

# Spring-Set Brake Modules Electrically Released Brakes

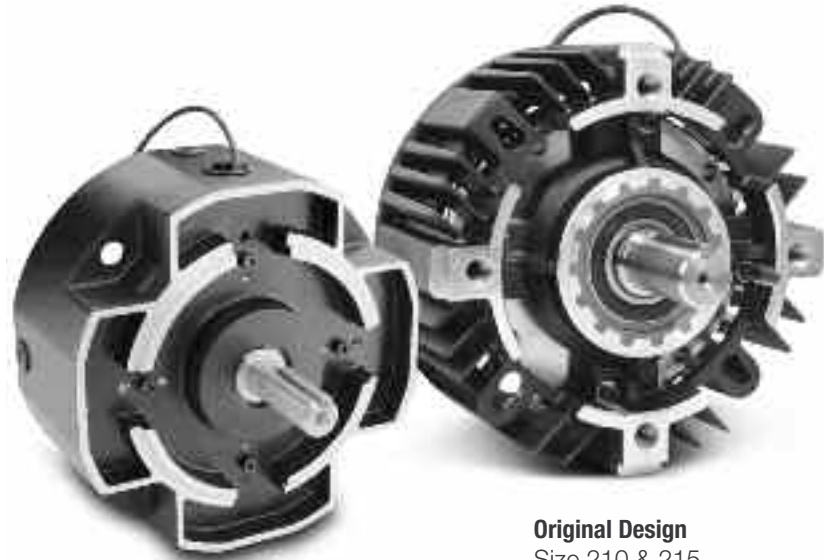
## SSBM Series- EM/ERS

### 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



**GEN 2 Design**  
Sizes 50 & 180

**Original Design**  
Size 210 & 215

### Principle of Operation

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

To release the brake, electrical 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 (Blue shaded areas indicate GEN 2 design)

Model	NEMA Frame Size	Holding Torque (ft-lbs)	Max RPM	Unit Weight (lbs)	Unit Inertia (lb-in <sup>2</sup> )	Voltage (DC)	Power (Watts)	Current (Amperes)	Resistance (Ohms)	GEN 2 Part Number	Original Part Number
EM-50/ERS-42	56C/48Y	7.0	3600	6.4	.295	24 90	23.3 21.5	0.973 0.239	24.67 376.2	5370-170-201 5370-170-203	5370-170-122 5370-170-123
EM-50/ERS-49	56C/48Y	15.0	3600	8.2	.673	24 90	27.3 25.8	1.136 0.287	21.12 313.6	5370-170-206 5370-170-207	5370-170-124 5370-170-125
EM-180/ERS-49	143TC/145TC	15.0	3600	8.2	.673	24 90	27.3 25.8	1.136 0.287	21.12 313.6	5370-170-219 5370-170-220	
EM-180/ERS-57	143TC/145TC	34.0	3600	10.4	.955	24 90	36.2 35.2	1.510 0.391	15.90 230.1	5370-170-211 5370-170-212	5370-170-126 5370-170-127
EM-210/ERS-68	182TC/184TC	100.0	2000	24.7	3.842	24 90	54.9 51.9	2.286 0.577	10.50 156.5		5371-170-046 5371-170-047
EM-215/ERS-68	213TC/215TC	100.0	2000	24.7	3.842	24 90	54.9 51.9	2.286 0.577	10.50 156.5		5371-170-051 5371-170-052

# 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 released. The SSBM is also a cost effective emergency stopping device in the event of power failure, machine malfunction, 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

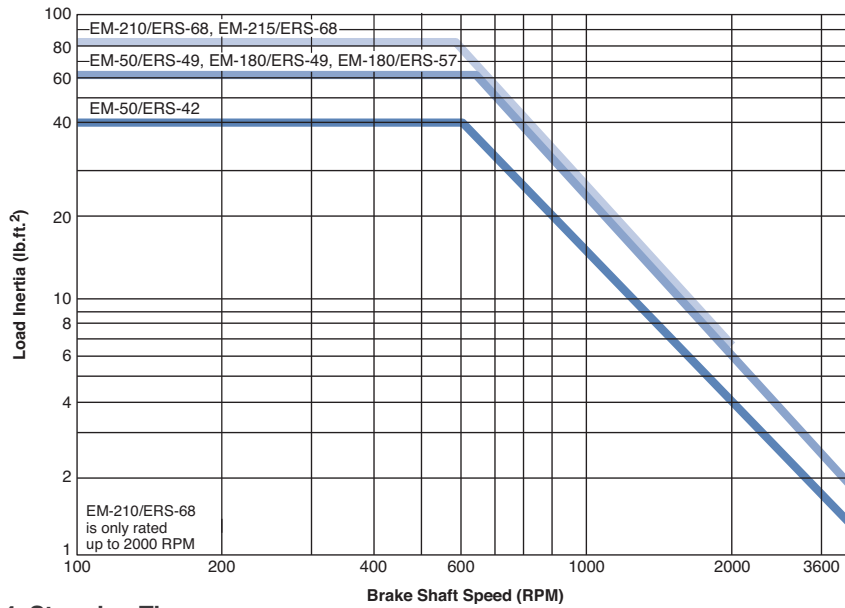
#### 3. System Inertia/Emergency Stop

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



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.

### 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<sup>2</sup>)

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

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

### Special Requirements

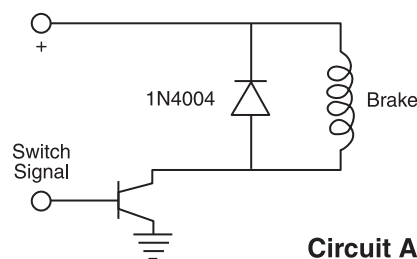
SSBM brake modifications, such as special voltages, rear motor mounting, and low torque units are available.

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

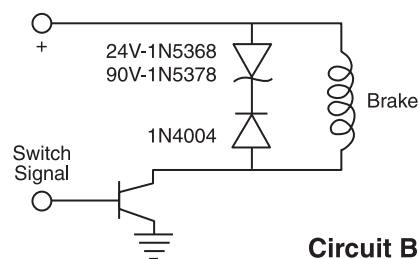
## Brake Apply/Release Time (Typical Values)

Model	Brake Release Time (Seconds)		Brake Apply Time (Seconds)			
	24V	90V	Suppression Circuit A		Suppression Circuit B	
			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 release only.



Circuit A

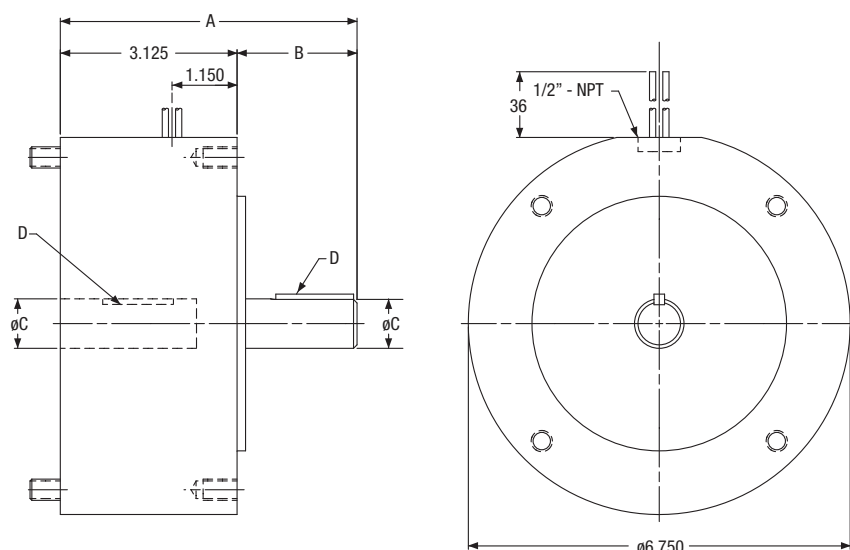


Circuit B

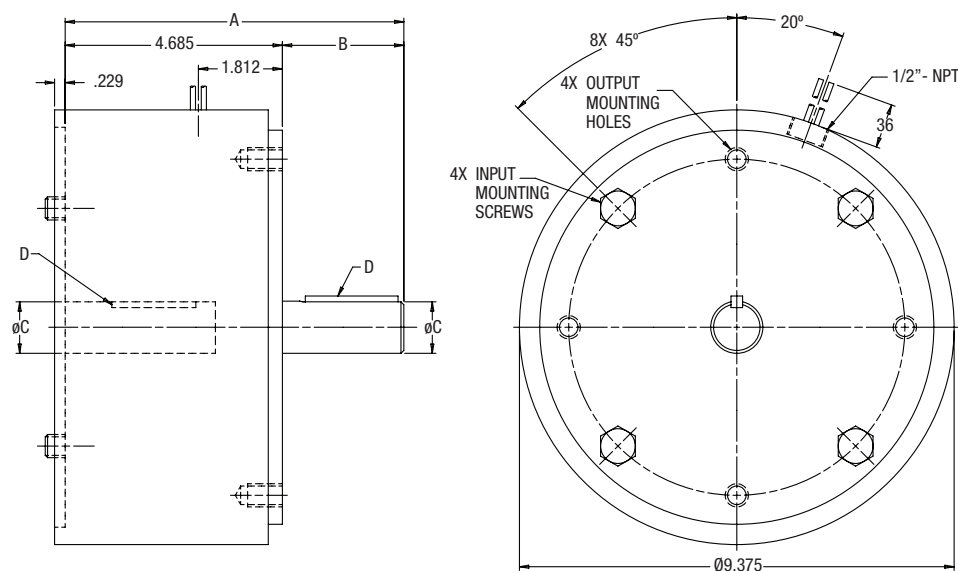
# Spring-Set Brakes Electrically Released Brakes

## SSBM Series-EM/ERS

### SIZE 50/180



### SIZE 210/215



### Dimensions (Blue shaded areas indicate GEN 2 design)

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 187.

Only 50 and 180 sizes of the models listed will be converted to the new GEN 2 design.  
210 and 215 size will continue to be offered in the original design and will not be converted.