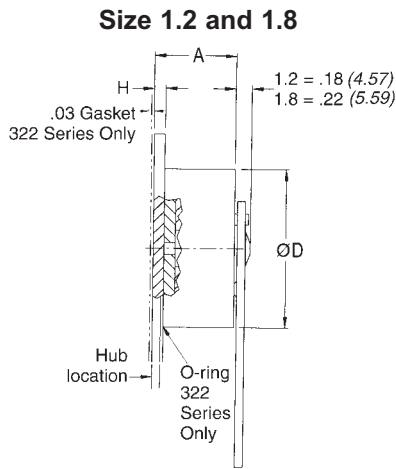


Series 321 & Series 322 Armature Actuated Brakes

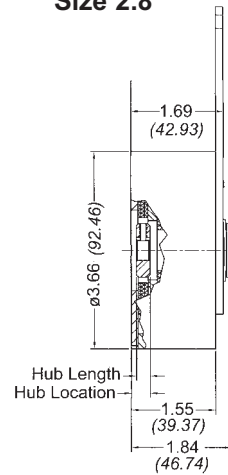


Totally Enclosed Non-Ventilated (TENV) Direct-Acting Brake - Quiet Operation

- **Torque Rating:** 3 lb-in through 72 lb-in
- **Enclosure Rating:** 321 Series IP42 322 Series IP54
- **UR and CUR recognized insulation system - File E-125303; and sizes 1.8 & 2.8 brakes and 48C & 56C motor frame brakes with internal power supply File E-71115**
- **Class B temperature rise with Class H mag wire**
- **Pressure plate mount**
- **Installation and Service Instructions: P/N 8-078-901-00**
- **Optional:** Double D Friction disc-hub is NOT required, which reduces shaft machining, installation cost and assembly error.
- **Optional:** Maintained manual release lever, or non-maintained pull release
- **Optional:** Through-shaft
- **Optional:** AC Rectifiers - Internal, or external in-line (availability depends on size)



New Design Size 2.8



Dimensions in Inches (millimeters)

Size	Nominal Static Torque		Basic Model Number	A	H	D		Hub Location	Hub Length
	Lb-in	Nm				Series	Mag Body Ø		
1.2 Dynamic	3	.34	3-21-24	.904 (22.962)	.12 (3.05)	321	1.77 (4.96)	.02 (.51)	.19 (4.83)
			3-22-24			322	1.875 (47.625)		
1.2 Holding	5	.56	3-21-25	1.080 (27.432)	.12 (3.05)	321	1.77 (4.96)	.02 (.51)	.19 (4.83)
			3-22-25			322	1.875 (47.625)		
1.8 Dynamic	7	.79	3-21-44	1.296 (32.918)	.12 (3.05)	321	2.50 (63.50)	.02 (.51)	.25 (6.35)
			3-22-44			322			
1.8 Holding	15	1.69	3-21-45	1.296 (32.918)	.12 (3.05)	321	2.50 (63.50)	.02 (.51)	.25 (6.35)
			3-22-45			322			
1.8 Dynamic	15	1.69	3-21-46	1.296 (32.918)	.12 (3.05)	321	2.50 (63.50)	.02 (.51)	.25 (6.35)
			3-22-46			322			
2.8 Dynamic	35	3.95	3-21-74	-	-	321	3.66 (92.96)	.34 (8.64)	.25 (6.35)
			3-22-74			322			
2.8 Dynamic	50	5.65	3-21-75	-	-	321	3.66 (92.96)	.34 (8.64)	.25 (6.35)
			3-22-75			322			
2.8 Holding	72	8.14	3-21-77	-	-	321	3.66 (92.96)	.34 (8.64)	.25 (6.35)
			3-22-77			322			

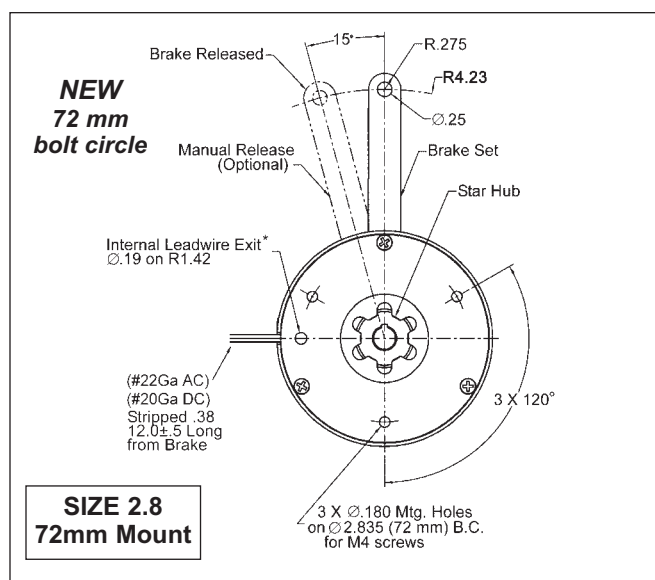
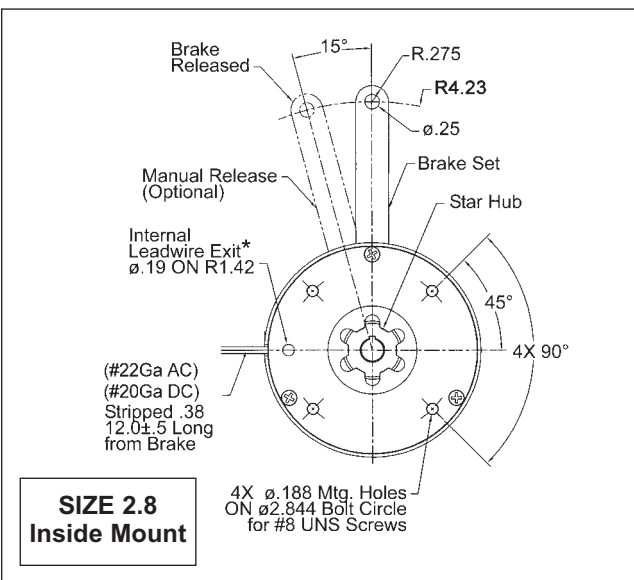
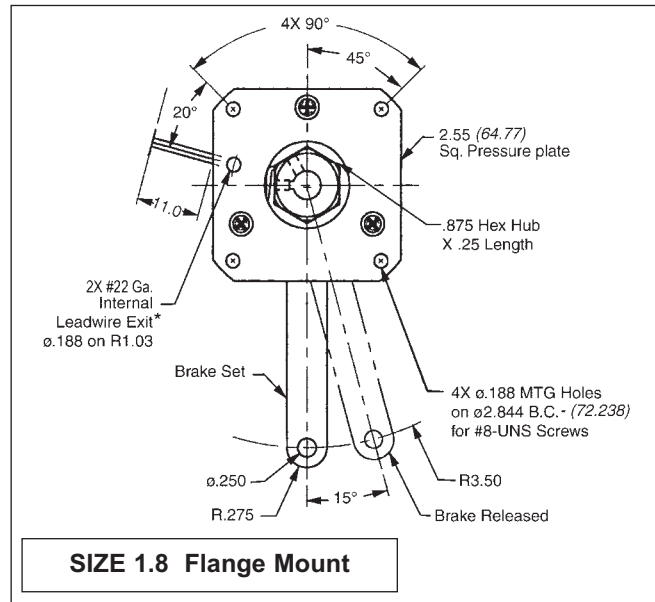
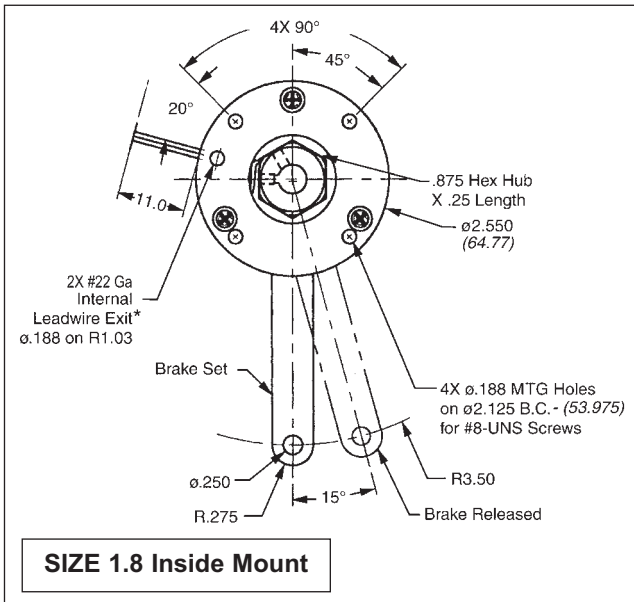
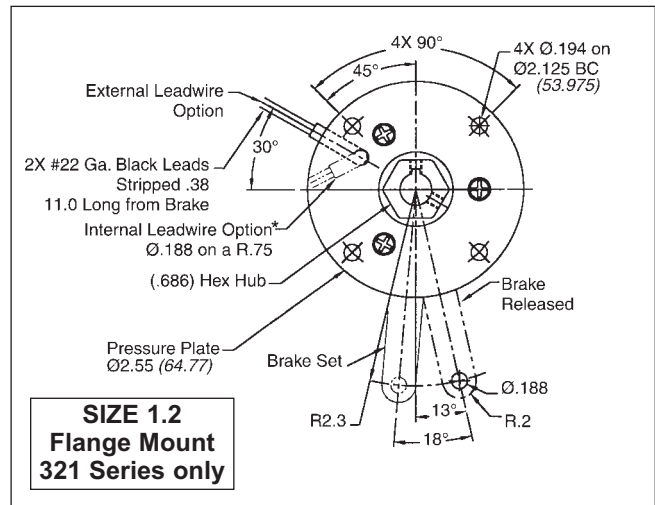
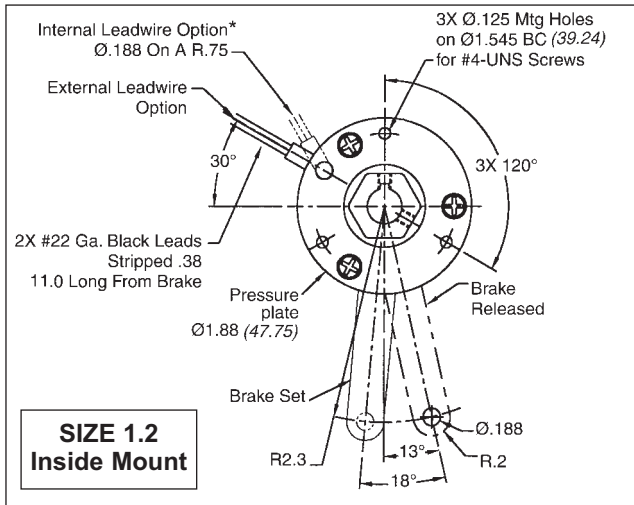
Specifications

Size	Basic Model Number	Nominal Static Torque Lb-in (Nm)	Approx. Weight		Power (watts)	Hub and Disc inertia (Oz-in-sec ²)	Thermal Capacity HP-sec/min	Maximum Bore Size	
			lbs	kg				in	mm
1.2 Dynamic	3-2X-24	3 (.34)	.4	.18	7	7.02 x 10 ⁻³	Consult Factory	3/8	9
1.2 Holding	3-2X-25	5 (.56)			9				
1.8 Dynamic	3-2X-44	7 (.79)	1.3	.59	10	4.8 x 10 ⁻⁴	.26	1/2**	12**
1.8 Holding	3-2X-45	15 (1.69)							
1.8 Dynamic	3-2X-46	15 (1.69)							
2.8 Dynamic	3-2X-74	35 (3.95)	2.0	.91	17	2.3 x 10 ⁻³	.17	1/2	12
2.8 Dynamic	3-2X-75	50 (5.65)	2.0	.91	17	2.3 x 10 ⁻³		1/2	12
2.8 Holding	3-2X-77	72 (8.14)	2.0	.91	22	2.3 x 10 ⁻³		1/2	12

**Set screws located 120° from keyway

Series 321 & Series 322 Continued

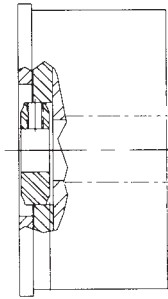
BACK TO PAGE 1



*Also the location for the external lead (on the backside of magnet body) for Series 322 only.

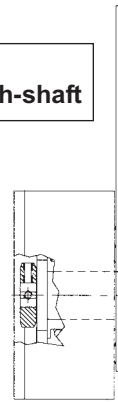
THROUGH-SHAFT OPTION

SIZE 1.2 & 1.8
Optional through-shaft



Size 1.2
.41 (10.41) Max.
Size 1.8
.45 (11.43) Max.
not available
with manual release
3/8" max. shaft dia.

SIZE 2.8
Optional through-shaft

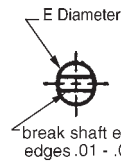
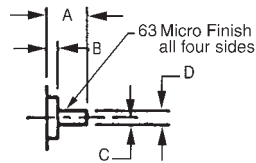


shown with
manual release
max. .75 (19.05)
1/2" max.
shaft dia.

DOUBLE - D DISC OPTION



Double "D" Option



Hubless option with flattened
shaft double "D" friction disc

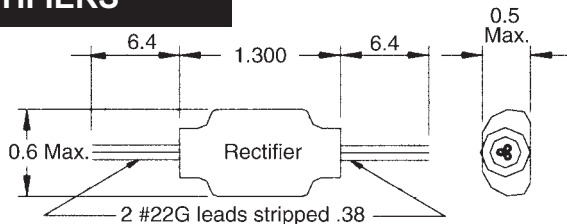
Brake Size	A	B
1.2	.25 + .05/-0.00	.075 max.
1.8	.30 + .13/-0.00	.075 max.

Shaft Size	C	D	E
5/16	.052	.105 / .103	.3135 / .3115
3/8	.063	.126 / .124	.376 / .374

NOTE: Contact factory for Double "D" disc on brakes greater than 7 lb-in nominal static torque

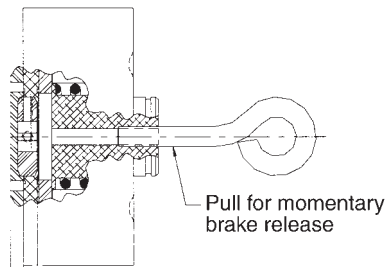
AC RECTIFIERS

External In-line
(as shown)
or
Internal



Internal rectifier is available only
on the 1.8 and 2.8 models.
external in-line rectifier is a
standard option only on the 1.2
model.

**NON-MAINTAINED
MANUAL RELEASE**



BRAKE RELEASE INDICATOR

A mechanical switch which is activated by the
manual release lever, and can be used to
disconnect power in case of accidental start-up
when the brake is manually released.



Series 321 & Series 322 Continued

Pricing (Discount Symbol R2)

Size	321 Series Model External leads*		321 Series List Price DC		322 Series Model External Leads*		322 Series List Price DC		Options List Price Adders			
	Mounting		Standard Brake	With manual release	Mounting		Standard Brake	With manual release	Double "D" disc	Carrier ring disc	Release indicator switch	Through-shaft
	Inside***	Flange			Inside***	Flange						
1.2 Dynamic	3-21-2401G	3-21-2403G	\$95	\$120	3-22-2401G	N/A**	\$105	\$130	N/C**	N/A	\$40	\$5
1.2 Holding	3-21-2501G	3-21-2503G	100	125	3-22-2501G	N/A**	110	135	N/C**	N/C**	40	5
1.8 Dynamic	3-21-4401G	3-21-440DG	110	140	3-22-4401G	3-22-440DG	121	151	N/C**	\$10	40	5
1.8 Holding	3-21-4501G	3-21-450DG	125	155	3-22-4501G	3-22-450DG	138	168	N/C**	\$10	40	5
1.8 Dynamic	3-21-4601G	3-21-460DG	135	165	3-22-4601G	3-22-460DG	148	178	N/A**	N/A**	40	5
2.8 Dynamic	3-21-7401K	N/A**	170	200	3-22-7401K	N/A**	187	217	N/A**	N/A**	40	5
2.8 Dynamic	3-21-7501K	N/A**	190	220	3-22-7501K	N/A**	207	237	N/A**	N/A**	40	5
2.8 Holding	3-21-7701K	N/A**	205	235	3-22-7701K	N/A**	225	255	N/A**	N/A**	40	5
72 mm mount					72 mm mount							
2.8 Dynamic	3-21-740MK	N/A**	\$170	\$200	3-22-740MK	N/A**	\$187	\$217	N/A**	N/A**	\$40	\$5
2.8 Holding	3-21-750MK	N/A**	190	220	3-22-750MK	N/A**	207	237	N/A**	N/A**	40	5

*For internal lead location use an "A" for the 6th digit. Internal lead not available with in-line rectifier
 **N/C =No charge N/A =Not Available Contact factory for Double "D" Disc on brakes greater than 7 lb-in nominal static torque
 ***Mounting bolt circle inside (less than) the outside diameter of magnet body. (BC dimensions shown on page 71)

Ordering Information

Group "3" Armature Actuated Brakes ——— 3-2X-XXXXX-XX-XX ——— Options – Table 3
 Series = 321 or 322 ——— Voltages – Table 2
 Hub Bore and Keyway – Table 1
 For Double "D" Bores See Table 1A

Character	Size
2	1.2
4	1.8
7	2.8

Character	Modification
E	Brake release indicator (NC)
F	Brake release indicator (NO)
G	Standard - GGA Friction Material
J	CCW manual release rotation
K	"Star" hub and GGA disc

Size	Static Torque (lb-in)	Numeral
1.2	3 Dynamic	4
1.2	5 Holding	5
1.8	7 Dynamic	4
1.8	15 Holding	5
1.8	15 Dynamic	6
2.8	35 Dynamic	4
2.8	50 Dynamic	5
2.8	72 Holding	7

Numeral or Letter	Description	Series
0	Standard Brake External Lead Location	321, 322
A	Internal Lead Location*	321 or 322
6	External leads Thru-Shaft	321
C	Internal Leads* Thru-Shaft	321

Numerical or Letter	Mounting	Brake Size		
		1.2	1.8	2.8
1	Inside Mount	x	x	x
D	Flange Mount 2.844" Mounting Bolt Circle	x	x	
3	Flange Mount 2.125" Mounting Bolt Circle	x		
M	Body Mount 72 mm Mounting Bolt Circle			x

Table 1: Bore Size

Characters to Insert	Bore	Keyway Size*		Bores Available		
		Width (in.) x Depth (in.)	Mag Body Size	1.2	1.8	2.8
0A	3/16	no keyway	x			
0B	3/16	1/16 1/32			x	
0C	1/4	no keyway	x			
0D	1/4	1/16 1/32			x	x
0E	5/16	no keyway	x			
0F	5/16	1/16 1/32			x	x
0G	3/8	no keyway	x			
0H	3/8	3/32 3/64			x	x
0J	1/2	1/8 1/16			①	x
05	5	2 mm 1 mm	②	x	x	
06	6	2 mm 1 mm	②	x	x	
07	7	2 mm 1 mm	②	x	x	
08	8	2 mm 1 mm	②	x	x	
09	9	3 mm 1.4 mm	②	x	x	

NOTE: For non-standard bores add \$32.00.

① Set Screws located 120° from keyway

② Hubs are provided without keyway

*Keyseats made to ANSI B17.1 standard

*Internal lead not available with in-line rectifier

Table 1A: (Double "D" Bores)

Characters to Insert	Bore
0F	5/16
0H	3/8

NOTE: Contact factory for Double "D" disc on brakes greater than 7 lb-in nominal static torque. Can be used up to 15 lb-in holding.

Table 3: Options

Characters to Insert	Options
A	Long Hub, Size 2.8 Only
D	Short Hub pressure plate mounted
G	Short Hub with Maintained Manual Release
X	Double "D" Friction Disc
Y	Option X with Maintained Manual Release

Table 2: Standard Coil Voltage

Character to Insert	Voltage	List Adder	Current Rating in Amps		
			Size 1.2	Size 1.8	Size 2.8
C	12 Vdc	-	.632	.826	1.37
E	24 Vdc	-	.307	.421	.70
G	48 Vdc	-	.158	.216	.36
J	90 Vdc	-	.076	.123	.17
K	103 Vdc	-	.085	.115	.140
L	180 Vdc	-	.039	.060	.09
N	115 Vac external in-line	\$25.00	.085	N/A	N/A
P	230 Vac external in-line	\$25.00	.044	N/A	N/A
T*	115 Vac Internal Rectifier	\$15.00	N/A	.115	.168*
U*	230 Vac Internal Rectifier	\$15.00	N/A	.059	.086*
Z	115/230 Vac external in-line	\$25.00	.085/.044	.115/.059	.140/.097

*Internal rectifier not available on size 2.8 brake with 72mm bolt circle

NOTE: Other voltages available, contact factory. Add \$20.00 for non-standard voltages

NOTE: Final part number may change due to specifications or options selected or other product design considerations. A number such as a 2, 3, 4 etc., in the 12th position is used to designate a unique brake (custom) and can only be assigned by Stearns Design Engineering Department.

Modifications are available - see AAB Modification Section.

Armature Actuated Brakes (AAB) Torque Selection

Select the proper torque rating based on horsepower and rpm (speed at the clutch or brake) using the *Torque Selection Chart* below. Based on 1.4 service factor.

For other service factors and speeds, use the formulas shown below.

Formula for TABLE 1

$$T = \frac{63,025 \times P}{N} \times SF$$

T = Static torque, lb-in.
 P = Horsepower, hp
 N = Shaft speed at brake, rpm
 SF = Service Factor
 63,025 = Constant

Formula for TABLE 2

$$T = \frac{5,252 \times P}{N} \times SF$$

T = Static torque, lb-ft.
 P = Horsepower, hp
 N = Shaft speed at brake, rpm
 SF = Service Factor
 5,252 = Constant

Caution: Do not use Table 1 to select brakes for overhauling or high inertial loads, or where a stop in specified time or distance is required. For these applications the total inertia of the load and power transmission system must be determined to make a brake selection. Refer to sections on torque and thermal ratings and determination.

NOTE: Series 310 and 311 for holding applications only.

TABLE 1

Series 320, 321, 322 Static Torque in lb-in. (Nm)

Motor hp	rpm									
	600	800	1000	1200	1500	1800	2000	2400	3000	3600
	Static Torque lb-in (Nm)									
1/20	18 (.203)	7 (.79)	7 (.79)	7 (.79)	3 (.34)	3 (.34)	3 (.34)	3 (.34)	3 (.34)	3 (.34)
1/12	18 (.203)	18 (2.03)	7 (.79)	7 (.79)	7 (.79)	7 (.79)	7 (.79)	3 (.34)	3 (.34)	3 (.34)
1/8	35 (3.95)	18 (2.03)	18 (2.03)	18 (2.03)	18 (2.03)	7 (.79)	7 (.79)	7 (.79)	7 (.79)	3 (.34)
1/6	35 (3.95)	35 (3.95)	18 (2.03)	18 (2.03)	18 (2.03)	18 (2.03)	18 (2.03)	7 (.79)	7 (.79)	7 (.79)
1/4	—	35 (3.95)	35 (3.95)	35 (3.95)	18 (2.03)	18 (2.03)	18 (2.03)	18 (2.03)	18 (2.03)	7 (.79)
1/3	—	—	35 (3.95)	35 (3.95)	35 (3.95)	18 (2.03)	18 (2.03)	18 (2.03)	18 (2.03)	18 (2.03)
1/2	—	—	—	—	35 (3.95)	35 (3.95)	35 (3.95)	35 (3.95)	18 (2.03)	18 (2.03)
3/4	—	—	—	—	—	—	35 (3.95)	35 (3.95)	35 (3.95)	35 (3.95)
1	—	—	—	—	—	—	—	—	—	35 (3.95)

TABLE 2

Series 333/350/360 Static Torque in lb-ft. (Nm)

Motor hp (kw)	rpm									
	600	800	1000	1200	1500	1800	2000	2400	3000	3600
	Static Torque lb-ft (Nm)									
1/3 (.25)	6 (8)	6 (8)	3 (4)	3 (4)	3 (4)	3 (4)	3 (4)	3 (4)	3 (4)	3 (4)
1/2 (.37)	12 (16)	6 (8)	6 (8)	6 (8)	3 (4)	3 (4)	3 (4)	3 (4)	3 (4)	3 (4)
3/4 (.55)	12 (16)	12 (16)	6 (8)	6 (8)	6 (8)	6 (8)	3 (4)	3 (4)	3 (4)	3 (4)
1 (.75)	25 (34)	12 (16)	12 (16)	12 (16)	6 (8)	6 (8)	6 (8)	6 (8)	6 (8)	3 (4)
1-1/2 (1.1)	25 (34)	25 (34)	12 (16)	12 (16)	12 (16)	12 (16)	6 (8)	6 (8)	6 (8)	6 (8)
2 (1.5)	25 (34)	25 (34)	25 (34)	25 (34)	12 (16)	12 (16)	12 (16)	6 (8)	6 (8)	6 (8)
3 (2.2)	45 (60)	45 (60)	25 (34)	25 (34)	25 (34)	25 (34)	12 (16)	12 (16)	12 (16)	12 (16)
5 (3.7)	60 (80)	60 (80)	45 (60)	45 (60)	25 (34)	25 (34)	25 (34)	25 (34)	25 (34)	12 (16)
7-1/2 (5.6)	110 (150)	110 (150)	60 (80)	60 (60)	45 (60)	45 (60)	45 (60)	25 (34)	25 (34)	25 (34)
10 (7.5)	180 (240)	110 (150)	110 (150)	110 (150)	60 (80)	45 (60)	45 (60)	45 (60)	25 (34)	25 (34)
15 (11.2)	300 (400)	180 (240)	110 (150)	110 (150)	110 (150)	60 (80)	60 (80)	60 (80)	45 (60)	45 (60)
20 (14.9)	300 (400)	180 (240)	180 (240)	180 (240)	110 (150)	110 (150)	110 (150)	60 (80)	60 (80)	60 (80)
25 (18.6)	—	300 (400)	180 (240)	180 (240)	180 (240)	110 (150)	*	*	*	*
30 (22.4)	—	300 (400)	300 (400)	300 (400)	180 (240)	180 (240)	*	*	*	*
40 (29.8)	—	—	300 (400)	300 (400)	300 (400)	180 (240)	*	*	*	*
50 (37.3)	—	—	—	—	300 (400)	300 (400)	*	*	*	*
60 (44.7)	—	—	—	—	300 (400)	300 (400)	*	*	*	*

* Exceeds maximum speed rating.

Stearns® Spring-Set Disc Brakes

Installation and Service Instructions for 321/322 Series AAB Spring-Set Brakes (1.2, 1.8 and 2.8)

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.

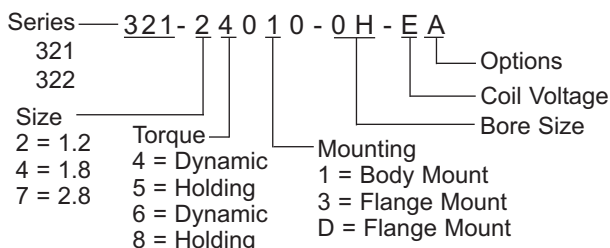
Caution

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) 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.

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.

Brake Identification



Installation

The brake should be pressure plate mounted only. The hub should be secured to shaft before mounting brake. Two set screws are provided and should be tightened securely. Refer to Table A for set screw torque. The key should not extend towards the armature or past the face of the hub. Refer to Table B or C for positioning of hub. If brake was supplied with the Double "D" friction disc option, then brake hub is not required; see Figure A. Mount brake to register using screws or bolts. Refer to Table A for mounting torque. Lock washers are optional. The rated voltage should be available at the brake and allowance should be made for voltage drop in long wiring runs. The optional, factory installed, manual release lever is a rotary maintained design.

Note: Position of hub should allow full engagement of friction disc without interfering with the movement of the armature. Motor shaft end float should be taken into consideration when positioning the hub.

Figure A

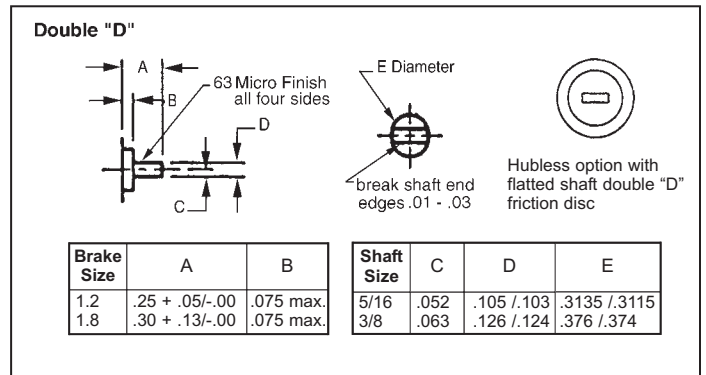
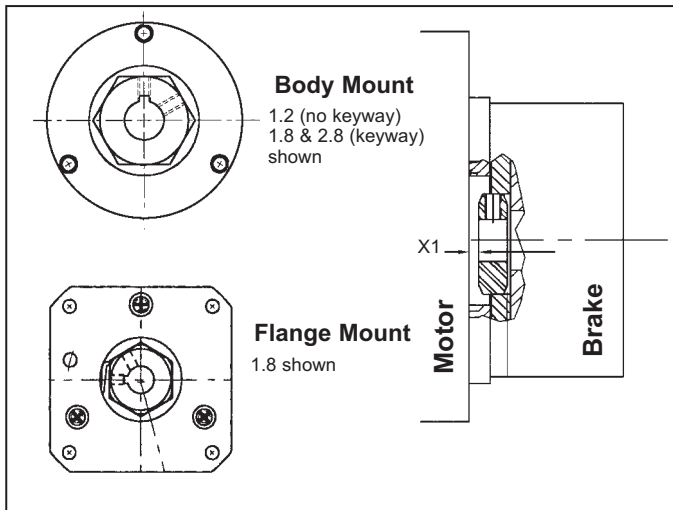


Table A

Model Number	Set Screws		Mounting Screws		
	Torque	Size	Torque Maximum	Qty Screws	Operating Range Air Gap (inches)
3-21-2XXX 3-22-2XXX	9-10 lb-in	*	9 lb-in/#4 37 lb-in/#8	3	.003 to .012
3-21-4XXX 3-22-4XXX	9-10 lb-in	#8	37 lb-in	4	.003 to .015
3-21-7XXX 3-22-7XXX	9-10 lb-in	#8	37 lb-in	4	.003 to .015

*Use #4 for body mount; #8 for flange mount.



General

After proper installation, no further adjustment should be required for the life of the unit.

Power supply

The voltage to be applied is determined by rating shown on the nameplate. Resistance and other coil data for various voltages are tabulated on appropriate Engineering Data Sheets. This data can be secured by contacting the factory.

Troubleshooting for AAB Brakes

Overheating, coil burned out or loss of torque

1. Check ambient temperature. It is above 40° C? Consult factory for assistance.
2. Check thermal capacity of unit versus actual heat dissipation requirements. Consult factory.
3. Check voltage supply as close to coil as feasible. Compare to nameplate data, if incorrect apply proper voltage.
4. Is coil resistance correct? Consult factory for resistance of the specific coil.

Caution: To avoid damage to power supply, hipot testing should not exceed 1500 volts for one second. Brake coil leads must be connected together.

5. Stop time on brake normally should not exceed one second. If excessive, recheck torque rating versus load characteristics.
6. Check for oil/grease on friction elements. If this is found, replacement of entire brake may be required.
7. On pressure spring, check for broken, missing or substituted springs not of our design.
8. Failure to release after unit has performed satisfactorily for a period indicates wear has occurred. Refer to Table A for operating air gap range. Replacement of the brake is required if air gap exceeds maximum shown.
9. If brake hub is loose or not positioned properly, the hub may come in contact with the motor endbell or the brake armature. Check Table B or C for proper hub positioning, and Table A for correct set screw torque.

Fuse in DC power supply blows

1. Never put in a higher rating fuse or replace with a slo-blow type.
2. Check resistance of coil, if shorted, replacement of brake is required. If not shorted, obtain coil resistance from factory and compare to your reading.
3. If cause was not found in Step 2 above, check rectifier bridge by removing all loads and replacing fuse. If fuse blows when AC is applied to rectifier, bridge is shorted. Replace bridge if feasible or discard control and replace.

Table B

Model Number	Hub Position (inch)**	Max. Allowed Misalignment (inches)		Standard Pressure Plate Thickness Reference PP ¹
		X1	Parallel	
3-21-2XXX 3-22-2XXX	.02*	.005	.005	.120"
3-21-4XXX 3-22-4XXX	.02*	.005	.005	.120"
3-21-7XXX 3-22-7XXX	.09*	.005	.005	.164"

*This dimension is for units mounting on hub end, and using short version of the hub. Factor in motor shaft end float; do not allow hub to contact armature.

**Add .03 when mounting gasket is used.

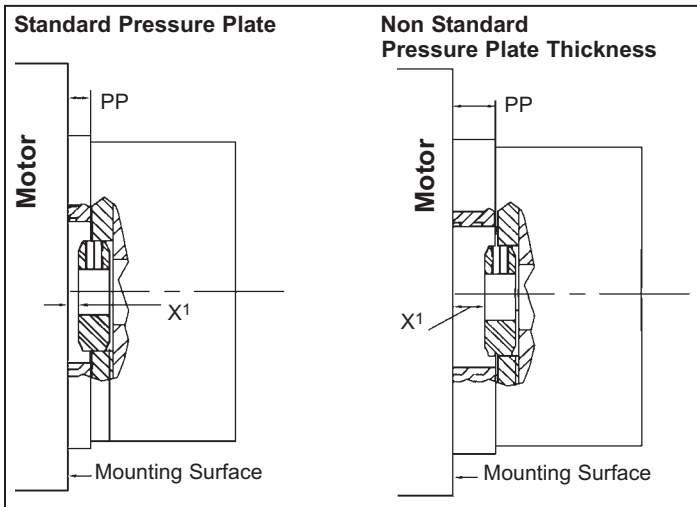


Table C - Hub Position for brakes with Non-Standard Pressure Plate Thickness PP

Model Number	Hub Position (inch) **
3-21-2XXX 3-22-2XXX	X ¹ = PP - .10
3-21-4XXX 3-22-4XXX	X ¹ = PP - .10
3-21-7XXX 3-22-7XXX	X ¹ = PP - .07

**Add .03 when sealing gasket is used.









Example: If the actual 3212XXX non-standard pressure plate thickness is 0.15" then hub position equals .05.



Armature Actuated Brake Modifications

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Series 320/321/322

Modification	Series	Brake Size	List Price
Maintained Manual Release			
	320/321/322	1.2 1.8 2.0 2.8	\$25.00 \$30.00 \$30.00 \$30.00
Non-Maintained Manual Release			
	320/321/322	1.2 1.8 2.0 2.8	\$25.00 \$30.00 \$30.00 \$30.00
Brake Release Indicator Switch			
	320/321/322	ALL	\$40.00
AC Rectifiers, In-Line			
	310/320/321/322	ALL	\$25.00
AC Rectifiers, Internal	320/321/322	1.8 and 2.8	\$15.00
Encoder Mount			
	310/320/321/322 tapped holes in magnet body for tether mount		\$25.00
Through-Shaft			
	321/322	ALL (through-shaft combined with manual release only available on size 2.8)	\$5.00
Mounting Plates			
	320/321/322	Size	List Price
		1.2	\$20.00
		1.8, 2.8	\$15.00
		1.8, 2.8 3.5", 2.5" register	\$30.00
		2.0 2.844"	\$20.00
Double "D" Disc			
	320/321/322	1.2, 1.8, and 2.0 Contact factory for Double "D" disc on brakes rated greater than 7 lb-in	No charge
Carrier Ring Disc	320/321/322	1.8	\$10.00