

# 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	No. of Friction Discs	Coil Size	Maximum Solenoid Cycle Rate <sup>①</sup>	Thermal Capacity <sup>②</sup>	Inertia (Wk <sup>2</sup> )			
					hp-sec/min (watts)	lb-ft <sup>2</sup> (kgm <sup>2</sup> x 10 <sup>-4</sup> )		
						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)	.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					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	.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. Adder below*	— (—)
			5-55-7043-00 List \$1,300.00	.56 (14.22)
284TC 286TC	10.50 (266.70)	-11	5-55-7055-00 List \$450.00	.81 (20.64)
metric	—	-10	Endplate modified for 130mm register (AK) & 165mm bolt circle (AJ). Add: Brake w/aluminum endplate \$725.00 includes adder for cast iron endplate. Brake with cast iron endplate: \$340.00	—
324TC, 326TC, 364TC, 365TC, 404TC or 405TC	12.50 (317.50)	-13	5-55-7046-00 List \$875.00	.88 (22.22)
	—	-07	Endplate modified to provide a 6.75" male register (AK) and 7.19" bolt circle (AJ). Adder below*	—
182TC/184TC, 213TC, 215TC, 254TC/256TC	8.5 (215.90)	-03	Extended endplate. Adder below*	.625 (15.88)

\*Brakes with aluminum endplate: \$725.00 (includes adder for cast iron endplate)

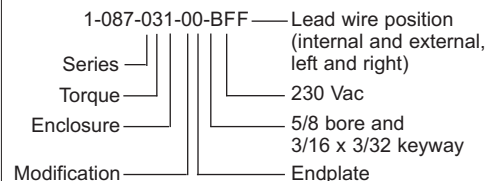
\*Brakes with cast iron endplate: \$340

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:



### 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

### 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	115/230	60
Q	230/460	60
	190/380	50
R	200/400	60

Maximum allowable bore 1.875. For thru-shaft applications 1.625 is maximum.

\*These bores are non-standard. Add \$250.00 to list price.

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

### Direct Current

Character	Voltage
T	12
U	24
V	36
W	48
X	95
Y	115
Z	230

Consult factory if other DC voltage is needed.

**Modifications are available—see SAB Modification Section**

Dimensional drawings are on the pages following.

# 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 and list price adders.

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.

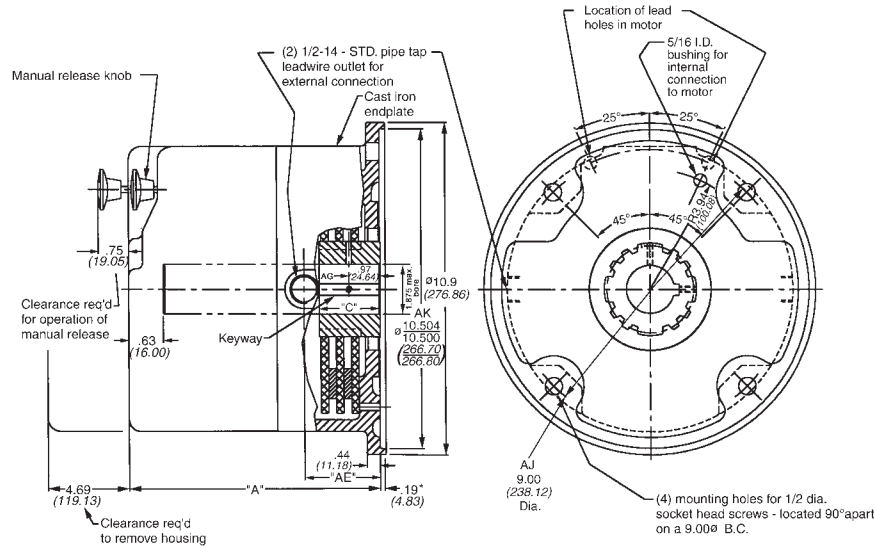
**Specifications including bore sizes/voltages:** Page 17

**Modifications:** Pages 51-60 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 98):

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/Unit Pricing (Discount Symbol B3)

Nominal Static Torque (lb-ft) (Nm)	Enclosure	Basic Model Number and List Price*				Dimensions in Inches (Dimensions in Millimeters)				Wt. lbs (kg)
		AC	AC List Price*	DC	DC List Price*	A	AE	AG	C	
50	IP 23	1-087-151-00	\$1,600.00	1-087-155-00	\$2,170.00	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	2,200.00	1-087-156-00	2,770.00	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	2,100.00	1-087-165-00	2,670.00	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	2,700.00	1-087-166-00	3,270.00	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	2,800.00	1-087-185-00	3,370.00	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	3,400.00	1-087-186-00	3,970.00	8.44 (214.31)	2.69 (68.26)	.97 (24.64)	2.00 (50.80)	58 (26.3)
125'	IP 23	1-087-191-00	3,300.00	1-087-195-00	3,870.00	8.25 (209.55)	2.69 (68.26)	.97 (24.64)	2.00 (50.80)	46 (19.0)
125'	IP 54	1-087-192-00	3,900.00	1-087-196-00	4,470.00	8.44 (214.31)	2.69 (68.26)	.97 (24.64)	2.00 (50.80)	58 (26.3)

\* Subtract \$45.00 for brake ordered less hub.

<sup>1</sup> 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).

# SELECTION - Solenoid Actuated Brakes

**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	750	500	440	*	*
125	—	1000	1000	750	500	*	*
150	—	—	1000	750	500	*	*
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
<b>Manually-Adjusted Brakes (require periodic adjustment to compensate for friction disc wear)</b>													
1.5-6	48,100	①											
1.5-25	56,X00		①										
10-25	56,500			①		②							
<b>Self-Adjusting Brakes (automatically compensate for friction disc wear)</b>													
6-105	87,X00			③		①		①		②		②	
50-105	87,100					①		①		②		②	
125-230	81,000					②		②		①		①	
125-440	82,000					②		②		①		①	
500-1000	86,000					②		②		②		②	
500-1000	86,100												①
<b>Division I Hazardous Location Brakes (for atmospheres containing explosive gases or ignitable dusts) / Motor Mounted</b>													
1.5-15	65,300		①	①		②		②		②		②	
10-105	87,300					①		①		②		②	
125-330	82,300					②		②		①		①	②
<b>Division I Hazardous Location Brakes (for atmospheres containing explosive gases or ignitable dusts) / Foot Mounted</b>													
10-105	87,300					④		④				④	
125-330	82,300									④		④	
<b>Division 2 Hazardous Location Brakes</b>													
1.5-25	56,800		①	①		②		②		②		②	
6-105	87,800		③	③		①		①		②		②	
<b>Double C-Face Brake Couplers (for direct coupling a C-face motor to a C-face gear reducer)</b>													
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.