

E-Letter October 2008

### Basic Brake Wiring Guidelines



Solenoid Coils can have two, three or four leads as detailed in the October 2007 e-letter. A two lead coil is a single voltage and frequency coil. A three lead coil is a single voltage coil with a dual frequency option and a four lead is dual voltage & single frequency. Each has a

specific wiring requirement which is detailed in the coil kit or the brake installation sheet.

The coil label information should be compared to the power supply as well as the wiring diagram. A general wiring sheet is found at:

<http://www.stearns.rexnord.com/pdf/Trouble/AC-coil.pdf>

Solenoid coils have a brief inrush or pull in amperage requirement that is much higher than the amperage necessary to keep the brake released. The inrush time is measured in milliseconds yet still needs to be considered in the power supply especially in smaller single phase motors. Stearns AC coils do not have a polarity sensitivity and are single phase. Solenoid coils rated 48VDC and less may have a polarity requirement and a direct acting brake can be considered if polarity is a concern. The solenoid coils do require a fixed frequency and a voltage within plus or minus 10% of the rated voltage.

Stearns solenoid coils must be wired separately from any Variable Frequency Drive (VFD) output as the coil pull force is designed with a fixed frequency.



When the brake is wired across the motor, there can be a delay between removing power to the brake-motor and the brake spring setting action. The amperage necessary to keep the brake power released is very low. The brake will continue to be power released until the motor is no longer generating at or above the holding amperage.

Wire brakes separate from the motor for a rapid stop and generally in gravity affected loads such as hoists and lifts.

Picture: brake wired through to the motor with the brake motor connection diagram clearly identified on the junction box.

**Stearns® Spring-Set Disc Brakes**  
**Wiring Instructions for AC Voltage Coils**

**Important:**  
 Please read these instructions carefully before installing, operating, or servicing your Stearns Brake. Failure to comply with these instructions could cause injury to personnel or other damage to property. If you have any questions or need additional information, contact the manufacturer, L.C. Stearns Division, 10100 International Drive, Crawley, WI 53119. (414) 272-1100.

**Caution:**  
 1. Installation and wiring must be made in accordance with all local and national electrical codes and safety standards. All wiring and electrical connections must comply with the National Electrical Code (NEC) and local electrical codes in effect.  
 2. Do not touch the brake's internal components or electrical wiring during installation or service.  
 3. Do not operate an electrical motor, disconnect power source before working on the brake. To prevent electrical shock, use of a lock-out device is recommended.  
 4. Make certain power source conforms to the requirements specified on the brake's nameplate.  
 5. Do not connect the wiring to the motor of an operating brake. Also, confirm that the brake is held in the open position. Failure may be the result of a hot surface, fire, or other injury.

6. Do not operate brake with housing removed. All wiring parts should be guarded.  
 7. Installation and wiring should be performed only by qualified personnel familiar with the construction and operation of the brake.  
 8. Do not perform maintenance and operations on the brake until the power source is de-energized. All power to Stearns parts should be locked out and tagged.  
 9. After wiring, the brake motor will operate normally. Repeat before removal of the brake. The brake must be removed before maintenance or adjustment of the brake.  
 10. DO NOT BLOCK OR FIGHT using an air hose in the operation of the disc brake. Do not use the air or hydraulic air line as a release mechanism or a respiratory valve. Air pressure should not be used on a brake.  
 11. When a release device or a soft touch is required, the brake must be removed from the motor. When the holding force is required, the brake must be removed from the motor. When the brake is in a release position, the brake must be locked off.

**Wiring Diagram - Dual Voltage Coil**  
 Class A Coil (48VDC)  
 Class B Coil (24VDC)  
 Class C Coil (12VDC)  
 Class D Coil (6VDC)  
 Class E Coil (3VDC)  
 Class F Coil (1.5VDC)  
 Class G Coil (0.75VDC)  
 Class H Coil (0.375VDC)  
 Class I Coil (0.1875VDC)  
 Class J Coil (0.09375VDC)  
 Class K Coil (0.046875VDC)  
 Class L Coil (0.0234375VDC)  
 Class M Coil (0.01171875VDC)  
 Class N Coil (0.005859375VDC)  
 Class O Coil (0.0029296875VDC)  
 Class P Coil (0.00146484375VDC)  
 Class Q Coil (0.000732421875VDC)  
 Class R Coil (0.0003662109375VDC)  
 Class S Coil (0.00018310546875VDC)  
 Class T Coil (0.000091552734375VDC)  
 Class U Coil (0.0000457763671875VDC)  
 Class V Coil (0.00002288818359375VDC)  
 Class W Coil (0.000011444091796875VDC)  
 Class X Coil (0.0000057220458984375VDC)  
 Class Y Coil (0.00000286102294921875VDC)  
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 Class AA Coil (0.0000007152557373046875VDC)  
 Class AB Coil (0.00000035762786865234375VDC)  
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 Class GF Coil (0.000244698917339234375VDC)  
 Class GG Coil (0.00012234945866696171875VDC)  
 Class GH Coil (0.000000

Direct acting brakes with a small air gap do not have the inrush amperage requirement. Direct acting brakes have a DC coil. An AC to DC rectifier is selected based on the DC amperage, available AC power supply and performance specifications such as rapid set, rapid release, filtered full wave or half wave power supply. The AC rectifier input voltage is matched to the required output DC voltage. The rectifier should be selected at the same time as the brake specifications are set. Rectifiers can be installed in the electrical panel or closer to the brake. Armature actuated brakes should be wired separately from a Variable Frequency Drive output.

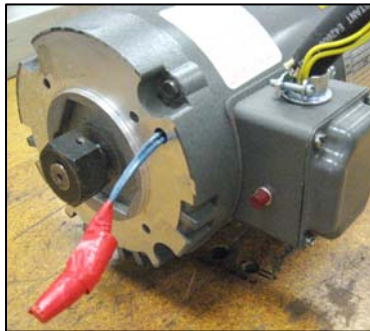
Picture: Using a shim gage to check air gap of a direct acting AAB brake.



Solenoid coils can be changed at site depending on available voltage. Direct acting brake coils are part of the magnet body assembly and are changed out as sub-assembly. A separately wired brake voltage may be different than the motor and drive voltage.

Voltage and amperage should be checked as close to the brake as possible. Line power drop and wire gage size should be considered due to cable run length and other electrical equipment sharing the same power lines. Coils are wound with voltage spike resistant wire.

Use a fuse chart for correct fuse selection, considering the inrush and holding amperage requirements as listed on the coil and in the catalog. Reaction times for solenoid & AAB style brakes are listed in the catalog. Solenoid style brakes generally react under 40 ms for brakes less than 20 lbft, and 60-80ms for larger brakes. Direct acting brake reaction time is affected by the rectifier choice.



Pictures:

Power leads at C-face ready for wiring brake internally.

Hazardous environment brake wired externally across motor leads in the power box.

Motor and brake wired separately with separate junction or conduit boxes.

The common coil failures are: incorrect wiring, incorrect power, high or low power, and finally an incorrect air gap on solenoid product.

Installation sheets are shipped with brakes, posted on the internet and can be requested directly from Stearns.

Prior e-letter tech sheets are posted on the Stearns web site: [www.stearns.rexnord.com](http://www.stearns.rexnord.com)

**Stearns®: Reliable brakes through design, manufacture and support.**

**Stearns®** E-Letter October 2008