Spring-Set Brakes for Static Holding and Emergency Stopping Applications

Statically engaged holding brakes are applied where the rotating shaft needs to be held after it has stopped and is in a static condition. Spring-set brakes automatically stop and hold a load in the event of power failure or other emergency stop situations. The spring clamping force provides holding torque until the brake is electromagnetically released.

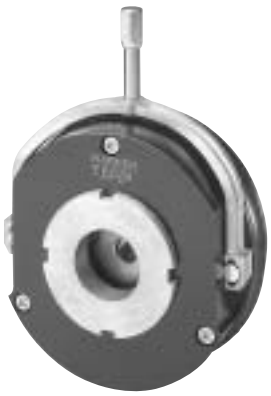
ERS Series

Static Engaged Brakes

Although this brake should be engaged only when the shaft is at rest, it can occasionally act as a braking device on a rotating shaft in an emergency situation. However, it is intended to be used for static applications.

ERD Series

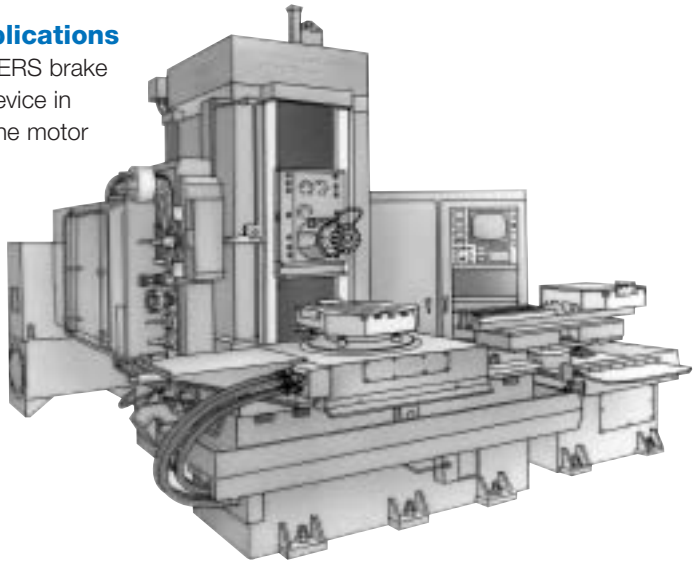
Dual Purpose Engagement Brakes



This brake can be engaged when the shaft is at rest or when the shaft is in motion.

ERS Typical Applications

The Warner Electric ERS brake is an ideal holding device in applications where the motor is used to stop and accurately position the load.

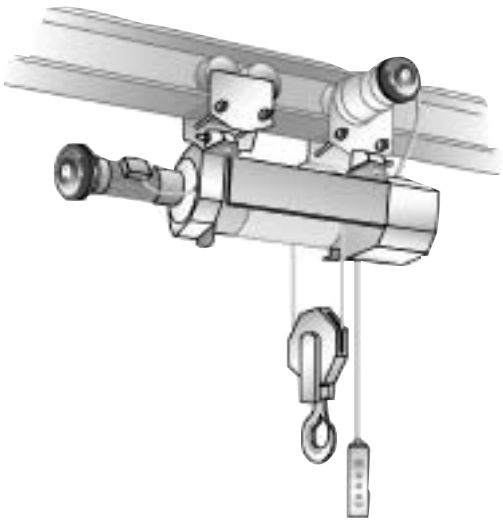


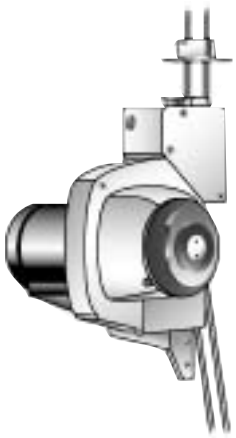
Machine Tools

ERS Brakes are used on automatic tool changers to hold the load and maintain precise positioning accuracy.

ERD Typical Applications

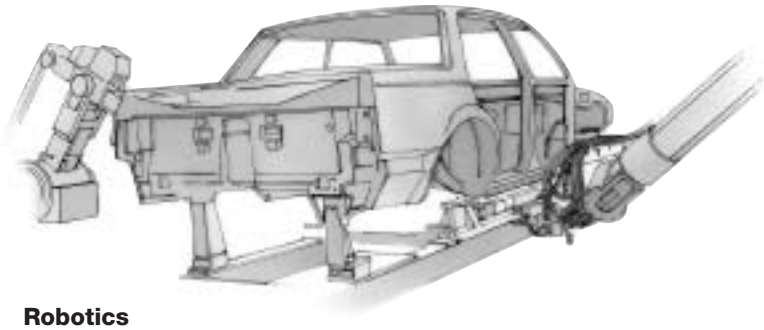
The Warner Electric line of ERD electrically released, dynamic, spring-set brakes offers a high-performance, cost effective solution for power-off load holding applications.



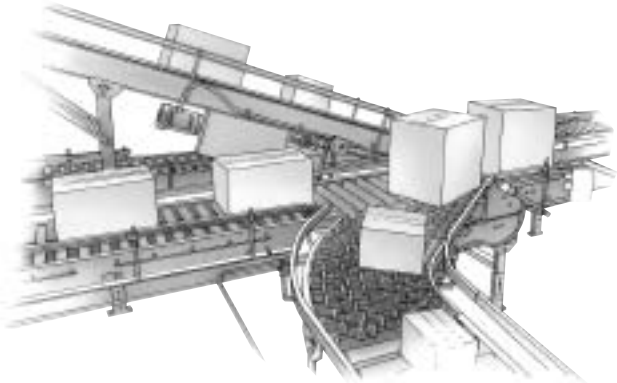


Hoist/Winch

The ERD with central torque adjustment can be used to consistency stop the rated load within a fixed distance by dialing-in the proper torque level on each production hoist. The addition of a manual release allows the load to be gradually and safely lowered to the ground in the event of power failure.



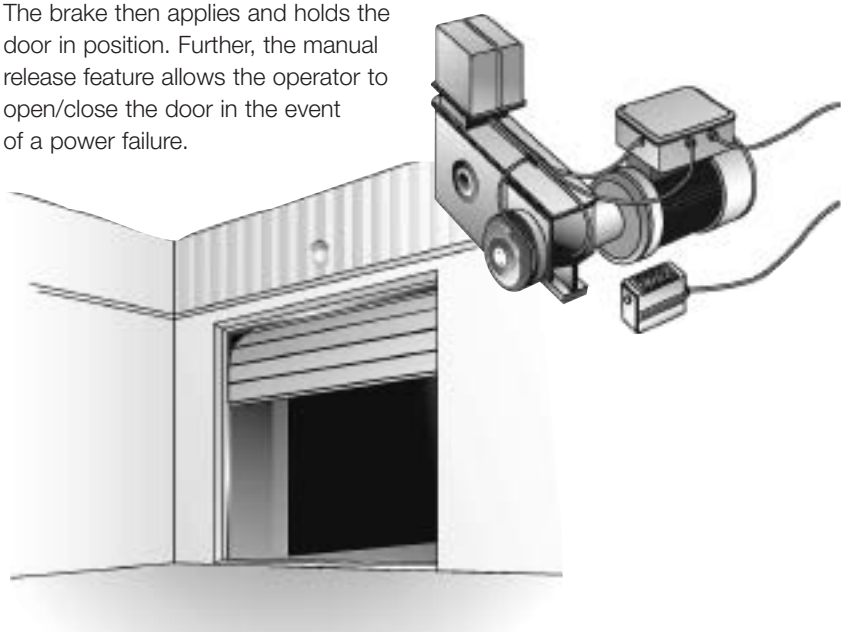
Robotics
ERS Brakes can position and hold robotic equipment. Emergency braking in the event of power loss can prevent damage to equipment.

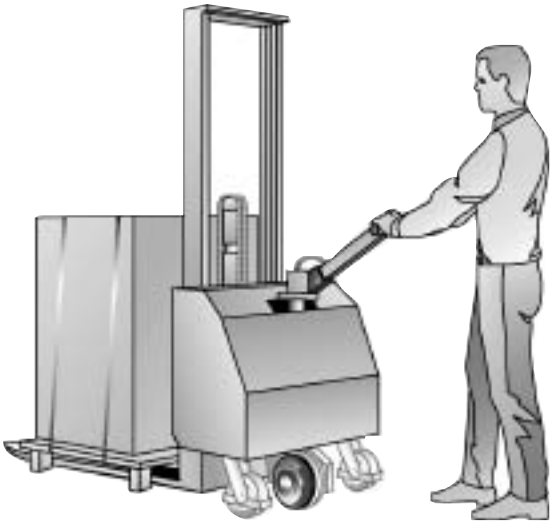


Automated Material Handling Systems
ERS Brakes hold rollers and lift mechanisms in place, and lock drive wheels in place.

Medical Equipment
ERS brakes are used as parking brakes in wheelchairs and holding brakes in medical apparatus such as mammography and cat scan equipment.

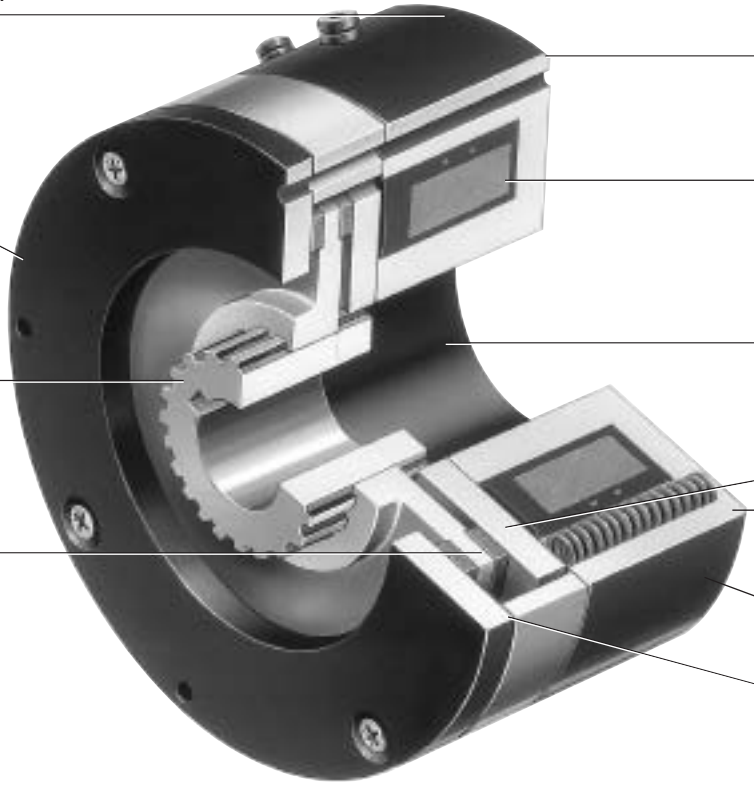
Overhead Door
The ERD can be used in conjunction with a photo eye. In this application, whenever the light beam is broken, voltage to the brake is removed. The brake then applies and holds the door in position. Further, the manual release feature allows the operator to open/close the door in the event of a power failure.





Mobile Equipment
ERS Brake, applied as a parking brake function on lift trucks, prevent rolling on slanted surfaces without the need for manual brake linkage or expensive hydraulic brakes.

For Static Holding and Emergency Stopping



Packaged Performance

Warner Electric ERS Brakes are pre-assembled and burnished at the factory. The engineering is built-in. Each unit is checked to ensure full rated torque right out-of-the-box. Just secure the hub, bolt down the brake and wire it up. An optional AC to DC control is available for use with all 90 volt units. Unique mounting features make it easy to adapt the ERS Brake to almost any application requirement.

ERS brakes are available in NEMA C-face mounted modules. Please consult factory for assistance.

Features

- Designed for static holding operations
- Brake automatically engages when power is turned off
- Flexible mounting
- Electrically released – spring actuated
- Quick, quiet response for rapid engagement
- Compact, low profile design saves space
- Spline drive for high torque, minimal backlash and long life
- Available in five sizes. Static torque ratings from 1.5 lb.ft. to 100 lb.ft.
- ERS-26 and ERS-42 UL approved.

Principle of Operation

ERS 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.

"Electrically Released" brakes are so named because, when power is removed, the brake will stop and hold a load. This occurs when power is lost either intentionally or unexpectedly due to a machine malfunction. When power is on, the brake electrically releases the load, allowing it to move freely.

Sizing

Three factors are important for proper sizing:

- Static holding torque requirement
- System inertia and brake RPM
- Stopping time

Step 1

Holding Torque

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

Brake Size	Holding Torque Rating lb. ft.
ERS-26	1.5
ERS-42	7.0
ERS-49	15.0
ERS-57	34.0
ERS-68	100.0

Step 2

System Inertia/Emergency Stop

In an emergency stop (when power is interrupted), the ERS Brake 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 ERS Brake is not necessary; 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 designated by the next higher line.

Selection Procedure

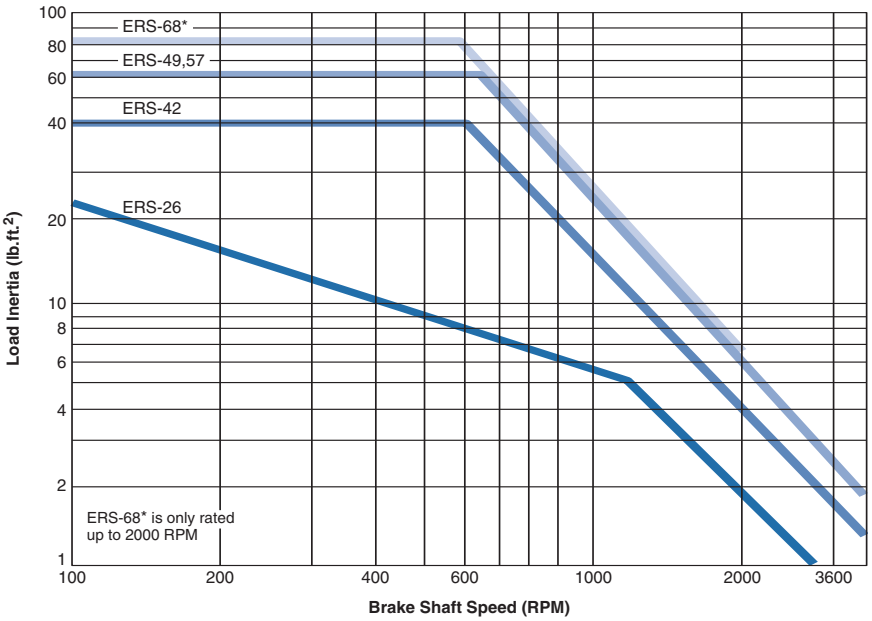
ERS Brakes are available in five models for an optimum size to match your application requirements. Static torque capabilities range from 1.5 lb.ft. to 100 lb.ft.

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, the ERS 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, the ERS Brake is the ideal choice.

Will the brake be subject to frequent dynamic braking action? If yes, then a Warner Electric ER, FB or ERD brake should be considered. The ERS Brake is not the best choice for use as a high cycle rate dynamic brake.

Emergency Stop Selection Chart



*ERS-68 is only rated up to 2000 RPM

Selection

Step 3

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: $t = \frac{WR^2N}{308T}$

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

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

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

T = rated brake holding torque in pound-feet (lb.ft.) See step 1, page 89.

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 us.

Step 4

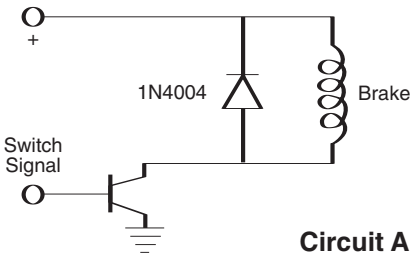
Select Control

Consult the Controls Section for control product overview. The holding torque for an ERS is not adjustable. Therefore, an adjustable torque control is not required.

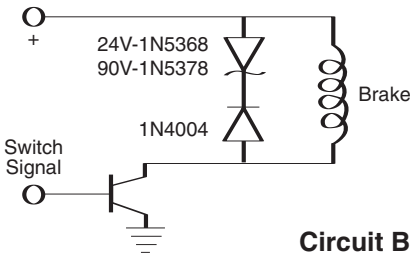
Brake Apply/Release Time (Typical Values)

	Brake Release Time (Seconds)		Brake Apply Time (Seconds)			
			Suppression Circuit A		Suppression Circuit B	
Model	24V	90V	24V	90V	24V	90V
ERS-26	0.03	0.03	0.04	0.04	0.01	0.01
ERS-42	0.05	0.06	0.10	0.10	0.01	0.02
ERS-49	0.07	0.08	0.15	0.15	0.02	0.02
ERS-57	0.11	0.11	0.15	0.15	0.02	0.02
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

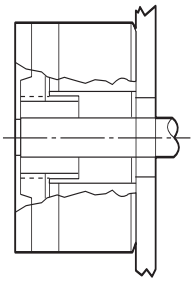


Circuit B

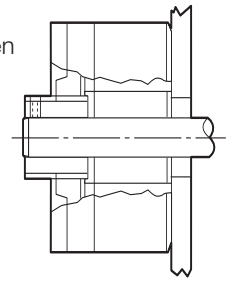
Armature Drives

The rugged splined drive provides flexibility in selecting the most efficient method of coupling a load to the ERS Brake. Each unit size has standard splined hubs available for common shaft sizes.

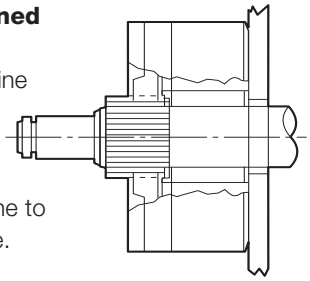
Recessed Hub
For maximum space efficiency, mount hub on shaft, then mount brake over hub.



Extended Hub
Mount brake first, then position hub on shaft so hub is beyond the brake.

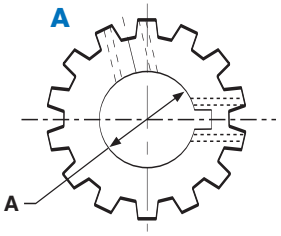


Mating Splined Member
Machined spline on drive member matches armature spline to operate brake.

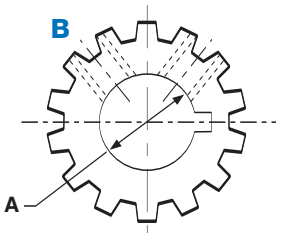


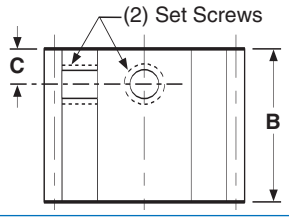
Drive Hub/Spline and Interface Data

Set Screw Orientation



Set Screw Orientation





Model	A Bore	Mating Key (Not furnished)	Set screw Orientation	B Nom.	C Nom.	Set Screws	No. of Teeth	Dia. Pitch	Pressure Angle
	.2525/ .2505	1/16 x 1/16	B						
ERS-26	.3150/ .3130	1/16 x 1/16	B	.600	.135	6-32	14	20/40	30°
	.3775/ .3755	3/32 x 3/32	B						
	.3775/ .3755	3/32 x 3/32	A						
	.5025/ .5005	1/8 x 1/8	A						
ERS-42	.6275/ .6255	3/16 x 3/16	A	.700	.150	8-32	19	16/32	30°
	.7525/ .7505	3/16 x 3/16	B						
	.3775/ .3755	3/32 x 3/32	A						
	.5025/ .5005	1/8 x 1/8	A						
ERS-49	.6275/ .6255	3/16 x 3/16	A	.800	.160	10-32	21	16/32	30°
	.7525/ .7505	3/16 x 3/16	B						
	.8775/ .8755	3/16 x 3/16	B						
	.5025/ .5005	1/8 x 1/8	A						
	.6275/ .6255	3/16 x 3/16	A						
ERS-57	.7525/ .7505	3/16 x 3/16	A	.800	.190	1/4-20	15	10/20	30°
	.8755/ .8755	3/16 x 3/16	B						
	1.0025/1.0005	1/4 x1/4	B						
	1.0025/1.0005	1/4 x 1/4	A						
	1.1275/1.1255	1/4 x 1/4	A						
ERS-68	1.2525/1.2505	1/4 x 1/4	A	.900	.190	1/4-20	22	10/20	30°
	1.3775/1.3755	5/16 x 5/16	A						
	1.5025/1.5005	3/8 x 3/8	B						

Note: Involute spline data per ANSI B92. 1a-1976, Class 5.

Backlash

Total unit backlash includes spline and armature movement. It is typically less than one degree of rotation. Spline backlash alone is typically 15 minutes of rotation or less.

Mounting

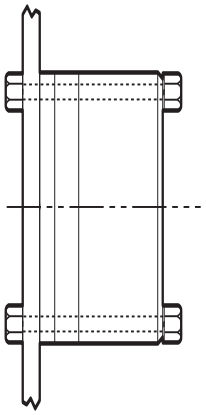
Mounting Orientation

ERS Brakes are easily modified to accommodate different mounting orientations. The brake can be mounted with either face against the mounting surface. The following mountings are possible with the standard ERS brake.

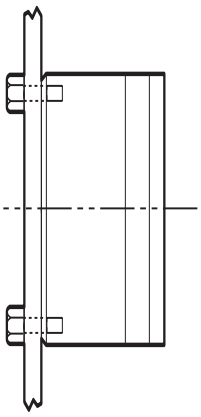
Mounting Requirements

1. Mounting surface to be perpendicular to shaft with in .006" T.I.R.
2. Mounting holes to be within .015" true position to the shaft.

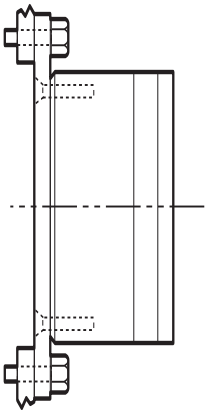
Through Bolt
Provides rigid support. May be mounted on either side of brake.



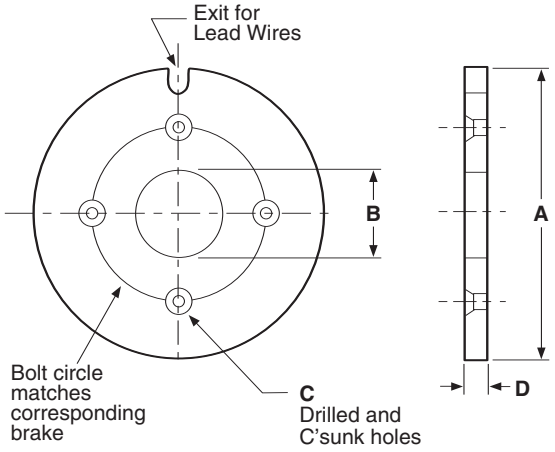
Tapped Hole
Works well where through bolt mounting is impractical.



Flange
Flange mounting to brake tapped holes for most versatile attachment to many different housings, motors, and frames.



Optional Adapter Mounting Flange

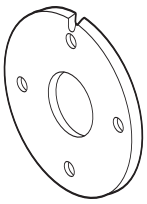


Model	A Nom.	B Nom.	C Holes	D Nom.
ERS-26	4.000	.935	#4	.100
ERS-42	5.000	1.450	#6	.144
ERS-49	6.250	1.575	#8	.193
ERS-57	7.500	1.825	#10	.193
ERS-68	9.500	2.500	1/4	.224

Note: Holes for attaching flange to mounting surface to be provided by customer.

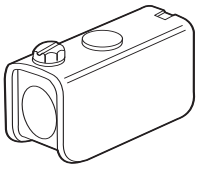
Accessories

Adapter Flanges



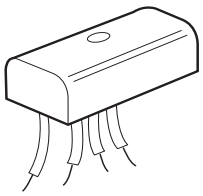
Model	Part Number
ERS-26	686-0182
ERS-42	686-0183
ERS-49	686-0184
ERS-57	686-0185
ERS-68	686-0186

Conduit Box



Model	Part Number
Conduit Box	5154-101-001
Mounts to ERS-49, 57 and 68 only	

Controls



Model	Part Number
CBC-100-1	6003-448-101
AC to DC Control	
To be used with 90V ERS brakes	

See the Controls Section on page 141 for complete information.

CBC-100-1 is 110 volt only

Ordering Information

Ordering the appropriate ERS brake for your application is a simple, step-by-step procedure based on the intended function, brake size, mounting configuration and operating voltage of the unit best suited for your needs, including any optional parts and accessories that you may require. A Warner Electric sales representative or distributor is always happy to provide assistance.

How to Order

1. Verify that the brake is to be used in a static holding/intermittent engagement application.
2. Choose the correct size ERS Brake from the selection procedure on pages 89-90. Select the correct brake part number for the appropriate size and desired operating voltage.
3. Choose the splined hub part number for the required bore diameter and unit size.
4. Select optional accessories, such as: adapter flange kit, AC to DC control and conduit box kit.

ERS Brake

Model	Voltage	Part Number
ERS-26	24V	5158-170-016
	90V	5158-170-015
ERS-42	24V	5151-170-002
	90V	5151-170-001
ERS-49	24V	5155-170-002
	90V	5155-170-001
ERS-57	24V	5153-170-003
	90V	5153-170-002
ERS-68	24V	5154-170-002
	90V	5154-170-001

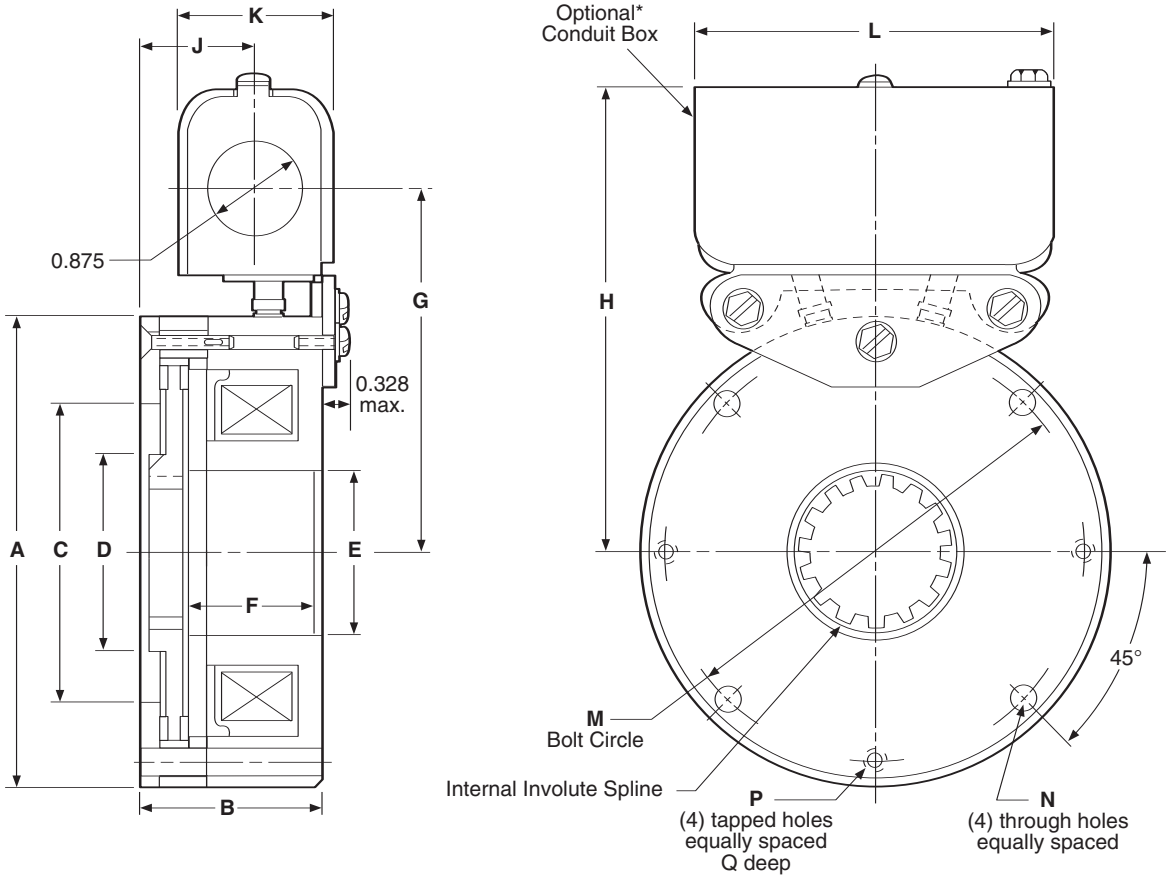
Splined Hub

Model	Bore Dia.	Part Number
ERS-26	.250	5158-541-006
	.312	5158-541-007
	.375	5158-541-008
ERS-42	.375	5151-541-002
	.500	5151-541-003
	.625	5151-541-004
	.750	5151-541-005
ERS-49	.375	5155-541-002
	.500	5155-541-003
	.625	5155-541-004
	.750	5155-541-005
	.875	5155-541-006
ERS-57	.500	5153-541-004
	.625	5153-541-005
	.750	5153-541-006
	.875	5153-541-007
	1.000	5153-541-008
ERS-68	1.000	5154-541-005
	1.125	5154-541-006
	1.250	5154-541-007
	1.375	5154-541-008
	1.500	5154-541-009

Special Requirements

ERS Brake modifications such as metric bores, special voltages and low torque units are available. Consult factory.

ERS-26, ERS-42, ERS-49, ERS-57, ERS-68



*Available only for the ERS-49, 57, and 68 sizes

ERS-26, ERS-42, ERS-49, ERS-57, ERS-68

All dimensions are nominal, unless otherwise noted.

Model	A Max.	B Max.	C	D	E	F	G
ERS-26	2.460	1.515	1.375	1.125	.860	1.250	—
ERS-42	3.520	1.595	2.000	1.600	1.375	1.255	—
ERS-49	4.270	1.767	2.600	1.750	1.500	1.332	3.625
ERS-57	5.020	1.937	3.240	2.100	1.750	1.503	4.000
ERS-68	6.520	2.030	4.504	2.800	2.425	1.565	4.750

Model	H	J	K	L	M Dia.	N Dia.	P	Q
ERS-26	—	—	—	—	2.125	.172/.164	4-40	.375
ERS-42	—	—	—	—	3.125	.200/.190	6-32	.400
ERS-49	4.625	1.000	1.625	3.750	3.750	.228/.218	8-32	.400
ERS-57	5.000	1.170	1.625	3.750	4.500	.288/.278	10-24	.400
ERS-68	5.750	1.265	1.625	3.750	5.875	.413/.404	1/4-20	.500

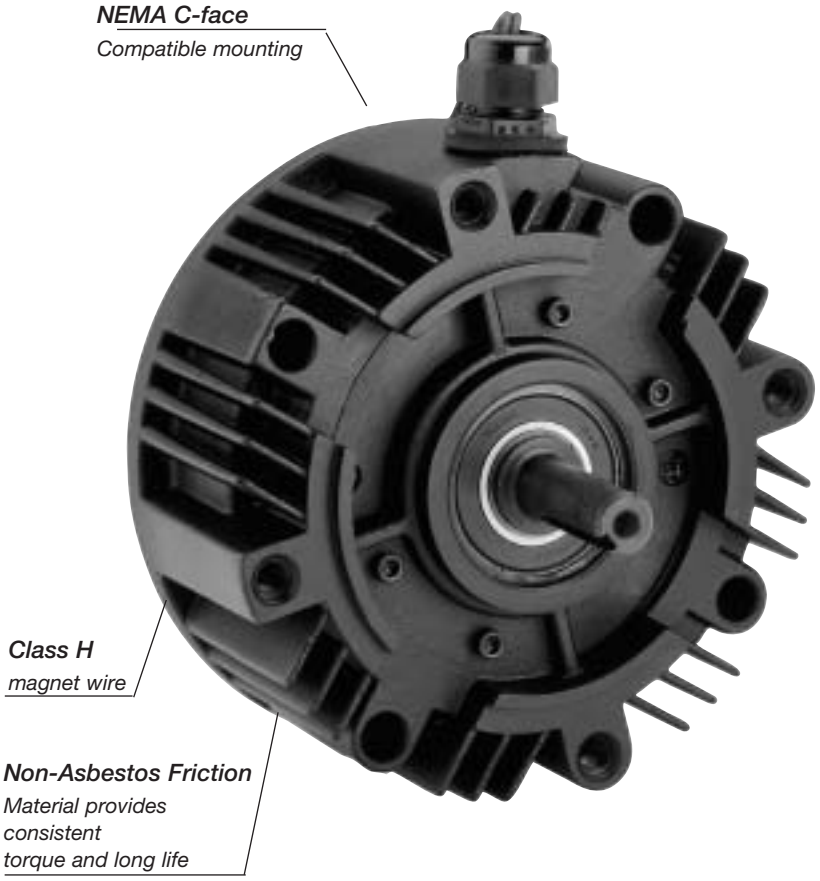
Specifications

Model	Voltage DC	Power (Watts)	Current (Amperes)	Resistance (Ohms)	Static Torque (lb.ft.)	Inertia (lb.in.^{2}) Unit	Inertia (lb.in.^{2}) Hub	Weight (lbs.) Unit	Weight (lbs.) Hub
ERS-26	24V 90V	17.6 16.0	0.733 0.178	32.75 506.5	1.5	0.03	0.004	1.20	0.06
ERS-42	24V 90V	23.3 21.5	0.973 0.239	24.67 376.2	7	0.14	0.040	2.50	0.20
ERS-49	24V 90V	27.3 25.8	1.136 0.287	21.12 313.6	15	0.45	0.060	4.30	0.25
ERS-57	24V 90V	36.2 35.2	1.510 0.391	15.9 230.1	34	0.54	0.110	6.50	0.38
ERS-68	24V 90V	54.9 51.9	2.286 0.577	10.5 155.9	100	1.44	0.550	11.30	0.75

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

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 plae. 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 ($lb\text{-}in^2$)	Voltage (DC)	Power (Watts)	Current (Amperes)	Resistance (Ohms)	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	5370-170-122 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	5370-170-124 5370-170-125
EM-180/ERS-57	182C/143TC 184C/145TC	34.0	3600	10.4	.955	24 90	36.2 35.2	1.510 0.391	15.90 230.1	5370-170-126 5370-170-127
EM-210/ERS-68	213C/182TC 215C/184TC	100.0	2000	24.7	3.842	24 90	54.9 51.9	2.286 0.577	10.50 155.9	5371-170-042 5371-170-043

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 four 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
182C/143TC 184C/145TC	EM-180/ERS-57
213C/182TC 215C/184TC	EM-210/ERS-68

2. Holding Torque

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

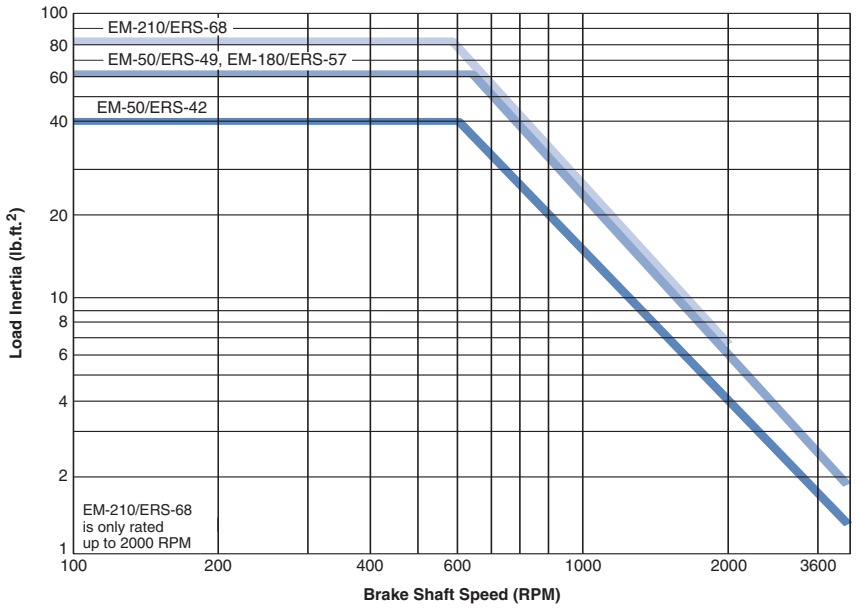
Holding Torque Rating (ft.lb.)	Brake Model
7.0	EM-50/ERS-42
15.0	EM-50/ERS-49
34.0	EM-180/ERS-57
100.0	EM-210/ERS-68

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.

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 141 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 ($ft.lb^2$)

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

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

Special Requirements

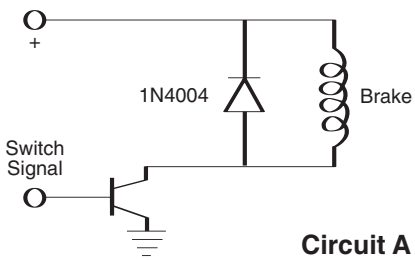
SSBM brake modifications, such as special voltages, rear motor mounting, and low torque units are available.

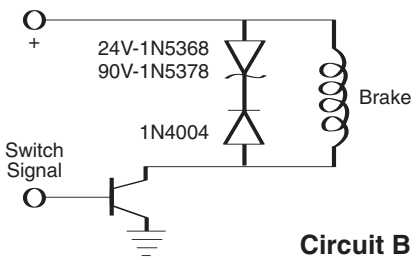
Contact Warner Electric Technical Support at 800-825-9050.

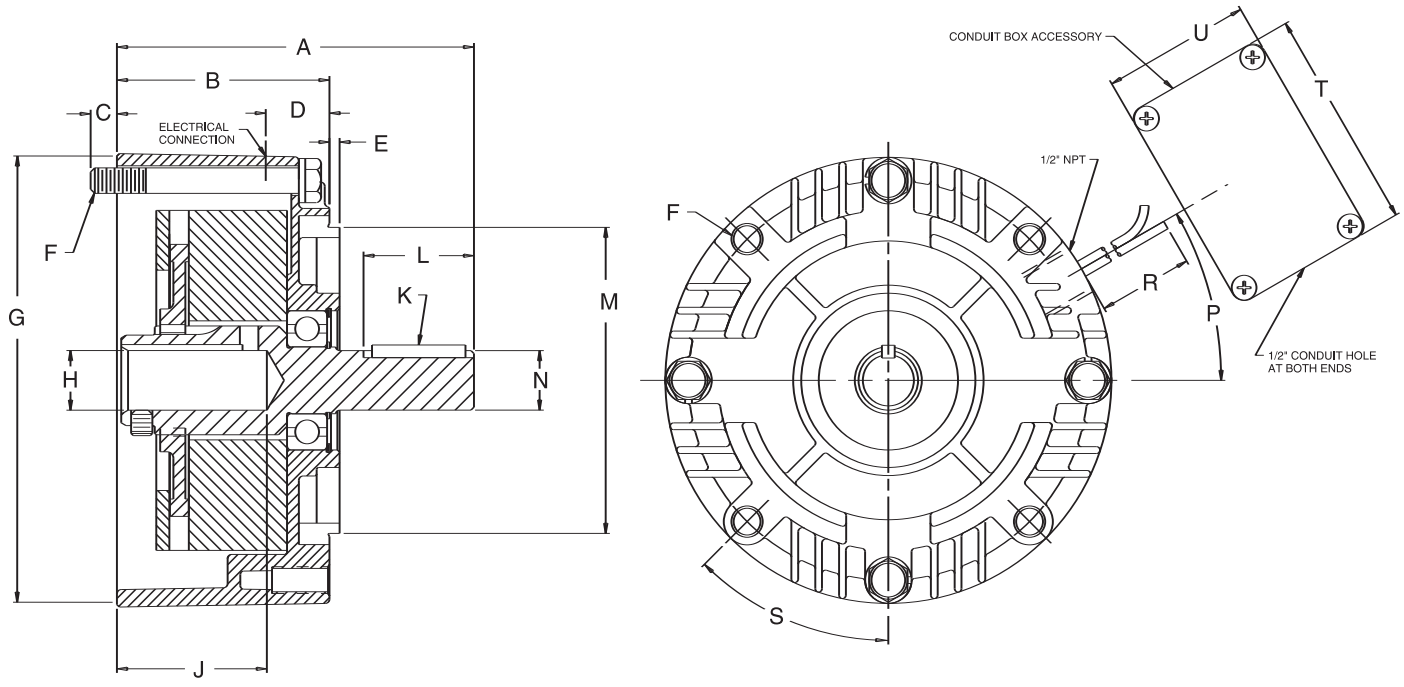
Brake Apply/Release Time (Typical Values)

	Brake Release Time (Seconds)		Brake Apply Time (Seconds)			
			Suppression Circuit A		Suppression Circuit B	
Model	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	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	0.16	0.20	0.20	0.20	0.03	0.03

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







All dimensions are nominal, unless otherwise noted.

Model	A Max	B	C Max	D	E Max	F	G	H Dia	H Key
EM-50	5.232	3.125	.475	.937	.156	(4) 3/8-16 UNC on 5.875 Dia	6.688	.625	3/16x3/16
EM-180	5.292	3.125	.475	.937	.156	(4) 3/8-16 UNC on 5.875 Dia	6.688	.875	3/16x3/16
EM-210	7.579	4.609	.562	1.500	.315	(4) 1/2-13 UNC on 7.250 Dia	9.344	1.125	1/4x1/4

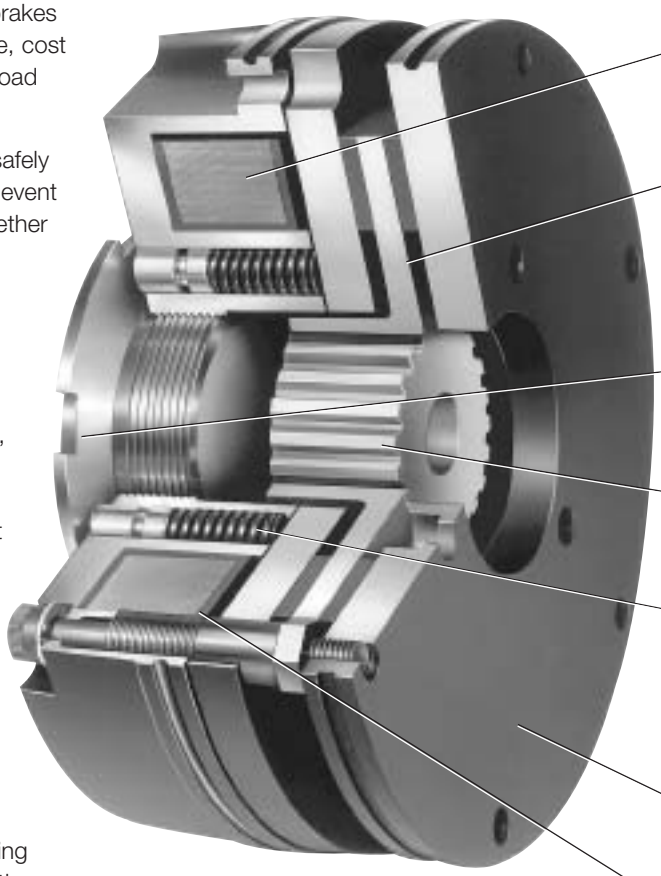
Model	J	K	L	M	N	P	R	S	T	U
EM-50	2.212	3/16x3/16	1.437	4.500 Pilot Dia	.625 Dia	30°	36	45°	3.25	2.188
EM-180	2.216	3/16x3/16	1.437	4.500 Pilot Dia	.875 Dia	30°	36	45°	3.25	2.188
EM-210	3.002	1/4x1/4	2.125	8.500 Pilot Dia	1.125 Diza	25°	36	45°	3.25	2.188

Dynamic Braking With Reliable, Fast Response

The Warner Electric line of electrically released, dynamic, spring-set brakes (ERD) offers a high-performance, cost effective solution for power-off load holding applications.

These brakes are designed to safely keep the load in position in the event of a power or motor failure, whether intentional or accidental. An optional manual release allows the operator to safely move the load even when no power is available.

By applying voltage to the ERD, an electromagnetic field is created which causes the armature plate to pull-in against helical compression springs, thus releasing the brake. When power is removed, the springs force the armature to compress the friction carrier against the mounting flange, thus stopping and holding the load. Fully dynamic friction material on the carrier allows for repeated braking cycles from full motor speed with no torque fade.



Continuous Duty Coil
Epoxy-sealed; windings have Class F insulation. Lead wires have standard Class B insulation rating.

Friction Carrier
Double friction surfaces for increased torque in small package size.

Central Torque Adjustment
(optional) Allows braking torque adjustment down to 50% of nominal rating; ideal for controlling stopping distances.

Splined Center Hub
Steel for wear resistance and available in a variety of bore sizes and keyways.

Compression Springs
Used to provide balanced armature plate loading.

Mounting Flange
Easily modified to suit unique bolt patterns. In special cases, brakes may be mounted directly to the motor without the need for the flange.

Air Gap
Factory pre-set and easy to adjust during field maintenance.

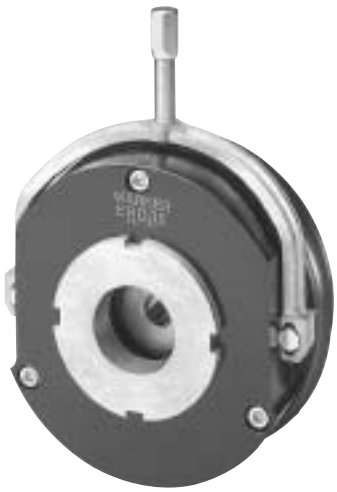
Features

- Spring-set design holds the load in place when voltage is removed from the brake. Dynamic friction material can stop loads from motor speeds up to 3600 RPM.
- Few moving parts mean quiet operation
- Lead and asbestos free, dynamic friction material is suited for high cycle rates.
- Adjustable air gap for ease of service and long life in the field.
- Variety of voltages available.
- Simple DC control (or AC with available rectifiers).
- Low power requirements for energy savings.
- Eight different sizes ranging from 3.3 inches to 9.9 inches in diameter.
- Torque capacities from 4 to 220 lb.ft.
- Bi-directional stopping capability.

Options

Manual Release
Allows the brake to be released by hand; ideal for lowering suspended loads.

Dust Cover
Shields the brake actuation system from external dust and debris.



Torque Adjustment

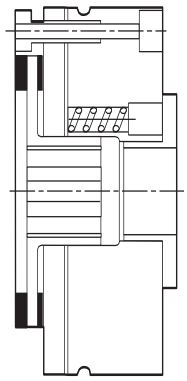
Brakes are factory set at the minimum torque rating shown in the Specifications chart.

Friction Disc Carriers

Replaceable Friction carriers are available
in two types:

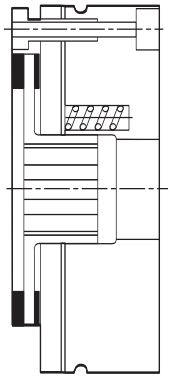
- Metallic Standard on all brakes
- Thermoplastic can be used as an option on sizes 5 and 10 brakes only

Design Variations



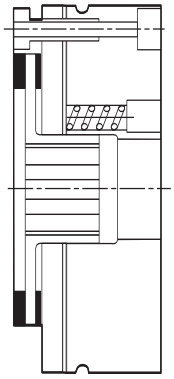
VAR 2
Central ring nut adjusts torque

- Up to 50% torque reduction possible
- Available in all sizes



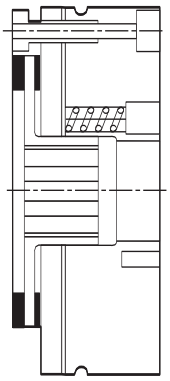
VAR 0
Torque preset and constant

- No torque adjustments possible
- Available in all sizes



VAR 1
Four screw torque adjustment

- Up to 50% torque reduction possible
- Available in sizes 5, 10, 20 and 35 only



VAR 3
Four screw torque adjustment with provision for tachometer

- Up to 50% torque reduction possible
- Mounting holes for tachometer
- Available in sizes 5, 10, 20 and 35 only

Note: VAR 2 and VAR 0 are most common.

Specifications

	Holding Torque		Max. Speed	Rotating Inertia (lb. in.²)		Current Draw (Amps)				Resistance (Ohms)				Weight
Size	lb. in.	lb. ft.	RPM	Thermoplastic	Metallic Disc	24	96	190	215	24	96	190	215	(lbs.)
ERD-5	45	3.75	3600	0.041	0.103	0.83	0.21	0.11	0.09	28.9	454	1775	2380	2
ERD-10	85	7.08	3600	0.137	0.321	1.03	0.26	0.13	0.12	23.4	372	1450	1813	4
ERD-20	175	14.58	3600		0.957	1.22	0.31	0.16	0.14	19.6	310	1209	1545	7
ERD-35	310	25.83	3600		2.529	1.61	0.41	0.21	0.18	14.9	233	912	1175	10
ERD-60	530	44.17	3000		7.415	1.94	0.577	0.293		12.4	166.2	648.1		14
ERD-100	890	74.17	3000		12.472	2.35	0.569	0.302		10.22	168.6	628.5		22
ERD-170	1500	125.00	3000		14.010	2.73	0.69	0.375		8.78	139.2	507.2		34
ERD-300	2650	220.83	3000		29.386	4.11	1.122	0.602		5.83	85.63	315.6		57

Selection

Proper ERD brake selection involves determining,in order:

1. Static Holding Torque

The ERD brake nominal holding torque should exceed the torque from the load by a minimum safety factor of 2.0

2. Dynamic Torque

This is determined from the equation:

$$T = \frac{5250\ P}{N}$$

where:

T = Dynamic Torque in lb.ft.
N = Motor Speed in RPM
P = Motor Horsepower

Once the dynamic torque has been calculated, check the dynamic torque curves (adjacent) at the required operating speed to determine the suitable brake.

3. Energy Capacity

ERD sizing by energy capacity is a function of the cycling frequency (cycles per hour) and the single cycle energy put into the brake as determined from the equation:

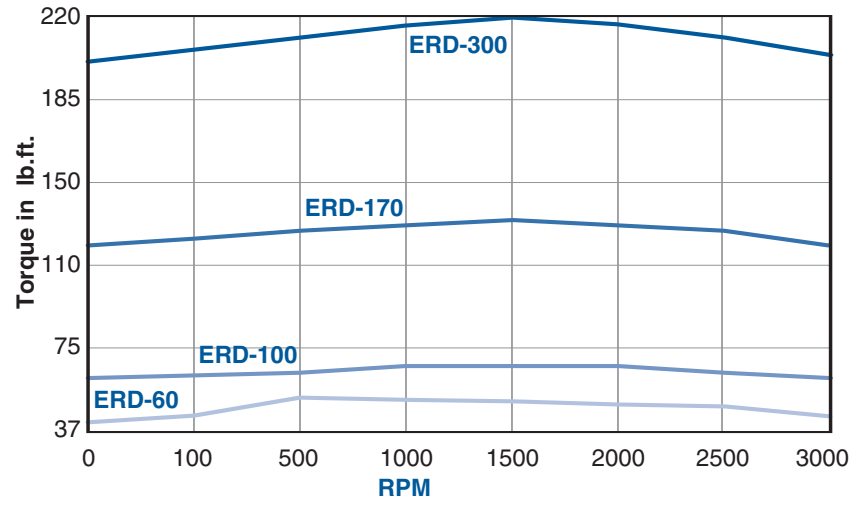
$$E = 1.7 \times WR^2 \left(\frac{N}{100}\right)^2$$

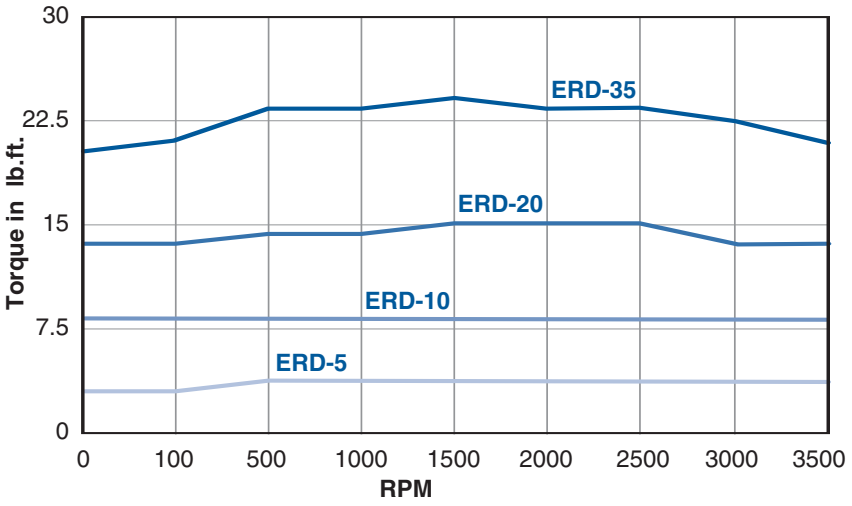
where:

E = Single Cycle Energy in lb.ft.
WR^2 = Load Inertia in $lb.ft^2$
N = Speed in RPM

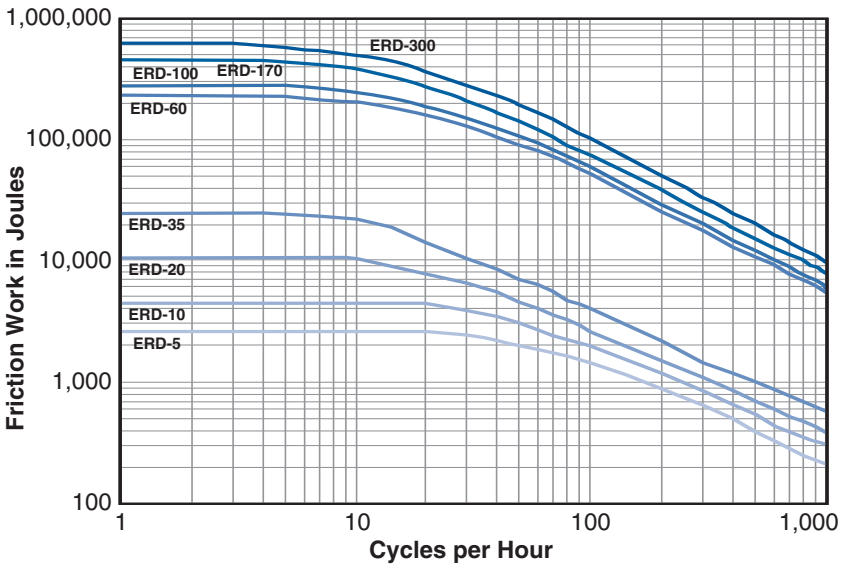
Applying the energy per cycle with the cycle rate to the energy curve, the brake selection is verified.

Dynamic Torque



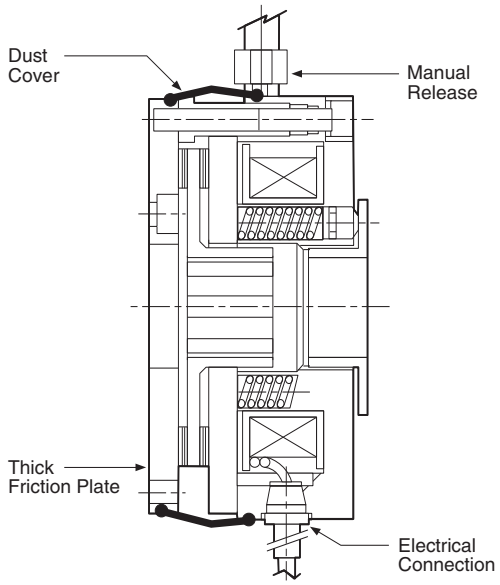


Energy Capacity



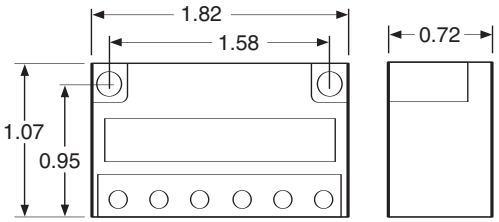
Note: To convert Joules/min. to ft.lbs./min, multiply times .7376

Fully Assembled Unit



Typical brake unit (VAR 2) with options installed

Connections



Rectifiers

AC Input	DC Output	Rectifier	Part No.
240/220 V	96 V	Half Wave	ACG830A1P1
415/380 V	190 V	Half Wave	ACG830A1P1
240/220 V	190 V	Full Wave	ACG830A1P2
110 V	96 V	Full Wave	ACG830A1P2

Max. current = 1 AMP CG830 A1P1
= 2 AMP CG830 A1P2

Mounting Options

Flange Type	Screw Kit	Mounting Style
Thick	Short	Standard – Customer Mounting via Hole Pattern H
Thin	Long	Customer Mounting via Hole Pattern E
None	Long	Customer Mounting via Hole Pattern E

How to Order

Specify

1. ERD Series

2. Size: 5, 10, 20, 35, 60, 100, 170, or 300

3. Variation

0 – No torque adjustment
1 – With torque adjusting screws
2 – With central torque adjusting ring
3 – With mounting holes for tachometer

4. Voltage

24 DC is standard

12, 96, 190, and 215 DC are modifications

5. Friction Carrier

Metallic carrier is standard

Thermoplastic carrier is available on sizes 5 and 10

6. Bore Size

ERD-5: 1/2" max
ERD-10: 5/8" max
ERD-20: 1" max
ERD-35: 1-1/8" max
ERD-60: 1-1/4" max
ERD-100: 1-3/8" max
ERD-170: 1-3/4" max
ERD-300: 1-3/4" max

7. Mounting Flange

Thick Flange is standard

Thin Flange available up to size 35

8. Mounting Screws

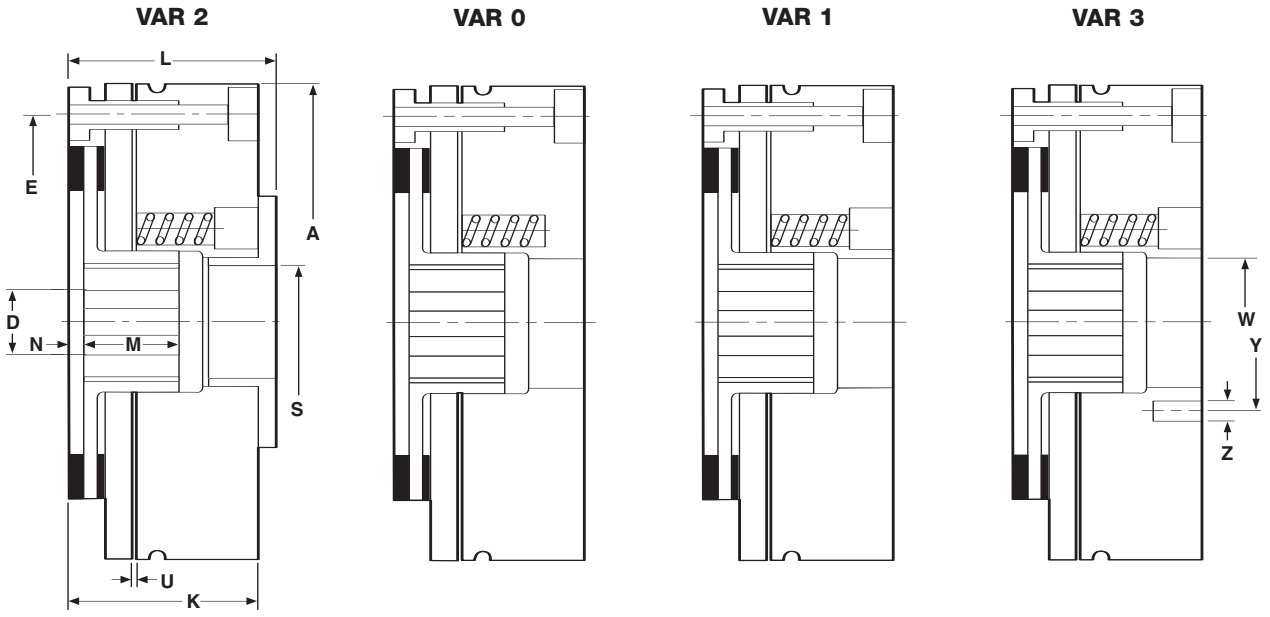
Short Kit is standard
Long Kit is available

9. Options

Dust Cover

Manual Release

Dimensions–Brake Units

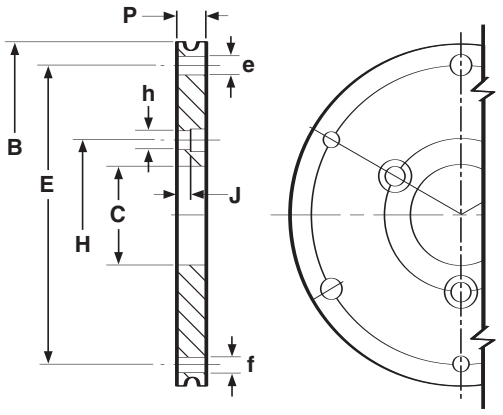


ERD Size	A	D Max.	E	K	L Max.	M +0.000/-0.008	N
5	3.307	0.5	2.835	1.378	1.575	0.709	0.071
10	4.016	0.625	3.543	1.614	1.831	0.787	0.098
20	5.000	1	4.409	1.870	2.165	0.787	0.138
35	5.787	1.125	5.197	2.146	2.559	0.984	0.118
60	6.378	1.25	5.709	2.520	2.933	1.181	0.118
100	7.402	1.375	6.693	2.795	3.209	1.181	0.118
170	8.465	1.75	7.717	3.268	3.780	1.378	0.177
300	9.921	1.75	9.055	3.819	4.528	1.575	0.197

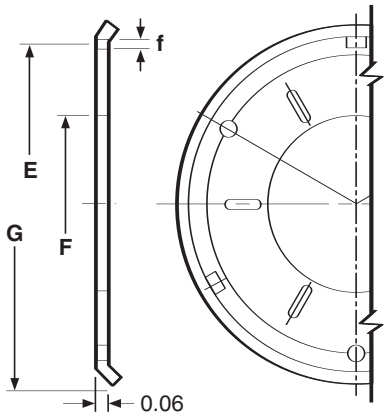
ERD Size	S	U +/-0.002	W	Y	Z Bolt Pattern	Variations Available
5	0.748	0.006	0.925	1.299	4xM4	0, 1, 2, 3
10	0.945	0.006	1.122	1.594	4xM5	0, 1, 2, 3
20	1.378	0.008	1.594	2.224	4xM5	0, 1, 2, 3
35	1.575	0.008	1.909	2.244	4xM5	0, 1, 2, 3
60	1.890	0.012	2.303			0, 2
100	2.047	0.012	2.500			0, 2
170	2.362	0.012	2.894			0, 2
300	2.874	0.012	3.484			0, 2

For service information, request manual P-229.

Friction Plates



Thick Friction Plate (Standard – all sizes)

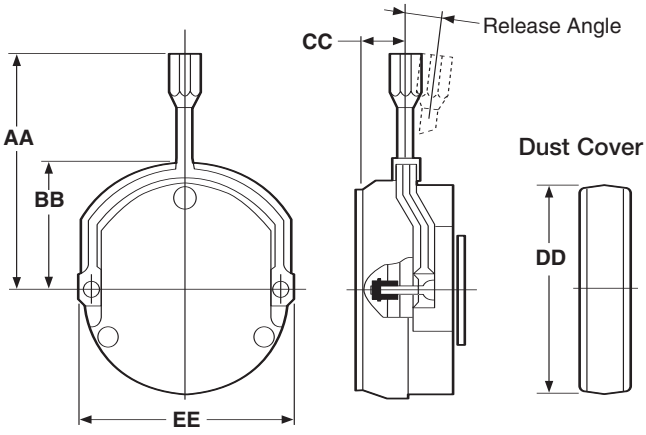


Thin Friction Plate (Sizes 5 thru 35 only)

ERD Size	B	C	E	e Bolt Pattern	f Bolt Clearance Holes	F	G	H	h Bolt Clearance Holes	J	P
5	3.268	0.787	2.835	3xM4	3x0.177	1.654	3.425	1.181	3x0.177	0.079	0.236
10	3.937	1.181	3.543	3xM5	3x0.217	2.126	4.213	1.772	3x0.217	0.079	0.276
20	4.921	1.575	4.409	3xM6	3x0.256	2.362	5.217	2.205	3x0.256	0.118	0.354
35	5.709	1.772	5.197	3xM6	3x0.256	2.953	6.004	2.441	3x0.256	0.118	0.354
60	6.299	2.165	5.709	3xM8	3x0.335	3.346	6.732	2.913	3x0.335	0.118	0.433
100	7.283	2.559	6.693	3xM8	3x0.335	3.858	7.717	3.307	3x0.335	0.118	0.433
170	8.346	2.953	7.717	6xM8	6x0.335			3.937	6x0.335	0.118	0.433
300	9.843	3.543	9.055	6xM10	6x0.413			4.724	6x0.413	0.118	0.433

The thick mounting flange provides the proper material and mounting tolerances for the brake. The thin mounting flange provides the proper material in applications where flatness, squareness and concentricity requirements are met on the machine already.

Manual Release



ERD Size	AA	BB	CC	DD	EE	Release Angle
5	3.86	2.09	0.67	3.46	3.46	10
10	4.21	2.44	0.71	4.17	4.17	8
20	5.08	2.99	0.98	5.20	5.20	7
35	5.47	3.39	0.87	5.98	5.98	7
60	6.75	4.09	1.61	6.06	6.54	7
100	7.74	4.72	1.73	7.01	7.36	7
170	9.57	5.51	2.09	7.99	8.78	10
300	12.44	6.38	2.36	9.33	10.33	10