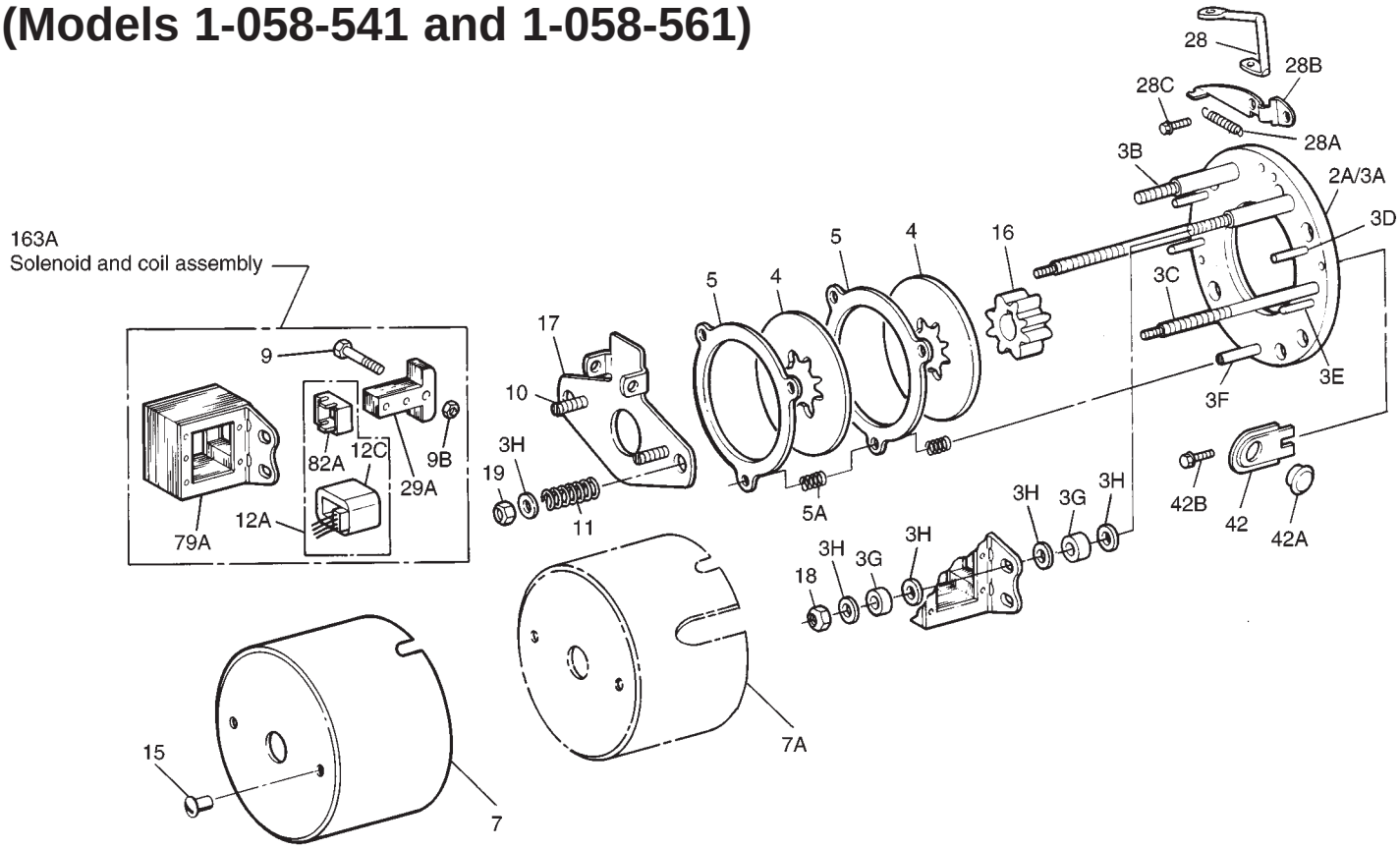
Stearns® *Spring-Set Disc Brakes*

P/N 8-078-925-10
effective 12/1/99

Installation and Service Instructions for Series 58,500
(Models 1-058-541 and 1-058-561)



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 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.

Caution

1. Installation and servicing must be made in compliance with all 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. Do not install the brake in a hazardous location other than that as designated.

   To prevent ignition of hazardous atmospheres, disconnect the product from the supply circuit before opening. Keep assembly tightly closed when in operation.
3. To prevent an electrical hazard, disconnect power source before working on the brake. If power disconnect point is out of sight, lock disconnect in the *off* position and tag to prevent accidental application of power.
4. Make certain power source conforms to the requirements specified on the brake nameplate.
5. Be careful when touching the exterior of an operating brake. Allow sufficient time for the brake to cool before disassembly. Surfaces may be hot enough to be painful or cause injury.
6. Do not operate brake with housing removed. All moving parts should be guarded.
7. Installation and servicing should be performed only by qualified personnel familiar with the construction and operation of the brake.
8. For proper performance and operation, only genuine Stearns parts should be used for repairs and replacements.
9. After usage, the brake interior will contain burnt and degraded friction material dust.

   This dust must be removed before servicing or adjusting the brake.

   DO NOT BLOW OFF DUST using an air hose. It is important to avoid dispersing dust into the air or inhaling it, as this may be dangerous to your health.

   a) Wear a filtered mask or a respirator while removing dust from the inside of a brake.

   b) Use a vacuum cleaner or a soft brush to remove dust from the brake. When brushing, avoid causing the dust to become airborne. Collect the dust in a container, such as a bag, which can be sealed off.

General Description

The 58,500 Series is a spring-set, electrically released disc brake for controlled stopping and holding of a load. It has a single-phase solenoid coil for operation on alternating current only. The nominal static torque is factory set.

Construction

The 58,500 Series Brake utilizes composition friction disc(s) driven by a

metal hub that is fastened to the motor shaft. Manual release with automatic electrical reset is provided. Splined hub and friction disc is standard. Only open enclosure is available.

Operation

When brake is properly wired, starting the motor will energize the solenoid and compress the pressure spring. This action removes the force against the stationary plate and friction disc and allows the disc to rotate freely. Stopping the motor will de-energize the solenoid and restores pressure spring force against the stationary plate and friction disc, stopping and holding the load.

Warning! Any mechanism or load held in position by the brake should be secured to prevent possible injury to personnel or damage to equipment before any disassembly of the brake is attempted or the manual release lever is operated on the brake.

When the motor is off and the load is to be moved without energizing the motor, the manual release lever can be rotated 90° away form the mounting face. This removes the retarding torque from the motor shaft, allowing the load to be moved. The brake will remain in the manual release position until the release lever is returned manually to its *set* position, or until the brake is reenergized electrically and the release lever returns to its *set* position.

Note: The motor should not be run with the brake in the manual release position to avoid overheating of friction disc.

I. General Installation Notes

A two friction disc brake can be mounted in any horizontal or vertical above motor position. A single friction disc brake can be mounted in any position.

II. Installation Procedure

Note: Do not operate manual release until brake is installed to maintain disc alignment for installation ease.

1. Remove housing nuts (15) and housing (7) or (7A).
2. Remove hub (16) from brake and slide onto motor shaft and key (not furnished) to within **3/16**" of motor mounting surface. Torque both set screws to 78 lb-in of torque for 1/4" and 156 lb-in for **5/16**.

Note: Check motor mounting face to be sure NEMA dimensions of 0.004 " T.I.R. on concentricity and face run out are met. Shaft run out is to be within 0.002" T.I.R. Maximum shaft end float is 0.020".

3. Attach brake to mounting surface by sliding the brake friction disc(s) (4) onto hub (16), engaging without force. Brake endplate (2) is to be tight against mounting face.
4. Mount the brake to the mounting surface with two 3/8" socket head cap screws (not furnished) 180° apart. Recommend four 3/8" screw mounting for 25 lb-ft brake. Torque to screw manufacturer's recommendation based on material being used.
5. Verify solenoid air gap is 5/32" for brakes with 10 through 25 lb-ft nominal static torque or 1/8" for brake with 6 lb-ft or less. Push in plunger and allow it to snap out. Check air gap. If adjustment is required, see *Wear Adjustment.*
6. See *Electrical Connection* for coil connection.
7. Replace housing.

III. Torque Adjustment

The brake is factory set for nominal rated torque. No further adjustment to increase torque may be made. The approximate compressed torque spring length to produce nominal rated torque is given in Table A.

Table A

Brake Torque (lb-ft)	Length "L" (in)
15 25	$1\frac{13}{16}$ $1\frac{13}{16}$

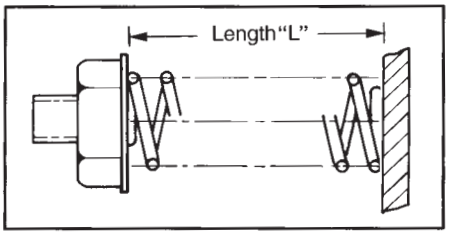


Figure 1

To increase stopping time, turn torque adjusting nuts (19) counterclockwise equal amounts to increase spring length. One full turn on the nut will reduce the nominal torque approximately 10%. Do not reduce torque to less than 60% of nominal rated.

IV. Electrical Connection

Caution: Inverter Motor and Special Control Systems. This brake contains either a single phase AC coil or DC coil that requires instantaneous power within ± 10% of rating at the coil. A separate power source is required when this brake is used in conjunction with a motor or control system that limits voltage or current input (i.e. inverter motors) or causes a ramping of the power supply.

Note 1: Brake coil connections described here cover common motor connections. For nonstandard motor or control connections contact respective supplier or Stearns Division.

Note 2: Be sure lead wires to coil are not tight or pinched, and that leads will not be rubbed by friction disc, trapped between solenoid plunger and frame, caught between lever arm and endplate, or by linkage.

General

All coils are single-phase alternating current (AC).

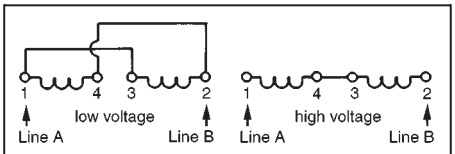
Single voltage coil connection

Connect coil (12C) to any two wires of a single-phase or three-phase power source of appropriate voltage. For operation with a motor control, connect to any two motor leads with correct voltage.

Dual voltage coil connection

Preconnect coil for appropriate high or low voltage as shown in Figure 2. On these coils observe the lead numbering sequence for proper connections as follows:

AC Voltage Coil Connection



For	Power Line A	Power Line B	Tie Leads
Low voltage	1 and 3	2 and 4	–
High voltage	1	2	3 and 4

Figure 2

Connecting AC solenoid coils on dual voltage 230/460 three-phase motors

To use a 230 volt coil (or a 230/460 dual voltage coil connected for 230 volts) with a 230/460 dual voltage three-phase motor, the brake leads are connected across two motor terminals as shown, or other equivalent combinations. If a 230 volt brake coil is connected as shown in Figures 3 or 4, the motor can be operated on either 230 volts or 460 volts with no effect on brake operation.

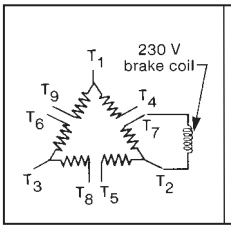


Figure 3

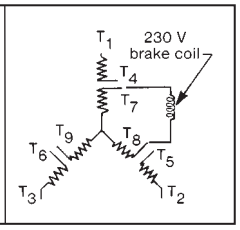


Figure 4

DC Voltage Coil Connection

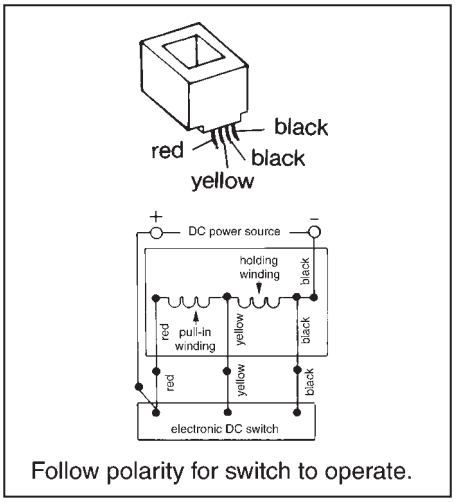


Figure 5

DC coils

1. All Stearns DC coils are single voltage, dual winding. A high current pull-in

winding is initially energized to start solenoid plunger movement, while a low current holding winding is momentarily short circuited via field effect transistor. When the plunger is seated, the field effect transistor switches off which removes the short circuit from the holding winding, and inserts it in series with pull-in winding. Due to the high initial current demand of a DC solenoid, a separate DC power source of adequate current capacity is usually required.

Caution! Never use a series resistor to drop power supply voltage as brake malfunction will result! For electrical release of brake, apply full rated solenoid coil voltage by the closing of a switch. DO NOT increase voltage to coil slowly.

2. Connect proper power to two terminals of coil or the two free leads (red and black) of four lead coil. POLARITY IS IMPORTANT

V. General Maintenance

1. **Warning!** Any mechanism or load held in position by the brake should be secured to prevent possible injury to personnel or damage to equipment before any disassembly of the brake is attempted or before the manual release lever is operated on the brake.
2. Observe all cautions listed at the beginning of this manual before attempting to service brake.
3. Remove housing nuts (15) and housing (7) or (7A).

Wear adjustment

1. Normal friction disc wear will cause solenoid air gap to become larger from the original set air gap. An increase in stopping time and a slight reduction in torque will consequently occur. See figure 6.
2. When the solenoid air gap increases to 1/4 ", the brake must be adjusted. The gap is measured between the mating ground surfaces of the solenoid frame and solenoid plunger.
3. To decrease air gap, turn both wear adjusting screws (10) equal amount clockwise until an air gap is attained. To increase gap, turn screws equally counterclockwise. Air gap is 5/32" for brakes with 10 through 25 lb-ft nominal static torque or 1/8" brakes with 6 lb-ft or less.
4. After adjustment, push in plunger and allow it to snap out. Recheck air gap.
5. Replace friction disc when thickness of worn area is approximately 1/8" down from the original 7/32" (.22) disc thickness.

Friction disc replacement

1. Disconnect power source to brake.
2. Remove housing nuts (15) and housing (7) or (7A).
3. Remove the four endplate mounting screws and slide the entire brake off motor and hub.
4. Remove the slotted stationary disc stud (3F) from the endplate (2). Be sure to retain the two centralizing springs (5A).
5. Remove the friction discs (4) radially out of the brake from where the stud (3F) was.
6. Insert the new friction disc in reverse order. It will be necessary to turn both wear adjust screws EQUALLY counterclockwise for clearance.
7. Reinstall the stationary disc stud and centralizing springs (5A) for horizontal or vertical above motor operation.

Note: For vertical below motor operation on a two friction disc brake, the three centralizing springs next to the endplate (2) are removed.

8. See *Wear Adjustment* to set air gap.
9. Replace housing.
10. Restore power to brake.

Coil or solenoid assembly replacement

1. Disconnect coil (12C) from circuit.
2. Remove two nuts (18), two washers (3H), and two shock pad washers (3G) from the solenoid mount studs. Pull solenoid frame (79A) off the solenoid mount studs. The solenoid mount studs may loosen with the removal of the nuts (18). If necessary, rethread the studs into the endplate.
3. Through 15 lb-ft brake - Remove plunger guide (82A) by lifting out of top of solenoid frame. Coil (12C) has a lock tab, located at top of coil opposite lead wire side, which is pressed against coil and coil is slid sideways from solenoid frame.

3A. 25 lb-ft brake - Remove plunger guide (82A) from out of top of solenoid frame. Slide coil (12C) sideways from frame noting position of lead wires.

4. For coil replacement, inspect and clean solenoid assembly (163A). Install the new coil in original solenoid frame or original coil in new solenoid frame with the lead wires positioned as before. Install plunger guide(s) in reverse order of (3) or (3A).

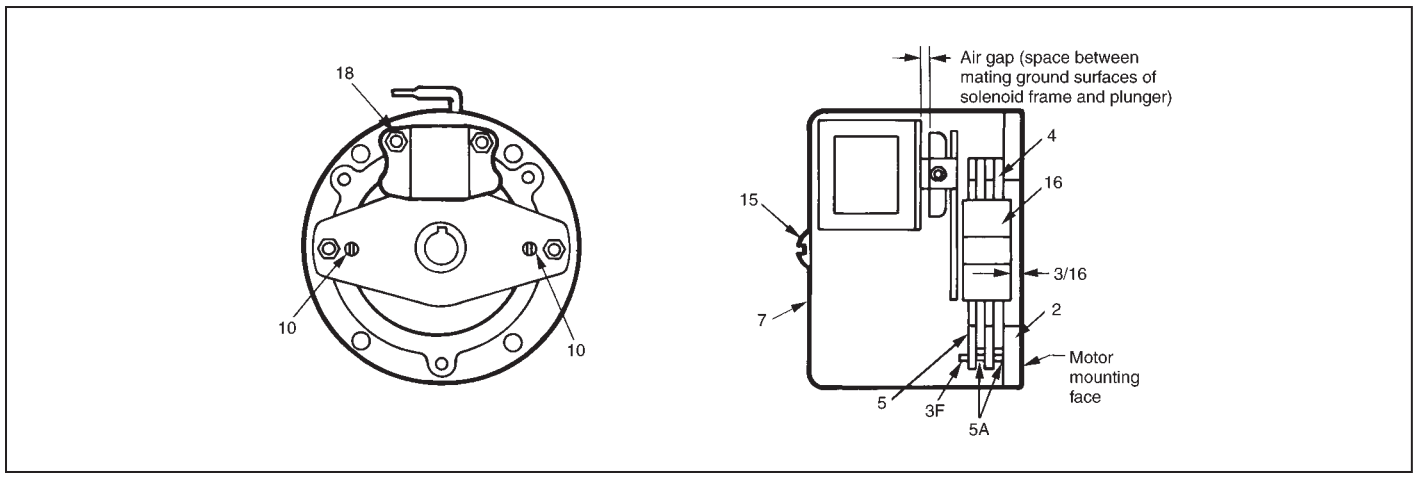
4A. For solenoid assembly replacement, remove plunger screw (9) and plunger nut (9B). Install new plunger (29A) with new plunger screw and nut.

5. Reassemble brake in reverse order of Steps 1 and 2. Tighten the two nuts (18) to equally compress the shock pads (3G). If solenoid buzz is noted; readjust frame alignment by slight tightening or loosening of one nut (18). Check that plunger is in center of frame. See *Wear Adjustment.*
6. Replace housing.
7. Restore power to brake.

Troubleshooting

A. If brake does not stop shaft properly or overheats, check the following:

1. Is brake manually released rather than electrically released while motor is running?
2. Is friction disc excessively worn, charred or broken.
3. Has hub become loose and shifted on shaft?
4. Is hub clean, and does friction disc slide freely?
5. Does stationary plate(s) slide freely on guide pins?
6. Are pressure springs improperly assembled or broken?
7. Is solenoid air gap adjusted correctly? See *Wear Adjustment.*
8. Does solenoid linkage move freely?



9. Is voltage supply at coil correct?
10. Are controls which govern start or stop of braking cycle operating properly?
11. Is brake coil energized at same time or prior to energization of motor, and de-energized at same time or after de-energization of motor?
12. Is stopping time more than one second (rule of thumb) and/or is application more than five stops per minute?
    If so, consult factory. Check thermal requirements of load versus thermal rating of brake.
13. Replace friction disc when thickness of worn area is approximately 1/8", down from the original 7/32" (.22) disc thickness.

B. If brake hums, solenoid pulls in slowly, or coil burns out, check the following:

1. Voltage supply at coil versus coil rating and connection.
2. Is solenoid air gap excessive?
3. Shading coils may be broken.
4. Solenoid frame and plunger may be excessively worn.
5. Is solenoid dirty?
6. Solenoid mounting nuts may have become loose causing frame to shift and plunger to seat improperly.
7. Does solenoid linkage move freely?
8. Check for excessive voltage drop in motor line when motor is started. Check wire gauge of supply line against motor starting current and solenoid inrush current. Measure voltage drop at solenoid coil leads during maximum inrush current condition. To accomplish this, connect voltmeter at brake coil. Insert a block of wood, or other non-magnetic material, between solenoid plunger and frame. Block thickness should approximately equal solenoid air gap. Energize motor and brake simultaneously, take reading and immediately shut down. (This is to prevent motor, brake, or solenoid burn up, since brake will be set during procedure.)

C. If disc noise occurs, check:

If friction disc (4) becomes noisy, check centralizing springs (5A) to be sure they are installed.