

ALTRA INDUSTRIAL MOTION

# Electrically Released Spring-Set Brakes & Unibrake AC Motor Brakes



# Warner Electric

Founded in 1927, Warner Electric has grown to become a global leader in the development of innovative electromagnetic clutch & brake solutions. Warner Electric engineers utilize the latest materials and manufacturing technologies to design long life, easy-to-use clutches and brakes that provide improved accuracy and repeatability. Warner Electric offers the broadest selection of industrial clutches, brakes, controls and web tension systems available from a single manufacturer.

Reliable Warner Electric components are used in a wide range of markets including material handling, packaging machinery, food & beverage, elevator & escalator, turf & garden, agriculture, off-highway, forklift, crane and motion control. Applications include conveyors, lift trucks, wrapping machines, servo motors, capping equipment, combines, balers, baggage handling systems, military vehicles, hoists and lawn mowers.

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# Altra Industrial Motion

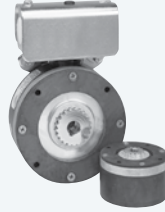
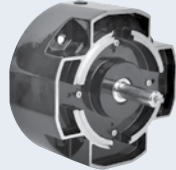

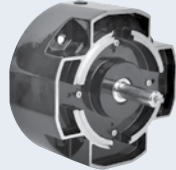

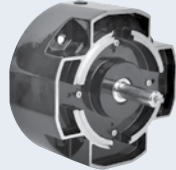

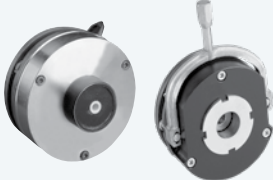
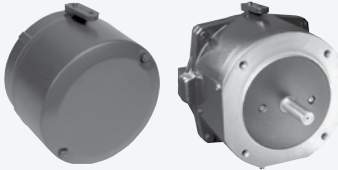
Altra is a leading global designer and manufacturer of quality power transmission and motion control products utilized on a wide variety of industrial drivetrain applications. Altra clutches and brakes, couplings, gearing and PT component product lines are marketed under the industries most well known manufacturing brands. Each brand is committed to the guiding principles of operational excellence, continuous improvement and customer satisfaction. Highly-engineered Altra solutions are sold in over 70 countries and utilized in a variety of major industrial markets, including food processing, material handling, packaging machinery, mining, energy, automotive, primary metals, turf and garden and many others.

Altra's leading brands include **Ameridrives**, **Bauer** Gear Motor, **Bibby** Turboflex, **Boston** Gear, **Delroyd** Worm Gear, **Formsprag** Clutch, **Guardian** Couplings, **Huco**, **Industrial** Clutch, **Inertia** Dynamics, **Kilian**, **Lamiflex** Couplings, **Marland** Clutch, **Matrix**, **Nuttall** Gear, **Stieber**, **Stromag**, **Svendborg** Brakes, **TB Wood's**, **Twiflex**, **Warner** Electric, **Warner** Linear and **Wichita** Clutch.

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# Electrically Released Spring-Set Brakes & Unibrakes

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# Packaged Performance Products

## Electromagnetic Clutches and Brakes

### Packaged Products Benefits

Warner Electric Packaged Products come pre-assembled, ready to install right out of the box.

Warner Electric Packaged Products consist of a single part number in most cases. One part number to inventory, one part number to track in your engineering system.

All Warner Electric packaged products incorporate our Autogap™ mechanism that automatically adjusts for wear. This eliminates the need for maintenance, but more importantly, it ensures the same engagement time cycle after cycle after cycle through the whole life of the unit ensuring consistent product manufacturing processes.

Warner Electric Packaged designs are available for:

- C-face mount applications
- Parallel shaft applications
- Base mount applications

### The Basics

The electric clutch and brake has been called the best thing that ever happened to the electric motor. It's simple, electric clutches and brakes do all the work, while permitting motors to run smoothly and continuously at their most efficient speed by connecting/disconnecting the motor and the load. Fast starts and stops, easy control interface, remote pushbutton operation and smooth acceleration and deceleration are outstanding user benefits.

### Reliable Performance

- High cycle rates
- Smooth soft starts
- Cushioned stops
- Accurate positioning
- Indexing
- Jogging
- Reversing
- Speed changing



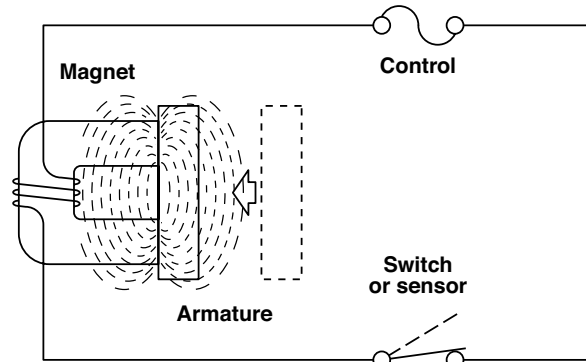


# Packaged Performance Products

## Electromagnetic Clutches and Brakes

### Principle of Operation

A key feature of Warner Electric brakes and clutches is the method of actuation. Like an electromagnet, they have two basic parts. A magnetic field is generated as soon as the current flows through the magnet coil. This draws the armature into direct contact with the magnet. The strength of the magnetic field is directly proportional to the amount of current applied. Full range torque control from 0 to 100% is as simple as turning the knob on a light dimmer.



### Fast and Accurate

The benefits of electric actuation combined with the use of small, low inertia components is fast response, high cycle rates, and increased accuracy. While other devices are often sluggish and slow to respond, electric brakes and clutches respond instantly, resulting in higher productivity and better consistency.

### Easy to Select

Most of the time, all you need to know is motor horsepower and the speed at the brake or clutch location. Warner Electric takes care of the rest. The performance you require is built in, and with the broad range of products to choose from, you won't have to compromise with a clutch or brake that's a little too big or a little too small.

### Maintenance Free

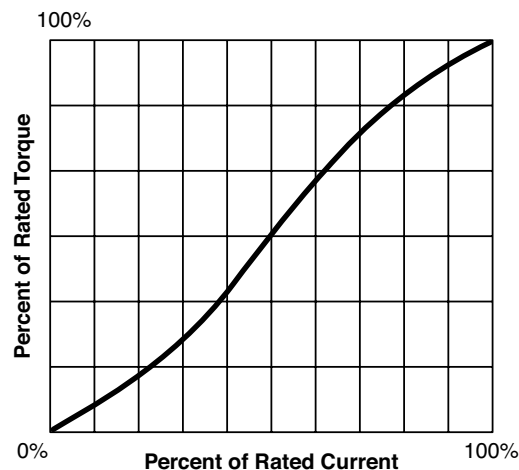
Warner Electric brakes and clutches are clean and quiet. They require no maintenance. They never need lubrication, and they're completely self adjusting for wear. No complicated air system or messy hydraulics. Warner Electric brakes and clutches are outstandingly trouble free.

### Controllable

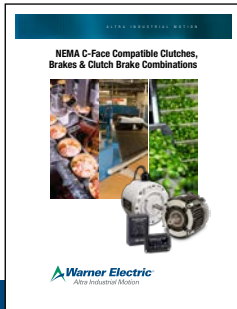
Electric brakes and clutches are incredibly easy to control. The shift from positive, instantaneous engagement to soft, cushioned starts and stops is as simple as turning a knob.



### Torque/Current Curve



# Packaged Performance Products



## NEMA C-face Clutches, Brakes and Clutch Brake Combinations P-8586-WE

### Electro Module

#### Individual Clutch and Brake Modules



#### EM Series

##### Modular Components that are Easily Combined

- 5 sizes
- 16 clutch and brake modules
- 16 to 95 lb. ft. torque range

Individual modules may be used in combination to form clutches, brakes or clutch/brake packages.

Electro Modules can be bolted directly to NEMA C-face motors or reducers, or base mounted for stand alone operation.

See P-8586-WE for Service Parts

### UniModule®

#### One Piece Preassembled Clutches and Clutch/Brakes



#### UM Series

##### C-face or Base Mounted Units

- 5 sizes
- 20 combinations
- 16 to 95 lb. ft. torque range

UniModule clutches and clutch/brake packages offer the ultimate in installation convenience.

Can be motor or reducer mounted, or used as a separate drive unit powered from a prime mover.

See P-8586-WE for Service Parts

#### UM Smooth-Start

##### Soft Engage Designs

- 5 sizes
- 10-57 lb.ft. torque range

Smooth-Start designs allow for a soft engage clutch and brake without sacrificing unit life.

#### UM-C Series

##### High Performance Version for High Cycle Rate Applications

- 3 sizes
- 6 combinations
- 16 to 95 lb. ft torque range

The UM-C units are UniModules with ceramic faced components, specifically designed for long life, high energy, and high cycle rate applications.

### Enclosed UniModule®

#### Preassembled Units Offer Clean, Quiet Operation



#### EUM Series

##### Totally Enclosed Clutch and Brake Packages

- 5 sizes
- 3 combinations
- 16 to 95 lb. ft. torque range

Totally enclosed, rugged enclosure keeps wear particles in and contaminants out. Finned for rapid heat dissipation and long life.

See P-8586-WE for Service Parts

#### EUM-W Series

##### Washdown Version

- 5 sizes
- 8 combinations
- 16 to 95 lb. ft. torque range

The washdown version of the EUM uses stainless steel shafting, USDA approved coating, corrosion resistant fasteners and special seals.

See P-8586-WE for Service Parts

# Packaged Performance Products



## Shaft Mounted Clutches & Brakes P-8587-WE



## Base Mounted Clutch/Brake Combinations P-8588-WE

### Electro Clutches Electro Brakes

#### Shaft Mounted Units



#### EC Series Clutches

##### Pre-Packaged Convenience

- 6 sizes
- 16 to 465 lb. ft. torque range

All the features of an electric clutch in a convenient, pre-packaged assembly. Mounts on any through shaft or extended motor shaft. Easy-to-assemble with standard sheaves, pulleys, gears and sprockets. Packaged design. No assembly required. Long life. No maintenance.

See P-8587-WE for Service Parts

#### EB Series Brakes

##### Torque Arm Mounting

- 6 sizes
- 16 to 465 lb. ft. torque range

Torque arm feature makes Electro Brakes easy to mount on any motor or through shaft. Packaged design. No assembly required. Long life. No maintenance.

See P-8587-WE for Service Parts

### Advanced Technology Clutches and Brakes

#### Extra Rugged Design



#### ATC Series Clutches ATB Series Brakes

##### Replaceable Friction Faces

- 3 sizes
- 25 to 115 lb. ft. torque range

Rugged, heavy duty units designed for extra long life and efficient operation. Cast components for durability. Finned armatures for high heat dissipation.

Friction faces are designed to allow for replacement without replacing valuable, non-wear components. Provides superior wear life with reduced engagement noise.

See P-8587-WE for Service Parts

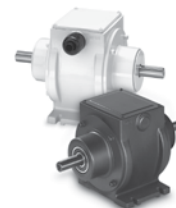
#### SFP Series Clutches

- Pre-assembled SF – No assembly required
- Ball bearing mounted field and armature
- 70 inch pound and 270 inch pound sizes
- Bore sizes from 3/8" to 1/2" and 1/2" to 1"

SFP clutches provide the simplicity and cost efficiency of the Basic SF design, but with a ball bearing mounted armature hub.

### Electro Pack Clutch/Brakes

#### Foot Mounted Units



#### EP Series

##### Totally Enclosed Units

- 8 sizes
- 15 lb. to 1350 lb. ft. torque range

Electro Packs are rugged, pre-assembled clutch and brake combinations in enclosed, foot mounted housings.

See P-8588-WE for Service Parts

#### EP-C Series

##### High Performance Version

- 2 sizes
- 15 and 70 lb. in. torque

Ceramic faced wear components provide long life for high cycle rate use. Consistent torque and cycle repeatability with Smooth-Start/stop control.

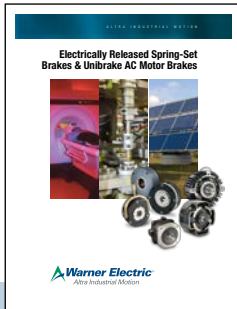
#### EP-W Series

##### Washdown Design

- 2 sizes
- 70 and 270 lb. in. static torque ranges
- USDA approved coating
- Stainless steel shaft and hardware
- Available in 24 or 90 volt DC



# Packaged Performance Products



## Electrically Released Spring-Set Brakes & Unibrake AC Motor Brakes P-8589-WE

### Spring-Set Brakes

For Power-Off Static Holding and Emergency Stopping Applications

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



#### ERS Series

Static Engaged

- 5 sizes
- 1.5 to 100 lb. ft. holding torque

Designed for static holding. ERS models feature multiple coil springs that force armature and friction faces together to generate braking torque when power is off. The Electromagnet counters the spring force to disengage the brake when power is applied.

Although this brake should be engaged only when the shaft is at rest, it can occasionally act as a dynamic braking device to stop a rotating load in an emergency situation.

#### Spring Set Brake Module

- 7 to 100 lb. ft. holding torque
- NEMA C-face version of the ERS Series



#### ERD Series

Dynamic Braking

- 8 sizes
- 4 to 221 lb. ft. holding torque

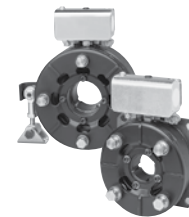
ERD units are electrically released, static and dynamic engaged, spring-set brakes for power-off load holding applications. These spring-set brakes automatically stop and hold a load in the event of a power failure or other emergency stop situations. Fully dynamic friction material allows for repeated braking cycles from full motor speed with no torque fade. An optional manual release allows the brake to be released by hand.

#### Unibrake Series AC Motor Brakes

- Spring Set/Solenoid Released
- Direct acting/manual release standard 3 families
- 3, 6, 10 and 15 lb. ft. capacity
- Steel or cast iron covers
- Rear mount or double C-face designs

### Permanent Magnet Brakes

For Power-Off Dynamic Stopping and Cycling Applications



#### FB Series

Shaft Mounted, Dynamic Braking

- 3 models
- 10.5 to 56 lb. ft. static torque

Permanent magnet brakes are designed to dynamically stop and hold a moving load and also for high cycle rate stopping. Electric power to the coil nullifies the attraction of the permanent magnet, releasing the brake.

FB models are pre-assembled and feature a torque arm for convenient shaft mounting.

See P-8590-WE for Service Parts.

#### ER Series

Flange Mounted, Dynamic Braking

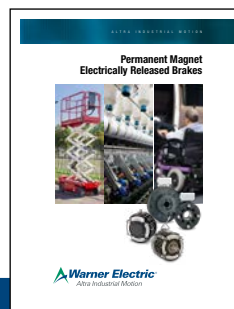
- 5 models
- 10.5 to 400 lb. ft. static torque

The ER style brake offers a bulk head flange mounting system, the highest torque rating offered by Warner Electric in the power released series, high cycle rate capability, and excellent life. They require some assembly.

See P-8590-WE for Service Parts.

# Packaged Performance Products

## Permanent Magnet Electrically Released Brakes P-8590-WE



### Electro Module

#### C-face Brake Modules



#### EM-FBC Clutch/Brakes

##### Individual Module Components

- ❑ 3 sizes
- ❑ 10.5 to 56 lb. ft. torque range

Used in combination with an Electro Module motor or input clutch module for clutch/brake applications. Electrical power applied to the brake coil nullifies the permanent magnets' force and the brake releases. No springs to limit cycle rates.

#### EM-FBB

##### Brake Modules

- ❑ 5 sizes
- ❑ 10.5 to 56 lb. ft. torque range

Use for brake alone applications. Mounts between a C-face motor and reducer. Recommended for dynamic cycling operations only.

#### EM-MBFB

##### Motor Brakes

- ❑ 4 sizes
- ❑ 56C to 215C frame motors

Mounts to the back of a double shafted C-face motor. Never needs adjustment or lubrication.

### UniModule

#### C-face Brake Modules



#### UM-FBC Clutch/Brakes

##### One Piece Packages

- ❑ 4 sizes
- ❑ 7 combinations
- ❑ 10.5 to 56 lb. ft. static brake torque

UniModule pre-assembled clutch and electrically released brake packages are available in both C-face and base mounted versions.

Unique design employs powerful permanent magnets for maximum torque when power is removed from the brake coil. A small amount of electrical power applied to the brake coil nullifies the permanent magnets and the brake releases. No springs to limit cycle rates. Never any adjustment. No lubrication. These brakes are recommended for dynamic cycling operations only.

### Enclosed UniModule

#### C-face Brake Modules



#### EUM-FBB Brake Modules

##### Totally Enclosed

- ❑ 4 sizes
- ❑ 6 to 32 lb. ft. static torque

Totally enclosed UniModule electrically released brake packages keep contaminants out and wear particles in for clean, quiet operation. Assembly, alignment, and preburnishing have been done at the factory. Use for brake alone applications, mountings between a motor and a gear reducer. Select the torque required for the application. Higher torque brakes stop loads faster. Lower torque models provide softer stopping to prevent boxes on conveyors from tipping or skidding.

#### EUM-MBFB

##### Motor Brakes

- ❑ 4 sizes
- ❑ 56C to 215C frame motors

UniModule motor brakes are used for dynamic stopping and holding of loads when power is removed from the motor. Typical applications include conveyors, process equipment, and lifting devices. Mounts to a double shafted C-face motor.





# Spring-Set Brakes

# Unibrake AC Motor Brakes



**A**

# Selection Guide Electrically Released Brakes

Electrically Released brakes fall within two categories: **Static Engage** and **Dynamic Stopping**. Static engage brakes are similar in function to an automotive parking brake: while they can be used to stop in an emergency, they are primarily to hold a load stationary after the load is already stopped. A static engage brake that is used as an active stopping brake at high cycle rate will wear out quickly.

Common industrial static applications are vertical or incline conveyors. The drive and motor may decelerate the conveyor to a stop and then engage the brake to hold the load in position. A second common application is where a servo or step motor will accelerate and decelerate the load and the brake holds the load in proper position.

Dynamic engage brakes are those designed to actively stop and hold the load. In these applications the brake is the force that stops the load as well as hold it. Dynamic engagement brakes are designed to provide appropriate life in applications where they experience frequent cycles per minute.



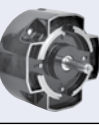







All electrically released brakes will engage when power is turned off and as such will provide emergency stop braking.

## Static Engage Brakes

- ERS
- ERD
- EM/ERS

## Dynamic Engage Brakes

- FB
- ER
- EM-FBB, FBC, MBFB
- UM-FBC and MBFB
- Unibrake

	Model	Description / Application
Static Engage See Catalog P-8589-WE	ERS 	The ERS family of brakes is a spring set/ electrically released design. Excellent for use in holding applications. Torque ranges from 1.5 to 100 foot pounds.
	ERD 	The ERD family of brakes is a spring set/ electrically released design similar in concept to the ERS designs. The ERD family extends the torque ratings from 3 to 220 foot pounds. The ERD family also includes an adjustable torque option and manual release option.
	EM/ERS 	For C-face mounted applications the EM/ERS provides the ERS design with the easy to mount C-face mounting.
Dynamic Engage See Catalog P-8590-WE	ER 	ER brakes provide a permanent magnet engage/ electrically released design. The customer assembled design of the ER family allows for ease of installation into unique customer applications requiring torque ranges from 10 to 400 foot pounds.
	FB 	The bearing mounted FB products are a permanent magnet engage/electrically released design. The bearing mounted design allows for simple mounting using just a torque arm for applications where a pre- assembled unit is desired and no mounting flange is available. Torque ranges from 10 to 56 foot pounds.
	FBB 	The C-face mount FBB units are designed to mount on the output side of a C-face motor where a brake only configuration is appropriate.
	MBFB 	The MBFB designs are the same as the FBB, except they are for the back of motor mounting for double C-face motors.
	FBC 	The C-face mount FBC units are designed to work with the clutch design for applications needing an electrically engaged clutch and electrically released brake.
See Catalog P-8589-WE	Unibrake 	The Unibrake designs are a spring set/ solenoid release brake for mounting to the back of the motor. This is a lower cost, lower cycle rate design compared to the MBFB. Adjustable torque and manual release are standard features.
	Unibrake Coupler 	The coupler design of the Unibrake family is designed for mounting on the output side of a motor where a spring set/solenoid release brake is desired. Adjustable torque and manual release are standard features.

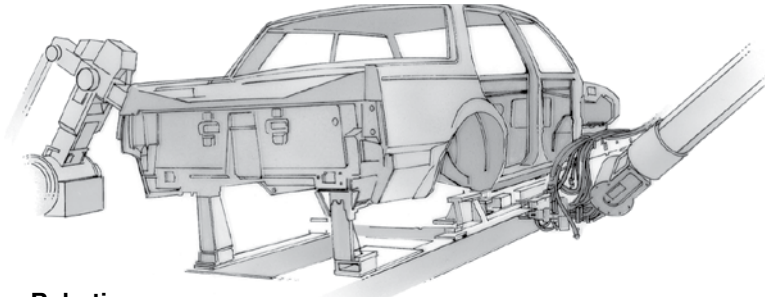
## Selection Guide Electrically Released Brakes

	Load Holding	Manual Release	Bearing Mount	Flange Mount	C-Face Mtg Drive Side	C-Face Mtg Non-Drive Side	Coil Voltage	Adjustable Torque
	✓						DC	
	✓	✓					DC	✓
	✓				✓		DC	
	✓			✓			DC	✓
	✓		✓				DC	✓
	✓				✓		DC	✓
	✓					✓	DC	✓
	✓				✓		DC	✓
	✓	✓				✓	AC	✓
	✓	✓			✓		DC or AC	✓



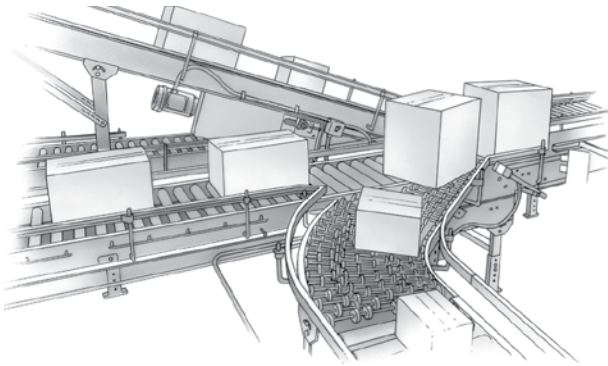
# Spring-Set Electrically Released Brakes

## Spring Set Brakes



### 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.

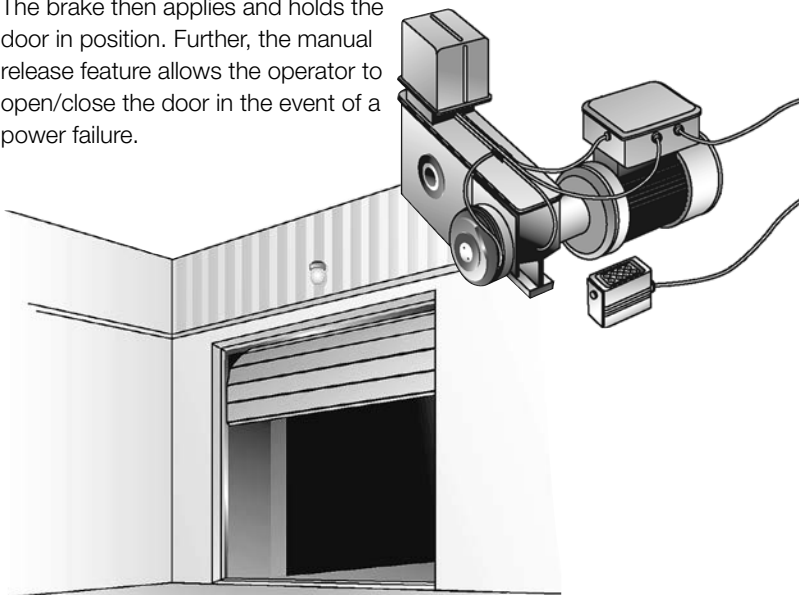


### Medical Equipment

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.

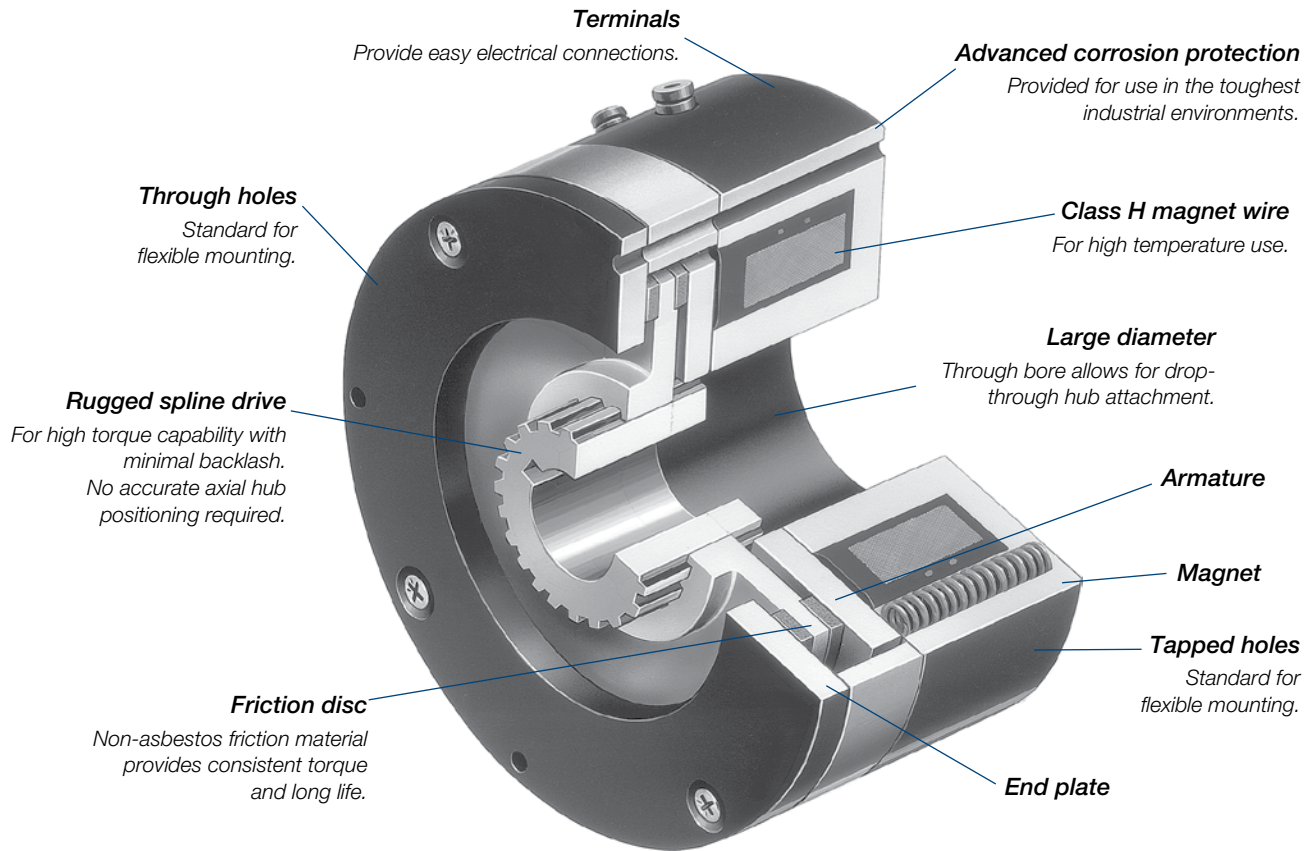


### Mobile Equipment

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.

# ERS Series Electrically Released 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.
- UL listed – All sizes.

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

### 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.

# ERS Series Electrically Released Brakes

## Selection



### 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

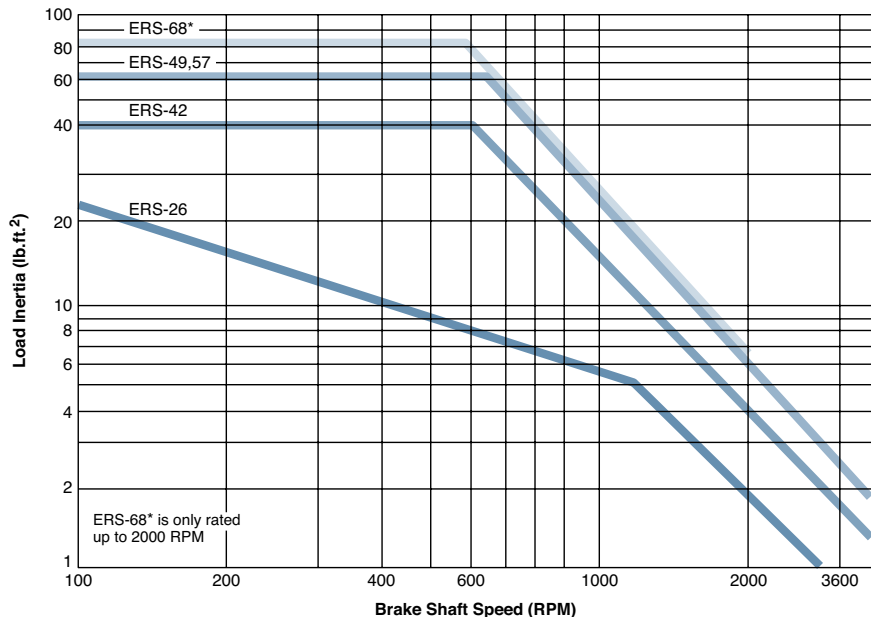
ERS Brakes are available in five models for an optimum size to match your application requirements. Static torque capabilities range from 1.5 lb.ft. to 100 lb.ft.

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



# ERS Series Electrically Released Brakes

## 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<sup>2</sup> = system inertia at the brake location in pound-feet squared (lb.ft.<sup>2</sup>)

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 110.

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

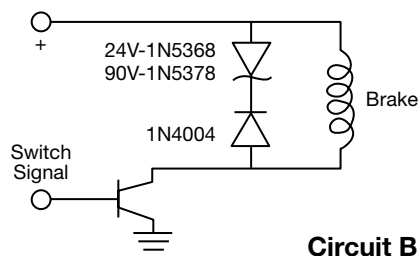
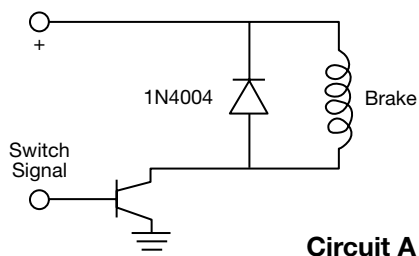
#### Select Control

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)

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



# ERS Series Electrically Released Brakes

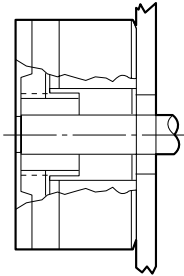
## Armatures/Hubs

### 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.

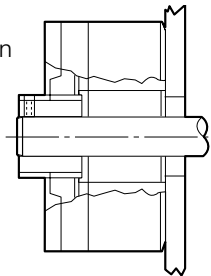
#### Recessed Hub

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



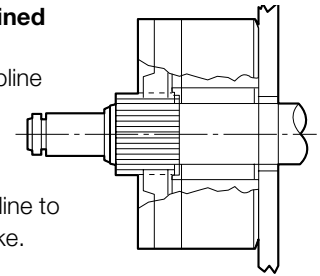
#### Extended Hub

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



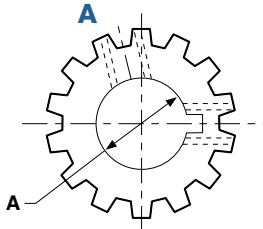
#### Mating Splined Member

Machined spline on drive member matches armature spline to operate brake.

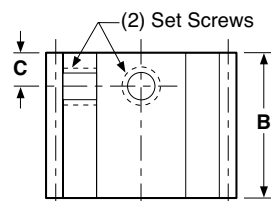
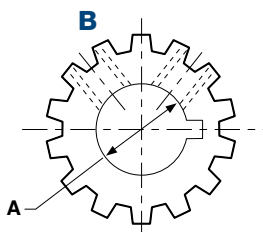


## Drive Hub/Spline and Interface Data

### 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
ERS-26	.2525/ .2505	1/16 x 1/16	B	.600	.135	6-32	14	20/40	30°
	.3150/ .3130	1/16 x 1/16	B						
	.3775/ .3755	3/32 x 3/32	B						
ERS-42	.3775/ .3755	3/32 x 3/32	A	.700	.150	8-32	19	16/32	30°
	.5025/ .5005	1/8 x 1/8	A						
	.6275/ .6255	3/16 x 3/16	A						
ERS-49	.7525/ .7505	3/16 x 3/16	B	.800	.160	10-32	21	16/32	30°
	.3775/ .3755	3/32 x 3/32	A						
	.5025/ .5005	1/8 x 1/8	A						
ERS-57	.6275/ .6255	3/16 x 3/16	A	.800	.190	1/4-20	15	10/20	30°
	.7525/ .7505	3/16 x 3/16	B						
	.8775/ .8755	3/16 x 3/16	B						
ERS-68	1.0025/1.0005	1/4 x 1/4	B	.900	.190	1/4-20	22	10/20	30°
	1.0025/1.0005	1/4 x 1/4	A						
	1.1275/1.1255	1/4 x 1/4	A						
	1.2525/1.2505	1/4 x 1/4	A						
	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.

# ERS Series Electrically Released Brakes

## Mounting

### Mounting Orientation

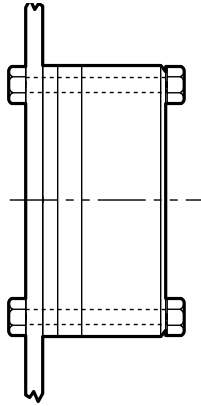
ERS Brakes are easily modified to accommodate different mounting orientations. The brake can be mounted with either face against the mounting surface. The following mountings are possible with the standard ERS brake.

### 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.

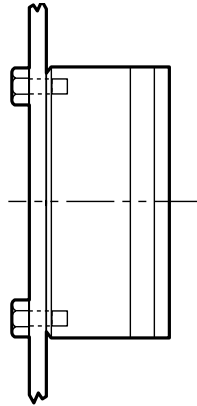
#### Through Bolt

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



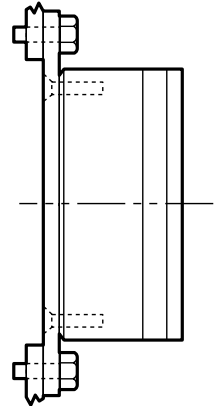
#### Tapped Hole

Works well where through bolt mounting is impractical.

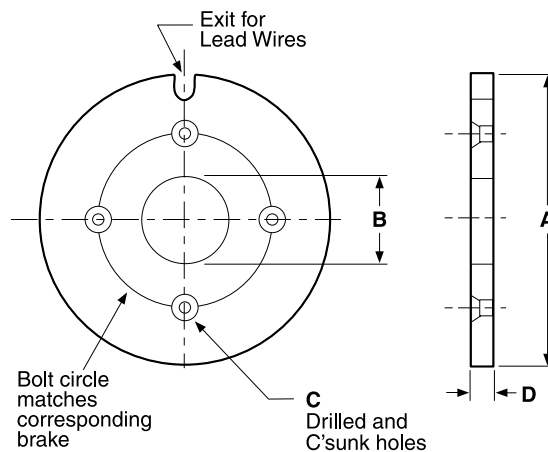


#### Flange

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

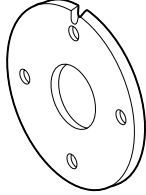
Note: Holes for attaching flange to mounting surface to be provided by customer.

# ERS Series Electrically Released Brakes

## Ordering Information

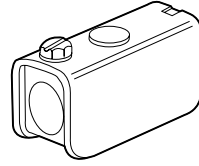
### Accessories

#### Adapter Flanges



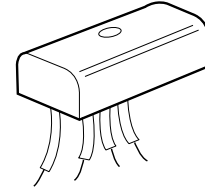
Model	Part Number
ERS-26	686-0182
ERS-42	686-0183
ERS-49	686-0184
ERS-57	686-0185
ERS-68	686-0186

#### 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 CTL-1 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 110-111. 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

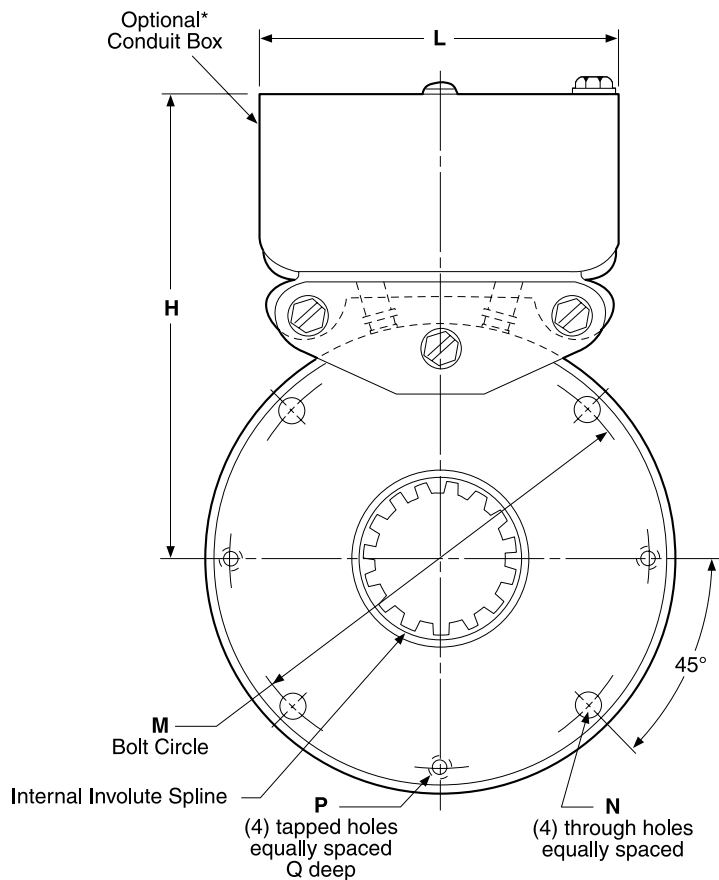
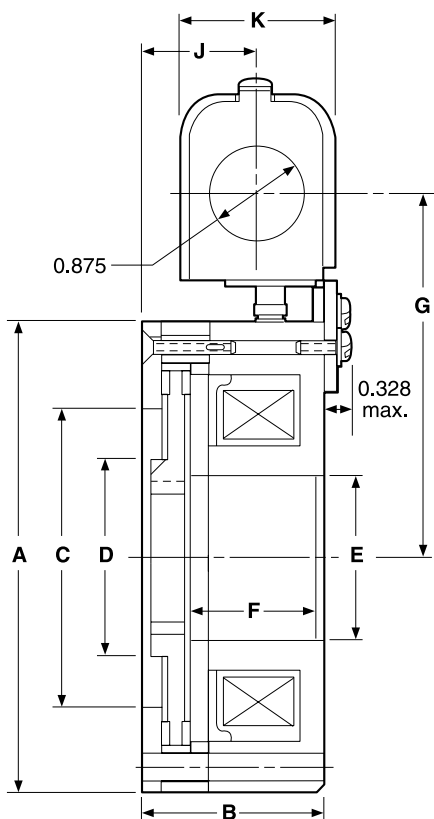
Model	Bore Dia.	Part Number
ERS-26	.250	5158-541-006
	.312	5158-541-007
	.375	5158-541-008
ERS-42	.375	5151-541-002
	.500	5151-541-003
	.625	5151-541-004
	.750	5151-541-005
	.375	5155-541-002
ERS-49	.500	5155-541-003
	.625	5155-541-004
	.750	5155-541-005
	.875	5155-541-006
	.500	5153-541-004
ERS-57	.625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

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



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



# ERS Series Electrically Released Brakes

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

### Dimensions

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)		Weight (lbs.)	
						Unit	Hub	Unit	Hub
ERS-26	24V	17.6	0.733	32.75	1.5	0.03	0.004	1.20	0.06
	90V	16.0	0.178	506.5					
ERS-42	24V	23.3	0.973	24.67	7	0.14	0.040	2.50	0.20
	90V	21.5	0.239	376.2					
ERS-49	24V	27.3	1.136	21.12	15	0.45	0.060	4.30	0.25
	90V	25.8	0.287	313.6					
ERS-57	24V	36.2	1.510	15.9	34	0.54	0.110	6.50	0.38
	90V	35.2	0.391	230.1					
ERS-68	24V	54.9	2.286	10.5	100	1.44	0.550	11.30	0.75
	90V	51.9	0.577	155.9					

# 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



Sizes 50 & 180

Size 210 & 215

**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 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

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)	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

# 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

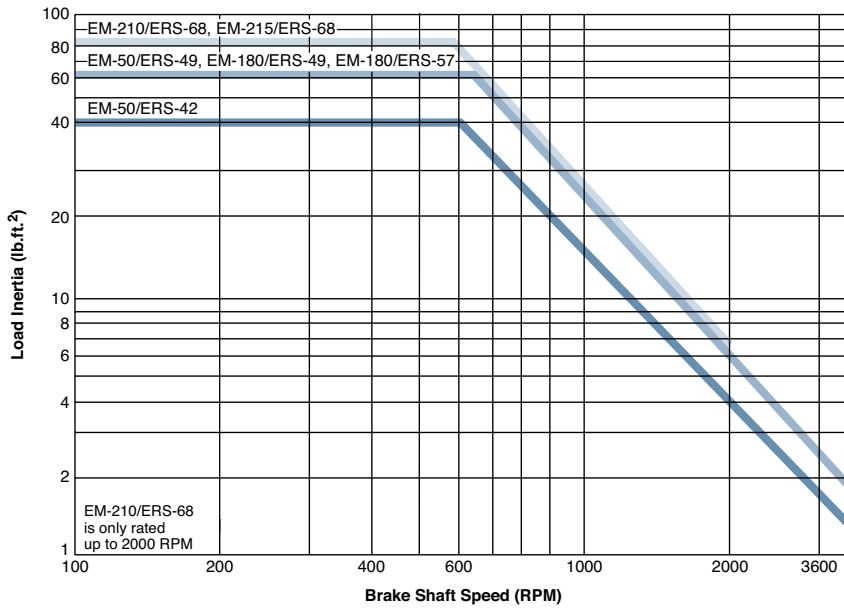
#### 3. System Inertia/Emergency Stop

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.

# Spring-Set Brakes Electrically Released Brakes

## 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

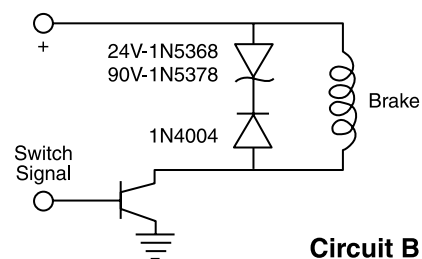
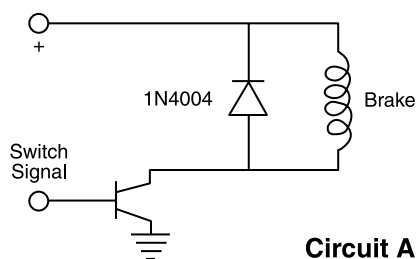
SSBM brake modifications, such as special voltages, rear motor mounting, and low torque units are available.

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

## Brake Apply/Release Time (Typical Values)

Model	Brake Apply Time (Seconds)					
	Brake Release 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	0.07	0.08	0.15	0.15	0.02	0.02
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	0.16	0.20	0.20	0.20	0.03	0.03
EM-215/ERS-68	0.16	0.20	0.20	0.20	0.03	0.03

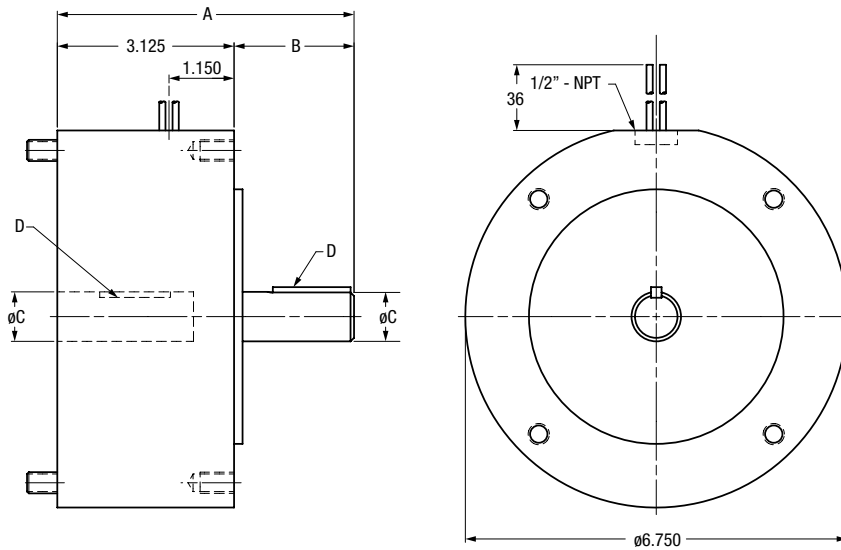
Note: Release and Apply Times are armature engagement and release only.



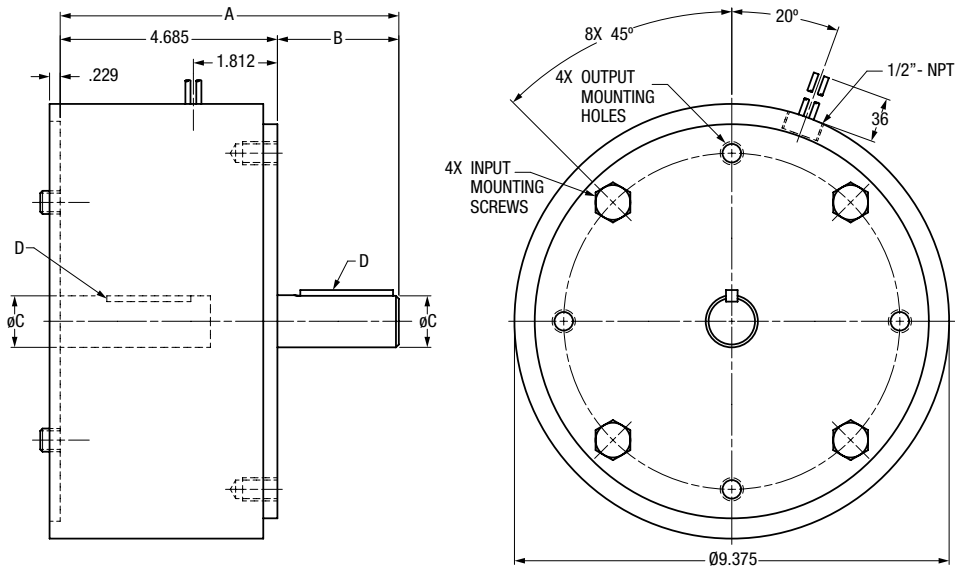
# Spring-Set Brakes Electrically Released Brakes

## 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.



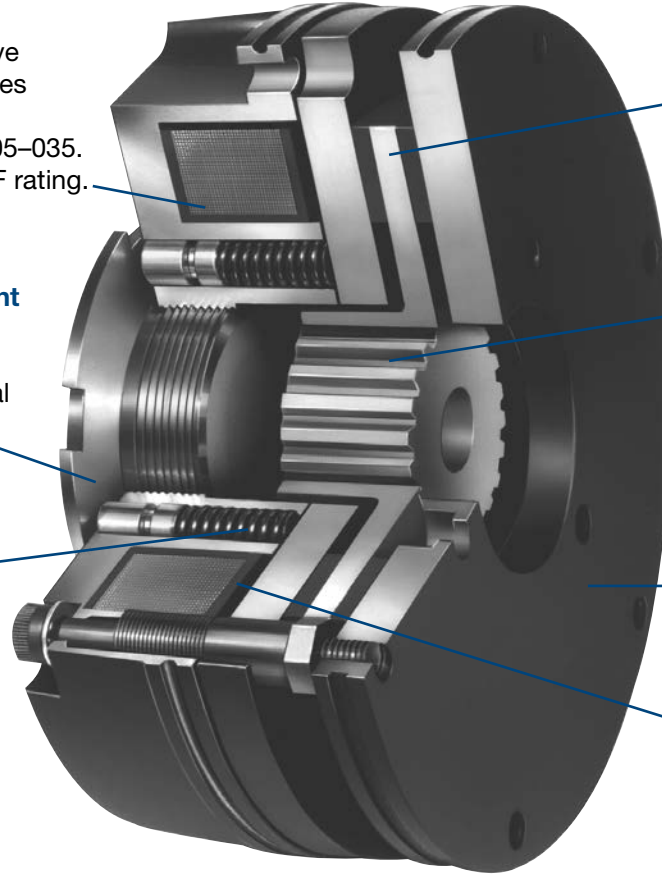
# ERD Series Electrically Released Brakes

## The Inside Story

**Continuous duty coil** is epoxy-sealed; windings have Class F insulation. Lead wires have standard Class B insulation rating on sizes 005–035. Sizes 060–300 have Class F rating.

**Central Torque Adjustment (VAR 02)** allows braking torque adjustment down to 50% of nominal rating; ideal for controlling stopping distances.

**Compression Springs** are used to provide balanced armature plate loading.



**Friction Disc** has double friction surfaces for increased torque in small package size.

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

**Friction Flange** can easily be 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** is factory pre-set and easy to adjust during field maintenance.

ERD Series brakes are designed to safely keep the load in position in the event of a power or motor failure, whether intentional or accidental.

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.

An optional manual release allows the operator to safely move the load even when no power is available.

Brakes are available in eight different sizes ranging from 3.3 inches to 9.9 inches in diameter with torque capacities from 4 to 220 lb.ft.

## Features/Benefits

- Dynamic friction material can stop loads from motor speeds up to 3600 RPM.
- Few moving parts means quiet operation.
- Lead and asbestos free, dynamic friction material is suited for high cycle rates.
- Variety of voltages available.
- Simple DC control (or AC with available rectifiers).
- Low power requirements for energy savings.
- Bi-directional stopping capability.
- Epoxy encapsulated coil for uniform heat transfer.
- Corrosion resistant.
- Low inertia rotating parts.
- Splined hub for quiet dependable operation.
- Metric and inch standard bore sizes.

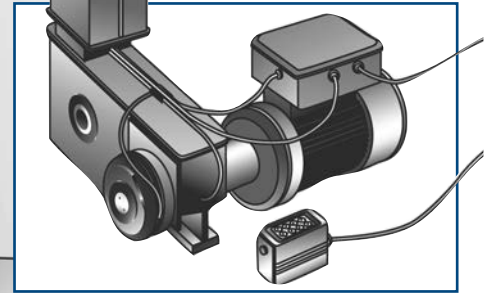
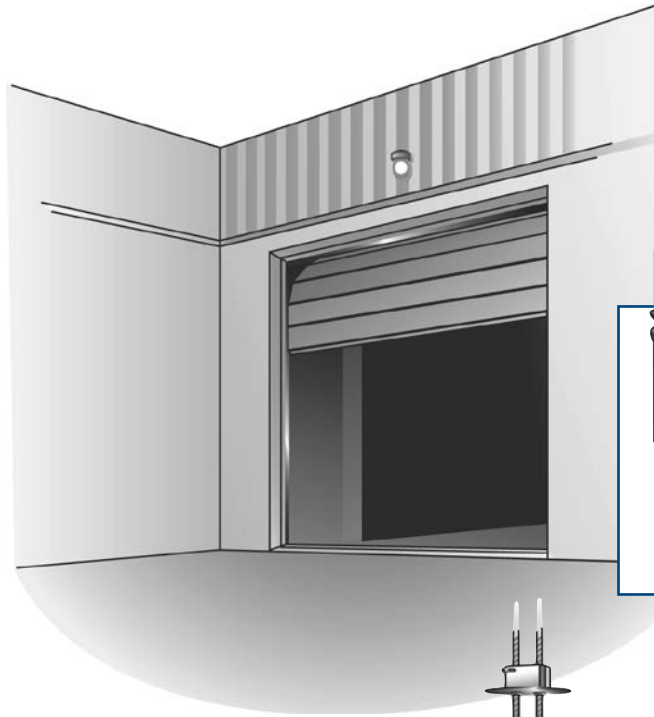
**WARNING** For general use in horizontal shaft applications only. For possible vertical applications, contact technical support.

# ERD Series Electrically Released Brakes

## Applications

As a fail-safe, power-off brake, the ERD family is ideally suited for such load-stopping and holding applications as:

- Conveyors
- Machine Tools
- Robotics
- Medical X-Y Positioning
- Scooters
- Floor Sweepers/Cleaners
- Motor Brakes
- Overhead Doors
- Hoist/Winch
- Fork Lift

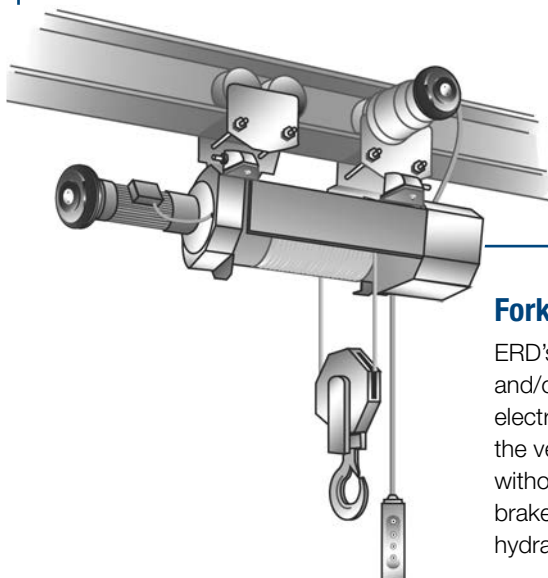
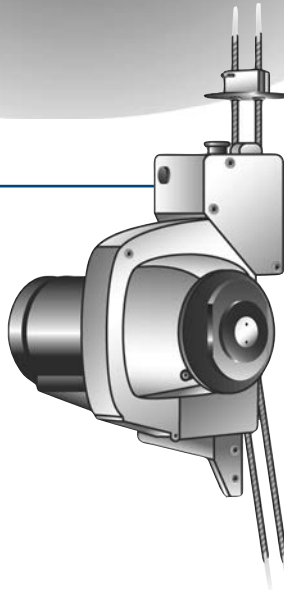


## Overhead Door

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.

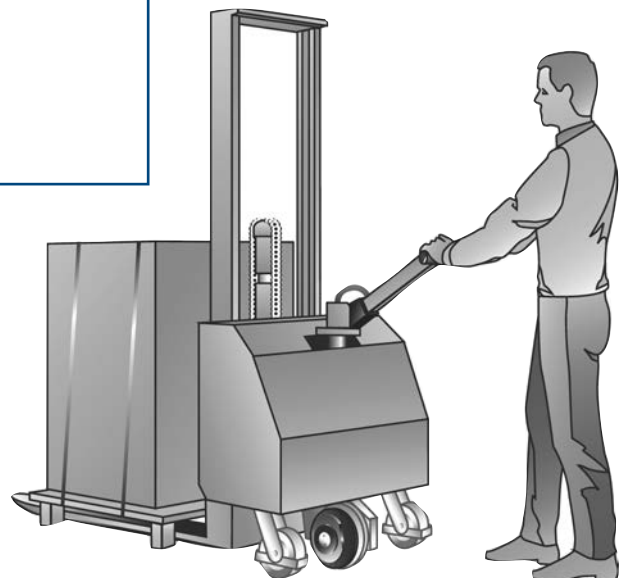
## Hoist/Winch

The ERD with central torque adjustment can be used to consistently 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.



## Fork Lift

ERD's are used as safety and/or parking brakes on electric fork trucks to hold the vehicle on inclines etc. without the need for manual brake linkage or expensive hydraulic brakes.



# ERD Series Electrically Released Brakes

## Selection Procedure

Proper fail-safe 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:

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

where:

- T = Dynamic Torque, ft.lb.
- N = Motor Speed, RPM
- P = Motor Horsepower
- K = Momentary Peak Torque Factor (Typically 2.5)

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

### 3. Energy Capacity (Heat Dissipation)

Sizing of the ERD 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:

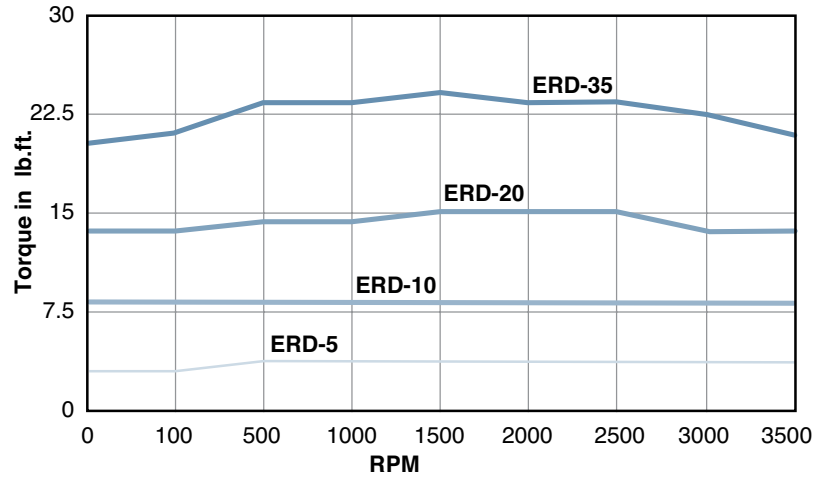
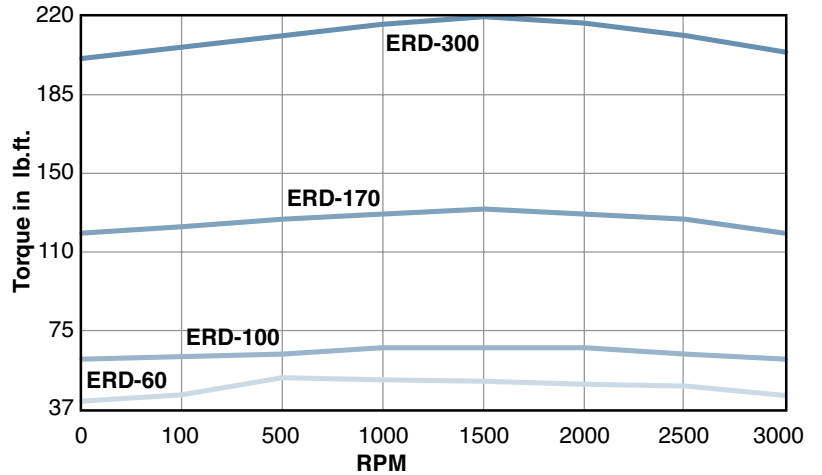
$$E = 1.7 WR^2 \left( \frac{N}{100} \right)^2$$

where:

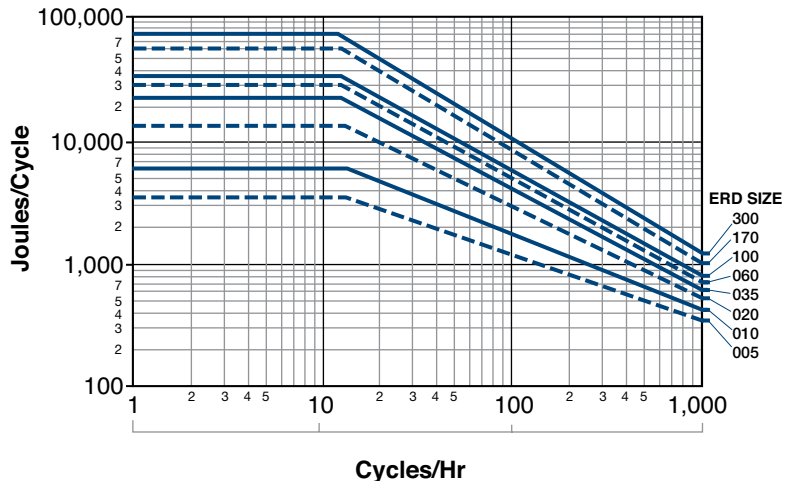
- E = Single Cycle Energy, ft.lb.
- WR<sup>2</sup> = Load Inertia, lb.ft<sup>2</sup>
- N = Speed, RPM

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

## Dynamic Torque



## Energy Capacity (Heat Dissipation)



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

# ERD Series Electrically Released Brakes

## Specifications

	Options	Units	ERD 5	ERD 10	ERD 20	ERD 35	ERD 60	ERD 100	ERD 170	ERD 300
Holding Torque		in.lb.	45	85	175	310	530	890	1500	2650
		ft.lb.	4	7	15	26	44	75	125	221
Maximum Speed		RPM	3600	3600	3600	3600	3600	3600	3600	3600
Rotating Inertia	S	lb.in.2	0.041	0.137						
	M	lb.in.2	0.103	0.321	0.957	2.529	7.415	12.472	14.010	29.386
Current Draw		Amps								
	24 VDC		0.83	1.03	1.22	1.61	1.94	2.35	2.73	4.11
	103.5 VDC*		0.21	0.26	0.31	0.41	0.49	0.57	0.69	1.122
	207 VDC*		0.09	0.12	0.14	0.18				
Resistance at Ambient Temperature	24 VDC	Ohms	28.9	23.4	19.6	14.9	12.4	10.22	8.78	5.83
	103.5 VDC*		454	372	310	233	166.2	168.6	139.2	85.63
	207 VDC*		2380	1813	1545	1175				
Weight		lbs	2	4	7	10	14	22	34	57

\* The controls designed on pages 130 and 131 provide output voltages to operate these brakes.

## Ordering Procedure

### Specify:

- Size: upon sizing criteria, select a size.  
5, 10, 20, 35, 60, 100, 170, or 300
- Variation:  
0 – No torque adjustment  
2 – With central torque adjusting ring
- Friction Disc:  
Metallic carrier is standard.  
Thermoplastic carrier is available on sizes 5 & 10.  
High torque carrier available on sizes 060 through 300.
- Options:  
Dust Cover  
Manual Release
- Friction Flange & Mounting Screws:  
Thick Flange is standard –  
Requires Short Screws.  
Intermediate Flange available up to Size 35  
– Requires Long Screws.  
No Mounting Flange is an option –  
Requires Long Screws.

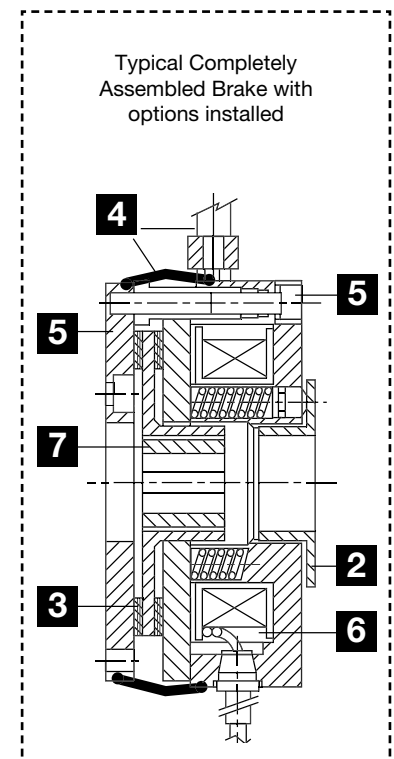
- Voltage:  
24 DC is standard.  
103.5 (90)\* & 207/215\* DC are modifications.
- Bore Size:  
Pilot bored hubs available in all sizes. See table for US-English and Metric bore sizes available by ERD size.  
Special bores available on request.
- Detection Kit – Micro Switch  
For Service Manual, request catalog P-229. This option not retrofittable. Requires a 25 piece minimum order for sizes 005 thru 035.

### Caution:

These units are designed for dry operation. The brake must be free from oil and grease.

Exceeding the maximum rotation speed listed in the catalog will invalidate the guarantee.

\* Coil voltages can vary slightly depending on unit size.

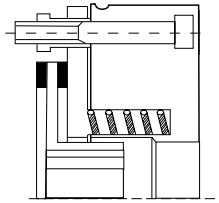




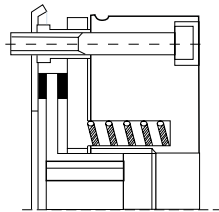


# ERD Series Electrically Released Brakes

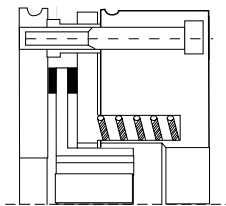
## 4 Mounting Options (by customer)



**No Friction Flange**  
Requires long screw kit

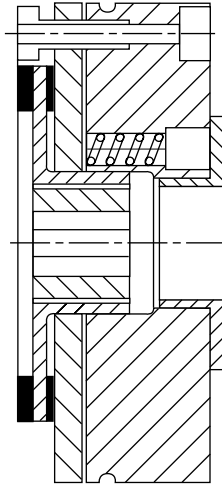


**Intermediate Friction Flange**  
Requires long screw kit  
Available on sizes 005 thru 035 only.



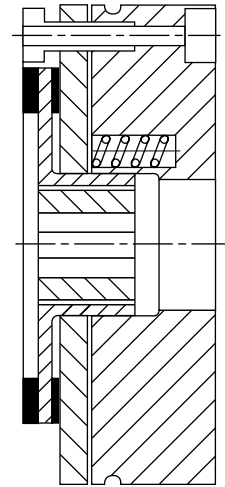
**Thick Friction Flange (Standard)**  
Requires short screw kit

## 2 Magnet Assembly Variations



**VAR 02**

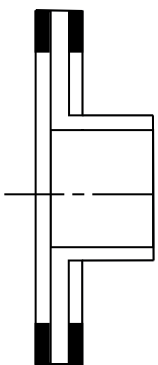
- Torque reduction up to 50% by loosening one nut.
- Available in all sizes.
- Central nut has several “Detents” per turn allowing accurate torque adjustment.
- The brake is factory set at the minimum torque (50% of max. torque).



**VAR 00**  
No torque adjustment possible

- Available in all sizes.
- No hand release option available.

## 3 Rotor/Friction Disc

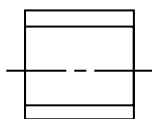


Available in two styles

- M – Metallic (Standard)
- S – Thermoplastic (Low inertia)  
Sizes 005 & 010 only

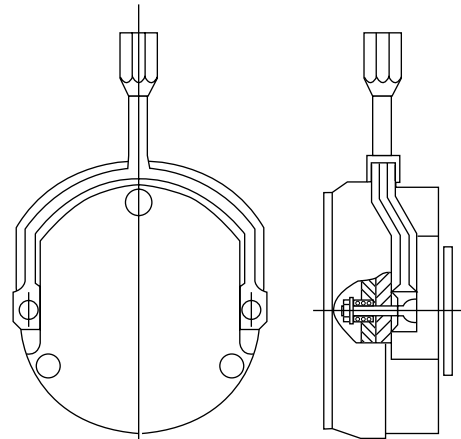
- Large thermoplastic bore hubs (Available in sizes 005 and 010 only)
- Large bore metallic disc (Available in sizes 005 thru 035)
- High torque metallic discs (Available in sizes 060 thru 300. Requires lower speed of rotation.)

## 7 Hub



See Table for hub, bore and keyway size availability by ERD size.

## 4 Manual Release (Optional)



Automatically returns to “neutral position” when released, thereby restoring holding torque to the brake.

Designed to be retrofitted, except to VAR 00.

## 4 Dust Cover (Optional)

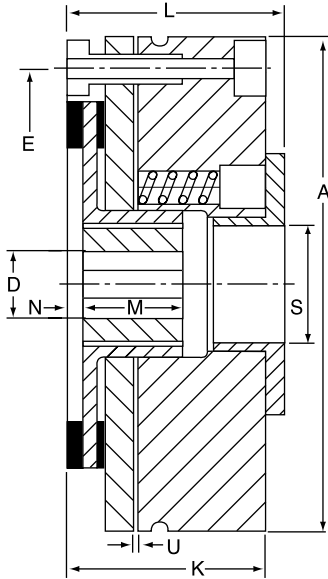
Available in all sizes.



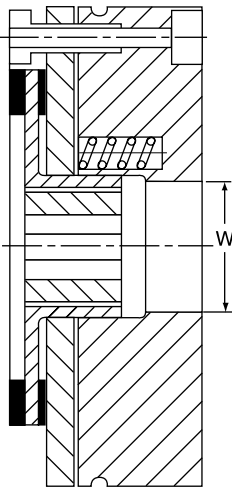
# ERD Series Electrically Released Brakes

## Brakes

### VAR 02



### VAR 00



## Dimensions

All dimensions are nominal, unless otherwise noted.

ERD Size	A	D Max.	E	K	L Max.	M +0.000/-0.008
5	3.307 (84)	0.5 (12)	2.835 (72)	1.378 (35)	1.575 (40)	0.709 (18)
10	4.016 (102)	0.625 (15)	3.543 (90)	1.614 (41)	1.831 (46.5)	0.787 (20)
20	5.000 (127)	1.0 (24)	4.409 (112)	1.870 (47.5)	2.185 (55.5)	0.787 (20)
35	5.787 (147)	1.125 (28)	5.197 (132)	2.146 (54.5)	2.559 (65)	0.984 (25)
60	6.378 (162)	1.25 (32)	5.709 (145)	2.520 (64)	2.933 (74.5)	1.181 (30)
100	7.402 (188)	1.500 (41)	6.693 (170)	2.795 (71)	3.209 (81.5)	1.181 (30)
170	8.465 (215)	1.95 (50)	7.717 (196)	3.268 (83)	3.780 (96)	1.378 (35)
300	9.921 (252)	2.125 (54)	9.055 (230)	3.819 (97)	4.528 (115)	1.575 (40)

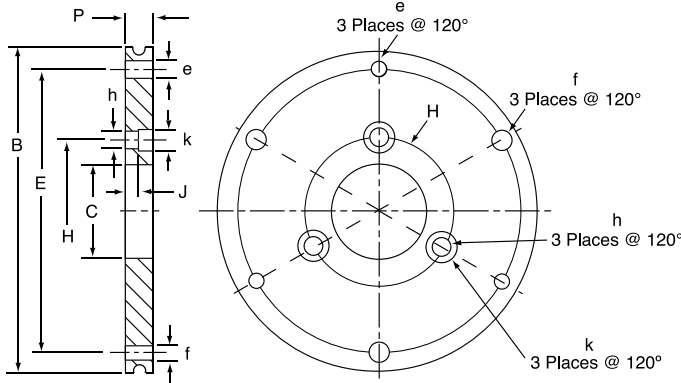
ERD Size	N	S	U +/-0.002	W
5	0.079 (2)	0.748 (19)	0.008 (0.2)	0.925 (23.5)
10	0.118 (3)	0.945 (24)	0.008 (0.2)	1.122 (28.5)
20	0.157 (4)	1.378 (35)	0.008 (0.2)	1.594 (40.5)
35	0.118 (3)	1.575 (40)	0.012 (0.3)	1.909 (48.5)
60	0.118 (3)	1.890 (48)	0.012 (0.3)	2.303 (58.5)
100	0.118 (3)	2.047 (52)	0.012 (0.3)	2.500 (63.5)
170	0.177 (4.5)	2.362 (60)	0.012 (0.3)	2.894 (73.5)
300	0.197 (5)	2.874 (73)	0.012 (0.3)	3.484 (88.5)

1. Concentricity of field mounting pilot diameter with rotor mounting shaft within .006 T.I.R.
2. Squareness of field mounting face with rotor mounting shaft within .006 T.I.R. measured at field mounting bolt circle.
3. Rotor mounting shaft concentric with armature center of rotation within .006 T.I.R.
4. Armature hub pilot diameter to be concentric with armature center of rotation within .010 T.I.R.
5. If customer does not use a friction flange, the mating surface must be square to their mounting shaft within .006" and flat within .002".

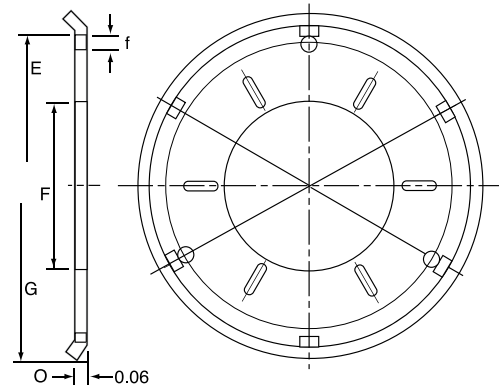
# ERD Series Electrically Released Brakes

## Friction Plates

### Thick friction plate



### Intermediate friction plate



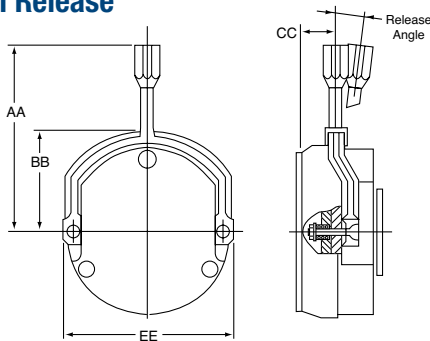
## Dimensions

All dimensions are nominal, unless otherwise noted.

ERD Size	B	C	E	e Bolt Pattern	f Bolt Clearance Holes	F	G	H	h	k Bolt Clearance Holes	J	P	O
5	3.268 (83)	0.787 (20)	2.835 (72)	3xM4	3x0.177 3(4.5)	1.654 (42)	3.425 (87)	1.181 (30)	3x0.177 (4.5)	3x0.315 (8)	0.079 (2)		0.125 (3.2)
10	3.937 (100)	1.181 (30)	3.543 (90)	3xM5	3x0.217 3(5.5)	2.126 (54)	4.213 (107)	1.772 (45)	3x0.217 (5.5)	3x0.394 (10)	0.079 (2)		0.125 (3.2)
20	4.921 (125)	1.575 (40)	4.409 (112)	3xM6	3x0.256 3(6.5)	2.362 (60)	5.217 (132.5)	2.205 (56)	3x0.260 (6.5)	3x0.433 (11)	0.118 (3)		0.141 (3.6)
35	5.709 (145)	1.772 (45)	5.197 (132)	3xM6	3x0.256 3(6.5)	2.755 (70)	6.004 (152.5)	2.441 (62)	3x0.260 (6.5)	3x0.433 (11)	0.118 (3)		0.181 (4.6)
60	6.299 (160)	2.165 (55)	5.709 (145)	3xM8	3x0.335 3(8.3)			2.913 (74)	3x0.327 (8.3)	3x0.551 (14)	0.118 (3)	0.433 (11)	
100	7.283 (185)	2.559 (65)	6.693 (170)	3xM8	3x0.335 3(8.3)			3.307 (84)	3x0.327 (8.3)	3x0.551 (14)	0.118 (3)	0.433 (11)	
170	8.346 (212)	2.953 (75)	7.717 (196)	6xM8	6x0.335 6(8.3)			3.937 (100)	3x0.327 (8.3)	6x0.551 (14)	0.118 (3)	0.433 (11)	
300	9.843 (250)	3.543 (90)	9.055 (230)	6xM10	6x0.413 6(10.3)			4.724 (120)	3x0.406 (10.3)	6x0.670 (17)	0.118 (3)	0.433 (11)	

The thick mounting flange provides the proper material and mounting tolerances for the brake. The intermediate 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 (98)	2.09 (53)	0.67 (17)	3.46 (88)	3.46 (88)	10°
10	4.21 (107)	2.44 (62)	0.71 (18)	4.17 (106)	4.17 (106)	9°
20	5.08 (129)	2.99 (76)	0.98 (25)	5.20 (132)	5.20 (132)	8°
35	5.47 (139)	3.39 (86)	0.87 (22)	5.98 (152)	5.98 (152)	8°
60	7.44 (189)	4.09 (104)	1.57 (40)	6.53 (166)	6.54 (166)	15°
100	8.07 (205)	4.72 (120)	1.73 (44)	7.56 (192)	7.36 (187)	15°
170	9.45 (240)	5.51 (140)	2.09 (53)	8.62 (219)	8.78 (228)	15°
300	12.32 (313)	6.38 (162)	2.40 (61)	10.8 (256)	10.33 (262.5)	20°

## Dust Cover



# ERD Series Electrically Released Brakes

## How To Order

### Hub Bore and Keyway Sizes

U.S. English

Bore in.	Keyway		Available Bores							
	Width	Depth	5	10	20	35	60	100	170	300
3/8	3/32	3/64	Std.							
1/2	1/8	1/16	*	Std.	Std.					
5/8	3/16	3/32	*(Max.)	*	Std.	Std.	Std.	Std.		
3/4	3/16	3/32		*(Max.)	Std.	Std.				
7/8	3/16	3/32			Std.(Max.)	Std.			Std.	
1	1/4	1/8			*(Max.)	Std.	Std.	Std.		Std.
1-3/8	5/16	5/32				*(1-1/8Max.)		Std.	Std.	Std.
1-3/4	3/8	3/16							Std.	Std.

Metric

Bore (mm).	Keyway		Available Bores							
	Width	Depth	5	10	20	35	60	100	170	300
8			P.B.							
10			Std.	P.B.	P.B.					
11	4	2	Std.	Std.	Std.					
14	5	2.5	*	Std.	Std.	P.B.	P.B.			
15	5	2.5	*		Std.	Std.		P.B.		
18				*	Std.	Std.				
20	6	3		*(20Max.)	Std.	Std.			P.B.	
22	6	3			Std.	Std.				
24	8				*	Std.				
25	8	3.5				Std.	Std.	Std.		P.B.
28	8	3.5			*(28Max.)	*				
30	8	3.5				*(32Max.)	Std.	Std.		
35	10	4					(32Max.)	Std.	Std.	Std.
40	12	4						Max.	Std.	Std.
45	14	4.5							Std.	Std.
50	14	4.5							Max.	(54 Max.)

P.B. = Pilot Bore, \* = Large Bore Hub, which requires use of a large bore friction disc.

### Design Considerations/Limitations

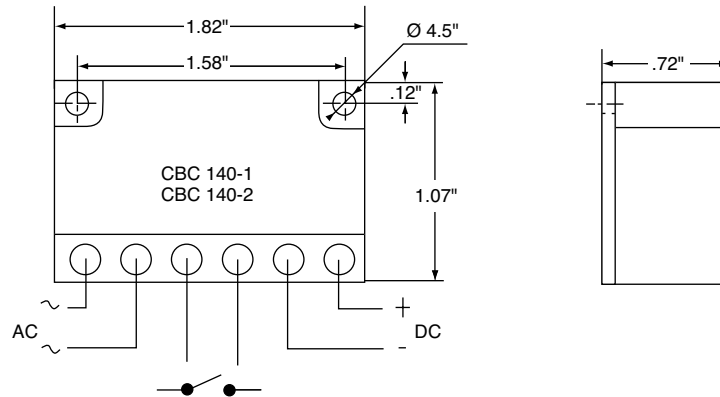
1. Check the airgap periodically and reset as required per instructions found on page 4 of the service manual P-229. Inspection interval(s) depend on the frequency of brake application.
2. Check friction material thickness periodically per dimension N (see page 127) and replace when below the minimum shown below.

Inches (mm) millimeters

ERD Size	5	10	20	35	60	100	170	300
Min. Thickness	0.009 (0.22)	0.008 (0.21)	0.012 (0.31)	0.009 (0.22)	0.010 (0.24)	0.010 (0.24)	0.012 (0.31)	0.013 (0.32)

# ERD Control Units

## Dimensions



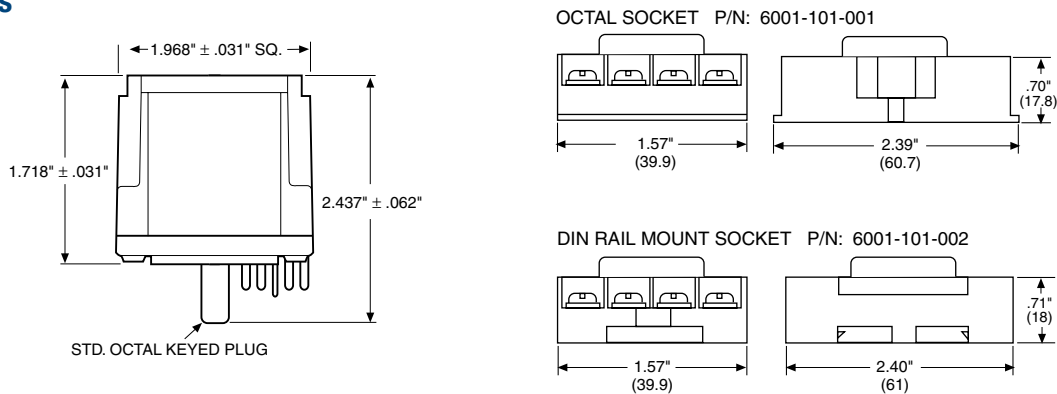
## Specifications

	CBC-141-1	CBC-141-2		
Part Number	ACG830A1P1	ACG830A1P2		
Frequency (Hz)	50/60	50/60		
Input Voltage	230 VAC	30	115	230
Output Voltage	103.5 VDC	24	103.5	207
Max. Current (A)	1	2	2	2

CBC-141-1: Supply unit with single wave rectification for low current.

CBC-141-2: Supply unit with dual wave rectification for low current.

## Dimensions



## Specifications

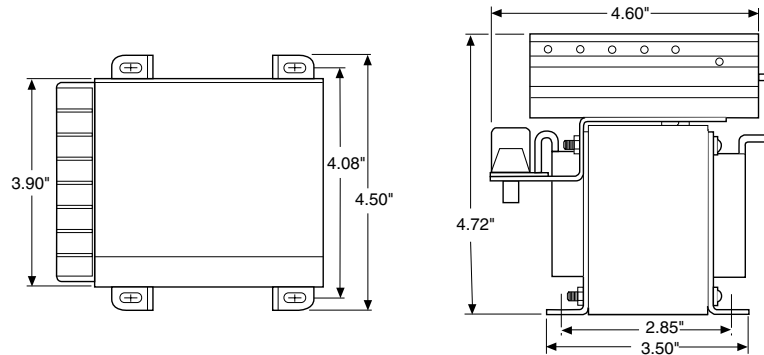
	CBC-801-1	CBC-801-2
Part No.	6001-448-004	6001-448-006
Input Voltage	120 VAC, 50/60 Hz	220/240 VAC, 50/60 Hz
Output Voltage	90 VDC, 1.25 A max.	90 VDC, 1.25 A max.
Circuit Protection	Fused 1.6 Amp, 250 V fast-blo	Fused 1.6 Amp, 250 V fast-blo
Ambient Temperature	-23° to 116°F (-31° to 47°C)	
Max. Cycle Rate	Limited by the clutch or brake, variable with application	
Switching	Single pole, double throw Minimum contact rating: 10 Amp, 28 VDC resistive or 10 Amp, 120 VAC inductive	
Status Indicator	Red LED indicates brake is energized, Green LED indicates clutch is energized	
Mounting	Two versions of octal socket are available: 6001-101-001 foot mount 6001-101-002 DIN rail mount	

All dimensions nominal unless otherwise specified.



# ERD Control Units

## Dimensions



## Specifications

	<b>CBC-450-90</b>	<b>CBC-450-24</b>
Part No.	6006-448-006	6006-448-005
Input Voltage	120/220/240/380/480 VAC	120/220/240/380/480 VAC
Output Voltage	90 VDC	24 VDC
Output Current	1 Amp/Channel 1.2 Amps Total	4 Amps/Channel 4 Amps Total
Auxiliary Supply	12 VDC 250 mA	12 VDC 250 mA
Circuit Protection	Fused 1.5 Amp	Fused 5 Amp
Ambient Temperature	+32° to 122°F (0° to 50°C)	+32° to 122°F (0° to 50°C)
Status Indicators	Red LED indicates channel is energized.	Red LED indicates channel is energized.
Adjustments	Jumper for single or dual operation.	Jumper for single or dual operation.
Inputs	3 Optically isolated, 10-30 VDC, 3-9 mA for Channel 1, Channel 2 and Channel 2 override (E-stop).	3 Optically isolated, 10-30 VDC, 3-9 mA for Channel 1, Channel 2 and Channel 2 override (E-stop).

# ERD Series Electrically Released Brakes

## 1 ERD005

Description	Part Number
<b>2</b> & <b>6</b> Variation 00 – 24 VDC	G5UE005A01P1
Variation 00 – 103.5 VDC	G5UE005A01P2
Variation 00 – 207 VDC	G5UE005A01P3
Variation 02 – 24 VDC	G5UE005A21P1
Variation 02 – 103.5 VDC	G5UE005A21P2
Variation 02 – 207 VDC	G5UE005A21P3

## 3 Friction Disc

Standard Synthetic Disc	A5UE005B1P1
Large Bore Synthetic Disc	A5UE005B3P1
Standard Metallic Disc	A5UE005B9P1
Large Bore Metallic Disc	A5UE005B8P1

## 4 Options

Hand Release	A5UE005K1P1
Dust Cover	A5UE005C4P1

## 5 Friction Flange & Screw Kit

Intermediate Flange	A5UE005C309P2
Thick Flange	A5UE005C301P1
Short Screw	A5UE005K2P1
Long Screw	A5UE005K2P2

## 7 Hub Bore size

Hub Pilot Bore – 8MM	A5UE005C500P1
Hub Bored W/Keyway – 11MM	A5UE005C500P2
Hub Bored W/Keyway – 10MM	A5UE005C500P5
Hub Bored W/O Keyway – 10MM	A5UE005C500P6
Hub Bored W/Keyway – 3/8"	A5UE005C500P9
Large Bore Hub W/Keyway – 1/2"	A5UE005C503P6
Large Bore Hub W/Keyway – 5/8"	A5UE005C503P5

## 8 Detection Kit

V4NST7	
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## 1 ERD010

Description	Part Number
<b>2</b> & <b>6</b> Variation-00 – 24 VDC	G5UE010A01P1
Variation-00 – 103.5 VDC	G5UE010A01P2
Variation-00 – 207 VDC	G5UE010A01P3
Variation 02 – 24 VDC	G5UE010A21P1
Variation 02 – 103.5 VDC	G5UE010A21P2
Variation 02 – 207 VDC	G5UE010A21P3

## 3 Friction Disc

Standard Synthetic Disc	A5UE010B1P1
Large Bore Synthetic Disc	A5UE010B3P1
Standard Metallic Disc	A5UE010B9P1
Large Bore Metallic Disc	A5UE010B15P1

## 4 Options

Hand Release	A5UE010K1P1
Dust Cover	A5UE010C4P1

## 5 Friction Flange & Screw Kit

Intermediate Flange	A5UE010C312P2
Thick Flange	A5UE010C301P1
Short Screw	A5UE010K2P1
Long Screw	A5UE010K2P2

## 7 Hub Bore size

Pilot Bore – 10MM	A5UE010C500P1
Hub Bored W/Keyway – 1/2"	A5UE010C500P13
Large Bore Hub W/Keyway – 5/8"	consult factory
Large Bore Hub W/Keyway – 3/4"	consult factory

## 8 Detection Kit

V4NST7	
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## 1 ERD020

Description	Part Number
<b>2</b> & <b>6</b> Variation 00 – 24 VDC	G5UE020A01P1
Variation 00 – 103.5 VDC	G5UE020A01P2
Variation 00 – 207 VDC	G5UE020A01P3
Variation 02 – 24 VDC	G5UE020A21P1
Variation 02 – 103.5 VDC	G5UE020A21P2
Variation 02 – 207 VDC	G5UE020A21P3

## 3 Friction Disc

Standard Synthetic Disc	N/A
Large Bore Synthetic Disc	N/A
Standard Metallic Disc	A5UE020B9P1
Large Bore Metallic Disc	A5UE020B3P1

## 4 Options

Hand Release	A5UE020K1P1
Dust Cover	A5UE020C4P1

## 5 Friction Flange & Screw Kit

Intermediate Flange	A5UE020C308P2
Thick Flange	A5UE020C301P1
Short Screw	A5UE020K2P1
Long Screw	A5UE020K2P2

## 7 Hub Bore size

Pilot Bore – 10MM	A5UE020C500P1
Hub Bored W/Keyway – 15MM	A5UE020C500P2
Hub Bored W/Keyway – 20MM	A5UE020C500P3
Hub Bored W/Keyway – 11MM	A5UE020C500P6
Hub Bored W/Keyway – 14MM	A5UE020C500P7
Hub Bored W/Keyway – 1/2"	A5UE020C500P15
Hub Bored W/Keyway – 5/8"	A5UE020C500P16
Hub Bored W/Keyway – 3/4"	A5UE020C500P17
Hub Bored W/Keyway – 7/8"	A5UE020C500P18
Large Bore Hub W/Keyway - 1"	consult factory

## 8 Detection Kit

V4NST7	
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## 1 ERD035

Description	Part Number
<b>2</b> & <b>6</b> Variation-00 – 24 VDC	G5UE035A01P1
Variation-00 – 103.5 VDC	G5UE035A01P2
Variation-00 – 207 VDC	G5UE035A01P3
Variation 02 – 24 VDC	G5UE035A21P1
Variation 02 – 103.5 VDC	G5UE035A21P2
Variation 02 – 207 VDC	G5UE035A21P3

## 3 Friction Disc

Standard Synthetic Disc	N/A
Large Bore Synthetic Disc	N/A
Standard Metallic Disc	A5UE035B2P1
Large Bore Metallic Disc	A5UE035B5P1-NM

## 4 Options

Hand Release	A5UE035K1P1
Dust Cover	642-0013

## 5 Friction Flange & Screw Kit

Intermediate Flange	A5UE035C311P2
Thick Flange	A5UE035C301P1
Short Screw	A5UE035K2P1
Long Screw	A5UE035K2P2

## 7 Hub Bore size

Pilot Bore Hub – 14MM	A5UE035C500P1
Hub Bored W/Keyway – 20MM	A5UE035C500P2

# ERD Series Electrically Released Brakes

Hub Bored W/Keyway – 25MM	A5UE035C500P3
Hub Bored W/Keyway – 15MM	A5UE035C500P7
Hub Bored W/Keyway – 5/8"	A5UE035C503P1
Hub Bored W/Keyway – 3/4"	A5UE035C503P3
Hub Bored W/Keyway – 7/8"	A5UE035C503P4
Hub Bored W/Keyway – 1"	A5UE035C503P2
Large Bore Hub W/Keyway - 1-1/8"	consult factory

<b>8 Detection Kit</b>	V4NST7
<b>Rectifiers</b>	
Half Wave	MCS-141-1 ACG830A1P1
Full Wave	MCS-141-2 ACG830A1P2

## 1 ERD060

Description	Part Number
<b>6 Variation 00 – 24 VDC</b>	BT212094250
<b>Variation 00 – 103.5 VDC</b>	BT212094251
<b>Variation 00 – 207 VDC</b>	BT212094252
<b>Variation 02 – 24 VDC</b>	BT212094246
<b>Variation 02 – 103.5 VDC</b>	BT212094247
<b>Variation 02 – 207 VDC</b>	BT212094248

<b>3 Friction Disc</b>	
Standard Metallic Friction Disc (M)	BT212094481
Metallic Friction Disc (HT)	BT212094185

<b>4 Options</b>	
Dust Cover	BT312026932
Hand Release	BT212094492

<b>5 Friction Flange &amp; Screw Kit</b>	
Thick Friction Plate	BT312026917
Short Screw (for Thick Friction Plate)	BT212094220
Long Screw (for No Friction Plate)	BT212094221

<b>7 Hub Bore Size</b>	
Pilot Bore Hub – 14MM	BT312026935
Hub Bored W/Keyway – 25MM	BT312026936
Hub Bored W/Keyway – 30MM	BT312026937
Hub Bored W/Keyway – 5/8"	BT312028396
Hub Bored W/Keyway – 1"	BT312028397

<b>8 Detection Kit</b>	BT212095409
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## 1 ERD100

Description	Part Number
<b>6 Variation 00 – 24 VDC</b>	BT212094258
<b>Variation 00 – 103.5 VDC</b>	BT212094259
<b>Variation 00 – 207 VDC</b>	BT212094260
<b>Variation 02 – 24 VDC</b>	BT212094254
<b>Variation 02 – 103.5 VDC</b>	BT212094255
<b>Variation 02 – 207 VDC</b>	BT212094256

<b>3 Friction Disc</b>	
Standard Metallic Friction Disc (M)	BT212094497
Metallic Friction Disc (HT)	BT212094186

<b>4 Options</b>	
Dust Cover	BT312026934
Hand Release	BT212094508

<b>5 Friction Flange &amp; Screw Kit</b>	
Thick Friction Plate	BT312026928
Short Screw (for Thick Friction Plate)	BT212094223
Long Screw (for No Friction Plate)	BT212094224

<b>7 Hub Bore Size</b>	
Pilot Bore Hub – 15MM	BT312026938
Hub Bored W/Keyway – 25MM	BT312026939
Hub Bored W/Keyway – 30MM	BT312026940
Hub Bored W/Keyway – 35MM	BT312026941

Hub Bored W/Keyway – 5/8"	BT312028398
Hub Bored W/Keyway – 1"	BT312028398
Hub Bored W/Keyway – 1-3/8"	BT312028400

<b>8 Detection Kit</b>	BT212095409
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## 1 ERD170

Description	Part Number
<b>6 Variation 00 – 24 VDC</b>	BT212094358
<b>Variation 00 – 103.5 VDC</b>	BT212094359
<b>Variation 00 – 207 VDC</b>	BT212094360
<b>Variation 02 – 24 VDC</b>	BT212094355
<b>Variation 02 – 103.5 VDC</b>	BT212094356
<b>Variation 02 – 207 VDC</b>	BT212094357

<b>3 Friction Disc</b>	
Standard Metallic Friction Disc (M)	BT212094448
Metallic Friction Disc (HT)	BT212094329

<b>4 Options</b>	
Dust Cover	BT312027158
Hand Release	BT212094522

<b>5 Friction Flange &amp; Screw Kit</b>	
Thick Friction Plate	BT312027135
Short Screw (for Thick Friction Plate)	BT212094350
Long Screw (for No Friction Plate)	BT212094351

<b>7 Hub Bore Size</b>	
Pilot Bore Hub – 20MM	BT312027150
Hub Bored W/Keyway – 35MM	BT312027151
Hub Bored W/Keyway – 40MM	BT312027152
Hub Bored W/Keyway – 45MM	BT312027153
Hub Bored W/Keyway – 7/8"	BT312028401
Hub Bored W/Keyway – 1-3/8"	BT312028402
Hub Bored W/Keyway – 1-3/4"	BT312028403

<b>8 Detection Kit</b>	BT212095409
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## 1 ERD300

Description	Part Number
<b>6 Variation 00 – 24 VDC</b>	BT212094364
<b>Variation 00 – 103.5 VDC</b>	BT212094365
<b>Variation 00 – 207 VDC</b>	BT212094366
<b>Variation 02 – 24 VDC</b>	BT212094361
<b>Variation 02 – 103.5 VDC</b>	BT212094362
<b>Variation 02 – 207 VDC</b>	BT212094363

<b>3 Friction Disc</b>	
Standard Metallic Friction Disc (M)	BT212094449
Metallic Friction Disc (HT)	BT212094334

<b>4 Options</b>	
Dust Cover	BT312027159
Hand Release	BT212094536

<b>5 Friction Flange &amp; Screw Kit</b>	
Thick Friction Plate	BT312027146
Short Screw (for Thick Friction Plate)	BT212094353
Long Screw (for No Friction Plate)	BT212094354

<b>7 Hub Bore Size</b>	
Pilot Bore Hub – 25MM	BT312027154
Hub Bored W/Keyway – 35MM	BT312027155
Hub Bored W/Keyway – 40MM	BT312027156
Hub Bored W/Keyway – 45MM	BT312027157
Hub Bored W/Keyway – 1"	BT312028404
Hub Bored W/Keyway – 1-3/8"	BT312028405
Hub Bored W/Keyway – 1-3/4"	BT312028406

<b>8 Detection Kit</b>	BT212095409
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# UniBrake AC Motor Brakes

## Warner Electric UNIBRAKE® decelerates or holds loads when power is off

### C-Face, Power-Off Brakes

Single C-Face Power-Off Brakes are designed to decelerate or hold inertia loads when the power is turned off. The single C-Face mounts on the non-driven end of a motor. Brakes are available from 3 ft. lb. to 15 ft. lb.

### C-Face, Power-Off Brakes with Heavy-Duty Enclosures

Our Single C-Face Power-Off Brake is also available with cast iron housing for applications involving corrosive environments. The heavy-duty housing also includes o-ring seals to create a dust-tight brake. Brakes are available from 3 ft. lb. to 15 ft. lb.

### Double C-Face, Power-Off Brakes

The Double C-Face Brake is designed for use as a coupler between standard C-Face motors and C-Face gear reducers.



## UNIBRAKE is available to meet the demands of a wide variety of applications



## Applications

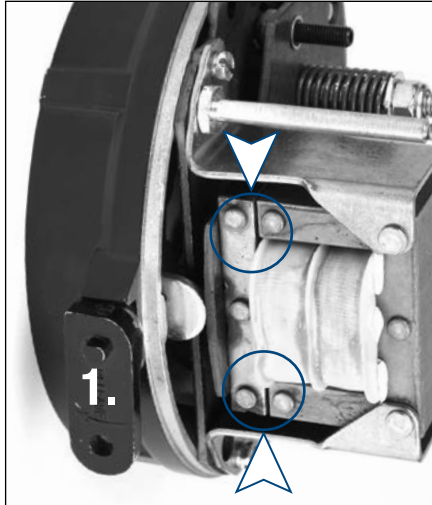
The motor brakes are commonly used as parking brakes to hold a load in place or as stopping brakes to dynamically decelerate a load.

Applications include:

- Material Handling
- Food Processing
- Machine Tools

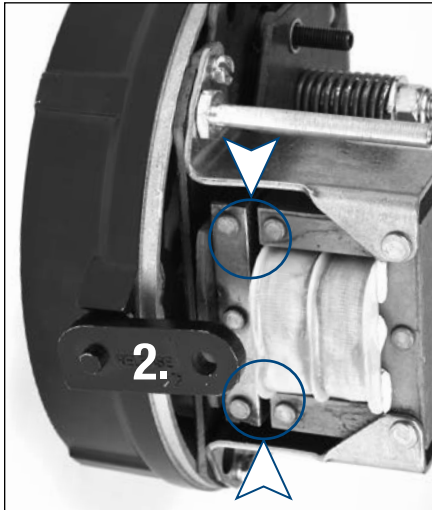
# UniBrake AC Motor Brakes

Simple design with fewer moving parts means less downtime



**Figure 1:**

When the motor is 'off', the driven load can be moved without energizing the motor by rotating the manual release lever 90° clockwise which removes the retarding torque from the motor shaft.



**Figure 2:**

The lever returns to the normal "set" position when the brake is re-energized.

## Spring Applied — Power-Off Operation

Warner Electric spring applied motor brakes are designed to decelerate or park inertial loads when the voltage is turned off, either intentionally or accidentally, as in the case of power failure. The friction disc with the hub is coupled to the motor shaft to be braked but is capable of moving axially. When power is off, a spring force clamps the friction disc between a pressure plate and a stationary plate, hence retarding motion. When an AC voltage is applied, the solenoid creates a Direct Acting magnetic force which releases the friction disc without the use of a linkage. This allows the hub and motor shaft to turn freely.

## Features

- External manual release lever
- Totally enclosed construction
- Torque adjustable from full rated torque down to 50%
- Single phase AC coils provide fast engagement and release times and easy wiring.

## Mounting

Two styles are available: the single C-Face brake and the double C-Face brake. The single C-Face mounts on the non-driven end of a motor. The C-Face brake is interchangeable with existing brakes and can be used on motors that are modified to accept a brake. The double C-Face brake can be used as a coupler between standard C-Face motors and C-Face gear reducers. All motor brakes are interchangeable with competitive motor brakes.



# F Series UniBrakes

## C-Face AC Rear-Mounted Brakes with NEMA 2 Housing

### Aluminum Head-Steel Cover

56,000 NEMA 2; 56,100 NEMA 2; 56,300 NEMA 1

Warner Electric Single C-Face Power-Off Brakes are designed to decelerate or hold inertia loads when the power is turned off. The single C-Face mounts on the non-driven end of a motor. Brakes are available from 3 ft. lb. to 15 ft. lb.

#### Features:

- External manual release lever
- Totally enclosed construction
- Torque adjustable from full-rated torque down to 50%
- Single-phase AC coils to provide fast release times and easy wiring
- Single C-Face



#### Brake Part Numbers

#### Technical Data

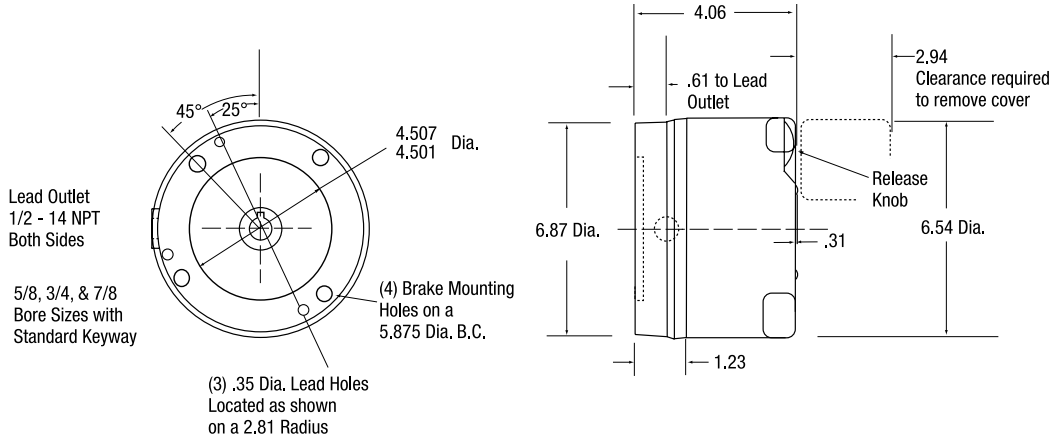
Coil Voltage	3 ft. lb. Brakes (1 Disc)	6 ft. lb. Brakes (1 Disc)	10 ft. lb. Brakes (2 Discs)	15 ft. lb. Brakes (3 Discs)	Current Holding Amps	Current Inrush Amps
<b>5/8 Bore Hub</b>						
115/230, 60 HZ	F51A0321-W	F51A0621-W	F52A0721-W	F53A0821-W	.50/.25	3.66/1.83
230/460, 60 HZ	F51A0324-W	F51A0624-W	F52A0724-W	F53A0824-W	.28/.14	1.94/.97
287/575, 60 HZ	F51A0325-W	F51A0625-W	F52A0725-W	F53A0825-W	.22/.11	1.54/.77
115/230, 50 HZ	F51A0328-W	F51A0628-W	F52A0728-W	F53A0828-W	.45/.22	3.27/1.64
230/460, 50 HZ	F51A0329-W	F51A0629-W	F52A0729-W	F53A0829-W	.24/.12	1.76/.88
<b>3/4 Bore Hub</b>						
115/230, 60 HZ	F51B0321-W	F51B0621-W	F52B0721-W	F53B0821-W	.50/.25	3.66/1.83
230/460, 60 HZ	F51B0324-W	F51B0624-W	F52B0724-W	F53B0824-W	.28/.14	1.94/.97
287/575, 60 HZ	F51B0325-W	F51B0625-W	F52B0725-W	F53B0825-W	.22/.11	1.54/.77
115/230, 50 HZ	F51B0328-W	F51B0628-W	F52B0728-W	F53B0828-W	.45/.22	3.27/1.64
230/460, 50 HZ	F51B0329-W	F51B0629-W	F52B0729-W	F53B0829-W	.24/.12	1.76/.88
<b>7/8 Bore Hub</b>						
115/230, 60 HZ	F51C0321-W	F51C0621-W	F52C0721-W	F53C0821-W	.50/.25	3.66/1.83
230/460, 60 HZ	F51C0324-W	F51C0624-W	F52C0724-W	F53C0824-W	.28/.14	1.94/.97
287/575, 60 HZ	F51C0325-W	F51C0625-W	F52C0725-W	F53C0825-W	.22/.11	1.54/.77
115/230, 50 HZ	F51C0328-W	F51C0628-W	F52C0728-W	F53C0828-W	.45/.22	3.27/1.64
230/460, 50 HZ	F51C0329-W	F51C0629-W	F52C0729-W	F53C0829-W	.24/.12	1.76/.88



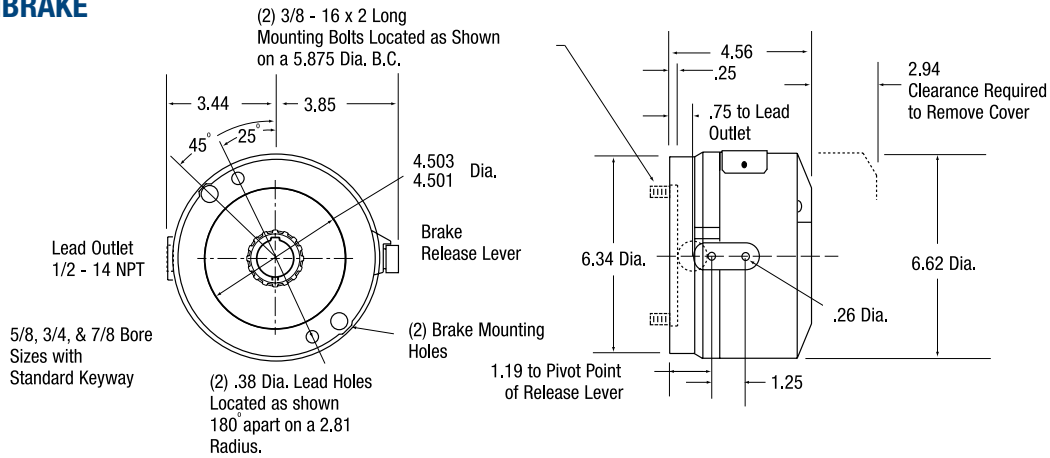
# F Series UniBrakes

## C-Face AC Rear-Mounted Brakes with NEMA 2 Housing Aluminum Head-Steel Cover 56,000 NEMA 2

### Stearns®



### Warner UNIBRAKE



### UNIBRAKE Interchange

Stearns® Part Number	Warner Electric Replacement
1-056-011-00-BNF	F51A0325-W
1-056-011-00-BOF	F51A0328-W
1-056-011-00-BPF	F51A0321-W
1-056-011-00-BQF	F51A0324-W
1-056-011-00-CNF	F51B0325-W
1-056-011-00-COF	F51B0328-W
1-056-011-00-CPF	F51B0321-W
1-056-011-00-CQF	F51B0324-W
1-056-011-00-DNF	F51C0325-W
1-056-011-00-DOF	F51C0328-W
1-056-011-00-DPF	F51C0321-W
1-056-011-00-DQF	F51C0324-W
1-056-021-00-BNF	F51A0625-W
1-056-021-00-BOF	F51A0628-W
1-056-021-00-BPF	F51A0621-W
1-056-021-00-BQF	F51A0624-W

Stearns® Part Number	Warner Electric Replacement
1-056-021-00-CNF	F51B0625-W
1-056-021-00-COF	F51B0628-W
1-056-021-00-CPF	F51B0621-W
1-056-021-00-CQF	F51B0624-W
1-056-021-00-DNF	F51C0625-W
1-056-021-00-DOF	F51C0628-W
1-056-021-00-DPF	F51C0621-W
1-056-021-00-DQF	F51C0624-W
1-056-031-00-BNF	F52A0725-W
1-056-031-00-BOF	F52A0728-W
1-056-031-00-BPF	F52A0721-W
1-056-031-00-BQF	F52A0724-W
1-056-031-00-CNF	F52B0725-W
1-056-031-00-COF	F52B0728-W
1-056-031-00-CPF	F52B0721-W
1-056-031-00-CQF	F52B0724-W

Stearns® Part Number	Warner Electric Replacement
1-056-031-00-DNF	F52C0725-W
1-056-031-00-DOF	F52C0728-W
1-056-031-00-DPF	F52C0721-W
1-056-031-00-DQF	F52C0724-W
1-056-041-00-BNF	F53A0825-W
1-056-041-00-BOF	F53A0828-W
1-056-041-00-BPF	F53A0821-W
1-056-041-00-BQF	F53A0824-W
1-056-041-00-CNF	F53B0825-W
1-056-041-00-COF	F53B0828-W
1-056-041-00-CPF	F53B0821-W
1-056-041-00-CQF	F53B0824-W
1-056-041-00-DNF	F53C0825-W
1-056-041-00-DOF	F53C0828-W
1-056-041-00-DPF	F53C0821-W
1-056-041-00-DQF	F53C0824-W

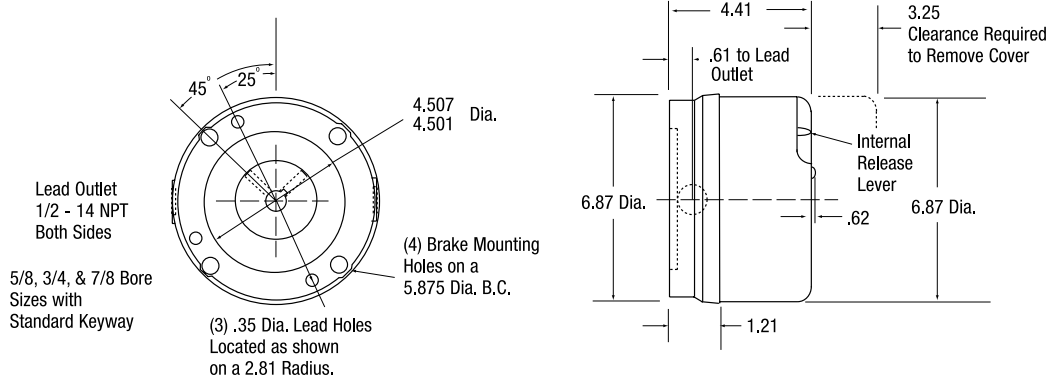
# F Series UniBrakes

## C-Face AC Rear-Mounted Brakes with NEMA 2 Housing

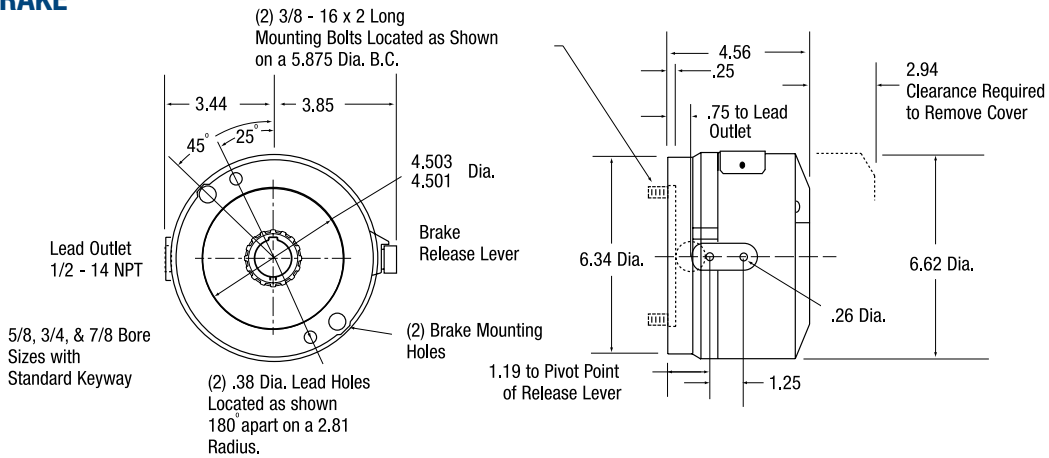
### Aluminum Head-Steel Cover

#### 56,100 NEMA 2

Stearns®



## Warner UNIBRAKE



## UNIBRAKE Interchange

Stearns® Part Number	Warner Electric Replacement
1-056-111-00-BNF	F51A0325-W
1-056-111-00-BOF	F51A0328-W
1-056-111-00-BPF	F51A0321-W
1-056-111-00-BQF	F51A0324-W
1-056-111-00-CNF	F51B0325-W
1-056-111-00-COF	F51B0328-W
1-056-111-00-CPF	F51B0321-W
1-056-111-00-CQF	F51B0324-W
1-056-111-00-DNF	F51C0325-W
1-056-111-00-DOF	F51C0328-W
1-056-111-00-DPF	F51C0321-W
1-056-111-00-DQF	F51C0324-W
1-056-121-00-BNF	F51A0625-W
1-056-121-00-BOF	F51A0628-W
1-056-121-00-BPF	F51A0621-W
1-056-121-00-BQF	F51A0624-W

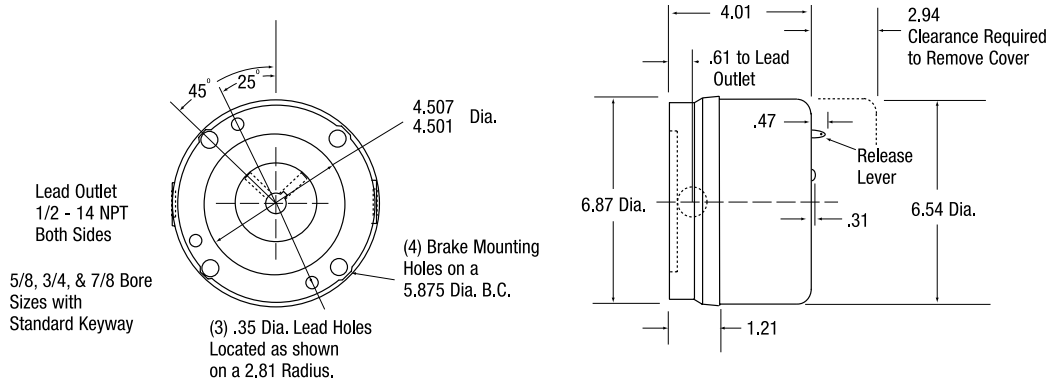
Stearns® Part Number	Warner Electric Replacement
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1-056-121-00-COF	F51B0628-W
1-056-121-00-CPF	F51B0621-W
1-056-121-00-CQF	F51B0624-W
1-056-121-00-DNF	F51C0625-W
1-056-121-00-DOF	F51C0628-W
1-056-121-00-DPF	F51C0621-W
1-056-121-00-DQF	F51C0624-W
1-056-131-00-BNF	F52A0725-W
1-056-131-00-BOF	F52A0728-W
1-056-131-00-BPF	F52A0721-W
1-056-131-00-BQF	F52A0724-W
1-056-131-00-CNF	F52B0725-W
1-056-131-00-COF	F52B0728-W
1-056-131-00-CPF	F52B0721-W
1-056-131-00-CQF	F52B0724-W

Stearns® Part Number	Warner Electric Replacement
1-056-131-00-DNF	F52C0725-W
1-056-131-00-DOF	F52C0728-W
1-056-131-00-DPF	F52C0721-W
1-056-131-00-DQF	F52C0724-W
1-056-141-00-BNF	F53A0825-W
1-056-141-00-BOF	F53A0828-W
1-056-141-00-BPF	F53A0821-W
1-056-141-00-BQF	F53A0824-W
1-056-141-00-CNF	F53B0825-W
1-056-141-00-COF	F53B0828-W
1-056-141-00-CPF	F53B0821-W
1-056-141-00-CQF	F53B0824-W
1-056-141-00-DNF	F53C0825-W
1-056-141-00-DOF	F53C0828-W
1-056-141-00-DPF	F53C0821-W
1-056-141-00-DQF	F53C0824-W

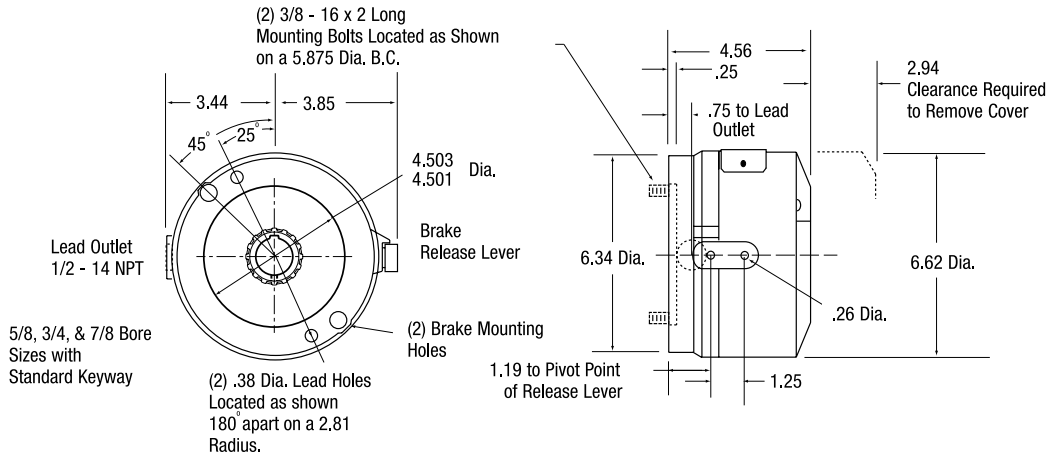
# F Series UniBrakes

## C-Face AC Rear-Mounted Brakes with NEMA 1 Housing Aluminum Head-Steel Cover 56,300 NEMA 1

### Stearns®



### Warner UNIBRAKE



### UNIBRAKE Interchange

Stearns® Part Number	Warner Electric Replacement
1-056-311-00-BNF	F51A0325-W
1-056-311-00-BOF	F51A0328-W
1-056-311-00-BPF	F51A0321-W
1-056-311-00-BQF	F51A0324-W
1-056-311-00-CNF	F51B0325-W
1-056-311-00-COF	F51B0328-W
1-056-311-00-CPF	F51B0321-W
1-056-311-00-CQF	F51B0324-W
1-056-311-00-DNF	F51C0325-W
1-056-311-00-DOF	F51C0328-W
1-056-311-00-DPF	F51C0321-W
1-056-311-00-DQF	F51C0324-W
1-056-321-00-BNF	F51A0625-W
1-056-321-00-BOF	F51A0628-W
1-056-321-00-BPF	F51A0621-W
1-056-321-00-BQF	F51A0624-W

Stearns® Part Number	Warner Electric Replacement
1-056-321-00-CNF	F51B0625-W
1-056-321-00-COF	F51B0628-W
1-056-321-00-CPF	F51B0621-W
1-056-321-00-CQF	F51B0624-W
1-056-321-00-DNF	F51C0625-W
1-056-321-00-DOF	F51C0628-W
1-056-321-00-DPF	F51C0621-W
1-056-321-00-DQF	F51C0624-W
1-056-331-00-BNF	F52A0725-W
1-056-331-00-BOF	F52A0728-W
1-056-331-00-BPF	F52A0721-W
1-056-331-00-BQF	F52A0724-W
1-056-331-00-CNF	F52B0725-W
1-056-331-00-COF	F52B0728-W
1-056-331-00-CPF	F52B0721-W
1-056-331-00-CQF	F52B0724-W

Stearns® Part Number	Warner Electric Replacement
1-056-331-00-DNF	F52C0725-W
1-056-331-00-DOF	F52C0728-W
1-056-331-00-DPF	F52C0721-W
1-056-331-00-DQF	F52C0724-W
1-056-341-00-BNF	F53A0825-W
1-056-341-00-BOF	F53A0828-W
1-056-341-00-BPF	F53A0821-W
1-056-341-00-BQF	F53A0824-W
1-056-341-00-CNF	F53B0825-W
1-056-341-00-COF	F53B0828-W
1-056-341-00-CPF	F53B0821-W
1-056-341-00-CQF	F53B0824-W
1-056-341-00-DNF	F53C0825-W
1-056-341-00-DOF	F53C0828-W
1-056-341-00-DPF	F53C0821-W
1-056-341-00-DQF	F53C0824-W

# F Series UniBrakes

## C-Face AC Rear-Mounted Brakes with NEMA 2 Housing

### Cast Iron Head-Steel Cover

#### 56,400 NEMA 2

Warner Electric Single C-Face Power-Off Brakes are designed to decelerate or hold inertia loads when the power is turned off. The single C-Face mounts on the non-driven end of a motor. Brakes are available from 3 ft. lb. to 15 ft. lb.

#### Features:

- External manual release lever
- Totally enclosed construction
- Torque adjustable from full-rated torque down to 50%
- Single-phase AC coils to provide fast release times and easy wiring
- Single C-Face



#### Brake Part Numbers

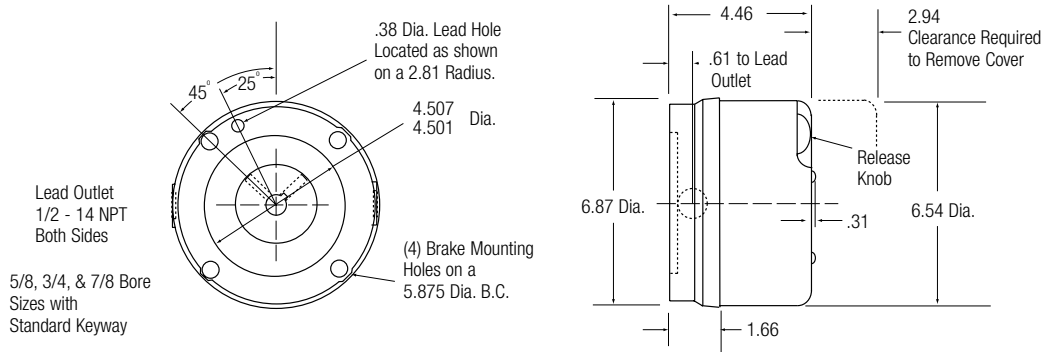
#### Technical Data

Coil Voltage	3 ft. lb. Brakes (1 Disc)	6 ft. lb. Brakes (1 Disc)	10 ft. lb. Brakes (2 Discs)	15 ft. lb. Brakes (3 Discs)	Current Holding Amps	Current Inrush Amps
<b>5/8 Bore Hub</b>						
115/230, 60 HZ	F51A7321-W	F51A7621-W	F52A7721-W	F53A7821-W	.50/.25	3.66/1.83
230/460, 60 HZ	F51A7324-W	F51A7624-W	F52A7724-W	F53A7824-W	.28/.14	1.94/.97
287/575, 60 HZ	F51A7325-W	F51A7625-W	F52A7725-W	F53A7825-W	.22/.11	1.54/.77
115/230, 50 HZ	F51A7328-W	F51A7628-W	F52A7728-W	F53A7828-W	.45/.22	3.27/1.64
230/460, 50 HZ	F51A7329-W	F51A7629-W	F52A7729-W	F53A7829-W	.24/.12	1.76/.88
<b>3/4 Bore Hub</b>						
115/230, 60 HZ	F51B7321-W	F51B7621-W	F52B7721-W	F53B7821-W	.50/.25	3.66/1.83
230/460, 60 HZ	F51B7324-W	F51B7624-W	F52B7724-W	F53B7824-W	.28/.14	1.94/.97-W
287/575, 60 HZ	F51B7325-W	F51B7625-W	F52B7725-W	F53B7825-W	.22/.11	1.54/.77
115/230, 50 HZ	F51B7328-W	F51B7628-W	F52B7728-W	F53B7828-W	.45/.22	3.27/1.64
230/460, 50 HZ	F51B7329-W	F51B7629-W	F52B7729-W	F53B7829-W	.24/.12	1.76/.88
<b>7/8 Bore Hub</b>						
115/230, 60 HZ	F51C7321-W	F51C7621-W	F52C7721-W	F53C7821-W	.50/.25	3.66/1.83
230/460, 60 HZ	F51C7324-W	F51C7624-W	F52C7724-W	F53C7824-W	.28/.14	1.94/.97
287/575, 60 HZ	F51C7325-W	F51C7625-W	F52C7725-W	F53C7825-W	.22/.11	1.54/.77
115/230, 50 HZ	F51C7328-W	F51C7628-W	F52C7728-W	F53C7828-W	.45/.22	3.27/1.64
230/460, 50 HZ	F51C7329-W	F51C7629-W	F52C7729-W	F53C7829-W	.24/.12	1.76/.88

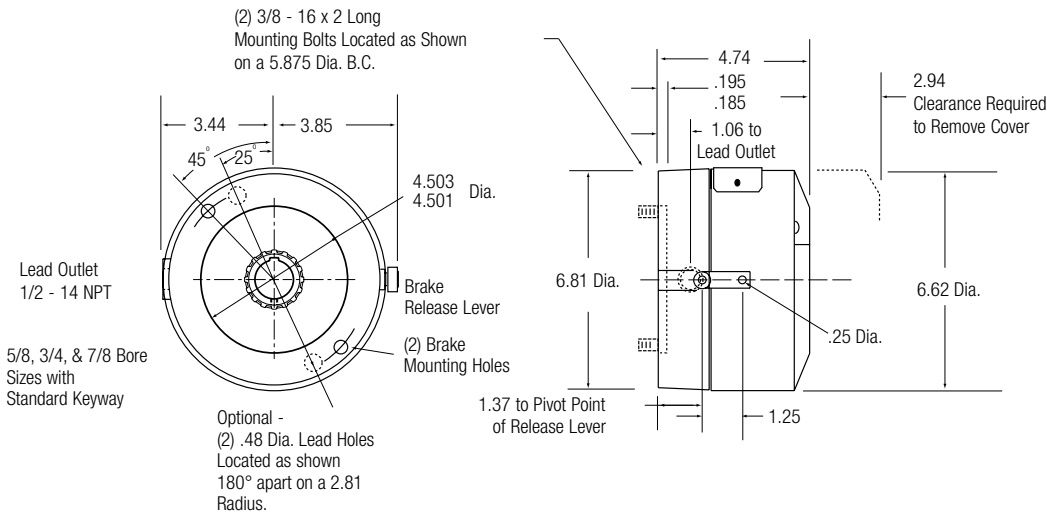
# F Series UniBrakes

## C-Face AC Rear-Mounted Brakes with NEMA 2 Housing Cast Iron Head-Steel Cover 56,400 NEMA 2

### Stearns®



### Warner UNIBRAKE



### UNIBRAKE Interchange

Stearns® Part Number	Warner Electric Replacement
1-056-411-00-BNF	F51A7325-W
1-056-411-00-BOF	F51A7328-W
1-056-411-00-BPF	F51A7321-W
1-056-411-00-BQF	F51A7324-W
1-056-411-00-CNF	F51B7325-W
1-056-411-00-COF	F51B7328-W
1-056-411-00-CPF	F51B7321-W
1-056-411-00-CQF	F51B7324-W
1-056-411-00-DNF	F51C7325-W
1-056-411-00-DOF	F51C7328-W
1-056-411-00-DPF	F51C7321-W
1-056-411-00-DQF	F51C7324-W
1-056-421-00-BNF	F51A7625-W
1-056-421-00-BOF	F51A7628-W
1-056-421-00-BPF	F51A7621-W
1-056-421-00-BQF	F51A7624-W

Stearns® Part Number	Warner Electric Replacement
1-056-421-00-CNF	F51B7625-W
1-056-421-00-COF	F51B7628-W
1-056-421-00-CPF	F51B7621-W
1-056-421-00-CQF	F51B7624-W
1-056-421-00-DNF	F51C7625-W
1-056-421-00-DOF	F51C7628-W
1-056-421-00-DPF	F51C7621-W
1-056-421-00-DQF	F51C7624-W
1-056-431-00-BNF	F52A7725-W
1-056-431-00-BOF	F52A7728-W
1-056-431-00-BPF	F52A7721-W
1-056-431-00-BQF	F52A7724-W
1-056-431-00-CNF	F52B7725-W
1-056-431-00-COF	F52B7728-W
1-056-431-00-CPF	F52B7721-W
1-056-431-00-CQF	F52B7724-W

Stearns® Part Number	Warner Electric Replacement
1-056-431-00-DNF	F52C7725-W
1-056-431-00-DOF	F52C7728-W
1-056-431-00-DPF	F52C7721-W
1-056-431-00-DQF	F52C7724-W
1-056-441-00-BNF	F53A7825-W
1-056-441-00-BOF	F53A7828-W
1-056-441-00-BPF	F53A7821-W
1-056-441-00-BQF	F53A7824-W
1-056-441-00-CNF	F53B7825-W
1-056-441-00-COF	F53B7828-W
1-056-441-00-CPF	F53B7821-W
1-056-441-00-CQF	F53B7824-W
1-056-441-00-DNF	F53C7825-W
1-056-441-00-DOF	F53C7828-W
1-056-441-00-DPF	F53C7821-W
1-056-441-00-DQF	F53C7824-W

# F Series UniBrakes

## C-Face AC Rear-Mounted Brakes with NEMA 2 Housing

### Cast Iron Head and Cover

#### 56,200 NEMA 2

Warner Electric Single C-Face Power-Off Brake is also available with cast iron housing for applications involving corrosive environments. Brakes are available from 3 ft. lb. to 15 ft. lb.

#### Features:

- External manual release lever
- Totally enclosed construction
- Torque adjustable from full-rated torque down to 50%
- Single-phase AC coils to provide fast release times and easy wiring
- Single C-Face



#### Brake Part Numbers

#### Technical Data

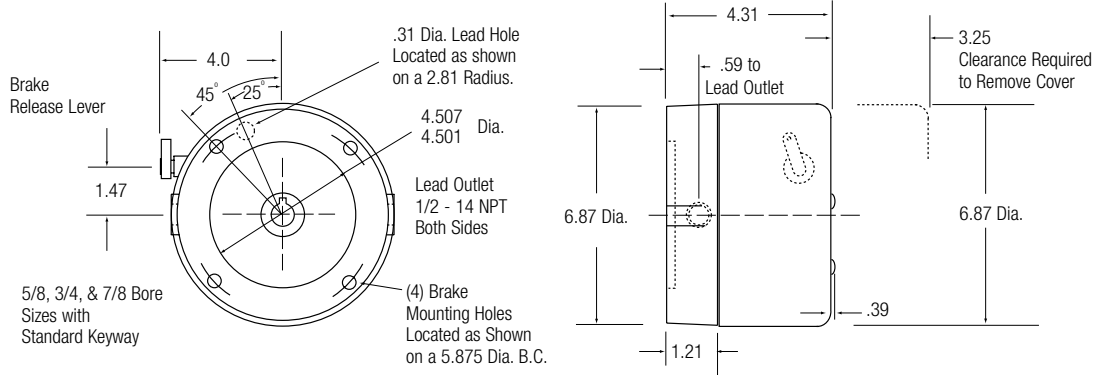
Coil Voltage	3 ft. lb. Brakes (1 Disc)	6 ft. lb. Brakes (1 Disc)	10 ft. lb. Brakes (2 Discs)	15 ft. lb. Brakes (3 Discs)	Current Holding Amps	Current Inrush Amps
<b>5/8 Bore Hub</b>						
115/230, 60 HZ	F51A8311-W	F51A8611-W	F52A8711-W	F53A8811-W	.50/.25	3.66/1.83
230/460, 60 HZ	F51A8314-W	F51A8614-W	F52A8714-W	F53A8814-W	.28/.14	1.94/.97
287/575, 60 HZ	F51A8315-W	F51A8615-W	F52A8715-W	F53A8815-W	.22/.11	1.54/.77
115/230, 50 HZ	F51A8318-W	F51A8618-W	F52A8718-W	F53A8818-W	.45/.22	3.27/1.64
230/460, 50 HZ	F51A8319-W	F51A8619-W	F52A8719-W	F53A8819-W	.24/.12	1.76/.88
<b>3/4 Bore Hub</b>						
115/230, 60 HZ	F51B8311-W	F51B8611-W	F52B8711-W	F53B8811-W	.50/.25	3.66/1.83
230/460, 60 HZ	F51B8314-W	F51B8614-W	F52B8714-W	F53B8814-W	.28/.14	1.94/.97
287/575, 60 HZ	F51B8315-W	F51B8615-W	F52B8715-W	F53B8815-W	.22/.11	1.54/.77
115/230, 50 HZ	F51B8318-W	F51B8618-W	F52B8718-W	F53B8818-W	.45/.22	3.27/1.64
230/460, 50 HZ	F51B8319-W	F51B8619-W	F52B8719-W	F53B8819-W	.24/.12	1.76/.88
<b>7/8 Bore Hub</b>						
115/230, 60 HZ	F51C8311-W	F51C8611-W	F52C8711-W	F53C8811-W	.50/.25	3.66/1.83
230/460, 60 HZ	F51C8314-W	F51C8614-W	F52C8714-W	F53C8814-W	.28/.14	1.94/.97
287/575, 60 HZ	F51C8315-W	F51C8615-W	F52C8715-W	F53C8815-W	.22/.11	1.54/.77
115/230, 50 HZ	F51C8318-W	F51C8618-W	F52C8718-W	F53C8818-W	.45/.22	3.27/1.64
230/460, 50 HZ	F51C8319-W	F51C8619-W	F52C8719-W	F53C8819-W	.24/.12	1.76/.88



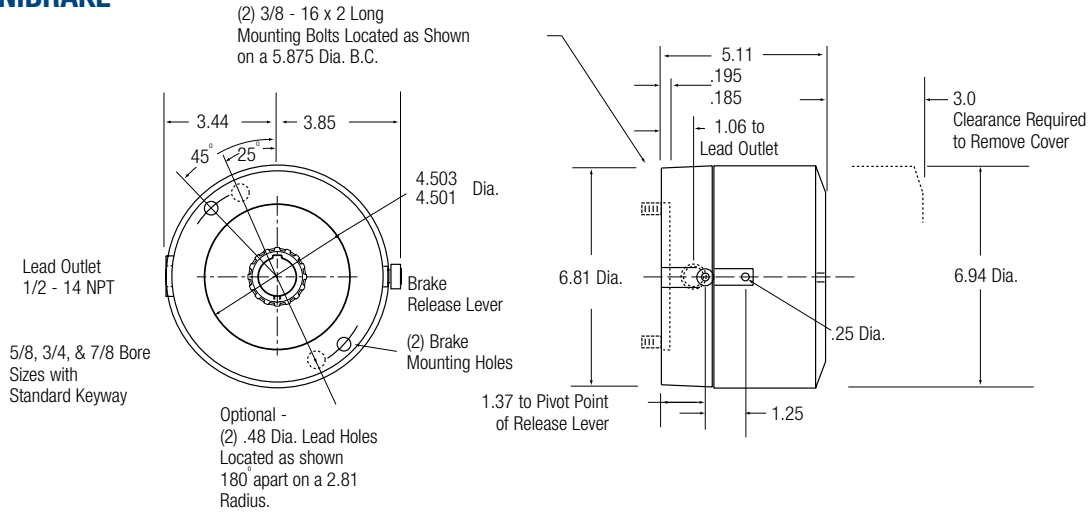
# F Series UniBrakes

## C-Face AC Rear-Mounted Brakes with NEMA 2 Housing Cast Iron Head and Cover 56,200 NEMA 2

### Stearns®



### Warner UNIBRAKE



### UNIBRAKE Interchange

Stearns® Part Number	Warner Electric Replacement
1-056-211-00-BNF	F51A8315-W
1-056-211-00-BOF	F51A8318-W
1-056-211-00-BPF	F51A8311-W
1-056-211-00-BQF	F51A8314-W
1-056-211-00-CNF	F51B8315-W
1-056-211-00-COF	F51B8318-W
1-056-211-00-CPF	F51B8311-W
1-056-211-00-CQF	F51B8314-W
1-056-211-00-DNF	F51C8315-W
1-056-211-00-DOF	F51C8318-W
1-056-211-00-DPF	F51C8311-W
1-056-211-00-DQF	F51C8314-W
1-056-221-00-BNF	F51A8615-W
1-056-221-00-BOF	F51A8618-W
1-056-221-00-BPF	F51A8611-W
1-056-221-00-BQF	F51A8614-W

Stearns® Part Number	Warner Electric Replacement
1-056-221-00-CNF	F51B8615-W
1-056-221-00-COF	F51B8618-W
1-056-221-00-CPF	F51B8611-W
1-056-221-00-CQF	F51B8614-W
1-056-221-00-DNF	F51C8615-W
1-056-221-00-DOF	F51C8618-W
1-056-221-00-DPF	F51C8611-W
1-056-221-00-DQF	F51C8614-W
1-056-231-00-BNF	F52A8715-W
1-056-231-00-BOF	F52A8718-W
1-056-231-00-BPF	F52A8711-W
1-056-231-00-BQF	F52A8714-W
1-056-231-00-CNF	F52B8715-W
1-056-231-00-COF	F52B8718-W
1-056-231-00-CPF	F52B8711-W
1-056-231-00-CQF	F52B8714-W

Stearns® Part Number	Warner Electric Replacement
1-056-231-00-DNF	F52C8715-W
1-056-231-00-DOF	F52C8718-W
1-056-231-00-DPF	F52C8711-W
1-056-231-00-DQF	F52C8714-W
1-056-241-00-BNF	F53A8815-W
1-056-241-00-BOF	F53A8818-W
1-056-241-00-BPF	F53A8811-W
1-056-241-00-BQF	F53A8814-W
1-056-241-00-CNF	F53B8815-W
1-056-241-00-COF	F53B8818-W
1-056-241-00-CPF	F53B8811-W
1-056-241-00-CQF	F53B8814-W
1-056-241-00-DNF	F53C8815-W
1-056-241-00-DOF	F53C8818-W
1-056-241-00-DPF	F53C8811-W
1-056-241-00-DQF	F53C8814-W

# F Series UniBrakes

## C-Face AC Rear-Mounted Brakes with NEMA 4 Housing

### Cast Iron Head and Cover

#### 56,200 NEMA 4

Warner Electric Single C-Face Power-Off Brake is also available with cast iron housing for applications involving corrosive environments. The heavy-duty housing also includes o-ring seals to create a dust-tight brake. Brakes are available from 3 ft. lb. to 15 ft. lb.



#### Features:

- External manual release lever
- Totally enclosed construction
- Torque adjustable from full-rated torque down to 50%
- Single-phase AC coils to provide fast release times and easy wiring
- Single C-Face

#### Brake Part Numbers

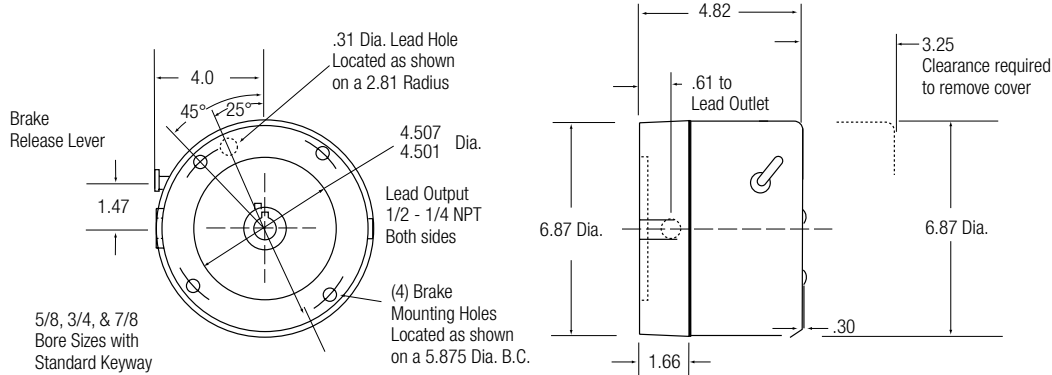
#### Technical Data

Coil Voltage	3 ft. lb. Brakes (1 Disc)	6 ft. lb. Brakes (1 Disc)	10 ft. lb. Brakes (2 Discs)	15 ft. lb. Brakes (3 Discs)	Current Holding Amps	Current Inrush Amps
<b>5/8 Bore Hub</b>						
115/230, 60 HZ	F51A1311-W	F51A1611-W	F52A1711-W	F53A1811-W	.50/.25	3.66/1.83
230/460, 60 HZ	F51A1314-W	F51A1614-W	F52A1714-W	F53A1814-W	.28/.14	1.94/.97
287/575, 60 HZ	F51A1315-W	F51A1615-W	F52A1715-W	F53A1815-W	.22/.11	1.54/.77
115/230, 50 HZ	F51A1318-W	F51A1618-W	F52A1718-W	F53A1818-W	.45/.22	3.27/1.64
230/460, 50 HZ	F51A1319-W	F51A1619-W	F52A1719-W	F53A1819-W	.24/.12	1.76/.88
<b>3/4 Bore Hub</b>						
115/230, 60 HZ	F51B1311-W	F51B1611-W	F52B1711-W	F53B1811-W	.50/.25	3.66/1.83
230/460, 60 HZ	F51B1314-W	F51B1614-W	F52B1714-W	F53B1814-W	.28/.14	1.94/.97
287/575, 60 HZ	F51B1315-W	F51B1615-W	F52B1715-W	F53B1815-W	.22/.11	1.54/.77
115/230, 50 HZ	F51B1318-W	F51B1618-W	F52B1718-W	F53B1818-W	.45/.22	3.27/1.64
230/460, 50 HZ	F51B1319-W	F51B1619-W	F52B1719-W	F53B1819-W	.24/.12	1.76/.88
<b>7/8 Bore Hub</b>						
115/230, 60 HZ	F51C1311-W	F51C1611-W	F52C1711-W	F53C1811-W	.50/.25	3.66/1.83
230/460, 60 HZ	F51C1314-W	F51C1614-W	F52C1714-W	F53C1814-W	.28/.14	1.94/.97
287/575, 60 HZ	F51C1315-W	F51C1615-W	F52C1715-W	F53C1815-W	.22/.11	1.54/.77
115/230, 50 HZ	F51C1318-W	F51C1618-W	F52C1718-W	F53C1818-W	.45/.22	3.27/1.64
230/460, 50 HZ	F51C1319-W	F51C1619-W	F52C1719-W	F53C1819-W	.24/.12	1.76/.88

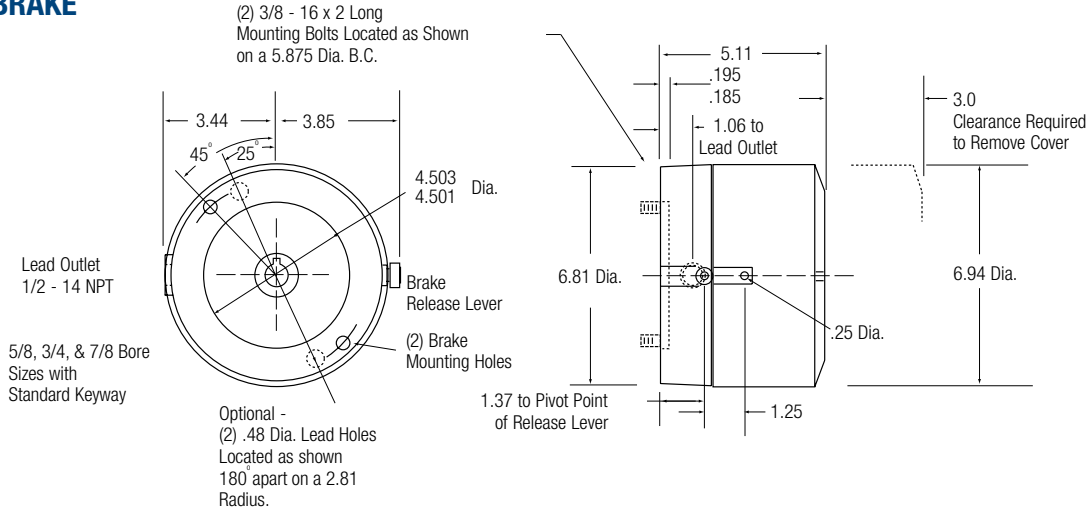
# F Series UniBrakes

## C-Face AC Rear-Mounted Brakes with NEMA 4 Housing Cast Iron Head and Cover 56,200 NEMA 4

### Stearns®



### Warner UNIBRAKE



### UNIBRAKE Interchange

Stearns® Part Number	Warner Electric Replacement
1-056-212-00-BNF	F51A1315-W
1-056-212-00-BOF	F51A1318-W
1-056-212-00-BPF	F51A1311-W
1-056-212-00-BQF	F51A1314-W
1-056-212-00-CNF	F51B1315-W
1-056-212-00-COF	F51B1318-W
1-056-212-00-CPF	F51B1311-W
1-056-212-00-CQF	F51B1314-W
1-056-212-00-DNF	F51C1315-W
1-056-212-00-DOF	F51C1318-W
1-056-212-00-DPF	F51C1311-W
1-056-212-00-DQF	F51C1314-W
1-056-222-00-BNF	F51A1615-W
1-056-222-00-BOF	F51A1618-W
1-056-222-00-BPF	F51A1611-W
1-056-222-00-BQF	F51A1614-W

Stearns® Part Number	Warner Electric Replacement
1-056-222-00-CNF	F51B1615-W
1-056-222-00-COF	F51B1618-W
1-056-222-00-CPF	F51B1611-W
1-056-222-00-CQF	F51B1614-W
1-056-222-00-DNF	F51C1615-W
1-056-222-00-DOF	F51C1618-W
1-056-222-00-DPF	F51C1611-W
1-056-222-00-DQF	F51C1614-W
1-056-232-00-BNF	F52A1715-W
1-056-232-00-BOF	F52A1718-W
1-056-232-00-BPF	F52A1711-W
1-056-232-00-BQF	F52A1714-W
1-056-232-00-CNF	F52B1715-W
1-056-232-00-COF	F52B1718-W
1-056-232-00-CPF	F52B1711-W
1-056-232-00-CQF	F52B1714-W

Stearns® Part Number	Warner Electric Replacement
1-056-232-00-DNF	F52C1715-W
1-056-232-00-DOF	F52C1718-W
1-056-232-00-DPF	F52C1711-W
1-056-232-00-DQF	F52C1714-W
1-056-242-00-BNF	F53A1815-W
1-056-242-00-BOF	F53A1818-W
1-056-242-00-BPF	F53A1811-W
1-056-242-00-BQF	F53A1814-W
1-056-242-00-CNF	F53B1815-W
1-056-242-00-COF	F53B1818-W
1-056-242-00-CPF	F53B1811-W
1-056-242-00-CQF	F53B1814-W
1-056-242-00-DNF	F53C1815-W
1-056-242-00-DOF	F53C1818-W
1-056-242-00-DPF	F53C1811-W
1-056-242-00-DQF	F53C1814-W

# M Series UniBrakes

## Double C-Face AC Coupler Brakes with NEMA 2 Housing

### Aluminum Head and Cover

#### 56,700 NEMA 2

The Double C-Face brake is designed for use as a coupler between standard C-Face motors and C-Face gear reducers.

#### Features:

- External manual release lever
- Totally enclosed construction
- Torque adjustable from full-rated torque down to 50%
- Single-phase AC coils to provide fast release times and easy wiring



#### Brake Part Numbers

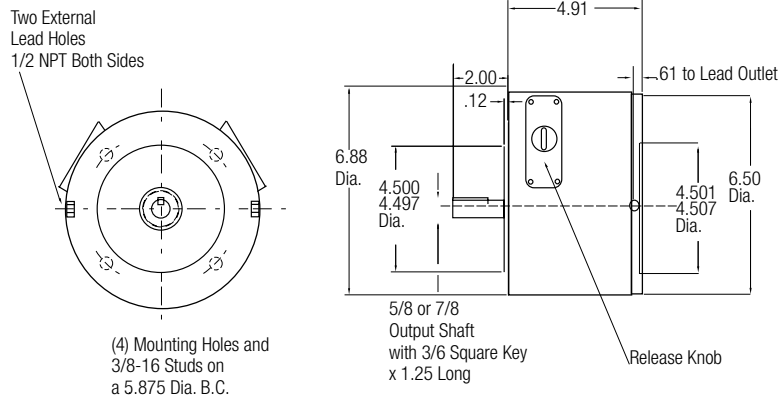
#### Technical Data

Coil Voltage	3 ft. lb. Brakes (1 Disc)	6 ft. lb. Brakes (1 Disc)	10 ft. lb. Brakes (2 Discs)	Current Holding Amps	Current Inrush Amps
<b>5/8 Bore Shaft and Hub (56C)</b>					
115/230, 60 HZ	M51A0321-W	M51A0621-W	M52A0721-W	.50/.25	3.66/1.83
230/460, 60 HZ	M51A0324-W	M51A0624-W	M52A0724-W	.28/.14	1.94/.97
287/575, 60 HZ	M51A0325-W	M51A0625-W	M52A0725-W	.22/.11	1.54/.77
115/230, 50 HZ	M51A0328-W	M51A0628-W	M52A0728-W	.45/.22	3.27/1.64
230/460, 50 HZ	M51A0329-W	M51A0629-W	M52A0729-W	.24/.12	1.76/.88
<b>7/8 Bore Shaft and Hub (145TC)</b>					
115/230, 60 HZ	M51C0321-W	M51C0621-W	M52C0721-W	.50/.25	3.66/1.83
230/460, 60 HZ	M51C0324-W	M51C0624-W	M52C0724-W	.28/.14	1.94/.97
287/575, 60 HZ	M51C0325-W	M51C0625-W	M52C0725-W	.22/.11	1.54/.77
115/230, 50 HZ	M51C0328-W	M51C0628-W	M52C0728-W	.45/.22	3.27/1.64
230/460, 50 HZ	M51C0329-W	M51C0629-W	M52C0729-W	.24/.12	1.76/.88

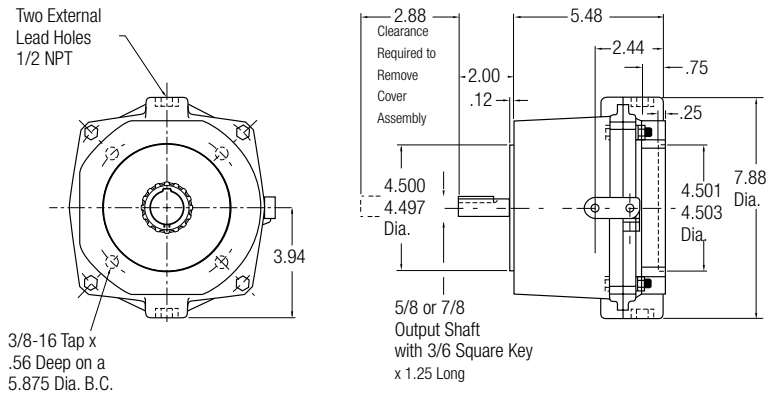
# M Series UniBrakes

## Double C-Face AC Coupler Brakes with NEMA 2 Housing Aluminum Head and Cover 56,700 NEMA 2

### Stearns®



### Warner UNIBRAKE



### UNIBRAKE Interchange

Stearns® Part Number	Warner Electric Replacement
1-056-711-05-NF	M51A0325-W
1-056-711-05-OF	M51A0328-W
1-056-711-05-PF	M51A0321-W
1-056-711-05-QF	M51A0324-W
1-056-711-07-NF	M51C0325-W
1-056-711-07-OF	M51C0328-W
1-056-711-07-PF	M51C0321-W
1-056-711-07-QF	M51C0324-W

Stearns® Part Number	Warner Electric Replacement
1-056-721-05-NF	M51A0625-W
1-056-721-05-OF	M51A0628-W
1-056-721-05-PF	M51A0621-W
1-056-721-05-QF	M51A0624-W
1-056-721-07-NF	M51C0625-W
1-056-721-07-OF	M51C0628-W
1-056-721-07-PF	M51C0621-W
1-056-721-07-QF	M51C0624-W

Stearns® Part Number	Warner Electric Replacement
1-056-731-05-NF	M52A0725-W
1-056-731-05-OF	M52A0728-W
1-056-731-05-PF	M52A0721-W
1-056-731-05-QF	M52A0724-W
1-056-731-07-NF	M52C0725-W
1-056-731-07-OF	M52C0728-W
1-056-731-07-PF	M52C0721-W
1-056-731-07-QF	M52C0724-W

# M Series UniBrakes

## Double C-Face DC Coupler Brakes with NEMA 2 Housing

### Aluminum Head and Cover

### 56,700 NEMA 2

The Double C-Face Brake is designed for use as a coupler between standard C-Face motors and C-Face gear reducers.

#### Features:

- External manual release lever
- Totally enclosed construction
- Torque adjustable from full-rated torque down to 50%
- DC coils to provide fast release times and easy wiring



#### Brake Part Numbers

#### Technical Data

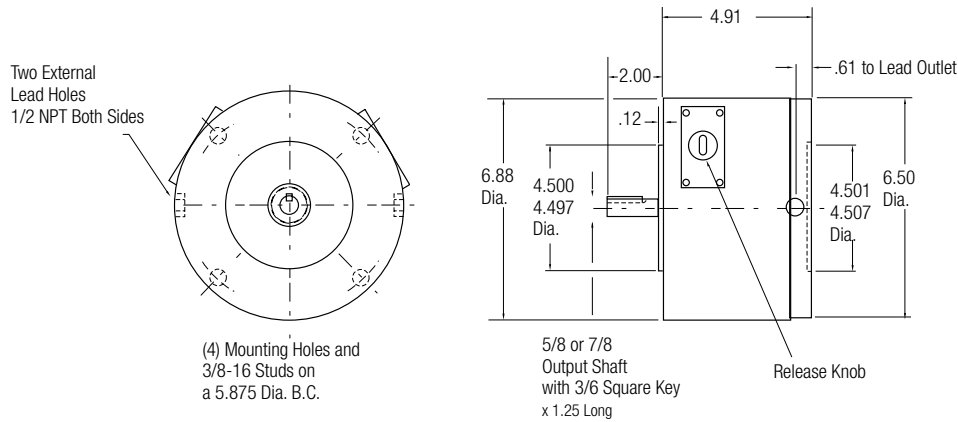
Coil Voltage	3 ft. lb. Brakes (1 Disc)	6 ft. lb. Brakes (2 Disc)	10 ft. lb. Brakes (3 Discs)	Current Holding Amps	Current Inrush Amps
<b>5/8 Bore Shaft and Hub (56C)</b>					
24 VDC	M51A032Y-W	M52A062Y-W	M53A072Y-W	.91	26.4
90 VDC	M51A032X-W	M52A062X-W	M53A072X-W	.25	365
<b>7/8 Bore Shaft and Hub (145TC)</b>					
24 VDC	M51C032Y-W	M52C062Y-W	M53C072Y-W	.91	26.4
90 VDC	M51C032X-W	M52C062X-W	M53C072X-W	.25	365



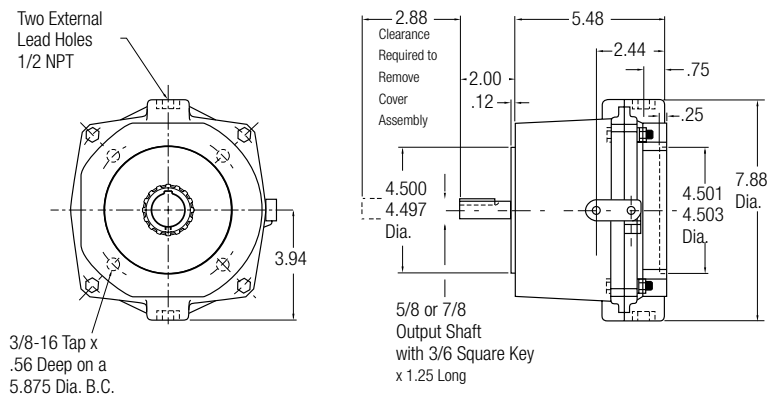
# M Series UniBrakes

## Double C-Face DC Coupler Brakes with NEMA 2 Housing Aluminum Head and Cover 56,700 NEMA 2

### Stearns®



### Warner UNIBRAKE

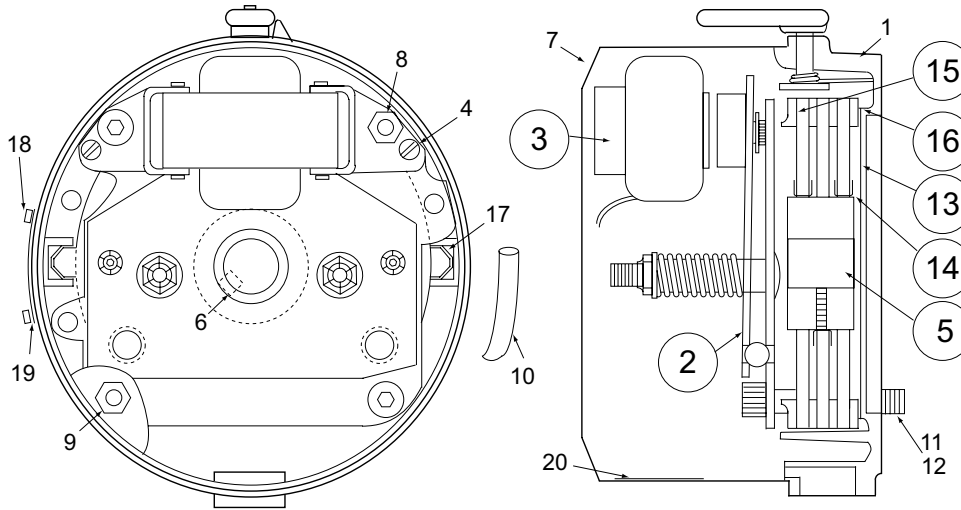


### UNIBRAKE Interchange

Stearns® Part Number	Warner Electric Replacement
1-056-711-05-UF	M51A032Y-W
1-056-711-05-XF	M51A032X-W
1-056-711-07-UF	M51C032Y-W
1-056-711-07-XF	M51C032X-W
1-056-721-05-UF	M52A062Y-W
1-056-721-05-XF	M52A062X-W
1-056-721-07-UF	M52C062Y-W
1-056-721-07-XF	M52C062X-W
1-056-731-05-UF	M53A072Y-W
1-056-731-05-XF	M53A072X-W
1-056-731-07-UF	M53C072Y-W
1-056-731-07-XF	M53C072X-W

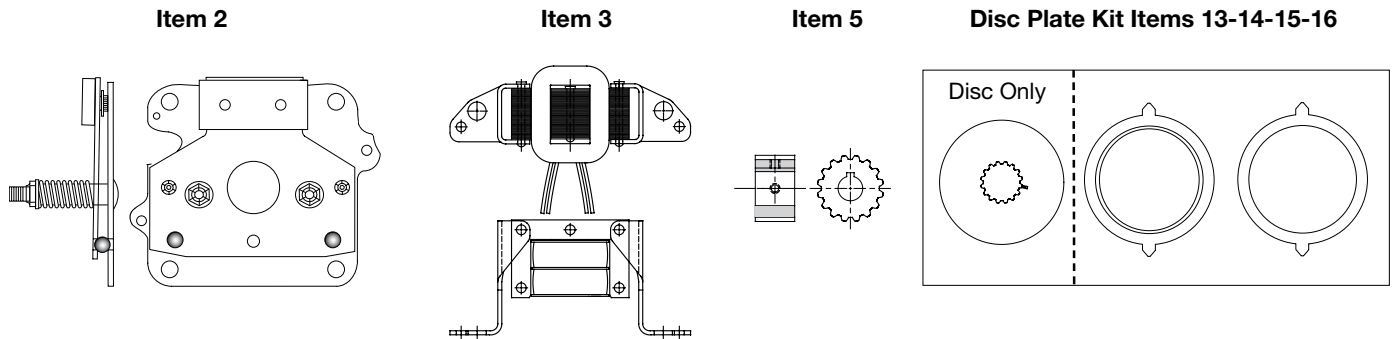
# UNIBRAKES

## F-Series AC Rear-Mounted Brakes



### Component Parts

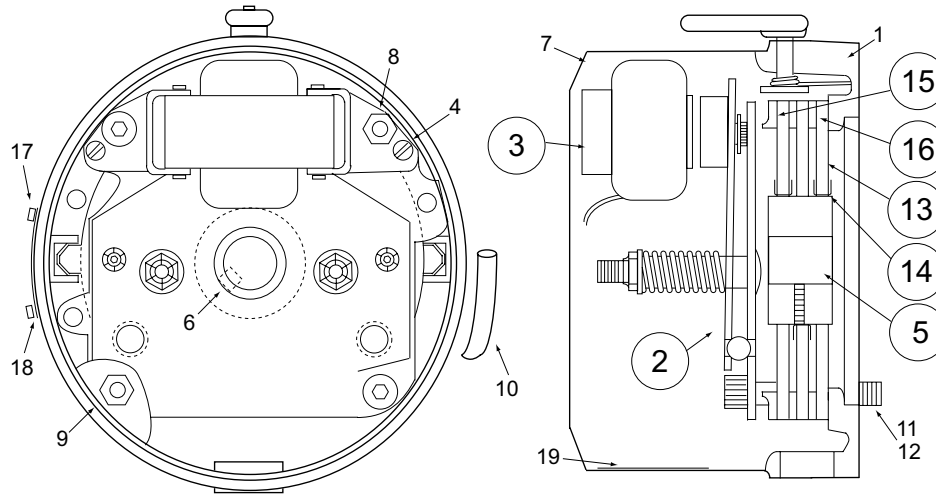
Item	Description	Part No.	Qty.	Item	Description	
2	Support & Armature Plate Assembly	6, 10, & 15 ft.lb.	79060-07-A	1	1	Brake Head Machined
		3 ft.lb.	79060-07-B	1		
		275/550V 60HZ	79137-18-G	1		
		230/460V 60HZ	79137-18-J	1		
		115/230V 60HZ	79137-18-K	1		
3	Coil and Pole Assembly	200/400V 60HZ	79137-18-L	1	4	10-32 X 5/16 Slotted Hex Head With Split LW
		208/416V 50HZ	79137-18-M	1		
		115/230V 50HZ	79137-18-N	1		
		230/460V 50HZ	79137-18-P	1		
		5/8 Bore	58D22	1		
5	Hub Assembly	3/4 Bore	58D23	1	6	3/16" SQR X 1" Key
		7/8 Bore	58D24	1		
		7/8 Bore	58D24	1		
13	Brake Disc (Individual)	327213	1	7	Brake Cover	
13,14	Disc Plate Kit	3 & 6 ft.lb. ( 1 disc )	327212-1			1
		10 ft.lb. ( 2 discs )	327212-2			1
		15 ft.lb. ( 3 discs )	327212-3			1
15,16	(Includes Disc & Pressure Plates)	10 ft.lb. ( 2 discs )	327212-2	1	8	Stud Extension
		15 ft.lb. ( 3 discs )	327212-3	1		
11	3/8-16 X 2-1/4" Socket Cap Screw	3/8-16 X 2-1/4" Socket Cap Screw	327212-1	1	9	10-32 Hex Nut
17	Anti Rattle Spacer	Anti Rattle Spacer	327212-1	1	10	Insulating Sleeve
18	Nameplate	Nameplate	327212-1	1	11	3/8-16 X 2-1/4" Socket Cap Screw



### Service Parts

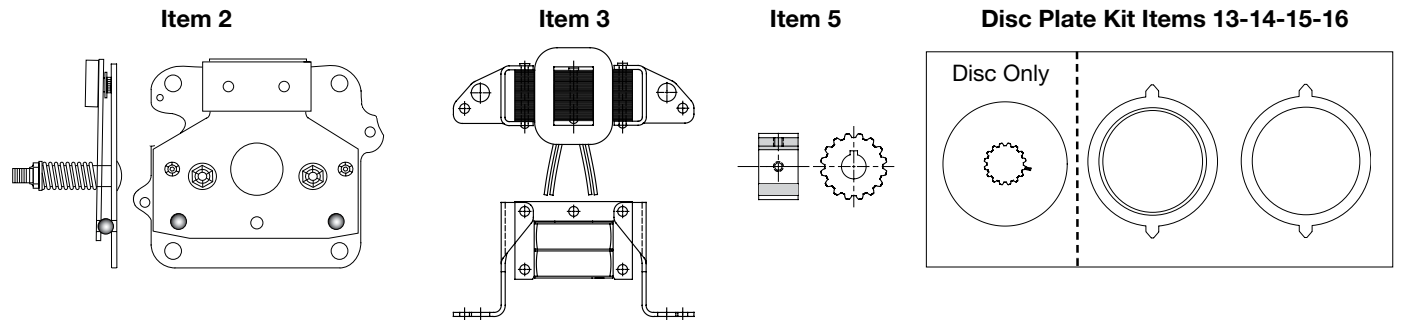
# UNIBRAKES

## F-Series AC Rear-Mounted Brakes



### Component Parts

Item	Description	Part No.	Qty.	Item	Description	
2	Support & Armature Plate Assembly	6, 10, & 15 ft.lb.	79060-07-A	1	1	Brake Head Machined
		3 ft.lb.	79060-07-B	1	4	10-32 X 5/16 Slotted Hex Head With Split LW
		275/550V 60HZ	79137-18-G	1	6	3/16" SQR X 1" Key
		230/460V 60HZ	79137-18-J	1	7	Brake Cover
		115/230V 60HZ	79137-18-K	1	8	Stud Extension
3	Coil and Pole Assembly	200/400V 60HZ	79137-18-L	1	9	10-32 Hex Nut
		208/416V 50HZ	79137-18-M	1	10	Insulating Sleeve
		115/230V 50HZ	79137-18-N	1	11	3/8-16 X 2-1/2" Socket Cap Screw
		230/460V 50HZ	79137-18-P	1	12	3/8" Hi-Collar Lock Washer
		5/8 Bore	58D22	1	17	6-32 X 1/4" Hex Washer Head Screw
5	Hub Assembly	3/4 Bore	58D23	1	18	Nameplate
		7/8 Bore	58D24	1	19	Instruction Label
		13	Brake Disc (Individual)	327213	1	
13,14	Disc Plate Kit	3 & 6 ft.lb. ( 1 disc )	327212-4	1		
15,16	(Includes Disc & Pressure Plates)	10 ft.lb. ( 2 discs )	327212-5	1		
		15 ft.lb. ( 3 discs )	327212-6	1		



### Service Parts



# Packaged Performance Products Service Parts

## Electrically Released Brakes

### Packaged Performance Products Service Parts for Electrically Released Brakes

#### Spring-Set Brakes

ERS Series Static Engaged Brakes . . . . .	N/A
ERD Series Dual Purpose Engagement Brakes . . . . .	N/A
UNIBRAKES AC Motor Brakes . . . . .	SP-2



When replacing components in clutches and brakes several guidelines are appropriate. In all cases, when replacing worn friction surfaces both the components need to be replaced. In many cases, the splined hubs should be inspected and replaced if worn.

#### Common Replacement Practices:

##### Electrically released brakes

- On all Electrically released brakes the magnet and armature are only sold as a matched set and must be replaced as a set.

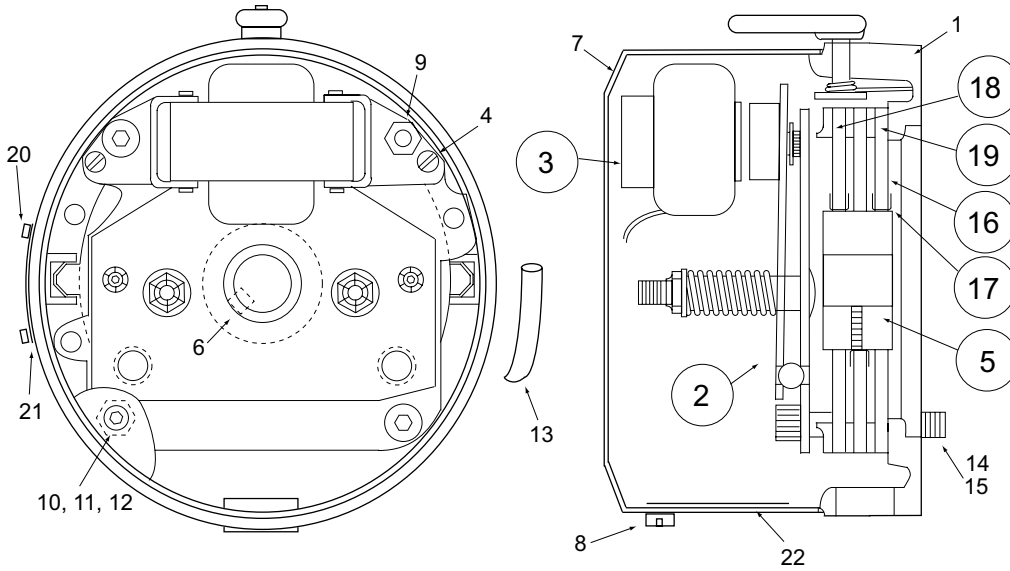
##### A note on burnishing:

When new friction surfaces are installed it will be necessary to burnish the unit prior to returning to full production rates. Burnishing is the act of wearing in the friction faces to ensure full engagement and therefore full torque. Burnishing is achieved by simply cycling the unit under less than full load (machine empty, if possible). Most units will achieve full torque in less than 100 cycles. Refer to the service manual for more details.

### Service Parts

# UNIBRAKES

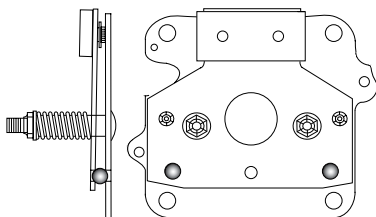
## F-Series AC Rear-Mounted Brakes



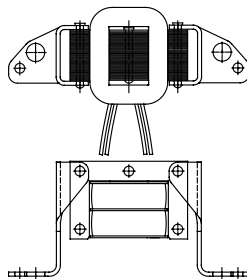
### Component Parts

Item	Description	Part No.	Qty.	Item	Description	
2	Support & Armature Plate Assembly	6, 10, & 15 ft.lb.	79060-07-A	1	1	Brake Head Machined
		3 ft.lb.	79060-07-B	1	4	10-32 X 5/16 Slotted Hex Head With Split LW
		275/550V 60HZ	79137-18-G	1	6	3/16\" SQR X 1\" Key
		230/460V 60HZ	79137-18-J	1	7	Brake Cover
		115/230V 60HZ	79137-18-K	1	8	Cover Plug
3	Coil and Pole Assembly	200/400V 60HZ	79137-18-L	1	9	Stud Extension
		208/416V 50HZ	79137-18-M	1	10	5/16\" Split Lock Washer
		115/230V 50HZ	79137-18-N	1	11	10-32 X 5/8 Socket Head Cap Screw
		230/460V 50HZ	79137-18-P	1	12	#10 Flat Washer
		5/8 Bore	58D22	1	13	Insulating Sleeve
5	Hub Assembly	3/4 Bore	58D23	1	14	3/8-16 X 2-1/2\" Socket Cap Screw
		7/8 Bore	58D24	1	15	3/8\" Hi-Collar Lock Washer
					20	9 Gage Escutcheon Pin
16	Brake Disc (Individual)	327213	1	21	Nameplate	
16,17	Disc Plate Kit	3 & 6 ft.lb. ( 1 disc )	327212-4	1	22	Instruction Label
18,19	(Includes Disc & Pressure Plates)	10 ft.lb. ( 2 discs )	327212-5	1		
		15 ft.lb. ( 3 discs )	327212-6	1		

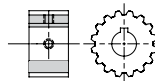
Item 2



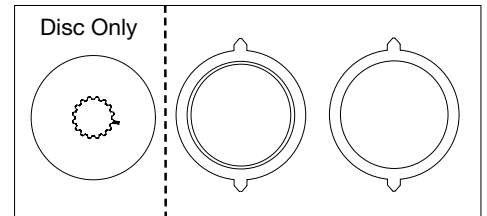
Item 3



Item 5



Disc Plate Kit Items 13-14-15-16

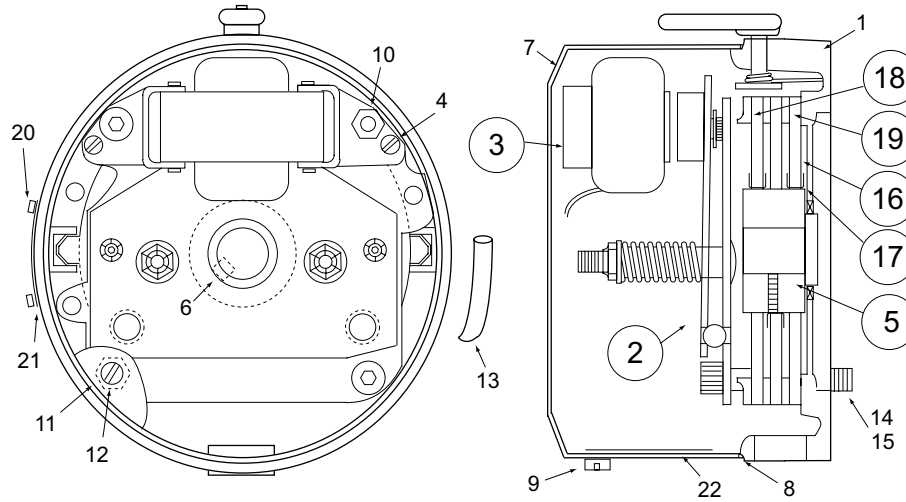


### Service Parts



# UNIBRAKES

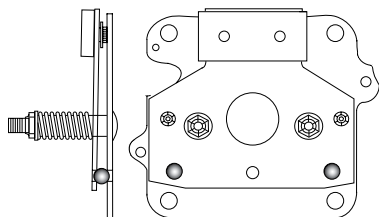
## F-Series AC Rear-Mounted Brakes



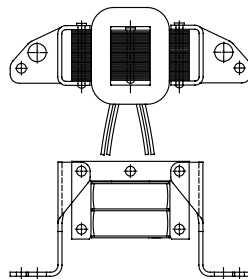
### Component Parts

Item	Description	Part No.	Qty.	Item	Description	
2	Support & Armature Plate Assembly	6, 10, & 15 ft.lb.	79060-07-A	1	1	Brake Head Machined
		3 ft.lb.	79060-07-B	1	4	10-32 X 5/16 Slotted Hex Head With Split LW
		275/550V 60HZ	79137-18-G	1	6	3/16" SQR X 1" Key
		230/460V 60HZ	79137-18-J	1	7	Brake Cover
		115/230V 60HZ	79137-18-K	1	8	Brake Cover Gasket
3	Coil and Pole Assembly	200/400V 60HZ	79137-18-L	1	9	Cover Plug
		208/416V 50HZ	79137-18-M	1	10	Stud Extension
		115/230V 50HZ	79137-18-N	1	11	5/16" Split Lock Washer
		230/460V 50HZ	79137-18-P	1	12	10-32 X 5/8" SS Pan Head With O-Ring
		5/8 Bore	58D29	1	13	Insulating Sleeve
5	Hub Assembly	3/4 Bore	58D30	1	14	3/8-16 X 2-1/2" Socket Cap Screw
		7/8 Bore	58D31	1	15	3/8" Hi-Collar Lock Washer
		16	Brake Disc (Individual)	327213	1	20
16,17	Disc Plate Kit	3 & 6 ft.lb. ( 1 disc )	327212-4	1	21	Nameplate
18,19	(Includes Disc & Pressure Plates)	10 ft.lb. ( 2 discs )	327212-5	1	22	Instruction Label
		15 ft.lb. ( 3 discs )	327212-6	1		

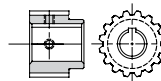
Item 2



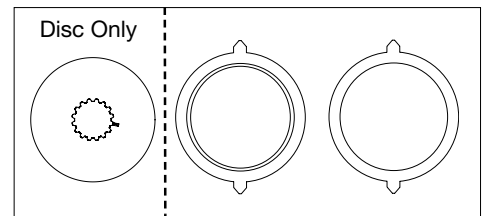
Item 3



Item 5



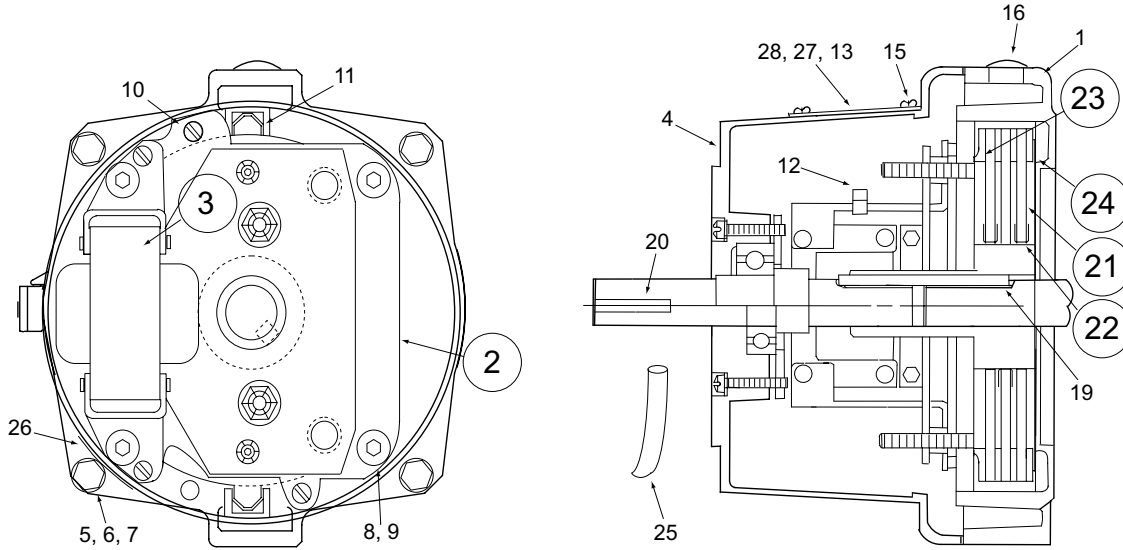
Disc Plate Kit Items 13-14-15-16



### Service Parts

# UNIBRAKES

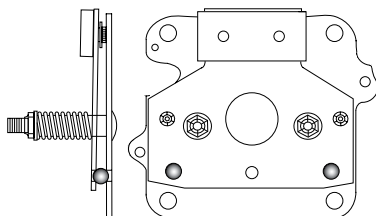
## M-Series AC Coupler Brakes



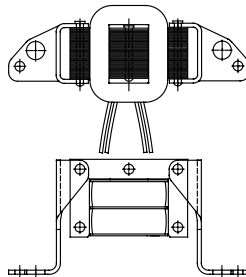
### Component Parts

Item	Description	Part No.	Qty.	Item	Description		
2	Support & Armature Plate Assembly	6, 10, & 15 ft.lb.	79060-07-A	1	1	Brake Head Machined	
		3 ft.lb.	79060-07-B	1	4	Brake Cover Assembly	
		275/550V 60HZ	79137-18-G	1	5	1/4-20 X 1-1/2" Hex Cap Screw	
		230/460V 60HZ	79137-18-J	1	6	1/4" Split Lock Washer	
		115/230V 60HZ	79137-18-K	1	7	1/4-20 Hex Nut	
			79137-18-L	1	8	3/8-16 X 2-1/4" Socket Cap Screw	
3	Coil and Pole Assembly	200/400V 60HZ	79137-18-M	1	9	3/8" Hi-Collar Lock Washer	
		208/416V 50HZ	79137-18-N	1	10	1/4-20 X 3/8 Slotted Round Head Screw	
		115/230V 50HZ	79137-18-P	1	11	Anti Rattle Spacer	
		230/460V 50HZ	79137-18-P	1	12	Lead Clip	
		21	Brake Disc (Individual)	327213	1	13	Window Cover Plate
		21,22	Disc Plate Kit	3 & 6 ft.lb. ( 1 disc )	327212-1	1	15
23,24	(Includes Disc & Pressure Plates)	10 ft.lb. ( 2 discs )	327212-2	1	16	1/2" Plug Button	
				19	3/16" SQR X 2-3/4" Key		
				20	3/16" SQR X 1-1/4" Key		
				25	Insulating Sleeve		
				26	Name Plate		
				27	Instruction Label - Gap		
				28	Instruction Label - Wire		

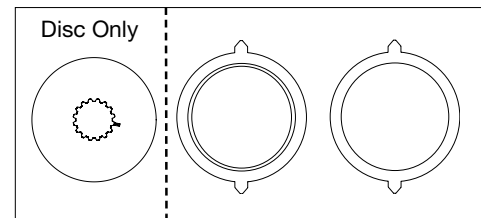
Item 2



Item 3



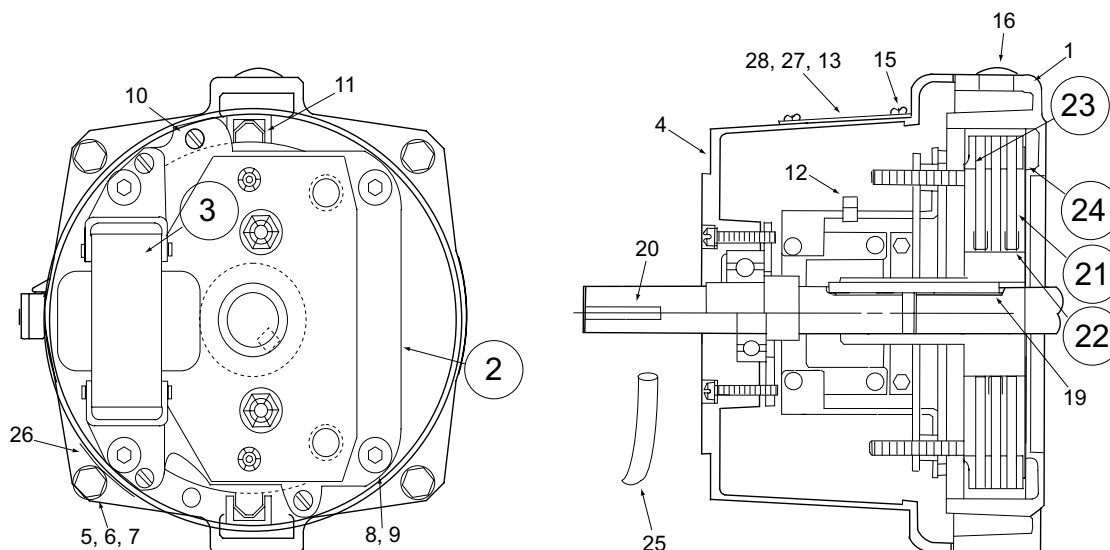
Disc Plate Kit Items 13-14-15-16



### Service Parts

# UNIBRAKES

## M-Series DC Coupler Brakes

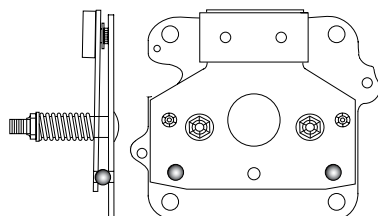


### Component Parts

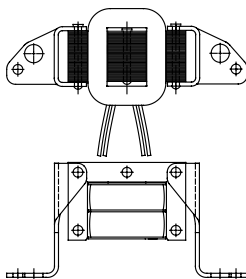
Item	Description	Part No.	Qty.
2	Support & Armature Plate Assembly	79060-07-A	1
3	Coil and Pole Assembly	327208	1
21	Brake Disc (Individual)	327213	1
21,22	Disc Plate Kit	327212-1	1
23,24	(Includes Disc & Pressure Plates)	327212-2	1
		327212-3	1

Item	Description
1	Brake Head Machined
4	Brake Cover Assembly
5	1/4-20 X 1-1/2" Hex Cap Screw
6	1/4" Split Lock Washer
7	1/4-20 Hex Nut
8	3/8-16 X 2-1/4" Socket Cap Screw
9	3/8" Hi-Collar Lock Washer
10	1/4-20 X 3/8 Slotted Round Head Screw
11	Anti Rattle Spacer
12	Lead Clip
13	Window Cover Plate
15	6-32 X 1/4" Hex Washer Head Screw
16	1/2" Plug Button
19	3/16" SQR X 2-3/4" Key
20	3/16" SQR X 1-1/4" Key
25	Insulating Sleeve
26	Name Plate
27	Instruction Label - Gap
28	Instruction Label - Wire

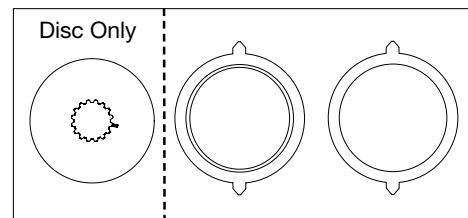
Item 2



Item 3



Disc Plate Kit Items 13-14-15-16



### Service Parts



# General Engineering Data



G

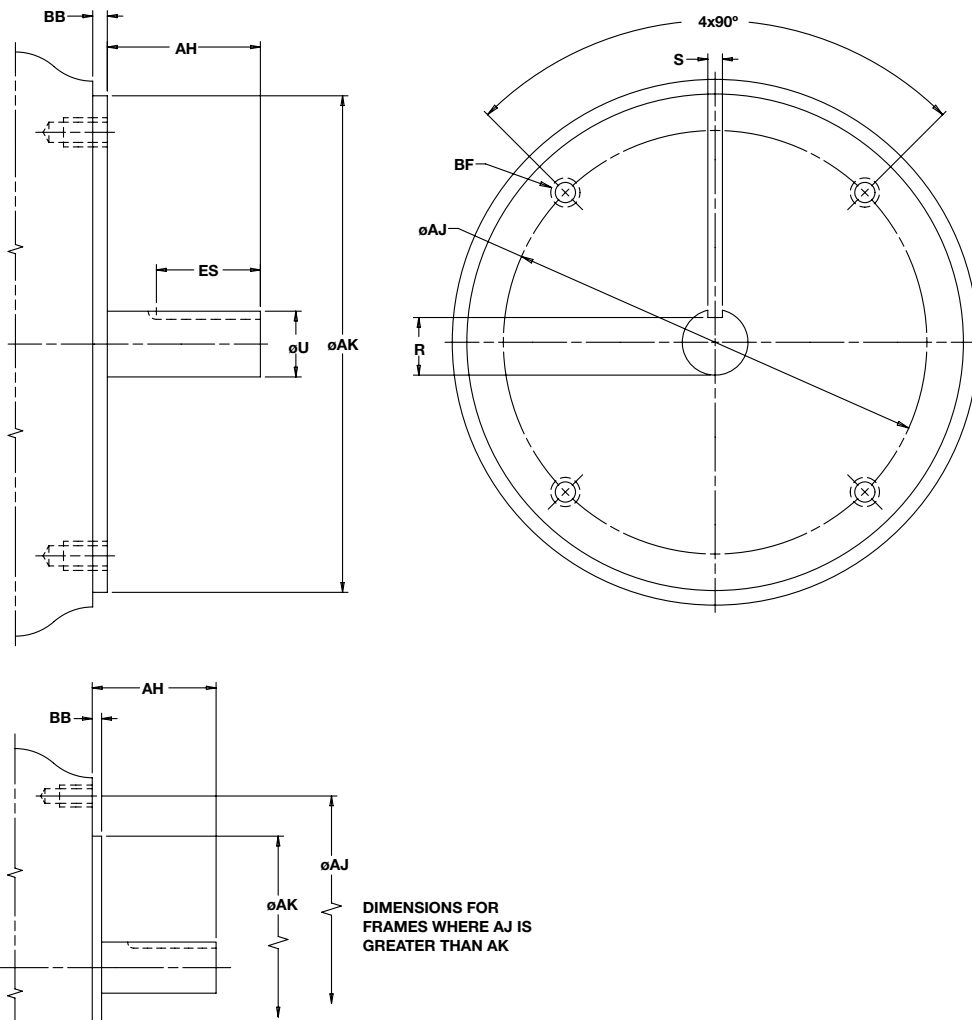
# Mechanical Data Application Engineering

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Ordering Information / Standard NEMA Frame Dimensions..... G-3  
Mechanical Data / Dynamic Torque ..... G-4  
Mechanical Data / Rotational Speed ..... G-6  
Mechanical Data / Clutch Field Restraining Devices..... G-7  
Electrical Data / Coil Ratings ..... G-8  
Electrical Data / Installation Procedure ..... G-11  
Electrical Data / Coil Suppression & Clutch/Brake Overlap ..... G-12  
Electrical Data / Overexcitation ..... G-13



# Standard NEMA Frame Dimensions Ordering Information



## Specifications

Module Size	NEMA Frame Size	AH	AJ	AK	BB	BF	ES	R	S	U
50	56C/48Y	2.06	5.875	4.500	.16 MAX	3/8-16 UNC	1.41 MIN	0.517	0.188	0.625
100	56C/48Y	2.06	5.875	4.500	.16 MAX	3/8-16 UNC	1.41 MIN	0.517	0.188	0.625
180	143TC/145TC	2.12	5.875	4.500	.16 MAX	3/8-16 UNC	1.41 MIN	0.771	0.188	0.875
210	182TC/184TC	2.62	7.250	8.500	.25 MIN	1/2-13 UNC	1.78 MIN	0.986	0.250	1.125
215	213TC/215TC	3.12	7.250	8.500	.25 MIN	1/2-13 UNC	2.41 MIN	1.201	0.312	1.375

Note: Warner Electric Modules are designed to comply with standard NEMA frame dimensions for mounting. Reference to each particular frame size is given in the individual selection tables for each type of Warner Electric module.

# Mechanical Data Dynamic Torque

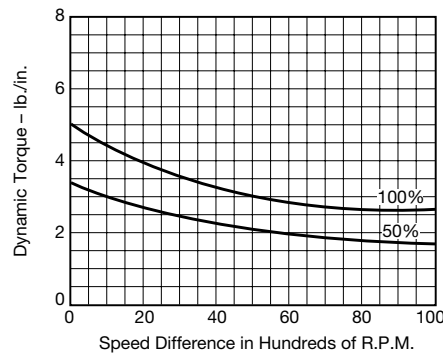
## NOTES:

Speed difference means the difference in speed between one friction face and the other at the moment of engagement. The intersection of the top curve and the speed difference is the maximum torque produced by the unit. When both friction faces are engaged and rotating at the same speed, the unit is said to be locked-in and produces the maximum static torque (zero speed difference).

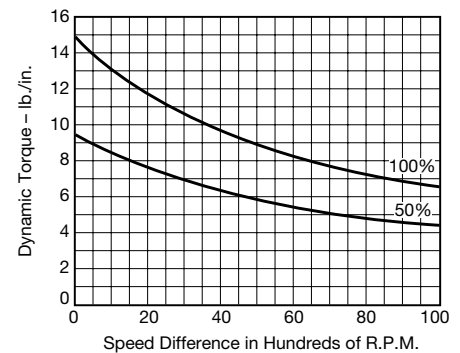
The % lines indicate the percentage of full voltage being used. Example: If 90 volt unit runs at 45 volts, use the 50% line.

Average Torque = Dynamic Torque at  $1/2$  operating speed. Example: If operating speed is 1800, use dynamic torque at 900.

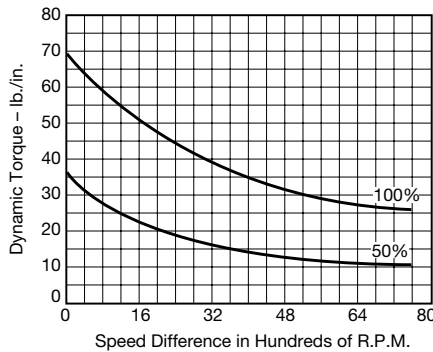
**Size 120** Maximum Speed 10,000 rpm  
Static Torque 5 lb./in.



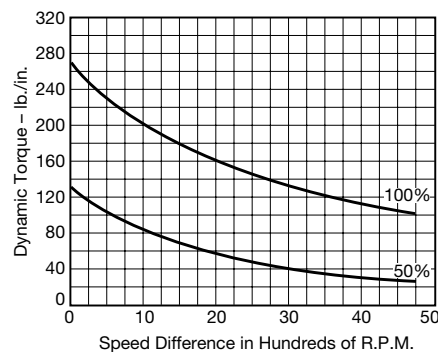
**Size 170** Maximum Speed 10,000 rpm  
Static Torque 15 lb./in.



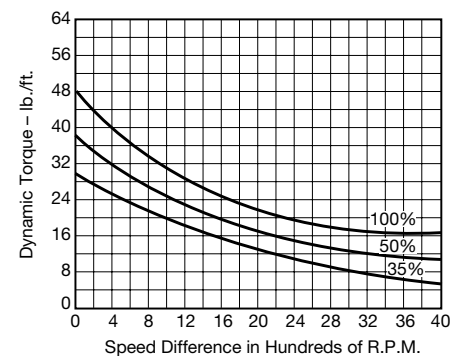
**Size 250** Maximum Speed 7,500 rpm  
Static Torque 70 lb./in.



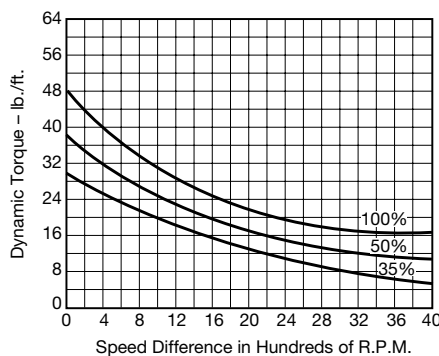
**Size 400** Maximum Speed 4,500 rpm  
Static Torque 270 lb./in.



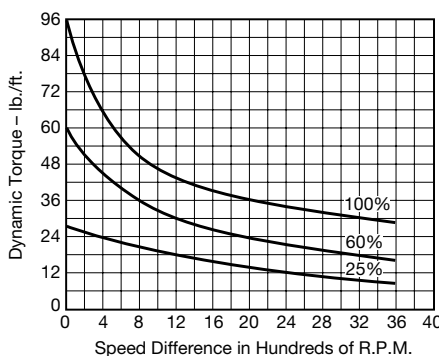
**Size 500-SF** Maximum Speed 4,000 rpm  
Static Torque 50 lb./ft.



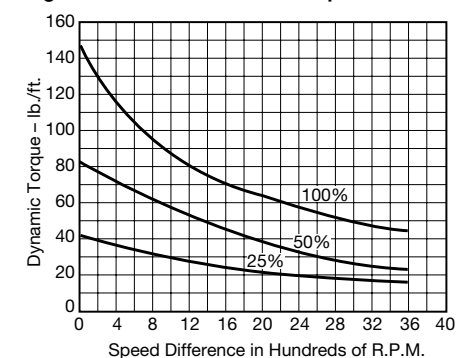
**Size 500-SF** Maximum Speed 4,000 rpm  
Static Torque 50 lb./ft.



**Size 650** Maximum Speed 3,600 rpm  
Static Torque 95 lb./ft.



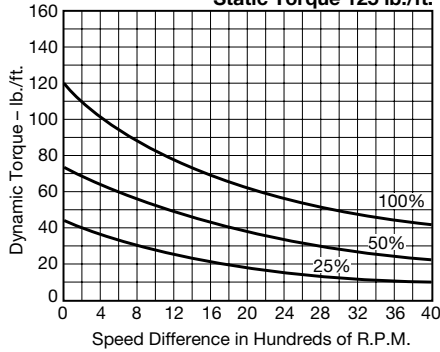
**Size 825-SF** Maximum Speed 3,600 rpm  
Brg. Mtd. Static Torque 150 lb./ft.



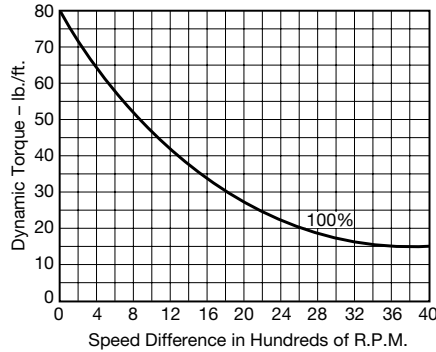
NOTE: Torque values are in inch lbs. for size 400 and smaller, and in ft.lbs. for size 500 and larger.

# Mechanical Data Dynamic Torque

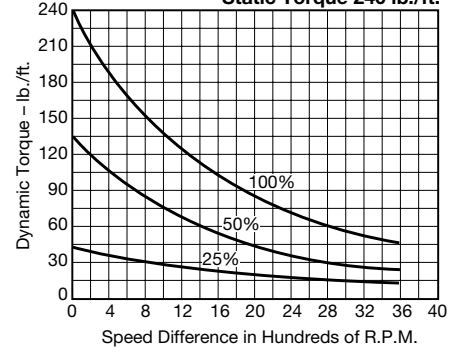
**Size 825** Maximum Speed 4,000 rpm  
Electro-Pack 3,600 rpm  
Static Torque 125 lb./ft.



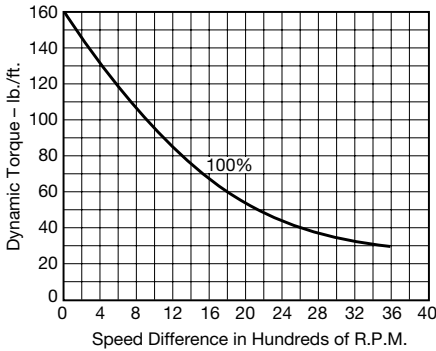
**Size 825-MB** Maximum Speed 4,000 rpm  
Static Torque 80 lb./ft.



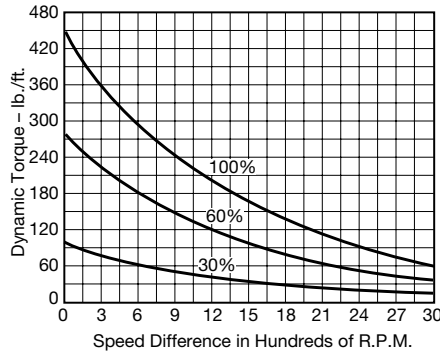
**Size 1000** Maximum Speed 3,600 rpm  
Electro-Pack 3,000 rpm  
Static Torque 240 lb./ft.



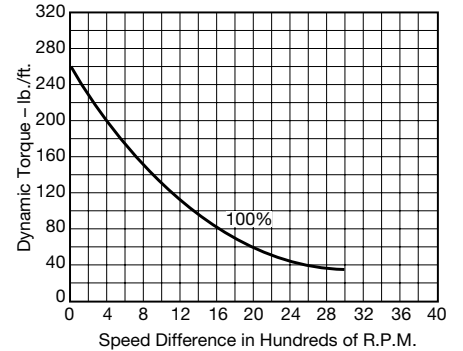
**Size 1000-MB** Maximum Speed 3,600 rpm  
Static Torque 160 lb./ft.



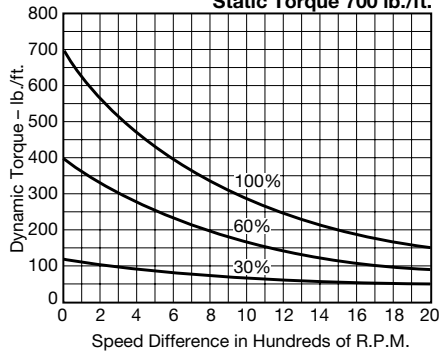
**Size 1225** Maximum Speed 3,000 rpm  
Static Torque 465 lb./ft.



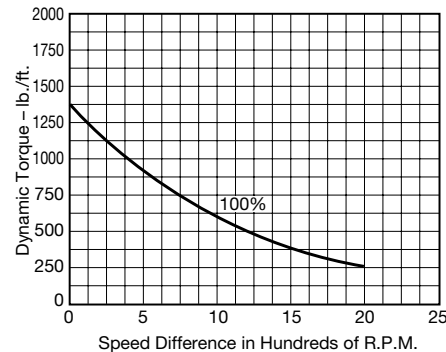
**Size 1225-MB** Maximum Speed 3,000 rpm  
Static Torque 260 lb./ft.



**Size 1525** Maximum Speed 2,000 rpm  
Electro-Pack 1,800 rpm  
Static Torque 700 lb./ft.



**Size 1525-Hi Torque** Maximum Speed 2,000 rpm  
Static Torque 1,350 lb./ft.



# Mechanical Data Rotational Speed

## Rotational Speed

Rotational speed of a clutch or brake is an important consideration when selecting a unit for a particular application. Numerous factors must be considered, such as the maximum rated speed of the clutch/brake unit, the dynamic torque required, the heat dissipation needed, the effect of speed on wear rate, and torque stability at very low speeds. Each of these issues are separate, and sometimes interrelated, but always important in selecting the right product for an application.

## Maximum RPM Rating

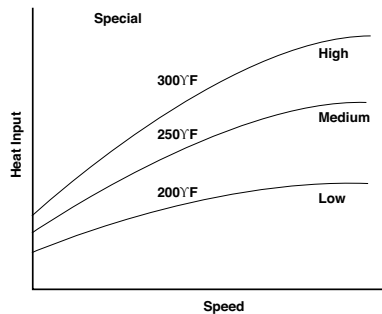
The most important rotational speed consideration is the maximum rated RPM capability of a unit. DO NOT exceed this rating. Exceeding the maximum RPM of a unit may cause personal injury and/or machine damage. Maximum rated speeds are based on the structural integrity of the rotating components and associated shaft and bearing capabilities. If the RPM rating is exceeded, structural failure may occur, or the unit may experience premature bearing failure and/or premature friction material wear out.

## Dynamic Torque

When determining the correct size clutch/brake for an application, dynamic torque at the highest slip speed is often the determining factor. As you can see by reviewing the dynamic torque curves for different units as shown starting on page G-4, dynamic clutch/brake torque usually decreases with higher speeds. As slip RPM increases, the coefficient of friction of a unit decreases, causing a decrease in dynamic torque availability. Be careful to consider this when selecting the appropriate unit size needed.

## Heat Dissipation

Heat dissipation is inversely related to dynamic torque. As RPM increases, the heat dissipation ability of a unit increases. When an armature is rotating, the heat dissipation rate is proportional to the aerodynamic fan effect of the rotating armature. The faster the armature rotates, the greater the heat dissipation. This is illustrated with a typical catalog curve as shown in Figure 1. It's interesting to note that, at zero RPM, the unit still has some heat dissipation capability. This is due to convection and radiation, but is usually not an important consideration.



**Figure 1:** Typical Heat Dissipation Characteristics

## Wear Rate

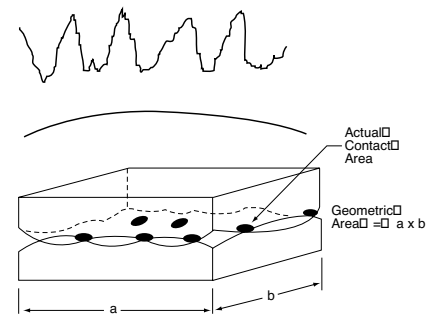
The wear rate of friction surfaces is dependent on the clamping pressure of the mating surfaces as well as the surface velocity between the wearing surfaces. Many variables are involved in predicting wear life, of which RPM is probably the most influential. Typically, the wear rate will increase directly with the rubbing velocity distance. Another way of stating this is the higher the relative engagement speeds of two rotating parts, the longer they are allowed to slip against each other and the faster the wear rate.

## Low Speed Operation

The effect of low speed usage should also be considered in applications. Performance of clutch/brake units at less than 100 RPM may be very different than at higher RPM. This is due to “burnish” characteristics of friction surfaces.

## Wear In

“Burnish” is the wear in, or mating of two surfaces. When new, these surfaces have manufacturing features which include roughness and waviness. When these surfaces come into initial contact, only the high spots actually meet. See Figure 2. This results in only a small surface area in contact, while the non-contact surface area is “air.” The result is low torque. As the mating surfaces continue to engage and slip against each other, the high spots are worn down and more surface area is in contact, thus increasing torque capability. This wear in period, or burnish, typically occurs in the first few hundred cycles of a clutch/brake's life. Faster slip speeds and higher loads mean fewer cycles needed to complete the burnish process. For applications where the speed is less than 100 RPM, the required application torque



**Figure 2:** Unburnished Contact Areas

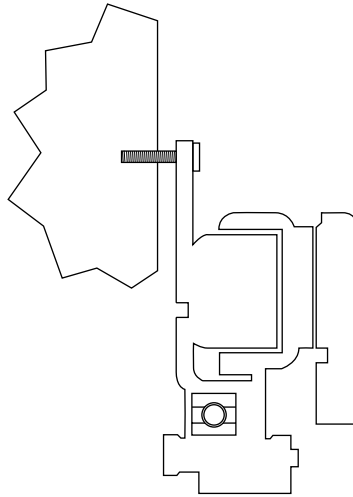
should be doubled to compensate for the low speed “burnish” that the unit experiences. A low speed burnish will require many cycles before full torque and stability are achieved. For example, if an application is determined to need 20 ft.lbs. of static torque, an SF-400 clutch could be selected. But, if the application is only 100 RPM or less, then an SF-500 unit should be the choice to compensate for the low RPM usage, as indicated on the selection chart found on page G-4.

Careful consideration of rotating speeds will help the selection process of an application. Follow these guidelines and the proper clutch/brake selected will provide troublefree operation.

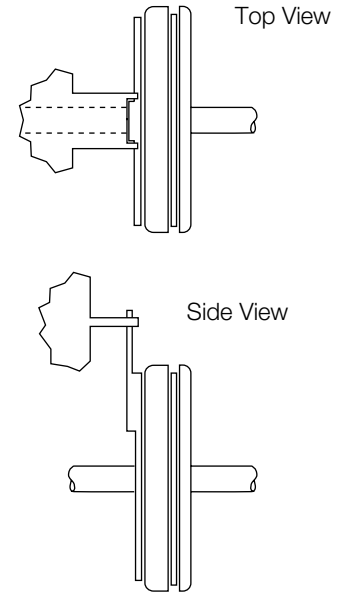
# Mechanical Data Clutch Field Restraining Devices

Many Warner Electric clutch assemblies have a bearing mounted stationary field. By design the bearing maintains its proper position between the field and rotor making it easy for the customer to mount the field-rotor assembly. However, the bearing has a slight drag which tends to make the field rotate if not restrained. And, since the field has lead wires attached, it must be restrained to prevent rotation and pulling of these wires. To counteract this rotational force, the field has a "torque tab" to which the customer must attach an appropriate anti-rotational restraint.

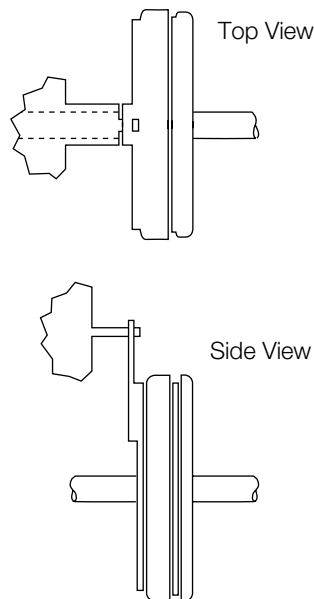
A few hints regarding proper torque tab restraints are in order. First and foremost, it is important to recognize that the force to be overcome is very small and the tab should not be restrained in any manner which will preload the bearing. For example, if the clutch is mounted with the back of the field adjacent to a rigid machine member the customer should not attach a capscrew tightly between the tab and the machine member. This may pull the tab back against the rigid member as shown in Figure 1 and preload the bearing. The recommended methods are illustrated in Figures 2, 3, and 4. The method selected is primarily a matter of customer preference or convenience.



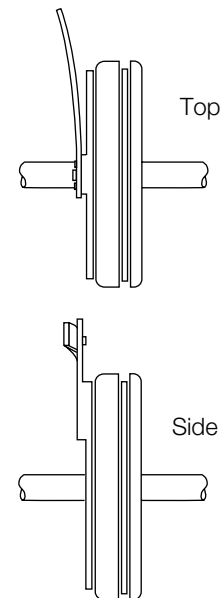
**Figure 1:**  
Rigid member



**Figure 2:**  
Rigid Member with Slot  
Straddling Tab  
(Preferred)



**Figure 3:**  
Pin in Hole  
Loosely  
(Preferred)



**Figure 4:**  
Flexible Strap  
(Preferred)

# Electrical Data Coil Ratings

EC/EB-375	EC			EB		
Voltage – DC	90	24	6	90	24	6
Resistance @ 20° C – Ohms	453.5	29.3	2.10	446.8	29.3	1.96
Current – Amperes	.198	.82	2.85	.201	.82	3.07
Watts	17	20	17	18	20	18
Coil Build-up – milliseconds	62	60	59	50	60	52
Coil Decay – milliseconds	13	14	15	8	14	10

EC/EB-475	EC			EB		
Voltage – DC	90	24	6	90	24	6
Resistance @ 20° C – Ohms	368.9	37.8	2.32	443.1	28.8	2.05
Current – Amperes	.244	.64	2.58	.203	.88	2.93
Watts	22	15	16	18	21	18
Coil Build-up – milliseconds	92	91	90	80	75	70
Coil Decay – milliseconds	18	17	16	8	9	9

EC/EB-650	EC			EB		
Voltage – DC	90	24	6	90	24	6
Resistance @ 20° C – Ohms	225	17.7	1.16	257.2	18.3	1.24
Current – Amperes	.4	1.36	5.19	.35	1.3	4.84
Watts	36	33	31	32	31	29
Coil Build-up – milliseconds	120	115	110	112	108	105
Coil Decay – milliseconds	20	20	20	12	13	14

FB/ER-375, 475, 650	FB-375		FB-475		FB-650	
Voltage – DC	90	24	90	24	90	24
Resistance @ 20° C – Ohms	446	29	310	22	235	16
Current – Amperes	.201	.822	.300	1.09	.380	1.426
Watts	18	19	27	26	34	34
Coil Build-up – milliseconds	40	40	80	80	90	90
Coil Decay – milliseconds	5	10	8	10	10	10

ER-825, 1225	ER-825		ER-1225	
Voltage – DC	90	24	35-75	
Resistance @ 20° C – Ohms	305	21.5	235	
Current – Amperes	.29	1.1	.383	
Watts	26	27	35	
Coil Build-up – milliseconds	400	–	700	
Coil Decay – milliseconds	20	–	20	

EC/EB-825	EC			EB		
Voltage – DC	90	24	6	90	24	6
Resistance @ 20° C – Ohms	221	20.9	1.098	223.3	20.4	1.27
Current – Amperes	.407	1.15	5.464	.4	1.18	4.74
Watts	37	28	33	36	28	28
Coil Build-up – milliseconds	225	200	180	170	170	170
Coil Decay – milliseconds	130	122	115	80	75	70

EC/EB-1000	EC			EB		
Voltage – DC	90	24	6	90	24	6
Resistance @ 20° C – Ohms	248.7	19.7	1.23	248.7	19.7	1.23
Current – Amperes	.36	1.22	4.87	.36	1.22	4.87
Watts	33	29	29	33	29	29
Coil Build-up – milliseconds	250	235	220	235	220	205
Coil Decay – milliseconds	70	75	80	70	75	80

EC/EB-1225	EC			EB		
Voltage – DC	90	24	6	90	24	6
Resistance @ 20° C – Ohms	207.3	15.1	1.04	261.7	22.3	1.33
Current – Amperes	.43	1.59	5.79	.34	1.08	4.5
Watts	39	38	35	31	26	27
Coil Build-up – milliseconds	500	490	480	460	445	435
Coil Decay – milliseconds	220	230	240	190	160	140

ATC, ATTC, ATB, ATTB-25	ATC			ATB		
Voltage – DC	6	24	90	6	24	90
Resistance @ 20° C – Ohms	1.37	20.2	290	1.37	20.2	290
Current – Amperes	4.38	1.19	.31	4.38	1.19	.31
Watts	26.3	28.6	27.9	26.3	28.6	27.9
Coil Build-up – milliseconds	145	145	145	145	145	145
Coil Decay – milliseconds	8	8	8	9	9	9

ATC, ATTC, ATB, ATTB-55	ATC			ATB		
Voltage – DC	6	24	90	6	24	90
Resistance @ 20° C – Ohms	1.21	19.6	230	1.21	19.6	230
Current – Amperes	4.96	1.22	.39	4.96	1.22	.39
Watts	29.8	29.3	35.2	29.8	29.3	35.2
Coil Build-up – milliseconds	200	200	200	210	210	210
Coil Decay – milliseconds	20	20	20	35	35	35

ATC, ATTC, ATB, ATTB-115	ATC			ATB		
Voltage – DC	6	24	90	6	24	90
Resistance @ 20° C – Ohms	1.02	16.5	182	1.02	16.5	182
Current – Amperes	5.91	1.46	.50	5.91	1.46	.50
Watts	35.4	35	44.6	35.4	35	44.6
Coil Build-up – milliseconds	145	145	145	150	150	150
Coil Decay – milliseconds	40	40	40	45	45	45

## Electrical Data Coil Ratings

UM/EM/UMFB/EMFB	Clutch	UM/EM Brake	Clutch	UM/EM Brake	Clutch	UM/EM Brake	UMFB/EMFB Brake	UMFB/EMFB Brake	
Voltage – DC	90	90	24	24	6	6	24	90	
Resistance (ohms)	EM-50	452	429	31.8	28.8	1.9	1.9	28.8	429
	EM-100	392	392	26.7	26.7	1.8	1.8	21.7	308
	EM-180	392	392	26.7	26.7	1.8	1.8	21.7	308
	EM-210/215	248	248	17.9	17.9	1.22	1.22	13.3	205
Amperes	EM-50	.20	.21	.76	.83	3.2	3.2	.83	.21
	EM-100	.23	.23	.90	.90	3.3	3.3	1.1	.29
	EM-180	.23	.23	.90	.90	3.3	3.3	1.1	.29
	EM-210/215	.36	.36	1.3	1.3	4.9	4.9	1.8	.38
Watts	EM-50	18	19	19	20	20	20	20	19
	EM-100	21	21	22	22	20	20	27	27
	EM-180	21	21	22	22	20	20	27	27
	EM-210/215	33	33	32	32	30	30	43	34
Build-up (millisecond)	EM-50	52	53	52	53	52	53	40	40
	EM-100	72	75	72	75	72	70	80	80
	EM-180	72	75	72	75	72	70	80	80
	EM-210/215	120	100	120	100	110	100	90	90
Decay (millisecond)	EM-50	6	5	6	5	6	5	5	5
	EM-100	12	10	12	10	12	10	8	8
	EM-180	12	10	12	10	12	10	8	8
	EM-210/215	20	10	20	10	20	10	10	10



# Electrical Data Coil Ratings

Unit Size	SF/PB 120			SF/PB 170			SF/PB 250		
Voltage – DC	6	24	90	6	24	90	6	24	90
Resistance @ 20°C – Ohms	6.32	104	1386	6.96	111.2	1506	5	76.4	1079
Current – Amperes	.949	.230	.065	.861	.215	.060	1.2	.314	.084
Watts	5.69	5.52	5.85	5.85	5.16	5.37	7.2	7.5	7.51
Coil Build-up – milliseconds	12	12	11	17	17	16	48	48	44
Coil Decay – milliseconds	8	8	7	8	7	6	15	15	13

Unit Size	SF/PB 400			SF-500			PB & PC 500			SF-650		
Voltage – DC	6	24	90	6	24	90	6	24	90	6	24	90
Resistance @ 20°C – Ohms	4.88	73	1087	1.076	14.9	206.1	1.36	23.8	251.1	1.16	17.7	225
Current – Amperes	1.23	.322	.083	5.58	1.61	.44	4.4	1.01	.36	5.19	1.36	.4
Watts	7.39	7.96	7.45	34	39	39	26	24	32	31	33	36
Coil Build-up – milliseconds	154	154	154	82	85	90	84	87	93	110	115	120
Coil Decay – milliseconds	62	60	55	40	40	40	38	35	30	50	50	50

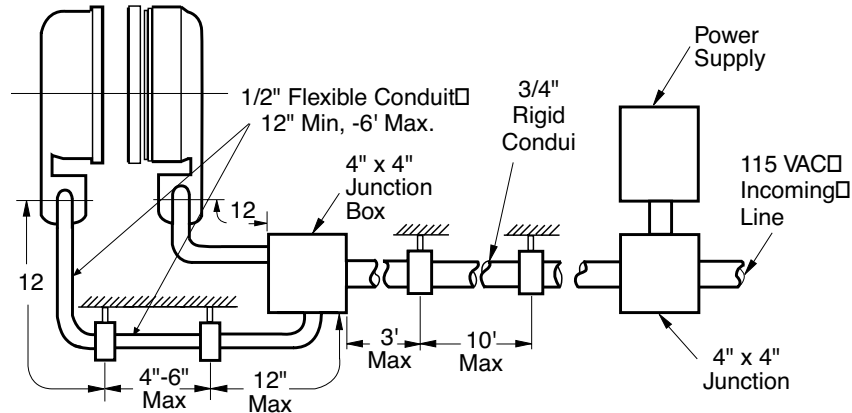
Unit Size	PB-650			SF-825			SF-825 Brg			PB & PC 825			SF-1000			PB & PC 1000		
Voltage – DC	6	24	90	6	24	90	6	24	90	6	24	90	6	24	90	6	24	90
Resistance @ 20°C – Ohms	1.24	18.3	257.2	1.23	20.9	267.0	1.098	14.6	221	1.27	20.4	223.3	1.07	14.4	214.4	1.23	19.7	248.7
Current – Amperes	4.84	1.31	.35	4.9	1.15	.34	5.464	1.65	.407	4.74	1.18	.4	5.61	1.67	.42	4.87	1.22	.36
Watts	29	31	32	29	28	30	33	40	37	28	28	36	34	40	38	29	29	33
Coil Build-up – milliseconds	100	105	110	222	200	245	180	200	225	170	170	170	256	275	283	205	220	235
Coil Decay – milliseconds	50	50	50	105	120	100	115	120	130	70	75	80	123	105	90	70	75	80

Unit Size	SF-1225			PB & PC 1225			SF-1525			PB & PC 1525			SF-1525 H.T.	
Voltage – DC	6	24	90	6	24	90	6	24	90	6	24	90	6	90
Resistance @ 20°C – Ohms	1.21	19.5	268.3	1.33	22.3	261.7	1.11	15.5	239.1	1.45	19.8	258.4	55	113.4
Current – Amperes	4.97	1.23	.34	4.5	1.08	.34	5.41	1.55	.38	4.13	1.21	.35	10.83	.794
Watts	30	30	30	27	26	31	32	37	34	25	29	31	65	72
Coil Build-up – milliseconds	475	490	510	300	320	350	505	535	575	470	490	512	480	560
Coil Decay – milliseconds	240	230	220	190	190	190	230	237	215	200	170	140	210	160

NOTES: Build-up time equals current to approximately 90% of steady state value and flux to 90%. Decay time equals current to approximately 10% of steady state value and flux to 10%. Approximately because current leads or lags flux by a small amount.

# Electrical Data Installation Procedure



## Recommended Electrical Installation Procedure for Warner Electric Clutches and Brakes

Warner Electric clutches and brakes conform to UL (Underwriters Laboratories) requirements. All packaged products come with conduit boxes or are enclosed in housings with provision for electrical conduit connection. All sizes 400 and larger SF clutch fields and brake magnets accept UL conforming conduit boxes available from Warner Electric.

The National Electrical Code (NEC) requires that conductors subject to physical damage be adequately protected. When electrical conduit is used, a minimum of 12" of 1/2" flexible conduit is to be used between each brake and/or clutch and its box. This construction will prevent improper bearing loading in bearing mounted units and ease field and magnet assembly and disassembly.

Refer to the information below for proper installation practices and wire sizes.

Notwithstanding the above recommendations, all electrical installations should conform to NEC and/or other governing electrical codes.

## Recommended wire size versus maximum distance

Wire Size	Fractional Horsepower Sizes 170-400			Integral Horsepower Sizes 500-1525		
	Distance (feet)			Distance (feet)		
AWG	6 Volt	24 Volt	90 Volt	6 Volt	24 Volt	90 Volt
18	20	280	1000	4	65	700
16	30	430		6	95	
14	50	720		10	160	
12	75	720		10	160	
10	125			25	400	
8	200			40		

General construction wire type MTW or THW recommended.  
 #6 terminal screws (size 400 and smaller) are to be torqued to 15 in.lb.  
 #8 terminal screws (size 500 and larger) are to be torqued to 20 in.lb.

# Electrical Data Coil Suppression & Clutch/Brake Overlap

Users of electric clutch and brake systems are sometimes concerned that a clutch and brake will oppose each other or “overlap” during switching, i.e., when the clutch is switched off and the brake is switched on, or vice versa. This concern relates primarily to dual armature type clutch/brakes similar to the Warner Electric Electro Module product line, as compared to shuttle armature clutch/brakes.

In use, Warner Electric clutches and brakes are not subject to overlap when Zener diode coil suppression techniques are applied to the clutch/brake control. All Warner Electric clutch/brake controls use Zener diode suppression to eliminate any overlap situations.

The charts below graphically display current decay of the clutch and current rise of the brake with Zener diode and with straight diode suppression. In Chart 1, which shows brake and clutch operation with Zener diode suppression, the “Overlap Area” below the intersection of the brake and clutch current lines shows potential for the devices to fight one another. But this

intersection occurs at an extremely low current level and the armature Autogap® springs keep the friction surfaces of the brake armature and magnet separate at such low currents. Even though there is the appearance of a minor clutch/brake overlap in this instance, the brake armature has not yet contacted the brake magnet. Chart 2 shows a much larger overlap area since straight diode suppression is used in this circuit. Clutch current has not decayed fully as the brake is engaged and the load is brought to zero speed.

Clutch and brake coils are inductors. Inductance is the electrical equivalent to mechanical inertia and an energized coil dissipates its energy when turned “off.” Upon removal of power, voltage across an inductor reverses and current continues to flow in the same direction until the energy is fully dissipated. Without suppression in the control circuit, an arc can result from this potentially very large reverse voltage which can damage the electrical switching contacts.

Consequently, Zener diode suppression circuitry, by limiting the reverse voltage to

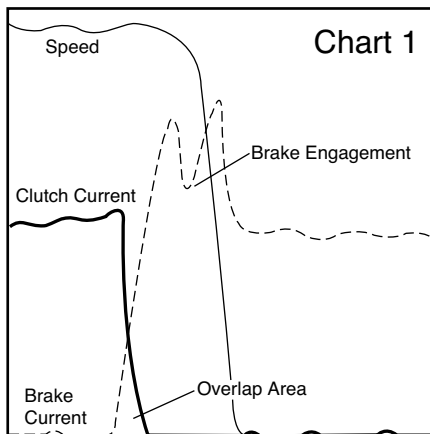
a sufficiently high but safe level, has two major benefits:

- Hastens coil decay
- Protects the switching contacts

The schematics below show circuits with no suppression and both straight diode and Zener diode suppression.

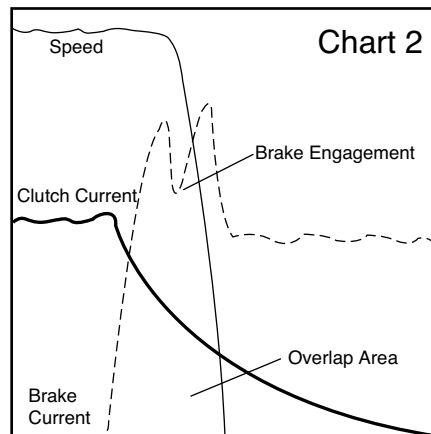
The rapid coil decay of Zener diode suppression lets users enjoy the major advantages which dual armatures have over single, “shuttle” armatures. These include:

- Better heat dissipation – greater area to give off heat and more “off” time.
- Longer life – two armatures absorb wear.
- Armature Autogap® self adjusting for the life of the unit
- Enhanced repeatability and controllability with the use of a light preload spring to keep the armatures in light contact with their mating surfaces, eliminating armature movement time and reducing noise and spline wear. Warner Electric utilizes this preload spring in some packaged clutch/brake models including ceramic EPs and Unimodules and Smooth Start Unimodules.



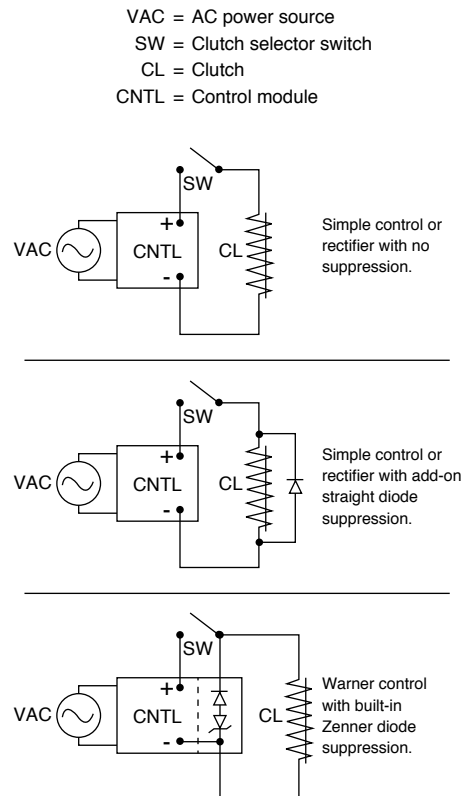
## Brake Engagement with Zener Diode Suppression

Clutch current decay and brake current rise overlap, but the brake armature is not engaged until well past the overlap point. Note that the “blip” in the brake current trace coincides with the sharp decline in the “speed” trace, indicating brake armature engagement at that point.



## Brake Engagement with Straight Diode Suppression

Clutch current decay is much slower than with Zener diode suppression as shown in Chart 1, greatly increasing the overlap area. The current level in the clutch coil is much higher at the point of brake engagement than with Zener diode suppression.



# Electrical Data Overexcitation

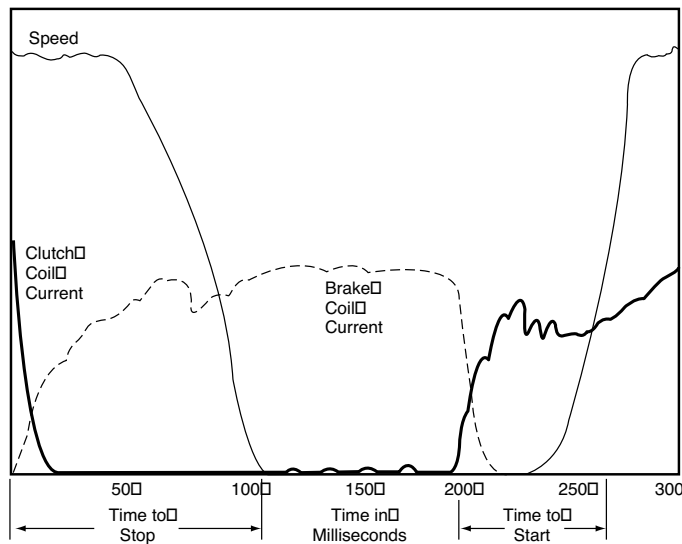
Overexcitation is a technique which makes a clutch or brake engage faster and have greatly improved starting and stopping accuracy. It involves applying over voltage to the clutch or brake coil to reduce current build up time, thereby reducing the magnetizing time.

The graphs below show current rise and shaft speed for an identical system using a Warner Electric EP-400 clutch/brake both with and without overexcitation. The effect of overexcitation is to reduce the time needed to achieve full current and thereby reduce the time required to achieve full speed with a clutch or zero speed with a brake. In the example below, "time to start" is approximate-

ly 70 ms without overexcitation. This is reduced to 30 ms when overexcitation is applied. This time is comparable to the coil buildup times stated on page G-10. The "time to stop" has been similarly reduced; the nominally excited system requires about 110 ms to stop the load, while this is accomplished in only 50 ms with overexcitation.

Overexcitation does not increase torque. Rather, the reduction in start-stop times comes from reduced coil current build up times (or "time to current"). For many common industrial applications, the reduction in "time to speed" and "time to stop" is one half when using overexcitation.

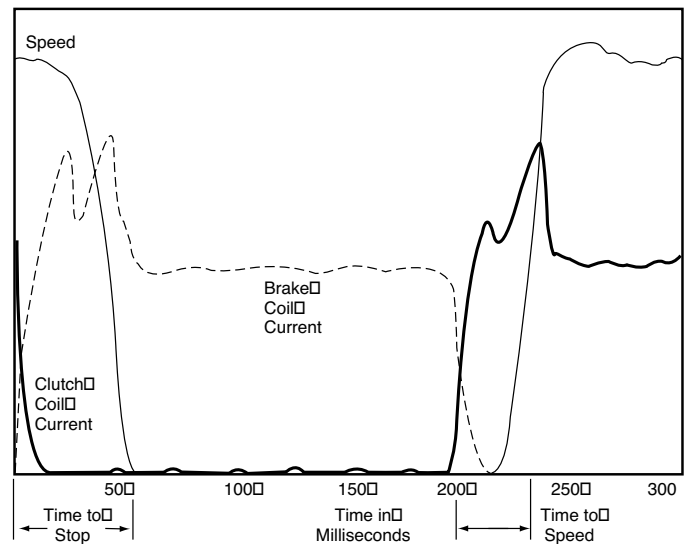
The use of overexcitation on a clutch/brake system does not increase system wear. In fact, the clutch/brake wear rate may be reduced because slippage and energy dissipation is marginally reduced in the clutch/brake. Compliance in the drivetrain may absorb some of the start/stop inertia or wear may be observed in other drivetrain components. Whenever overexcitation is used, adequate coil suppression must be employed. Please refer to "Coil Suppression and Clutch/Brake Overlap" on page G-12.



**Chart 1**

## Without Overexcitation

Current/speed trace of EP400 clutch/brake being run through a single stop/start cycle. Note that 110 milliseconds is required to stop from the time the clutch coil is de-energized and the brake coil is energized. At the 200 milliseconds point on the graph the clutch coil is energized and the load is at speed 70 milliseconds later. Note that the coil current is still increasing after the load is at full speed.



**Chart 2**

## With Overexcitation

Current/speed trace of EP400 clutch/brake being run through a single stop/start cycle. With overexcitation, both brake and clutch coil currents build much faster with concurrent reductions in both stop and start times, when compared with Chart 1.









# Clutch and Brake Controls

## Contents

Warner Electric's electronic controls are designed to provide simple setup and maximum performance when used with electric clutches and brakes. Our controls offer a range of functions from on-off to torque control to over-excitation.

### Selection

Many parameters beyond function can impact control selection. Warner Electric produces a variety of control options to suit numerous application requirements. Control selection parameters include:

- Mounting Location – Panel or conduit box mounting
- Switching – Relay switching of A.C. or D.C. lines or solid state switching
- Output Voltage – Controls are available for 6, 24 and 90 VDC clutch/brake coils
- Input Voltage – Controls with input power transformers are available for connection to high voltage mains.

If your application requires something special, please call us. We will be happy to provide solutions.

### Clutch and Brake Controls . . . . . CTL-2

#### On-Off Controls

CBC-100 . . . . . CTL-4  
 CBC-150 . . . . . CTL-4  
 CBC-160 . . . . . CTL-5  
 CBC-801 . . . . . CTL-6  
 CBC-802 . . . . . CTL-7

#### Adjustable Torque Controls

MCS-103-1 . . . . . CTL-8  
 MCS-805-1 . . . . . CTL-9  
 MCS-805-2 . . . . . CTL-9  
 CBC-300 . . . . . CTL-10  
 CBC-500 . . . . . CTL-12  
 CBC-550 . . . . . CTL-14  
 CBC-1825R . . . . . CTL-16

#### Overexcitation Controls

CBC-700 . . . . . CTL-18  
 CBC-750 . . . . . CTL-20

#### Appendix . . . . . CTL-22

#### Questions & Answers . . . . . CTL-23

#### Ordering Information . . . . . CTL-24



# Clutch and Brake Controls

## Functions

### On-Off (Basic start-stop)

Many applications are controlled by energizing the clutches and brakes with their rated D.C. voltages. Warner Electric controls are available with various mounting, input voltage and switching options.

### Adjustable Torque

#### (Soft start-stop)

The torque transmitted by a clutch or brake is proportional to the coil current. Warner Electric offers several products that provide torque control for smooth and repeatable starts and stops.

### Adjustable Accel-Decel

#### (Soft start-stop with full torque)

Warner Electric offers a control that allows for adjustment of the acceleration and deceleration time ramps to achieve a repeatable soft start or stop while still allowing for full torque.

### Overexcitation

#### (Rapid cycling)

The clutch/brake speed of response can be increased for improved accuracy and performance through overexcitation, which is the application of a short high voltage pulse to provide nearly instantaneous torque.

#### Control Type

#### On-Off Conduit Box Mount



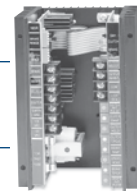
#### On-Off Octal Socket Mount



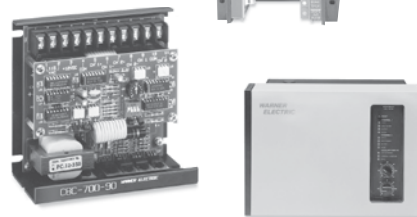
#### Adjustable Torque



#### Adjustable Accel-Decel



#### Overexcitation



# Clutch and Brake Controls

Model Number	No. of Channels	Torque Control Channels	A.C. Input Voltages	D.C. Output Voltages	Over-Excitation	Customer Supplied Switching Options	Description	Page Number
CBC-100-1	1	No	120	90	No	Relay A.C.	Single channel control to mount inside standard conduit box	CTL-4
CBC-100-2	1	No	220/240					
CBC-150-1	2	No	120	90	No	Relay A.C.	Dual channel control for clutch/brake to mount inside module conduit box	CTL-4
CBC-150-2	2	No	220/240					
CBC-160-1	1	1	120	90	No	Relay A.C.	Single channel control with torque adjust for module electrically released brakes	CTL-5
CBC-160-2			220/240					
CBC-801-1	2	No	120	90	No	Relay D.C.	Dual channel control for 2 clutches and/or brakes	CTL-6
CBC-801-2	2		220/240					
CBC-802	2	No	120	90	No	Transistor or Relay D.C.	Dual channel control with transistor switching	CTL-7
MCS-103-1	2	1	120	90	No	Relay D.C.	Dual channel control with torque adjust for one channel	CTL-8
MCS-805-1	1	1	120/240	35-75	No	Relay D.C.	Single adjustable channel control for use with ER-1225 brake.	CTL-9
MCS-805-2								
CBC-300	2	2	120	90	No	Transistor or Relay D.C.	Dual channel adjustable current control	CTL-10 to CTL-11
CBC-300-1								
CBC-500-90	2	2	120	90	No	Transistor or Relay D.C.	Dual channel control for two clutches and/or brakes with two torque adjust channels; Emergency stop input	CTL-12 to CTL-15
CBC-500-24	2	2	24-30	24	No			
CBC-550-90	2	2	120/220/240/380/480	90	No			
CBC-550-24	2	2	120/220/240/380/480	24	No			
CBC-1825-R	2	2	120	90	No			
						Transistor or Relay D.C.	Dual channel adjustable time ramp with short circuit protection	CTL-16 to CTL-17
CBC-700-90	2	No	120	90	Yes	Transistor or Relay D.C.	Dual channel compact overexcitation control for 24 or 90 volt clutches and brakes	CTL-18 to CTL-19
CBC-700-24	2		24-28	24				
CBC-750-6	2	2	120/220/240	6	Yes	Transistor, Relay D.C. or Triac A.C.	Dual channel full function overexcitation control; provides input/output logic, torque adjustable current and remote inputs	CTL-20 to CTL-21

# CBC-100/CBC-150 On-Off Controls

## Integral/Conduit Box Mounted Controls

The CBC-100 and CBC-150 series are UL listed, conduit box mounted controls for 90 volt clutches and brakes. Models are available for either 120 VAC or 220/240 VAC input.



### CBC-100 series Single unit capacity

The CBC-100 mounts inside a standard Warner Electric conduit box and includes rectification and suppression circuits.

- US
- Compact
- Single channel
- Mounts inside conduit box



### CBC-150 series Dual channel capacity

The CBC-150 replaces the cover on the standard module conduit box (part no. 5370-101-042). Provides rectification and suppression for two devices. Green LED indicates power to clutch. Red LED indicates power to brake.

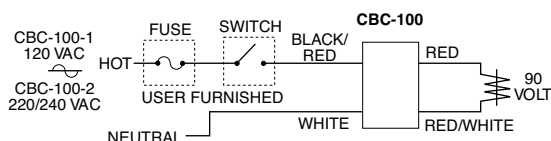
- US
- Dual channel
- Replaces the cover on the module conduit box

## Specifications

	CBC-100-1	CBC-100-2	CBC-150-1	CBC-150-2
Part No.	6003-448-101	6003-448-103	6004-448-001	6004-448-002
Input	120 VAC 50/60 Hz	220/240 VAC 50/60 Hz	120 VAC 50/60 Hz	220/240 VAC 50/60 Hz
Output	90 VDC full wave rectified .8 Amp max.	90 VDC half wave .8 Amp	90 VDC full wave rectified Dual .8 Amp	90 VDC half wave Dual .8 Amp
Ambient Temperatures	-20° to 113°F (-29° to 45°C)			
Switching	External to control, accomplished on A.C. line using relay or triac.			
	SPST	SPST	SPDT	SPDT
Solid State (maximum leakage current <2 mA)	140 VAC, 1 Amp min.	280 VAC, 1 Amp min.	140 VAC, 2 Amp min.	280 VAC, 2 Amp min.
Electro-mechanical	120 VAC, 1 Amp min.	240 VAC, 1 Amp min.	120 VAC, 1 Amp min.	240 VAC, 1 Amp min.

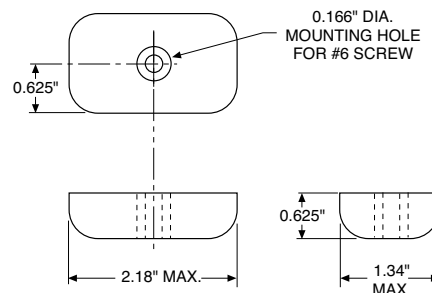
## Connection diagrams

### CBC-100-1, -2

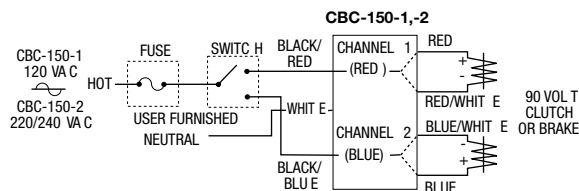


## Dimensions

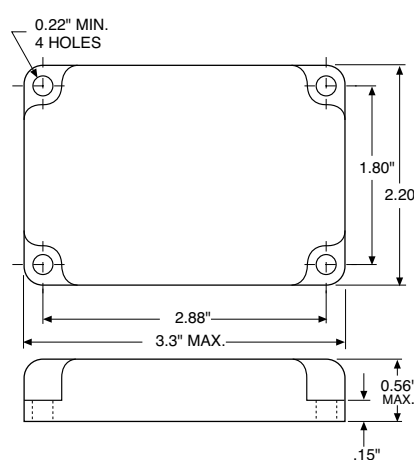
### CBC-100-1, -2



### CBC-150-1, -2



### CBC-150-1, -2



All dimensions nominal unless otherwise specified.

# CBC-160 On-Off Controls

## Integral/Electrically Released Motor Brake Controls

### CBC-160

The CBC-160 series clutch/brake controls provide a single 90 VDC adjustable output for use with any clutch/brake unit. The adjustable output will provide consistent and repeatable release for Warner Electric's 90 VDC permanent magnet electrically released brakes. The CBC-160 mounts as the cover on the standard module conduit box (part number: 5370-101-042).



#### CBC-160-1

The 160-1 accommodates 120 volts A.C. motors.

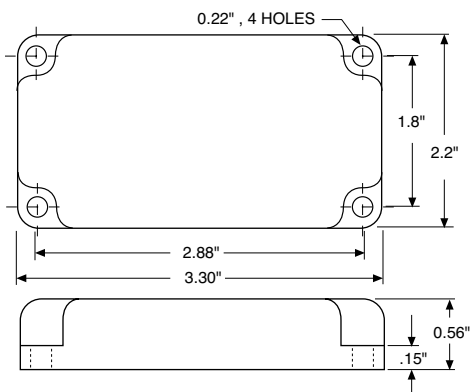
- cULus
- Adjustable 30-100 VDC
- LED indicator
- 120 volt A.C. input

#### CBC-160-2

The power to the 160-2 control can come from either a 230 volt or 460 volt A.C. motor. Customer-provided switching is accomplished through the motor starter on the A.C. input. This allows convenient retrofit of spring-set style motor brakes and inexpensive installation of new applications.

- cULus
- Adjustable 30-100 VDC
- Power from motor
- Easy retrofit
- 230/460 motors

### Dimensions

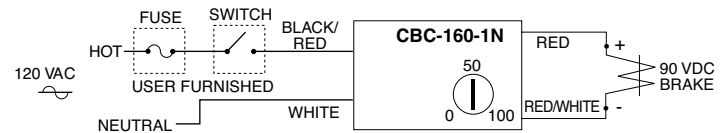


All dimensions nominal unless otherwise specified.

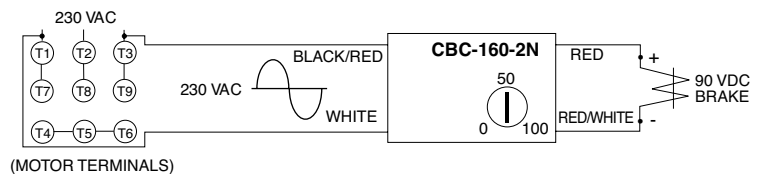
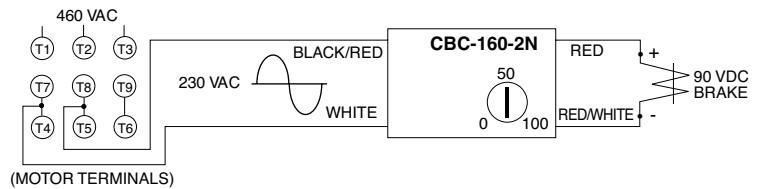
### Specifications

	CBC-160-1	CBC-160-2
Part No.	6013-448-001	6013-448-002
Input	120 VAC, 50/60 Hz	220/240 VAC, 60 Hz, 1 Phase, 100 VA max.
Status Indicator	Red LED indicates power to the brake	—
Output	Single Channel, 30-100 VDC half-wave rectified nominal, 0.8 Amps maximum	
Ambient Temperatures	0° to 122°F (-18° to 50°C)	
Switching	Accomplished through motor starter or on A.C. line using relay or triac	

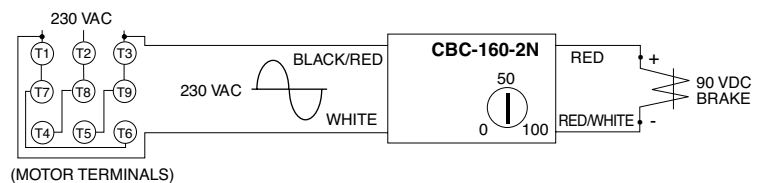
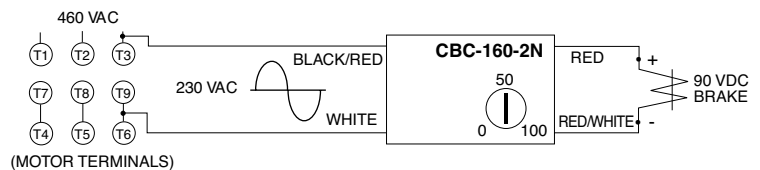
### Connection Diagrams



### WYE Connected Motor



### DELTA Connected Motor





# CBC-801 On-Off Controls

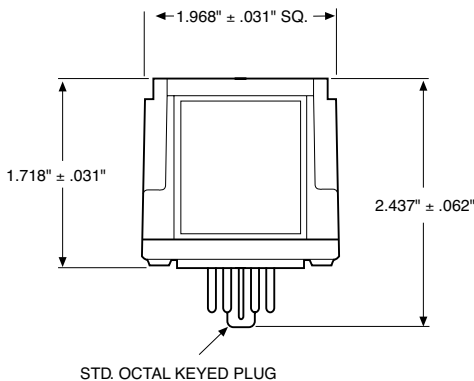
## Plug-in Octal Socket Power Supplies

The CBC-801 is a basic on-off power supply that provides full voltage to a 90 volt clutch or brake and is activated by an external switch. This type of power supply is sufficient for many clutch/brake applications.

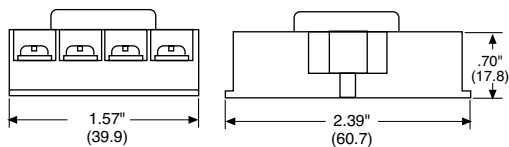
### CBC-801 series Multi-unit capacity

The CBC-801 is a plug-in power supply which is used with an octal socket. The wiring connections are made at the socket. The CBC-801 will operate two units separately—or simultaneously. Octal socket is purchased separately.

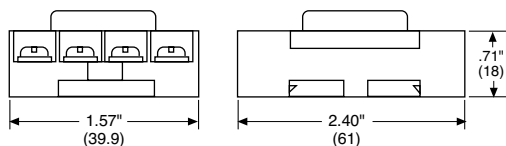
### Dimensions



OCTAL SOCKET



DIN RAIL MOUNT SOCKET



All dimensions nominal unless otherwise specified.

- US
- For basic on-off operation
- Wiring connections made at octal socket
- Arc suppression circuitry extends switch life
- Fused for overload protection
- LED output indicators
- DIN rail mountable

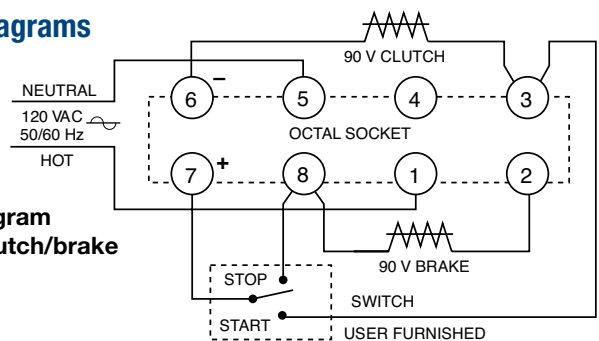


### Specifications

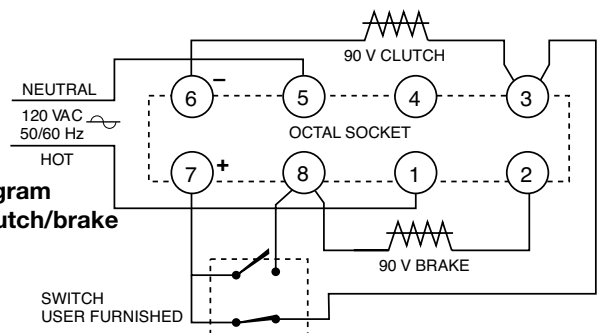
	CBC-801-1	CBC-801-2
Part No.	6001-448-004	6001-448-006
Input Voltage	120 VAC, 50/60 Hz	220/240 VAC, 50/60 Hz
Output	90 VDC, 1.25 A max.	
Circuit Protection	Fused 1.6 Amp, 250 V fast-blo	
Ambient Temperature	-23° to 116°F (-31° to 47°C)	
Max. Cycle Rate	Limited by the clutch or brake, variable with application	
Switching	Single pole, double throw Minimum contact rating: 10 Amp, 28 VDC resistive or 10 Amp, 120 VAC inductive	
Status Indicator	Red LED indicates brake is energized, Green LED indicates clutch is energized	
Mounting	Two versions of octal socket are available: 6001-101-001 foot mount 6001-101-002 DIN rail mount	

### Connection Diagrams

Connection diagram for operating clutch/brake separately.



Connection diagram for operating clutch/brake simultaneously.



# CBC-802 On-Off Controls

## Plug-in Octal Socket Power Supplies

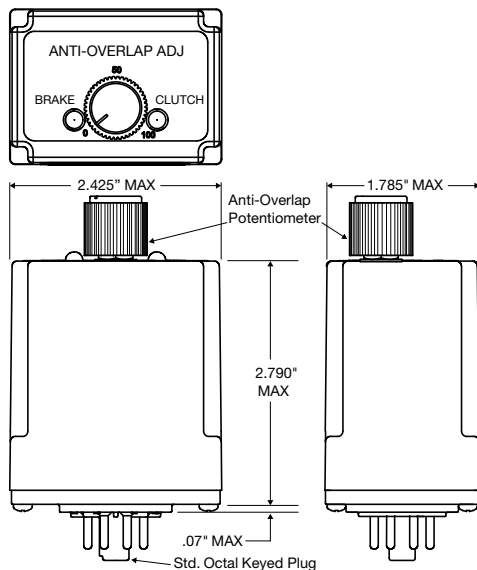


### CBC-802 PLC compatible

The CBC-802 is a power supply with solid state circuits for load switching. A brake and clutch may be operated separately — or, two brakes or two clutches, one unit on at a time. The CBC-802 mounts on an octal socket (purchased separately), and the wiring connections are made at the socket terminals. Octal socket sold separately, refer to mounting specifications for part number.

- Plug-in power supply with solid state switching circuits—increases switch service life
- Adjustable time delay for controlling clutch/brake overlap
- Internally fused for overload protection
- DIN rail mountable
- LED output indicators

### Dimensions

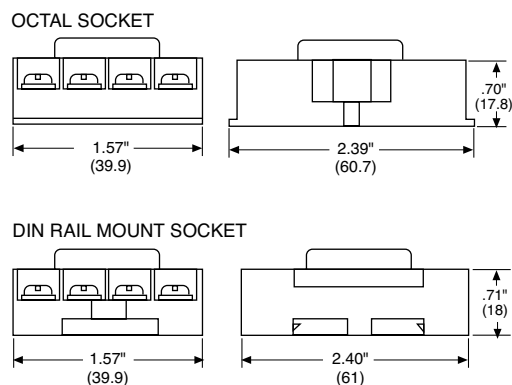
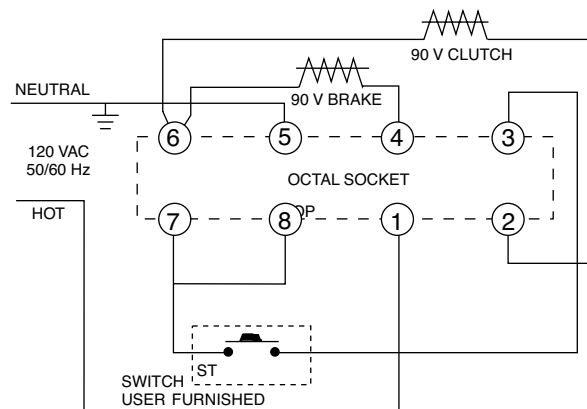


All dimensions nominal unless otherwise specified.

### Specifications

CBC-802	
Part No.	6002-448-002
Input	120 VAC, 50/60 Hz
Output	90 VDC, 0.5 A max.
Status Indicator	Red LED indicates brake energized. Green LED indicates clutch energized.
Circuit Protection	Fused 0.5 Amps, 250 V
Ambient Temperature	-20° to 113°F (-29° to 45°C)
Leakage Current	500 uA max. for solid state switches
Max. Cycle Rate	Limited by the clutch or brake, variable with application
Switching	Momentary contact, maintained contact, or solid state open collector logic Minimum contact rating 20 VDC resistive, 0.01 Amps Minimum input pulse—1 millisecond
Adjustments	Externally adjusted potentiometer sets overlap between clutch and brake from 0 to 130 MS.
Mounting:	Two versions of octal socket are available: 6001-101-001 foot mount 6001-101-002 DIN rail mount

### Connection Diagram






# MCS-103-1 Adjustable Torque Controls

## Adjustable Torque Control

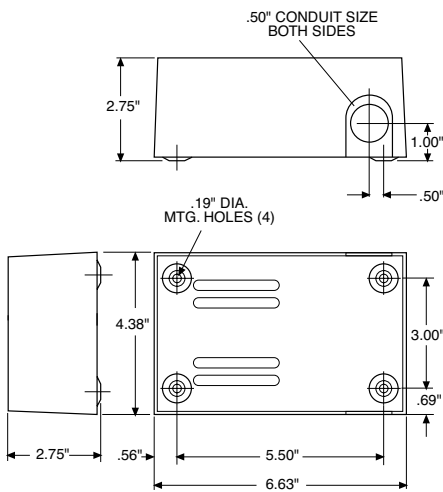
The MCS-103-1 is an enclosed control complete with a cover and mounting provisions. A brake and clutch may be operated separately with this control – or up to four units, two at a time. The external wiring is connected to the terminal strip located behind the cover.

-  Can be used with electrically released brakes

- Torque control for one 90 VDC clutch or brake
- Operates up to four units, two on at a time
- Easy-to-install. Compact. 120 VAC input
- Convenient terminal strip behind an easy-to-remove cover



## Dimensions

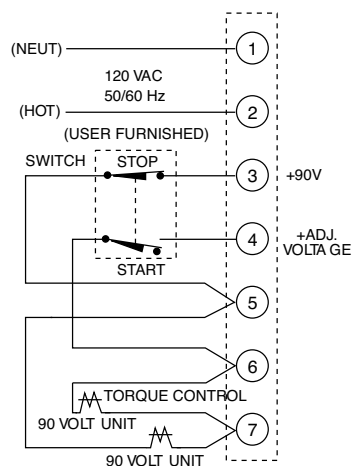


All dimensions nominal unless otherwise specified.

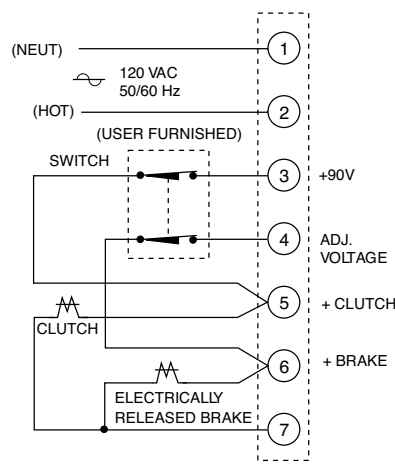
## Specifications

MCS-103-1	
Part No.	6010-448-002
Input	120 VAC, 50/60 Hz
Output	1.25 Amp 90 V full wave rectified for one unit and adjustable from 0-90 volts full wave rectified for second unit
Circuit Protection	Fused 1.5 Amp, 250 V
Ambient Temperature	-20° to 113°F (-29° to 45°C)
Maximum Cycle Rate	Limited by the clutch or brake and will vary with application.
Mounting	Mounting centers 5-1/2" wide, 3" high. Knockouts for 1/2" conduit
External Switches (User furnished)	Double pole, double throw maintained contact. Minimum contact rating: 10 Amp, 28 VDC resistive or 10 Amp, 120 VAC inductive. Contact ratings given will operate all Warner Electric brake and clutch units. However, switches with ratings less than those given may be used with fractional horsepower units provided the rating is equal to or greater than the coil current.

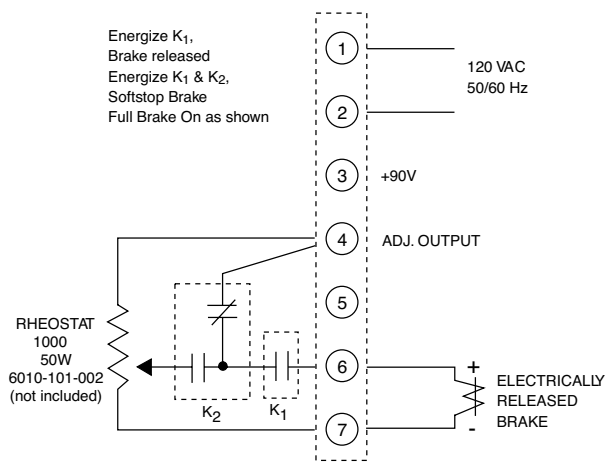
## Connection Diagrams



Normal Clutch/Brake Operation  
(One unit on at a time)



Clutch/Electrically Released  
Brake Operation  
(Both units on at a time)



Soft Stop for  
Electrically Released Brake

# MCS-805-1/MCS-805-2 Power Supply

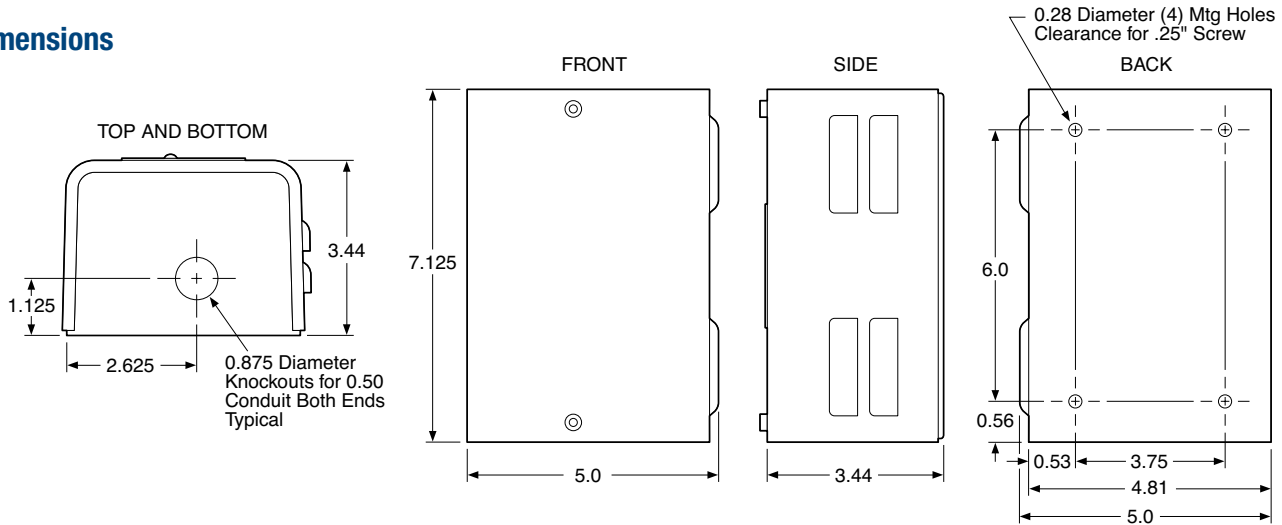
The DC voltage required to release the Warner Electric ER-1225 Brake is supplied by the MCS-805-1 or MCS-805-2 Power Supply. The correct brake release voltage—approximately 35-75 volts DC—is set by adjusting the power supply at the time of brake installation. Temperature compensating circuits provide proper operation over the entire operating range of 0°F to 150°F. Switching may be provided on either the AC or DC side of the power supply. The MCS-805-1 may be mounted on its back panel or on 1/2" conduit. The MCS-805-2 has a torque adjustment capability for soft stop applications. The MCS-805-2 requires two switching circuits when used for those applications requiring soft engagement.



## Specifications

	MCS-805-1	MCS-805-2
Part No.	6090-448-006	6090-448-007
Input	115/230 VAC, 50/60 Hz ±10%	115/230 VAC, 50/60 Hz ±10%
Output	0.4 Amp, 35/75 VDC	0.4 Amp, 35/75 VDC
Ambient Temperature	-20° to 150°F (-29° to 65°C)	-20° to 150°F (-29° to 65°C)
Maximum Cycle Rate	Limited by the clutch or brake and will vary with application. Consult factory for specifics.	
External Switches (User furnished)	For DC switching: single pole, single throw. Minimum contact rating 1 amp, 120 volts DC resistive. For AC switching: single pole, single throw. Minimum contact rating 1 amp, 120 volts AC.	
Circuit Protection	.75 Amp 250V Slow Blow 3 AG	

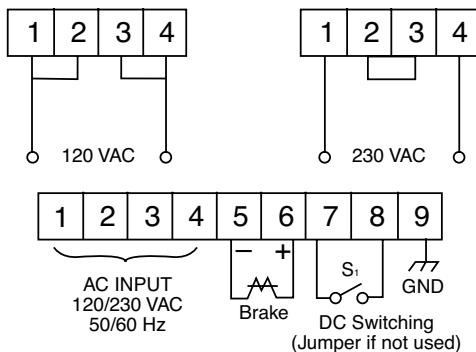
## Dimensions



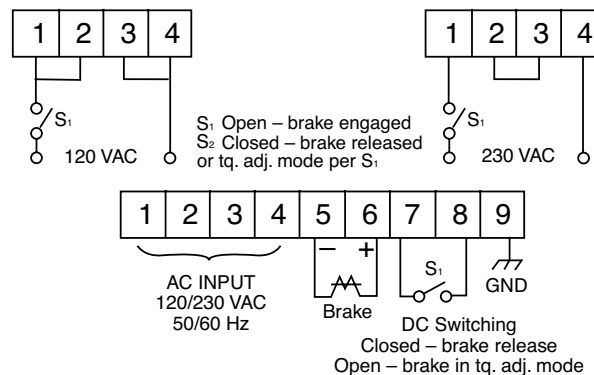
## Connection Diagrams

Connect the MCS-805-1 or MCS-805-2 Power Supply per the following diagram and instructions:

### MCS 805-1




### MCS 805-2



For AC switching, switch may be in series with input supply. For DC switching, use terminals 7 and 8 as shown. DO NOT put switch in series with load on terminals 5 and 6.

# CBC-300 Adjustable Torque Controls

The CBC-300 Series Controls provide dual torque controls when connected to any of Warner Electric's 90 volt clutches and brakes.

-  US
- Current monitored output maintains consistent torque regardless of variation in coil temperature.
- Switch selection tunes control to exactly match current requirements and operating characteristics of each clutch or brake.
- Individual torque adjust allows preset maximum torque tailored to application requirements.
- Short circuit protection, line to line.
- Torque limiting protects machine components from damage.
- Can be used with electrically released brakes.
- Internally Fuse Protected



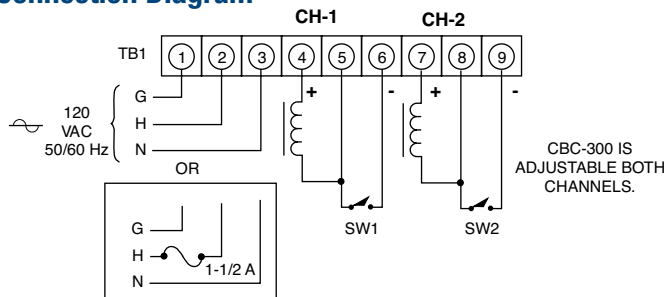
## CBC-300 Series Dual channel/Dual channel torque adjust

The CBC-300 has two adjustable current channels.

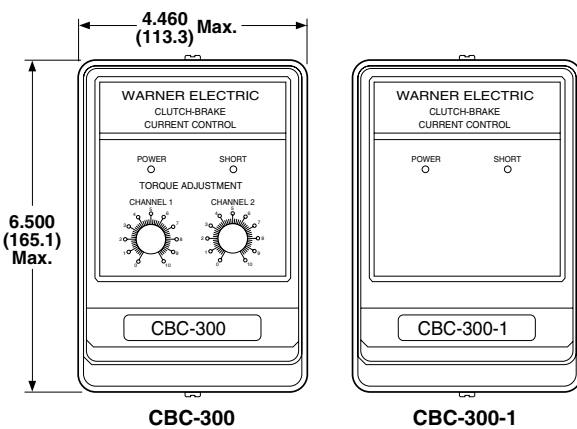
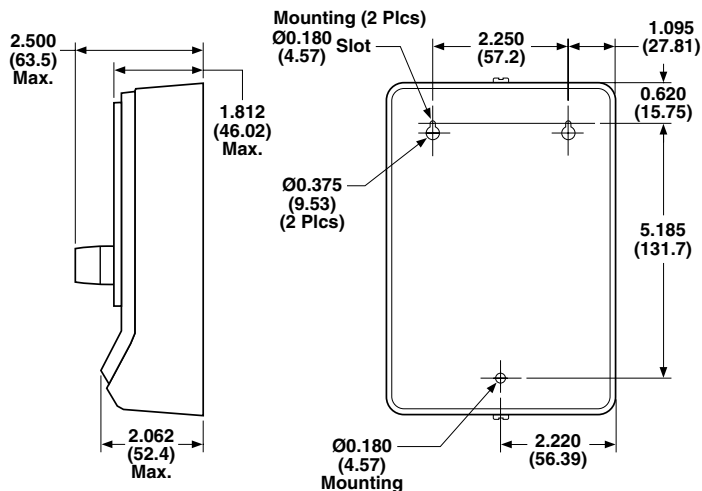
## Specifications

CBC-300													
Part No.	6021-448-009												
Input Power	120 VAC +10% -15%, 50/60 Hz, single phase, 215 VA max.												
Output	Pulse-width modulated full wave rectified D.C. Constant current, switch selectable ranges, 0-90 volt												
Ambient Temperature	+32°F to +113°F (0°C to 45°C) with plastic cover installed +32°F to +150°F (0°C to 66°C) with plastic cover removed												
Circuit Protection	Internal line to line short circuit protection Optional customer supplied fusing on A.C. line, 1.5 Amps, 250 VAC. Fast-acting fuse internal 300 (recommended 300-1)												
Current Adjust (via front panel potentiometers)	Dual adjustable channels												
Status indicators	"POWER"—green LED indicates A.C. power is applied to the control. "SHORT"—red LED indicates a short circuit condition exists on one or both outputs.												
Internal Adjustments	Set DIP switches SW1 and SW2 to suit the current draw of the connected clutch/brake coil: <table border="1"> <thead> <tr> <th>Switch Range</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> </tr> </thead> <tbody> <tr> <td>Max Current Draw (mA)</td> <td>60</td> <td>175</td> <td>245</td> <td>305</td> <td>533</td> </tr> </tbody> </table>	Switch Range	1	2	3	4	5	Max Current Draw (mA)	60	175	245	305	533
Switch Range	1	2	3	4	5								
Max Current Draw (mA)	60	175	245	305	533								
External Switching	Mechanical or electromechanical—customer supplied: 1 Amp, 125 V minimum rating Solid-state, NPN isolated transistor—customer supplied: 2 Amp, J250 V minimum rating. Maximum off state leakage current <1 mA												

## Connection Diagram



# CBC-300 Adjustable Torque Controls



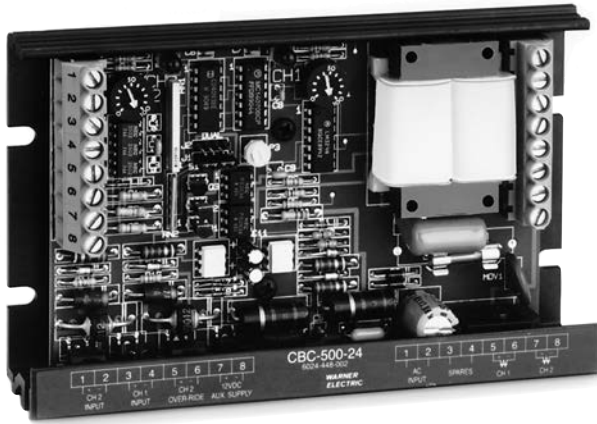
Pots for remote current adjustment: 6011-101-001 single turn  
6011-101-002 ten turn

## Selection Guide

	CBC 300	CBC 300-1
	6021-448-009	6021-448-002
NEMA 1 Enclosure	Both channels adjustable	Both channels adjustable
	Adjustable by knobs on unit	Adjustable by remote pots
	Max. output at 100%	Max. output at 100%

# CBC-500 Adjustable Torque Controls

## Panel Mounted



## Specifications

	CBC-500-90	CBC-500-24
Part No.	6024-448-003	6024-448-002
Input Voltage	120 VAC	24-30 VAC or VDC
Output Voltage	0-90 VDC	0-24 VDC
Output Current	1 Amp/Channel 2 Amps Total	5 Amps/Channel 5 Amps Total
Auxiliary Supply	12 VDC 250 mA	12 VDC 250 mA
Circuit Protection	Fused 2.5 Amp, 250 V Fast-blo	Fused 6.3 Amp, 250 V Fast-blo
Ambient Temperature	+32° to 122°F (0° to 50°C)	
Status Indicators	Red LED indicates channel is energized.	
Adjustments	Two potentiometers for voltage adjustment of channel 1 and channel 2 output from 0 to full rated voltage. Frequency adjustment from 60 to 400 Hz to reduce clutch/brake "Hum" associated with machine frequencies. Jumper for single or dual operation. See Appendix for explanation.	
Inputs:	3 Optically coupled, 10-30 VDC, 3-9 mA for Channel 1, Channel 2 and Channel 2 override (applies full voltage to channel 1 output)	

## CBC-500 series Dual torque adjustable power supplies

The CBC-500 series is a dual channel adjustable voltage control with optically isolated input switching for 24 and 90 volt electric clutches and brakes. These controls can be set up to energize the two outputs alternately (single) or simultaneously (dual). Refer to the Appendix for additional setup and switching information.

- Dual adjustable channels
- Optically isolated input switching
- Single or dual channel operation
- Auxiliary 12V supply
- Can be used with electrically released brakes

## Enclosure (Optional)

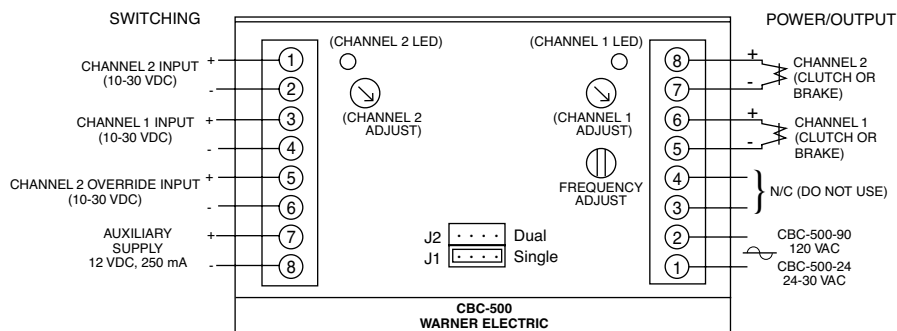


- Lift off hinge
- Quick-release latches
- Conforms to NEMA Type 13
- European Standard IEC 529, IP65

# CBC-500 Adjustable Torque Controls

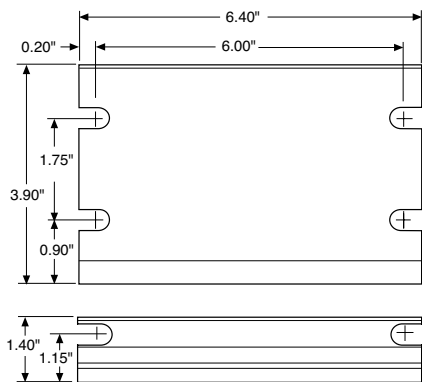
**Panel Mounted**

## Connection Diagram



All dimensions nominal unless otherwise specified.

## Dimensions



**Part No. 6042-101-004**

Size 8"H x 6"W x 4"D  
(203.2 x 152.4 x 101.6 mm)

# CBC-550 Adjustable Torque Controls

## Panel Mounted

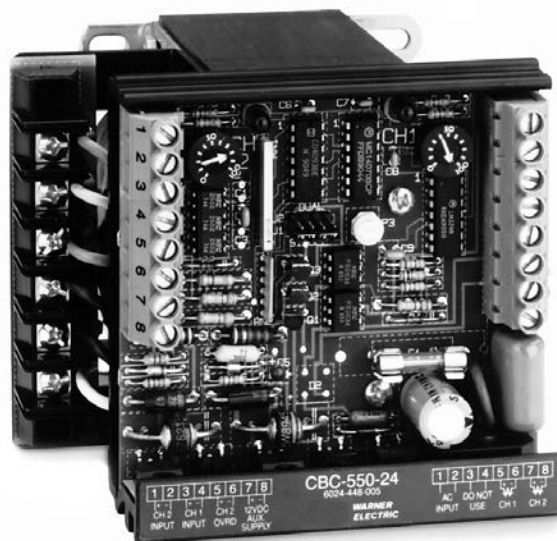
### CBC-550 series

#### Dual adjustable with power transformer

The CBC-550 series is a dual channel adjustable voltage control with optically coupled switching for 24 and 90 volt electric clutches and brakes. These controls can be set up to energize the two outputs alter-nately (single) or simultaneously (dual). Refer to the Appendix for additional setup and switching information.

The CBC-550 series has a power transformer which will operate with a 120, 220, 240, 380, or 480 VAC input.

- Dual adjustable channels
- Optically isolated input switching
- Single or dual channel operation
- Can be used with electrically released brakes



## Specifications

	CBC-550-90	CBC-550-24
Part No.	6024-448-006	6024-448-005
Input Voltage	120/220/240/380/480 VAC	
Output Voltage	0-90 VDC	0-24 VDC
Output Current	1 Amp/Channel 1.2 Amps Total	4 Amps/Channel 4 Amps Total
Auxiliary Supply	12 VDC 250 mA	12 VDC 250 mA
Circuit Protection	Fused 1.5 Amp, 250 V fast-blo	Fused 5 Amp, 250 V fast-blo
Ambient Temperature	+32° to 122°F (0° to 50°C)	
Status Indicators	Red LED indicates channel is energized.	
Adjustments	Two potentiometers for voltage adjustment of channel 1 and channel 2 output from 0 to full rated voltage. Frequency adjustment from 60 to 400 Hz to reduce clutch/brake "Hum" associated with machine frequencies. Jumper for single or dual operation. See Appendix for explanation.	
Inputs	3 Optically coupled, 10-30 VDC, 3-9 mA for Channel 1, Channel 2 and Channel 2 override (applies full voltage to channel 1 output)	

## Enclosure (Optional)



- Lift off hinge
- Quick-release latches
- Conforms to NEMA Type 13
- European Standard IEC 529, IP65

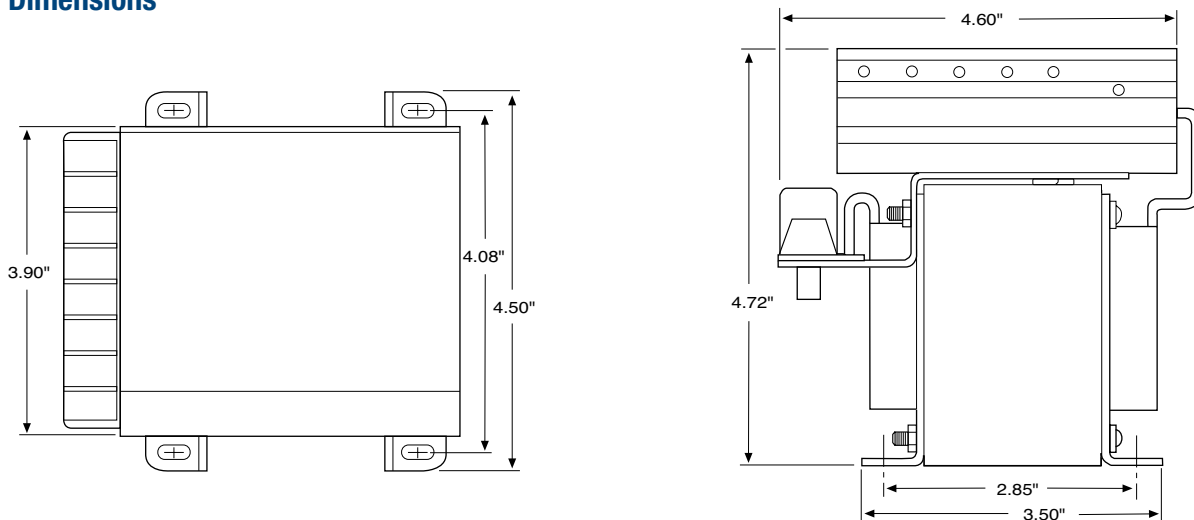
Part No.	6006-101-007
Size	6"H x 6"W x 6"D (152.4 x 152.4 x 152.4 mm)



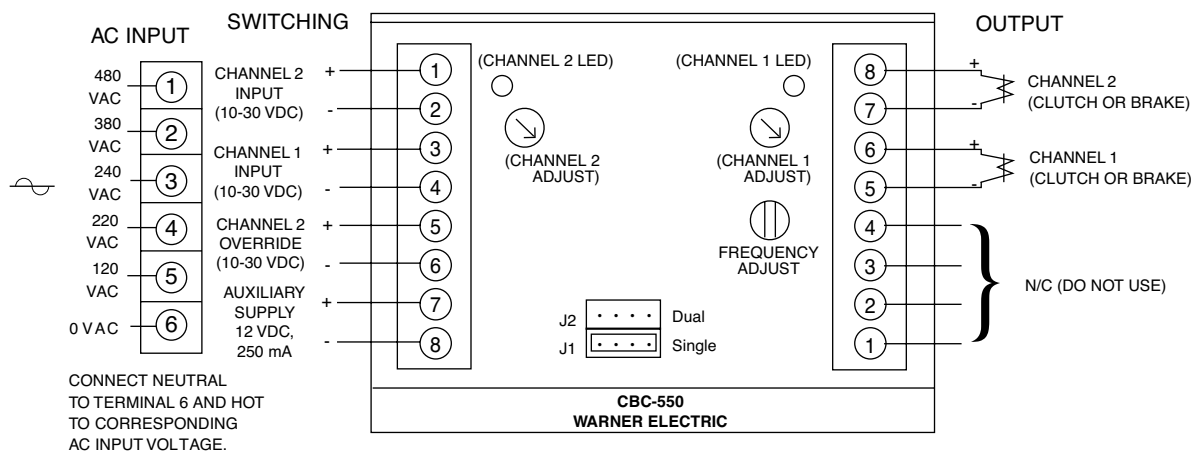
# CBC-550 Adjustable Torque Controls

Panel Mounted

## Dimensions



## Connection Diagram



All dimensions nominal unless otherwise specified.

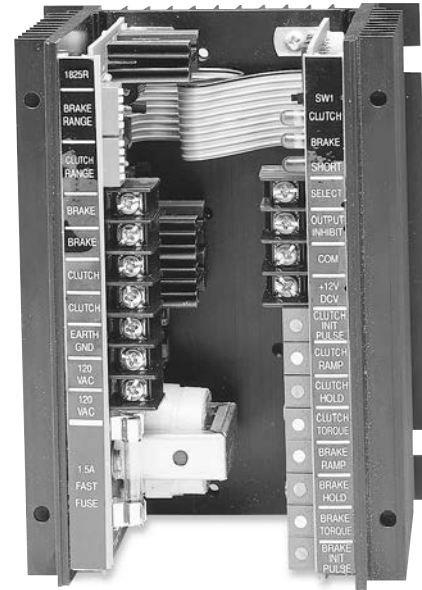
# CBC-1825R Adjustable Torque Controls

## Panel Mounted

### CBC-1825R series

The CBC-1825R is designed to provide consistent and repeatable acceleration and deceleration when used with Warner Electric 90 VDC clutches and brakes. Current to each channel is introduced along an adjustable time ramp and monitored continuously. Adjustments include initial pull-in pulse, hold level, maximum torque, and ramp time. LEDs are provided on the circuit board to indicate power is applied to the clutch or brake unit.

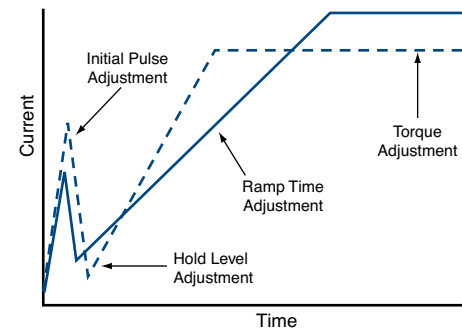
**Note:** It is recommended that the auto-gap springs be removed from the clutch and brake for successful accel-decel application.



### Specifications

CBC-1825R	
Part No.	1825-448-001
Input Voltage	120 VAC, 50/60 Hz, 100 VA maximum
Output Current	Current driven PWM, compatible with 90 VDC clutch/brake (switch selectable current output)
Auxiliary Supply	12 VDC 250 mA
Circuit Protection	Input Fused 1.5 Amp, 250 V fast-blo clutch and brake outputs are short circuit protected
Status Indicators	Clutch and brake LEDs indicate output is energized Short circuit LED indicates a fault
Ambient Temperature	0° to 122°F (-18° to 50°C)
Switching	Contact rating: 15 mA @ 15 V, open collector NPN 2mA maximum allowable leakage current and 2 V maximum saturation voltage

### Set-up

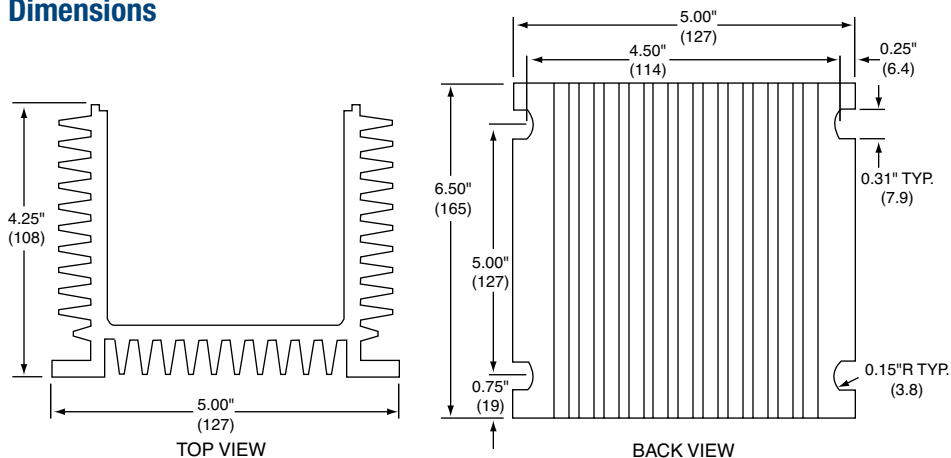


All dimensions nominal unless otherwise specified.

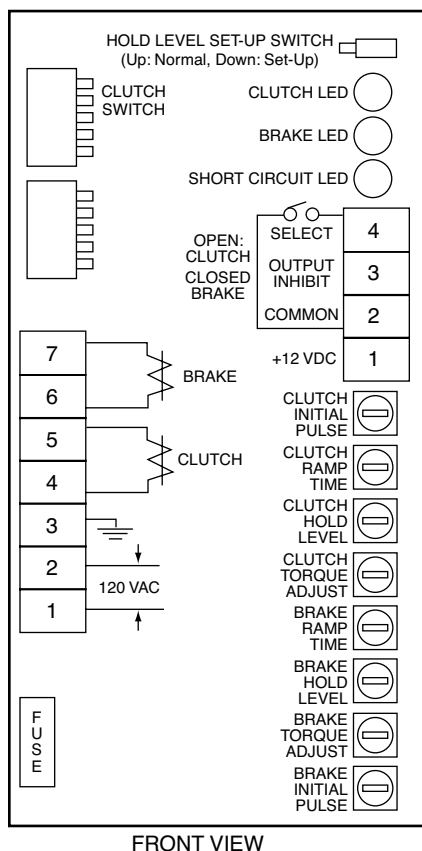
# CBC-1825R Adjustable Torque Controls

Panel Mounted

## Dimensions



## Connection Diagram



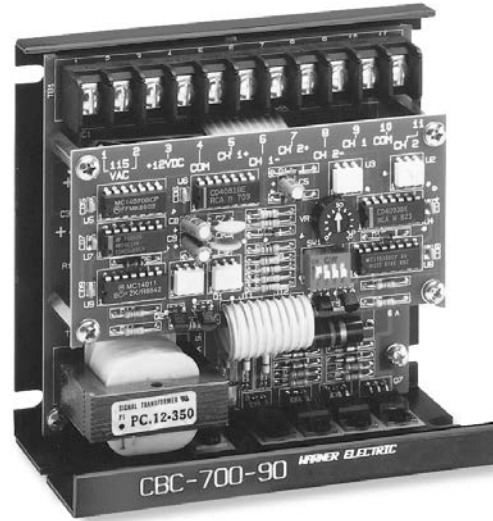
# CBC-700 Overexcitation Controls

## General Purpose OEX Control

### CBC-700 Series

Simple, compact, high performance OEX control for either 90 or 24 VDC clutches and brakes. OEX spike duration and anti-overlap times delay are adjustable. Two optically isolated inputs.

- High performance
- Switch selectable OEX duration
- Force decay suppression with adjustable anti-overlap time delay
- Compact, flexible mounting
- Models for 24 or 90 volt clutches and brakes
- Cycle rate limited by clutch/brake



### Specifications

	CBC-700-90	CBC-700-24
Part No.	6042-448-003	6042-448-002
Input	120 VAC, 50/60 Hz	24-28 VAC, 50/60 Hz
Output Voltages		
Steady State	90 VDC	24 VDC
Overexcitation	340 VDC	105 VDC
Output Current (Per channel alternately)	.5 Amps	3.5 Amps
OEX Pulse Duration	Adjustable through logic board dip switches (see service manual)	
Inputs	Two-optically isolated (10-30 VDC)	
Ambient Temperature Range	0°F to 140°F (-18°C to +60°C)	
Maximum Off State Leakage	<2 mA (inputs)	
Circuit Protection	1.6A Fast Act (5 x 20 mm)	5A Slo-Blo (5 x 20 mm)
Auxiliary Supply	12 VDC, 250 mA maximum	

### Enclosure (Optional)



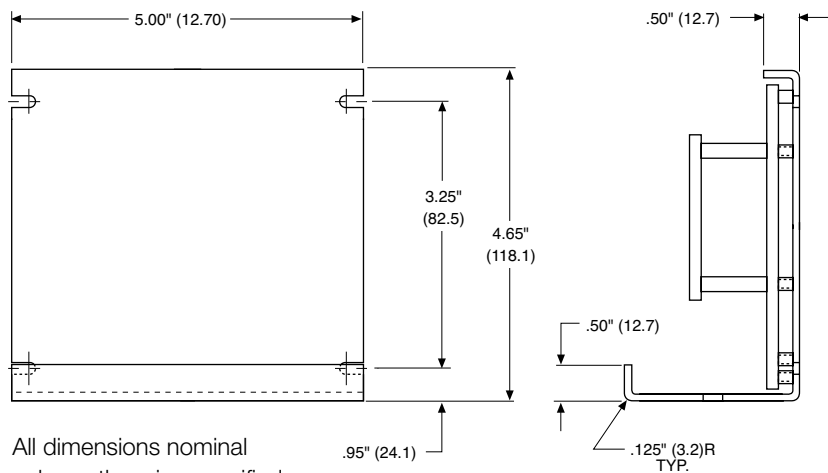
- Lift off hinge
- Quick-release latches
- Conforms to NEMA Type 13
- European Standard IEC 529, IP65

Part No.	6042-101-004
Size	8"H x 6"W x 4"D (203.2 x 152.4 x 101.6 mm)

# CBC-700 Overexcitation Controls

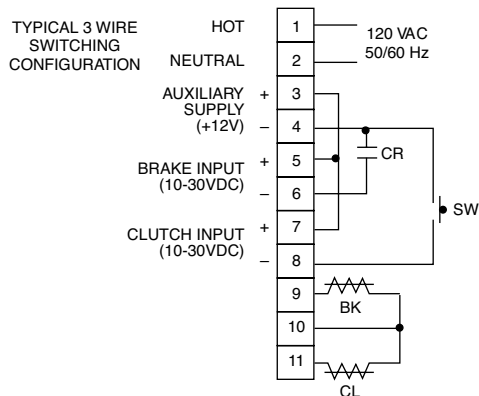
## General Purpose OEX Control

### Dimensions



All dimensions nominal unless otherwise specified.

### Connection Diagram



**NOTE:** CR, SW user furnished switch options for use with control.  
 CR normally open relay contact  
 SW normally open push button switch

# CBC-750 Overexcitation Control

## Rapid Acceleration/Deceleration

### CBC-750 Dual channel, current based OEX with switching logic

Warner Electric's CBC-750 Constant Current Overexcitation Clutch/Brake Control is a solid-state electronic control designed to increase the cycle rate capabilities and accuracies of electromagnetic clutches and brakes. The control accomplish this by sending a momentary high voltage overexcitation spike to the clutch and/or brake magnetic coil to build a high density magnetic flux field almost instantaneously. By using overexcitation, the response time is reduced as dramatically as performance is increased. For example, the current build up time of a 5 inch, 6 volt magnet is reduced from 84 milliseconds to 2 milliseconds.

The CBC-750 user selects either 120, 220 or 240 VAC operation at the time of installation, and is available for 6 volt clutches and brakes.

LED indicators on the faceplate of each control tell the user the status of input signals, output activation and any auxiliary inputs. A reset switch resets the output should a short be detected. Remote torque adjust potentiometer inputs are also provided. Appropriate current range for each size clutch or brake is selected by a dip switch. Constant current for each level is assured by the control's design.

- Maintains torque at preset levels regardless of temperature variations
- Automatically controls OEX pulse duration for optimum response without overheating coils
- Automatically prevents clutch and brake "overlap"
- Configurable as an analog follower control through remote top input
- Integral switching logic through auxiliary, inhibit and override inputs



Shown with optional cover, part number 6041-101-004

- High performance OEX control
- Constant current output capability
- Available for 6 volt clutches and brakes
- Outputs short circuit protected.
- AC/DC optically isolated inputs
- Transformer isolation Remote torque potentiometer capability
- Input/Output inhibit functions
- Switch selectable OEX function
- Automatic CH1/CH2 anti-overlap feature
- Heavy duty suppression circuits
- Selectable output current ranges
- Remote status indicators inputs and outputs

## Specifications

CBC-750-6	
Part No.	6041-448-001
Input Power	120/220/240 VAC, $\pm 10\%$ , 50/60 Hz, 350 VA (switch selectable)
Control Inputs	Opto-isolated 10-30 VDC @ 10-35 mA nominal sinking or sourcing, or 24 VAC (50/60Hz) @ 22 mA nominal, or 120 VAC (50/60 Hz) @ 20 mA nominal
Clutch/brake Output	
Steady State Output	
Current controlled	.910 to 4.34 A max.
Current Rise Time	Dependent on clutch/brake size
Current Fall Time	Depending on clutch/brake size
Overexcitation Voltage	75 VDC nom.
Overexcitation Time	Automatic adjustment by control feedback
Anti-overlap Time	Automatic adjustment by control feedback
Power Supply Output	12 VDC, $\pm 0.6$ VDC, 250 mA max.
Auxiliary Indicator	Opto-isolated NPN transistors
Outputs	24 VDC maximum, 20 mA max., reverse polarity protected
Circuit Protection	Internal short circuit protection on each output channel.
Fusing	
AC Input Line	2 Amp, 250 V Slo-Blo
OEX Supply	10 Amp, 32 V Slo-Blo

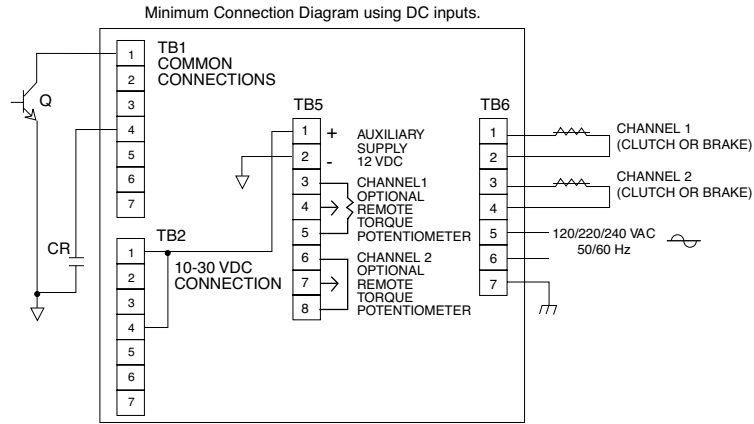
# CBC-750 Overexcitation Controls

## Rapid Acceleration/Deceleration

Seven optically isolated inputs accept 10-30V A.C./D.C. (TB2) or 120 VAC (TB3), configured through set-up switches

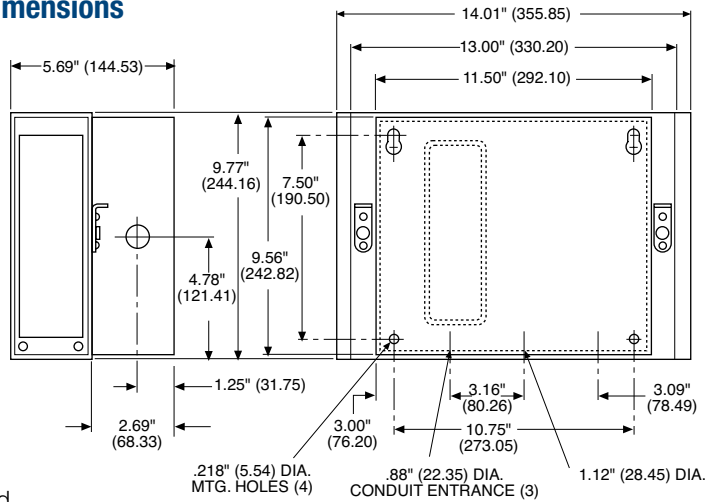
1. Channel 2 Input
2. Channel 2 Input Inhibit (disregards channel 2 input signal)
3. Auxiliary Input
4. Channel 1 Input
5. Channel 1 Input Inhibit (disregards channel 1 input signal)
6. Output Inhibit (deactivates both output channels)
7. Channel 2 Override (applies full voltage to channel 1 output)

### Connection Diagram



**NOTE:** Q, CR user furnished switch options for use with control.  
 Q NPN transistor  
 CR normally open relay contact

### Dimensions



All dimensions nominal unless otherwise specified.

### Setup Switches

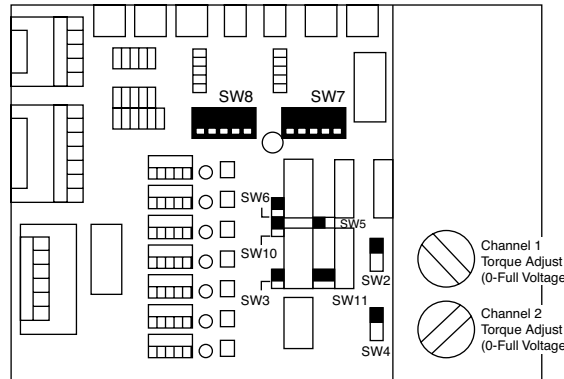
SW1: AC Voltage selection switch on terminal board inside control unit

### Max. Current Output

(SW7 & SW8 settings)

Nominal Voltage	1	2	3	4	5
6	0.910	2.35	3.183	3.760	4.340

**SW8** Channel 2 current range selector (settings in diagram below)  
**SW7** Channel 1 current range selector (settings in diagram below)



All switches are in the down (v) position from factory

- SW6** Channel 2 OEX enable (v) / disable (Δ)
- SW5** Channel 1 OEX enable (v) / disable (Δ)
- SW2** Channel 1 local (Δ) or remote (v) torque adjust
- SW10** Channel 1 input invert (Δ) (v) (v)
- SW3** Level/pulse selector level (Δ) pulse (v)
- SW4** Channel 2 local (Δ) or remote (v) torque adjust
- SW11** Auxiliary input selector Channel 1 (Δ) Channel 2 (v)

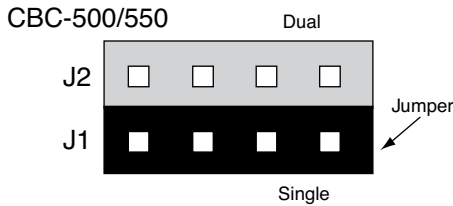


# Appendix

## CBC-500/550 Single vs. Dual Operation

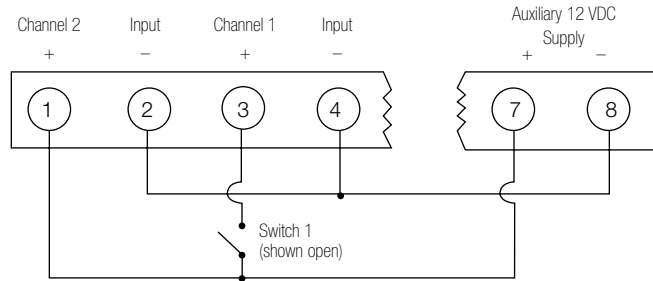
The CBC-500/550 series controls allow operation in either a single or dual mode. The mode of operation is determined via the position of a jumper on the main control board.

The controls are shipped with the jumper in the J1 or single mode position. A variety of output logic can be accomplished via the single/dual jumper position and whether the control is wired to one input switching device (2-wire mode) or two input switching devices (3-wire mode). The following diagrams show how each channel (output) of the control can be either alternately or simultaneously energized.



### 2-wire Switching Option

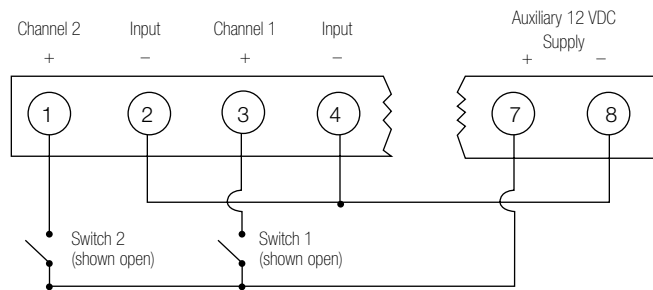
#### Control's switching terminal block



Jumper Mode	Switch 1	Channel 1	Channel 2
J1-Single	Open	Off	Powered
	Closed	Powered	Off
J2-Dual	Open	Powered	Powered
	Closed	Off	Off

### 3-wire Switching Option

#### Control's switching terminal block



Jumper Mode	Switch 1	Switch 2	Channel 1	Channel 2
J1-Single	Closed	Open	Latched On	Off
	Open	Closed	Off	Latched On
J2-Dual	Closed	Open	Off	Off
	Open	Closed	Latched On	Latched On

# Questions and Answers

## 1. What transformers can be used with controls requiring 24-30 VAC input?

Manufacturer	Part Number	Primary	Secondary
Abbott	6B 12-160	115 VAC	24V @ 6 amps
Quality	6-K-119VBR	115/230 VAC	24V @ 8 amps
Signal	24-6	115 VAC	24V @ 6 amps
Signal	DP24-6	115/230 VAC	24V @ 6 amps
Triad	F-260-U	115 VAC	24V @ 6 amps

## 2. What is the difference between a MCS-801 and a CBC-801-1 or between a MCS-103 and a MCS-103-1?

There is no performance difference between the MCS-103 and MCS-103-1. There is no performance difference between the MCS-801 and CBC-801-1. The CBC-801-1 is roughly 1/4" shorter than the MCS-801. The units wire and work exactly the same.

## 3. Which power supplies can be used with the SF 1525HT and SFC 1525HT coil?

The SF and SFC 1525 High Torque clutch coils require .794 amps of current to provide full rated torque. The following power supplies and controls will provide the needed power.

CBC-100	.8 amps	MCS-103-1	1.25 amps
CBC-150	.8 amps	CBC-500	1 amp
CBC-801	1.25 amps	CBC-550	1 amp

## 4. Can I use a CBC-160 with a variable frequency drive and AC motor?

No. As the voltage to the drive is varied, the output to the electrically released brake would also vary. This would cause the brake to re-engage when it should be released.

## 5. Which power supplies offer a 12 VDC power source that could be used to power auxiliary switch inputs such as inductive or photoelectric sensors?

CBC-500, CBC-550, CBC-700, CBC-750

## 6. We plan to use a PLC in the application. Does that impact our choice of control or power supply?

The CBC-801s and MCS-103-1 are not very PLC friendly. Both require a 10 amp relay for switching which is not very common for PLCs. Alternatives would be CBC-150 or CBC-500/550 respectively which are more 'PLC-Friendly'.

## 7. Which of the controls would allow for the independent operation of two clutches or two brakes?

Four controls allow for completely independent operation of two clutches or brakes. That is, that a clutch and brake can both be on at once, both off at once, or one on and one off. These controls are:

CBC-801-1 and CBC-801-2, MCS-103-1, CBC-300

The CBC-500/550 allows for operation of both channels on at once, both channels off at once or cycling between channel one and two. However, in the both-on/both-off mode, you cannot also do independent single channel operation.

## 8. Our PLC can provide 24 or 90 volts output. Why do we need a separate power supply at all?

There are two reasons to use a Warner Electric control or power supply with clutches and brakes. First, the electric coil within clutches and brakes can create a significant back EMF spike when turned off. This can damage PLC circuits (some PLCs include a diode for protection). All Warner Electric controls and power supplies include a suppression network to protect upstream electrical components from the back EMF spike. Second, this same suppression network will speed the collapse of the magnetic field within a clutch or brake. Without the suppression circuit, a clutch and brake will often overlap each other in performance with resulting poor machine performance.

## 9. Which controls can be used with electrically released brakes?

The CBC-160-1 and CBC-160-2 are designed specifically to use with the conduit box of EM and EUM electrically released brake designs. The CBC-160-1 and CBC-160-2 can also be used with ER and FB brake designs.

The MCS-103-1, CBC-300 and CBC-500/550 can all be used with ER, FB as well as UM-FBC, EM and EUM-FBB and EM and EUM-MBFB designs.

The MCS 805-1 and MCS 805-2 are for use only with the ER 1225 brakes. The ERS series brakes can be used with the CBC-100 or CBC-801 power supplies.

# Ordering Information

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Model	Part Number	Page
CBC-100-1 .....	6003-448-101 .....	CTL-4
CBC-100-2 .....	6003-448-103 .....	CTL-4
MCS-103-1 .....	6010-448-002 .....	CTL-8
CBC-150-1 .....	6004-448-001 .....	CTL-4
CBC-150-2 .....	6004-448-002 .....	CTL-4
CBC-160-1 .....	6013-448-001 .....	CTL-5
CBC-160-2 .....	6013-448-002 .....	CTL-5
CBC-300 .....	6021-448-009 .....	CTL-10, CTL-11
CBC-300-1 .....	6021-448-002 .....	CTL-11
CBC-500-24 .....	6024-448-002 .....	CTL-12
CBC-500-90 .....	6024-448-003 .....	CTL-12
CBC-550-24 .....	6024-448-005 .....	CTL-14
CBC-550-90 .....	6024-448-006 .....	CTL-14
CBC-1825R .....	1825-448-001 .....	CTL-16
CBC-700-24 .....	6042-448-002 .....	CTL-18
CBC-700-90 .....	6042-448-003 .....	CTL-18
CBC-750-6 .....	6041-448-001 .....	CTL-20
CBC-801-1 .....	6001-448-004 .....	CTL-6
CBC-801-2 .....	6001-448-006 .....	CTL-6
Octal Socket, Foot Mount .....	6001-101-001 .....	CTL-6, CTL-7
Octal Socket, DIN Rail Mount .....	6001-101-002 .....	CTL-6, CTL-7
CBC-802 .....	6002-448-002 .....	CTL-7
Optional Enclosure: CBC-500, CBC-700 .....	6042-101-004 .....	CTL-12, CTL-18
Optional Enclosure: CBC-550 .....	6006-101-007 .....	CTL-14
MCS-805-1 .....	6090-448-006 .....	CTL-9
MCS-805-2 .....	6090-448-007 .....	CTL-9

# Part Numbers Ordering Information

**PN**

# Part Numbers Ordering Information

## Spring-Set Electrically Released Brakes

### Spring-Set Brakes (Static Holding) - ERS

Description	Model	Part No.	Voltage	Pg. No.
ERS	ERS-26	5158-170-016	24	A-5
		5158-170-015	90	
ERS-42	ERS-42	5151-170-002	24	A-5
		5151-170-001	90	
ERS-49	ERS-49	5155-170-002	24	A-5
		5155-170-001	90	
ERS-57	ERS-57	5153-170-003	24	A-5
		5153-170-002	90	
ERS-68	ERS-68	5154-170-002	24	A-5
		5154-170-001	90	

### ERS Mounting Flanges (Optional)

Model	Part No.	Pg. No.
ERS-26	686-0182	A-9
ERS-42	686-0183	A-9
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	.625	5151-541-004	A-8
	.750	5151-541-005	A-8
ERS-49	.375	5155-541-002	A-8
	.500	5155-541-003	A-8
	.625	5155-541-004	A-8
	.750	5155-541-005	A-8
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	.625	5153-541-005	A-8
ERS-57	.750	5153-541-006	A-8
	.875	5153-541-007	A-8
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	1.000	5154-541-005	A-8
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P-8589-WE 11/18