to Tor-ac module, module is defective. Replace.
   b) 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.

C. Unit fails to engage

1. See Items under A, this Section.
2. Check armature for free movement of the pins in hub or pulley.
3. Check voltage output from Tor-ac or rectifier control when applying 115 Vac; should be approximately 103 Vdc with coil connected. Replace Tor-ac module or rectifier control if it is defective.