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Spring-Set Brake Modules Electrically Released Brakes

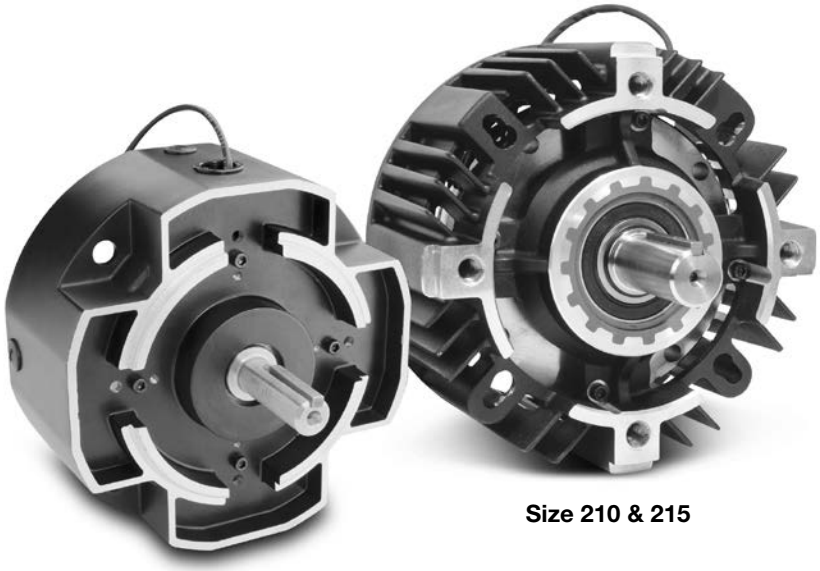
SSBM Series- EM/ERS

Packaged Spring-Set Brake Module for Holding Applications

The Spring-Set Brake Module is a NEMA C-face compatible unit designed to perform holding as well as occasional emergency stopping functions, making it particularly well-suited for motor brake applications. Because it is designed to be mounted on the front of a motor, it is an excellent choice for retrofitting an existing motor, or for use on custom designed machinery.

Features

- NEMA C-face compatible mounting
- Performs holding functions with occasional e-stops
- Completely assembled and preburnished at the factory
- Easy to install
- No adjustment required
- High torque, lead-free and asbestos-free friction material



Size 210 & 215

Sizes 50 &180

WARNING For general use in horizontal shaft applications only. For possible vertical applications, contact technical support.

Principle of Operation

SSBM Brake torque is developed when springs apply a clamping force between the brake armature and the friciton disc to the end plate. Spring clamping force provides the holding torque of the brake.

To release the brake, electical power is applied to the magnet coil, generating a magnetic attractive force between the armature and magnet. The magnetic force overcomes the spring action, allowing the friction disc to rotate freely.

Specifications

Model	NEMA Frame Size	Holding Torque (ft-lbs)	Max RPM	Unit Weight (lbs)	Unit Inertia (lb-in2)	Voltage (DC)	Power (Watts)	Current (Amperes)	Resistance (Ohms)	Part Number
EM-50/ERS-42	56C/48Y	7.0	3600	6.4	.295	24	23.3	0.973	24.67	5370-170-201
						90	21.5	0.239	376.2	5370-170-203
EM-50/ERS-49	56C/48Y	15.0	3600	8.2	.673	24	27.3	1.136	21.12	5370-170-206
						90	25.8	0.287	313.6	5370-170-207
EM-180/ERS-49	143TC/145TC	15.0	3600	8.2	.673	24	27.3	1.136	21.12	5370-170-219
						90	25.8	0.287	313.6	5370-170-220
EM-180/ERS-57	143TC/145TC	34.0	3600	10.4	.955	24	36.2	1.510	15.90	5370-170-211
						90	35.2	0.391	230.1	5370-170-212
EM-210/ERS-68	182TC/184TC	100.0	2000	24.7	3.842	24	54.9	2.286	10.50	5371-170-046
						90	51.9	0.577	156.5	5371-170-047
EM-215/ERS-68	213TC/215TC	100.0	2000	24.7	3.842	24	54.9	2.286	10.50	5371-170-051
						90	51.9	0.577	156.5	5371-170-052

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Spring-Set Brakes Electrically Released Brakes

SSBM Series-EM/ERS

Applications

The Warner Electric Spring-Set Brake Module is an ideal holding device in applications where the motor is used to stop and accurately position the load. The SSBM brake will hold the load in that position until electrically realeased. The SSBM is also a cost effective emergency stopping device in the event of power failure, machine malfunciton, or other occasional dynamic stopping.

Application examples include holding railroad crossing arms, basketball backboards, robotic arms, and assemblies on vertical ball screws.

Selection

SSBM Series Brakes are available in six models with static torque capabilities ranging from 7.0 lb.ft. to 100 lb.ft.

The stopping function is an important consideration when deciding which brake to use. Will the brake be engaged and disengaged in a static condition (zero speed difference between the armature disc and the friction disc)? If yes, then the SSBM Brake is the right choice.

Will the brake be normally engaged and disengaged in a static condition with intermittent engagements dynamically? An emergency stop is a good example. If yes, then the SSBM Brake is the ideal choice.

Will the brake be subject to frequent dynamic braking action? If yes, then a Warner Electric EM-FBB, EUM-FBB, EM-MBFB, EUM-MBFB, EM-FBC or UM-FBC should be considered because these are the best choices for use as high cycle rate dynamic brakes in NEMA C-face applications.

Sizing

Four factors are important for proper sizing:

- Motor frame size
- Static holding torque requirement
- System inertia and brake RPM
- Stop time

Be sure to consider each of these factors as outlined below to effectively select the most appropriate brake for your application.

1. NEMA C-face Mounting

Verify the brake is to be used in a static holding/intermittent engagement application.

Based on the NEMA C-face frame size of the prime mover, select the correct brake module size from the Frame Size Selection Chart.

Frame Size Selection Chart

NEMA Frame Size	Brake Model
56C/48Y	EM-50/ERS-42
	EM-50/ERS-49
143TC/145TC	EM-180/ERS-49
	EM-180/ERS-57
182TC/184TC	EM-210/ERS-68
213TC/215TC	EM-215/ERS-68

2. Holding Torque

Select the size unit with the torque capacity closest to, but not less than, the holding torque required.

Holding Torque Rating (ft.lb.)	Brake Model
7.0	EM-50/ERS-42
15.0	EM-50/ERS-49
15.0	EM-180/ERS-49
34.0	EM-180/ERS-57
100.0	EM-210/ERS-68
100.0	EM-215/ERS-68

3. System Inertia/Emergency Stop

In an emergency stop (when power is interrupted), the SSBM will engage and bring the load to a stop. To properly size a brake for this application, load inertia must be known. This is the total inertia of all components which are to be brought to a stop. Adding the inertia of the SSBM Brake is not necessary as it has been included in the selection chart.

With the load inertia and brake RPM known, use the Emergency Stop Selection Chart to verify your brake selection. Simply locate the intersection of your RPM and inertia and make sure you are not above the line for the brake you selected based on Holding Torque (Step 1). If you are above the line, select the brake designed by the next higher line.

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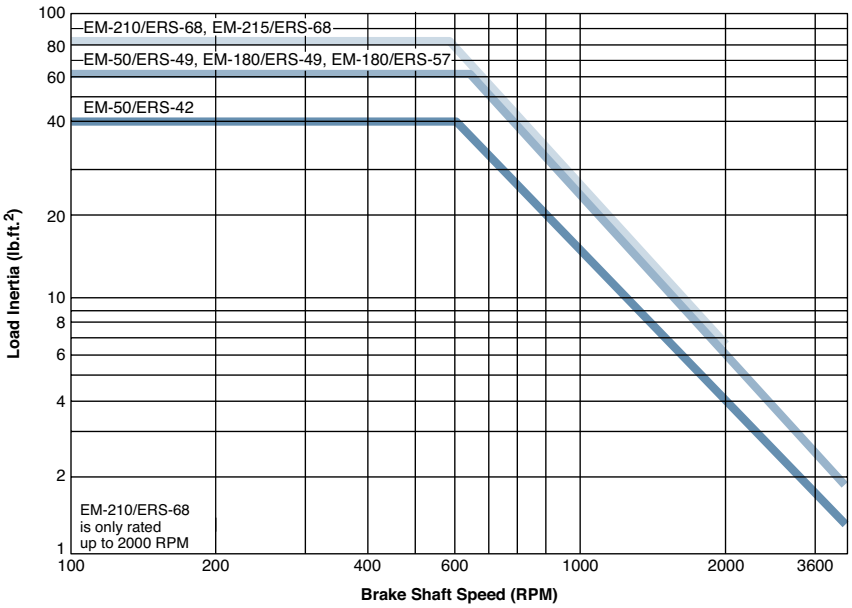
Emergency Stop Selection Chart



4. Stopping Time

In some applications, it is desirable to know how fast a brake will bring a load to rest.

The time to stop a load can be determined if the system inertia and brake holding torque are known, according to the following equation:

Where: $t = (WR^2N)/(308T)$

t = time to stop the load in seconds (sec.)

WR^2 = system inertia at the brake location in pound-feet squared ($ft.lb^2$)

N = speed of the brake shaft in revolutions per minute (RPM)

T = rated brake holding torque in foot-pounds (ft.lb.)

Actual stopping times depend on application variables, which include brake temperature, electrical suppression (see the brake apply time data below), manufacturing tolerances, friction material wear, etc. For this reason, specific stop times should be evaluated under actual application conditions.

If your application has special requirements, please call Warner Electric Technical Support.

5. Select Control

Consult the Controls Section on page 201 for control product overview. The holding torque for a SSBM is not adjustable: therefore, an adjustable torque control is not required.

Special Requirements

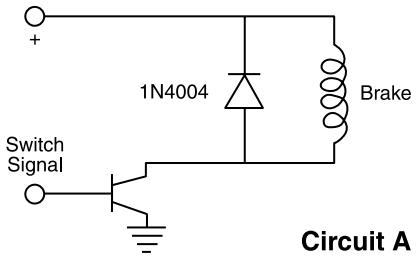
SSBM brake modifications, such as special voltages, rear motor mounting, and low torque units are available.

Contact Warner Electric Technical Support at 800-825-9050.

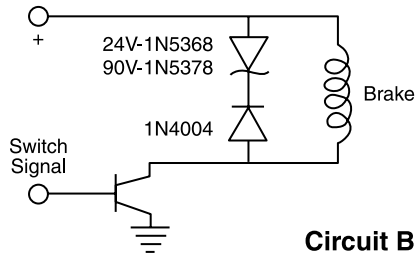
Brake Apply/Release Time (Typical Values)

Model	Brake Release Time (Seconds)		Brake Apply Time (Seconds			
			Suppression Circuit A		Suppression Circuit B	
	24V	90V	24V	90V	24V	90V
EM-50/ERS-42	0.05	0.06	0.10	0.10	0.01	0.02
EM-50/ERS-49 EM-180/ERS-49	0.07	0.08	0.15	0.15	0.02	0.02
EM-180/ERS-57	0.11	0.11	0.15	0.15	0.02	0.02
EM-210/ERS-68 EM-215/ERS-68	0.16	0.20	0.20	0.20	0.03	0.03

Note: Release and Apply Times are armature engagement and realease only.



Circuit A



Circuit B

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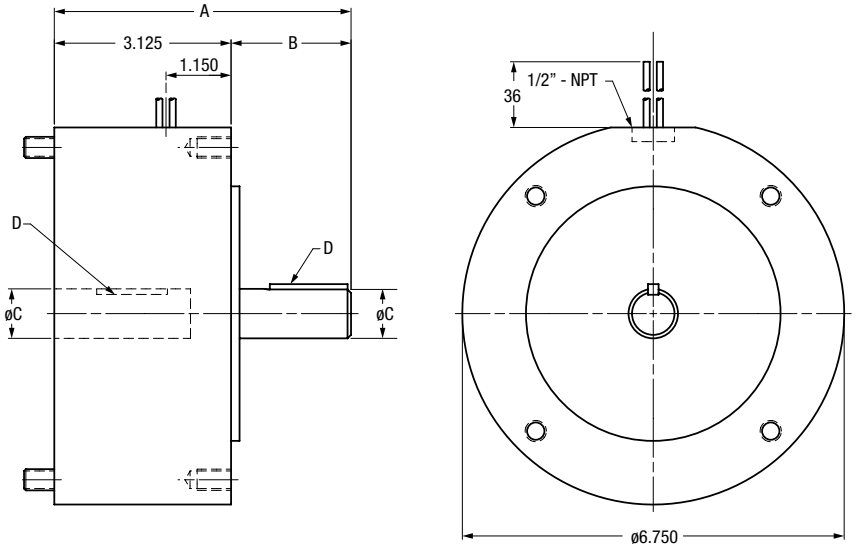
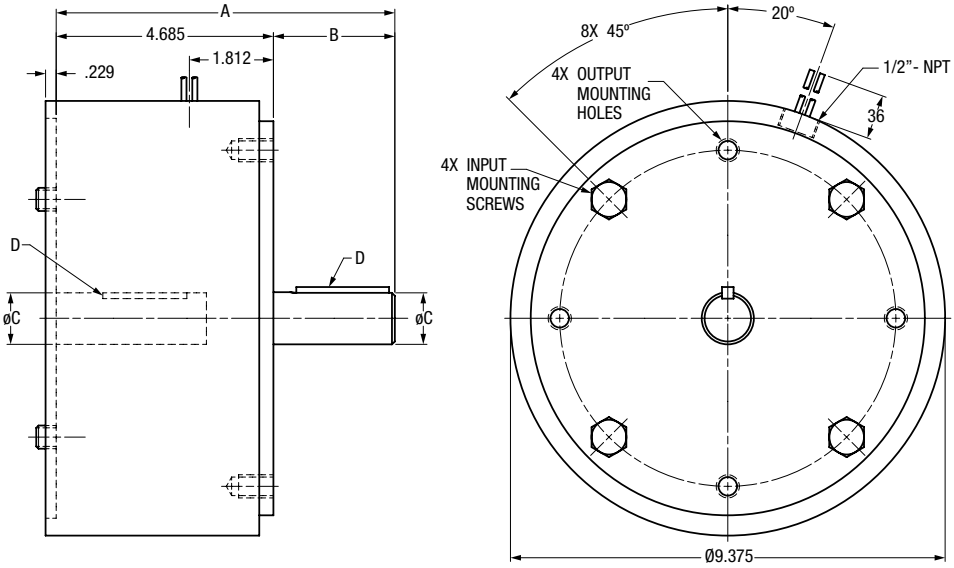
SSBM Series-EM/ERS

SIZE 50/180



SIZE 210/215



Dimensions

Size	A	B	C	D
50	5.197	2.072	.625	3/16 x 3/16
180	5.257	2.132	.875	3/16 x 3/16
210	7.304	2.619	1.125	1/4 x 1/4
215	7.804	3.119	1.375	5/16 x 5/16

For standard NEMA frame dimensions, see page G-3.

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