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Performance Parameters and Limited Warranty

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The performance of Stearns brakes, clutches, clutch-brake combinations, solenoids, and controls depends upon the proper application of the product, adequate run in, installation and maintenance procedures, and reasonable care in operation.

All torque values listed in our bulletins are nominal and are subject to the variations normally associated with friction devices. The purchaser should take into consideration all variables shown in the applicable specification sheets. Although our application engineers are available for consultation, final selection and performance assurance on the purchaser's machine is the responsibility of the purchaser. Careful purchaser selection, adequate testing at time of installation, operation and maintenance of all products of Rexnord Industries, LLC, Stearns Division are required to obtain effective performance.

Stearns warrants to its purchasers that all its products will be free from defects in material and workmanship at the time of shipment to the purchaser for a period of one (1) year from the date of shipment. All warranty claims must be submitted in writing to Stearns within the warranty period, or shall be deemed waived. As to products or parts thereof which Stearns finds to have been defective at the time of shipment, its sole responsibility hereunder shall be to repair, correct or replace (whichever Stearns deems advisable) such defective products or parts without charge, FOB Stearns factory. In the alternative, Stearns may, at its option, either before or after attempting a different remedy, refund the purchase price upon return of the product or parts.

This warranty shall not apply to any product which has been subjected to misuse: misapplication: neglect (including but not limited to improper maintenance and storage); accident: improper installation; modification (including but not limited to use of other than genuine Stearns replacement parts or attachments); adjustment; or repair.

THE FOREGOING IS IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING THAT OF MERCHANTABILITY AND OF FITNESS FOR A PARTICULAR PURPOSE, AND OF ANY OTHER OBLIGATION OR LIABILITY ON OUR PART OF ANY KIND OR NATURE WHATSOEVER.

No Stearns representative has any authority to waive, alter, vary or add to the terms hereof without prior approval in writing, to our purchaser, signed by an officer of Rexnord Industries, LLC.

Stearns liability for its products, whether for breach of contract, negligence, strict liability in tort, or otherwise, shall be limited to the repair, correction, or replacement of the products or parts thereof, or to the refund of the purchase price of such products or parts. Stearns will not be liable for any other injury, loss, damage or expense, whether direct or consequential, including but not limited to loss of use, income, profit or production, or increased cost of operation, or spoilage of or damage to material, arising in connection with the sale, installation, use of, inability to use, or the repair or replacement of, or late delivery of, Stearns products.

Any cause of action for breach of the foregoing warranty must be brought within one (1) year from the date the alleged breach occurs.

Note on Special (Nuclear) Applications:

"Rexnord Industries, LLC, Stearns Division products are designed for standard industrial and commercial applications. Operating requirements, environments and required tolerances in nuclear and aircraft applications may be beyond the commercial standards of the Stearns Divisions products. Rexnord Industries, LLC, Stearns Division will assume absolutely no responsibility for the use of and/or resale of Rexnord Industries, LLC, Stearns Division products for such applications unless approved in writing in advance by Rexnord Industries, LLC, Stearns Division."

Introduction to Solenoid Actuated Brakes (SAB's)

Stearns Brakes Set the Standard for Excellence

Stearns offers the most comprehensive line of solenoid actuated brakes (SAB's) on the market today. We have earned the reputation as the industry's quality leader by working closely with you, our customers, understanding your needs and developing products with design features to handle your most challenging applications. We have installed millions of Stearns brakes worldwide since 1935. Many brakes operating today are 40 years old or more; evidence of our product quality and reliability.

Stearns motor brakes can be mounted directly to an electric motor or foot mounted. The compact design delivers high torque in a small size with fast, positive response and no residual drag when released. Our brakes can be mounted directly onto NEMA C-face motors without special alignment procedures. Many motor manufacturers offer a brake kit which will convert a stock fan-cooled motor into a brakemotor. Stearns Solenoid Actuated Brakes feature unitized construction which makes servicing friction discs easy using only a screwdriver and wrench. The Stearns SAB ensures automatic stopping and holding any time power to the brake is interrupted. And, as with ALL Stearns products, the friction material is non-asbestos.

We can produce a brake which meets your specifications, including metric mounting. Chances are, we've already manufactured similar requirements from a long list of pre-engineered options.

Enclosure Types

Stearns brakes, when properly installed, are provided in a variety of IP enclosure types.

IP 21 - intended for general purpose, indoor applications, as a ventilated enclosure. Protected against dripping water.

IP 23 - intended for indoor applications, as a non-ventilated enclosure. It provides protection against falling, non-corrosive dirt and liquid. Protected against spraying water.

IP 54 - intended for dust protected indoor and outdoor applications. Protected against splashing water.

IP 55 - intended for dust protected indoor and outdoor applications. Protected against water jets.

IP 56 - intended for dust protected indoor and outdoor applications. Protected against heavy seas or powerful jets.

IP 57 - intended for dust protected indoor and outdoor applications. Protected against the effects of immersion.

NOTE: IP 21, 23 & 54 - formerly referred to by Stearns as NEMA 1, 2 & 4 respectively.

IP 55, 56 & 57 - formerly referred to by Stearns as NEMA Type 4X (BISSC Certified with epoxy coating and stainless steel hardware on exterior, or with a stainless steel enclosure).

Self-Adjusting Disc Brakes

Remote inaccessible locations or high cycling applications require a specially designed, low-maintenance brake that will operate at peak efficiency and provide uniform braking for long periods of time. Stearns exclusive self-adjusting feature helps eliminate the major cause of brake maintenance - friction lining wear. Self-adjusting brakes are also well suited for applications where rapid cycling requires frequent resetting of solenoid air gap. Automatic adjustment also eliminates the errors that can occur with hand adjustment. They can be easily modified to suit your particular application. Depending upon the series you select, these brakes can be direct mounted on motors ranging in size from NEMA 182TC through NEMA 505C.

Manually Adjusted Disc Brakes with Automatic Reset

It's an unbeatable combination; the features you want most in spring-set disc brakes. Standard features now include: a unique spring design which allows for universal mounting, an air gap adjustment gauge for visual recognition that the brake needs adjustment, a new patented hub design, and genuine Stearns friction discs which are trademarked and patented. The 56 Series Brakes come in static torque ratings from 1.5 through 25 lb-ft with NEMA C-face mountings 56C, 143TC, 145TC, 182TFC and 184TFC. Ten different housing, endplate, and release configurations, with a wide variety of pre-engineered modifications, you can select from 120,000 possible combinations! In addition, for holding applications where friction disc wear is not a factor, Stearns 87,000 Series Brakes are available with an optional manual adjust. The 87,000 Series Brakes are available in static torque ratings from 6 lb-ft through 105 lb-ft, with NEMA C-face moutings, 182TC through 286TC.

Introduction to Stearns Solenoid Actuated Brakes (SAB's)

Brakes for Hazardous Locations

Although rugged Stearns Brakes are built to withstand rigorous industrial environments, many applications require additional protection from explosive gases or ignitable dusts. Stearns manufactures a complete line of disc brakes designed from the hazardous locations defined in the *National Electric Code (NEC)*. Each brake is labeled to show the Class, Group, and maximum operating temperature of the brake enclosure. We offer both motor-mounted and foot-mounted designs, and all Stearns Hazardous Location Brakes are UL Listed and CUL or CSA certified.

Double C-Face Disc Brake Couplers

Stearns Disc Brake Couplers provide maximum versatility, allowing you to add a brake to a C-face motor with a single shaft extension. Using these reliable products, you can couple a C-face motor to a C-face gear reducer.

Washdown Brakes

Stearns Washdown Brakes include the 56,000 and 87,000 Series brake models. These brakes meet BISSC Standards, AAA Dairy Standards, and other food industry washdown requirements. They feature stainless steel hardware, neoprene gasketing, and FDA-approved white epoxy paint or stainless steel enclosure.

Marine Applications

Brakes used in marine applications are customized to meet specific standards. These standards are established to provide various levels of corrosion resistance and performance standards under specific conditions.

Maritime and Naval Brakes are designed for U.S. Navy and Coast Guard military specifications. These units conform to MIL-B-16392C or 46CFR 110.10-1 and IEEE Standard 45. Special material components help prevent corrosion due to shipboard environments. SAB's used in marine environments can be custom built to meet the specifications. In addition, all Stearns SAB's are "Type Approval Certified" by the American Bureau of Shipping.

Today, Stearns is focused on being your worldwide, value-added supplier. Our factory-trained field sales force is available to work with you in person to determine your application needs, as well as provide training and support to your engineers and maintenance staff. Our extensive network of more than 900 distributor branches is your assurance of quality service after the sale.

Stearns is a division of Rexnord Industries, LLC, a world leader in power transmission products. We have the resources, experience and dedication to meet your industrial brake, clutch and solid-state electronic centrifugal switch needs.

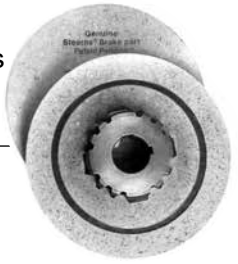
Solenoid Actuated Brakes versus Armature Actuated Brakes

Solenoid Actuated Brakes	Armature Actuated Brakes
Simple wear adjustment	Complex wear adjustment
Easy coil exchange for different voltages	Difficult to change out complete magnet assembly
Maintained manual release with automatic reset for brake release during set-up	Non-maintained release (deadman) requires constant external force to operate
Add on options easily assembled to standard unit	Options require complete brake in most units
Rapid set and release times.	Response time is slower due to required magnetic field build-up in magnet-style coil
Connection can be made directly to AC power source	Direct connection to AC power source requires an optional electric control

Trademarked and Patented Friction Discs

Now you can rely on identifying genuine Stearns Friction Discs which assure continuous, reliable performance backed by the Stearns name.

A molded ring in the Stearns friction discs makes it easy to visually identify a Stearns disc. The new splined discs are trademarked and patented by Stearns Division, Rexnord Industries, LLC.



Manually Adjusted Solenoid Actuated Brakes

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Stearns manually-adjusted disc brakes are available from .5 to 105 lb-ft static torque. They feature spring-set, electrically released designs having simple adjustments to compensate for friction lining wear. All have simple 2-wire motor connection.

Series 48,100 Disc Brakes

Mount directly to NEMA 48C motor frames. Static torque ratings are 1½, 3 and 6 lb-ft.

Quality Design Features:

- Spring-set, electrically released
- Single-disc caliper design
- Simple wear adjustment for easy maintenance
- Knock-out plug on housing for through-shaft applications
- Maintained manual release with automatic reset
- Mount in any position without modification

All Series 56,X00 Disc Brakes

Mount directly to NEMA 56C, 143TC, 145TC, 182TC and 184TC motor frames. Static torque ratings from 1½ to 25 lb-ft.

The 56 Series family is an unbeatable combination: the features you want most in spring-set disc brakes, at a low price. We took a fresh look at the brake itself as well as your needs and designed a comprehensive line of spring-set brakes that set new standards for quality, reliability and customer convenience. Here's a sampling of the features we've built into the Stearns 56 Series brakes:

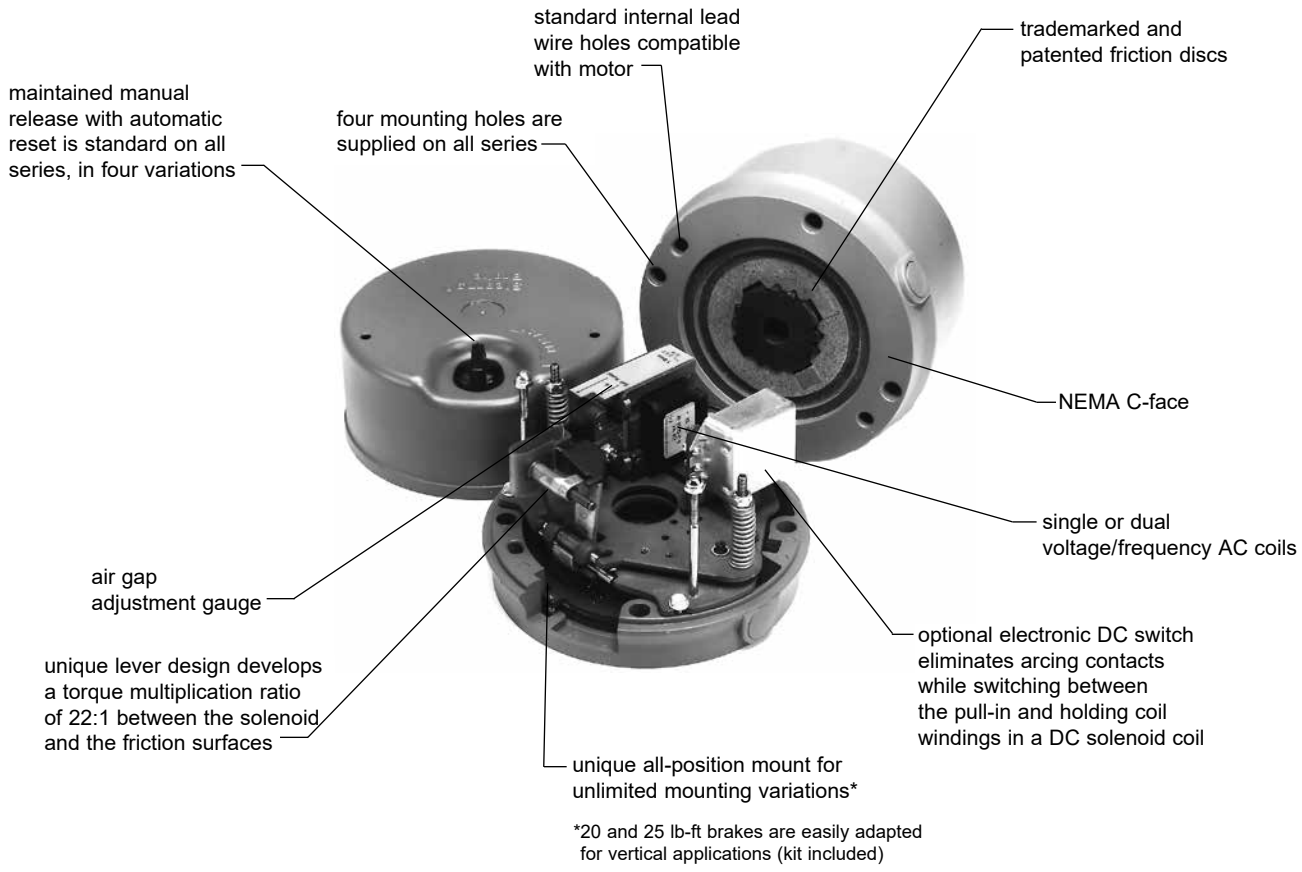
- A Stearns-exclusive spring design permits all-position mount for unlimited mounting possibilities.
- Trademarked and patented friction discs
- Patented splined hub that increases friction disc working area, runs quieter, and offers enhanced heat dissipating capability
- ABS Type Approval Certified

The 56 Series come in static torque ratings from 1.5 through 25 lb-ft with NEMA C-face mountings 56C, 143TC, 145TC, 182TFC, and 184TFC. Ten different housing, endplate, and release configurations accommodate IP 23, IP 54, IP 55, IP 56 and IP 57 enclosures. With a wide variety of pre-engineered modifications, you can select from 120,000 possible combinations!

87,000 Series Disc Brakes

An optional manual adjust mechanism can be provided on 87,000 Series Brakes (does not include 87,300 and 87,800 Series Brakes). Mounted directly to NEMA 182TC through 256TC frames. Includes all the other features of the Series 87,000.

Series 56,000 Design Features



*20 and 25 lb-ft brakes are easily adapted for vertical applications (kit included)

Exploded View- Part Indentification

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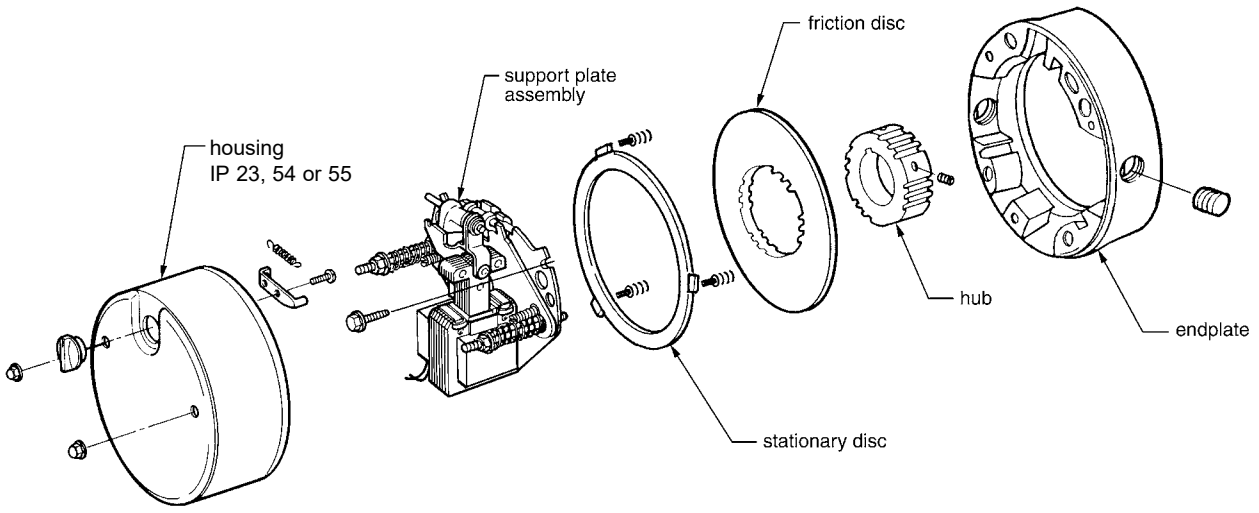
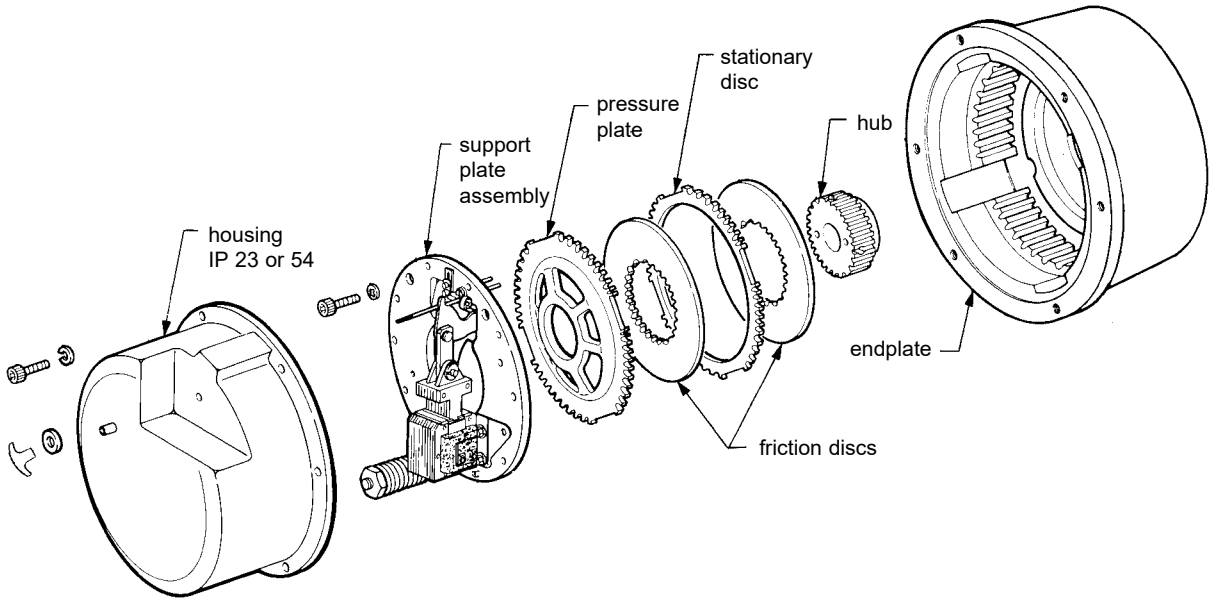
Series 56,000 Manually-Adjusted Solenoid Actuated Brake



Self-Adjusting Disc Brakes - Main Components



Self-Adjusting Solenoid Actuated Brakes

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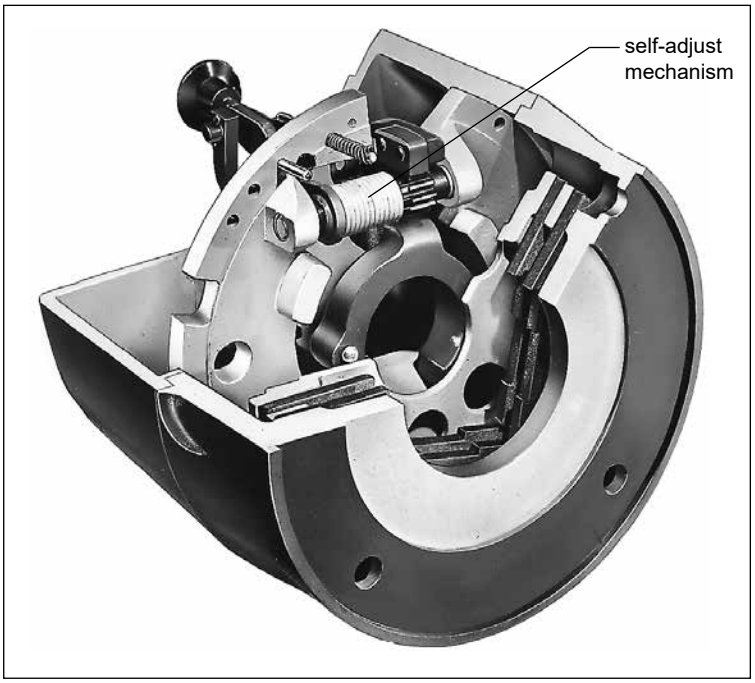
Stearns self-adjusting disc brakes feature an exclusive, automatic adjusting device that eliminates the major cause of brake maintenance – adjustment to compensate for friction lining wear. This feature makes Stearns self-adjusting brakes ideal for remote or inaccessible locations, and for applications where rapid cycling requires frequent wear adjustment of manual adjustable brakes.

The self-adjust mechanism is a simple wrap-spring clutch that automatically adjusts the brake's solenoid air gap to compensate for wear of the friction discs. Automatic adjustment occurs every time the brake is operated, eliminating the errors that can occur with hand adjustment. The self-adjust feature means Stearns motor brakes always operate at peak efficiency, providing more uniform braking, longer disc life, less maintenance time and smooth, quiet operation.



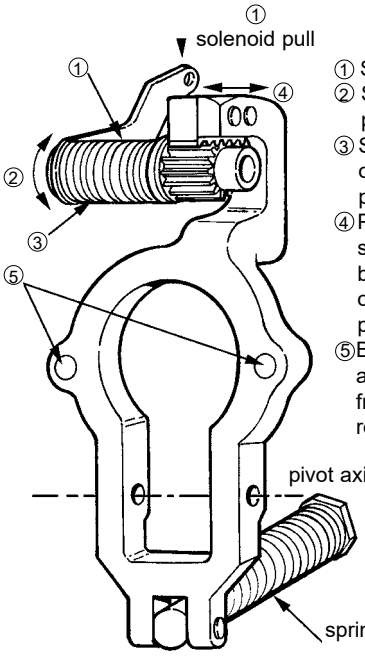
There are nine series of Stearns self-adjusting brakes to select from:

- Series 81,000 brakes for direct mounting to NEMA 324TC through 365TC motor frames. Static torque ratings from 125 to 230 lb-ft.
- Series 82,000 brakes for direct mounting to NEMA 324TC through 405TSC motor frames. Static torque ratings from 125 to 440 lb-ft.
- Series 86,X00 brakes for direct mounting to NEMA 444TSC through 505TSC motor frames. Static torque ratings from 500 to 1,000 lb-ft.
- Series 87,X00 brakes for direct mounting to NEMA 182TC through 286TC motor frames. Static torque ratings from 6 to 105 lb-ft.
- Series 87,200 for floor mounted, double shaft output with bearing support. Static torque ratings from 10 to 105 lb-ft.
- Series 87,300 hazardous location brakes for UL Listed Division I applications, which mount directly to NEMA 182TC through 256TC motor frames. Static torque ratings from 10 to 105 lb-ft.
- Series 82,300 hazardous location brakes for UL listed Division I applications, for mounting directly to NEMA 324TC through 405TSC. Static torque ratings 125 to 330 lb-ft.
- Series 87,700 brakes for in-line applications, to couple the motor and gear box. For direct mounting to NEMA 182TC through 256TC motor frames. Torque Rating of 10 to 105 lb-ft.
- Series 87,800 brakes hazardous location brake for UL Listed Division 2 applications, which mount directly to NEMA 182TC through 256TC motor frames. Static torque ratings of 10 to 105 lb-ft.

Quality Design Features

- Spring-set, electrically released.
- Self-adjusting mechanism minimizes maintenance by automatically compensating for lining wear.
- Unitized construction for easy friction disc replacement.
- Maintained manual release with automatic reset.
- Simple 2-wire motor connection.
- Standard or dust-tight, waterproof enclosures available.
- Many modifications for special application requirements.
- Models for marine and maritime applications.
- Models in accordance with Military Specification B16392-C for Navy applications.
- ABS Type Approval Certified.

Lever Arm and Self-Adjusting Mechanism



① Solenoid is energized.
② Solenoid arm and pinion rotate.
③ Spring clutch tightens on hubs and turns pinion.
④ Pinion moves rack section of lever arm back above pivot axis, overcoming force of pressure spring.
⑤ Buttons on lever arm move away from pressure plate, releasing brake.

SELECTION - Solenoid Actuated Brakes

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NOTE: For overhauling/high inertia loads, to stop in a specified time/distance, or for brakes combined with variable frequency drives, please refer to *Application Engineering* Section.

Stearns Solenoid Actuated Brakes can be easily selected from Table 1 and 2.

Given motor data:
1. Horsepower (hp)
2. Speed (RPM)
3. NEMA C-face frame size

Determine:
1. Static torque rating of the brake (lb-ft)
2. Brake series

Step 1 – Given the motor horsepower and speed, select the brake torque from Table 1. Torque in table 1 is calculated using formula:

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

Where, T_S = Static torque, lb-ft
P = Motor horsepower, hp
N = Motor full load speed, rpm
SF = Service Factor
5,252 = constant

Example: Given a 5 hp, 1800 RPM motor, the selected brake is 20 or 25 lb-ft.

Step 2 – Given the NEMA C-face motor frame size, select the brake series from Table 2.

Example: Given the 5 hp, 1800 RPM motor in Step 1 with a NEMA 184TC frame, Series 87,000; 87,300 or 87,700 Brakes can be selected to mount directly to the motor.

Table 1 – Torque Selection

In this table, brake torque ratings are no less than 140% of the motor full load torque.

Motor hp	Brakemotor Shaft Speed (RPM)						
	700	900	1200	1500	1800	3000	3600
	Static Torque Rating of Brake (lb-ft)						
1/6	3	1.5	1.5	1.5	0.75	0.5	0.5
1/4	3	3	3	1.5	1.5	0.75	0.5
1/3	6	3	3	3	1.5	1.5	0.75
1/2	6	6	3	3	3	1.5	1.5
3/4	10	6	6	6	6	3	3
1	15	10	6	6	6	3	3
1-1/2	20	15	10	10	10	6	3
2	25	20	15	10	10	6	6
3	35	25	20	15	15	10	6
5	75	50	35	25	20 or 25	15	10
7-1/2	105	75	50	50	35	25	15
10	105	105	75	50	50	25	25
15	175	125	105	75	75	50	35
20	230	175	125	105	105	50	50
25	330	230	175	125	105	75	50
30	330	330	230	175	125	75	75
40	440	330	330	230	175	105	105
50	550	440	330	330	230	*	*
60	750	500	440	330	330	*	*
75	1000	750	500	440	330	*	*
100	—	1000	1000	500	440	*	*
125	—	—	1000	750	500	*	*
150	—	—	—	750	750	*	*
200	—	—	—	1000	1000	*	*
250	—			—	1000	*	*

*See catalog pages for maximum rpm by series. Thermal capacity must be considered in load stops over 1800 rpm.

Table 2 – Brake Series Selection by NEMA Frame Size

Torque Range (lb-ft)	Brake Series	C-Face Motor Frame Size											
		48C	56C	143TC 145TC	182TC 184TC	213TC 215TC	254TC 254UC 256TC 256UC	284TC 284UC 286TC 286UC	324TC 324UC 326TC 326UC	364TC 364UC 365TC 365UC	404TC 404UC 405TC 405UC	444TC 444UC 445TC 445UC	504UC 504SC 505C 505SC
Manually-Adjusted Brakes (require periodic adjustment to compensate for friction disc wear)													
1.5-6	48,100	①											
1.5-25	56,X00		①	①	②	②	②						
10-25	56,500				①								
Self-Adjusting Brakes (automatically compensate for friction disc wear)													
6-105	87,X00		③	③	①	①	①	②	②	②	②		
50-105	87,100							①					
125-230	81,000				②	②	②	②	①	①	①	②	
125-440	82,000				②	②	②	②	①	①	①	②	
500-1000	86,000								②	②	②	①	
500-1000	86,100												①
Division I Hazardous Location Brakes (for atmospheres containing explosive gases or ignitable dusts) / Motor Mounted													
1.5-15	65,300		①	①	②	②	②						
10-105	87,300				①	①	①	②	②	②	②		
125-330	82,300				②	②	②	②	①	①	①	②	
Division I Hazardous Location Brakes (for atmospheres containing explosive gases or ignitable dusts) / Foot Mounted													
10-105	87,300				④	④	④						
125-330	82,300								④	④	④		
Division 2 Hazardous Location Brakes													
1.5-25	56,800		①	①	②	②	②						
6-105	87,800		③	③	①	①	①	②	②	②	②		
Double C-Face Brake Couplers (for direct coupling a C-face motor to a C-face gear reducer)													
1.5-25	56,700		①	①									
10-105	87,700				①	①	①						

① Brake mounts directly to motor C-face.
② Adapter required to mount brake to motor C-face. Refer to brake specifications for adapter information.
③ Brake endplate modified for direct mounting to motor C-face without an adapter.
④ Brake is foot mounted for coupling to a hazardous-location motor.

Series 48,100 (1-048-1XX)
Mounting Face: 48C
3.0” AK, 3.75” AJ

Static Torque: 1.5 through 6 lb-ft

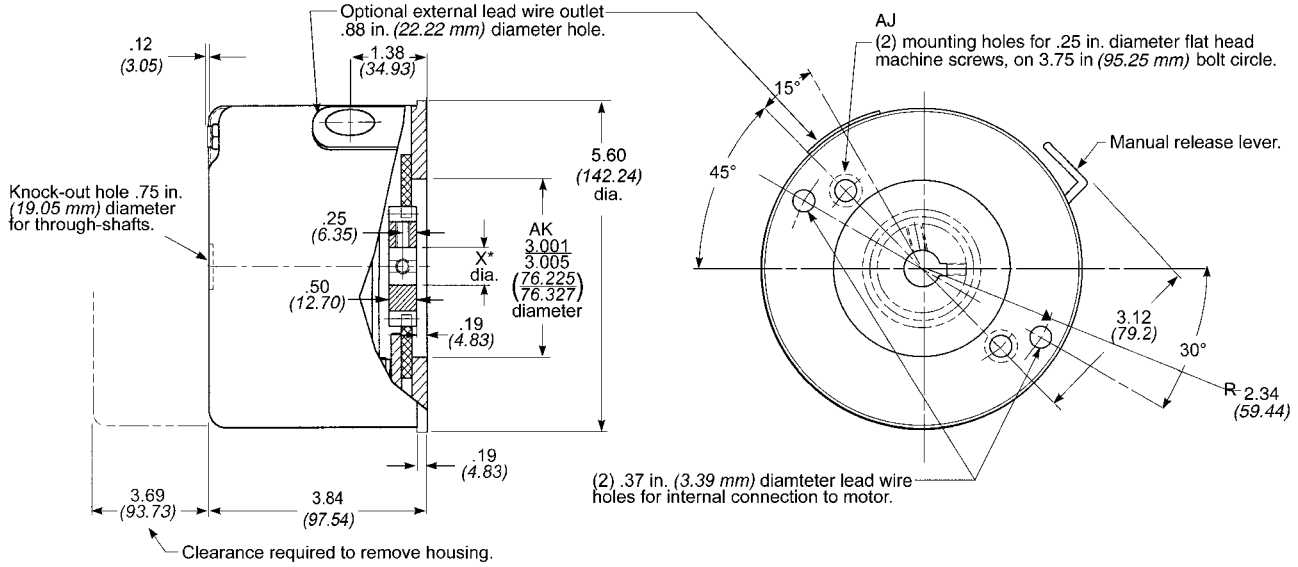
Enclosure: IP23 (formerly referred to by Stearns as NEMA 2), Stamped Steel Housing

Release Type: Side Lever

Installation and Service Instructions: P/N 8-078-924-06

Parts List: P/N 8-078-914-02

- Adjustable Torque
- Manual Wear Adjustment
- Side Manual Release Lever with Automatic Reset
- Class B Coil Insulation
- Spring-Set Electrically Released
- Lead Wire Length: 24 inches
- Maximum Speed: Horizontal 5000 rpm
- Certified: CSA File LR-6254.



Dimensions for estimating only. For installation purposes request certified prints.

Specifications

Nominal Static Torque	Number of Friction Discs	Coil Size		Maximum Solenoid Cycle Rate①		Thermal Capacity②	Inertia (WK^2)
lb-ft (Nm)		AC	DC	cycles/min AC	cycles/min DC	hp-sec/min (watts)	lb-ft² ($kgm^2 \times 10^{-4}$)
1.5 (2)	1	4	4	40	20	4 (50)	.003 (1.26)
3 (4)	1	K4	4	36	20	4 (50)	.003 (1.26)
6 (8)	1	M4	K4	36	20	4 (50)	.003 (1.26)

① Maximum solenoid cycle rate is based on ambient temperature of 72°F *(22°C)* with 50% duty cycle. Does not relate to brake cycle rate (see Thermal Capacity).

② Thermal capacity rating is based on ambient temperature of 72°F *(22°C)*, stop time of one second or less, with no heat absorbed from motor. Derate thermal capacity by 25% for vertical mounting. Refer to *Selection Procedure* Section.

Unit Data

Model Number*	Nominal Static Torque (lb-ft) (Nm)	Weight lbs (kg)
1-048-151-00-XX	1.5 (2)	4.6 (2.1)
1-048-151-01-XX	1.5 (2)	4.6 (2.1)
1-048-161-00-XX	3 (4)	4.6 (2.1)
1-048-161-01-XX	3 (4)	4.6 (2.1)
1-048-171-00-XX	6 (8)	5 (2.3)
1-048-171-01-XX	6 (8)	5 (2.3)

*Eighth and Ninth positions designate lead wire position: 00 =internal and external 01 = internal only.

Ordering and Identification Information

The following example and tables provide information for selecting the appropriate three-letter suffix when ordering a Stearns Brake.

Example of a complete part number:

1-048-161-XX-BP

- Series
- Torque
- Enclosure
- 00= Internal and external leadwire position
- 01= Internal only
- Lead wire position does not apply
- 115/230 Vac
- 5/8 bore and 3/16 x 3/32 keyway

Current Ratings (amperes)

Coil Size	Current	Voltage: 60 Hz 115 Vac	230 Vac	460 Vac	575 Vac
4	Inrush	3.6	1.8	.9	.7
	Holding	.3	.2	.08	.06
K4	Inrush	4.3	2.2	1.1	.9
	Holding	.3	.2	.08	.07
M4	Inrush	3.0	1.5	.8	.6
	Holding	.6	.3	.1	.1

Modifications are available- see SAB Modification Section

Hub Selection

Char-acter	Bore (in.)	Keyway** (in. x in.)
A*	5/8	1/8 x 1/16
B	5/8	3/16 x 3/32
C*	3/4	3/16 x 3/32
K	1/2	1/8 x 1/16

Maximum allowable bore .750. For through-shaft applications .625 is maximum

*These bores are non-standard.

**Keyseats made to ANSI B17.1 Standard.

Standard AC Voltage Ratings

Character	Voltage	Hz
B	115	60
D	110	50
E	200	60
F	230	60
	190	50
H	220	50
L	460	60
	380	50
M	415	50
N	575	60
O	110/220	50
P	115/208-230	60
Q	208-230/460	60
	190/380	50
R	200/400	60

Includes DC electronic switch (polarized).

56 Series
Mounting Face: NEMA 56C, 143TC and 145TC

The 56,X00 Series have the following design features:

- Spring-Set Electrically Released
- Static Torque 1.5 through 25 lb-ft
- Adjustable Torque, down to 50% of rated nameplate torque
- Manual Wear Adjustment
- Airgap Adjust Gage
- Splined Hub
- IP 21, 23 & 54 (formerly referred to by Stearns as NEMA type 1, 2 & 4 respectively)
  IP 55, 56, & 57 (formerly referred to by Stearns as NEMA Type 4X (BISSC Certified with epoxy coating and stainless steel hardware on exterior, or with a stainless steel enclosure)
- Universal mounting through 15 lb-ft. The 20 and 25 lb-ft are supplied with springs for vertical modification.

Specifications:

- Lead Wire Length: 24 inches
- Maximum Speed:
  Horizontal 5000 rpm
  Vertical 3600 rpm
- Coil Insulation: Standard Class B
  Optional Class H
  (56,800 Series Class H standard)
- Certified: CSA File LR-6254
- ABS Type Approval Certified

Product Overview

56000 Series

Designed for industrial applications requiring high performance in a compact lightweight package.

Construction:
Die cast aluminum endplate with stamped steel housing

Available Enclosures:
IP 23, 54 & 55

Release Type:
External knob manual release with or without automatic reset

Through Shaft Capability: Yes (IP 23 only)

56200 Series

Designed for industrial applications requiring the protection of a heavy duty cast iron enclosure.

Construction:
Cast iron endplate and housing.

Available Enclosures: IP 56 & 57

Release Type:
External side lever release with automatic reset

Through Shaft Capability: Yes

56500 Series

Same as 56000 Series with 182TC / 184TC mounting.

Construction:
Cast iron endplate with stamped steel housing
(Direct mount to 182TC / 184TC)

Available Enclosures:
IP 23, 54 & 55

Release Type:
External knob manual release with or without automatic reset

Through Shaft Capability: Yes (IP 23 only)

56900 Series

For use in severe environments found in process industries such as food, pulp and paper mills and chemical plants.

Construction: Stainless steel

Release Type:
Side lever with automatic reset

Available Enclosures: IP 56 & IP 57

Through Shaft Capability: with IP43 rating only

56700 Series

Units designed for industrial applications that fit between a standard C-Face motor and gear reducer. Can also be used to retrofit installed units without braking capability.

Construction: Die cast aluminum endplate and housing

Available Enclosures:
IP 23, 54, 55 & 56

Release Type: External knob release with automatic reset

C-face brake has output shaft

Also Available . . .

56100 Series

Full die cast aluminum endplate and housing with internal release lever

Available Enclosures:
IP 23, 56 & 57

56300 Series

Die cast aluminum endplate with stamped steel housing and external maintained release, IP 21

56400 Series

Cast iron endplate with stamped steel housing and external knob release

Available Enclosures:
IP 23 & 54

56600 Series

Cast iron endplate and housing with internal release lever

Available Enclosures: IP 23, 56 & 57

Series 56,000; 56,100; 56,200; 56,300; 56,400; 56,500; 56,600; 56,700; and 56,900
Mounting Face: NEMA 56C, 143TC and 145TC

Engineering Specifications

Maximum Solenoid Cycle Rate: ①

AC 36 cycles/min
DC 10 cycles/min

Thermal Capacity: ②

Horizontal 9 hp-sec/min *(112 watts)*
Vertical 6.5 hp-sec/min *(80 watts)*

① Maximum solenoid cycle rate is based on ambient temperature of 72°F *(22°C)* with 50% duty cycle.
Does not relate to brake cycle rate (see Thermal Capacity).

② Thermal capacity rating is based on ambient temperature of 72°F *(22°C)*, stop time of one second or less, with no heat absorbed from motor. Refer to *Selection Procedure* Section.

Brake set and release times in milliseconds, when brake and motor are switched separately (for T1/T2 definitions, see page 101):

Static Torque lb-ft	Coil Size	T1	T2
1.5 - 25	4, K4, K4+, M4+	25	14

Series 56,000; 56,100; 56,300; 56,500; and 56,700

Nominal Static Torque lb-ft *(Nm)*	Number of Friction Discs	Coil Size AC	Coil Size DC	Inertia (WK^2) lb-ft² *(kgm² x 10⁻⁴)*
1.5-3 *(2-4)*	1	4	4+	.008 *(3.36)*
6 *(8)*	1	K4	K4+	.008 *(3.36)*
10 *(14)*	2	K4	K4+	.014 *(5.88)*
15 *(20)*	2	K4+	M4+	.014 *(5.88)*
20 *(27)*	3	K4+	M4+	.020 *(8.40)*
25 *(34)*	3	M4+	P4+	.020 *(8.40)*

Series 56,200; 56,400; 56,600; and 56,900

Nominal Static Torque lb-ft *(Nm)*	No. of Friction discs	Coil Size AC	Coil Size DC	Inertia (WK^2) lb-ft² *(kgm² x 10⁻⁴)*
3-6 *(4-8)*	2	4	4+	.014 *(5.88)*
10 *(14)*	2	K4	K4+	.014 *(5.88)*
15 *(20)*	2	K4+	M4+	.014 *(5.88)*
20 *(27)*	3	K4+	M4+	.020 *(8.40)*
25 *(34)*	3	M4+	P4+	.020 *(8.40)*

Current Ratings (amperes)

Solenoid Coil Size*	AC Current	Voltage: 60 Hz 115	200	230	400	460	575	Voltage: 50 Hz 110	220	380	Voltage: DC 24	95	115	230
4	Inrush	3.6	2.1	1.8	1.1	.9	.7	4.1	2.1	.9	13.3	3.6	2.8	1.5
	Holding	.3	.2	.2	.08	.08	.06	.3	.2	.08	.3	*.1*	*.05*	*.03*
4+	Inrush	–	–	–	–	–	–	–	–	–	12.0	4.7	3.7	2.0
	Holding										*.4*	*.1*	*.08*	*.04*
K4	Inrush	4.3	2.5	2.2	1.3	1.1	.9	3.8	1.9	1.1	17.5	4.7	3.7	2.0
	Holding	*.3*	*.2*	*.2*	*.1*	*.08*	*.07*	*.4*	*.2*	*.08*	*.4*	*.1*	*.08*	*.04*
K4+	Inrush	4.6	2.5	2.3	1.2	1.0	.9	4.9	2.0	1.0	20.5	7.5	5.5	2.0
	Holding	*.4*	*.2*	*.2*	*.1*	*.1*	*.08*	*.4*	*.2*	*.1*	*.5*	*.1*	*.08*	*.04*
M4	Inrush	3.0	1.7	1.5	.9	.8	.6	–	–	.8	–	–	–	–
	Holding	*.6*	*.3*	*.3*	*.2*	*.1*	*.21*			*.1*				
M4+	Inrush	4.6	2.5	2.3	1.2	1.0	.9	4.1	2.0	1.3	30.3	7.9	5.5	2.0
	Holding	*.4*	*.2*	*.2*	*.1*	*.1*	*.08*	*.4*	*.2*	*.1*	*.5*	*.1*	*.1*	*.04*
P4+	Inrush	–	–	–	–	–	–	–	–	–	30.3	11.3	8.4	3.0
	Holding										*.5*	*.1*	*.08*	*.04*

Motor Frame Adapters: Series 56,000 through 56,600

WARNING! Before selecting an adapter to mount a brake on a larger motor frame, the torque and thermal capacity required by the application should be determined as shown in the "Selection Procedure" section. A larger motor may indicate a requirement for greater thermal capacity than the brake is designed for. The brake selection must be matched to the motor and application requirements, before use of an adapter is considered.

To Adapt to NEMA Frame Size	AK Dim. in. *(mm)*	Reg. No.	Brake Enclosure ①	Brake Torque	Adapter Stock Number	Additional Shaft Length Required in. *(mm)*
182TC 184TC 213TC 215TC 254TC 256TC	8.50 *(215.90)*	-9	IP 23	1.5-15	5-55-5041-00	.94 *(23.81)*
	8.50 *(215.90)*	-9	IP 54	1.5-6	5-55-5041-00	.94 *(23.81)*
	8.50 *(215.90)*	-9	IP 23	20 & 25	5-55-5043-00	.94 *(23.81)*
	8.50 *(215.90)*	-9	IP 54	10-25	5-55-5043-00	.94 *(23.81)*

① 56,300 Series have NEMA 1 enclosure. For adapter dimensions, see *Technical Data*

Ordering and Identification Information

The following example and tables provide information for selecting the appropriate three-letter suffix when ordering a Stearns Brake.

Example of a complete part number:

1-056-034-00-BFF
- Series
- Torque
- Enclosure
- Lead wire position (internal and external, left and right) standard
- 230 Vac
- 5/8 bore and 3/16 x 3/32 keyway

Hub Selection

Character	Bore (in.)	Keyway** (in. x in.)
A*	5/8	1/8 x 1/16
B	5/8	3/16 x 3/32
C	3/4	3/16 x 3/32
D	7/8	3/16 x 3/32
E	1-1/8	1/4 x 1/8
F*	1-1/4	1/4 x 1/8
K	1/2	1/8 x 1/16
L*	1	1/4 x 1/8
N*	9/16	1/8 x 1/16
O*	11/16	3/16 x 3/32
P*	1-1/16	1/4 x 1/8
R*	13/16	3/16 x 3/32
S*	15/16	1/4 x 1/8
Z	.460	pilot bore

Minimum bore is .500. Maximum allowable bore is 1.25 (maximum shaft length not to exceed end of hub). For through-shaft applications, .875 is maximum

*These bores are non-standard.

**Keyseats made to ANSI B17.1 Standard.

Standard AC Voltage Ratings

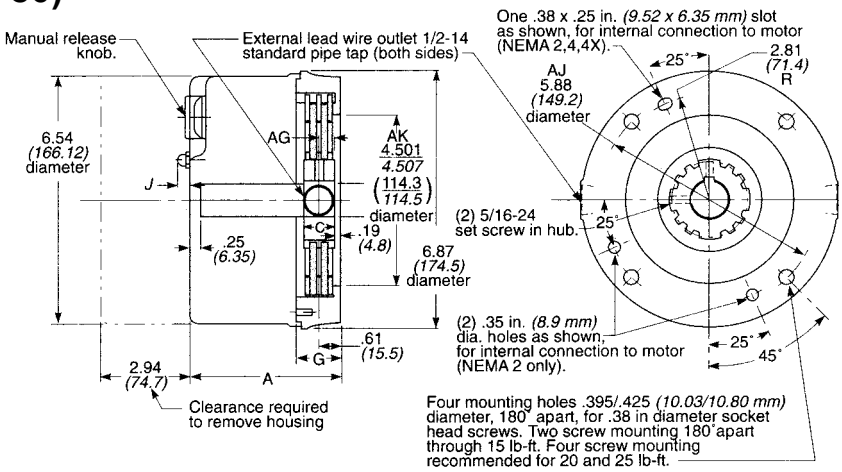
Character	Voltage	Hz
B	115	60
D	110	50
E	200	60
F	230 190	60 50
H	220	50
L	460 380	60 50
M	415	50
N	575	60
O	110/220	50
P	115/208-230	60
Q	208-230/460 190/380	60 50
R	200/400	60

Modifications are available- see SAB Modification Section

Dimensional Drawings are on the pages following.

Series 56,000 (1-056-0XX-00) & Series 56,000-80 (1-056-0XX-80)

Mounting Face: NEMA 56C, 143TC and 145TC
4.5” AK, 5.88” AJ



Dimensions for estimating only.
For installation purposes request certified prints.

Series 56,000

Nominal Static Torque lb-ft (Nm)	Enclosure	Basic Model Number
		AC
1.5 *(2)*	IP 23	1-056-001-00
	IP 54	1-056-002-00
	IP 55	1-056-004-00
3 *(4)*	IP 23	1-056-011-00
	IP 54	1-056-012-00
	IP 55	1-056-014-00
6 *(8)*	IP 23	1-056-021-00
	IP 54	1-056-022-00
	IP 55	1-056-024-00
10 *(14)*	IP 23	1-056-031-00
	IP 54	1-056-032-00
	IP 55	1-056-034-00
15 *(20)*	IP 23	1-056-041-00
	IP 54	1-056-042-00
	IP 55	1-056-044-00
20 *(27)*	IP 23	1-056-051-00
	IP 54	1-056-052-00
	IP 55	1-056-054-00
25 *(34)*	IP 23	1-056-061-00
	IP 54	1-056-062-00
	IP 55	1-056-064-00

Series 56,000-80*

Nominal Static Torque lb-ft (Nm)	Enclosure	Basic Model Number
		AC
1.5 *(2)*	IP 54	1-056-002-80*
3 *(4)*	IP 54	1-056-012-80*
6 *(8)*	IP 54	1-056-022-80*
10 *(14)*	IP 54	1-056-032-80*
15 *(20)*	IP 54	1-056-042-80*
20 *(27)*	IP 54	1-056-052-80*
25 *(34)*	IP 54	1-056-062-80*

*** 56,000-80 Series includes a C-face gasket only, no hub seal.**

Enclosure: Lightweight Steel Housing, Aluminum Endplate

Enclosure Protection: IP 23, 54 & 55
(formerly referred to by Stearns as NEMA 2, 4 & 4X* respectively)
(*BISSC certified)

Mounting: Fanguard mounted brakes requiring IP 54 or IP 55 protection may require additional sealing measures beyond seals provided with the brake. Refer to Installation & Service Instruction sheets.

Installation and Service: P/N 8-078-905-60

Parts List: P/N 8-078-906-00

Modifications: Pages 54-63

IP 23 Dimensions

Nominal Static Torque lb-ft (Nm)	Dimensions in Inches *(Dimensions in Millimeters)*					Wt lbs (Kg)
	A	AG	C Hub Width	G	J	
1.5 *(2)*	4.06 *(103.1)*	.52 *(13.2)*	.81 *(20.6)*	1.23 *(31.2)*	.31 *(7.9)*	8 *(3.6)*
3 *(4)*						8 *(3.6)*
6 *(8)*						8 *(3.6)*
10 *(14)*						8 *(3.6)*
15 *(20)*						8 *(3.6)*
20 *(27)*	4.50 *(114.3)*	.52 *(13.2)*	1.18 *(30.0)*	1.66 *(42.2)*	.31 *(7.9)*	9 *(4.0)*
25 *(34)*						9 *(4.0)*

IP 54 / 55 Dimensions

Nominal Static Torque lb-ft (Nm)	Dimensions in Inches *(Dimensions in Millimeters)*					Wt lbs (Kg)
	A	AG	C Hub Width	G	J	
1.5 *(2)*	4.06 *(103.1)*	.47 *(11.9)*	.81 *(20.6)*	1.21 *(30.7)*	.37 *(9.4)*	8 *(3.6)*
3 *(4)*						8 *(3.6)*
6 *(8)*						8 *(3.6)*
10 *(14)*	4.51 *(114.6)*	.59 *(15.0)*	1.18 *(30.0)*	1.66 *(42.2)*	.37 *(9.4)*	9 *(4.0)*
15 *(20)*						9 *(4.0)*
20 *(27)*						9 *(4.0)*
25 *(34)*						9 *(4.0)*

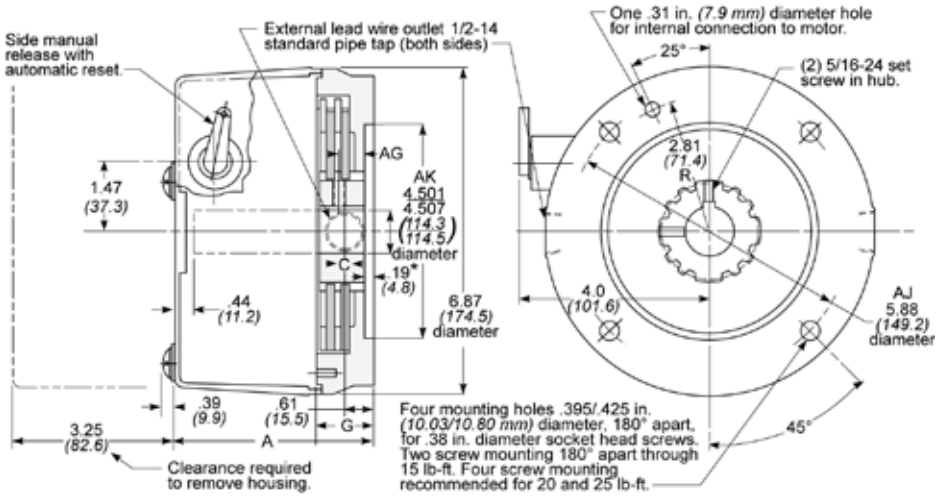
Series 56,200 (1-056-2XX) Cast Iron & Series 56,900 (1-056-9XX) Stainless Steel

Mounting Face: NEMA 56C, 143TC and 145TC

4.5” AK, 5.88” AJ

Installation and Service:
P/N 8-078-905-60

Modifications: Pages 54-63



Dimensions for estimating only. For installation purposes request certified prints.

56,200 Series: Heavy Duty Cast Iron Enclosure

Parts List: P/N 8-078-906-02

Enclosure:
IP 56 & 57 (formerly referred to by Stearns as NEMA Type 4X, BISSC Certified)

Mounting: Fanguard-mounted brakes requiring IP 56 or IP 57 protection may require additional sealing measures beyond seals provided with the brake - Refer to Installation & Service Instruction Sheets.

56,900 Series: Stainless Steel Enclosure

Parts List: P/N 8-078-906-09

Enclosure Protection:
IP 56 & 57 (formerly referred to by Stearns as NEMA Type 4X)

Mounting: Fanguard-mounted brakes requiring IP 56 or IP 57 protection may require additional sealing measures beyond seals provided with the brake - Refer to Installation & Service Instruction Sheets.

IP 56 / IP 57 Dimensions

Nominal Static Torque lb-ft (Nm)	Dimensions in Inches *(Dimensions in Millimeters)*				Wt lbs (Kg) 56,200	Wt lbs (Kg) 56,900
	A	AG	C Hub Width	G		
3 *(4)*	4.67 *(118.6)*	.59 *(15.0)*	1.18 *(30.0)*	1.66 *(42.2)*	17 *(7.7)*	17 *(7.7)*
6 *(8)*					17 *(7.7)*	17 *(7.7)*
10 *(14)*					18 *(8.0)*	17 *(7.7)*
15 *(20)*					18 *(8.0)*	17 *(7.7)*
20 *(27)*					21 *(9.5)*	21 *(9.5)*
25 *(34)*					21 *(9.5)*	21 *(9.5)*

Series 56,900

Nominal Static Torque lb-ft (Nm)	Enclosure	Basic Model Number
		AC
3 *(4)*	IP 57	1-056-914-00
6 *(8)*	IP 57	1-056-924-00
10 *(14)*	IP 57	1-056-934-00
15 *(20)*	IP 57	1-056-944-00
20 *(27)*	IP 57	1-056-954-00
25 *(34)*	IP 57	1-056-964-00

Series 56,200

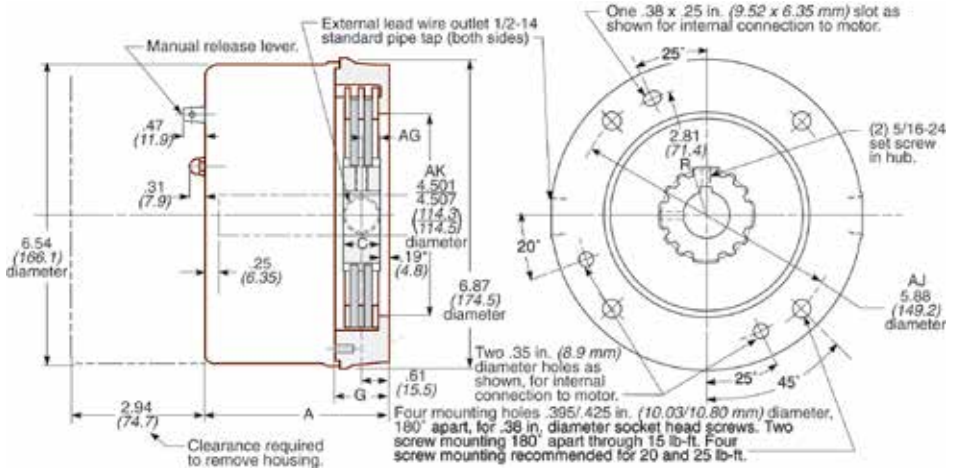
Nominal Static Torque lb-ft (Nm)	Enclosure	Basic Model Number
		AC
3 *(4)*	IP 56	1-056-212-00
	IP 57	1-056-214-00
6 *(8)*	IP 56	1-056-222-00
	IP 57	1-056-224-00
10 *(14)*	IP 56	1-056-232-00
	IP 57	1-056-234-00
15 *(20)*	IP 56	1-056-242-00
	IP 57	1-056-244-00
20 *(27)*	IP 56	1-056-252-00
	IP 57	1-056-254-00
25 *(34)*	IP 56	1-056-262-00
	IP 57	1-056-264-00

Series 56,300 (1-056-3XX)

Mounting Face: NEMA 56C, 143TC and 145TC , 4.5” AK, 5.88” AJ

56,300 Series Enclosure: IP 21 (formerly referred to by Stearns as NEMA 1), Stamped steel housing, cast aluminum endplate
Release Type: Lever, maintained
Parts List: P/N 8-078-906-03

Installation and Service: P/N 8-078-905-60



Series 56,300

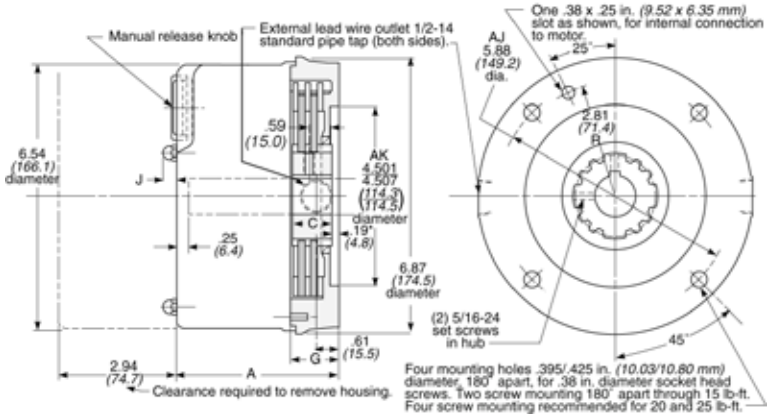
Nominal Static Torque lb-ft (Nm)	Basic Model Number
	AC
1.5 *(2)*	1-056-301-00
3 *(4)*	1-056-311-00
6 *(8)*	1-056-321-00
10 *(14)*	1-056-331-00
15 *(20)*	1-056-341-00
20 *(27)*	1-056-351-00
25 *(34)*	1-056-361-00

IP 21 Dimensions

Nominal Static Torque lb-ft (Nm)	Dimensions in Inches *(Dimensions in Millimeters)*				Wt lbs (Kg)
	A	AG	C Hub Width	G	
1.5 *(2)*	4.01 *(101.9)*	.59 *(15.0)*	.81 *(20.6)*	1.21 *(30.7)*	8 *(3.6)*
3 *(4)*					8 *(3.6)*
6 *(8)*					8 *(3.6)*
10 *(14)*					8 *(3.6)*
15 *(20)*					8 *(3.6)*
20 *(27)*	4.46 *(113.3)*	.59 *(15.0)*	1.18 *(30.0)*	1.66 *(42.2)*	9 *(4.0)*
25 *(34)*					9 *(4.0)*

Series 56,400 (1-056-4XX)

56,400 Series: Stamped steel housing, cast iron endplate.
Enclosure Protection: IP 23 & 54 (formerly referred to by Stearns as NEMA 2 & 4 respectively)
Release Type: Knob, maintained
Mounting: Fanguard-mounted brakes requiring IP 54 protection may require additional sealing measures beyond seals provided with the brake - Refer to Installation & Service Instruction sheets
Parts List: P/N 8-078-906-04
Installation and Service: P/N 8-078-905-60



Series 56,400

Nominal Static Torque lb-ft (Nm)	Enclosure	Basic Model Number
		AC
3 *(4)*	IP 23	1-056-411-00
	IP 54	1-056-412-00
6 *(8)*	IP 23	1-056-421-00
	IP 54	1-056-422-00
10 *(14)*	IP 23	1-056-431-00
	IP 54	1-056-432-00
15 *(20)*	IP 23	1-056-441-00
	IP 54	1-056-442-00
20 *(27)*	IP 23	1-056-451-00
	IP 54	1-056-452-00
25 *(34)*	IP 23	1-056-461-00
	IP 54	1-056-462-00

IP 23 Dimensions

Nominal Static Torque lb-ft (Nm)	Dimensions in Inches *(mm)*			Wt lbs (Kg)
	A	C Hub Width	G	
3 *(4)*	4.46 *(113.3)*	1.18 *(30.0)*	1.66 *(42.2)*	11 *(5.0)*
6 *(8)*				11 *(5.0)*
10 *(14)*				11 *(5.0)*
15 *(20)*				12 *(5.5)*
20 *(27)*				12 *(5.5)*
25 *(34)*				13 *(6.0)*

IP 54 Dimensions

Nominal Static Torque lb-ft (Nm)	Dimensions in Inches *(mm)*			Wt lbs (Kg)
	A	C Hub Width	G	
3 *(4)*	4.51 *(114.6)*	1.18 *(30.0)*	1.66 *(42.2)*	12 *(5.5)*
6 *(8)*				12 *(5.5)*
10 *(14)*				12 *(5.5)*
15 *(20)*				13 *(6.0)*
20 *(27)*				13 *(6.0)*
25 *(34)*				13 *(6.0)*

Series 56,100 (1-056-1XX) Die Cast Aluminum & Series 56,600 (1-056-6XX) Cast Iron

Mounting Face: NEMA 56C, 143TC and 145TC , 4.5” AK, 5.88” AJ

Release Type: Internal Lever, Non-Maintained

Installation and Service: P/N 8-078-905-60

Modifications: Pages 54-63

Enclosure Protection: IP 23; 56 & 57 (formerly referred to by Stearns as NEMA 2, 4 & 4X respectively)

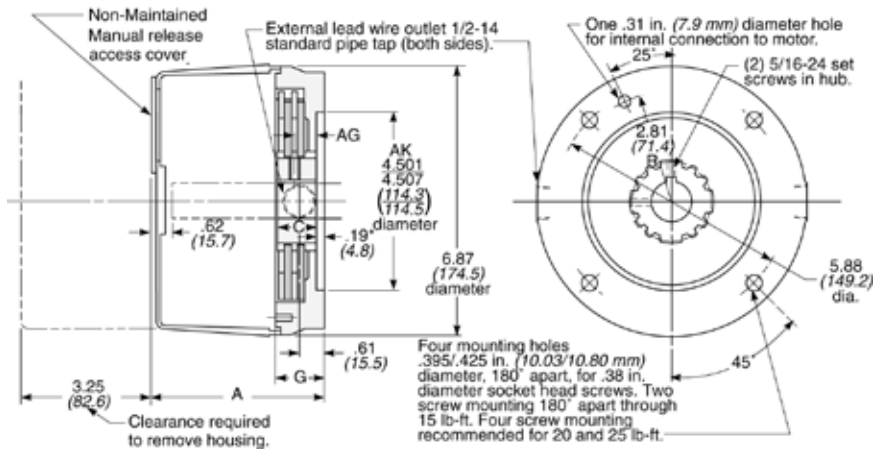
Visual Wear Indicator

Mounting: Fanguard-mounted brakes requiring IP 56 or IP 57 protection may require additional sealing measures beyond seals provided with the brake - Refer to Installation & Service Instruction sheets

56,100 Series: Die Cast aluminum enclosure
Parts List: P/N 8-078-906-01

56,600 Series: Cast iron enclosure

Parts List: P/N 8-078-906-06



Series 56,100 Dimensions

Nominal Static Torque lb-ft (Nm)	Enclosure	Dimensions in Inches (mm)				Wt lbs (Kg)
		A	AG	C Hub Width	G	
1.5-15 *(2-20)*	IP 23	4.41 *(112.0)*	.59 *(15.0)*	.81 *(20.6)*	1.21 *(30.7)*	8 *(3.6)*
20-25 *(27-34)*		4.86 *(123.4)*		1.18 *(30.0)*	1.66 *(42.2)*	10 *(4.5)*
1.5-6 *(2-8)*	IP 56/57	4.50 *(114.3)*	.47 *(11.9)*	.81 *(20.6)*	1.21 *(30.7)*	8 *(3.6)*
10-25 *(14-34)*		4.95 *(125.7)*	.59 *(15.0)*	1.18 *(30.0)*	1.66 *(42.2)*	10 *(4.5)*

Series 56,600 Dimensions

Nominal Static Torque lb-ft (Nm)	Enclosure	Dimensions in Inches (mm)				Wt lbs (Kg)
		A	AG	C Hub Width	G	
3-25 *(4-34)*	IP 23	4.95 *(125.7)*	.59 *(15.0)*	1.18 *(30.0)*	1.66 *(42.2)*	21 *(9.5)*
3-25 *(4-34)*	IP 56/57	5.05 *(128.3)*				

Series 56,100

Nominal Static Torque lb-ft (Nm)	Enclosure	Basic Model Number
		AC
1.5 *(2)*	IP 23	1-056-101-00
	IP 56	1-056-102-00
	IP 57	1-056-104-00
3 *(4)*	IP 23	1-056-111-00
	IP 56	1-056-112-00
	IP 57	1-056-114-00
6 *(8)*	IP 23	1-056-121-00
	IP 56	1-056-122-00
	IP 57	1-056-124-00
10 *(14)*	IP 23	1-056-131-00
	IP 56	1-056-132-00
	IP 57	1-056-134-00
15 *(20)*	IP 23	1-056-141-00
	IP 56	1-056-142-00
	IP 57	1-056-144-00
20 *(27)*	IP 23	1-056-151-00
	IP 56	1-056-152-00
	IP 57	1-056-154-00
25 *(34)*	IP 23	1-056-161-00
	IP 56	1-056-162-00
	IP 57	1-056-164-00

Series 56,600

Nominal Static Torque lb-ft (Nm)	Enclosure	Basic Model Number
		AC
3 *(4)*	IP 23	1-056-611-00
	IP 56	1-056-612-00
	IP 57	1-056-614-00
6 *(8)*	IP 23	1-056-621-00
	IP 56	1-056-622-00
	IP 57	1-056-624-00
10 *(14)*	IP 23	1-056-631-00
	IP 56	1-056-632-00
	IP 57	1-056-634-00
15 *(20)*	IP 23	1-056-641-00
	IP 56	1-056-642-00
	IP 57	1-056-644-00
20 *(27)*	IP 23	1-056-651-00
	IP 56	1-056-652-00
	IP 57	1-056-654-00
25 *(34)*	IP 23	1-056-661-00
	IP 56	1-056-662-00
	IP 57	1-056-664-00

Series 56,500 (1-056-5XX)

Mounting Face: NEMA 182TC and 184TC
8.5” AK, 7.25” AJ

Enclosure Material: Stamped Steel Housing, Cast Iron Endplate

Enclosure Protection: IP 23, 54 & 55 (formerly referred to by Stearns as NEMA 2, 4 & 4X*) * BISSC Certified

Release Type: Knob, Maintained with Automatic Reset

Mounting: Fanguard-mounted brakes requiring IP 54 or IP 55 protection may require additional sealing measures beyond seals provided with the brake - Refer to Installation & Service Instruction sheets.

Installation and Service:
P/N 8-078-905-60

Parts List: P/N 8-078-906-05

Modifications: Pages 54-63

* Hub location.

Dimensions for estimating only. For installation purposes request certified prints.

IP 23 Dimensions

Nominal Static Torque lb-ft (Nm)	Dimensions in Inches *(Dimensions in Millimeters)*			Wt lbs (Kg)
	A	C Hub Width	J	
10 *(14)*	4.46 *(113.3)*	.81 *(20.6)*	.31 *(7.9)*	14 *(6.4)*
15 *(20)*				14 *(6.4)*
20 *(27)*				14 *(6.4)*
25 *(34)*				15 *(6.8)*

IP 54 / 55 Dimensions

Nominal Static Torque lb-ft (Nm)	Dimensions in Inches *(Dimensions in Millimeters)*			Wt lbs (Kg)
	A	C Hub Width	J	
10 *(14)*	4.51 *(114.6)*	1.18 *(30.0)*	.37 *(9.4)*	14 *(6.4)*
15 *(20)*				14 *(6.4)*
20 *(27)*				15 *(6.8)*
25 *(34)*				15 *(6.8)*

Series 56,500

Nominal Static Torque lb-ft (Nm)	Enclosure	Basic Model Number
		AC
10 *(14)*	IP 23	1-056-531-00
	IP 54	1-056-532-00
	IP 55	1-056-534-00
15 *(20)*	IP 23	1-056-541-00
	IP 54	1-056-542-00
	IP 55	1-056-544-00
20 *(27)*	IP 23	1-056-551-00
	IP 54	1-056-552-00
	IP 55	1-056-554-00
25 *(34)*	IP 23	1-056-561-00
	IP 54	1-056-562-00
	IP 55	1-056-564-00

Series 87,000 and 87,100
Mounting Face: NEMA 182TC - 256TC/UC

The 87,X00** Series have the following design features:

- Self-Adjusting Design
- Splined Hub
- Lead Wire Length: 24 inches
- Maximum Speed:
  Horizontal 4000 rpm
  Vertical 3600 rpm (modification required for vertical mounting), see SAB Modification Section.
- Coil Insulation: Standard Class B Optional Class H (Class H standard on 87,800)
- Certified: CSA File LR-6254
- ABS Type Approval Certified

** Does not include 87,300 and 87,700 Series brakes.

Engineering Specifications

Nominal Static Torque lb-ft (Nm)	No. of Friction Discs	Coil Size	Maximum Solenoid Cycle Rate① Cycles/min	Thermal Capacity② hp-sec/min (watts)	Inertia (Wk²) lb-ft² (kgm² x 10⁻⁴) 87,000	87,100	87,700
6 (8)	1	5	30	17.5 (218)	.048 (20.34)	—	—
10 (14)	1	5	30	17.5 (218)	.048 (20.34)	—	.078 (32.76)
15 (20)	1	6	25	17.5 (218)	.048 (20.34)	—	.078 (32.76)
25 (34)	1	6	25	17.5 (218)	.048 (20.34)	—	.078 (32.76)
35 (47)	1	8	20	17.5 (218)	.048 (20.34)	—	.078 (32.76)
50 (68)	2	6	25	17.5 (218)	.089 (37.40)	.089 (37.40)	.108 (45.36)
75 (102)	2	8	20	17.5 (218)	.089 (37.40)	.089 (37.40)	.108 (45.36)
105 (142)	3	8	20	17.5 (218)	.129 (54.45)	.129 (54.45)	.145 (60.90)
125 (169)	3	8	20	20.0 (248)	—	.129 (54.45)	—

① Maximum solenoid cycle rate is based on ambient temperature of 72°F *(22°C)* with 50% duty cycle. Does not relate to brake cycle rate (see *Thermal Capacity*).

② Thermal capacity rating is based on ambient temperature of 72°F *(22°C)*, stop time of one second or less, with no heat absorbed from motor. Derate thermal capacity by 25% for vertical mounting. Refer to *Selection Procedure* Section.
87,800 Thermal capacity is 14 hp-sec/min (174 watts).

Current Ratings (amperes)

Solenoid Coil Size	AC Current	Voltage: 60 Hz 115	200	230	400	460	575	Voltage: 50 Hz 110	220	380	Voltage: DC 24	95	115	230
5	inrush	7.5	4.3	3.7	2.2	1.9	1.5	5.4	4.0	1.9	38.0	8.4	5.6	3.2
	holding	.5	.3	.2	.1	.1	.09	.3	.3	.1	.5	.1	.08	.04
6	inrush	13.0	7.5	6.5	3.7	3.2	2.6	9.4	5.6	3.2	42.8	11.7	8.5	3.7
	holding	.6	.4	.3	.2	.2	.1	.5	.3	.2	.61	.16	.13	.06
8	inrush	17.6	10.3	8.8	5.0	4.2	3.5	15.4	7.7	4.2	43.1	11.4	9.3	4.6
	holding	1.2	.7	.6	.3	.3	.3	1.0	.5	.3	.8	.2	.2	.09

Motor Frame Adapters/Special Endplate

To Adapt to NEMA Frame Size	in. (mm)	Reg. No.	Adapter Stock Number	Additional Shaft Length Required in. (mm)
56C, 143TC, or 145TC 182TFC, 184TFC	4.50 (114.30)	-05	Brake endplate is modified for 4.50 in AK	— (—)
			5-55-7043-00	.56 (14.22)
284TC 286TC	10.50 (266.70)	-11	5-55-7055-00	.81 (20.64)
metric	—	-10	Endplate modified for 130mm register (AK) & 165mm bolt circle (AJ).	—
324TC, 326TC, 364TC, 365TC, 404TC or 405TC	12.50 (317.50)	-13	5-55-7046-00	.88 (22.22)
	—	-07	Endplate modified to provide a 6.75" male register (AK) and 7.19" bolt circle (AJ).	
182TC/184TC, 213TC, 215TC, 254TC/256TC	8.5 (215.90)	-03	Extended endplate.	.625 (15,88)

For motor frame adapters: Series 87,000 through 87,800 see Technical Data

Ordering and Identification Information

The following example and tables provide information for selecting the appropriate three-letter suffix when ordering a Stearns Brake.

Example of a complete part number:

1-087-031-00-BFF
- Series
- Torque
- Enclosure
- Modification
- Lead wire position (internal and external, left and right)
- 230 Vac
- 5/8 bore and 3/16 x 3/32 keyway Endplate

Hub Selection

Character	Bore (in.)	Keyway** (in. x in.)
A*	5/8	1/8 x 1/16
B*	5/8	3/16 x 3/32
C*	3/4	3/16 x 3/32
D	7/8	3/16 x 3/32
E	1-1/8	1/4 x 1/8
F	1-1/4	1/4 x 1/8
G	1-3/8	5/16 x 5/32
H	1-5/8	3/8 x 3/16
I*	1-3/4	3/8 x 3/16
J*	1-7/8	1/2 x 1/4
K*	1/2	1/8 x 1/16
L*	1	1/4 x 1/8
M*	1-1/2	3/8 x 3/16
N*	9/16	1/8 x 1/16
O*	11/16	3/16 x 3/32
P*	1-1/16	1/4 x 1/8
Q*	1-7/16	3/8 x 3/16
R*	13/16	3/16 x 3/32
S*	15/16	1/4 x 1/8
T*	1-3/16	1/4 x 1/8
U*	1-5/16	5/16 x 5/32
Z	.600	pilot bore

Maximum allowable bore 1.875 (maximum shaft length not to exceed end of hub).
For thru-shaft applications 1.625 is maximum.

*These bores are non-standard.

**Keyseats made to ANSI B17.1 standard.

Standard AC Voltage Ratings

Character	Voltage	Hz
B	115	60
D	110	50
E	200	60
F	230 190	60 50
H	220	50
L	460 380	60 50
M	415	50
N	575	60
O	110/220	50
P	115/230	60
Q	230/460 190/380	60 50
R	200/400	60

Modifications are available-
see SAB Modification Section

Dimensional drawings are on the pages following.

Series 87,000

Mounting Face: NEMA 182TC 184TC, 213TC, 215TC, 254TC, and 256TC (Note: for 182TFC and 184TFC mounting, add a -05- register)

8.5” AK, 7.25” AJ

Static Torque: 6 through 105 lb-ft

Enclosure Material: IP 23 - Sheet Metal Housing, Aluminum Endplate. IP 54 & 55 - Cast Iron Housing and Endplate. IP 54 & 55 also available in sheet metal housing, aluminum endplate. IP 56 - Cast iron housing and endplate.

Enclosure Protection: IP 23, 54 55 (formerly referred to as NEMA 2, 4 & 4X* respectively) & IP 56. *BISSC Certified

Release Type: Pull Release Knob, maintained with automatic reset. Vertical above IP 54 & 55 supplied with side manual release lever; and all Cast Iron IP 55 brakes supplied with side manual release lever.

Installation, Service and Parts List: P/N 8-078-928-01 *Rev. B brakes*

Mounting: Horizontal, unless modified for vertical. Vertical mounting is defined as 15° or more from horizontal. Vertical above requires modification. Vertical below requires modification on 50-105 lb-ft brakes. Vertical above IP 54/55 includes side manual release. See SAB Modification Section

Fanguard-mounted brakes requiring IP 54 or IP 55 protection may require additional sealing measures beyond seals provided with the brake - Refer to Installation & Service Instruction sheets.

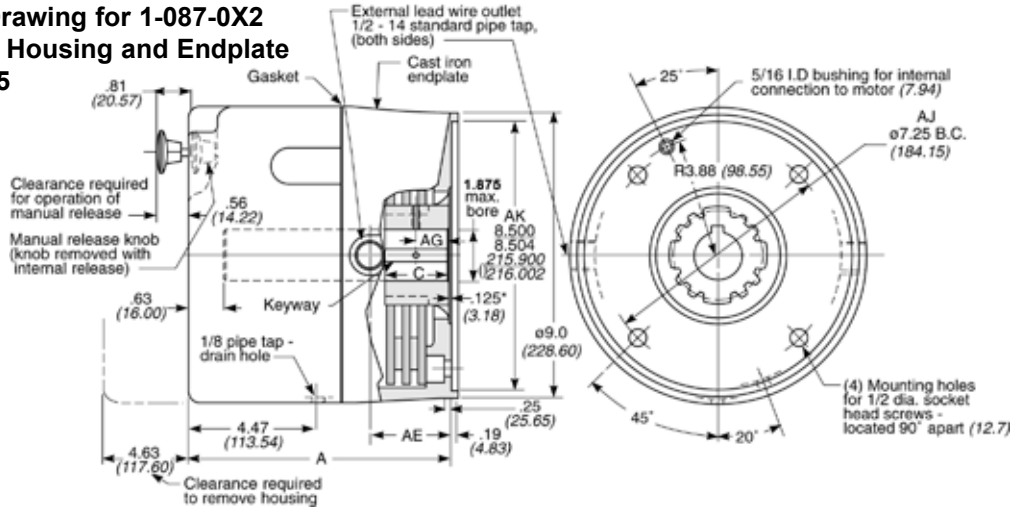
Specifications including bore sizes/voltages: Page 17

Modifications: Pages 54-63 Including New Manual Adjust Option

Brake set and release times in milliseconds, when brake and motor are switched separately (for T1/T2 definitions, see page 101):

Static Torque	Coil Size	T1	T2
10, 15, 25, 50	5 & 6	42	20
35, 75, 105	8	48	20

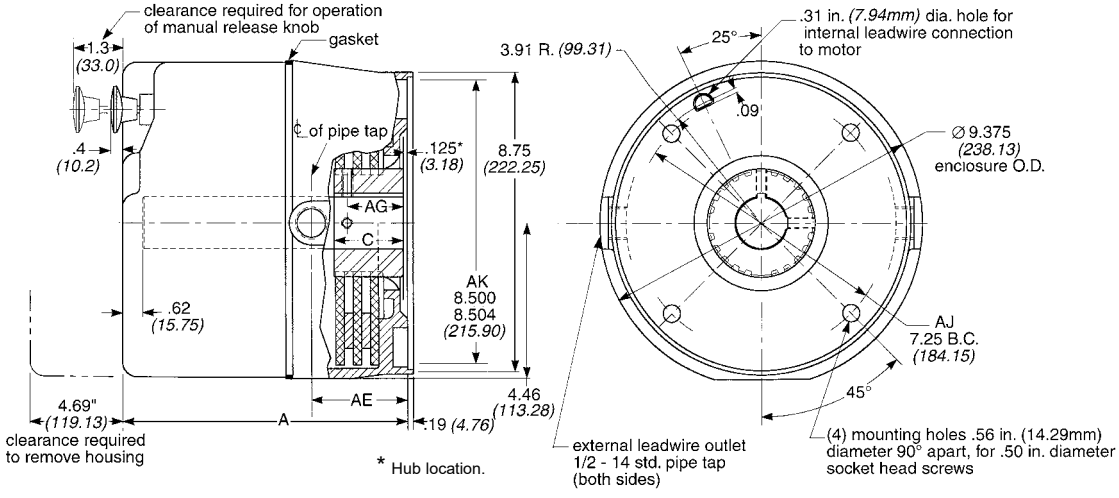
Outline Drawing for 1-087-0X2 Cast Iron Housing and Endplate IP 54 & 55



* Hub location.

Dimensions for estimating only. For installation purposes request certified prints.

Outline Drawing for 1-087-0X1 and 1-087-0X4 Sheet Metal Housing, Aluminum Endplate IP 23, 54 & 55



* Hub location.

Series 87,000 Dimensional Data

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IP 23 Enclosure - aluminum & steel

Nominal Static Torque lb-ft (Nm)	Basic Model Number	Dimensions in Inches *(Dimensions in Millimeters)*				Wt. lbs (kg)**	Discount Symbol
	AC	A	AE	AG	C Hub Width		
6 *(8)*	1-087-001-00	7.38 *(187.32)*	1.81 *(46.04)*	.68 *(17.29)*	1.00 *(25.40)*	20 *(9.0)*	B2
10 *(14)*	1-087-011-00					20 *(9.0)*	B2
15 *(20)*	1-087-021-00					22 *(10.0)*	B2
25 *(34)*	1-087-031-00					22 *(10.0)*	B3
35 *(47)*	1-087-041-00					24 *(11.0)*	B3
50 *(68)*	1-087-051-00	7.88 *(200.02)*	2.31 *(58.74)*	.97 *(24.64)*	1.50 *(38.10)*	22 *(10.0)*	B3
75 *(102)*	1-087-061-00					27 *(12.2)*	B3
105 *(142)*	1-087-081-00	8.38 *(212.72)*	2.81 *(71.44)*	.97 *(24.64)*	2.00 *(50.80)*	33 *(15.0)*	B3

IP 54 and IP 55 Enclosure - CAST IRON

Nominal Static Torque lb-ft (Nm)	Enclosure	Basic Model Number	Dimensions in Inches *(Dimensions in Millimeters)*				Wt. lbs (kg)**	Discount Symbol
		AC	A	AE	AG	C Hub Width		
6 *(8)*	IP 54 IP 55	1-087-002-00 1-087-002-B0	7.56 *(192.09)*	1.81 *(46.04)*	.68 *(17.29)*	1.00 *(25.40)*	44 *(20.0)*	B2
10 *(14)*	IP 54 IP 55	1-087-012-00 1-087-012-B0					44 *(20.0)*	B2
15 *(20)*	IP 54 IP 55	1-087-022-00 1-087-022-B0					46 *(21.0)*	B2
25 *(34)*	IP 54 IP 55	1-087-032-00 1-087-032-B0					46 *(21.0)*	B3
35 *(47)*	IP 54 IP 55	1-087-042-00 1-087-042-B0					48 *(21.7)*	B3
50 *(68)*	IP 54 IP 55	1-087-052-00 1-087-052-B0	8.06 *(204.79)*	2.31 *(58.74)*	.97 *(24.64)*	1.50 *(38.10)*	51 *(23.0)*	B3
75 *(102)*	IP 54 IP 55	1-087-062-00 1-087-062-B0					52 *(24.0)*	B3
105*(142)*	IP 54 IP 55	1-087-082-00 1-087-082-B0	8.56 *(217.49)*	2.81 *(71.44)*	.97 *(24.64)*	2.00 *(50.80)*	56 *(25.4)*	B3
125[1] *(169)*	IP 54 IP 55	1-087-092-00 1-087-092-B0	8.56 *(217.49)*	2.81 *(71.44)*	.97 *(24.64)*	2.00 *(50.80)*	56 *(25.4)*	B3

IP 54 and IP 55 Enclosure - Lightweight ALUMINUM & STEEL

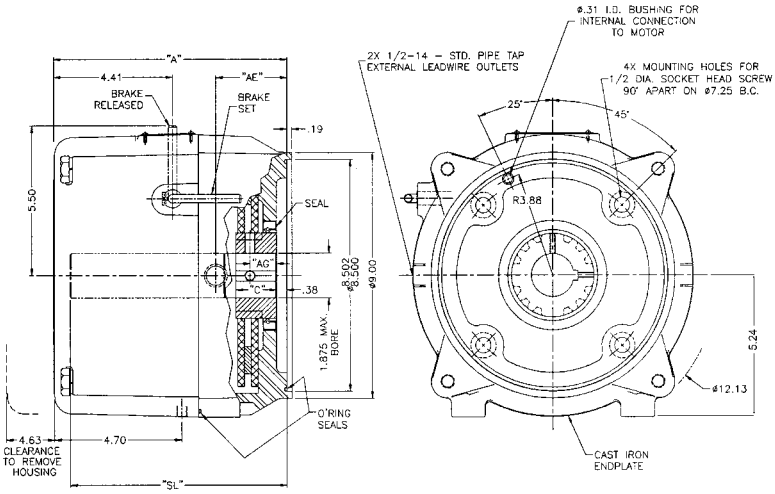
Nominal Static Torque lb-ft (Nm)	Enclosure	Basic Model Number	Dimensions in Inches *(Dimensions in Millimeters)*				Wt. lbs (kg)**	Discount Symbol
		AC	A	AE	AG	C Hub Width		
6 *(8)*	IP 54 IP 55	1-087-004-00 1-087-004-B0	7.43 *(188.59)*	1.81 *(46.04)*	.68 *(17.29)*	1.00 *(25.40)*	19 *(8.6)*	B2
10 *(14)*	IP 54 IP 55	1-087-014-00 1-087-014-B0					19 *(8.6)*	B2
15 *(20)*	IP 54 IP 55	1-087-024-00 1-087-024-B0					20 *(9.0)*	B2
25 *(34)*	IP 54 IP 55	1-087-034-00 1-087-034-B0					20 *(9.0)*	B3
35 *(47)*	IP 54 IP 55	1-087-044-00 1-087-044-B0					22 *(10.0)*	B3
50 *(68)*	IP 54 IP 55	1-087-054-00 1-087-054-B0	7.93 *(201.28)*	2.31 *(58.74)*	.97 *(24.64)*	1.50 *(38.10)*	23 *(10.4)*	B3
75 *(102)*	IP 54 IP 55	1-087-064-00 1-087-064-B0					23 *(10.4)*	B3
105 *(142)*	IP 54 IP 55	1-087-084-00 1-087-084-B0	8.43 *(213.97)*	2.81 *(71.44)*	.97 *(24.64)*	2.00 *(50.80)*	24 *(11.0)*	B3

** Foot mounting adds 7 lbs. (3.2 kg) to weight.

[1] These model numbers and list prices include non-standard friction discs. For high inertia or overhauling loads, it is recommended that 81,000 or 82,000 series brakes be used, as these brakes have substantially higher thermal capacities (50% higher for 81,000 series and 150% higher for 82,000 series).

Series 87,000

Enclosure Protection: IP 56
Enclosure Material: Cast Iron Housing & Endplate



Dimensional Data

Nominal Static Torque lb-ft *(Nm)*	Basic Model Number		Dimensions in Inches *(Dimensions in Millimeters)*					
	Enclosure	AC	A	C	AG	AE	SL	
							min	max[1]
25 *(34)*	IP 56	1-087-030-00	8.63	1.50	0.97	2.63	1.88	8.00
35 *(47)*	IP 56	1-087-040-00	8.63	1.50	0.97	2.63	1.88	8.00
50 *(68)*	IP 56	1-087-050-00	8.63	1.50	0.97	2.63	1.88	8.00
75 *(102)*	IP 56	1-087-060-00	8.63	1.50	0.97	2.63	1.88	8.00
105 *(142)*	IP 56	1-087-080-00	9.13	2.00	0.97	3.13	2.38	8.50

[1] SL max for 1.875" max dia. shaft = 2.32" for 50 & 75 lb-ft brakes, & 2.82" for 105 lb-ft brake

Specifications

Nominal Static Torque lb-ft *(Nm)*	No. of Friction Discs	Coil Size	Maximum Solenoid Cycle Rate cycles/min	Thermal Capacity [2] hp-sec/min *(watts)*	Inertia (Wk^2) $lb\text{-}ft^2$ *($kgm^2 \times 10^{-4}$)*	Wt. Lbs *(kg)***
25 *(34)*	2	6	25	17.5 *(21.8)*	.089 *(37.40)*	75 *(34)*
35 *(47)*	2	6	25	17.5 *(21.8)*	.089 *(37.40)*	75 *(34)*
50 *(68)*	2	6	25	17.5 *(21.8)*	.089 *(37.40)*	75 *(34)*
75 *(102)*	2	8	20	17.5 *(21.8)*	.089 *(37.40)*	76 *(34.5)*
105 *(142)*	3	8	20	17.5 *(21.8)*	.129 *(54.45)*	80 *(36.3)*

Series 87,100 (1-087-1XX)
Mounting Face: NEMA 284TC, 284UC, 286TC and 286UC
10.5” AK, 9.0” AJ

Static Torque: 50 through 125 lb-ft

Enclosure Material: IP 23 - Sheet Metal Housing, Cast Iron Endplate. IP 54 - Cast Iron Housing and Endplate

Release Type: Knob, maintained with automatic reset. Vertical above IP 54 supplied with side release lever.

Enclosure Protection: IP 23 & 54 (formerly referred to by Stearns as NEMA Type 2 & 4, respectively.

Installation, Service and Parts List: P/N 8-078-928-01 *Rev. B brakes*

Mounting: Horizontal, unless modified for vertical. Vertical mounting is defined as 15° or more from horizontal. Vertical above and vertical below require modification. Vertical above NEMA 4/4X includes side manual release. See SAB Modification Section for detail.

Fanguard mounted brakes requiring IP 54 protection may require additional sealing measures beyond seals provided with the brake - Refer to Installation and Service Instruction sheets.

Specifications including bore sizes/voltages: Page 17

Modifications: Pages 54-63 Including New Manual Adjust Option

Brake set and release times in milliseconds, when brake and motor are switched separately (for T1/T2 definitions, see page 101):

Static Torque	Coil Size	T1	T2
50	6	42	20
35, 75, 105, 125	8	48	20

* Hub location

Dimensions for estimating only. For installation purposes request certified prints.

Dimensional Data

Nominal Static Torque (lb-ft) (Nm)	Enclosure	Basic Model Number	Dimensions in Inches (Dimensions in Millimeters)				Wt. lbs *(kg)*
		AC	A	AE	AG	C	
50	IP 23	1-087-151-00	7.75 *(196.85)*	2.19 *(55.56)*	.97 *(24.64)*	1.50 *(38.10)*	40 *(18.0)*
50	IP 54	1-087-152-00	7.94 *(201.68)*	2.19 *(55.56)*	.97 *(24.64)*	1.50 *(38.10)*	53 *(24.0)*
75	IP 23	1-087-161-00	7.75 *(196.85)*	2.19 *(55.56)*	.97 *(24.64)*	1.50 *(38.10)*	44 *(20.0)*
75	IP 54	1-087-162-00	7.94 *(201.68)*	2.19 *(55.56)*	.97 *(24.64)*	1.50 *(38.10)*	52 *(23.6)*
105	IP 23	1-087-181-00	8.25 *(209.55)*	2.69 *(68.26)*	.97 *(24.64)*	2.00 *(50.80)*	46 *(19.0)*
105	IP 54	1-087-182-00	8.44 *(214.31)*	2.69 *(68.26)*	.97 *(24.64)*	2.00 *(50.80)*	58 *(26.3)*
125[1]	IP 23	1-087-191-00	8.25 *(209.55)*	2.69 *(68.26)*	.97 *(24.64)*	2.00 *(50.80)*	46 *(19.0)*
125[1]	IP 54	1-087-192-00	8.44 *(214.31)*	2.69 *(68.26)*	.97 *(24.64)*	2.00 *(50.80)*	58 *(26.3)*

[1] These model numbers include non-standard friction discs. For high inertia or overhauling loads, it is recommended that 81,000 or 82,000 series brakes be used, as these brakes have substantially higher thermal capacities (50% higher for 81,000 series and 150% higher for 82,000 series).

Series 81,000 and 82,000

Mounting Face NEMA 324 and 326TC, TSC, UC or USC, NEMA 364 and 365TC, TSC, UC or USC NEMA 404 and 405 TC, TSC, UC or USC

81,000 Series Specifications

Nominal Static Torque lb-ft *(Nm)*	No. of Friction Discs	Coil Size	Maximum Solenoid Cycle Rate① cycles/min	Thermal Capacity② hp-sec/min *(watts)*	Inertia (Wk^2) lb-ft² ($kgm^2 \times 10^{-3}$)
125 *(169)*	2	9	15	30 *(373)*	.192 *(8.06)*
175 *(237)*	2	9	15	30 *(373)*	.192 *(8.06)*
230 *(312)*	3	9	15	30 *(373)*	.280 (11.76)

82,000 Series Specifications

Nominal Static Torque lb-ft *(Nm)*	No. of Friction Discs	Coil Size AC	Coil Size DC	Maximum Solenoid Cycle Rate① cycles/min AC	Maximum Solenoid Cycle Rate① cycles/min DC	Thermal Capacity② hp-sec/min *(watts)*	Inertia (Wk^2) lb-ft² ($kgm^2 \times 10^{-3}$)
125 (169)	2	9	9	15	15	50 (621)	.490 (20.58)
175 (237)	2	9	9	15	15	50 (621)	.490 (20.58)
230 (312)	3	9	9	15	15	50 (621)	.704 (29.57)
330 (447)	3	K9	9	13	15	50 (621)	.704 (29.57)
440 (597)	4	K9	9	13	15	50 (621)	.918 (38.56)

① Maximum solenoid cycle rate is based on ambient temperature of 72°F *(22°C)* with 50% duty cycle. Does not relate to brake cycle rate (see Thermal Capacity).

② Thermal capacity rating is based on ambient temperature of 72°F *(22°C)* stop time of one second or less, with no heat absorbed from motor. Refer to "Selection Procedure" Section. Derate thermal capacity by 25% for vertical mounting.

Current Ratings (amperes)

Coil Size	Frequency	Voltage	Current Inrush	Current Holding
9	60 Hz	115	44.0	1.6
		200	25.4	.9
		230	22.0	.8
		400	12.7	.5
		460	11.4	.4
		575	8.8	.3
	50 Hz	110	32.1	1.2
		220	16.0	.6
		380	11.1	.4
	DC	24	56.4	.7
		95	14.9	.2
		115	11.4	.1
		230	5.9	.07
K9	60 Hz	115	50.0	2.2
		200	28.0	1.3
		230	25.0	1.1
		400	14.0	.6
		460	12.5	.6
		575	10.0	
	50 Hz	110	36.0	1.6
		220	24.0	.9
		380	12.5	.6
	DC	—	—	—
		—	—	—
		—	—	—

Ordering and Identification Information

The following example and tables provide information for selecting the appropriate three-letter suffix when ordering a Stearns Brake.

Example of a complete part number, Series 81,000:

1-081-011-02-NLF
- Lead wire position (internal and external, left and right)
- 460 Vac
- 2-1/8 bore and 1/2 x 1/4 keyway

Example of a complete part number, Series 82,000:

1-082-012-02-NLF
- Lead wire position (internal and external, left and right)
- 460 Vac
- 2-1/8 bore and 1/2 x 1/4 keyway

81,000 Series Hub Selection

Character	Bore (in.)	Keyway** (in. x in.)
A	1 1/8	1/4 X 1/8
B*	1 1/4	1/4 X 1/8
C	1 3/8	5/16 X 5/32
D	1 1/2	3/8 X 3/16
E*	1 9/16	3/8 X 3/16
F	1 5/8	3/8 X 3/16
G*	1 11/16	3/8 X 3/16
H	1 3/4	3/8 X 3/16
I*	1 13/16	1/2 x 1/4
J	1 7/8	1/2 x 1/4
K*	1 15/16	1/2 x 1/4
L*	2	1/2 x 1/4
M*	2 1/16	1/2 x 1/4
N	2 1/8	1/2 x 1/4
O*	2 3/16	1/2 x 1/4
P*	2 1/4	1/2 x 1/4
Q*	2 5/16	5/8 x 5/16
R	2 3/8	5/8 x 5/16
S*	2 7/16	5/8 x 5/16
T	2 1/2	5/8 x 5/16
W	1 1/8	pilot bore

Maximum allowable bore 2.500 in. *(76.200 mm)* (maximum shaft length not to exceed end of hub)

*These bores are non-standard.

**Keyseats made to ANSI B17.1 standard.

82,000 Series Hub Selection

Character	Bore (in.)	Keyway** (in. x in.)
A	1 1/8	1/4 X 1/8
B*	1 1/4	1/4 X 1/8
C	1 3/8	5/16 X 5/32
D	1 1/2	3/8 X 3/16
E*	1 9/16	3/8 X 3/16
F	1 5/8	3/8 X 3/16
G*	1 11/16	3/8 X 3/16
H	1 3/4	3/8 X 3/16
I*	1 13/16	1/2 x 1/4
J	1 7/8	1/2 x 1/4
K*	1 15/16	1/2 x 1/4
L*	2	1/2 x 1/4
M*	2 1/16	1/2 x 1/4
N	2 1/8	1/2 x 1/4
O*	2 3/16	1/2 x 1/4
P*	2 1/4	1/2 x 1/4
Q*	2 5/16	5/8 x 5/16
R	2 3/8	5/8 x 5/16
S*	2 7/16	5/8 x 5/16
T	2 1/2	5/8 x 5/16
U*	2 5/8	5/8 x 5/16
V*	2 3/4	5/8 x 5/16
W	1 1/8	pilot bore
X	2 7/8	3/4 x 3/8
Y*	2 15/16	3/4 x 3/8
Z*	3	3/4 x 3/8

Maximum allowable bore 3.000 in. *(76.200 mm)* (maximum shaft length not to exceed end of hub)

*These bores are non-standard.

**Keyseats made to ANSI B17.1 standard.

Standard AC Voltage Ratings

Character	Voltage	Hz
B	115	60
D	110	50
E	200	60
F	230 190	60 50
H	220	50
L	460 380	60 50
M	415	50
N	575	60
O	110/220	50
P	115/230	60
Q	230/460 190/380	60 50
R	200/400	60

Modifications are available- see SAB Modification Section

Series 81,000 (1-081-0XX)

Mounting Face: NEMA 324 and 326 TC, TSC, UC or USC, NEMA 364 and 365 TC, TSC, UC or USC, NEMA 404 and 405 TC, TSC, UC or USC

12.5" AK, 11.0" AJ

Static Torque: 125 through 230 lb-ft

Enclosure Material: Cast Iron

Release Type: Knob, maintained with automatic reset. Vertical above IP 54 supplied with side release lever.

Enclosure Protection: IP 23 and 54 (formerly referred to by Stearns as NEMA Type 2 & 4, respectively).

Mounting: Fanguard-mounted brakes requiring IP 54 protection may require additional sealing measures beyond seals provided with the brake - Refer to Installation & Service Instruction sheets.

- Self-Adjusting Design
- Splined Hub
- Spring-Set Electrically Released
- Lead Wire Length: 36 inches
- Maximum Speed: 3600 Horizontal 2400 Vertical
- Coil Insulation: Standard Class B Optional Class H
- Certified: CSA File LR-6254
- ABS Type Approval Certified

Brake set and release times in milliseconds, when brake and motor are switched separately (for T1/T2 definitions see page 101):

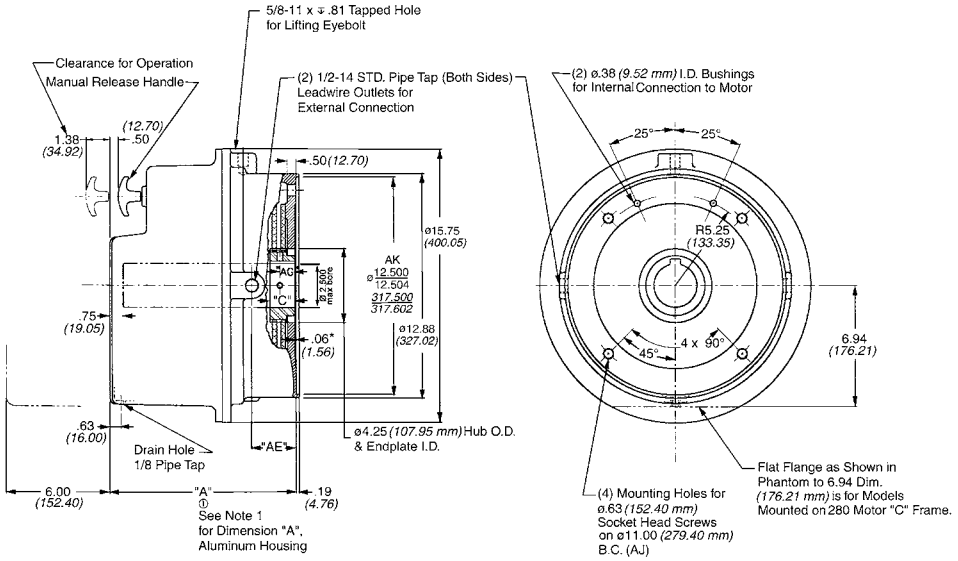
Static Torque	Coil Size	T1	T2
All	9	56	27

Installation, Service and Parts List: P/N 8-078-921-00

Specifications, bores/voltages: Page 22

Modifications: Pages 54-63

Modification required for vertical mounting. Vertical above IP 54 includes side release. See SAB Modifications for details.



* Hub location.

Dimensions for estimating only. For installation purposes request certified prints.

Dimensional Data

Nominal Static Torque (lb-ft) (Nm)	Enclosure	Type	Basic Model Number①	Dimensions in Inches (Dimensions in Millimeters)				Cast Iron Wt. lbs (kg)②
				A Cast Iron	AE	AG	C	
125 (169)	IP 23	AC DC	1-081-011-0X 1-081-015-0X	10.81 (274.64)	2.56 (65.09)	.94 (23.81)	1.44 (36.51)	148 (67.0)
125 (169)	IP 54	AC DC	1-081-012-0X 1-081-016-0X	10.88 (276.22)	2.56 (65.09)	.94 (23.81)	1.44 (36.51)	151 (69.0)
175 (237)	IP 23	AC DC	1-081-021-0X 1-081-025-0X	10.81 (274.64)	2.56 (65.09)	.94 (23.81)	1.44 (36.51)	148 (67.0)
175 (237)	IP 54	AC DC	1-081-022-0X 1-081-026-0X	10.88 (276.22)	2.56 (65.09)	.94 (23.81)	1.44 (36.51)	151 (69.0)
230 (312)	IP 23	AC DC	1-081-031-0X 1-081-035-0X	11.31 (287.34)	3.06 (77.79)	1.44 (36.51)	1.94 (49.21)	155 (70.0)
230 (312)	IP 54	AC DC	1-081-032-0X 1-081-036-0X	11.38 (288.92)	3.06 (77.79)	1.44 (36.51)	1.94 (49.21)	158 (72.0)

① New! 9th digit indicates aluminum or cast iron housing
2 = Cast Iron
3 = Aluminum: Add .38" to "A" dimension

② Subtract 21 lbs. for aluminum housing. Foot mounting adds 40 lbs *(18.2 kg)* to weight.

Motor Frame Adapters

WARNING! Before selecting an adapter to mount a brake on a larger motor frame, the torque and thermal capacity required by the application should be determined as shown in the "Selection Procedure" section. A larger motor may indicate a requirement for greater thermal capacity than the brake is designed for. The brake selection must be matched to the motor and application requirements, before use of an adapter is considered.

To Adapt to NEMA Frame Size	AK Dim. in (mm)	Reg. No.	Adapter Stock Number	Additional Shaft Length Required in. (mm)
182TC, 184TC, 213TC, 215TC, 254TC or 256TC	8.50 (215.90)	-9	5-55-2041-00 List $1325	.94 (23.81)
284TC or 286TC	10.50 (266.70)	-11	5-55-2043-00 List $1325	.94 (23.81)
444TSC and 445TSC	16.00 (406.40)	-16	5-55-2045-00 List $1875	.88 (22.22)

For adapter dimensions, see *Technical Data*.

Series 82,000 (1-082-0XX)

Mounting Face: NEMA 324 and 326 TC, TSC, UC or USC, NEMA 364 and 365 TC, TSC, UC or USC, NEMA 404 and 405 TC, TSC, UC or USC

12.5” AK, 11.0” AJ

Static Torque: 125 through 440 lb-ft

Enclosure Material: Cast Iron

Release Type: Knob, maintained with automatic reset. Vertical above IP 54 supplied with side release lever.

Enclosure Protection: IP 23 & 54 (formerly referred to by Stearns as NEMA Type 2 & 4 respectively).

Mounting: Fanguard-mounted brakes requiring IP 54 protection may require additional sealing measures beyond seals provided with the brake - Refer to Installation & Service Instruction sheets.

- Self-Adjusting Design
- Splined Hub
- Spring-Set Electrically Released
- Lead Wire Length: 36 inches
- Maximum Speed: 3600 Horizontal 2400 Vertical
- Coil Insulation: Standard Class B Optional Class H
- Certified: CSA File LR-6254
- ABS Type Approval Certified

Brake set and release times in milliseconds, when brake and motor are switched separately (for T1/T2 definitions see page 101)

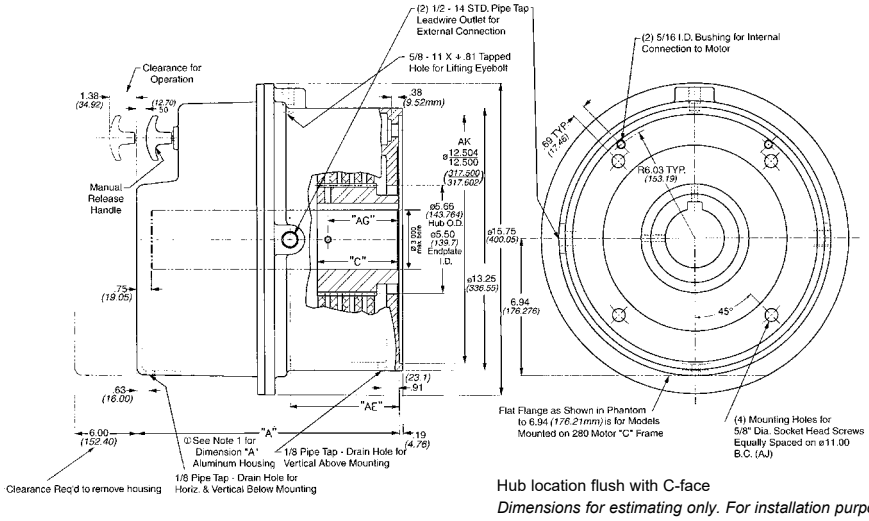
Static Torque	Coil Size	T1	T2
All	9	56	27

Installation, Service and Parts List: P/N 8-078-922-10 *Rev. A brakes*

Specifications, bores/voltages: Page 22

Modifications: Pages 54-63

Modification required for vertical mounting. Vertical above IP 54 includes side release. See SAB Modifications for details.



Hub location flush with C-face

Dimensions for estimating only. For installation purposes request certified prints.

Dimensional Data

Nominal Static Torque lb-ft (Nm)	Enclosure	Type	Basic Model Number①	Dimensions in Inches (Dimensions in Millimeters)				Cast Iron Wt. lbs (kg)②
				A① Cast Iron	AE	AG	C	
125 (169)	IP 23	AC	1-082-011-0X	12.12 (307.98)	4.31 (109.54)	1.75 (44.45)	2.31 (58.74)	189 (86.0)
125 (169)	IP 54	AC	1-082-012-0X	12.19 (309.56)	4.31 (109.54)	1.75 (44.45)	2.31 (58.74)	189 (86.0)
175 (237)	IP 23	AC	1-082-021-0X	12.12 (307.98)	4.31 (109.54)	1.75 (44.45)	2.31 (58.74)	189 (86.0)
175 (237)	IP 54	AC	1-082-022-0X	12.19 (309.56)	4.31 (109.54)	1.75 (44.45)	2.31 (58.74)	189 (86.0)
230 (312)	IP 23	AC	1-082-031-0X	12.12 (307.98)	4.31 (109.54)	2.38 (60.32)	2.94 (74.61)	190 (86.0)
230 (312)	IP 54	AC	1-082-032-0X	12.19 (309.56)	4.31 (109.54)	2.38 (60.32)	2.94 (74.61)	190 (86.0)
330 (447)	IP 23	AC	1-082-041-0X	12.12 (307.98)	4.31 (109.54)	2.38 (60.32)	2.94 (74.61)	190 (86.0)
330 (447)	IP 54	AC	1-082-042-0X	12.19 (309.56)	4.31 (109.54)	2.38 (60.32)	2.94 (74.61)	190 (86.0)
440 (597)	IP 23	AC	1-082-051-0X	13.38 (339.72)	5.56 (141.29)	3.00 (76.20)	3.56 (90.49)	192 (87.0)
440 (597)	IP 54	AC	1-082-052-0X	13.44 (341.31)	5.56 (141.29)	3.00 (76.20)	3.56 (90.49)	192 (87.0)

① New! 9th digit indicates aluminum or cast iron housing
2 = Cast Iron
3 = Aluminum: Add .38” to “A” dimension

② Subtract 21 lbs. for aluminum housing. Foot mounting adds 40 lbs *(18.2 kg)* to weight.

Motor Frame Adapters

WARNING! Before selecting an adapter to mount a brake on a larger motor frame, the torque and thermal capacity required by the application should be determined as shown in the *Selection Procedure* section. A larger motor may indicate a requirement for greater thermal capacity than the brake is designed for. The brake selection must be matched to the motor and application requirements, before use of an adapter is considered.

To Adapt to NEMA Frame Size	AK Dim. in (mm)	Reg. No.	Adapter Stock Number	Additional Shaft Length Required in. (mm)
182TC, 184TC, 213TC, 215TC, 254TC or 256TC	8.50 (215.90)	-9	5-55-2042-00	1.19 (30.16)
284TC or 286TC	10.50 (266.70)	-11	5-55-2044-00	1.19 (30.16)
444TSC and 445TSC	16.00 (406.40)	-16	5-55-2046-00	1.75 (44.45)

For adapter dimensions, see *Technical Data*.

Series 86,000 (1-086-XXX)
Mounting Face: NEMA 444 and 445TC, TSC, UC or USC
16.0” AK, 14.0” AJ

Series 86,100 (1-086-1XX)
Mounting Face: NEMA 505TC, TSC, UC or USC
16.5” AK, 14.5” AJ

Static Torque: 500 through 1000 lb-ft

Enclosure Material: Cast Iron

Release Type: Knob, maintained with automatic reset

Enclosure Protection: IP 23 & 54 (formerly referred to by Stearns as NEMA type 2 & 4 respectively).

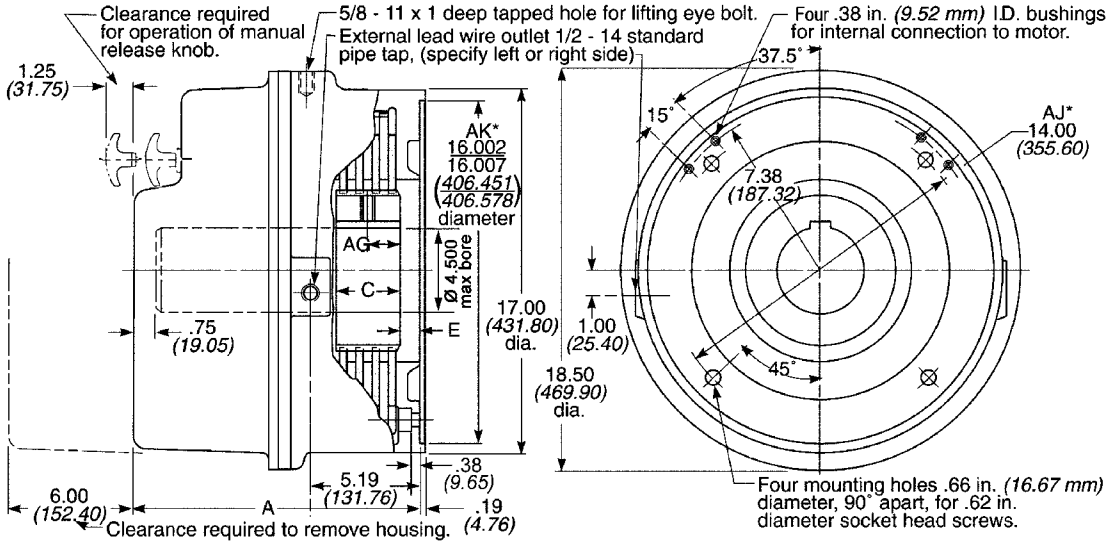
Mounting: Fanguard-mounted brakes requiring IP 54 protection may require additional sealing measures beyond seals provided with the brake - Refer to Installation & Service Instruction sheets.

Installation, Service and Parts List: P/N 8-078-926-00

Additional 86,000 Specs: Double Solenoid Design Terminal Block Provided.

Modification required for vertical mounting, available through 750 lb-ft only.

- Self-Adjusting Design
- Splined Hub
- Spring-Set Electrically Released
- Lead Wire Length: 36 inches
- Maximum Speed: 1800 rpm
- Coil Insulation: Standard Class B Optional Class H
- Certified: CSA File LR-6254
- ABS Type Approval Certified



*86,100 Series AK = 16.502/16.507 AJ = 14.50

Dimensions for estimating only. For installation purposes request certified prints.

Dimensional Data

Nominal Static Torque (lb-ft) (Nm)	Enclosure	Type	Basic Model Number①	Dimensions in Inches (Dimensions in Millimeters)				Cast Iron Wt. lbs (kg)②
				A Cast Iron	AG	C	E	
500 (678)	IP 23	AC	1-086-X21-02	13.31 (338.14)	.75 (19.05)	1.5 (38.1)	.94 (23.88)	310 (141.0)
500 (678)	IP 54	AC	1-086-X22-02	13.38 (339.72)	1.69 (42.86)	2.44 (61.91)	.0 (0.0)	320 (145.0)
750 (1017)	IP 23	AC	1-086-X31-02	13.31 (338.14)	1.12 (28.58)	2.25 (57.15)	.94 (23.88)	330 (150.0)
750 (1017)	IP 54	AC	1-086-X32-02	13.38 (339.72)	2.06 (52.39)	3.19 (80.96)	.0 (0.0)	340 (154.0)
1000 (1356)	IP 23	AC	1-086-X41-02	13.31 (338.14)	1.50 (38.10)	3.0 (76.2)	.94 (23.88)	350 (159.0)
1000 (1356)	IP 54	AC	1-086-X42-02	13.38 (339.72)	2.44 (61.91)	3.94 (100.01)	.0 (0.0)	360 (164.0)

① X = 0 or 1. 0 designates a 16 in. “AK”, 14 in “AJ”. 1 designates 16.5 in. “AK”, 14.5 in. “AJ”.

② Foot mounting adds 75 lbs. (34 kg) to weight.

Motor Frame Adapters

To adapt to NEMA Frame Size	AK. Dim in. (mm)	Reg. No.	Adapter Stock Number	Additional Shaft Length Required in. (mm)
324TC, 326TC, 364TC, 365TC, 404TC or 405TC	12.50 (317.50)	-13	5-55-6041-00	1.38 (34.92)

For adapter dimensions, see *Technical Data.*

Series 86,000 Specifications continued

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Engineering Specifications*

Nominal Static Torque lb-ft (Nm)	No. of Friction Discs	Solenoid Size ① AC	Solenoid Size ① DC	Maximum Solenoid Cycle Rate ② cycles/min AC	Maximum Solenoid Cycle Rate ② cycles/min DC	Thermal Capacity ③ hp-sec/min (watts)	Inertia (Wk^2) lb-ft² ($kgm^2 \times 10^{-3}$)
500 *(678)*	2	K9	9	13	15	80 *(994)*	1.4 *(58.8)*
750 *(1017)*	3	K9	9	13	15	80 *(994)*	2.1 *(88.2)*
1000 *(1356)*	4	K9	9	13	15	80 *(994)*	2.8 *(117.6)*

* *All specifications are also applicable to the 86,100 Series.*

① Two required.

② Maximum solenoid cycle rate is based on ambient temperature of 72°F *(22°C)* with 50% duty cycle. Does not relate to brake cycle rate (see Thermal Capacity).

③ Thermal capacity rating is based on ambient temperature of 72°F *(22°C)*, stop time of one second or less, with no heat absorbed from motor. Derate thermal capacity by 25% for vertical mounting. Refer to "Selection Procedure" Section.

Current Ratings (amperes)

Coil Size							
	Voltage: 60 Hz						
	Current	**115 VAC**	**200 VAC**	**230 VAC**	**400 VAC**	**460 VAC**	**575 VAC**
K9	Inrush	100.	56.0	50.0	28.0	25.0	20.0
	Holding	4.4	2.4	2.2	1.2	1.2	.8
	Voltage: 50 Hz						
	Current	**110 VAC**	**220 VAC**	**380 VAC**			
	Inrush	72.0	48.0	25.0	—	—	—
	Holding	3.2	1.8	1.2			
9	**Voltage: DC**						
	Current	**24 VDC**		**115 VDC**	**230 VDC**		
	Inrush	112.8	29.8	22.8	11.8	—	—
	Holding	1.4	.4	.2	.14		

Ordering and Identification Information

The following example and tables provide information for selecting the appropriate three-letter suffix when ordering a Stearns Brake.

Example of a complete part number: 1-086-031-02-NLF

- NLF — Lead wire position (internal and external, left and right)
- 02 — 460 Vac
- 031 — 2-7/8 bore and 3/4 x 3/8 keyway
- 086 — Designate 0 for 16 in. "AK", 14 in. "AJ" / Designate 1 for 16.5 in. "AK", 14.5 in. "AJ"
- 1 — Standard AC Voltage Ratings

Hub Selection

Character	Bore (in.)	Keyway* (in. x in.)
D	2-1/8	1/2 x 1/14
H	2-3/8	5/8 x 5/16
K	2-5/8	5/8 x 5/16
L	2-3/4	5/8 x 5/16
N	2-7/8	3/4 x 3/8
P	3	3/4 x 3/8
T	3-3/8	7/8 x 7/16
V	3-1/2	7/8 x 7/16
W	1-7/8	pilot bore
Z	4	1 x 1/2

Maximum allowable bore 4.500 in. (maximum shaft length not to exceed end of hub) For through-shaft applications, 4.000 is maximum.

*Keyseats made to ANSI B17.1 standard

Standard AC Voltage Ratings

Character	Voltage	Hz
B	115	60
D	110	50
E	200	60
F	230	60
	190	50
H	220	50
L	460	60
	380	50
M	415	50
N	575	60

Single voltage coils only - dual voltage coils not allowed

Modifications are available-see SAB Modification Section

Hazardous Location Brakes

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Enclosures for standard Stearns disc brakes are designed to prevent accidental contact with the internal mechanism while keeping contaminants from the operating parts. Many installations, however, require additional protection due to the presence of explosive gases or ignitable dusts in the atmosphere. Hazardous locations are defined in the National Electrical Code (NEC) and designated by Class, Division and Group. For a better understanding of hazardous locations, or for definitions of hazardous location terminology, please refer to: http://www.ul.com/global/eng/pages/ offerings/services/hazardouslocations/.

- *Class I* – Locations where the atmosphere may contain flammable gases or vapors in explosive or ignitable concentrations. An electric disc brake for Class I locations must be built in such a manner that any ignition of gases or vapors within the brake will not result in rupture of the enclosure or allow a flame or spark to travel from within the brake to the surrounding hazardous atmosphere.
- *Class II* – Locations with combustible dust in suspension in the atmosphere. An electric disc brake for Class II locations must be enclosed in a manner which precludes entry of ignitable dusts or exit of any arcs, sparks, or hot gases which may cause ignition of dusts suspended in the surrounding atmosphere or accumulated on the enclosure. The exterior surface temperature of the brake enclosure must be limited so that it can function at its maximum-rated duty cycle without causing dehydration or carbonization of dust that accumulates on the enclosure.
- *Divisions* – Each hazardous-location Class is also divided into two Divisions, 1 and 2. Division 1 is a *normally* hazardous location. Division 2 is normally *not* hazardous. Division 1 brakes can be used in both types of locations. **Division 2 can be used in Division 2 environments ONLY.**
- *Groups* – Class I gases and vapors are listed in four Groups A, B, C and D, based on specific properties such as maximum explosion pressure and ignition temperature. Class II airborne dusts are listed in three Groups: E, F, and G. The dust properties considered include thermal and electrical conductivity and ignition temperature.

Selection

When specifying a Stearns hazardous-location disc brake, the Class and Group designations of the hazardous atmosphere and its ignition temperature must be known. The selection table gives the hazardous atmospheres that Stearns brakes are suitable for, along with the brake's maximum operating temperature. For more information on hazardous location responsibilities, see: http://www.ul.com/global/eng/pages/ offerings/services/hazardouslocations/

Step 1 – Determine the Class and Group designation of the hazardous atmosphere.

Step 2 – For Class I hazardous substances, determine the ignition temperature of the explosive gas or vapor. Select a brake listed for the appropriate group with a maximum external surface temperature that does *not* exceed the ignition temperature of the explosive gas or vapor.

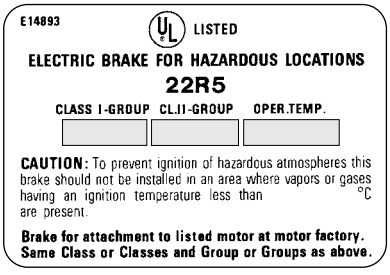
Step 3 – For Class II hazardous substances, select a brake listed for the appropriate group.

Ignition temperatures of Combustible Dusts may be found in NFPA publication NFPA 499 Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas. Ignition temperatures of Flammable Liquids, Gases and Vapors may be found in NFPA publication NFPA 497 Recommended Practice for the Classification of Flammable Liquids, Gases and Vapors and of Hazardous (Classified) locations for Electrical Installations in Chemical Process Areas.

Brake Labels and Listing

Stearns brakes for use in hazardous locations are marked to show the Class, Group, and maximum Class II operating temperature (in a 40°C ambient) of the brake enclosure, as well as the minimum Class I ignition temperature of the gases or vapors to which they can be exposed.

Generally, compliance with the NEC is demonstrated by UL Listing of the product in Underwriters Laboratories Hazardous Location Equipment Directory. A label displaying the UL Listing mark and required rating information will be found on each Stearns brake to confirm the Listing.



In Canada, the Canadian Standards Association (CSA) is an organization with the responsibility to publish and administer national electrical standards as well as to test and certify electrical products. The CUL or CSA monogram will be found on Stearns hazardous-location brakes sold in Canada to confirm certification.

Stearns *motor-mounted*, hazardous-location electric disc brakes are Listed only when mounted directly to a Listed hazardous-location motor of the same Class and Group at the motor manufacturer's facility, and where the combination has been accepted by UL. This procedure completes the explosion-proof assembly of the brake. However, *foot-mounted* Listed hazardous-location disc brakes are also available for coupling to a motor, and may be installed by anyone.

These brakes are listed by UL (Underwriters Laboratories, Inc.,) for use in certain locations classified as hazardous. Installation and servicing must be in compliance with all existing local safety codes. All wiring and electrical connections must comply with the National Electric Code (NEC) and local electrical codes in effect at the time. For additional information see the Underwriters Laboratories (UL) website http://www.ul.com/hazloc/codes/html.

HazLoc inspection authorities are responsible for verifying and authorizing the use of suitably designed, manufactured and installed HazLoc equipment. When questions arise always consult the local Authority Having Jurisdiction (AHJ) for directions and approvals.

Hazardous-Location Brake Enclosures

Division 1, hazardous location brakes are typically provided with machined components, without gaskets. Series 65300 brakes can be provided with gaskets to meet IP 55, 56 or Type 4 enclosure protection. Series 87300 brakes can be provided with gaskets to meet IP 55, 56 or 57 enclosure protection. Series 82300 can be provided with IP 56 enclosure protection. All Division 1 enclosures prevent flame propagation to the outside atmosphere through tortuous flame paths having controlled clearances. If the brake is used in a high humidity or low temperature environment, internal electric heaters should be used.

Division 2 hazardous location brakes are provided with an IP 55 enclosure. Heater and proximity switch options are limited to Division 2, Class II brakes.

Thermal Considerations

A major design requirement of hazardous-location brakes is to limit exterior surface temperature. The surface temperature of the enclosure must not exceed a specified limit as a result of heat energy created in stopping the motor and load. This NEC restriction on the exterior surface temperature limits the hazardous-location brake's ability to dissipate heat, resulting in less thermal capacity than a comparable brake with a standard or dust-tight, waterproof enclosure.

THEREFORE, HAZARDOUS-LOCATION BRAKES ARE INTENDED ESSENTIALLY FOR NON-CYCLIC OR HOLDING PURPOSES, BUT MAY BE USED FOR STOPPING LIGHT INERTIAL LOADS.

Hazardous Location Brake Selection Table

Classification		Minimum Auto-Ignition Temperature of Atmosphere	Minimum Layer or Cloud Ignition Temperature	T Code	Brake Series Division 1	Brake Series Division 2
Class	Group					
I	A	160°C / 320°F		T3C		56800, 87800
	B	160°C / 320°F		T3C		56800, 87800
	C	100°C / 212°F		T5	87300	
		135°C / 275°F	212°F	T4	82300	
		160°C / 320°F		T3C		56800, 87800
		180°C / 356°F		T3A	65300	
	D	100°C / 212°F		T5	87300	
		135°C / 275°F		T4	82300	
		160°C / 320°F		T3C		56800, 87800
		180°C / 356°F		T3A	65300	
II	E		100°C / 212°F	T5	87300	
			135°C / 275°F	T4	82300	
			165°C / 329°F	T3B	65300*	
	F		100°C / 212°F	T5	87300	
			135°C / 275°F	T4	82300	
			160°C / 320°F	T3C		56800, 87800
			165°C / 329°F	T3B		87800
			165°C / 329°F	T3B	65300	
	G		100°C / 212°F	T5	87300	
			135°C / 275°F	T4	82300	
			160°C / 320°F	T3C		56800, 87800
			165°C / 329°F	T3B		87800
			165°C / 329°F	T3B	65300	
NOTE: Group E available in select models only. Consult Factory.						

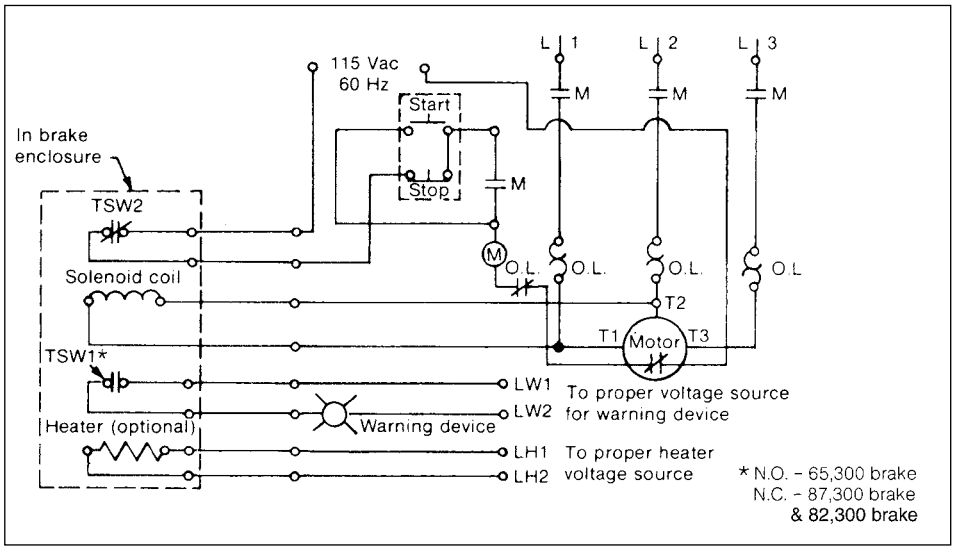
*Series 65,300-07 (New Design Close Coupled) and 65,300-09 (Fan Guard Mount) are Class I Group C and D, Class II Group F and G only
Maximum exterior surface temperature is based on operation in an ambient of 104°F *(40°C)*.

65,300 and 87,300 & 82,300

These brakes rely on a thermostat switch wired to the motor control circuit to limit the brake's enclosure surface temperature. Refer to the circuit diagram. If the brake begins to overheat, the thermostat TSW2 switch will open and interrupt the motor starter and brake solenoid current, causing the brake to set. A second thermostat TSW1 will close on Series 65,X00, or will open on Series 87,300** and 82,300** brakes. The TSW1 switch can be used to actuate alarm or warning light. This switch actuates at a lower temperature than TSW2, and will alert the equipment operator of an impending thermal overload.

**TSW1 is optional on 87,300 and 82,300 series brakes.

Circuit Diagram



Series 65,300 (1-065-3XX-05, -07 & -09)

Division I Hazardous Location
Mounting Face: NEMA 56C, 143TC and 145TC
4.5" AK, 5.88" AJ

Hazardous-location brakes are intended essentially for non-cyclic or holding purposes, but may be used for stopping light inertial loads.

Static Torque: 1.5 through 15 lb-ft

Enclosure Material: Cast Iron

Release Type: Knob, maintained with automatic reset

- Manual Wear Adjustment
- Epoxy Encapsulated Coil Construction, with Class H Insulation
- NO Interlock & NC Warning (Optional) Thermostats
- Spring-Set Electrically Released
- Lead Wire Length: 36 inches
- Maximum Speed: Horizontal 5000 rpm, Vertical 3600 rpm

No modification required for vertical mounting

1-065-3XX-05 Series Close Coupled Hazardous location NEMA 7, 9

Model Number	Nominal Static Torque (lb-ft) *(Nm)*	Dimensions in Inches *(mm)*		Weight lbs *(kg)*
		SL Max.	SL Min.	
1-065-311-05-XXX	1.5 *(2)*	2.95 *(74.93)*	2.25 *(57.15)*	38 *(17.2)*
1-065-321-05-XXX	3 *(4)*	2.95 *(74.93)*	2.25 *(57.15)*	38 *(17.2)*
1-065-331-05-XXX	6 *(8)*	2.95 *(74.93)*	2.25 *(57.15)*	40 *(18.1*
1-065-351-05-XXX	10 *(14)*	2.95 *(74.93)*	2.31 *(58.67)*	45 *(20.4)*
1-065-361-05-XXX	15 *(20)*	2.95 *(74.93)*	2.31 *(58.67)*	45 *(20.4)*

1-065-3XX-07 Close Coupled Hazardous location NEMA 7, 9

Model Number	Enclosure	Static Torque (lb-ft)	Weight lbs *(kg)*
1-065-312-07-XXX	IP 56	1.5	52 *(23.6)*
1-065-322-07-XXX	IP 56	3	52 *(23.6)*
1-065-332-07-XXX	IP 56	6	57 *(25.8)*
1-065-352-07-XXX	IP 56	10	57 *(25.8)*
1-065-362-07-XXX	IP 56	15	57 *(25.8)*

Engineering Specifications

Nominal Static Torque (lb-ft) *(Nm)*	No. of Friction Discs	Coil Size	Maximum Solenoid Cycle Rate①	Thermal Capacity ②	Inertia (Wk^2)
			cycles/min	hp-sec/min *(watts)*	lb-ft² *($kgm^2 \times 10^{-4}$)*
1.5 *(2)*	1	4	40	2 *(25)*	.008 *(3.36)*
3 *(4)*	1	4	40	2 *(25)*	.008 *(3.36)*
6 *(8)*	1	K4	40	2 *(25)*	.008 *(3.36)*
10 *(14)*	2	K4	40	2 *(25)*	.014 *(5.58)*
15 *(20)*	2	K4+	40	2 *(25)*	.014 *(5.58)*

① Maximum solenoid cycle rate is 40 cycles/min., based on ambient temperature of 72°F *(22°C)* with 50% duty cycle. Does not relate to brake cycle rate (see Thermal Capacity).

② Thermal capacity rating is 2 hp-sec/min. (25 watts) based on ambient temperature of 72°F *(22°C)*, stop time of one second or less, with no heat absorbed from motor. Derate thermal capacity by 25% for vertical mounting. Refer to "Selection Procedure" Section.

Ordering and Identification Information

Example of a complete part number:

1-065-351-05-BFB
- BFB — Lead wire position (external left)
- 351 — 230 Vac
- 05 — 5/8 bore and 3/16 x 3/32 keyway
- 065 — Series : (Current Design = 05) (***New*** Fan Guard Mount = 09)

Standard AC Voltage Ratings

Character	Voltage	Hz
B	115	60
D	110	50
E	200	60
F	230 190	60 50
H	220	50
L	460 380	60 50
M	415	50
N	575	60
O	110/220	50
P	115/208-230	60
Q	208-230/460 190/380	60 50
R	200/400	60

Hub Selection

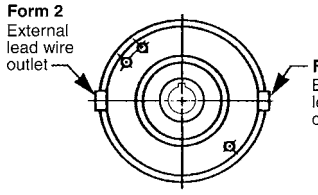
Character	Bore (in.)	Keyway** (in. x in.)
A*	5/8	1/8 x 1/16
B	5/8	3/16 x 3/32
C	3/4	3/16 x 3/32
D	7/8	3/16 x 3/32
K	1/2	1/8 x 1/16
maximum allowable bore	1.0 in. *(22.40 mm)*	

* These bores are non-standard.

** Keyseats made to ANSI B17.1 standard

Modifications are available- see SAB Modification Section

Lead Wire Positions



View facing mounting register on brake.

Character	Lead Wire Position
B	Form 2
C	Form 3

Current Ratings (amperes)

Solenoid Coil Size	AC Current	Voltage: 60 Hz						Voltage: 50 Hz		
		115	200	230	400	460	575	110	220	380
4	Inrush	3.6	2.1	1.8	1.1	.9	.7	4.1	2.1	.9
	Holding	.3	.2	.2	.08	.08	.06	.3	.2	.08
K4	Inrush	4.3	2.5	2.2	1.3	1.1	.9	3.8	1.9	1.1
	Holding	.3	.2	.2	.1	.08	.07	.4	.2	.08
K4+	Inrush	4.6	2.5	2.3	1.2	1.0	.9	4.9	2.0	1.0
	Holding	.4	.2	.2	.1	.1	.08	.4	.2	.1

Series 65,300 Continued

1-065-3XX-05 Series

Mounting Requirements: 1-065-3XX-05 Series Hazardous Location Motor Mounted Brake is used for mounting close coupled (directly) to the motor end bell. If the brake is to be mounted to a motor fan guard, or if a motor frame adapter is incorporated, it is recommended that Series 1-065-3XX-09 be used, as it provides additional bearing support for the longer shaft that is required. The acceptability of the brake and motor combination must be determined by Underwriters Laboratories Inc.

Certified: Series 65,300-05 (1-065-3XX-05) USL/CNL, File E-14893, for Class I, Group C and D and Class II, Group E, F and G

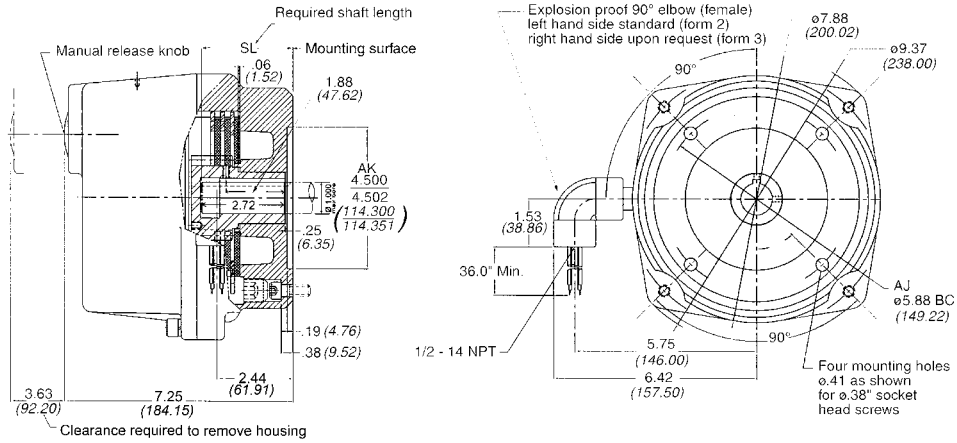
Class I, Zone 1, Group IIA and IIB

Enclosure Protection: Type 1/IP 40 and Hazardous Location NEMA 7, 9

Installation and Service Instructions: P/N 8-078-925-13 *Rev. C & D brakes*

Parts List: P/N 8-078-913-13 *Rev. C & D brakes*

Dimensions for estimating only.
For installation purposes request certified prints.



1-065-3XX-07 Series

Mounting Requirements: 1-065-3XX-07 Series Hazardous Location Motor Mounted Brake is used for mounting close coupled (directly) to the motor end bell. If the brake is to be mounted to a motor fan guard, or if a motor frame adapter is incorporated, it is recommended that Series 1-065-3XX-09 be used, as it provides additional bearing support for the longer shaft that is required. The acceptability of the brake and motor combination must be determined by Underwriters Laboratories Inc.

Certified: Series 65,300-07 (1-065-3XX-07) USL/CNL Listed, File E-14893, for Class I, Group C and D and Class II, Group F and G

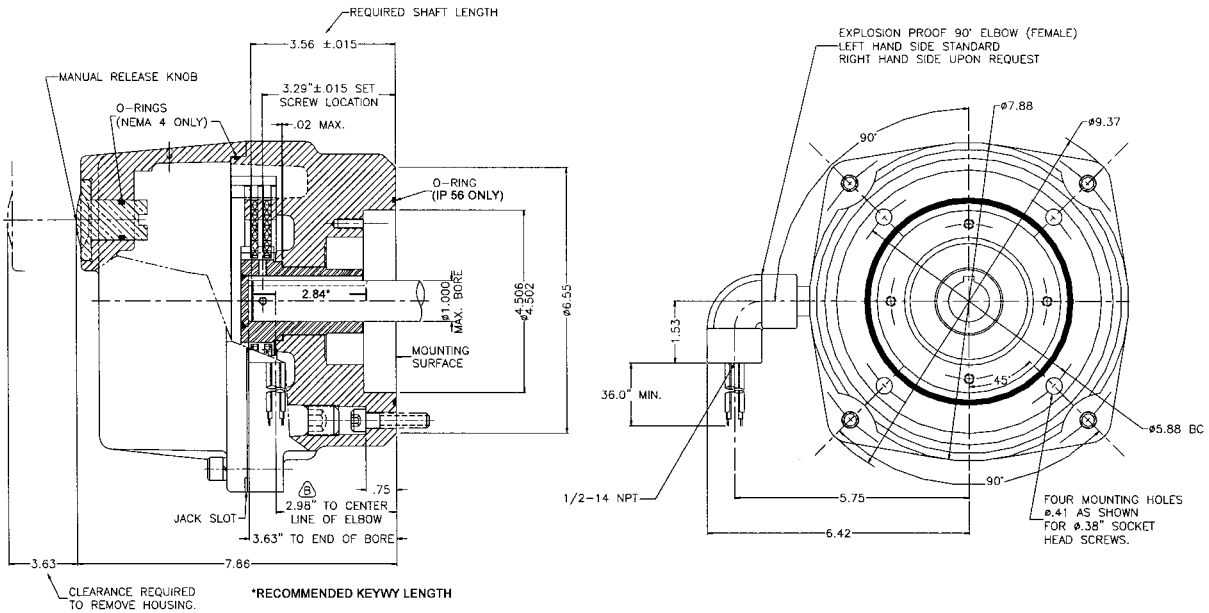
Class I, Zone 1, Group IIA and IIB

Enclosure Protection: Type 4/IP 56, and Hazardous Location NEMA 7, 9, UL Type 4

Installation and Service Instructions: P/N 8-078-925-09

Parts List: P/N 8-078-913-09

Note: 65,300 Series Close-Coupled Brakes (-07) must be mounted directly to motor endbell.



1-065-3XX-09 Fan-Guard Mount IP 23
Hazardous location NEMA 7, 9

Model Number	Static Torque lb-ft *(Nm)*	Weight lbs *(kg)*
1-065-311-09-XXX	1.5 *(2)*	52 *(23.6)*
1-065-321-09-XXX	3 *(4)*	52 *(23.6)*
1-065-331-09-XXX	6 *(8)*	57 *(25.8)*
1-065-351-09-XXX	10 *(14)*	57 *(25.8)*
1-065-361-09-XXX	15 *(20)*	57 *(25.8)*

1-065-3XX-09 Series

Mounting Requirements: 1-065-3X1-09 Series Hazardous Location Motor Mounted Brake is recommended for mounting to a motor fan guard or for use with a motor frame adapter. The acceptability of the brake and motor combination must be determined by Underwriters Laboratories Inc.

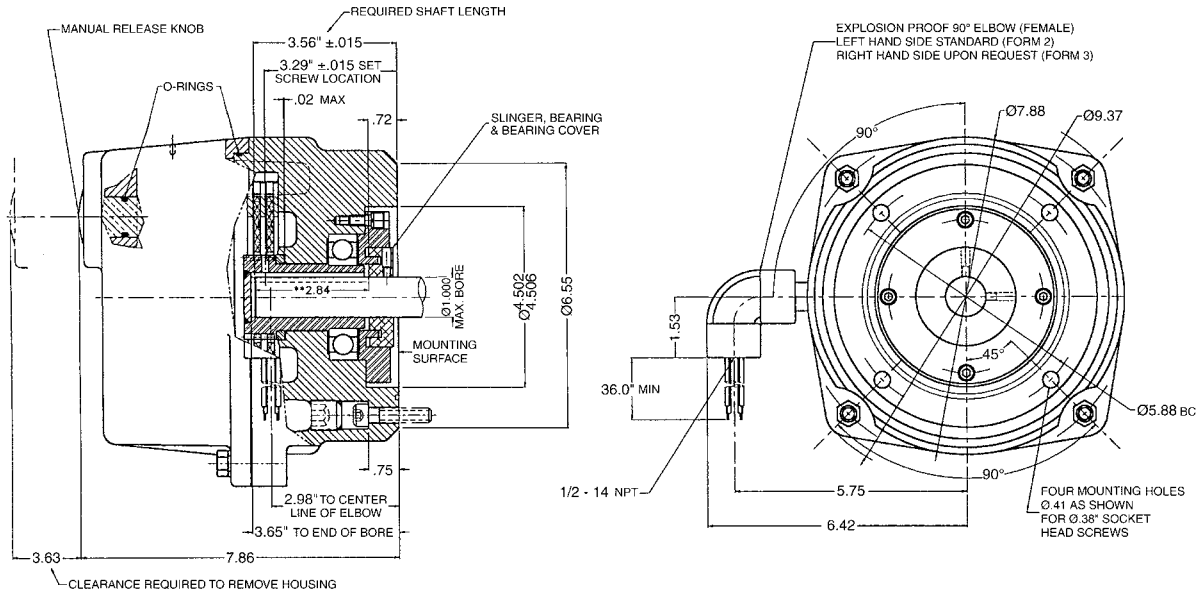
Enclosure Protection: Type 1/IP 40 and Hazardous Location NEMA 7, 9

Certified: 65,300-09 (1-065-3XX-09)
USL/CNL File E-14893, for Class I, Group C and D and Class II, Group F and G
Class I, Zone 1, Group IIA and IIB

Installation and Service Instructions: P/N 8-078-925-09

Parts List: P/N 8-078-913-09

Dimensions for estimating only.
For installation purposes request certified prints.



**Maximum keyway length for Fan Guard Mount (1-065-3XX-09)

Series 87,300-00 and 87,300-02

(1-087-3XX) Motor Mounted
Division I Hazardous Location
Mounting Face: NEMA 182TC, 184TC, 213TC, 215TC, 254TC, 256TC
8.5” AK, 7.25” AJ

Static Torque: 10 through 105 lb-ft

Enclosure Material: Cast Iron

Release Type: Knob

Modification required for vertical above mounting. For vertical below, modification required on 50-105 lb-ft. See SAB Modification Section..

- Self-Adjusting Design
- Epoxy Encapsulated Coil Construction, with Class H Insulation
- NC Thermostat
- Spring-Set Electrically Released
- Lead Wire Length: 36 inches
- Maximum Speed: Horizontal 4000 rpm, Vertical 3000 rpm
- ABS Type Approval Certified.

Brake set and release times in milliseconds, when brake and motor are switched separately (for T1/T2 definitions, see page 101):

Static Torque	Coil Size	T1	T2
10, 15, 25, 50	5 & 6	42	20
35, 75, 105	8	48	20

Hazardous-location brakes are intended essentially for non-cyclic or holding purposes, but may be used for stopping light inertial loads.

Series 87,300-00

Enclosure Protection: Type 1/IP 40, Type 4/IP 55, or Type 4/IP 57 protection, the brake must be mounted close coupled to the motor end bell (a motor frame adapter may be included). Hazardous Location NEMA 7, 9.

***Mounting Requirements*:** 1-087-3XX-00 Series Hazardous Location Motor Mounted Brake is recommended for mounting close coupled (directly) to the motor end bell. If the brake is to be mounted to a motor fan guard, or if a motor frame adapter is incorporated, it is recommended that Series 1-087-3XX-02 be used, as it provides additional bearing support for the longer shaft that is required. The acceptability of the brake and motor combination must be determined by Underwriters Laboratories Inc.

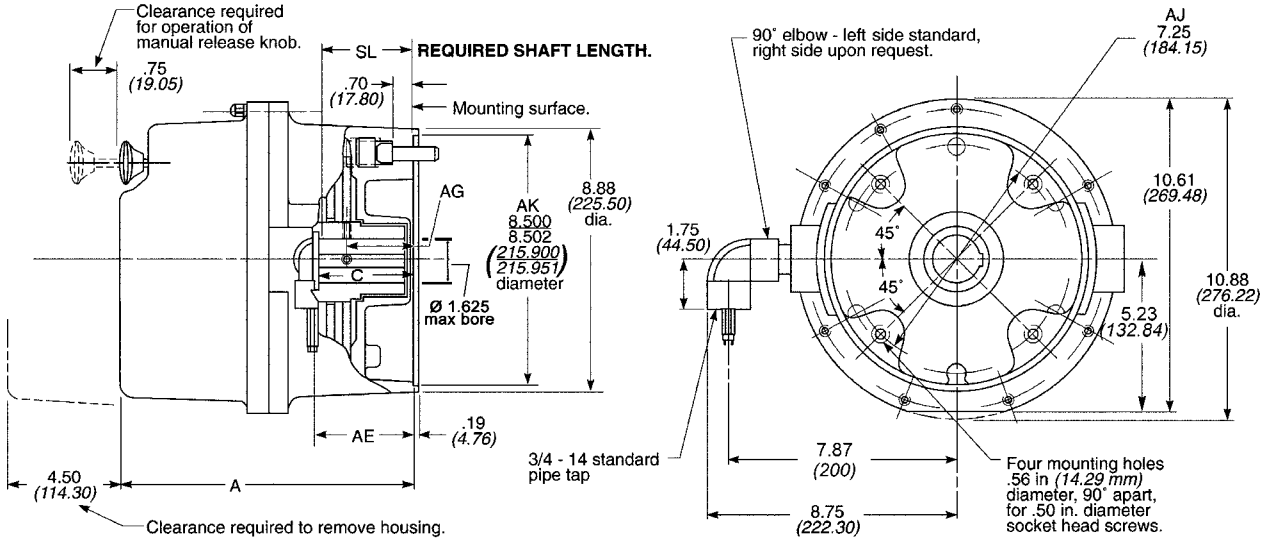
Certified: UL Listed, File E-14893 for Class I, Group C and D and Class II, Group F and G.
CSA Certified, File LR-9584 for Class I, Group C and D, and Class II, Group F and G.

Installation and Service Instructions: P/N 8-078-927-03

Parts List: P/N 8-078-917-03 for *IP 40* 8-078-917-23 *for IP 55*

Outline Drawing for IP 40 & 55

Dimensions for estimating only. For installation purposes request certified prints.



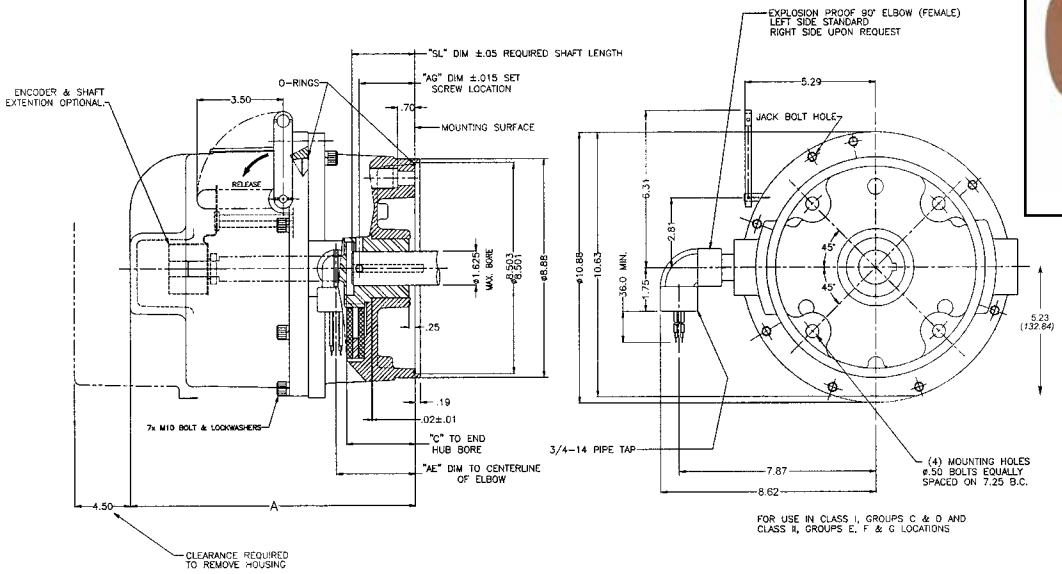
Dimensional Data

Model Number	Enclosure	Nominal Static Torque (lb-ft) *(Nm)*	Dimensions in Inches (Dimensions in Millimeters)					Weight lbs *(kg)*
			A	AE	AG	C	SL ± .05”	
1-087-311-00-XXX	IP 40	10 *(14)*	9.34 (237.33)	3.22 *(81.79)*	2.25 *(57.2)*	2.76 *(70.1)*	2.56 *(65.0)*	62 *(28.0)*
1-087-314-00-XXX	IP 55							
1-087-321-00-XXX	IP 40	15 *(20)*	9.34 *(237.33)*	3.22 *(81.79)*	2.25 *(57.2)*	2.76 *(70.1)*	2.56 *(65.0)*	63 *(28.6)*
1-087-324-00-XXX	IP 55							
1-087-331-00-XXX	IP 40	25 *(34)*	9.34 *(237.33)*	3.22 *(81.79)*	2.25 *(57.2)*	2.76 *(70.1)*	2.56 *(65.0)*	63 *(28.6)*
1-087-334-00-XXX	IP 55							
1-087-341-00-XXX	IP 40	35 *(47)*	9.34 *(237.33)*	3.22 *(81.79)*	2.25 *(57.2)*	2.76 *(70.1)*	2.56 *(65.0)*	63 *(28.6)*
1-087-344-00-XXX	IP 55							
1-087-351-00-XXX	IP 40	50 *(68)*	9.34 *(237.33)*	3.22 *(81.79)*	2.25 *(57.2)*	2.76 *(70.1)*	2.56 *(65.0)*	64 *(29.0)*
1-087-354-00-XXX	IP 55							
1-087-361-00-XXX	IP 40	75 *(102)*	9.34 *(237.33)*	3.22 *(81.79)*	2.25 *(57.2)*	2.76 *(70.1)*	2.56 *(65.0)*	65 *(29.5)*
1-087-364-00-XXX	IP 55							
1-087-381-00-XXX	IP 40	105 *(142)*	10.34 *(262.73)*	4.22 *(107.19)*	2.75 *(69.9)*	3.73 *(94.7)*	3.53 *(89.7)*	72 *(32.7)*
1-087-384-00-XXX	IP 55							

Series 87,300-00

Enclosure Protection: IP 57

Certified: UL Listed, File E-14893 for Class I, Group C and D and Class II, Group E, F and G.



Dimensional Data

Model Number	Enclosure	Nominal Static Torque lb-ft *(Nm)*	Dimensions in Inches *(Dimensions in Millimeters)*					Wt. Lbs *(kg)***
			A	C	SL	AE	G	
1-087-318-00-XXX	IP 57	10 *(14)*	11.57	2.76	2.56	3.22	2.25	63 *(28.6)*
1-087-328-00-XXX	IP 57	15 *(20)*	11.57	2.76	2.56	3.22	2.25	64 *(29)*
1-087-338-00-XXX	IP 57	25 *(34)*	11.57	2.76	2.56	3.22	2.25	64 *(29)*
1-087-348-00-XXX	IP 57	35 *(47)*	11.57	2.76	2.56	3.22	2.25	64 *(29)*
1-087-358-00-XXX	IP 57	50 *(68)*	11.57	2.76	2.56	3.22	2.25	65 *(29.5)*
1-087-368-00-XXX	IP 57	75 *(102)*	11.57	2.76	2.56	3.22	2.25	66 *(30)*
1-087-388-00-XXX	IP 57	105 *(142)*	12.57	3.73	3.53	4.22	2.75	73 *(33.1)*

Series 87,300-00 and 87,300-02 Continued
(1-087-3XX) Motor Mounted
Division I Hazardous Location

Series 87,300-02

Enclosure Protection: Type 1/IP 40, Type 4/IP 55, or Type 4/IP 56. Hazardous Location NEMA 7, 9.

Installation and Service Instructions: P/N 8-078-927-05

Parts List: P/N 8-078-917-05

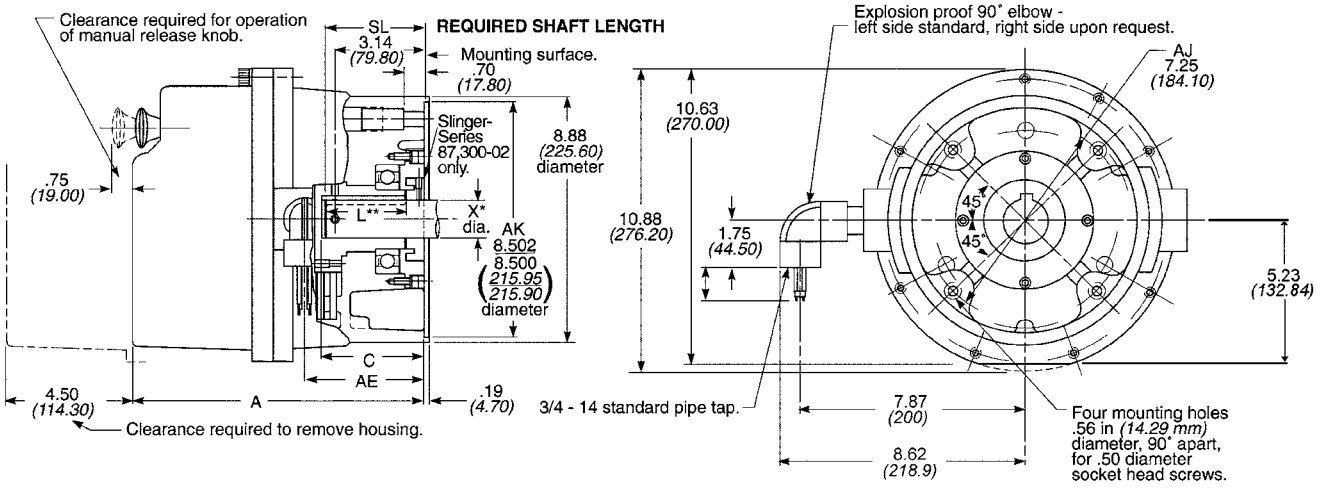
***Mounting Requirements*:** 1-087-3XX-02 Series Hazardous Location Motor Mounted Brake is recommended for mounting to a motor fan guard, or for use with a motor frame adapter. The acceptability of the brake and motor combination must be determined by Underwriters Laboratories Inc.

Certified: UL Listed, File E-14893
Series 87,300-02, Class I Group C and D and Class II, Group E, F and G.
CSA Certified, File LR-9584, Class I, Group C and D, and Class II, Group E, F and G.

Outline Drawing for IP 40 & 55

Hazardous-location brakes are intended essentially for non-cyclic or holding purposes, but may be used for stopping light inertial loads.

Dimensions for estimating only.
For installation purposes request certified prints.



*X max diameter 1.625 in./ min. .875 in. **L is the maximum keyway slot.

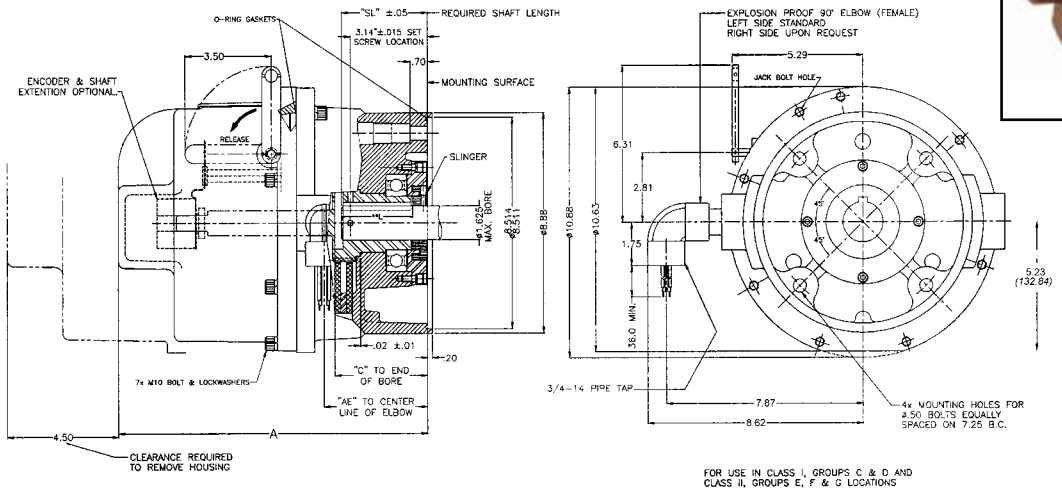
Dimensional Data

Model Number	Enclosure	Nominal Static Torque (lb-ft) *(Nm)*	Dimensions in Inches (Dimensions in Millimeters)					Weight lbs (kg)
			A	AE	C	SL ± .05"	L** Max.	
1-087-311-02-XXX	IP 40	10	10.34	4.22	3.65	3.50	2.89	90
1-087-314-02-XXX	IP 55	*(14)*	*(262.60)*	*(107.19)*	*(92.70)*	*(88.90)*	*(73.40)*	*(41)*
1-087-321-02-XXX	IP 40	15	10.34	4.22	3.65	3.50	2.89	90
1-087-324-02-XXX	IP 55	*(20)*	*(262.60)*	*(107.19)*	*(92.70)*	*(88.90)*	*(73.40)*	*(41)*
1-087-331-02-XXX	IP 40	25	10.34	4.22	3.65	3.50	2.89	90
1-087-334-02-XXX	IP 55	*(34)*	*(262.60)*	*(107.19)*	*(92.70)*	*(88.90)*	*(73.40)*	*(41)*
1-087-341-02-XXX	IP 40	35	10.34	4.22	3.65	3.50	2.89	90
1-087-344-02-XXX	IP 55	*(47)*	*(262.60)*	*(107.19)*	*(92.70)*	*(88.90)*	*(73.40)*	*(41)*
1-087-351-02-XXX	IP 40	50	10.34	4.22	3.65	3.50	2.89	90
1-087-354-02-XXX	IP 55	*(68)*	*(262.60)*	*(107.19)*	*(92.70)*	*(88.90)*	*(73.40)*	*(41)*
1-087-361-02-XXX	IP 40	75	10.34	4.22	3.65	3.50	2.89	90
1-087-364-02-XXX	IP 55	*(102)*	*(262.60)*	*(107.19)*	*(92.70)*	*(88.90)*	*(73.40)*	*(41)*
1-087-381-02-XXX	IP 40	105	10.84	4.72	4.11	3.75	3.14	96
1-087-384-02-XXX	IP 55	*(142)*	*(275.10)*	*(119.10)*	*(104.40)*	*(95.30)*	*(79.70)*	*(43.5)*

Side release is also available in a fan guard mount design. Consult Stearns and request drawing no. 1-087-305-2D

Series 87,300-02

Enclosure Protection: IP 56



Dimensional Data

Model Number	Enclosure	Nominal Static Torque lb-ft *(Nm)*	Dimensions in Inches *(Dimensions in Millimeters)*					Wt. Lbs *(kg)***
			A	C	**L	SL	AE	
1-087-315-02-XXX	IP 56	10 *(14)*	12.60	3.65	2.89	3.50	4.22	91 *(41.3)*
1-087-325-02-XXX	IP 56	15 *(20)*	12.60	3.65	2.89	3.50	4.22	91 *(41.3)*
1-087-335-02-XXX	IP 56	25 *(34)*	12.60	3.65	2.89	3.50	4.22	91 *(41.3)*
1-087-345-02-XXX	IP 56	35 *(47)*	12.60	3.65	2.89	3.50	4.22	91 *(41.3)*
1-087-355-02-XXX	IP 56	50 *(68)*	12.60	3.65	2.89	3.50	4.22	91 *(41.3)*
1-087-365-02-XXX	IP 56	75 *(102)*	12.60	3.65	2.89	3.50	4.22	91 *(41.3)*
1-087-385-02-XXX	IP 56	105 *(142)*	13.10	4.11	3.14	3.75	4.72	97 *(44)*

Series 87,300-00 (1-087-3XX)
Division I Hazardous Location
Mounting: Foot Mounted

Static Torque: 10 through 105 lb-ft

Enclosure Material: Cast Iron

Release Type: Knob

Enclosure Protection: Type 1/IP 40, Type 4/IP 55 and Hazardous Location NEMA 7 and NEMA 9

Installation and Service Instructions: P/N 8-078-927-03

Parts List: P/N 8-078-917-03

Mounting Requirements: 1-087-3X2-00 Series Hazardous Location Foot Mounted Brake does not require assembly to the motor to complete the hazardous location enclosure.

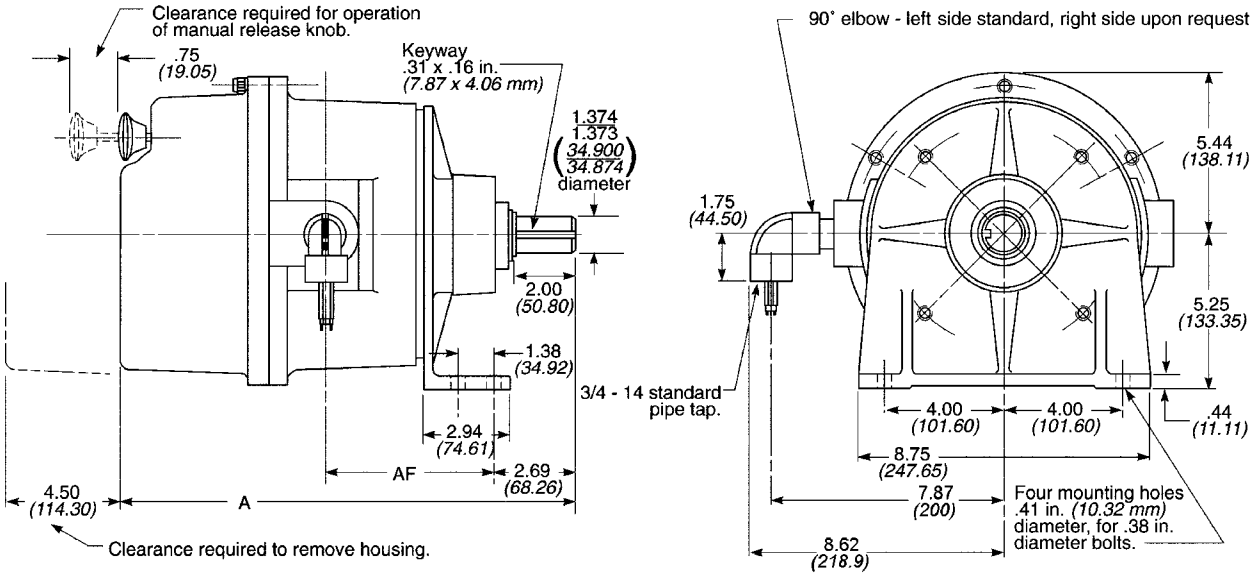
- Self-Adjusting Design
- Epoxy Encapsulated Coil Construction, with Class H Insulation
- NC Thermostat
- Spring-Set Electrically Released
- Lead Wire Length: 36 inches
- Maximum Speed: Horizontal 4000 rpm
- Certified: UL Listed (IP 40 models only), File E-14893 for Class I, Group C and D and Class II, Group F and G. CSA Certified (IP 40 and IP 55 models), File LR-9584 for Class I, Group C and D, and Class II, Group F and G.
- ABS Type Approval Certified

Brake set and release times in milliseconds, when brake and motor are switched separately (for T1/T2 definitions, see page 101):

Static Torque	Coil Size	T1	T2
10, 15, 25, 50	5 & 6	42	20
35, 75, 105	8	48	20

Hazardous-location brakes are intended essentially for non-cyclic or holding purposes, but may be used for stopping light inertial loads.

Dimensions for estimating only. For installation purposes request certified prints.



*Keyseats made to ANSI B17.1 standard

Dimensional Data

Model Number	Enclosure	Nominal Static Torque (lb-ft) *(Nm)*	Dimensions in Inches (Dimensions in Millimeters)		Weight (lbs) *(kg)*
			A	AF	
1-087-312-00-XX	IP 40	10 *(14)*	14.66 *(372.27)*	5.85 *(148.59)*	82 *(37.2)*
1-087-316-00-XX	IP 55				
1-087-322-00-XX	IP 40	15 *(20)*	14.66 *(372.27)*	5.85 *(148.59)*	83 *(37.6)*
1-087-326-00-XX	IP 55				
1-087-332-00-XX	IP 40	25 *(34)*	14.66 *(372.27)*	5.85 *(148.59)*	83 *(37.6)*
1-087-336-00-XX	IP 55				
1-087-342-00-XX	IP 40	35 *(47)*	14.66 *(372.27)*	5.85 *(148.59)*	83 *(37.6)*
1-087-346-00-XX	IP 55				
1-087-352-00-XX	IP 40	50 *(68)*	14.66 *(372.27)*	5.85 *(148.59)*	84 *(38.1)*
1-087-356-00-XX	IP 55				
1-087-362-00-XX	IP 40	75 *(102)*	14.66 *(372.27)*	5.85 *(148.59)*	85 *(38.5)*
1-087-366-00-XX	IP 55				
1-087-382-00-XX	IP 40	105 *(142)*	15.66 *(397.67)*	6.85 *(173.99)*	92 *(41.7)*
1-087-386-00-XX	IP 55				

Series 87,300 continued

Specifications and Ordering Information for Series 87,300-00 (1-087-3XX-00) and Series 87,300-02 (1-087-3XX-02)

Engineering Specifications

Nominal Static Torque (lb-ft) *(Nm)*	No. of Friction Discs	Coil Size	Maximum Solenoid Cycle Rate① cycles/min	Thermal Capacity② hp-sec./min *(watts)*	Inertia (Wk^2) lb-ft² *($kgm^2 \times 10^{-4}$)*
10 *(14)*	1	5	30	15 *(187)*	.056 *(23.68)*
15 *(20)*	1	6	25	15 *(187)*	.056 *(23.68)*
25 *(34)*	1	6	25	15 *(187)*	.056 *(23.68)*
35 *(47)*	1	8	20	15 *(187)*	.056 *(23.68)*
50 *(68)*	2	6	25	15 *(187)*	.089 *(37.56)*
75 *(102)*	2	8	20	15 *(187)*	.089 *(37.56)*
105 *(142)*	3	8	20	15 *(187)*	.127 *(53.64)*

① Maximum solenoid cycle rate is based on ambient temperature of 72°F *(22°C)* with 50% duty cycle. Does not relate to brake cycle rate (see *Thermal Capacity*).

② Thermal capacity rating is based on ambient temperature of 104°F *(40°C)*, stop time of one second or less, with no heat absorbed from motor. Derate thermal capacity by 25% for vertical mounting. Refer to *Selection Procedure* Section.

Current Ratings (amperes)

Coil Size	Voltage: 60 Hz							Voltage: 50 Hz		
	Current	115 VAC	200 VAC	230 VAC	400 VAC	460 VAC	575 VAC	110 VAC	220 VAC	380 VAC
5	Inrush	7.5	4.3	3.7	2.2	1.9	1.5	5.4	4.0	1.9
	Holding	.5	.3	.2	.1	.1	.09	.3	.25	.1
6	Inrush	13.0	7.5	6.4	3.7	3.2	2.6	9.4	5.6	3.2
	Holding	.6	.4	.3	.2	.2	.1	.5	.3	.2
8	Inrush	17.6	10.3	8.8	5.0	4.2	3.5	15.4	7.7	4.2
	Holding	1.2	.7	.6	.3	.3	.24	.1	.5	.3

Motor Frame Adapters

WARNING! Before selecting an adapter to mount a brake on a larger motor frame, the torque and thermal capacity required by the application should be determined as shown in the "Selection Procedure" section. A larger motor may indicate a requirement for greater thermal capacity than the brake is designed for. The brake selection must be matched to the motor and application requirements, before use of an adapter is considered.

Consult the factory.

Ordering and Identification Information

The following example and tables provide information for selecting the appropriate three-letter suffix when ordering a Stearns Brake.

Example of a complete part number: 1-087-341-02-ELC

- EL — Lead wire position (external right)
- C — 460 Vac
- 1-1/8 bore and 1/4 x 1/8 keyway (does not apply to foot mounted brake)
- 02 — Series -02

Hub Selection

Character	Bore (in.)	Keyway* (in. x in.)
D	7/8	3/16 x 3/32
E	1-1/8	1/4 x 1/8
F	1-1/4	1/4 x 1/8
G	1-3/8	5/16x 5/32
H	1-5/8	3/8 x 3/16
maximum allowable bore	1.625 in.	

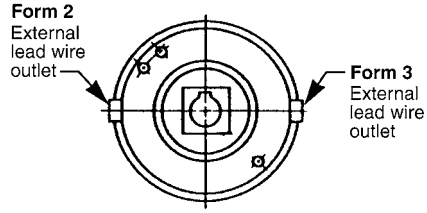
*Keyseats made to ANSI B17.1 standard

Standard AC Voltage Ratings

Character	Voltage	Hz
B	115	60
D	110	50
E	200	60
F	230 190	60 50
H	220	50
L	460 380	60 50
M	415	50
N	575	60
O	110/220	50
P	115/230	60
Q	230/460 190/380	60 50
R	200/400	60

Character	Lead Wire Position
B	Form 2
C	Form 3

Lead Wire Positions



View facing brake mounting register.

Modifications are available-see SAB Modification Section

Series 82,300 (1-082-3XX) Motor Mounted

Division I Hazardous Location

Mounting Face: NEMA 324 and 326 TC, TSC, NEMA 364 and 365 TC,TSC, NEMA 404 and 405 TC, TSC. 12.5" AK, 11.0" AJ

Static Torque: 125 through 330 lb-ft

Enclosure Material: Cast Iron

Release Type: Side lever

Enclosure Protection: Type 1/IP 40, Type 4/IP 56 Hazardous location NEMA 7 and NEMA 9

Modification required for vertical mounting.

Hazardous-location brakes are intended essentially for non-cyclic or holding purposes, but may be used for stopping light inertial loads.

Cast Iron Enclosure, Including new IP 56 & new Fan Guard Mount

- Self-Adjusting Design
- Epoxy Encapsulated Coil Construction, with Class H Insulation
- NC Thermostat
- Spring-Set Electrically Released
- Lead Wire Length: 36 inches
- Maximum Speed:
  3600 RPM Horizontal
  2400 RPM Vertical
- Certified: UL Listed, File E-14893, CSA File LR-9584 for Class I, Group C and D, and Class II, Group E and F, and G.

1-082-3XX-00 Series Close Coupled Hazardous location NEMA 7, 9

Model Number	Enclosure	Nominal Static Torque lb-ft *(Nm)*
1-082-315-00	IP 40	125 *(169)*
1-082-314-00	IP 56	
1-082-325-00	IP 40	175 *(237)*
1-082-324-00	IP 56	
1-082-335-00	IP 40	230 *(312)*
1-082-334-00	IP 56	
1-082-345-00	IP 40	330 *(447)*
1-082-344-00	IP 56	

1-082-3X4-02 Series Fan Guard Mount[1] Hazardous location NEMA 7, 9

Model Number	Enclosure	Nominal Static Torque lb-ft *(Nm)*
1-082-314-02	IP 56	125 *(169)*
1-082-324-02	IP 56	175 *(237)*
1-082-334-02	IP 56	230 *(312)*
1-082-344-02	IP 56	330 *(447)*

[1]Also, see page 51 for Mining Brakes - MSHA Certified series 1-082-3X4-06

1-082-3XX-00 Series Foot Mounted Hazardous location NEMA 7, 9

Model Number	Enclosure	Nominal Static Torque lb-ft *(Nm)*
1-082-316-00	IP 56	125 *(169)*
1-082-326-00	IP 56	175 *(237)*
1-082-336-00	IP 56	230 *(312)*
1-082-346-00	IP 56	330 *(447)*

Ordering and Identification Information

Example of a complete part number:

1-082-314-00-FNB
- FNB — Lead wire position (external left)
- 00 — 575 Vac
- 314 — 1-5/8 bore and 3/8 x 3/16 keyway
- 1-082- — Series : (Motor mount = 00)
  New Fan Guard Mount = 02)

Standard AC Voltage Ratings

Character	Voltage	Hz
B	115	60
D	110	50
E	200	60
F	230 190	60 50
H	220	50
L	460 380	60 50
M	415	50
N	575	60
O	110/220	50
P	115/230	60
Q	230/460 190/380	60 50
R	200/400	60

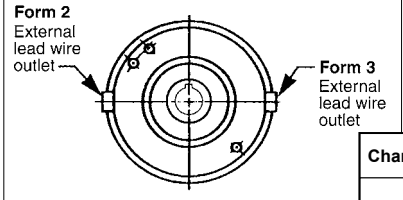
Hub Selection

Character	Bore (in.)	Keyway** (in. x in.)
A	1-1/8	1/4 x 1/8
C	1-3/8	5/16 x 5/32
D	1-1/2	3/8 x 3/16
F	1-5/8	3/8 x 3/16
H	1-3/4	3/8 x 3/16
J	1-7/8	1/2 x 1/4
L *	2	1/2 x 1/4
N	2-1/8	1/2 x 1/4
maximum allowable bore	2.125 in. *(53.975 mm)*	

*These bores are non-standard.

**Keyseats made to ANSI B17.1 standard.

Lead Wire Positions



View facing mounting register on brake.

Character	Lead Wire Position
B	Form 2
C	Form 3

Modifications are available- see SAB Modification Section

Motor Frame Adapters

Adapters are available for mounting to 182TC-256TC, 284-286TC, and 444-445TSC motor frames. See Series 82,000 for details.

Engineering Specifications

Nominal Static Torque (lb-ft) *(Nm)*	No. of Friction Discs	Coil Size	Maximum Solenoid Cycle Rate① cycles/min	Thermal Capacity② hp-sec/min *(watts)*	Inertia (Wk^2) lb-ft2 *($kgm^2 \times 10^{-4}$)*
125 *(169)*	2	9	15	10 *(124)*	.228 *(95.76)*
175 *(237)*	2	9	15	10 *(124)*	.228 *(95.76)*
230 *(312)*	3	9	15	10 *(124)*	.317 *(133.14)*
330 *(447)*	3	K9	13	10 *(124)*	.317 *(133.14)*

① Maximum solenoid cycle rate is based on ambient temperature of 72°F *(22°C)* with 50% duty cycle. Does not relate to brake cycle rate (see Thermal Capacity).

② Thermal capacity rating is based on ambient temperature of 72°F *(22°C)*, stop time of one second or less, with no heat absorbed from motor. Refer to "Selection Procedure" Section.

Current Ratings (amperes) 82,300 Motor Mounted and Foot Mounted

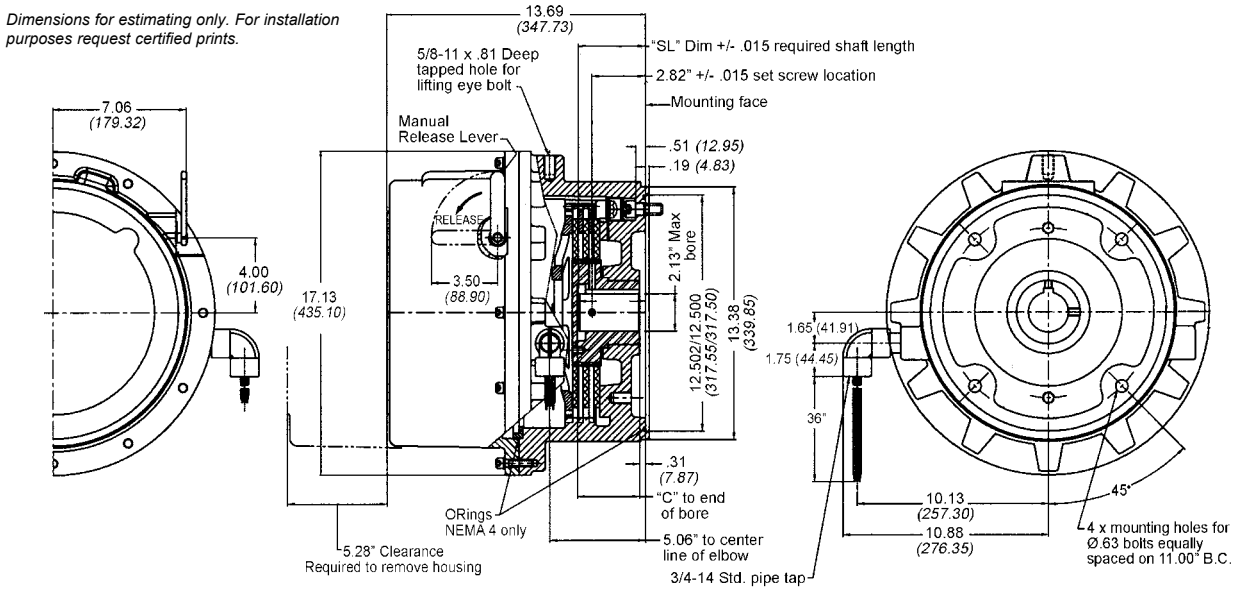
Coil Size	Voltage: 60 Hz						
	Current	**115 VAC**	**200 VAC**	**230 VAC**	**400 VAC**	**460 VAC**	**575 VAC**
9	Inrush	44.0	25.4	22.0	12.7	11.1	8.8
	Holding	1.6	.9	.8	.5	.4	.3
	Voltage: 50 Hz						
	Current	**110 VAC**	**220 VAC**	**380 VAC**			
	Inrush	32.1	16.0	11.1			
	Holding	1.2	.6	.4			
K9	**Voltage: 60 Hz**						
	Current	**115 VAC**	**200 VAC**	**230 VAC**	**400 VAC**	**460 VAC**	**575 VAC**
	Inrush	50.0	28.0	25.0	14.0	12.5	10.0
	Holding	2.2	1.3	1.1	.6	.6	.4
	Voltage: 50 Hz						
	Current	**110 VAC**	**220 VAC**	**380 VAC**			
	Inrush	36.0	24.0	12.5			
	Holding	1.6	.9	.6			

Series 82,300 Continued

1-082-3XX-00 Series Motor Mounted Brake

Mounting Requirements: 1-082-3XX-00 Series Hazardous Location Motor Mounted Brake is used for mounting close coupled (directly) to the motor end bell. If brake is to be mounted to a motor fan guard, or if a motor frame adapter is incorporated, please contact the factory for information on Series 1-082-3X4-02, as it provides additional bearing support for the longer shaft that is required. The acceptability of the brake and motor combination must be determined by Underwriters Laboratories Inc.

Enclosure Protection: Type 1/IP 40, Type 4/IP 56, and Hazardous Location NEMA 7, 9



Model Number	Torque	C	SL
1-082-31X-00	125 lb-ft	2.79	3.03
1-082-32X-00	175 lb-ft	*(70.87)*	*(76.96)*
1-082-33X-00	230 lb-ft	3.29	3.53
1-082-34X-00	330 lb-ft	*(83.57)*	*(89.66)*

Above drawing is for motor mounted brake only. For fan guard mounted brake (1-082-3X4-02 series), request Stearns drawing no. 1-082-304-2D.

1-082-3X6-00 Series Foot Mounted Brake

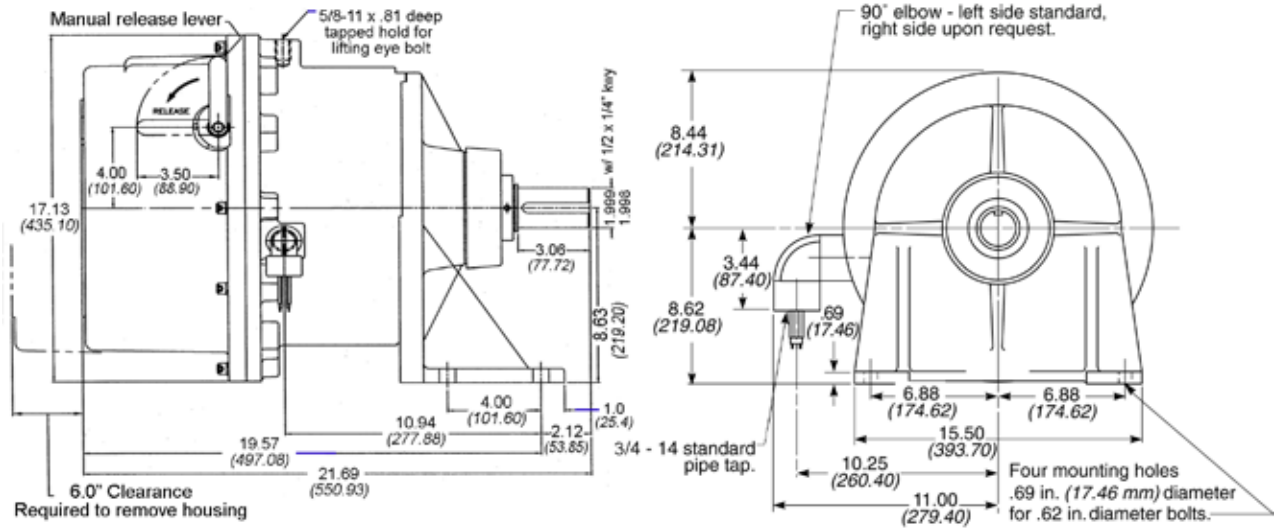
Mounting Requirements: 1-082-3X6-00 Series Hazardous Location Foot Mounted Brake does not require assembly to the motor to complete the hazardous location enclosure.

Enclosure Protection: Type 4/IP 56 and Hazardous Location NEMA 7, 9

Hazardous-location brakes are intended essentially for non-cyclic or holding purposes, but may be used for stopping light inertial loads.

Dimensions for estimating only. For installation purposes, request certified prints.

*Keyseats made to ANSI B17.1 standard



Series 56,800 (1-056-8XX)
Division 2 Hazardous Location
Mounting Face: NEMA 56C, 143TC and 145TC
4.5” AK, 5.88” AJ

Static Torque: 1.5 through 25 lb-ft

Enclosure Material: Cast Iron

Release Type: Side Lever, maintained with auto reset

Enclosure Protection: Type 4/IP 56

Certified: UL Listed, File E 14893 for Class 1, Division 2, Groups A, B, C, D, and Class II, Division 2, Groups F and G

Mounting Requirements: 1-056-8X2 Series Hazardous Location Motor Mounted Brake is recommended for mounting close coupled to the motor end bell. The acceptability of the brake and motor combination must be determined by Underwriters Laboratory.

Universal Mounting: Through 15 lb-ft. 20 and 25 lb-ft. supplied with springs for vertical modification.

Epoxy Encapsulated Coil Construction, with Class H Insulation

NC Thermostat

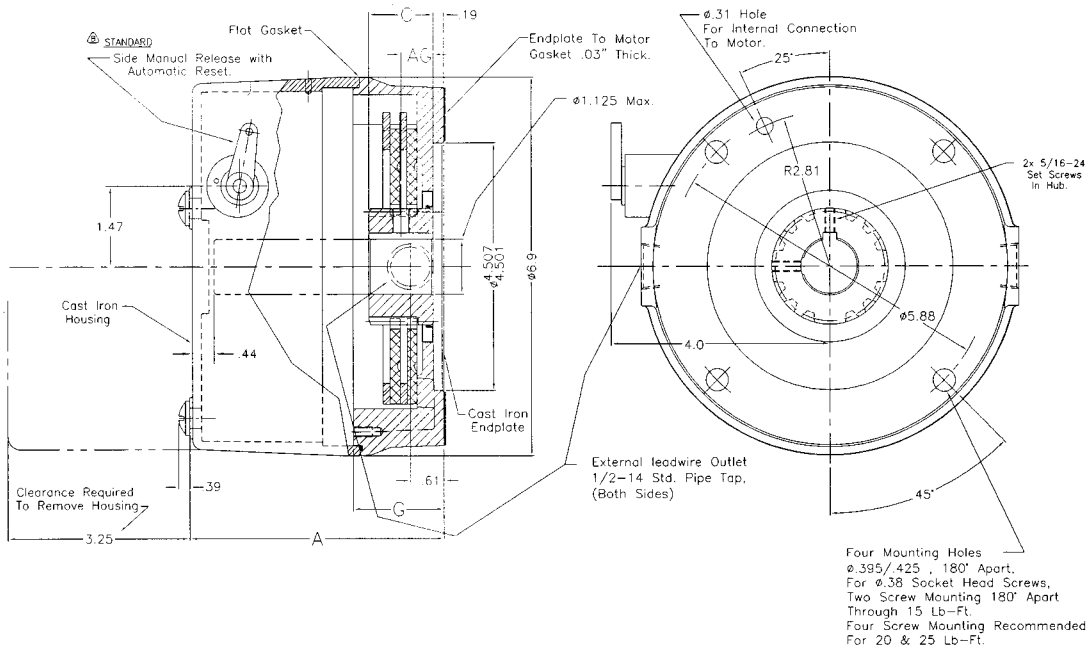
Maximum speed:
Horizontal 5000 rpm
Vertical 3600 rpm

Installation, Service and Parts List:
P/N 8-078-905-18

ABS Type Approval Certified

Brake set and release times in milliseconds, when brake and motor are switched separately (for T1/T2 definitions, see page 101):

Static Torque	Coil Size	T1	T2
1.5 - 25	4, K4, K4+, M4+	25	14



Dimensions for estimating only. For installation purposes request certified prints.

Motor Frame Adapters

WARNING! Before selecting an adapter to mount a brake on a larger motor frame, the torque and thermal capacity required by the application should be determined as shown in the “Selection Procedure” section. A larger motor may indicate a requirement for greater thermal capacity than the brake is designed for. The brake selection must be matched to the motor and application requirements, before use of an adapter is considered.

To Adapt to NEMA Frame Size	AK Dim. in. (mm)	Reg. No.	Brake Torque	Adapter Stock Number	Additional Shaft Length Required in. (mm)
182TC 184TC 213TC 215TC 254TC 256TC	8.50 (215.90)	-9	1.5-6	5-55-5041-00	.94 (23.81)
	8.50 (215.90)	-9	10-25	5-55-5043-00	.94 (23.81)

For adapter dimensions, see *Technical Data*.

Dimensions

Model Number	Nominal Static Torque (lb-ft) (Nm)	Dimensions in Inches (Dimensions in Millimeters) A	AG	C	G	Enclosure	Wt. lbs (kg)
1-056-812-00	3 (4)	4.7 (119.4)	.59 (15.0)	1.18 (30.0)	1.66 (42.2)	IP 56	15
1-056-822-00	6 (8)	4.7 (119.4)	.59 (15.0)	1.18 (30.0)	1.66 (42.2)	IP 56	15
1-056-832-00	10 (14)	4.7 (119.4)	.59 (15.0)	1.18 (30.0)	1.66 (42.2)	IP 56	17
1-056-842-00	15 (20)	4.7 (119.4)	.59 (15.0)	1.18 (30.0)	1.66 (42.2)	IP 56	17
1-056-852-00	20 (27)	4.7 (119.4)	.59 (15.0)	1.18 (30.0)	1.66 (42.2)	IP 56	21
1-056-862-00	25 (34)	4.7 (119.4)	.59 (15.0)	1.18 (30.0)	1.66 (42.2)	IP 56	21

Engineering Specifications

Nominal Static Torque	No. of Friction Discs	Coil Size	Maximum Solenoid Cycle Rate①	Thermal Capacity②	Inertia (Wk^2)
lb-ft *(Nm)*		AC	cycle/min	hp-sec/min *(watts)*	lb-ft² (kgm² x 10^{-4})
			AC	Horizontal	
1.5 *(2)*	1	4	7.5	3.5 *(43.50)*	.008 *(3.36)*
3 *(4)*	2	4	7.5	3.5 *(43.50)*	.014 *(5.88)*
6 *(8)*	2	4	7.5	3.5 *(43.50)*	.014 *(5.88)*
10 *(14)*	2	K4	7.5	3.5 *(43.50)*	.014 *(5.88)*
15 *(20)*	2	K4+	7.5	3.5 *(43.50)*	.014 *(5.88)*
20 *(27)*	3	K4+	7.5	3.5 *(43.50)*	.020 *(8.40)*
25 *(34)*	3	M4+	7.5	3.5 *(43.50)*	.020 *(8.40)*

① Maximum solenoid cycle rate is based on ambient temperature of 104°F *(40°C)* with 50% duty cycle. Does relate to brake cycle rate (see *Thermal Capacity*).

② Thermal capacity rating is based on ambient temperature of 104°F *(40°C)*, stop time of one second or less, with no heat absorbed from motor. Derate thermal capacity by 25% for vertical mounting. Refer to *Selection Procedure* Section.

Current Ratings (amperes)

Solenoid Coil Size	AC Current	Voltage: 60 Hz						Voltage: 50 Hz		
		115 Vac	200 Vac	230 Vac	400 Vac	460 Vac	575 Vac	110 Vac	220 Vac	380 Vac
4	Inrush	3.6	2.1	1.8	1.1	.9	.7	4.1	2.1	.9
	Holding	.3	.2	.2	.08	.08	.06	.3	.2	.08
K4	Inrush	4.3	2.5	2.2	1.3	1.1	.9	3.8	1.9	1.1
	Holding	.3	.2	.2	.1	.08	.07	.4	.2	.08
K4+	Inrush	4.6	2.5	2.3	1.2	1.0	.9	4.9	2.0	1.0
	Holding	.4	.2	.2	.1	.1	.08	.4	.2	.1
M4+	Inrush	4.6	2.5	2.3	1.2	1.0	.9	4.1	2.0	1.3
	Holding	.4	.2	.2	.1	.1	.08	.4	.2	.1

Ordering and Identification Information

The following example and tables provide information for selecting the appropriate three-letter suffix when ordering a Stearns Brake.

Example of a complete part number: 1-056-832-00-BFF
- BFF — Lead wire position (internal and external, left and right)
- F — 230 Vac
- F — 5/8 bore and 3/16 x 3/32 keyway

Hub Selection

Character	Bore (in.)	Keyway** (in. x in.)
A*	5/8	1/8 x 1/16
B	5/8	3/16 x 3/32
C	3/4	3/16 x 3/32
D	7/8	3/16 x 3/32
E	1-1/8	1/4 x 1/8
F*	1-1/4	1/4 x 1/8
K	1/2	1/8 x 1/16
L*	1	1/4 x 1/8
N*	9/16	1/8 x 1/16
O*	11/16	3/16 x 3/32
P*	1-1/6	1/4 x 1/8
R*	13/16	3/16 x 3/32
S*	15/16	1/4 x 1/8

Maximum allowable bore 1.25. For thru-shaft applications, .875 is maximum.

*These bores are non-standard.

**Keyseats made to ANSI B17.1 standard.

Standard AC Voltage Ratings

Character	Voltage	Hz
B	115	60
D	110	50
E	200	60
F	230 190	60 50
H	220	50
L	460 380	60 50
M	415	50
N	575	60
O	110/220	50
P	115 230	60
Q	230/460 190/380	60
R	200/400	60

DC voltages not available.

Space heater not available.

Modifications are available- see SAB Modification Section

Series 87,800 (1-087-8XX)
Division 2 Hazardous Location
Mounting Face: NEMA 182TC 184TC, 213TC, 215TC, 254TC, 254UC, 256TC and 256UC
8.5" AK, 7.25" AJ

Static Torque: 6 through 105 lb-ft

Enclosure Material: Cast Iron

Release Type: Knob

Enclosure Protection: Type 4/IP 56 Division 2 Hazardous Duty

Certified: UL Listed, File E-14893. For Hazardous Location Classification, see Dimensional Data below.

Mounting Requirements: 1-87-8XX Series Hazardous Location Motor Mounted Brake is recommended for mounting close coupled to the motor end bell. The acceptability of the brake and motor combination must be determined by Underwriters Laboratory.

Modification required for vertical above mounting. For vertical below, modification required on 50-105 lb-ft.

Epoxy Encapsulated Coil Construction, with Class H Insulation

NC Thermostat

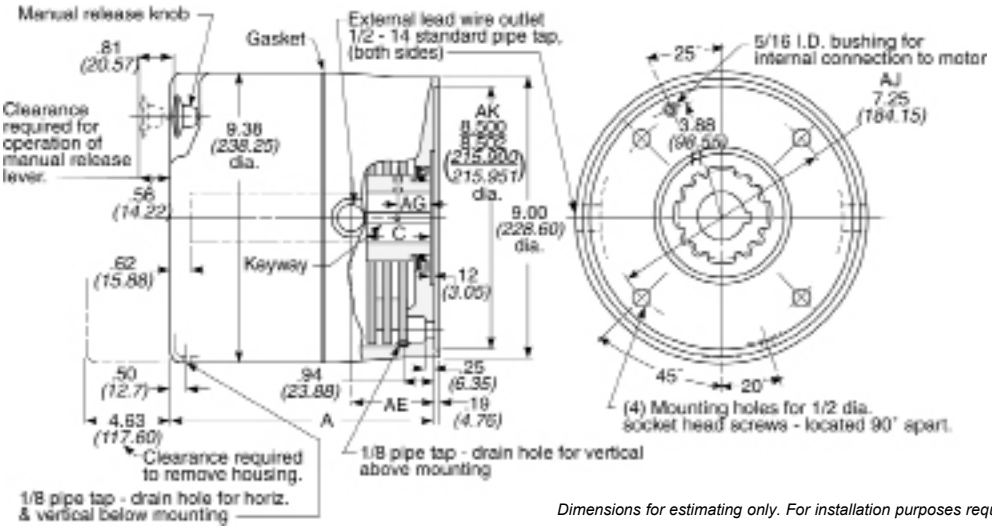
Maximum speed:
Horizontal 4000 rpm
Vertical 3000 rpm

ABS Type Approval Certified

Installation, Service & Parts List:
P/N 8-078-927-08

Brake set and release times, when brake and motor are switched separately (for T1/T2 definitions, see page 101):

Static Torque	Coil Size	T1	T2
10, 15, 25, 50	5 & 6	42	20
35, 75, 105	8	48	20



Dimensions for estimating only. For installation purposes request certified prints.

Dimensional Data

Model Numbers	Nominal Static Torque lb-ft (Nm)	Hazardous Location Classification Division 2		Dimensions in Inches (Dimensions in Millimeters)				Enclosure	Wt. lbs (kg)
		Class I Group -	Class II Group -	A	AE	AG	C		
1-087-802-00	6 (8)		F, G	7.56 (192.02)	1.81 (45.97)	.78 (19.81)	1.00 (25.4)	IP 56	42 (19.1)
1-087-802-01	6 (8)	A, B, C, D	F, G	7.56 (192.02)	1.81 (45.97)	.78 (19.81)	1.00 (25.4)	IP 56	42 (19.1)
1-087-812-00	10 (14)		F, G	7.56 (192.02)	1.81 (45.97)	.78 (19.81)	1.00 (25.4)	IP 56	42 (19.1)
1-087-812-01	10 (14)	A, B, C, D	F, G	7.56 (192.02)	1.81 (45.97)	.78 (19.81)	1.00 (25.4)	IP 56	42 (19.1)
1-087-822-00	15 (20)		F, G	7.56 (192.02)	1.81 (45.97)	.78 (19.81)	1.00 (25.4)	IP 56	43 (19.5)
1-087-822-01	15 (20)	A, B, C, D	F, G	7.56 (192.02)	1.81 (45.97)	.78 (19.81)	1.00 (25.4)	IP 56	43 (19.5)
1-087-832-00	25 (34)		F, G	7.56 (192.02)	1.81 (45.97)	.78 (19.81)	1.00 (25.4)	IP 56	43 (19.5)
1-087-832-01	25 (34)	A, B, C, D	F, G	7.56 (192.02)	1.81 (45.97)	.78 (19.81)	1.00 (25.4)	IP 56	43 (19.5)
1-087-842-00	35 (47)		F, G	7.56 (192.02)	1.81 (45.97)	.78 (19.81)	1.00 (25.4)	IP 56	46 (20.9)
1-087-842-01	35 (47)	A, B, C, D	F, G	7.56 (192.02)	1.81 (45.97)	.78 (19.81)	1.00 (25.4)	IP 56	46 (20.9)
1-087-852-00	50 (68)		F, G	7.56 (192.02)	2.31 (58.67)	.97 (24.64)	1.50 (38.10)	IP 56	42 (19.1)
1-087-852-01	50 (68)	A, B, C, D	F, G	7.56 (192.02)	2.31 (58.67)	.97 (24.64)	1.50 (38.10)	IP 56	42 (19.1)
1-087-862-00	75 (102)		F, G	7.56 (192.02)	2.31 (58.67)	.97 (24.64)	1.50 (38.10)	IP 56	50 (22.7)
1-087-862-01	75 (102)	A, B, C, D	F, G	7.56 (192.02)	2.31 (58.67)	.97 (24.64)	1.50 (38.10)	IP 56	50 (22.7)
1-087-882-00	105 (142)		F, G	8.56 (217.42)	2.81 (71.37)	.97 (24.64)	2.00 (50.80)	IP 56	50 (22.7)
1-087-882-01	105 (142)	A, B, C, D	F, G	8.56 (217.42)	2.81 (71.37)	.97 (24.64)	2.00 (50.80)	IP 56	50 (22.7)

Motor Frame Adapters:

WARNING! Before selecting an adapter to mount a brake on a larger motor frame, the torque and thermal capacity required by the application should be determined as shown in the "Selection Procedure" section. A larger motor may indicate a requirement for greater thermal capacity than the brake is designed for. The brake selection must be matched to the motor and application requirements, before use of an adapter is considered.

To Adapt to NEMA Frame Size	AK Dim. in. (mm)	Reg. No.	Adapter Stock Number	Additional Shaft Length Required in. (mm)
56C, 143TC or 145TC	4.50 *(114.30)*	-05	Brake endplate is modified for 4.50 in. AK. An adapter is not furnished. Add: $340.00	— *(—)*
			5-55-7043-00	.56 (14.22)
284 TC or 286TC	10.50 *(266.70)*	-11	5-55-7055-00	.81 (20.64)
324TC, 326TC, 364TC, 365TC, 404TC or	12.50 *(317.50)*	-13	5-55-7046-00	.88 (22.22)

For adapter dimensions, see *Technical Data.*

Current Ratings (amperes)

Coil Size	AC Current	Voltage: 60 Hz						Voltage: 50 Hz		
		115	200	230	400	460	575	110	220	380
5	inrush	7.5	4.3	3.7	2.2	1.9	1.5	5.4	4.0	1.9
	holding	.5	.3	.2	.1	.1	.09	.3	.25	.1
6	inrush	13.0	7.5	6.5	3.7	3.2	2.6	9.4	5.6	3.2
	holding	.6	.4	.3	.2	.2	.1	.5	.3	.2
8	inrush	17.6	10.3	8.8	5.0	4.2	3.5	15.4	7.7	4.2
	holding	1.2	.7	.6	.3	.3	.3	.1	.5	.3

Engineering Specifications

Nominal Static Torque lb-ft *(Nm)*	No. of Friction Discs	Coil Size	Maximum Solenoid Cycle Rate① cycles/ min	Thermal Capacity② hp-sec/min *(watts)*	Inertia (Wk^2) lb-ft.^{2} ($kgm^2 \times 10^{-4}$)
6 *(8)*	1	5	4	14 *(174)*	.048 *(20.34)*
10 *(14)*	1	5	4	14 *(174)*	.048 *(20.34)*
15 *(20)*	1	6	4	14 *(174)*	.048 *(20.34)*
25 *(34)*	1	6	4	14 *(174)*	.048 *(20.34)*
35 *(47)*	1	8	4	14 *(174)*	.048 *(20.34)*
50 *(68)*	2	6	4	14 *(174)*	.089 *(37.40)*
75 *(102)*	2	8	4	14 *(174)*	.089 *(37.40)*
105 *(142)*	3	8	4	14 *(174)*	.129 *(54.45)*

① Maximum solenoid cycle rate is based on ambient temperature of 104°F (40°C) with 50% duty cycle. Does relate to brake cycle rate (see Thermal Capacity).

② Thermal capacity rating is based on ambient temperature of 104° (40°C), stop time of ne second or less, with no heat absorbed from motor. Derate thermal capacity by 25% for vertical mounting. Refer to *Selection Procedure Section.*

Ordering and Identification Information

The following example and tables provide information for selecting the appropriate three-letter suffix when ordering a Stearns Brake.

Example of a complete part number:

1-087-832-01-ELF
- E — Lead wire position (internal and external, left and right)
- L — 460 Vac
- F — 1-1/8 bore and 1/4 x 1/8 keyway

Hub Selection

Character	Bore (in.)	Keyway** (in. x in.)
A*	5/8	1/8 x 1/16
B*	5/8	3/16 x 3/32
C*	3/4	3/16 x 3/32
D	7/8	3/16 x 3/32
E	1-1/8	1/4 x 1/8
F	1-1/4	1/4 x 1/8
G	1-3/8	5/16 x 5/32
H	1-5/8	3/8 x 3/16
I*	1-3/4	3/8 x 3/16
K*	1/2	1/8 x 1/16
L*	1	1/4 x 1/8
M*	1-1/2	3/8 x 3/16
N*	9/16	1/8 x 1/16
O*	11/16	3/16 x 3/32
P*	1-1/16	1/4 x 1/8
Q*	1-7/16	3/8 x 3/16
R*	13/16	3/16 x 3/32
S*	15/16	1/4 x 1/8
T*	1-3/16	1/4 x 1/8
U*	1-5/16	5/16 x 5/32
Z	.600	pilot bore

Maximum allowable bore 1.625.

*These bores are non-standard.

**Keyseats made to ANSI B17.1 standard.

Standard AC Voltage Ratings

Character	Voltage	Hz
B	115	60
D	110	50
E	200	60
F	230 190	60 50
H	220	50
L	460 380	60 50
M	415	50
N	575	60
O	110/220	50
P	115/230	60
Q	230/460 230	60 50
R	200/400	60

Modifications are available- see SAB Modification Section

Optional Space Heater for Class II Brakes only

Series 56,700 (1-056-7XX) Die Cast Aluminum (1-056-7XS) Stainless Steel

Mounting Face: NEMA 56C, 143TC and 145TC

4.5” AK, 5.88” AJ

Static Torque: 1.5 through 25 lb-ft

Enclosure Material: IP 23, 54 & 55 Die Cast Aluminum; IP 56 Stainless Steel

Release Type: Knob, Maintained with automatic reset

Enclosure Protection: IP 23 & 54 (formerly referred to by Stearns as NEMA Type 2 & 4 respectively).

IP 55 & 56 (formerly referred to by Stearns as NEMA Type 4X BISSC Certified & Type 4X stainless steel enclosure, respectively).

- ABS Type Approval Certified
- Spring-Set Electrically Released
- Adjustable Torque
- Manual Release Knob, Maintained with Automatic Reset
- Manual Wear Adjustment
- Maximum Speed: 5000 rpm Horizontal
  3600 rpm Vertical

Note: 56,700 Series mounts between C-Face motor and reducer. Do not apply overhung load to brake output shaft.

Installation and Service: P/N 8-078-905-67

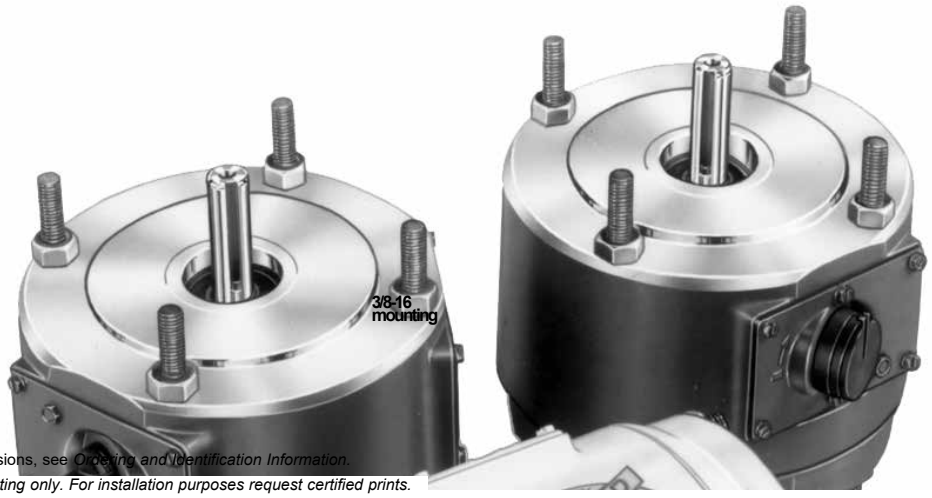
Parts List: P/N 8-078-906-07

Modifications: Pages 54-63

Universal Mounting: Through 15 lb-ft.
20 and 25 lb-ft. supplied with springs for vertical modification.

Brake set and release times in milliseconds, when brake and motor are switched separately (for T1/T2 definitions, see page 101)

Static Torque lb-ft	Coil Size	T1	T2
1½ - 25	4, K4, K4+, M4+	25	14



* For X and U dimensions, see *Ordering and Identification Information.*

Dimensions for estimating only. For installation purposes request certified prints.

Dimensions

Nominal Static Torque (lb-ft) *(Nm)*	Enclosure	Type	Basic Model Number	Dimensions in Inches *(mm)* A	J	L	Wt. lbs *(kg)*
1.5 *(2)*	IP 23	AC	1-056-701-0X	4.91 *(124.7)*	3.81 *(96.8)*	1.53 *(38.9)*	12 *(5.4)*
	IP 54	AC	1-056-702-0X	4.94 *(125.5)*	3.88 *(98.6)*	1.53 *(38.9)*	13 *(5.9)*
	IP 55	AC	1-056-704-0X	4.94 *(125.5)*	3.88 *(98.6)*	1.53 *(38.9)*	13 *(5.9)*
3 *(4)*	IP 23	AC	1-056-711-0X	4.91 *(124.7)*	3.81 *(96.8)*	1.53 *(38.9)*	12 *(5.4)*
	IP 54	AC	1-056-712-0X	4.94 *(125.5)*	3.88 *(98.6)*	1.53 *(38.9)*	13 *(5.9)*
	IP 55	AC	1-056-714-0X	4.94 *(125.5)*	3.88 *(98.6)*	1.53 *(38.9)*	13 *(5.9)*
	IP 56	AC	1-056-71S-0X	4.94 *(125.5)*	3.88 *(98.6)*	1.53 *(38.9)*	22 *(10)*
6 *(8)*	IP 23	AC	1-056-721-0X	4.91 *(124.7)*	3.81 *(96.8)*	1.53 *(38.9)*	12 *(5.4)*
	IP 54	AC	1-056-722-0X	4.94 *(125.5)*	3.88 *(98.6)*	1.53 *(38.9)*	13 *(5.9)*
	IP 55	AC	1-056-724-0X	4.94 *(125.5)*	3.88 *(98.6)*	1.53 *(38.9)*	13 *(5.9)*
	IP 56	AC	1-056-72S-0X	4.94 *(125.5)*	3.88 *(98.6)*	1.53 *(38.9)*	22 *(10)*
10 *(14)*	IP 23	AC	1-056-731-0X	4.91 *(124.7)*	3.81 *(96.8)*	1.53 *(38.9)*	12 *(5.4)*
	IP 54	AC	1-056-732-0X	4.94 *(125.5)*	3.88 *(98.6)*	1.53 *(38.9)*	13 *(5.9)*
	IP 55	AC	1-056-734-0X	4.94 *(125.5)*	3.88 *(98.6)*	1.53 *(38.9)*	13 *(5.9)*
	IP 56	AC	1-056-73S-0X	4.94 *(125.5)*	3.88 *(98.6)*	1.53 *(38.9)*	22 *(10)*

Dimensions

Nominal Static Torque (lb-ft) *(Nm)*	Enclosure	Type	Basic Model Number	Dimensions in Inches *(mm)* A	J	L	Wt. lbs *(kg)*
15 *(20)*	IP 23	AC	1-056-741-0X	4.91 *(124.7)*	3.81 *(96.8)*	1.53 *(38.9)*	12 *(5.4)*
	IP 54	AC	1-056-742-0X	4.94 *(125.5)*	3.88 *(98.6)*	1.08 *(27.4)*	13 *(5.9)*
	IP 55	AC	1-056-744-0X	4.94 *(125.5)*	3.88 *(98.6)*	1.08 *(27.4)*	13 *(5.9)*
	IP 56	AC	1-056-74S-0X	4.94 *(125.5)*	3.88 *(98.6)*	1.53 *(38.9)*	22 *(10)*
20 *(27)*	IP 23	AC	1-056-751-07	5.36 *(136.1)*	3.81 *(96.8)*	1.08 *(27.4)*	12 *(5.4)*
	IP 54	AC	1-056-752-07	5.39 *(136.9)*	3.88 *(98.6)*	1.08 *(27.4)*	14 *(6.3)*
	IP 55	AC	1-056-754-07	5.39 *(136.9)*	3.88 *(98.6)*	1.08 *(27.4)*	14 *(6.3)*
	IP 56	AC	1-056-75S-0X	5.39 *(136.9)*	3.88 *(98.6)*	1.08 *(27.4)*	22 *(10)*
25 *(34)*	IP 23	AC	1-056-761-07	5.36 *(136.1)*	3.81 *(96.8)*	1.08 *(27.4)*	13 *(5.9)*
	IP 54	AC	1-056-762-07	5.39 *(136.9)*	3.88 *(98.6)*	1.08 *(27.4)*	14 *(6.3)*
	IP 55	AC	1-056-764-07	5.39 *(136.9)*	3.88 *(98.6)*	1.08 *(27.4)*	14 *(6.3)*
	IP 56	AC	1-056-76S-0X	5.39 *(136.9)*	3.88 *(98.6)*	1.08 *(27.4)*	22 *(10)*

* X in 9th digit designates hub bore and shaft size.

Series 56,700 Continued

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Engineering Specifications

Nominal Static Torque	No. of Friction Discs	Coil Size		Maximum Solenoid Cycle Rate①		Thermal Capacity②		Inertia (Wk^2)
lb-ft *(Nm)*		AC	DC	cycles/min		hp-sec/min *(watts)*		lb - ft^2 ($kgm^2 \times 10^{-4}$)
				AC	DC	Horizontal	Vertical	
1.5 *(2)*	1	4	4+	36	20	9 *(112)*	6.5 *(80)*	.008 *(3.36)*
3 *(4)*	1	4	4+	36	20	9 *(112)*	6.5 *(80)*	.008 *(3.36)*
6 *(8)*	1	K4	K4-	36	20	9 *(112)*	6.5 *(80)*	.008 *(3.36)*
10 *(14)*	2	K4	K4+	36	20	9 *(112)*	6.5 *(80)*	.014 *(5.88)*
15 *(20)*	2	K4+	M4+	36	20	9 *(112)*	6.5 *(80)*	.014 *(5.88)*
20 *(27)*	3	K4+	M4+	36	20	9 *(112)*	6.5 *(80)*	.020 *(8.40)*
25 *(34)*	3	M4+	P4+	36	20	9 *(112)*	6.5 *(80)*	.020 *(8.40)*

① Maximum solenoid cycle rate is based on ambient temperature of 72°F *(22°C)* with 50% duty cycle. Does not relate to brake cycle rate (see Thermal Capacity).

② Thermal capacity rating is based on ambient temperature of 72°F *(22°C)*, stop time of one second or less, with no heat absorbed from motor. Refer to *Selection Procedure* Section.

Current Ratings (amperes)

Solenoid Coil Size	AC Current	Voltage: 60 Hz						Voltage: 50 Hz			Voltage: DC			
		115	200	230	400	460	575	110	220	380	24	95	115	230
4	inrush holding	3.6 .3	2.1 .2	1.8 .2	1.1 .08	.9 .08	.7 .06	4.1 .3	2.1 .2	.9 .08	13.3 .3	3.6 .1	2.8 .05	1.5 .03
4+	inrush holding	–	–	–	–	–	–	–	–	–	12.0 .4	4.7 .1	3.7 .08	2.0 .04
K4	inrush holding	4.3 .3	2.5 .2	2.2 .2	1.3 .1	1.1 .08	.9 .07	3.8 .4	1.9 .2	1.1 .08	17.5 .4	4.7 .1	3.7 .08	2.0 .04
K4+	inrush holding	4.6 .4	2.5 .2	2.3 .2	1.2 .1	1.0 .1	.9 .08	4.9 .4	2.0 .2	1.0 .1	20.5 .5	7.5 .1	5.5 .08	2.0 .04
M4	inrush holding	3.0 .6	1.7 .3	1.5 .3	.9 .2	.8 .1	.6 .1	–	–	.8 .1	–	–	–	–
M4+	inrush holding	4.6 .4	2.5 .2	2.3 .2	1.2 .1	1.0 .1	.9 .08	4.1 .4	2.0 .2	1.3 .1	30.3 .5	7.9 .1	5.5 .08	2.0 .04
P4+	inrush holding	–	–	–	–	–	–	–		–	30.3 .5	11.3 .1	8.4 .08	3.0 .04

Ordering and Identification Information

The following example and tables provide information for selecting the appropriate three-letter suffix when ordering a Stearns Brake.

Example of a complete part number:

1-056-731-05-–FF
- Series: 1-056
- Torque: 731
- Enclosure: 05
- 5/8 hub bore and shaft
- Does not apply
- 230 Vac
- Lead wire position (internal and external, left and right)

Hub Bore, Shaft and Keyway Sizes

9th Digit of Model No.	Bore Dia. (X)	Keyway**	Shaft Dia. (U)	Keyway**
5	.625	.19 x .09	.625	.19 x .09
7	.875	.19 x .09	.875	.19 x .09
8*	.875 with sleeve to convert to .625	.19 x .09	.625 with sleeve to convert to .875	.19 x .09

*One sleeve provided in each brake.

**Keyseats made to ANSI B17.1 standard.

Standard AC Voltage Ratings

Character	Voltage	Hz
B	115	60
D	110	50
E	200	60
F	230 190	60 50
H	220	50
L	460 380	60 50
M	415	50
N	575	60
O	110/220	50
P	115/208 230	60
Q	208 230/460 190/380	60 50
R	200/400	60

Modifications are available- see SAB Modification Section

Series 87,700 (1-087-7XX)

Mounting Face: NEMA 182TC 184TC, 213TC, 215TC, 254TC, 254UC, 256TC and 256UC Double C-Face Coupler

8.5” AK, 7.25” AJ

Static Torque: 6 through 105 lb-ft

Enclosure Material:
Aluminum Housing, Cast Iron Endplate

Release Type: Side Lever, Maintained with automatic reset

Enclosure Protection: IP 23, 54 & 55 (formerly referred to by Stearns as NEMA 2, 4 & 4X BISSC Certified, respectively).

Installation and Service Instructions:
P/N 8-078-927-27 *Rev. B & C*

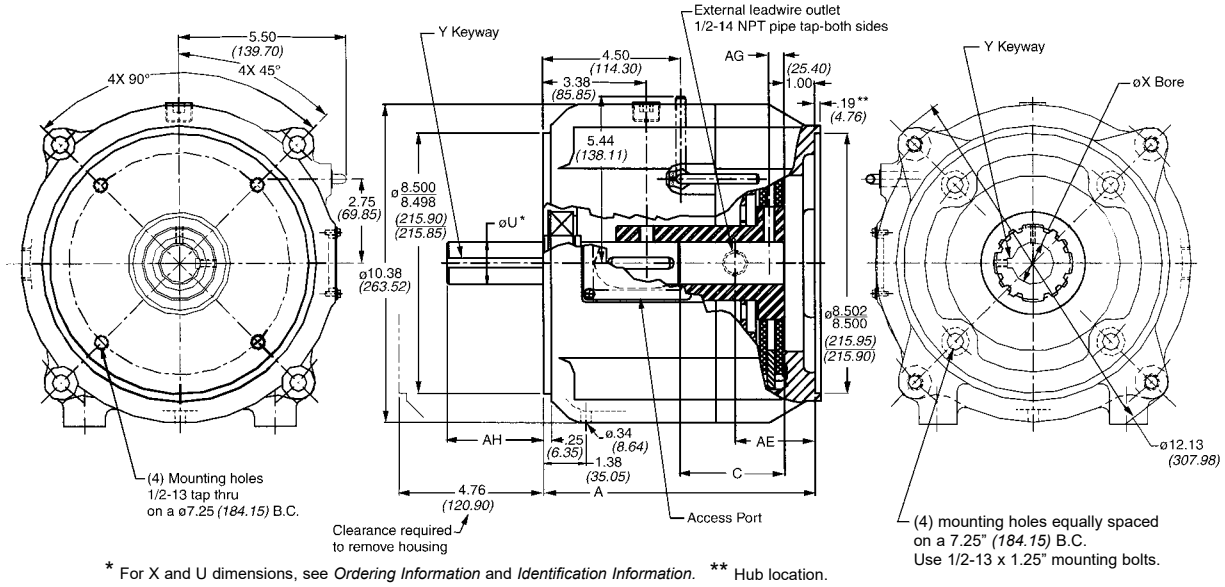
Parts List: P/N 8-078-917-57 *Rev. B*
P/N 8-078-917-67 *Rev. C*

Modifications: Pages 54-63

Note: 87,700 Series mounts between C-Face motor and reducer. Do not apply overhung load to brake output shaft.

Modification required for vertical above mounting. For vertical below, modification required on 50-105 lb-ft..

- ABS Type Approval Certified
- Spring-Set Electrically Released
- Self-Adjusting Design
- Maximum Speed: Horizontal 4000 rpm
  Vertical 3600 rpm
- Certified: CSA File LR-6254



* For X and U dimensions, see *Ordering Information* and *Identification Information.* ** Hub location.

Dimensions for estimating only. For installation purposes request certified prints.

Dimensional Data

Nominal Static Torque lb-ft (Nm)	Enclosure	Basic Model Number	Dimensions in Inches *(Dimensions in Millimeters)*				Wt. lbs (kg)**
		AC	A	AE	AG	C	
10 *(14)*	IP 23	1-087-711-0X	8.38 *(212.72)*	2.12 *(53.93)*	.19 *(4.83)*	2.81 *(71.44)*	66 *(30.0)*
	IP 54	1-087-712-0X					
	IP 55	1-087-712-BX					
15 *(20)*	IP 23	1-087-721-0X	8.38 *(212.72)*	2.12 *(53.93)*	.19 *(4.83)*	2.81 *(71.44)*	66 *(30.0)*
	IP 54	1-087-722-0X					
	IP 55	1-087-722-BX					
25 *(34)*	IP 23	1-087-731-0X	8.38 *(212.72)*	2.12 *(53.93)*	.19 *(4.83)*	2.81 *(71.44)*	66 *(30.0)*
	IP 54	1-087-732-0X					
	IP 55	1-087-732-BX					
35 *(47)*	IP 23	1-087-741-0X	8.38 *(212.72)*	2.12 *(53.93)*	.19 *(4.83)*	2.81 *(71.44)*	66 *(30.0)*
	IP 54	1-087-742-0X					
	IP 55	1-087-742-BX					
50 *(68)*	IP 23	1-087-751-0X	8.88 *(225.42)*	2.62 *(66.68)*	.44 *(11.18)*	3.31 *(84.14)*	73 *(33.0)*
	IP 54	1-087-752-0X					
	IP 55	1-087-752-BX					
75 *(102)*	IP 23	1-087-761-0X	8.88 *(225.42)*	2.62 *(66.68)*	.44 *(11.18)*	3.31 *(84.14)*	73 *(33.0)*
	IP 54	1-087-762-0X					
	IP 55	1-087-762-BX					
105 *(142)*	IP 23	1-087-781-0X	9.38 *(238.12)*	3.12 *(79.38)*	1.00 *(25.40)*	3.81 *(96.84)*	80 *(36.0)*
	IP 54	1-087-782-0X					
	IP 55	1-087-782-BX					

* X in 9th digit designates hub bore and shaft size.

Series 87,700 Specifications continued

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Specifications

Nominal Static Torque lb-ft (Nm)	No. of Friction Discs	Solenoid Size	Maximum solenoid Cycle Rate① cycles/ min	Thermal Capacity② hp-sec/min (watts)	Inertia (Wk^2) lb-ft² ($kgm^2 \times 10^{-4}$)
10 (14)	1	5	30	17.5 (249)	.078 (32.76)
15 (20)	1	6	25	17.5 (249)	.078 (32.76)
25 (34)	1	6	25	17.5 (249)	.078 (32.76)
35 (47)	1	8	20	17.5 (249)	.078 (32.76)
50 (68)	2	6	25	17.5 (249)	.108 (45.36)
75 (102)	2	8	20	17.5 (249)	.108 (45.36)
105 (142)	3	8	20	17.5 (249)	.145 (60.90)

① Maximum solenoid cycle rate is based on ambient temperature of 72°F *(22°C)* with 50% duty cycle. Does not relate to brake cycle rate (see Thermal Capacity).

② Thermal capacity rating is based on ambient temperature of 72°F *(22°C)*, stop time of one second or less, with no heat absorbed from motor. Derate thermal capacity by 25% for vertical mounting. Refer to *Selection Procedure* Section.

Brake set and release times in milliseconds, when brake and motor are switched separately (for T1/T2 definitions, see page 101):

Static Torque	Coil Size	T1	T2
10, 15, 25, 50	5 & 6	42	20
35, 75, 105	8	48	20

Current Ratings (amperes)

Coil Size	AC Current	Voltage: 60 Hz						Voltage: 50 Hz			Voltage: DC			
		115	200	230	400	460	575	110	220	380	24	95	115	230
5	Inrush	7.5	4.3	3.7	2.2	1.9	1.5	5.4	4.0	1.9	38.0	8.4	5.6	3.2
	Holding	.5	.3	.2	.1	.1	.09	.3	.25	.1	.5	.1	.08	.04
6	Inrush	13.0	7.5	6.5	3.7	3.2	2.6	9.4	5.6	3.2	42.8	11.7	8.5	3.7
	Holding	.6	.4	.3	.2	.2	.1	.5	.28	.2	.6	.2	.1	.06
8	Inrush	17.6	10.3	8.8	5.0	4.2	3.5	15.4	7.7	4.2	43.1	11.4	9.3	4.6
	Holding	1.2	.7	.6	.3	.3	.24	.1	.5	.3	.8	.2	.2	.09

Ordering and Identification Information

The following example and tables provide information for selecting the appropriate three-letter suffix when ordering a Stearns Brake.

Example of a complete part number:

1-087-732-01--FG — Lead wire position (external, left and right)
- 230 Vac
- Does not apply
- Hub bore and output shaft size 1.125

Hub Bore, Shaft and Keyway Sizes

9th Digit of Model Number	Dimensions in Inches *(Dimensions in Millimeters)*				
	Bore Dia. (X)	Keyway*	Shaft Dia. (U)	Keyway*	Shaft Length (AH)
1	1.125 / 1.126 (28.575 / 28.600)	.25 x .12 (6.35 x 3.18)	1.125 / 1.124 (28.575 / 28.550)	.25 x .12 (6.35 x 3.18)	2.62 (66.68)
3	1.375 / 1.376 (34.925 / 34.950)	.31 x .16 (7.94 x 3.97)	1.375 / 1.374 (34.905 / 34.950)	.31 x .16 (7.94 x 3.97)	3.12 (79.38)
5	1.625 / 1.626 (41.275 / 41.300)	.38 x .19 (9.52 x 4.76)	1.625 / 1.624 (41.275 / 41.250)	.38 x .19 (9.52 x 4.76)	3.75 (95.25)

For sizes other than those shown, contact factory.
No motor frame adapters or foot mounting kit available.
*Keyseats made to ANSI B17.1 standard.

Standard AC Voltage Ratings

Character	Voltage	Hz
B	115	60
D	110	50
E	200	60
F	230 190	60 50
H	220	50
L	460 380	60 50
M	415	50
N	575	60
O	110/220	50
P	115/230	60
Q	230/460 230	60 50
R	200/400	60

Modifications are available- see SAB Modification Section

Series 56,703 (1-056-7X3) Foot Mounted, Bearing-Supported Thru-Shaft

Static Torque: 1.5 through 25 lb-ft

Enclosure Material: Die Cast Aluminum

Enclosure Protection: IP 23 (formerly referred to by Stearns as NEMA 2).

Release Type: Side Release Knob

Installation, Service and Parts List: P/N 8-078-905-27

Specifications: Page 11

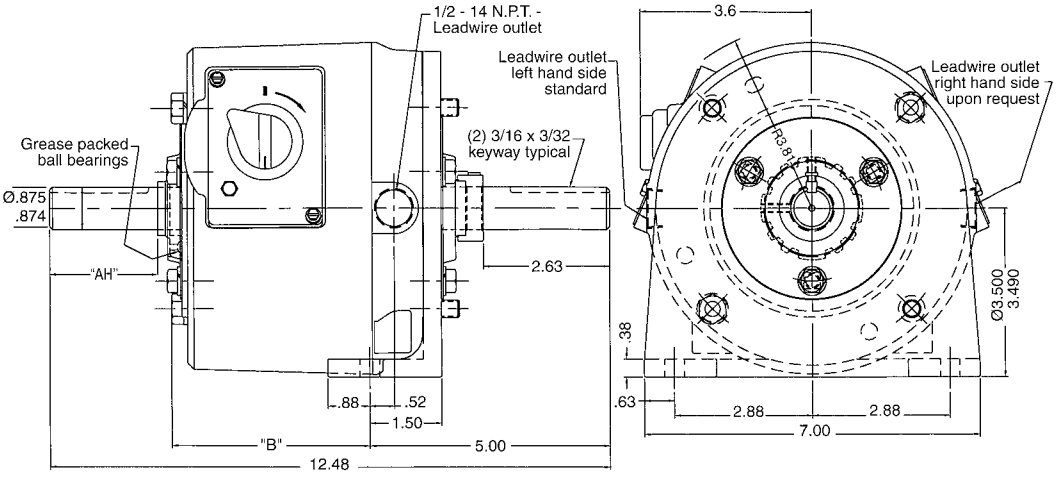
Modifications: Pages 54-63

Maximum overhung or side load measured at one inch from end of shaft: 36 lbs

Universal Mounting: 1.5 through 15 lb-ft. 20 and 25 lb-ft supplied with springs for vertical modification.

Brake set and release times in milliseconds, when brake and motor are switched separately (for T1/T2 definitions, see page 101):

Static Torque lb-ft	Coil Size	T1	T2
1½ - 25	4, K4, K4+, M4+	25	24



Dimensions for estimating only. For installation purposes request certified prints.

Dimensions

Nominal Static Torque		No. of Friction Discs	"B"	"AH"
Lb-Ft	(Nm)			
1.5 3 6	*(2)* *(4)* *(8)*	1	4.13	2.69
10 15	*(14)* *(20)*	2		
20 25	*(27)* *(34)*	3	4.56	2.25

Nominal Static Torque		Basic Model Number
Lb-Ft	*(Nm)*	AC
1.5	*(2)*	1-056-703-00-XX
3	*(4)*	1-056-713-00-XX
6	*(8)*	1-056-723-00-XX
10	*(14)*	1-056-733-00-XX
15	*(20)*	1-056-743-00-XX
20	*(27)*	1-056-753-00-XX
25	*(34)*	1-056-763-00-XX

Ordering and Identification Information

The following example and tables provide information for selecting the appropriate two-letter suffix when ordering this Stearns Brake.

Example of a complete part number:

1-056-723-00-QC — Right hand leads
└— 230/460 Vac
Shaft diameter is 7/8"

Example of a complete part number:

1-087-232-00-QC — Right hand leads
└— 230/460 Vac
Shaft diameter is 1-1/4"

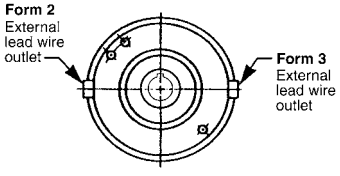
Standard AC* Voltage Ratings

Character	Voltage	Hz
B	115	60
D	110	50
E	200	60
F	230 190	60 50
H	220	50
L	460 380	60 50
M	415	50
N	575	60
O	110/220	50
P	115/208-230	60
Q	208-230/460 190/380	60 50
R	200/400	60

*Current ratings see page 11

Character	Lead Wire Position
B	Form 2
C	Form 3

Lead Wire Positions



View facing mounting register on brake.

Modifications are available- see SAB Modification Section

Series 87,200 (1-087-2XX) Foot Mounted, Bearing-Supported Thru-Shaft

BACK TO TABLE OF CONTENTS

Static Torque: 6 through 105 lb-ft.

Enclosure Material: Cast Iron Endplate and Housing

Release Type: Side Lever, maintained with automatic release.

Enclosure Protection: IP 23 & 54 (formerly referred to by Stearns as NEMA 2 & 4, respectively).

Installation and Service Instructions: P/N 8-078-927-00

Parts List: P/N 8-078-917-02

Specifications: Page 17

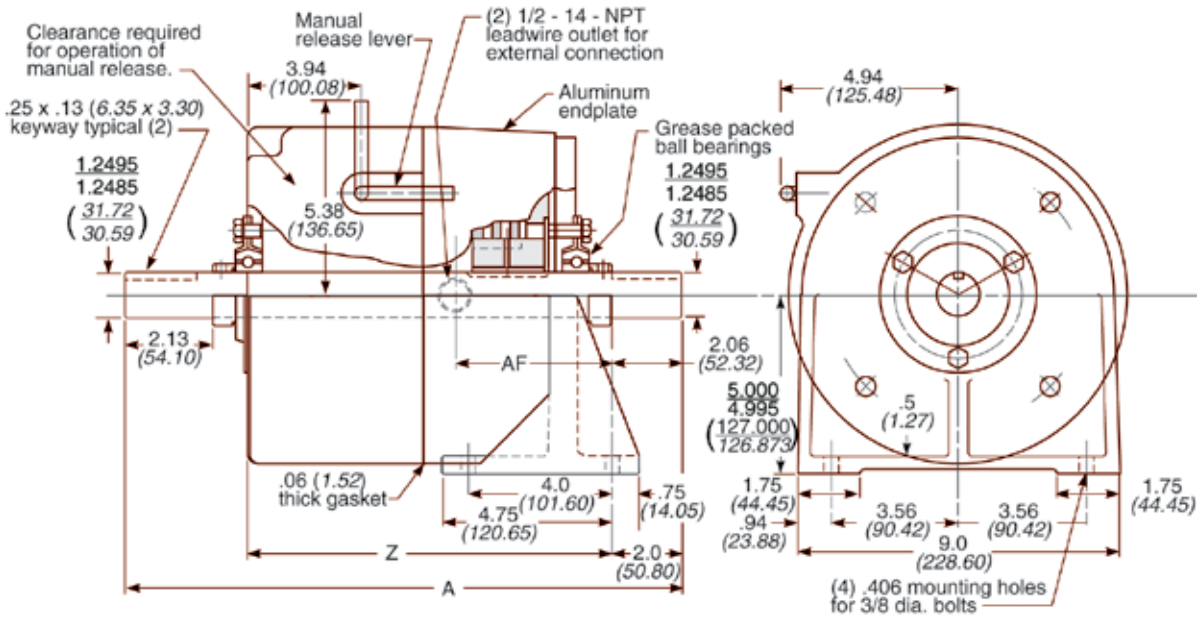
Modifications: Pages 54-63
Self adjust - see SAB Modifications for new manual adjust.

For vertical mounting modification see SAB Modification Section.

Maximum overhung, or side load measured at one inch from end of shaft: 100 lbs on brake housing side, 150 lbs on endplate/foot mount side

Brake set and release times in milliseconds, when brake and motor are switched separately (for T1/T2 definitions, see page 101):

Static Torque	Coil Size	T1	T2
10, 15, 25, 50	5 & 6	42	20
35, 75, 105	8	48	20



*Keyseats made to ANSI B17.1 standard.

Dimensions for estimating only. For installation purposes request certified prints.

Dimensional Data and Engineering Specifications

Nominal Static Torque lb-ft (Nm)	Enclosure	Basic Model Number*	Dimensions in Inches *(Dimensions in Millimeters)*			Thermal Capacity (hp-sec/min)	Inertia Wk² (lb-ft²)	Wt. lbs (kg)**
		AC	A	Z	AF			
10 *(14)*	IP 23	1-087-211-00	14.56 *(369.82)*	9.32 *(238.13)*	3.56 *(90.42)*	17.5	.049	72 *(33.0)*
	IP 54	1-087-212-00		9.38 *(328.25)*				
15 *(20)*	IP 23	1-087-221-00	14.56 *(369.82)*	9.32 *(238.13)*	3.56 *(90.42)*	17.5	.049	72 *(33.0)*
	IP 54	1-087-222-00		9.38 *(328.25)*				
25 *(34)*	IP 23	1-087-231-00	14.56 *(369.82)*	9.32 *(238.13)*	3.56 *(90.42)*	17.5	.049	73 *(33.0)*
	IP 54	1-087-232-00		9.38 *(328.25)*				
35 *(47)*	IP 23	1-087-241-00	14.56 *(369.82)*	9.32 *(238.13)*	3.56 *(90.42)*	17.5	.049	73 *(33.0)*
	IP 54	1-087-242-00		9.38 *(328.25)*				
50 *(68)*	IP 23	1-087-251-00	15.06 *(382.50)*	9.81 *(249.94)*	4.06 *(103.12)*	17.5	.083	78 *(35.0)*
	IP 54	1-087-252-00		9.88 *(250.95)*				
75 *(102)*	IP 23	1-087-261-00	15.06 *(382.50)*	9.81 *(249.94)*	4.06 *(103.12)*	17.5	.083	78 *(35.0)*
	IP 54	1-087-262-00		9.88 *(250.95)*				
105 *(142)*	IP 23	1-087-281-00	15.56 *(395.20)*	10.32 *(262.13)*	4.56 *(115.82)*	17.5	.117	81 *(37.0)*
	IP 54	1-087-282-00		10.38 *(263.65)*				

*See "Ordering Information", previous page.

Marine, Maritime & Navy Brakes

Solenoid-Actuated Brakes

	Marine		Marine		Maritime		Navy
Description	Suitable for many shipboard and severe duty applications		Suitable for many shipboard and severe duty applications		Suitable for many Coast Guard, shipboard and severe duty applications when “ductile iron” is specified		Designed to Military Specification
Compliance (Note A)	IEEE 45 ABS		IEEE 45 ABS		IEEE 45 Federal Standard 46 ABS		MIL-DTL-16392D (Ships)
Spring Set Operation (Note E)	Armature Actuated Brake (AAB)		Solenoid Actuated Brake (SAB)				
Stearns Series (Note B)	350	360	1-056-200-K0	1-087-0xx-K0 1-082-0xx-K0 1-086-0xx-K0	1-087-Mxx	1-082-4xx 1-086-4xx	1-087-6xx 1-082-6xx 1-086-6xx
Enclosure	IP 56	IP 56	IP 56	(Note C) IP 54, IP 56	IP 55		IP 56
Enclosure Finish	DI - Water Based Primer Alum - anodize MIL-A-8525 F		Water Based Primer		Alkyd Primer MIL TT-P-645C		Enamel MIL-E-15090
Coil	Encapsulated Construction Class H Insulation		Injection Molded Construction Class B Insulation		Injection Molded Construction Class B Insulation		Encapsulated Class H
Endplate or Mount Plate Material	Steel		Cast Iron		Ductile Iron		Ductile Iron
Housing Material	Cast Aluminum or Ductile Iron		Cast Iron		Ductile Iron		Ductile Iron
Support Plate Material	N/A		Steel	(Note H)	Ductile Iron		Ductile Iron
Pressure Plate & Stationary Disc Material	N/A		Brass		Brass		Brass
Self Adjusting (Note G)	No. Gap By Gage		No, Gap By Scale	Yes	Yes		Yes
Manual Release (Note D)	Optional		Maintained		Maintained		Non-Maintained

A. IEEE 45 compliance nameplate is optional. ABS Certificate SB374021
B. Additional options and modifications are included in the full 12 digit part number
C. IP 56 with side release option available in 1-087-000-K0 & 1-082-000-K0
D. The maintained release holds the brake in a release condition until the brake is electrically, or manually, re-engaged
The non-maintained (“deadman”) release is manually held in the the released condition, re-setting when the force is removed
E. Spring-set, Solenoid with coil & linkage actuated brake (SAB), AC or DC voltage coil
Spring-set, Armature actuated direct-acting brake (AAB), DC voltage coil
F. Carrier ring friction disc is standard with the 350 & 360 series and is an option in the SAB brakes
G. Stainless Steel Self-Adjust is standard with the 1-08x-600 and 1-087-M00
H. 1-087: cast aluminum; 1-082: cast iron; 1-086: ductile iron
I. Dimensions may differ from catalog brakes; dimensional drawings available on request.

Armature-Actuated Brakes

MIL-B-16392C is inactive for new design and is no longer required, except for replacement purposes, per statement issued by Naval Sea Systems Command in June of 2001. The armature-actuated brake (AAB) was designed in consultation with Naval specification authorities as a suitable Commercial off the shelf (COTS) motor brake.

Series 350

Pressure Plate Mount
Internal Maintained Manual Release

Torque (lb-ft)	Model Number	NEMA Frame Size
75	3-51-734H0	182TC-256TSC
110	3-51-744H0	182TC-256TSC
110	3-51-744J0	284TC-286TSC
110	3-51-744K0	324TC-405TSC
180	3-51-844J0	284TC-286TSC
180	3-51-844K0	324TC-405TSC
300	3-51-944k0	324TC-405TSC

Series 360

Magnet Body Mount
Internal Maintained/ Optional External
Non-Maintained Manual Release

Torque (lb-ft)	Model Number	NEMA Frame Size
60	3-61-644H0	182TC-256TSC
60	3-61-644J0	284TC-286TSC
75	3-61-734H0	182TC-256TSC
110	3-61-744H0	182TC-256TSC
110	3-61-744J0	284TC-286TSC
180	3-61-844J0	284TC-286TSC
180	3-61-844K0	324TC-405TSC
300	3-61-944K0	324TC-405TSC
300	3-61-944L0	444TC

Mining Brakes - MSHA Certified

Stearns 1-082-3X4-06 series of electric fail-safe motor brakes are now certified for use in underground mines by the federal Mine Safety and Health Administration (MSHA).

Stearns is the only supplier of MSHA certified motor brakes.

MSHA approves and certifies products for use in underground coal and gassy mines to ensure that they do not cause a fire or explosion.

Features:

Fan Guard Mounted

Mounting face: 12.5” AK, 11.0” AJ (NEMA 324 and 326 TC, NEMA 364 and 365 TC, NEMA 404 and 405 TC)

Static Torque: 125 through 330 lb-ft

Spring-Set Electrically-Released

Enclosure Material: Cast Iron

Manual Release Type: Side lever, latching with automatic reset when electric power is applied to the brake coil

Enclosure Protection: IP 56

Self-Adjust Design: Automatic adjustment for friction disc wear - to reduce maintenance

Class H Coil Insulation

Thermal Cut-Out Switch

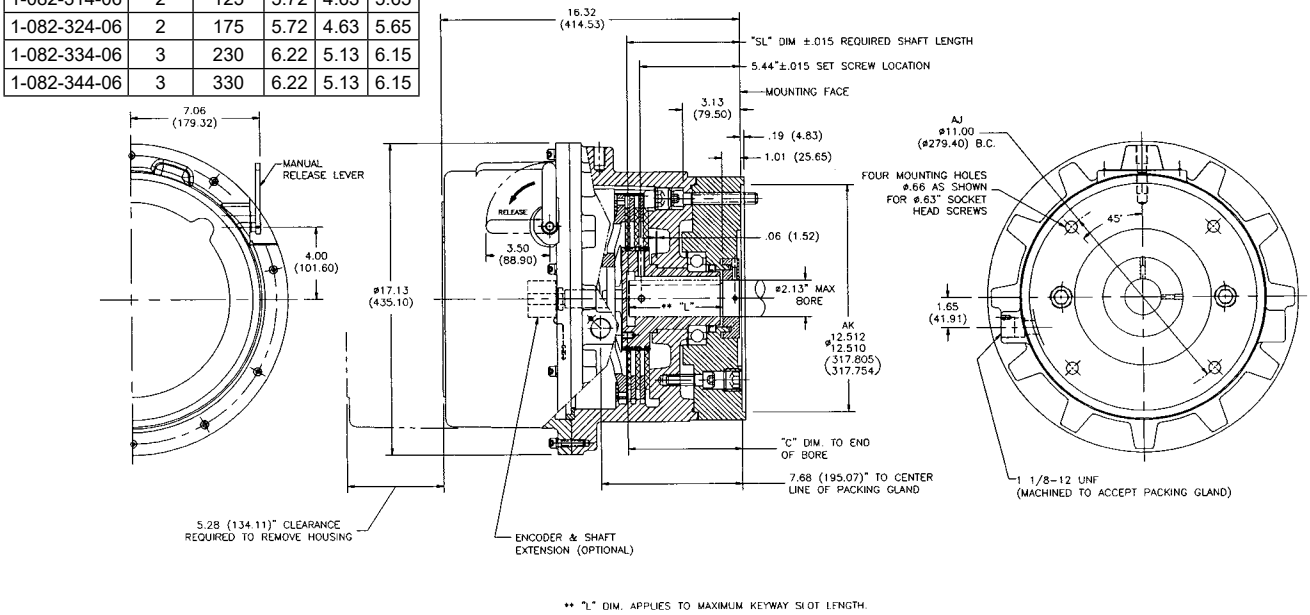
Electrical Connections terminate at terminal block

MSHA Certification Number: 18-XPA070006-0

Options:

- Internal Encoder
- Internal Electric Heater
- Electrical Release Indicator Switch
- Carrier Ring Friction Discs

Model No. IP56	No. of Discs	Torque Lb-Ft	C	**L	SL
1-082-314-06	2	125	5.72	4.63	5.65
1-082-324-06	2	175	5.72	4.63	5.65
1-082-334-06	3	230	6.22	5.13	6.15
1-082-344-06	3	330	6.22	5.13	6.15



** "L" DIM. APPLIES TO MAXIMUM KEYWAY SLOT LENGTH.

Model No.	Enclosure	Nominal Static Torque lb-ft *(Nm)*
1-082-314-06	IP56	125 *(169)*
1-082-324-06	IP56	175 *(237)*
1-082-334-06	IP56	230 *(312)*
1-082-344-06	IP56	330 *(447)*

Ordering Information - specify[1]:

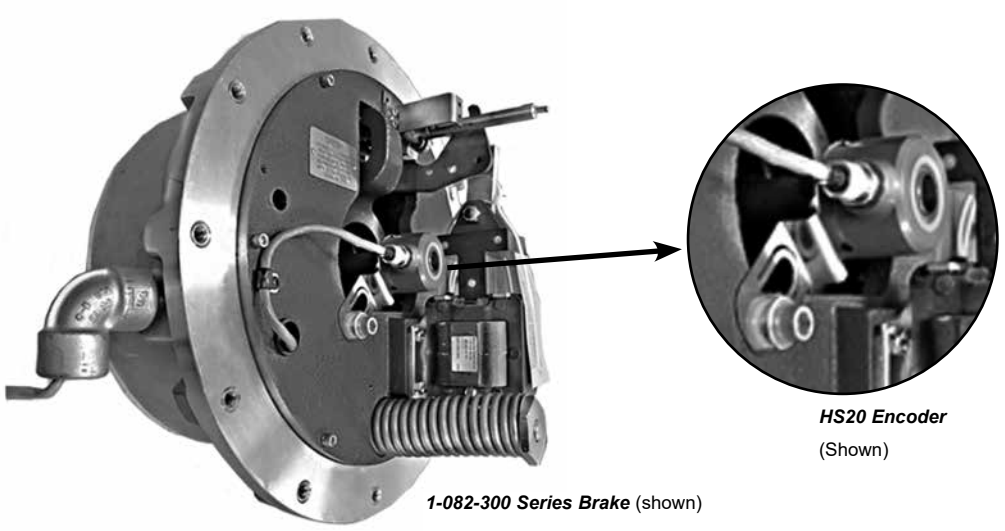
- Model Number
- Bore & keyway[2]
- Voltage[2]
- Options
- Leadwire packing gland - left or right (looking towards brake mounting face). Note: encoder option requires that the encoder wiring enters the brake from the opposite side of all of the other brake wiring.

1 These brakes need to be purchased from the motor manufacturer, as the required shaft length (dimension “SL” above) is not standard.

2 Refer to Stearns Catalog page 37

Encoder Brakes

Stearns Solenoid Actuated Brakes with Internally Mounted Encoder



HS20 Encoder (Shown)

1-082-300 Series Brake (shown)

Features

- Available in frame sizes 182TC - 505TC
- All enclosure ratings available, including hazardous location
- Separate conduit exits are provided for the brake and encoder leads, to minimize potential electrical interference
- Choice of popular encoder manufacturers

Benefits

- Encoder located in protected environment enclosed inside the brake housing
- Simplified encoder mounting - using a hub or shaft-mount encoder - and it's already done!
- Reduced package length - an internal encoder does not add any length to the brake
- Lower installed cost

Ordering Information

Stearns brakes with internal encoders are purchased through the motor manufacturer, as the required shaft length and diameter are non-standard. An internal encoder is not a retrofit option, like a brake coil, heater or switch. To order the brake motor package, specify the brake model and encoder option from table on following page.

Encoder Brakes (Con't)

Stearns Solenoid Actuated Brakes with Internally Mounted Encoder

Ordering Information

For Stearns Solenoid Actuated Brakes (SABs), with internal encoders

Industrial Locations

Frame Size	Brake Series	Torque Range (lb-ft)	Encoder Options[1]	Connector / Cable[2]	Stearns Drawing No.[3]
182TC - 256TC	1-087-EX2	25 - 105	Dynapar HS20 BEI HS20 BEI HS25	M12, 8 Pin / 15' M12, 8 Pin / 5m 10 Pin / 20'	1087E00ED 1087E00ED
324TC - 405TC	1-081-XXX	125 - 230	Dynapar HS20 BEI HS20 BEI HS25	M12, 8 Pin / 15' M12, 8 Pin / 5m 10 Pin / 20'	10810022ED 10810022ED
324TC - 405TC	1-082-XXX	125 - 440	Dynapar HS20 BEI HS20 BEI HS25	M12, 8 Pin / 15' M12, 8 Pin / 5m 10 Pin / 20'	10820022ED 10820022ED
444TC - 505TC	1-086-XXX	500 - 1000	Dynapar HS20 BEI HS20 BEI HS25 BEI HS35M	M12, 8 Pin / 15' M12, 8 Pin / 5m 10 Pin / 20' 10 Pin MS / 15'	10860022ED 10860022ED 10860022ED 10860022E35D

Division 1 Hazardous Location[4]

182TC - 256TC	1-087-3X8	10 - 105	Dynapar HS20 BEI HS20	M12, 8 Pin / 15' M12, 8 Pin / 5m	1087308D[5] 1087308D[5]
324TC - 405TC	1-082-3X4	125 - 330	Dynapar HS20 BEI HS20 BEI HS25	M12, 8 Pin / 15' M12, 8 Pin / 5m 10 Pin / 20'	1082304D[6] 1082304D[6]

[1] Encoders are Optical, 1024 PPR.

[2] Cables are shielded. Lengths are from encoder connector, inside the brake (not from outside of brake housing)

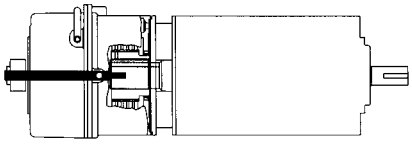
[3] Request this drawing for shaft design requirements

[4] No motor shaft modifications required, beyond the brake requirements for a standard hazardous location brake.

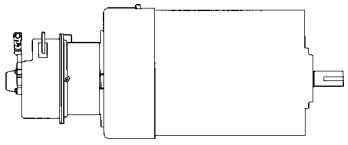
[5] Drawing 1087308D brake model mounts close-coupled to the motor end bell.
For the brake model that mounts to the motor fan guard, refer to drawing 10873081D.
For the brake model that mounts to the motor fan guard - with a slinger - refer to drawing 10873052D.

[6] Drawing 1082304D brake model mounts close-coupled to the motor end bell.
For the brake model that mounts to the motor fan guard, refer to drawing 10823042D.

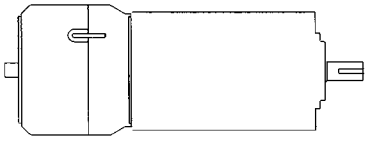
In addition to the fully enclosed brake with internal encoder options, encoders can be adapted externally to Stearns brakes:



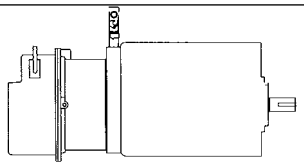
Motor shaft mounted encoder tethered to the brake housing.



Motor shaft mounted encoder bolted to the brake housing.



Encoder mounts to the stepped shaft of a double C-face brake (145TC-256TC frame.)



In-line coupling style encoder (182TC-256TC frame).

Information Needed for Modifications

Stearns is dedicated to providing you with the most comprehensive selection of modified spring-set disc brakes on the market today. We have included a list of our more popular modifications complete with descriptions, pictures and graphics when applicable and list price adders along with their representative series. Note that modification list prices are subject to the same discounts as apply to the complete brake assembly.

Below please find examples of how the modifications are called out with a letter in the 8th position of the 12 digit model number. Note that these listings are not complete, but represent our more popular selections. For any special applications and modification requirements not found here, please contact your Stearns representative.

IMPORTANT – The modification letter will appear in the *8th position* to call out the modification.

Examples:

1-056-XXX-__X
└──── 8th position

1-087-XXX-__X
└──── 8th position

1-08X-XXX-__X
└──── 8th position

See specific tables for some of the available options of the series required.

If two or more letter modifications are required, the 8th position of the part number will remain zero and position 10, 11 and 12 will be assigned by Stearns as a special part number.

All Series

Modification	Letter
Vertical Mounting - Above Motor	A
Class H Insulation	H
Space Heater (115 Volt Circuit)	I
Space Heater (115 Volt Circuit), Brass Pressure Plate and Stationary Disc	J
Brass Pressure Plate and Stationary Disc	K
Vertical Mounting - Below Motor	L
Thru-Shaft Housing (Standard)	Q
Vertical Mounting - Above Motor and Class H Insulation	T
Electrical Release Indicator Switch, N.O. contacts	W
Side Manual Release with Shaft Through Housing Stamped Steel	Z
Series 87,X00 Only	
Vertical Mounting - Above Motor, Brass Pressure Plate and Stationary Disc	N
Series 81,X00, 82,X00 87,000 and 87,100	
Side Manual Release	Y

Solenoid Actuated Brakes Modification Index

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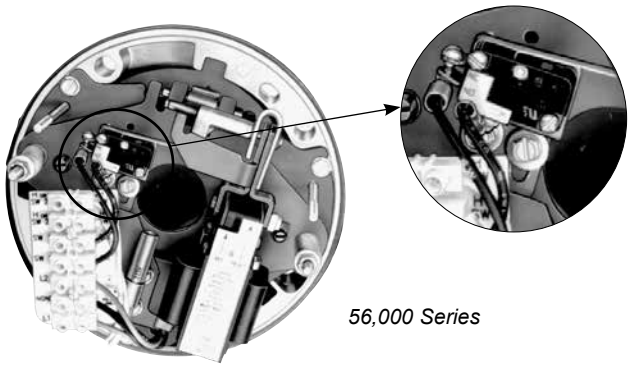
Category	Description	Modification Number (M___)	Page
Coils	Class H Insulation	M6	56
	Non-Standard Voltage AC	M25	60
	Special Leadwire Length	M31	61
Corrosion Resistance	Brass Pressure Plate	M3	55
	Brass Stationary Disc	M4	55
	Breather Drain	M5	56
	Space Heater (115 or 230 volt)	M13	57
	Special Paint	M14	58
	Stainless Steel Self-Adjust	M15	58
	Stainless Steel Hardware	M16	58
	Corrosion-Resistant Endplate	M39	62
	Stainless Steel Hub	M42	62
Endplates	Special Internal Leadwire Hole	M35	61
	Corrosion-Resistant Endplate	M39	62
	Special Milling: Flat Bottom on Housing & Endplate	M40	62
Friction Discs	Special Material Friction Disc	M44	63
	Carrier Ring Disc (Steel or Zinc Aluminum)	M46	63
	Carrier Ring Disc (Bronze)	M47	63
Gaskets	Motor Gasket	M38	62
	Viton® Gasket	M43	63
Hubs/ Brake Shaft	Non-Standard Bore or Keyway	M11	57
	Special Shaft - Coupler Brakes	M29	60
	Taper-Lock Hubs	M30	61
	Stainless Steel Hub	M42	62
	Splined Hub and Friction Disc	M45	63
Machining Options	Encoder/Tach Machining	M7	56
	Metric Machining	M33	61
	Special Milling: Flat Bottom on Housing & Endplate	M40	62
Manual Adjust	Manual Adjust for 87,000 Series	M48	63
Manual Release	Side Manual Release	M12	57
	Non-Maintained (Deadman)	M32	61
	Internal Release	M37	62
Mounting	Vertical	M21, M23, M24	59-60
	Metric Machining	M33	61
	Motor Frame Adapters		97
	Foot Mounting Kits		98
Nameplates	Mylar or Metal	M10	57
	Brass Nameplate	M41	62
Paint/ Special Finish or Material	Brass Pressure Plate	M3	55
	Brass Stationary Disc	M4	55
	Special Paint	M14	58
	Stainless Self-Adjust	M15	58
	Stainless Steel Hardware	M16	58
	Corrosion-Resistant Endplate	M39	62
	Stainless Steel Hub	M42	62
Special Housing	Thru-Shaft NEMA 2	M19	59
	Thru-Shaft NEMA 4 and 4X	M20	59
	Split Housing	M36	62
Switches	Electrical Release Indicator	M1	55
	Electrical Release Indicator Proximity Switch	M2	55
	Thermal Switch	M18	58
	Wear Indicator	M27	60
Tach Mounting	Tach Machining	M7	56
	Thru-Shaft NEMA 2	M19	59
	Thru-Shaft NEMA 4 and 4X	M20	59
Torque Derating	Brass Pressure Plate	M3	55
	Brass Stationary Disc	M4	55
	Special Derating of Torque	M34	61
Wiring Options	Conduit Box with Terminal Strip	M8	56
	Terminal Strip	M17	58
	Special Length Leadwires	M31	61
	Internal Leadwire Hole	M35	61

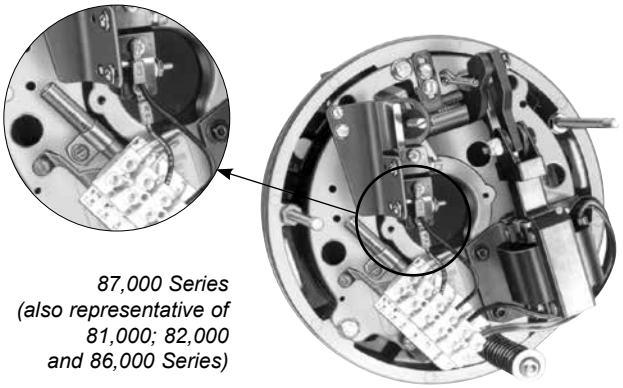
M1 Electrical Release Indicator Switch

This switch is used to indicate when the brake is in a released, non-holding position. This mechanism utilizes a mechanical limit switch.

Applicable Series
56,X00
81,000; 82,000; 87,X00
86,X00



56,000 Series



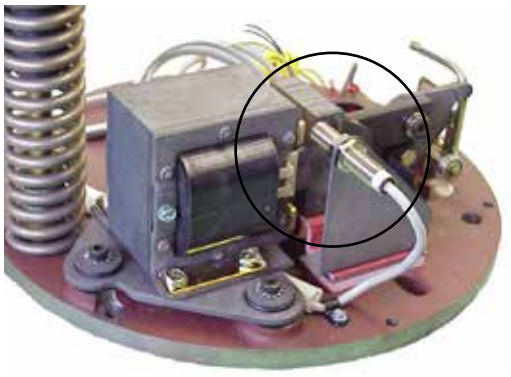
87,000 Series (also representative of 81,000; 82,000 and 86,000 Series)

Not available on 56,800, 65,300 or 87,800 Series Brakes.

M2 Electrical Release Indicator Proximity Switch

Same function as the switch in M1 above; except, M2 uses an electronic proximity sensor.

Applicable Series
81,000 82,000 87,X00
86,X00



Not available on 56,800 or 87,800 Series Brakes.

M3 Brass Pressure Plate

Typically used in marine applications or in applications where the potential for sparks need to be eliminated. Brass can also be used to reduce torque.

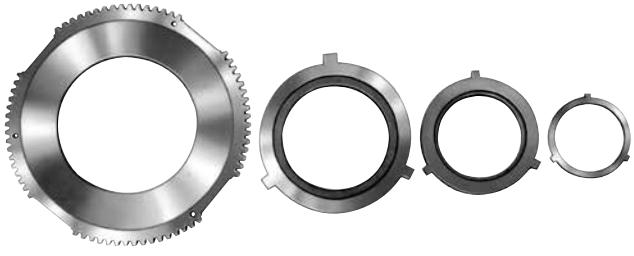
Applicable Series
56,X00
65,X00
81,000; 82,000
86,X00
87,X00*

*(N/A for 1-087-19X-00 125 lb-ft brake)

M4 Brass Stationary Discs

Used with brass pressure plate (List per disc).

Applicable Series
56,X00
65,X00
87,X00*
81,000; 82,000
86,X00



*(N/A for 1-087-19X-00 125 lb-ft brake)

M5 Breather Drain

A drain plug is tapped into the bottom of the housing to let moisture escape. This option is only available on brakes with cast aluminum or cast iron housings.

Applicable Series
56,X00
65,X00
81,000 82,000 86,X00 87,X00

M6 Class H Insulation

Brake is provided with an epoxy encapsulated coil, rated for NEMA Class H designation.

These Class H coils are standard on hazardous location brakes.

Applicable Series
56,X00
87,X00
81,000 82,000
86,X00

M7 Housing Machining for Encoder/Tach Mounting

Standard Machining: The housing is machined for a thru shaft, and to allow for an encoder or tach to be mounted. This option is only available on brakes with cast aluminum or cast iron housings. Consult factory for availability.

Close tolerance: The housing and endplate are assembled and dowel pinned together - then machined as a matched set for a through shaft and encoder mounting. This option is only available on brakes with cast aluminum or cast iron housings. This option is recommended for Series 81,000; 82,000; and 86,X00 due to the long distance between the motor and encoder.

Tether Mount: The housing is machined for a through shaft, and a single tapped hole for a bolt to secure a tether arm. (56,X has a through hole and tach-welded nut on inside of housing, instead of a tapped hole).

Applicable Series	Close Tolerance Bolt Circle & Register Maximum Thru-Shaft Dia. (inch)
56,X00 (except N/A for 56,800)	
87,000 - 87,100	1.63
87,M00 - 87,500 - 87,600	
81,000 - 82,000*	2.5
86,000	

Open Enclosure - Referred to on the product pages in the catalog as IP23

Enclosed - Referred to on the product pages as IP54/55 (these enclosure ratings no longer apply when the housing is machined for this modification - the customer is responsible for meeting any specific enclosure rating when assembling the encoder.

* M7 Modification for Series 81,000 and 82,000 will also require the M12 Modification; the side manual release.

M8 Conduit Box with Terminal Strip

A terminal strip is located inside the conduit box. It allows for easy connection and identification of lead wires.

Applicable Series
All series except hazardous location *(not available for the 48,100 series)*
All hazardous location brakes

M10 Nameplates

To order new brake nameplates, the serial number of the brake is required. A loose nameplate shipped from Stearns Division without being attached to a brake must have all agency markings removed (UL, CSA, etc.). In order to have a brake renameplated with the appropriate agency markings, it must be returned to Stearns Division for product verification.

M11 Nonstandard Hub or Keyway

For standard bore diameter and keyway specifications, see specific brake selection page.
For taper bores, consult factory.

M12 Side Manual Release

Side release not available on the 1-065-300 or the 1-086-000

Applicable Series Sheet Metal Housing (IP 23 Only)
56,000; 56,400; 56,500
87,000; 87,100

Applicable Series Cast Iron Housing
87,000 IP 23
87,000 IP 54
81,000 82,000

M13 Space Heater (115 or 230 Volt Only)

A space heater cartridge is used to prevent moisture build-up inside the brake housing.

Applicable Series	Wattage
56,X00*	15
81,000; 82,000; 86,X00	50 and 75
87,X00**	25 to 30
Hazardous Duty Brakes	25 to 50

*Not available on 1-056-800 Series Brakes
**Not available in 87,800 Class I

56,000 Series

87,000 Series (also representative of 81,000; 82,000 & 86,000 Series)

M14 Special Paint

The standard paint for all brake series (except BISSC Certified & Maritime/Navy) is a red, water-base primer, painted inside and out.

For additional corrosion protection, a special (green) zinc chromate primer can be provided (painted inside and out) in place of the standard red primer. Consult factory for pricing.

Applicable Series
56,X00
65,X00
81,000; 82,000; 86,X00
87,000

Other Special Paint options are available - either primers, a white epoxy finish coat, or clean finish (exterior primer removed). Consult factory for pricing.

BISSC Certified paint (white epoxy exterior paint) is standard for brake series with IP55 and IP57 enclosure ratings - and the prices are included in the standard list prices.

Maritime and Navy brakes have their own specified paints, with pricing included in the standard list prices.

M15 Stainless Steel Self-Adjust Mechanism

For severe duty applications. This option includes a stainless steel pinion and plated wrap spring in the auto-adjust mechanism. It is only available on the 81,000; 82,000; 86,000 and 87,000 Series Brakes

Applicable Series
81,000; 82,000; 87,X00*
86,X00

* Stainless steel self-adjust is standard on series 87, 600

M16 Stainless Steel Hardware

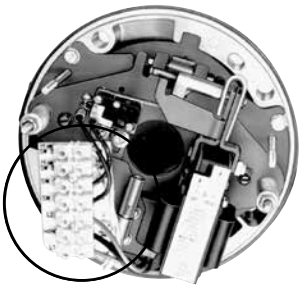
All external hardware is provided in stainless steel.

Applicable Series
48,100
56,X00, 87,X00
81,000, 82,000 86,000

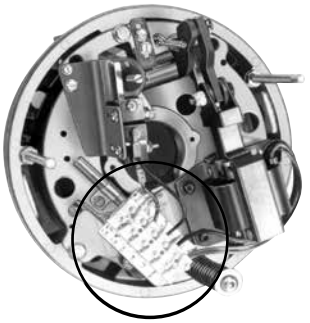
M17 Terminal Strip

A terminal strip is located in the inside of the brake, on the support plate. It allows for easy connection and identification of lead wires.

Applicable Series
All



56,000 Series



87,000 Series (also representative of 81,000; 82,000 & 86,000 Series)

M18

This switch is used to indicate when a brake is overheating. Thermostats are standard in 8X,300 and 65,X00 Series. This option is for NON-UL brakes only.

Applicable Series	Switch Operation Specificatons
87,X00	Normally Closed: Opens at 295°F, Closes at 255°F
1,000, 82,000 86,X00	Normally Closed: Opens at 210°F, Closes at 180°F
56,X00	Normally Closed: Opens at 195°F, Closes at 175°F

M19 Through-Shaft Enclosure

This configuration allows for the motor shaft to extend beyond the housing of the brake.

This modification lowers the brake enclosure rating to IP20.

Applicable Series
56,000, 56,400
56,100, 56,200
56,600
81,000, 82,000
86,000
87,000, 87,100 sheet metal*
87,000, 87,100 with cast iron housing

*Up to 1-5/16".
Above 1-5/16", contact factory for pricing

M20 Through-Shaft Cast Iron Enclosure with Lip Seal

This configuration allows the motor shaft to extend beyond the housing of the brake with a bushing to use with a housing lip seal.

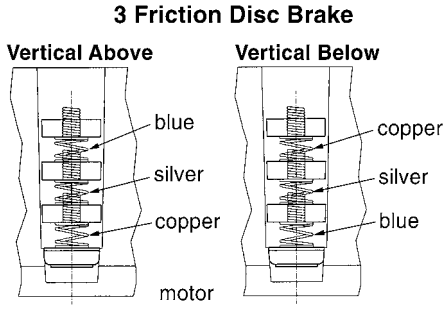
This modification lowers the brake enclosure rating to IP40.

Applicable Series
56,100, 56,200 56,600
81,000, 82,000
86,000
87,000, 87,100

M21 Vertical Mounting for 56,000 Series & 65,300 Series

The 56,000 20 and 25 lb-ft Series Brakes are shipped with spring kits. Vertical modification at 15° from horizontal. Read installation and service instructions for details on its use.

Factory assembly for three disc configuration - Contact factory for pricing.



Example of 56,000 Series spring requirements for vertical above and below mounting.

M23 Vertical Mounting for 87,X00 Series

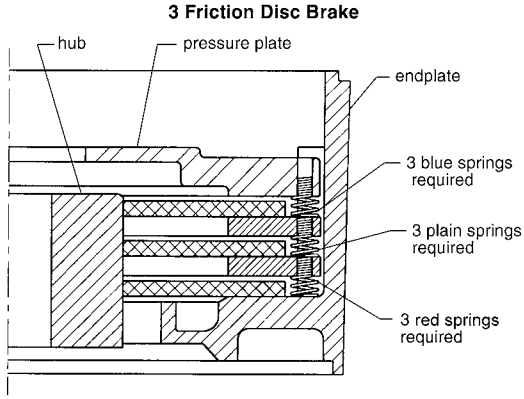
For factory modification to vertical above or below application.
Vertical modification at 15° from horizontal.

Series 87,000 & 87,100

Torque Value (lb-ft)	IP 23 & IP 54 steel hsg Above	IP 23 & IP 54 steel hsg Below	IP 54/55 cast iron Above	IP 54/55 cast iron Below
6, 10, 15, 25 & 35	Contact factory for pricing			
50 & 75	Contact factory for pricing			
105	Contact factory for pricing			

Series 87,300; 87,800; 87,700

Torque Value (lb-ft)	Vertical Above	Vertical Below
6, 10, 15, 25 & 35	Contact factory for pricing	
50 & 75	Contact factory for pricing	
105	Contact factory for pricing	

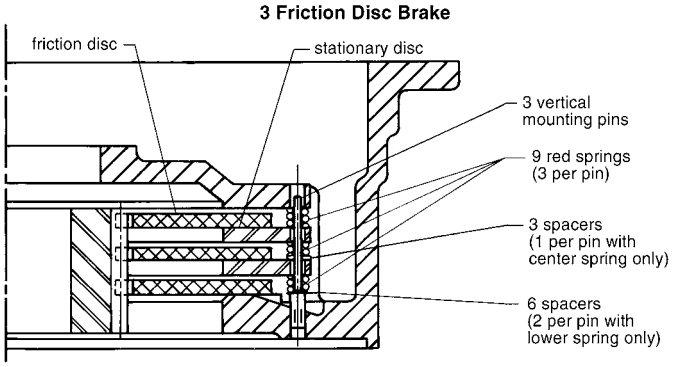


Example of 87,000 Series spring requirements for vertical above mounting.

M24 Vertical Mounting for 81,000; 82,000 and 86,000 Series

These brakes require factory modifications for vertical applications. Vertical modification at 15° from horizontal.

Applicable Series	Torque Value (lb-ft)
81,000 & 82,X00	125 & 175
81,000 & 82,X00	230
82,X00	330
82,X00	440
86,000	500 & 750

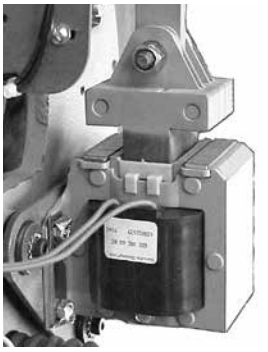


Example of 81,000 Series pin, spring and spacer requirements for vertical above mounting.

M25 Voltage Non-Standard (AC)

For standard voltage listing, see the ordering information section for the specific brake.

Applicable Series
48,100
65,X00
56,000
81,000; 82,X00
86,X00
87,X00

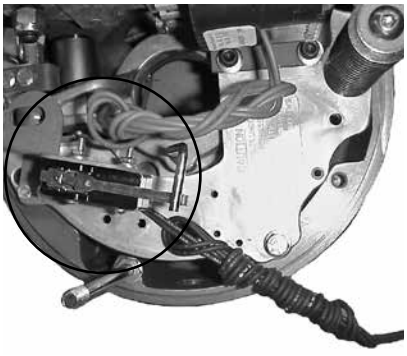


M27 Wear Indicator (Friction Disc) Switch

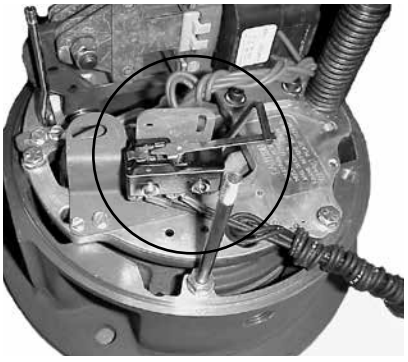
A mechanical switch is installed to indicate when the friction disc requires replacement.

Applicable Series
81,000; 82,X00
86,000
87,X00*

**Switch supplied with leads (Switches N/A on Series 87,800)*



87,000 Assembly



87,000 Assembly

M29 Special Shaft-Coupler Brake and Foot Mount Brake

Any non-standard input or output shaft on a 56,700, 87,200 or 87,700 Series Brake.

Applicable Series
56,700
87,200; 87,700

M30 Taper-Lock Hubs

For use in severe duty applications and reversing application to secure the brake hub to the motor shaft.

Series	Lb. Ft.
87,000; 87,100 IP 23 only	10 to 35 lb-ft
	50 to 75 lb-ft
	105 lb-ft
81,000	125 & 175 lb-ft
	230 lb-ft
82,000	125 & 175 lb-ft
	230 & 330 lb-ft
	440 lb-ft

M31 Special Length Lead Wires

Length	Series
Up to 5'	All
Over 5'	All

M32 Non-Maintained (Deadman) Manual Release

The brake is mechanically released while the release is pulled into a release position. Once released, the brake sets.

Applicable Series*
56,200, 56,700, 56,800 & 56,900
56,000, 56,400 & 56,500
81,000; 82,000& 87,000
86,000

**N/A on 56,300.*
Standard on 56,100 and 56,600.

M33 Metric Machining Including Cast Iron Endplate

Stearns SAB's can be used with metric motor frames. The following table indicates standard frame capabilities for an IEC B14 Face mount.

Applicable Series	IEC Frame Sizes
56,200; 56,400; 56,600 & 56,900	B14 flange in sizes 80; 90 & 100 B5 flange in sizes D63 & D71
56,500	B14 flange in sizes 112; 132 & 160 B5 flange in sizes D71; D80; D90; D100 & D112
87,000	B14 flange in sizes 112; 132 & 160 B5 flange in sizes D71; D80; D90; D100 & D112

M34 Derating of Torque

Stearns industrial SAB's can be custom built to meet your specific torque requirements.

Applicable Series	Torque Value (lb-ft)
56,500	6 lb-ft
87,100	20 or 30 lb-ft
81,000 & 82,000	To be approved with application engineering

M35 Special Internal Lead Wire Hole with Bushing

Any non-standard, internal lead wire hole in the endplate.

Applicable Series*
All brakes except hazardous location brakes

M36 Housing Split

SAB's can be provided with a split housing.

Applicable Series
81,000; 82,000 & 86,000
81,000; 82,000 & 86,000 gasketed
87,000; 87,100 sheet metal
87,000; 87,100 cast iron gasketed

M37 Internal Release

An internal manual release requires that the housing be removed before the brake can be released by hand.

**N/A for hazardous location brakes*

Applicable Series
87,0XX; 81,0XX; 82,0XX; 86,0XX

M38 Motor Gasket

The brake is provided with an additional C-Face gasket to be placed between the brake and motor.

Applicable Series*
81,000; 82,000; 86,000
56,X00 & 87,000

**N/A for hazardous location brakes*

M39 Corrosion-Resistant Endplate

Rust preventative treatment applied to brake endplate.

Applicable Series
56,200, 56,400, 56,500, 56,800 & 65,300
81,000; 82,X00 & 86,000
87,X00

M40 Special Milling: Flat Bottom on Housing & Endplate

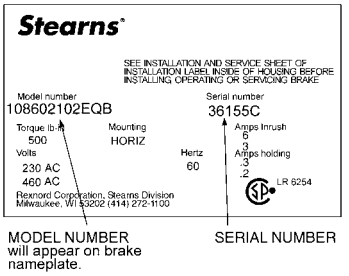
This modification is provided in the event the flange between the endplate and housing interfere with the mounting configuration.

Applicable Series
81,000; 82,000 & 86,000

M41 Brass Nameplate with Special Engraving

Brass nameplates offer greater durability in outdoor applications.

Applicable Series
81,000; 82,000 & 86,000



M42 Stainless Splined Hub

Stainless steel splined hubs are available for extreme outdoor applications, to prevent corrosion on the disc and hub interface.

Applicable Series
81,000; 82,000 & 86,000
87,000

M43 Viton® Gasket

Gaskets and o-rings in brakes can be provided in Viton® (flourocarbon) material, in place of the standard neoprene. However, the V-wiper steel-backed seals that are used on pull rod manual releases are not available in Viton® and remain as neoprene.

Viton® is a registered trademark name of DuPont.

Applicable Series
81,000; 82,000; 86,000
87,000*
56,000

*Viton® gaskets and o-rings are standard for 87,X00 series, except for hazardous location brakes where Viton® seals are N/A.

***Except series 56,200; 56,700; & 56,900 - where Viton gaskets are standard.*

M44 Special Friction Disc (per Disc)

Any non-standard friction disc in a brake. Cost is per disc.

Non-standard discs include: hi-inertia friction discs and heavy duty friction discs. Does not include carrier ring friction discs (see M46 and M47).

Applicable Series
87,000*
56,000

M45 Splined Hub and Friction Disc

Standard on most models. Used for severe duty and reversing applications.

Applicable Series
87,300

Applicable Series	Torque (lb-ft)
87,X00*	6-35 lb-ft
	50 & 75 lb-ft
	105 lb-ft

** Spline is standard on this series.*

M46 Carrier Ring Friction Disc

The friction material is bonded to a steel or zinc/ aluminum alloy ring.
This is used for severe duty applications and applications where people are being moved.

Applicable Series	Carrier ring material
Horizontal Use Only	
81,000	Steel
82,000	Steel
Horizontal or Vertical Use	
87,X00** (not available on 87,300 or 87,800 series	Zinc aluminum alloy

M47 Carrier Ring Friction Disc (Bronze)

The friction material is bonded to a bronze ring.
This is used for severe duty applications and applications where people are being moved.

Horizontal applications only

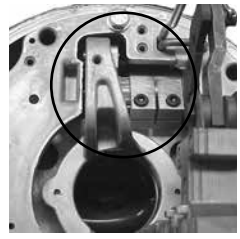
*** Only available with pre-revision design, 24-tooth splined hub, which is included in this price*

Applicable Series
81,000
82,000
86,000
87,X00** 6-35 lb-ft 50 & 75 lb-ft 105 lb-ft

M48 1,08X,000 Series Manual Adjust Mechanism

Excellent for holding applications when disc wear is not a concern. (Not available on hazardous location brakes.)

Applicable Series
87,000
81,000 82,000 86,000



M60 Encoders

Internally mounted encoders are available in some series brakes, including some hazardous location brakes. See pages 52-53 for series availability and additional information.

Maximum Encoder Diameter (in.)	
1-056	N/A
1-087-E00	2.0”
1-081 & 1-082	2.5”
1-086	3.5”

Introduction to Armature Actuated Brakes (AAB)

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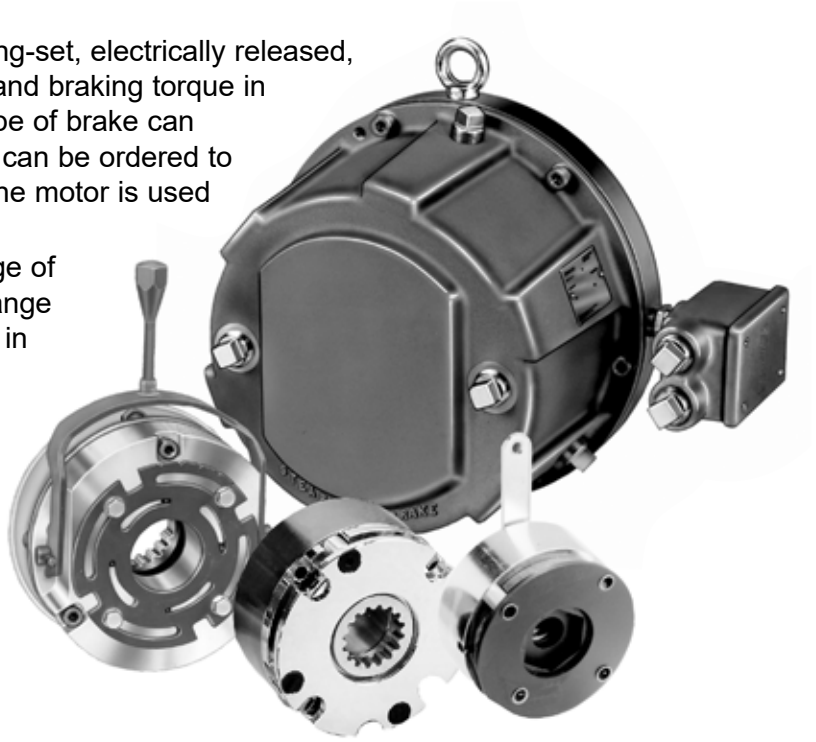
The Armature Actuated Brakes are spring-set, electrically released, friction devices, which develop holding and braking torque in the absence of electrical power. This type of brake can decelerate and hold a rotational load or can be ordered to provide a holding function only, where the motor is used as the dynamic brake.

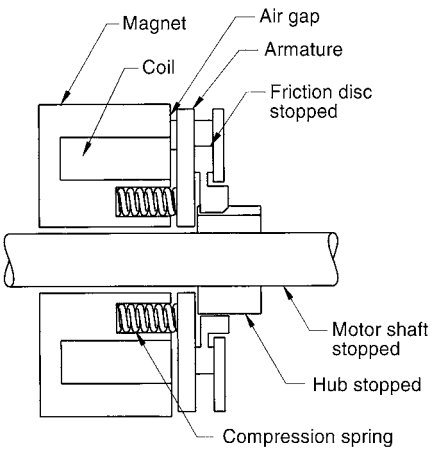
AAB's are available to meet a wide range of braking requirements. Available sizes range from 3 lb-in up to 300 lb-ft static torque, in a variety of mounting options. A short hub is available for face mounting or to provide for maximum space efficiency. Features include Class H magnet wire coils, corrosion resistance, and optional manual release lever. Custom designs and modifications are possible; consult the factory for more information.



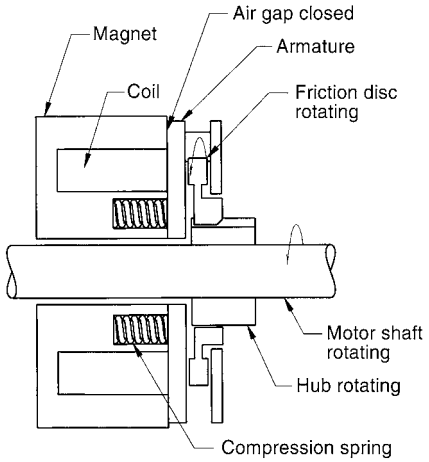
Operating Principle

A hub which is attached to the shaft supports the rotatable friction disc. Brake torque is developed when springs apply a clamping force between the brake armature, friction disc and pressure plate. When electrical power is applied, the armature is pulled by the electromagnetic force in the magnet body assembly which overcomes spring action allowing the friction disc to rotate freely. When electrical power is interrupted, the electromagnetic force is removed and the pressure spring will mechanically force the armature plate to clamp the friction disc between itself and the pressure plate, thereby torque is developed.

Engaged Condition (power off)



Disengaged Condition (power on)



Continued on next page

Product Overview

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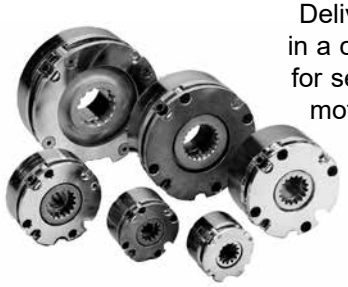
Series 310 & 311

Pages 67-70



Delivers high torque in a compact package for servo and stepper motor applications

Sizes ranging from 8 to 400 lb-in, (.9 to 45.2 Nm) of torque

Series 320

Pages 71-72

Commercial duty, for small gear motors

Sizes ranging from 3 to 50 lb-in (.34 to 5.6 Nm) of torque

Series 321 Totally -Enclosed Non-ventilated (TENV) & Series 322 IP54 Enclosure

Pages 73-76

Sizes from 3 to 72 lb-in (.34 to 8.1 Nm) of torque

Series 321 NEMA C TENV

Pages 77-78

Direct mounting to 48C and 56C motors

Sizes from 1.5 to 25 lb-ft (2 to 34 Nm) of torque

Series 331 & 333

Pages 79-80, 84

High performance brake for metric/IEC applications.

Direct drop-in for Kebco, Lenze, and Binder.

Sizes ranging from 3 to 300 lb-ft, (4 to 400 Nm) of torque

Series 331 & 333 NEMA C-Face

Pages 82-84

- Adaptors for NEMA frame sizes 48C through 405TC/UC
- Enclosed version available in NEMA 48C through 215TC

Series 350

Pages 85-86

Pressure plate mounted, IP56 enclosure, ideal for Portal Crane applications.

Torque sizes ranging from 75-300 lb-ft (102-400 Nm).

Series 360

Pages 87-88

Magnet-body mounted brake in an IP-56 enclosure. Ideal for Portal Crane applications.

Torque sizes ranging from 60-300 lb-ft (80-400 Nm).

Proving Switches and AC Rectifiers

Pages 89-93

For use with AAB Series 333, 350, and 360

Pages 94-96

AAB Modifications

Description, Availability, and Pricing

Armature Actuated Brakes (AAB) Torque Selection

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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 *(2.03)*	7 *(.79)*	7 *(.79)*	7 *(.79)*	3 *(.34)*	3 *(.34)*	3 *(.34)*	3 *(.34)*	3 *(.34)*	3 *(.34)*
1/12	18 *(2.03)*	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)*

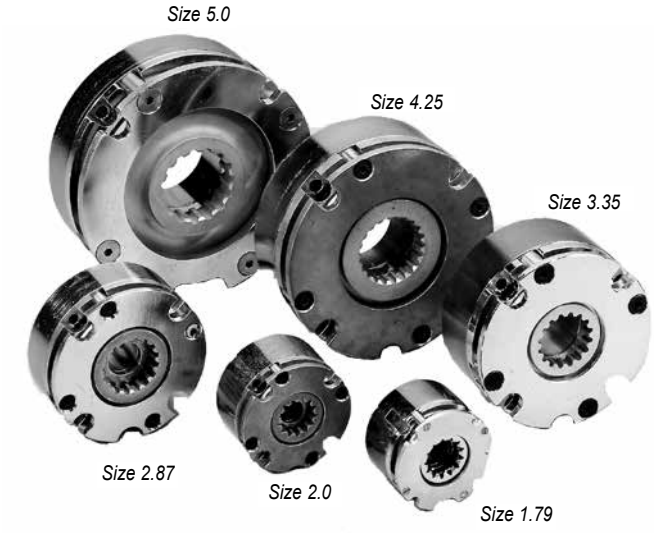
TABLE 2

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)*	*	*	*	*

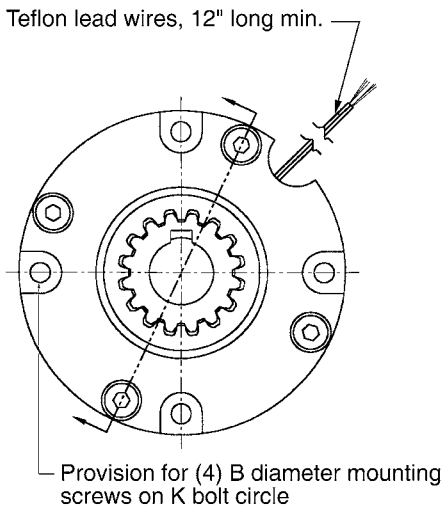
* Exceeds maximum speed rating.

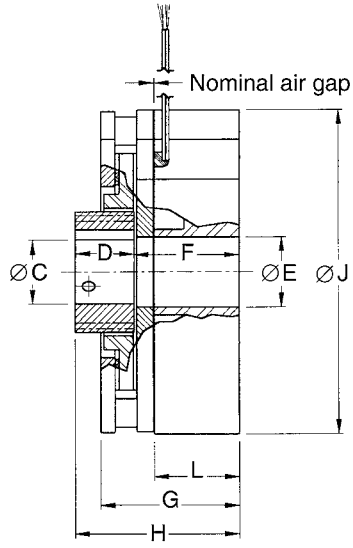
Series 310



- *Torque: 10 to 350 lb-in (1.1 to 39.5 Nm)*
- *UL Recognized Class H coil insulation system to US Standards (UR) and Canadian National Standards (CUR) - File E125303*
- *Spring activated and DC voltage released*
- *High torque, Compact size*
- *Corrosion resistant finishes*
- *Standard voltages 24 and 90 Vdc 115 and 230 Vac*
- *Available voltages 12, 36, 48 and 180 Vdc*
- *Low inertia rotating parts*
- *Splined hub for quiet dependable operation*
- *Holding applications only*
- *Installation and Service Instructions: P/N 8-078-888-00*

Option A, Long Hub





Dimensional Data

Size	Model Number	Mounting Screw		ØC Maximum	D Hub Lengths	E	Hub Location	G	H Overall	J	L Mounting Screw thru Mag. Body
		B	K				F				
1.79	310-24010	#2 *(M2)*	Ø1.640 *(41.656)*	5/16 *(8mm)*	.406 *(10.31)*	.560 *(14.22)*	.914 *(23.22)*	1.185 *(30.10)*	1.320 *(33.53)*	1.79 *(45.47)*	.354 (9)
	310-25010						1.06 *(26.92)*	1.325 *(33.66)*	1.470 *(37.34)*		
2.0	310-34010	#6 *(M3)*	Ø1.770 *(44.958)*	5/16 *(8mm)*	.406 *(10.31)*	.425 *(10.80)*	.969 *(24.62)*	1.190 *(30.23)*	1.375 *(34.93)*	2.00 *(50.80)*	.845 (21.5)
2.87	310-44010	#8 *(M4)*	Ø2.500 *(63.500)*	5/8 *(15mm)*	.520 *(13.21)*	.625 *(15.88)*	.927 *(20.55)*	1.220 *(30.99)*	1.447 *(36.75)*	2.87 *(72.89)*	.750 (19)
3.35	310-54010	#10 *(M5)*	Ø2.913 *(73.990)*	5/8 *(15mm)*	.700 *(17.78)*	1.125 *(28.58)*	1.213 *(30.81)*	1.630 *(41.40)*	1.913 *(48.59)*	3.35 *(85.09)*	1.086 (27.6)
4.25	310-64010	1/4 *(M6)*	Ø3.750 *(95.250)*	7/8 *(22mm)*	.700 *(17.78)*	1.500 *(38.10)*	1.336 *(33.93)*	1.752 *(44.50)*	2.036 *(51.7)*	4.25 *(107.95)*	1.085 (27.6)
5.0	310-74010	1/4 *(M6)*	Ø4.500 *(114.300)*	15/16 *(24mm)*	.800 *(20.32)*	1.750 *(44.45)*	1.387 *(35.23)*	1.905 *(48.39)*	2.187 *(55.55)*	5.00 *(127.00)*	1.062 (27)

Series 310 Continued

Engineering Specifications

Size	Part Number	Nominal Static Torque		Friction Material Type	Approximate Weight		Electric Power (watts)	Hub and Disc Inertia	
		lb-in	*Nm*		lbs	*kg*		lb-in-sec²	*kg-cm-sec²*
1.79	310-24010-XX-XX	10	*1.13*	Holding	.5	*0.23*	13	1.7275E-05	*1.9876E-05*
	310-25010-XX-XX	13	*1.47*						
2.0	310-34010-XX-XX	18	*2.03*	Holding	.7	*.32*	17	1.6150E-05	*1.8582E-05*
2.87	310-44010-XX-XX	40	*4.52*	Holding	1.5	*.68*	17	1.1150E-04	*1.2829E-04*
3.35	310-54010-XX-XX	140	*15.8*	Holding	3	*1.36*	22	1.6047E-04	*1.8464E-04*
4.25	310-64010-XX-XX	200	*22.5*	Holding	4.5	*2.04*	26	6.4099E-04	*7.3751E-04*
5.0	310-74010-XX-XX	350	*39.5*	Holding	6.6	*2.99*	19	1.9996E-03	*2.3007E-03*

Ordering Information

310-2401 0-0H-JA

- Group "3" Armature Acting Brake
- 3-10: For AAB-S Models
- 4=Standard Torque; 3= Reduced Torque
- Options – **TABLE 3**
- Voltages – **TABLE 2**
- Hub bore and Keyseat – **TABLE 1**

AAB-S Unit Sizes	Part Number
1.79	2
2.0	3
2.87	4
3.35	5
4.25	6
5.0	7

Character	Options	Available by size
0	standard brake	ALL
H	Quiet operation, plastic carrier disc	1.79, 2.0, 2.87, 3.35*, 4.25*

*With carrier disc option, size 3.35 torque is 50 lb-in holding, and size 4.25 torque is 100 lb-in holding

Numeral or Letter	Options
1	Standard Unit

Numeral	Enclosure type
0	None

Table 1: hub bores 310-24010 - ⊠⊠-JA

Character to insert	Bore +001/.001	Keyway Size		Bores Available (Size)					
		Width inches	Depth inches	1.79	2.0	2.87	3.35	4.25	5.0
0D	1/4	1/16	1/32	X	X				
0F	5/16	1/16	1/32	X	X				
0H	3/8	3/32	3/64	X	X	X			
0J	1/2	1/8	1/16			X	X		
0L	5/8	3/16	3/32			X	X	X	X
0N	3/4	3/16	3/32					X	X
0O	7/8	3/16	3/32					X	X
0P	15/16	1/4	1/8						X
	Metric	*mm*	*mm*						
06	6	2	1	X	X				
07	7	2	1	X	X				
08	8	2	1	X	X				
09	9	3	1.4			X			
10	10	3	1.4			X			
11	11	4	1.8			X			
12	12	4	1.8			X			
14	14	5	2.3			X	X	X	
15	15	5	2.3			X	X	X	
17	17	5	2.3					X	X
18	18	6	2.8					X	X
19	19	6	2.8					X	X
20	20	6	2.8					X	X
22	22	6	2.8					X	X
23	23	8	3.3						X
24	24	8	3.3						X

NOTE: Non-standard bore sizes available, contact factory.

Table 2:
Coil Voltage 310-2401-0H-⊠A

Character to insert	Voltage	Current Rating in amps					
		1.79	2.0	2.87	3.35		5.0
C	*12 Vdc	1.01	1.10	1.29	1.82	1.76	1.26
E	24 Vdc	.51	.55	.66	.93	.89	.64
G	*48 Vdc	.27	.29	.35	.46	.54	.40
J	90 Vdc	.13	.14	.16	.23	.22	.16
L	*180 Vdc	.08	.09	.09	.13	.14	.11
N	115 Vac	.11	.16	.16	.17	.25	.17
P	230 Vac	.06	.08	.08	.09	.13	.09

*These voltages are non-standard.

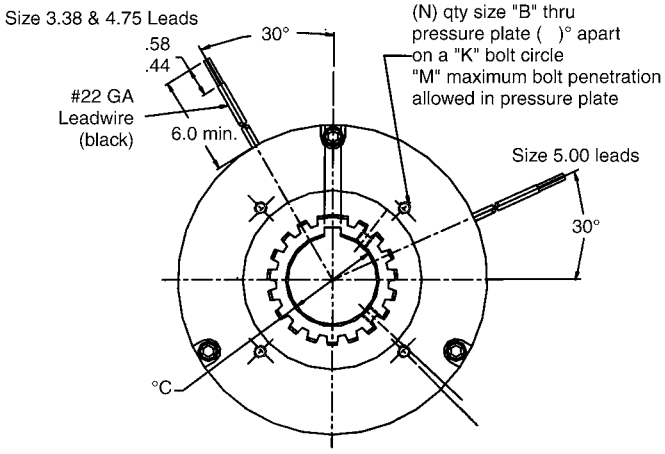
Table 3:
Options 310-24010-0H-J⊠

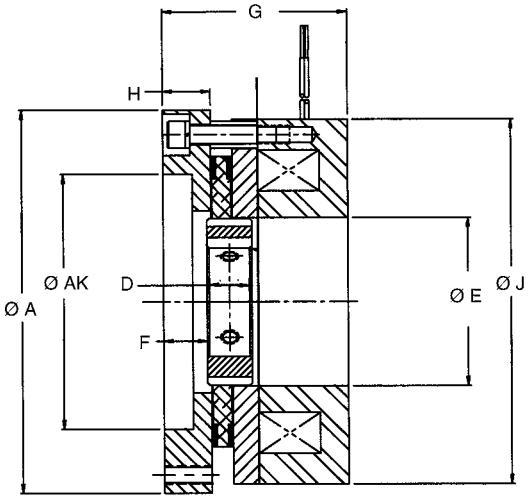
Character	Options	Available by size
A	Basic Brake, Magnet Body Mounted, Long Hub	1.79, 2.0, 2.87, 3.35* 4.25*, 5.0*

*Sizes 3.35, 4.25 and 5.0 have a pass-through hub.

Series 311

- *Torque: 75 to 400 lb-in (8.5 to 45.2 Nm)*
- *UL Recognized Class H coil insulation system to US Standards (UR) and Canadian National Standards (CUR) - File E125303*
- *Spring activated and DC voltage released*
- *Corrosion resistant finishes*
- *Standard voltages 24 and 90 Vdc*
- *Available voltages 12, 36, 48 and 180 Vdc*
- *Low inertia rotating parts*
- *Splined hub for quiet dependable operation*
- *Holding applications only*
- *Installation and Service Instructions: P/N 8-078-888-00*





Dimensions in Inches (*mm*)

Size	Model Number	K	N	B	A	AK	ØC Maximum	D Hub Lengths	E	Hub Location F	G	H	J	M
3.38	311-54010	2.500 *(63.500)*	Qty. 2 (180°) apart	#10-24 UNC	3.375 *(85.725)*	-	1.125	1.00 *(25.4)*	1.713 *(43.51)*	.30 *(7.620)*	1.999 *(50.775)*	.383 *(9.728)*	3.380 *(85.852)*	.360 *(9.144)*
4.75	311-64010	3.125 *(79.375)*	Qty. 4 (90°) apart	#10-32 UNF	4.750 *(120.650)*	2.750 *(69.850)*	1.375	.562 *(14.27)*	2.350 *(59.690)*	.16 *(4.064)*	2.310 *(58.670)*	.493 *(12.522)*	4.750 *(120.65)*	.465 *(11.811)*
5.00	311-74010	4.750 *(120.650)*	Qty. 6 (60°) apart	1/4-20 UNC	5.250 *(133.35)*	3.500 *(88.900)*	1.500	.620 *(15.75)*	2.312 *(58.725)*	.60 *(15.240)*	2.540 *(64.516)*	.656 *(16.662)*	5.00 *(127.00)*	.625 *(15.875)*

NOTE: Mounting bolt circles, mounting hole thread sizes, and quantity of mounting holes can be changed to meet your requirements. Please contact factory to request mounting dimensions other than those shown here

Series 311 Continued

Engineering Specifications

Size	Part Number	Nominal Static Torque		Friction Material Type	Approximate Weight		Electric Power (watts)	Hub and Disc Inertia	
		lb-in	*Nm*		lbs	*kg*		lb-in-sec²	kg-cm-sec²
3.38	311-54010-XX-XX	75	*8.5*	holding	2.75	*1.25*	25	5.2 E-04	*5.99E-04*
4.75	311-64010-XX-XX	120	*13.6*	holding	7.00	*3.18*	30	1.48E-03	*1.71E-03*
5.0	311-74010-XX-XX	400	*45.2*	holding	8.75	*3.97*	30	1.87E-03	*2.16E-03*

Ordering Information

Group "3" Armature Acting Brake — 311-6 4 0 1 0-0 H-J A — Options – **TABLE 3**

3-11: For AAB-S Models

AAB-S Unit Sizes	Part Number
3.38	5
4.75	6
5.0	7

Voltages – **TABLE 2**

Hub bore and Keyseat – **TABLE 1**

Modifications 0 = Standard model

Numeral or Letter	Options
1	Standard Unit

Standard Torque - Holding

Numeral	Enclosure type
0	None

Table 1: hub bores 311-64010 - ☒☒-JA

Character to insert	Bore +001/.001	Keyway Size*		Bores Available (Size)		
		Width inches	Depth inches	3.38	4.75	5.0
0B	5/8	3/16	3/32	X	X	
0D	7/8	3/16	3/32	X	X	X
0E	1-1/8	1/4	1/8	X	X	X
0G	1-3/8	1/4	1/8		X	X
0M	1-1/2	1/4	1/8			X
	Metric	*mm*	*mm*			
12	12	4	1.8	X		
14	14	5	2.3	X	X	
15	15	5	2.3	X	X	
17	17	5	2.3	X	X	
18	18	6	2.8	X	X	
19	19	6	2.8	X	X	
20	20	6	2.8	X	X	
22	22	6	2.8	X	X	X
23	23	8	3.3	X	X	X
24	24	8	3.3	X	X	X
25	25	8	3.3	X	X	X
26	26	8	3.3	X	X	X
28	28	8	3.3	X	X	X
30	30	8	3.3		X	X
32	32	10	3.3		X	X
34	34	10	3.3		X	X
35	35	10	3.3			X
36	36	10	3.3			X
38	38	10	3.3			X

NOTE: Non-standard bore sizes available, contact factory.
*Keyseats made to ANSI B17.1 standard.

Table 2:
Coil Voltage 311-6401-0H-☒A

Character to insert	Voltage
C	*12 Vdc
E	24 Vdc
G	*48 Vdc
J	90 Vdc
L	*180 Vdc

*These voltages are non-standard.

Table 3:
Options 311-64010-0H-J☒

Character	Options
A	Basic Brake, Endplate Mounted, Long Hub*

* Pass-through hub

Series 320 Armature Actuated Brakes

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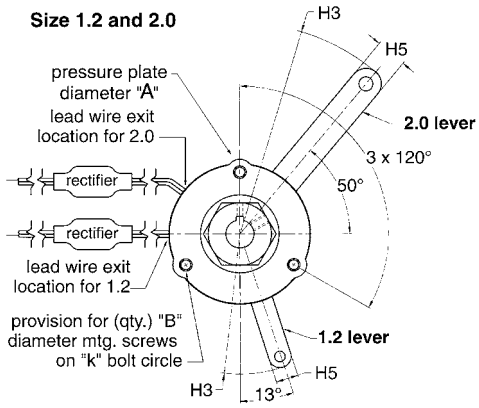
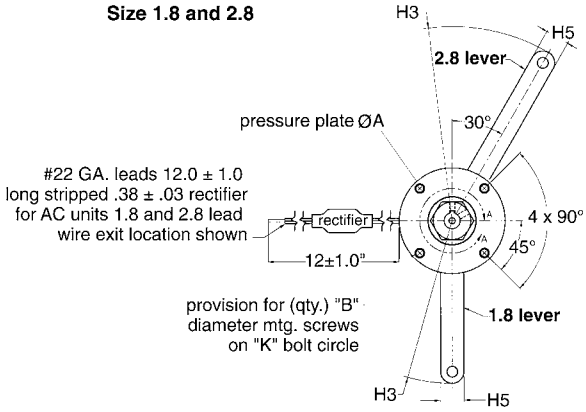
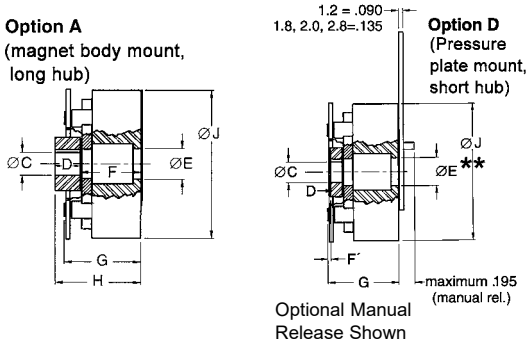
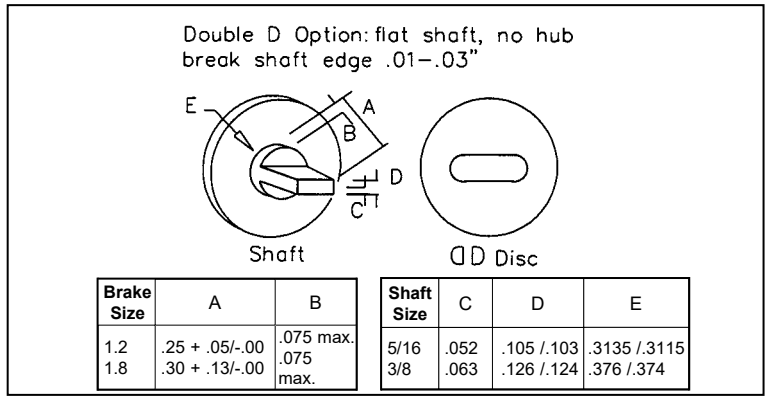
- *Torque rating 3 to 50 lb-in / (.34 to 5.6 NM)*
- *UR and CUR Recognized insulation system, E-125303 and sizes 1.8, 2.8 brakes with internal power supply File E-71115*
  Class B temperature rise with Class H mag wire
- *Available for holding (H) or dynamic (D) stopping applications*
- *Corrosion resistance*
- *Optional "double D" friction discs are available in 3-7 lb-in dynamic and 3-15 lb-in holding brakes. DD shafts fit the brake directly without a brake hub, no shaft keyway cost and simplify assembly*
- *Optional maintained manual release*
- *Optional mounting plates to make conversion over to the superior Stearns product easy*
- *Optional AC Rectifiers - internal or external in-line*
- *Optional band seal (not available for 1.2 size)*
- *Installation and Service Instructions: P/N 8-078-889-00*









Brake Size	A	B
1.2	.25 + .05/-.00	.075 max.
1.8	.30 + .13/-.00	.075 max.

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

Dimensional Data

Size	Model Number	Mounting Screw			Maximum Shaft Length (Manual Release Units)		Hub Location		E**	G	H Long Hub	H3	H5	J	D Hub Lengths		A
		Qty.	B	K			F	F`							Long	Short	
1.2D 1.2H	3-20-2401G 3-20-2501G	3	Ø.140 #4, (M3)	Ø1.545 (39.243)	.300	(7.62)	.685 (17.40) .860 (21.84)	.015 (.381)	.410 (10.41	.890 (22.60) 1.065 (27.05)	1.065 (27.05) 1.240 (31.50)	2.5 (63.5)	.40 (10.16)	1.77 (44.96)	.38 (9.65)	.19 (4.83)	1.925 (48.90)
1.8D 1.8H	3-20-4401G 3-20-4501G	4	Ø.177 #6 (M3.5)	Ø2.125 (53.975)	.430	(10.92)	.995 (25.27)	.015 (.381)	.450 (11.43)	1.260 (32.00)	1.405 (35.69)	3.775 (95.885)	.55 (10.16)	2.43 (61.72)	.410 (10.41)	.25 (6.35)	2.55 (64.77)
2.0D 2.0H	3-20-5401G 3-20-5501G	3	Ø.145 #6 (M3)	Ø2.220 (56.388)	.430	(10.92)	.933 (23.70)	.015 (.381)	.530 (13.46)	1.190 (30.23)	1.623 (41.22)	3.775 (95.885)	.55 (10.16)	2.50 (63.5)	.69 (17.53)	.31 (7.87)	2.50 (63.50)
2.8D 2.8H	3-20-7401G 3-20-7501G	4	Ø.188 #8 (M4)	Ø2.844 (72.738)	.490	(12.45)	.954 (24.23)	.050* (1.27)	1.10 (27.94)	1.415 (35.94)	1.364 (34.64)	4.5 (95.885)	.55 (10.16)	3.25 (82.55)	.410 (10.41)	*	3.32 (84.33)

*Size 2.8 can be pressure plate mounted using the long hub. The F` dimension shown for size 2.8 is for pressure plate mount using the long hub.
** No thru bore with manual release option.

Series 320 Continued

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Engineering Specifications

Size	Part Number	Nominal Static Torque		Friction Material	Approx Weight		Electric Power	Hub and Disc Inertia	Thermal Capacity	Maximum Bore	
		lb-in	*Nm*	Type	lbs	*kg*	(watts)	oz-in-sec^2	HP-sec/min	in	*mm*
1.2D	3-20-2401G-XX-XX	3	*.34*	Dynamic	.4	*.181*	7	7.02 x 10^{-5}	Consult Factory	3/8	*9*
1.2H①	3-20-2501G-XX-XX	5①	*.56*	Holding①	.4	*.181*	9	7.02 x 10^{-5}		3/8	*9*
1.8D	3-20-4401G-XX-XX	7	*.79*	Dynamic	1.1	*.499*	10	4.8 x 10^{-4}	.26	1/2②	*12*
1.8H①	3-20-4501G-XX-XX	15①	*1.69*	Holding①	1.1	*.499*	10	4.8 x 10^{-4}		1/2②	*12*
1.8D	3-20-4601G-XX-XX	15	*1.69*	Dynamic	1.1	*.499*	10	4.8 x 10^{-4}		1/2②	*12*
2.0D	3-20-5401G-XX-XX	18	*2.03*	Dynamic	1.2	*.544*	12.5	2.23 x 10^{-3}	.32	1/2	*12*
2.0H①	3-20-5501G-XX-XX	30①	*3.39*	Holding①	1.2	*.544*	12.5	2.23 x 10^{-3}		1/2	*12*
2.8D	3-20-7401G-XX-XX	35	*3.95*	Dynamic	2.0	*.91*	17	2.3 x 10^{-3}	.17	1/2②	*12*
2.8H①	3-20-7501G-XX-XX	50①	*5.65*	Holding①	2.0	*.91*	17	2.3 x 10^{-3}		1/2②	*12*

①For holding applications only. ②Set Screws located 120° from keyway.

Ordering Information

Group "3" Armature Acting Brake. – 320- 4 4 0 1 G - 0 H - J D

- 320 = For AAB-R Models
- Options – **Table 3**
- Voltages – **Table 2**
- Hub bore and Keyway – **Table 1**
  For Double "D" Bores See **Table 1A**

AAB-R Unit Sizes	Part Number
1.2	2
1.8	4
2.0	5
2.8	7

Character		Nominal Static Torque (lb-in)	List Adder
Size 1.2	4	3 Dynamic	---
	5	5 Holding	---
Size 1.8	4	7 Dynamic	---
	6	15 Dynamic	$20.00
	9	9 Dynamic	$10.00
	5	15 Holding	---
Size 2.0	4	18 Dynamic	---
	5	30 Holding	---
	3	15 Dynamic	---
	6	25 Holding	---
	7	7 Dynamic	---
Size 2.8	4	35 Dynamic	---
	5	50 Holding	---

Characters to insert	Modification
E	Brake release indicator (NC)
F	Brake release indicator (NO)
G	Standard - GGA Friction Material
J	CCW manual release rotation
S	Carrier ring friction disc

Numeral or Letter	Options
1	Standard Unit
A-Z	Reserved for Mounting Plates

Numeral	Enclosure type
0	None
2	Band seal

Table 1: 320-44010 - ⊠⊠-JD

Characters to insert	Bore	Keyway Size* Width (in.) x Depth (in.)		Bores Available Mag Body Size			
				1.2	1.8	2.0	2.8
0A	3/16	N/A	N/A	X			
0B	3/16	1/16	1/32		X		
0C	1/4	N/A	N/A	X			
0D	1/4	1/16	1/32		X	X	X
0E	5/16	N/A	N/A	X			
0F	5/16	1/16	1/32		X	X	X
0G	3/8	N/A	N/A	X			
0H	3/8	3/32	3/64		X	X	X
0J	1/2	1/8	1/16		①	①	①
05	5	*2 mm*	*1 mm*	②	X	X	X
06	6	*2 mm*	*1 mm*	②	X	X	X
07	7	*2 mm*	*1 mm*	②	X	X	X
08	8	*2 mm*	*1 mm*	②	X	X	X
09	9	*3 mm*	*1.4 mm*	②	X	X	X
10	10	*3 mm*	*1.4 mm*		X	X	X
11	11	*4 mm*	*1.8 mm*		X	X	X
12	12	*4 mm*	*1.8 mm*		X	X	X

①**Set screws located 120° from keyway.**

②**Hubs are provided without keyway.**

***Keyseats made to ANSI B17.1 standard.**

Table 1A: 320-44010 - ⊠⊠-JX
(Double "D" Bores)

Characters to insert	Bore	Bores Available Mag Body Size	
		1.2	1.8H
0F	5/16	X	X
0H	3/8	X	X

NOTE: Can be used up to 15 lb-in for holding.

Table 2: 320-44010-0H-⊠D
Standard Coil Voltage

Character to Insert	Voltage	List Adder*	Current Rating in Amps			
			Size 1.2	Size 1.8	Size 2.0	Size 2.8
C	12 Vdc	-	.632	.826	1.04	1.37
E	24 Vdc	-	.307	.421	.53	.70
G	48 Vdc	-	.158	.216	.27	.36
J	90 Vdc	-	.076	.123	.13	.17
K	103 Vdc	-	.085	.115	.121	.140
L	180 Vdc	-	.039	.060	.069	.09
N	115 Vac	$50.00	.085	.115	.140	.140
P	230 Vac	$50.00	.044	.059	.075	.097
Z	115/230 Vac	$50.00	.085/.044	.115/.059	.140/.075	.140/.097

***For external in-line rectifier (for internal rectifier, add $30.00 list)**

NOTE: 65°C maximum ambient temperature for all external in-line rectifiers

Table 3:
Options 320-44010-0H-J⊠

Characters	Options
A	Basic Brake, Magnet Body Mounted, Long Hub
D*	Basic Brake, Pressure Plate Mounted, Short Hub*
G*	Short Hub, Pressure Plate Mounted with Maintained Manual Release*
H	Long Hub with Maintained Manual Release, Size 2.8 Only
X	Double "D" Friction Disc, 1.2H, 1.2D, 1.8H
Y	Option X with Maintained Manual Release Pressure Plate Mounted

*Short hub not required for size 2.8 pressure plate mount.

***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.

Series 321 & Series 322 Armature Actuated Brakes

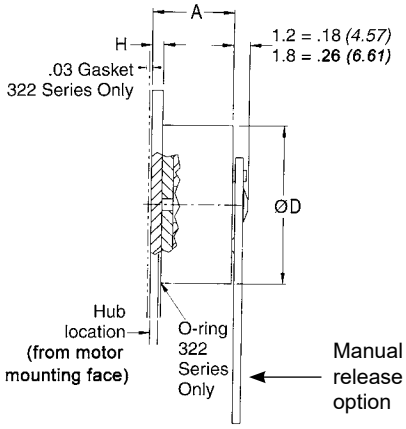
Shown: Size 2.8 with thru-shaft & manual release options

Shown: Size 1.8 flange mount with manual release option

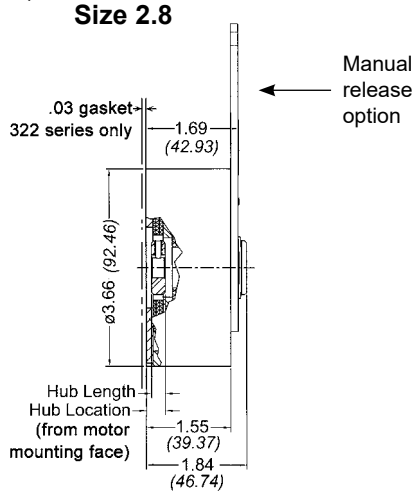
Totally Enclosed Non-Ventilated (TENV) Direct-Acting Brake - Quiet Operation

- ***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:*** *Optional "double D" friction discs are available in 3-7 lb-in dynamic and 3-15 lb-in holding brakes. DD shafts fit the brake directly without a brake hub, no shaft keyway cost and simplify assembly*
- ***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)*

Size 1.2 and 1.8



Size 2.8



Dimensions in Inches *(millimeters)*

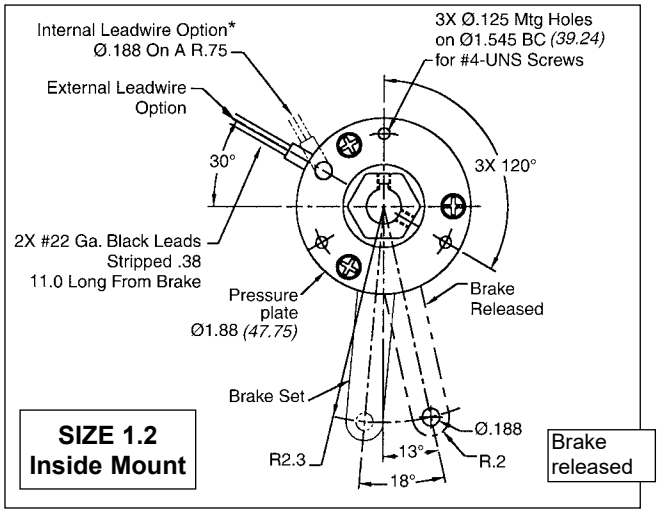
Size	Nominal Static Torque		Basic Model Number	A	H	D		Hub Location	Hub Length
	Lb-in	*Nm*				Series	Mag Body Ø		
1.2 Dynamic	3	*.34*	3-21-24	.904 *(22.962)*	.12 *(3.05)*	321	1.77 *(44.96)*	.02 *(.51)*	.19 *(4.83)*
			3-22-24			322	1.875 *(47.625)*	.05 *(1.27)*	
1.2 Holding	5	*.56*	3-21-25	1.080 *(27.432)*		321	1.77 *(44.96)*	.02 *(.51)*	
			3-22-25			322	1.875 *(47.625)*	.05 *(1.27)*	
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		.05 *(1.27)*	
1.8 Holding	15	*1.69*	3-21-45			321		.02 *(.51)*	
			3-22-45			322		.05 *(1.27)*	
1.8 Dynamic	15	*1.69*	3-21-46			321		.02 *(.51)*	
			3-22-46			322		.05 *(1.27)*	
2.8 Dynamic	35	*3.95*	3-21-74	–	–	321	3.66 *(92.96)*	.100 *(2.54)*	.25 *(6.35)*
			3-22-74			322		.125 *(3.18)*	
2.8 Dynamic	50	*5.65*	3-21-75	–	–	321	3.66 *(92.96)*	.100 *(2.54)*	.25 *(6.35)*
			3-22-75			322		.125 *(3.18)*	
2.8 Holding	72	*8.14*	3-21-77	–	–	321	3.66 *(92.96)*	.100 *(2.54)*	.25 *(6.35)*
			3-22-77			322		.125 *(3.18)*	

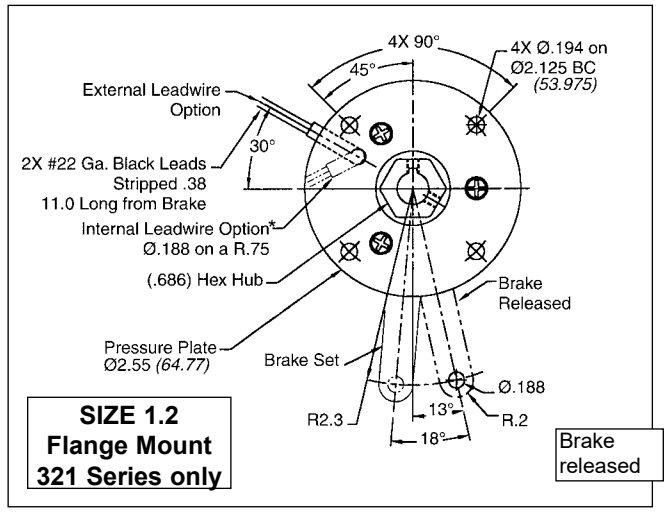
Specifications

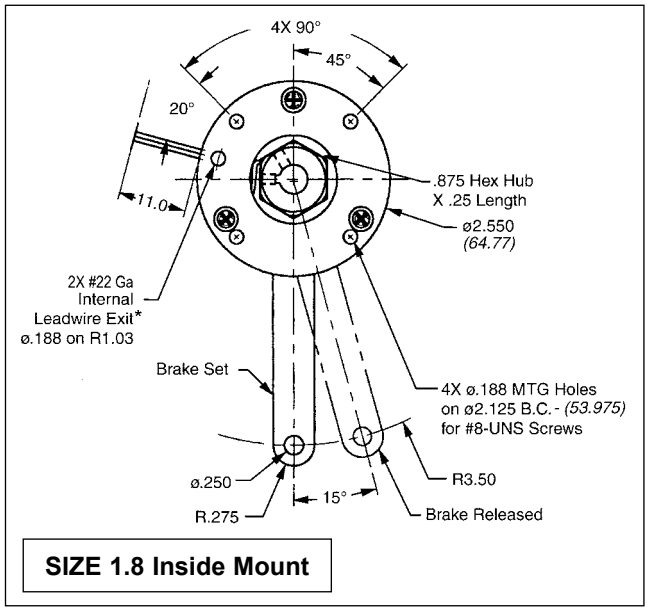
Size	Basic Model Number	Nominal Static Torque Lb-in (*Nm*)	Approx. Weight		Power (watts)	Hub and Disc inertia (Oz-in-sec^2)	Thermal Capacity HP-sec/min	Maximum Bore Size	
			lbs	*kg*				in	*mm*
1.2 Dynamic	3-2X-24	3 (*.34*)	.4	*.18*	7	7.02 x 10^{-3}	Consult Factory	3/8	*9*
1.2 Holding	3-2X-25	5 (*.56*)			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*

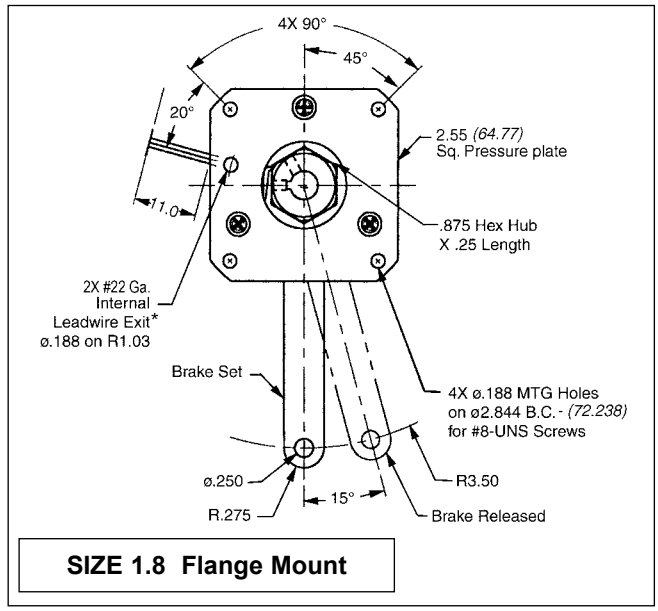
**Set screws located 120° from keyway

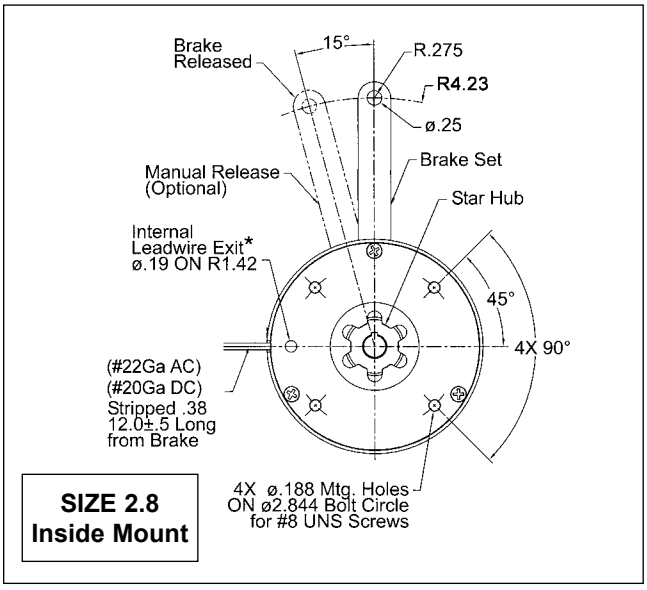
Series 321 & Series 322 Continued

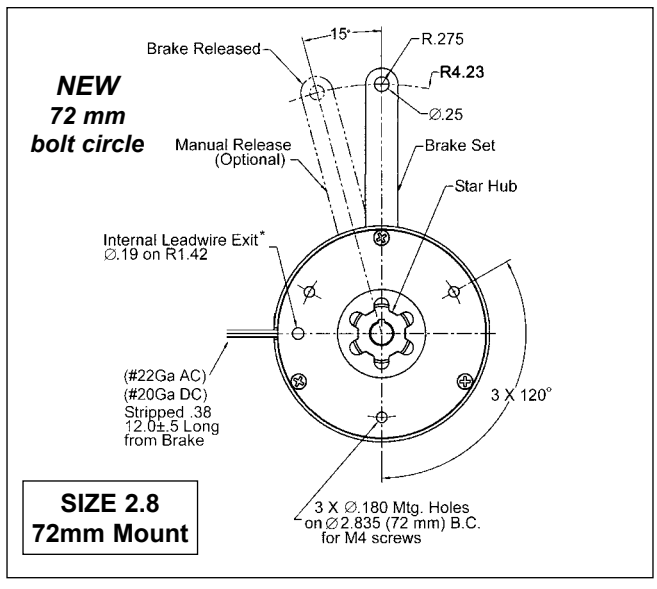










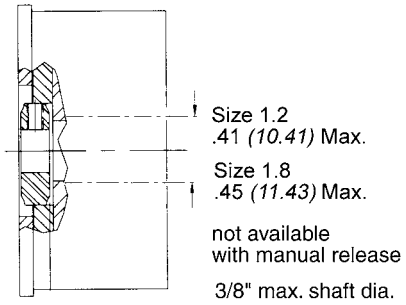


*Also, the location of the external leads for the 322 series is on the backside of the magnet body - not on the side (as shown in the above drawings) as with the 321 series.

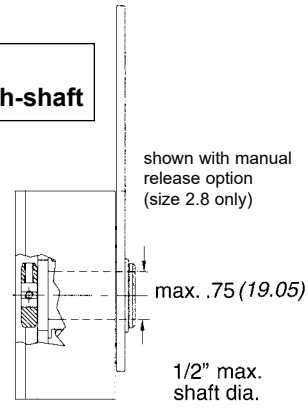
Series 321 & Series 322 Continued Options

THROUGH-SHAFT OPTION

SIZE 1.2 & 1.8
Optional through-shaft - No manual release option

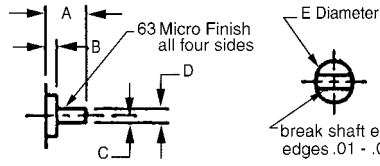


SIZE 2.8
Optional through-shaft



DOUBLE - D DISC OPTION

Double "D" Option



Hubless option with flatted shaft double "D" friction disc

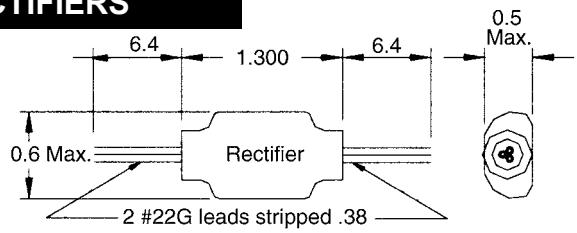
Brake Size	A	B
1.2	.25 + .05/-.00	.075 max.
1.8	.30 + .13/-.00	.075 max.

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

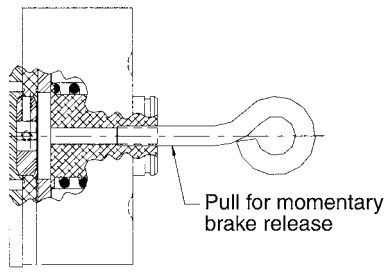
AC RECTIFIERS

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

Size	321 Series Model External leads		322 Series Model External Leads	
	Mounting		Mounting	
	Inside***	Flange	Inside***	Flange
1.2 Dynamic	3-21-2401G	3-21-2403G	3-22-2401G	N/A**
1.2 Holding	3-21-2501G	3-21-2503G	3-22-2501G	N/A**
1.8 Dynamic	3-21-4401G	3-21-440DG	3-22-4401G	3-22-440DG
1.8 Holding	3-21-4501G	3-21-450DG	3-22-4501G	3-22-450DG
1.8 Dynamic	3-21-4601G	3-21-460DG	3-22-4601G	3-22-460DG
2.8 Dynamic	3-21-7401K	N/A**	3-22-7401K	N/A**
2.8 Dynamic	3-21-7501K	N/A**	3-22-7501K	N/A**
2.8 Holding	3-21-7701K	N/A**	3-22-7701K	N/A**
	72 mm mount		72 mm mount	
2.8 Dynamic	3-21-740MK	N/A**	3-22-740MK	N/A**
2.8 Holding	3-21-750MK	N/A**	3-22-750MK	N/A**

**N/A = Not Available

***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 — Series = 321 or 322

3-2X- X X X X X - XX- X X

- Options – **Table 3**
- 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 2.8
S	Carrier ring friction disc size 1.8

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

Numeral 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* Width (in.) x Depth (in.)		Bores Available 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*

①**Set Screws located 120° from keyw**

②**Hubs are provided without keyway**

***Keyseats made to ANSI B17.1 standard**

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
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

Manual release & thru bore size 2.8 only

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	-	.090	.115	.150
L	180 Vdc	-	.051	.060	.090
T*	115 Vac Internal Rectifier	$30.00	N/A	.115	.168*
U*	230 Vac Internal Rectifier	$30.00	N/A	.059	.086*
V	115 Vac external in-line QuickSet	$80.00	.090	.115	.168
W	230 Vac external in-line QuickSet	$80.00	.044	.059	.086
Z	115/230 Vac external in-line	$50.00	.090	.115	.168

*Internal rectifier not available on size 2.8 brake with 72mm bolt circle and 1.2 brake

NOTE: Other voltages available, contact factory.

NOTE: 65°C maximum ambient temperature for all external in-line rectifiers

***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.

Series 321 & 322 NEMA C
Armature Actuated Brakes

High Cycling Brake

Direct mounting to 48C and 56C motors

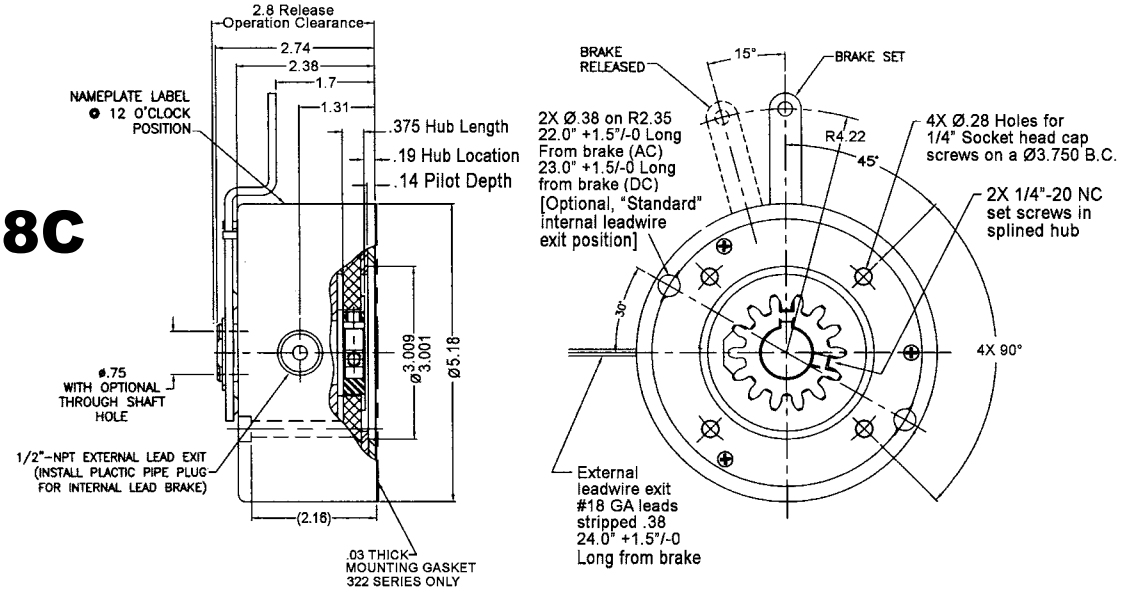
Features

- **TENV totally-enclosed non-ventilated**
  Series 321= IP42 Enclosure, Series 322 = IP54 Enclosure
- *Out-of-box torque - No burnishing required*
- *Class B temperature rise with class H mag wire*
- *Brake housing integrated with mag body creating a heat exchanger that keeps the brake coil cool*
- *Field replaceable coil*
- *Splined hub and friction disc*

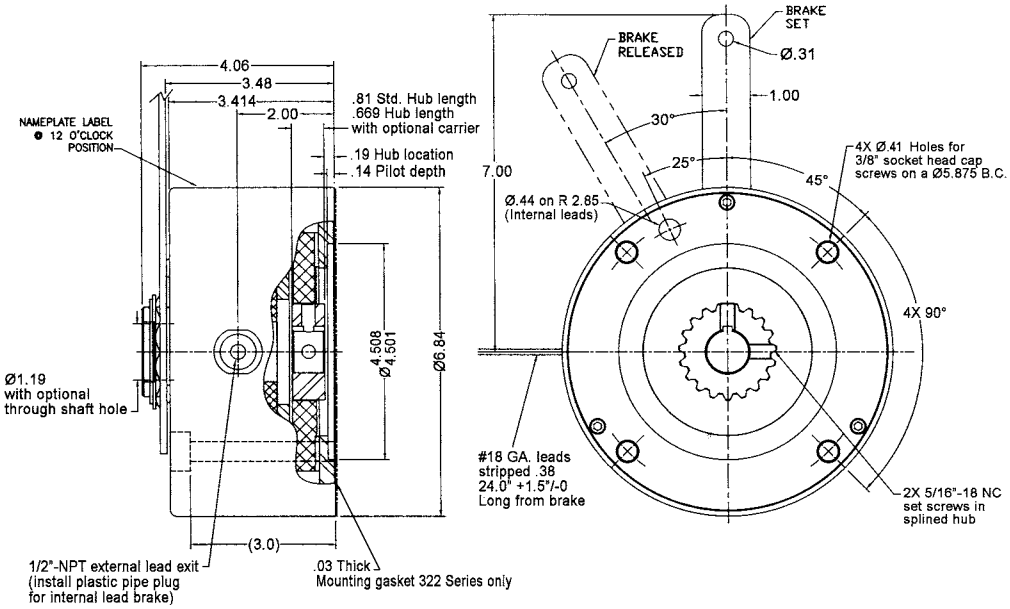
Options

- *Internal rectifier*
- *Quick-set rectifiers - for fast response time even when wired directly across motor*
- *Maintained manual release*
- *Brake release indicator switch*
- *Single point torque adjustment- to 50% of nameplate torque*
- *Through-shaft*
- *Conduit box*
- *Quiet armature actuations*
- *Carrier ring friction disc*

48C



56C



Series 321 NEMA C Continued

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Engineering Specifications

Motor Frame	321 Series Model Number	Nominal Static Torque Lb-ft (*Nm*)	322 Series Model Number	Approx. Weight		Power (watts)	Hub and Disc inertia (Oz-in-sec^2)
				lbs	*kg*		
48C	3-21-83XF	1.5 *(2)*	3-22-83XF	9.5	*4.3*	20	1.2 x 10^{-2}
	3-21-84XF	3 *(4)*	3-22-84XF				
	3-21-85XF	6 *(8)*	3-22-85XF				
	3-21-86XF	8.3 *(11)*	3-22-86XF				
56C	3-21-93XG	3 *(4)*	3-22-93XG	23	*10.4*	31	15.5 x 10^{-2}
	3-21-94XG	6 *(8)*	3-22-94XG				
	3-21-95XG	10 *(14)*	3-22-95XG				
	3-21-96XG	15 *(20)*	3-22-96XG				
	3-21-98XG	25 *(34)*	3-22-98XG				

Note: Available as standard or w/manual release

Ordering Information

Group "3" Armature Actuated Brakes — 3-2X- X X X X 0 - XX- X X — Options – **Table 3**

Series = 321 or 322

Voltages – **Table 2**

Hub Bore and Keyway – **Table 1**

Character	NEMA frame
8	48C
9	56C

Options = 8th digit	Modification Description
0	Standard brake
S	Carrier ring friction disc

48C	
Torque = 5th digit	**Nominal Static Torque Lb-ft *(Nm)***
3	1.5 *(2)*
4	3 *(4)*
5	6 *(8)*
6	8.3 *(11)*

56C	
Torque = 5th digit	**Nominal Static Torque Lb-ft *(Nm)***
3	3 *(4)*
4	6 *(8)*
5	10 *(14)*
6	15 *(20)*
8	25 *(34)*

Mounting = 7th digit	NEMA frame size
F	48C
G	56C

Lead location & options = 6th digit	Description
0	External leads
6	External leads & through shaft
A	Internal leads

Table 1: Bore Sizes

Character to insert	Bore	Keyway	Bores Available
0B	5/8	3/16 x 3/32	48C & 56C
0D	7/8	3/16 x 3/32	56C only
0K	1/2	1/8 x 1/16	48C

Other bore sizes available.

Table 2: Standard Coil Voltage

Character to Insert	Voltage	Current Rating in Amps	
		48C	56C
C	12 Vdc	1.47	2.44
E	24 Vdc	.75	1.26
G	48 Vdc	.38	.647
J	90 Vdc	.23	.393
R	460 Vac Half Wave Internal	.50	.50
V	115 Vac Internal QuickSet	.25	.40
W	230 Vac Internal QuickSet	.25	.40

Other voltages available.

Table 3: Options

Characters to Insert	Options
D	Standard Brake
G	With Maintained Manual Release

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.

Series 33X
Armature Actuated Brakes

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Direct Replacement for European Brakes - *Kebco, Lenze, and Binder

The 33X Series have the following design features:

- *Direct Acting*
- *Torque rating 3 to 300 lb-ft (4 to 400 NM)*
- *UL Recognized Class H coil insulation system to US Standards (UR) and Canadian National Standards (CUR) - File E125303*
- *Spring-set and DC voltage released - AC rectifiers optional*
- *Series 333 torque adjustable*
- *Pre-adjusted air gap for easy assembly*
- *Corrosion resistance*
- *Spline hub for quiet dependable operation*
- *Metric and US Customary bore sizes*

Options:

- *AC rectifiers (full and half wave) See pages 86-89 for rectifier specifications*
- *Band seal (boot)*
- *Tach/encoder Mounting*
- *Manual release - Non-Maintained or Maintained*
- *Shaft seal*
- *Mounting flange*
- *Electronic brake release indicator switch*

Product Overview

333 Series

Static torque from 3 to 300 lb-ft, with nine different sizes ranging from 72mm bolt circle up to 278 mm bolt circle.

Torque can be adjusted down to approximately 50% of the nameplate torque rating.

Shown here with optional non-maintained manual release lever; other options include boot (band seal), end cap plug, through-shaft seal, and many more listed in the AAB Modification Section.

331 Series

Basic brake without the torque adjust option.

Available in torque ratings from 3 to 300 lb-ft (4 to 400 Nm).

Manual release optional, can be provided with non-maintained release lever or maintained release bolts.

Metric mount; also can be ordered with C-face adaptor or as the C-face Enclosed version, and as Severe Duty.

33X Series with C-face Adaptor

Series 331 or Series 333 can be provided with a C-face adaptor for motor frames from 48C through 404/405TC, TSC, UC, USC.

All other available modifications for the 33X Series can be ordered for this brake.

33X Series Enclosed

Series 33X with a C-face adaptor and a brake housing. Order as an IP43 Enclosure with or without external manual release:

33B Series for brake without torque adjust
33C Series for brake with torque adjust

OR IP54 Enclosure with the option of internal maintained manual release:

33H Series for brake without torque adjust
33J Series for brake with torque adjust

Also Available.....

330 Series

Magnet body is not machined for a manual release option. See ordering information for the 33X Series brakes.

33X Severe Duty

Any of the 33X Series can be ordered as Severe Duty, appropriate for high-cycle rate applications. See ordering information for the 33X series brakes.

332 Series

Basic brake with the torque adjust option, and the magnet body not machined for the manual release option. See ordering information for the 33X series brakes.

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Series 331 (without torque adjust) & Series 333 (torque adjustable)
Armature Actuated Brakes

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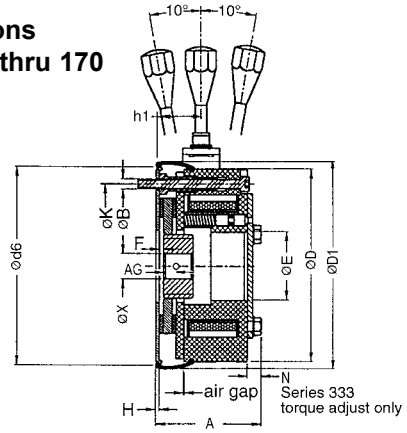
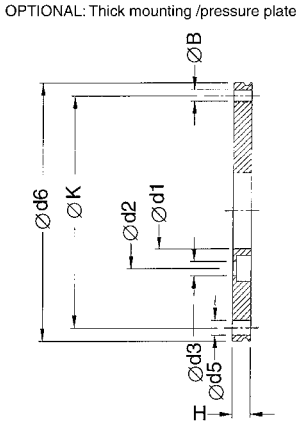
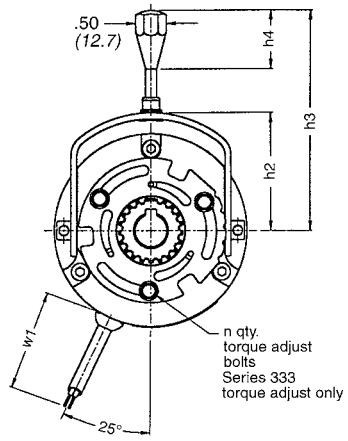
Dimensions
Sizes 72 thru 170







Size	Basic Model Number	Torque lb-ft (Nm)	D1 Max	øB	X		C Hub length	øE	F Recommended Hub Location	AG Set screw location English bores only	A			H		D	øK	N 333 Series only	n torque adjust bolts 333 series only
					Min. Bore	Max. Bore					Thick Plate	Thin Plate	No Plate	Thick Plate	Thin Plate				
72	**33X-14010**	3 *(4)*	3.56 *90.4*	*3 x M4*	3/8 *9**	9/16 *15*	0.709 *18*	1.183 *30*	0.070 *1.78*	.355 *9.02*	2.016 *51.20*	1.838 *46.68*	1.780 *45.20*	0.236 *6*	0.058 *1.47*	3.346 *85*	2.835 *72*	0.257 *6.52*	3
90	**33X-24010**	6 *(8)*	4.48 *113.8*	*3 x M5*	1/2 *9**	3/4 *16, 20***	0.787 *20*	1.183 *30*	0.070 *1.78*	.394 *10.01*	2.275 *57.78*	2.057 *52.24*	1.999 *50.77*	0.276 *7*	0.058 *1.47*	4.016 *102*	3.543 *90*	0.257 *6.52*	4
112	**33X-34010**	12 *(16)*	5.39 *136.9*	*3 x M6*	5/8 *10**	7/8 *22, 24***	0.787 *20*	1.262 *32*	0.105 *2.67*	.393 *9.98*	2.771 *70.38*	2.475 *62.86*	2.417 *61.38*	0.354 *9*	0.058 *1.47*	5.000 *127*	4.409 *112*	0.287 *7.29*	3
132	**33X-44010**	25 *(32)*	6.19 *157.2*	*3 x M6*	7/8 *14**	1-1/8 *25, 28***	0.984 *25*	1.380 *35*	0.105 *2.67*	.492 *12.50*	3.001 *76.23*	2.705 *68.71*	2.647 *67.23*	0.354 *9*	0.058 *1.47*	5.787 *147*	5.197 *132*	0.327 *8.30*	4
145	**33X-54010**	45 *(60)*	6.81 *173*	*3 x M8*	7/8 *14**	1-1/8 *30, 34***	1.181 *30*	1.577 *40*	0.130 *3.30*	.590 *14.99*	3.696 *93.88*	3.321 *84.35*	3.263 *82.88*	0.433 *11*	0.058 *1.47*	6.457 *164*	5.709 *145*	0.366 *9.30*	4
170	**33X-64010**	60 *(80)*	7.80 *198*	*3 x M8*	1-1/8 *15**	1-3/8 *35, 38***	1.181 *30*	1.852 *47*	0.133 *3.38*	.590 *14.99*	3.781 *96.04*	3.406 *86.51*	3.348 *85.04*	0.433 *11*	0.058 *1.47*	7.480 *190*	6.693 *170*	0.380 *9.65*	4

Size	Basic Model Number	d1	d2	d3	d5	d6	h1			h2 ①	h3 ①	h4	w1
							Thick Plate	Thin Plate	No Plate				
72	**33X-14010**	0.787 *20*	1.181 *30*	0.177 *4.5*	0.177 *4.5*	3.268 *83*	0.905 *23*	0.727 *18.47*	0.669 *17*	2.05 *52.1*	3.85 *97.8*	1.00 *25.4*	17.5 *444.5*
90	**33X-24010**	1.181 *30*	1.772 *45*	0.217 *5.5*	0.217 *5.5*	3.937 *100*	0.985 *25*	0.767 *19.48*	0.709 *18*	2.33 *59.2*	4.52 *114.8*	1.00 *25.4*	17.5 *444.5*
112	**33X-34010**	1.575 *40*	2.205 *56*	0.261 *6.6*	0.261 *6.6*	4.921 *125*	1.338 *34*	1.042 *26.47*	0.984 *25*	2.96 *75.2*	5.08 *129.0*	.950 *24.13*	17.5 *444.5*
132	**33X-44010**	1.772 *45*	2.441 *62*	0.261 *6.6*	0.261 *6.6*	5.709 *145*	1.200 *31*	0.924 *23.47*	0.866 *22*	3.35 *85.1*	5.47 *138.9*	.950 *24.13*	17.5 *444.5*
145	**33X-54010**	2.165 *55*	2.913 *74*	0.354 *9*	0.354 *9*	6.299 *160*	1.575 *40*	1.200 *30.48*	1.142 *29*	3.95 *100.3*	6.90 *175.3*	1.25 *31.9*	17.5 *444.5*
170	**33X-64010**	2.559 *65*	3.307 *84*	0.354 *9*	0.354 *9*	7.283 *185*	1.338 *34*	1.042 *26.47*	0.984 *25*	4.69 *119.1*	7.73 *196.3*	1.25 *31.9*	23.6 *600*

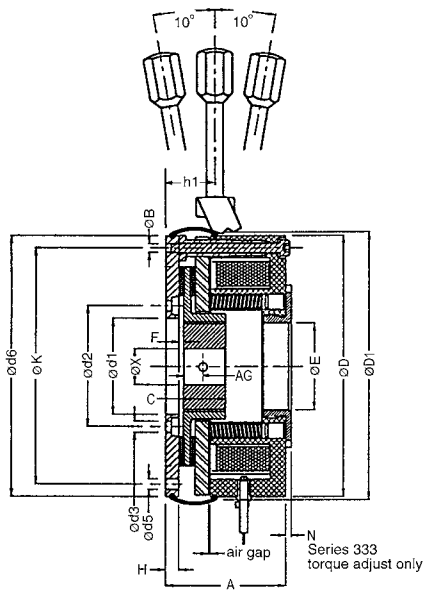
* Without keyway pilot bore. ** Keyway to DIN 6885/3 p9 - standard metric keyway DIN 6885/1 p9.① Size 132: "h2" and "h3" dimensions, contact factory. May vary .09 inch. For verification of manual release dimensions, contact factory.

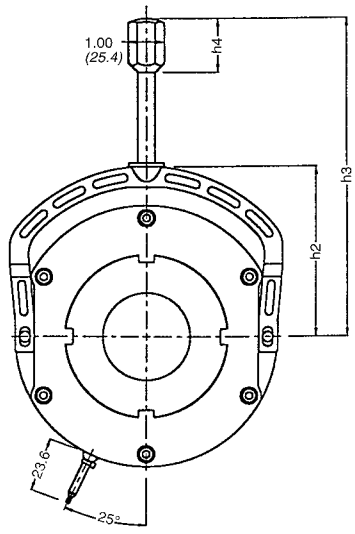
Specifications - Sizes 72 thru 170

Size Bolt Circle *(mm)*	Part Number	Nominal Static Torque	Inertia (Wk^2)		Approx Weight	Max RPM	Power (Watts)	Thermal Capacity Hp-Sec/Min
		lb-ft *(Nm)*	$lb\text{-}ft^2$	$Kgm^2 \times 10^{-4}$	lbs *(Kg)*			
72	**33X-14010-XX-XX**	3 *(4)*	.002	*.84*	2.28 *(1.03)*	3600	24	2
90	**33X-24010-XX-XX**	6 *(8)*	.003	*1.26*	4 *(1.81)*	3600	29	3
112	**33X-34010-XX-XX**	12 *(16)*	.005	*2.10*	6.78 *(3.07)*	3600	32	4
132	**33X-44010-XX-XX**	25 *(32)*	.011	*4.62*	11.42 *(5.18)*	3600	49	6
145	**33X-54010-XX-XX**	45 *(60)*	.019	*7.98*	14.45 *(6.55)*	3600	62	12
170	**33X-64010-XX-XX**	60 *(80)*	.041	*17.22*	22.6 *(10.25)*	3600	76	13

Series 331 (without torque adjust) & Series 333 (torque adjustable) Armature Actuated Brakes

Dimensions
Sizes 196 thru 278





Dimensions

Size	Basic Model Number	Torque lb-ft *(Nm)*	D1 Max	B	X		C Hub length	E	F Recommended Hub Location	AG Set screw location English bores only	A		H		D	K	N 333 Series only	
					Min. Bore	Max. Bore					Pressure Plate	No Plate	Pressure Plate	No Plate			Min.	Max.
196	**33X-74020**	110 *(149)*	8.94 *227*	*6 x M8*	1-3/8 *20**	1-5/8 *45, 48***	1.378 *35*	2.836 *72*	0.174 *4.42*	.689 *17.50*	3.902 *99.11*	3.469 *88.11*	0.433 *11*	0	8.543 *217*	7.717 *196*	0.187 *4.75*	0.479 *12.17*
230	**33X-84020**	180 *(240)*	10.38 *263.6*	*6 x M10*	1-5/8 *25**	1-7/8 *45, 50***	1.575 *40*	2.836 *72*	0.216 *5.49*	.790 *20.07*	4.352 *110.54*	3.927 *99.75*	0.433 *11*	0	10.000 *254*	9.055 *230*	0.340 *8.64*	0.740 *18.80*
278	**33X-94020**	300 *(400)*	12.43 *315.7*	*6 x M10*	1-7/8 *25**	2-1/8 *70*	1.969 *50*	2.836 *72*	0.216 *5.49*	.985 *25.02*	4.915 *124.84*	4.438 *112.73*	0.492 *12.5*	0	12.047 *306*	10.945 *278*	0.340 *8.64*	0.730 *18.54*

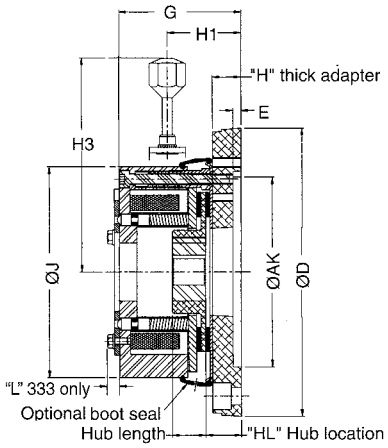
Size	Basic Model Number	d1	d2	d3	d5	d6	h1		h2	h3	h4
							Pressure Plate	No Plate			
196	**33X-74020**	3.125 *79.4*	3.937 *100*	0.354 *9*	0.354 *9*	8.543 *217*	1.575 *40*	1.142 *29*	5.51 *140*	10.43 *265*	1.75 *44.5*
230	**33X-84020**	3.86 *98*	4.724 *120*	0.433 *11*	0.433 *11*	10.00 *254*	1.850 *47*	1.417 *36*	5.34 *161*	11.26 *286*	1.75 *44.5*
278	**33X-94020**	4.724 *120*	5.906 *150*	0.433 *11*	0.433 *11*	11.654 *296*	2.205 *56*	1.772 *45*	7.36 *187*	13.34 *339*	1.71 *43.4*

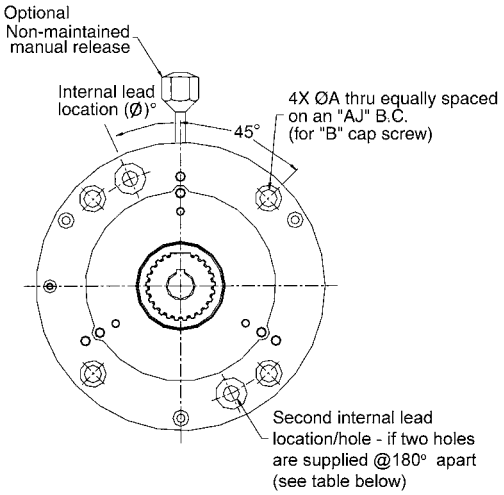
* Without keyway pilot bore. ** Keyway to DIN 6885/3 p9 - standard metric keyway DIN 6885/1 p9

Specifications - Sizes 196 thru 278

Size Bolt Circle *(mm)*	Part Number	Nominal Static Torque	Inertia (Wk^2)		Approx Weight	Max RPM	Power (Watts)	Thermal Capacity Hp-Sec/Min
		lb-ft *(Nm)*	$lb\text{-}ft^2$	$Kgm^2 \times 10^{-4}$	lbs *(Kg)*			
196	**33X-74020-XX-XX**	110 *(150)*	.066	*27.72*	50.00 *(22.7)*	1800	84	22
230	**33X-84020-XX-XX**	180 *(240)*	.163	*68.46*	47.00 *(21.3)*	1800	102	28
278	**33X-94020-XX-XX**	300 *(400)*	.401	*168.42*	75.00 *(34.0)*	1800	112	30

Series 331 & Series 333 Armature Actuated Brakes
C-Face Mounted





Model Number	Size	NEMA Frame	A	AJ	AK	B	D	E	G	H	HL	Hub Length	H1	H3	J	L	Internal Lead Hole Location
3-3X-140F0	72	48C	.28	3.75	3.0	1/4	5.50	.19	2.07	.50	.54	.709	1.22	3.85	3.35	.257	(2) @ 60°/180° apart
3-3X-240F0	90*	48C	.28	3.75	3.0	1/4	5.50	.19	2.30	.50	.55	.787	1.25	4.52	3.96	.257	(2) @ 60°/180° apart
3-3X-240G0	90	56C	.41	5.875	4.50	3/8	6.83	.19	2.48	.68	.73	.787	1.43	4.52	3.96	.257	(2) @ 25°/180° apart
3-3X-340G0	112	56C, 145TC	.41	5.875	4.50	3/8	6.83	.19	2.86	.68	.74	.787	1.72	5.08	4.97	.287	(2) @ 25°/180° apart
3-3X-440G0	132	56C, 145TC	.41	5.875	4.50	3/8	6.83	.19	3.05	.68	.74	.984	1.59	5.47	5.79	.327	(2) @ 25°/180° apart
3-3X-440H0	132	182-256TC△	.56	7.25	8.50	1/2	9.25	.19	3.37	1.00	.81	.984	1.91	5.47	5.79	.327	(1) @ 25°
3-3X-540G0	145*	145TC	.41	5.875	4.50	3/8	6.83	.19	3.63	.68	.92	1.181	1.87	6.90	6.45	.366	(2) @ 25°/180° apart
3-3X-540H0	145	182-256TC△	.56	7.25	8.50	1/2	9.25	.19	3.95	1.00	.94	1.181	2.19	6.90	6.45	.366	(1) @ 25°
3-3X-640H0	170*	182-256TC△	.56	7.25	8.50	1/2	9.25	.19	4.03	1.00	.94	1.181	2.04	7.73	7.47	.380	(1) @ 15°
3-3X-740H0	196	182-256TC	.53	7.25	8.50	1/2	8.90	.19	5.0	1.30	1.50	1.378	2.14	10.43	8.54	**	None
3-3X-740K0	196	324/326TC-△ 404/405TC	.66	11.0	12.50	5/8	13.25	.19	5.38	1.50	1.67	1.378	2.69	10.43	8.54	**	(2) @ 25°***
3-3X-840H0	230*	182-256TC△	.53	7.25	8.50	1/2	10.00	.19	5.62	1.00	1.22	1.58	2.42	11.26	10.00	**	None
3-3X-840K0	230	324/326TC-△ 404/405TC	.66	11.0	12.50	5/8	13.25	.19	6.10	1.50	1.72	1.58	2.94	11.26	10.00	**	(2) @ 25°***
3-3X-940K0	278*	324/326TC-404/405TC	.66	11.0	12.50	5/8	13.25	.19	6.75	1.60	1.82	1.97	3.38	13.34	12.05	**	(2) @ 25°***

*On these sizes, the brake diameter is larger than the adaptor mounting/bolt circle.

**L min. & max: size 196 = .187 min. & .479 max.
size 230/278 = .340 min. & .730 max.

***On each side of the 12:00 position (the location of second hole is not shown on above drawing)

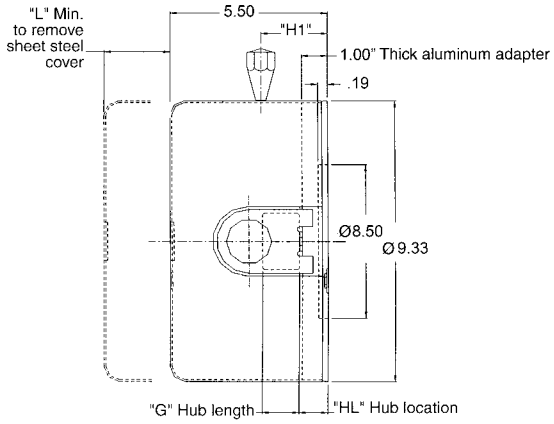
△ Frame shaft size may require derate of a larger brake. Confirm hub bore.

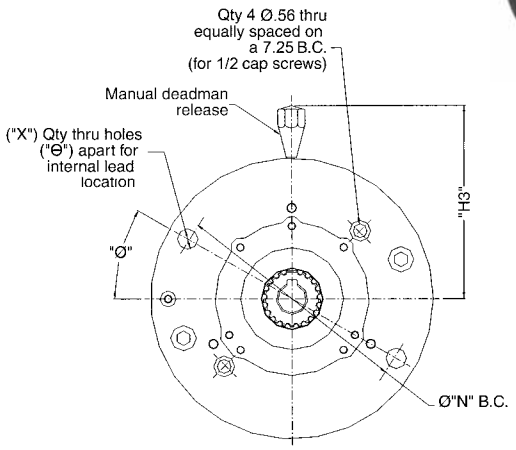
Available Frames/Sizes

Model Number	Size	Nominal Static Torque		NEMA Frame Size△	Approximate Weight	
		Lb-Ft	*Nm*		Lbs	*Kg*
3-3X-140F0-XX-XX	72	3	*4*	48C	2.76	*1.25*
3-3X-240F0-XX-XX	90	6	*8*	48C	4.48	*2.03*
3-3X-240G0-XX-XX	90	6	*8*	56C	5.24	*2.38*
3-3X-340G0-XX-XX	112	12	*16*	56C	8.02	*3.64*
3-3X-440G0-XX-XX	132	25	*32*	56C	14.00	*6.36*
3-3X-440H0-XX-XX	132	25	*32*	182TC-256TC	17.52	*7.95*
3-3X-540G0-XX-XX	145	45	*60*	56C	16.14	*7.32*
3-3X-540H0-XX-XX	145	45	*60*	182TC-256TC	20.55	*9.32*
3-3X-640H0-XX-XX	170	60	*80*	182TC-256TC	35.00	*15.89*
3-3X-740H0-XX-XX	196	110	*150*	182TC-256TC	55.00	*25.00*
3-3X-740K0-XX-XX	196	110	*150*	324-365/404-405TC/TSC/UC/USC	72.30	*32.79*
3-3X-840H0-XX-XX	230	180	*240*	182TC-256TC	65.55	*29.76*
3-3X-840K0-XX-XX	230	180	*240*	324-365/404-405TC/TSC/UC/USC	88.30	*40.05*
3-3X-940K0-XX-XX	278	300	*400*	324-365/404-405TC/TSC/UC/USC	140.00	*63.50*

Series 331 & Series 333
Armature Actuated Brakes
C-Face with Brake Housing

IP43 Enclosure



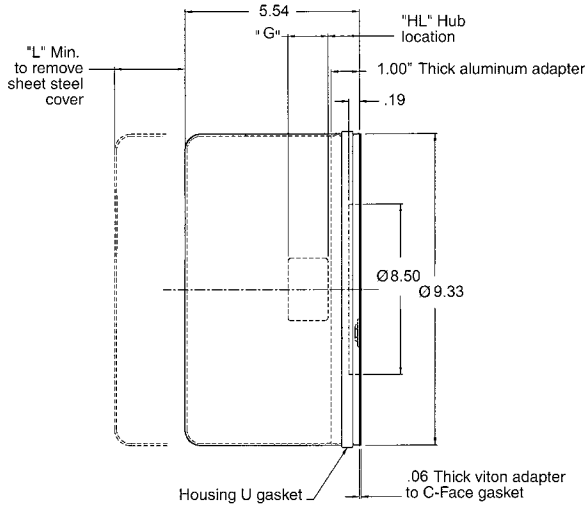


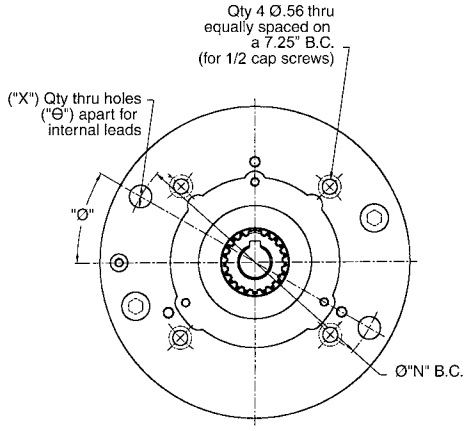
Dimensions IP43

Model Number	Size	Nominal Static Torque Lb-Ft (*Nm*)	NEMA Frame*	HL	G	H1	H3	L	Internal lead location X, Ø and O on "N" Bolt circle	Approximate Weight Lbs (*Kg*)
33X-441H0	132	25 (*32*)	182TC-256TC	1.16	.984	1.94	6.35	2.88	(1) @ 65° on R3.81	20.14 (*9.1*)
33X-541H0	145	45 (*60*)	182TC-256TC	1.19	1.181	2.22	6.90	3.50	(1) @ 65° on R3.81	23.17 (*10.5*)

For sizes 196 through 278 with C-Face and housing, see Series 350 or Series 360.

IP54 Enclosure (No manual release/Optional Internal manual release)





Dimensions IP54

Model Number	Size	Nominal Static Torque Lb-Ft (*Nm*)	NEMA Frame*	HL	G	L	Internal lead location X, Ø and O on N B.C.	Approximate Weight Lbs (*Kg*)
33X-444H0	132	25 (*32*)	182TC-256TC	1.16	.984	2.88	(1) @ 65° on R3.81	25 (*11.35*)
33X-544H0	145	45 (*60*)	182TC-256TC	1.19	1.181	3.50	(1) @ 65° on R3.81	29 (*13.16*)
33X-644H0	170	60 (*80*)	182TC-256TC	1.19	1.181	3.50	(1) @ 65° on R3.81	36 (*16.34*)

*For NEMA 48C and 56C mounting, see pages 77-78, Series 321/322 NEMA C.

Series 331 & Series 333 Continued

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Ordering Information

Group "3" Armature Acting Brake — 333- 4 4 1 1 0 - O D - K C

- Metric Mount
- Options **Table 3**
- Voltages - **Table 2**
- Hub bore and keyseat - **Table 1**

Numeral	Description
0	No torque adjust, mag body not machined for manual release
1	No torque adjust
2	With torque adjust, mag body not machined for manual release
3	With torque adjust
B	Housing with conduit hole, no torque adjust (Size 72 - 145)
C	Housing with conduit hole, with torque adjust
H	IP54 housing, no torque adjust (Size 72 - 170)
J	IP54 housing, with torque adjust (Size 72 - 170)

Numeral	AAB-E Unit Sizes
1	72
2	90
3	112
4	132
5	145
6	170
7	196
8	230
9	278

Numeral	Description
2	Reduced torque with air gap shim
3	Reduced torque (severe duty- long life)
4	Standard
5	Size 90 Only; 8.34 lb-ft holding applications only
6	Std torque with air gap shim

Numeral	Modifications
0	Standard

Numeral	Mounting Style
0	Less pressure plate
1	Thin pressure plate (Size 72 - 170 only)
2	Thick pressure plate
F	NEMA 48C (Size 72 & 90)
G	NEMA 56C (Size 90, 132, & 112)
H	NEMA 180/210/250 TC (Size 132, 145, 170, 196 & 230)
J	NEMA 280 TC/UC (Size 196)
K	NEMA 320/360/400 TC/UC (Size 196, 230, 278)

Numeral	Enclosure Type
0	Standard
1	Seal (boot) kit thru bore
2	Seal (boot) and end cap plug
3	Seal (boot) and through-shaft seal
4	IP54 Enclosure

Table 1 - Hub Bores 333-14010-[*][*]-EA

NOTE: See page 100 for recommended minimum bore size by torque

Bore (in)	Character to insert	Keyway Size*		Available Bores								
				Brake Size								
				1	2	3	4	5	6	7	8	9
		Width (in)	Depth (in)	72	90	112	132	145	170	196	230	278
3/8	0V	3/32	3/64	std								
1/2	0K	1/8	1/16	std	std							
9/16	0N	1/8	1/16	non std	non std							
5/8	0B	3/16	3/32		std	std	non std					
3/4	0C	3/16	3/32		non std	non std	non std					
7/8	0D	3/16	3/32			std	std	std	non std			
1	0L	1/4	1/8				non std	std	non std			
1-1/8	0E	1/4	1/8				std	std	std	non std		
1-1/4	0F	1/4	1/8						non std	non std		
1-3/8	0G	5/16	5/32						std	std	non std	non std
1-1/2	0M	3/8	3/16							std	non std	non std
1-5/8	0H	3/8	3/16							std	std	non std
1-3/4	0I	3/8	3/16								std	non std
1-7/8	0J	1/2	1/4								std	std
2	0L	1/2	1/4									non std
2-1/8	0N	1/2	1/4									std
Metric		***Width (mm)***	***Depth (mm)***	*Metric Bores Supplied Without Set Screws, circlip recommended*								
11	11	*4*	*1.8*	std		non std						
14	14	*5*	*2.3*	std	std	std	non std	non std				
15	15	*5*	*2.3*	non std	std	std	non std	non std	non std			
16	16	*5*	*2.3*		non std	non std	non std	non std	non std			
20	20	*6*	*2.8*		std**	std	non std	non std	non std	non std**		
22	22	*6*	*2.8*			std**	non std	non std	non std	non std		
24	24	*8*	*3.3*				std	non std	non std	non std		
25	25	*8*	*3.3*				std	non std	std	non std	non std**	non std**
28	28	*8*	*3.3*				non std**	non std	std	non std	non std	non std
30	30	*8*	*3.3*					std	std	std	std	std
34	34	*10*	*3.3*					std**	non std	non std	non std	non std
35	35	*10*	*3.3*						non std	std	std	std
38	38	*10*	*3.3*						std**	std	std	non std
40	40	*12*	*3.3*							std	std	std
42	42	*12*	*3.3*							non std	std	non std
45	45	*14*	*3.8*							non std	std	std
48	48	*14*	*3.8*							std**	non std	non std
49	49	*14*	*3.8*								non std	non std
50	50	*14*	*3.8*								std**	std
55	55	*16*	*4.3*									std
60	60	*18*	*4.4*									std
70	70	*20*	*4.9*									std

*Standard U.S. Keyseats made to ANSI B17.1 standard. Standard metric Keyseat DIN 6885/1 p9.

** Keyseat to DIN 6885/3 p9.

Table 2 - STD Coil Voltage 333-14010-14-[*]A

Character to insert	Coil Voltage	Current Rating in Amps								
		1	2	3	4	5	6	7	8	9
		72	90	112	132	145	170	196	230	278
B	414/432 Vdc	0.06	0.07	0.09	0.12	0.16	0.22	0.25	0.26	0.29
C	12 Vdc	2.13	2.66	2.27	3.50	3.90	5.60	6.40	8.30	N/A
E	24 Vdc	1.10	1.28	1.16	1.80	1.84	2.80	3.30	4.27	3.85
J	90 Vdc	0.28	0.32	0.29	0.45	0.72	0.70	0.82	1.05	1.19
K	103 Vdc	0.21	0.24	0.33	0.51	0.53	0.80	0.75	0.96	1.08
L	180 Vdc	0.15	0.17	0.15	0.23	0.38	0.36	0.42	0.54	0.61
M	205 Vdc	0.11	0.12	0.17	0.27	0.27	0.41	0.38	0.49	0.56
S	258 Vdc	0.09	0.10	0.14	0.21	0.23	0.33	0.34	0.40	0.44
N*	115 Vac	0.21	0.24	N/A	N/A	N/A	N/A	N/A	N/A	N/A
P*	230 Vac	0.11	0.12	0.17	.27	N/A	N/A	N/A	N/A	N/A
V**	115 Vac quickset	0.21	0.24	N/A	N/A	N/A	N/A	N/A	N/A	N/A
W**	230 Vac quickset	0.11	0.12	0.17	N/A	N/A	N/A	N/A	N/A	N/A

*In-line rectifier. Consult factory for pricing

**In-line quickset rectifier. Consult factory for pricing

Contact factory for non-standard coils.

Add the following for non-std. coil voltage

- Sizes 72 through 112 = Consult factory for pricing
- Sizes 132 through 170 = Consult factory for pricing
- Sizes 196 through 278 = Consult factory for pricing

For separate AC rectifiers see pages 89-92

Table 3 - Options 333-14010-14-E[*]

Character to insert	Description/Options
A	Basic brake
C	Option A with non-maintained release
J	Steel hub w/manual release (for press-fit applications)
K	Steel hub, no manual release
L	Internal manual release, non-maintained
R	Maintained manual release (bolts)

Modifications are available- see AAB Modification Section

Series 350 Armature Actuated Brakes

Brake with IP56 Aluminum Cover

Brake showing space heater and release indicator location

Reverse view showing adapter mounting plate orientation

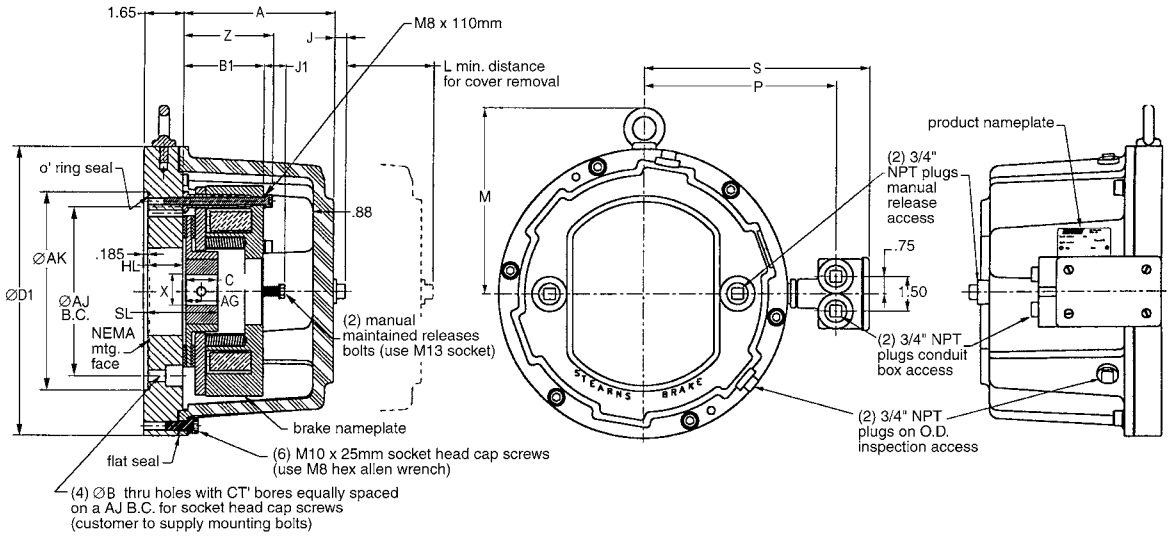
Features

- *Torque rating 102 - 400 Nm, 75 - 300 lb-ft*
- *Universal mounting*
- *Class H insulation*
- *Maintained manual release*
- *Corrosion resistance (stainless steel external hardware)*
- *IP56 enclosure protection (available in ductile cast iron or aluminum cover)*
- *ABS, CSA and CE certification*
- *Simple wear adjustment with access hole for air gap inspection*
- *Metric and US Customary bore sizes*
- *C-Face mounting - various adapter plates available for 182TC through 405TSC frame mounting*
- *Splined hub for quiet dependable operation*
- *Installation Instructions/Parts List: P/N 8-078-895-00*

Standard Options

- *AC rectifier (see pages 86-89)*
- *Tach/encoder mounting*
- *Space Heater 115, 230 or 460 Vac*
- *Thru-shaft*
- *IEC D and C Flange*
- *Conduit Box- specify F1 or F2 location (F1 location shown)*

F1 Conduit Box location shown.
F2 location on left side facing brake housing.



Size		NEMA Frame	ØB	Torque		AJ	AK	Mount Bolt	X				D1**	D1***	B1	Z	L	M	S	P	J1	A**	A***	J	C Hub length	HL Hub Location	AG set screw location
									Min. Bore		Max. Bore																
				lb-ft	Nm				in	*mm*	in	*mm*															
7	196	182TC-256TSC	.53	75	*102*	7.250	8.500	1/2"-13	1.375	*20*	1.625	*48**	12.38	15.75	3.57	3.97	4.6	8.00	9.68	8.25	.93	6.47	6.73	.50	1.378	1.63	.689 *17.50*
7	196	182TC-256TSC	.53	110	*150*	7.250	8.500	1/2"-13	1.375	*20*	1.625	*48**	12.38	15.75	3.57	3.97	4.6	8.00	9.68	8.25	.93	6.47	6.73	.50	1.378	1.63	.689 *17.50*
7	196	284TC-286TSC	.53	110	*150*	9.000	10.500	1/2"-13	1.375	*20*	1.625	*48**	12.38	15.75	3.57	3.97	4.6	8.00	9.68	8.25	.93	6.47	6.73	.50	1.378	1.63	.689 *17.50*
7	196	324TC-405TSC	.66	110	*150*	11.000	12.500	5/8"-18	1.375	*20*	1.625	*48**	15.75	15.75	3.57	3.97	4.6	9.63	11.38	9.94	.93	6.73	6.73	.50	1.378	1.63	.689 *17.50*
8	230	284TC-286TSC	.53	180	*240*	9.000	10.500	1/2"-13	1.625	*25*	1.875	*50**	15.75	15.75	4.00	4.46	5.0	9.63	11.38	9.94	.93	6.73	6.73	.25	1.575	1.63	.790 *20.07*
8	230	324TC-405TSC	.66	180	*240*	11.000	12.500	5/8"-11	1.625	*25*	1.875	*50**	15.75	15.75	4.00	4.46	5.0	9.63	11.38	9.94	.93	6.73	6.73	.25	1.575	1.63	.790 *20.07*
9	278	324TC-405TSC	.66	300	*400*	11.000	12.500	5/8"-11	1.875	*25*	2.125	*70*	15.75	15.75	4.00	5.08	5.0	9.63	11.38	9.94	.97	6.73	6.73	.25	1.969	1.63	.985 *25.02*

*Key to DIN 6885/3p9-Standard Metric Keyway DIN 6885/1p9
D1** & A** for Aluminum Cover
D1*** & A*** for Ductile Iron Cover

Component Materials:

- Adapter plate - steel (zinc plate)
- Splined hub - steel (zinc plate)
- Splined carrier - aluminum
- Armature - steel (zinc plate)
- Magnet body - steel (zinc plate)
- Hardware - steel (corrosion resistant plating or stainless)
- Cover: Size 196 - 182T thru 286TS NEMA - Aluminum (anodized) (additional paint optional) Size 196 - 324T thru 405TS NEMA - Cast Iron (primed) (additional paint optional)
- Size 230 - 284T thru 405TS NEMA - Cast Iron (primed) (additional paint optional)
- Size 278 - 324T thru 405TS NEMA - Cast Iron (primed) (additional paint optional)

Series 350 Continued

Unit Specifications

Size	NEMA Frame	Nominal Static Torque		Part Number		Weight/lbs		Max RPM	Thermal Capacity Hp-Sec/Min
		lb-ft	*Nm*	Ductile Cast Iron	Aluminum Cover	Ductile Iron	Aluminum		
196	182TC-256TSC	75	*102*	351-734HX-XX-XX	355-734HX-XX-XX	–	103	1800	22
196	182TC-256TSC	110	*150*	351-744HX-XX-XX	355-744HX-XX-XX	–	103	1800	22
196	284TC-286TSC	110	*150*	351-744JX-XX-XX	355-744JX-XX-XX	–	103	1800	22
196	324TC-405TSC	110	*150*	351-744KX-XX-XX	355-744KX-XX-XX	134	128	1800	22
230	284TC-286TSC	180	*240*	351-844JX-XX-XX	355-844JX-XX-XX	208	178	1800	28
230	324TC-405TSC	180	*240*	351-844KX-XX-XX	355-844KX-XX-XX	208	178	1800	28
278	324TC-405TSC	300	*400*	351-944KX-XX-XX	355-944KX-XX-XX	219	189	1800	30

Ordering Information

Part number example: 355-74 4 J C O M E A

Group "3" Armature Acting Brake (Direct acting with a DC Coil)

Mounting Design	
Numeral	**Design**
5	Pressure Plate Mount

Numeral	Brake Cover Type
1	Ductile Iron
5	Aluminum

Numeral/ Alpha	Magnet Body Size	Torque lb-ft
7	196	110
8	230	180
9	278	300

	Torque/Modification
3	Reduced Torque
4	Standard Torque

Numeral	Enclosure
H	IP66 conduit box* with terminal strip
M	IP66 conduit box*

*Specify F1 or F2 location for conduit box modification

Options **Table 3**

Voltages - **Table 2**

Hub bore and keyset - **Table 1**

Additional Options	
Standard Brake	0
Space Heater 115	1
Space Heater 230	2
Space Heater 460	3
Brake release indicator NO/NC	4
Brake release indicator NO/NC Space Heater 115	5
Brake release indicator NO/NC Space Heater 230	6
Brake release indicator NO/NC Space Heater 460	7

Mounting	
NEMA 180/210/250 C-face	H
NEMA 280 C-face	J
NEMA 320/400 C-face	K
NEMA 440 C-face Mt*	L
NEMA 500 C-face Mt*	M
IEC 132 C-face Mt*	S
IEC 160 C-face Mt*	T
IEC 132 D-face Mt*	U
IEC 160 D-face Mt*	V
IEC 180 D-face Mt*	W
IEC 200 D-face Mt*	X
IEC 225 D-face Mt*	Y

*Contact factory for pricing on these mounting options

Table 1 - Hub Bores

NOTE: See page 100 for recommended minimum bore sizes by torque

Character to insert	Bore	Keyway Size*		Bores Available		
		Width (in.)	Depth (in.)	Unit Size		
				196	230	278
0G	1.375	5/16	5/32	X		
0M	1.500	3/8	3/16	X		
0H	1.625	3/8	3/16	X	X	
0I	1.750	3/8	3/16		X	
0J	1.875	1/2	1/4		X	X
0L	2.000	1/2	1/4			X
0N	2.125	1/2	1/4			X
Metric	*Bore*	*Width*	*Depth*	***196***	***230***	***278***
20	*20*	—	—	X		
30	*30*	*8*	*3.3*	X		X
35	*35*	*10*	*3.3*	X	X	
38	*38*	*10*	*3.3*	X	X	
40	*40*	*12*	*3.3*	X	X	X
42	*42*	*12*	*3.3*	X	X	
45	*45*	*14*	*3.8*	X	X	X
48	*48*	*14*	*3.8*	X		
50	*50***	*14*	*3.8***		X	
50	*50*	*14*	*3.8*			X
55	*55*	*16*	*4.3*			X
60	*60*	*18*	*4.4*			X
70	*70*	*20*	*4.9*			X

*Standard U.S. keyseats made to ANSI B17.1 standard. Standard metric keyseat DIN 6885/1 p9.

**Keyseat to DIN 6885/3 p9.

Table 2 - Coil Voltage

Character to Insert	Coil Voltage	Current Rating		
		7	8	9
		196	230	278
E	24 Vdc	3.30	4.27	3.85
J	90 Vdc	.82	1.05	1.19
K	103 Vdc	.75	.96	1.08
L	180 Vdc	.42	.54	.61
M	205 Vdc	.38	.49	.56
B	414/432 Vdc	.24	.26	.28

Other voltages available - consult factory
For AC rectifiers see pages 86-89

Table 3 - Additional Options

No manual release	A
Maintained release (standard)	R

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.

Series 360 Armature Actuated Brakes (Magnet Body Mounted)

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*Shown with **optional** conduit box*

Reverse view showing adapter mounting plate orientation

Brake showing space heater and release indicator location

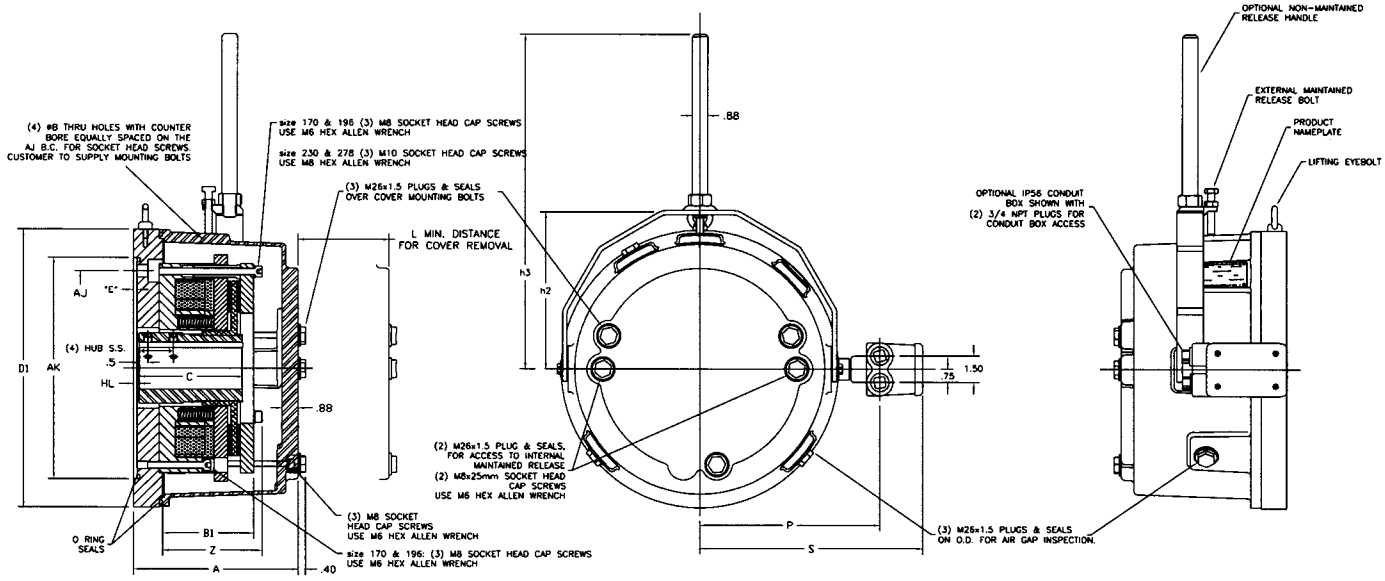
Features

- *Universal mounting*
- *Internal maintained manual release*
- *IP56 enclosure*
- *ABS, CE, and CSA Certification*
- *Brake gaskets are captive (O-Ring), so parts are not lost during maintenance*
- *Stainless Steel nameplate (exterior)*
- *Modular brake assembly Install and remove brake without having to readjust air gaps*
- *Class H insulation*
- *Installation Instructions and Parts List: P/N 8-078-898-00*

Standard Brake Options

- *AC Rectifier (see pages 86-89)*
- *Tach/encoder mounting*
- *Space Heater*
- *Electronic brake release indicator*
- *Contact Factory for Electronic Wear Indicator*
- *Thru-Shaft*
- *Optional external non-maintained/maintained manual release*
- *Optional IP66 conduit box mounted on adapter plate. Wiring is not disturbed when brake housing is removed*

F1 Conduit Box location shown.
F2 location on left side facing brake housing.



Dimensional Data Sizes 170 through 278

Size		Model	NEMA Frame	Torque		∅B	AJ	AK	Mount Bolt	D1	E	B1	Z	L	h2	h3	S	P	A	HL Hub Location	C Hub Length	S.S. Location
				lb-ft	*Nm*																	
6	170	36X-6	182-256TC	35	47	.53	7.25	8.50	1/2"-13	10.38	.185	3.57	3.94	3.8	6.00	16.1	9.54	7.09	6.70	.19	4.64	1.63
6	170	36X-6	182-256TC	60	*80*		7.25	8.50		10.38	.185						9.54	7.09	6.70			
6	170	36X-6	284-286TC	60	*80*		9.00	10.50		10.76	.190						10.25	7.81	6.90			
7	196	36X-7	182-256TC	110	*149*	.53	7.25	8.50	1/2"-13	11.81	.185	3.72	4.12	4.3	6.70	16.6	10.25	7.81	6.90	.19	4.70	1.75
7	196	36X-7	284-286TC	110	*149*	.53	9.00	10.50														
8	230	36X-8	284-286TC	180	*240*	.53	9.00	10.50	1/2"-13	13.63	.190	4.45	4.94	5.2	8.25	17.9	11.19	10.94	8.27	.19	5.20	2.12
8	230	36X-8	324TC-405TSC	180	*240*	.69	11.00	12.50	5/8"-11													
9	278	36X-9	324TC-405TSC	300	*400*	.69	11.00	12.50	5/8"-11	15.68	.190	5.12	5.60	5.8	9.20	18.8	12.19	11.94	9.69	.19	5.82	2.12
9	278	36X-9	444-445TC	300	*400*	.69	14.00	16.00		16.56							12.63	12.38				

Note: Dimensions for estimating purposes only.

***Component Materials* for 361-X Series:**

- Adapter plate - steel (zinc phosphate, prime & paint)
- Splined hub - steel (zinc plate)
- Armature - steel (normalized)
- Pressure Plate - steel (normalized)
- Magnet body - steel (zinc plated)
- Housing - ductile iron (primed & painted):
- Hardware - steel (corrosion resistant plated or stainless)

Series 360 Continued

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Specifications

Size	NEMA Frame	Nominal Static Torque		Model Number	Thermal Capacity Hp-Sec/Min	Approx weight lbs.
		lb-ft	Nm			
170	182-256TC	35	*47*	3-61-634H0	14	101
170	182-256TC	60	*80*	3-61-644H0		
170	284-286TC	60	*80*	3-61-644J0		
196	182-256TC	75	*102*	3-61-734H0	20	120
196	182-256TC	110	*150*	3-61-744H0		
196	284-286TC	110	*150*	3-61-744J0		
230	284-286TC	180	*240*	3-61-844J0	26	176
230	324TC/364-365TC	180	*240*	3-61-844K0		
278	324TC/364-365TC	300	*400*	3-61-944K0	28	280
278	444TC	300	*400*	3-61-944L0		

Ordering Information

Part number example: 361-744JCOMES

Group "3" Armature Acting Brake (Direct acting with a DC Coil)

Mounting Design	
Numeral	**Design**
6	Magnet Body Mount

Numeral	Brake Cover Type
1	Ductile Iron

Numeral/ Alpha	Magnet Body Size	Torque lb-ft
6	170	60
7	196	110
8	230	180
9	278	300

	Torque/Modification
3	Reduced Torque
4	Standard Torque

Numeral	Enclosure
4	IP56 Enclosure (standard)
H	IP66 conduit box* with terminal strip
M	IP66 conduit box*

*Specify F1 or F2 location for conduit box modification

Options **Table 3**

Voltages - **Table 2**

Hub bore and keyset - **Table 1**

Additional Options	
Standard Brake	0
Space Heater 115	1
Space Heater 230	2
Space Heater 460	3
Brake release indicator Switch NO/NC	4
Brake release indicator NO/NC Space Heater 115	5
Brake release indicator NO/NC Space Heater 230	6
Brake release indicator NO/NC Space Heater 460	7
Wear indicator NO NO	A
Wear indicator NO/NC Space Heater 115	B
Wear indicator NO/NC Space Heater 230	C
Wear indicator NO/NC Space Heater 460	D

Mounting/Size	
NEMA 180/210/250 C-face	H
NEMA 280 C-face	J
NEMA 320/400 C-face	K
NEMA 440 C-face Mt*	L
NEMA 500 C-face Mt*	M
IEC 132 C-face Mt*	S
IEC 160 C-face Mt*	T
IEC 132 D-face Mt*	U
IEC 160 D-face Mt*	V
IEC 180 D-face Mt*	W
IEC 200 D-face Mt*	X
IEC 225 D-face Mt*	Y

*Contact factory for pricing on these mounting options

Table 1 - Hub Bores

NOTE: See page 100 for recommended minimum bore sizes by torque

Character to insert	Bore	Keyway Size*		Bores Available			
		Width (in.)	Depth (in.)	Unit Size			
				170	196	230	278
0E	1.125	1/4	1/8	X			
0F	1.250	1/4	1/8	X			
0G	1.375	5/16	5/32	X	X		
0M	1.500	3/8	3/16	X	X		
0H	1.625	3/8	3/16	X	X	X	
0I	1.750	3/8	3/16		X	X	
0J	1.875	1/2	1/4		X	X	X
0L	2.000	1/2	1/4			X	X
0N	2.125	1/2	1/4				X
0R	2.375	5/8	5/16				X
Metric	***Bore***	***Width***	***Depth***	***170***	***196***	***230***	***278***
30	*30*	*8*	*3.3*	X	X		
35	*35*	*10*	*3.3*	X	X	X	
38	*38*	*10*	*3.3*	X	X	X	
40	*40*	*12*	*3.3*	X	X	X	X
42	*42*	*12*	*3.3*		X	X	
45	*45*	*14*	*3.8*		X	X	X
48	*48*	*14*	*3.8*		X	X	X
50	*50*	*14*	*3.8*			X	X
55	*55*	*16*	*4.3*				X
60	*60*	*18*	*4.4*				X

*Standard U.S. keyseats made to ANSI B17.1 standard. Metric keyseats to DIN 6885/1 p9.

Table 2 - Coil Voltage

Character to Insert	Coil Voltage	Current Rating			
		6	7	8	9
		170	196	230	278
E	24 Vdc	2.80	4.27	3.85	3.85
J	90 Vdc	.70	1.05	1.19	1.19
K	103 Vdc	.80	.96	1.08	1.08
L	180 Vdc	.36	.54	.61	.61
M	205 Vdc	.41	.49	.56	.56
S	258 Vdc	.33	.34	.40	.44
B	414/432 Vdc	.22	.26	.28	.28

Other voltages available - consult factory

For AC rectifiers see pages 89-92

Table 3 - Additional Options

Standard - Internal Maintained Manual Release	R
External Non-Maintained (deadman) and Maintained Manual Release	S

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.*

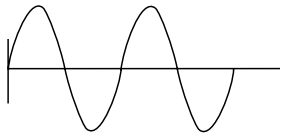
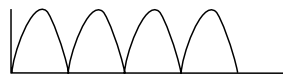
Modifications are available - see AAB Modification Section.

AC Rectifiers for use with Armature Actuated Brakes

Product Overview

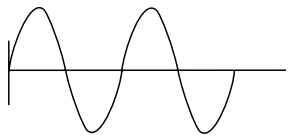
NOTE: For brake response times with and without AC rectifiers see page 97.

Full Wave

Input  Output 

A rectifier in which both positive and negative half-cycles of the incoming (AC) signal are rectified to produce a unidirectional (DC) current through the load. The DC output voltage of a full wave rectifier is $V_{DC=}$ .90V_{AC}
Maximum operating voltage is +10% ofnominal,frequency 50/60 Hz, maximum ambient temperature range of -40°C to 65°C

Half Wave

Input  Output 

A rectifier in which only alternate half-cycles of the incoming (AC) signal are rectified to produce a unidirectional (DC) current through the load. The DC output voltage of a half wave rectifier is $V_{DC=}$ .45V_{AC}.
Maximum operating voltage is +10% of nominal, frequency 50/60 Hz, maximum ambient temperature range of -40°C to 65°C

Combination Full and Half Wave

Provides option of utilizing either full or half wave rectification
Maximum operating voltage is +10% of nominal, frequency 50/60 Hz.
Maximum ambient temperature range is -40°C to 65°C

TOR-AC Full and Half Wave

Provides coil turn off nearly as fast as DC side switching. Includes line filter for AC drive applications or whenever electrical filtering is required to protect the rectifier from high-frequency electrical line pulses. Must be switched on/off by a switch in an AC lead of the TOR-AC. Maximum operating voltage +10% of nominal, frequency 50/60 Hz.
Maximum ambient temperature range is -40°C to 65°C

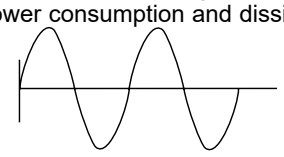
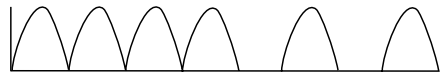
QuickSet

A rectifier that provides a quick brake response time even when the rectifier is permanently wired across the windings of an AC motor. The QuickSet Rectifier detects the decaying, motor generated voltage that occurs when power is removed from the motor circuit, and interrupts brake coil current in response. QuickSet Rectifiers can be specified full wave or half wave.
Operating voltage is ±10% of nominal, frequency 50/60 Hz.
Maximum ambient temperature range is -40°C to 65°C

QuickSet/QuickRelease

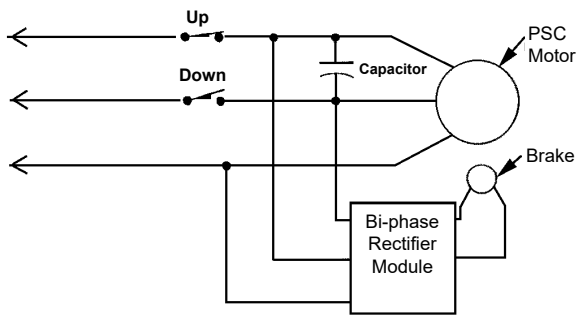
A rectifier that provides a timed, full wave rectified “over-excitation” brake release function, followed by continuous, half wave rectified brake released “holding” function, when used in conjunction with an appropriate brake coil voltage rating.

USED AS WATTSAVER: Provides a timed, full wave rectified brake release function, followed by continuous, half wave rectified brake released “wattsaver” function, when used in conjunction with an appropriate brake coil voltage rating. The Wattsaver serves to reduce the electrical power consumption and dissipation of the brake in the released state. Operating voltage is ±10% of nominal, frequency 50/60 Hz. Maximum ambient temperature varies by part number - see information by part number on following pages.

Input  Output 

Bi-Phase Rectifiers

A rectifier that is typically used in single phase, reversing, permanent split capacitor (PSC) motor applications. A single phase, reversing, PSC motor typically has two windings of equivalent resistance. The winding which serves as the main winding is connected directly across the power line, the winding which serves as the auxiliary winding is connected in series with a run capacitor across the power line. The direction of rotation is reversed by interchanging the function of the two windings. The Bi-Phase Rectifier provides the same voltage to the brake coil regardless of the direction of rotation of the motor. The Bi-Phase Rectifier has five leads and comes in standard response and QuickSet versions. Bi-Phase Rectifiers are application specific. Please contact factory for more information.



AC Rectifiers Selection

115 Vac Input Voltage

**At 50 Vdc coil voltage, this rectifier can be used on brake sizes 72-112. At 103 Vdc coil voltage, this rectifier can be used on brake sizes 72-196. At all other listed coil voltages, this rectifier can be used on any brakes size.

Full Wave

Brake Sizes	Part Number	AC Input 50/60 Hz	DC Output	Brake Coil Voltage/Letter Designation	Switching	Connection	Max Current (amps)
72-196	412029101K	115	103	K or J	ac or dc side or connect across motor terminals	ac leads dc terminal block	.8
ALL	412029201K	115	103	K or J	ac or dc side or connect across motor terminals	ac terminal block dc terminal block	1.6
ALL	412029203K	115	103	K or J	ac or dc side or connect across motor terminals	ac leads dc leads	1.6

Combination Full and Half Wave

Brake Sizes	Part Number	AC Input	DC Output	Brake Coil Voltage/ Letter Designation	Switching	Connection	Max Current (amps)
**	412049101K	115/230 460/575	50/103 207/259 414/517	50 Vdc = G 207 Vdc = M 414 Vdc = B 103 Vdc = K 259 Vdc = S 517 Vdc = A	ac or dc side or connect across motor terminals	ac terminal block dc terminal block	.8

Quick Set/Quick Release or 103 Vdc Wattsaver

Brake Sizes	Part Number	AC Input	DC Output	Brake Coil Voltage/ Letter Designation	Switching	Connection	Max Current (amps)
72-112	412019611K	115	103 Vdc over-excitation	G	ac side only or connect across motor terminals	ac terminal block dc terminal block	2.0
			50 Vdc Sustaining				1.0

230 Vac Input Voltage

**At 50 Vdc coil voltage, this rectifier can be used on brake sizes 72-112. At 103 Vdc coil voltage, this rectifier can be used on brake sizes 72-196. At all other listed coil voltages, this rectifier can be used on any brakes size.

Full Wave

Brake Sizes	Part Number	AC Input 50/60 Hz	DC Output	Brake Coil Voltage/Letter Designation	Switching	Connection	Max Current (amps)
ALL	412029101K	230	207	M	ac or dc side or connect across motor terminals	ac leads dc terminal block	.8
ALL	412029201K	230	207	M	ac or dc side or connect across motor terminals	ac terminal block dc terminal block	1.6
ALL	412029203K	230	207	M	ac or dc side or connect across motor terminals	ac leads dc leads	1.6

Combination Full and Half Wave

Brake Sizes	Part Number	AC Input	DC Output	Brake Coil Voltage/ Letter Designation	Switching	Connection	Max Current (amps)
**	412049101K	115/230 460/575	50/103 207/259 414/517	50 Vdc = G 207 Vdc = M 414 Vdc = B 103 Vdc = K 259 Vdc = S 517 Vdc = A	ac or dc side or connect across motor terminals	ac terminal block dc terminal block	.8

TOR-AC Rectifier with Line Filter, Full Wave

Brake Sizes	Part Number	AC Input 50/60 Hz	DC Output	Brake Coil Voltage/ Letter Designation	Switching	Connection	Max Current (amps)
ALL	412029401K 412029402K	230	207	M	ac side only	Terminals Leadwires	.6

QuickSet

Brake Sizes	Part Number	AC Input 50/60 Hz	DC Output	Brake Coil Voltage/ Letter Designation	Switching	Connection	Max Current (amps)
ALL	412029601K	230	207	M	NONE-connect across motor terminals	ac terminal block dc terminal block	.6

QuickSet/QuickRelease or 205 Vdc Wattsaver

Brake Sizes	Part Number	Max Ambient Temp	AC Input 50/60 Hz	DC Output	Brake Coil Voltage/ Letter Designation	Switching	Connection	Max Current (amps)
72-230	412029301K	65°C	230	207 Vdc over-excitation	K or J	ac side only or connect across motor terminals	ac terminal block dc terminal block	2.0
				103 Vdc sustaining				1.0

AC Rectifiers Selection

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460 Vac Input Voltage

**At 50 Vdc coil voltage, this rectifier can be used on brake sizes 72-112. At 103 Vdc coil voltage, this rectifier can be used on brake sizes 72-196. At all other listed coil voltages, this rectifier can be used on any brakes size.

Half Wave

Brake Sizes	Part Number	AC Input 50/60 Hz	DC Output	Brake Coil Voltage/Letter Designation	Switching	Connection	Max Current (amps)
ALL	412049301K	400	180	L	ac or dc side or connect across motor terminals	ac terminal block dc terminal block	.8
		460	207	M			

Combination Full and Half Wave

Brake Sizes	Part Number	AC Input	DC Output	Brake Coil Voltage/ Letter Designation	Switching	Connection	Max Current (amps)
**	412049101K	115/230 460/575	50/103 207/259 414/517	50 Vdc = G 103 Vdc = K 207 Vdc = M 259 Vdc = S 414 Vdc = B 517 Vdc = A	ac or dc side or connect across motor terminals	ac terminal block dc terminal block	.8

TOR-AC with Line Filter

Brake Sizes	Part Number	AC Input	DC Output	Brake Coil Voltage/Letter Designation	Switching	Connection	Max Current (amps)
ALL	412049404K	460	414	B / Full	ac side only	Terminals	0.3
ALL	412049405K	460	414	B / Full	ac side only	Leadwires	0.3
ALL	412049411K	460	207	M / Half	ac side only	Terminals	0.3
ALL	412049412K	460	207	M / Half	ac side only	Leadwires	0.3
ALL	412049413K	460	207	M / Half	ac side only	Terminals	0.6
ALL	412049414K	460	207	M / Half	ac side only	Leadwires	0.6

QuickSet

Brake Sizes	Part Number	AC Input	DC Output	Brake Coil Voltage/ Letter Designation	Switching	Connection	Max Current (amps)
ALL	412049801K	460	414	B Fullwave	NONE-connect across motor terminals	ac terminal block dc terminal block	.3
ALL	412049811K	460	207	M Halfwave	NONE-connect across motor terminals	ac terminal block dc terminal block	.6

QuickSet/QuickRelease or 414 Vdc Wattsaver

Brake Sizes	Part Number	Max Ambient Temp	AC Input 50/60 Hz	DC Output	Brake Coil Voltage/ Letter Designation	Switching	Connection	Max Current (amps)
72-230	412049601K	45°C	460	414 Vdc over-excitation	M	ac side only or connect across motor terminals	ac terminal block dc terminal block	1.0
				207 Vdc sustaining				0.5

575 Vac Input Voltage

**At 50 Vdc coil voltage, this rectifier can be used on brake sizes 72-112. At 103 Vdc coil voltage, this rectifier can be used on brake sizes 72-196. At all other listed coil voltages, this rectifier can be used on any brakes size.

Half Wave

Brake Sizes	Part Number	AC Input 50/60 Hz	DC Output	Brake Coil Voltage/Letter Designation	Switching	Connection	Max Current (amps)
ALL	412059101K UL E71115	400	180	L	ac side only or connect across motor terminals	ac leads dc terminal block	.8
		575	259	S			
ALL	412059103K	400	180	L	ac side only or connect across motor terminals	ac leads dc leads	.8
		575	259	S			

Combination Full and Half Wave

Brake Sizes	Part Number	AC Input	DC Output	Brake Coil Voltage/ Letter Designation	Switching	Connection	Max Current (amps)
**	412049101K	115/230 460/575	50/103 207/259 414/517	50 Vdc = G 103 Vdc = K 207 Vdc = M 259 Vdc = S 414 Vdc = B 517 Vdc = A	ac or dc side or connect across motor terminals	ac terminal block dc terminal block	.8

QuickSet

Brake Sizes	Part Number	AC Input 50/60 Hz	DC Output	Brake Coil Voltage/ Letter Designation	Switching	Connection	Max Current (amps)
ALL	412059811K	575	258	S	NONE-connect across motor terminals	ac terminal block dc terminal block	.6

TOR-AC with Line Filter - Half Wave

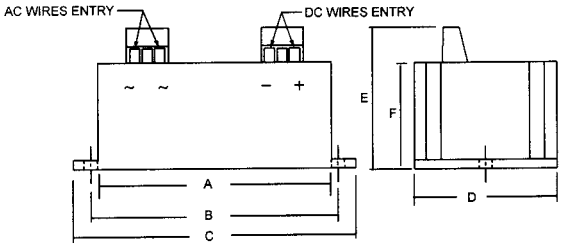
Brake Sizes	Part Number	AC Input 50/60 Hz	DC Output	Brake Coil Voltage/ Letter Designation	Switching	Connection	Max Current (amps)
ALL	412059411K	575	259	S	ac side only	terminals	.6
	412059412K					leadwires	

AC Rectifiers Continued

Rectifier Dimensions

Tape Mount

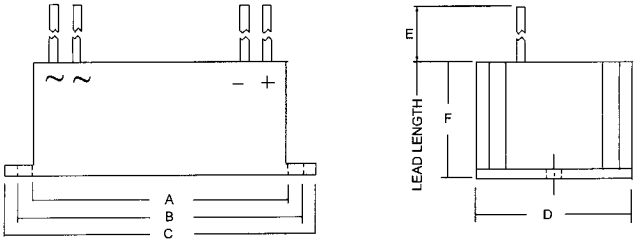
Part Number	Length	Width	Ht	Connection	
				AC	DC
4-1-20291-01K	1.4	0.6	1.0	Leadwire, 7” long	Terminal
4-1-20292-01K	1.38	1.06	0.94	Terminal	Terminal
4-1-20292-03K	1.38	1.06	0.9	Leadwire, 2.5” long	Leadwire, 2.5” long
4-1-20491-01K	2.25	1.25	1.0	Terminal	Terminal
4-1-20591-03K	1.4	0.75	0.9	Leadwire, 7” long	Leadwire, 7” long
4-1-20591-01K	1.4	0.75	1.0	Leadwire, 7” long	Terminal



Terminal location or connection may differ from sketch

Flange or Tape Mount

Part Number	A	B	C	D	E	F
4-1-20293-01K	4.6	5	5.5	3.3	2.03	1.25
4-1-20294-01K	3	3.5	4	2	2	1.5
4-1-20296-01K	3	3.5	4	3	2	1.5
4-1-20493-01K	2	2.5	3	1.5	1.6	1
4-1-20494-04K	3	3.5	4	2	2	1.5
4-1-20494-11K	3	3.5	4	2	2	1.5
4-1-20494-13K	3	3.5	4	2	2	1.5
4-1-20496-01K	4.6	5	5.5	3.3	2	1.25
4-1-20498-01K	3	3.5	4	3	2	1.5
4-1-20498-11K	2	2.38	2.6	2	2.1	1.3
4-1-20594-11K	3	3.5	4	2	2	1.5
4-1-20598-11K	2	2.38	2.6	2	2.1	1.3
4-1-20196-11K	4.6	5	5.5	3.3	2.03	1.25

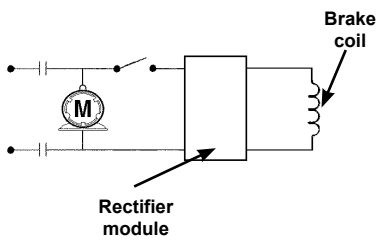


Part Number	A	B	C	D	E	F	Mount
4-1-20494-01K	2.3			1.32	6	0.86	Tape
4-1-20294-02K	3	3.5	4	2	6	1.5	Flange
4-1-20494-05K	3	3.5	4	2	6	1.5	Flange
4-1-20494-12K	3	3.5	4	2	6	1.5	Flange
4-1-20494-14K	3	3.5	4	2	6	1.5	Flange
4-1-20594-12K	3	3.5	4	2	6	1.5	Flange

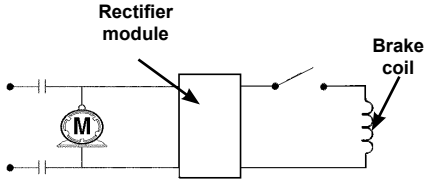
Wiring Diagrams/Switching

NOTE: For brake response times with and without AC rectifiers see page 101

AC Side Switching

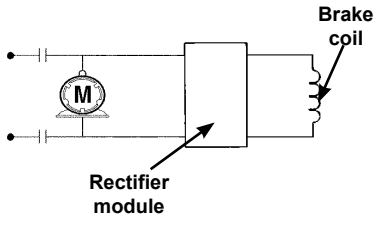


DC Side Switching



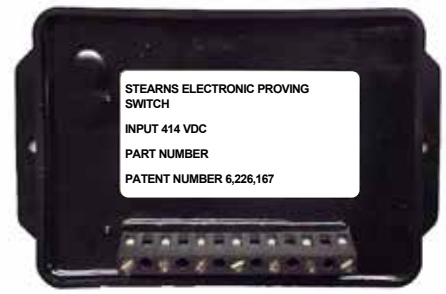
Use DC side switching with the following Rectifiers ONLY: 4-1-20291-01K, 4-1-20292-01K, 4-1-20292-03K, 4-1-20493-01K, 4-1-20491-01K

Connected Across Motor Terminals (No switching)



Electronic Brake Release Indicator (Proving Switch)
Armature-Actuated Brake Series

Indicates when the brake is released by sensing the change in the brake coil current waveform.
For use with the Series 333/350/360 brakes



Features

- *Mount in remote location (control cabinet)*
- *Operating temperature -40°C through 65°C*
- *Not susceptible to common problems of mechanical switches, such as mechanical fatigue, tolerances, and vibration.*
- *Relay contacts are silver-cadmium oxide*
- *Utilize either normally-open contacts (UL rated 2-20A, inductive or resistive, at 12-240 VAC and CSA rated 10A, inductive or resistive at 240 VAC) or normally-closed contacts (UL rated 2-10A, inductive or resistive, at 12-240 VAC and CSA rated 10A, inductive or resistive, at 240 VAC)*

Wiring Instructions: See sheet P/N 8-178-000-03

Brake Operation

When electrical power is applied to the armature-actuated brake coil, the armature is attracted by the electromagnetic force generated by the magnet body, which overcomes spring action. This allows the friction disc to rotate freely. When electrical power is interrupted, the electromagnetic force is removed and the pressure spring mechanically forces the armature plate to clamp the friction disc between itself and the pressure plate. This develops torque to stop or hold the load.

Switch Operation

When the brake armature is pulled in to the magnet body to release the brake, a change in the brake coil current waveform occurs. By tracking this change in the brake coil current, the electronic switch indicates when the brake is released.

Ordering Information

Part Number Example: 4 - 4 - 0 7 0 9 0 - X X

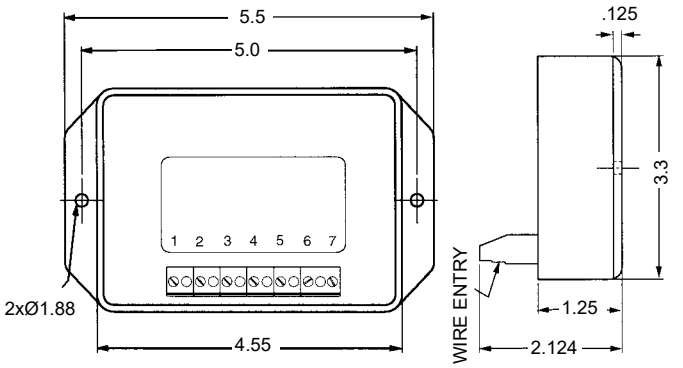
DC Voltage*	Characters To Insert
24	024
90	090
103	103
180	180
205	205
258	258
414	414

*Standard voltages listed. For other voltages, contact factory.

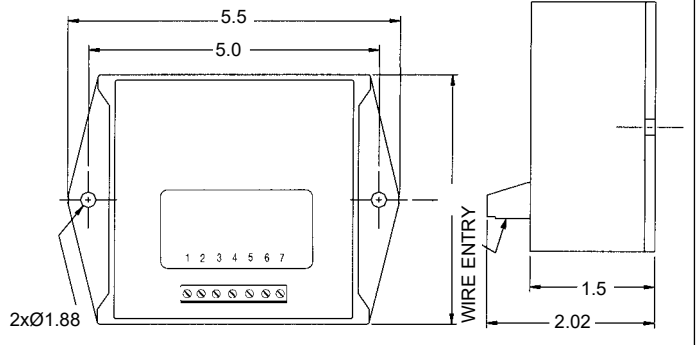
Specify brake model number. The last 2 digits of the switch part number will depend upon the brake size

Dimensions

414V Unit



24V thru 240V Units



*Standard voltages listed. For other voltages, contact factory.

NOTE: Cannot be used with half-wave rectifier. Use with full-wave or TOR-AC full-wave rectifier only.

Armature Actuated Brake Modifications

Series 320/321/322

<table>
<tr><th>Modification</th><th>Series</th><th>Brake Size</th></tr>
<tr><td colspan="3">Maintained Manual Release</td></tr>
<tr><td>  </td><td>320/321/322</td><td>1.2
1.8
2.0
2.8</td></tr>
<tr><td colspan="3">Non-Maintained Manual Release</td></tr>
<tr><td>  </td><td>320/321/322</td><td>1.2
1.8
2.0
2.8</td></tr>
<tr><td colspan="3">Brake Manual Release Indicator Switch</td></tr>
<tr><td> 
Manual release engaged</td><td>320/321/322</td><td>ALL</td></tr>
<tr><td colspan="3">AC Rectifiers, In-Line</td></tr>
<tr><td>  </td><td>310/320/321/322</td><td>ALL (Except Quick Set)
Quick Set</td></tr>
<tr><td>AC Rectifiers, Internal</td><td>320/321/322</td><td>1.8 and 2.8</td></tr>
<tr><td colspan="3">Encoder Mount</td></tr>
<tr><td>  </td><td>310/320/321/322
tapped holes in magnet body for tether mount</td><td></td></tr>
<tr><td colspan="3">Through-Shaft</td></tr>
<tr><td rowspan="2">  </td><td>320</td><td>See catalog pg.</td></tr>
<tr><td>321/322</td><td>ALL
(through-shaft combined with manual release only available on size 2.8)</td></tr>
<tr><td colspan="3">Mounting Plates</td></tr>
<tr><td>  </td><td>320/321/322</td><td>
<table>
<tr><th>Size</th><th>Bolt Circle</th></tr>
<tr><td>1.2</td><td>2.5/2.62”</td></tr>
<tr><td>1.8, 2.8</td><td>3.5”</td></tr>
<tr><td>1.8, 2.8</td><td>3.5”, 2.5” register</td></tr>
<tr><td>2.0</td><td>2.844”</td></tr>
</table>
</td></tr>
<tr><td>Double “D” Disc</td><td></td><td></td></tr>
<tr><td>  </td><td>320/321/322</td><td>1.2, 1.8, and 2.0
Contact factory for Double “D” disc on brakes rated greater than 7 lb-in</td></tr>
<tr><td>Carrier Ring Disc</td><td>320/321/322</td><td>1.8</td></tr>
</table>

Armature Actuated Brake Modifications

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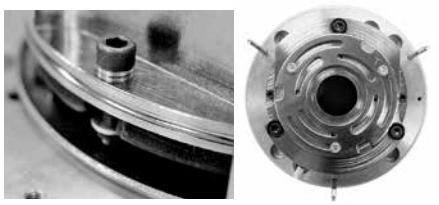
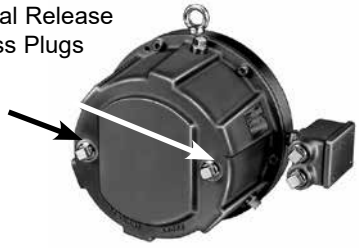
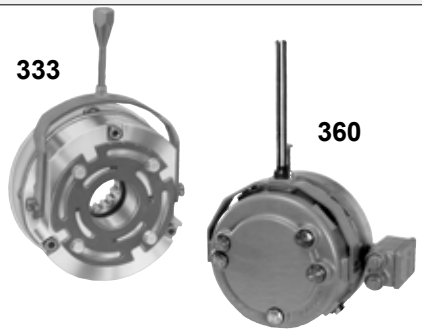
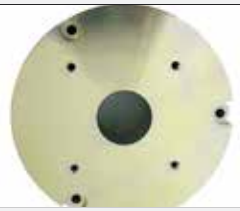
Series 333/350/360

Modification	Series	Brake Size
Maintained Manual Release		
	333	ALL
Manual Release Access Plugs 	350/360	ALL
Non-Maintained Manual Release		
	333	ALL
	360	ALL
Electronic Brake Release Indicator Switch		
	333/350/360	ALL
Electronic Wear Indicator Switch	333/350/360	ALL
AC Rectifiers, In-Line	333	size 72-90 115 Vac size 72-112 230 Vac
AC Rectifiers, Separate	333/350/360	ALL
Conduit Box		
	333/350/360	ALL
	350/360 with IP67 conduit box	ALL

Series 333/350/360 Modifications

Modification	Series	Brake Size
Band Seal (Boot)		
	333	ALL
End Cap Plug		
	333	ALL
Space Heater		
	333/350/360	ALL
Tach Machining		
	333 tapped holes in magnet body for tether mount	ALL
	350/360 Machining on brake housing	ALL
Through-Shaft		
	333 through-shaft seal in magnet body	ALL
	350/360 through-shaft hole in housing with shaft seal	ALL

Technical Data

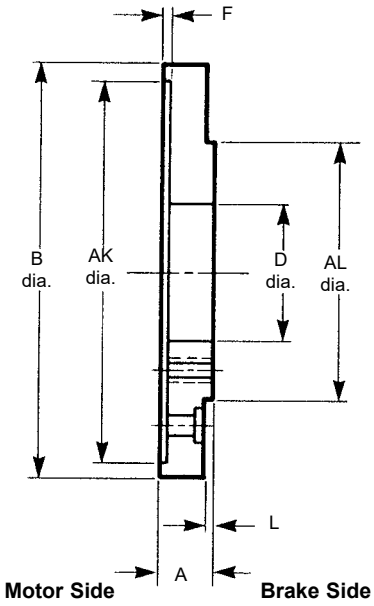
SAB Motor Frame Adapter Dimensions

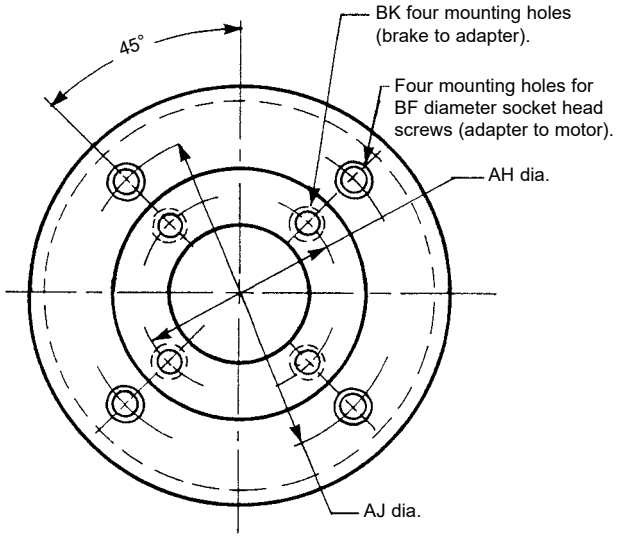
Selection

To select an adapter for a specific brake, refer to the *Motor Frame Adapter* Tables as shown in the brake series sections of this Catalog. After selecting the adapter stock number, refer to the Tables below for dimensions.

All adapters are constructed with an opening for internal lead wire connection, corresponding to the NEMA standard location for the motor frame size.

Screws for mounting adapter to motor must be provided by customer. Socket head cap screws are supplied for mounting brake to adapter.





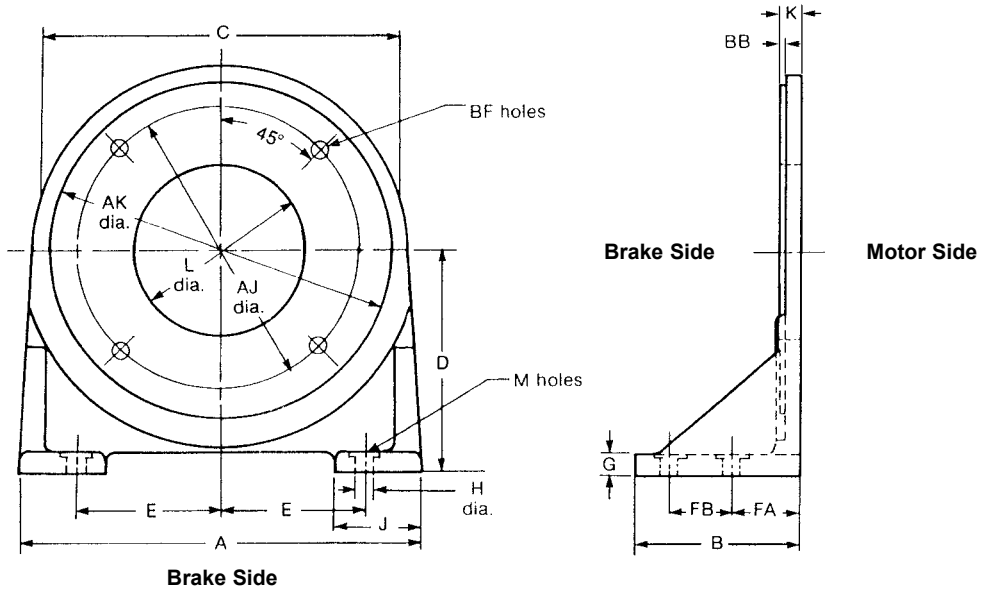
Dimensions for estimating only. For installation purposes, request certified prints.

Brake Series	Torque (lb-ft)	Adapter Stock Number	Dimensions in Inches *(Dimensions in Millimeters)*											Add'l Shaft Length Req'd
			A	AH	AJ	AK	AL	B	BF	BK Hole	D	F	L	
56,000	1.5 - 6	5-55-5041-00	1.25 *(31.75)*	5.88 *(149.22)*	7.25 *(184.15)*	8.500 8.502 *(215.900)* (215.951)	4.497 4.500 *(114.325)* (114.275)	9.00 *(228.60)*	.50 *(12.70)*	3/8 - 16 x 1/2 deep	4.00 *(101.60)*	.19 *(4.76)*	.12 *(3.18)*	.94 *(23.88)*
65,300*		5-55-5046-00												
56,000 and 56,800*	10 - 25	5-55-5043-00												
87,000 and 87,800*	6 - 105	5-55-7046-00	1.06 *(26.99)*	7.25 *(184.15)*	11.00 *(279.40)*	12.501 12.504 *(317.525)* (317.602)	8.499 8.497 *(215.875)* (215.849)	13.00 *(330.20)*	.62 *(15.88)*	1/2 - 13 through	4.12 *(104.78)*	.19 *(4.76)*	.38 *(9.52)*	.87 *(22.10)*
87,300		5-55-7054-00												
87,000 and 87,800*	6 - 105	5-55-7055-00	1.00 *(25.40)*		9.00 *(228.60)*	10.500 10.502 *(266.700)* (266.751)	8.499 8.497 *(215.875)* (215.849)	11.00 *(279.40)*	**		6.25 *(158.75)*		.25 *(6.35)*	.81 *(20.57)*
87,300*		5-55-7045-00												
87,000, 87,800* and 87,300*	6 - 105	5-55-7043-00	.75 *(19.05)*	7.25 *(184.15)*	5.88 *(149.35)*	4.502 4.507 *(114.35)* (114.48)	8.499 8.497 *(215.875)* (215.849)	8.75 *(222.25)*	.62 *(15.75)*	1/2 - 13 through	4.00 *(101.60)*	.19 *(4.76)*	.25 *(6.35)*	.56 *(14.23)*
81,000	125 - 130	5-55-2045-00	1.06 *(26.99)*	11.00 *(279.40)*	14.00 *(355.60)*	16.002 16.005 *(406.451)* (406.527)	12.499 12.496 *(317.475)* (317.398)	16.50 *(419.10)*	.62 *(15.88)*	5/8 - 11 through	9.75 *(247.65)*	.19 *(4.76)*	.25 *(6.35)*	.87 *(22.10)*
81,000	125 - 230	5-55-2041-00	1.12 *(28.58)*	11.00 *(279.40)*	7.25 *(184.15)*	8.500 8.502 *(215.900)* (215.951)	12.499 12.496 *(317.475)* (317.398)	12.499 12.496 *(317.475)* (317.398)	.50 *(12.70)*	5/8 -11 through	6.00 *(152.40)*	.19 *(4.76)*	---	.93 *(23.62)*
81,000		5-55-2043-00			9.00 *(228.60)*	10.500 10.502 *(266.700)* (266.751)					7.75 *(196.85)*			.93 *(23.62)*
82,000 and 82,300*	125 - 440	5-55-2046-00	1.94 *(49.21)*	11.00 *(279.40)*	14.00 *(355.60)*	16.002 16.005 *(406.451)* (406.527)	12.499 12.496 *(317.475)* (317.398)	16.50 *(419.10)*	.62 *(15.88)*	5/8 - 11 x 1 deep	9.50 *(241.30)*	.19 *(4.76)*	.25 *(6.35)*	1.75 *(44.45)*
82,000 and 82,300*		5-55-2042-00	1.38 *(34.92)*		7.25 *(184.15)*	8.500 8.502 *(215.900)* (215.951)		13.25 *(336.55)*	.50 *(12.70)*	5/8 -11 through	6.00 *(152.40)*			1.19 *(30.23)*
82,000 and 82,300*		5-55-2044	1.38 *(34.92)*		9.00 *(228.60)*	10.500 10.502 *(266.700)* (266.751)		13.25 *(336.55)*			7.75 *(196.85)*			1.19 *(30.23)*
86,000	500 - 1000	5-55-6041-00	1.56 *(38.69)*	14.00 *(355.60)*	11.00 *(379.40)*	12.500 12.504 *(317.500)* (317.602)	16.000 15.995 *(406.400)* (406.273)	16.19 *(441.16)*	.62 *(15.88)*	5/8 - 11 x 3/4 deep	8.62 *(219.08)*	.19 *(4.76)*	.25 *(6.35)*	1.37 *(34.80)*

* 1/2-13 flat head screws are supplied with adapter.

** When adding an adapter to a hazardous location brake, refer to the "mounting requirements" on the product page for the recommended brake series for accommodating adapters.

Foot Mounting Kits



Kits include the foot mounting bracket and hardware to fit the BF mounting holes.

Dimensions for estimating only. For installation purposes, request certified prints.

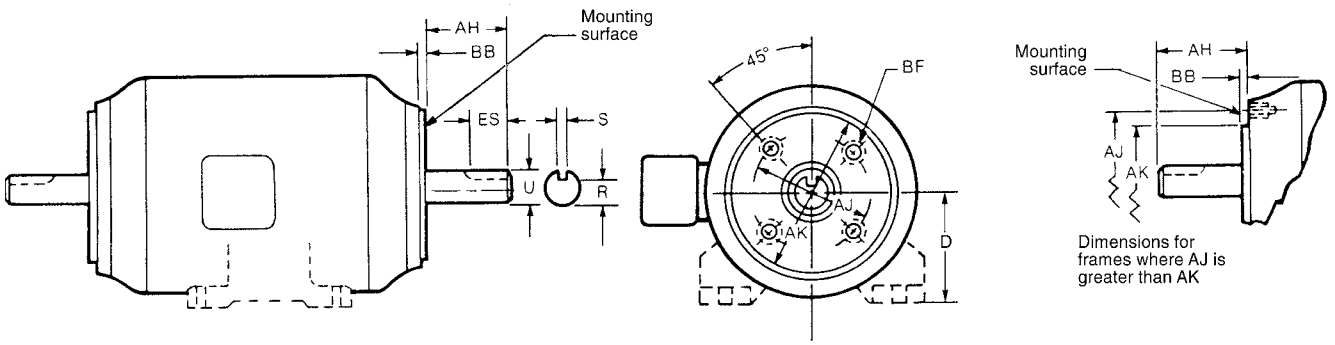
Brake Series	Torque	Foot Mounting Kit Number	Dimensions in Inches (Dimensions in Millimeters)																		Wgt lbs.
			A	AJ	AK	B	BB	BF No.	BF Thd.	C	D	E	FA	FB	G	H	J	K	L	M No.	
56,000	1.5-25	5-55-5023-00	7.00 (177.80)	5.88 (149.22)	4.499 / 4.498 (114.275 / 114.249)	2.38 (60.32)	.12 (3.18)	2	3/8-16	6.50 (165.10)	3.50 (88.90)	2.88 (73.02)	1.50 (38.10)	–	.38 (9.52)	.41 (10.32)	1.50 (38.10)	.50 (12.70)	2.50 (63.50)	2	4.5
87,000	6-125	5-55-7021-00	8.62 (219.08)	7.25 (184.15)	8.499 / 8.498 (215.875 / 215.849)	3.00 (76.20)	.25 (6.35)	4	1/2-13	8.62 (218.95)	5.00 (127.00)	3.56 (90.49)	2.00 (50.80)	–	.38 (9.52)	.53 (13.49)	1.62 (41.28)	.56 (14.29)	5.75 (146.05	2	7
81,000	125-230	5-55-2022-00	15.50 (393.70)	11.00 (279.40)	12.499 / 12.498 (317.475 / 317.449)	7.00 (177.80)	.25 (6.35)	4	5/8-11	13.25 (336.55)	8.50 (215.90)	6.88 (174.62)	2.00 (50.80)	4.00 (101.60)	.62 (15.88)	.69 (17.46)	3.00 (76.20)	.88 (22.22)	9.00 (228.60)	4	40
82,000	125-550																				
86,000	500-1000	5-55-6021-00	18.25 (463.55)	14.00 (355.60)	16.000 / 15.995 (406.400 / 406.273)	8.00 (203.20)	.22 (5.56)	4	5/8-11	17.00 (431.80)	10.88 (276.22)	6.38 (161.92)	3.38 (85.72)	3.00 (76.20)	1.00 (25.40)	.81 (20.64)	4.12 (104.78)	1.22 (30.96)	8.50 (215.90)	4	75

Dimensions for C-Face Brake Motor Systems

Brakes Externally Wired to Motor

C-face motor with double shaft extension.

Stearns Disc Brakes are designed to mount on standard C-face motors having the same dimensions and tolerances on the accessory end as on the drive end. They also mount on foot mounting brackets and machine mounting faces having the same mounting dimensions and tolerances. Some motor accessory end C-face may differ from the drive end.



Drive End Dimensions (Inches)

Frame Designation	AJ	AK	BB Min.	BF Hole			U	AH	Keyseat			Base to Centerline D
				Number	Tap Size	Bolt Penetration Allowance			R	ES Min.	S	
42C	3.750	3.000	0.16	4	1/4-20	. . .	0.375	1.312	0.328	. . .	flat	2.62
48C	3.750	3.000	0.16	4	1/4-20	. . .	0.500	1.69	0.453	. . .	flat	3.00
56C	5.875	4.500	0.16	4	3/8-16	. . .	0.625	2.06	0.517	1.41	0.188	3.50
143TC and 145TC	5.875	4.500	0.16	4	3/8-16	0.56	0.875	2.12	0.771	1.41	0.188	3.50
182TC and 184TC	7.250	8.500	0.25	4	1/2-13	0.75	1.125	2.62	0.986	1.78	0.250	4.50
182TCH and 184TCH	5.875	4.500	0.16	4	3/8-16	0.56	1.125	2.62	0.986	1.78	0.250	4.50
213TC and 215TC	7.250	8.500	0.25	4	1/2-13	0.75	1.375	3.12	1.201	2.41	0.312	5.25
254TC and 256TC	7.250	8.500	0.25	4	1/2-13	0.75	1.625	3.75	1.416	2.91	0.375	6.25
284TC and 286TC	9.000	10.500	0.25	4	1/2-13	0.75	1.875	4.38	1.591	3.28	0.500	7.00
284TSC and 286TSC	9.000	10.500	0.25	4	1/2-13	0.75	1.625	3.00	1.416	1.91	0.375	7.00
324TC and 326TC	11.000	12.500	0.25	4	5/8-11	0.94	2.125	5.00	1.845	3.91	0.500	8.00
324TSC and 326TSC	11.000	12.500	0.25	4	5/8-11	0.94	1.875	3.50	1.591	2.03	0.500	8.00
364TC and 365TC	11.000	12.500	0.25	8	5/8-11	0.94	2.375	5.62	2.021	4.28	0.625	9.00
364TSC and 365TSC	11.000	12.500	0.25	8	5/8-11	0.94	1.875	3.50	1.591	2.03	0.500	9.00
404TC and 405TC	11.000	12.500	0.25	8	5/8-11	0.94	2.875	7.00	2.450	5.65	0.750	10.00
404TSC and 405TSC	11.000	12.500	0.25	8	5/8-11	0.94	2.125	4.00	1.845	2.78	0.500	10.00
444TC and 445TC	14.000	16.000	0.25	8	5/8-11	0.94	3.375	8.25	2.880	6.91	0.875	11.00
444TSC and 445TSC	14.000	16.000	0.25	8	5/8-11	0.94	2.375	4.50	2.021	3.03	0.625	11.00
500 Frame Series	14.500	16.500	0.25	4	5/8-11	0.94	. . .	. . .	. . .	. . .	. . .	12.50

Tolerances (Inches)

AK Dimension, Face Runout, Permissible Eccentricity of Mounting Rabbet

AK Dimension	Tolerance on AK Dimension		Maximum Face Runout	Maximum Permissible Eccentricity of Mounting Rabbet
	Plus	Minus		
Less than 12	0.000	0.003	0.004	0.004
12 and Larger	0.000	0.005	0.007	0.007

Shaft Extension Diameters

Shaft Diameter	Tolerances	
	Plus	Minus
0.2500 to 1.5000, inclusive	0.000	0.0005
Over 1.5000 to 6.500, inclusive	0.000	0.001

Width of Shaft Extension Keyseats

Width of Keyseat	Tolerances	
	Plus	Minus
0.188 to 0.750, inclusive	0.002	0.000
Over 0.750 to 1.500, inclusive	0.003	0.000

Shaft Runout

Shaft Diameter	Maximum Permissible Shaft Runout
0.3750 to 1.625, inclusive	0.002
Over 1.625 to 6.500, inclusive	0.003

SOURCE: ANSI/NEMA Standards Publication No. MG 1-1987; Part 4 and Part 11.

Dimensions for C-Face AC Brake Motor System (cont.)

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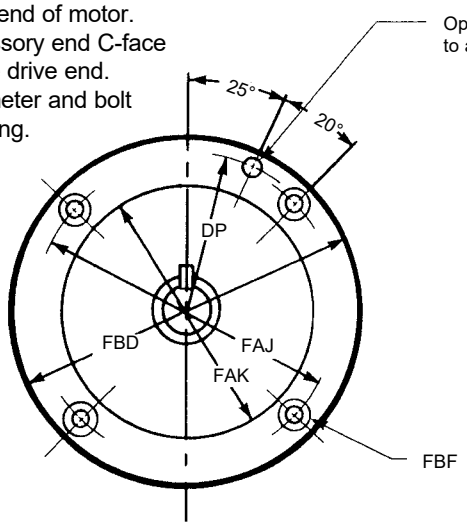
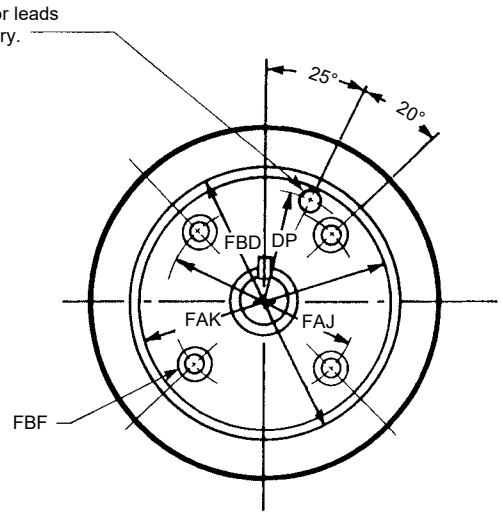
Accessory End

FC face mounting for accessories, including brakes, on the end opposite the drive end of motor. Some motor accessory end C-face may differ from the drive end. Confirm shaft diameter and bolt circle before ordering.



143TFC to 184TFC Frames, Inclusive



213TFC to 326TFC Frames, Inclusive

Dimensions (Inches)

Frame Designation	FAJ	FAK	FBD Max.	FBF Hole			Hole for Accessory Leads	
				Number	Tap Size	Bolt Penetration Allowance	DP	Diameter
143TFC and 145TFC	5.875	4.500	6.50	4	3/8-16	0.56	2.81	0.41
182TFC and 184TFC	5.875	4.500	6.50	4	3/8-16	0.56	2.81	0.41
213TFC and 215TFC	7.250	8.500	9.00	4	1/2-13	0.75	3.81	0.62
254TFC and 256TFC	7.250	8.500	10.00	4	1/2-13	0.75	3.81	0.62
284TFC and 286TFC	9.000	10.500	11.25	4	1/2-13	0.75	4.50	0.62
324TFC and 326TFC	11.000	12.500	14.00	4	5/8-11	0.94	5.25	0.62

NOTE: Standards have not been developed for the shaft extenison diameter and length, and keyseat dimensions.

Tolerances* (Inches)

FAK Dimension, Face Runout, Permissible Eccentricity of Mounting Rabbet

FAK Dimension	Tolerance on FAK Dimension		Maximum Face Runout	Maximum Permissible Eccentricity of Mounting Rabbet
	Plus	Minus		
Less than 12	0.000	0.003	0.004	0.004
12 and Larger	0.000	0.005	0.007	0.007

* Tolerance requirement on 56,X00 and 87,000 Series Brake kits is .015 T.I.R.
(total indicated runout shaft to motor register face).

Shaft Runout

Shaft Diameter	Maximum Permissible Shaft Runout
0.3750 to 1.625, inclusive	0.002
Over 1.625 to 6.500, inclusive	0.003

SOURCE: ANSI/NEMA Standards Publication No. MG 1-1987; Part 4 and Part 11.

Stearns Recommended Minimum Shaft Diameter by Torque

Minimum recommended shaft size considers a keyed C1045 steel shaft under *dynamic* use in a typical spring set brake application.

Torque ft-lb	Minimum Shaft (inches)
0.50	0.250
0.75	0.250
1.5	0.375
3	0.500
6	0.500
10	0.625
15	0.750
25	0.875
35	1.000
50	1.125

Torque ft-lb	Minimum Shaft (inches)
75	1.250
105	1.375
125	1.375
175	1.625
230	1.750
330	2.000
440	2.125
500	2.375
750	2.500
1000	2.750

Torque Nm	Minimum Shaft (mm)
4 Nm	ø10 mm
8 Nm	ø13 mm
16 Nm	ø16 mm
32 Nm	ø20 mm
60 Nm	ø25 mm
80 Nm	ø28 mm
150 Nm	ø34 mm
240 Nm	ø39 mm
400 Nm	ø47 mm

Set and Release Times

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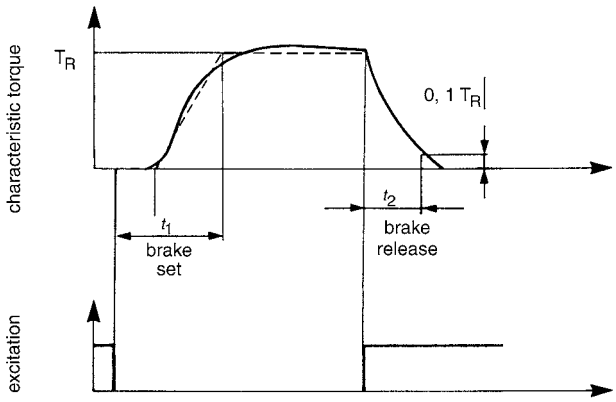
The models listed below were tested for typical set and release times. Times listed below are defined as follows:

T1 = Total set time to 80% of rated static torque

T2 = Release time, measured as the time from when the power is applied to the brake to the time that the solenoid plunger or

NOTE: Times will vary with the motor used, and brakes tested with factory-set air gap. The times shown should be used as a guide only.



SAB T1/T2 Time in Milliseconds

Series	Static Torque lb-ft	Coil Size	T1 AC	T2 AC
56,000	1 1/2 – 25	K4, K4, K4+, M4+	25	14
87,000	10,15, 25,50	5 & 6	53	21
87,000	35,75,105	8	50	25
81,000 82,000	All	9	58	31

Brake and motor are switched separately.
All brakes tested in horizontal position.
Coil is energized for >24 hours before testing.
Ambient temperature 70°F at time of test.

AAB Series 310/311/320/321 Times in Milliseconds

Series	310 DC Side Switching					
Size	**1.79**	**2.0**	**2.87**	**3.35**	**4.25**	**5.0**
T1	3	6	9	14	13	22
T2	20	43	48	110	120	195
Series	**311 DC Side Switching**					
Size	**3.38**	**4.75**	**5.0**			
T1	43	48	96			
T2	12	74	35			
Series	**320 DC Side Switching**					
Size	**1.2**	**1.8**	**2.0**	**2.8**		
T1	14	43	16	27		
T2	24	26	35	34		
Series	**320 Full wave rectifier/AC Side Switching**					
Size	**1.2**	**1.8**	**2.0**	**2.8**		
T1	31	97	52	78		
T2	27	29	40	42		
Series	**321 DC Side Switching**			**321 AC Side Switching**		
Size	**1.2**	**1.8**	**2.8**	**1.2**	**1.8**	**2.8**
T1	13	16	20	45	77	131
T2	18	27	49	16	25	26

AAB Series 333 Times in Milliseconds

Size	Applied Voltage/Type of Switching	T1	T2
72	DC side switching	23	35
	230 Vac/ac side switching/full wave	103	39
	460 Vac/ac side switching/half wave	98	34
90	DC side switching	19	73
	230 Vac/ac side switching/full wave	113	72
	460 Vac/ac side switching/half wave	114	73
	230 Vac connected across motor full wave	357	72
	230 Vac connected across motor /quickset	42	72
112	DC side switching	155	39
	230 Vac/ac side switching/full wave	547	43
	460 Vac/ac side switching/half wave	501	54
132	DC side switching	119	100
	230 Vac/ac side switching/full wave	833	101
	460 Vac/ac side switching/half wave	803	106
145	DC side switching	185	186
	230 Vac/ac side switching/full wave	999	192
	460 Vac/ac side switching/half wave	1007	209
	230 Vac connected across motor full wave	1689	192
	230 Vac connected across motor /quickset	368	192
	460 Vac/ac side switching/half wave/With air gap shim	629	223
170	DC side switching	129	163
	230 Vac/ac side switching/full wave	1130	174
	460 Vac/ac side switching/half wave	1140	175
196	DC side switching	96	263
	230 Vac/ac side switching/full wave	920	264
	460 Vac/ac side switching/half wave	957	274
230	DC side switching	131	264
	230 Vac/ac side switching/full wave	1299	236
	460 Vac/ac side switching/half wave	1303	276
	Tor-Ac 230 Vac/ac side switching/full wave	169	295
	Tor-Ac 230 Vac/ac side switching/full wave/ With air gap shim	122	327
	230 Vac connected across motor quickset/ quickrelease/with air gap shim	122	145
278	DC side switching	182	388
	230 Vac/ac side switching/full wave	1807	389
	460 Vac/ac side switching/half wave	1689	366

Conversions

English-Metric Conversion Factors

Multiply the base unit by the factor shown to obtain the desired conversion.

Measurement	Base Unit	Factor	Conversion
Length	inch, in *(millimeter, mm)*	25.4 .03937	*(millimeter, mm)* inch, in
Torque	pound-feet, lb-ft *(newton-meter, Nm)* pound-inch, lb-in *(newton-meter, Nm)* ounce-inch, oz-in *(newton-meter, Nm)*	1.355818 .73756 .113 8.85 .007062 141.611	*(newton-meter, Nm)* pound-feet, lb-ft *(newton-meter, Nm)* pound-inch, lb-in *(newton-meter, Nm)* ounce-inch, oz-in
Moment of Inertia	pound-feet squared, lb-ft² *(kilogram-meter squared, kgm²)*	.04214 23.73	*(kilogram-meter squared, kgm²)* pound-feet squared, lb-ft²
Kinetic Energy	foot-pound, ft-lb *(joule, J)*	1.355818 .73756	*(joule, J)* foot-pound, ft-lb
Weight	pound, lb *(kilogram, kg)*	.453592 2.20462	*(kilogram, kg)* pound, lb
Horsepower (English)	horsepower, hp *(kilowatt, kW)*	.7457 1.341	*(kilowatt, Kw)* horsepower, hp
Thermal Capacity	horsepower-seconds per minute, hp-sec/min *(watts, W)*	12.42854 .08046	*(watts W)* horsepower-seconds per minute, hp-sec/min
Temperature	degrees Fahrenheit,°F *(degrees Celsius, °C)*	(°F – 32) x $^{5}/_{9}$ (°C x $^{9}/_{5}$) + 32	*(degrees Celsius, °C)* degrees Fahrenheit, °F

English-English Conversion Factors for Thermal Capacity

Base Unit	Multiply by	To Obtain
horsepower	60.0	hp-sec/min
ft-lb/sec	.109	hp-sec/min
ft-lb/min	.0018	hp-sec/min
in-lb/sec	.009	hp-sec/min
in-lb/min	.00015	hp-sec/min

Decimal Equivalents of Fractions

Decimal Equivalent (Inches)		Fraction (Inches)
2-Place	3-Place	
.02	.016	$^{1}/_{64}$
.03	.031	$^{1}/_{32}$
.05	.047	$^{3}/_{64}$
.06	.062	$^{1}/_{16}$
.08	.078	$^{5}/_{64}$
.09	.094	$^{3}/_{32}$
.11	.109	$^{7}/_{64}$
.12	.125	$^{1}/_{8}$
.14	.141	$^{9}/_{64}$
.16	.156	$^{5}/_{32}$
.17	.172	$^{11}/_{64}$
.19	.188	$^{3}/_{16}$
.20	.203	$^{13}/_{64}$
.22	.219	$^{7}/_{32}$
.23	.234	$^{15}/_{64}$
.25	.250	$^{1}/_{4}$
.27	.266	$^{17}/_{64}$
.28	.281	$^{9}/_{32}$
.30	.297	$^{19}/_{64}$
.31	.312	$^{5}/_{16}$
.33	.328	$^{21}/_{64}$
.34	.344	$^{11}/_{32}$
.36	.359	$^{23}/_{64}$
.38	.375	$^{3}/_{8}$

Decimal Equivalent (Inches)		Fraction (Inches)
2-Place	3-Place	
.39	.391	$^{25}/_{64}$
.41	.406	$^{13}/_{32}$
.42	.422	$^{27}/_{64}$
.44	.438	$^{7}/_{16}$
.45	.453	$^{29}/_{64}$
.47	.469	$^{15}/_{32}$
.48	.484	$^{31}/_{64}$
.50	.500	$^{1}/_{2}$
.52	.516	$^{33}/_{64}$
.53	.531	$^{17}/_{32}$
.55	.547	$^{35}/_{64}$
.56	.562	$^{9}/_{16}$
.58	.578	$^{37}/_{64}$
.59	.594	$^{19}/_{32}$
.61	.609	$^{39}/_{64}$
.62	.625	$^{5}/_{8}$
.64	.641	$^{41}/_{64}$
.66	.656	$^{21}/_{32}$
.67	.672	$^{43}/_{64}$
.69	.688	$^{11}/_{16}$
.70	.703	$^{45}/_{64}$
.72	.719	$^{23}/_{32}$
.73	.734	$^{47}/_{64}$
.75	.750	$^{3}/_{4}$

Decimal Equivalent (Inches)		Fraction (Inches)
2-Place	3-Place	
.77	.766	$^{49}/_{64}$
.78	.781	$^{25}/_{32}$
.80	.797	$^{51}/_{64}$
.81	.812	$^{13}/_{16}$
.83	.828	$^{53}/_{64}$
.84	.844	$^{27}/_{32}$
.86	.859	$^{55}/_{64}$
.88	.875	$^{7}/_{8}$
.89	.891	$^{57}/_{64}$
.91	.906	$^{29}/_{32}$
.92	.922	$^{59}/_{64}$
.94	.938	$^{15}/_{16}$
.95	.958	$^{61}/_{64}$
.97	.969	$^{31}/_{32}$
.98	.984	$^{63}/_{64}$
1.00	1.000	1

SINPAC Switches: Brief Operating Description

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For over 75 years, single-phase motors have utilized a mechanical centrifugal switch to switch the start circuit. Inherent characteristics of a mechanical device have made these switches prone to various problems, including tolerances, tolerance build-ups, mechanical fatigue, vibration and a host of others that can lead to switch failures and/or performance inconsistency.

Our challenge was to design a reliable solid-state switch to replace the mechanical switch and actuator mechanism, and duplicate the function of connecting and disconnecting the start circuit at particular speeds with the additional benefits of a solid-state device. After considerable research, we decided a successful electronic motor starting switch could be created by sensing the voltages present in the main and start windings.

Until the rotor of a single-phase motor begins to rotate, there is no coupling between its start winding and main winding. When the rotor begins to turn, the main winding induces flux in the rotor, which then induces a voltage in the start winding. The voltage induced in the start winding is directly proportional to motor speed. In Stearns SINPAC Electronic Switches, the voltage across a motor's main winding and the voltage across its start winding are sampled and fed to a comparator. The logic circuitry is designed so that the electronic switch interrupts the start circuit current after the motor has accelerated to the speed at which cut out voltage is developed, generally 75 to 80% of synchronous motor speed. The logic circuitry then shuts down the switch's power stage, which consists of a triac or inverse parallel SCR's. This function is referred to as "cut out." When the start circuit is disconnected, the main winding field then drives the motor's rotor to its running speed.

If the motor encounters an overload, and the motor speed falls to approximately 50% of its synchronous speed, the SINPAC Switch automatically reconnects the motor's start circuit. This function is referred to as "cut in." Cut in detection circuitry constantly monitors start winding voltage. When the motor's speed falls to the cut in point, the detection circuit causes the control logic to energize the SINPAC Switch's power output stage. The motor then goes through its normal startup procedure, with the start circuit being switched out at a motor speed approximately 75 to 80% of synchronous speed.

SINPAC Switches are potted and completely sealed, making it impervious to dust, dirt and moisture. The unique speed sensing circuit provides a universal design which allows a few switches to work on most standard motor designs regardless of manufacturer.

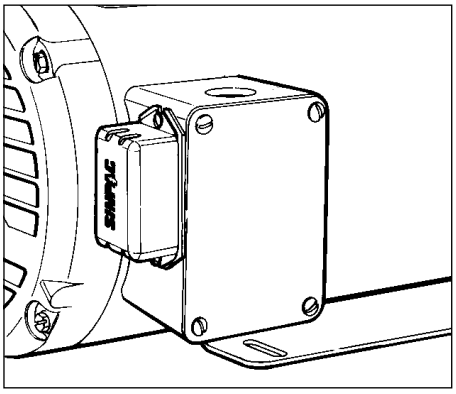
Acceptance by Motor Manufacturers

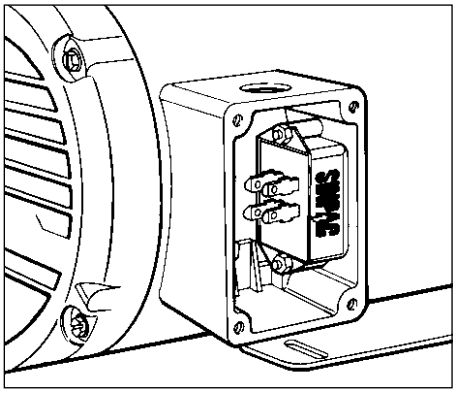
US and foreign motor manufacturers have tested and retested the SINPAC Switch for reliability and quality. Today, many of these manufacturers have begun installing SINPAC Switches on their standard motor lines with more companies ready to make the changeover.

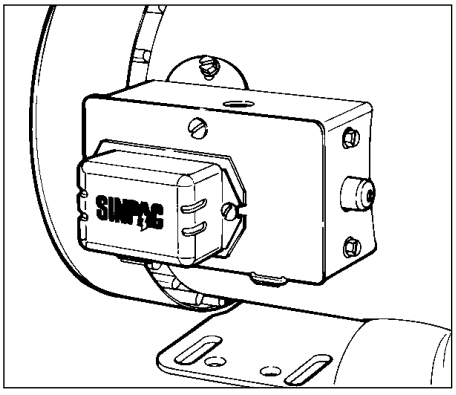
UL Recognition

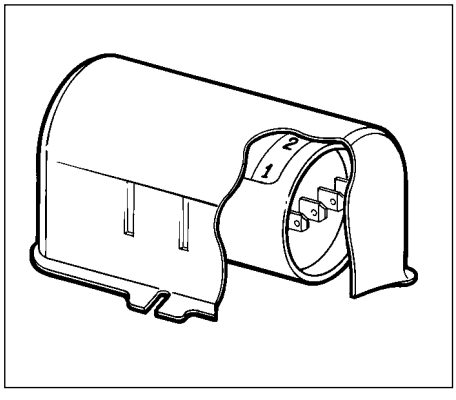
Most SINPAC Switches have already been recognized C-UR-US under the Component Program of Underwriters Laboratories, Inc. (E-71115). In addition, all switches have internal surge protection which is tested according to ANSI/IEEE C62.41 – 1991 Category A3.

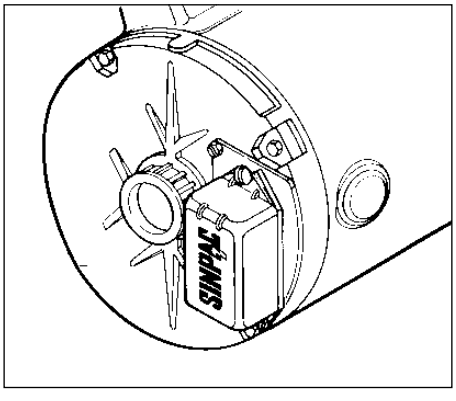
Mounting Options

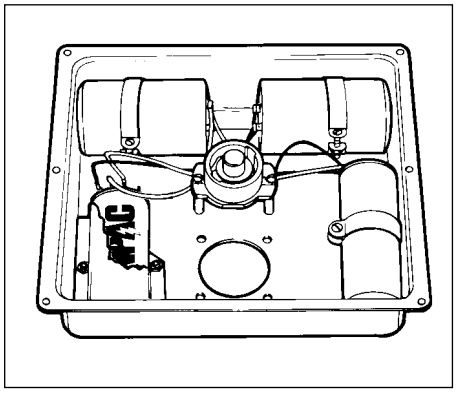




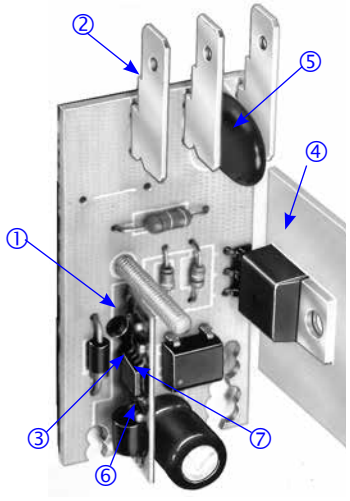








Sinpac Design Features



① ***Electrically Protected.*** Designed to filter out electrical noise, so there is no concern of random switch malfunction.

② ***Reduced Installation Time.*** Easy accessible 1/4 inch terminals and mounting, reduce the amount of time required to install SINPAC Switches or to change out mechanical switches.

③ ***Restart Capability.*** When motor speed drops below 50% of synchronous speed, the start winding is brought back into the circuit to reinitiate starting torque.

④ ***Soldered Heat Sink.*** High cycling.

⑤ ***Transient Protection.*** Transient protection tested per ANSI/IEEE C62.41 - 1991 Category A3.

⑥ ***Universal Design.*** 50/60 Hz operation. Will work on 2, 4 or 6 pole motors of any manufacturer. Reduced inventory.

⑦ ***Line Voltage Compensation.*** No modifications or changes are required for line voltage variations. SINPAC Switches will operate in areas susceptible to *brown-outs* or low voltage due to long wiring runs.

ADDITIONAL FEATURES

- **Operating Temperature:** -40°C to 65 °C (-40 °F to 149°F) [for operation between 65°C and 85°C (149°F and 185°F), consult factory.]
- **Operating Voltage:** 115 Vac SINPAC Switch: 90-130 Vac. For dual voltage motor equipped with center-tapped main winding: 90-130 Vac or 180-265 Vac. 230 Vac SINPAC Switch: 190-255 Vac.

Typical Applications

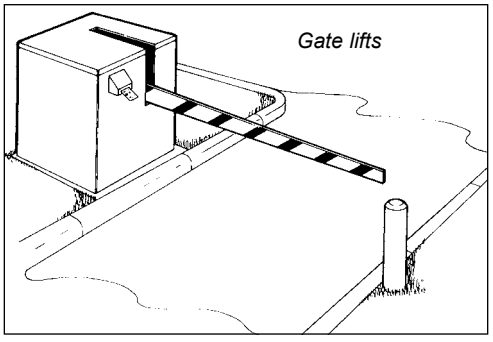
Stearns SINPAC Switches are ideal for applications requiring reliable switching of the start circuit in single-phase motors.

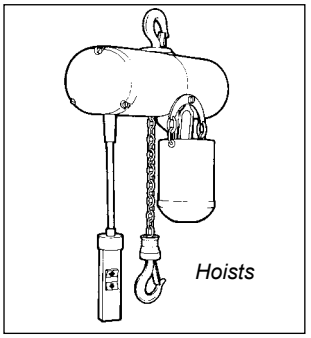
Mechanical switches are prone to various problems including mechanical fatigue, tolerances, tolerance build-ups and vibration which can lead to performance inconsistency.

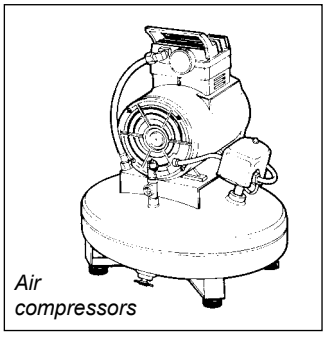
Electronic SINPAC Switches solve all those problems which reduce production downtime in hundreds of applications. Some of these applications are illustrated below:

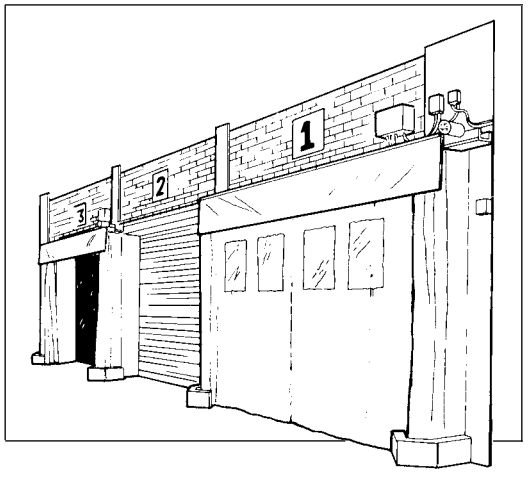
Some additional applications include:

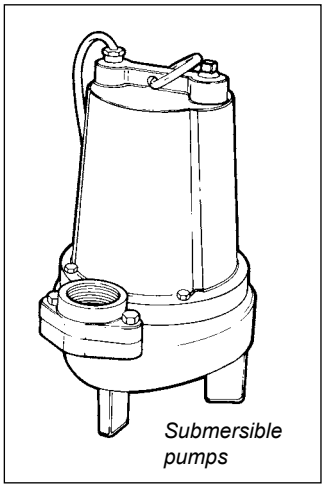
- Grain Dryers
- Water Equipment
- Power Tools
- Commercial Dryers
- Commercial Washing Machines
- Ice Makers
- Gas Pumps
- Floor Washers
- Bottle Washing Machines
- Floor Sanders
- Poultry Feeding Systems
- Fans, Blowers
- Grinding Machines
- Milking Machines
- Winches
- 50/60 Hz
- Paint Sprayers
- Pressure Sprayers
- Vibrators
- Auger Drives
- Door Openers
- Sump Pumps
- Diaphragm Pumps
- Hermetic Motors
- Rotary Compressors
- Refrigeration Compressors
- Heat Pumps
- Jet Pumps
- Food Processing

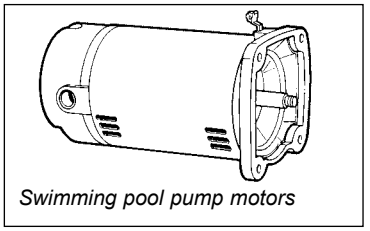

Gate lifts

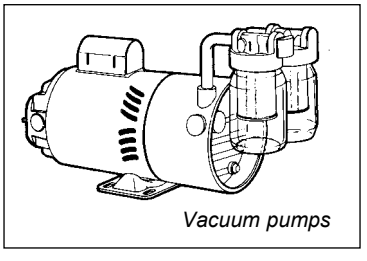

Hoists


Air compressors




Submersible pumps


Swimming pool pump motors


Vacuum pumps

SINPAC Switches: Selection

Motor hp ratings are typical. For an accurate selection procedure, measure start winding current during a normal start or at locked rotor and select a SINPAC Switch with higher maximum current rating than that measured.

1. Be sure switch series matches motor type.
2. Be sure switch voltage rating matches (start) circuit voltage rating.
3. Selection can be based on actual measurement of start winding current ortwo times the motor nameplate FLA rating.
4. Switch current rating must match or exceed the motor start winding current requirements. Always select a SINPAC Switch with the next higher current rating for:
   a) High cycling applications.
   b) Long acceleration time.
   c) High ambients: Greater than 55°C.
5. To assure proper motor operation, the voltage across the start winding must reach the SINPAC Switch cut out reference voltage between 70% to 85% of motors synchronous speed.

   Caution: SINPAC Switches are line voltage compensated. Changes in the line voltage will not effect system operation unless an overload condition causes reduced running speed, along with reduced voltage across the start winding.
6. Higher current switches can be used in place of lower rated switches of the same series.

SINPAC Electronic Switch Catalog Numbering System

CV – 16 – 165

Start Winding Voltage
blank = 115, ***2*** = 230

Series
CV - Capacitor Start Only, ***VR*** = Capacitor Start/Capacitor Run Only, ***IR*** = Capacitor Start Instant Reverse

Cut Out Voltage

Maximum Current Rating

4–7–21016–11–U03

Electronics

7 = SINPAC Switch

2 = CV Series - Capacitor Start Only
3 = Made-To-Order (MTO)*
5 = IR Series - Capacitor Start Only
7 = VR Series - Capacitor Start/ Capacitor Run Only

1 = 115 Start Circuit Voltage
2 = 230 Start Circuit Voltage

0 = Standard
A = Inductor

Amps (max. current)

3 = Standard, ***K*** = Kit

115 V SINPAC Switch
A = 130 VCO, ***B*** = 147 VCO, ***0*** = 165 VCO
D = 180 VCO
L = 130 VCO 15 VCI
V = 210 VCO

230 V SINPAC Switch
C = 260 VCO, ***0*** = 310 VCO, ***E*** = 410 VCO
M = 340 VCO, ***S*** = 350 VCO

U = UL Recognized, ***N*** = Not UL

Package Style
11 = Metal Can 2.48 x 1.38 x .81
12 = Metal Can 2.67 x 1.78 x .86
15 = Capacitor Case 1.822 dia. x 3.372 long

*__NOTE:__ For part numbers beginning with 473 (these are OEM specials), the remaining digits of this numbering system do not apply.

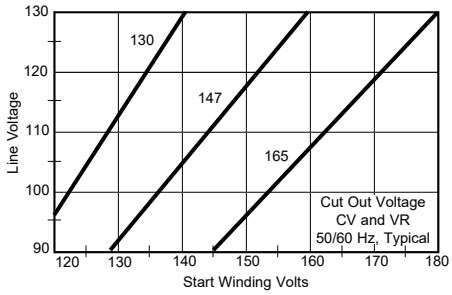
16, 25, 35, 40, 50

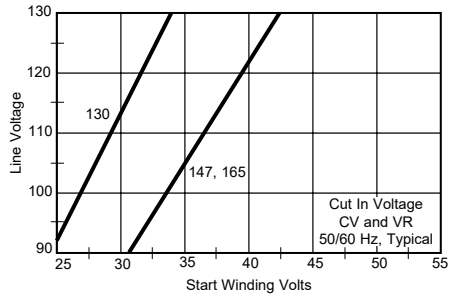
SINPAC Switches: Line Voltage Compensation Charts

CV , VR , and IR Series

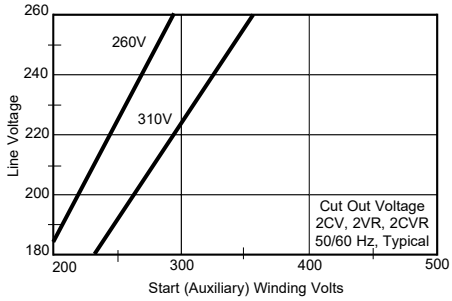
Induced voltage across the start winding is directly proportional to motor speed and line voltage. All SINPAC Switches use this voltage to switch the start capacitor out of the circuit. Your motor with a SINPAC Switch must generate a voltage that is 20% greater than the switch cut out voltage to assure cut out of the start capacitor. Refer to charts below.

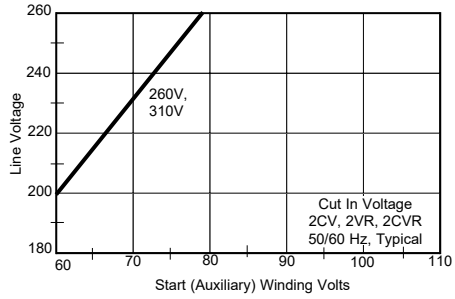
CV and VR



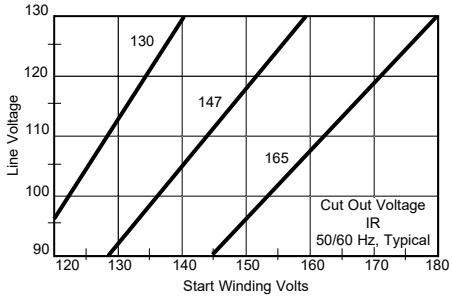


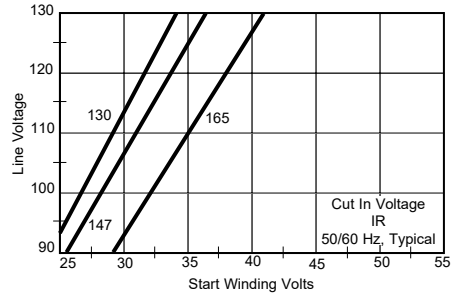
2CV and 2VR





IR SERIES





CV Series for 115 Vac or 115/230 Vac Dual Voltage Capacitor Start Motors

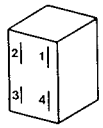
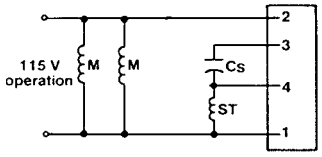
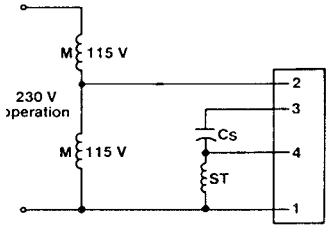
Basic Operation

Capacitor start motors require a method to extract speed data from the voltage across the motor start winding. By comparing the start winding RPM-sensitive voltage with the main AC input voltage (which serves as a reference voltage), the switch determines when the start circuit should be energized. The electronic switch interrupts the start circuit current after the motor has accelerated to the cut out speed, and reconnects the start circuit whenever the motor speed has fallen to cut in speed (usually about 50% of synchronous motor speed).

Typical Maximum Motor hp	Typical Full Load Motor Nameplate Current Rating (amps)		Switch Rating and Permissible Maximum Start Capacitor Current (amps)	Start Circuit Voltage	Catalog Number	Part Number*	Cut Out Voltage Typical	Cut In Voltage Typical	Package Style
	115 Volts	115/230 Volts							
1/2	8	8/4	16	115	CV-16-130	4-7-21016-XX-UA3	130	30	11
1/2	8	8/4	16	115	CV-16-147	4-7-21016-XX-UB3	147	37	11
1/2	8	8/4	16	115	CV-16-165	4-7-21016-XX-U03	165	37	11
1	12	12/6	25	115	CV-25-130	4-7-21025-XX-UA3	130	30	11
1	12	12/6	25	115	CV-25-147	4-7-21025-XX-UB3	147	37	11
1	12	12/6	25	115	CV-25-165	4-7-21025-XX-U03	165	37	11
2	20	20/10	40	115	CV-40-130	4-7-21040-XX-UA3	130	30	11
2	20	20/10	40	115	CV-40-147	4-7-21040-XX-UB3	147	37	11
2	20	20/10	40	115	CV-40-165	4-7-21040-XX-U03	165	37	11

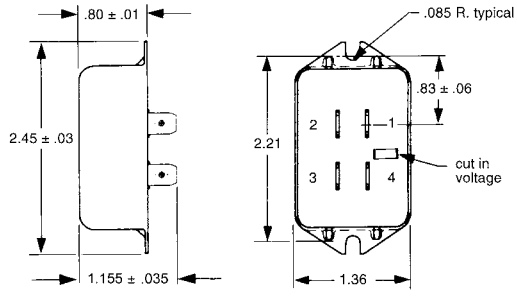
*Specify package style in place of XX in part number.

Wiring Diagram

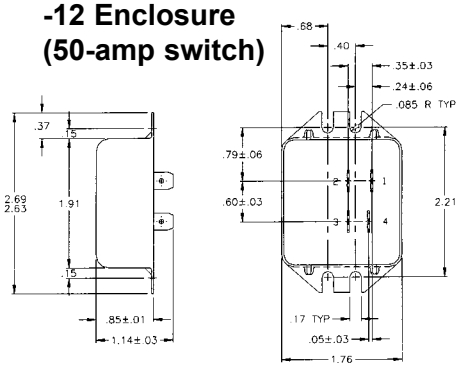
Catalog Number	SINPAC Switch Rating	115 Volt 50/60 Hz Motor Operation	230 Volt 50/60 Hz Motor Operation
CV-16 CV-25 CV-40 CV-50 *Connect to Capacitor Start Motors*			

Cs – Start Capacitor, **M** – Motor main winding, **ST** – Motor start winding

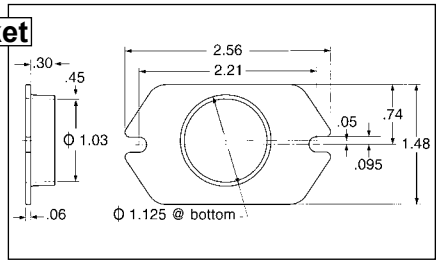
-11 Enclosure



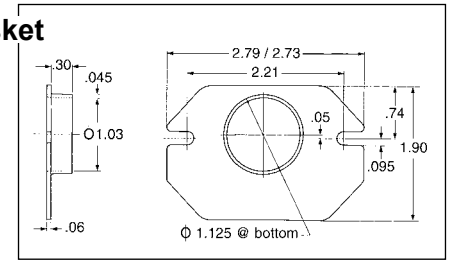
-12 Enclosure (50-amp switch)



-11 Gasket



-12 Gasket



VR Series for 115 Vac or 115/230 Vac Dual Voltage Capacitor Start/Capacitor Run Motors

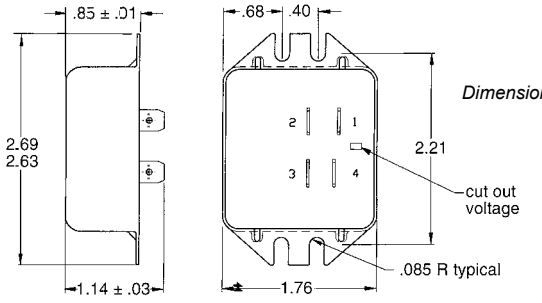
Basic Operation

Capacitor start/capacitor run motors provide continuous voltage sensing information which can be used to extract speed data from the voltage across the motor start winding. By comparing this start winding RPM-sensitive voltage to the main AC input voltage (which serves as a reference voltage), the switch determines when the start circuit should be de-energized. The electronic switch interrupts the start circuit current after the motor has accelerated to the cut out voltage (speed), and reconnects the start circuit whenever the speed sensitive circuit senses the motor voltage (speed) has decreased to a preselected cut in voltage (RPM) level.

Capacitor start/capacitor run motors exhibit current transients and higher voltages across the start switch. These electrical stresses occur due to the switching of the two capacitors (start and run) that are connected in parallel during motor start and may have different voltages at time of restart. These stresses occur at restart with both mechanical and electronic start switches. The VR switch features circuitry designed to eliminate the effects of these conditions.

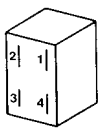
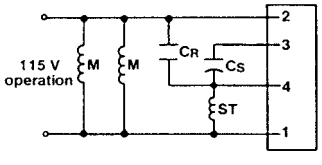
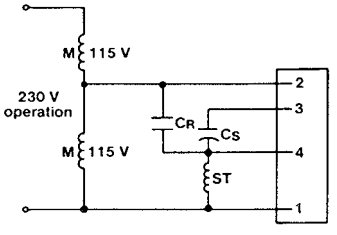
Typical Maximum Motor hp	Typical Full Load Motor Nameplate Current Rating (amps)		Switch Rating and Permissible Maximum Start Capacitor Current (amps)	Start Circuit Voltage	Catalog Number	Part Number	Cut Out Voltage Typical	Cut In Voltage Typical	Package Style
	115 Volts	115/230 Volts							
1/2	8	8/4	16	115	VR-16-130	4-7-71016-12-UA3	130	30	12
1/2	8	8/4	16	115	VR-16-147	4-7-71016-12-UB3	147	37	12
1/2	8	8/4	16	115	VR-16-165	4-7-71016-12-U03	165	37	12
2	20	20/10	40	115	VR-40-130	4-7-71040-12-UA3	130	30	12
2	20	20/10	40	115	VR-40-147	4-7-71040-12-UB3	147	37	12
2	20	20/10	40	115	VR-40-165	4-7-71040-12-U03	165	37	12
3	25	50/25	50	115	VR-50-130	4-7-71050-12-UA3	130	30	12
3	25	50/25	50	115	VR-50-147	4-7-71050-12-UB3	147	37	12
3	25	50/25	50	115	VR-50-165	4-7-71050-12-U03	165	37	12

-12 Enclosure

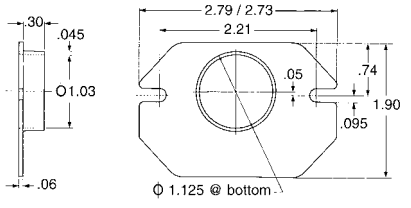


Dimensions are for estimating only. Drawings for customer reference are available upon request.

Wiring Diagram

Catalog Number	SINPAC Switch Rating	115 Volt 50/60 Hz Motor Operation	230 Volt 50/60 Hz Motor Operation
VR-16 VR-40 VR-50 *Connect to Capacitor Start/ Capacitor Run Motors*			

Gasket



2CV Series for 230 Vac Capacitor Start Motors
2VR Series for 230 Vac Capacitor Start/Capacitor Run Motors

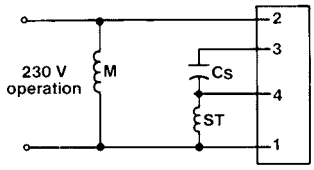
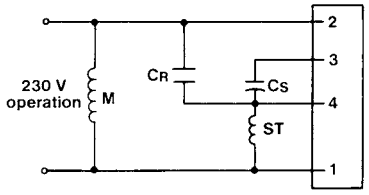
Basic Operation

Capacitor start/capacitor run motors and capacitor start motors provide continuous voltage sensing information which can be used to extract speed data from the voltage across the motor start (auxiliary) winding. By comparing this start (auxiliary) winding RPM-sensitive voltage to the main AC input voltage (which serves as a reference voltage), the switch determines when the start circuit should be de-energized. The electronic switch interrupts the start circuit current after the motor has accelerated to the cut out speed, and reconnects the start circuit whenever the motor speed has decreased to a preselected cut in RPM level.

Capacitor start/capacitor run motors exhibit current transients and higher voltages across the start switch. This electrical stress is due to the voltage differential which may exist between the start and run capacitors at the instant of switch closure. This stress phenomenon occurs with both mechanical and electronic type start switches. SINPAC Switches have voltage detection circuitry to minimize the effects of these conditions.

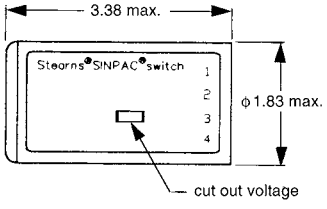
Motor Type	Typical Max. Motor hp	Typical Full Load Motor Nameplate Current Rating (amps)		Switch Rating and Permissible Maximum Start Capacitor Current (amps)	Start Circuit Voltage	Catalog Number	Part Number	Cut Out Voltage Typical	Cut In Voltage Typical	Package Style
		115 Volts	230 Volts							
Capacitor start only	3 3	– –	17 17	35 35	230 230	2CV-35-310	4-7-22035-15-U01	310	70	15
Capacitor start only	5 5	– –	25 25	50 50	230 230	2CV-50-310	4-7-22050-15-U01	310	70	15
Capactitor start capacitor run	3 3	– –	17 17	35 35	230 230	2VR-35-260 2VR-35-310	4-7-72035-15-UC1 4-7-72035-15-U01	260 310	70 70	15 15
Capactitor start capacitor run	5 5	– –	25 25	50 50	230 230	2VR-50-260 2VR-50-310	4-7-72050-15-UC1 4-7-72050-15-U01	260 310	70 70	15 15

Wiring Diagram

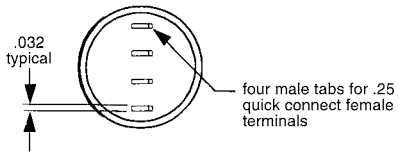
Catalog Number	SINPAC Switch Rating	115 Volt 50/60 Hz Motor Operation	230 Volt 50/60 Hz Motor Operation
2CV *Connect to Capacitor Start Motors*	230 Volts	*Not Applicable*	
2VR *Connect to Capacitor Start/ Capacitor Run Motors*		*Not Applicable*	

C_S– Start capacitor, **M** – Motor main winding, **C_R** – Run capacitor, **ST** – Motor start winding

-15 Enclosure



End view -15



Dimensions are for estimating only. Drawings for customer reference are available upon request.

IR Series for Instant Reversing 115 Vac or 115/230 Vac Dual Voltage Capacitor Start Motors

Basic Operation

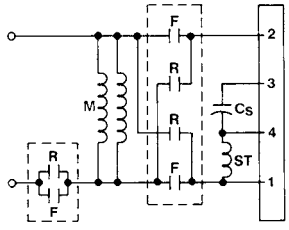
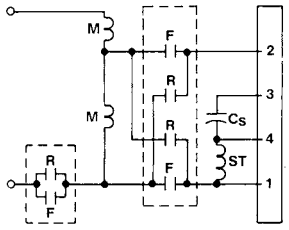
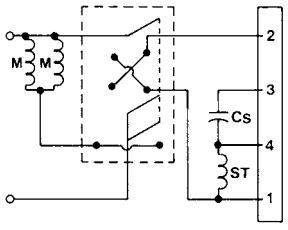
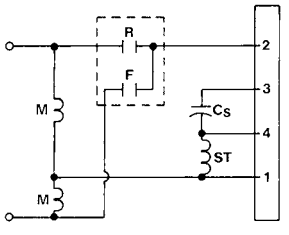
Bidirectional motors - those that can rotate in either direction – are of two classes: *1. Reversing motors*, which can change from full speed in one direction to full speed in the opposite direction. *2. Reversible motors*, which can be reversed only when the motor is not running, or is running below cut out speed. Some motor manufacturers distinguish between quick reversing and instant reversing. A quick reversing motor requires a time delay of approximately 1/25th of a second or more for the switching circuitry to react. An instant reversing motor requires absolutely no time delay. The standard SINPAC Switch can be used on reversible and reversing motors. The SINPAC IR Series Switch provides the function of a direction sensing centrifugal switch and makes a reversible capacitor start motor into an instant reversing motor.

In order to reverse a single-phase motor, it is necessary to reverse the polarity of either the start or main winding, but not both at the same time. The reversal of the winding is accomplished with an external reversing switch or contactor that is not part of the SINPAC Switch. SINPAC Instant Reverse Switch is not dependent upon how quickly the user operates the reversing switch, but only that the reversing switch did change states, i.e., forward to reverse, or vice versa. The SINPAC Switch detects the change in the phase shift between the main and start windings, and the logic circuit instantly actuates the starting switch, causing the start circuit to be reconnected to line voltage. This connection causes the motor to decelerate and then reaccelerate in the opposite direction. The SINPAC IR Series Switch interrupts the start circuit current after the motor has accelerated to the cut out speed, and reconnects the start circuit whenever the circuit senses the motor speed has fallen to cut in speed (usually about 50% of synchronous motor speed).

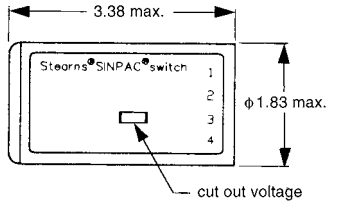
Typical Maximum Motor hp	Typical Full Load Motor Nameplate Current Rating (amps)		Switch Rating and Permissible Maximum Start Capacitor Current (amps)	Start Circuit Voltage	Catalog Number	Part Number	Cut Out Voltage Typical	Cut In Voltage Typical	Package Style
	115 Volts	115/230 Volts							
1/2	12	12/6	25	115	IR-25-130	4-7-51025-15-UA3	130	30	15
1/2	12	12/6	25	115	IR-25-165	4-7-51025-15-U03	165	37	15
1/2	12	12/6	25	115					15
2	20	20/10	40	115	IR-40-130	4-7-51040-15-UA3	130	30	15
2	20	20/10	40	115	IR-40-165	4-7-51040-15-U03	165	37	15
2	20	20/10	40	115					15

Contact factory on IVR series for capacitor start/capacitor run motors.

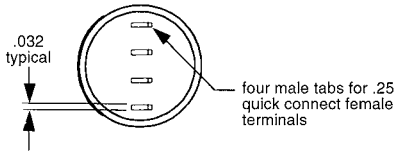
Wiring Diagram

Catalog Number	SINPAC Switch Rating	115 Volt 50/60 Hz Motor Operation	230 Volt 50/60 Hz Motor Operation
IR-25 IR-40 *Connect to Instant Reverse Start Motors*		**115 Volt Operation Dual Voltage Motor Using Two Full Voltage 2 or 3 Pole Single-Phase Reversing Contactors with Mechanical Interlock** *(Electrical Interlock Optional)*  Reversing contacts are not part of SINPAC Switch.	**230 Volt Operation Dual Voltage Motor Using Two Full Voltage 2 or 3 Pole Single-Phase Reversing Contactors with Mechanical Interlock** *(Electrical Interlock Optional)*  Reversing contacts are not part of SINPAC Switch.
		 Drum switch is not part of SINPAC Switch.	 Reversing contacts are not part of SINPAC Switch.

C_S– Start capacitor, **M** – Motor main winding, **ST** – Motor start winding, **F** – Forward, **R** – Reverse



Dimensions are for estimating only. Drawings for customer reference are available upon request.



TENV/IP54 Super-Mod® Clutch-Brake Modules

Imagine a totally-enclosed, non-ventilated clutch-brake ready to work right out of the box, requiring no modifications. And at a price competitive with “open” enclosure clutch-brakes.

TENV Super-Mod will give you extended cycles, enhanced operating efficiency and longer operating life. TENV Super-Mod Modules are well suited for challenging applications where water, moisture, dirt, dust and other airborne pollutants can shorten the life of traditional clutch-brakes.

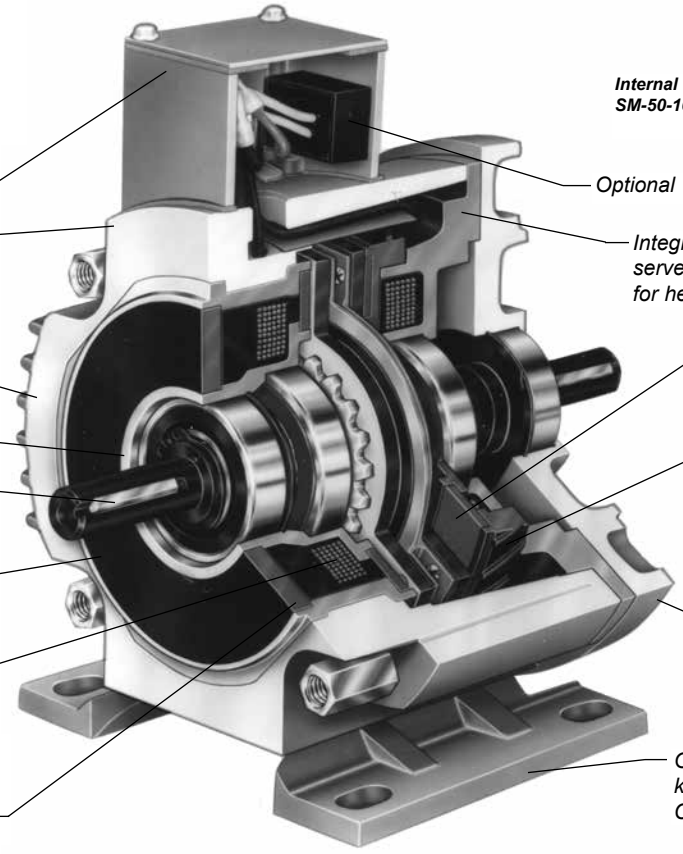
Examine these key value-added features:

- Cast-aluminum housing that meets IP54 requirements, preventing moisture and dirt from affecting operation of the unit
- Integrally cast, clutch-side magnetic body and endbell provides large heat sink that conducts heat away from coil
- Brake-side magnetic body integrated with cast housing creates a heat exchanger that keeps the brake coil cool
- Unique fan design creates bi-directional air movement within the unit. This stabilizes internal temperatures and eliminates hot spots. The fan is cast into the drive hub and is equally efficient at moving air axially through the housing during motor rotation in either direction
- Depending on the model, between 28 and 60 percent fewer parts than competitive units for enhanced reliability and service life
- Armature assembly features an automatic gap adjustment that maintains a consistent de-energized armature-to-friction-face air gap
- Completely gasketed conduit box resists moisture and spray
- Washdown (IP55) availability in select models

For even better performance, include an optional Tor-ac™ rectifier for 115 or 230 Vac input. Tor-ac rectifiers connect directly to the AC power source for switching on the AC-side. This eliminates contact arcing, improving the life of associated switching components while providing you with mechanical response times comparable to DC-side switching.

The Stearns TENV Super-Mod Module comes in a wide range of popular sizes with nominal static torque ratings from 16 and 145 lb-ft. Each unit is designed as an exact drop-in replacement, so you can upgrade today or at your next regularly scheduled maintenance shutdown.

Stearns Super-Mod Totally-Enclosed Non-Ventilated (TENV) Modules Featuring …



Internal components shown are for SM-50-100-180 only.

Standard conduit box has gaskets to protect against moisture

Rugged TENV/ IP54 cast-aluminum enclosure

Precision sealed ball bearings

Grooved shaft key

Machined C-face and C-face registers

Class H insulation materials Operating range - 20° thru 104° F

Brake magnet body cast into aluminum housing creates an efficient heat sink to conduct heat away from brake coil

Optional Tor-ac Rectifier(s)

Integral clutch magnet body serves as a large heat sink for heat dissipation

Non-asbestos friction linings

Exclusive bi-directional integral fan circulates air internally which eliminates hot spots inside the enclosure

Input adapter kit delivers flexibility to change configurations

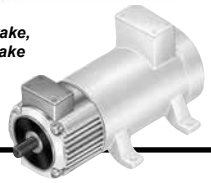
Optional cast-aluminum base kit does not restrict use of C-face and C-face register

Super-Mod® Clutch-Brake Modules

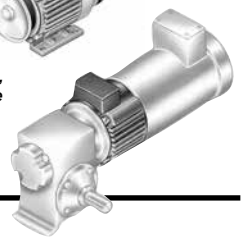
How To Select The Proper Unit For Your Application

C-face mounted motor brake module (20MB)

Foot/base mounting of clutch-brake or clutch module (2030B or 3040B)



C-face mounted brake, clutch or clutch-brake module (20, 1020 or 1040)



C-face mounted brake, clutch, or clutch-brake module. Mounted between motor and gearbox (20, 1020, or 1040)

1st Select the appropriate configuration based on the relationship with the motor, gearbox and drive components.

2nd Determine if the application requires clutching only, braking only or a clutch-brake combination.

Clutch Only

Provides a start and/or continuous motion until the control logic disengages (removes the power or voltage from the unit's coil).

NOTE: The load will coast since no braking action is provided.

Brake Only

Provides a stop and hold, typically of a motor shaft, until the control logic disengages (removes the power or voltage from the unit's coil).

Clutch-Brake

Provides a start-stop motion used for cycling, intermediate or random motion and controls a load or machine element. Both the clutch and brake coils are electrically engaged (power on), however, the control logic should not signal both coils to be engaged at the same time.

3rd Select the proper size/torque rating based on horsepower and RPM (speed at the clutch or brake) using the Super-Mod Selection Chart to the right. Based on 2.75 service factor.

For other service factors and speeds, use the formulas shown to the far right.

CAUTION: RPM refers to shaft speed at clutch or brake.

Note: Frame size and shaft diameter may affect selection and should be considered. See manufacturer's dimensional and sizing information.

Super-Mod Selection Chart

HP \ RPM	200	400	600	800	1000	1200	1500	1800	2100	2400
1/8										
1/4										
1/3										
1/2					SM-50					
3/4										
1					SM-100/180					
1 1/2										
2										
3						SM-210				
5										
7 1/2							SM-250			
10										

$$T_d = \frac{5252 \times P}{N} \times SF$$

Where:

T_d = Average dynamic torque, lb-ft

P = Horsepower, HP

N = Shaft speed differential at clutch and/or brake components, RPM

SF = Service factor

5252 = Constant

4th Ensure that the unit can properly dissipate the heat generated by the application. Thermal capacity can be calculated as follows:

$$E = 1.7 \times WR^2 \times \left(\frac{N}{100}\right)^2 \times F$$

Where:

E = Energy (heat) which needs to be dissipated in foot pounds per minute (ft-lb/min) for the application requirement.

WR^2 = Total reflected inertia at clutch-brake shaft location. This should include clutch-brake inertia.

Inertia (lb-ft²)	SM 50, 100, 180	SM 210, 250
Clutch/Brake	0.063	0.144
Clutch Only	0.04	0.08
Brake Only	0.035	0.08

N = Speed differential in revolutions per minute at the clutch-brake shaft.

F = Number of cycles per minute (cycle rate)

The thermal capacity requirements calculated should be compared to the thermal capacity ratings. Exceeding this rating could cause overheating and possible failure. SM 50-100-180 can accommodate 5,000 ft-lb/min; SM-210 7,000 ft-lb/min; and SM-250 5,600 ft-lb/min.

5th Options Select any other options you may require.

Tor-ac Kit

Single-channel, solid-state, quick-response rectifier circuit can be mounted in any SM unit which allows you to switch on the AC-side with mechanical response times comparable to traditional DC-side switching.

Adapter Kit

An input adapter kit can be stocked which gives you immediate flexibility to modify to double shafted configurations. See page 115 for ordering and dimensional information.

Base Kit

A base kit can be added to clutch only (1040) or clutch-brake (1020) units. See page 16 for ordering and dimensional information.

6th Special Applications

Low Speed

Application of clutches and brakes at speeds of 300 RPM or less may not permit sufficient burnishing or run-in to occur, the result being reduced and erratic torque output. For these applications, we suggest using a unit which has a static torque rating of at least two times the calculated torque requirement.

High Cycle Rates

Applications where high cycle rates are required could result in heat being generated which is in excess of the unit's capability to dissipate. The thermal capacity requirement equation should be used to size the clutch and/or brake for this type of application. High cycle rates may also require special high-speed controls.

Washdown

For applications requiring regular washdown, such as food processing or other wet, high-humidity environments use the Super-Mod TENV Washdown Clutch-Brake Modules.

- Models in most popular sizes with nominal static torque ratings of 16 and 35 lb-ft.
- Fully neoprene gasketed with BISSC approved white epoxy paint.

Soft Starts And/Or Stops

While the Stearns Gap feature is desirable in most applications, there are some situations where it should be disabled, such as very soft starts and/or stops achieved with low voltage energizing of the coil. For applications where the voltage will be varied to below 75% of the coil rating, request that the Stearns Gap feature be disabled.

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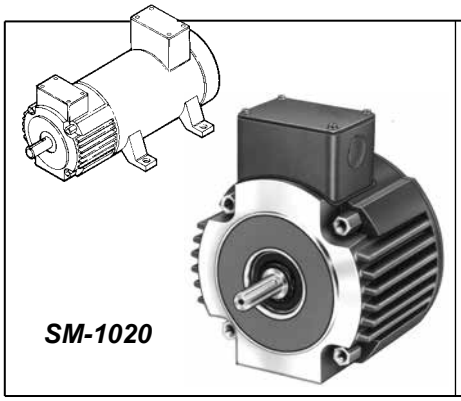
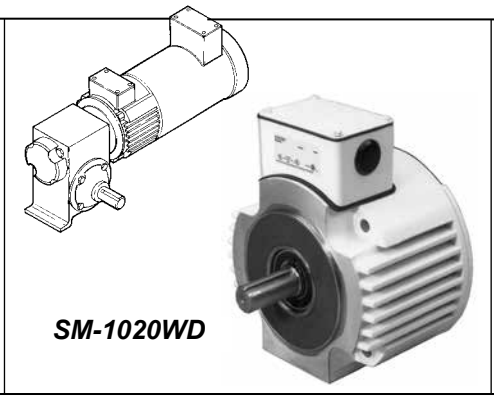
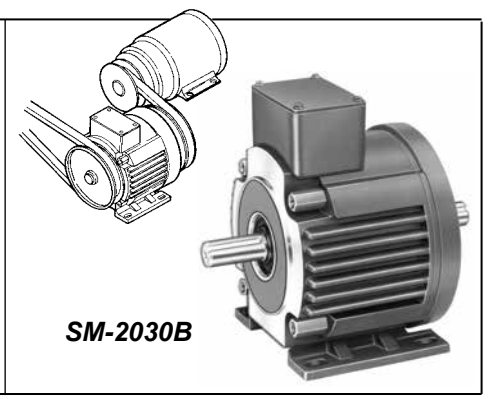
Super-Mod® Clutch-Brake Modules: SM-1020, SM-1020WD (Washdown) and SM-2030B







- 56C through 215TC NEMA Frame Sizes
- 16 through 145 lb-ft Static Torque; 2400 Maximum RPM
- TENV – Totally Enclosed (Non-Ventilated) IP-54 Enclosure Protection, (IP-55 for Washdown Units)
- Listed by Underwriters Laboratories, Inc., File E-71115 and CSA Certified, File LR-6254
- Power-On Clutch and Brake* Engagement
- Maximum Overhung load capacity is 85 lbs

*See Series 56,700 and 87,700 for power-off "fail safe" C-face coupler units

Performance Data and Ordering Information

Static Torque lb-ft	Dynamic Torque lb-ft	NEMA Frame	Hub bore and shaft diameter	Model	Part Number①	Thermal Capacity (ft-lb/min) ②	Wt. (lbs)	Maximum Electrical Power (watts)
16	10	56C	5/8 hub bore 5/8 shaft	SM-50-1020	2-35-0561-01-A*L	5000	20	19
16	10	56C		SM-50-1020B	2-35-0561-01-B*L	5000	22	19
16	10	56C		SM-50-1020WD	2-35-0562-01-A*L	5000	20	19
16	10	56C		SM-50-2030	2-35-0561-01-C*L	5000	24	19
16	10	56C		SM-50-2030B	2-35-0561-01-D*L	5000	24	19
35	20	56C		SM-100-1020	2-35-0561-02-A*L	5000	20	29
35	20	56C		SM-100-1020B	2-35-0561-02-B*L	5000	22	29
35	20	56C		SM-100-1020WD	2-35-0562-02-A*L	5000	20	29
35	20	56C		SM-100-2030	2-35-0561-02-C*L	5000	24	29
35	20	56C		SM-100-2030B	2-35-0561-02-D*L	5000	24	29
35	20	140TC	7/8 hub bore 7/8 shaft	SM-180-1020	2-35-1401-02-A*O	5000	20	29
35	20	140TC		SM-180-1020B	2-35-1401-02-B*O	5000	22	29
35	20	140TC		SM-180-1020WD	2-35-1402-02-AJO	5000	20	29
35	20	140TC		SM-180-2030	2-35-1401-02-C*O	5000	24	29
35	20	140TC		SM-180-2030B	2-35-1401-02-D*O	5000	24	29
75	44	180TC	1-1/8 hub bore 1-1/8 shaft	SM-210-1020	2-35-1801-03-A*R	7000	31	16
75	44	180TC		SM-210-1020B	2-35-1801-03-B*R	7000	31	16
75	44	180TC		SM-210-2030	2-35-1801-03-C*R	7000	37	16
75	44	180TC		SM-210-2030B	2-35-1801-03-D*R	7000	37	16
145	86	210TC	1-3/8 hub bore 1-3/8 shaft	SM-250-1020	2-35-2101-04-A*U	5600	37	38
145	86	210TC		SM-250-1020B	2-35-2101-04-B*U	5600	37	38
145	86	210TC		SM-250-2030	2-35-2101-04-C*U	5600	37	38
145	86	210TC		SM-250-2030B	2-35-2101-04-D*U	5600	37	38

②Thermal capacity rating is based on ambient temperature of 70°F at 1750 RPM.

①Example of a complete part number:

2-35-0561-01-AJL
- 5/8 hub
- 90-100 Vdc
- Basic unit
- 0=Standard Unit
- 2= Without Gap Adjust

Specials available upon request.

Options - Features Table

Series	Character	Description
SM-1020	A	Basic Unit - Direct Couple
SM-1020B	B	Basic Unit Plus Base
SM-2030	C	Basic Unit Plus Clutch Input Adapter
SM-2030B	D	Basic Unit Plus Base & Clutch Input Adapter
SM-1020WD		IP-55 Washdown (available in NEMA frame sizes 56C-145TC)

Voltage Table

Character	Voltage
C	12 Vdc
E	24-28 Vdc
J	90-100 Vdc
N	115 Vac
P	230 Vac

Hub Size Table for SM-1020's

Character	Bore	Keyway
L	5/8	3/16 x 3/32
O	7/8	3/16 x 3/32
R	1 1/8	1/4 x 1/8
U	1 3/8	5/16 x 5/32

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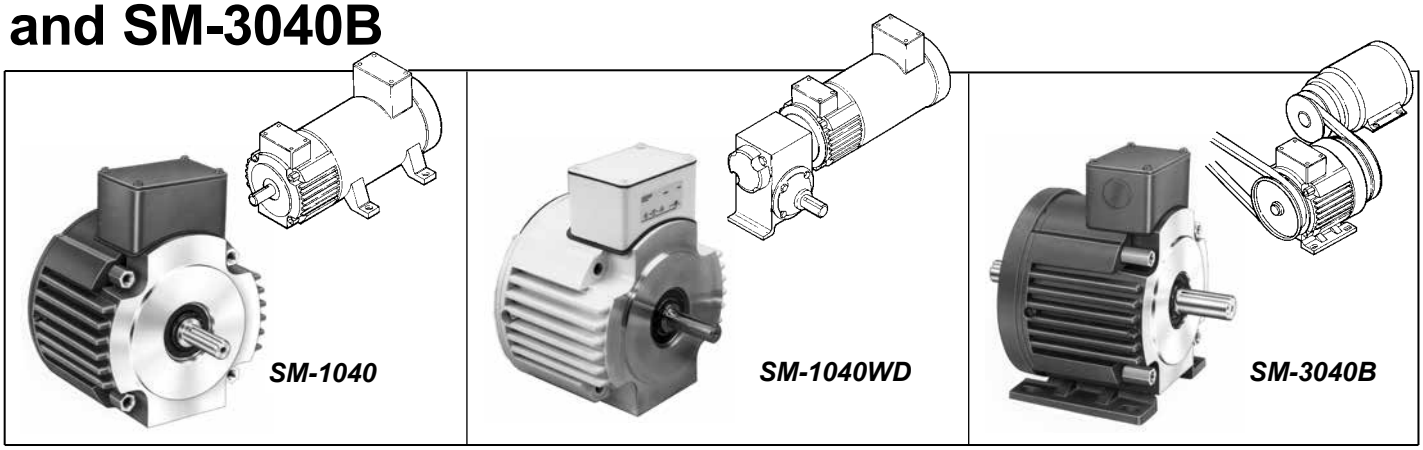
Super-Mod® Clutch Only Modules: SM-1040, SM-1040WD (Washdown) and SM-3040B



- 56C through 215TC NEMA Frame Sizes
- 16 through 145 lb-ft Static Torque; 2400 Maximum RPM
- TENV – Totally Enclosed (Non-Ventilated) IP-54 Enclosure Protection, (IP-55 for Washdown Units)
- Listed by Underwriters Laboratories, Inc., File E-71115 and CSA Certified, File LR-6254
- Maximum overhung load capacity is 85 lbs

Performance Data and Ordering Information

Static Torque lb-ft	Dynamic Torque lb-ft	NEMA Frame	Hub bore and shaft diameter	Model	Part Number①	Thermal Capacity (ft-lb/min) ②	Wt. (lbs)	Maximum Electrical Power (watts)
16	10	56C	5/8 hub bore 5/8 shaft	SM-50-1040	2-36-0561-01-A*L	5000	20	19
16	10	56C		SM-50-1040B	2-36-0561-01-B*L	5000	22	19
16	10	56C		SM-50-1040WD	2-36-0562-01-A*L	5000	20	19
16	10	56C		SM-50-3040	2-36-0561-01-C*L	5000	20	19
16	10	56C		SM-50-3040B	2-36-0561-01-D*L	5000	24	19
35	20	56C		SM-100-1040	2-36-0561-02-A*L	5000	20	29
35	20	56C		SM-100-1040B	2-36-0561-02-B*L	5000	22	29
35	20	56C		SM-100-1040WD	2-36-0562-02-A*L	5000	22	29
35	20	56C		SM-100-3040	2-36-0561-02-C*L	5000	22	29
35	20	56C		SM-100-3040B	2-36-0561-02-D*L	5000	24	29
35	20	140TC	7/8 hub bore 7/8 shaft	SM-180-1040	2-36-1401-02-A*O	5000	20	29
35	20	140TC		SM-180-1040B	2-36-1401-02-B*O	5000	22	29
35	20	140TC		SM-180-1040WD	2-36-1402-02-A*O	5000	20	29
35	20	140TC		SM-180-3040	2-36-1401-02-C*O	5000	22	29
35	20	140TC		SM-180-3040B	2-36-1401-02-D*O	5000	24	29
75	44	180TC	1-1/8 hub bore 1-1/8 shaft	SM-210-1040	2-36-1801-03-A*R	7000	31	16
75	44	180TC		SM-210-1040B	2-36-1801-03-B*R	7000	31	16
75	44	180TC		SM-210-3040	2-36-1801-03-C*R	7000	31	16
75	44	180TC		SM-210-3040B	2-36-1801-03-D*R	7000	31	16
145	86	210TC	1-3/8 hub bore 1-3/8 shaft	SM-250-1040	2-36-2101-04-A*U	5600	31	38
145	86	210TC		SM-250-1040B	2-36-2101-04-B*U	5600	31	38
145	86	210TC		SM-250-3040	2-36-2101-04-C*U	5600	31	38
145	86	210TC		SM-250-3040B	2-36-2101-04-D*U	5600	31	38

②Thermal capacity rating is based on ambient temperature of 70°F at 1750 RPM.

①Example of a complete part number:

2-36-0561-01-AJL
- AJL: 5/8 hub; 90-100 Vdc; Basic unit
- 01: 0=Standard Unit; 2= Without Gap Adjust

Specials available upon request.

Options - Features Table

Series	Character	Description
SM-1040	A	Basic Unit - Direct Couple
SM-1040B	B	Basic Unit Plus Base
SM-3040	C	Basic Unit Plus Clutch Input Adapter
SM-3040B	D	Basic Unit Plus Base & Clutch Input Adapter
SM-1040WD		IP-55 Washdown (available in NEMA frame sizes 56C-145TC)

Voltage Table

Character	Voltage
C	12 Vdc
E	24-28 Vdc
J	90-100 Vdc
N	115 Vac
P	230 Vac

Hub Size Table for SM-1040's

Character	Bore	Keyway
L	5/8	3/16 x 3/32
O	7/8	3/16 x 3/32
R	1 1/8	1/4 x 1/8
U	1 3/8	5/16 x 5/32

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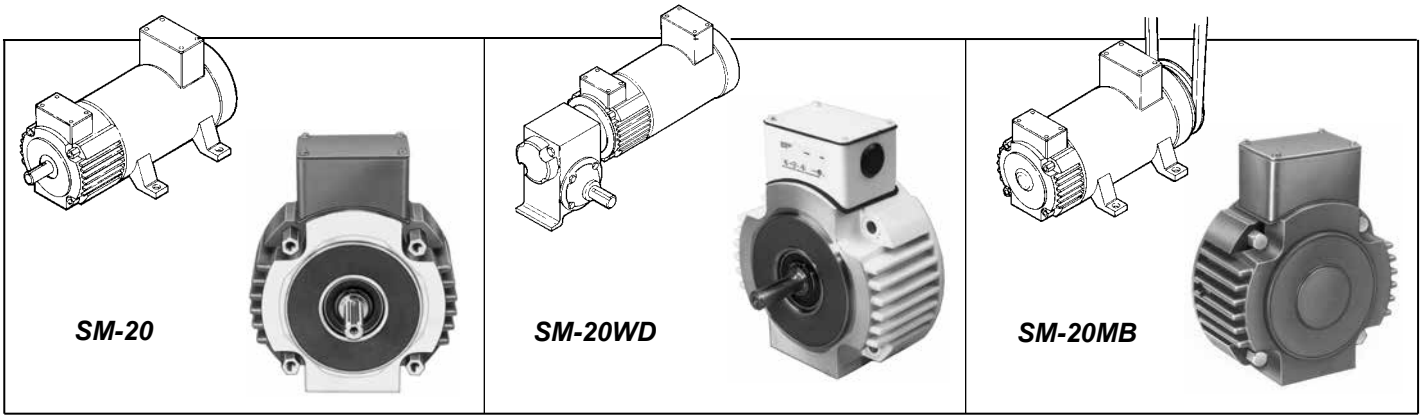
Super-Mod® Brake Only Modules:
SM-20, SM-20WD (Washdown) and SM-20MB



- 56C through 215TC NEMA Frame Sizes
- 16 through 145 lb-ft Static Torque; 2400 Maximum RPM
- TENV – Totally Enclosed (Non-Ventilated) IP-54 Enclosure Protection, (IP-55 for Washdown Units)
- Listed by Underwriters Laboratories, Inc., File E-71115 and CSA Certified, File LR-6254
- Power-On Brake* Engagement
- Maximum overhung load capacity is 85 lbs.

*See Series 56,700 and 87,700 for power-off "fail safe" C-face coupler units

Performance Data and Ordering Information

Static Torque lb-ft	Dynamic Torque lb-ft	NEMA Frame	Hub bore and shaft diameter	Model	Part Number①	Thermal Capacity (ft-lb/min) ②	Wt. (lbs)	Maximum Electrical Power (watts)
16	10	56C	5/8 hub bore 5/8 shaft	SM-50-20	2-37-0561-01-A*L	5000	11	19
16	10	56C		SM-50-20WD	2-37-0562-01-A*L	5000	11	19
16	10	56C		SM-50-20MB	2-37-0561-01-X*L	5000	10	19
35	20	56C		SM-100-20	2-37-0561-02-A*L	5000	11	29
35	20	56C		SM-100-20WD	2-37-0562-02-A*L	5000	11	29
35	20	56C		SM-100-20MB	2-37-0561-02-X*L	5000	10	29
35	20	140TC	7/8 hub bore 7/8 shaft	SM-180-20	2-37-1401-02-A*O	5000	12	29
35	20	140TC		SM-180-20WD	2-37-1402-02-A*O	5000	12	29
35	20	140TC		SM-180-20MB	2-37-1401-02-X*O	5000	11	29
75	44	180TC	1-1/8 hub bore 1-1/8 shaft	SM-210-20	2-37-1801-03-A*R	7000	15	16
75	44	180TC		SM-210-20MB	2-37-1801-03-X*R	7000	15	16
145	86	210TC	1-3/8 hub bore 1-3/8 shaft	SM-250-20	2-37-2101-04-A*U	5600	18	38
145	86	210TC		SM-250-20MB	2-37-2101-04-X*U	5600	18	38

②Thermal capacity rating is based on ambient temperature of 70°F at 1750 RPM.

①Example of a complete part number:

2-37-0561-01-AJL
- AJL — 5/8 hub
- L — 90-100 Vdc
- J — Basic unit
- 01 — 0=Standard Unit, 2= Without Gap Adjust
- 0561 — Specials available upon request.

Options - Features Table

Series	Character	Description
SM-20	A	Basic Unit - Coupler
SM-20MB	X	No Shaft (end mount motor brake)
SM-20WB		IP-55 Washdown (available in NEMA frame sizes 56C-145TC)

Voltage Table

Character	Voltage
C	12 Vdc
E	24-28 Vdc
J	90-100 Vdc
N	115 Vac
P	230 Vac

Hub Size Table for SM-20's

Character	Bore	Keyway
L	5/8	3/16 x 3/32
O	7/8	3/16 x 3/32
R	1 1/8	1/4 x 1/8
U	1 3/8	5/16 x 5/32

Super-Mod® Conversion Kits

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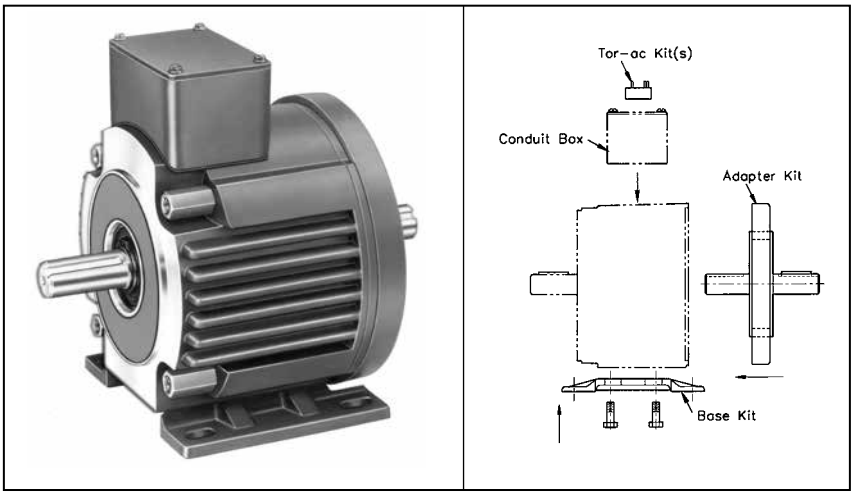


Mechanical Flexibility through Conversion Kits

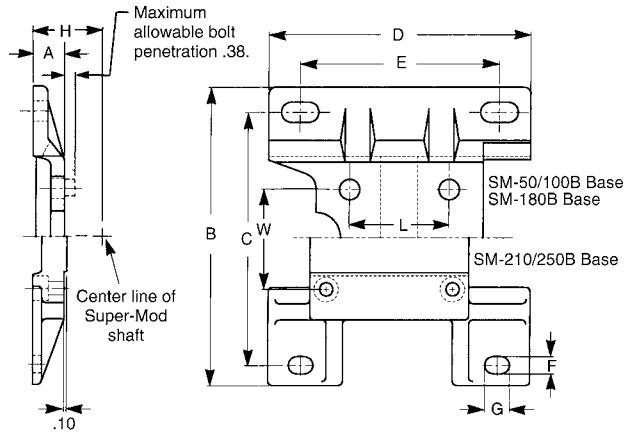
Super-Mod provides the answer with inexpensive, easy to use, stock conversion kits. Stock either the base kit, adapter kit, Tor-ac kit or all of them and you can quickly modify your standard clutch (1040), or clutch-brake (1020) into almost any configuration (2030TB, 3040B for example).

Super-Mod is an innovative product. When combined with your equipment, it provides added value through increased reliability and reduced inventory.

Base Kit Dimensional Data (In Inches)

Base Kits Cannot Be Used On Brake Only (20 and 20MB)

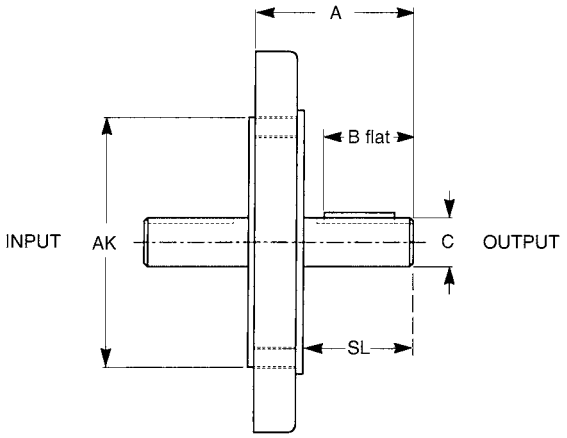
Series	A	B	C	D	E	F	G	H	L	W	Bolt Size
SM-50/100B	.54	6.00	5.00	5.25	4.00	.41	.78	3.50	2.02 1.98	1.914 1.910	3/8" - 16x3/4" hex head
SM-180B	1.54	6.00	5.00	5.25	4.00	.41	.78	4.50	2.02 1.98	1.914 1.910	3/8" - 16x3/4" hex head
SM-210/250B	.80	9.00	7.75	8.00	6.00	.54	.78	5.26	3.13 3.12	3.865 3.855	3/8" - 16x1" socket head



Input Adapter Kit (For use with Super-Mod only)

Dimensional Data (In Inches)

Series	AK	A	B	C	Keyway	SL
SM-50/100A	4.50	2.78	1.41	.625/.624	3/16 x 3/32	1.785-2.014
SM-180A	4.50	2.84	1.41	.875/.874	3/16 x 3/16	1.792-2.022
SM-210A	8.50	3.33	1.78	1.125/1.124	1/4 x 1/4	2.439-2.489
SM-250A	8.50	3.87	2.41	1.375/1.374	5/16 x 5/16	2.929-2.979



Ordering Information

Catalog Number	Part Number	Option
Base Kits ***(Base Kits Cannot Be Used On Brake Only - 20 and 20MB)***		
SM-50/100B SM-180B SM-210B	5-78-1101-01 5-78-1101-02 5-78-0001-30	SM-50 and SM-100 Series SM-180 Series SM-210 and SM-250 Series
Input Adapter Kits		
SM-50/100A SM-180A SM-210A SM-256A	5-78-6100-31 5-78-6100-32 5-78-0000-23 5-78-0000-24	SM-50 and SM-100 Series SM-180 Series SM-210 Series SM-250 Series

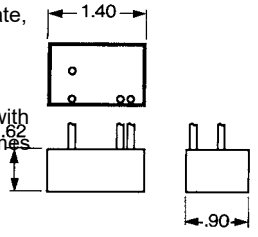
Rectifiers Performance Data

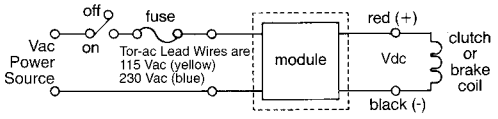
	Catalog Number	Part Number	AC Input Voltage	Nominal DC Output		
				Volts	Max. Amps②	Max. Watts
SM-Tor-ac①	SBC-100-1	4-1-20194-00K	115 50-60 Hz	100	.4	40
SM-Tor-ac①	SBC-200-1	4-1-20290-00K	230 50-60 Hz	100	.4	80

①Use with 90-100 Vdc "J" coils only.
②Based on ambient temperature of 149°F.

SM Tor-ac™ Kit

Single channel, solid-state, quick response rectifier circuit can be mounted in any SM unit. Lets you switch on the AC-side, with mechanical response times equal to traditional DC-side switching.





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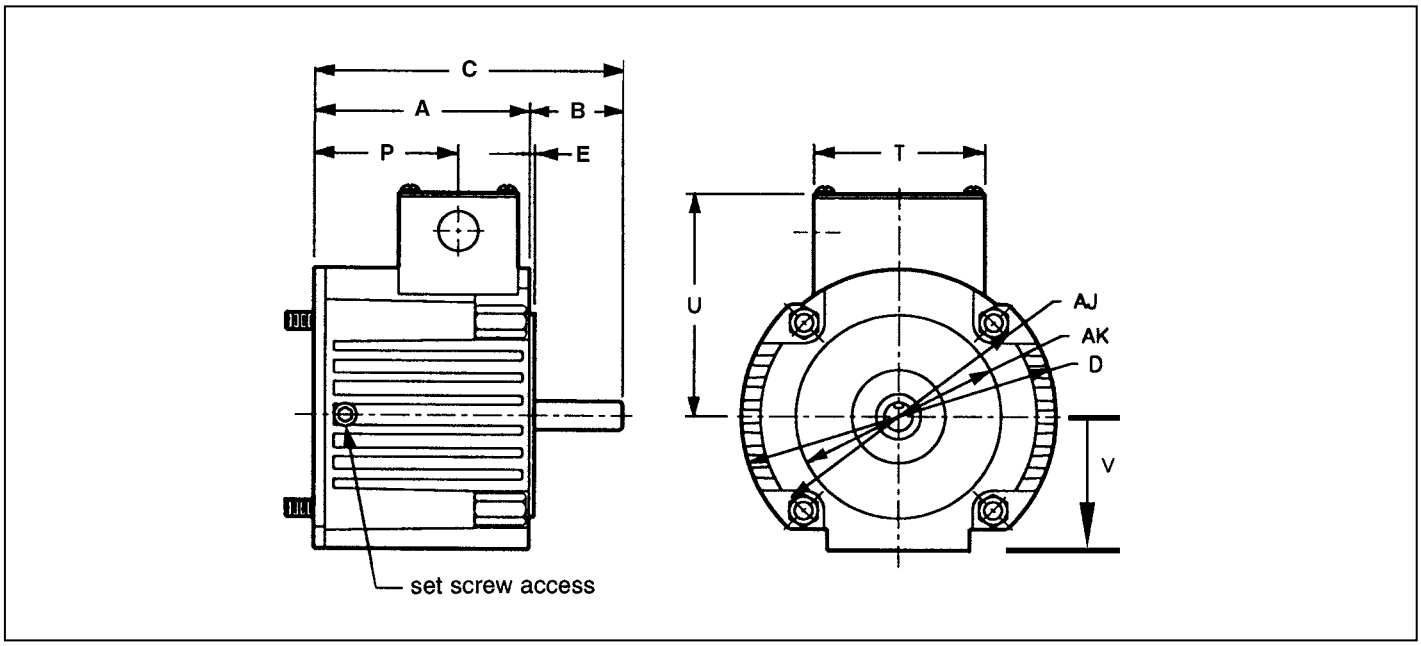
SM-1020, SM-1040, SM-20 and SM-20MB



NEMA C-Face Frame Size	Configuration	Basic Module Style	Basic Model Number	AJ	AK	Hub Bore and Shaft Ø	Keyway	A	B	C	D	E	P	T	U	V
SM-50 SM-100 56C 5/8 hub bore 5/8 shaft	C-Face Clutch/Brake	1020	2-35-056X-0X-A*L	5.875	4.5	5/8	3/16 x 3/32	4.71	2.06	6.77	6.9	.16	3.15	2.8	4.9	3.0
	C-Face Clutch Only	1040	2-36-056X-0X-A*L													
	C-Face Brake Only	20	2-37-056X-0X-A*L					3.14		5.2			2.92			
	C-Face Brake Only without Shaft	20MB	2-37-056X-0X-X*L						-	-		-				
SM-180 145TC 7/8 hub bore 7/8 shaft	C-Face Clutch/Brake	1020	2-35-140X-02-A*O	5.875	4.5	7/8	3/16 x 3/32	4.71	2.12	6.83	6.9	.16	3.15	3.8	4.9	3.0
	C-Face Clutch Only	1040	2-36-140X-02-A*O													
	C-Face Brake Only	20	2-37-140X-02-A*O					3.14		5.25			1.58			
	C-Face Brake Only without Shaft	20MB	2-37-140X-02-X*O						-	-		-				
SM-210 182TC 184TC 1-1/8 hub bore 1-1/8 shaft	C-Face Clutch/Brake	1020	2-35-1801-03-A*R	7.25	8.5	1-1/8	1/4 x 1/8	6.11	2.59	8.7	9	.25	2.83	4	7.4	4.63
	C-Face Clutch Only	1040	2-36-1801-03-A*R													
	C-Face Brake Only	20	2-37-1801-03-A*R					4.61		7.2			2.17			
	C-Face Brake Only without Shaft	20MB	2-37-1801-03-X*R						-	-		-				
SM-250 213TC 215TC 1-3/8 hub bore 1-3/8 shaft	C-Face Clutch/Brake	1020	2-35-2101-04-A*U	7.25	8.5	1-3/8	5/16 x 5/32	6.11	3.03	9.14	9	.25	2.83	4	7.4	4.63
	C-Face Clutch Only	1040	2-36-2101-04-A*U													
	C-Face Brake Only	20	2-37-2101-04-A*U					4.61		7.64			2.17			
	C-Face Brake Only without Shaft	20MB	2-37-2101-04-X*U						-	-		-				

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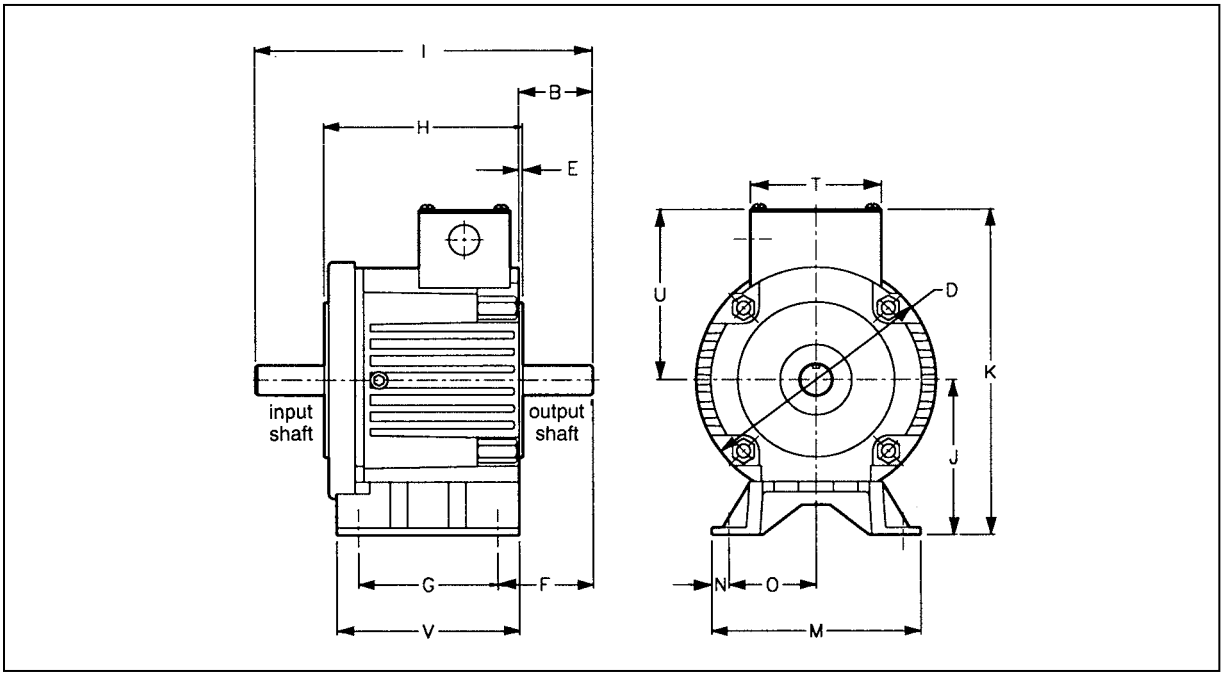
SM-2030B and SM-3040B



NEMA C-Face Frame Size	Configuration	Basic Module Style	Basic Model Number	Shaft ø	Keyway	B	D	E	F	G	H	I	J	K	M	N	O	T	U	V
SM50 SM100 56C 5/8 shaft	Base Mount Clutch/Brake-Double Shaft	2030B	2-35-056X-0X-D*L	5/8	3/16 x 3/32	2.06	6.9	.16	2.76	4	5.9	9.55	3.5	8.4	6	0.5	2.5	3.8	4.9	5.25
	Base Mount Clutch Only-Double Shaft	3040B	2-36-056X-0X-D*L	5/8	3/16 x 3/32															
SM-180 143TC 145TC 7/8 shaft	Base Mount Clutch/Brake-Double Shaft	2030B	2-35-140X-0X-D*O	7/8	3/16 x 3/32	2.12	6.9	.16	2.82	4	5.9	9.61	4.5	9.4	6	0.5	2.5	3.8	4.9	5.25
	Base Mount Clutch Only-Double Shaft	3040B	2-36-140X-0X-D*O	7/8	3/16 x 3/32															
SM-210 182TC 184TC 1-1/8 shaft	Base Mount Clutch/Brake-Double Shaft	2030B	2-35-1801-03-D*R	1-1/8	1/4 x 1/8	2.59	9	.25	3.41	6	6.91	12.09	5.25	12.65	9	0.63	3.87	4	7.4	8
	Base Mount Clutch Only-Double Shaft	3040B	2-36-1801-03-D*R	1-1/8	1/4 x 1/8															
SM-250 213TC 215TC 1-3/8 shaft	Base Mount Clutch/Brake-Double Shaft	2030B	2-35-2101-04-D*U	1-3/8	5/16 x 5/32	3.03	9	.25	3.88	6	6.91	12.97	5.25	12.65	9	0.63	3.87	4	7.4	8
	Base Mount Clutch Only-Double Shaft	3040B	2-36-2101-04-D*U	1-3/8	5/16 x 5/32															

Application Engineering

Introduction

Information and guidelines provided in the application section are intended for general selection and application of spring set brakes. Unusual operating environments, loading or other undefined factors may affect the proper application of the product. Stearns application services are available to assist in proper selection or to review applications where the specifier may have questions.

A spring set brake is used to stop and hold a rotating shaft. Generally the brake is mounted to an electric motor, but can also be mounted to gear reducers, hoists, machinery or utilize a foot mount kit.

The brake should be located on the high speed shaft of a power transmission system. This permits a brake with the lowest possible torque to be selected for the system.

Spring set disc brakes use friction to stop (dynamic torque) and hold (static torque) a load. Energy of the motor rotor and moving load is converted to thermal energy (heat) in the brake during deceleration. The brakes are power released, spring applied. No electrical current is required to maintain the spring set condition.

The system designer will need to consider the mount surface and match the brake to the load and application. Factors include: brake torque, stopping time, deceleration rate, load weight and speed, location and environment. Brake thermal ratings, electrical requirements and environmental factors are discussed in separate sections.

Electrical Considerations

Solenoid actuated brakes (SAB's) are available with standard motor voltages, frequencies and Class B or H coil insulation. Most models can be furnished with either single or dual voltage coils. Coils in most models are field replaceable.

Inrush and holding amperage information is published for the common coil voltages and factory available for other voltages or frequencies. Amperage information for specific coil sizes is provided for selection of wire size and circuit protection at brake installation. Fixed voltage - 50/60 Hz dual frequency coils are available in many models.

All SAB AC coils are single phase and can be wired to either single or three phase motors without modifications. All solenoid coils have a voltage range of +/- 10% of the rated nameplate voltage at the rated frequency. Instantaneous rated voltage must be supplied to the coil to insure proper solenoid pull in and maximum coil cycle rate. The plunger rapidly seats in the solenoid and the amperage requirements drops to a holding amperage value.

Instantaneous voltage must be supplied to the coil to insure proper solenoid pull-in and maximum coil cycle rate.

Because Stearns Solenoid Actuated Brakes (SAB's) require low current to maintain the brake in the released position, the response time to set the brake *can* be affected by EMF voltages generated by the motor windings. It may be necessary to isolate the brake coil from the motor winding.

The solenoid coil cycle rate limits the engagements per minute of a static or holding duty brake. Brake thermal performance, discussed in another section, limits engagements per minute in dynamic applications.

Class B insulation is standard in most SAB models, class H coil insulation is optional and is recommended for environments above 104°F (40°C), or rapid cycling applications.

Armature actuated brakes (AAB's) are available in standard DC voltages. Available AC rectification is listed in the catalog section. Wattage information is provided in the catalog pages. Unlike solenoid actuated brakes, armature actuated brakes do not have inrush amperage. Coil and armature reaction time and resulting torque response time information is available. Like SAB, mechanical reaction time depends on typical application factors including load, speed and position.

Electrical response time and profiles are unique to the SAB and AAB. Reaction time requirements should be considered when selecting or interchanging brakes.

All Stearns brake coils are rated for continuous duty and can be energized continually without overheating. The coil heating effect is greatest at coil engagement due to engaging, pull in or inrush amperage.

Temperature limits as established by UL controls standards are:

Class A insulation	221°F (105°C)
Class B insulation	266°F (130°C)
Class H insulation	356°F (180°C).

Types of Applications

In order to simplify the selection of a disc brake, loads can be classified into two categories, non-overhauling and overhauling.

Loads are classified as non overhauling, if (1) no components of the connected equipment or external material undergo a change of height, such as would occur in hoisting, elevating or lowering a load, and (2) there is only rotary motion in a horizontal plane. For example, a loaded conveyor operating in a horizontal plane would be typical of a non-overhauling load.

If the same conveyor were transporting material to a lower level, it would be classified as an overhauling load. The external material or load undergoes a change in height, with the weight of the load attempting to force the conveyor to run faster than its design speed or to overhaul.

Non-overhauling loads require braking torque only to stop the load and will remain at rest due to system friction. Overhauling loads, such as a crane hoist, have two torque requirements. The first requirement is the braking torque required to *stop* the load, and the second requirement is the torque required to *hold* the load at rest. The sum of these requirements is considered when selecting a brake for an overhauling load.

Alignment

Requirements per NEMA:

Permissible ECCENTRICITY of mounting rabbet (AK dimension):

42C to 286TC frames inclusive is 0.004" total indicator reading. 324TC to 505TC frames inclusive is 0.007" total indicator reading.

Face Runout:

42C to 286TC frames inclusive is 0.004" total indicator reading.

If a customer furnishes a face on the machine for brake mounting, the same tolerances apply. Floor mounted brakes must be carefully aligned within 0.005" for concentricity and angular alignment. Use of dowels to insure permanent alignment is recommended.

In offset brake mount locations such as fan covers, cowls or jack shafting, proper mount rigidity and bearing support must be provided. Spring set frictional brakes characteristically have a rapid stop during torque application which may affect the mount surface or contribute to shaft deflection.

Printed installation information is published and available on all Stearns spring set brakes.

Determining Brake Torque

Torque ratings

Brake torque ratings are normally expressed as nominal static torque. That is, the torque required to begin rotation of the brake from a static, engaged condition. This value is to be distinguished from dynamic torque, which is the retarding torque required to stop a linear, rotating or overhauling load.

As a general rule, a brake's dynamic torque is approximately 80% of the static torque rating of the brake for stopping time up to one second. Longer stopping time will produce additional brake heat and possible fading (reduction) of dynamic torque. The required dynamic torque must be converted to a static torque value before selecting a brake, using the relationship:

$$T_S = \frac{T_d}{0.8}$$

Where, T_S = Static torque, lb-ft

T_d = Dynamic torque, lb-ft

0.8 = Constant (derating factor)

All Stearns brakes are factory burnished and adjusted to produce no less than rated nominal static torque. Burnishing is the initial wear-in and mating of the rotating friction discs with the stationary metallic friction surfaces of the brake.

Although brakes are factory burnished and adjusted, variations in torque may occur if components are mixed when disassembling and reassembling the brake during installation. Further burnishing may be necessary after installation. Friction material will burnish under normal load conditions. Brakes used as holding only duty require friction material burnishing at or before installation to insure adequate torque.

When friction discs are replaced, the brake must be burnished again in order to produce its rated holding torque.

System Friction

The friction and rolling resistance in a power transmission system is usually neglected when selecting a brake. With the use of anti-friction bearings in the system, friction and rolling resistance is usually low enough to neglect. Friction within the system will assist the brake in stopping the load. If it is desired to consider it, subtract the frictional torque from the braking torque necessary to decelerate and stop the load. Friction and rolling resistance are neglected in the examples presented in this guide.

Non-overhauling Loads

There are two methods for determining brake torque for non-overhauling loads. The first method is to size the brake to the torque of the motor. The second is to select a brake on the basis of the total system or load inertia to be stopped.

Selecting Brake Torque from the Motor Data

Motor full-load torque based or nameplate horsepower and speed can be used to select a brake. This is the most common method of selecting a brake torque rating due to its simplicity.

This method is normally used for simple rotary and linear inertial loads. Brake torque is usually expressed as a percent of the full load torque of the motor. Generally this figure is not less than 100% of the motor's full load torque. Often a larger service factor is considered. Refer to *Selection of Service Factor.*

The required brake torque may be calculated from the formula:

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

Where, T_S = Static brake torque, lb-ft

P = Motor horsepower, hp

N = Motor full load speed, rpm

SF = Service factor

5,252 = Constant

Match the brake torque to the hp used in the application. When an oversized motor hp has been selected, brake torque based on the motor hp may be excessive for the actual end use.

Nameplate torque represents a nominal static torque. Torque will vary based on combinations of factors including cycle rate, environment, wear, disc burnish and flatness. Spring set brakes provide a rapid stop and hold and are generally not used in repeat positioning applications.

Selection of Service Factor

A service factor is applied to the basic drive torque calculation. The SF compensates for any tolerance variation, data inaccuracy, unplanned transient torque and potential variations of the friction disc.

When using the basic equation: T= (hp x 5252) / rpm with non-overhauling loads, a service factor of 1.2 to 1.4 is typical. Overhauling loads with unknown factors such as reductions may use a service factor of 1.4 to 1.8.

Spring set brakes combined with variable frequency drives use service factors ranging from 1.0 to 2.0 (2.0 for holding duty only) depending on the system design. These holding duty brakes must be wired to a separate dedicated power supply.

Occasionally, a brake with a torque rating less than the motor full load torque or with a service factor less than 1.0 is selected. These holding or soft stop applications must be evaluated by the end user or system designer to insure adequate sizing and thermal capacity.

Typically a brake rated 125% of the motor full load torque, or with a 1.25 service factor, provides a stop in approximately the same time as that required for the motor to accelerate the load to full load speed.

Occasionally a motor is oversized or undersized for the load or application. In these situations, the load inertia and desired stopping time calculations should be used rather than relying on the service factor method alone.

Service factor selection can be based on motor performance curves. Motor rotor and load inertia should be considered in this selection process. Depending on the motor design (NEMA A, B, C and D), rpm and horsepower, the maximum torque is either the starting or breakdown torque. A NEMA design B, 3 phase, squirrel cage design motor at breakdown torque produces a minimum of 250% the full load torque. A service factor of 2.5 would be selected. Typical service factors depending on NEMA motor design are: NEMA design A or B: 1.75 to 3.0, NEMA design C: 1.75 to 3.0 and NEMA design D: not less than 2.75.

A brake with an excessive service factor may result in system component damage, an unreasonably rapid stop or loss of load control. A SF above 2.0 is not recommended without evaluation by the end user or system designer.

Example 1: Select brake torque from motor horsepower and speed.

Given: Motor power (P) - 5 hp

Motor speed (N) - 1,750 rpm

Service factor (SF) - 1.4

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

$$= \frac{5{,}252 \times 5}{1{,}750} \times 1.4$$

T = 21 lb-ft

A brake having a standard rating of 25 lb-ft nominal static torque would be selected.

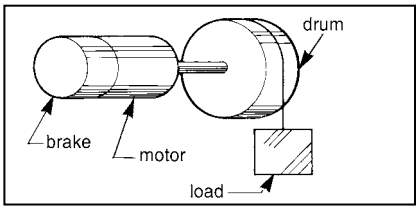
Example 2 illustrates selection of a brake to provide proper static torque to hold a load if dynamic braking were used to stop the load.

Example 2: Select a brake to hold a load in position after some other method, such as dynamic braking of the motor, has stopped all rotation.

Given: Weight of load (W) - 5 lb

Drum radius (R) - 2 ft

Service factor (SF) - 1.4



The static holding torque is determined by the weight of the load applied at the drum radius. A service factor is applied to ensure sufficient holding torque is available in the brake.

$$T_S = F \times R \times SF$$
$$= 5 \times 2 \times 1.4$$
$$T_S = 14 \text{ lb-ft}$$

Sizing the Brake to the Inertial Load

For applications where the load data is known, where high inertial loads exist, or where a stop in a specified time or distance is required, the brake should be selected on the basis of the total inertia to be retarded. The total system inertia, reflected to the brake shaft speed, would be:

$$Wk_T^2 = Wk_B^2 + Wk_M^2 + Wk_L^2$$

Where: Wk_T^2 = Total inertia reflected to the brake, lb-ft²
Wk_B^2 = Inertia of brake, lb-ft²
Wk_M^2 = Inertia of motor rotor, lb-ft²
Wk_L^2 = Equivalent inertia of load reflected to brake shaft, lb-ft²

Other significant system inertias, including speed reducers, shafting, pulleys and drums, should also be considered in determining the total inertia the brake would stop.

If any component in the system has a rotational speed different than the rotational speed of the brake, or any linear moving loads are present, such as a conveyor load, their equivalent inertia in terms of rotary inertia at the brake rotational speed must be determined. The following formulas are applicable:

Rotary motion:

$$\text{Equivalent } Wk_B^2 = Wk_L^2 \left(\frac{N_L}{N_B}\right)^2$$

Where,
Equivalent Wk_B^2 = Inertia of rotating load reflected to brake shaft, lb-ft²
Wk_L^2 = Inertia of rotating load, lb-ft²
N_L = Shaft speed at load, rpm
N_B = Shaft speed at brake, rpm

Horizontal Linear Motion

$$\text{Equivalent } Wk_W^2 = W\left(\frac{V}{2\pi N_B}\right)^2$$

Where,
Equivalent Wk_W^2 = Equivalent inertia of linear moving load reflected to brake shaft, lb-ft²
W = Weight of linear moving load, lb
V = Linear velocity of load, ft/min
N_B = Shaft speed at brake, rpm

Once the total system inertia is calculated, the required average dynamic braking torque can be calculated using the formula:

$$T_d = \frac{Wk_T^2 \times N_B}{308 \times t}$$

Where, T_d = Average dynamic braking torque, lb-ft
Wk_T^2 = Total inertia reflected to brake, lb-ft²
N_B = Shaft speed at brake, rpm
t = Desired stopping time, sec
308 = Constant

The calculated dynamic torque is converted to the static torque rating using the relationship:

$$T_s = \frac{T_D}{0.8}$$

Where, T_s = Brake static torque, lb-ft
T_d = System dynamic torque, lb-ft

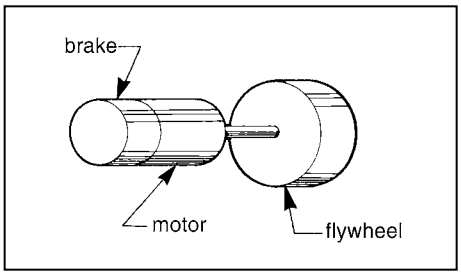
Examples 3, 4, 5 and 6 illustrate how brake torque is determined for non-overhauling loads where rotary or horizontal linear motion is to be stopped.

Example 3: Select a brake to stop a rotating flywheel in a specified time.

Given, Motor speed (N_M) - 1,750 rpm
Motor inertia (Wk_M^2) - 0.075 lb-ft²
Flywheel inertia (Wk_{FW}^2) - 4 lb-ft²
Brake inertia (Wk_B^2) - 0.042 lb-ft²
Required stopping time (t) - 1 sec

First determine the total inertia to be stopped,

$$Wk_T^2 = Wk_M^2 + Wk_{FW}^2 + Wk_B^2$$
$$= 0.075 + 4 + 0.042$$
$$Wk_T^2 = 4.117 \text{ lb-ft}^2$$



The dynamic braking torque required to stop the total inertia in 1 second is,

$$T_d = \frac{Wk_T^2 \times N_{BM}}{308 \times t}$$
$$= \frac{4.117 \times 1{,}750}{308 \times 1}$$
$$T_d = 23.4 \text{ lb-ft}$$

Converting T_d to static torque

$$T_S = \frac{T_d}{0.8}$$
$$= \frac{23.4}{0.8}$$
$$T_S = 29.3 \text{ lb-ft}$$

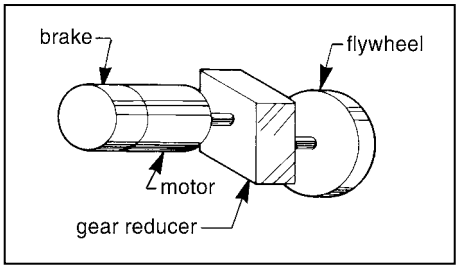
A brake having a standard static torque rating of 35 lb-ft would be selected. Since a brake with more torque than necessary to stop the flywheel in 1 second is selected, the stopping time would be,

$$t = \frac{Wk_T^2 \times N_{BM}}{308 \times T_d}$$
$$= \frac{Wk_T^2 \times N_{BM}}{308 \times (0.8\ T_S)}$$
$$\frac{4.117 \times 1{,}750}{308 \times (0.8 \times 35)}$$
$$t = 0.84 \text{ sec}$$

See section on *Stopping Time* and *Thermal Information.*

Example 4: Select a brake to stop a rotating flywheel, driven through a gear reducer, in a specified time.

Given: Motor speed (N_M) - 1,800 rpm
Motor inertia (Wk_M^2) - 0.075 lb-ft²
Gear reduction (GR) - 20:1
Gear reducer inertia at high speed shaft (Wk_{GR}^2) - 0.025 lb-ft²
Flywheel inertia (Wk_{FW}^2) - 20 lb-ft²
Required stopping time (t) - 0.25 sec



First, determine rotating speed of flywheel (N_{FW})

$$N_{FW} = \frac{N_{BM}}{GR}$$

$$= \frac{1,800}{20}$$

$$N_{FW} = 90 \text{ rpm}$$

Next, the inertia of the flywheel must be reflected back to the motor brake shaft.

$$Wk^2_b = Wk^2_{FW}\left(\frac{N_{FW}}{N_M}\right)^2$$

$$= 20\left(\frac{90}{1,800}\right)^2$$

$$Wk^2_b = 0.05 \text{ lb-ft}^2$$

Determining the total Wk^2,

$$Wk^2_T = Wk^2_M + Wk^2_{GR} + Wk^2_b$$

$$= 0.075 + 0.025 + 0.05$$

$$Wk^2_T = 0.15 \text{ lb-ft}^2$$

The required dynamic torque to stop the flywheel in 0.25 seconds can now be determined.

$$T_d = \frac{Wk^2_T \times N_{BM}}{308 \times t}$$

$$T_d = \frac{0.15 \times 1,800}{308 \times 0.25}$$

$$T_d = 3.5 \text{ lb-ft}$$

Converting dynamic torque to static torque,

$$T_s = \frac{T_d}{0.8}$$

$$= \frac{3.5}{0.8}$$

$$T_s = 4.4 \text{ lb-ft}$$

A brake having a standard static torque rating of 6 lb-ft would be selected. Since a brake with more torque than necessary to stop the flywheel in 0.25 seconds is selected, the stopping time would be,

$$t = \frac{Wk^2_T \times N_M}{308 \times T_d}$$

$$= \frac{Wk^2_T \times N_M}{308 \times (0.8 \times T_s)}$$

$$= \frac{0.15 \times 1,800}{308 \times (0.8 \times 6)}$$

$$t = 0.18 \text{ sec}$$

See section on *Stopping Time* and *Thermal Information*.

Example 5: Select a brake to stop a load on a horizontal belt conveyor in a specified time.

Given:

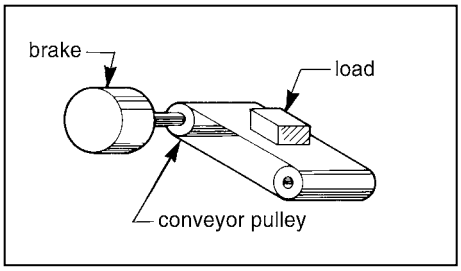
Conveyor pulley speed (N_p) - 32 rpm

Weight of load (W) - 30 lb

Conveyor pulley and belt inertia (Wk^2_p) - 4.0 lb-ft^2

Conveyor pulley diameter (d_p) - 1 ft

Required stopping time (t) - 0.25 sec



First, convert the rotational pulley speed to linear belt speed (V_B).

$$V_B = \pi d_p N_p$$

$$= \pi \times 1 \times 32$$

$$V_B = 100.5 \text{ ft/min}$$

Next, determine inertia of load.

$$Wk^2_W = W\left(\frac{V_B}{2\pi \times N_p}\right)^2$$

$$= 30\left(\frac{100.5}{2\pi \times 32}\right)^2$$

$$Wk^2_W = 7.5 \text{ ft-lb}^2$$

Then, determine total inertial load.

$$Wk^2_T = Wk^2_W + Wk^2_p$$

$$= 7.5 + 4.0$$

$$Wk^2_T = 11.5 \text{ lb-ft}^2$$

The required dynamic torque to stop the conveyor load in 0.25 seconds can now be determined.

$$T_d = \frac{Wk^2_T \times N_p}{308 \times t}$$

$$T_d = \frac{11.5 \times 32}{308 \times 0.25}$$

$$T_d = 4.8 \text{ lb-ft}$$

Converting dynamic torque to static torque,

$$T_S = \frac{T_d}{0.8}$$

$$= \frac{4.8}{0.8}$$

$$T_S = 6 \text{ lb-ft}$$

A brake having a standard static torque rating of 6 lb-ft would be selected. See *Thermal Information.*

Example 6: Select a brake to stop a trolley crane and its load in a specified time. Brake mounted on wheel axle.

Given:

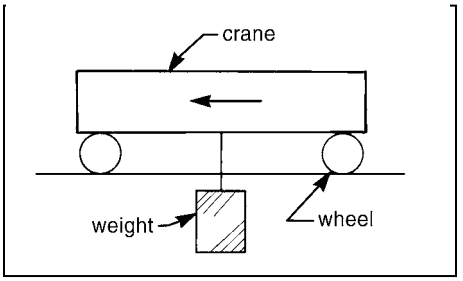
Weight of crane (W_C) - 2,000 lb

Weight of load (W_L) - 100 lb

Trolley velocity (v) - 3 ft/sec or 180 ft/min

Radius of trolley wheel (r) - 0.75 ft

Required stopping time (t) - 2 sec



The dynamic braking torque required to stop the trolley crane and load can be determined by one of two methods. The first method is to determine the equivalent inertia of the linearly moving crane and load, then calculate the dynamic braking torque. The second method is to determine the dynamic braking torque directly.

Using the first method, the total weight to be stopped is determined first.

$$W_T = W_L + W_C$$
$$= 100 + 2{,}000$$
$$W_T = 2{,}100 \text{ lb}$$

Next, the rotational speed of the axle (N_B) is calculated.

$$N_B = \frac{V}{2\pi r}$$
$$= \frac{180}{2 \times \pi \times 0.75}$$
$$N_B = 38.2 \text{ rpm}$$

Then, the equivalent inertia of the linearly moving crane and load is determined.

$$Wk_f^2 = W_T\left(\frac{V}{2\pi N_B}\right)^2$$
$$= 2{,}100\left(\frac{180}{2\pi\ 38.2}\right)^2$$
$$Wk_f^2 = 1{,}181 \text{ lb-ft}^2$$

Finally, the dynamic braking torque required to stop the total inertia in 2 seconds is,

$$T_d = \frac{Wk_f^2 \times N_B}{308 \times t}$$
$$= \frac{1{,}181 \times 38.2}{308 \times 2}$$
$$T_d = 73 \text{ lb-ft}$$

Using the second method, the dynamic braking torque required to stop the crane and load in 2 seconds can be calculated directly using the formula,

$$T_d = \frac{W_T^V}{gt} \times r$$

Where, T_d = Average dynamic braking torque, lb-ft

W_t = Total weight of linear moving load, lb

v = Linear velocity of load, ft/sec

g = Gravitational acceleration constant, 32.2 ft/sec^2

t = Desired stopping time, sec

r = Length of the moment arm (wheel radius), ft

or, for this example,

$$T_d = \frac{2{,}100 \times 3}{32.2 \times 2} \times .75$$
$$T_d = 73 \text{ lb-ft}$$

For both methods above, the required dynamic braking torque is converted to static torque,

$$T_s = \frac{T_d}{0.8}$$
$$= \frac{73}{0.8}$$
$$T_s = 91 \text{ lb-ft}$$

A smaller brake could be mounted on the high speed shaft in place of the higher torque on the low speed shaft.

A brake having a standard static torque rating of 105 lb-ft is selected. Since a brake with more torque than necessary to stop the load in 2 seconds is selected, the stopping time would be,

$$T = \frac{W_T^V}{gT_d} \times r$$
$$= \frac{W_T^V}{g \times (0.8 \times T_s)} \times r$$
$$= \frac{2{,}100 \times 3}{32.2 \times (0.8 \times 105)} \times 0.75$$
$$t = 1.8 \text{ sec}$$

See section on *Stopping Time* and cycle rates, *Thermal Selection.* Stops should be under 2 seconds. Longer stops require application test.

Overhauling Loads

Applications with a descending load, such as power lowered crane, hoist or elevator loads, require a brake with sufficient torque to both *stop* the load, and *hold* it at rest. Overhauling loads having been brought to rest still invite motion of the load due to the effect of gravity. Therefore, brake torque must be larger than the overhauling torque in order to stop and hold the load. If brake torque is equal to or less than the overhauling torque, there is no net torque available for stopping a descending load.

First, the total system inertia reflected to the brake shaft speed must be calculated.

Second, the average dynamic torque required to decelerate the descending load in the required time is calculated with the formula:

$$T_d = \frac{Wk_T^2 \times N_B}{308 \times t}$$

Where, T_d = Average dynamic braking torque, lb-ft

Wk_T^2 = Total inertia reflected to brake, lb-ft^2

N_B = Shaft speed at brake, rpm. Consider motor slip when descending.

t = Desired stopping time, sec

Third, the overhauling torque reflected to the brake shaft is determined by the formula:

$$T_o = W \times R \times \frac{N_L}{N_B}$$

Where, T_o = Overhauling dynamic torque of load reflected to brake shaft, lb-ft

W = Weight of overhauling load, lb

R = Radius of hoist or elevator drum, ft

N_L = Rotating speed of drum, rpm

N_B = Rotating speed at brake, rpm

Or alternately, the dynamic torque to overcome the overhauling load can be calculated with the formula:

$$T_o = \frac{0.158 \times W \times V}{N_B}$$

Where, T_o = Overhauling dynamic torque of load reflected to brake shaft, lb-ft

W = Weight of overhauling load, lb

V = Linear velocity of descending load, ft/min

N_B = Shaft speed at brake, rpm

0.158 = Constant

Next, the total dynamic torque required to stop and hold the overhauling load is the sum of the two calculated dynamic torques:

$$T_t = T_d + T_o$$

Finally, the dynamic torque must be converted to static brake torque to select a brake:

$$T_S = \frac{T_d}{0.8}$$

Where, T_S = Brake static torque, lb-ft

T_t = System dynamic torque, lb-ft

If the total inertia of the system and overhauling load cannot be accurately determined, a brake rated at 180% the motor full load torque should be selected. Refer to *Selection of Service Factor.* The motor starting torque may permit a heavier than rated load to be lifted; the brake must stop the load when descending.

Examples 7, 8 and 9 illustrate how brake torque would be determined for overhauling loads. In these examples brakes are selected using the system data rather than sizing them to the motor. Refer to the section on *Thermal Calculations* to determine cycle rate.

Consider motor slip in calculation. An 1800 rpm motor with 10% slip would operate at 1,620 rpm when the load is ascending and 1,980 rpm when descending. Motor rpm, armature inertia and load position will affect stop time. Brakes on overhauling loads should be wired through a dedicated relay.

Example 7: Select a brake to stop an overhauling load in a specified time.

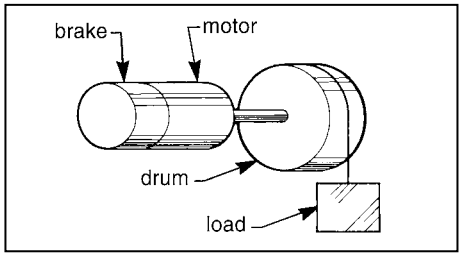
Given: Cable speed (V) - 667 ft/min
Weight of load (W) - 100 lb
Drum diameter (D) - 0.25 ft
Drum inertia (Wk_D^2) - 5 lb-ft^2
Required stopping time (t) -1 sec

First, determine brakemotor shaft speed (N_B).

$$NB = \frac{V}{\pi D}$$

$$= \frac{667}{\pi \times 0.25}$$

$$NB = 849 \text{ rpm}$$



Then, determine the equivalent inertia of the overhauling load.

$$Wk_I^2 = W\left(\frac{V}{2\pi N_B}\right)^2$$

$$= 100\left(\frac{667}{2\pi \times 849}\right)^2$$

$$Wk_I^2 = 1.56 \text{ lb-ft}^2$$

Therefore, the total inertia at the brake is,

$$Wk_T^2 = Wk_D^2 + Wk_I^2$$

$$= 5 + 1.56$$

$$Wk_T^2 = 6.56 \text{ lb-ft}^2$$

Now, the dynamic torque required to decelerate the load and drum in the required time is calculated.

$$T_d = Wk_T^2 \times N_B$$

$$= \frac{6.56 \times 850}{308 \times 1}$$

$$T_d = 18.1 \text{ lb-ft}$$

Next, calculate the dynamic torque required to overcome the overhauling load.

$$T_O = W \times R$$

$$= 100 \times \frac{0.25}{2}$$

$$T_O = 12.5 \text{ lb-ft}$$

The total dynamic torque to stop and hold the overhauling load is the sum of the two calculated dynamic torques.

$$T_t = T_d + T_O$$

$$= 18.1 + 12.5$$

$$T_t = 30.6 \text{ lb-ft}$$

Dynamic torque is then converted to static torque.

$$T_s = \frac{T_t}{0.8}$$

$$= \frac{30.6}{0.8}$$

$$T_s = 38.3 \text{ lb-ft}$$

A brake having a standard torque rating of 50 lb-ft is selected based on expected stop time. Since a brake with more torque than necessary to stop the load in 1 second is selected, the stopping time would be,

$$t = \frac{WK_T^2 \times N}{308 \times T_d}$$

where, $T_s = \frac{T_t}{0.8}$

$$= \frac{T_d + T_O}{0.8}$$

or, $T_d = 0.8T_S - T_O$

$$= (0.8)\ (50) - 12.5$$

$$T_d = 27.5 \text{ lb-ft}$$

therefore, $t = \frac{6.56 \times 850}{308 \times 27.5}$

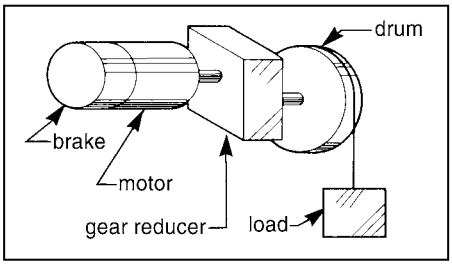
$$t = 0.7 \text{ sec}$$

Wire the brake through a dedicated relay on overhauling loads where stop time or distance is critical. See section on *Stopping time*.

Example 8: Select a brake to stop an overhauling load driven through gear reducer in a specified time.

Given: Motor speed (N_M) - 1,150 rpm
Motor inertia (WK_M^2) - 0.65 lb-ft^2
Gear reduction (GR) - 300:1
Drum diameter (D) - 1.58 ft
Weight of load (W) - 4,940 lb
Drum inertia (WK_D^2) - 600 lb-ft^2
Required stopping time (t) - 0.5 sec

First, calculate all inertial loads reflected to the brakemotor shaft.



The rotational speed of the drum is,

$$N_D = \frac{N_M}{GR}$$

$$= \frac{1,150}{300}$$

$$N_D = 3.83 \text{ rpm}$$

From this, the cable speed can be determined.

$$V = N_D \times \pi D$$

$$= 3.83 \times \pi \times 1.58$$

$$V = 19.0 \text{ ft/min}$$

The equivalent inertia of the load reflected to the brakemotor shaft is,

$$Wk_I^2 = W\left(\frac{V}{2\pi N_{BM}}\right)^2$$

$$= 4,940\left(\frac{19.0}{2\pi\ 1,150}\right)^2$$

$$Wk_I^2 = 0.034 \text{ lb-ft}^2$$

The equivalent inertia of the drum at the brakemotor shaft speed is,

$$Wk_d^2 = Wk_D^2\left(\frac{N_D}{N_{BM}}\right)^2$$

$$= 600\left(\frac{3.83}{1,150}\right)^2$$

Finally, the total inertia the brake will retard is,

$$Wk_T^2 = Wk_M^2 + Wk_T^2 + Wk_d^2$$

$$Wk_T^d = .0067 \text{ lb-ft}^2$$

$$Wk_T^2 = 0.691 \text{ lb-ft}^2$$

The dynamic torque required to decelerate the total inertia is,

$$T_d = \frac{Wk_T^2 \times N_{BM}}{308 \times t}$$

$$= \frac{0.691 \times 1,150}{308 \times 0.5}$$

$$T_d = 5.16 \text{ lb-ft}^2$$

Now, calculate the dynamic torque to overcome the overhauling load.

$$T_O = W \times R = W \times ½D$$

$$= 4,940 \times \frac{1.58}{2}$$

$$T_O = 3,903 \text{ lb-ft}$$

Which reflected to the brakemotor shaft becomes,

$$T_m = \frac{T_O}{GR}$$

$$= \frac{3,903}{300}$$

$$T_m = 13.0 \text{ lb-ft}$$

Then, the total dynamic torque to stop and hold the overhauling load is the sum of the two calculated dynamic torques.

$$T_t = T_d + T_m$$

$$= 5.16 + 13.0$$

$$T_t = 18.16 \text{ lb-ft}$$

Dynamic torque is then converted to static torque.

$$T_S = \frac{T_t}{0.8}$$

$$= \frac{18.16}{0.8}$$

$$T_S = 22.7 \text{ lb-ft}$$

A brake having a standard torque rating of 25 lb-ft is selected.

Example 9: Select a brake to stop and hold a load on an inclined plane (skip hoist).

Given: Motor data

Power (P) - 7½ hp

Speed (N_M) - 1,165 rpm

Rotor inertia (WK_M^2) - 1.4 lb-ft²

Gear reducer data:

Reduction (G_R) - 110:1

Inertia at input shaft (Wk_R^2) - 0.2 lb-ft²

Drum data

Diameter (D_D) - 1.5 ft

Inertia (Wk_D^2) - 75 lb-ft²

Pulley data

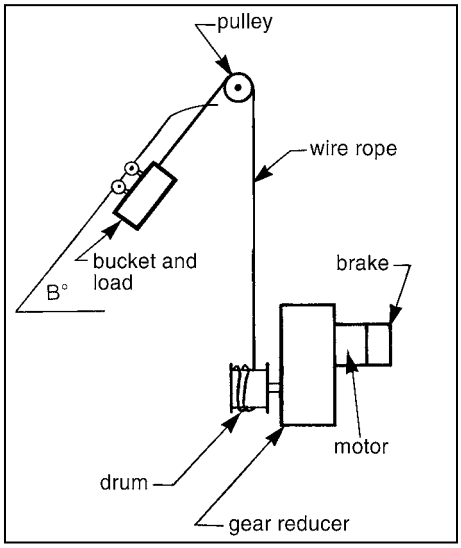
Diameter (D_P) - 1.5 ft

Inertia (Wk_P^2) - 20 lb-ft²

Bucket weight (W_B) - 700 lb

Maximum weight of load (W_L) - 4,000 lb

Slope of track (B) -52.7°



Required stopping time (t) -1 sec

The bucket is full when ascending the track and is empty when descending. When selecting a brake the most severe condition would be a fully loaded bucket backed down the hoist track. In normal operation the descending bucket would be empty. In this example, the brake is selected for the most severe condition.

The total torque to stop and hold the bucket and load when descending is the sum of (a) the torque to decelerate the total inertia and (b) the torque required to hold the loaded bucket.

First, calculate all inertial loads reflected to the brakemotor shaft. The rotational speed of the drum is:

$$N_D = \frac{N_M}{GR}$$

$$= \frac{1,165}{110}$$

$$N_D = 10.6 \text{ rpm}$$

From this the cable speed can be determined

$$V = N_D \times \pi D_D$$

$$= 10.6 \times \pi \times 1.5$$

$$V = 50 \text{ ft/min}$$

The equivalent inertia of the loaded bucket reflected to the brakemotor shaft is,

$$Wk_T^2 = W\left(\frac{V}{2\pi N_M}\right)^2$$

$$= 4,700\left(\frac{50}{2\pi \times 1,165}\right)^2$$

$$Wk_T^2 = 0.219 \text{ lb-ft}^2$$

Next, the inertia of the pulley and drum are reflected to the brake motor shaft speed so the total inertia at the brake can be determined.
Since the diameters of the pulley and drum are the same, 1.5 ft, their rotational speeds would be the same, 10.6 rpm.

The inertia of the pulley reflected to the brakemotor shaft is,

$$Wk_p^2 = Wk_p^2\left(\frac{N_D}{N_M}\right)^2 = Wk_p^2\left(\frac{1}{GR}\right)^2$$

$$= 20 \times \left(\frac{1}{110}\right)^2$$

$$Wk_p^2 = 0.0017 \text{ lb-ft}^2$$

The inertia of the drum reflected to the brakemotor shaft is,

$$Wk_d^2 = Wk_D^2\left(\frac{N_D}{N_M}\right)^2 = Wk_D^2\left(\frac{1}{GR}\right)^2$$

$$= 75 \times \left(\frac{1}{110}\right)^2$$

$$Wk_d^2 = 0.0062 \text{ lb-ft}^2$$

The total inertia to be stopped is,

$$Wk_T^2 = Wk_T^2 + Wk_p^2 + Wk_d^2 + Wk_R^2 + Wk_M^2$$

$$= 0.219 + 0.0017 + 0.0062 + 0.2 + 1.4$$

$$Wk_T^2 = 1.827 \text{ lb-ft}$$

Then, the dynamic torque required to bring the descending bucket and load to rest is,

$$T_d = \frac{Wk_T^2 \times N_M}{308 \times T_d}$$

$$T_d = \frac{1.827 \times 1,165}{308 \times 1}$$

The additional dynamic torque required to hold the overhauling load would be determined by the unbalanced component of the force acting along the plane of the hoist track, $W_T \sin B$, and the length of the moment arm which is the drum radius (R_D). $W_T \sin B$ is the force necessary to retard downward motion of the loaded hoist bucket.

$$T_O = W_T \sin B \times R_D$$
$$= W_T \sin B \times \tfrac{1}{2} D_D$$
$$= 4{,}700 \times \sin 52.7^\circ \times \tfrac{1}{2}(1.5)$$
$$= 4{,}700 \times 0.7955 \times 0.75$$
$$T_O = 2{,}804 \text{ lb-ft}$$

Which reflected to the brakemotor shaft becomes,

$$T_m = \frac{T_O}{GR}$$
$$= \frac{2{,}804}{110}$$
$$T_m = 25.5 \text{ lb-ft}$$

Then, the total dynamic torque to stop and hold the descending bucket and load is the sum of the two calculated dynamic torques.

$$T_t = T_d + T_m$$
$$= 6.9 + 25.5$$
$$T_t = 32.4 \text{ lb-ft}$$

Converting to static torque,

$$T_S = \frac{T_t}{0.8}$$
$$= \frac{32.4}{0.8}$$
$$T_S = 40.5 \text{ lb-ft}$$

A brake having a standard torque rating of 50 lb-ft is selected. Since a brake with more torque than necessary to stop the load in 1 second is selected, the stopping time would be,

$$t = \frac{W_f^2 \times N_M}{308 \times T_d}$$

Where, $T_S = \dfrac{T_t}{0.8}$

$$= \frac{T_d + T_m}{0.8}$$

or, $T_d = 0.8 T_S - T_m$

$$= (0.8)(50) - 25.5$$
$$T_d = 14.5 \text{ lb-ft}$$

therefore,

$$t = \frac{1.827 \times 1{,}165}{308 \times 14.5}$$
$$t = 0.48 \text{ sec}$$

See section on *Stopping time.*

Stopping Time and Deceleration Rate

In the formulas used to determine dynamic torque, stopping time or "t" in seconds is a desired or assumed value selected on the requirements of the application. For optimum brake performance, a stopping or braking time of 1 second or less is desirable. Stop times between 2 and 3 seconds require test. *A brake of insufficient torque rating will lengthen the stopping time. This may result in overheating of the brake to a point where torque falls appreciably. The friction material could carbonize, glaze, or fail.*

After determining the braking torque required by a system, it may be necessary to recalculate the stopping time based on the actual brake size selected to insure that stopping time falls within the 0 to 2 second range. Any formula, where the stopping time is a variable, may be rewritten to solve for the new stopping time. For instance, the dynamic torque equation may be transposed as follows:

$$T_d = \frac{Wk_f^2 \times N_B}{308 \times t}$$

or, $$t = \frac{Wk_f^2 \times N_B}{308 \times (0.8 \times T_S)}$$

Where, t = Stopping time, sec

Wk_f^2 = Total inertia reflected to brake, lb-ft^2

N_B = Shaft speed at brake, rpm

T_S = Nominal static torque rating of brake, lb-ft

T_d = Dynamic braking torque ($0.8 \times T_S$), lb-ft

0.8 = Constant (derating factor)

308 = Constant

Brakes are rated in static torque. This value is converted to dynamic torque, as done in the above equation, when stopping time is calculated. That is,

$$T_d = 0.8 \times T_S$$

Where, T_d = Dynamic braking torque, lb-ft

T_S = Nominal static torque rating of brake, lb-ft

The approximate number of revolutions the brake shaft makes when stopping is:

$$\text{Revolutions to stop} = \frac{t \times N_B}{120}$$

Where, t = Stopping time, sec

N_B = Shaft speed at brake, rpm

120 = Constant

The average rate of deceleration when braking a linearly moving load to rest can be calculated using the stopping time determined by the above formula and the initial linear velocity of the load.

$$a = -\frac{V_i}{t}$$

Where, a = Deceleration, ft/sec^2

V_i = Initial linear velocity of load, ft/sec

t = Stopping time, sec

RPM Considerations

The maximum allowable rotational speed of the brake should not be exceeded in braking. Maximum brake rpm as listed in the catalog is intended to limit stopping time to 2 seconds or less and insure friction disc stability. Brakes are not dynamically balanced because of the low brake inertia.

Determining Required Thermal Capacity

Thermal Ratings

When a brake stops a load, it converts mechanical energy to thermal energy or heat. The heat is absorbed by components of the brake. This heat is then dissipated by the brake. The ability of a given brake to absorb and dissipate heat without exceeding temperature limitations is known as thermal capacity.

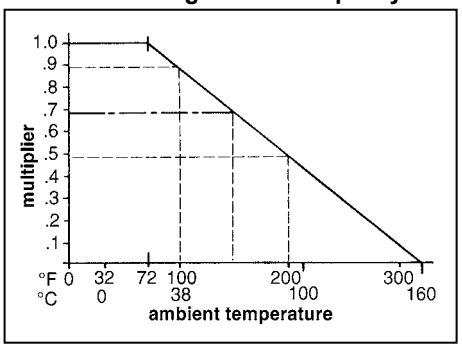
There are two categories of thermal capacity for a brake. The first is the *maximum* energy the brake can absorb in one stop, generally referred to as a "crash" or "emergency" stop. The second is the heat dissipation capability of the brake when it is cycled frequently. *To achieve optimum brake performance, the thermal rating should not be exceeded. They are specified for a predetermined maximum temperature rise of the brake friction material.*

The ability of a brake to absorb and dissipate heat is determined by many factors, including the design of the brake, the ambient temperature, brake enclosure, position of the brake, the surface that the brake is mounted to, and the altitude.

The rating for a given brake is the maximum allowable. Longer brake life results when the brake has more thermal capacity than a power transmission requires. Much shorter life or brake failure will result when the thermal capacity rating is exceeded. Ratings are determined at an ambient temperature of 72°F *(22°C)*, with the brake in a horizontal position, with a stopping time of 1 second or less, and with no external heat source such as a motor.

Ambient temperature will limit the thermal capacity of a brake. Temperatures above 72°F *(22°C)* require derating of the thermal capacity rating. For example, at 150°F, thermal capacity is reduced approximately 30% (see *Derating Thermal Capacity Chart*).

CHART: Derating Thermal Capacity



A temperature range of 20°F *(-7°C)* to 104°F *(40°C)* is acceptable in most brake applications. Above 104°F also consider Class H coil insulation.

Thermal capacity ratings are determined with enclosures on the brake. Other customer furnished covers or cowls may affect a brake's thermal capacity. The effect on thermal capacity should be evaluated. In some cases, thermal capacity may be increased by use of air or liquid cooling. However, provisions must be made to prevent contaminating the brake internally.

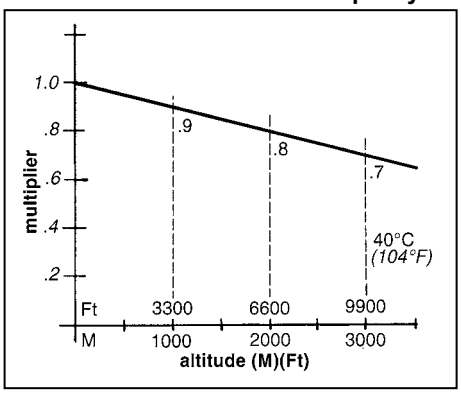
Brakes with brass stationary discs are derated 25%.

The mounting position of a brake will also affect thermal capacity. The specified ratings are for brakes mounted in a horizontal position with the solenoid plunger above the solenoid. For brakes mounted in a vertical position, or 15° or more from horizontal, the thermal capacity decreases due to friction disc drag. Brakes are modified for vertical operation to minimize the drag. 2- and 3- disc brakes are derated 25%, 4-disc brakes are derated 33%. 4- and 5-disc brakes are not recommended for vertical use.

Thermal capacity ratings are established without external sources of heat increasing the brake temperature. The surface that a brake is mounted to, such as an electric motor or gear reducer, will limit the heat dissipation capability or thermal capacity of a brake. These sources of heat should be evaluated when determining the thermal requirements of the system for which the brake is selected.

High altitudes may also affect a brake's thermal capacity. Stearns brakes will operate to 10,000 ft above sea level at 72°F *(22°C)* ambient temperature. At 104°F *(40°C)* ambient temperature, altitude and temperature adjustments occur. Refer to *NEMA MG1-1993 Section 14 for additional information.*

CHART: Altitude & Thermal Capacity



Maximum Energy Absorption

The thermal capacity of a brake is limited by the maximum energy it can absorb in one stop. This factor is important when stopping extremely high inertial loads at infrequent intervals. Such use of a brake requires extensive cooling time before it can be operated again.

The energy a brake is required to absorb in one stop by a given power transmission system is determined by the formulas below. *The calculated energy of the system should not exceed the maximum kinetic energy rating of the brake. System energy exceeding the brake's maximum rating may result in overheating of the brake to a point where torque falls appreciably. The friction material of the brake could glaze, carbonize or fail.*

In the case of linear loads, the energy that the brake must absorb is kinetic energy. It is determined by the formula:

$$KE_I = \frac{W_V^2}{2g}$$

KE_I = Kinetic energy of linear moving load, lb-ft

W = Weight of load, lb

v = Linear velocity of load, ft/sec

g = Gravitational acceleration constant, 32.2 ft/sec^2

In the case of rotational loads, the energy that the brake must absorb is also kinetic energy. It is determined by the formula:

$$KE_r = \frac{Wk_r^2 \times N_B^2}{5875}$$

Where, KE_r = Kinetic energy of linear load, lb-ft

Wk_r^2 = Inertia of the rotating load reflected to brake shaft, lb-ft^2

N_B = Shaft speed at brake, rpm

5875 = Constant

In the case of overhauling loads, both the kinetic energy of the linear and rotating loads and the potential energy transformed into kinetic energy by the change in height or position must be considered when determining the total energy that the brake must absorb. The potential energy transformed to kinetic energy is determined by the formula:

$$PE = W_s$$

Where, PE = Change in potential energy, ft-lb

W = Weight of overhauling load, lb

s = Distance load travels, ft

Thus, the total energy to be absorbed by a brake stoping an overhauling load is:

$$E_T = KE_I + KE_r + PE$$

Example 10 illustrates how energy absorption for Example 8 would be determined for one stop.

Example 10: Determine the total energy absorbed by a brake in one stop.

In Example 8, the calculation for total energy to be absorbed would be as follows.

First, calculate the kinetic energy of the linear load. The load weight was 4,940 lb and the velocity is 19 ft/min or 0.317 ft/sec. The kinetic energy is:

$$KE_I = \frac{W_V^2}{2g}$$

$$= \frac{4{,}940 \times 0.317^2}{2 \times 32.2}$$

KE_I = 7.71 ft-lb

Next, calculate the kinetic energy for the rotational load. The motor inertia is 0.65 lb-ft^2 and the drum inertia reflected to the brake shaft speed is 0.0067 lb-ft^2. The total rotational inertia at the brakemotor shaft is,

$$Wk_r^2 = Wk_M^2 + Wk_d^2$$
$$= 0.65 + 0.0067$$
$$Wk_r^2 = 0.6567 \text{ lb-ft}^2$$

And the kinetic energy of the rotating components is,

$$KE_r = \frac{Wk_r^2 \times N_B^2}{5{,}875}$$
$$= \frac{0.6567 \times 1{,}150^2}{5{,}875}$$
$$KE_I = 147.8 \text{ ft-lb}$$

Now, calculate the potential energy converted to kinetic energy due to the change in position of the load while descending. A descending load is the most severe case since potential energy is transformed to kinetic energy that the brake must absorb. A 25 lb-ft brake was selected in Example 8. The 25 lb-ft static torque rating is converted to dymanic torque,

$$T_t = T_S \times 0.8$$
$$= 25 \times 0.8$$
$$T_t = 20 \text{ lb-ft}$$

Of this torque, 13.0 lb-ft is required to overcome the overhauling load as determined in Example 8. The dynamic torque available to decelerate the load is,

$$T_d = T_t - T_m$$
$$= 20 - 13$$
$$T_d = 7 \text{ lb-ft}$$

The stopping time resulting from this dynamic torque is,

$$t = \frac{Wk_r^2 \times N_M}{308 \times T_d}$$
$$= \frac{0.691 \times 1{,}150}{308 \times 7}$$
$$t = 0.369 \text{ sec}$$

Where, $Wk_r^2 = 0.690$ lb-ft^2 is the total inertia the brake is to retard as determined in Example 8. With the load traveling at 19.0 ft/min or 0.317 ft/sec, the distance it will travel is,

$$s = \tfrac{1}{2} vt$$
$$= \tfrac{1}{2} \times 0.317 \times 0.369$$
$$s = 0.059 \text{ lb-ft}$$

Wire the brake through a dedicated relay on overhauling loads where stop time or distance is critical. The potential energy transformed to kinetic energy in this distance would be,

$$PE = W_S$$
$$= 4{,}940 \times 0.059$$
$$PE = 291 \text{ ft-lb}$$

Thus, the total energy to be absorbed by the brake would be,

$$E_T = KE_I + KE_r + PE$$
$$= 7.71 + 147.8 + 291$$
$$E_T = 447 \text{ lb-ft}$$

The 25 lb-ft brake selected in Example 8 should be capable of absorbing 447 ft-lb of energy. The brake's maximum kinetic energy absorption rating should exceed this value.

Motor slip and test loads (150% of load) should be considered both in sizing and thermal calculations.

Brakes overheated in testing will require inspection before using in the standard application.

Heat dissipation in cyclic applications

In general, a brake will repetitively stop a load at the duty cycle that a standard electric motor can repetitively start the load. A brake's thermal capacity is based upon the heat it can absorb and dissipate while cycling. The thermal capacity ratings for brakes are listed in the specification tables for specific brake models.

The energy that a brake is required to absorb and dissipate by a given power transmission system is determined from the total inertia of the load and system, the rotating or linear speed of the load, and the number of times the load is to be stopped in a given time period. The rate of energy dissipation is expressed in horsepower seconds per minute (hp-sec/min). Other common units for energy rates, such as foot pounds per second (ft-lb/sec), can be converted to hp-sec/min using the conversion factors given in the *Technical Data* section.

Refer to the Thermal Capacity Chart for use above 104°F *(40°C)* ambient temperature.

For applications demanding optimum brake performance, such as high inertial loads and frequent stops, the rate of energy dissipation required by the system is determined using the following formulas. *The calculated rate of energy dissipation should not exceed the thermal capacity of the brake. Thermal dissipation requirements exceeding the brake's rating may result in overheating of the brake to a point where torque falls appreciably. The friction material of the brake could glaze, carbonize or fail.*

For rotating or linear loads, the rate at which a brake is required to absorb and dissipate heat when frequently cycled is determined by the relationship:

$$TC = \frac{Wk_T^2 \times N_B^2 \times n}{3.2 \times 10^6}$$

Where, TC = Thermal capacity required for rotating or linear loads hp-sec/min

Wk_T^2 = Total system inertia reflected to brake, lb-ft^2

N_B = Shaft speed at brake, rpm

n = Number of stops per minute, not less than 1

3.2×10^6 = Constant

The rotating speed enters the formula as a squared function. Therefore, thermal requirements are of particular significance in systems where the brake will be operated at high speeds.

$$TC = \frac{E_T \times n}{550}$$

Where, TC = Thermal capacity required for overhauling loads hp-sec/min

E_T = Total energy brake absorbs, ft-lb

n = Number of stops per minute, not less than 1

550 = Constant

For overhauling loads, the rate at which a brake is required to absorb and dissipate heat when frequently cycled is determined by the relationship:

Example 11 illustrates how the required thermal capacity would be determined for Example 4.

Example 11: Determine the thermal capacity required to stop a rotating load frequently.

Referring back to Example 4, the flywheel will be stopped 20 times per minute. The required thermal capacity of the 6 lb-ft brake selected in this example is determined as follows.

The total inertial load the brake is to retard is 0.15 lb-ft^2. The shaft speed of the brake motor is 1,800 rpm. Therefore, the required thermal capacity is,

$$TC = \frac{Wk_T^2 \times N_M^2 \times n}{3.2 \times 10^6}$$
$$= \frac{0.15 \times 1{,}800^2 \times 20}{3.2 \times 10^6}$$
$$TC = 3.0 \text{ hp-sec/min}$$

The 6 lb-ft brake selected in Example 4 should have a thermal capacity rating equal to or greater than 3.0 hp-sec/min.

A brake with greater thermal capacity will result in greater wear life.

If productivity is to be improved in Example 4 by increasing the cycle rate, the maximum number of stops per minute is determined by the rated thermal capacity of the brake. If the 6 lb-ft brake selected in Example 4 has rated thermal capacity of 9 hp-sec/min, the maximum permissible stops per minute would be determined by transposing the above formula to,

$$n_{max} = \frac{TC_{rated} \times (3.2 \times 10^6)}{Wk^2_t \times N^2_M}$$

$$= \frac{9 \times (3.2 \times 10^6)}{0.15 \times 1{,}800^2}$$

$$n_{max} = 59 \text{ stops/min}$$

So, the brake could be operated up to 36 times per minute without exceeding its ability to absorb and dissipate the heat generated by the frequent stops and meet the maximum solenoid cycle rating. *Cycle rate cannot exceed the solenoid cycle rate appearing in the catalog.*

Electrical Considerations

Please see page 118.

Environmental Considerations

Brakes with standard open enclosures when mounted on NEMA C-face motors are drip-proof, except where a manual release lever has a clearance opening in the housing. The standard enclosure is commonly used on open, drip-proof and enclosed motors operating indoors or in protected outdoor environments.

NEMA 4, IP 54 enclosures are available on most brake models and are commonly used for outdoor installations, or where there are moist, abrasive or dusty environments. Standard and severe duty NEMA 4 enclosures are available in some brake series.

Brakes of various styles and materials for above or below deck on ships and dockside installation are available. The materials are usually specified by the ship designers or Navy specification MIL-B-16392C. Brakes are also available to meet MIL-E-17807B for shipboard weapon and cargo elevators. Refer to *Marine, Maritime and Navy Catalog* pages.

Brakes Listed by Underwriters Laboratories, Inc. and certified by Canadian Standards Association are available for use in hazardous locations, including Class I, Groups C and D; and Class II, Groups E, F and G. *Motor-mounted*, hazardous-location electric disc brakes are listed only when mounted to a Listed hazardous-location motor of the same Class and Group at the motor manufacturer's facility, and where the combination has been accepted by UL or CSA. This procedure completes the hazardous duty assembly of the brake. However, foot-mounted hazardous-location disc brakes that are Listed are also available for coupling to a motor, and may be installed by anyone.

Hazardous-location brakes are *not* gasketed unless indicated in the brake description. The enclosure prevents flame propagation to the outside atmosphere through controlled clearances. Protection from weather and washdowns must be provided. If the brake is used in a high humidity or low temperature environment, internal electric heaters should be used.

Standard ambient temperature range for brake operation is from 20°F *(-7°C)* to 104°F *(40°C)*. Refer to *Thermal Ratings* section for brake operation at higher ambient temperatures. Heaters may be available for brake operation at low ambient temperatures and high humidity environments. Ductile iron construction and heaters are recommended for prolonged cold climate use.

Conclusion

The spring-set, electrically released disc brake is an important accessory to electric motors used in cycling and holding operations. It is available in a wide variety of enclosures. In most applications, a brake requires no additional wiring, controls or auxiliary electrical equipment. It is simple to maintain since the replaceable items, the friction discs, can be easily changed.

Many spring-set motor brakes are equipped with features such as simple wear adjustment to provide optimum friction disc life, visual wear indicator, torque adjustment and manual release. Featured on some types of brakes is automatic adjustment to compensate for friction disc wear. This feature eliminates the need for periodic adjustment and is advantageous in remote or inaccessible locations. Not all of the brakes on the market provide all of these features, but there are many Stearns motor brakes offering these features.

Care should be exercised in properly selecting a brake giving due consideration to torque as well as environment and thermal requirements. On applications where all the pertinent information is not available, selection must be based on previous experience of the designer and user, as well as the brake manufacturer, and should be confirmed by tests under actual operating conditions. If the brake is selected with reasonable allowances made for extremes in operating conditions, it will perform its task with little attention or maintenance.

Formulas

The following formulas cover the basic calculations used in brake application engineering.

Required	Given	Formula
Full load motor torque (T_{flmt}), lb-ft	Horsepower (P), hp Shaft speed (N), rpm 5252 = Constant	$T_{flmt} = \frac{5252 \times P}{N}$
Average dynamic braking torque (T_d), lb-ft	Total inertia reflected to brake (Wk^2), lb-ft^2 Shaft speed at brake (N), rpm Desired stopping time (t), seconds 308 = Constant	$T_d = \frac{Wk^2 \times N}{308 \times T}$
Static torque (T), lb-ft	Force (F), lb Pulley or drum radius, (R), ft	$T = F \times R$
Overhauling dynamic torque reflected to brake shaft (T_o), lb-ft	Weight of overhauling load (W), lb Linear velocity of descending load (V), ft/min Shaft speed at brake (N), rpm 0.158 = Constant	$T_o = \frac{0.158 \times W \times V}{N}$.
Static torque of brake (T_s), lb-ft (General Guideline)	Dynamic braking torque required (T_d), lb-ft 0.8 = Constant (derating factor)	$T_s = \frac{Td}{0.8}$
Inertia of rotating load reflected to brake shaft (Wk_b^2), lb-ft^2	Inertia of rotating load (Wk_L^2), lb-ft^2 Shaft speed at load (N_L), rpm Shaft speed at brake (N_B), rpm	Equivalent $Wk_b^2 = Wk_L^2\left(\frac{N_L}{N_B}\right)^2$
Equivalent inertia of linear moving load reflected to brake shaft (Wk_w^2), lb-ft^2	Weight of linear moving load (W), lb Linear velocity of load (V), ft/min Shaft speed at brake (N_B), rpm 2 = Constant	Equivalent $Wk_w^2 = W\left(\frac{V}{2\pi N_B}\right)^2$
Kinetic energy of rotating load, (KE_r), ft-lb	Inertia of rotating load reflected to brake shaft (Wk_b^2), lb-ft^2 Shaft speed at brake (N_B), rpm 5875 = Constant	$KE_r = \frac{Wk_b^2 \times N_B^2}{5875}$
Kinetic energy of linear moving load (KE_I), ft-lb	Weight of load (W), lb Linear velocity of load (v), ft/sec g = Gravitational acceleration constant, 32.2 ft/sec^2	$KE_I = \frac{Wv^2}{2g}$
Change in potential energy (PE), ft-lb	Weight of overhauling load (W), lb Distance load travels (s), ft	$PE = Ws$
Total energy absorbed by brake (E_T), ft-lb	Total linear kinetic energy, (KE_L), ft-lb Total rotary kinetic energy (KE_R), ft-lb Potential energy converted to kinetic energy (PE), ft-lb	$E_T = KE_L + KE_R + PE$
Thermal capacity required for rotational or linear moving loads (TC), hp-sec/min	Total system inertia reflected to brake shaft (Wk_T^2), lb-ft^2 Shaft speed at brake (N_B), rpm Number of stops per minute (n), not less than one 3.2 x 10^6 = Constant	$TC = \frac{Wk_T^2 \times N_B^2 \times n}{3.2 \times 10^6}$
Thermal capacity required for overhauling loads (TC), hp-sec/min	Total energy brake absorbs (E_T), ft-lb Number of stops per minute (n), not less than one 550 = Constant	$TC = \frac{E_T \times n}{550}$
Linear velocity, ft/min	N = rpm Diameter (D), ft	$V = N\pi D$

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