

Installation and Service Instructions for Series 55,000; 55,200; 55,300; 55,400; 55,500 and 57,500

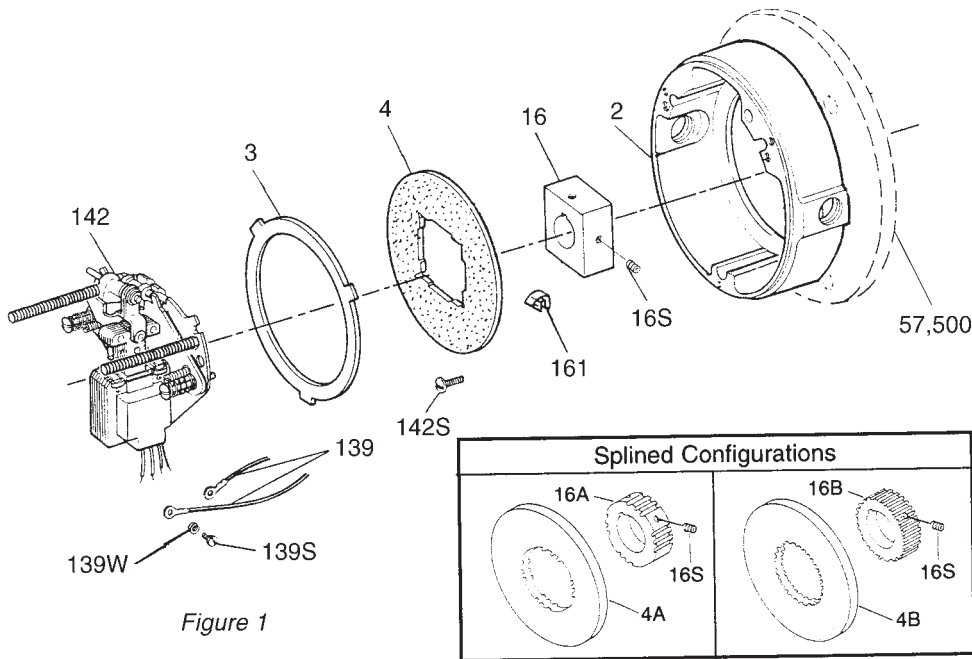


Figure 1

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, LLC, Stearns Division, 5150 S. International Dr., Cudahy, WI 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 atmospheres containing explosive gases or dusts.
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 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

These series of brakes are spring-set, electrically released. They contain one or more rotating friction discs (4) driven by a hub (16) mounted on the motor or other shaft, except the 55,200 Series which has the hub mounted on a shaft supported by two brake bearings.

Operating Principle

These series contain one or more friction discs (4) assembled alternately between the endplate (2) friction surface, stationary disc(s) (3) and pressure plate (also called stationary disc) (3). The stationary disc(s) are restrained from rotating by being keyed into the endplate. With the brake released, all disc pack components are free to slide axially and the friction disc(s) to rotate.

Brake release occurs when the solenoid coil is electrically energized, causing the solenoid plunger to travel a specified distance and through a lever system, overcoming the pressure spring force. This action releases the clamping force on the disc pack, thereby allowing the friction disc(s) and brake hub to rotate.

Brake sets and torque is produced when electric current to the solenoid coil is interrupted, thereby collapsing the solenoid magnetic field. The solenoid plunger returns to its original de-energized position allowing the lever arm to move forward by virtue of the compressed torque springs. This action compresses the disc pack components which applies a retarding torque to the brake hub and ultimately restores the brake to a spring-set static condition.

Caution! While the brake is equipped with a manual release to allow manual shaft rotation, the motor should not be run with the manual release engaged, to avoid overheating the friction disc(s).

I. Installation Procedure

To remove housing, follow instructions listed under each individual brake series in Figure 2, then continue with the following steps.

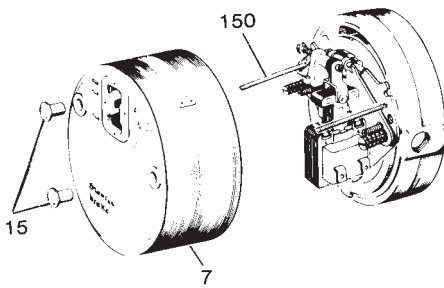
A. Method of installing 55,300; 55,500; 57,500 plus 55,000 and 55,400 Brakes with standard enclosure:

1. Remove hub (16) from brake assembly, using caution to preserve alignment of friction disc(s) (4) for ease of brake assembly. Do not operate manual release until brake is installed. When removing hub from brake on multi-disc brakes, check that hub slides freely. If not, file area of discs contacting hub so that discs slide freely without binding.

Note 1: On single-disc brakes the hub may have moved far enough into brake to be *locked in* by stabilizing springs (161). Remove springs from friction discs, but be sure to replace them in same position and proper location after hub is removed. (Locate at 90° in recessed portion of square hole, with prongs pointing into brake.) Stabilizing springs (161) are only used on single disc brakes with square hub and splined hub with the teeth removed for stabilizing spring clearance.

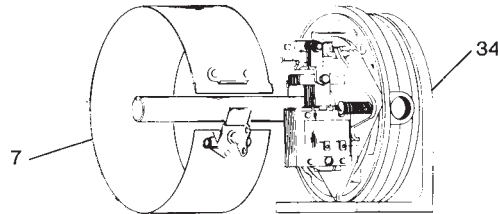
55,000 and 55,400 Series

Remove housing nuts (15) by unscrewing from housing studs (150), remove housing (7) by pulling back.



55,200 Series

Remove wraparound sheet metal housing (7) by turning wing-nut on latch counterclockwise until latch releases.



55,500; 55,300 and 57,500 Series

Remove housing nuts (15) by unscrewing from housing studs (150), remove housing (7) by pulling back.

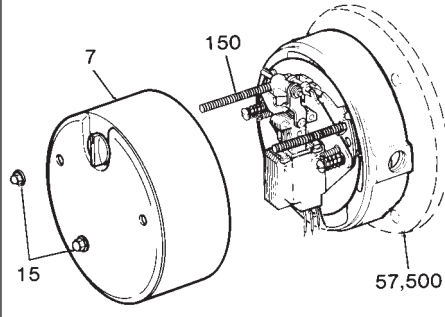


Figure 2

Note 2: Check face of motor, machine or foot mounting bracket to which brake is to be mounted 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 0.002" T.I.R. Maximum shaft end float is 0.020". On foot mounted brakes, dowels are recommended for bracket.

2. Use a key (not supplied) tight fitting and full axial length of hub (16). Slide hub on shaft positioning inboard face of hub about 3/16" from mounting face or at 5/16" for 57,500 Series. See Figure 3. Securely tighten both hub set screws (16S) with torque of 78 in-lbs on 1/4" and 156 in-lbs on 5/16". Recommended practice is to drill a set screw dimple into shaft, especially on vertical installation.

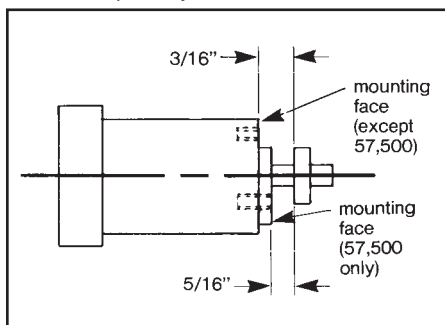


Figure 3

3. Attach brake to mounting face by sliding brake friction disc(s) (4) over hub, engaging without force. Brake endplate (2) face is to be tight against mounting face.

Note 3: If motor or assembly is to be ceiling or horizontally wall mounted, orient brake so that plunger will be above solenoid frame at final installation.

4. Install 3/8" – 16 cap screws (not supplied) or 1/2" size for 57,500 Series to attach endplate to mounting surface. Tighten

to manufacturer's recommended torque. Continue with Step D.

B. Method of installing 55,000 and 55,400 Series with waterproof, dust-tight enclosure:

1. Remove screws (142S) and support plate assembly (142).
2. Remove stationary disc(s) (3) and friction disc(s) (4).

Note: Vertically mounted multi-disc brakes have special pins which guide vertical mounting springs. Observe color coded sequence of springs from reinstallation.

See Notes 1, 2 and 3 in *Method I-A of Installing Brakes with Standard Enclosure*.

3. Attach endplate (2) to mounting face and tighten 3/8" – 16 cap screws (not supplied) to manufacturer's recommended torque.
4. Use a key (not supplied) tight fitting and full axial length of hub (16). Slide hub on shaft positioning square inboard face of hub 1/32" to 1/16" from unfinished cast surface of endplate (2). See *Installation Procedure, A, Step 2* for set screw tightening.
5. Reassemble friction disc(s) (4) and stationary disc(s) in the same order, being sure all slide freely without binding. If vertical mounting springs are used, be sure to reassemble in original sequence or refer to Sheet 301.4.
6. Mount support plate assembly (142) and torque screws (142S) evenly to 43 in-lbs. Be sure plunger is above frame on horizontal brakes. Continue with Step D.

C. Method of installing 55,200 Series:

1. Do not disassemble brake.
2. Bolt foot mounting bracket to a suitable base.
3. For in-line coupling, follow coupling manufacturer's suggestions on alignment.

4. If installing pulley or sprocket on brake shaft, do not use excessive force during installation. Maximum overhung load at center of keyway length is 150 lbs.
5. After alignment, dowels are suggested to maintain alignment.
6. Remove housing (7). Continue with Step D.

D. For all sizes

1. Refer to solenoid air gap, Table 2 in Section IV-A. Follow Steps 1 and 2 for checking and air gap adjustment, if necessary.
2. See Section II, *Electrical Connection of the Brake*, for coil connection.
3. Replace housing. On 55,300; 55,500 and 57,500 Series Brake, tighten housing nut (15) 3/4 to 1 turn (8 in-lb) beyond contacting the housing surface. On 55,000 and 55,400 Series standard enclosure brake, tighten housing nut 1/4 turn (30 in-lb) beyond contacting housing. On 55,000 and 55,400 Series DTWP enclosure brake, housing nut gaskets are provided. Tighten housing nut 1/2 to 3/4 turn (20 in-lb) beyond contacting gasket on housing.

Note: If brake is *upside down* for later ceiling mount, turn brake upright before installing housing.

II. Electrical Connection of Brake

CAUTION: Inverter Motor and Special Control Systems. This brake contains either a single phase AC coil or DC coil that requires instantaneous power within $\pm 10\%$ 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: On brakes with space heater, connect to appropriate power source. Heater is to be energized continuously, even during storage, if rust may occur.

Note 3: 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.

A. AC coils – single and dual voltage

1. All Stearns AC coils are single-phase. Connect single voltage coils to any two wires of single or three-phase power source, or, for operation with motor control, to any two motor leads of proper voltage.

Method of connecting dual voltage coil for use on high or low voltage is shown in Figure 4. Observe the lead numbering sequence for proper connection as shown in next column.

2. To use a 230 volt coil (or a 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

AC Voltage Coil Connection

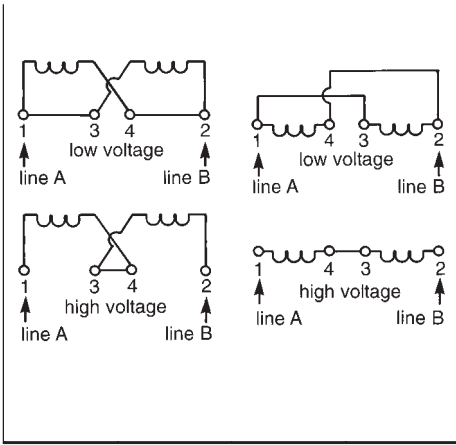


Figure 4

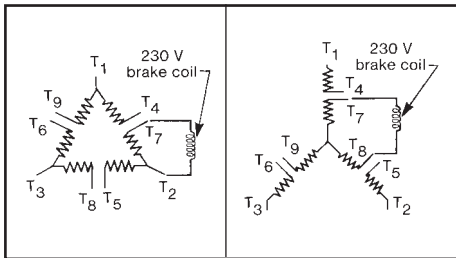


Figure 5

Figure 6

DC Voltage Coil Connection

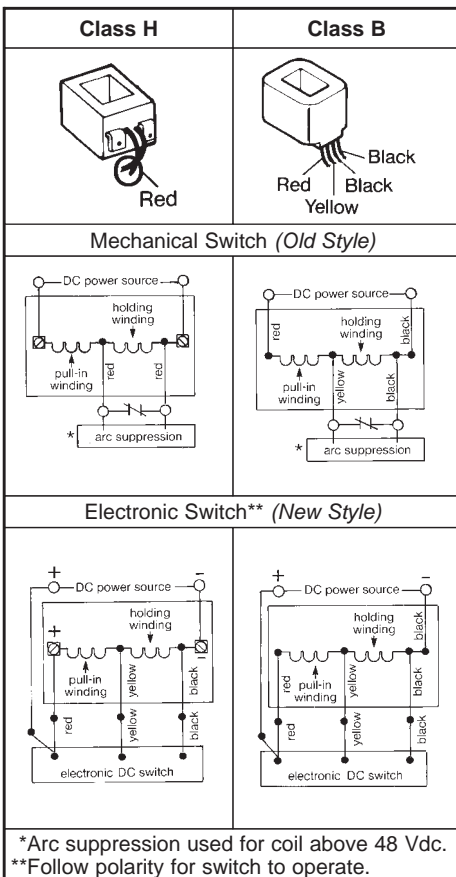


Figure 7

equivalent combinations. If a 230 volt brake coil is connected as shown in Figures 5 or 6, the motor can be operated on either 230 volts or 460 volts with no adverse effect on brake operation.

Table 1

Series	Nominal Static Torque (lb-ft)	Maximum Counterclockwise Turns	% Torque Reduction per Turn	Required Torque Adjust Screw Length (inches)	Original Spring Height (inches)
55,500	1.5			2	1
55,300 55,500	3, 6 & 10	4	12	2	7/8
55,500 55,300	15	3	16	2-3/4	1-27/32
55,000	1.5			2	1-1/8
55,000 55,200 55,400 57,500	3, 6, 10 & 15	3	16	2	1
55,000 55,200 55,400 57,500	25	3	16	2-3/4	1-7/8
57,500	10	3	16	2	1
57,500	15	3	16	2	7/8
55,000 55,400 57,500	20	3	16	2-3/4	1-7/8

B. DC coils

- All Stearns DC coils are single voltage dual winding. A high current pull-in winding is initially energized to start the plunger movement, while a low current holding winding is momentarily shunted from the circuit until the plunger has pulled in. The older design incorporated a mechanical switch mounted to the solenoid frame and actuated by an arm mounted to the plunger to bring the holding coil into the circuit. In addition, coils over 48 Vdc have an arc suppression module in parallel with the switch contacts to protect the contacts from arc erosion and suppress EMI. The polarity of the incoming power supply is immaterial with the mechanical switch. The new electronic switch design incorporates an electronic timing circuit to allow the plunger to pull in, then electrically switch to the holding winding. Polarity of the power supply to the electronic switch and coil must be maintained. Refer to Figure 7 for proper wiring.

Caution! Never use a series resistor to drop power supply voltage to the coil as brake malfunction will result.

- Due to high initial current demands of a DC solenoid, a separate DC power source of adequate current capacity is usually required.

Caution! For electrical release of brake, apply full rated coil voltage instantly. Do not increase voltage slowly.

III. Torque Adjustment

These series of brakes are factory set for nominal rated static torque which is maximum torque. Torque may be decreased for increased stopping time, see Table 1. The torque on the 1-1/2 lb-ft brake may not be reduced.

Note 1: Torque adjust screws on older brakes are 1/4" shorter than shown in Table 1. For replacement screws use part number 8-009-501-00 and specify 2" length needed or use part number 8-009-503-00 and specify 2-3/4" length needed, based on series and torque from Table.

Note 2: Both adjustment screws (11), Figure 8, must be turned equal amounts counterclockwise to decrease torque.

IV. General Maintenance

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 knob is operated on the brake.

Observe all cautions listed at the beginning of this manual before attempting to service brake.

A. Adjustment for friction disc wear (see Table 2 and Figure 8)

- Manually lift solenoid plunger to maximum travel. Depress and allow solenoid plunger to snap out several times. Measure solenoid air gap between mating ground surfaces of solenoid frame and solenoid plunger. (On vertically mounted brakes, it will be necessary

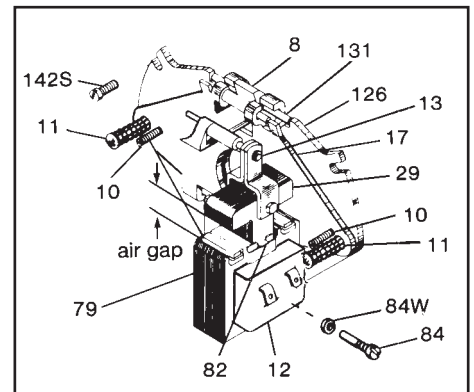


Figure 8

Table 2: Air Gap Settings

Nominal Static Torque (lb-ft)	55,000 55,200 55,400	55,500 55,300	57,500
1.5; 3	13/32"	13/32"	-
6	1/2"	1/2"	-
10	9/16"	1/2"	9/16"
15	9/16"	9/16"	9/16"
20; 25	9/16"	-	9/16"

to push solenoid plunger into solenoid frame to the point where spring pressure is felt, before measuring solenoid air gap.) As friction disc wear occurs, the air gap will increase as well as stopping time. If solenoid air gap exceeds 11/16", adjustment is necessary.

- The solenoid air gap may be decreased by turning both wear adjustment screws (10) equal amounts clockwise, approximately 1/8 turn, until solenoid gap is attained. Counterclockwise rotation will increase gap.
- Follow Step 1 and Step D of *Installation Procedure*, Section I, to replace housing.
- Restore power source to brake.

B. Replacement of friction discs

Follow Steps B-1, 2, 5, 6 and D of *Installation Procedure*, Section I.

C. Inspection or replacement of solenoid and associated components

- Refer to Figures 8 and 9. Insert screwdriver between support plate (126) and lever arm (17). Wedge apart and remove as an assembly bearing pin (26), bearing (6), pin (131), solenoid lever (8) connected to solenoid link (13) and plunger (29).

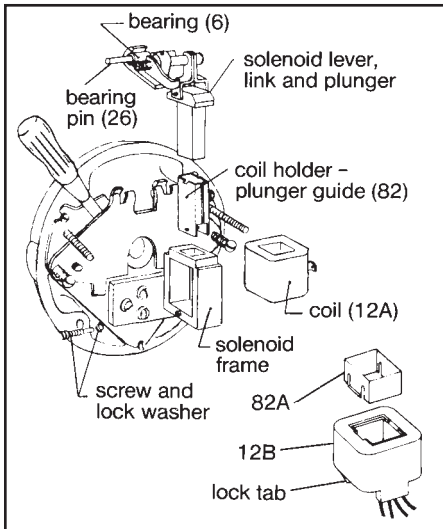


Figure 9

- On coil type (12A) remove plunger guide screw and lock washer. Remove both plunger guides (82) by prying up on the flanges. Slide coil (12A) sideways from frame noting position of coil terminals or lead wires.
 - On coil type (12B), remove plunger guide (82A) by lifting out of top of solenoid frame. Coil (12B) has a lock tab, located at bottom of coil opposite lead wire side which is pressed against coil and coil is slid sideways from solenoid frame.
- Inspect and clean all items. If coil, plunger guides, or solenoid replacement is required, refer to appropriate replacement parts list and select necessary replacement part, kit or assembly. Kits

or assembly packets contain full retrofit instructions.

- Reassemble brake in reverse order of Steps 1 and 2.
- Replace housing.
- Restore power source to brake.

D. Miscellaneous parts replacement (see Figures 1 and 8)

All parts shown in Figures 1 and 8 are available as kits, assemblies, or piece parts. Consult appropriate parts list for ordering information. Kits and assembly packets contain complete repair instructions.

V. Troubleshooting

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

- Are friction discs excessively worn, charred, or broken?
- Hub may have become loose and shifted on shaft. Recheck Section I, appropriate Step.
- Is hub clean, and do friction discs slide freely?
- Do stationary discs slide freely in the endplate? Check slots of endplate for wear at the areas where stationary discs are in contact. Grooves in the slots can cause hang-up of ears of stationary discs. If grooving is noted, replace endplate.
- On vertically mounted brakes, are springs in place in disc pack? See Sheet 301.4 for 55,000; 55,300; 55,400 and 57,500 or Sheet 301.5 for 55,300 and 55,500 if correct sequence is in doubt.
- With brake de-energized and housing (7) removed, check compressed length of pressure springs (11). Compare to tabulated values and adjust to minimum height to obtain desired stop times. See *Torque Adjustment*, Section III, Table 1.
- Is solenoid air gap adjusted correctly? See Section IV and refer to *Air Gap Setting*, Table 2.
- Solenoid may not be energizing and releasing the brake. Check voltage at the coil and compare to the coil and/or nameplate voltage rating.
- Whether brake is AC or DC a voltage drop may be occurring. If excessive drop in voltage is noted, check wire size of power source. Correct as needed.

Note: A method to check voltage at coil is to insert a block of wood of the approximate thickness of the solenoid air gap between the solenoid frame and plunger. (The block will prevent brake from releasing when coil is energized.) Connect voltmeter leads at the coil terminals or lead wires. Energize coil. Voltmeter needle will not fluctuate and reading can be taken. Reading should be taken immediately and the coil de-energized to prevent overheating of the coil. Compare voltage reading with coil rating.

- If brake is DC solenoid style, check switch actuation and condition of coil. The switch should open with a 3/16"

approximate air gap. (This is plunger travel remaining before plunger seats to frame.)

- Check linkage for binding. The approximate pressure applied to the top of the solenoid link to move plunger is:

#4 coil	3-1/2 lbs
#K4 coil	5 lbs

If excessive force is required, determine cause of binding and correct. Do not overlook bent, worn or broken plunger guides as a possible cause for binding.

- Are controls which govern start of braking cycle operating properly?
 - Brake coil should be energized at same time or prior to energization of motor, and de-energized at same time or after de-energization of motor.
 - If stopping time is more than 1 second (rule of thumb) and/or application is more than five stops per minute, check thermal requirements of load versus thermal rating of brake.
 - Check mounting face to which brake is attached per *Installation Procedure*, Note 2 after Item 1.
 - Replace friction disc(s) when worn area is one half of original thickness (3/16").
 - Check to be sure wear adjust screws are of equal height. Measure from inboard side of support plate with depth micrometer. Turn one screw to obtain equal height, reassemble and see *Adjustment for Friction Disc Wear*.
- ##### B. If solenoid hums, pulls in slowly, or coil burns out, check the following:
- Check A-6 through A-11 of this Section.
 - Check for broken shading coil.
 - Plunger guides may be excessively worn. Does solenoid plunger rub on solenoid frame laminations?
 - Solenoid frame and plunger may be excessively worn.
 - Is solenoid dirty?
 - Solenoid mounting screws may have become loose, causing frame to shift and plunger to seat improperly.