P/N 8-078-841-00
effective 10/08/12

Installation, Service and Parts List for Series 7EC Size 5

Brake Identification

The brake part number is eleven or twelve characters, with the first 3 characters defining the brake “Series”, and the 4th character defining the brake size.

General Brake Information

Record nameplate information for future repair, replacement or product support. Nameplate date includes: part number, serial number, and electrical information. A full part number or serial number identifies the voltage, mount dimensions and any brake options. The 7EC is a dry brake, do not use lubrication on friction surfaces. The armature is magnetically attracted to the magnet body pole faces releasing the spring force so that the rotor/disc is able to rotate. When power is removed and the brake is spring set, the compressed friction pads prevent the disc from rotating. Brakes can only be mounted horizontal.

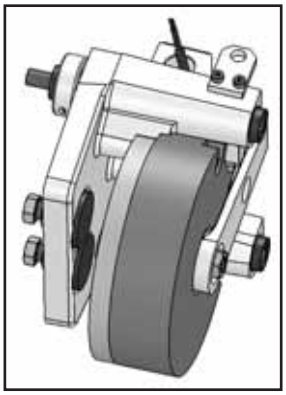


Fig. 1: 7EC Size 5 Brake

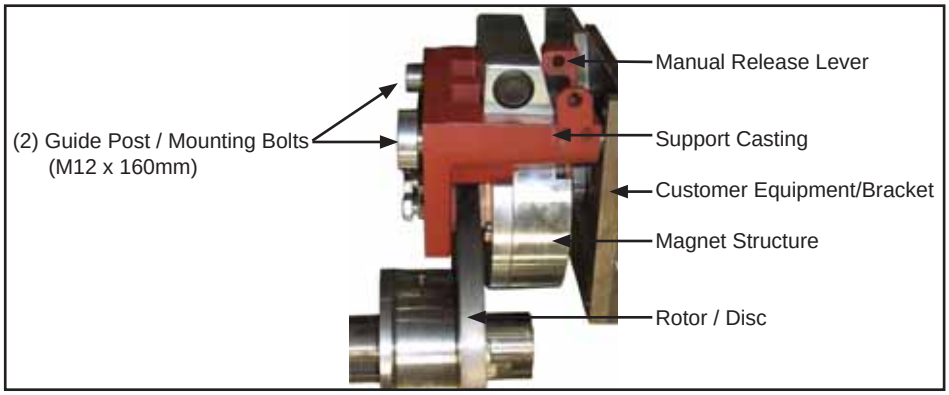


Fig. 2: 7EC Size 5 Brake Installation

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 Corporation, Stearns Division, 5150 South International Dr., Cudahy, WI 53110, (414) 272-1100.

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 brake. If power disconnect point is out of sight, lock disconnect in the *off* position and tag to prevent accidental application of power to system.
3. To avoid damage to internal power supply, hipot testing should not exceed 1500 volts for one (1) second. Brake coil leads must be connected together.
4. Heat developed during normal operation of the brake may be hot enough to be painful or cause injury. Be careful when touching exterior surfaces. Allow sufficient time for the brake to cool before servicing.
5. After usage, the brake will have burnt and degraded friction material dust. This dust should 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.
   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.
6. Maximum operating ambient temperature for these brakes should not exceed 40°C (104°F).

Design

The 7EC is a spring-set electrically-released brake, for stopping and/or holding applications. It’s a “floating” caliper design - where the brake is free to float (the support casing slides on two guide posts) so that the friction pads will contact both sides of the rotor/disc, while the rotor/disc can remain in the same axial position.

The 7EC operates on DC voltage. It requires a momentary over-excite (OEX) voltage to initially release the brake, and then a lower voltage for holding the brake in the disengaged mode. Stearns offers (OEX) rectifiers for the typical AC voltage power sources.

The rotor/disc is typically fixed to a shaft, shaft coupling, or other drive system component (on commercial elevator drives, it is part of the rope sheave). The brake is mounted to the customer’s equipment with two bolts (that fit inside the guide posts).

Brake Delivery Condition

A. Brake is assembled to the support casting - do not disassemble.

B. The Manual Release Lever is assembled with a shipping bolt, to insure that the brake is in the disengaged position. Do not remove this bolt until the brake is assembled on the disc and the electrical connections have been made.

C. The brake air gap is factory set to be .010” - .014” when assembled on the disc (with the specified disc thickness). It may be necessary to readjust this air gap with the particular disc being used.

If for some reason it's desired to bench test the brake, it is necessary to insert the disc (or a "block" of the same thickness) between the pads, prior to removing the manual release lever shipping bolt. Power may then be applied to check the electrical release of the brake. Before removing the disc or block, operate the manual release handle to disengage the brake and re-bolt the handle. If this is not done, the brake air gap will increase considerably and the brake cannot be mounted on the disc (or be disengaged electrically on the bench), and it will take substantial force to operate the lever to manually disengage the brake.

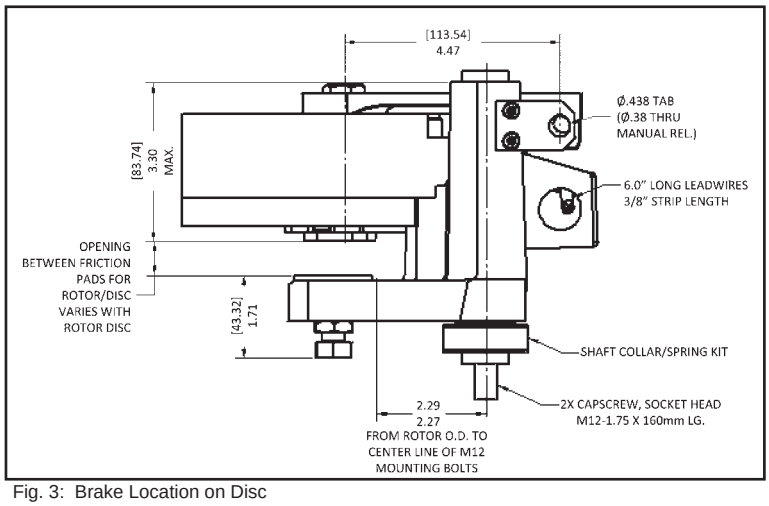


Fig. 3: Brake Location on Disc

Installation Conditions - check the following before installing the brake:

A. Brake Disc

- Runout: 0.005"-.010" FIM (0,127mm-0,254mm FIM) maximum
- Surface quality: Ra = 80 micro inches maximum
- Thickness: needs to match the 7EC caliper, which is machined to accommodate a specific disc thickness
- Material: Medium carbon steel (like AISI 1045), or cast grey iron (like G2500a)
- Material hardness: 160 Bhn minimum

B. Mounting Support

- The caliper must be mounted to a rigid base
  Caution: the equipment structure, mounting support, and any other mounting components used for installing this brake should be designed by a qualified engineer, with due consideration to factors of safety for potential static and dynamic loads from brake actuation and resulting braking torque.
- The mounting surface of base in Guide Post area, must be parallel to the brake disc within 0.002" (0,04mm)

C. Brake Pads

- The brake pads - and disc - must be free from oil or other contamination that could adversely affect the torque development of the caliper/disc assembly.

Brake Installation

NOTE: Do not remove the manual release lever shipping bolt until the brake assembly is complete and the electrical connections have been made.

A. The disc needs to be inserted far enough into the brake such that the brake pad area completely contacts the disc surface. The distance from the centerline of the M12 mounting bolts to the OD of the disc should be 2.27" - 2.29", as shown in Fig. 3.

B. Insert the guide Posts and Mounting Bolts shown in Fig. 4. The bolts need to be M12 diameter, class 12.9 DIN 912 (as supplied by Stearns), or 1/2" diameter, ASME/ANSI B18.3.

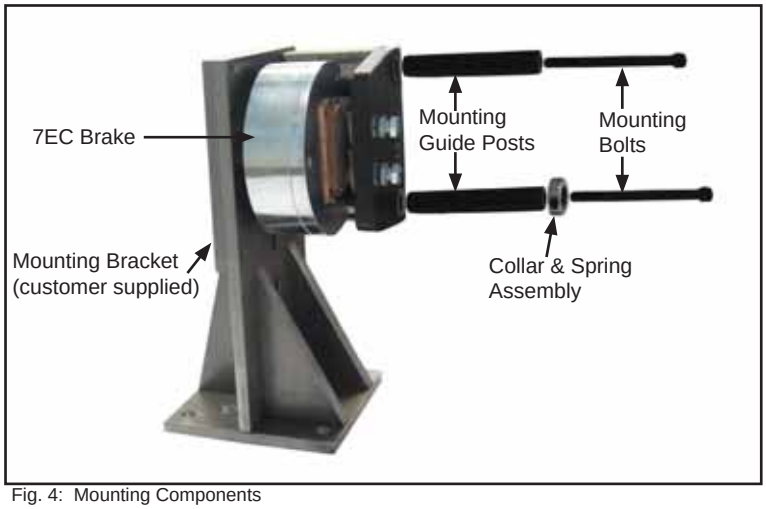


Fig. 4: Mounting Components

The bolts must safely transmit the occurring shear forces.

C. Install the guideposts, without completely tightening down on the mounting bolts. Check that the brake is free to move/"float" on the guideposts.

There are plain bearings inside the mounting bracket, to allow for this bracket to float. These bearings are self-lubricating and, therefore, no grease or oil should be applied. Use of any lubricants would attract dirt and grit, which would hinder movement or caliper float.

D. Apply medium-strength loctite, and tighten the mounting bolts to a torque of approximately 110-120 lb-ft/150-160 Nm, (when bolting to a steel base).

E. Slide the disc assembly onto the shaft, but do not yet tighten down its position on the shaft. Slide the brake onto the guide posts, and over the disc. The brake can be mounted as shown in Fig. 4, or in the opposite orientation with the brake side away from the mounting bracket. The preferred location is such that the disc is closer to the shaft support bearing. Position the disc between the friction pads, while keeping enough room along the guide post to mount the collar & spring assembly (also shown in Fig. 4).

To determine the exact position for the disc assembly along the shaft when using a QD bushing, keep in mind that - when tightening the

bushing cap screws - the disc will draw up tight on the bushing. For reference, this distance will be up to approximately 1/8", depnding on bushing size.

Important: use the following recommended procedure for tightening the QD bushing.

"QD" Bushing Proper Wrench Torque

TIGHTENING "IMPORTANT"

Tighten screws evenly and progressively. Never allow the sheave to be drawn in contact witht he flange of the bushing. If extreme screw tightening forces are applied, excess pressures will be created in the hub of the mounted sheave which may cause it to crack.

Bushing Size	Screw Size	Torque Wrench	Open End or Socket Wrench		Torque Capacity
	Inches	Ft-Lbs	Length Inches	Pull (Lbs)	In-Lbs
SK	5/16	15	8	30	7,000
SF	3/8	30	6	60	11,000
E	1/2	60	12	60	20,000
F	9/16	75	12	75	30,000
J	5/8	135	15	108	45,000
M	3/4	225	15	180	85,000

Proper Wrench Torque To Tighten Screws

F. Mount the collar and spring on one of the Guide Posts, on the "back" side of the mounting bracket, as shown in fig. 4. Position the collar such that the wavy spring lightly pushes the brake away from the disc, eliminating any rubbing between the disc and friction pads. Tighten to secure the collar in place after finding this balance.

G. If rubbing while spinning the rotor cannot be eliminated by adjusting the position of the collar, check that disc run out is within .005"-.010" FIM, and that the mounting surface of base for the Guide Post is parallel to the brake disc within 0.002" (0,04mm).

H. Remove the manual release lever shipping bolt after the electrical connections have been made. Refer to Stearns sheet P/N 8-078-877-00 for wiring instructions for Stearns rectifiers.

Electrical Considerations

Caution: Brake wiring should only be carried out by qualified personnel.

Stearns 7EC brake coils are wound for DC voltage and the over-excite and holding voltage input at ±10% of nameplate rating. The over-excite voltage required is two times the holding voltage (coil rating). The brake requires the over-excite voltage to be applied for 1-2 seconds, to disengage the brake. The DC voltage must then be reduced to the holding voltage to maintain brake disengagement, and avoid over heating of the brake coil.

Coil resistances shown in Table 1 are for reference purposes only.

Coil Data

Voltage (Rated Holding)	Coil Resistance (ohms)
48-50	55.3
100-103	213
200-205	820

Table 1

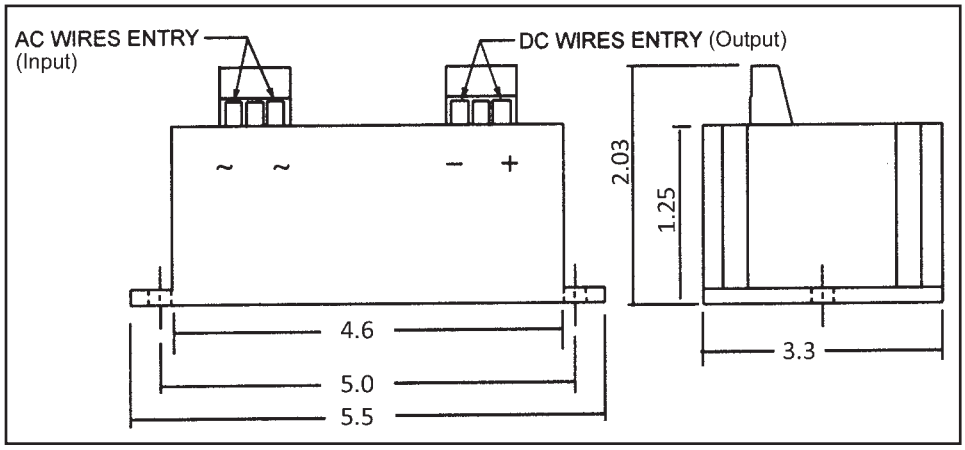
Rectifier Data

For applications where AC voltage is being rectified by a Stearns rectifier, refer to Table 2 for the proper rectifier. When using one of the Stearns rectifiers it is necessary to do the switching on the AC side, to insure that the initial over-excite voltage is applied (do not use control switching on the DC side of Stearns OEX rectifier).

AC Input Voltage (50/60 Hz)	Part Number	DC Output Voltage		Brake DC Coil Rating	Max. Current		Connections	Max Ambient Temperature
		Over-Excite	Holding		Over-Excite	Holding	(AC & DC)	
115 VAC	412019611K	103 VDC	48 VDC	50/48 VDC	2.0A	1.0A	terminal blocks	110°F (43°C)
230 VAC	412029301K	207 VDC	103 VDC	103/100 VDC	2.0A	1.0A	terminal blocks	110°F (43°C)
460 VAC	412049601K	414 VDC	207 VDC	207/200 VDC	1.0A	0.5A	terminal blocks	110°F (43°C)

Table 2

Rectifier Dimensions



Operational Brake Release Indicator Switch

This optional switch (Fig. 8) is a NO/NC (Fig. 9) mechanical limit switch (IP 67 enclosure rating), rated for .1 A at 30 VDC or 125 VAC. It is factory adjusted to trip (change states) when armature is pulled in completely. No adjustment is required. However, if necessary for some reason, the switch can be readjusted as follows:

- back off the jam nut
- adjust the actuating bolt inwards or outwards, so that the switch is actuated when power is applied to the brake and the armature is fully pulled in
- tighten down the jam nut, double check for correct signal operation

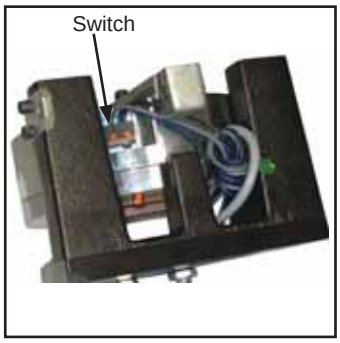


Fig. 8

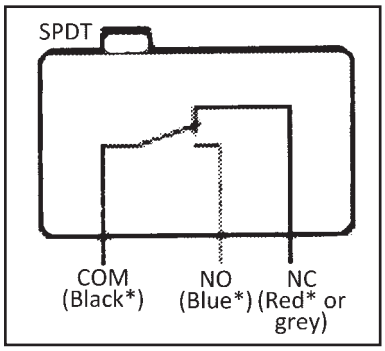


Fig. 9

Bedding - Guidelines for Running-in, or "Bedding" Procedures for the Brake Pads - either the **F**iber material pads (included in brake P/N's 7EC5XX**F**), or the **M**etallic material pads (included in brake P/N's 7EC5XX**M**).

There are two aspects to the bedding procedure:

1. Bedding the pads on the disc so that the full area of the pads is making contact, and the disc surface itself is beginning to polish.
2. Generating progressively more heat at the pad surface to condition the material, so it is able to perform at the rated torque and required duty cycle.

The amount of bedding required will vary somewhat per each application. As a result, the following suggested procedure may be varied based on the pad performance for the specific application.

Prior to starting, be sure that the pads and disc are clean and dry.

Holding Brakes: A brake that is used for static holding duties only, still requires bedding in order to achieve full rated torque. Without bedding, the pad/disc interface may develop only 50% or less of the rated torque. Follow the procedure for dynamic brakes, below, to reach full rated static torque.

Dynamic Brakes: Start with light braking, to remove pad high spots and to achieve full pad contact with the disc. Cycle and stop the load (engage the brake) a few times at slow speed or reduced load.

Engage the brake a few more times at progressively higher speeds and/or loads, until the full braking duty is reached. If pad material starts to deposit on the disc, remove this material and proceed more slowly to the full braking duty.

Monitor the disc temperature during bedding, and allow adequate cooling time to prevent excessive temperatures from occurring. 180°C is a safe temperature for the braking path area in most cases, with metallic pads (or 120°C for fiber pads).

Much higher temperatures may be used in emergency brakes, but these brakes should be allowed to cool down to near ambient temperature before further testing. Some pad damage may be acceptable for emergency brake application, but a thorough bedding procedure should still be followed. This assumes that after an actual emergency stop, that the entire braking system will be inspected and any damaged parts replaced.

After bedding, re-check the air gap and adjust if necessary.

Air Gap and Wear Adjustment

The air gap is the distance between the armature and the brake magnet body; or the total distance between the pads on each side of the disc (fig. 10). At installation, it's best to measure the air gap between the pads and disc, as the air gap between the armature and magnet body may be uneven or difficult to measure. The factory set air gap is .010" to .014", which is then split between the friction pads on each side of the disc under normal operation. After burnishing, the air gap should be checked using a feeler gage, and readjusted if necessary. The air gap is adjusted with the two wear adjusting bolts. Loosen the jam nuts, adjust each bolt evenly to set air gap back to the factory setting, and re-tighten the jam nuts. Double check the air gaps after tightening the jam nuts.

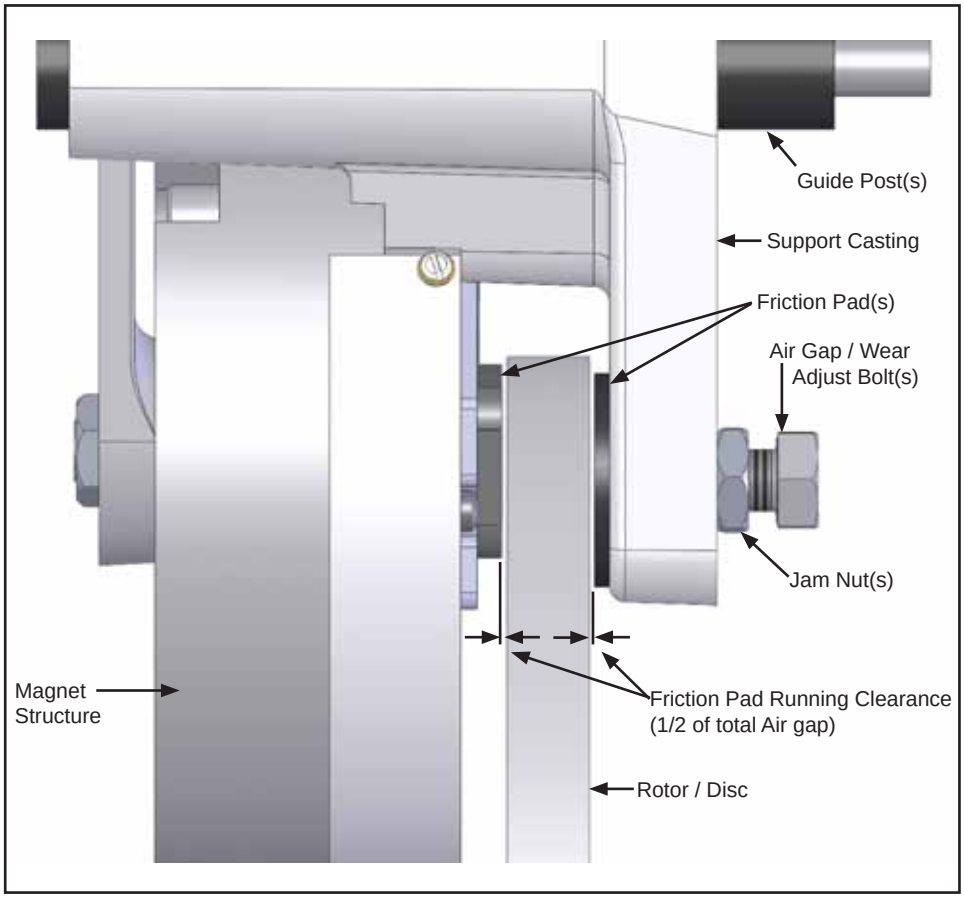


Fig. 10

The air gap will increase due to friction pad wear. The air gap should be readjusted to the factory setting once it reaches .030", or fails to release, whichever occurs first. The friction pads are replaceable, and should be replaced once the thickness of the friction material has been reduced to 0.090".

Troubleshooting

General Information: Do not lubricate any part of the brake.

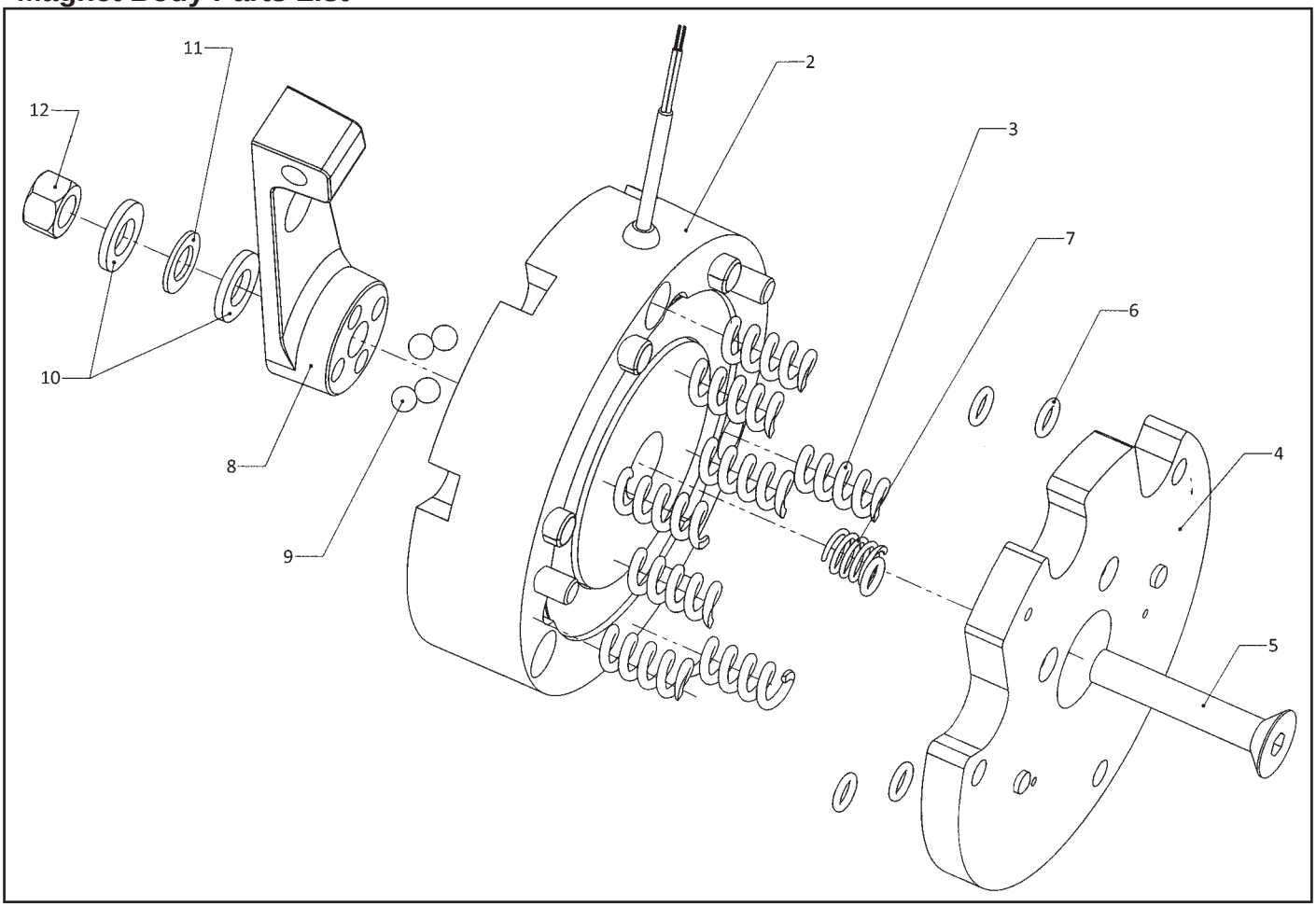
Electrical:

1. Compare power (voltage) at the brake to the brake nameplate power requirements.
2. Compare rectifier input and output rating to the brake coil.
3. Check coil resistance at the coil or on the DC side of the circuit.
4. Check for damaged and grounded (shorted) leadwires.
5. Check rectifier current/voltage rating.
6. If using optional brake release indicator switch - check for proper status switch change of states (NC-NO) operation.

Brake does not release (power release):

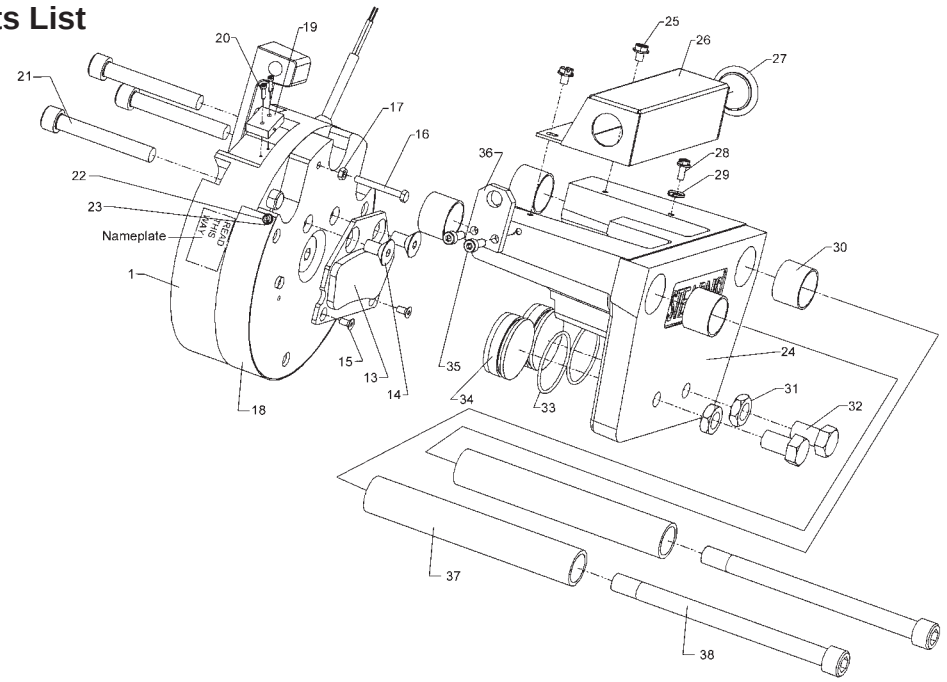
1. Recheck air gap at three points between the armature and magnet body, using a feeler gage. Confirm air gap between .010" to .014".
2. Recheck power supply at the brake. Confirm that correct momentary over-excite voltages is being applied.
3. If using Stearns OEX type rectifier make sure that the control logic is switching the AC side on and off.

Magnet Body Parts List



Item Number	Description	Part Number
2	Magnet body / Coil Assembly, 51 VDC / 103 VDC over-excite Magnet body / Coil Assembly, 103 VDC / 205 VDC over-excite Magnet body / Coil Assembly, 205 VDC / 410 VDC over excite	5-04-0705-01-01G 5-04-0705-01-01K 5-04-0705-01-01M
3	Compression Spring (8) (for reduced torque units, consult factory)	9-70-0710-00
4	Armature & Pin Assembly (without Quiet Features) Armature & Pin Assembly (with Quiet Features)	5-27-5002-00 5-27-5001-00
5	Capscrew, FSH M12-1.75 x 80mm Lg.	9-15-4153-00
6	Quiet Feature O-Ring (6) (Counterbores Not Shown) Less Quiet Units, No O-Rings or Counterbores on Armature	9-02-0169-00
7	Compression Spring Manual Release - Anti Rattle	9-70-0711-00
8	Manual Release Handle	8-419-710-01
9	Ball Bearing (4)	9-67-0006-00
10	Flat Washer M12	9-45-2021-00
11	Flat Washer Delrin (Plastic)	9-46-0031-00
12	Top Lock Nut M12-1.75	9-40-5057-00

General Parts List



Item Number	Description	Part Number
1	Magnet Body & Armature Assembly	
14	Capscrew, FSH, M8-1.25 x 16mm Lg. 920 lb-ft) (2)	9-16-4149-00
15	Capscrew, FSH, M4-0.7 x 8mm Lg. (2.5 lb-ft) (2)	9-15-4120-00
17	Hex Nut, M4 (optional)	9-40-5018-00
18	Airgap Shield (optional)	
 16 19 20	Release Indicator Switch Kit Capscrew, Hex Head, M4 x 35mm HexRelease Indicator Switch Machine Screw, PPH, M2 x 10mm Lg. (2) req'd	5-75-0750-00 9-17-9851-00 9-62-8032-00 9-13-3095-00
21	Capscrew, SH M10 X 70mm Lg. (55~60 lb-ft) (3) Apply Loctite Before Final Torque Down	9-17-0979-00
22	Machine Screw, PH, #5-40 x 1/4 Lg. (optional) (2)	
23	Flat Washer #5 Brass (optional) (2)	
24	Caliper (part number based on disc thickness - consult factory)	
25	Machine Screw, SL HWH #10-32 x .25 Lg. (2)	9-13-3096-00
26	Leadwire Cover	8-070-710-01
27	Plug, Snap-In-Blank	9-61-1162-00
28	Electrical Bonding (Ground) Green	9-25-9017-00
29	Terminal Washer, Bonding	9-45-0027-00
30	Sleeve Bearing (4)	9-04-1003-00
31	Hex Jam Nut, M12 (35 lb-ft) (2)	9-40-5084-00
32	Air Gap and Wear Adjustment Bolts, Capscrew, Hex Head M12 x 20mm Lg. (2)	9-17-9925-01
33	O-Ring, 2mm x 38mm, (2) Use a small amount of dry silicone or teflon spray lube as necessary to install in bracket bores)	9-02-0170-00
35	Capscrew, SH M5 x 14MM LG. (2) Req'd	9-17-0936-00
36	Manual Release Tab	8-170-750-01
 13 34	Brake Pad Replacement Kit (for 7EC5XX**F**, fiber mat'l)* Armature Pad (with backing plate) Piston Puck Pad, (2) req'd O-Ring, (1) Req'd per puck	5-75-0751-10 5-14-0750-00 5-14-0751-00 9-02-0170-00
 13 34	Brake Pad Replacement Kit (for 7EC5XX**M**, metallic mat'l)* Armature Pad (with backing plate) Piston Puck Pad, (2) req'd O-Ring, (1) Req'd per puck	5-75-0751-00 8-41-4600-12 8-41-4600-13 9-02-0170-00
37 38	Guide Post (2) Mounting bolts, capscrew, SH M12 x 16mm (2)	8-17-5752-01 8-35-0075-00

* Recommended spare part

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