P/N 8-078-890-05 effective 05/02/14

Installation and Service Instructions Series AAB – Armature Actuated Brakes Sizes 72 through 170 Model Numbers 33[]-1, 33[]-2, 33[]-3, 33[]-4, 33[]-5 and 33[]-6

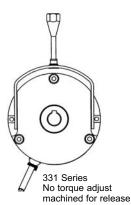
Brake Identification

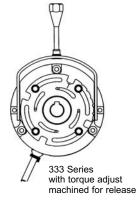
The brake part number is twelve characters, with the first 3 characters defining the brake "Series", and the 4th character defining the brake size. See explanation below.

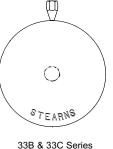
Part Number characters 1 - 3 (Series)	Machined for manual release option (release can be added in the field)		IP43 Housing (with adaptor)	IP54 Housing (with adaptor)
330				
331	X			
333	X	Х		
33B	X		Х	
33C	X	Х	Х	
33H	X			Х
33J	X	Х		Х

Part Number characters 1 - 4 (4th digit = size)	Size	Torque lb-ft (Nm)
33[]-1	72	3 (4)
33[]-2	90	6 (8)
33[]-3	112	12 (16)
33[]-4	132	25 (32)
33[]-5	145	45 (60)
33[]-6	170	60 <i>(80)</i>











with torque adjust

33C

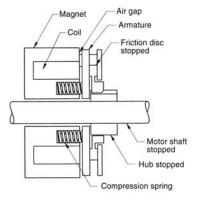
internal release option 33H No torque adjust 33J with torque adjust

STEARNS

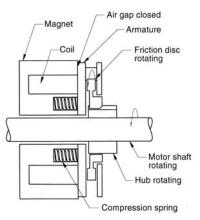
33H & 33J Series

IP54 enclosure

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 AAB is a dry brake, do not use lubrication on friction surfaces. The AAB is a spring-set, power-released DC brake which may be rectified for AC use. When power is applied to the coil, the armature is magnetically drawn to the magnet body pole faces releasing the spring force so the shaft is able to rotate. When power is removed and the brake is spring set, the compressed carrier ring friction disc prevents the hub and shaft from rotating. Brakes can be mounted horizontal or vertical above or below motor without modification.



Power Off - Brake Set



Power On - Brake Released

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, 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 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 second. Brake coil leads must be connected together.
- 4. Heat developed during normal operation (135°C/ 275°F) 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 contain 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).

I. Installation

Note 1: Position of hub should allow full engagement of friction disc without interfering with the movement of the armature. Motor shaft end float should not exceed .020". Shaft runout should be within .002" TIR. Motor mounting surface should be flat and perpendicular to within .004" of motor shaft.

Note 2: Keep grease and oil from contacting friction surfaces.

Note 3: Hub should be a tight sliding fit. For shrink fit hub consult the factory.

1. Hub and Pressure Plate Installation:

Most brakes use a thin pressure plate, some brakes have a thick pressure plate and some brakes have an additional plate used as a mount adapter.

1A. Supplied with thick pressure plate:

1. Bolt the thick pressure plate or adapter plate to the motor.

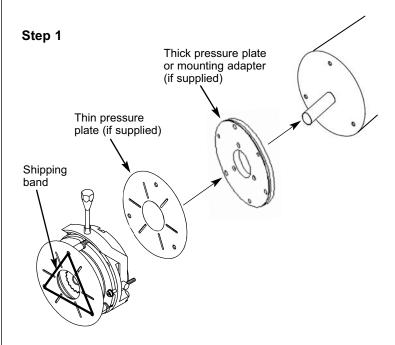
1B. Supplied with C-face mounting adaptor:

1. If the AAB brake diameter covers the adaptor mounting bolt circle, remove the adaptor from the brake first, and then bolt the adaptor to the motor. The thin pressure plate locates over the adaptor.

If the brake diameter does NOT cover the adaptor bolt circle, the adaptor does not need to be removed from the brake. See Step 2 and install the brake hub on the motor shaft first, and the complete brake with adaptor can be installed as shown in Step 3.

Supplied with thin pressure plate:

- 2. Remove the stretch shipping band from the mount bolts.
- 3. Remove the thin pressure plate from the brake and slide over the shaft. Place the plate tightly against the motor mount surface or the adaptor, with the rolled edge facing away from the motor. All surfaces must be flat, tight and flush.



2. Placement of hub.

- 1. Slide the brake hub over the keyed motor shaft.
- Position the hub to the H2 dimension. Measure from the outside pressure plate (or adaptor) face to the near surface of the hub. The pressure plate must be tight against the motor face when measuring the H2 dimension.
- Tighten the single use setscrews. Carefully apply Loctite[®] threadlocker to the setscrew for repeat use.

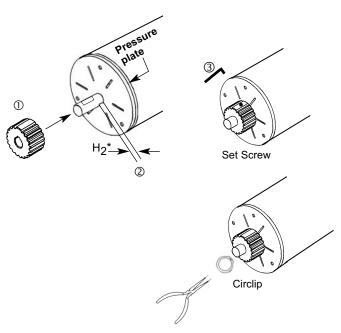
NOTES: Metric bores do not have set-screws; a circlip positioned in a groove is used to locate and retain the hub against the stepped shaft.

Circlips are recommended on all vertical installations.

Size 112 (33[]-3) and larger brakes without manual release: remove armature retention nuts and bolts after mounting to the motor.

The hub slides on the shaft with a close fit.

Step 2



Brake Model	Size (Bolt	H2 Hub	Location		crew que	Set screw Hex Wrench Size
No.	Circle		mm	lb-in	Nm	in
33[]-1	72	0.03	0.8	20	2.3	5/64
33[]-2	90	0.03	0.8	33	3.8	3/32
33[]-3	112	0.10	2.5	78	8.8	1/8
33[]-4	132	0.10	2.5	156	17.6	5/32
33[]-5	145	0.13	3.3	156	17.6	5/32
33[]-6	170	0.13	3.3	156	17.6	5/32

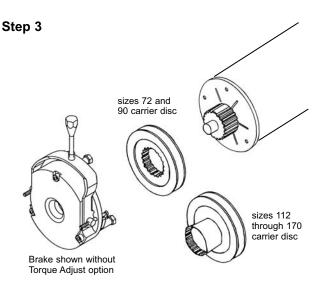
Hub location can be ±10%, as required.

3. Mounting the Brake:

- 1. Slide the friction disc and carrier onto the hub.
- Locate the brake assembly over the carrier disc and slide against the pressure plate.
- 3. Insert the mounting bolts and tighten to the torque listed in the table. Use of a torque wrench is necessary.
- 4. Remove armature retention bolts provided on sizes 112 (33[]-3) and larger.

Mount Bolt Torque:

	SizeHex .			orque (Nm)	Mounting Bolt			
Brake Model No.	(Bolt	Wrench Size	Brake mou	nt surface*	Bolt	Length mm		
model No.	Circle)	mm	steel	aluminum	size	thin plate & aluminum adapter	thick plate	
33[]-1	72	3	24 (2.7)	17 (1.9)	M4	45	40	
33[]-2	90	4	40 (4.5)	27 (3.1)	M5	50	45	
33[]-3	112	5	82 (9.3)	57 (6.4)	M6	60	55	
33[]-4	132	5	82 (9.3)	57 (6.4)	M6	65	60	
33[]-5	145	6	169 (19.1)	82 (9.3)	M8	80	75	
33[]-6	170	6	169 (19.1)	82 (9.3)	M8	80	80	



NOTE: Size 90 carrier disc includes a stabilizing clip. Verify that the stabilizing clip is on the disc.

4. Air Gap and Wear Adjustments:

- All brakes have an initial factory burnish to the carrier friction material.
- Air gap is the distance between the armature and the magnet body as measured at the adjusting bolts. Air gap is factory set but may change with brake mount.
- Measure the air gap after brake mount and again after a few cycles or after replacing friction material.
- 4. Air gap will increase with normal friction wear. Re-adjust the air gap when the maximum air gap is reached (See Air Gap Table).
- Normal disc replacement occurs after 4 to 5 air gap adjustments are made.
- It is necessary to use a torque wrench in mounting the AAB brake to set the air gap correctly.

Air Gap Table

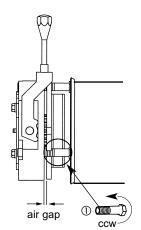
Brake Model	Minimum New Brake Air Gap				Maximum Air Gap		Air Gap Adjust Hex Wrench Size
No.	inch	mm	inch	mm	inch	mm	mm
33[]-1	.010 to .014	.254 to.356	.006 to .010	.152 to .254	.019	.48	8
33[]-2	.010 to .014	.254 to.356	.006 to .010	.152 to .254	.019	.48	10
33[]-3	.012 to .016	.305 to .406	.008 to .012	.203 to .305	.019	.48	11
33[]-4	.014 to .018	.356 to .457	.010 to .014	.254 to .356	.029	.74	11
33[]-5	.013 to .017	.330 to .432	.013 to .017	.330 to .432	.031	.78	13
33[]-6	.020 to .024	.508 to .610	.020 to .024	.508 to .610	.039	.99	13

Wear Adjustment Procedure

- Rotate each wear adjust screw evenly to achieve original gap (Air Gap Table).
- Retighten mounting bolts to specifications shown in in Step 3.
 Recheck air gap per Air GapTable. Check air gap using a feeler gage at each of the (3) wear adjust screws.

Note 1: 90° ccw rotation of the wear adjust screw is approximately 0.010" (.25mm) for the 72, 90, 145 and 170 size brakes. 90° ccw rotation is approximately 0.012" (.30mm) for the 112 & 132 size brakes.

Note 2: Brake discs should be replaced when they reach the thickness shown in the table below. Normally this will occur after 4-5 adjustments.



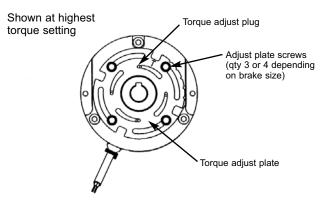
Measure air gap at adjusting bolt Optional manual release shown

Minimum Disc Thickness

Brake Model No.	Size (Bolt circle)		ction Disc thickness
woder No.	mm	inch	mm
33[]-1	72	0.22	5.59
33[]-2	90	0.45	11.30
33[]-3	112	0.21	5.41
33[]-4	132	0.26	6.60
33[]-5	145	0.35	8.89
33[]-6	170	0.34	8.74

Torque Adjust Option

- 1. The torque adjust feature can be identified by a slotted round plate fastened to the magnet body.
- All brakes are shipped with a factory burnish at or above nameplate torque rating.
- Brakes with adjustable torque are shipped at the highest torque setting.
- Loosen the adjust plate screws by turning counter close-wise (CCW).
- 5. Rotate the adjust plate clockwise to reduce torque.
- 6. Internal spring height, and spring force, is adjusted by the plug location in the adjust plate slot.
- Torque decreases as the plug is rotated to the wider end of the slots.
- Re-tighten the adjust plate screws clockwise (CW) to hold the plate in position. The plate fasteners must be tight.

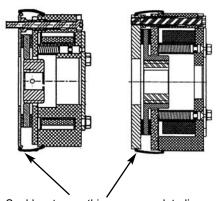


Torque adjust plate table:

Brake Model No.	Hex Wrench Size mm	Bolt Torque lb-in (Nm)	Torque decrease % per notch
33[]-1	8	20 (2.25)	9
33[]-2	10	20 (2.25)	9
33[]-3	11	20 (2.25)	9
33[]-4	11	35 (3.95)	11.5
33[]-5	13	35 (3.95)	7.5
33[]-6	13	35 (3.95)	7.5

Boot Seal Option

- Place the optional boot seal over the lead wires and optional manual release before wiring the brake to the power source.
- Stretch the seal over the pressure plate and magnet body assembly.
- The seal will locate from the thin pressure plate or a groove in a thick plate adapter.
- 4. If the seal has a small drain hole, locate the hole at the bottom facing downward.
- 5. The seal should be flat against the brake and cover the open air gap areas.

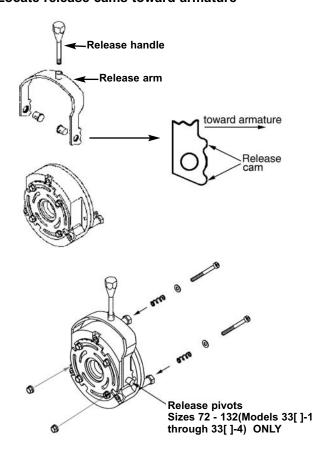


Seal locates on thin pressure plate lip OR on a groove in the thick pressure plate

Non-Maintained (Yoke style) manual release kit

- 1. Thread handle into the release arm and hand tighten.
- Insert the two release pivots in the release arm. Brake sizes 145 and 170 (models 33[]-5 and 33[]-6) do not require pivots.
- Slide the release handle assembly over the flat sides of the brake assembly.
- 4. The release cams must face the armature side of the brake.
- AAB sizes 72 through 132 (models 33 []-1 and 33[]-4: insert cap screws, washers and springs through the armature slots. Thread into the release pivots.
- AAB sizes 145 and 170 (models 33[]-5 and 33[]-6): Insert hex bolt, washer and spring through the armature slots and through the holes in the manual release arm. Install the threaded nut onto the screw.
- 7. Washers must rest on the face of the armature.

Locate release cams toward armature

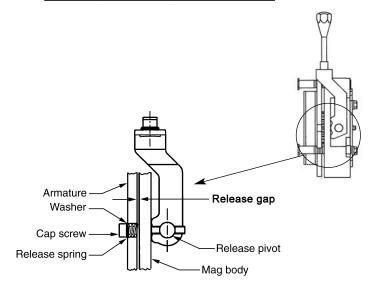


Manual release set up gap adjustment

- Tighten the cap screws until proper set up gap is reached.
 The manual release set up gap is measured at the cap screw on the release side as shown.
- Once the release has been installed and is operating, the brake air gap can be checked as detailed in the air gap adjustment section.

Set up gap adjustment table:

Brake Model No.	Hex Wrench Size	Manaul Release Adjustment Gap Set-Up
Wiodei No.	mm	inch/mm
33[]-1	2.5	.040 / 1.02
33[]-2	2.5	.040 / 1.02
33[]-3	3	.040 / 1.02
33[]-4	3	.050 / 1.27
33[]-5	10	.050 / 1.27
33[]-6	10	.050 / 1.27



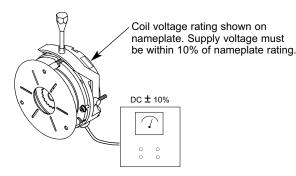
The manual release set up gap is measured above the cap screw as shown

Electrical Considerations

Coil Wiring

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

Stearns brake coils are wound for DC voltage input at \pm 10% of nameplate rating. Coil resistances shown below are for references purposes. For applications where AC voltage is being rectified refer to AC control switching shown on this page.



Caution: Electrical work should only be preformed by qualified personnel.

Note 1: All 33[] series brakes have DC wound coils designed to accept DC line voltage at \pm 10% of nameplate rating.

Note 2: When using a rectifier for AC line input, use the rectifier table to determine the proper DC coil rating requirement.

Model N	Model Number		33[]-2	33[]-3	33[]-4	33[]-5	33[]-6
Brake Size		72	90	112	132	145	170
Torque Ib-ft (Nm)		3 (4)	6 (8)	12 (16)	25 (34)	45 (60)	60 (80)
	Amps	1.10	1.28	1.17	1.80	1.94	2.80
24 Vdc	Ohms	21.8	18.7	20.5	13	12.4	8.6
	Watts	26.5	30.8	28.0	43.2	46.4	67.3
	Amps	0.67	0.78	0.71	1.09	1.84	1.70
36 Vdc	Ohms	53.5	46	50.7	33	19.5	21.2
	Watts	24.2	28.2	25.6	39.3	66.4	61.2
	Amps	0.57	0.66	0.60	0.93	1.25	1.44
48 Vdc	Ohms	83.8	72.7	79.5	52	38.4	33.3
	Watts	27.5	31.9	29.0	44.5	59.4	69,2
	Amps	0.28	0.32	0.29	0.45	0.76	0.70
90 Vdc	Ohms	320.8	277	306.5	200	119	129.3
	Watts	25.3	29.2	26.4	40.5	68.2	62.7
	Amps	0.21	0.24	0.34	0.51	0.55	0.80
103 Vdc	Ohms	501.2	433	306.5	200	186.5	129.3
	Watts	21.2	24.5	34.6	53.0	56.9	82.0
	Amps	0.15	0.17	0.15	0.23	0.39	0.36
180 Vdc	Ohms	1221	1058	1175.4	770	459	499.7
	Watts	26.5	30.6	27.6	42.1	70.7	64.8
	Amps	0.11	0.12	0.17	0.27	0.29	0.41
205 Vdc	Ohms	1904	1653	1175.4	770	718.5	499.7
	Watts	22.1	25.4	35.8	54.6	58.5	84.1
	Amps	0.09	0.10	0.14	0.21	0.23	0.33
258 Vdc	Ohms	2867	2535	1838	1204	1125	783.4
	Watts	22.4	26.3	36.3	55.3	59.2	85.0
414/432	Amps	0.06/0.06	0.07/0.07	0.09/0.10	0.14/0.15	0.15/0.16	0.22/0.22
414/432 Vdc	Ohms	7186	6265	4483	2956	2755	1922
	Watts	23.9/26.0	27.4/29.8	38.2/41.6	57.9/63.1	62.2/67.7	89.1/97.1

Contact factory for non-standard coils.

Rectifier Table

Line Voltage	Rectifier Type	Recommended Coil Voltage Rating
100	Full	90
110	Full	103
115	Full	103
127	Full	103
208	Full	180
220	Full	205
230	Full	205
240	Full	205
220	Half	103
230	Half	103
240	Half	103
380/400	Half	180
415	Half	180
460	Half	205
575	Half	258

Note 3: Fullwave rectifier output is 90% of AC line input. Halfwave rectifier output is 45% of AC line input.

AC Switching with Standard Rectifier

Switching on the AC line is the most common method of control when the rectifier is wired through the motor windings or motor contacts. However, brake engagement can take up to 5 times longer than DC switching. Switching on the AC line is not suitable for hoist and crane applications.

Crane and Hoist Applications

For descending loads such as cranes and hoists or high inertia loads, the motor windings can develop regenerative voltage during deceleration which can delay the engagement of the brake when switching on the AC supply.

For these type of applications it is important to switch on the DC side of the rectifier or use a Quick Set device.

Stearns rectifiers have a built in suppression circuit to protect the rectifier. However, it may still be necessary to protect the switching contacts with a separate suppression device. (see Figure 1 and Figure 2).

Figure. 1

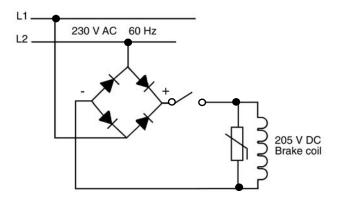
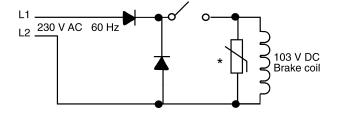
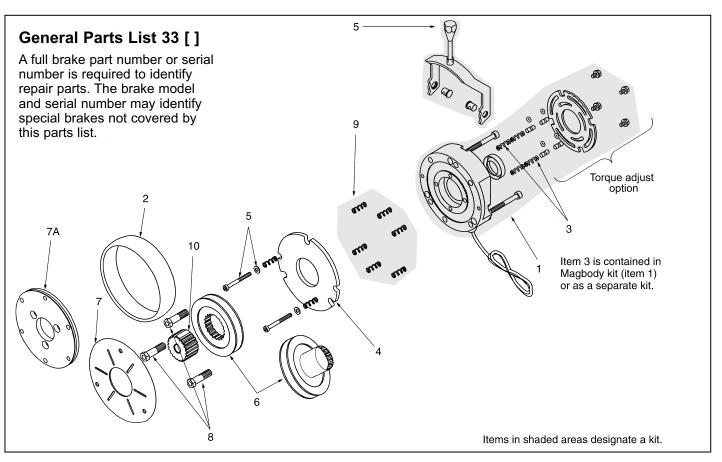


Figure. 2



^{*} A suppression device **is** required when switching on the DC side of the line and using the half wave rectifier (412-0591-01K)



	Brake Part No→	33[]-1	33[]-2	33[]-3	33[]-4	33[]-5	33[]6
Item	Item Description↓						
1	Mag body & coil assy -see voltage table Torque Adjust Without Torque Adjust Without Torque Adjust OR Manual Release Machining	5-04-0925-00-0[]K 5-04-0923-00-0[]K	5-04-0930-00-0[jK	5-04-0941-00-0[jK	5-04-0955-00-0[jK	5-04-0962-00-0[]K	5-04-0975-00-0[]K 5-04-0973-00-0[]K 5-04-0974-00-0[]K
2	Boot Seal Kit	8-075-100-0K	8-075-101-0K	8-075-102-0K	8-075-103-0K	8-075-104-0K	8-075-105-0K
3	Inner Spring Kit	9-70-0932-0K	9-70-0932-0K	9-70-0942-0K	9-70-0957-0K	9-70-0964-0K	9-70-0975-0K
4	Armature Kit	8-405-925-0K	8-405-932-0K	8-405-943-0K	8-405-957-0K	8-405-964-0K	8-405-975-0K
5	Manual Release Kit	8-419-925-0K	8-419-932-0K	8-419-943-0K	8-419-957-0K	8-419-964-0K	8-419-975-0K
6	Carrier Disc Kit	5-14-0925-0K	5-14-0933-0K	5-14-0943-0K	5-14-0957-0K	5-14-0964-0K	5-14-0976-0K
7 7A	Pressure plate thin Pressure plate thick	8-438-925-0K 8-438-926-0K	8-438-932-0K 8-438-933-0K	8-438-943-0K 8-438-944-0K	8-438-957-0K 8-438-958-0K	8-438-964-0K 8-438-965-0K	8-438-975-0K 8-438-976-0K
8	Adjusting Bolt Kit	8-434-925-0K	8-434-932-0K	8-434-943-0K	8-434-943-0K	8-434-975-0K	8-434-975-0K
9	Outer Spring Kit	9-70-0933-0K	9-70-0933-0K	9-70-0943-0K	9-70-0943-0K	9-70-0965-0K	9-70-0965-0K
10	Hub-See bore size table English Bore Metric Bore	5-16-0921-00-01[] 8-016-920-00-m[]	5-16-0931-00-01[] 8-016-930-00-M[]		5-16-0951-00-01[] 8-016-950-00-M[]		5-16-0971-01-01[] 8-016-970-00-M[]

Kit Contents

Item	Description
1	Mag Body & Coil Assembly Adjust Plate Inner Plate Screws Adjust Plate Screws Mounting Bolts (3)
3	Inner Spring Set Torque Adjust Plugs
5	Release Arm Release Handle Release Pivots Release Springs Washers Assembly Screws
9	Outer Pole Springs

Coil Voltage Table

Item Magbody & Coil Assembly Voltage Identifier -0[]k		
Voltage	Insert	
12 V DC	0 [C]K	
24 V DC	0 [E]K	
90 V DC	0 [J]K	
103 V DC	0 [K]K	
180 V DC	0 [L]K	
205 V DC	0 [M]K	
258 V DC	0 [S]K	
414/432 V DC	0 [B]K	

Hub Bore Table

Bore Diameters			
English Bore	Insert	Metric Bore	Insert
3/8	V	9 mm	09
1/2	K	11 mm	11
9/16	N	12 mm	12
5/8	В	14 mm	14
3/4	С	15 mm	15
7/8	D	16 mm	16
1	L	17 mm	17
1 1/8	E	18 mm	18
1 1/4	F	20 mm	20
1 3/8	G	22 mm	22
		24 mm	24
		25 mm	25
		28 mm	28
		30 mm	30
		34 mm	34
		35 mm	35

Troubleshooting

General Information:

Do not lubricate any part of the brake.

Electrical:

- 1. Compare power supply 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 leadwires.
- 5. Check rectifier current/voltage rating. Tor-ac[™] or Quickset rectifiers are available if a faster brake set time is required.

Brake does not release (power release):

- 1. Re-check air gap at three points using a feeler gage. Confirm air gap adjustment described in section four and the manual release adjustment section.
- 2. The manual release gap is used for release installation and initial set up only. The working air gap is listed separately by model number.
- 3. Rectifier choice will affect set and release time. To reduce brake set time, use a Quickset rectifier or switch on the DC side.
- 4. An air gap shim- used to reduce set time- is factory installed available.
- 5. Use a torque wrench to measure brake mount torque. Bolt torque rating for aluminum is different than steel. Check the installation table for the correct rating. Over-tightening will cause air gap to become smaller.

Brake does not engage (spring set):

- 1. Re-check air gap at three points using a feeler gage. Re-set the air gap as described in step four of the installation sheets.
- 2. Rectifier choice will affect release time, switch on the DC side or use a quick release rectifier to reduce coil reaction time.

Carrier Disc and hub:

- 1. Friction discs have a close fit on the hub. Forcing a carrier disc onto the hub may cause the disc to bind on the hub. Check for any burrs, taper or knicks on the hub. Check the disc to hub fit by reversing the hub and looking for a close free fit.
- 2. Hub set screws are shipped loose and have a single use locking patch. To re-use set screws, apply Loctite[®] 242 threadlocker, or equivalent. Tighten set screws as shown in Step 2. Do not allow loctite to pool on the hub or reach the carrier disc.
- 3. Check that hub is placed properly on the motor shaft as shown in Step 2.

