

CLUTCH / BRAKE



**Packaged
Electromagnetic
Clutches/Brakes**

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- Warner Electric
 - Industrial Clutches and Brakes
 - Packaged NEMA C-faced
 - Electro Module (EM)
 - UniModule (UM)
 - Unimodule Ceramic (UM-C)
 - Enclosed UniModule (EUM)
 - Enclosed UniModule Washdown
 - Electrically Released Modules
 - Packaged Shaft & Foot Mounted
 - Electrically Released Brakes
 - Basic Clutches & Brakes
 - Wrap Spring Clutches & Brakes
 - Tension Clutches & Brakes
 - Turf & Garden Clutches & Brakes
 - Vehicular Clutches & Brakes
 - Controls for Clutches & Brakes
 - Tension Systems
 - Sensors & Switches
 - Accessories
 - Application Clutch / Brake Data Form
 - Product Warranty
 - Terms & Conditions
 - Web site Disclaimer



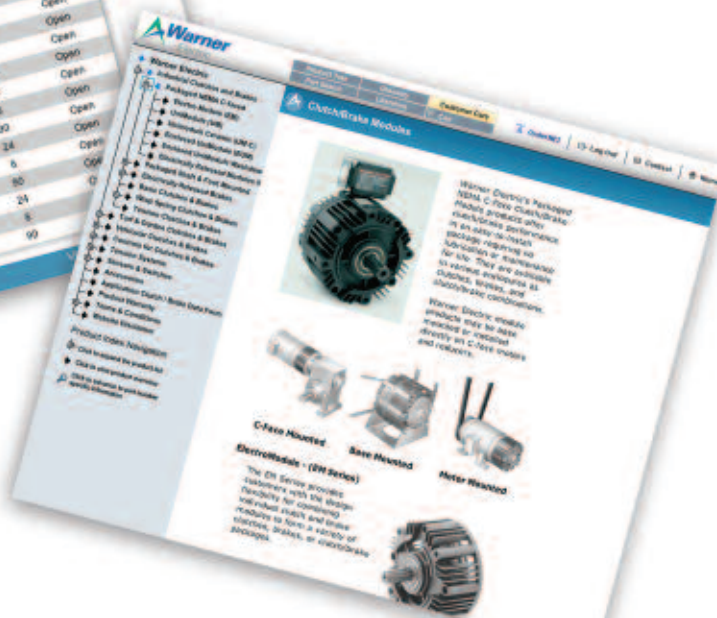
warnerelectric.com now features our new interactive eCATALOG making it faster and easier to find and spec the motion control products you need.

Go to this interactive online resource when you want to explore the unlimited potential of what you can do with Clutches, Brakes, Tensioning Control Systems, Sensors, Switches and other motion control components. The site is dedicated to engineering needs, with many enhanced features and loads of rich, new content.

Within the Warner Electric Interactive eCATALOG, you can start your search for basic equipment such as clutches or brakes, then quickly refine your search from hundreds of possibilities to a search that meets your specific power transmission requirements for NEMA, input/output configurations and other factors. You can also download specifications and PDF pages or submit a RFQ for any of your selections.

Find it fast at www.warnerelectric.com

Add to RFQ List	View Spec Sheet	Part No.	Friction Faces	Torque (lb-ft)	Model	Voltage (DC)	Housing
ADD	VIEW	5370-271-10	50	30	UM-100-100-1	90	Open
ADD	VIEW	5370-271-004	50	18	UM-50-1040	8	Open
ADD	VIEW	5370-271-008	50	18	UM-50-1040	90	Open
ADD	VIEW	5370-271-009	50	18	UM-50-1040	24	Open
ADD	VIEW	5370-271-010	50	18	UM-50-1040	6	Open
ADD	VIEW	5370-271-011	50	18	UM-50-1040	90	Open
ADD	VIEW	5370-271-014	50	30	UM-100-1040	24	Open
ADD	VIEW	5370-271-015	50	30	UM-100-1040	6	Open
ADD	VIEW	5370-271-018	50	30	UM-100-1040	90	Open
ADD	VIEW	5370-271-019	50	30	UM-100-1040	24	Open
ADD	VIEW	5370-271-020	50	30	UM-100-1040	6	Open
ADD	VIEW	5370-271-024	50	30	UM-100-1040	90	Open
ADD	VIEW	5370-271-025	50	30	UM-100-1040	24	Open
ADD	VIEW	5370-271-026	50	30	UM-100-1040	6	Open
ADD	VIEW	5370-271-027	50	30	UM-100-1040	90	Open
ADD	VIEW	5370-271-028	50	30	UM-100-1040	24	Open



A Broad Range of Clutches, Brakes and Clutch/Brake Combinations

Warner Electric packaged performance products are electric clutches and brakes, assembled and aligned at the factory, to offer maximum start-stop performance combined with quick and easy installation. They are offered as clutches, brakes, and clutch/brake combinations in a wide range of sizes and torque ratings.

All packaged performance products have been designed to mate easily with industry standard motors, reducers, and other power transmission components. They can be foot mounted, shaft mounted, or installed on C-face motors and reducers. Bolt-it-down, wire-it-up . . . they're ready to go. Most packaged performance products are recognized and/or listed by Underwriters Laboratories and/or the Canadian Standards Association.

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C-face Compatible Units

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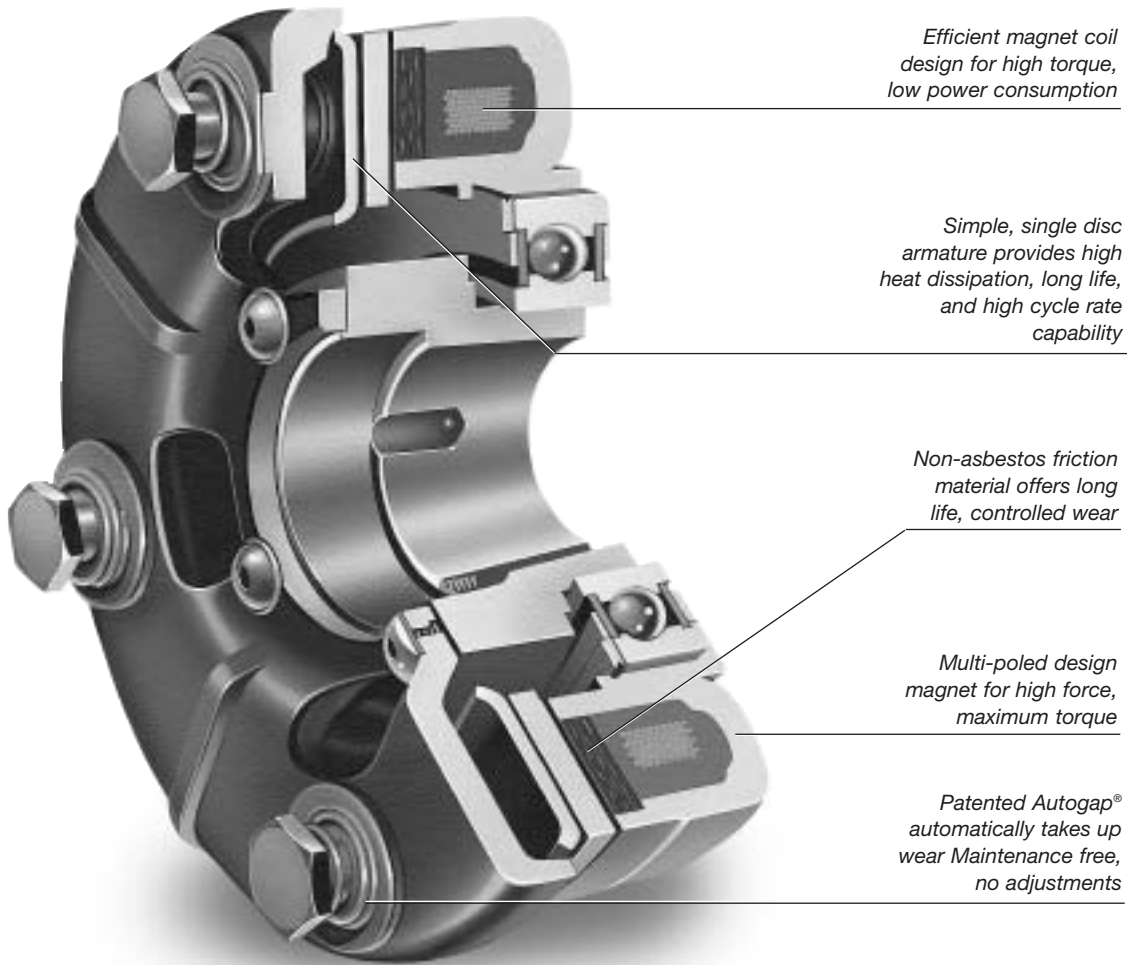
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Packaged Performance Products

Electromagnetic Clutches and Brakes



Packaged Products Benefits

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 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.

The Basics

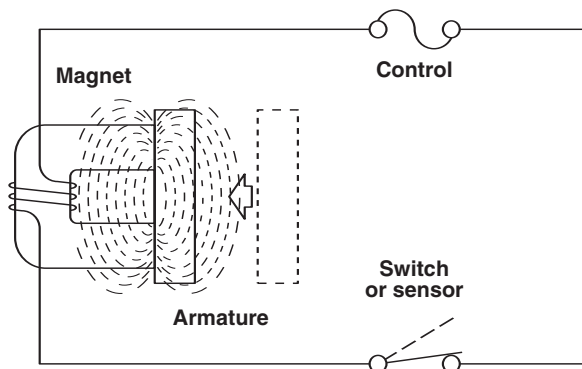
The electric clutch and brake has been called the best thing that ever happened to the electric motor. It's simple, electric clutches and brakes do all the work, while permitting motors to run smoothly and continuously at their most efficient speed by connecting/disconnecting the motor and the load. 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

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.

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.



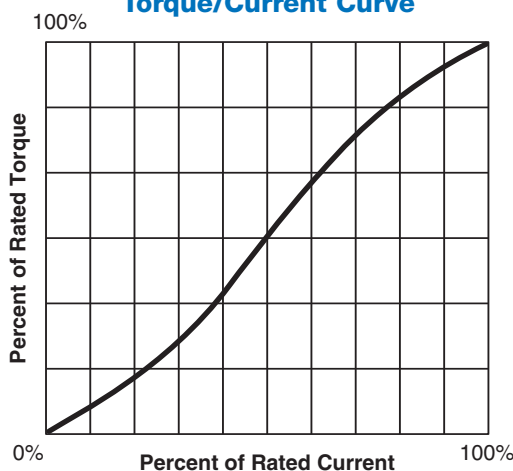
Easy to Select

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.

Torque/Current Curve



Packaged Performance Products

C-face Clutches and Clutch/Brake Assemblies

Electro Module

Individual Clutch and Brake Modules



EM Series Page 8

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. They offer clutch/brake convenience in an easy-to-install package requiring no lubrication or maintenance for life.

Service Parts, see page 169.

UniModule®

One Piece Preassembled Clutches and Clutch/Brakes



UM Series Page 22

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.

Service Parts, see page 176.

UM-C Series Page 32

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 Page 40

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.

Service Parts, see page 184.

EUM-W Series Page 40

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, and is BISSC certified.

Service Parts, see page 184.

Electro Clutches Electro Brakes

Shaft Mounted Units



EC Series Clutches Page 52

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.

Service Parts, see page 190.

EB Series Brakes Page 58

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.

Service Parts, see page 196.

Advanced Technology Clutches and Brakes

Extra Rugged Design



ATC Series Clutches Page 68

ATB Series Brakes Page 72

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.

Service Parts, see page 202.

SFP Series Clutches Page 75

- ❑ 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

Page 77

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.

Service Parts, see page 206.

EP-C Series

Page 82

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.

Packaged Performance Products

Electrically Released Brakes

Spring-Set Brakes

**For Power-Off Static Holding and
Emergency Stopping Applications**



ERS Series **Page 88** **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 **Page 96**

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



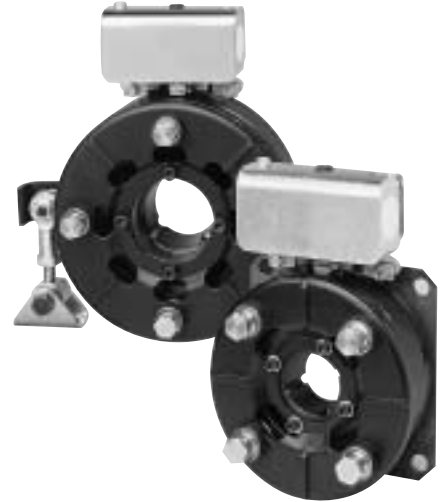
ERD Series **Page 100** **Dynamic Braking**

- ❑ 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.

Permanent Magnet Brakes

**For Power-Off Dynamic Stopping
and Cycling Applications**



FB Series **Page 106** **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.

Service Parts, see page 214.

ER Series **Page 110** **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.

Service Parts, see page 216.

Permanent Magnet, Power-Off Brakes

C-face Brake Modules



Electro Module Page 130

Individual Module Components EM-FBC (Clutch/Brakes)

- ❑ 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 Page 117

One Piece Packages UM-FBC (Clutch/Brakes)

- ❑ 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.

Service Parts, see page 218.

Enclosed UniModule Page 123

Totally Enclosed EUM-FBB (Brake Modules)

- ❑ 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.

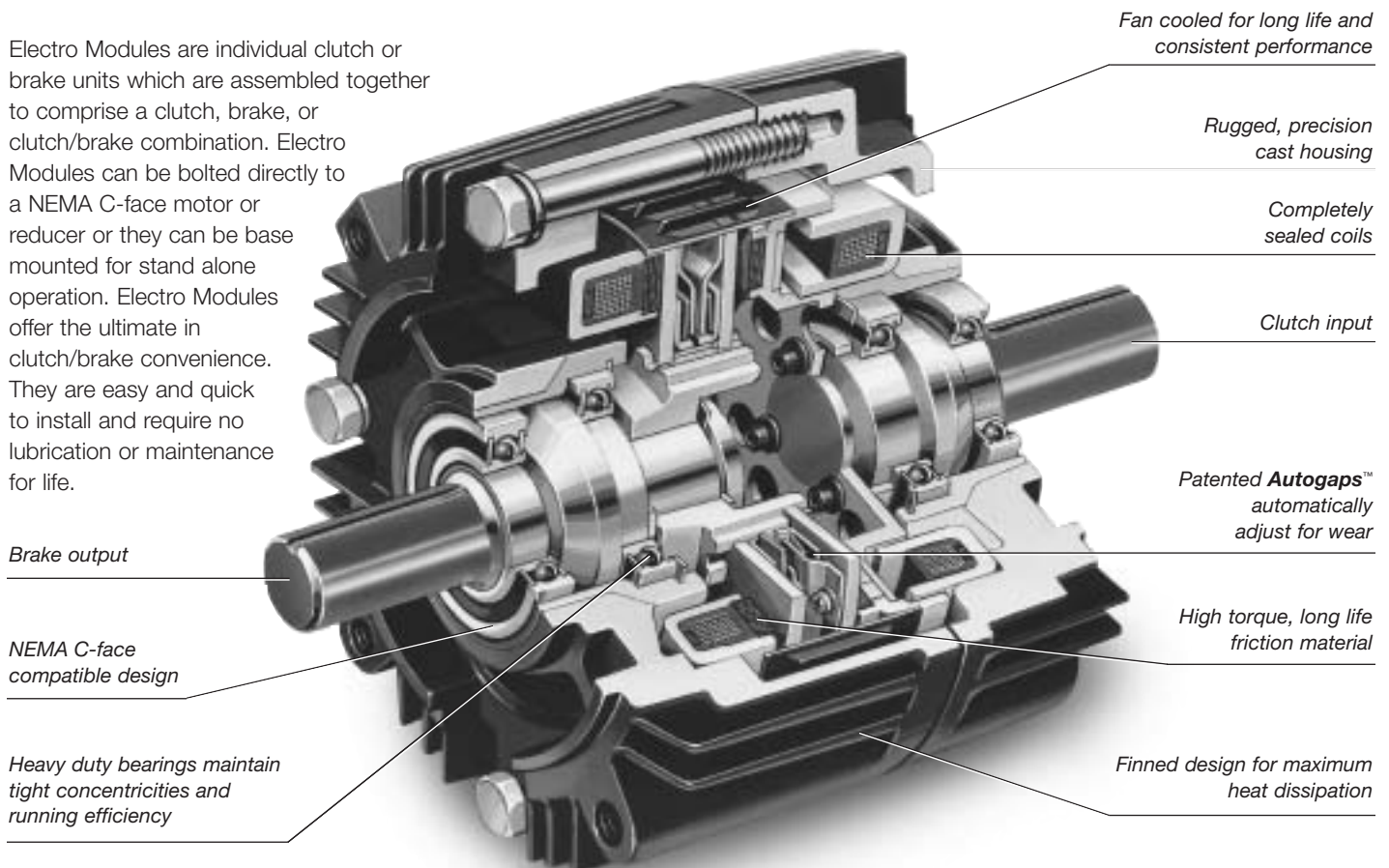
EUM-MBFB (Motor Brakes)

- ❑ 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.

Individual Clutch or Brake Module Combine to Comprise a Clutch, Brake or Clutch/Brake Combination!

Electro Modules are individual clutch or brake units which are assembled together to comprise a clutch, brake, or clutch/brake combination. Electro Modules can be bolted directly to a NEMA C-face motor or reducer or they can be base mounted for stand alone operation. Electro Modules offer the ultimate in clutch/brake convenience. They are easy and quick to install and require no lubrication or maintenance for life.



Bolt-it-down and wire-it-up . . . it's ready to go!

- Modular design flexibility
- 1/4 to 7-1/2 HP at 1800 RPM
- Outstanding controllability
- Fast cycling
- Smooth starts and stops
- Accurate
- Bidirectional
- Consistent performance
- Complete control capability

Selection Flexibility Clutch/Brake Combination

A wide range of module combinations for use with motors, reducers and other standard power transmission components is available. The flexibility of Electro Module enables you to pick the exact combination of function and design.

Power-On Applications

Electro Modules for power-on applications are purchased as individual clutches and brakes to be assembled for C-face, flange, or base mounting applications.

Power-Off (Electrically Released) Applications

Electrically released operation is the primary feature of power-off Electro Module brakes. They can be used as brakes, motor brakes and in combination with clutches. See pages 114, 116 and 123 for complete information.

Selection

The correct size can be determined from easy-to-use selection charts based on NEMA frame sizes or horsepower and shaft speed. Examples show the right way to order the Electro Module required.

Controls

Warner Electric controls assure that you get the maximum performance from your Electro Module. See the Controls Section for all the models.

Clutch Modules

10 Motor Clutch

Fan cooled for long life and consistent performance.

See page 14.



30 Input Clutch

Fan cooled. Sealed coils. Twin bearing mounted shaft maintains tight concentricities.

See page 16.



40 Output Clutch

Autogaps™ automatically for wear. Does not have a –use in combination with 10 Motor Clutch or 30 Input Clutch

See page 17.



Brake Modules



20 Brake

Bolts directly to C-face components. See page 15.

20-FBB Electrically Released Brake

Use for brake alone applications. Has one armature. See page 134.

20-FBC Electrically Released Brake

Use in combination with a 10 Motor Clutch or 30 Input Clutch module. Has dual armatures. See page 135.



20MB Motor Brake

Does not have a shaft. Has end cap. See page 15.

20MBFB Electrically Released Motor Brake

Automatically engages when power goes off. Requires no power to stop or hold a load. See page 136.

Clutch Combinations



10/40

Motor Clutch/Output Clutch

Use for clutch only applications. Has hollow bore input for mounting directly to C-face motors. Shaft and C-face on output side of unit accommodates reducer, parallel drive or coupling. Basic components are field, rotor and armature. See page 19.



30/40

Input Clutch/Output Clutch

Use for clutch only applications. Features dual C-faces and shafts. Unit input from parallel drive or coupling. Output to reducer. Basic components are field, rotor and armature. See page 21.



30/40-B

Input Clutch/Output Clutch-Base Mounted

Base mounting allows the clutch units to be utilized as a separate drive unit. Attach with pulleys, sprockets, etc. See page 21.

Clutch/Brake Combinations



10/20

Motor Clutch/Brake

Use for clutch/brake applications. Hollow bore input. Shaft on output side. Basic components are field, rotor, 2 armatures and power-on magnet. See page 18.

10/20-FBC

Motor Clutch/Electrically Released Brake

Use for clutch/electrically released brake applications. Basic components are field, rotor, 2 armatures and power-off magnet. See page 135.



20/30

Brake/Input Clutch

Use for clutch/brake applications. Features dual C-faces and shafts. Input from parallel drive or coupling. Output to reducer. Basic components are field, rotor, 2 armatures and power-on magnet. See page 20.

20/30-FBC

Electrically Released Brake/Input Clutch

Use for clutch/electrically released brake applications. Basic components are field, rotor, 2 armatures and power-off magnet. See page 122.



20/30-B

Brake/Input Clutch-Base Mounted

Stand alone units attach with pulleys, sprockets, etc. See page 20.

20/30-FBC-B

Electrically Released Brake/Input Clutch-Base Mounted

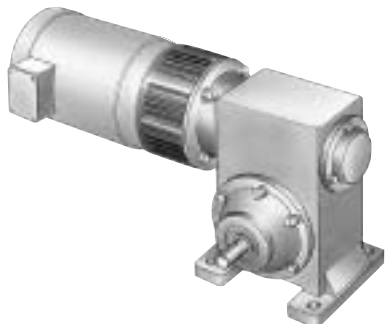
Stand alone units attach with pulleys, sprockets, etc. See page 122.

Selection

Electro Module clutch or brake units may be mounted directly to NEMA C-face motors and reducers, or can be base mounted.

1. Select Configuration

a. NEMA C-face Mounting



Based on the NEMA C-face frame size of the prime mover, select the correct clutch or brake module size from the Frame Size Selection chart. Size 100 houses the components of the size 180 in a size 50 frame, while size 215 incorporates size 210 components.

b. Base Mounting



Electro Module assemblies may be mounted as separate drive units driven from the prime mover by V-belts, chain and sprockets, couplings, timing belts and other standard power transmission components.

Select the correct size module from the Horsepower vs. Shaft Speed chart by determining the motor horsepower and RPM at the module location. The correct size Electro Module is shown at the intersection of the HP and operating speed.

For additional sizing information, refer to the technical sizing procedure (step 2).

2. Determine Technical Requirements

Technical considerations for sizing and selection are torque and heat dissipation. Each merits careful consideration, especially heat dissipation as over time, use in excessive temperature environments will have an adverse effect on bearing life and coil wire insulation integrity.

Compare the calculated torque requirement with the average dynamic torque ratings. Select a unit with adequate torque. If the unit selected on torque is different than the unit selected based on heat, select the larger size unit.

Frame Size Selection

NEMA Frame Size	Electro Module Size
56C/48Y	EM-50* EM-100**
182C/143TC 184C/145TC	EM-180
213C/182TC 215C/184TC	EM-210
213TC/215TC	EM-215

*For 56C/48Y C-frame motors 3/4 HP and smaller, the EM-100 size may be used where extended life is desirable.

**The EM-100 size is recommended for motors 1 HP and larger.

Horsepower vs. Shaft Speed

HP	SHAFT SPEED AT CLUTCH (IN RPM)																	
▼	100	200	300	400	500	600	700	800	900	1000	1100	1200	1500	1800	2000	2400	3000	3600
1/4																		
1/2																		
3/4																		
1																		
1-1/2																		
2																		
3																		
5																		
7-1/2																		

EM-50

EM-100 or EM-180

EM-210 or EM-215

a. Heat Dissipation Sizing

Friction surfaces slip during the initial period of engagement and, as a result, heat is generated. The clutch/brake selected must have a heat dissipation rating greater than the heat generated by the application. Therefore, in high inertia or high cycle rate applications, it is necessary to check the heat dissipation carefully. Inertia, speed and cycle rate are the required parameters.

Heat dissipation requirement is calculated as follows:

$$E = 1.7 \times WR^2 \times (N/100)^2 \times F$$

where:

$$E = \text{Heat (lb. ft./min.)}$$

WR^2 = Total reflected inertia at the clutch/brake shaft. Include the clutch/brake output inertia. (lb.ft.²)

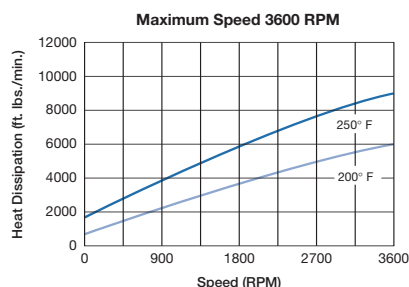
N = Speed in revolutions per minute. (RPM)

F = Cycle rate in cycles per minute (CPM)

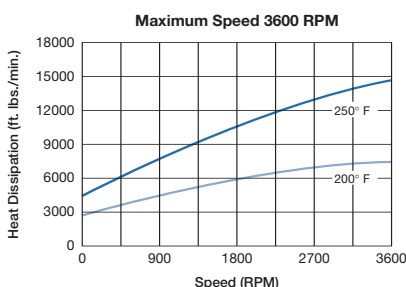
Compare the calculated heat generated in the application to the unit ratings using the heat dissipation curves. Select the appropriate unit that has adequate heat dissipation ability.

Heat Dissipation Curves

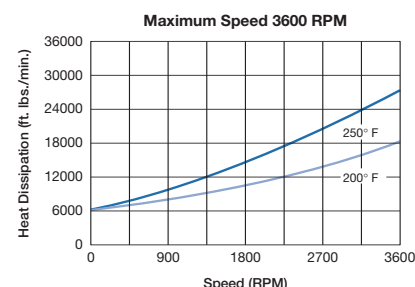
Size 50



Size 100/180



Size 210/215



b. Torque Sizing

For most applications, the correct size clutch/brake can be selected from the Horsepower vs. Shaft Speed chart.

Determine the motor horsepower and the RPM at the clutch/brake. The correct size unit is shown at the intersection of horsepower and shaft speed.

If the static torque requirements are known, refer to the Specifications Table to select a unit.

For some applications, the torque requirement is determined by the time allowed to accelerate and decelerate the load. (This time is generally specified in milliseconds.) For these applications, it is necessary to determine the torque requirement based on load inertia and the time allowed for engagement.

The torque requirements are calculated as follows:

$$T = (WR^2 \times N) / (308 \times t)$$

where:

$$T = \text{Average Dynamic Torque (lb. ft.)}$$

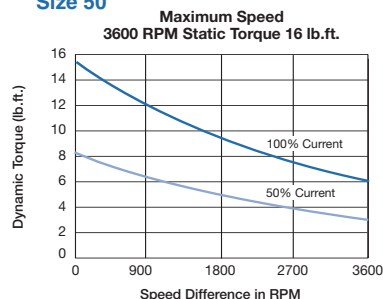
WR^2 = Total reflected inertia at the clutch/brake shaft. Include the clutch/brake output inertia. (lb. ft.²)

N = Speed in revolutions per minute. (RPM)

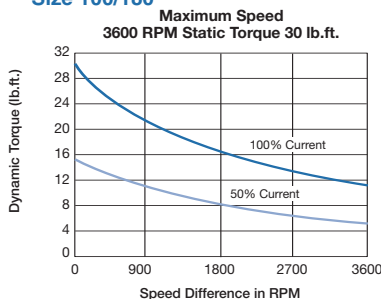
t = Time allowed for the engagement (sec)

C-face Clutch/Power-on Brake Dynamic Torque Curves

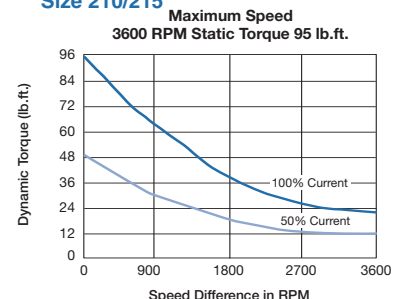
Size 50



Size 100/180



Size 210/215



Specifications

EM Size	Static Torque lb. ft.	Maximum RPM	Voltage D.C.
50	16	3600	6, 24, or 90
100	30	3600	6, 24, or 90
180	30	3600	6, 24, or 90
210	95	3600	6, 24, or 90
215	95	3600	90

3. Accessories

Warner Electric Electro Modules can be fitted with several accessories to extend their capacity and ease of mounting.

a. Conduit Box

NEMA 4 and UL listed, available in standard and washdown versions.



4. Select Control

Warner Electric manufactures clutch/brake controls to meet several system functions including:

- On/Off
- Torque adjust
- Over excitation
- Position loop

Many requirements beyond function can impact control selection. See the Controls Section on page 141 for complete information.

a. Mounting Brackets

Two styles of mounting brackets are available for simplified installation. The base mount is used with the 20/30 and 30/40 configurations. A motor mount is also available and provides sturdy support for 10/20 and 10/40 units and motor.



Part Numbers

Description	Model No.	Voltage DC	Part No.
10 Motor Clutch Module	EM-50-10	6	5370-270-020
	EM-50-10	24	5370-270-030
	EM-50-10	90	5370-270-015
	EM-100-10	6	5370-270-045
	EM-100-10	24	5370-270-056
	EM-100-10	90	5370-270-046
	EM-180-10	6	5370-270-021
	EM-180-10	24	5370-270-055
	EM-180-10	90	5370-270-017
	EM-210-10	6	5371-270-011
	EM-210-10	24	5371-270-027
	EM-210-10	90	5371-270-009
20 Brake Module	EM-50-20	6	5370-169-043
	EM-50-20	24	5370-169-045
	EM-50-20	90	5370-169-042
	EM-100-20	6	5370-169-040
	EM-100-20	24	5370-169-072
	EM-100-20	90	5370-169-041
	EM-180-20	6	5370-169-050
	EM-180-20	24	5370-169-071
	EM-180-20	90	5370-169-051
	EM-210-20	6	5371-169-022
	EM-210-20	24	5371-169-034
	EM-210-20	90	5371-169-023
20MB Motor Brake	EM-215-20	90	5371-169-076
	EM-50-20MB	6	5370-169-047
	EM-50-20MB	24	5370-169-062
	EM-50-20MB	90	5370-169-048
	EM-180-20MB	6	5370-169-053
	EM-180-20MB	24	5370-169-073
	EM-180-20MB	90	5370-169-054
	EM-210-20MB	6	5371-169-025
	EM-210-20MB	24	5371-169-035
	EM-210-20MB	90	5371-169-026
30 Input Clutch Module	EM-50-30	6	5370-270-019
	EM-50-30	24	5370-270-052
	EM-50-30	90	5370-270-016
	EM-100-30	6	5370-270-047
	EM-100-30	24	5370-270-054
	EM-100-30	90	5370-270-048
	EM-180-30	6	5370-270-049
	EM-180-30	24	5370-270-053
	EM-180-30	90	5370-270-050
	EM-210-30	6	5371-270-023
	EM-210-30	24	5371-270-026
	EM-210-30	90	5371-270-024
40 Output Clutch Module	EM-50-40		5370-536-008
	EM-100-40		5370-536-007
	EM-180-40		5370-536-009
	EM-210-40		5371-536-005

Accessories

Description	EM Size	Part No.
Conduit Box	EM series	5370-101-042
	All sizes	
Base Mount Kit for 2030, 3040	50/100	5370-101-004
	180	5370-101-002
	210/215	5371-101-001
Motor Mount Kit for 20, 1020, 1040	50/100	5370-101-010
	180	5370-101-012
	210/215	5371-101-012

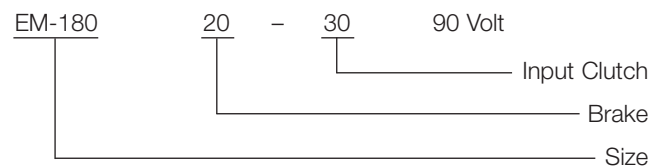
How to Order

Motor or Reducer Mounted

Simply combine the size number with the configuration of the modular combination from page 9.

Specify voltage and whether 20 brake module is power-on (20) or electrically released (20FBB). See chart for specific part numbers. See pages 130-133 for electrically released models. Order optional conduit box if desired.

Example

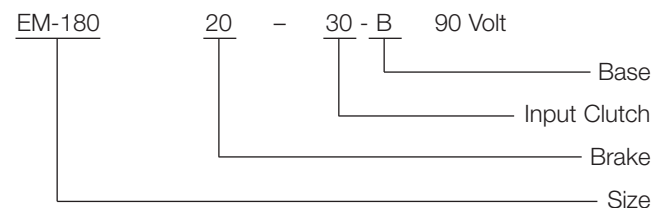


Base Mounted

Simply combine the size number with the configuration of the modular combination from page 9.

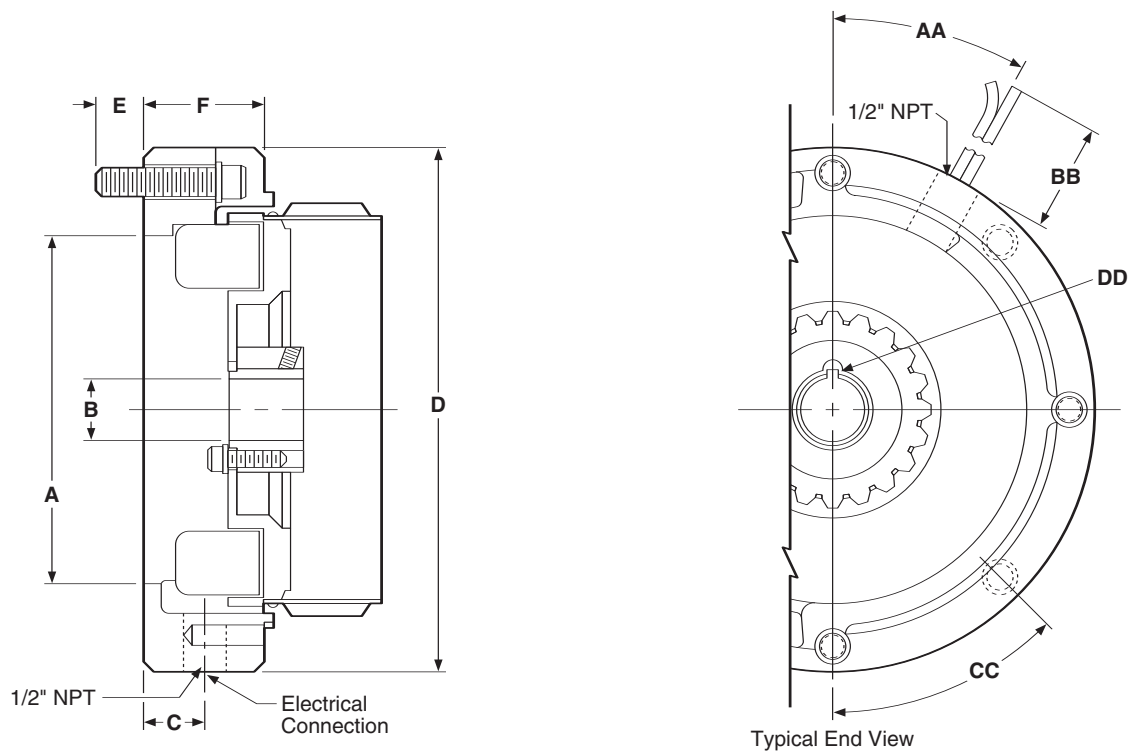
Specify voltage and whether 20 brake module is power-on (20) or electrically released (20FBB). See chart for specific part numbers. Order optional conduit box if desired.

Example



Select Appropriate Power Supply/Control. See the Controls Section beginning on page 141.

10 Motor Clutch Module



All dimensions are nominal, unless otherwise noted.

Size	A Pilot Dia.	B Dia.	C	D Dia.	E Max.	F Max.	AA	BB Min.	CC	DD Key
50	4.500	.625	.813	6.750	.599	1.563	30°	36	45°	3/16 x 3/16
100	4.500	.625	.813	6.750	.599	1.563	30°	36	45°	3/16 x 3/16
180	4.500	.875	.813	6.750	.599	1.563	30°	36	45°	3/16 x 3/16
210	8.500	1.125	.703	9.250	.625	1.313	25°	36	45°	1/4 x 1/4

Specifications

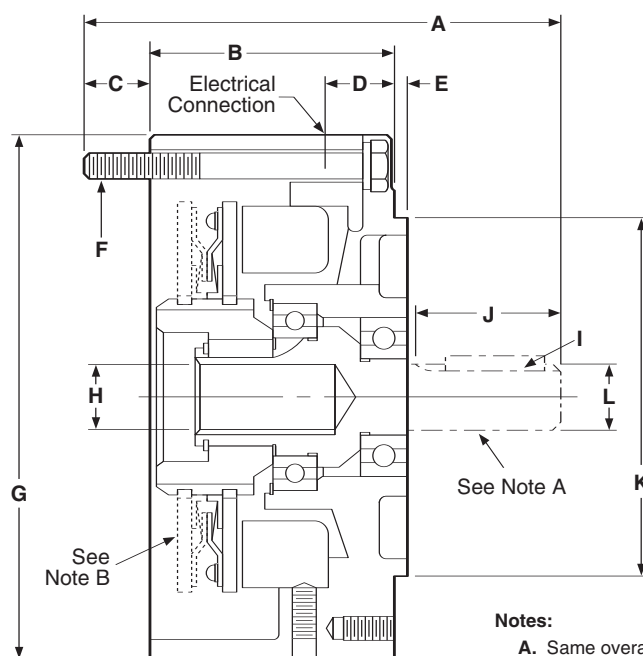
Model Size	Voltage DC	Static Torque lb. ft.	Max. RPM	Inertia-WR ² (lb.ft. ²)	Weight (lbs)	NEMA Frame Size
50	6, 24, 90	16	3600	.020	3.4	56C/48Y*
100	6, 24, 90	30	3600	.046	5.1	56C/48Y**
180	6, 24, 90	30	3600	.046	5.1	182C/143TC 184C/145TC
210	6, 24, 90	95	3600	.188	9.1	213C/182TC 215C/184TC

* For 56C/48Y Frame motors 3/4 HP and smaller the EM-100 size may be used where extended life is desirable.

** EM-100 size is recommended for motors 1 HP and larger.

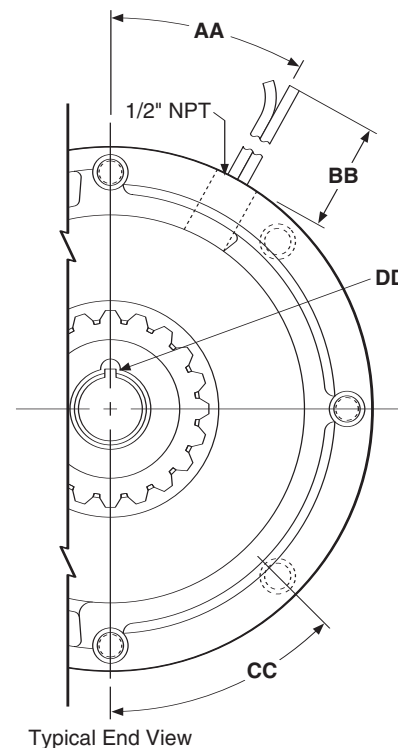
For NEMA Standard frame sizes, see page 137.

20 Brake Module 20MB Brake Module



Notes:

- A. Same overall dimensions apply to Motor Brakes. 20MB Module does not have an output shaft.
- B. Clutch armature only applies to EM-20.



Typical End View

All dimensions are nominal, unless otherwise noted.

Size	A Max.	B	C Max.	D	E Max.	F	G Dia.	H Dia.	I Keyway	J Min.	K Pilot Dia.	L Dia.	AA	BB Min.	CC	DD Key
50	5.188	3.125	.500	1.000	.156	3/8-16 UNC-2A Equally Spaced (4) on 5.875 D.	6.688	.625	3/16 X 3/16 x 1-3/8	1.813	4.500	.625	30°	36	45°	3/16 x 3/16
100	5.188	3.125	.500	1.000	.156	3/8-16 UNC-2A Equally Spaced (4) on 5.875 D.	6.688	.625	3/16 X 3/16 x 1-3/8	1.813	4.500	.625	30°	36	45°	3/16 x 3/16
180	5.266	3.125	.500	1.000	.156	3/8-16 UNC-2A Equally Spaced (4) on 5.875 D.	6.688	.875	3/16 X 3/16 x 1-3/8	1.891	4.500	.875	30°	36	45°	3/16 x 3/16
210	7.578	4.609	.594	1.500	.313	1/2-16 UNC-2A Equally Spaced (4) on 7.250 D.	9.344	1.125	1/4 X 1/4 x 2	2.500	8.500	1.125	25°	36	45°	1/4 x 1/4
215	8.078	4.609	.594	1.500	.313	1/2-16 UNC-2A Equally Spaced (4) on 7.250 D.	9.344	1.375	1/4 X 1/4 x 2	3.000	8.500	1.375	25°	36	45°	5/16 x 5/16

Specifications

Model Size	Voltage DC	Static Torque lb. ft.	Max. RPM	Armatures	Inertia-WR ² Arm. Hub	Shaft	Weight (lbs)	NEMA Frame Size
50	6, 24, 90	16	3600	.014	.002	.001	6.6	56C/48Y*
100	6, 24, 90	30	3600	.036	.003	.002	8.1	56C/48Y**
180	6, 24, 90	30	3600	.036	.003	.002	8.1	182C/143TC 184C/145TC
210	6, 24, 90	95	3600	.162	.021	.017	21.5	213C/182TC 215C/184TC
215	90	95	3600	.162	.021	.019	22	213TC/215TC***

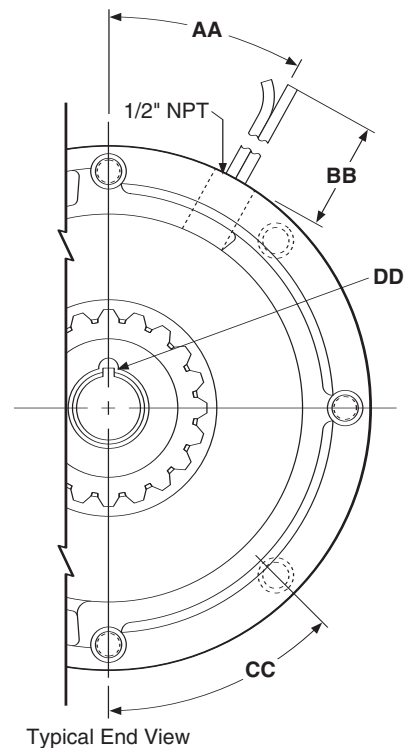
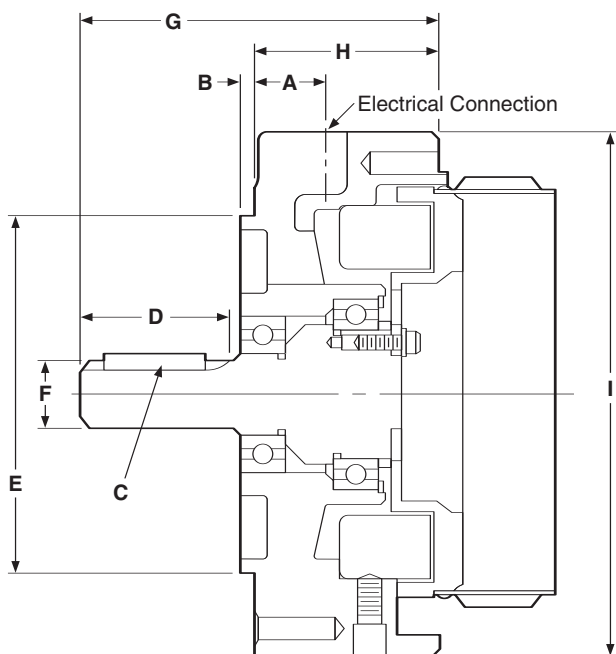
* For 56C/48Y Frame motors 3/4 HP and smaller the EM-100 size may be used where extended life is desirable.

** EM-100 size is recommended for motors 1 HP and larger.

*** For 7-1/2 HP max.

For NEMA standard frame sizes, see page 137.

30 Input Clutch Module



All dimensions are nominal, unless otherwise noted.

Size	A	B Max.	C	D Min.	E Pilot Dia.	F Dia.	G Max.	H	I Dia.	AA	BB Min.	CC	DD Key
50	1.000	1.56	3/16 x 3/16 x 1-3/8	1.813	4.500	.625	4.328	2.266	6.688	30°	36	45°	3/16 x 3/16
100	1.000	1.56	3/16 x 3/16 x 1-3/8	1.813	4.500	.625	4.328	2.266	6.688	30°	36	45°	3/16 x 3/16
180	1.000	1.56	3/16 x 3/16 x 1-3/8	1.891	4.500	.875	4.391	2.266	6.688	30°	36	45°	3/16 x 3/16
210	1.500	.312	1/4 x 1/4	2.500	8.500	1.125	5.391	2.438	9.219	25°	36	45°	1/4 x 1/4

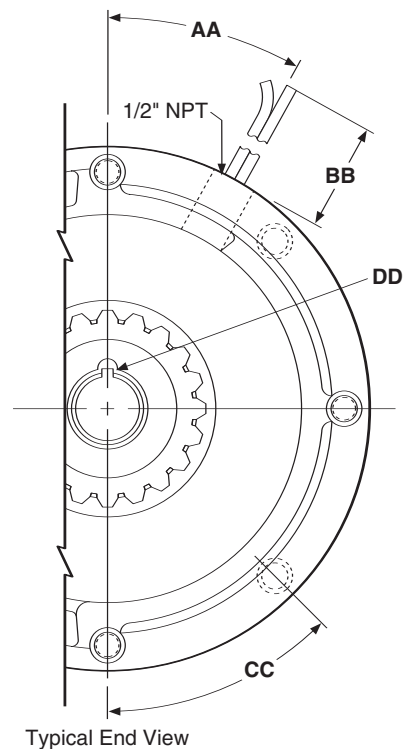
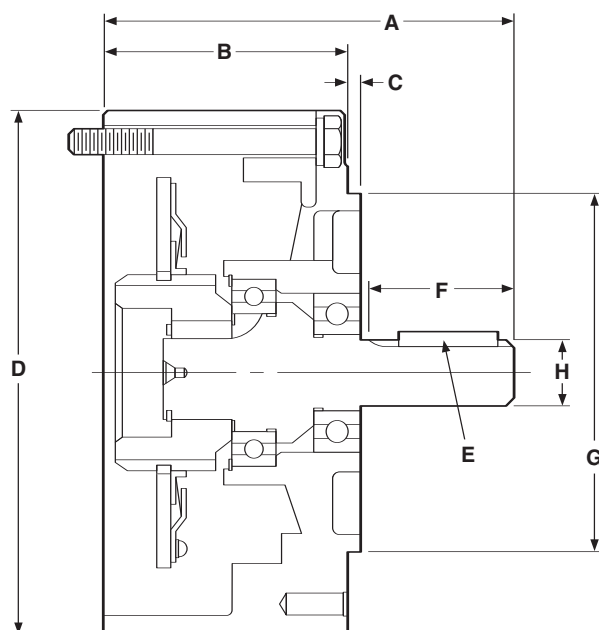
Specifications

Model Size	Voltage DC	Static Torque lb. ft.	Max. RPM	Inertia-WR ²		Weight (lbs)	NEMA Frame Size
				Rotor	Shaft		
50	6, 24, 90	16	3600	.020	.001	6.4	56C/48Y*
100	6, 24, 90	30	3600	.046	.002	8.4	56C/48Y**
180	6, 24, 90	30	3600	.046	.002	8.4	182C/143TC 184C/145TC
210	6, 24, 90	95	3600	.188	.017	19.8	213C/182TC 215C/184TC

* For 56C/48Y Frame motors 3/4 HP and smaller the EM-100 size may be used where extended life is desirable.

** EM-100 size is recommended for motors 1 HP and larger.

For NEMA standard frame sizes, see page 137.



All dimensions are nominal, unless otherwise noted.

Size	A Max.	B	C Max.	D Dia.	E	F Min.	G Pilot Dia.	H Dia.	AA	BB Min.	CC	DD Key
50	5.188	3.125	.156	6.687	3/16 x 3/16 x 1-3/8	1.813	4.500	.625	30°	36	45°	3/16 x 3/16
100	5.188	3.125	.156	6.687	3/16 x 3/16 x 1-3/8	1.813	4.500	.625	30°	36	45°	3/16 x 3/16
180	5.266	3.125	.313	6.687	3/16 x 3/16 x 1-3/8	1.891	4.500	.875	30°	36	45°	3/16 x 3/16
210	7.578	4.609	.313	9.344	1/4 x 1/4 x 2	2.500	8.500	1.125	25°	36	45°	1/4 x 1/4

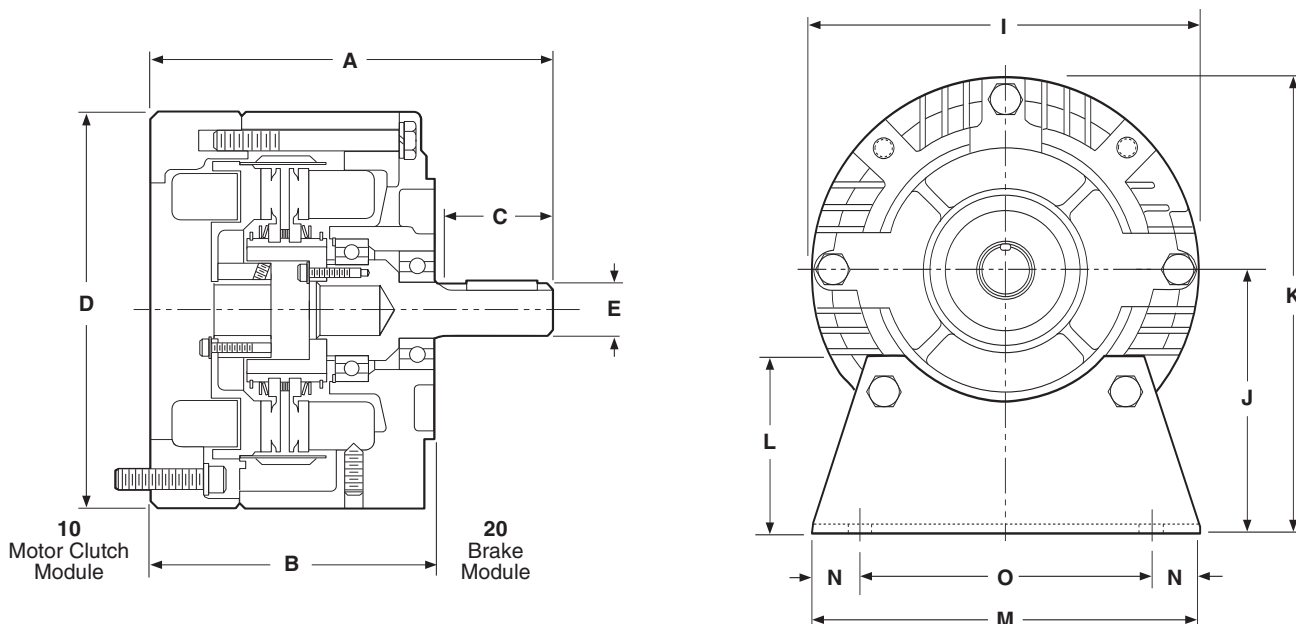
Specifications

Model Size	Voltage DC	Static Torque lb. ft.	Max. RPM	Armatures	Inertia-WR ² Arm. Hub	Shaft	Weight (lbs)	NEMA Frame Size
50	6, 24, 90	16	3600	.007	.002	.001	4.9	56C/48Y*
100	6, 24, 90	30	3600	.018	.003	.002	5.2	56C/48Y**
180	6, 24, 90	30	3600	.018	.003	.002	5.2	182C/143TC 184C/145TC
210	6, 24, 90	95	3600	.181	.021	.017	15.2	213C/182TC 215C/184TC

* For 56C/48Y Frame motors 3/4 HP and smaller the EM-100 size may be used where extended life is desirable.

** EM-100 size is recommended for motors 1 HP and larger.

For NEMA standard frame sizes, see page 137.



Note: Mounting base is optional and is ordered separately.
 Motor Clutch (10) and Output Clutch (20) are ordered separately.

All dimensions are nominal, unless otherwise noted.

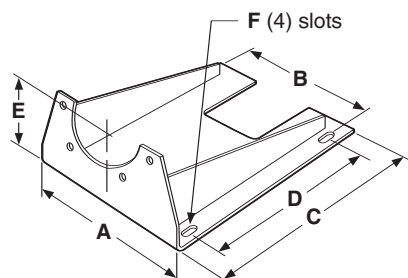
Size	A	B	C	D	E	I	J	K	L	M	N	O	NEMA Frame Size
50	6.750	4.844	1.813	6.750	.625	6.688	3.500	6.844	2.000	6.000	.500	5.000	56C/48Y*
100	6.750	4.844	1.813	6.750	.625	6.688	3.500	6.844	2.000	6.000	.500	5.000	56C/48Y**
180	6.828	4.844	1.891	6.750	.875	6.688	4.500	7.844	3.000	6.625	.813	5.000	182C/143TC 184C/145TC
210	8.891	5.922	2.500	9.250	1.125	9.688	5.250	9.906	3.375	9.000	.625	7.750	213C/182TC 215C/184TC

* For 56C/48Y Frame motors 3/4 HP and smaller the EM-100 size may be used where extended life is desirable.

** EM-100 size is recommended for motors 1 HP and larger.

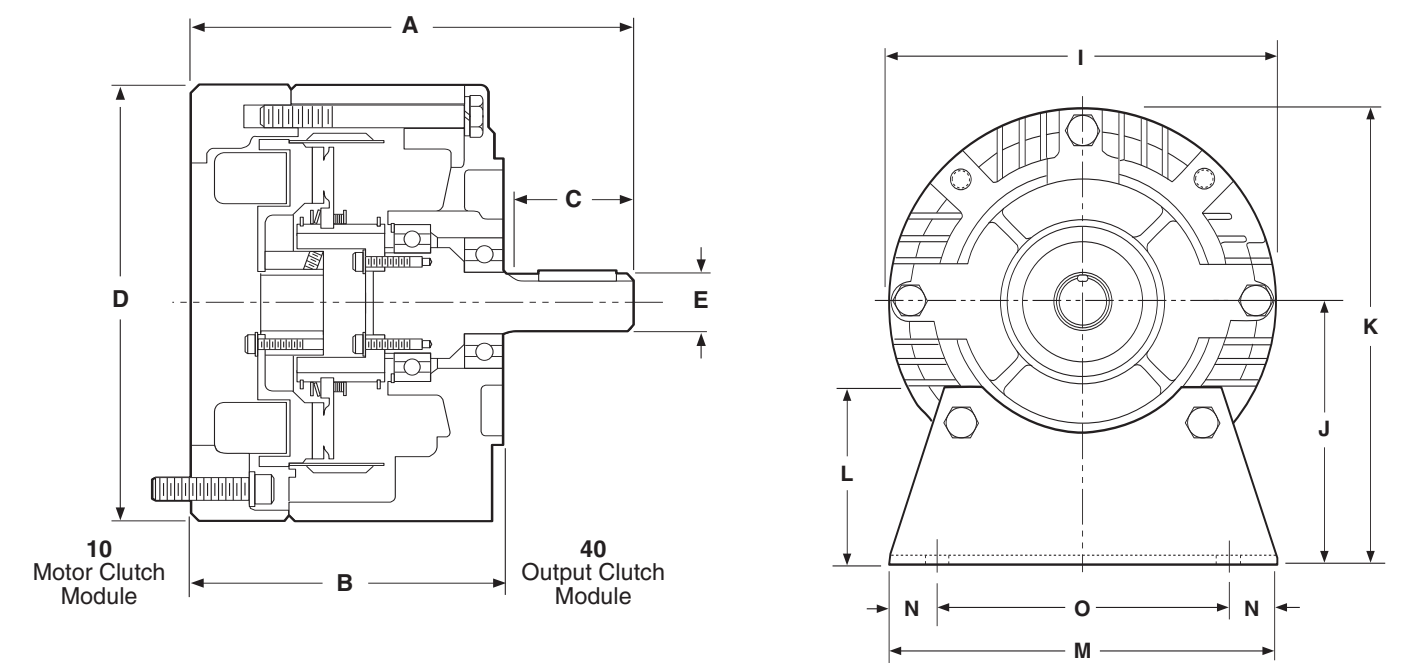
For NEMA standard frame sizes, see page 137.

Motor Mount (M)



For use with 1020, 1040, 20, 20 FBB and 1020 FBC Combinations.

Size	A	B	C	D	E	F	Part No.
50/100	9.25	8.25	11.00	8.000	3.50	.797 x .406	5370-101-010
180	9.25	8.25	11.00	8.000	4.50	.797 x .406	5370-101-012/5370-101-047
210/215	11.50	10.50	12.00	9.000	5.25	.750 x .406	5371-101-012/5371-101-025



Note: Mounting base is optional and is ordered separately. Motor Clutch (10) and Output Clutch (40) are ordered separately.

All dimensions are nominal, unless otherwise noted.

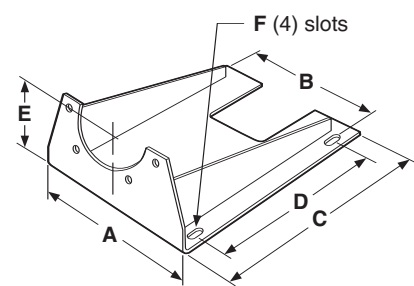
Size	A	B	C	D	E	I	J	K	L	M	N	O	NEMA Frame Size
50	6.750	4.844	1.813	6.750	.625	6.688	3.500	6.844	2.000	6.000	.500	5.000	56C/48Y*
100	6.750	4.844	1.813	6.750	.625	6.688	3.500	6.844	2.000	6.000	.500	5.000	56C/48Y**
180	6.828	4.844	1.891	6.750	.875	6.688	4.500	7.844	3.000	6.625	.813	5.000	182C/143TC 184C/145TC
210	8.891	5.922	2.500	9.250	1.125	9.688	5.250	9.906	3.375	9.000	.625	7.750	213C/182TC 215C/184TC

* For 56C/48Y Frame motors 3/4 HP and smaller the EM-100 size may be used where extended life is desirable.

** EM-100 size is recommended for motors 1 HP and larger.

For NEMA standard frame sizes, see page 137.

Motor Mount (M)

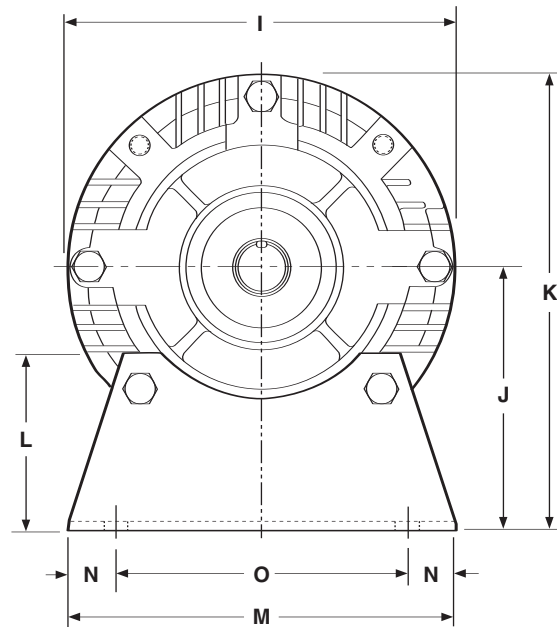
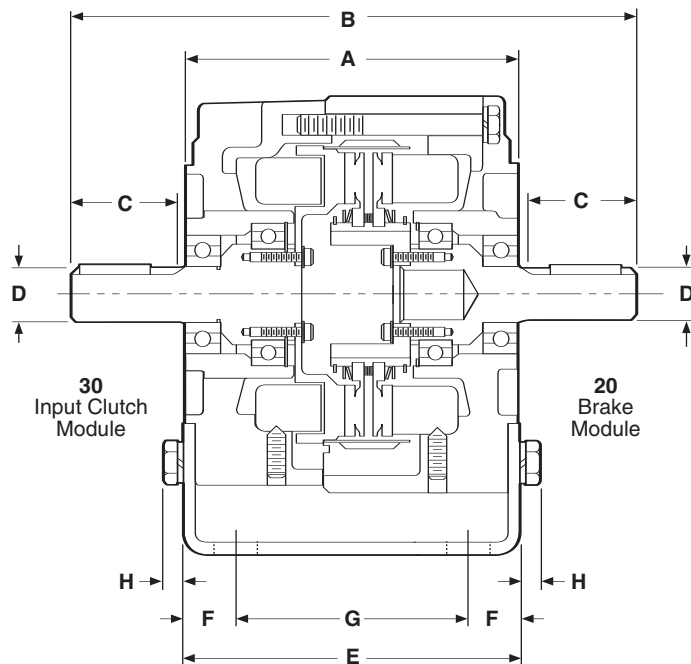


For use with 1020, 1040, 20, 20 FBB and 1020 FBC Combinations.

Size	A	B	C	D	E	F	Part No.
50/100	9.25	8.25	11.00	8.000	3.50	.797 x .406	5370-101-010
180	9.25	8.25	11.00	8.000	4.50	.797 x .406	5370-101-012/5370-101-047
210/215	11.50	10.50	12.00	9.000	5.25	.750 x .406	5371-101-012/5371-101-025

EM-20/30 Brake/Input Clutch Combination

EM-20/30-B Brake/Input Clutch Combination – Base Mounted

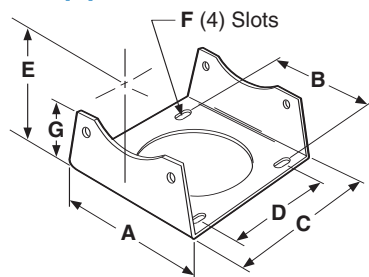


Note: Mounting base is optional and is ordered separately. Input Clutch (30) module and Brake Module (20) are ordered separately.

All dimensions are nominal, unless otherwise noted.

Size	A	B	C Min.	D	E	F	G	H	I	J	K	L	M	N	O
50	5.719	9.516	1.813	.625	5.672	.844	4.000	.344	6.688	3.500	6.844	2.000	6.000	.500	5.000
100	5.719	9.516	1.813	.625	5.672	.844	4.000	.344	6.688	3.500	6.844	2.000	6.000	.500	5.000
180	5.719	9.656	1.891	.875	5.672	.844	4.000	.344	6.688	4.500	7.844	3.000	6.625	.813	5.000
210	7.719	12.969	2.500	1.125	8.203	1.094	6.000	.438	9.688	5.250	9.906	3.375	9.000	.625	7.750

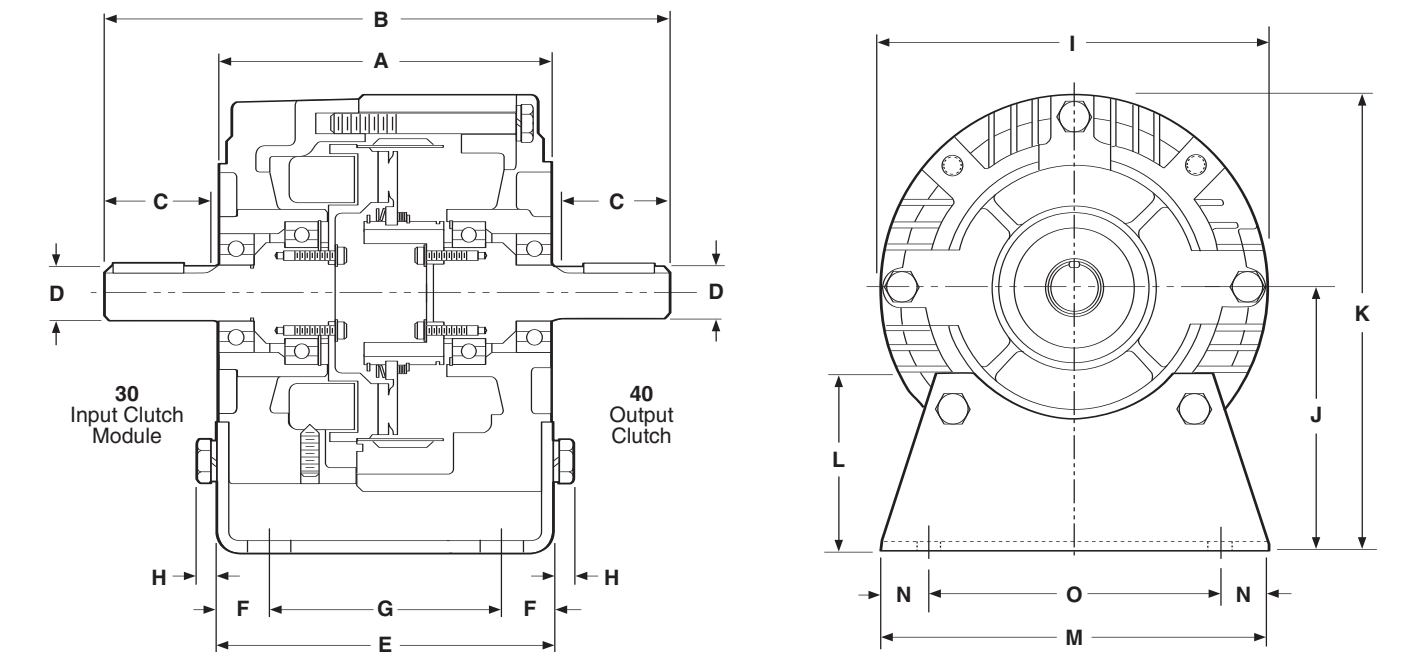
Base (B)



For use with 2030 and 3040 units.

Size	A	B	C	D	F	E	G	Part No.
50/100	6.000	5.000	5.672	4.000	.750 X .406	3.500	2.000	5370-101-004
180	6.625	5.000	5.672	4.000	.750 X .406	4.500	3.000	5370-101-002/5370-101-049
210/215	9.000	7.750	8.203	6.000	.750 X .531	5.250	3.385	5371-101-001/5371-101-026

EM-30/40 Input Clutch/Output Clutch Combination
EM-30/40 Input Clutch/Output Clutch Combination – Base Mounted

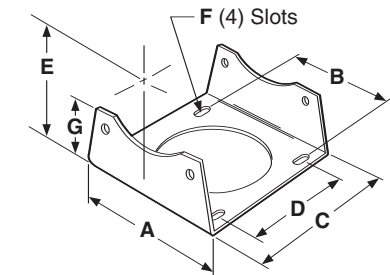


Note: Mounting base is optional and is ordered separately.
Input Clutch (30) module and Output Clutch (40) are ordered separately.

All dimensions are nominal, unless otherwise noted.

Size	A	B	C Min.	D	E	F	G	H	I	J	K	L	M	N	O
50	5.719	9.516	1.813	.625	5.672	.844	4.000	.344	6.688	3.500	6.844	2.000	6.000	.500	5.000
100	5.719	9.516	1.813	.625	5.672	.844	4.000	.344	6.688	3.500	6.844	2.000	6.000	.500	5.000
180	5.719	9.656	1.891	.875	5.672	.844	4.000	.344	6.688	4.500	7.844	3.000	6.625	.813	5.000
210	7.719	12.969	2.500	1.125	8.203	1.094	6.000	.438	9.688	5.250	9.906	3.375	9.000	.625	7.750

Base (B)



For use with 2030 and 3040 units.

Size	A	B	C	D	F	E	G	Part No.
50/100	6.000	5.000	5.672	4.000	.750 X .406	3.500	2.000	5370-101-004
180	6.625	5.000	5.672	4.000	.750 X .406	4.500	3.000	5370-101-002/5370-101-049
210/215	9.000	7.750	8.203	6.000	.750 X .531	5.250	3.385	5371-101-001/5371-101-026

Pre-assembled, C-face Clutches and Brakes

UniModules offer the ultimate in Clutch/Brake performance and convenience. UniModules offer the same performance as EM's without the assembly required.

Completely pre-assembled one-piece clutch and clutch/brake packages in five sizes. Can be motor or reducer mounted or used as a separate drive unit powered by a prime mover.

Pre-assembled, pre-aligned, and pre-burnished at the factory for rated torque directly out-of-the-box.

NEMA C-face compatible design

Single conduit entrance

Heavy duty bearings maintain tight concentricity and running efficiency

Fan cooled for long life and consistent performance

Completely sealed coils

Easy set screw access

Bearing mounted rotor

Autogaps® automatically adjust for wear

Finned design for maximum heat dissipation

High torque, long life, asbestos free friction material

- Easy installation
- Available with standard power-on and electrically released power-off brake units
- Fan cooled for high cycle rate operation
- Maintenance Free
- Available in 50, 100, 180, 210, and 215 sizes. NEMA C-face design
- UL rated, CSA certified
- Can be applied with control fitted as standard
- Bearing mounted clutch rotor eases assembly alignment
- Single access hole for all wires

Easy Installation

1. Slide UniModule on to motor shaft.
2. Position vent holes to bottom and insert four capscrews.
3. Use Allen wrench to tighten rotor set screws.



1.



2.



3.

Clutch Combinations



1040

Motor Clutch/Output Clutch

Use for clutch only applications. Has hollow bore input for mounting directly to C-face motors. Shaft and C-face on output side of unit accommodates reducer, parallel drive or coupling. Motor Clutch is fan cooled for long life and consistent performance. Basic components are field, rotor and armature. See page 29.



3040

Input Clutch/Output Clutch

Use for clutch only applications. Features dual C-faces and shafts. Unit input from parallel drive or coupling. Output to reducer. Input Clutch is fan cooled and has sealed coils. Twin bearing mounted shaft maintains tight concentricities. The Output Clutch utilizes Autogaps™ which automatically adjust armature for wear. Basic components are field, rotor and armature. See page 31.



3040-B

Input Clutch/Output Clutch – with Accessory Base Mounting

Base mounting allows the clutch unit to be utilized as a separate drive unit. Attach with pulleys, sprockets, etc. See page 31.

Clutch/Brake Combinations



1020

Motor Clutch/Brake

Use for clutch/brake applications. Has hollow bore input for mounting directly to C-face motors. Brake shaft and C-face on output side accommodate a reducer, parallel drive or coupling. Basic components: field, rotor, 2 armatures and power-on magnet. See page 28.

1020-FBC

Motor Clutch/Electrically Released Brake

Use for clutch/power-off brake applications. Has clutch input and brake on output side. Employs powerful permanent magnets for maximum torque when power is removed from the brake coil. Basic components are field, rotor, 2 armatures and power-off magnet. See page 119 for specifications.



2030

Input Clutch/Brake

Use for clutch/brake applications. Features dual C-faces and shafts. Input from parallel drive or coupling. Output to reducer. Basic components are field, rotor, 2 armatures and power-on magnet. See page 30.

2030-FBC

Input Clutch/Electrically Released Brake

Use for clutch/power-off brake applications. Has shafts on input and output sides. When electrical power is applied to the brake coil the brake releases. Ideal for dynamic cycling operations. Basic components are field, rotor, 2 armatures and power-off magnet. See page 119 for specifications.



2030-B

Input Clutch/Brake – with Accessory Base Mounting

Base mounting allows the clutch/brake units to be utilized as a separate drive unit. Attach with pulleys, sprockets, etc. See page 30.

2030-FBC-B

Input Clutch/Electrically Released Brake with Accessory Base Mounting

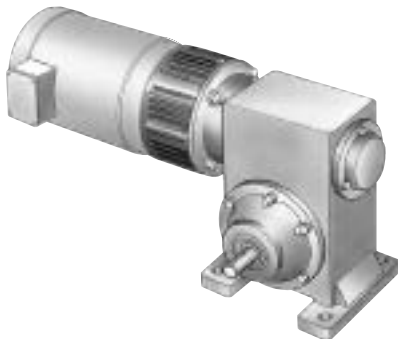
See page 130 for Electrically Released Brake specifications.

Selection

UniModule clutch, brake and clutch/brake units may be mounted directly to NEMA C-face motors and reducers, or can be base mounted.

1. Select Configuration

a. NEMA C-face Mounting



To select the correct UniModule package, determine the NEMA frame size of your motor and/or reducer, and choose the corresponding size UniModule from the Frame Size Selection chart.

Size UM-100 modules utilize a 5/8" diameter shaft to fit 56C/48Y motor frames with components of UM-180 units for higher torque and heat dissipation capacity than the UM-50.

UM-100 modules are available in 1020 and 2030 clutch/brake and 1040 and 3040 clutch configurations. For C-face mounting, select either a 1020 clutch/brake or a 1040 clutch configuration. The 2030 and 3040 configurations are for base mounting.

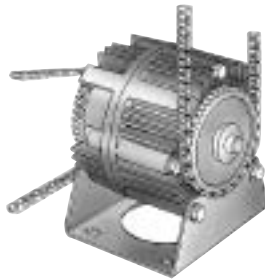
Frame Size Selection

NEMA Frame Size	UniModule Size
56C/48Y	UM-50* UM-100**
182C/143TC 184C/145TC	UM-180
213C/182TC 215C/184TC	UM-210
213TC/215TC	UM-215

* For 56C/48Y Frame motors 3/4 HP and smaller the UM-100 size may be used where extended life is desirable.

** UM-100 size is recommended for motors 1 HP and larger.

b. Base Mounting



UniModule assemblies may be mounted as separate drive units driven from the prime mover by V-belts, chain and sprockets, couplings, timing belts and other standard power transmission components.

Select the correct size module from the Horsepower vs. Shaft Speed chart by determining the motor horsepower and RPM at the module location. The correct size UniModule is shown at the intersection of the HP and operating speed.

For additional sizing information, refer to the technical sizing procedure (step 2).

2. Determine Technical Requirements

Technical considerations for sizing and selection are torque and heat dissipation. Each merits careful consideration, especially heat dissipation as over time, use in excessive temperature environments will have an adverse effect on bearing life and coil wire insulation integrity.

Compare the calculated torque requirement with the average dynamic torque ratings. Select a unit with adequate torque. If the unit selected on torque is different than the unit selected based on heat, select the larger size unit.

Horsepower vs. Shaft Speed

HP	SHAFT SPEED AT CLUTCH (IN RPM)																	
▼	100	200	300	400	500	600	700	800	900	1000	1100	1200	1500	1800	2000	2400	3000	3600
1/4																		
1/2																		
3/4																		
1																		
1-1/2																		
2																		
3																		
5																		
7-1/2																		

UM-50

UM-100 or UM-180

UM-210 OR UM-215

UM-215

a. Heat Dissipation Sizing

Friction surfaces slip during the initial period of engagement and, as a result, heat is generated. The clutch/brake selected must have a heat dissipation rating greater than the heat generated by the application. Therefore, in high inertia or high cycle rate applications, it is necessary to check the heat dissipation carefully. Inertia, speed and cycle rate are the required parameters.

Heat dissipation requirement is calculated as follows:

$$E = 1.7 \times WR^2 \times (N/100)^2 \times F$$

where:

$$E = \text{Heat (lb. ft./min.)}$$

WR^2 = Total reflected inertia at the clutch/brake shaft. Include the clutch/brake output inertia. (lb.ft.²)

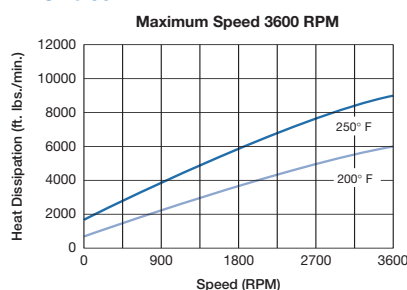
N = Speed in revolutions per minute. (RPM)

F = Cycle rate in cycles per minute (CPM)

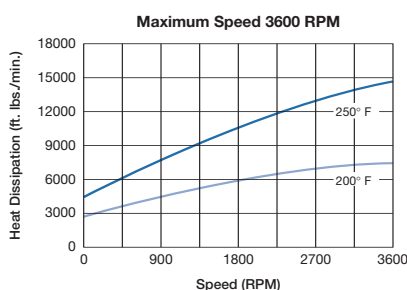
Compare the calculated heat generated in the application to the unit ratings using the heat dissipation curves. Select the appropriate unit that has adequate heat dissipation ability.

Heat Dissipation Curves

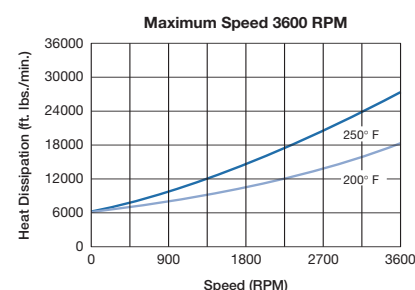
Size 50



Size 100/180



Size 210/215



b. Torque Sizing

For most applications, the correct size clutch/brake can be selected from the Horsepower vs. Shaft Speed chart located at the bottom of this page. Determine the motor horsepower and the RPM at the clutch/brake. The correct size unit is shown at the intersection of horsepower and shaft speed.

If the static torque requirements are known, refer to the technical ratings chart to select a unit.

For some applications, the torque requirement is determined by the time allowed to accelerate and decelerate the load. (This time is generally specified in milliseconds.) For these applications, it is necessary to determine the torque requirement based on load inertia and the time allowed for engagement.

The torque requirements are calculated as follows:

$$T = (WR^2 \times N) / (308 \times t)$$

where:

T = Average Dynamic Torque (lb. ft.)

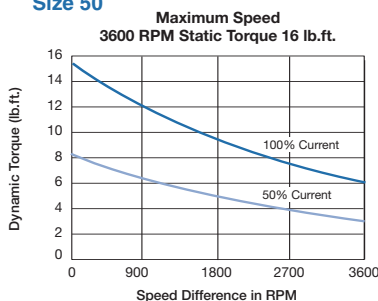
WR^2 = Total reflected inertia at the clutch/brake shaft. Include the clutch/brake output inertia. (lb. ft.²)

N = Speed in revolutions per minute. (RPM)

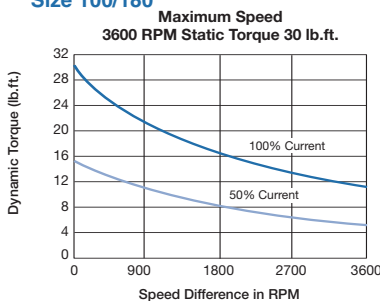
t = Time allowed for the engagement (sec)

C-face Clutch/Power-on Brake Dynamic Torque Curves

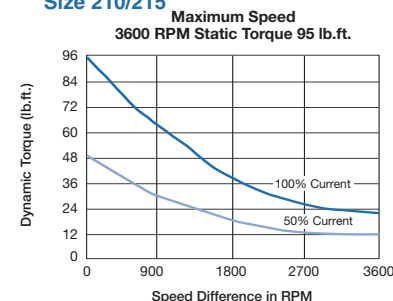
Size 50



Size 100/180



Size 210/215



Specifications

UM Size	Static Torque lb. ft.	Maximum RPM	Voltage DC
50	16	3600	6, 24, or 90
100	30	3600	6, 24, or 90
180	30	3600	6, 24, or 90
210	95	3600	6, 24, or 90
215	95	3600	6, 24, or 90

3. Accessories

Warner Electric UniModules can be fitted with several accessories to extend their capacity and ease of mounting.

a. Conduit Box

NEMA 4 and UL listed, available in standard and washdown versions.



b. Mounting Brackets

Two styles of mounting brackets are available for simplified installation. The base mount is used with the 2030 and 3040 configurations. A motor mount is also available and provides sturdy support for 1020 and 1040 units and a motor.



4. Select Control

Warner Electric manufactures clutch/brake controls to meet several system functions including:

- On/Off
- Torque adjust
- Over excitation
- Position loop

Many requirements beyond function can impact control selection. See the Controls Section on page 141 for complete information.

Part Numbers

Configuration	Model No.	Voltage D.C.	Part No.
	1020 UM-50-1020	6	5370-273-016
	UM-50-1020	24	5370-273-018
	UM-50-1020	90	5370-273-017
	UM-100-1020	6	5370-273-026
	UM-100-1020	24	5370-273-028
	UM-100-1020	90	5370-273-027
	UM-180-1020	6	5370-273-006
	UM-180-1020	24	5370-273-008
	UM-180-1020	90	5370-273-007
	UM-210-1020	6	5371-273-002
	UM-210-1020	24	5371-273-004
	UM-210-1020	90	5371-273-003
Motor Clutch/Brake	UM-215-1020	6	5371-273-076
	UM-215-1020	24	5371-273-077
	UM-215-1020	90	5371-273-078
UM-1020 w/Pre-installed control			
UM50-1020	w/CBC-150-1	90	5370-9
UM100-1020	w/CBC-150-1	90	5370-10
UM180-1020	w/CBC-150-1	90	5370-273-122
UM210-1020	w/CBC-150-1	90	5371-4
UM215-1020	w/CBC-150-1	90	5371-273-090
	1040 UM-50-1040	6	5370-271-004
	UM-50-1040	24	5370-271-006
	UM-50-1040	90	5370-271-005
	UM-100-1040	6	5370-271-024
	UM-100-1040	24	5370-271-026
	UM-100-1040	90	5370-271-025
	UM-180-1040	6	5370-271-014
	UM-180-1040	24	5370-271-016
	UM-180-1040	90	5370-271-015
	UM-210-1040	6	5371-271-002
	UM-210-1040	24	5371-271-004
	UM-210-1040	90	5371-271-003
Motor Clutch Output Clutch	UM-215-1040	6	5371-271-026
	UM-215-1040	24	5371-271-027
	UM-215-1040	90	5371-271-028
	2030 UM-50-2030	6	5370-273-021
	UM-50-2030	24	5370-273-023
	UM-50-2030	90	5370-273-022
	UM-100-2030	6	5370-273-031
	UM-100-2030	24	5370-273-033
	UM-100-2030	90	5370-273-032
	UM-180-2030	6	5370-273-011
	UM-180-2030	24	5370-273-013
	UM-180-2030	90	5370-273-012
	UM-210-2030	6	5371-273-007
	UM-210-2030	24	5371-273-009
	UM-210-2030	90	5371-273-008
Input Clutch/Brake	UM-215-2030	6	5371-273-043
	UM-215-2030	24	5371-273-044
	UM-215-2030	90	5371-273-045
	3040 UM-50-3040	6	5370-271-009
	UM-50-3040	24	5370-271-011
	UM-50-3040	90	5370-271-010
	UM-100-3040	6	5370-271-029
	UM-100-3040	24	5370-271-031
	UM-100-3040	90	5370-271-030
	UM-180-3040	6	5370-271-019
	UM-180-3040	24	5370-271-021
	UM-180-3040	90	5370-271-020
	UM-210-3040	6	5371-271-007
	UM-210-3040	24	5371-271-009
	UM-210-3040	90	5371-271-008
Input Clutch Output Clutch	UM-215-3040	6	5371-271-021
	UM-215-3040	24	5371-271-022
	UM-215-3040	90	5371-271-023

Accessories

Description	UM Size	Part No.
Conduit Box	All sizes	5370-101-042
Base Mount Kit for 2030, 3040	50/100	5370-101-004
	180	5370-101-002
	210/215	5371-101-001
Motor Mount Kit for 1020, 1040	50/100	5370-101-010
	180	5370-101-012
	210/215	5371-101-012

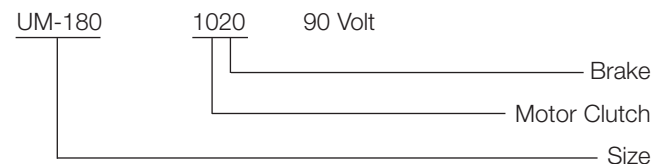
How to Order

Motor or Reducer Mounted

Simply combine the size number with the configuration of the required UniModule.

Specify voltage. See chart for specific part numbers. Power-off brake UniModules are found on page 120. Order optional conduit box if desired.

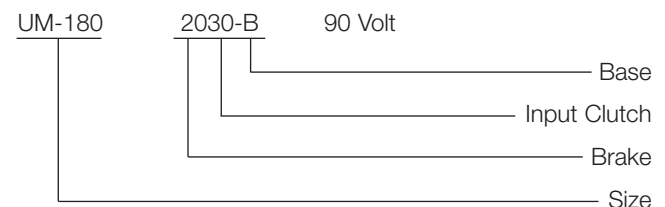
Example



Base Mounted

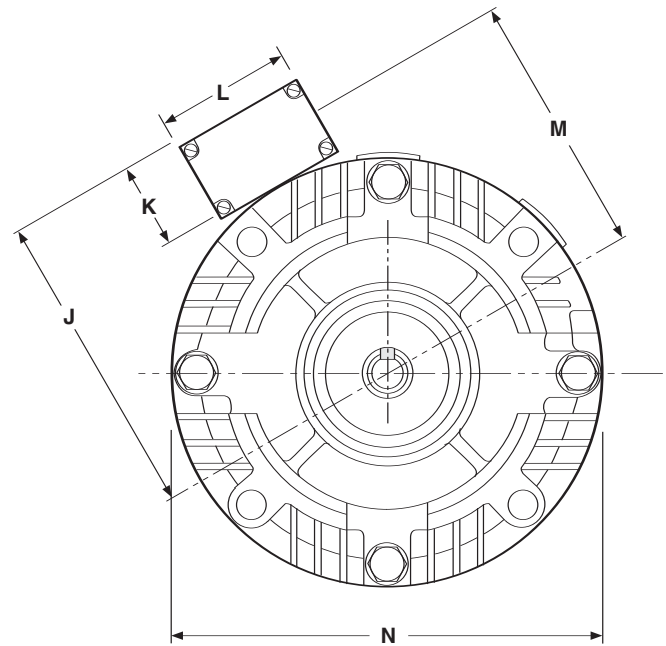
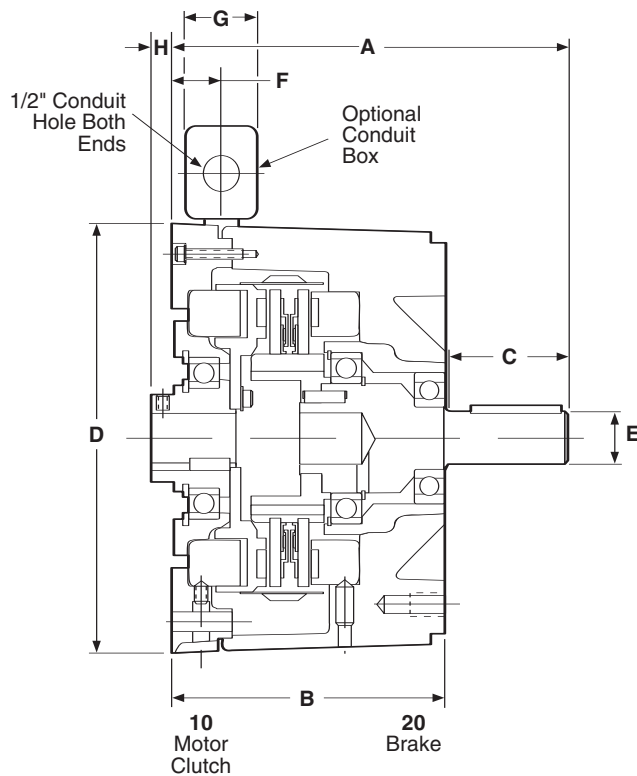
Simply combine the size number with the configuration of the required UniModule. Specify voltage. See chart for specific part numbers. Power-off brake UniModules are found on page 120. Order optional conduit box if desired.

Example



Select Appropriate Power Supply/Control. See the Controls Section beginning on page 141.

UM-1020 Motor Clutch/Brake Combination



Note: Some 90 VDC units are available with pre-installed controls. On all other modules, conduit box is optional and is ordered separately.

All dimensions are nominal, unless otherwise noted.

Size	A	B	C	D	E	F	G	H
50	6.750	4.844	1.813	6.750	.625	.937	2.203	—
100	6.750	4.844	1.812	6.750	.625	.937	2.203	.104
180	6.828	4.844	1.812	6.750	.875	.937	2.203	—
210	8.891	5.922	2.500	9.250	1.125	.500	2.203	.500
215	9.391	5.922	3.000	9.250	1.375	.500	2.203	.500

Size	I	J	K	L	M	N
50	3.250	5.531	2.188	3.250	4.438	6.688
100	3.250	5.531	2.188	3.250	4.438	6.688
180	3.250	5.531	2.188	3.250	4.438	6.688
210	3.250	6.859	2.188	3.250	5.766	9.688
215	3.250	6.859	2.188	3.250	5.766	9.688

Specifications

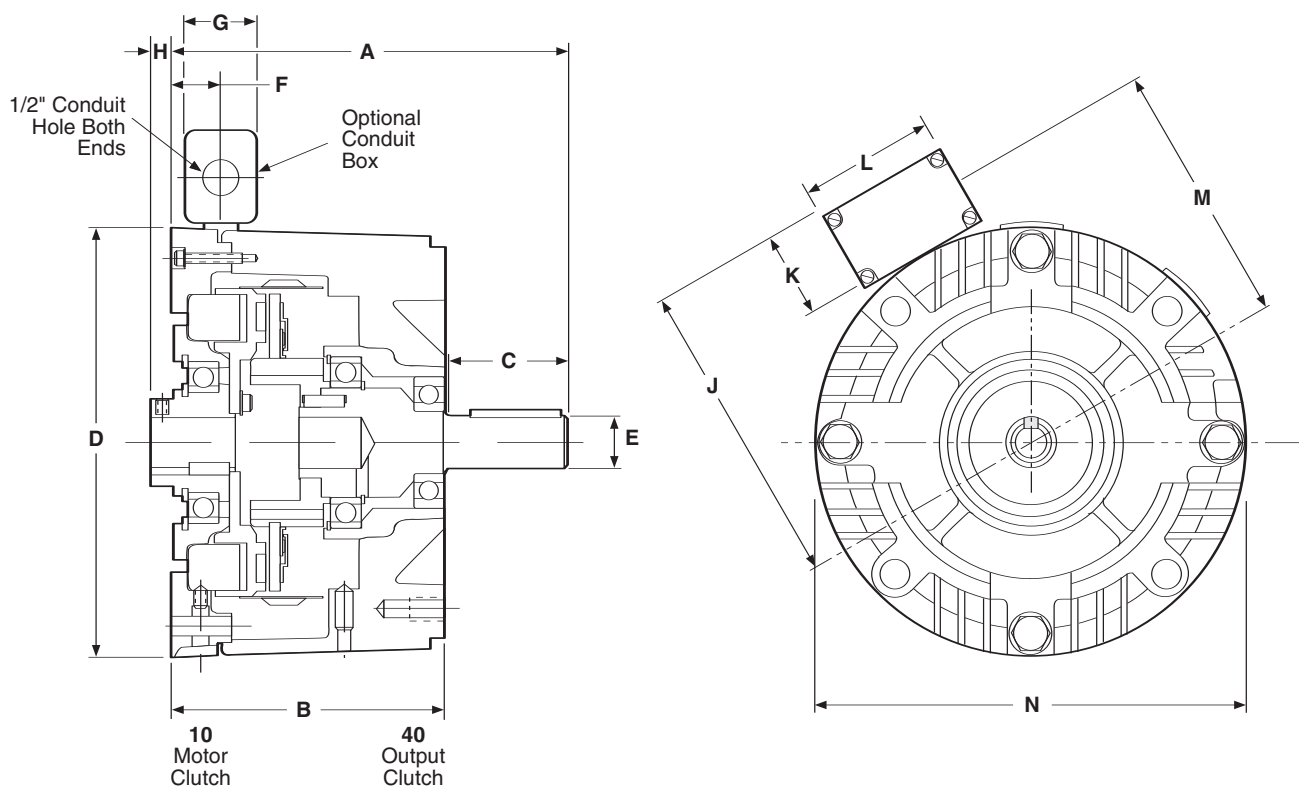
Model Size	Voltage DC	Static Torque lb. ft.	Max. RPM	NEMA Frame Size
50	6, 24, 90	16	3600	56C/48Y*
100	6, 24, 90	30	3600	56C/48Y**
180	6, 24, 90	30	3600	182C/143TC 184C/145TC
210	6, 24, 90	95	3600	213C/182TC 215C/184TC
215	6, 24, 90	95	3600	213TC/215TC

* For 56C/48Y Frame motors 3/4 HP and smaller the UM-100 size may be used where extended life is desirable.

** UM-100 size is recommended for motors 1 HP and larger.

For NEMA standard frame sizes, see page 137.

UM-1040 Motor Clutch/Output Clutch Combination



Note: Conduit box is optional and is ordered separately.

All dimensions are nominal, unless otherwise noted.

Size	A	B	C	D	E	F	G	H
50	6.750	4.844	1.813	6.750	.625	.937	2.203	—
100	6.750	4.844	1.812	6.750	.625	.937	2.203	.104
180	6.828	4.844	1.812	6.750	.875	.937	2.203	—
210	8.891	5.922	2.500	9.250	1.125	.500	2.203	.500
215	9.391	5.922	3.000	9.250	1.375	.500	2.203	.500

Size	I	J	K	L	M	N
50	3.250	5.531	2.188	3.250	4.438	6.688
100	3.250	5.531	2.188	3.250	4.438	6.688
180	3.250	5.531	2.188	3.250	4.438	6.688
210	3.250	6.859	2.188	3.250	5.766	9.688
215	3.250	6.859	2.188	3.250	5.766	9.688

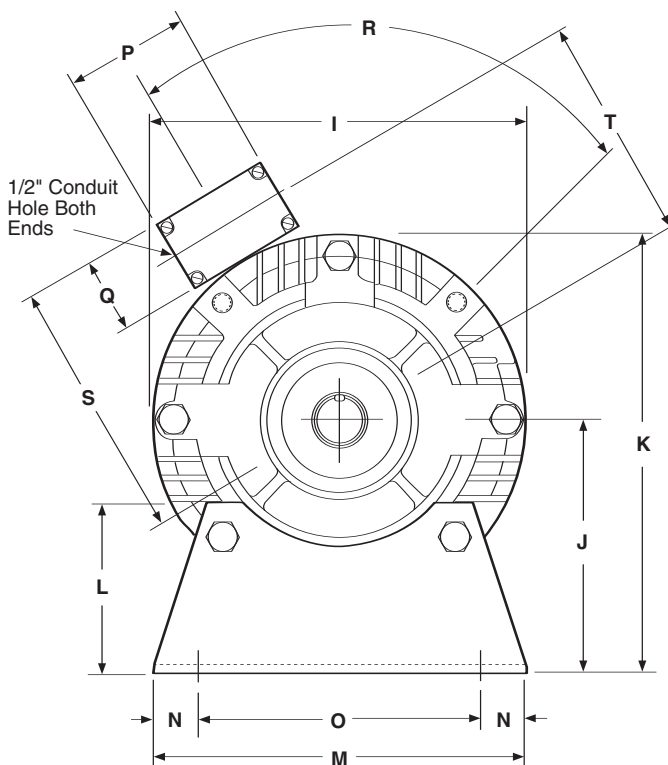
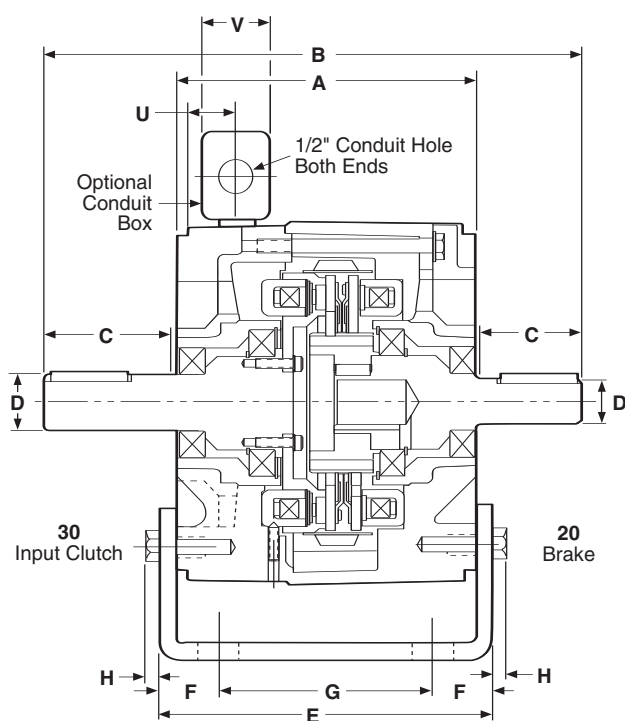
Specifications

Model Size	Voltage DC	Static Torque lb. ft.	Max. RPM	NEMA Frame Size
50	6, 24, 90	16	3600	56C/48Y*
100	6, 24, 90	30	3600	56C/48Y**
180	6, 24, 90	30	3600	182C/143TC 184C/145TC
210	6, 24, 90	95	3600	213C/182TC 215C/184TC
215	6, 24, 90	95	3600	213TC/215TC

* For 56C/48Y Frame motors 3/4 HP and smaller the UM-100 size may be used where extended life is desirable.

** UM-100 size is recommended for motors 1 HP and larger.

For NEMA standard frame sizes, see page 137.

UM-2030 Input Clutch/Brake Combination
UM-2030-B Input Clutch/Brake Combination – Base Mounted


Note: Mounting base and conduit box are optional and are ordered separately.

All dimensions are nominal unless otherwise noted.

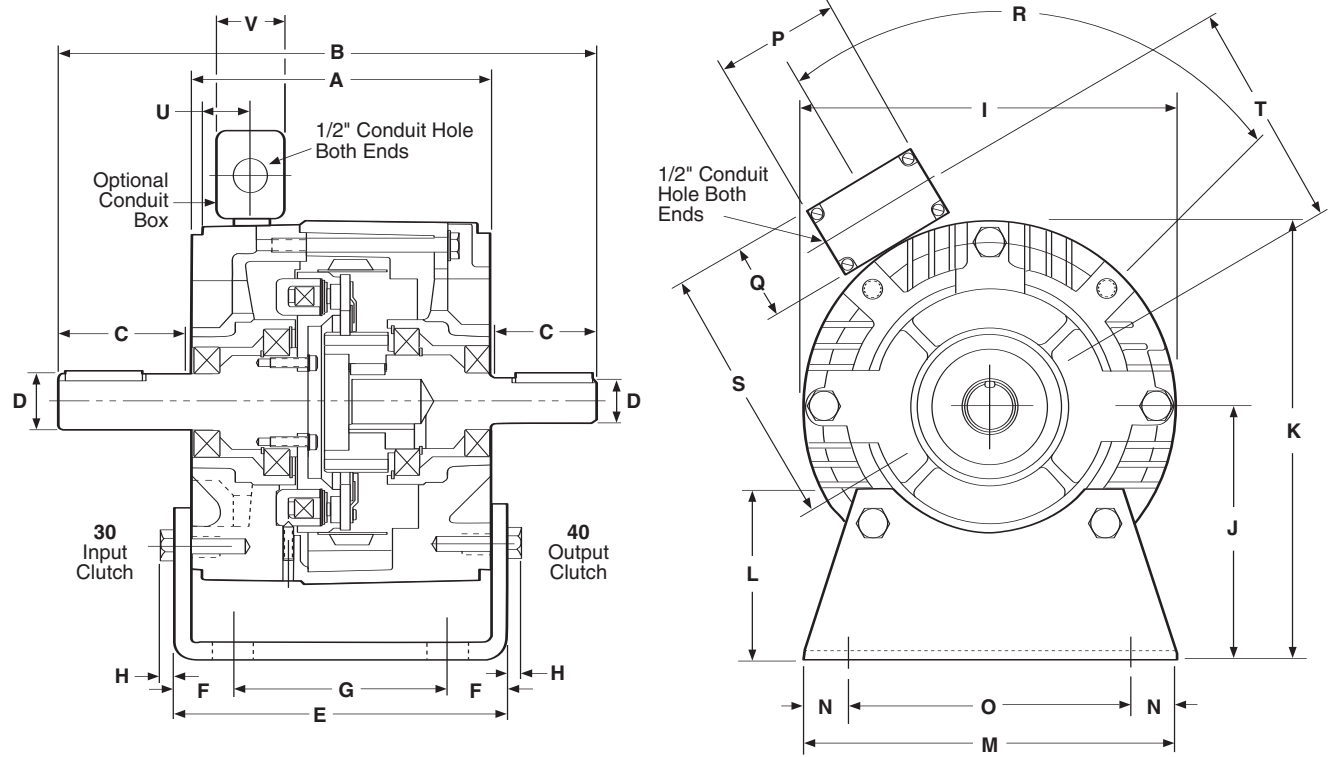
Size	A	B	C Min.	D	E	F	G	H	I	J	K	L	M
50	5.719	9.516	1.813	.625	5.672	.844	4.000	.344	6.688	3.500	6.844	2.000	6.000
100	5.719	9.516	1.890	.625	5.672	.844	4.000	.344	6.688	3.500	6.844	2.000	6.000
180	5.719	9.656	1.890	.875	5.672	.844	4.000	.344	6.688	4.500	7.844	3.000	6.625
210	7.719	12.969	2.500	1.125	8.203	1.094	6.000	.437	9.688	5.250	9.906	3.375	9.000
215	7.719	12.969	2.500	1.375	8.203	1.094	6.000	.437	9.688	5.250	9.906	3.375	9.000

Size	N	O	P	Q	R	S	T	U	V
50	.500	5.000	3.125	2.188	75°	5.531	4.438	1.125	2.203
100	.500	5.000	3.125	2.188	75°	5.531	4.438	1.125	2.203
180	.500	5.000	3.125	2.188	75°	5.531	4.438	1.125	2.203
210	.625	7.750	3.125	2.188	70°	6.859	5.766	1.625	2.203
215	.625	7.750	3.125	2.188	70°	6.859	5.766	1.625	2.203

Specifications

Model Size	Voltage DC	Static Torque lb. ft.	Max. RPM
50	6, 24, 90	16	3600
100	6, 24, 90	30	3600
180	6, 24, 90	30	3600
210	6, 24, 90	95	3600
215	6, 24, 90	95	3600

UM-3040 Input Clutch/Output Clutch Combination
UM-3040-B Input Clutch/Output Clutch Combination–Base Mounted



Note: Mounting base and conduit box are optional and are ordered separately.

All dimensions are nominal unless otherwise noted.

Size	A	B	C Min.	D	E	F	G	H	I	J	K	L	M
50	5.719	9.516	1.813	.625	5.672	.844	4.000	.344	6.688	3.500	6.844	2.000	6.000
100	5.719	9.516	1.890	.625	5.672	.844	4.000	.344	6.688	3.500	6.844	2.000	6.000
180	5.719	9.656	1.890	.875	5.672	.844	4.000	.344	6.688	4.500	7.844	3.000	6.625
210	7.719	12.969	2.500	1.125	8.203	1.094	6.000	.437	9.688	5.250	9.906	3.375	9.000
215	7.719	12.969	2.500	1.375	8.203	1.094	6.000	.437	9.688	5.250	9.906	3.375	9.000

Size	N	O	P	Q	R	S	T	U	V
50	.500	5.000	3.125	2.188	75°	5.531	4.438	1.125	2.203
100	.500	5.000	3.125	2.188	75°	5.531	4.438	1.125	2.203
180	.500	5.000	3.125	2.188	75°	5.531	4.438	1.125	2.203
210	.625	7.750	3.125	2.188	70°	6.859	5.766	1.625	2.203
215	.625	7.750	3.125	2.188	70°	6.859	5.766	1.625	2.203

Specifications

Model Size	Voltage DC	Static Torque lb. ft.	Max. RPM
50	6, 24, 90	16	3600
100	6, 24, 90	30	3600
180	6, 24, 90	30	3600
210	6, 24, 90	95	3600
215	6, 24, 90	95	3600

High Performance with Extended Life

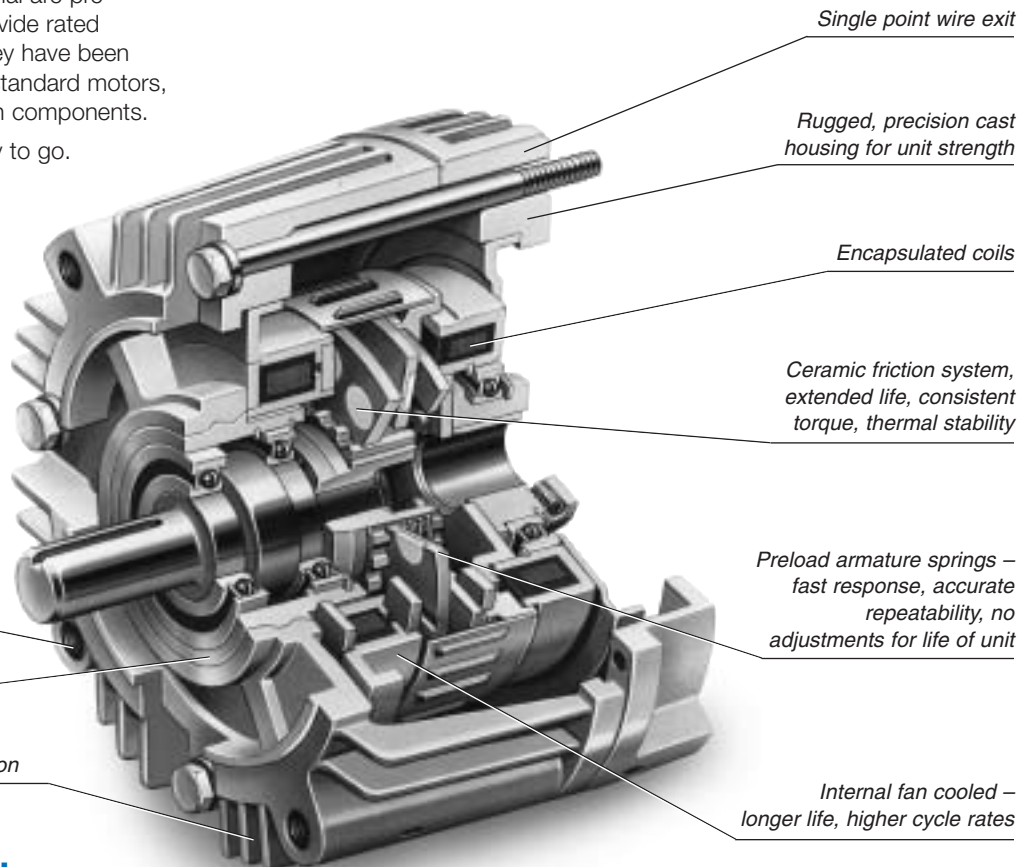
UniModules with ceramic friction material are pre-burnished during manufacturing to provide rated torque performance upon start up. They have been designed to mate easily with industry standard motors, reducers and other power transmission components.

- Bolt-it-down, wire-it-up . . . it's ready to go.
- Available in 3 sizes; 50, 180 and 210 and 2 configurations; 1020 and 2030.
- Standard voltages available 24V and 90V DC.
- C-face or foot mounted.
- No maintenance required.
- Accurate positioning when used with CBC-1000 Indexer and CBC-700 OEX control.

Heavy duty bearings maintain tight concentricity and running efficiency

NEMA C-face compatible design for easy mounting

Finned design for maximum heat dissipation



The Ceramic Difference . . .

Extended Life for High Cycle Rate Use

Ceramic faced clutches and brakes have been designed specifically for rapid cycling applications to satisfy today's needs for high speed equipment. Ceramic friction material provides excellent wear resistance that extends life 3 to 5 times that of standard clutch/brakes in demanding applications.



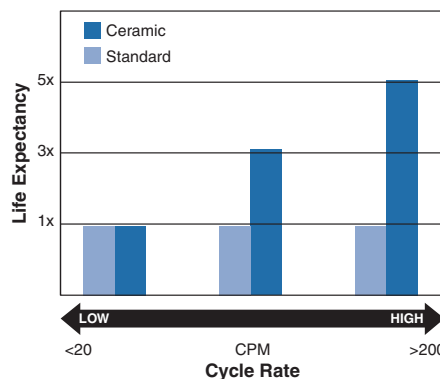
Consistent Torque and Cycle Repeatability

Preloaded armatures keep the ceramic friction surfaces lightly in contact to provide consistent torque and cycle-to-cycle repeatability. Variation is reduced by up to 30% over standard units. Autogaps are not required.

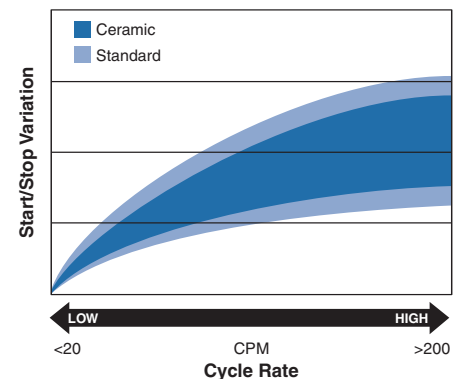
Controllability – Smooth Start/Stop

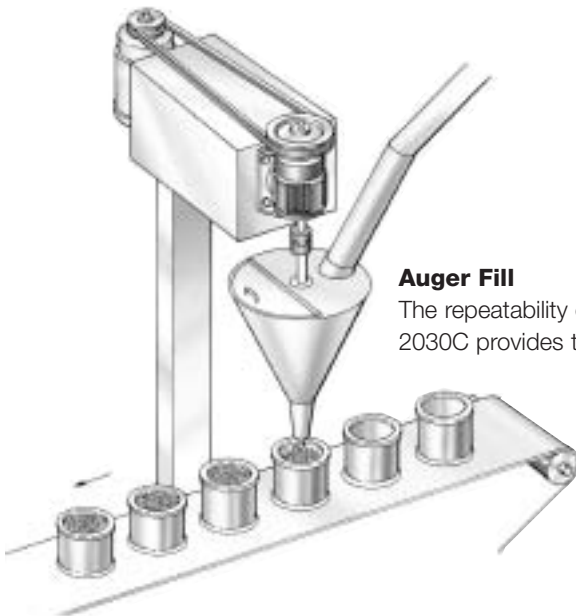
With the ceramic friction surfaces always in contact, dynamic torque response is fast and precise. When used with a CBC-700 over-excitation control and CBC-1000 programmable counter, exceptional closed loop clutch/brake performance can be achieved approaching that of more expensive motion control technologies – The PerformancePlus difference!

UM-C Product Life



UM-C Cycle Repeat

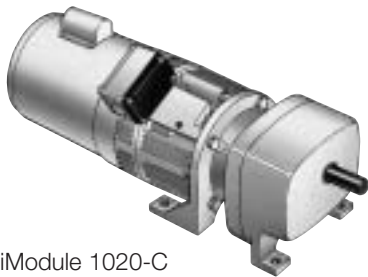
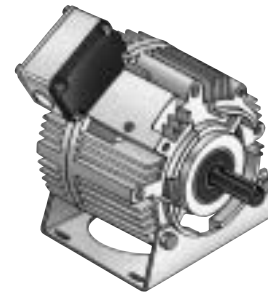




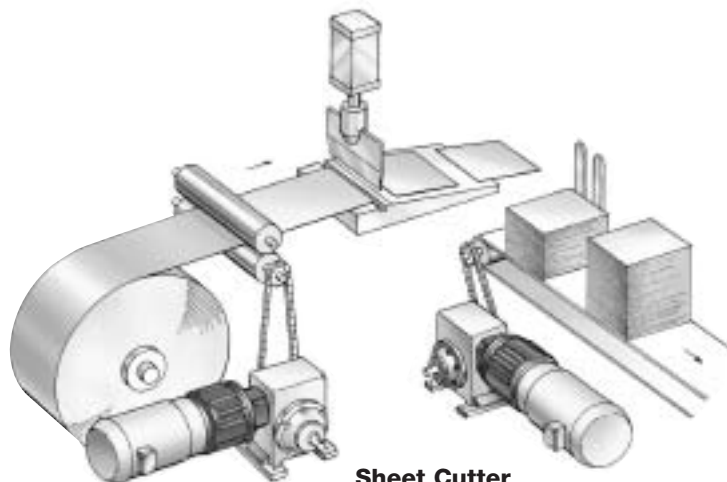
Auger Fill

The repeatability of the Ceramic UniModule 2030C provides the consistent fill levels.

UniModule 2030-C with base assembly mounted as a separate drive unit.



UniModule 1020-C clutch/brake between C-face motor and reducer.



Sheet Cutter

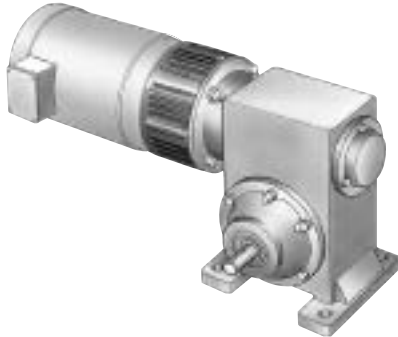
The Ceramic UniModules provide high cycle rate clutch/brake indexing.

Selection

Ceramic UniModule clutch/brake units may be mounted directly to NEMA C-face motors and reducers, or can be base mounted.

1. Determine Mounting Configuration

a. NEMA C-face Mounting (1020 Configuration)



To select the correct Ceramic UniModule package, determine the NEMA frame size of your motor and/or reducer, and choose the corresponding size UniModule from the Frame Size Selection chart.

b. Base Mount (2030 Configuration)



Ceramic UniModule assemblies may be mounted as separate drive units driven from the prime mover by V-belts, chain and sprockets, couplings, timing belts and other standard power transmission components.

Select the correct size module from the Horsepower vs. Shaft Speed chart by determining the motor horsepower and RPM at the module location. The correct size UniModule is shown at the intersection of the HP and operating speed. For additional sizing information, refer to the technical sizing procedure (step 2).

2. Determine Technical Requirements

Technical considerations for sizing and selection are torque and heat dissipation. Each merits careful consideration, especially heat dissipation as over time, use in excessive temperature environments will have an adverse effect on bearing life and coil wire insulation integrity.

Compare the calculated torque requirement with the average dynamic torque ratings. Select a unit with adequate torque. If the unit selected on torque is different than the unit selected based on heat, select the larger size unit.

Frame Size Selection

NEMA Frame Size	UniModule Size
56C/48Y	UM-50-C
182C/143TC 184C/145TC	UM-180-C
213C/182TC 215C/184TC	UM-210-C

Horsepower vs. Shaft Speed

HP	SHAFT SPEED AT CLUTCH (IN RPM)																	
	100	200	300	400	500	600	700	800	900	1000	1100	1200	1500	1800	2000	2400	3000	3600
1/4													UM-50-C					
1/2													UM-50-C					
3/4													UM-180-C					
1													UM-180-C					
1-1/2													UM-210-C					
2													UM-210-C					
3													UM-210-C					
5													UM-210-C					
7-1/2													UM-210-C					
10													UM-210-C					

a. Heat Dissipation Sizing

Friction surfaces slip during the initial period of engagement and, as a result, heat is generated. The clutch/brake selected must have a heat dissipation rating greater than the heat generated by the application. Therefore, in high inertia or high cycle rate applications, it is necessary to check the heat dissipation carefully. Inertia, speed and cycle rate are the required parameters.

Heat dissipation requirement is calculated as follows:

$$E = 1.7 \times WR^2 \times (N/100)^2 \times F$$

where:

$$E = \text{Heat (lb. ft./min.)}$$

WR^2 = Total reflected inertia at the clutch/brake shaft. Include the clutch/brake output inertia. (lb.ft.²)

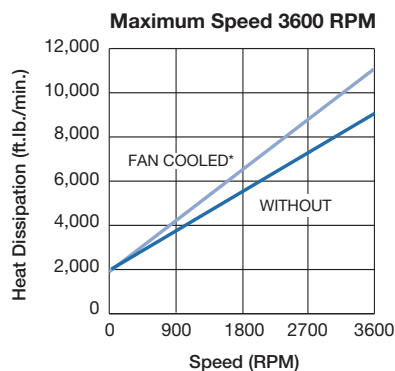
N = Speed in revolutions per minute. (RPM)

F = Cycle rate in cycles per minute (CPM)

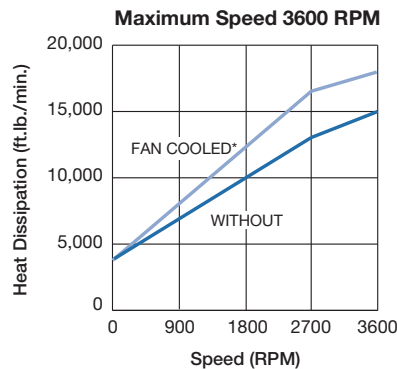
Compare the calculated heat generated in the application to the unit ratings using the heat dissipation curves. Select the appropriate unit that has adequate heat dissipation ability.

Heat Dissipation Curves

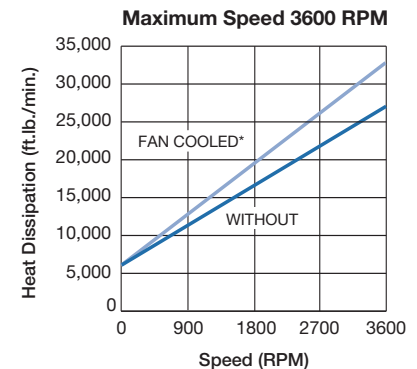
UM-50-C



UM-180-C



UM-210-C



* Fan accessory kit available for 1020 configuration

b. Torque Sizing

For most applications, the correct size clutch/brake can be selected from the Horsepower vs. Shaft Speed chart located at the bottom of this page. Determine the motor horsepower and the RPM at the clutch/brake. The correct size unit is shown at the intersection of horsepower and shaft speed.

If the static torque requirements are known, refer to the technical ratings chart to select a unit.

For some applications, the torque requirement is determined by the time allowed to accelerate and decelerate the load. (This time is generally specified in milliseconds.) For these applications, it is necessary to determine the torque requirement based on load inertia and the time allowed for engagement.

The torque requirements are calculated as follows:

$$T = (WR^2 \times N) / (308 \times t)$$

where:

T = Average Dynamic Torque (lb. ft.)

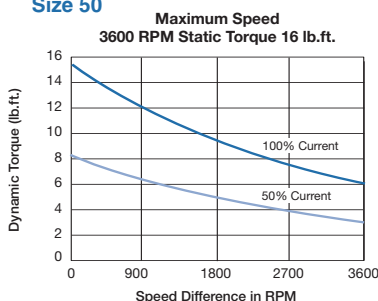
WR^2 = Total reflected inertia at the clutch/brake shaft. Include the clutch/brake output inertia. (lb. ft.²)

N = Speed in revolutions per minute. (RPM)

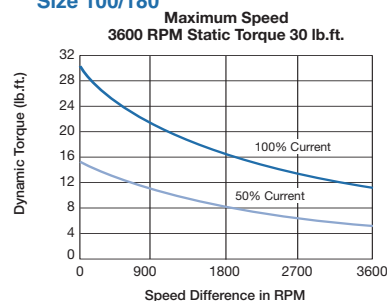
t = Time allowed for the engagement (sec)

C-face Clutch/Power-on Brake Dynamic Torque Curves

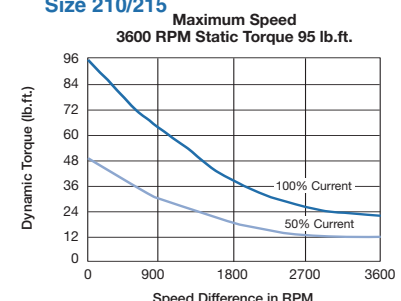
Size 50



Size 100/180



Size 210/215



Specifications

UniModule Size	Shaft Dia.	Static Torque lb. ft.	Horsepower	Max. RPM	Voltage DC	NEMA Frame Size
UM50-C	5/8"	16	1/4-3/4	3600	6, 24 and 90	56C/48Y
UM180-C	7/8"	30	1-2	3600	6, 24 and 90	182C/143TC 184C/145TC
UM210-C	1-1/8"	95	3-5	3600	6, 24 and 90	213/182TC 215C/184TC

3. Select Accessories

Warner Electric UniModules can be fitted with several accessories to extend their capacity and ease of mounting.

a. Conduit Box

NEMA 4 and UL listed.



b. Mounting Brackets

Two styles of mounting brackets are available for simplified installation. The base mount is used with the 2030 configuration. A motor mount is also available and provides sturdy support for the 1020 and a motor.



c. Fan Kit (1020 only)

Extends the thermal capacity of any size UM. Mounts between motor and UM, includes shaft fan, guard and hardware.



4. Select Control

Warner Electric manufactures clutch/brake controls to meet several system functions including:

- On/Off
- Torque adjust
- Overexcitation
- Position loop

Many requirements beyond function can impact control selection. See the Controls Section on page 141 for complete information.

Part Numbers

Configuration	Model No.	Voltage	Part Number
1020 (Motor Clutch/Brake)	UM 50-1020-C	6	5370-273-077
		24	5370-273-078
		90	5370-273-079
	UM 180-1020-C	6	5370-273-073
		24	5370-273-074
		90	5370-273-075
	UM 210-1020-C	6	5371-273-035
		24	5371-273-036
		90	5371-273-037
2030 (Input Clutch/Brake)	UM 50-2030-C	6	5370-273-085
		24	5370-273-086
		90	5370-273-087
	UM 180-2030-C	6	5370-273-081
		24	5370-273-082
		90	5370-273-083
	UM 210-2030-C	6	5371-273-039
		24	5371-273-040
		90	5371-273-041

Accessories

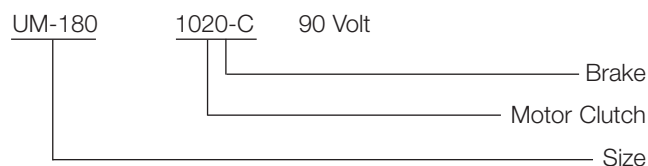
Description	UM-C Size	Part Number
Conduit Box Conduit Control	All sizes	5370-101-042
	CBC-150-1 (120 V)	6004-448-001
	CBC-150-2 (220 V)	6004-448-002
Fan Kits 1020	50	5370-101-055
	180	5370-101-054
	210	5371-101-029
Base Mount Kits for 1020-C	50	5370-101-004
	180	5370-101-002
	210	5371-101-001
Motor Mount Kit for 2030-C	50	5370-101-010
	180	5370-101-012
	210	5371-101-012

How to Order

Motor or Reducer Mounted

Simply combine the size number with the configuration of the required UniModule. Specify voltage. See chart for specific part numbers. Order optional conduit box if desired.

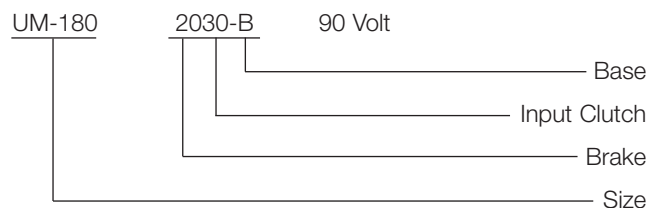
Example



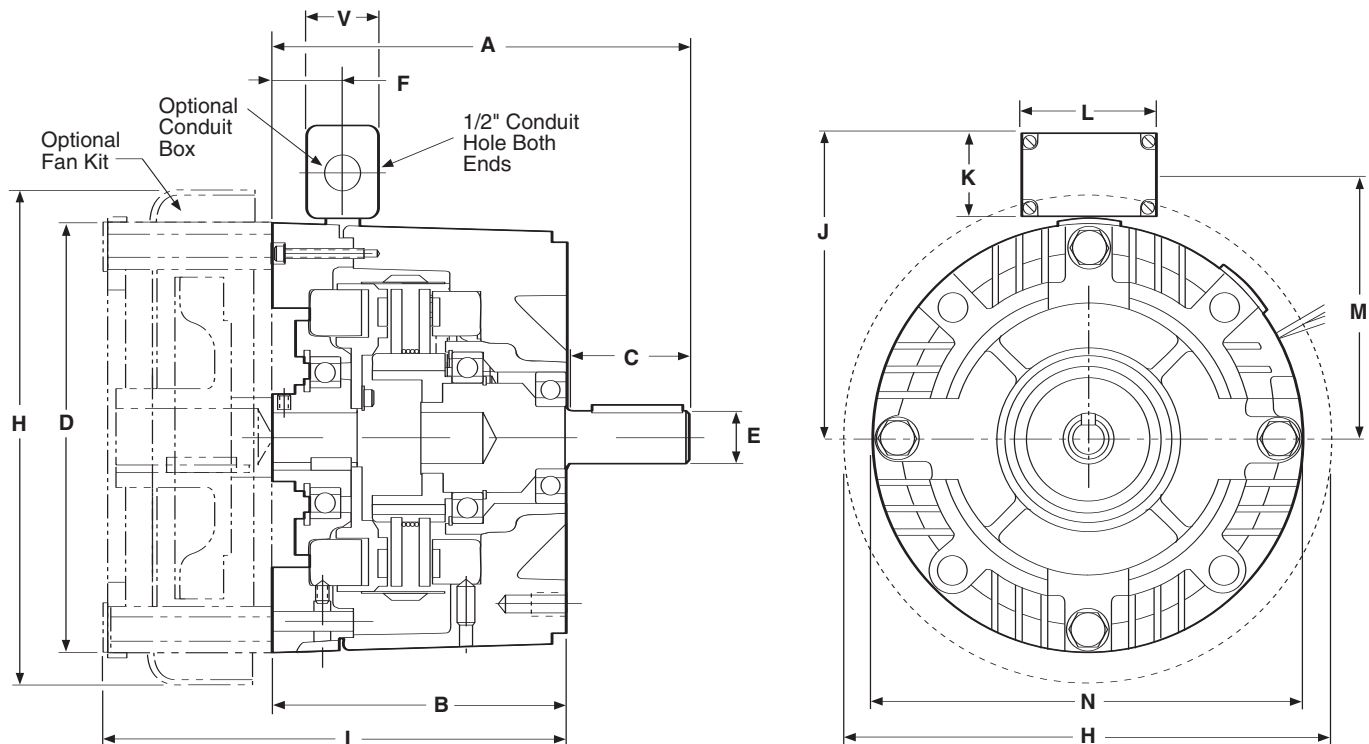
Base Mounted

Simply combine the size number with the configuration of the required UniModule. Specify voltage. See chart for specific part numbers. Order optional conduit box if desired.

Example



UM-1020-C Motor Clutch/Brake Combination



All dimensions are nominal, unless otherwise noted.

Size	A	B	C	D	E	F	G	H	I	J	K	L	M	N
50	6.750	4.844	1.813	6.750	.625	.937	2.203	7.687	7.274	5.531	2.188	3.125	4.438	6.688
180	6.828	4.844	1.812	6.750	.875	.937	2.203	7.687	7.274	5.531	2.188	3.125	4.438	6.688
210	9.391*	6.422*	2.500	9.250	1.125	1.125*	2.203	10.187	9.297	6.859	2.188	3.125	6.766	9.688

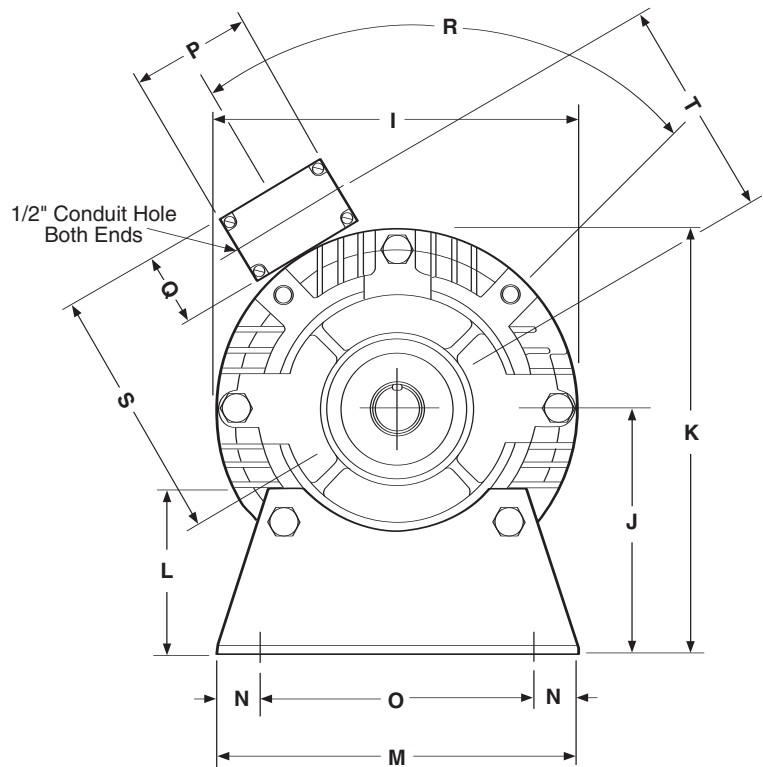
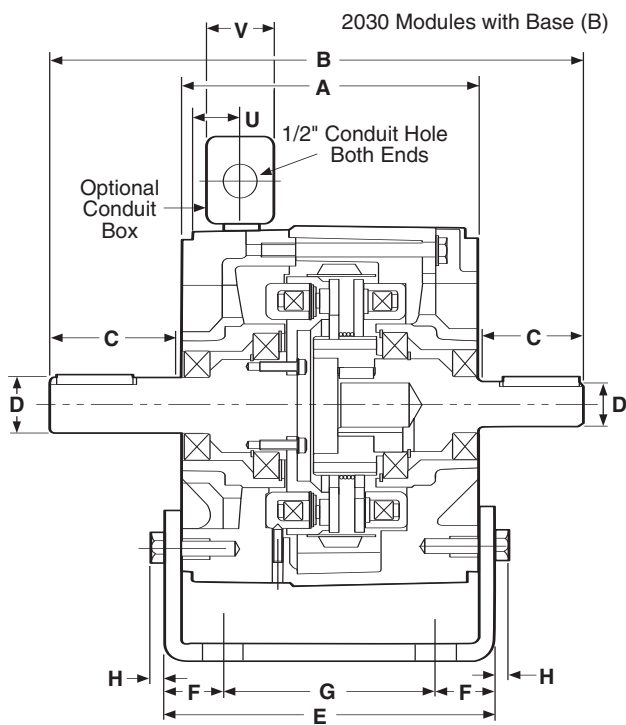
*Dimension includes the .500 thick adapter. Required for C-face mounting to a motor.

Specifications

UniModule Size	Shaft Dia.	Static Torque lb. ft.	Horsepower	Max. RPM	Voltage DC	NEMA Frame Size
UM50-C	.625	16	1/4-3/4	3600	6, 24 and 90	56C/48Y
UM180-C	.875	30	1-2	3600	6, 24 and 90	182C/143TC 184C/145TC
UM210-C	1.125	95	3-5	3600	6, 24 and 90	213/182TC 215C/184TC

For NEMA Standard Frame size, see page 137.

UM-2030-C Brake/Input Clutch Combination
UM-2030-C-B Brake/Input Clutch Combination–Base Mounted



Note: Mounting base is optional and must be ordered separately.

All dimensions are nominal, unless otherwise noted.

Size	A	B	C Min.	D	E	F	G	H	I	J	K
50	5.719	9.516	1.813	.625	5.672	.844	4.000	.344	6.688	3.500	6.844
180	5.719	9.656	1.890	.875	5.672	.844	4.000	.344	6.688	4.500	7.844
210	7.719	12.969	2.500	1.125	8.203	1.094	6.000	.437	9.688	5.250	9.906

Size	L	M	N	O	P	Q	R	S	T	U	V
50	2.000	6.000	.500	5.000	3.125	2.188	75°	5.531	4.438	1.125	2.203
180	3.000	6.625	.500	5.000	3.125	2.188	75°	5.531	4.438	1.125	2.203
210	3.375	9.000	.625	7.750	3.125	2.188	70°	6.859	5.766	1.625	2.203

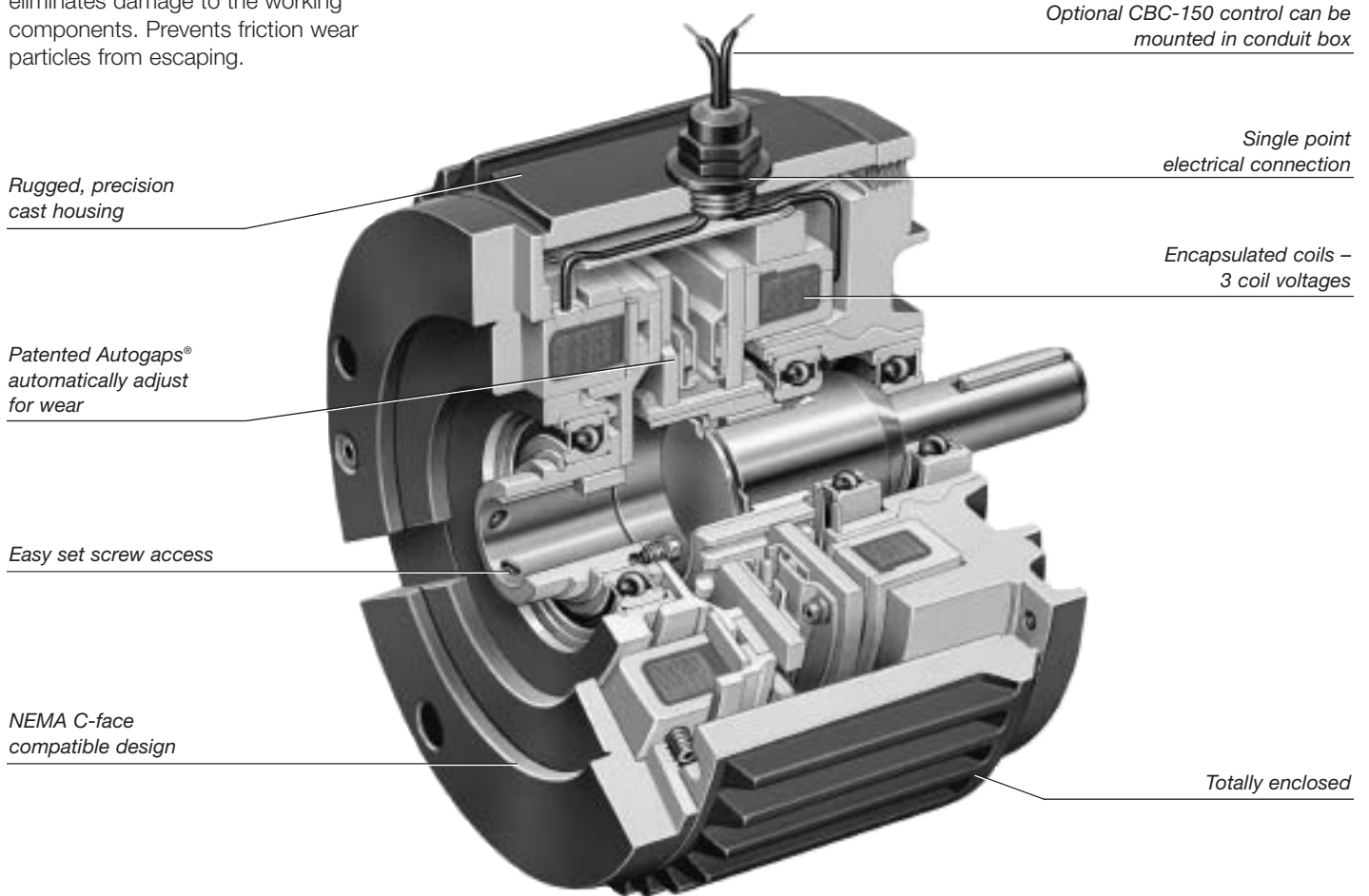
Specifications

UniModule Size	Shaft Dia.	Static Torque lb. ft.	Horsepower	Max. RPM	Voltage DC	NEMA Frame Size
UM50-C	.625	16	1/4-3/4	3600	6, 24 and 90	56C/48Y
UM180-C	.875	30	1-2	3600	6, 24 and 90	182C/143TC 184C/145TC
UM210-C	1.125	95	3-5	3600	6, 24 and 90	213/182TC 215C/184TC

For NEMA standard frame sizes, see page 137.

Contamination-Proof Design

Clean, quiet, operation. Nothing can get in, nothing can get out. Enclosed design eliminates damage to the working components. Prevents friction wear particles from escaping.



One piece, C-face package completely assembled and factory aligned. Mates easily with standard motors and reducers. Foot mounted package also available. Easy-to-install and no maintenance required.

Bolt-it-down, wire-it-up. UniModule is ready to go. Automatic adjustment for wear. Complete control capability.

Available with built-in power supply or used with separate controls for soft starts and stops . . . or for fast acting, accurate cycling.

- Factory burnished for out-of-box torque
- Superior heat transfer
- Dual endbell for easy repair
- Single point electrical connection
- Optional conduit box
- Optional integral control

Improved Hub Design/Autogap System

- Improved for longer spline life
- Autogap functions over broad current range
- New hub material

Two Versions

EUM Totally Enclosed

EUM (black) units are totally enclosed to keep wear particles in and exclude contaminants and are suitable for most industrial applications.

EUM-W Washdown Unit

EUM-W (white) units are ideal for applications that require frequent washing with high pressure spray systems.

EUM Series Clutch/Brakes and Clutch Combinations



Totally Enclosed Version

The Enclosed UniModule (EUM) packages the hardworking components from EM and UM products into a totally enclosed housing. This rugged housing keeps wear particles in and contaminants out and provides quiet operation. Pre-assembled and pre-aligned at the factory, and pre-burnished for rated torque directly out-of-box.

EUM (black) units are totally enclosed. They are suitable for most industrial applications and tolerate infrequent, light washing. They have aluminum endbells and a finned housing for rapid heat dissipation.

- Keeps contaminants out
- Keeps wear particles in
- Quiet operation
- Finned for heat dissipation
- UL listed when optional conduit box is installed



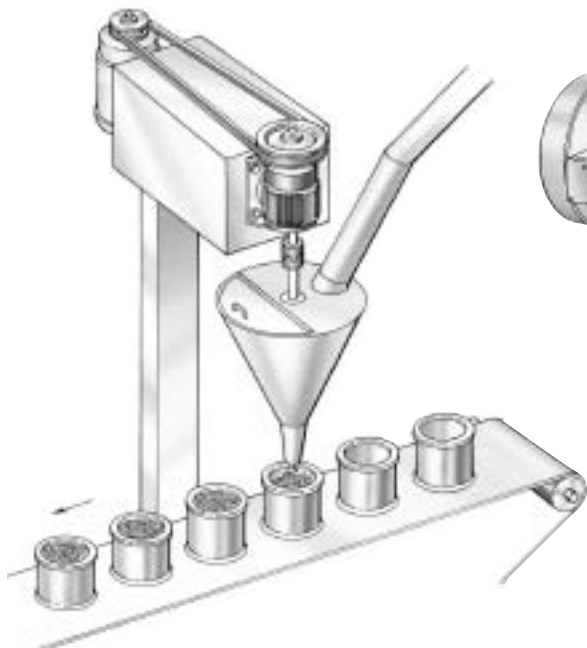
EUM-W Series Clutch/Brakes Washdown Unit

The washdown version of the EUM uses stainless steel shafting, USDA approved coating, corrosion resistant fasteners and special sealing accessories for use in washdown applications.

EUM-W (white) units are ideal for applications that require frequent washing with high pressure spray systems. Their smooth exterior does not allow food particles, or other contaminants, to get trapped and become host to bacteriological growth.

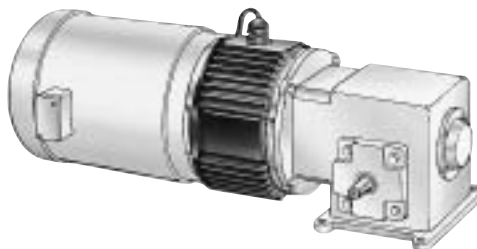
- USDA approved coating
- Stainless steel shafting
- Sealing (gaskets and plugs)
- Smooth exterior – easy washdown
- Corrosion resistant hardware
- Sealed/shielded bearings
- Baffled ventilation system
- Designed for IP65 enclosure requirements
- UL listed when conduit box is employed
- BISSC Certified

Applications and Mounting Configurations

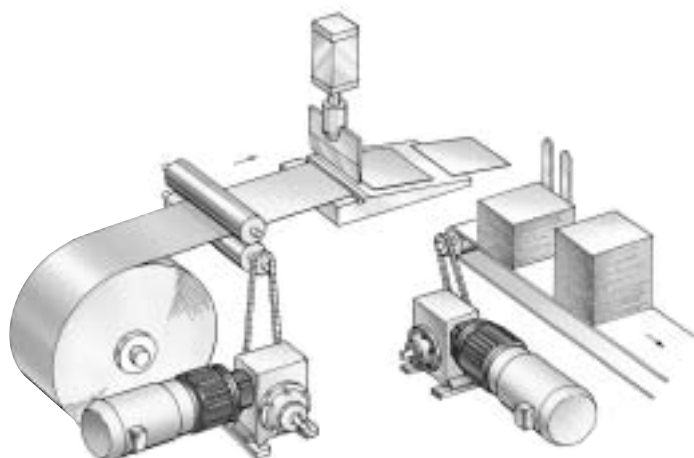


Auger Filler

The totally enclosed design of the EUM UniModule 2030 keeps wear particles in and contaminants out.

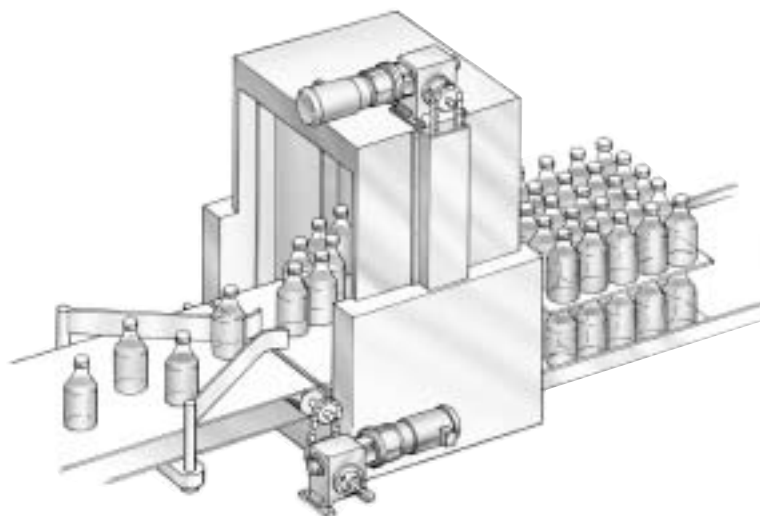


Enclosed UniModule 1040 clutch unit mounted between a C-face motor and reducer.



Sheet Cutter

The EUM UniModules 1020 provide quiet, clean, high cycle rate clutch/brake indexing.

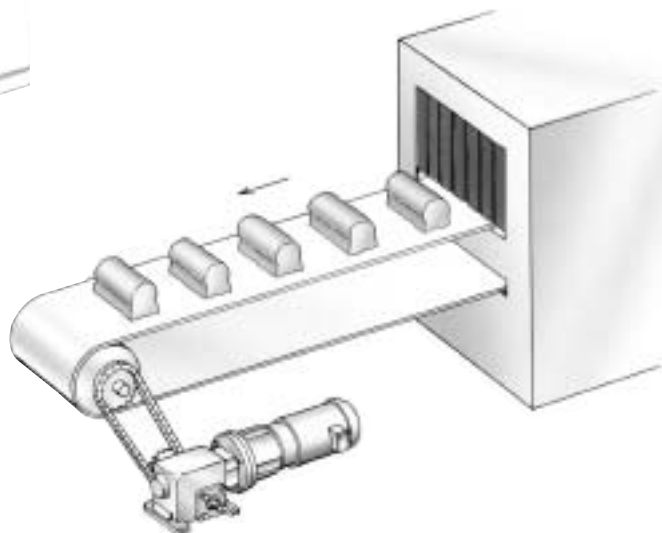


Stacking Operation

The clean design and corrosion resistance of EUM-W UniModules 1020 make them ideal for washdown applications.



Enclosed UniModule 2030 assembly base mounted for separate drive mounting.



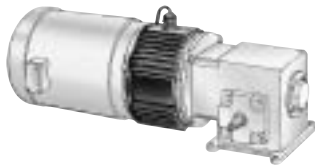
Food Handling

The EUM-W UniModule 1020 has an USDA approved coating which provides cleanliness and safe use in food processing operations.

EUM/EUM-W - Selection Procedure

Warner Electric EUM clutch/brake modules normally mount in either of two methods: NEMA C-face mounting or base mounting.

1. Select Configuration



a. NEMA C-face Mounting (1020 and 1040 Configurations)

Based on the NEMA C-face frame size of the prime mover, select the corresponding clutch/brake package size from the Frame Size Selection chart. Size 100 houses the components of the size 180 in a size 50 frame, while size 215 incorporates size 210 components.

Select either a 1020 or a 1040 (EUM only) configuration. The 1020 is a clutch/brake, while the 1040 is a clutch only. The 2030 configuration is a clutch/brake for base mounting.

Frame Size Selection

NEMA Frame Size	EUM Size
56C/48Y	EUM-50* EUM-100**
182C/143TC 184C/145TC	EUM-180
213C/182TC 215C/184TC	EUM-210
213TC/215TC	EUM-215

*For 56C/48Y C-frame motors 3/4 HP and smaller, the EUM-100 size may be used where extended life is desirable.

**The EUM-100 size is recommended for motors 1 HP and larger.

b. Base Mounting (2030 Configuration)



Enclosed UniModule assemblies may be mounted as separate drive units driven from the prime mover by V-belts, chain and sprockets, couplings, timing belts and other standard power transmission components.

Select the correct size 2030 package from the Horsepower vs. Shaft Speed chart by determining the motor horsepower and RPM at the module location. The correct size EUM is shown at the intersection of the HP and operating speed. For additional sizing information, refer to the technical sizing procedure (step 2).

2. Determine Technical Requirements

Technical considerations for sizing and selection are torque and heat dissipation. Each merits careful consideration, especially heat dissipation as over time, use in excessive temperature environments will have an adverse effect on bearing life and coil wire insulation integrity.

Compare the calculated torque requirement with the average dynamic torque ratings. Select a unit with adequate torque. If the unit selected on torque is different than the unit selected based on heat, select the larger size unit.

Two heat dissipation curves are shown. A fan kit accessory is available for use with these units.

Horsepower vs. Shaft Speed

HP	SHAFT SPEED AT CLUTCH (IN RPM)																	
▼	100	200	300	400	500	600	700	800	900	1000	1100	1200	1500	1800	2000	2400	3000	3600
1/4																		
1/2															EUM-50			
3/4																		
1															EUM-100/180			
1-1/2																		
2																		
3																		
5																		
7-1/2																		
10																		

a. Heat Dissipation Sizing

Friction surfaces slip during the initial period of engagement and, as a result, heat is generated. The clutch/brake selected must have a heat dissipation rating greater than the heat generated by the application. Therefore, in high inertia or high cycle rate applications, it is necessary to check the heat dissipation carefully. Inertia, speed and cycle rate are the required parameters.

Heat dissipation requirement is calculated as follows:

$$E = 1.7 \times WR^2 \times (N/100)^2 \times F$$

where:

$$E = \text{Heat (lb. ft./min.)}$$

WR^2 = Total reflected inertia at the clutch/brake shaft. Include the clutch/brake output inertia. (lb.ft.²)

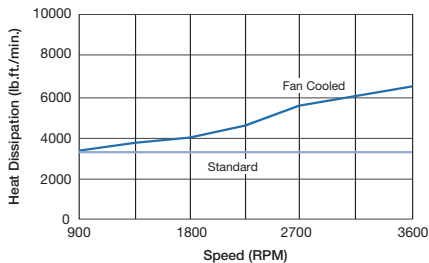
N = Speed in revolutions per minute. (RPM)

F = Cycle rate in cycles per minute (CPM)

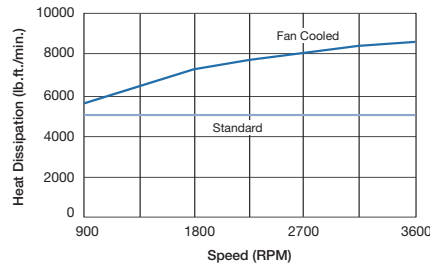
Compare the calculated heat generated in the application to the unit ratings using the heat dissipation curves. Select the appropriate unit that has adequate heat dissipation ability.

Enclosed UniModule Heat Dissipation Curves

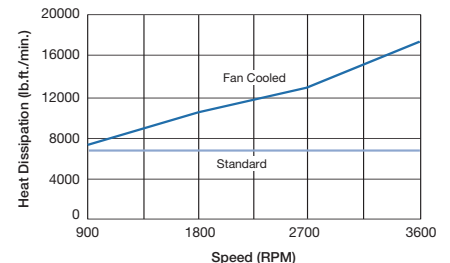
EUM 50



EUM 100/180



EUM 210/215 (fan not available for 215)



b. Torque Sizing

For most applications, the correct size clutch/brake can be selected from the Horsepower vs. Shaft Speed chart (located at the bottom of this page). Determine the motor horsepower and the RPM at the clutch/brake. The correct size unit is shown at the intersection of horsepower and shaft speed.

If the static torque requirements are known, refer to the technical ratings chart to select a unit.

For some applications, the torque requirement is determined by the time allowed to accelerate and decelerate the load. (This time is generally specified in milliseconds.) For these applications, it is necessary to determine the torque requirement based on load inertia and the time allowed for engagement.

The torque requirements are calculated as follows:

$$T = (WR^2 \times N) / (308 \times t)$$

where:

$$T = \text{Average Dynamic Torque (lb. ft.)}$$

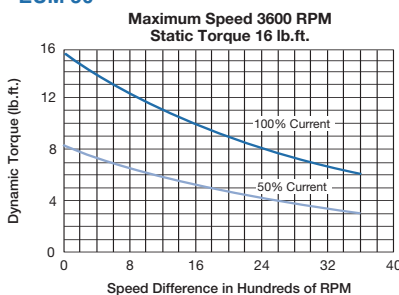
WR^2 = Total reflected inertia at the clutch/brake shaft. Include the clutch/brake output inertia. (lb. ft.²)

N = Speed in revolutions per minute. (RPM)

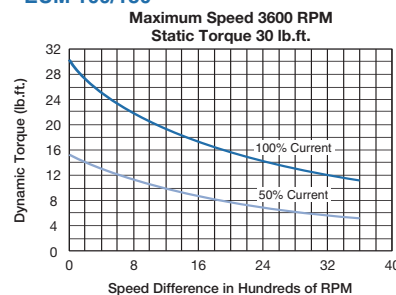
t = Time allowed for the engagement (sec)

C-face Clutch/Power-on Brake Dynamic Torque Curves

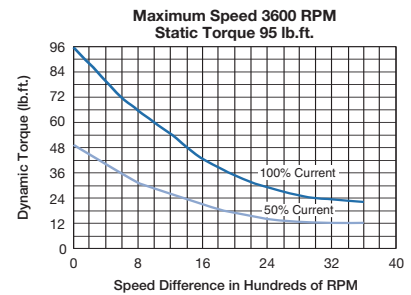
EUM 50



EUM 100/180



EUM 210/215



Specifications

UniModule Size	Shaft Dia.	Horsepower	Static Torque lb. ft.	Cycles per Min. @1750 RPM	Max. RPM	Voltage DC	NEMA Frame Size
EUM50	.625	1/4-3/4	16	125	3600	6, 24 or 90	56C/48Y
EUM100		1	30	90	3600	6, 24 or 90	
EUM180	.625	1-2	30	90	3600	6, 24 or 90	182C/143TC 184C/145TC
EUM210	1.125	3-5	95	37	3600	6, 24 or 90	213/182TC 215C/184TC
EUM215	1.375	7-1/2-10	95	37	3600	6, 24 or 90	213TC/215TC

3. Select Options

Warner Electric Enclosed UniModules can be fitted with several accessories to extend their capacity and ease of mounting.

a. Conduit Box

NEMA 4 and UL listed, available in standard and washdown versions.



b. Integral Control

The CBC-150 dual channel control fits into the cover of the conduit box. It is suitable for AC side switching (triac or relay) and includes high performance suppression.



c. Fan Kit (1020 only)

Extends the thermal capacity of an EUM. Mounts between motor and EUM, includes shaft, fan, guard and hardware. Available in standard black coating or food grade approved white coating.



d. Mounting Brackets

Two styles of mounting brackets are available for simplified installation. The base mount is used with the 2030 configuration. A motor mount is also available and provides sturdy support for a 1020 or 1040 combination with motor.



4. Select Control

Warner Electric manufactures clutch/brake controls to meet several system functions including:

- On/Off
- Torque adjust
- Over excitation
- Position loop

Many requirements beyond function can impact control selection. See the Controls Section on page 141 for complete information.

Selection and Ordering Information

Part Numbers

Totally Enclosed EUM	Voltage DC	Part No.
1020 Configuration		
EUM-50-1020	6	5370-273-058
	24	5370-273-059
	90	5370-273-057
EUM-100-1020	6	5370-273-092
	24	5370-273-093
	90	5370-273-091
EUM-180-1020	6	5370-273-066
	24	5370-273-067
	90	5370-273-065
EUM-210-1020	6	5371-273-028
	24	5371-273-029
	90	5371-273-027
EUM-215-1020	6	5371-273-082
	24	5371-273-083
	90	5371-273-084
1040 Configuration		
EUM-50-1040	90	5370-271-050
EUM-180-1040	90	5370-271-051
EUM-210-1040	90	5371-271-024
2030 Configuration		
EUM-50-2030	6	5370-273-062
	24	5370-273-063
	90	5370-273-061
EUM-180-2030	6	5370-273-070
	24	5370-273-071
	90	5370-273-069
EUM-210-2030	6	5371-273-032
	24	5371-273-033
	90	5371-273-031

Washdown EUM-W	Voltage DC	Part No.
1020 Configuration		
EUM-50-1020W	6	5370-273-100
	24	5370-273-101
	90	5370-273-099
EUM-100-1020W	6	5370-273-108
	24	5370-273-109
	90	5370-273-107
EUM-180-1020W	6	5370-273-116
	24	5370-273-117
	90	5370-273-115
EUM-210-1020W	6	5371-273-056
	24	5371-273-057
	90	5371-273-055
EUM-215-1020W	6	5371-273-086
	24	5371-273-087
	90	5371-273-088
2030 Configuration		
EUM-50-2030W	6	5370-273-104
	24	5370-273-105
	90	5370-273-103
EUM-180-2030W	6	5370-273-120
	24	5370-273-121
	90	5370-273-119
EUM-210-2030W	6	5371-273-060
	24	5371-273-061
	90	5371-273-059

Accessories

Option	Size	Enclosed UniModule	Washdown UniModule
Conduit box	All sizes	5370-101-042	5370-101-045
Control	CBC-150-1	6004-448-001	6004-448-001
	CBC-150-2	6004-448-002	6004-448-002
Base Mount Kits for 2030	Size 50/180*	5370-101-002	5370-101-047
	Size 210	5371-101-001	5371-101-025
Motor Mount Kits for 1020, 1040	Size 50/100/180*	5370-101-012	5370-101-049
	Size 210/215	5371-101-012	5371-101-026
Fan Kits for 1020	Size 50/100	5370-101-055	5370-101-060
	Size 180	5370-101-054	5370-101-061
	Size 210	5371-101-029	5371-101-033

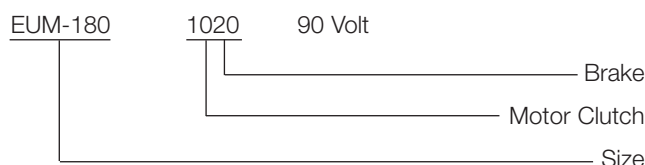
* Because of diameter limitations, EUM bases are available in 4.5" center height (143/145TC) only.

How to Order

Motor or Reducer Mounted

Simply combine the size number with the configuration of the required UniModule. Specify voltage. See chart for specific part numbers. Order optional conduit box if desired.

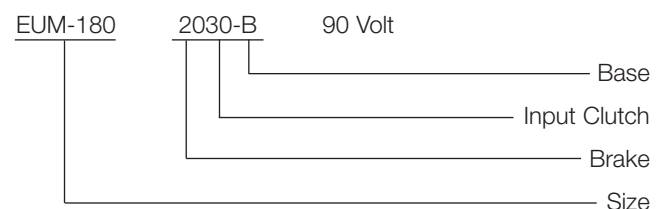
Example



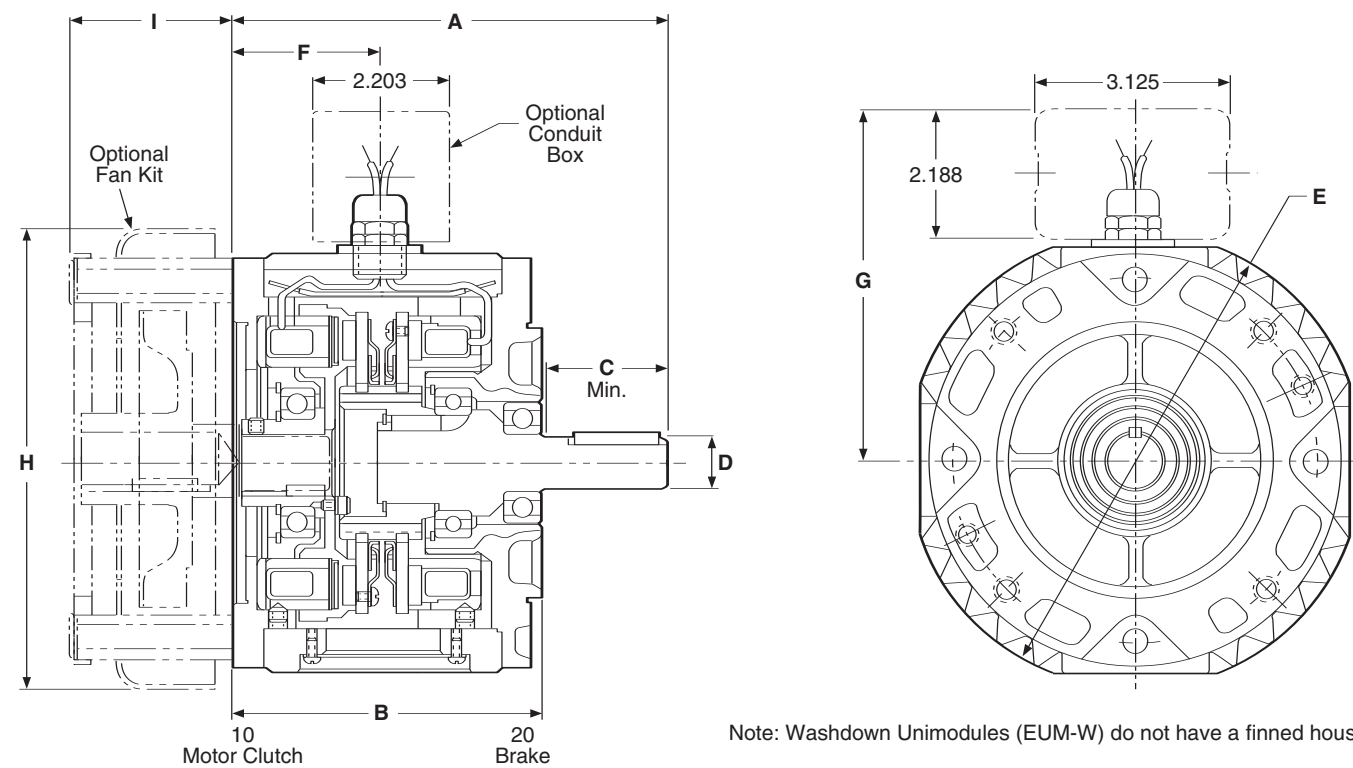
Base Mounted

Simply combine the size number with the configuration of the required UniModule. Specify voltage. See chart for specific part numbers. Order optional conduit box if desired.

Example



EUM-1020 Clutch/Brake Combination
EUM-W-1020 Clutch/Brake Combination



All dimensions are nominal, unless otherwise noted.

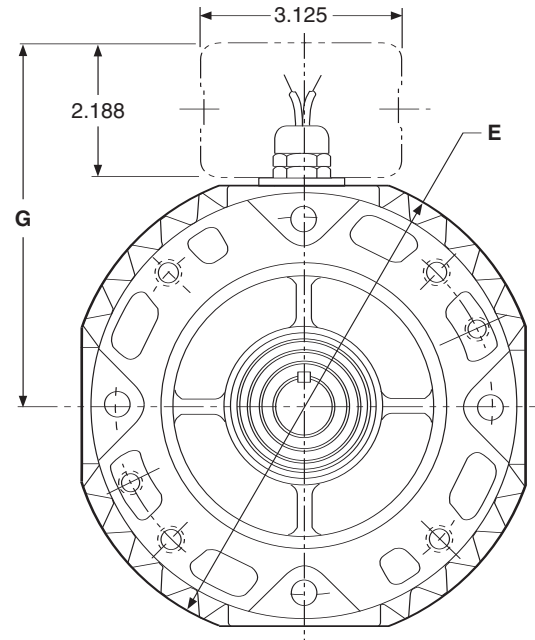
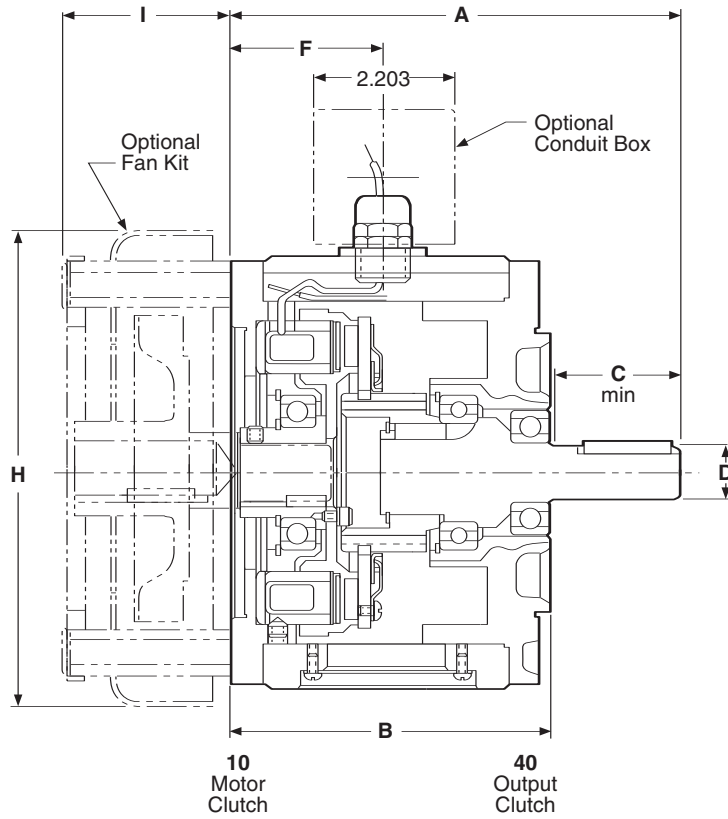
Size	A	B	C	D	E		F	G	H	I
					EUM	EUM-W				
50/100	6.750	4.844	1.813	.625	7.270	6.915	2.427	5.936	7.687	2.430
180	6.828	4.844	1.890	.875	7.270	6.915	2.427	5.936	7.687	2.430
210	8.891	5.922	2.500	1.125	10.000	10.00	3.053	7.146	10.187	3.375
215	9.391	5.922	3.000	1.375	10.000	10.00	3.053	7.146	10.187	3.375

Specifications

UniModule Size	Shaft Dia.	Horsepower	Static Torque lb. ft.	CPM @1750 RPM	Max. RPM	Voltage DC	NEMA Frame Size
EUM50	.625	1/4-3/4	16	125	3600	6, 24 or 90	56C/48Y
EUM100	.625	1	30	90	3600	6, 24 or 90	56C/48Y
EUM180	.875	1-2	30	90	3600	6, 24 or 90	182C/143TC 184C/145TC
EUM210	1.125	3-5	95	37	3600	6, 24 or 90	213/182TC 215C/184TC
EUM215	1.375	7-1/2	95	37	3600	6, 24 or 90	213TC/215TC

For NEMA standard frame sizes, see page 137.

EUM-1040 Clutch Combination



All dimensions are nominal, unless otherwise noted.

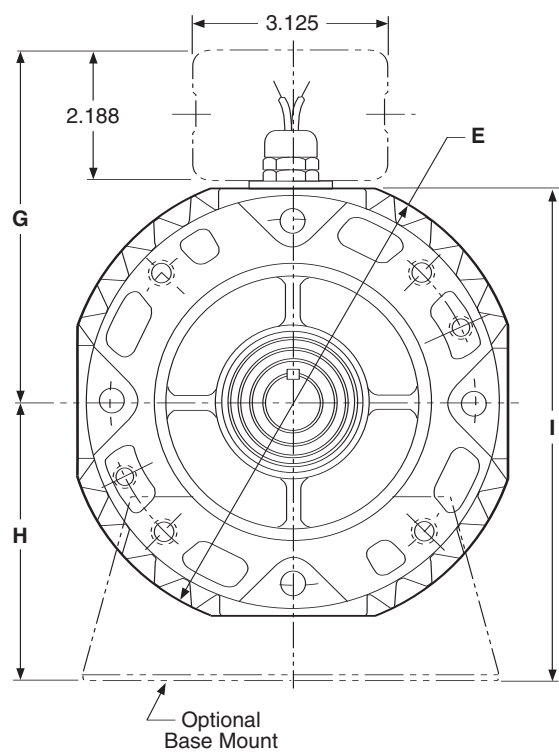
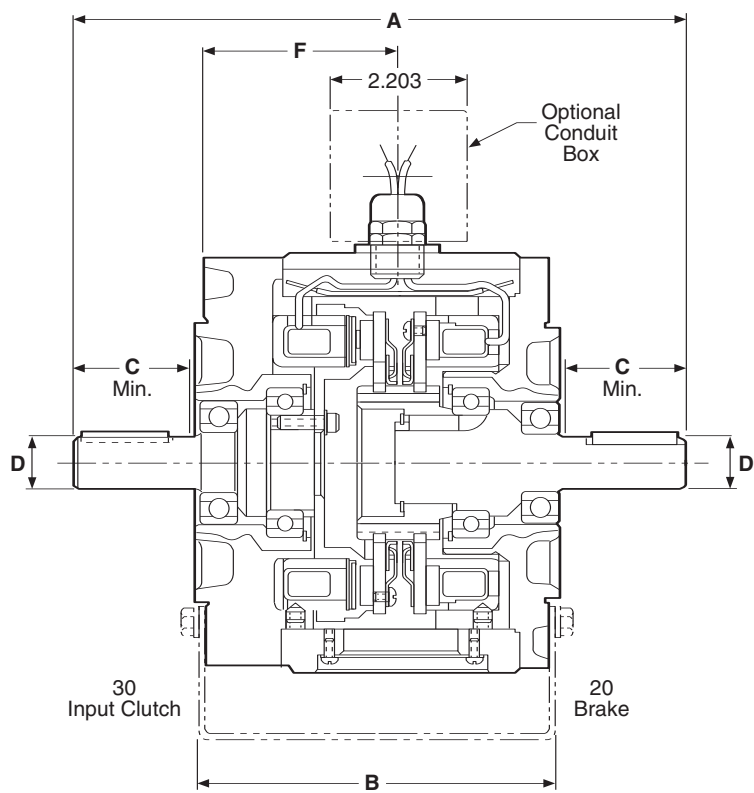
Size	A	B	C	D	E	F	G	H	I
50/100	6.750	4.844	1.813	.625	7.270	2.427	5.936	7.687	2.430
180	6.828	4.844	1.890	.875	7.270	2.427	5.936	7.687	2.430
210	8.891	5.922	2.500	1.125	10.000	3.053	7.146	10.187	3.375

Specifications

UniModule Size	Shaft Dia.	Horsepower	Static Torque lb. ft.	CPM @1750 RPM	Max. RPM	Voltage DC	NEMA Frame Size
EUM50	.625	1/4-3/4	16	125	3600	6, 24 or 90	56C/48Y
EUM100	.625	1	30	175	3600	6, 24 or 90	56C/48Y
EUM180	.875	1-2	30	175	3600	6, 24 or 90	182C/143TC 184C/145TC
EUM210	1.125	3-5	95	32	3600	6, 24 or 90	213/182TC 215C/184TC

For NEMA standard frame sizes, see page 137.

EUM-2030 Clutch/Brake
Combination–Base Mounted
EUM-W-2030 Clutch/Brake
Combination–Base Mounted



Note: Washdown UniModules (EUM-W) do not have a finned housing.

All dimensions are nominal, unless otherwise noted.

Size	A	B	C	D	E		F	G	H	I
					EUM	EUM-W				
50	9.516	5.672	1.813	.625	7.270	6.915	3.164	5.936	3.670	7.119
180	9.516	5.672	1.890	.875	7.270	6.915	3.164	5.936	4.484	8.119
210	12.969	8.260	2.500	1.125	10.000	10.00	4.514	7.146	5.234	10.234

Specifications

UniModule Size	Shaft Dia.	Horsepower	Static Torque lb. ft.	CPM @1750 RPM	Max. RPM	Voltage DC	NEMA Frame Size
EUM50	5/8"	1/4-3/4	16	125	3600	6, 24 or 90	56C/48Y
EUM100	5/8"	1	30	175	3600	6, 24 or 90	56C/48Y
EUM180	7/8"	1-2	30	175	3600	6, 24 or 90	182C/143TC 184C/145TC
EUM210	1-1/8"	3-5	95	32	3600	6, 24 or 90	213/182TC 215C/184TC

For NEMA standard frame sizes, see page 137.

Module Options

Warner Electric Enclosed UniModules can be fitted with several accessories to extend their capacity and ease of mounting.

Conduit Box

NEMA 4 and UL listed, available in standard and washdown versions.



Integral Control

The CBC-150 dual channel control fits into the cover of the conduit box. It is suitable for AC side switching (triac or relay) and includes high performance suppression.



Fan Kit (UM and EUM 1020 only)

Extends the thermal capacity of an EUM. Mounts between motor and EUM, includes shaft, fan, guard and hardware. Available in standard black coating or food grade approved white coating.



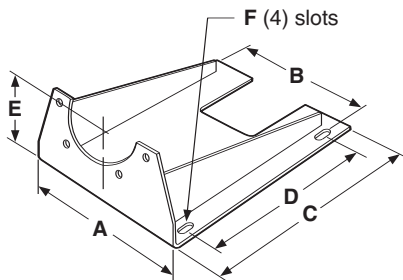
Mounting Brackets

Two styles of mounting brackets are available for simplified installation. The base mount is used with the 2030 configuration. A motor mount is also available and provides sturdy support for a 1020 or 1040 combination with motor.



(Optional)

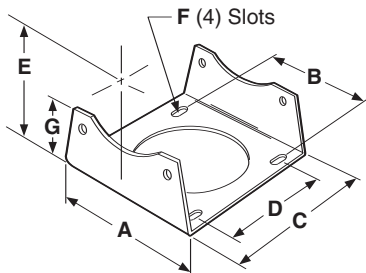
Motor Mount (M)



For use with 1020, 1040, 20, 20 FBB and 1020 FBC Combinations.

Size	A	B	C	D	E	F	Part No.
50/100	9.25	8.25	11.00	8.000	3.50	.797 x .406	5370-101-010
180	9.25	8.25	11.00	8.000	4.50	.797 x .406	5370-101-012/5370-101-047
210/215	11.50	10.50	12.00	9.000	5.25	.750 x .406	5371-101-012/5371-101-025

Base (B)



For use with 2030 and 3040 units.

Size	A	B	C	D	E	F	G	Part No.
50/100	6.000	5.000	5.672	4.000	3.500	.750 X .406	2.000	5370-101-004
180	6.625	5.000	5.672	4.000	4.500	.750 X .406	3.000	5370-101-002/5370-101-049
210/215	9.000	7.750	8.203	6.000	5.250	.750 X .531	3.385	5371-101-001/5371-101-026

Shaft Mounted Clutches

EC Series

All the features of an electric clutch in a convenient, preassembled package. Mounts on any through shaft or double shafted motor. Easy-to-assemble with standard sheaves, pulleys, gears and sprockets.

Available in a wide range of bore sizes. Shaft extension makes pulley or sprocket installation easy.

Shaft Mounted Brakes

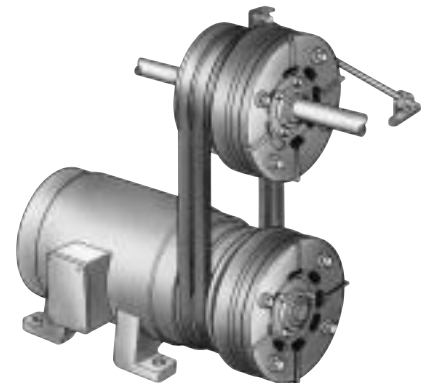
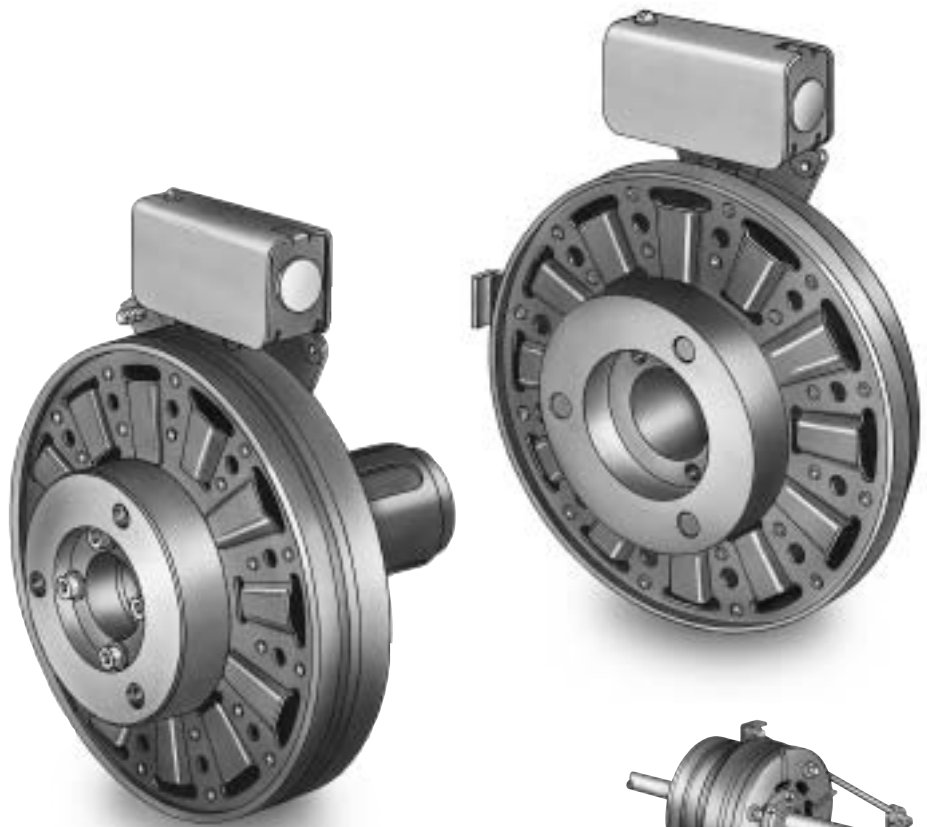
EB Series

Electro Brakes mount directly on a motor or through shaft for basic braking functions.

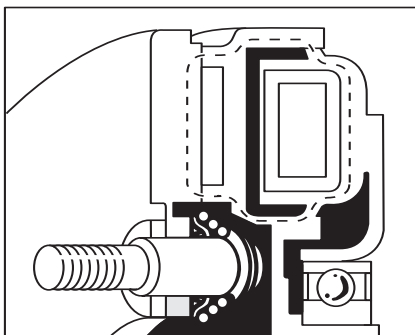
Torque arm feature makes Electro Brakes easy to install on any through shaft or double shaft motor.

Segmented and fluted armature disc provides maximum cooling of friction surfaces.

- Six sizes of clutches and brakes
- 16 lb. ft. to 465 lb. ft. torque range
- Preassembled. Factory aligned.
- Mounting flexibility
- Simple to install

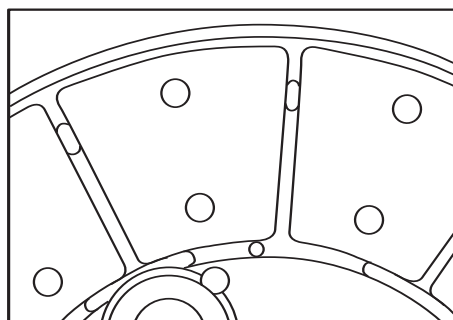


Motor mounted Electro Clutch used in combination with an Electro Brake on a through shaft installation.



Brushless Design

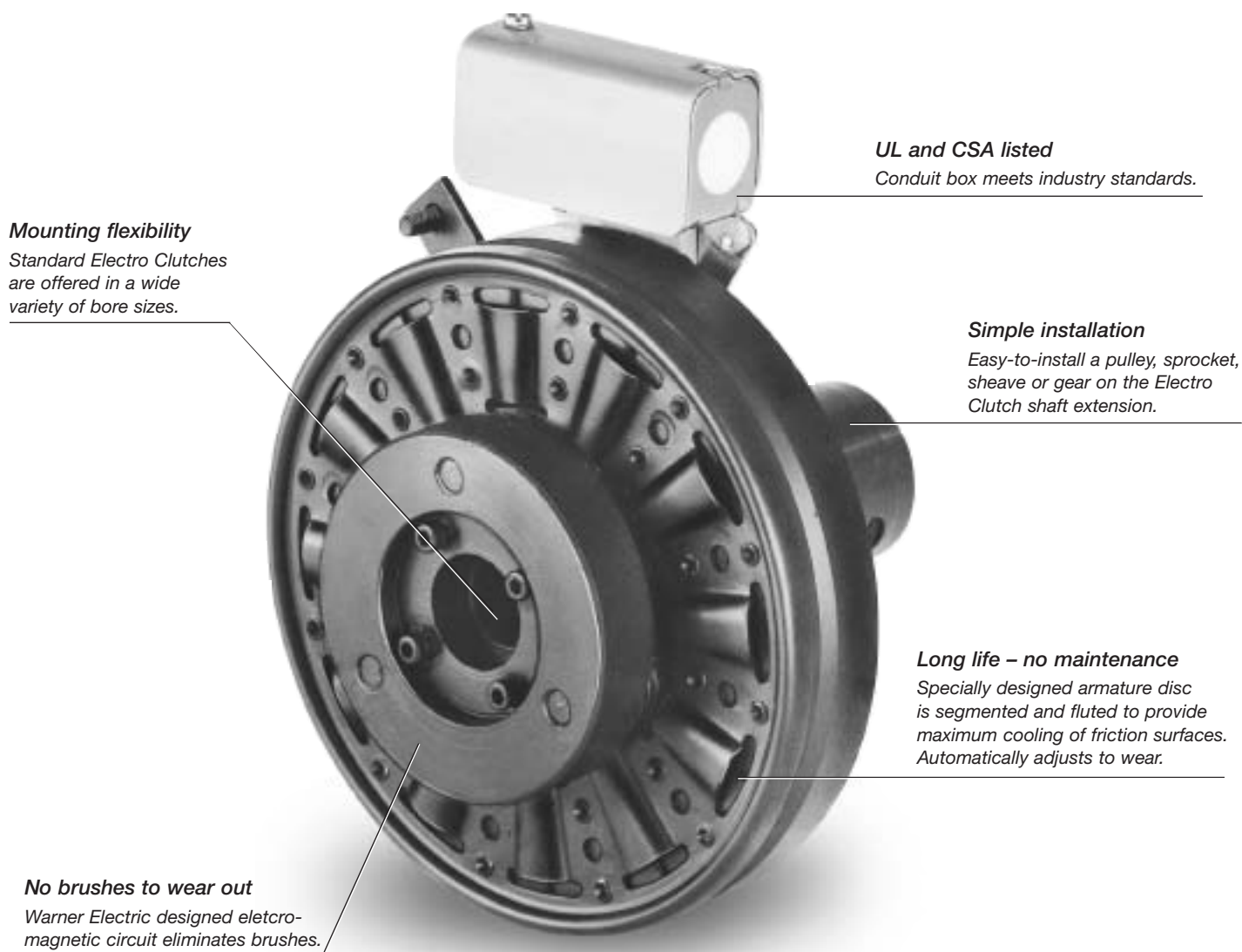
Warner Electric designed electromagnetic circuit eliminates brushes.



Heat Dissipation

Specially designed segmented armature disc is segmented and fluted to provide maximum cooling of friction surfaces. Automatically adjusts for wear.

Shaft Mounted Clutches



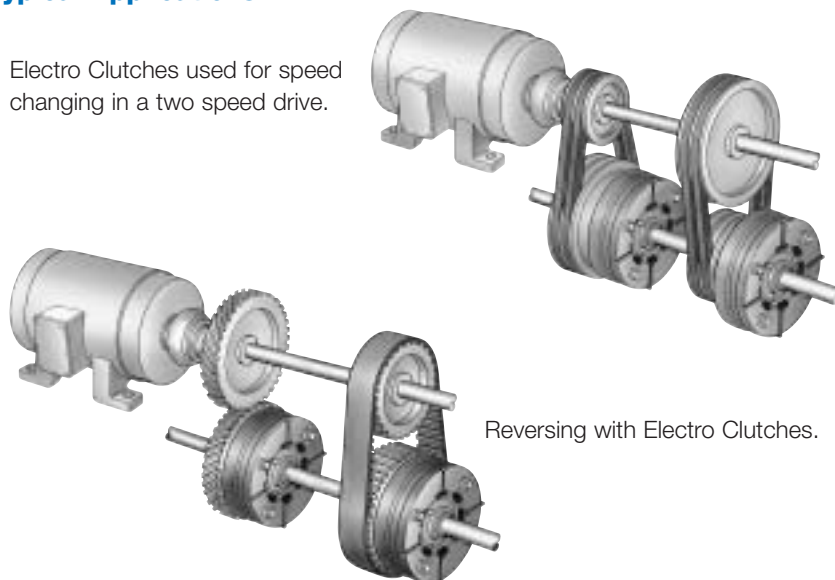
Packaged Performance

The engineering is built-in. Warner Electric Packaged Performance products are factory aligned and pre-assembled. They have been designed to mate easily with industry standard motors, reducers and other power transmission components. "Bolt-it-down and wire-it-up". . . they're ready to go.

- Hubs mate to standard sheaves, sprockets, gears and pulleys
- Wide torque range from 16 to 465 lb. ft.
- Handle 1 to 20 HP at 1800 RPM

Typical Applications

Electro Clutches used for speed changing in a two speed drive.



Reversing with Electro Clutches.

Selection Procedure

1. Determine the motor horsepower and r.p.m. at the clutch location.
2. Use the Horsepower vs. Shaft Speed chart to determine the right size Electro Clutch.
3. When ordering, specify bore size and voltage.
4. To get maximum performance from your Electro Clutch, use a Warner Electric Control. See the Controls Section.

Note:
Electro Clutches require extended length motor shafts for motor mounting.

Part Numbers

Model Size	Bore Size	Voltage DC	Part No.
EC-375	1/2"	6	5180-271-006
		24	5180-271-004
		90	5180-271-009
	5/8"	6	5180-271-002
		24	5180-271-008
		90	5180-271-005
EC-475	5/8"	6	5181-271-004
		24	5181-271-008
		90	5181-271-007
	3/4"	6	5181-271-003
		24	5181-271-009
		90	5181-271-005
EC-650	7/8"	6	5181-271-002
		24	5181-271-010
		90	5181-271-006
	1"	6	5281-271-004
		24	5281-271-018
		90	5281-271-007
EC-825	1-1/8"	6	5281-271-002
		24	5281-271-019
		90	5281-271-005
	1-1/4"	6	5281-271-009
		24	5281-271-020
		90	5281-271-008
EC-1000	1-3/8"	6	5281-271-003
		24	5281-271-016
		90	5281-271-006
	1-1/8"	6	5282-271-002
		24	5282-271-008
		90	5282-271-011
EC-1225	1-1/4"	6	5282-271-003
		24	5282-271-009
		90	5282-271-012
	1-3/8"	6	5282-271-004
		24	5282-271-010
		90	5282-271-013
EC-1225	1-3/8"	6	5283-271-002
		24	5283-271-010
		90	5283-271-003
	1-1/2"	24	5283-271-012
		90	5283-271-013
	1-5/8"	6	5283-271-004
		24	5283-271-011
		90	5283-271-005
EC-1225	1-5/8"	6	5284-271-008
		24	5284-271-013
		90	5284-271-010
	1-7/8"	6	5284-271-002
		24	5284-271-014
		90	5284-271-003
EC-1225	2-1/8"	6	5284-271-004
		24	5284-271-015
		90	5284-271-005

Note: Metric bores available in some sizes, consult factory.

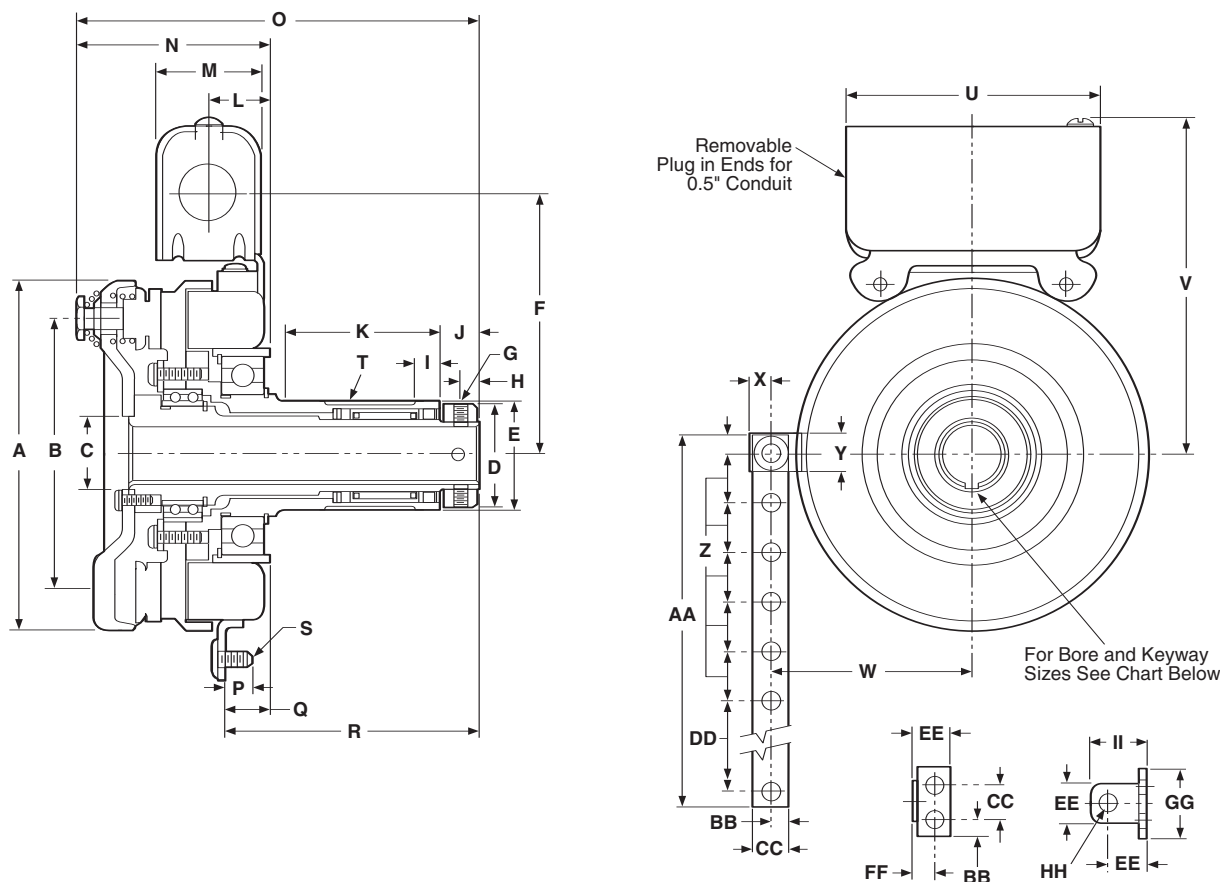
Horsepower vs. Shaft Speed

HP	SHAFT SPEED AT CLUTCH (IN RPM)																					
▼	100	200	300	400	500	600	700	800	900	1000	1100	1200	1500	1800	2000	2400	3000	3600	4000	4500	5000	
1/50																						
1/20																						
1/12																						
1/8										EC-375												
1/6																						
1/4																						
1/2																						
3/4																						
1										EC-475												
1-1/2																						
2										EC-650												
3																						
5										EC-825												
7-1/2																						
10										EC-1000												
15																						
20										EC-1225												

Specifications

Electro Clutch Size	Static Torque lb. ft.	Max. RPM	Voltage DC	Total Wt. lbs.
EC-375	16	5000	6, 24 or 90	4
EC-475	30	4500	6, 24 or 90	8
EC-650	95	3600	6, 24 or 90	18
EC-825	125	3600	6, 24 or 90	28
EC-1000	240	2000	6, 24 or 90	41
EC-1225	465	2000	6, 24 or 90	85

EC-375, EC-475, EC-650



All dimensions are nominal, unless otherwise noted.

Size	A Max.	B Dia.	C Min.	D Dia.	E Dia.	F	G	H	I	J	K Max.	L	M
375	4.078	3.125	.7505	1.313	<u>1.375</u> 1.374	3.344	10-24 UNC -3A x 5/15	.188	.375	.344	2.047	.781	1.547
475	5.172	4.000	1.0625	1.563	<u>1.625</u> 1.624	3.922	1/4-20 UNC -3A x 7/16	.281	.375	.578	2.359	.875	1.547
650	6.578	5.125	1.625	2.375	<u>2.5000</u> 2.4985	4.625	1/4-20 UNC -3A x 1/2	.281	.188	.563	3.047	.953	1.547

Bore Sizes and Keyways

Size	Bore Dia.	Keyway
375	.625 .500	*3/16 x 1/16 1/8 x 1/16
475	.750 .875 .625	3/16 x 3/32 *3/16 x 1/16 3/16 x 3/32
650	1.125 1.375 1.000 1.250	*1/4 x 1/8 *5/16 x 3/32 1/4 x 1/8 1/4 x 1/8

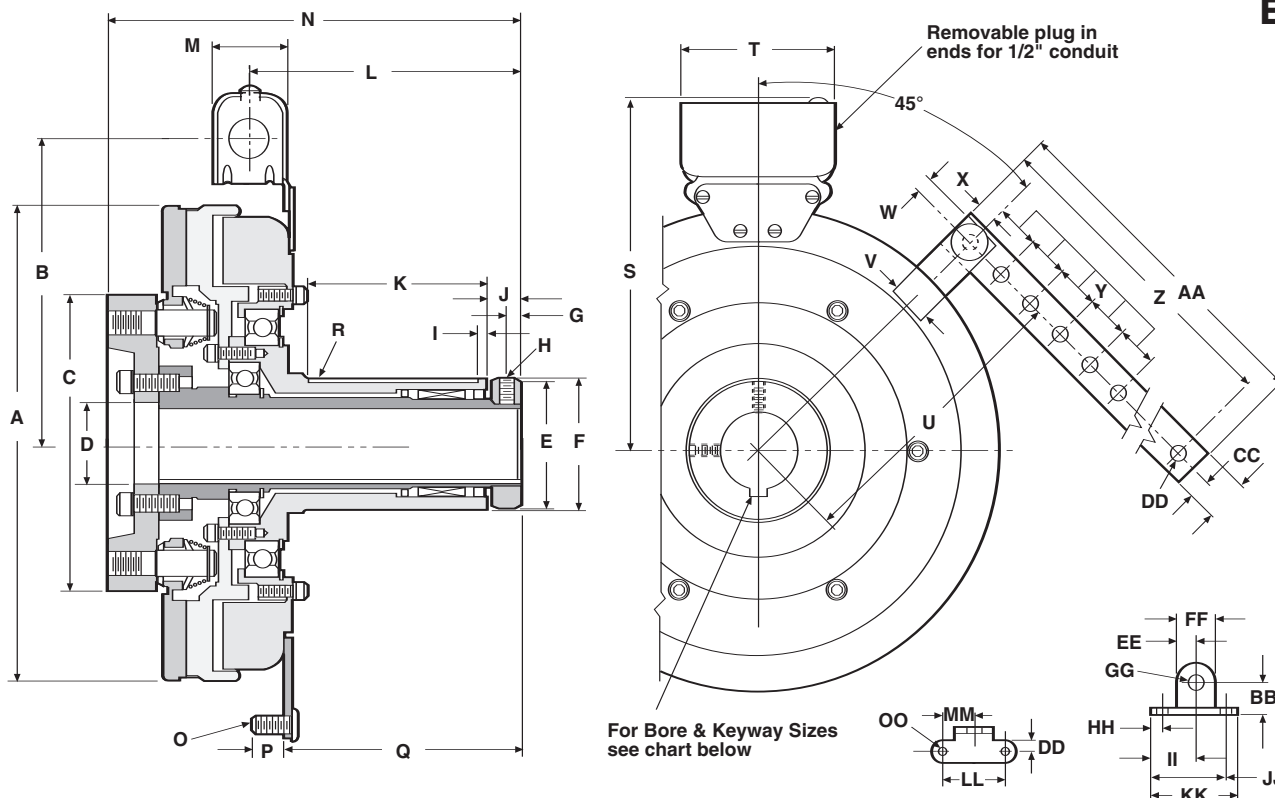
*Key Furnished

Size	N Max.	O Max.	P	Q Max.	R Min.	S	T	U	V Max.	W	X
375	2.484	4.984	.438	.609	3.000	1/4-20 UNC-2A	5/16 x 3/32	3.750	4.438	2.438	.313
475	3.219	6.266	.422	.658	3.641	1/4-20 UNC-2A	3/8 x 3/32	3.750	4.984	2.984	.313
650	3.547	7.141	.422	.722	4.359	1/4-20 UNC-2A	5/8 x 3/32	3.750	5.750	3.750	.313

Size	Y	Z	AA	BB	CC	DD	EE Dia.	FF	GG	HH Dia.	II
375	.563	.750	5.000	.250	.500	.750	.563	.313	1.000	<u>.270</u> .260	.828
475	.578	.750	5.000	.250	.500	.750	.563	.313	1.000	<u>.270</u> .260	.828
650	.563	.750	10.000	.250	.500	5.750	.563	.313	1.000	<u>.270</u> .260	.828

Specifications

Size	Average Wt.-lbs.				Inertia-WR ² (lb.ft. ²)			
	Arm. & Carrier.	Rotor	Outer Sleeve	Inner Sleeve	Arm. & Carrier	Rotor	Outer Sleeve	Inner Sleeve
EC-375	.60	.55	.49	.60	.010	.018	.001	.001
EC-475	1.13	1.12	.78	1.22	.072	.033	.006	.002
EC-650	2.3	2.5	1.6	2.37	.106	.202	.010	.013



Specifications

Model Size	Voltage DC	Inertia-WR ² (lb. ft ²)		Total Weight lbs.	Average Weight-lbs.	
		Armature, Hub & Inner Sleeve	Rotor & Outer Sleeve		Armature, Hub & Inner Sleeve	Rotor & Outer Sleeve
EC-825	6	.35	.87	28	6.0	18.5
	24	.35	.87	28	6.0	18.5
	90	.35	.87	28	6.0	18.5

All dimensions are nominal, unless otherwise noted.

Size	A Max.	B Dia.	C	D Min.	E Dia.	F Dia.	G	H	I	J
825	8.656	5.656	4.625	1.437	2.375	2.5000 2.4985	.281	1/4-20 UNC -3A x 3/8	.188	.563

Size	K Max.	L	M	N Max.	O	P	Q Max.	R*	S	T
825	3.047	5.219	1.547	8.000	5/16-18 UNC-2A	1.547	4.468	5/8 x 3/32	6.813	3.750

Size	U	V	W	X	Y	Z	AA	BB	CC	DD Dia.
825	5.063	.875	—	.375	.750	16.625	17	.750	.375	.330 .321

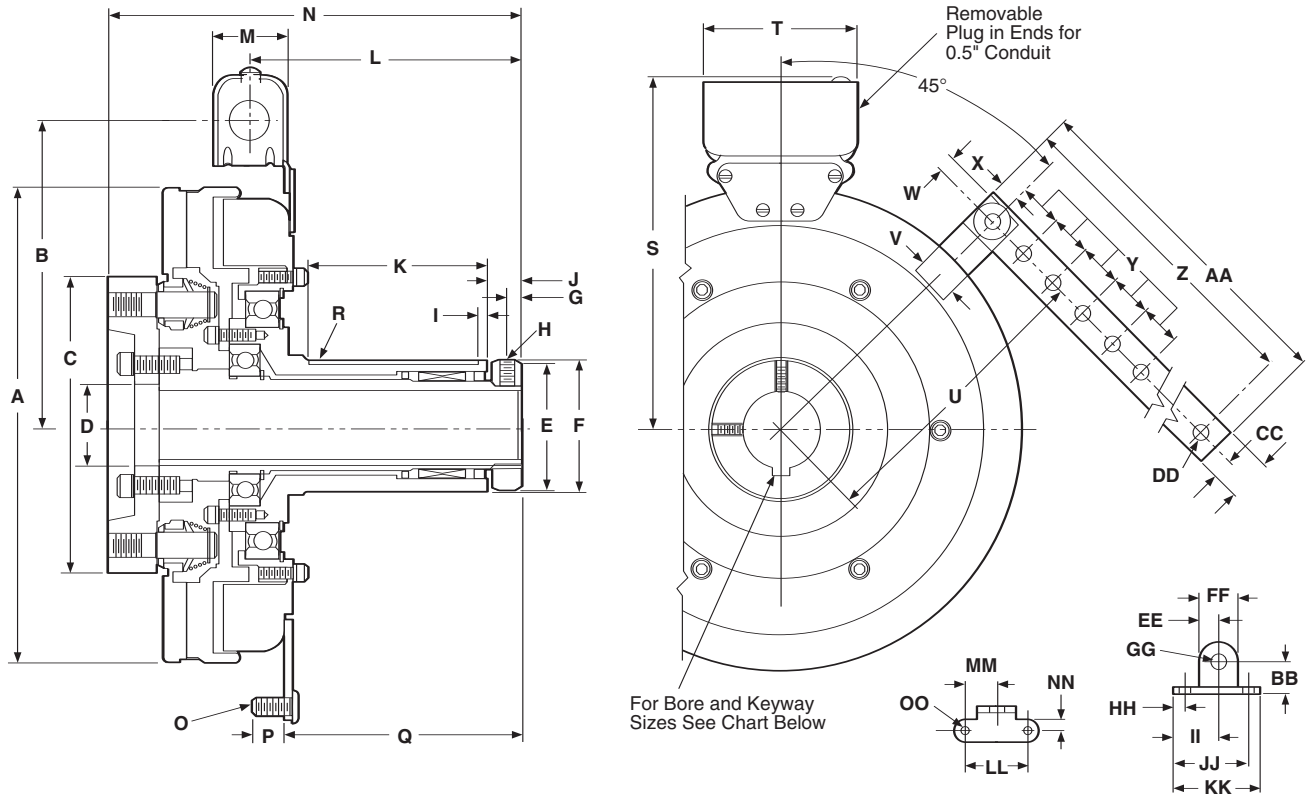
Size	EE	FF	GG Dia.	HH	II	JJ	KK	LL	MM	NN	OO
825	.438	.875	.313	.250	1.000	1.750	2.000	1.500	.750	.250	.270 .260

* Key supplied

Bore Sizes and Keyways

Size	Bore Dia.	Keyway
825	1.125	1/4 x 1/8
	1.250	1/4 x 1/8
	1.375	5/16 x 3/32

EC-1000, EC-1225



Specifications

Model Size	Voltage DC	Static Torque (lb. ft.)	Max. Speed RPM	Inertia-WR ² (lb. ft ²)			Inner Sleeve	Total Weight lbs.
				Arm. & Hub	Rotor	Outer Sleeve		
EC-1000	6	240 lb. ft.	2000	.720	.894	.129	.036	41
	24	240 lb. ft.	2000	.720	.894	.129	.036	41
	90	240 lb. ft.	2000	.720	.894	.129	.036	41
EC-1225	6	465 lb. ft.	2000	1.8	2.4	.129	.061	85
	24	465 lb. ft.	2000	1.8	2.4	.129	.061	85
	90	465 lb. ft.	2000	1.8	2.4	.129	.061	85

Bore Sizes and Keyway

Size	Bore Dia.	Keyway
1000	1.375	*5/15 x 5/32
	1.500	*3/8 x 11/64
	1.625	*3/8 x 1/8
1225	1.625	*3/8 x 5/32
	1.875	*1/2 x 1/4
	2.125	*1/2 x 3/16

*Key Furnished

All dimensions are nominal, unless otherwise noted.

Size	A Max.	B Dia.	C	D Min.	E Dia.	F Dia.	G	H	I	J	K Max.	L	M
1000	10.328	6.531	6.344	1.750	2.875	2.9375 2.9365	.344	5/16-18 UNC -3A x 3/8	.188	.750	3.969	6.000	1.547
1225	12.672	7.531	6.969	2.234	3.625	3.750 3.749	.406	5/8-16 UNC -3A x 3/4	.375	.859	5.219	7.781	1.547

Size	N Max.	O	P	Q Max.	R*	S	T	U	V	W	X	Y
1000	9.031	5/16-18 UNC-2A	1.547	5.281	3/4 x 1/8	7.688	3.750	6.125	.875	.344	.375	.750
1225	11.016	5/16-18 UNC-2A	1.547	7.047	7/8 x 1/8	8.688	3.750	7.000	.875	.344	.375	.750

Size	Z	AA	BB	CC	DD Dia.	EE	FF	GG Dia.	HH	II	JJ	KK	LL	MM	NN	OO
1000	16.625	17	.750	.375	.330 .321	.438	.875	.313	.250	1.000	1.750	2.000	1.500	.750	.250	.270 .260
1225	16.625	17	.750	.375	.330 .321	.438	.875	.313	.250	1.000	1.750	2.000	1.500	.750	.250	.270 .260

* Key supplied

Shaft Mounted Brakes for Power-On Applications

Pre-engineered, pre-packaged brakes mount on motor or thru shafts. They have been designed to mate easily with industry standard motors, reducers and other power transmission components. Bolt-it-down and wire-it-up . . . they're ready to go.

- Wide torque range from 16 to 465 lb. ft.
- Handle 1 to 75 HP at 1800 RPM
- Adjustable torque arm

Mounting Flexibility

Torque arm allows mounting anywhere on shaft. Standard bushings cover a wide range of shaft sizes.

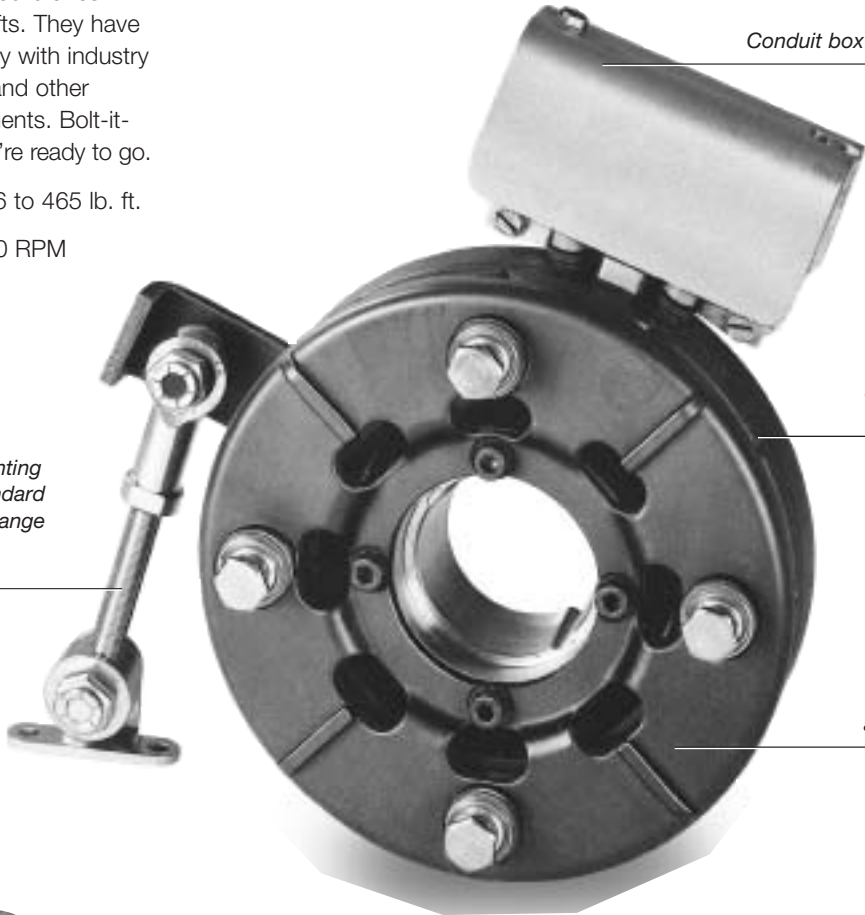
UL and CSA Listed
Conduit box meets industry standards.

Long Life, No Maintenance

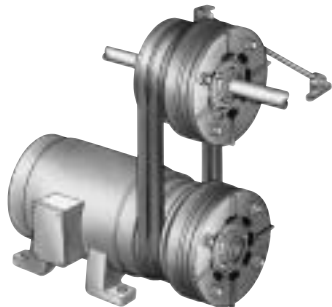
Automatically adjusts for wear. Designed for maximum heat dissipation. No lubrication necessary.

Packaged Design

No assembly required. Insert bushing for proper shaft size, slide on shaft and bolt down torque arm.



Typical Application



An Electro Brake mounted on a through shaft.

Selection Procedure

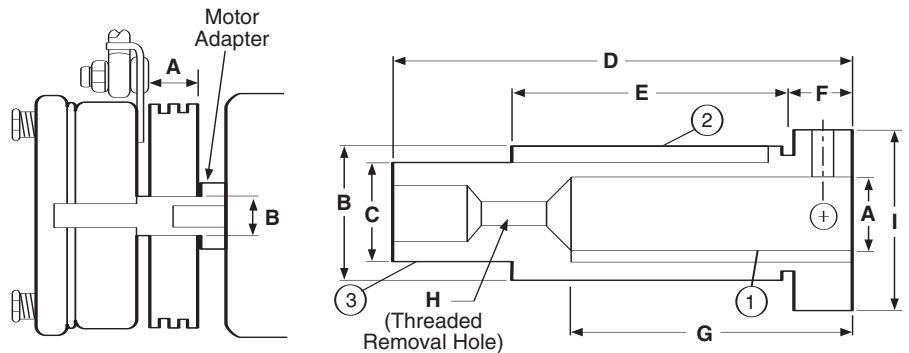
1. Determine the motor horsepower and r.p.m. at the brake location.
2. Use the Horsepower vs. Shaft Speed chart to determine the right size Electro Brake.
3. When ordering, specify bore size and voltage.
4. To get maximum performance from your Electro Clutch, use a Warner Electric Control. See the Controls Section.

Horsepower vs. Shaft Speed

HP	SHAFT SPEED AT BRAKE (IN RPM)																			
	100	200	300	400	500	600	700	800	900	1000	1100	1200	1500	1800	2000	2400	3000	3600	4000	5000
1/12																				
1/8																				
1/6																				
1/4																				
1/3																				
1/2																				
3/4																				
1																				
1-1/2																				
2																				
3																				
5																				
7-1/2																				
10																				
15																				
20																				
25																				
30																				
40																				
50																				
60																				
75																				

Optional Motor Shaft Adapter

Ten motor shaft adapters are available as an option for mounting Electro-Brakes on single shaft extension motors. For double shaft extension motors the adapter can be eliminated. A standard sheave, pulley, or sprocket, with either a tapered bushing or straight bore, can be installed on the shaft adapter. The Electro Brake is mounted on the end of the shaft adapter and the complete assembly fits onto the motor shaft and is secured with setscrews. Fitting the belts or chain and attaching the torque arm completes the installation.



All dimensions are nominal unless otherwise noted.

Model	A	Key			Key			Key			Dodge Bushing Size	D	E	F	G	H	I
		Kwy.	Part No. ①	B	Kwy.	Part No. ②	C	Kwy.	Part No. ③								
EB-375	5/8	3/16x 3/32	*	7/8	3/16x 3/32	590-0016	5/8	3/16x 3/32	590-0043	None	4.391 4.359	2	.391 .359	2	1/4-20 UNC	1.125	
EB-375	7/8	3/16x 3/32	*	1-1/4	1/4x 1/8	590-0022	5/8	3/16x 3/32	590-0043	None	4.578 4.742	2-1/4	.516 .484	2-1/4		1.500	
EB-475	1-1/8	1/4x 1/8	*	1-5/8	3/8x 3/16	590-0041	1	1/4x 1/8	**	#1008 1"	4.516 4.484	2-3/4	.641 .609	2-3/4	1/2-13 UNC	1.750	
EB-650	1-3/8	5/16x 5/32	*	2	1/2x 1/4	590-0042	1-3/8	5/16x 5/32	590-0044	#1310 1-3/8"	5.547 5.515	3-3/8	.641 .609	3-3/8	1/2-13 UNC	2.125	
EB-650	1-5/8	3/8x 3/16	*	2-1/4	1/2x 1/4	590-0042	1-3/8	5/16x 5/32	590-0044	#1310 1-3/8"	6.172 6.140	4	.641 .609	4		2.375	
EB-1000	1-5/8	3/8x 3/16	*	2-15/16	3/4x 7/16	590-0052	1-5/8	3/8x 7/32	**	#1615 1-5/8"	8.297 8.265	5-1/4		5	3/4-10 UNC	2.937	
EB-1000	1-7/8	1/2x 7/32	*	2-15/16	3/4x 7/16	590-0052	1-5/8	3/8x 7/32	**	#1615 1-5/8"						2.937	
EB-1000	2-1/8	1/2x 1/8	590-0062	2-15/16	3/4x 5/16	590-0069	1-5/8	3/8x 7/32	**	#1615 1-5/8"						2.937	
EB-1225	2-1/8	1/2x 7/32	*	3-3/4	7/8x 7/16	590-0049	2-1/8	1/2x 9/32	590-0048	#2517 2-1/8"	10.672 10.640	7-1/4		6-7/8	7/8-9 UNC	3.750	
EB-1225	2-3/8	5/8x 9/32	*	3-3/4	7/8x 7/16	590-0049	2-1/8	1/2x 9/32	590-0048	#2517 2-1/8"						3.750	

* Standard Square Key Furnished with Motor.

** Special Key Furnished with Bushing.

Note: For adapter part numbers, see page 108.

Part Numbers

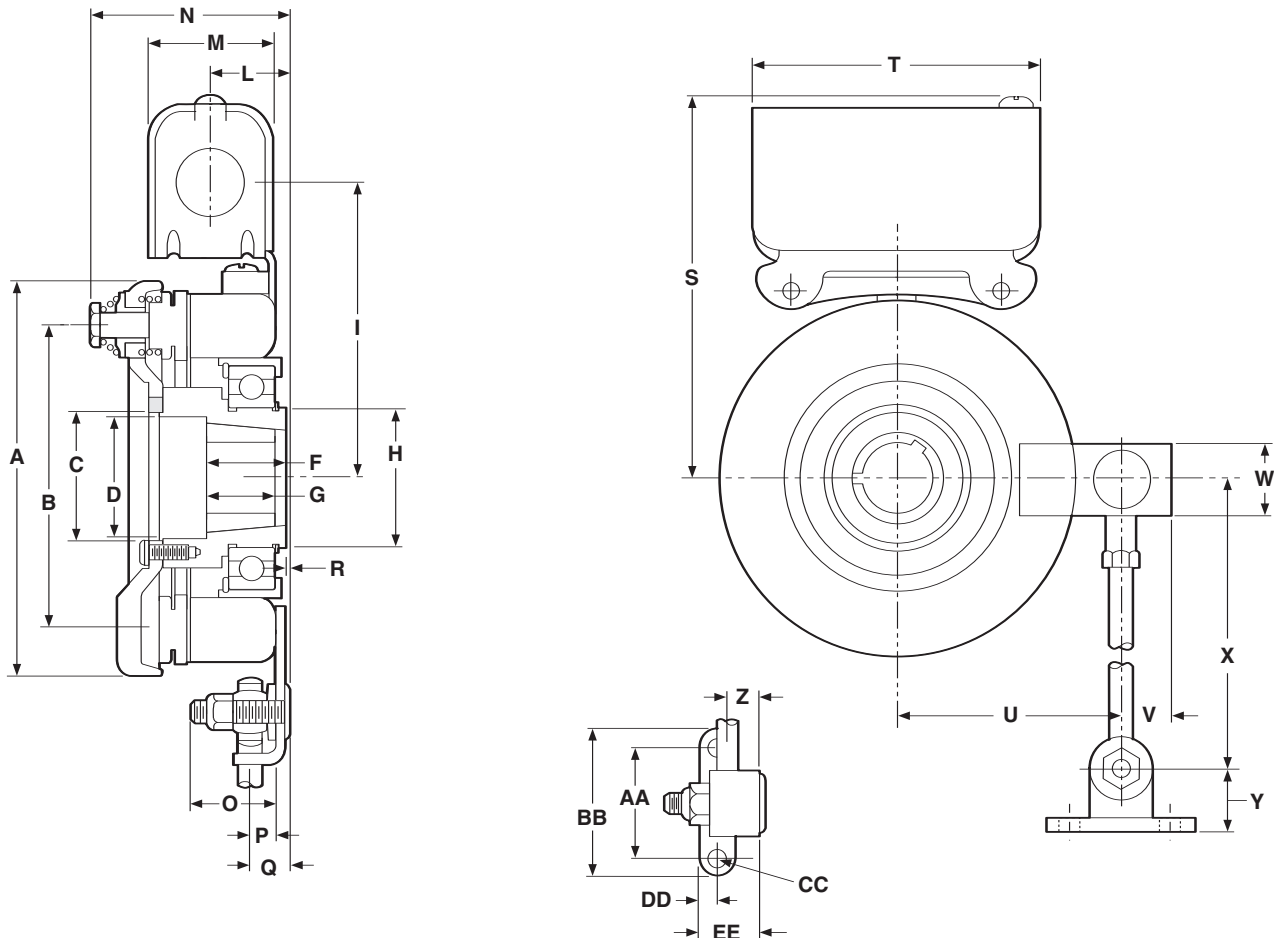
Model Size	Bore Size	Voltage DC	Part No.
EB-375	1/2"	6	5380-170-005
		24	5380-170-006
		90	5380-170-004
	5/8"	6	5380-170-003
		24	5380-170-007
		90	5380-170-002
EB-475	1/2" to 1"	6	5381-170-003
		24	5381-170-004
		90	5381-170-002
EB-650	1/2" to 1-3/8"	6	5382-170-003
		24	5382-170-005
		90	5382-170-002

Model Size	Bore Size	Voltage DC	Part No.
EB-825	1/2" to 1-1/2"	6	5383-170-002
		24	5383-170-004
		90	5383-170-005
EB-1000	1/2" to 1-5/8"	6	5384-170-003
		24	5384-170-005
		90	5384-170-002
EB-1225	1/2" to 2-12"	6	5385-170-003
		24	5385-170-005
		90	5385-170-002

Note: EB-375 also available in some metric bores.

EB-475-1225 use bushings which are available in metric bores.

EB-375, EB-475, EB-650



Adapter Requirements

For thru-shaft mounting, specify bore size. For EB-475 and EB-650 order bushing separately. EB-375 does not require a bushing. (See pages 235 and 236)

For motor mounting, order adapter separate (see page 59).

Bore Sizes and Keyway

Size	Bore Dia.	Keyway
375	.501/.500	1/8 x 1/16
	.626/.625	3/16 x 3/32
475	.500/.563	1/8 x 1/16
	.625/.875	3/16 x 3/32
	.938/1.000	*1/4 x 1/8
650	.500/.563	1/8 x 1/16
	.625/.875	3/16 x 3/32
	1.250/1.313	1/4 x 1/8
	1.313/1.375	5/16 x 5/32

*Key Furnished

All dimensions are nominal, unless otherwise noted.

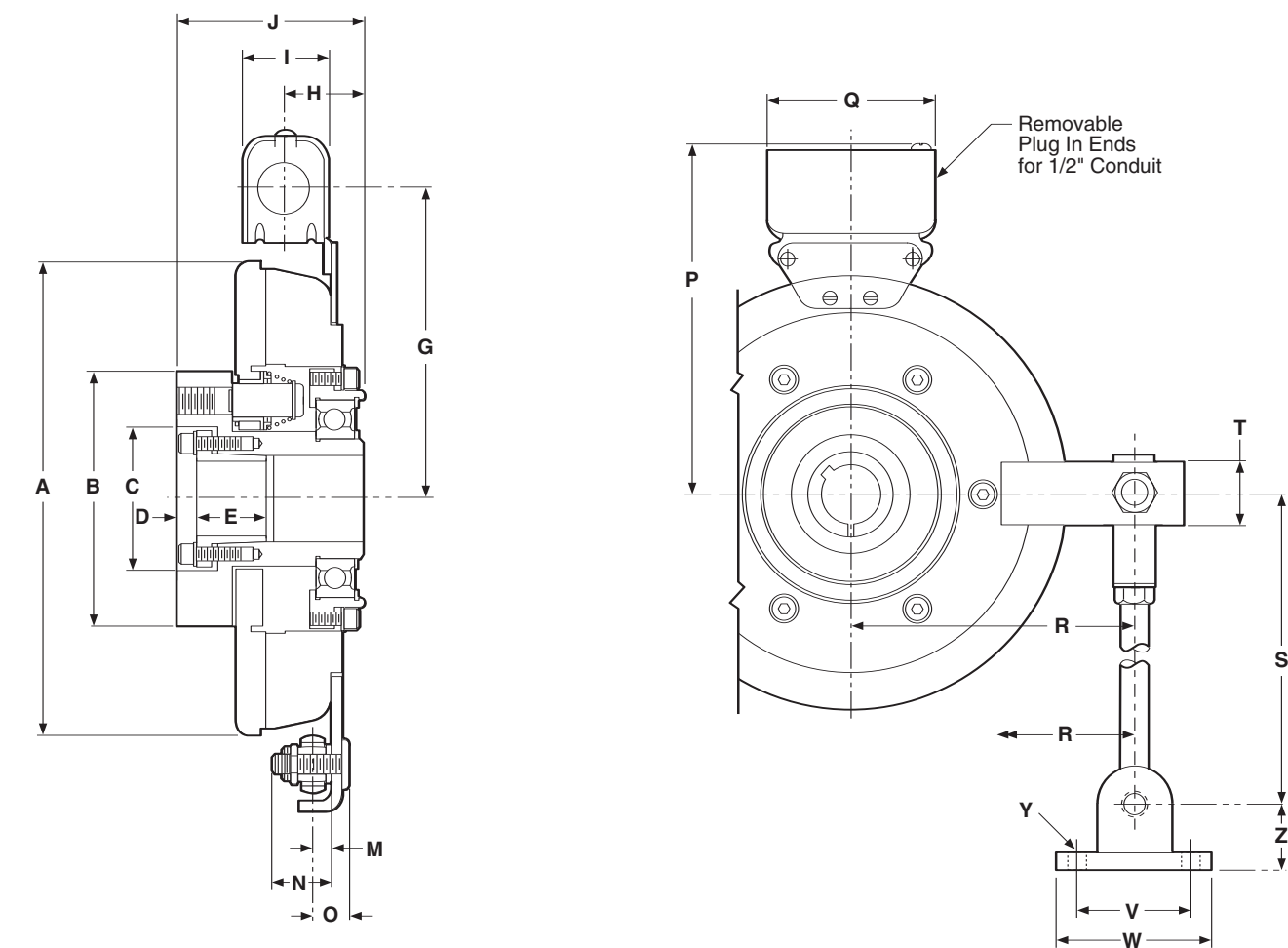
Size	A Max.	B Dia.	C Min.	D Dia.	E	F	G	H Dia.	I	J	K	L	M	N Max.	O
375	4.078	3.125	.7505	—	.031	1.656	—	1.375	3.344	10-32 UNF -3A x 1/4	.188	1.047	1.547	2.438	.844
475	5.172	4.000	1.663	1.594	—	1.000	1.000	1.781	3.875	—	—	.986	1.547	2.922	1.094
650	6.578	5.125	2.343	2.281	—	1.313	1.000	2.563	4.656	—	—	.986	1.547	3.109	1.031

Size	P	Q	R	S Max.	T	U	V	W	X	Y	Z	AA	BB	CC	DD	EE
375	.281	.625	.094 Min.	4.453	3.750	2.453	.666	1.000	8.000	.635	.359	1.500	2.000	.270 .260	.250	.781
475	.313	.531	.125 Max.	4.984	3.750	3.093	.697	1.000	10.000	.635	.391	1.500	2.000	.270 .260	.250	.781
650	.344	.641	.203 Max.	5.766	3.750	4.063	.843	1.125	11.000	.635	.438	1.500	2.000	.270 .260	.250	.781

Specifications

Model Size	Voltage DC	Static Torque (lb. ft.)	Max. Speed RPM	Inertia-WR ² (lb. ft ²)		Total Weight lbs.
				Arm. & Carrier	Hub	
EB-375	6, 24, 90	16	5000	.010	.001	4
EB-475	6, 24, 90	30	4500	.072	.006	7
EB-650	6, 24, 90	95	3600	.106	.010	11.3

EB-825

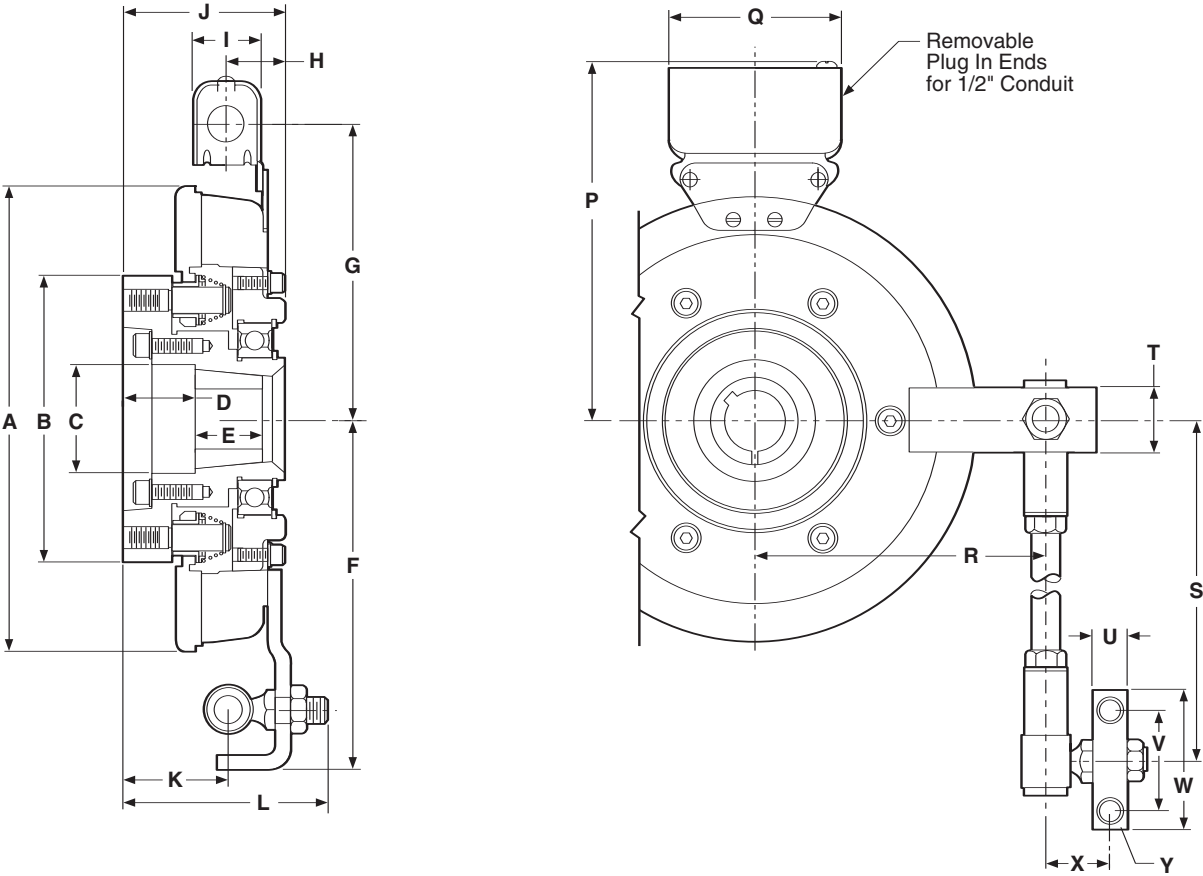


Size	A Max.	B Max.	C Dia.	D	E	F	G	H	I	J Max.	K	L	M
825	8.656	4.625	2.625	.563	1.250	–	5.281	1.344	1.547	3.375	–	–	.344

Size	N	O	P Max.	Q	R	S	T	U	V	W	X	Y	Z
825	1.031	.641	6.813	3.750	4.813	11.000	1.125	–	1.500	2.000	–	.270 .260	.781

Specifications

Model Size	Voltage DC	Static Torque lb. ft.	Max. Speed RPM	Inertia-WR ² (lb. ft ²) Arm. & Hub	Total Weight lbs.
EB-825	6, 24, 90	125	3600	.459	20



Adapter Requirements

For thru-shaft mounting, specify bore size. Order bushing separately.
For motor mounting order adapter separate (see page 59).

Size	A Max.	B Max.	C Dia.	D	E	F	G	H	I	J Max.	K	L	M
1000	10.328	6.344	2.563	1.563	1.500	7.688	6.531	1.281	1.547	3.531	2.266	4.531	–
1225	12.672	6.969	3.391	.875	1.750	8.438	7.531	1.297	1.547	3.719	2.453	4.703	–

Size	N	O	P Max.	Q	R	S	T	U	V	W	X	Y	Z
1000	–	–	7.688	3.750	–	18.000	1.500	.750	.2375	3.375	1.438	.413 .404	–
1225	–	–	8.688	3.750	–	18.000	1.500	.750	2.375	3.375	1.438	.413 .404	–

Specifications

Model Size	Voltage DC	Static Torque lb. ft.	Max. Speed RPM	Inertia-WR ² (lb. ft ²)		Total Weight lbs.
				Arm. & Hub	Hub	
EB-1000	6, 24, 90	240	2000	.720	.129	35.5
EB-1225	6, 24, 90	465	2000	1.8	.129	52.5

Rugged, Durable, Heavy Duty Clutches and Brakes

Warner Electric's AT clutches and brakes are rugged and durable.

The ATC and ATB incorporate a molded friction material/pole assembly and replaceable armature faces with a rugged, durable clutch and brake assembly. Uniquely designed for ease of application and low maintenance.

Besides providing the ultimate in long life and durability, the AT units are easily repairable and, for the first time, mounting a standard sheave, pulley or sprocket to the clutch is a snap.

The AT Clutches and Brakes feature a replaceable friction face. The results are long life, efficient operation, and minimal down time. Service kits of pre-selected parts enhance unit life.

ATC's and ATB's are completely assembled at the factory and have been specifically designed to match the torque ratings of standard motors, reducers, and other power transmission components. Easy-to-select and easy-to-install.

AT Clutches and Brakes are ideally suited for extremely rugged, heavy duty application demands.



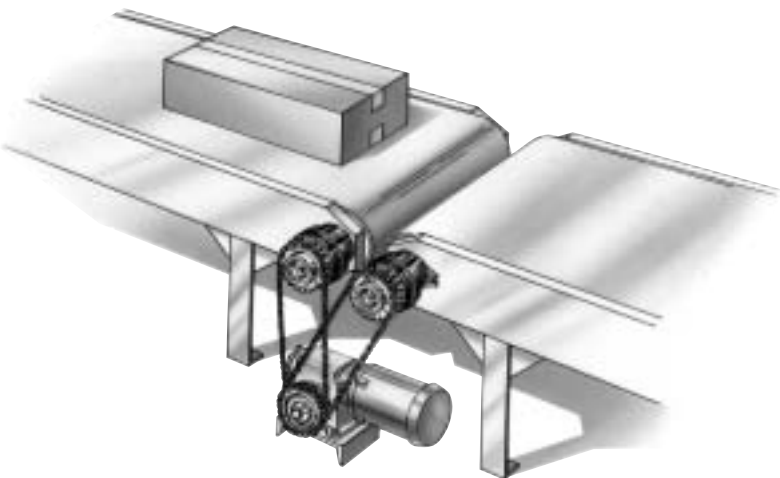
Advanced Technology Design Advantages

- Replaceable friction face
- Steel wear surface and cast iron hub/armature carrier
- Non-asbestos, split molded friction disc.
- Autogap™ provides automatic wear take-up for consistent engagement.
- Cast iron components—finned, cast iron armature carriers
- Special coil design for high temperature operation.
- Sealed heavy duty bearings
- Rugged spline drive operation
- Easy to install
- Maintenance free

Options and Accessories

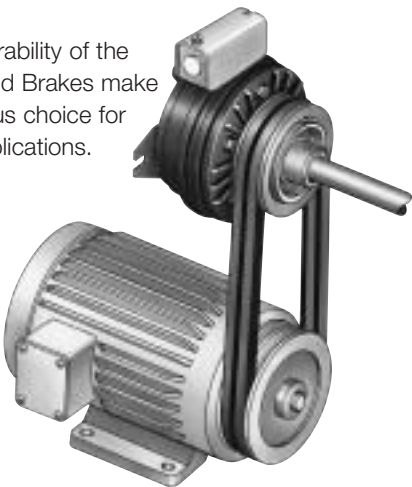
Warner Electric offers accessories and repair kits for AT clutches and brakes, including:

- Clutch field restraining straps
- Brake torque arms
- Conduit boxes
- Clutch pulleys
- Service kits

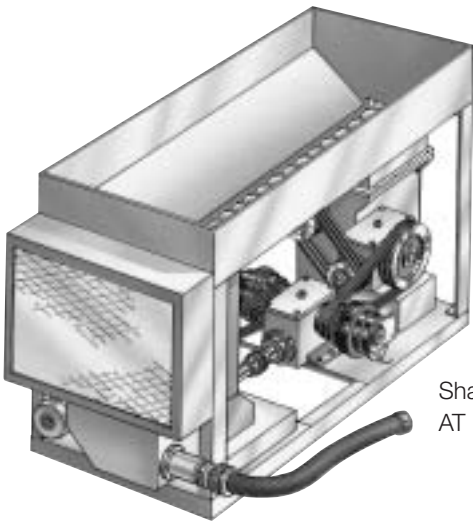
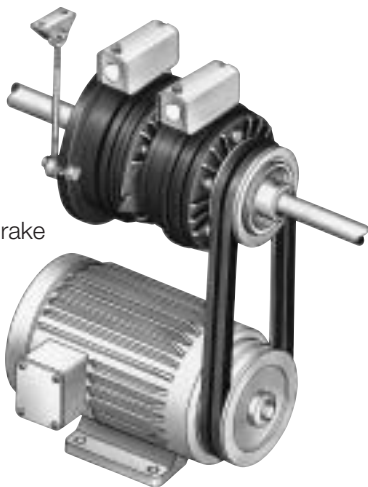


Two AT Clutches, easily mounted on conveyor headshafts, allow conveyor sections to be separately powered from a single drive.

The rugged durability of the AT Clutches and Brakes make them an obvious choice for heavy duty applications.



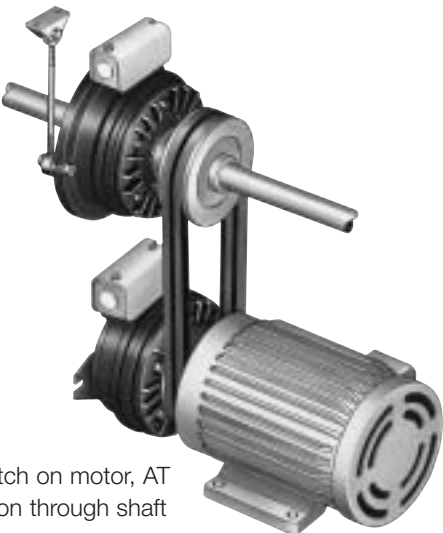
AT Clutch and AT Brake on through shaft



Shaft mounted AT Clutch



AT Clutches and Brakes are excellent for controlled torque applications.

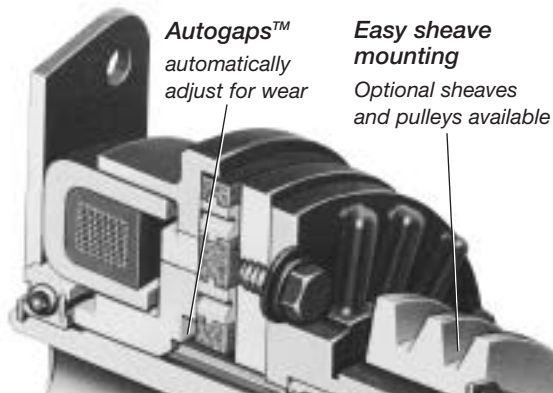


AT Clutch on motor, AT Brake on through shaft

Performance Advantages

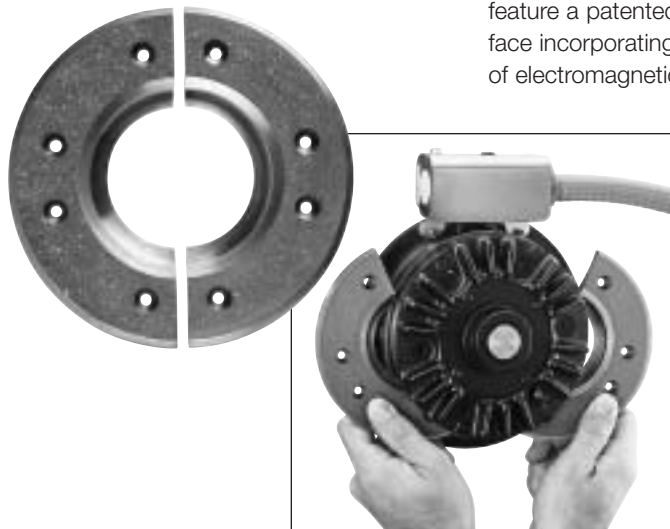
Principle of Operation

Ease of control is one of the most outstanding features of Warner Electric brakes and clutches. In operation, a magnetic field is generated as soon as current flows through the magnet coil. The magnetic poles are molded into a replaceable disc with the friction material. The electromagnetic force from the field or magnet passes through the poles to attract the armature, clamping the two together tightly. Strength of the magnetic field is directly proportional to the amount of current applied. The full torque range is completely controllable from 0 to 100% simply by turning the knob on the appropriate Warner Electric control.



Replaceable Friction Discs

The AT Electric Clutches and Brakes feature a patented replaceable friction face incorporating a unique combination of electromagnetic poles and friction material in a simple component. Easily visible friction disc indicates when replacement is necessary—providing a helpful maintenance guide. The results are long life, efficient operation, and minimal down time. Rebuild kits of pre-selected parts enhance unit life.



The split friction disc and armature are replaceable without unit disassembly in less than 5 minutes in most applications.

Autogap™ Alignment

Provides for automatic adjustment of the air gap between the wearing friction surfaces. Engagement times are consistent to maintain stopping and starting accuracy for the entire life of the unit.

Technical Considerations

Most normal duty applications will usually require a selection based only on horsepower and speed at the clutch or brake location as indicated on pages 67, 68 and 72. However, to insure the best

possible overall performance and the most cost effective unit size selection, additional factors should be considered. The main criteria are:

1. Horsepower
2. RPM
3. System inertia at the clutch or brake
4. Cycle rate and start/stop time
5. Static torque requirement, if any.

For instance, the HP and RPM sizing derived from the selection chart on page 68, may be different than the size required by the system inertia and cycle rate. In that case, the proper size is the larger size unit. Additional application information makes a very accurate and exacting unit size selection possible. To achieve this, system inertia and required cycle rate must be known.

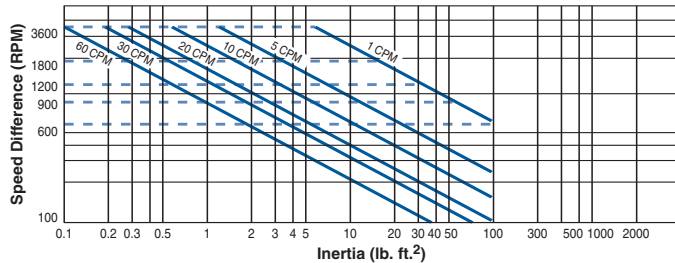
Cycle Rate

Cycle rate capability is often an important selection criteria. Cycle rate is usually defined as the number of times the clutch and/or brake is switched on and off in a minute or Cycles per Minute (CPM). In order to determine the correct size unit, both required cycle rate and reflected inertia must be known. The inertia of the AT clutch/brake components has been factored into the charts, so these need not be considered. To determine size from the charts:

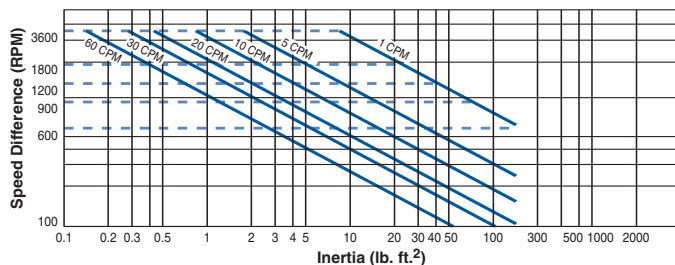
1. Estimate the size clutch or brake.
2. Read the chart for that size. The intersection of the reflected inertia (lb. ft.²) and speed difference (RPM) lines will indicate the maximum cycle rate for that size unit.
3. Compare cycle rates. If the cycle rate required falls within the units capability, proceed to step 4 below. If the required cycle rate is above the size selected, go to the next larger AT unit.
4. Verify selection. Compare the size selected in 2 and 3 above to the Horsepower/Speed simple selection made on page 68. If the size selected is not the same, choose the larger selected by the two methods.

Cycle Rate Capability

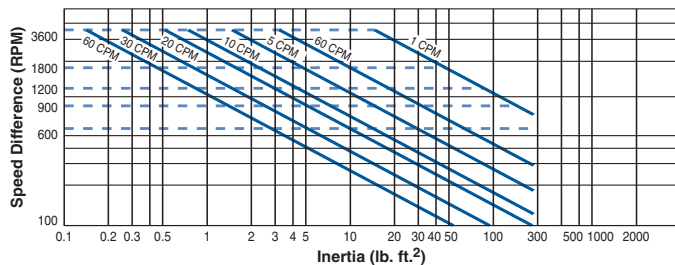
ATC 25/ATB 25



ATC 55/ATB 55

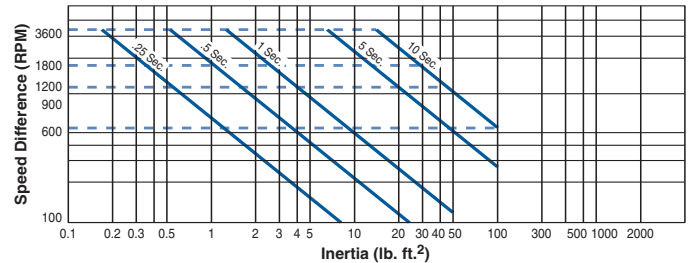


ATC 115/ATB 115

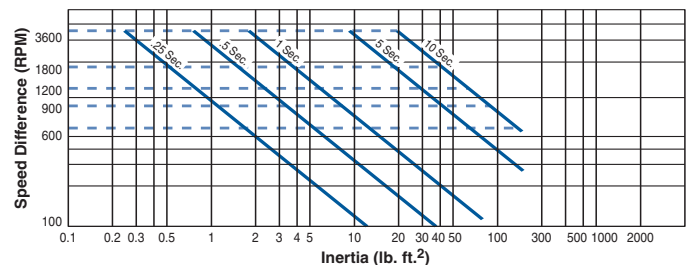


Stop/Start Time Capability

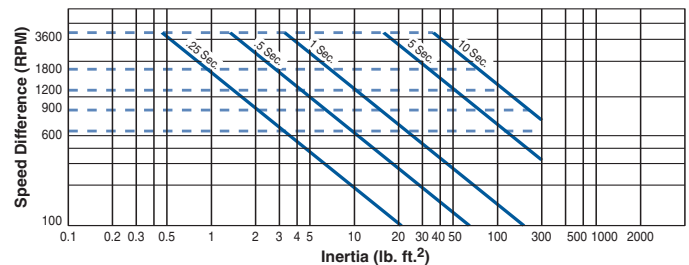
ATC 25/ATB 25



ATC 55/ATB 55



ATC 115/ATB 115

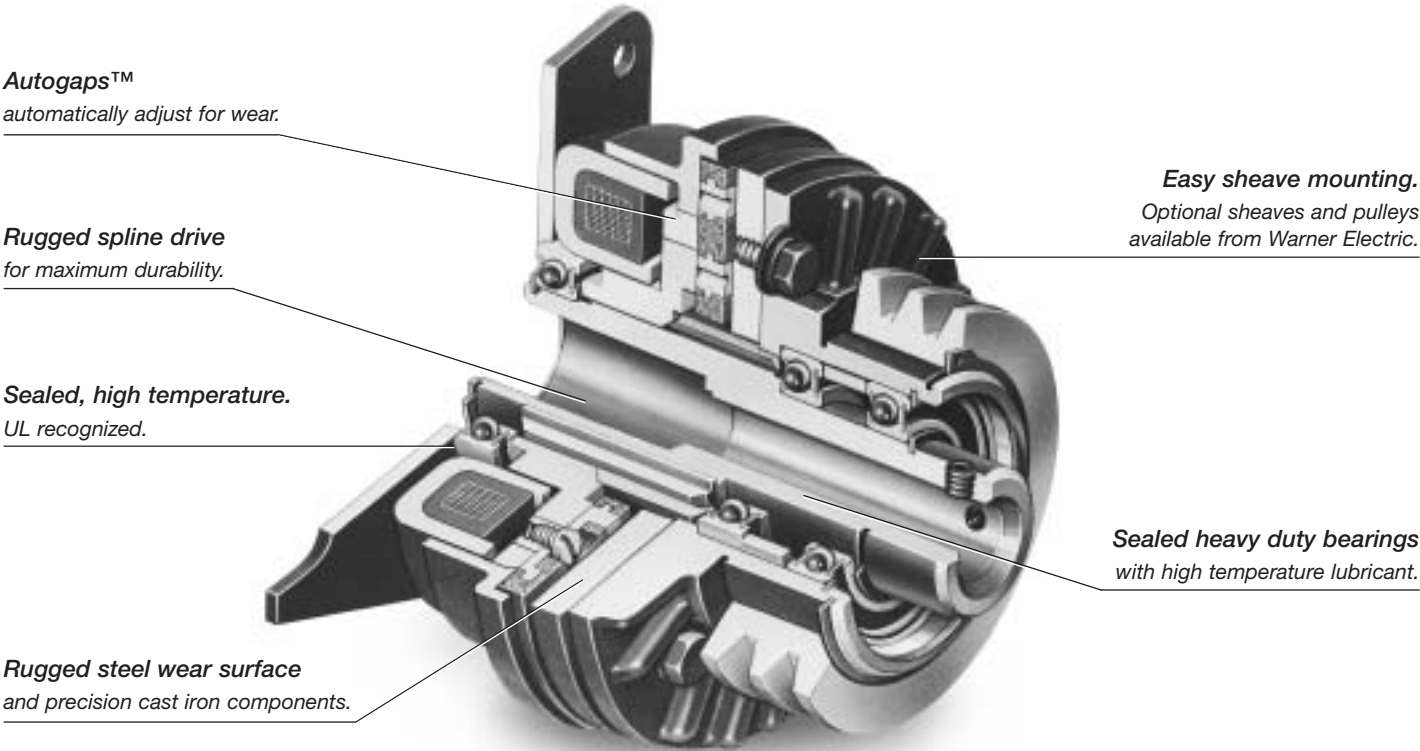


Start/Stop Times

In some applications, accelerating and/or decelerating the load within a specific time is a critical factor. In these start/stop time charts, AT unit inertias have already been factored in, so only reflected inertia need be considered. Selection for start/stop times can be made as follows:

1. Estimate the size clutch or brake required.
2. Read the chart for that size. Cross reference the speed difference (RPM) with the reflected inertia (lb. ft.²) to find the maximum start/stop capability for that size unit.
3. Compare start/stop times. If the start/stop time is equal to or less than that required for that application, the correct size unit has been selected. If shorter start/stop times are required, repeat the procedure on the chart for the next larger size unit.
4. Verify the selection. Compare the unit size chosen in steps 1, 2, and 3 to the unit size chosen by the simple Horsepower/Speed method on page 68. If the sizes selected are not identical, choose the larger selected by the two methods.

Rugged and Durable Operation



Mounting Flexibility

The ATC clutch design represents the best combination of features to allow mounting of the widest range of pulleys, sheaves or sprockets with keys and snap rings or bolts for maximum durability. The pulleys or sheaves selected as standard offerings to

support the line are matched to the torque capability of each clutch. The torques and wear lives have been designed to match industry-standard motors and reducers by shaft size and bore size.

Selection

1. Determine Model Size

Determine the motor horsepower and shaft speed (in R.P.M.) at the clutch location.

The correct size unit is shown at the intersection of HP and shaft speed.

2. Determine Bore Size

Select bore size and determine part number for correct size clutch from parts lists starting on page 69.

3. Select Options

Refer to the Standard Sheaves and Pulley chart to choose an optional Warner Electric standard pulley or obtain information for fitting other pulley or sprocket.

4. Select Control

A simple, built-in AC to DC control is optional for 90 volt AT Clutches.

Complete control information is found in the Controls Section.

Horsepower vs. Shaft Speed

HP	SHAFT SPEED (IN RPM)																	
▼	100	200	300	400	500	600	700	800	900	1000	1100	1200	1500	1800	2000	2400	3000	3600
1/4																		
1/2																		
3/4																		
1										AT-25								
1-1/2																		
2																		
3																		
5										AT-55								
7-1/2											AT-115							
10																		
15																		
20																		
25																		
30																		
35																		

Optional Equipment

Standard Sheaves and Pulleys

Sheave Pulley Type	Clutch or Brake Size	No. Grooves No. Teeth	Part Number	Pitch Diameter	Width	Dimensions O.D.
Timing Belt	25	26H100	689-0256	4.138"	1.312"	4.244"
	55	30H100	689-0278	4.755"	1.312"	4.881"
	115	40H150	689-0257	6.366"	1.812"	6.472"
"A" Section	25	1G3.60	689-0267	3.600"	.750"	3.850"
	55	2G4.80	689-0308	4.800"	1.445"	5.050"
	115	3G6.00	689-0271	6.000"	2.000"	6.250"
"3V" Section	25	1G3.65	689-0259	3.600"	.695"	3.650"
	55	2G4.12	689-0315	4.070"	1.094"	4.120"
	115	3G5.30	689-0263	5.250"	1.515"	5.300"
"B" Section	115	2G6.00	689-0275	6.000"	1.750"	6.350"

Other Sheaves, Pulleys and Sprockets

The unique AT Clutch design permits the installation of any customer provided sheave, pulley or sprocket that can be bored out and key seated to the Bore-to-Size dimensions shown on page 71.

Sprockets

The AT clutch design permits installation of customer supplied sprockets. Minimum size sprocket requirements found in the chart below can be bored out and drilled to the dimensions in that chart.

Part Numbers

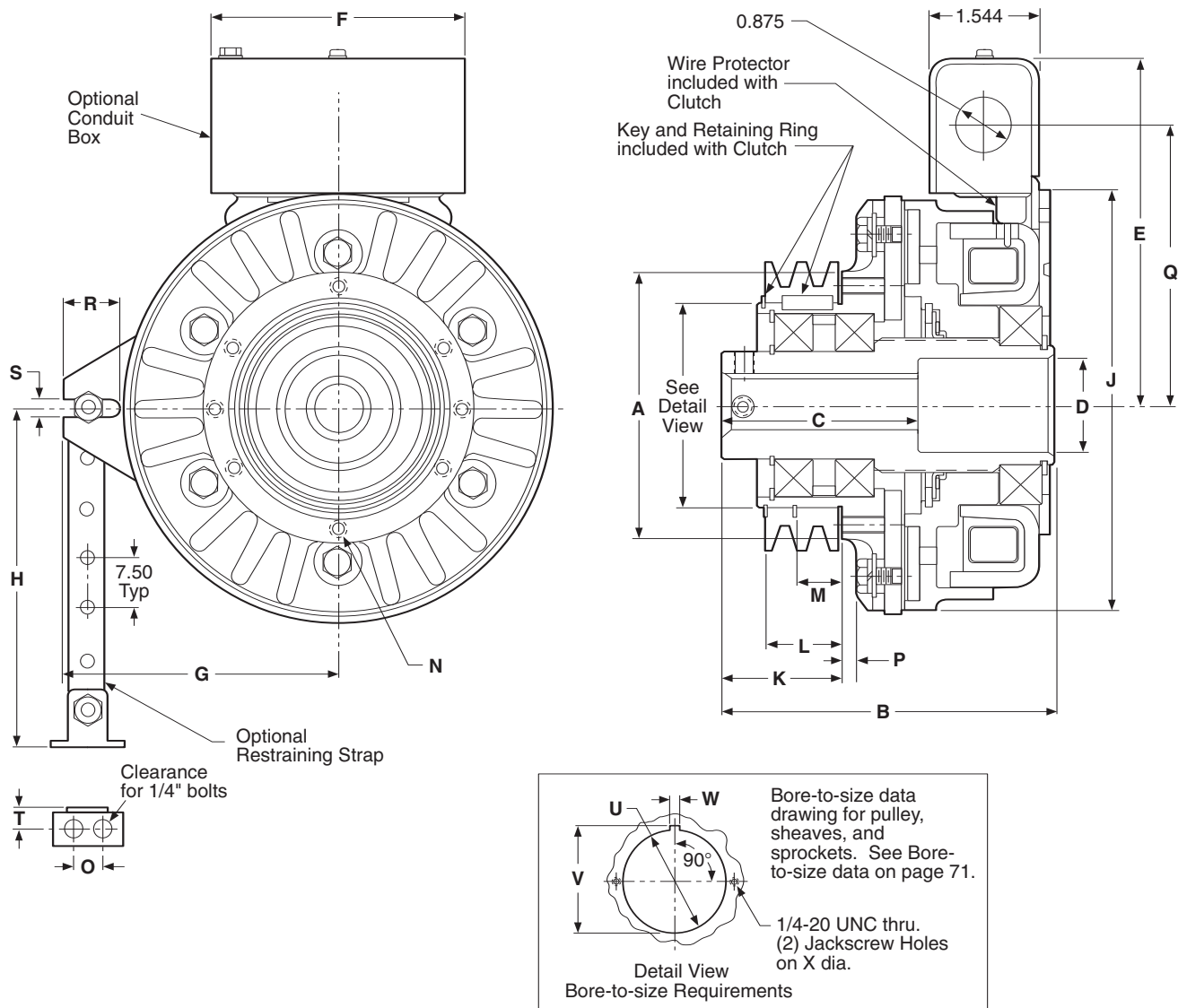
Model Size	Bore Size	Voltage DC	Part No.
ATC-25	1/2"	6	5161-271-002
		24	5161-271-010
		90	5161-271-003
	5/8"	6	5161-271-004
		24	5161-271-011
		90	5161-271-005
	3/4"	6	5161-271-006
		24	5161-271-012
		90	5161-271-007
	7/8"	6	5161-271-008
		24	5161-271-013
		90	5161-271-009
ATC-55	3/4"	6	5162-271-002
		24	5162-271-010
		90	5162-271-003
	7/8"	6	5162-271-004
		24	5162-271-011
		90	5162-271-005
	1"	6	5162-271-006
		24	5162-271-012
		90	5162-271-007
	1-1/8"	6	5162-271-008
		24	5162-271-013
		90	5162-271-009
ATC-115	1-1/8"	6	5163-271-002
		24	5163-271-010
		90	5163-271-003
	1-1/4"	6	5163-271-004
		24	5163-271-011
		90	5163-271-005
	1-3/8"	6	5163-271-006
		24	5163-271-012
		90	5163-271-007
	1-1/2"	6	5163-271-008
		24	5163-271-013
		90	5163-271-009

Minimum Size Sprockets for Pilot Mount

Chain Size	Clutch Size		
	25	55	115
25	54T	—	—
35	35T	40T	—
41/40	28T	30T	40T
50	22T	24T	30T
60	—	20T	24T
80	—	—	20T
100	—	—	—
120	—	—	—
Bore size	2.500/2.502/ (63.500/63.551)	3.000/3.002/ (76.200/76.251)	4.00/4.002/ (101.600/101.651)
Bolt Circle	3.000/(76.200)	3.500/(88.900)	4.750/(120.650)
No. Holes and Sizes	(3) .281/[(3) 7.144]	(4) .281/[(4) 7.144]	(4) .344/[(4) 8.731]

Note: Spacer may be required to avoid chain interference with clutch.

ATC-25, ATC-55, ATC-115



Specifications

Model Size	Voltage DC	Unit	Inertia*-WR ² (lb.ft. ²)	Max. RPM	Weight (lbs.)	Static Torque (lb.ft.)	Dynamic Torque @ 1800 RPM
25	6	Clutch	.048	3600	8	25	12 lb. ft.
	24		.048	3600	8	25	12 lb. ft.
	90		.048	3600	8	25	12 lb. ft.
55	6	Clutch	.173	3600	18	55	20 lb. ft.
	24		.173	3600	18	55	20 lb. ft.
	90		.173	3600	18	55	20 lb. ft.
115	6	Clutch	.483	3600	28	115	30 lb. ft.
	24		.483	3600	28	115	30 lb. ft.
	90		.483	3600	28	115	30 lb. ft.

() denotes millimeters

Model	A Max. Dia.	B Max.	C Nom.	D Nom. Dia.	E Max.	F Max.	G Max.	H Max.	J Max. Dia.	K Max.	L Nom.	M Max.	T Nom.
25	3.60 (91.44)	4.39 (111.51)	2.375 (60.33)	1.080 (27.43)	4.748 (120.60)	3.767 (95.68)	3.282 (83.36)	5.11 (129.79)	4.822 (122.49)	1.68 (42.67)	1.003/.991 (25.48/25.17)	.715/.703 (18.16/17.86)	.375 (9.53)
55	3.95 (100.33)	4.935 (125.35)	2.925 (74.30)	1.40 (35.56)	5.182 (131.62)	3.767 (95.682)	4.032 (102.412)	5.11 (129.792)	6.275 (159.39)	1.817 (46.152)	1.113/1.101 (28.27/27.97)	—	.375 (9.53)
115	5.254 (133.452)	5.977 (151.822)	3.102 (78.792)	1.86 (47.242)	6.089 (154.662)	3.767 (95.682)	4.246 (107.852)	10.11 (256.792)	7.906 (200.812)	2.467 (62.662)	1.539/1.523 (39.09/38.68)	—	.375 (9.53)

Model	No. of Holes	N Thread Size	Max. Depth	Bolt Circle	O Nom.	P Nom.	Q Nom.	R Min.	S Min.
25	3	1/4-20	.500	3.00	.500 (12.7)	.036 (0.91)	3.586 (91.10)	.752 (19.08)	.279 (7.09)
55	4	1/4-20	.635	3.50	.500 (12.7)	.081 (2.06)	4.156 (105.56)	.722 (18.34)	.265 (6.73)
115	4	5/16-18	.830	4.75	.500 (12.7)	.237 (6.02)	4.927 (125.15)	.504 (12.80)	.265 (6.73)

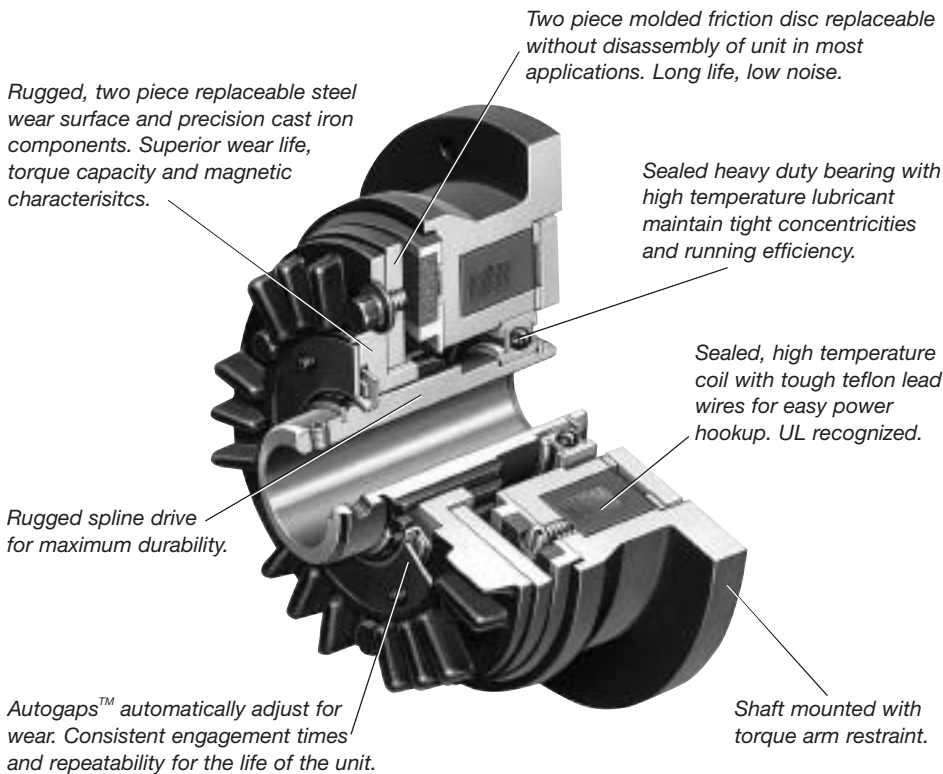
Bore to Size Data

Model	U Bore Dia.	V Keyway Height	W Keyway Width	X Bolt Circle
25	2.502/2.500 (63.55/63.50)	2.601/2.591 (66.06/65.81)	.1905/.1855 (4.84/4.79)	3.00 (76.20)
55	3.002/3.000 (76.25/76.20)	3.099/3.089 (78.71/78.46)	.1905/.1885 (4.84/4.79)	3.50 (88.90)
115	4.002/4.000 (101.65/101.60)	4.127/4.117 (104.83/104.57)	.378/.376 (9.60/9.55)	4.50 (114.30)

Bore Size and Keyways

Size	Unit Bore (in.)	Unit Bore (mm)	Key
ATC-25	.5025	12.76	1/8 Sq.
	.5005	12.71	
	.6275	15.94	3/16 Sq.
ATC-25	.6255	15.89	3/16 Sq.
	.7525	19.11	
ATC-55	.7505	19.06	3/16 Sq.
ATC-25	.8775	22.29	3/16 Sq.
	.8755	22.24	
ATC-55	1.0025	25.46	1/4 Sq.
	1.0005	25.41	
ATC-55	1.1275	28.64	1/4 Sq.
	1.1255	28.59	
ATC-115	1.2525	31.81	1/4 Sq.
	1.2505	31.76	
	1.3775	34.99	5/16 Sq.
	1.3755	34.94	
	1.5025	38.16	3/8 Sq.
	1.5005	38.11	

Replaceable Armature Faces Assure Minimum Downtime



ATB Brakes are completely assembled at the factory and have been specifically designed to match the torque ratings of standard motors, reducers, and other power transmission components. They feature a replaceable friction face, which has been designed to provide superior wear life with reduced engagement noise level wear and consistent torque capacity. Wear surfaces can, in many cases, be replaced without removing the unit from the shaft.

4. Select Control

A simple, built-in AC to DC control is optional for 90 volt AT Brakes.

Complete control information is found in the Controls Section. Selection is by required function.

Ordering Information

Part Numbers

Model Size	Bore Size	Voltage DC	Part No.
ATB-25	1/2"	6	5191-170-002
		24	5191-170-010
		90	5191-170-003
	5/8"	6	5191-170-004
		24	5191-170-011
		90	5191-170-005
	3/4"	6	5191-170-006
		24	5191-170-012
		90	5191-170-007
	7/8"	6	5191-170-008
		24	5191-170-013
		90	5191-170-009
ATB-55	3/4"	6	5192-170-002
		24	5192-170-010
		90	5192-170-003
	7/8"	6	5192-170-004
		24	5192-170-011
		90	5192-170-005
	1"	6	5192-170-006
		24	5192-170-012
		90	5192-170-007
	1-1/8"	6	5192-170-008
		24	5192-170-013
		90	5192-170-009
ATB-115	1-1/8"	6	5193-170-002
		24	5193-170-010
		90	5193-170-003
	1-1/4"	6	5193-170-004
		24	5193-170-011
		90	5193-170-005
	1-3/8"	6	5193-170-006
		24	5193-170-012
		90	5193-170-007
	1-1/2"	6	5193-170-008
		24	5193-170-013
		90	5193-170-009

Selection

1. Determine Model Size

Determine the motor horsepower and shaft speed (in R.P.M.) at the brake location.

The correct size unit is shown at the intersection of HP and shaft speed in the chart below.

2. Determine Bore Size

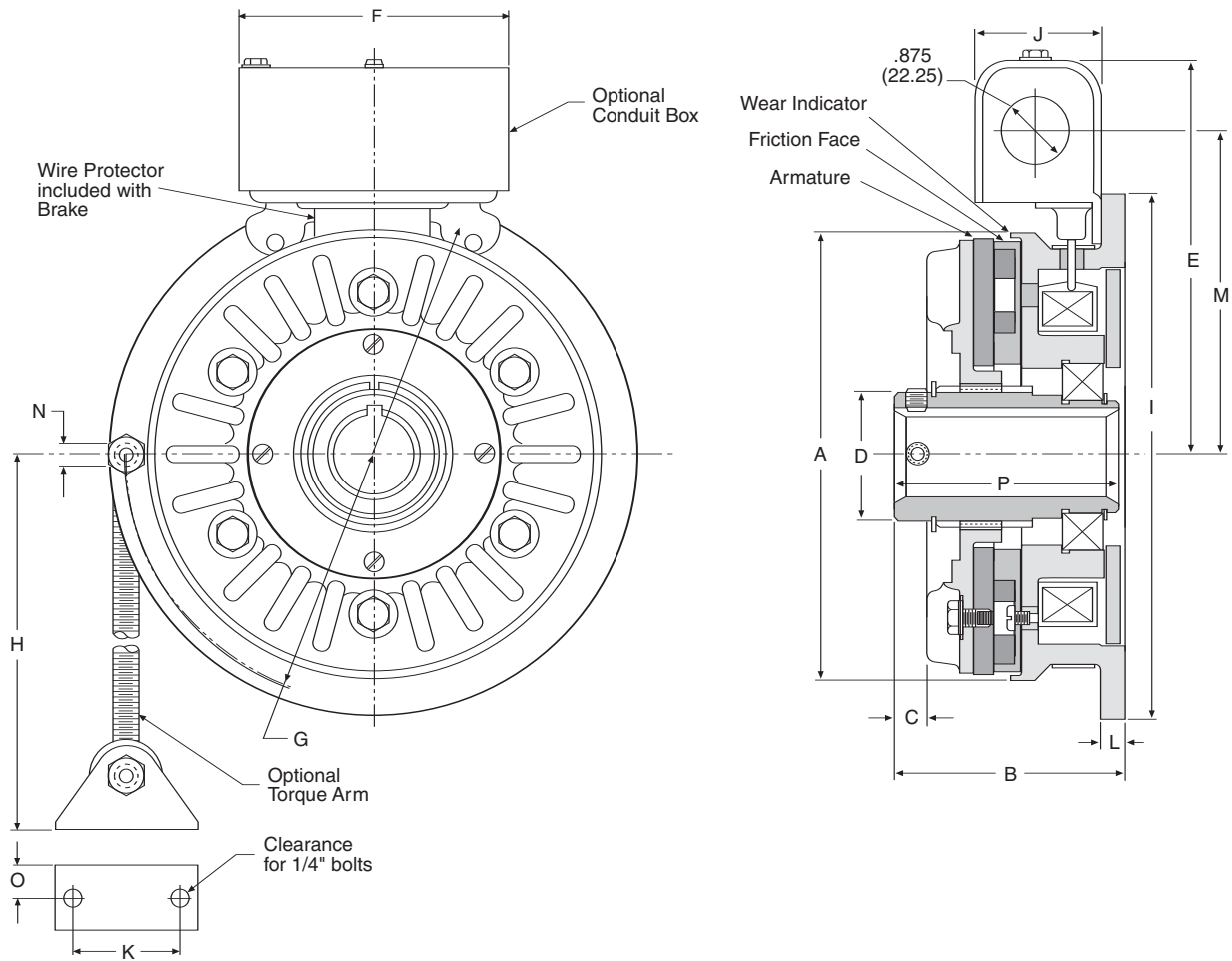
Select bore size and determine part number for correct size brake from parts lists starting on this page.

3. Select Options

Refer to the Standard Sheaves and Pulley chart to choose an optional Warner Electric standard pulley or obtain information for fitting other pulleys or sprockets.

Horsepower vs. Shaft Speed

HP	SHAFT SPEED (IN RPM)																		
▼	100	200	300	400	500	600	700	800	900	1000	1100	1200	1500	1800	2000	2400	3000	3600	
1/4																			
1/2																			
3/4																			
1											AT-25								
1-1/2																			
2																			
3																			
5											AT-55								
7-1/2											AT-115								
10																			
15																			
20																			
25																			
30																			
35																			



() denotes millimeters

Model	A Max. Dia.	B Max.	C Min. Dia.	D Max.	E Nom.	F Max.	G Nom.	H Max.
25	4.822 (122.48)	2.843 (72.21)	.354 (8.99)	1.345 (34.16)	4.748 (120.60)	3.767 (95.68)	2.406 (61.11)	9.03 (229.36)
55	6.271 (159.28)	3.224 (91.89)	.281 (7.14)	1.756 (44.83)	5.37 (136.40)	3.767 (95.68)	3.00 (76.20)	11.19 (284.23)
115	7.906 (200.81)	4.115 (104.52)	.687 (17.45)	2.150 (54.61)	6.278 (159.46)	3.767 (95.68)	3.781 (96.04)	11.19 (284.23)

Model	I Max. Dia.	J Nom.	K Min. Nom.	L Max.	M Nom.	N Min.	O Nom.	P Max.
25	5.760 (146.30)	1.544 (39.22)	1.500 (38.10)	.195 (4.95)	3.586 (91.08)	.280 (7.11)	.312 (7.92)	2.765 (70.23)
55	7.375 (187.33)	1.544 (39.22)	1.50 (38.10)	.491 (12.47)	4.208 (106.88)	.375 (9.53)	.375 (9.53)	3.105 (78.87)
115	9.00 (228.60)	1.544 (39.22)	1.50 (38.10)	.463 (11.76)	5.116 (129.95)	.375 (9.53)	.375 (9.53)	3.955 (100.46)

Bore Sizes and Keyways

Size	Unit Bore		Key
ATB-25	.5025	12.76	1/8 Sq.
	.5005	12.71	
	.6275	15.94	3/16 Sq.
ATB-25	.6255	15.89	3/16 Sq.
	.7525	19.11	
ATB-55	.7505	19.06	3/16 Sq.
ATB-25	.8775	22.29	3/16 Sq.
ATB-55	.8755	22.24	3/16 Sq.
ATB-55	1.0025	25.46	1/4 Sq.
	1.0005	25.41	
ATB-55	1.1275	28.64	1/4 Sq.
ATB-115	1.1255	28.59	1/4 Sq.
ATB-115	1.2525	31.81	1/4 Sq.
	1.2505	31.76	
	1.3775	34.99	5/16 Sq.
	1.3755	34.94	
	1.5025	38.16	3/8 Sq.
	1.5005	38.11	3/8 Sq.

Specifications

Model Size	Voltage DC	Static Torque lb. ft.	Max. RPM	Weight lbs.	Inertia-WR ² lb.-ft. ²	Dynamic Torque @ 1800 RPM
25	6, 24 or 90	25	3600	7	.038	12 lb. ft.
55	6, 24 or 90	55	3600	15	.126	20 lb. ft.
115	6, 24 or 90	115	3600	24	.383	30 lb. ft.

Service Parts

Packaged Performance Products

Shaft Mounted Clutches

Warner Electric's packaged stationary field clutches are factory assembled and burnished to deliver the maximum rated torque immediately. In addition, a packaged product assures that all engineering factors regarding the proper alignment of components to one another have been established at the factory. This allows the unit to be 'slid on the shaft' after being shipped to you. The proper alignment of components is critical to achieving maximum torque and assuring long life.

Features

- No assembly required
- Burnished for 'out-of-the box' torque
- Anti-backlash armatures standard
- Ball bearing mounted field and armature hub
- Two sizes available
250 – 70 in.lb. static torque
400 – 270 in.lb. static torque
- Standard bore sizes and voltages

No brushes to wear out

Besides saving valuable assembly and run-in time, the SFP clutches incorporate an original Warner Electric concept. The concept of the stationary field eliminates the need for brushes. Brushes can be a high maintenance item in an electromagnetic clutch because of the mechanical friction seen at the collector ring. There is no mechanical friction with the stationary field design. In sum, all of the best possible features wrapped up into one compact package - **Warner Electric's SFP.**



SFP-250

Three standard bore sizes:
3/8", 7/16", 1/2" *

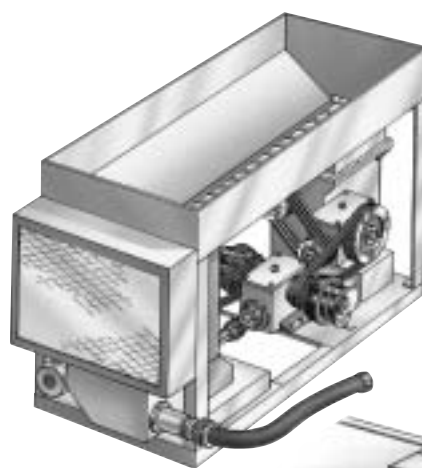
Three standard voltages:
6, 24 and 90 Volts DC

*Consult factory for 5/8" availability

SFP-400

Five standard bore sizes:
1/2", 5/8", 3/4", 7/8", 1"

Three standard voltages:
6, 24 and 90 Volts DC

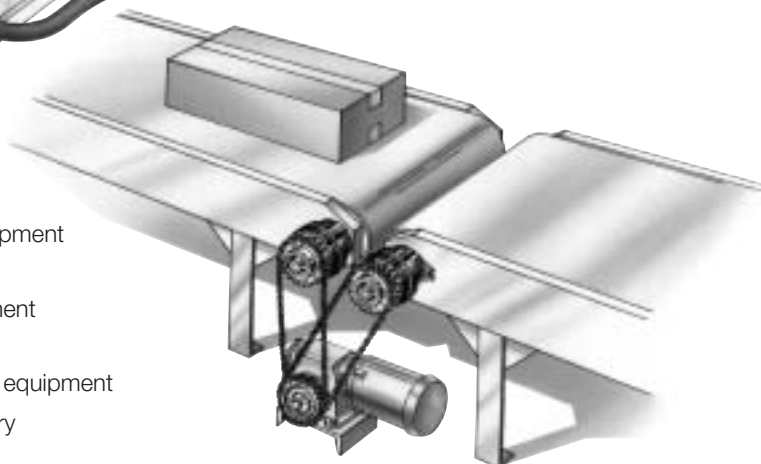


Applications

- Controlled, soft starts
- Speed variation
- Reversing
- Overload disconnect
- High cycling

Functions

- Packaging equipment
- Film readers
- Medical equipment
- Conveyors
- Sorting/feeding equipment
- Textile machinery



Specifications

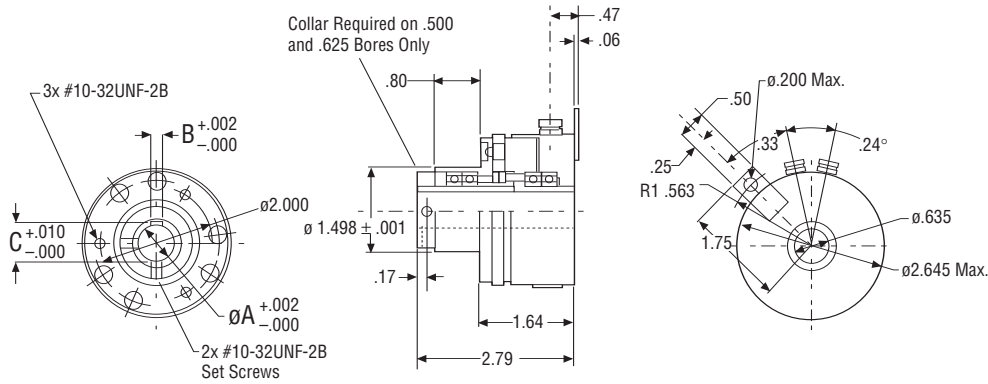
Model	Static Torque	Max.RPM
SFP-250	70 in.lb.	7500
SFP-400	270 in.lb.	5000

How to Order

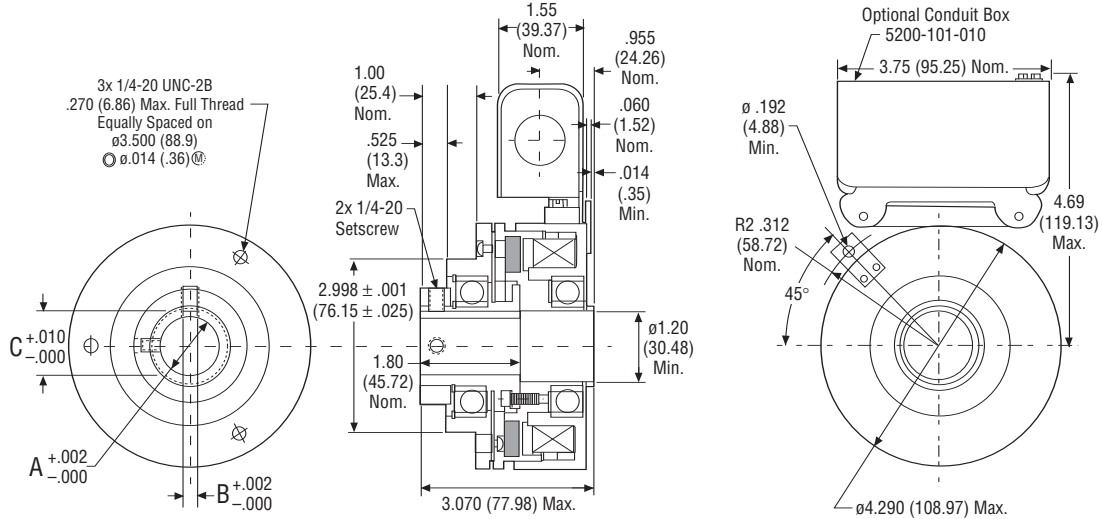
1. Select the proper size from the chart (right).
2. Select the bore size and voltage.
3. Find the corresponding part number from the table below.
4. Select a Warner Electric Control if appropriate.

HP	SHAFT SPEED AT CLUTCH (IN RPM)																				
▼	100	200	300	400	500	600	700	800	900	1000	1100	1200	1500	1800	2000	2400	3000	3600	4000	4600	5000
1/50																					
1/20																					
1/12																					
1/8											250										
1/6																					
1/4																					
1/3																					
1/2																					
3/4											400										
1																					
1-1/2																					
2																					
3																					

SFP-250



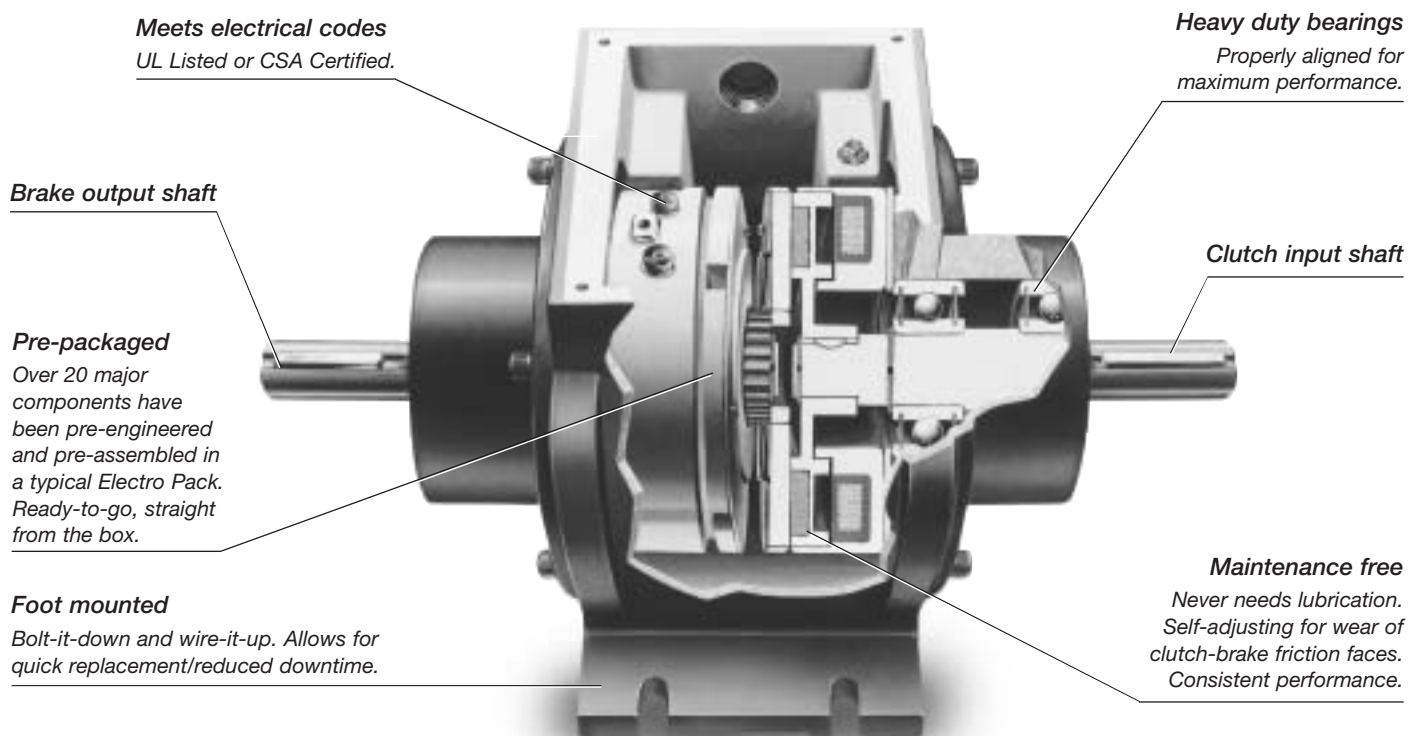
SFP-400



Tolerances

Model No.	A Bore	Keyway		Part Number		
		B	C	6V	24V	90V
SFP-250	.375"	.0948	.421	5103-271-002	5103-271-006	5103-271-010
	.438"	.126	.479	5103-271-003	5103-271-007	5103-271-011
	.500"	.126	.560	5103-271-004	5103-271-008	5103-271-012
	.6255	.1885	.678	5103-271-005	5103-271-009	5103-271-013
	.5005"	.125	.560	5104-271-006	5104-271-016	5104-271-021
SFP-400	.6255"	.1875	.709	5104-271-007	5104-271-017	5104-271-022
	.7505"	.1875	.837	5104-271-008	5104-271-018	5104-271-023
	.8755"	.1875	.964	5104-271-009	5104-271-019	5104-271-024
	1.0005"	.1875	1.090	5104-271-010	5104-271-020	5104-271-025

Base Mounted Clutch/Brake Combinations in a Rugged Housing



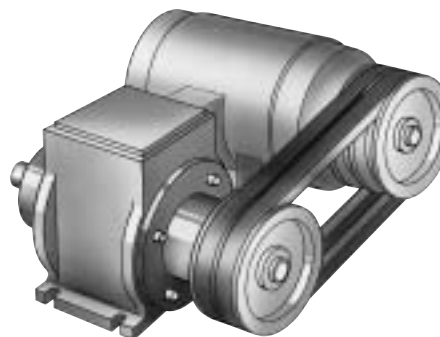
Electro Packs are rugged, pre-assembled clutch and brake combinations in an enclosed, foot mounted housing.

They are factory aligned and pre-assembled and have been designed to mate easily with industry standard motors and reducers with v-belts, pulleys, chain and sprockets, in line couplings and timing belt drives.

Features

- Bolt-it-down and wire-it-up . . . it's ready to go!
- Maintenance free
- A wide torque range from 15 lb. in. to 1350 lb. ft.

Typical Application



A foot mounted Electro Pack combines with a motor in a parallel shaft drive application.

Horsepower vs. Shaft Speed

HP ▼	SHAFT SPEED AT CLUTCH (IN RPM)																					
	100	200	300	400	500	600	700	800	900	1000	1100	1200	1500	1800	2000	2400	3000	3600	4000	4500	5000	
1/50										EP-170												
1/20																						
1/12																						
1/8																						
1/6										EP-250												
1/4																						
1/3																						
1/2																						
3/4										EP-400												
1																						
1-1/2																						
2										EP-500												
3																						
5																						
7-1/2																						
10										EP-1000												
15																						
20																						
25																						
30																						
40										EP-1525HT												

Selection Procedure

Determine the shaft speed at the Electro Pack location. The number listed at the intersection of horsepower and speed is the size Electro Pack you require.

Part Numbers

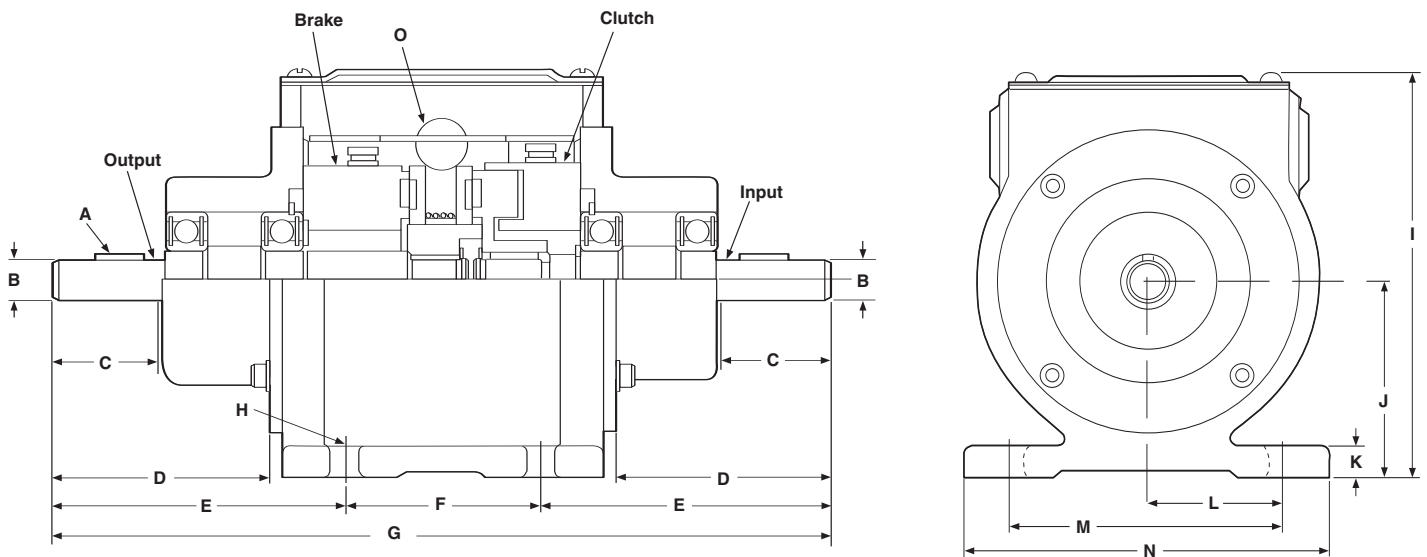
Model No.	Voltage DC	Part No.
EP-170	6	5633-273-002
	24	5633-273-003
	90	5633-273-005
EP-250	6	5130-273-031
	24	5130-273-032
	90	5130-273-034
EP-400	6	5131-273-009
	24	5131-273-010
	90	5131-273-011
EP-500	6	5230-273-003
	24	5230-273-011
	90	5230-273-002
EP-825	6	5231-273-003
	24	5231-273-004
	90	5231-273-002
EP-1000	6	5232-273-003
	24	5232-273-005
	90	5232-273-002
EP-1525	6	5234-273-003
	90	5234-273-002
EP-1525HT	24	5234-273-017
	90	5234-273-012

When ordering, specify size, voltage, and part numbers.

Specifications

Electro-Pack Size	Horsepower @ 1800 RPM	Static Torque	Max. RPM	Voltage DC
EP-170	1/8	15 lb. in.	10,000	6, 24 or 90
EP-250	1/2	70 lb. in.	7,500	6, 24 or 90
EP-400	1	270 lb. in.	4,500	6, 24 or 90
EP-500	2	50/40 lb. ft.	4,000	6, 24 or 90
EP-825	7-1/2	125 lb. ft.	3,600	6, 24 or 90
EP-1000	10	240 lb. ft.	3,000	6, 24 or 90
EP-1525	25	700 lb. ft.	1,800	6 or 90
EP-1525HT	40	1350 lb. ft. clutch 700 lb. ft. brake	1,800	24, 90

EP-170, EP-250, EP-400

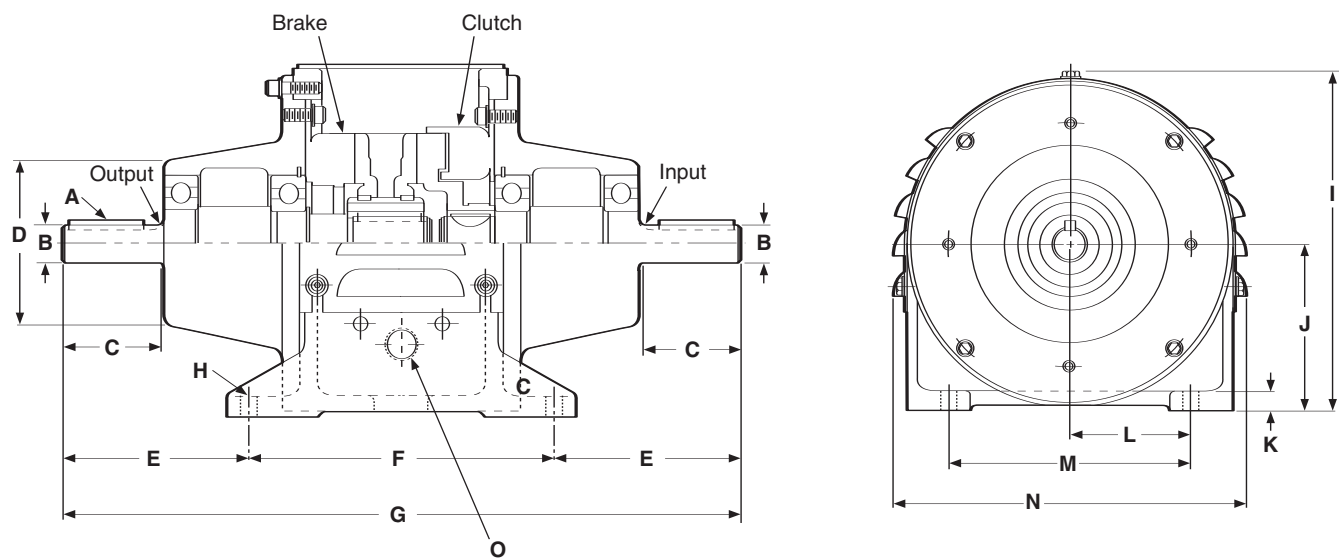


All dimensions are nominal, unless otherwise noted.

Size	A	B	C Min.	D	E	F	G Max.	H	I	J	K	L	M	N	O
170	3/32 x 3/64	.3745 .3735 Dia.	.750	1.406	2.203	1.500	6.000	.250 Wide (4 slots)	3.437	1.662 1.652	.312	1.110	2.220	3.250	1/2 14 NPT Conduit x 2
250	1/8 x 1/16	.4995 .4985 Dia.	1.250	2.468	3.312	2.250	8.968	.312 Wide (4 slots)	5.281	2.318 2.308	.375	1.625	3.250	4.250	1/2 14 NPT Conduit x 2
400	3/16 x 3/16 x 1-1/2	.7495 .7485	1.875	3.515	4.593	2.500	11.781	.312 Wide (4 slots)	6.937	3.474 3.464	.500	2.578	5.156	6.000	1/2 14 NPT Conduit x 2

Specifications

Model Size	Voltage DC	Static Torque lb. in.	Inertia*-WR ² (lb-in ²)		Max. RPM	Weight lbs.
			Output	Input		
EP-170	6	15	.031	.036	10,000	2.5
	24	15	.031	.036	10,000	2.5
	90	15	.031	.036	10,000	2.5
EP-250	6	70	.331	.293	7,500	7.1
	24	70	.331	.293	7,500	7.1
	90	70	.331	.293	7,500	7.1
EP-400	6	270	2.566	2.222	4,500	19.7
	24	270	2.566	2.222	4,500	19.7
	90	270	2.566	2.222	4,500	19.7



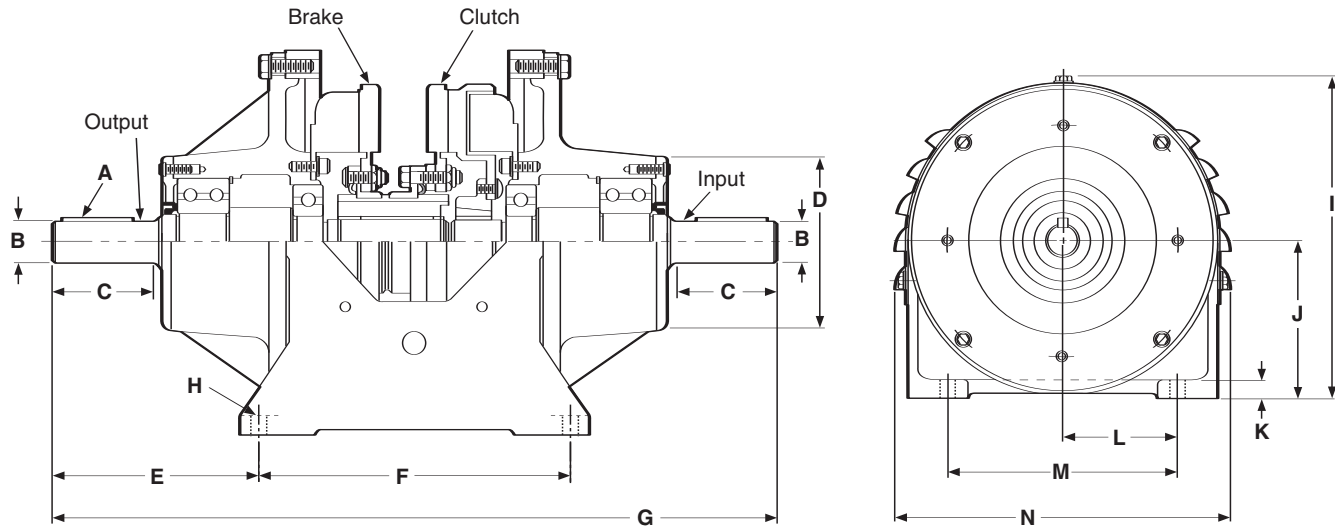
All dimensions are nominal, unless otherwise noted.

Size	A	B Dia.	C Min.	D Max. Dia.	E	F	G Max.	H Dia. (4 holes)	I	J	K	L	M	N Max.	O
500	3/16 x 1-3/4	.8750 .8745	2.218	3.796	4.234	7.000	15.515	.406 (4 holes)	8.218	4.004 3.992	.500	2.937	5.875	8.734	1/2 NPT Conduit x 2

Specifications

Model Size	Voltage DC	Unit	Static Torque	Inertia*-WR ² lb.ft. ²	Max. RPM	Weight lbs.
EP-500	6, 24 and 90	Clutch Brake	50 40	.039 .063	4000	56

EP-825



All dimensions are nominal, unless otherwise noted.

Size	A	B Dia.	C Min.	D Max. Dia.	E	F	G Max.	H	I	J	K	L	M	N Max.
825	1/4 x 1/4 x 2	<u>1.1250</u> 1.1245	2.875	5.000	5.734	8.500	20.031	.406 Dia. (4 holes)	10.812	<u>5.254</u> 5.252	.562	4.250	8.500	11.609

Specifications EP-825

Model Size	Voltage DC	Unit	Static Torque	Inertia*~WR ² lb.ft. ²	Max. RPM	Weight lbs.
EP-825	6, 24 & 90	Clutch	125	.651	3600	123
		Brake	125	.242		

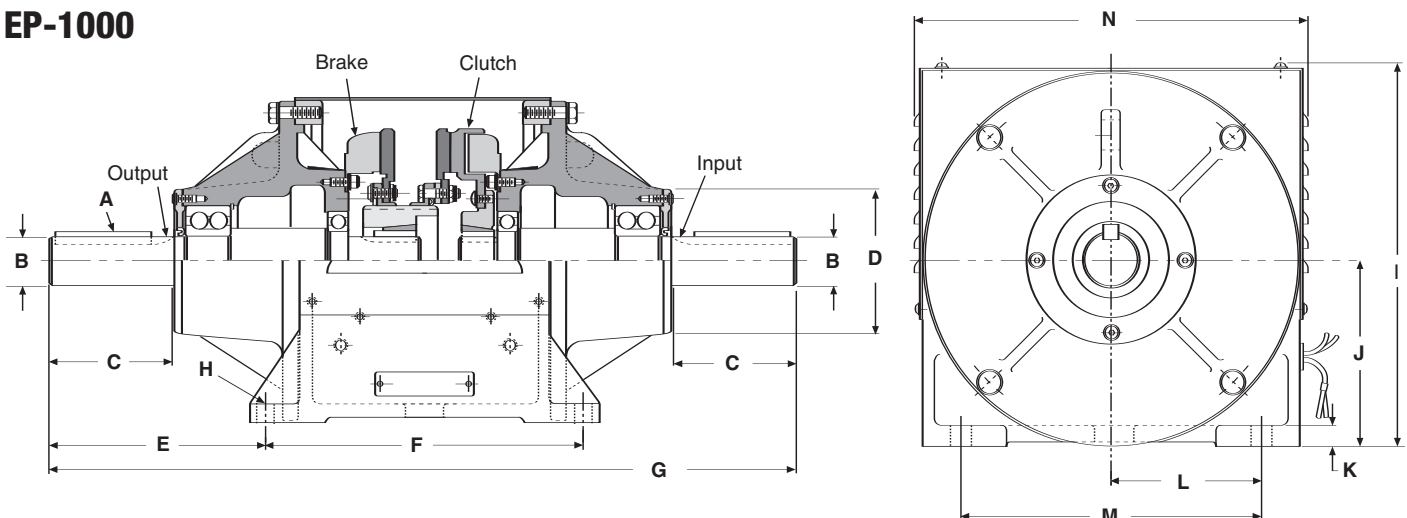
Specifications EP-1000

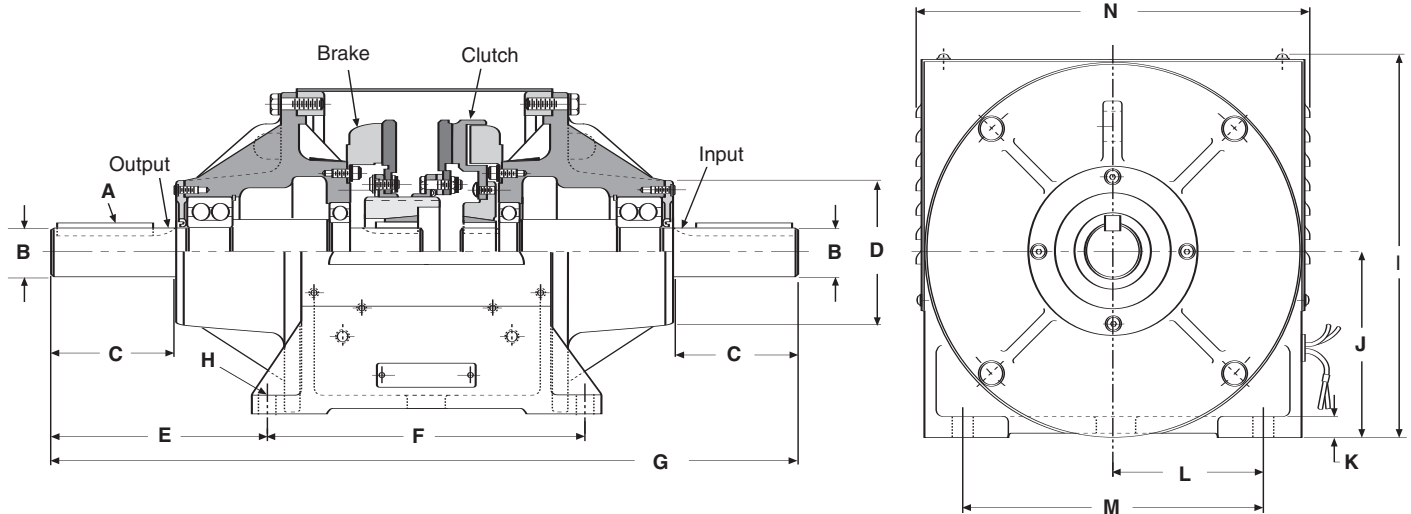
Model Size	Voltage DC	Static Torque	Inertia*~WR ² (lb-ft ²)		Max. RPM	Weight lbs.
			Output Side	Input Side		
EP-1000	6	240 lb.ft.	1.45	1.01	3000	288
	24	240 lb.ft.	1.45	1.01	3000	288
	90	240 lb.ft.	1.45	1.01	3000	288

All dimensions are nominal, unless otherwise noted.

Size	A	B Dia.	C Min.	D Dia.	E	F	G Max.	H	I	J	K	L	M	N Max.
1000	1/2 x 1/2 x 3-3/4	<u>1.875</u> 1.874	4.750	5.687	8.250	12.250	28.750	.656 Dia. (4 holes)	12.500	<u>6.255</u> 6.241	.718	5.000	10.000	12.875

EP-1000





All dimensions are nominal, unless otherwise noted.

Size	A	B Dia.	C Min.	D Max. Dia.	E	F	G Max.	H	I	J	K	L	M	N Max.
1525	5/8 x	<u>2.375</u>						.796 Dia.		<u>9.005</u>				
	5/8 x	2.374	5.750	7.500	8.468	16.500	33.500	(4 holes)	18.250	8.991	1.000	7.000	14.000	18.875
	4-1/4													
1525HT	5/8 x	<u>2.375</u>						.796 Dia.		<u>9.005</u>				
	5/8 x	2.374	5.750	7.500	8.468	16.500	33.500	(4 holes)	18.250	8.991	1.000	7.000	14.000	18.875
	4-1/4													

Specifications

Model Size	Voltage DC	Unit	Static Torque lb.ft.	Inertia*-WR ² lb.ft. ²		Max. RPM	Weight lbs.
				Output	Input		
EP-1525	6, 90	Clutch	700	7.89	5.68	1800	655
		Brake	700				
EP-1525HT	24, 90	Clutch	1350	7.89	6.41	1800	656
		Brake	700				

PerformancePlus™ clutch/brake combination in a foot mounted housing

Single point wire exit

Pre-packaged

Major components have been pre-engineered and pre-assembled in a typical Electro Pack. Ready-to-go, straight from the box.

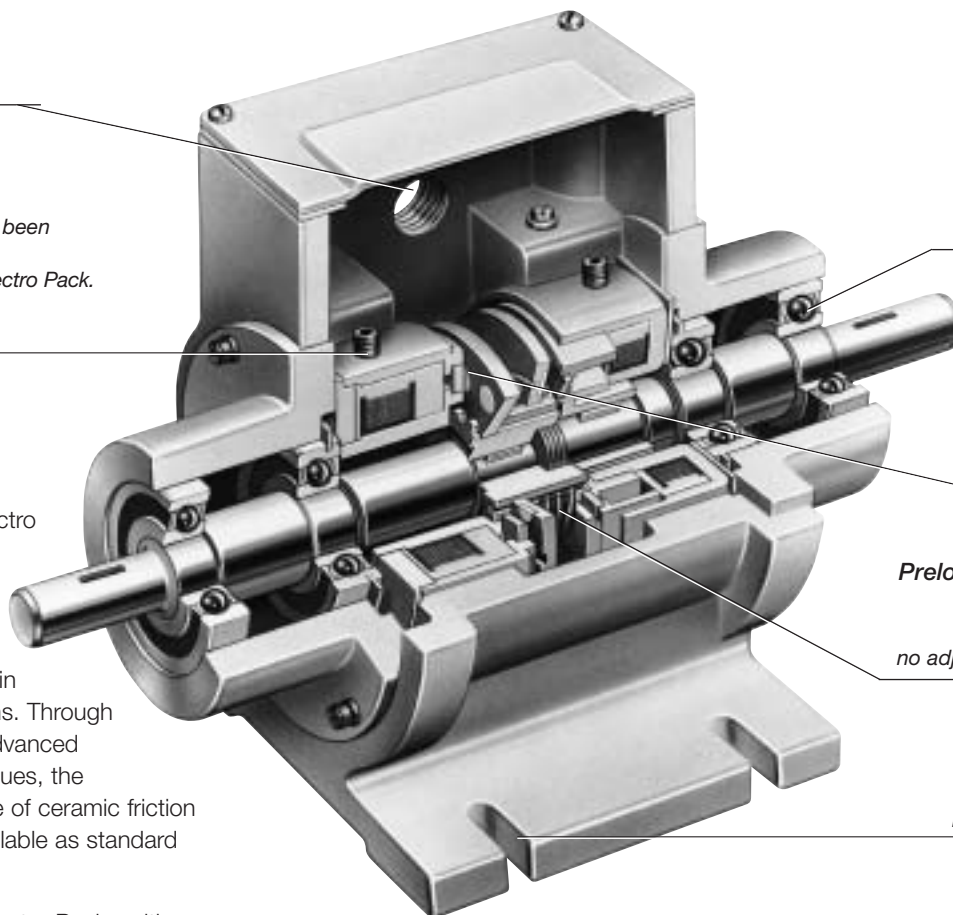
PerformancePlus™ Electro Packs use ceramic friction system technology. This technology has been in use for many years in specialized applications. Through the development of advanced manufacturing techniques, the improved performance of ceramic friction materials are now available as standard products off the shelf.

PerformancePlus™ Electro Packs with ceramic friction material are rugged, pre-assembled clutch and brake combinations in base mounted housings. They have been designed to be installed in standard power transmission systems with V-belts and pulleys, chain and sprockets, in line couplings, and timing belt drives.

When your application calls for a long life clutch/brake because of high cycle rates or demanding consistency, choose the PerformancePlus solution.

- Bolt-it-down and wire-it-up . . . it's ready to go!
- Available in two size; 170 and 250. Standard voltages are 24V and 90V DC.
- Maintenance free.
- Ideal for use with CBC 1000 indexers and CBC 700 OEX control.

PerformancePlus™ . . . the demanding application choice.



Heavy duty bearings

Properly aligned for maximum performance.

Ceramic on ceramic friction system

Longer life, and consistent torque.

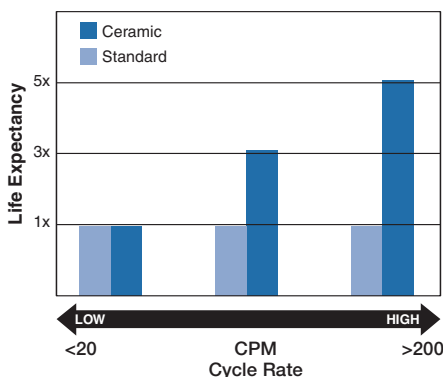
Preload armature springs

Fast response, accurate repeatability, no adjustments for life of unit.

Foot mounted

Bolt-it-down, wire-it-up.

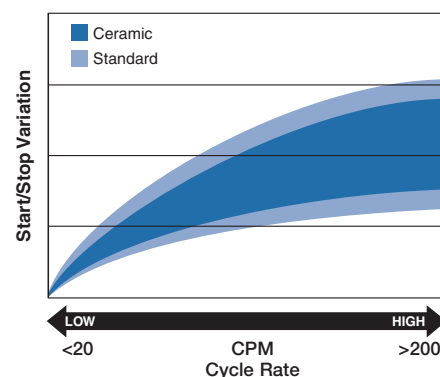
EP-C Product Life



Extended Life for High Cycle Rate Use

Ceramic faced clutches and brakes have been designed specifically for rapid cycling applications to satisfy today's needs for high speed equipment. Ceramic friction material provides excellent wear resistance that extends life 3 to 5 times that of standard clutch/brakes in demanding applications.

EP-C Cycle Repeat



Consistent Torque and Cycle Repeatability

Preloaded armatures keep the ceramic friction surfaces in light contact, providing consistent torque and cycle-to-cycle repeatability. Variation is reduced by up to 30% over standard units.

Controllability
Smooth Start/Stop

With the ceramic friction surfaces always in contact, dynamic torque response is fast and precise. When used with a CBC-700 over-excitation control and CBC-1000 programmable counter, exceptional closed loop clutch/brake performance can be achieved approaching that of more expensive motion control technologies – The PerformancePlus difference!

Selection

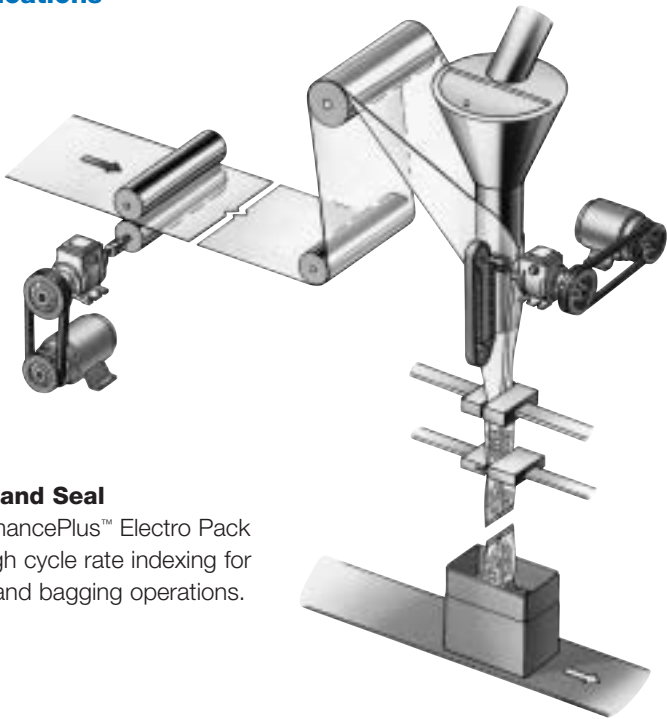
PerformancePlus Electro Packs are best suited for high energy applications where long life is a premium concern. The harder a ceramic friction surface is worked, the more wear life benefit is achieved. For slower cycle rates, up to 75 cycles per minute, dependable standard clutch/brakes are still a good choice.

For high cycle rates and high energy use (generally more than 50 cycles/minute for EP-170's and EP-250's) PerformancePlus clutch/brakes are the choice.

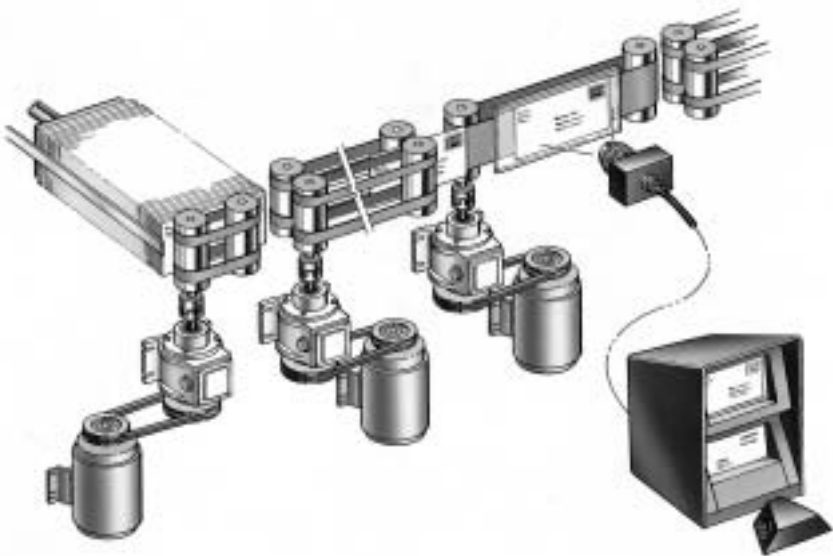
Technical considerations for sizing and selection are torque and heat dissipation. Each merits careful consideration, especially heat dissipation. Over temperature use will have an adverse effect on bearing life and coil wire insulation integrity.

For proper sizing information, refer to the Horsepower vs. Shaft Speed chart, and the technical sizing considerations below. When ordering, specify size, voltage, and part number.

Typical Applications



Form, Fill and Seal
The PerformancePlus™ Electro Pack provides high cycle rate indexing for packaging and bagging operations.



Mail Processing
The PerformancePlus Electro Pack provides fast cycling and accurate starting and stopping.

Horsepower vs. Shaft Speed

HP	SHAFT SPEED AT CLUTCH (IN RPM)																					
▼	100	200	300	400	500	600	700	800	900	1000	1100	1200	1500	1800	2000	2400	3000	3600	4000	4600	5000	
1/50																						
1/20										EP-170-C												
1/12																						
1/8																						
1/6										EP-250-C												
1/4																						
1/3																						
1/2																						
1																						

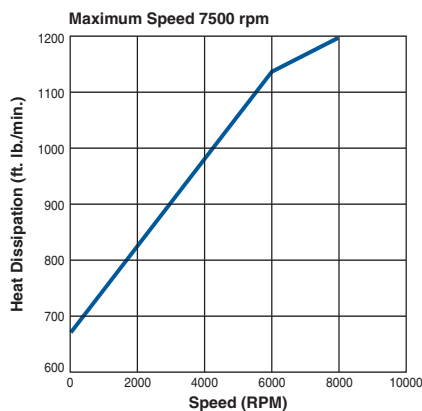
Selection/Ordering Information

Heat Dissipation Sizing

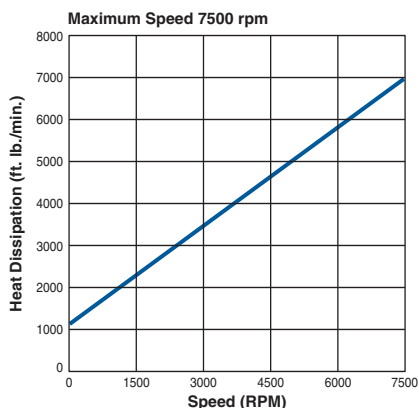
Friction surfaces slip during the initial period of engagement and, as a result, heat is generated. The clutch/brake selected must have a heat dissipation rating greater than the heat generated by the application. Therefore, in high inertia or high cycle rate applications, it is necessary to check the heat dissipation carefully. Inertia, speed and cycle rate are the required parameters.

These curves show the heat dissipation capability of the ceramic units.

EP-170-C



EP-250-C



Heat dissipation requirement is calculated as follows:

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

where:

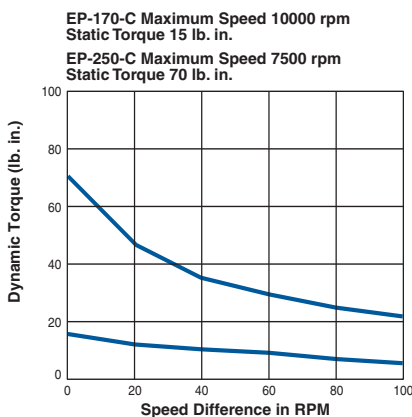
- E = Heat (lb.ft./min.)
 WR² = Total reflected inertia at the clutch/brake shaft. Include the clutch/brake output inertia. (lb.ft.²)
 N = Speed in revolutions per minute. (RPM)
 F = Cycle rate in cycles per minute. (CPM)

Compare the calculated heat generated in the application to the unit ratings using the heat dissipation curves. Select the appropriate unit that has adequate heat dissipation ability.

Dynamic Torque Sizing

These curves show the average dynamic torque during the slip period of engagement. Find the dynamic torque value on the curve at the clutch/brake input speed.

EP-170-C EP-250-C



For most applications, the correct size clutch/brake can be selected from the horsepower/shaft speed selection chart. Determine the motor horsepower and the RPM at the clutch/brake. The correct size unit is shown at the intersection of horsepower and shaft speed.

If the static torque requirements are known, refer to the technical ratings chart to select a unit.

Torque Ratings

Model Size	Max. RPM	Static Torque	Voltage DC
EP-170-C	10,000	15 lb. in.	24 & 90
EP-250-C	7500	70 lb. in.	24 & 90

For some applications, the torque requirement is determined by the time allowed to accelerate and decelerate the load. (This time is generally specified in milliseconds.) For these applications, it is necessary to determine the torque requirement based on load inertia and the time allowed for engagement.

The torque requirements are calculated as follows:

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

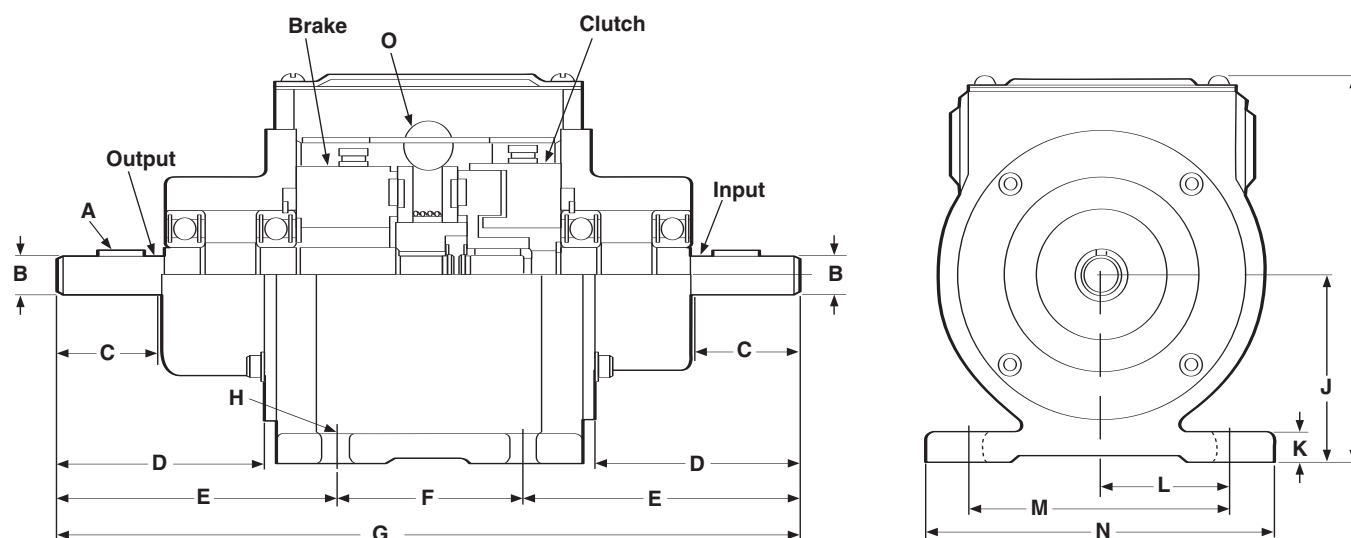
where:

- T = Average Dynamic Torque (lb. ft.)
 (For EP selection, multiply by 12 to convert to units of lb. in.)
 WR² = Total reflected inertia at the clutch/brake shaft. Include the clutch/brake output inertia. (lb. ft.²)
 N = Speed in revolutions per minute. (RPM)
 t = Time allowed for the engagement (sec)

Compare the calculated torque requirement with the average dynamic torque ratings. Select a unit with adequate torque. If the unit selected on torque is different than the unit selected based on heat, select the larger unit size.

Part Numbers

Model Size	Voltage DC	Part No.
EP-170-C	24V	P/N 5633-273-018
	90V	P/N 5633-273-019
EP-250-C	24V	P/N 5130-273-053
	90V	P/N 5130-273-054



All dimensions are nominal, unless otherwise noted.

Size	A	B Dia.	C Min.	D	E	F	G Max.	H	I	J	K	L	M	N	O
170-C	3/32 x 3/64	.3745 .3735	.750	1.406	2.203	1.500	6.000	.250 Wide (4 slots)	3.437	1.662 1.652	.312	1.125	2.250	3.250	14 NPT 1/2 conduit
250-C	1/8 x 1/16	.4995 .4985	1.230	2.468	3.312	2.250	8.968	.312 Wide (4 slots)	5.281	2.318 2.308	.375	1.625	3.250	4.250	14 NPT 1/2 conduit

Specifications

Model Size	Voltage DC	Unit	Static Torque lb. in.	Inertia*–WR ² lb.ft. ²		Max. RPM	Weight lbs.
				Output	Input		
170-C	24	Clutch	15	.031	.036	10,000	2.8
		Brake	15	.031	.036	10,000	2.8
	90	Clutch	15	.031	.036	10,000	2.8
		Brake	15	.031	.036	10,000	2.8
250-C	24	Clutch	70	.331	.293	7,500	7.5
		Brake	70	.331	.293	7,500	7.5
	90	Clutch	70	.331	.293	7,500	7.5
		Brake	70	.331	.293	7,500	7.5

Spring-Set Brakes for Static Holding and Emergency Stopping Applications

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

ERS Series Static Engaged Brakes



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

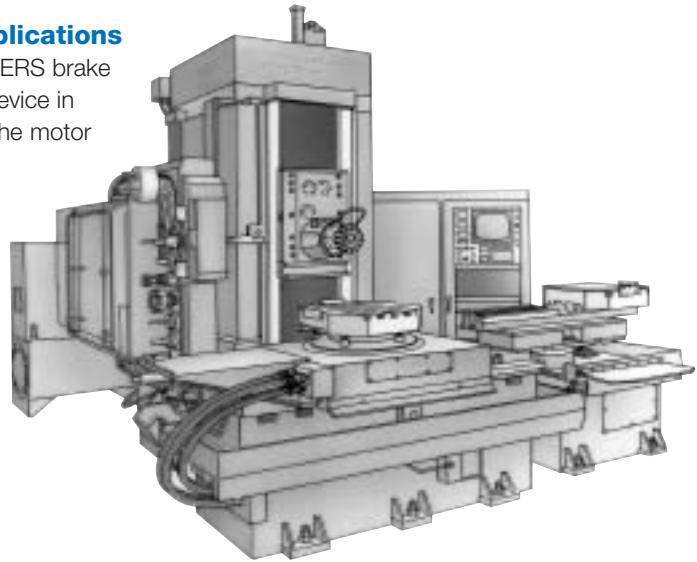
ERD Series Dual Purpose Engagement Brakes



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

ERS Typical Applications

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

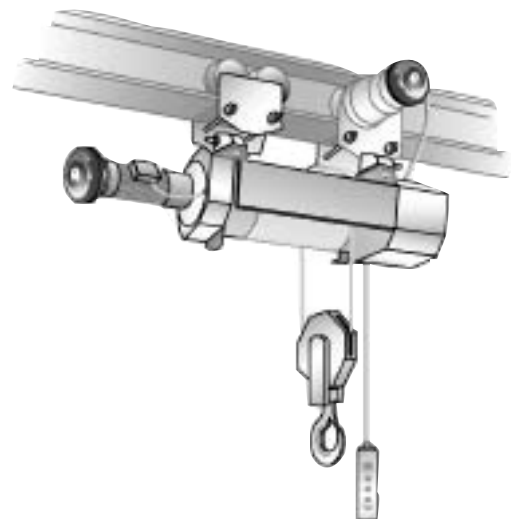


Machine Tools

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

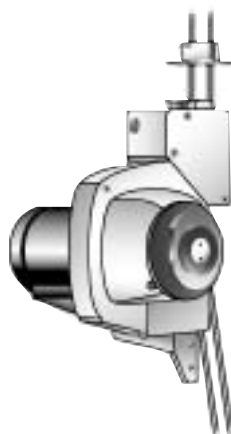
ERD Typical Applications

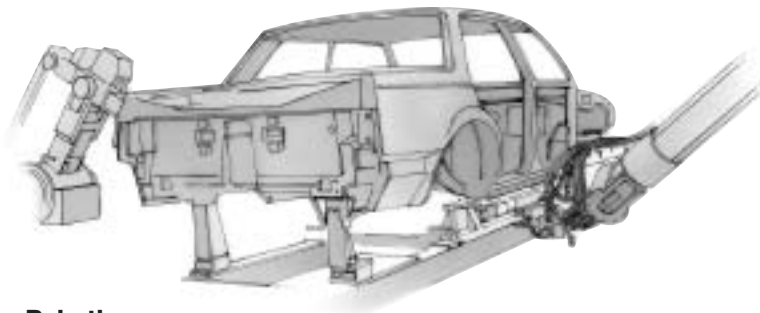
The Warner Electric line of ERD electrically released, dynamic, spring-set brakes offers a high-performance, cost effective solution for power-off load holding applications.



Hoist/Winch

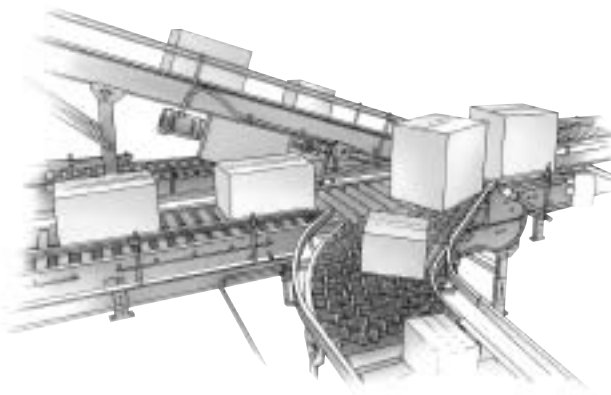
The ERD with central torque adjustment can be used to consistently stop the rated load within a fixed distance by dialing-in the proper torque level on each production hoist. The addition of a manual release allows the load to be gradually and safely lowered to the ground in the event of power failure.





Robotics

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



Automated Material Handling Systems

ERS Brakes hold rollers and lift mechanisms in place, and lock drive wheels in place.

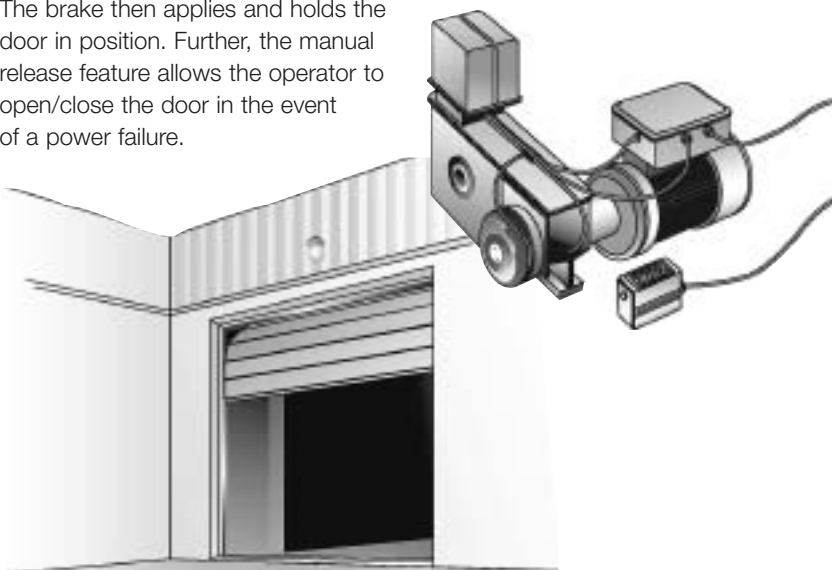


Medical Equipment

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

Overhead Door

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



Mobile Equipment

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

For Static Holding and Emergency Stopping

Terminals

Provide easy electrical connections.

Through holes

Standard for
flexible mounting.

Rugged spline drive

For high torque capability
with minimal backlash.
No accurate axial hub
positioning required.

Friction disc

Non-asbestos friction
material provides consistent
torque and long life.

Advanced corrosion protection

Provided for use in the toughest
industrial environments.

Class H magnet wire

For high temperature use.

Large diameter

Through bore allows for drop-
through hub attachment.

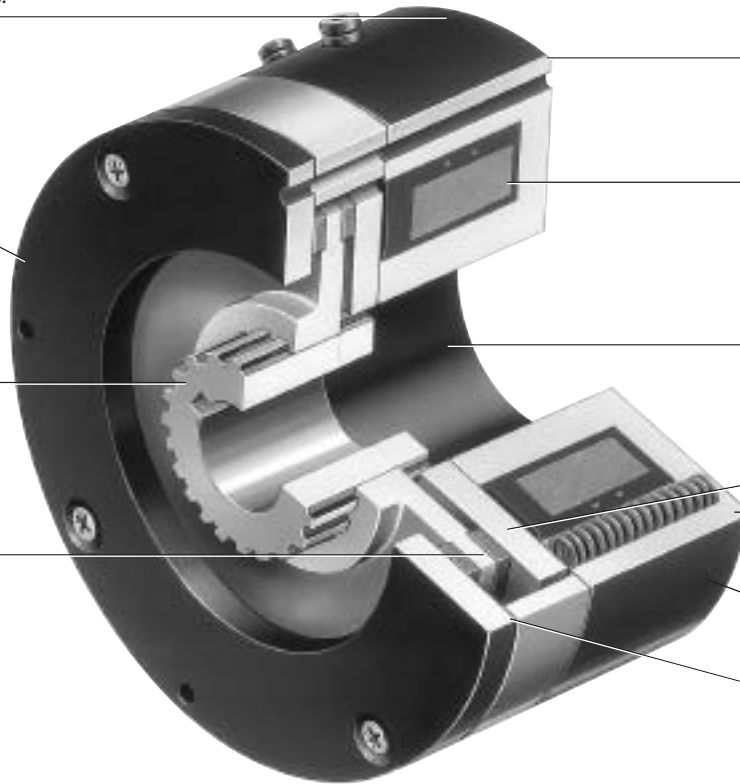
Armature

Magnet

Tapped holes

Standard for
flexible mounting.

End plate



Packaged Performance

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

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

Features

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

Principle of Operation

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

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

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



Sizing

Three factors are important for proper sizing:

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

Step 1

Holding Torque

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

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

Step 2

System Inertia/Emergency Stop

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

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

Selection Procedure

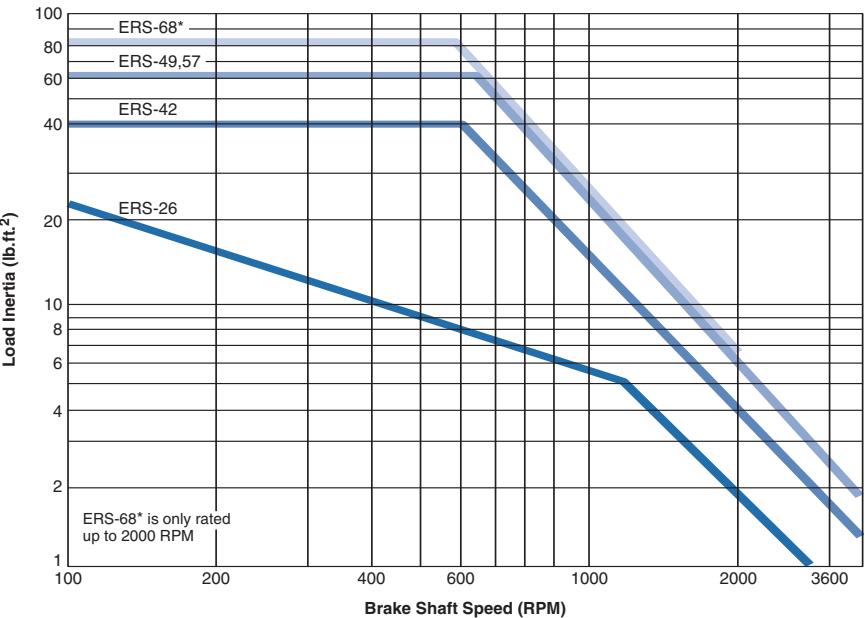
ERS Brakes are available in five models for an optimum size to match your application requirements. Static torque capabilities range from 1.5 lb.ft. to 100 lb.ft.

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

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

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

Emergency Stop Selection Chart



*ERS-68 is only rated up to 2000 RPM

Selection

Step 3

Stopping Time

In some applications, it is desirable to know how fast a brake will bring a load to rest. The time to stop a load can be determined if the system inertia and brake holding torque are known, according to the following equation:

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

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

WR² = system inertia at the brake location in pound-feet squared (lb.ft.²)

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

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

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

If your application has special requirements, please call us.

Step 4

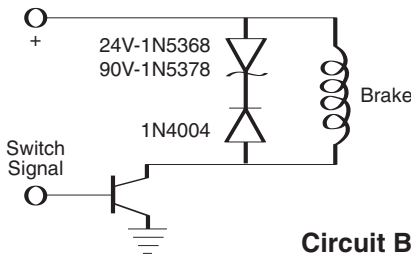
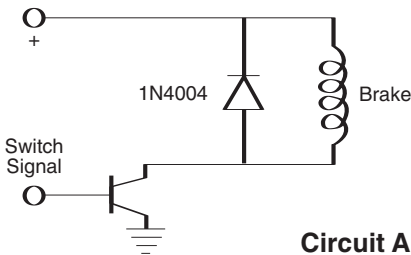
Select Control

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

Brake Apply/Release Time (Typical Values)

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.

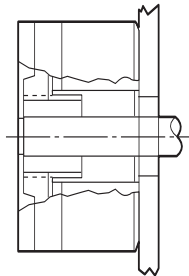


Armature Drives

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.

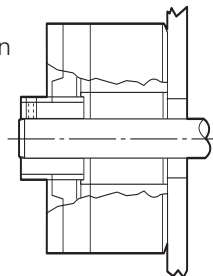
Recessed Hub

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



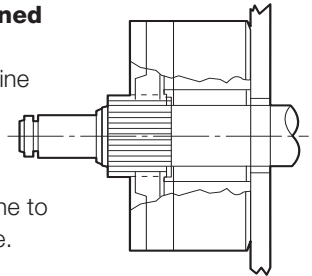
Extended Hub

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



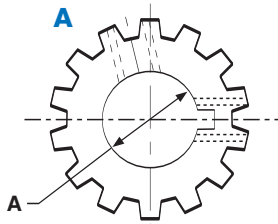
Mating Splined Member

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

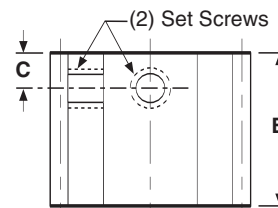
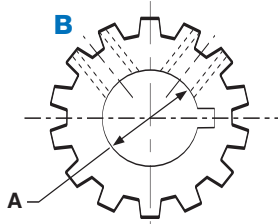


Drive Hub/Spline and Interface Data

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						
	.7525/.7505	3/16 x 3/16	B						
	.7525/.7505	3/16 x 3/16	B						
ERS-49	.3775/.3755	3/32 x 3/32	A	.800	.160	10-32	21	16/32	30°
	.5025/.5005	1/8 x 1/8	A						
	.6275/.6255	3/16 x 3/16	A						
	.7525/.7505	3/16 x 3/16	B						
	.8775/.8755	3/16 x 3/16	B						
ERS-57	.5025/.5005	1/8 x 1/8	A	.800	.190	1/4-20	15	10/20	30°
	.6275/.6255	3/16 x 3/16	A						
	.7525/.7505	3/16 x 3/16	A						
	.8755/.8755	3/16 x 3/16	B						
	1.0025/1.0005	1/4 x 1/4	B						
ERS-68	1.0025/1.0005	1/4 x 1/4	A	.900	.190	1/4-20	22	10/20	30°
	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.

Mounting

Mounting Orientation

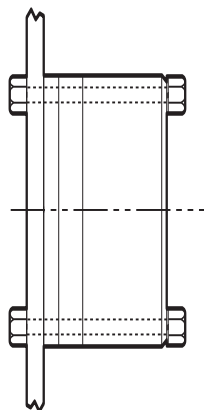
ERS Brakes are easily modified to accommodate different mounting orientations. The brake can be mounted with either face against the mounting surface. The following mountings are possible with the standard ERS brake.

Mounting Requirements

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

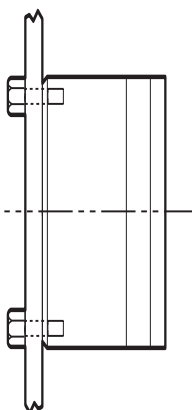
Through Bolt

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



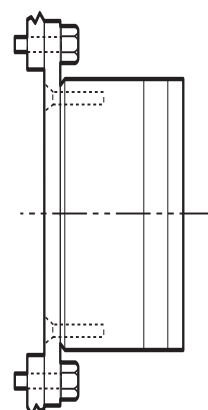
Tapped Hole

Works well where through bolt mounting is impractical.

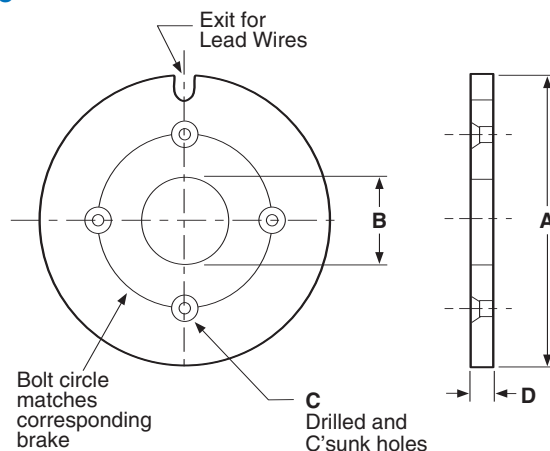


Flange

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



Optional Adapter Mounting Flange

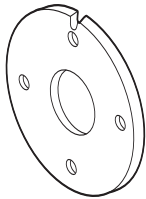


Model	A Nom.	B Nom.	C Holes	D Nom.
ERS-26	4.000	.935	#4	.100
ERS-42	5.000	1.450	#6	.144
ERS-49	6.250	1.575	#8	.193
ERS-57	7.500	1.825	#10	.193
ERS-68	9.500	2.500	1/4	.224

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

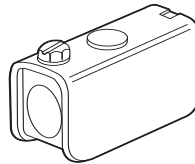
Accessories

Adapter Flanges



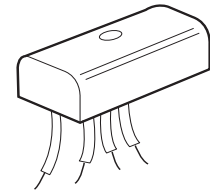
Model	Part Number
ERS-26	686-0182
ERS-42	686-0183
ERS-49	686-0184
ERS-57	686-0185
ERS-68	686-0186

Conduit Box



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

Controls



Model	Part Number
CBC-100-1	6003-448-101
AC to DC Control	
To be used with 90V ERS brakes	
See the Controls Section on page 141 for complete information.	
CBC-100-1 is 110 volt only	

Ordering Information

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

How to Order

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

ERS Brake

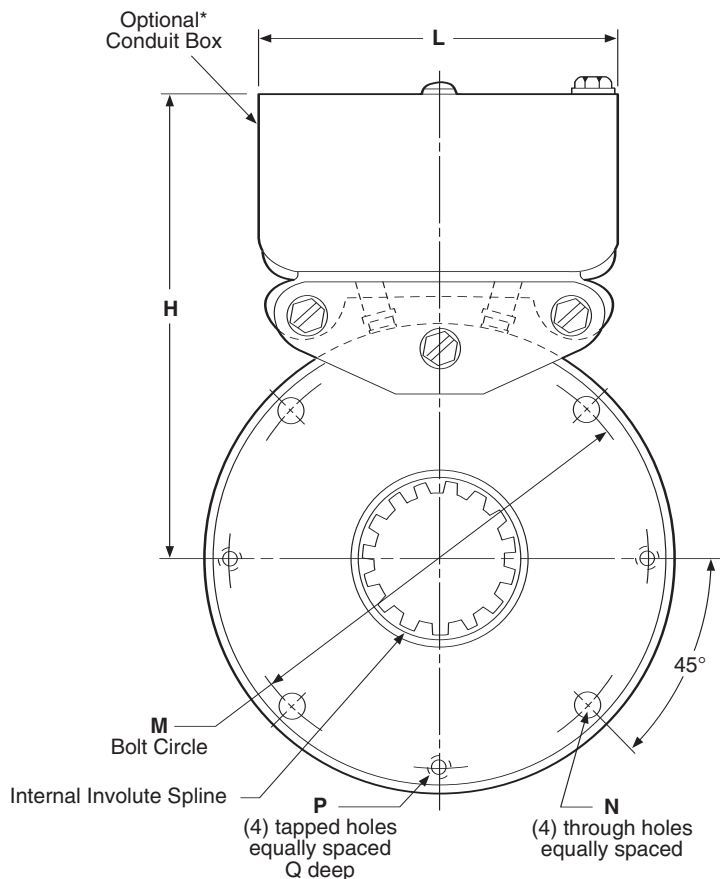
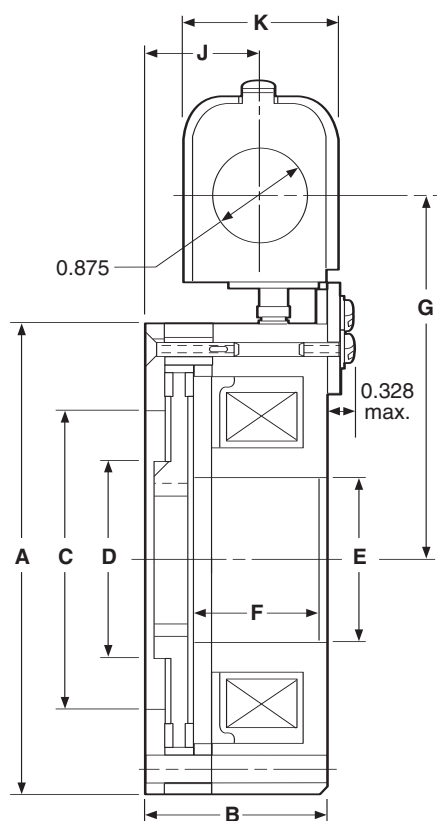
Model	Voltage	Part Number
ERS-26	24V	5158-170-016
	90V	5158-170-015
ERS-42	24V	5151-170-002
	90V	5151-170-001
ERS-49	24V	5155-170-002
	90V	5155-170-001
ERS-57	24V	5153-170-003
	90V	5153-170-002
ERS-68	24V	5154-170-002
	90V	5154-170-001

Splined Hub

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

Special Requirements

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



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

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					

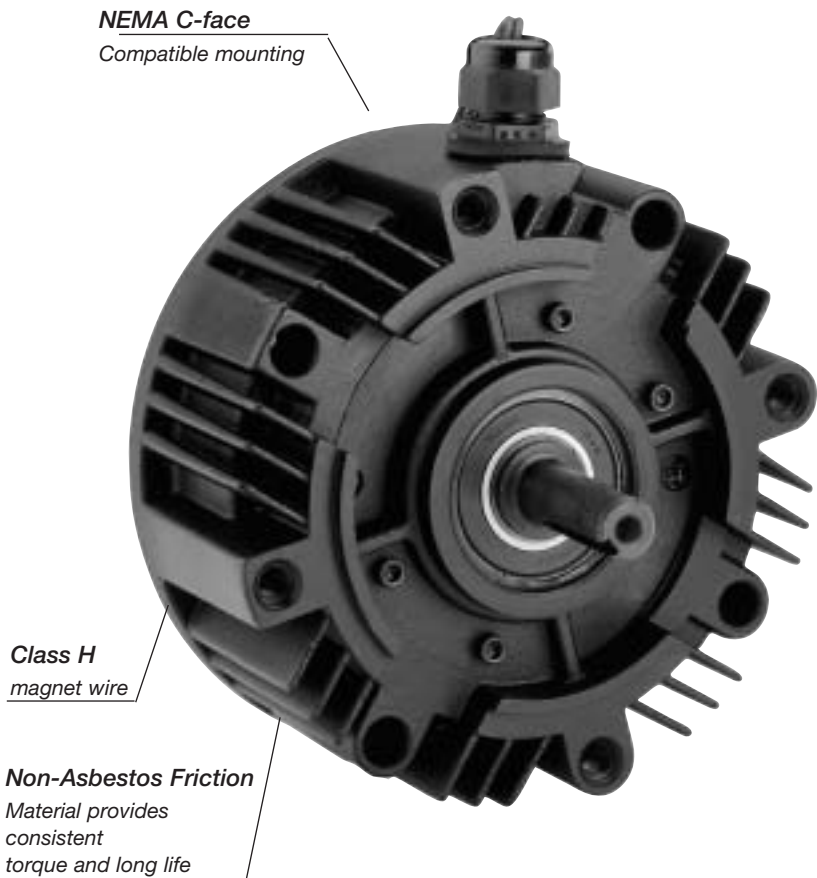
SSBM Series- EM/ERS

Packaged Spring-Set Brake Module for Holding Applications

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

Features

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



Principle of Operation

SSBM Brake torque is developed when springs apply a clamping force between the brake armature and the 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 ²)	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	5370-170-122
						90	21.5	0.239	376.2	5370-170-123
EM-50/ERS-49	56C/48Y	15.0	3600	8.2	.673	24	27.3	1.136	21.12	5370-170-124
						90	25.8	0.287	313.6	5370-170-125
EM-180/ERS-57	182C/143TC 184C/145TC	34.0	3600	10.4	.955	24	36.2	1.510	15.90	5370-170-126
						90	35.2	0.391	230.1	5370-170-127
EM-210/ERS-68	213C/182TC 215C/184TC	100.0	2000	24.7	3.842	24	54.9	2.286	10.50	5371-170-042
						90	51.9	0.577	155.9	5371-170-043

Applications

The Warner Electric Spring-Set Brake Module is an ideal holding device in applications where the motor is used to stop and accurately position the load. The SSBM brake will hold the load in that position until electrically 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 four models with static torque capabilities ranging from 7.0 lb.ft. to 100 lb.ft.

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

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

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

Sizing

Four factors are important for proper sizing:

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

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

1. NEMA C-face Mounting

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

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

Frame Size Selection Chart

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

2. Holding Torque

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

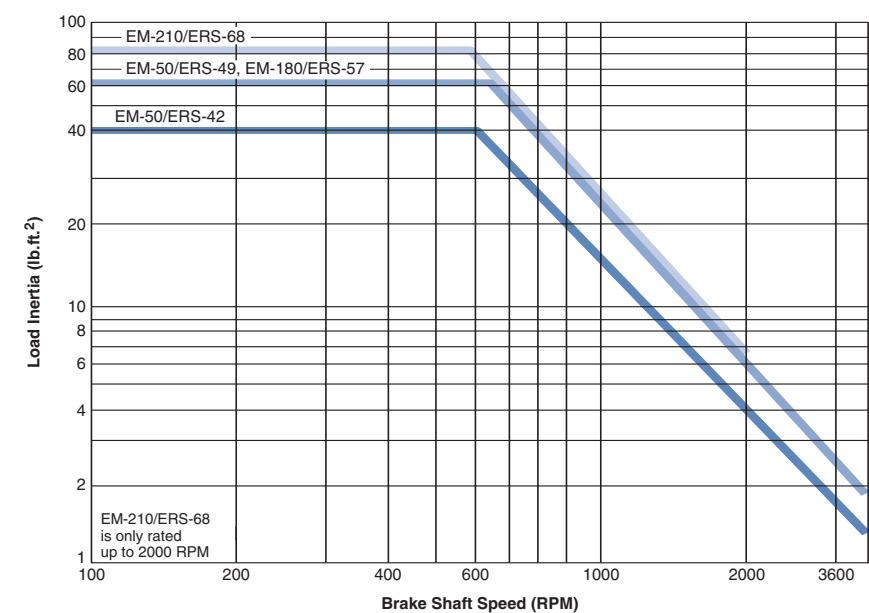
Holding Torque Rating (ft.lb.)	Brake Model
7.0	EM-50/ERS-42
15.0	EM-50/ERS-49
34.0	EM-180/ERS-57
100.0	EM-210/ERS-68

3. System Inertia/Emergency Stop

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

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

Emergency Stop Selection Chart



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

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

5. Select Control

Consult the Controls Section on page 141 for control product overview. The holding torque for a SSBM is not adjustable: therefore, an adjustable torque control is not required.

4. Stopping Time

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

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

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

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

WR^2 = system inertia at the brake location in pound-feet squared (ft.lb²)

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

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

Special Requirements

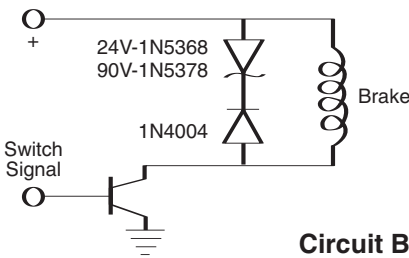
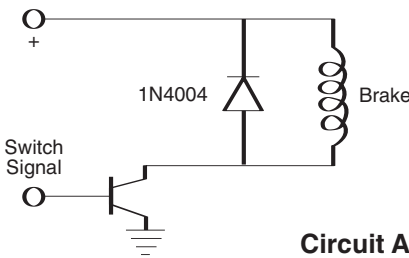
SSBM brake modifications, such as special voltages, rear motor mounting, and low torque units are available.

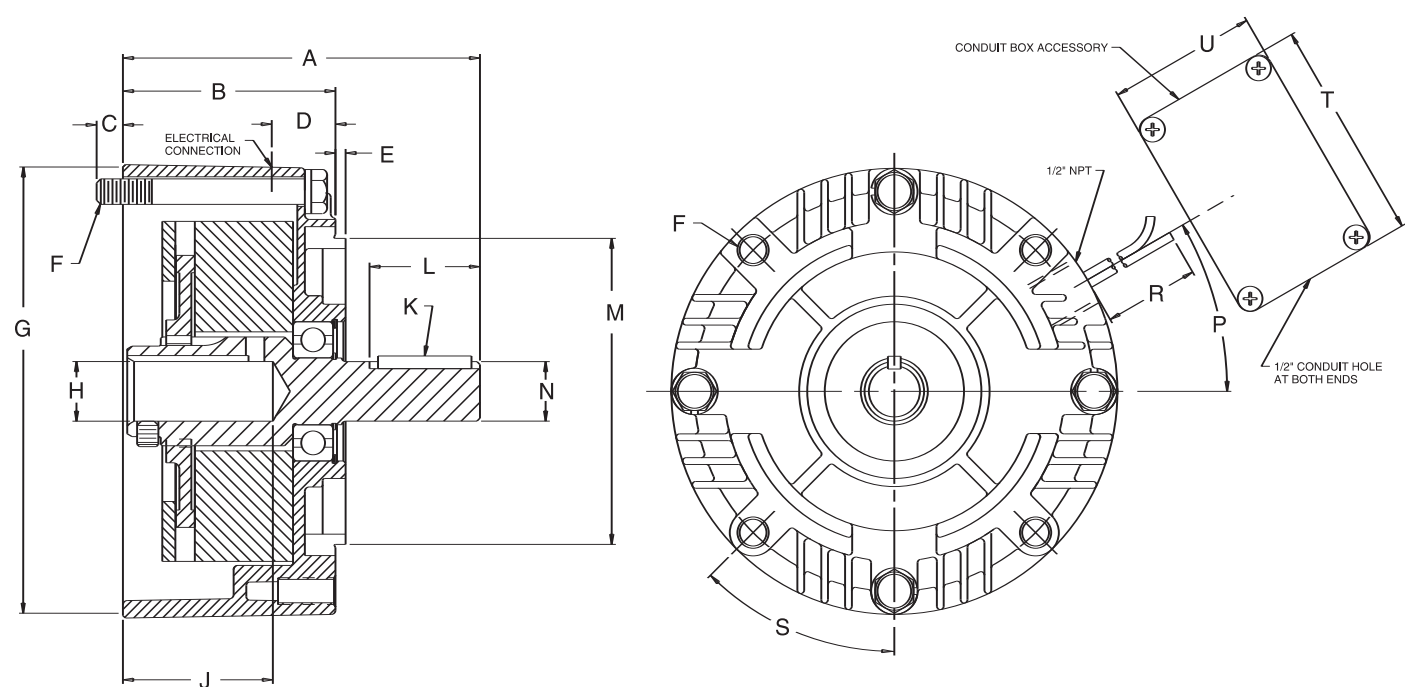
Contact Warner Electric Technical Support at 800-825-9050.

Brake Apply/Release Time (Typical Values)

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

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





All dimensions are nominal, unless otherwise noted.

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

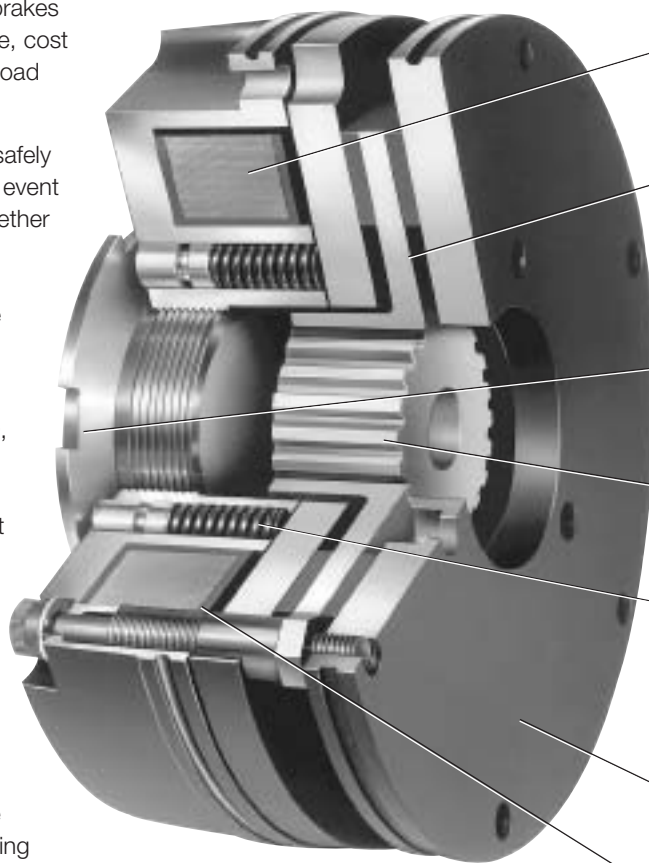
Model	J	K	L	M	N	P	R	S	T	U
EM-50	2.212	3/16x3/16	1.437	4.500 Pilot Dia	.625 Dia	30°	36	45°	3.25	2.188
EM-180	2.216	3/16x3/16	1.437	4.500 Pilot Dia	.875 Dia	30°	36	45°	3.25	2.188
EM-210	3.002	1/4x1/4	2.125	8.500 Pilot Dia	1.125 Dia	25°	36	45°	3.25	2.188

Dynamic Braking With Reliable, Fast Response

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

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

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



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

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

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

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

Compression Springs
Used to provide balanced armature plate loading.

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

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

Features

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

Options

Manual Release

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

Dust Cover

Shields the brake actuation system from external dust and debris.



Torque Adjustment

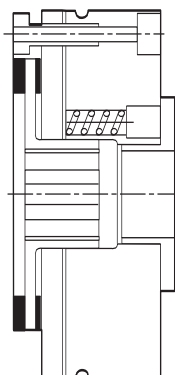
Brakes are factory set at the minimum torque rating shown in the Specifications chart.

Friction Disc Carriers

Replaceable Friction carriers are available in two types:

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

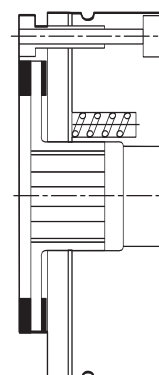
Design Variations



VAR 2

Central ring nut adjusts torque

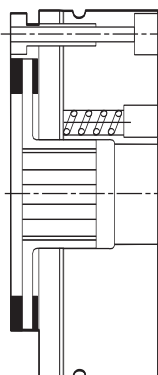
- Up to 50% torque reduction possible
- Available in all sizes



VAR 0

Torque preset and constant

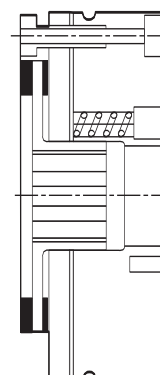
- No torque adjustments possible
- Available in all sizes



VAR 1

Four screw torque adjustment

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



VAR 3

Four screw torque adjustment with provision for tachometer

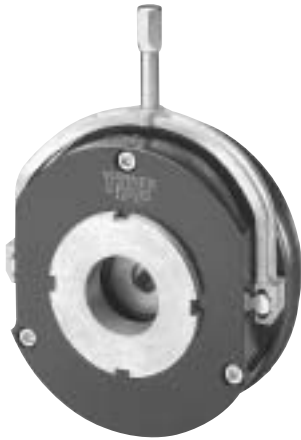
- Up to 50% torque reduction possible
- Mounting holes for tachometer
- Available in sizes 5, 10, 20 and 35 only

Note: VAR 2 and VAR 0 are most common.

Specifications

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

Selection



Proper ERD brake selection involves determining, in order:

1. Static Holding Torque

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

2. Dynamic Torque

This is determined from the equation:

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

where:

T = Dynamic Torque in lb.ft.

N = Motor Speed in RPM

P = Motor Horsepower

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

3. Energy Capacity

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

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

where:

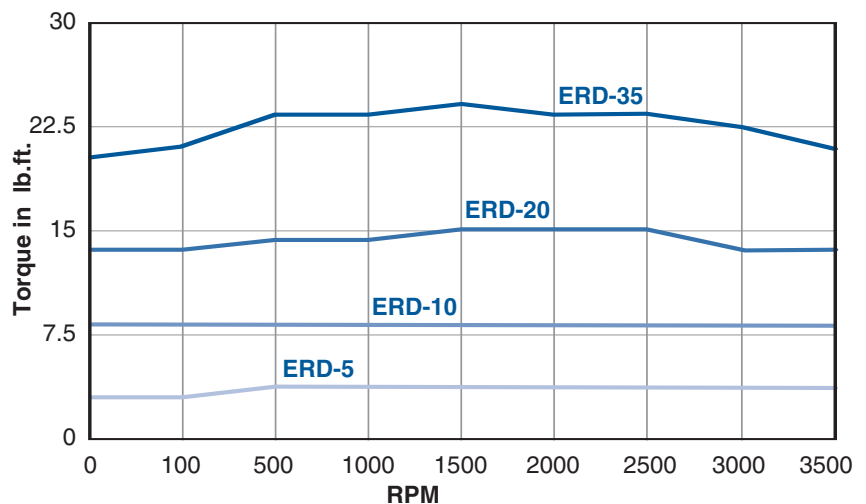
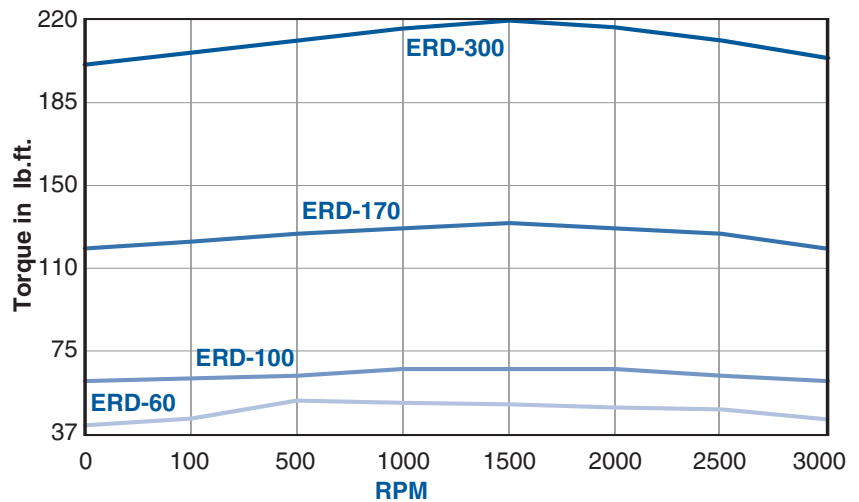
E = Single Cycle Energy in lb.ft.

WR² = Load Inertia in lb.ft²

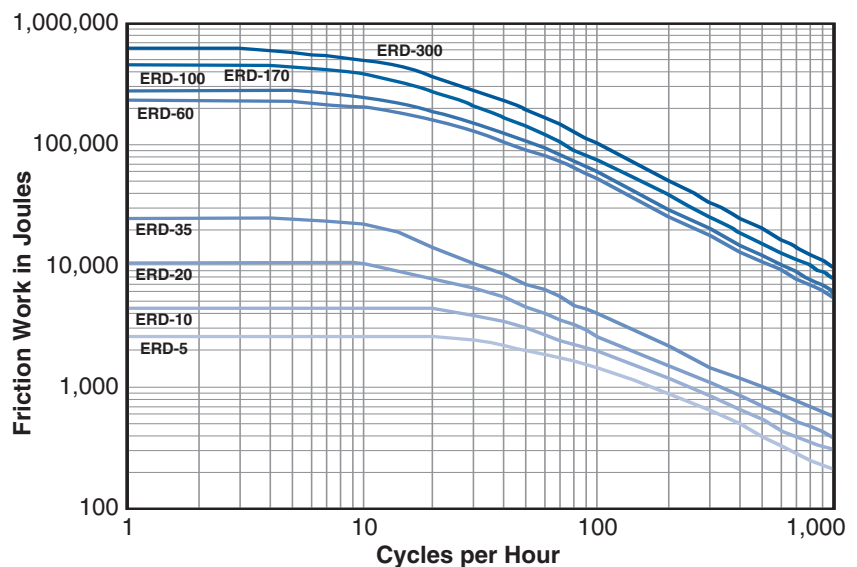
N = Speed in RPM

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

Dynamic Torque

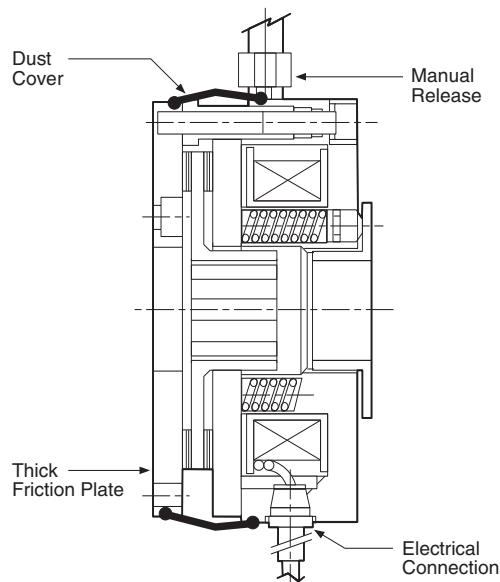


Energy Capacity



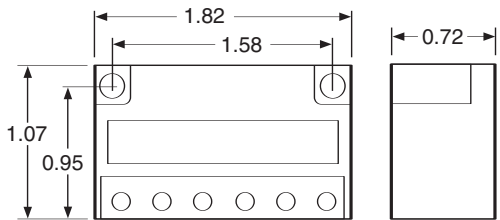
Note: To convert Joules/min. to ft.lbs./min, multiply times .7376

Fully Assembled Unit



Typical brake unit (VAR 2) with options installed

Connections



Rectifiers

AC Input	DC Output	Rectifier	Part No.
240/220 V	96 V	Half Wave	ACG830A1P1
415/380 V	190 V	Half Wave	ACG830A1P1
240/220 V	190 V	Full Wave	ACG830A1P2
110 V	96 V	Full Wave	ACG830A1P2
Max. current	= 1 AMP	CG830 A1P1	
	= 2 AMP	CG830 A1P2	

Mounting Options

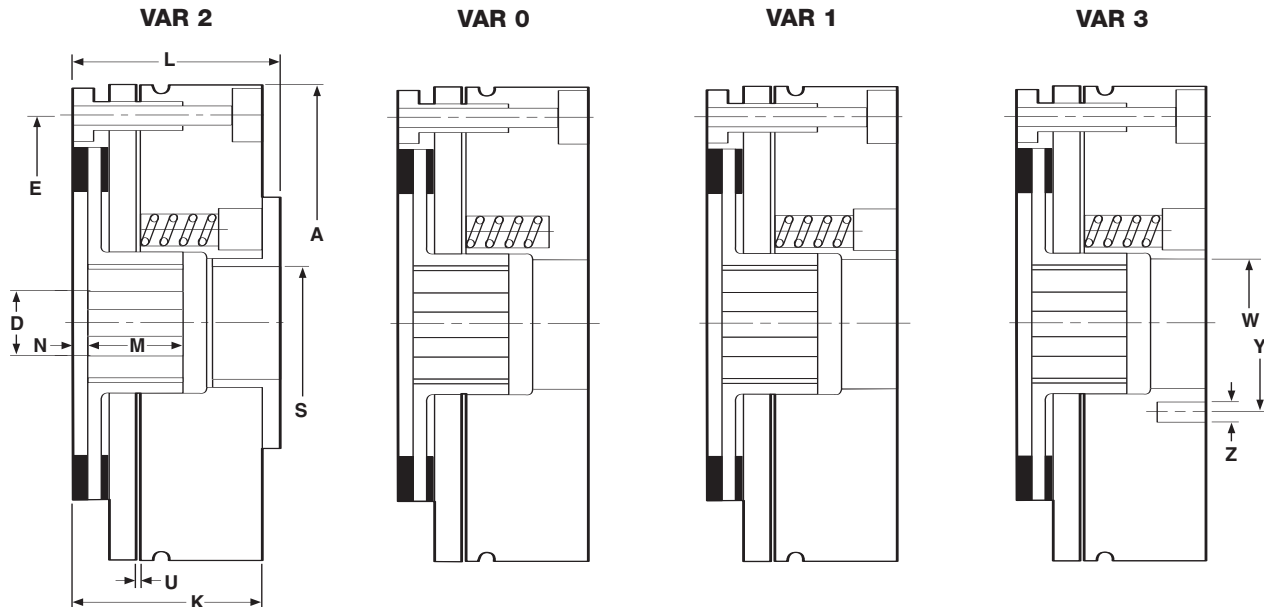
Flange Type	Screw Kit	Mounting Style
Thick	Short	Standard – Customer Mounting via Hole Pattern H
Thin	Long	Customer Mounting via Hole Pattern E
None	Long	Customer Mounting via Hole Pattern E

How to Order

Specify

- ERD Series
- Size: 5, 10, 20, 35, 60, 100, 170, or 300
- Variation
 - 0 – No torque adjustment
 - 1 – With torque adjusting screws
 - 2 – With central torque adjusting ring
 - 3 – With mounting holes for tachometer
- Voltage
 - 24 DC is standard
 - 12, 96, 190, and 215 DC are modifications
- Friction Carrier
 - Metallic carrier is standard
 - Thermoplastic carrier is available on sizes 5 and 10
- Bore Size
 - ERD-5: 1/2" max
 - ERD-10: 5/8" max
 - ERD-20: 1" max
 - ERD-35: 1-1/8" max
 - ERD-60: 1-1/4" max
 - ERD-100: 1-3/8" max
 - ERD-170: 1-3/4" max
 - ERD-300: 1-3/4" max
- Mounting Flange
 - Thick Flange is standard
 - Thin Flange available up to size 35
- Mounting Screws
 - Short Kit is standard
 - Long Kit is available
- Options
 - Dust Cover
 - Manual Release

Dimensions—Brake Units

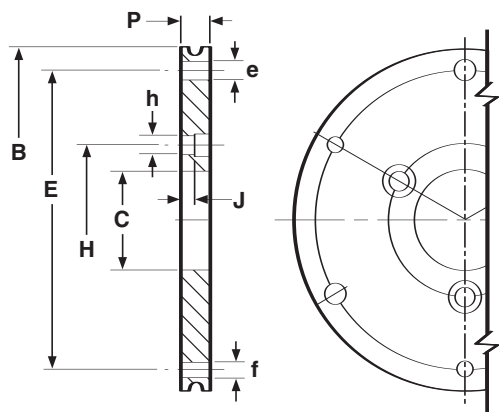


ERD Size	A	D Max.	E	K	L Max.	M +0.000/-0.008	N
5	3.307	0.5	2.835	1.378	1.575	0.709	0.071
10	4.016	0.625	3.543	1.614	1.831	0.787	0.098
20	5.000	1	4.409	1.870	2.165	0.787	0.138
35	5.787	1.125	5.197	2.146	2.559	0.984	0.118
60	6.378	1.25	5.709	2.520	2.933	1.181	0.118
100	7.402	1.375	6.693	2.795	3.209	1.181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

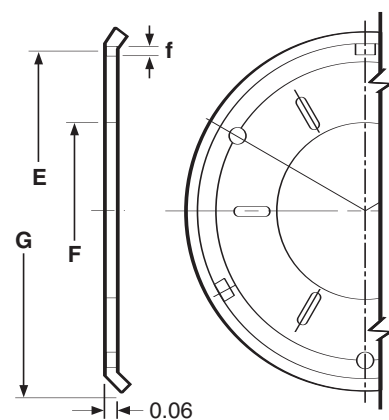
ERD Size	S	U +/-0.002	W	Y	Z Bolt Pattern	Variations Available
5	0.748	0.006	0.925	1.299	4xM4	0, 1, 2, 3
10	0.945	0.006	1.122	1.594	4xM5	0, 1, 2, 3
20	1.378	0.008	1.594	2.224	4xM5	0, 1, 2, 3
35	1.575	0.008	1.909	2.244	4xM5	0, 1, 2, 3
60	1.890	0.012	2.303			0, 2
100	2.047	0.012	2.500			0, 2
170	2.362	0.012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

For service information, request manual P-229.

Friction Plates



Thick Friction Plate (Standard – all sizes)

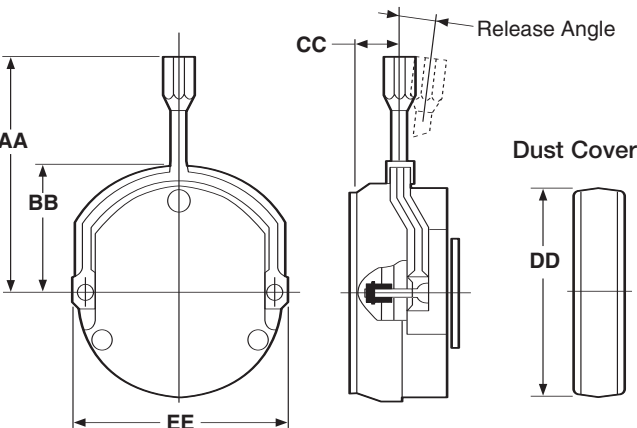


Thin Friction Plate (Sizes 5 thru 35 only)

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

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

Manual Release



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

Permanent Magnet Brakes

Frequent cycling applications which regularly engage the brake to stop a moving load call for FB or ER models. Frequent cycling keeps working surfaces burnished and operating at top efficiency. The convenience of power off braking combines with stopping capability in the event of power failure to provide the ideal brake for many applications.

FB Series (Shaft Mounted)



FB Series permanent magnet brakes are offered as off-the-shelf, pre-assembled packages in three sizes. Packaged products are easy to install.

ER Series (Flange Mounted)

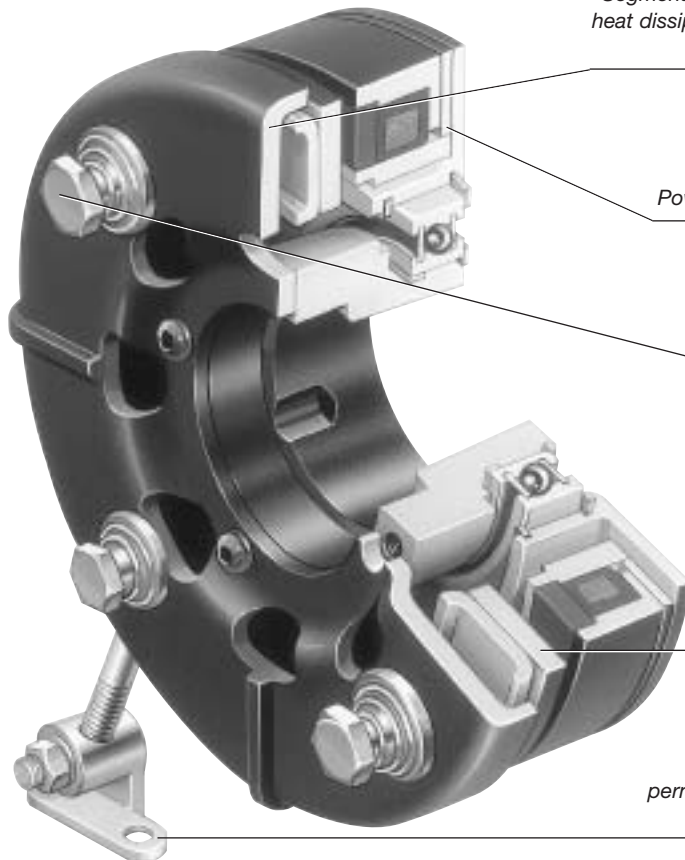


ER Series permanent magnet brakes allow customers added flexibility and larger sizes. 825 and 1225 are available in both standard and heavy duty models.

Principle of Operation

Electrically Released Brakes automatically engage when the power goes off. Reliable permanent magnets provide a permanent holding force. Electrical power applied to the coil nullifies the attraction of the permanent magnet and the brake releases. No power is required to stop or hold a load.

Packaged Convenience for Power Off Applications



Long Life – High Cycle Rates
Segmented armature provides high heat dissipation and long service life. Capable of rapid cycling.

High Torque
Powerful permanent magnets.

Autogap®
Automatic wear adjust.

Electrically Released
Brake automatically engages when power is turned off– releases when power is applied.

Mounting Flexibility
The FB torque arm feature permits mounting on any shaft. Wide range of shaft sizes.

FB Magnetically Set, Electrically Released, Dynamic Engagement Brake

Packaged brake assembly complete with conduit box is ready to install.

This brake must be engaged while the shaft is in motion. Shaft speed should be 100 RPM or greater when the brake is engaged. This style brake offers quick and easy bearing mounting on the shaft, high cycle rate capability, and excellent life.



FB Brake on double shaft motor.

Features

- Designed for dynamic stopping operations
- Brake automatically engages when power is turned off
- High cycle rate capability
- Never needs adjustment – automatically compensates for wear
- Mounting flexibility
- Powerful permanent magnets
- Segmented armature design provides high heat dissipation and long service life.
- Complete controllability for soft stops.
- UL, CSA listed

Selection Procedure

FB (Shaft Mounted) Series brakes are available in three models to provide an optimum size to match your application requirements. Static torque capabilities range from 10.5 lb.ft. to 56 lb.ft.

1. Verify that the brake will be cycled frequently in normal operation.
2. Determine the horsepower and speed at the brake location.
3. The correct size Electrically Released Brake is shown at the intersection of the HP and shaft speed on the chart below.
4. Available bore sizes are listed in the bore data chart. When ordering, specify voltage and bore size.
5. Five motor adapters are also available for mounting Electrically Released Brakes on single shaft extension motors (see motor adapter bore size chart on page 108). For double shaft extension motors, the adapter can be eliminated. Specify motor shaft size.

How to Order

1. Specify brake part number.
2. For FB-475 and FB-650, order bushing separately. FB-375 does not require a bushing.
3. For single shaft motor mounting, order adapter separately (Item 2 below). Specify the following bore size for the FB brake. This is the bore size required for mounting the electrically released brake on the end of the motor adapter.
 FB-375 5/8" bore
 FB-475 1-1/8" bore
 FB-650 1-3/8" bore
4. See the Controls Section for controls. FB Series brakes require a control with a potentiometer to vary brake channel output.
 CBC-200, 300 or 500/550 are recommended.

Horsepower vs. Shaft Speed*

HP	SHAFT SPEED AT BRAKE (IN RPM) *																		
▼	100	200	300	400	500	600	700	800	900	1000	1100	1200	1500	1800	2000	2400	3000	3600	4500
1/12																			
1/8																			
1/6																			
1/4																			
1/3										FB-375									
1/2																			
3/4																			
1																			
1-1/2										FB-475									
2																			
3										FB-650									
5																			
7-1/2																			
10																			
15																			

* For applications which require stopping below 100 RPM, consult factory.

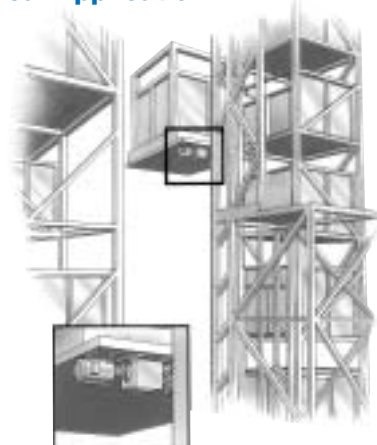
Specifications

Model	Voltage DC	Static Torque (lb.ft.)	Max. RPM	Total Weight (lbs.)
FB-375	24V 90V	10.5	5000	4.5
FB-475	24V 90V	21	4500	6.3
FB-650	24V 90V	56	3600	13.2

Electrically Released Brake Assemblies

Unit Size	Bore	Voltage DC	Part Number
FB-375	1/2"	24	5390-170-024
FB-375	1/2"	90	5390-170-021
FB-375	5/8"	24	5390-170-023
FB-375	5/8"	90	5390-170-022
FB-475	—	24	5391-170-012
FB-475	—	90	5391-170-009
FB-650	—	24	5392-170-010
FB-650	—	90	5392-170-007

Typical Application

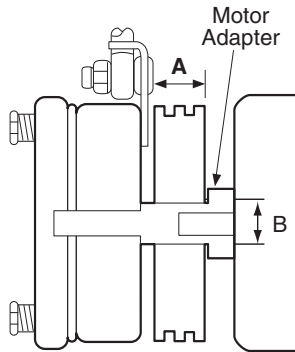


Storage Elevator

These brakes will stop as well as keep a load in position until they are electrically released. They are also used as emergency stopping devices.

Motor and Shaft Adapters

Motor Adapter Bore Sizes

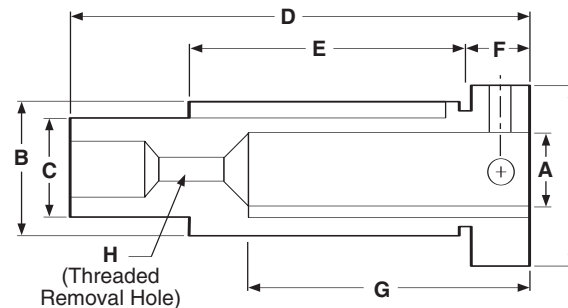


Model Size	Motor Shaft Size	A Usable Length	B Dia.	When using an adapter order the following Adapter Dodge Bushing	
375	.625	2.000	.875	5380-101-005	*None
	.875	2.250	1.250	5380-101-004	*None
475	1.125	2.750	1.625	5381-101-003	#1008 1"
650	1.375	3.000	2.000	5382-101-003	#1310 1.375"
	1.625	3.625	2.250	5382-101-002	#1310 1.375"

*Order FB-375 with 5/8" bore.

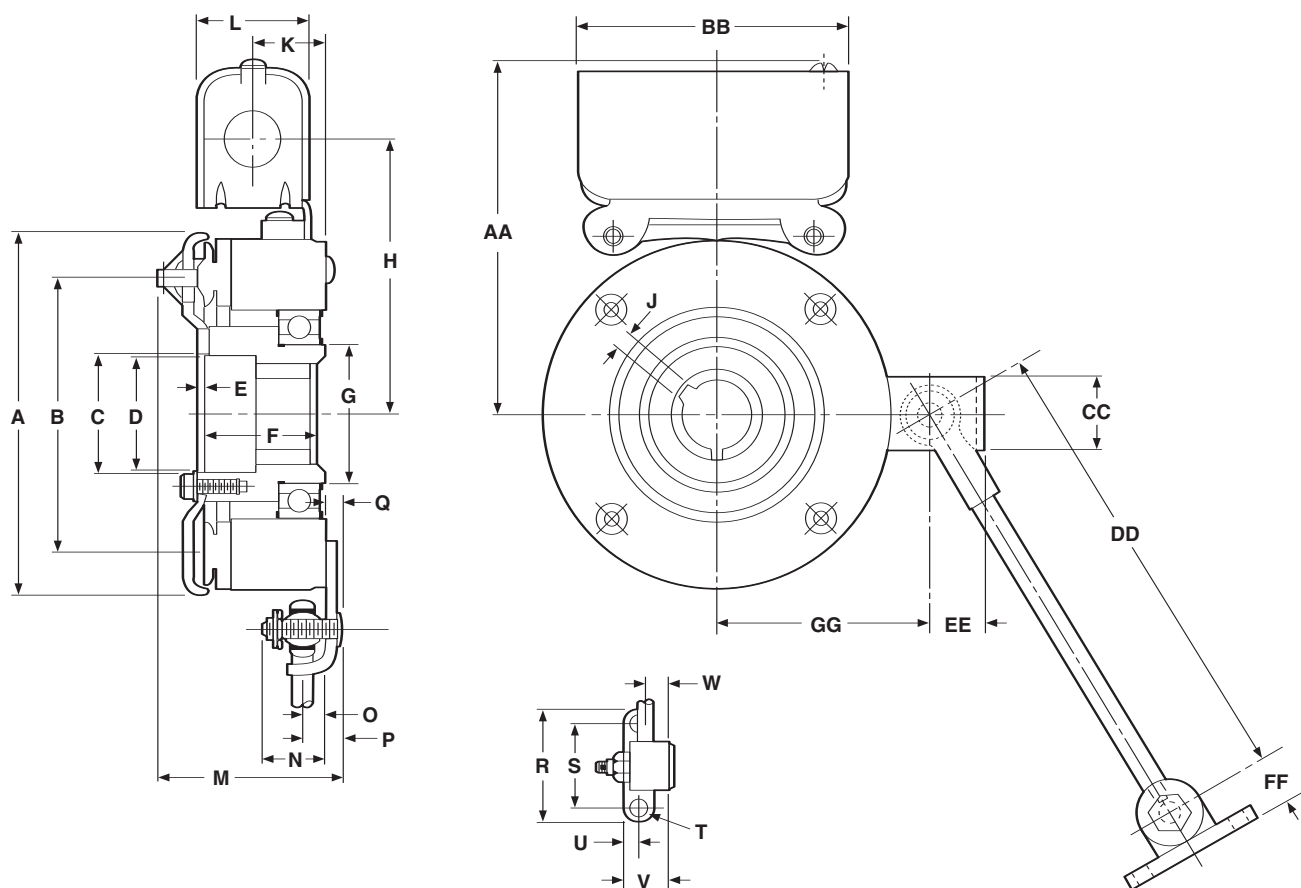
FB Shaft Adapter

Shown below are dimensions and specifications for the optional shaft adapter available for mounting FB Series brakes on a motor. A standard sheave, pulley, or sprocket, with either a tapered bushing or straight bore, can be installed on the shaft adapter. The brake is mounted on the end of the shaft adapter and the complete assembly fits onto the motor shaft, secured with setscrews. Fitting the belts or chain and torque arm completes the installation.



Model	A	Kwy.	B	Kwy.	Key Part No.	C	Kwy.	Key Part No.	Dodge Bushing Size	D	E	F	G	H	I
FB-375	5/8	3/16 x 3/32	7/8	3/16 x 3/32	590-0016	5/8	3/16 x 3/32	590-0043	None	4.391 4.359	2	.391 .359	2	1/4-20 UNC	1.125
FB-375	7/8	3/16 x 3/32	1-1/4	1/4 x 1/8	590-0022	5/8	3/16 x 3/32	590-0043	None	4.578 4.742	2-1/4	.516 .484	2-1/4	1/4-20 UNC	1.500
FB-475	1-1/8	1/4 x 1/8	1-5/8	3/8 x 3/16	590-0041	1	1/4 x 1/8	—	#1008 1"	4.516 4.484	2-3/4	.641 .609	2-3/4	1/2-13 UNC	1.750
FB-650	1-3/8	5/16 x 5/32	2	1/2 x 1/4	590-0042	1-3/8	5/16 x 5/32	590-0044	#1310 1-3/8"	5.547 5.515	3-3/8	.641 .609	3-3/8	1/2-13 UNC	2.125
FB-650	1-5/8	3/8 x 3/16	2-1/4	1/2 x 1/4	590-0042	1-3/8	5/16 x 5/32	590-0044	#1310 1-3/8"	6.172 6.140	4	.641 .609	4	1/2-13 UNC	2.375

All dimensions are nominal unless otherwise noted.



Bore Data (Key furnished)

Size	Bore Dia.	Keyway
FB-375	.626/.625	3/16 x 3/32
	.501/.500	1/8 x 1/16
FB-475 Dodge #1008	.500 – .562	1/8 x 1/16
	.625 – .875	3/16 x 3/32
	.937 – 1.000	1/4 x 1/8
FB-650 Dodge #1310	.500 – .562	1/8 x 1/16
	.625 – .875	3/16 x 3/32
	.937 – 1.250	1/4 x 1/8
	1.312 – 1.375	5/16 x 5/32

Note: FB-375 has a straight bore. Bushing not required.
Bushings also available in metric bores.

All dimensions are nominal, unless otherwise noted

Size	A Max.	B Dia	C Min.	D Dia.	E Min.	F	G Dia.	H	J	K	L	M Max.	N	O	P
375	4.078	3.125	.7505	—	.031	1.906	1.375	3.359	.187	1.281	1.546	2.716	.843	.281	.531
475	5.171	4.000	1.663	1.593	—	1.875	1.781	3.875	—	1.218	1.546	3.390	1.093	.312	.531
650	6.578	5.125	2.343	2.281	—	2.250	2.562	4.800	—	1.550	1.546	3.765	1.031	.343	.640

Size	Q Max.	R	S Dia.	T	U	V	W	AA Max.	BB	CC	DD	EE	FF	GG
375	—	2.000	1.500	.270	.270 .260	.781	.359	4.468	3.750	1.000	8.000	.666	.635	2.578
475	.281	2.000	1.500	.270	.270 .260	.781	.390	4.984	3.750	1.000	10.000	.697	.635	3.094
650	.359	2.000	1.500	.270	.270 .260	.781	.437	5.843	3.750	1.125	11.000	.843	.635	4.062

Ideal for Dynamic Braking Applications

ER Series Dynamic Engagement Brakes

This brake must be engaged while the shaft is in motion. Shaft speed should be 100 RPM or greater when the brake is engaged. This style brake offers a bulkhead flange mounting system, the highest torque rating offered by Warner Electric in the power released series, high cycle rate capability, and excellent life.

- Expands the electrically released product family with two larger sizes
- Designed for dynamic stopping operations
- High cycle rate capability
- Inside or outside mount options for 475 or 650 sizes
- Normal or heavy duty options available in larger sizes

Selection Procedure

ER Series brakes are available in five sizes. Static torque ratings range from 10.5 lb.ft. to 400 lb.ft.

1. Verify that the brake will be cycled frequently in normal operation.
2. Determine the horsepower and speed at the brake location.
3. The correct size ER Series brake is shown at the intersection of the HP and shaft speed.
4. When ordering, specify voltage and bore size. Available bore sizes are listed in the specifications chart.

How to Order

1. Specify model number
2. For thru-shaft mounting, specify bore size. For ER-475 and ER-650 order bushing separately, ER-375 does not require a bushing.
3. Models ER-475 and ER-650: Specify inside or outside mount. Models ER-825 and ER-1225: Specify normal or heavy duty.
4. See the Controls Section for controls. ER Series brakes require a control with a potentiometer to vary brake channel output; CBC-200, 300 or 500.550 (ER-825 only) or MCS-805-1 or -2 (ER-1225 only) are recommended.

Flange Mounted Brakes



Powerful permanent magnets.

Never needs adjustment—automatically compensates for wear.

Brake automatically engages when power is turned off.

Pre-burnished to assure rated torque upon installation.

Segmented armature design provides high heat dissipation and long service life.

Horsepower vs. Shaft Speed

HP	SHAFT SPEED AT BRAKE (IN RPM)																			
▼	100	200	300	400	500	600	700	800	900	1000	1100	1200	1500	1800	2000	2400	3000	3600	4000	4500
1/12																				
1/8																				
1/6																				
1/4																				
1/3																				
1/2																				
3/4																				
1																				
1-1/2																				
2																				
3																				
5																				
7-1/2																				
10																				
15																				
20																				
25																				
30																				
40																				
50																				
60																				
75																				

Specifications

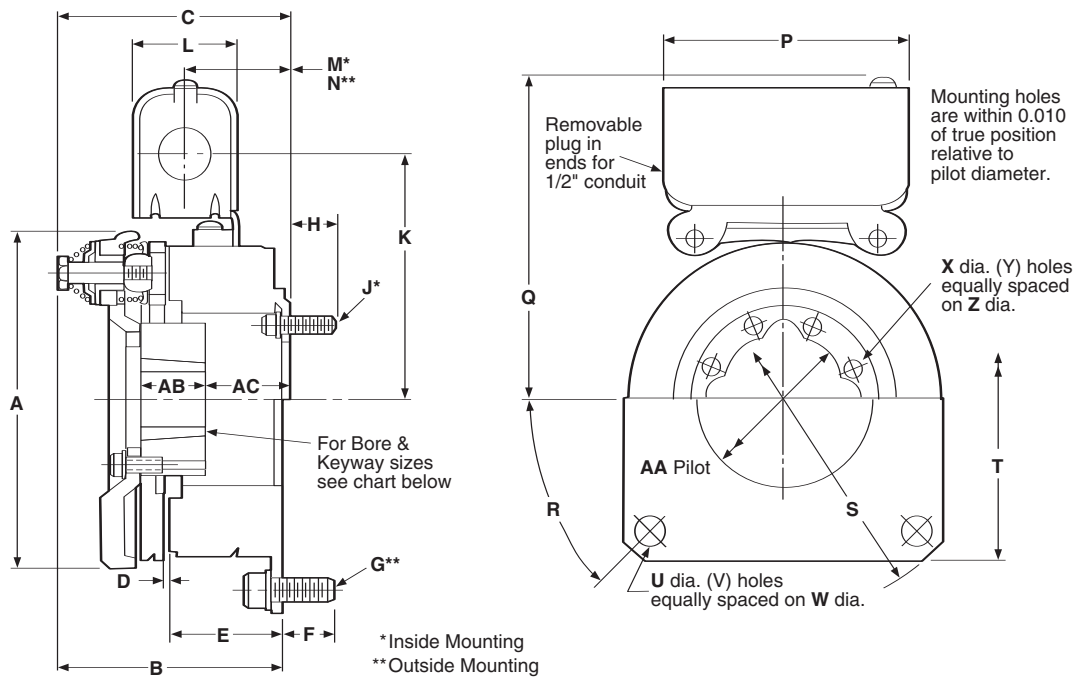
Model	Bore Size	Voltage DC	Static Torque lb. ft.	Max. RPM	Drive	Inertia lb.ft. ² Arm. & Carrier	Hub	Weight lbs. Arm. & Carrier	Hub	Total Weight lbs.
ER-375	.500" & .625"	90V	10.5	5000	—	.010	.001	.60	.49	4.5
ER-475	.500" to 1.000" Dodge #1008	90V	21	4500	—	.072	.006	1.13		6.3
ER-650	.500" to 1.375" Dodge #1310	90V	56	3600	—	.106	.020	2.3	1.6	13.2
ER-825 ND	.500" to 1.625" Dodge #1615	90V	125	3600	Pin Spline	.323 .326	.043 .006	4.783 5.263	1.857 .834	15.6
ER-825 HD	.500" to 1.500" Browning #H-1	90V	125	3600	Pin Spline	.323 .326	.043 .006	4.783 5.263	1.857 .834	15.6
ER-1225 ND	.937" to 3.00" Dodge #3030	35-75V	400	3000	Pin Spline	1.667 1.737	.380 .077	10.227 13.317	6.716 3.582	60.3
ER-1225 HD	.75" to 2.687" Browning #Q-1	35-75V	400	3000	Pin Spline	1.667 1.737	.380 .077	10.227 13.317	6.716 3.582	60.3

Bushing Part Numbers

		Bushing Number				Bushing Number				Bushing Number	
Shaft Size	Keyway Size	Warner Electric	Browning	Shaft Size	Keyway Size	Warner Electric	Browning	Shaft Size	Keyway Size	Warner Electric	Browning
1/2	1/8 x 1/16	180-0002		2-5/16	5/8 x 5/16	180-0051		1-15/16	1/2 x 1/4	180-0278	
9/16	1/8 x 1/16	180-0003		2-3/8	5/8 x 5/16	180-0052		2	1/2 x 1/4	180-0279	
5/8	3/16 x 3/32	180-0004		2-7/16	5/8 x 5/16	180-0053		2-1/16	1/2 x 1/4	180-0280	
11/16	3/16 x 3/32	180-0005		2-1/2	5/8 x 5/16	180-0054	QI-2	2-1/8	1/2 x 1/4	180-0281	
3/4	3/16 x 3/32	180-0006		2-9/16	5/8 x 5/16	180-0055		2-3/16	1/2 x 1/4	180-0282	
13/16	3/16 x 3/32	180-0007		2-5/8	5/8 x 5/16	180-0056		2-1/4	1/2 x 1/4	180-0283	
7/8	3/16 x 3/32	180-0008		2-11/16	5/8 x 5/16	180-0057		2-5/16	5/8 x 5/16	180-0284	
15/16	1/4 x 1/8	180-0009	H-1	1/2	1/8 x 1/16	180-0131		2-3/8	5/8 x 5/16	180-0285	
1	1/4 x 1/8	180-0010		9/16	1/8 x 1/16	180-0132		2-7/16	5/8 x 5/16	180-0286	3030
1-1/16	1/4 x 1/8	180-0011		5/8	3/16 x 3/32	180-0133		2-1/2	5/8 x 5/16	180-0287	
1-1/8	1/4 x 1/8	180-0012		11/16	3/16 x 3/32	180-0134		2-9/16	5/8 x 5/16	180-0288	
1-3/16	1/4 x 1/8	180-0013		3/4	3/16 x 3/32	180-0135		2-5/8	5/8 x 5/16	180-0289	
1-1/4	1/4 x 1/8	180-0014		13/16	3/16 x 3/32	180-0136		2-11/16	5/8 x 5/16	180-0290	
1-5/16	5/16 x 5/32	180-0015		7/8	3/16 x 3/32	180-0137		2-3/4	5/8 x 5/16	180-0291	
1-3/8	5/16 x 5/32	180-0016		15/16	1/4 x 1/8	180-0138		2-13/16	3/4 x 3/8	180-0292	
1-7/16	3/8 x 3/16	180-0017	H-2	1	1/4 x 1/8	180-0139		2-7/8	3/4 x 3/8	180-0293	
1-1/2	3/8 x 3/16	180-0018		1-1/16	1/4 x 1/8	180-0140	1615	2-15/16	3/4 x 3/8	180-0294	
3/4	3/16 x 3/32	180-0026		1-1/8	1/4 x 1/8	180-0141		3	3/4 x 3/8	180-0295	
13/16	3/16 x 3/32	180-0027		1-3/16	1/4 x 1/8	180-0142		1/2	1/8 x 1/16	180-0410	
7/8	3/16 x 3/32	180-0028		1-1/4	1/4 x 1/8	180-0143		9/16	1/8 x 1/16	180-0411	
15/16	1/4 x 1/8	180-0029		1-5/16	5/16 x 5/32	180-0144		5/8	3/16 x 3/32	180-0412	
1	1/4 x 1/8	180-0030		1-3/8	5/16 x 5/32	180-0145		11/16	3/16 x 3/32	180-0413	
1-1/16	1/4 x 1/8	180-0031		1-7/16	3/8 x 3/16	180-0146		3/4	3/16 x 3/32	180-0414	1008
1-1/8	1/4 x 1/8	180-0032		1-1/2	3/8 x 3/16	180-0147		13/16	3/16 x 3/32	180-0415	
1-3/16	1/4 x 1/8	180-0033		1-9/16	3/8 x 3/16	180-0148		7/8	3/16 x 3/32	180-0416	
1-1/4	1/4 x 1/8	180-0034		1-5/8	3/8 x 3/16	180-0149		15/16	1/4 x 1/16	180-0417	
1-5/16	5/16 x 5/32	180-0035	QI-1	15/16	1/4 x 1/8	180-0262		1	1/4 x 1/16	180-0418	
1-3/8	5/16 x 5/32	180-0036		1	1/4 x 1/8	180-0263		1/2	1/8 x 1/16	180-0421	
1-7/16	3/8 x 3/16	180-0037		1-1/16	1/4 x 1/8	180-0264		9/16	1/8 x 1/16	180-0422	
1-1/2	3/8 x 3/16	180-0038		1-1/8	1/4 x 1/8	180-0265		5/8	3/16 x 3/32	180-0423	
1-9/16	3/8 x 3/16	180-0039		1-3/16	1/4 x 1/8	180-0266		11/16	3/16 x 3/32	180-0424	
1-5/8	3/8 x 3/16	180-0040		1-1/4	1/4 x 1/8	180-0267		3/4	3/16 x 3/32	180-0425	
1-11/16	3/8 x 3/16	180-0041		1-5/16	5/16 x 5/32	180-0268		13/16	3/16 x 3/32	180-0426	
1-3/4	3/8 x 3/16	180-0042		1-3/8	5/16 x 5/32	180-0269	3030	7/8	3/16 x 3/32	180-0427	
1-13/16	1/2 x 1/4	180-0043		1-7/16	3/8 x 3/16	180-0270		15/16	1/4 x 1/16	180-0428	1310
1-7/8	1/2 x 1/4	180-0044		1-1/2	3/8 x 3/16	180-0271		1	1/4 x 1/8	180-0429	
1-15/16	1/2 x 1/4	180-0045		1-9/16	3/8 x 3/16	180-0272		1-1/16	1/4 x 1/8	180-0430	
2	1/2 x 1/4	180-0046		1-5/8	3/8 x 3/16	180-0273		1-1/8	1/4 x 1/8	180-0431	
2-1/16	1/2 x 1/4	180-0047		1-11/16	3/8 x 3/16	180-0274		1-3/16	1/4 x 1/8	180-0432	
2-1/8	1/2 x 1/4	180-0048	QI-2	1-3/4	3/8 x 3/16	180-0275		1-1/4	1/4 x 1/8	180-0433	
2-3/16	1/2 x 1/4	180-0049		1-13/16	1/2 x 1/4	180-0276		1-5/16	15/16 x 5/32	180-0434	
2-1/4	1/2 x 1/4	180-0050		1-7/8	1/2 x 1/4	180-0277		1-3/8	15/16 x 5/32	180-0435	

Browning® is registered to Emerson Electric Co.
Dodge and Browning bushings are also available
in metric bores.

ER-375, ER-475, ER-650



Mounting Requirements

Customer Shall Maintain:

1. Squareness of brake mounting face with armature hub shaft within .006 T.I.R.
2. Concentricity of brake mounting pilot diameter with armature hub shaft within .010 T.I.R.

3. If magnet mounting surface is a magnetic material, the magnet is to be insulated approximately 1/2" from that surface with a plate or spacers of non-magnetic material.

ER-375 available outside mounted only.

Bore and Keyway Dimensions

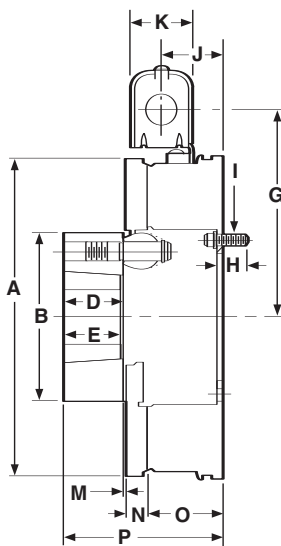
Size	Bore Dia.	Keyway
375	.501/.500	1/8 x 1/16
	.626/.625	3/16 x 3/32
475	.500 - .562	1/8 x 1/16
	.625 - .875	3/16 x 3/32
	.937 - 1.000	1/4 x 1/8
650	.500 - .562	1/8 x 1/16
	.625 - .875	3/16 x 3/32
	1.000 - 1.250	1/4 x 1/8
	1.312 - 1.375	5/16 x 5/32

All dimensions are nominal, unless otherwise noted.

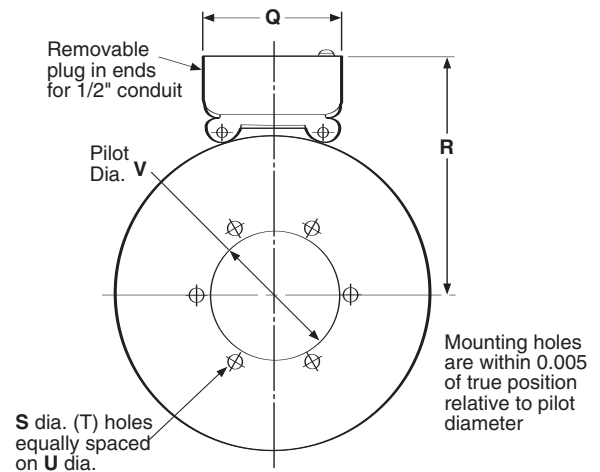
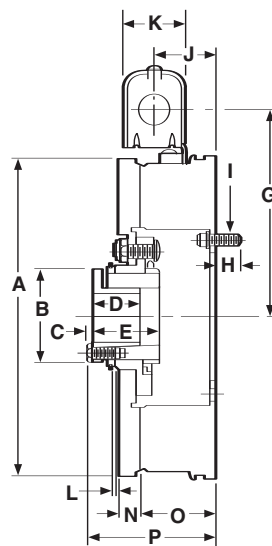
Size	A Max.	B Max.	C Max.	D	E	F Max.	G	H Max.	J	K	L	M	N	P
375	4.078	2.583	2.583	.032	1.410	.600	5/16-18 UNC-3A	—	—	3.325	1.547	—	—	3.750
475	5.172	3.195	3.274	.031	1.630	.431	3/8-16 UNC-3A	.390	8-32	3.875	1.547	1.354	1.236	3.750
650	6.578	3.525	3.525	.032	1.880	.542	5/16-18 UNC-3A	.542	5/16-18 UNC-3A	4.800	1.547	—	—	3.750

Size	Q Max.	R	S	T Sq.	U	V	W Dia.	X	Y	Z Dia.	AA Dia.	AB	AC
375	4.505	—	<u>5.625</u> 5.623	—	<u>.350</u> .341	3	5.000	—	—	—	—	23/32	1-3/4
475	5.000	45°	<u>6.500</u> 6.498	5.000	<u>.419</u> .403	4	5.875	<u>.208</u> .201	8	2.375	<u>2.065</u> 2.062	29/32	1-3/16 I.M. 1-1/16 O.M.
650	5.844	45°	<u>8.000</u> 7.998	6.500	<u>.358</u> .338	4	7.250	<u>.358</u> .338	4	3.688	<u>2.822</u> 2.820	1-1/32	1-3/8

ER-825 and ER-1225
Normal Duty (N.D.)



ER-825 and ER-1225
Heavy Duty (H.D.)



ER-825 & ER-1225 Magnet View
(Same for Pin Drive and Spline Drive)

Mounting Requirements

Customer Shall Maintain:

1. Squareness of magnet mounting face with armature shaft within .006 T.I.R.
2. Concentricity of magnet mounting pilot diameter with armature shaft within .010 T.I.R.
3. If magnet mounting surface is a magnetic material, the magnet is to be insulated approximately 1/2" from that surface with a plate or spacers of non-magnetic material.

Size	A Max.	B Dia.	C	D	E	G	H Max.	I	J	K Min.	L Min.
825 N.D.	8.656	4.625	—	1.593	1.500	5.625	.531	5/16-18 UNC-3A	1.687	1.546	—
825 H.D.	8.656	2.500	.156	1.250	1.765	5.625	.531	5/16-18 UNC-3A	1.687	1.546	.062
1225 N.D.	12.671	6.875	—	3.000	3.000	7.671	.546	5/16-18 UNC-3A	1.718	1.546	—
1225 H.D.	12.671	4.093	.234	2.500	2.171	7.671	.546	5/16-18 UNC-3A	1.718	1.546	.062

Size	M When New	N	O	P Max.	Q	R Max.	S	T	U	V
825 N.D.	.093	.562	2.080 .338	4.359	3.750	6.750 3.501	.358	6	4.250	3.503
825 H.D.	—	.531	2.080 .338	3.546	3.750	6.750 3.501	.358	6	4.250	3.503
1225 N.D.	.156	.593	2.500 .338	6.218	3.750	8.796 6.376	.358	6	7.250	6.378
1225 H.D.	—	.562	2.500 .338	5.031	3.750	8.796 6.376	.358	6	7.250	6.378

Bore and Keyway Dimensions

ER-825	Bore Dia.	Keyway
Pin Drive	.500 - .562	1/8 x 1/16
	.625 - .875	3/16 x 3/32
	.937 - 1.250	1/4 x 1/8
	1.312 - 1.375	5/16 x 5/32
	1.437 - 1.500	3/8 x 3/16
	1.562 - 1.625*	3/8 x 3/16
Spline Drive	.500 - .562	1/8 x 1/16
	.375 - .625	3/16 x 3/32
	.937 - 1.187	1/4 x 1/8
	1.250*	1/4 x 1/8
	1.312 - 1.375*	5/16 x 5/32
	1.437 - 1.500*	3/8 x 3/16
ER-1225		
Pin Drive	.937 - 1.250	1/4 x 1/8
	1.312 - 1.375	5/16 x 5/32
	1.437 - 1.750	3/8 x 3/16
	1.812 - 2.250	1/2 x 1/4
	2.312 - 2.750	5/8 x 5/16
	2.187 - 3.000*	3/4 x 3/8
Spline Drive	.750 - .875	3/16 x 3/32
	.937 - 1.250	1/4 x 1/8
	1.312 - 1.375	5/16 x 5/32
	1.437 - 1.750	3/8 x 3/16
	1.812 - 2.062	1/2 x 1/4
	2.125 - 2.250*	1/2 x 1/4
	2.312 - 2.687	5/8 x 5/16

*Key furnished

For Dynamic Stopping and Cycling Applications

Warner Electric's modular design brakes and clutch/brake units offer material handling system users a high performance alternative to spring-set brakes. These modular units provide long life, maintenance free operation, and consistent performance with minimal downtime.

These brakes are offered in power-off types for double shaft motors and for installation between C-face motor and reducer or other drive device. Powerful permanent magnets generate braking torque. The brakes release when voltage is applied to the coil, countering the force of the permanent magnets. No power is required to stop or hold a load. An optional integral conduit box provides simple wiring direct from the motor power leads.

- Designed for dynamic stopping operations
- Brake automatically engages when power is turned off
- High cycle rate capability
- Never needs adjustment – automatically compensates for wear
- Powerful permanent magnets provide braking force
- Choice of open or enclosed brakes
- Prepackaged, preburnished UM version

Three C-face Compatible Designs

The UM Series (UniModule Clutch/Brakes) are preassembled clutch/electrically released brake modules.

- The UM-1020-FBC brake/motor clutch combination is used for clutch/power-off brake applications. It mounts directly to C-face compatible components.
- The UM-2030-FBC brake/input clutch combination is used for clutch/power-off brake applications. It has shafts on both the input and output sides for base mounting.

The EUM Series (Enclosed Motor Brakes) are totally enclosed non-vented units that keep wear particles in and contaminants out.

- The EUM-FBB brake unit can be mounted between two C-face compatible components.
- The EUM-MBFB motor brake is mounted directly to the rear of a double-shafted motor.

The EM Series (Electro Module Brakes and Clutch/Brakes) are comprised of individual units that may bolt together to form various combinations:

- The EM-FBB brake module mounts between a C-face motor and a gear box or reducer.
- The EM-MBFB motor brake module is mounted to the rear of a double-shafted motor.
- The EM-FBC brake module is used in combination with a motor clutch or input clutch unit to make a clutch/electrically released brake or can be used alone as a brake only.

Brake Modules (FBB) – For mounting between a C-face motor and a gearbox or reducer

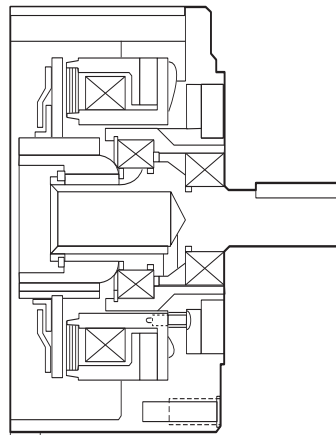


EM Series
Shaft mounted,
vented housing



EUM Series
Shaft mounted,
totally enclosed
non-vented housing

Use for brake alone applications.



Features

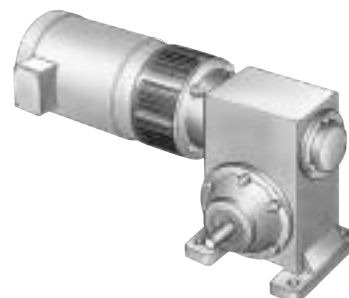
- Single armature for brake alone applications
- Output shaft
- Permanent magnets
- UL listed and CSA certified

EM-FBB

Available in 4 sizes

EUM-FBB

Available in 4 sizes



EM-FBB Electro Module
brake unit between a
motor and a reducer.

Permanent Magnet Modules

Electrically Released Brakes

C-face Compatible Brakes and Clutch/Brakes

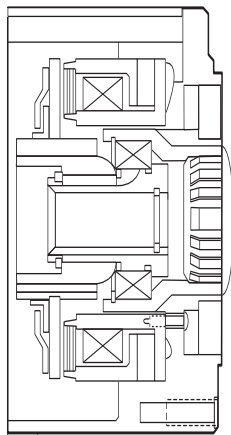
Motor Brake Modules (MBFB) – For mounting directly to the rear of a double-shafted motor



EM Series
vented housing

EUM Series
totally enclosed
non-vented
housing

Use as a motor brake on C-face type motors.



Features

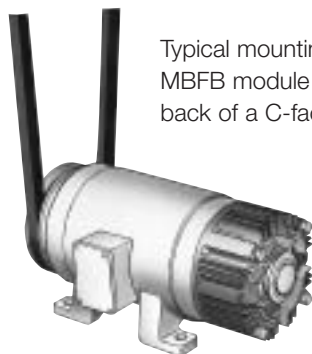
- Single armature design
- Complete torque control
- Precision cast housing
- Ceramic type permanent magnets

EM-MBFB

Available in 4 sizes

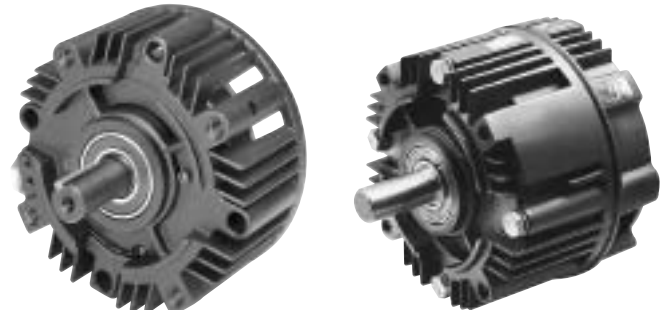
EUM-MBFB

Available in 5 sizes



Typical mounting of an MBFB module on the back of a C-face motor

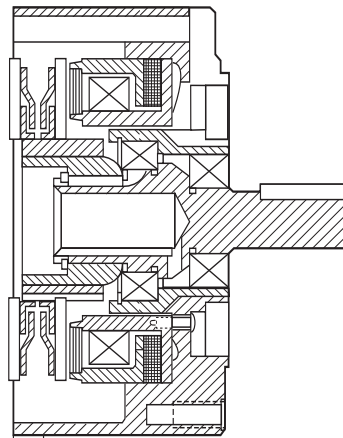
Clutch/Brake Modules (FBC) – Clutch/Fail-safe brake for mounting between a C-face motor and a gearbox or reducer



EM Series
Modular unit with
C/B capability

UM Series
Fully assembled C/B
combination package

Combine with a motor or input clutch for clutch/brake applications or use alone as a brake only.



Features

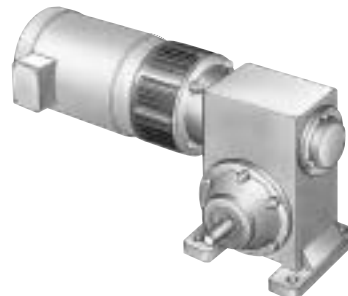
- Dual armature for clutch/brake combination
- Output shaft
- Can be base mounted for use as a separate drive unit.

EM-FBC

Available in 3 sizes

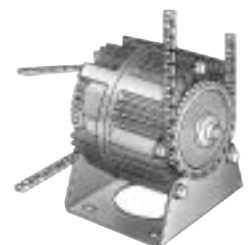
UM-FBC

Available in 4 size combinations



EM-FBC Electro Module brake unit combined with a motor clutch module

UM-FBC UniModule clutch/brake mounted on a base



UniModule Clutch/Electrically Released Brake Combination

Fan cooled for long life and consistent performance.

NEMA C-face compatible design

Single conduit entrance

Heavy duty bearings maintain tight concentricity and running efficiency.

High torque, long life, asbestos-free friction material

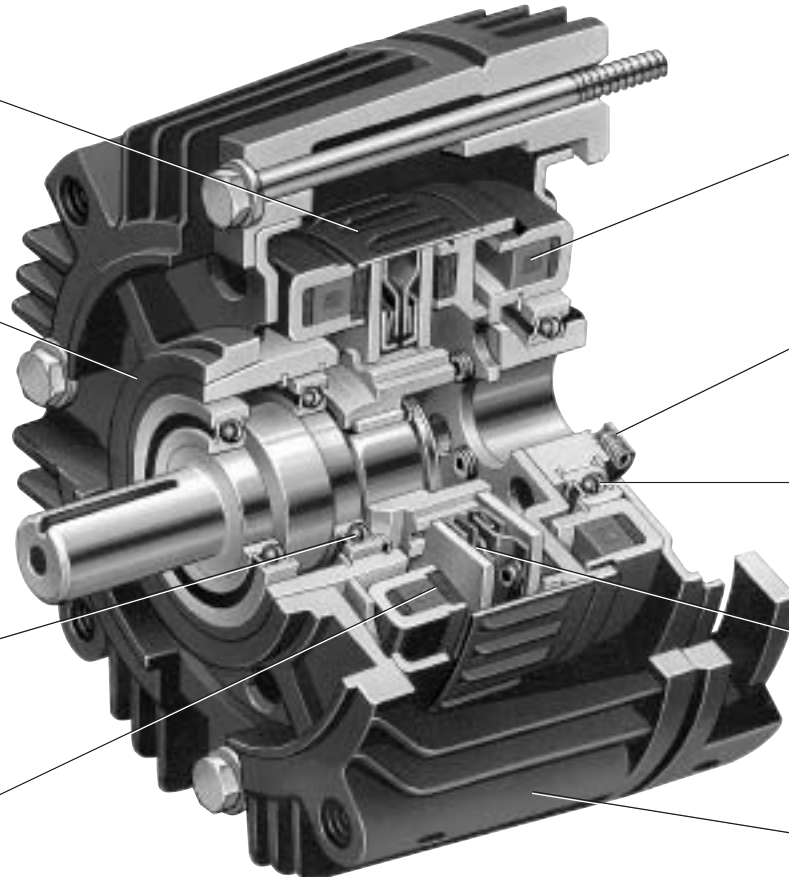
Completely sealed coils

Easy set screw access

Bearing mounted rotor.

Autogaps® automatically adjust for wear.

Finned design for maximum heat dissipation.



Warner Electric offers the convenience of pre-assembled UniModule clutch/electrically released brake packages. Assembly, alignment, and pre-burnishing have been done at the factory. Bolt it on, wire it up, and your clutch/electrically released brake is ready to go. Available in both C-face and base mounted versions.

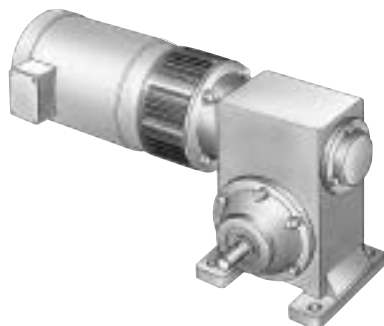
Warner Electric's unique design employs powerful permanent magnets for maximum torque when power is removed from the brake coil. A small amount of electrical power applied to the brake coil nullifies the permanent magnets and the brake releases. No springs to limit cycle rates. Never any adjustments. No

lubrication. These brakes are recommended for dynamic cycling operations only.

UniModule clutch/electrically released brake units may be mounted directly to NEMA C-face motors and reducers, or can be base mounted.

1. Select Configuration

a. NEMA C-face Mounting (1020 Configuration)



Verify the unit will be cycled frequently.

To select the correct UniModule package, determine the NEMA frame size of your motor and/or reducer, and choose the corresponding size UniModule from the Frame Size Selection chart. Verify torque ratings.

b. Base Mounting (2030 Configuration)



Verify the unit will be cycled frequently.

Select the correct size module from the Horsepower vs. Shaft Speed chart by determining the motor horsepower and RPM at the module location. The correct size UniModule is shown at the intersection of the HP and operating speed. For additional sizing information, refer to the technical sizing procedure (step 2).

2. Determine Technical Requirements

Technical considerations for sizing and selection are torque and heat dissipation. Each merits careful consideration, especially heat dissipation as over time, use in excessive temperature environments will have an adverse effect on bearing life and coil wire insulation integrity.

Compare the calculated torque requirement with the average dynamic torque ratings. Select a unit with adequate torque. If the unit selected on torque is different than the unit selected based on heat, select the larger size unit.

Horsepower vs. Shaft Speed

HP	SHAFT SPEED AT CLUTCH (IN RPM)																	
▼	100	200	300	400	500	600	700	800	900	1000	1100	1200	1500	1800	2000	2400	3000	3600
1/4																		
1/2																		
3/4																		
1																		
1-1/2																		
2																		
3																		
5																		
7-1/2																		

Frame Size Selection and Technical Ratings Chart

NEMA Frame Size	UniModule Size	Static Torque Brake lb.ft.	Static Torque Clutch lb.	Max. RPM	Voltage DC
56C/48Y	UM-50* UM-100**	10.5 21	16 30	3600	24 or 90
182C/143TC 184C/145TC	UM-180	21	30	3600	24 or 90
213C/182TC 215C/184TC	UM-210	56	95	3600	24 or 90
213TC/215TC	UM-215	56	95	3600	24 or 90

*For 56C/48Y C-frame motors 3/4 HP and smaller, the UM-100 size may be used where extended life is desirable.

**The UM-100 size is recommended for motors 1 HP and larger.

a. Heat Dissipation Sizing

Friction surfaces slip during the initial period of engagement and, as a result, heat is generated. The clutch/brake selected must have a heat dissipation rating greater than the heat generated by the application. Therefore, in high inertia or high cycle rate applications, it is necessary to check the heat dissipation carefully. Inertia, speed and cycle rate are the required parameters.

Heat dissipation requirement is calculated as follows:

$$E = 1.7 \times WR^2 \times (N/100)^2 \times F$$

where:

E = Heat (lb. ft./min.)

WR^2 = Total reflected inertia at the clutch/brake shaft. Include the clutch/brake output inertia. (lb.ft.²)

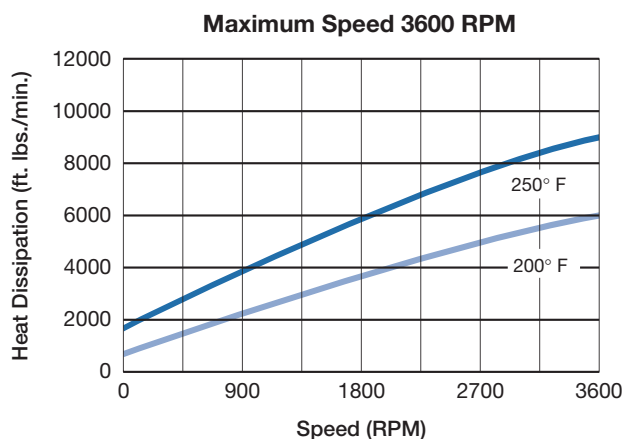
N = Speed in revolutions per minute. (RPM)

F = Cycle rate in cycles per minute (CPM)

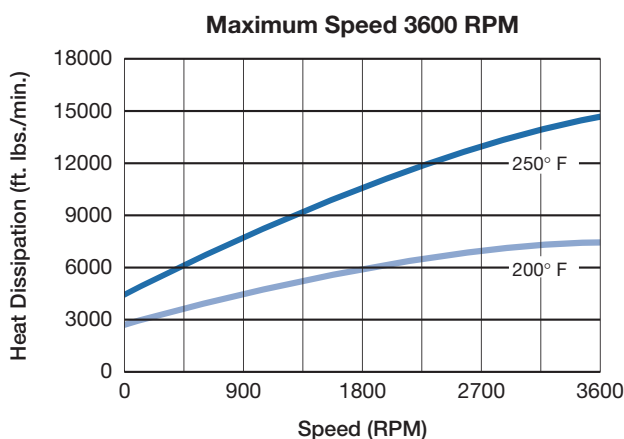
Compare the calculated heat generated in the application to the unit ratings using the heat dissipation curves. Select the appropriate unit that has adequate heat dissipation ability.

Heat Dissipation Curves

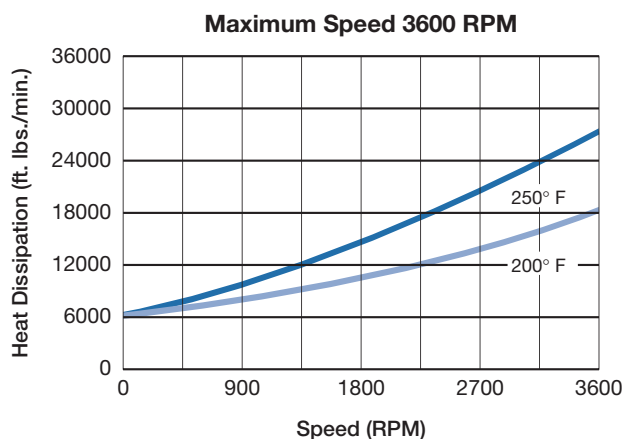
Size 50



Size 100/180



Size 210/215



b. Torque Sizing

For most applications, the correct size clutch/brake can be selected from the Horsepower vs. Shaft Speed chart on page 117. Determine the motor horsepower and the RPM at the clutch/brake. The correct size unit is shown at the intersection of horsepower and shaft speed.

If the static torque requirements are known, refer to the technical ratings chart to select a unit.

For some applications, the torque requirement is determined by the time allowed to accelerate and decelerate the load. (This time is generally specified in milliseconds.) For these applications, it is necessary to determine the torque requirement based on load inertia and the time allowed for engagement.

The torque requirements are calculated as follows:

$$T = (WR^2 \times N) / (308 \times t)$$

where:

T = Average Dynamic Torque (lb. ft.)

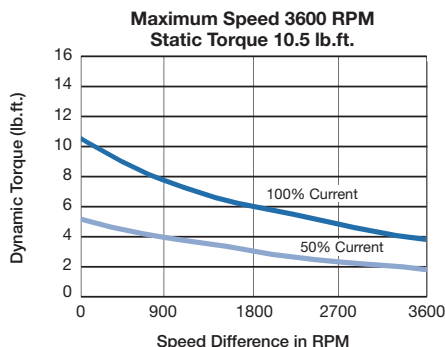
WR^2 = Total reflected inertia at the clutch/brake shaft. Include the clutch/brake output inertia. (lb. ft.²)

N = Speed in revolutions per minute. (RPM)

t = Time allowed for the engagement (sec)

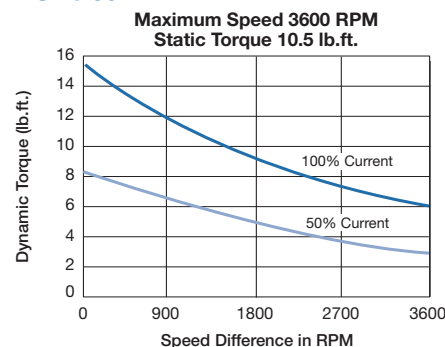
C-face Electrically Released Brake Dynamic Torque Curves

Size 50

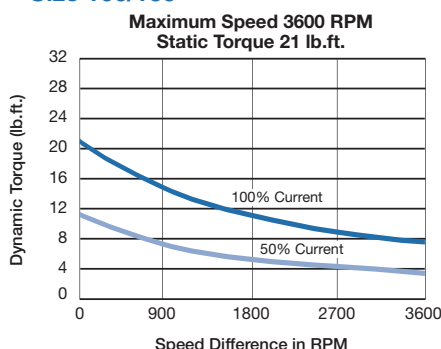


C-face Clutch Dynamic Torque Curves

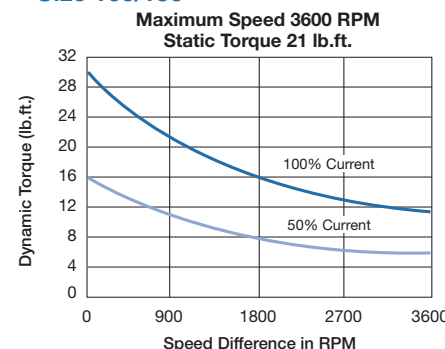
Size 50



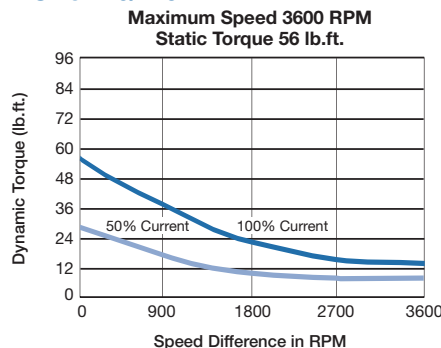
Size 100/180



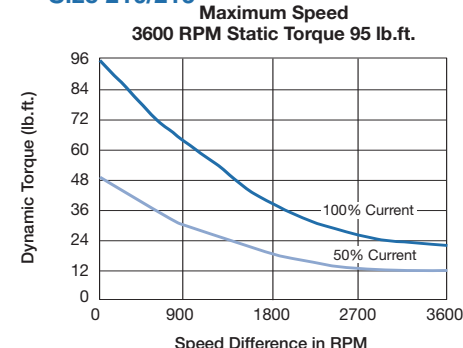
Size 100/180



Size 210/215



Size 210/215



Specifications (Max. Speed 3600 RPM)

						Component Inertia–WR ² (lb. ft. ²)						
						1020		2030				NEMA Frame Size
								Output Shaft	Input Shaft	Rotor w/Fan and Hub		
Size	Voltage DC	Nominal Weight (lbs.)		Armature		Shaft	Rotor w/Fan and Hub	Output Shaft	Input Shaft	Rotor w/Fan and Hub		
		1020	2030	(both)	Hub							
50	24 90	12	15	.018	.001	.001	.020	.001	.001	.020	56C/48Y	
100	24 90	16	19	.046	.002	.002	.046	.002	.002	.046	56C/48Y	
180	24 90	16	19	.046	.002	.002	.046	.002	.002	.046	182C/143TC 184C/145TC	
210	24 90	36	47	.162	.016	.014	.190	.016	.015	.183	213C/182TC 215C/184TC	
215	24 90	37	48	.162	.016	.016	.190	.017	.016	.183	213TC/215TC	

3. Select Options

Warner Electric Enclosed UniModules can be fitted with several accessories to extend their capacity and ease of mounting.

4. Select Control

All electrically released modules require a control with a potentiometer that will vary brake channel output. UM-FBC units require either a CBC-300 or a CBC 500/550 control.

UM Combination	UM Model No.	Voltage DC	Part No.
Motor Clutch/ ER Brake	UM-50-1020FBC	24	5370-273-037
	UM-50-1020FBC	90	5370-273-036
	UM-100-1020FBC	24	5370-273-153
	UM-100-1020FBC	90	5370-273-125
	UM-180-1020FBC	24	5370-273-047
	UM-180-1020FBC	90	5370-273-046
	UM-210-1020FBC	24	5371-273-013
	UM-210-1020FBC	90	5371-273-012
	UM-215-1020FBC	24	5371-273-099
	UM-215-1020FBC	90	5371-273-079
Input Clutch/ ER Brake	UM-50-2030FBC	24	5370-273-042
	UM-50-2030FBC	90	5370-273-041
	UM-100-2030FBC	24	5370-273-154
	UM-100-2030FBC	90	5370-273-155
	UM-180-2030FBC	24	5370-273-052
	UM-180-2030FBC	90	5370-273-051
	UM-210-2030FBC	24	5371-273-018
	UM-210-2030FBC	90	5371-273-017
	UM-215-2030FBC	24	5371-273-100
	UM-215-2030FBC	90	5371-273-101

Accessories

Description	UM Size	Part No.
Conduit Box	UM series All sizes	5370-101-042
Base Mount Kit for 2030 FBC	50/100	5370-101-036
	180	5370-101-037
	210/215	5371-101-039
Motor Mount Kit for 1020 FBC	50/100	5370-101-010
	180	5370-101-012
	210/215	5371-101-012

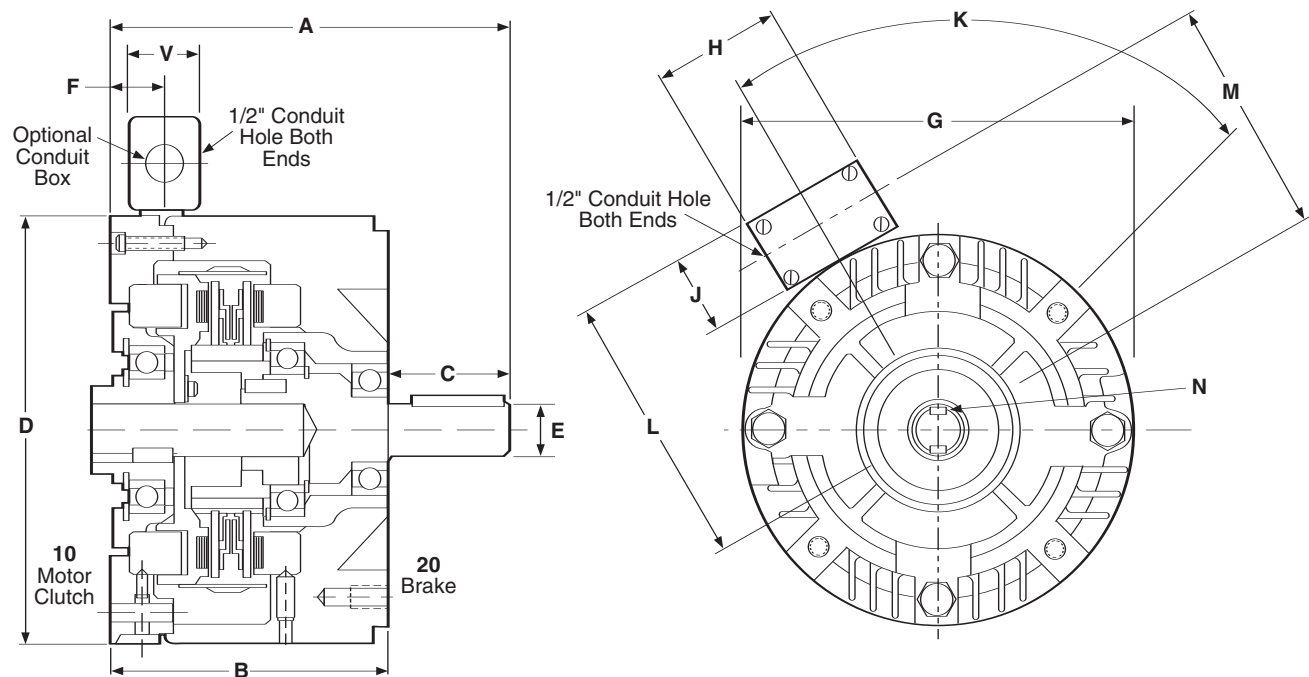
How to Order

1. Specify model number and voltage or the corresponding part number.
2. Specify conduit box, if desired. See the Controls Section.
3. Specify required control unit. See the Controls Section.

Ordering Example

UM-50-1020FBC, 90V or 5370-273-036;
5370-101-042 conduit box; CBC-300
control.

UM-1020 FBC Motor Clutch/Electrically Released Brake

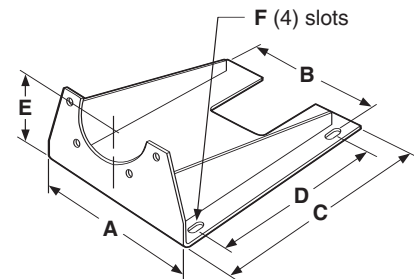


Note: Conduit box is optional and is ordered separately.

All dimensions are nominal, unless otherwise noted.

Size	A	B	C	D	E	F	G	H	J	K	L	M	N (Key)
50	7.281	5.375	1.813	6.750	.625	.938	6.688	3.250	2.188	75°	5.531	4.438	3/16 x 3/16 x 1-1/4
100	7.281	5.375	1.813	6.750	.625	.938	6.688	3.250	2.188	75°	5.531	4.438	3/16 x 3/16 x 1-1/4
180	7.359	5.375	1.891	6.750	.875	.938	6.688	3.250	2.188	75°	5.531	4.438	3/16 x 3/16 x 1-1/4
210	9.688	7.031	2.500	9.250	1.125	.625	9.688	3.250	2.188	70°	6.869	5.766	1/4 x 1/4 x 2
215	10.568	7.44	3.125	9.25	1.375	1.2	9.688	3.250	2.188	70°	6.869	5.766	5/16 x 5/16 x 2

Motor Mount (M)

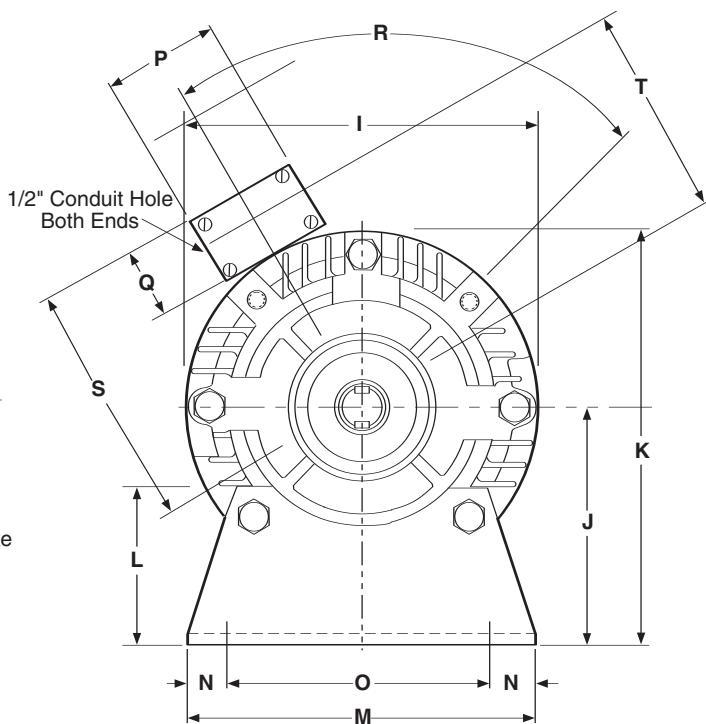
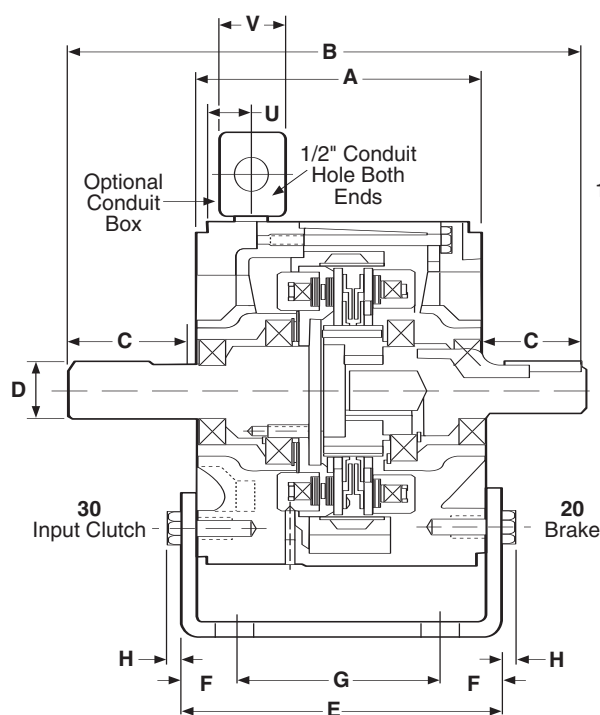


For use with 1020, 1040, 20, 20 FBB and 1020 FBC Combinations.

Size	A	B	C	D	E	F	Part No.
50/100	9.25	8.25	11.00	8.000	3.50	.797 x .406	5370-101-010
180	9.25	8.25	11.00	8.000	4.50	.797 x .406	5370-101-012
210/215	11.50	10.50	12.00	9.000	5.25	.750 x .406	5371-101-012

UM-2030 FBC Input Clutch/Electrically Released Brake

UM-2030 FBC-Input Clutch/Electrically Released Brake – Base Mounted



Note: Mounting base and conduit box are optional and are ordered separately.

All dimensions are nominal, unless otherwise noted.

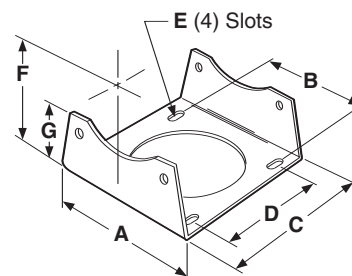
Size	A	B	C Min.	D	E	F	G	H	I	J	K
50	6.250	10.047	1.813	.625	6.219	1.109	4.000	.344	6.688	3.500	6.844
180	6.250	10.188	1.891	.875	6.219	1.109	4.000	.344	6.688	4.500	7.844
210	8.516	13.766	2.500	1.125	8.938	1.469	6.000	.438	9.688	5.250	9.906

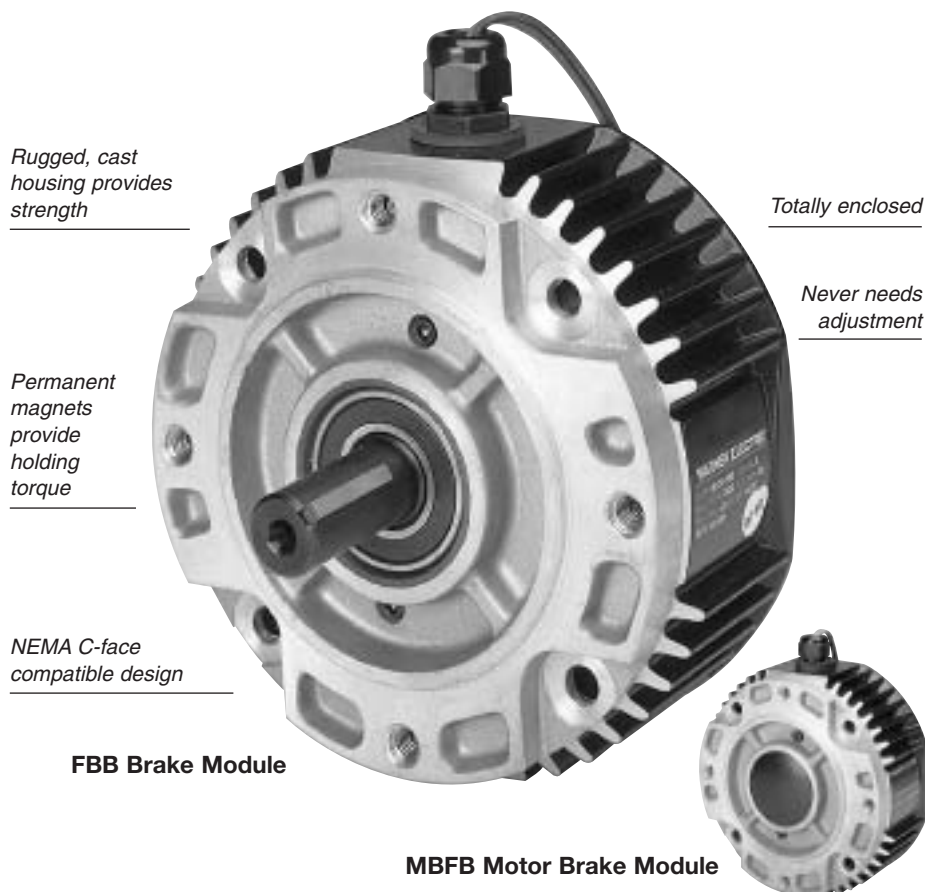
Size	L	M	N	O	P	Q	R	S	T	U	V
50	2.000	6.000	.500	5.000	3.250	2.188	75°	5.531	4.438	1.125	2.203
180	3.000	6.625	.813	5.000	3.250	2.188	75°	5.531	4.438	1.125	2.203
210	3.375	9.000	.625	7.750	3.250	2.188	70°	6.859	5.766	1.625	2.203

Base (B)

For use with 2030 FBC units.

Size	A	B	C	D	E	F	G	Part No.
50/100	6.000	5.000	6.219	4.000	.750 X .406	3.500	2.000	5370-101-036
180	6.625	5.000	6.219	4.000	.750 X .406	4.500	3.000	5370-101-037
210	9.000	7.750	8.938	6.000	.750 X .531	5.250	3.375	5371-101-019





Available in Two Design Styles

EUM-FBB Brake Module

Use for brake alone applications. Mounts between a motor and gear box or reducer. Available in four sizes.

EUM-MBFB Motor Brake Module

Mounts to a double shafted C-face motor. Available in five sizes.

Warner Electric offers the convenience of pre-assembly in UniModule electrically released brake packages. Assembly, alignment, and preburnishing have been done at the factory. Bolt it on, wire it up, and your electrically released brake is ready to go. (Control and conduit box optional)

Care must be exercised to assure proper sizing and selection of electrically released brakes. 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.

Warner Electric brakes are designed for NEMA C-face motors which match the motor frame size and shaft diameter to the brake. To select a brake, determine the motor frame size and pick an MBFB for double shafted motors or an FBB for mounting 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.

They are sized to provide nominal stopping of a motor in the event of power loss. If your application requires true "Fail safe" braking, the brake must be sized to meet or exceed peak motor torque and placed as close to the load shaft as possible. Peak motor torque can be determined by the formula:

$$\text{Peak Torque} = \frac{(\text{HP} \times 5250)}{\text{Motor Speed}}$$

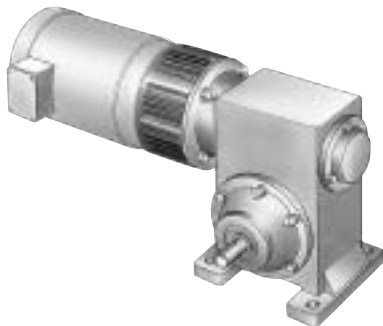
EUM-FBB, EUM-MBFB Selection

Warner Electric Electrically Released Enclosed UniModules are available in two styles. The EUM-FBB Brake Module is used in brake only applications and mounts between a C-face motor and a gear box or reducer. The EUM-MBFB Motor Brake Module mounts to the back of a double shafted motor.

Note: Care must be exercised when selecting a brake to ensure it is sized properly for your application.

1. Select Configuration

a. FBB for NEMA C-face Mounting Between a Motor and Reducer



Verify that the brake will be cycled frequently.

Determine the NEMA C-face frame size of your motor and/or reducer, and choose the corresponding size Enclosed UniModule from the Frame Size Selection chart.

Size EUM-100 modules utilize a 5/8" diameter shaft to fit 56C/48Y motor frames with components of EUM-180 units for higher torque and heat dissipation capacity than the EUM-50.

EUM-FBB Frame Size Selection

NEMA Frame Size	EUM Size
56C/48Y	EUM-50* EUM-100**
182C/143TC 184C/145TC	EUM-180
213C/182TC 215C/184TC	EUM-210
213TC/215TC	EUM-215

*For 56C/48Y C-frame motors 3/4 HP and smaller, the EUM-100 size may be used where extended life is desirable.

**The EUM-100 size is recommended for motors 1 HP and larger.

b. MBFB for NEMA C-face Mounting on the Back of a Double Shafted Motor

Verify that the brake will be cycled frequently.

Determine the NEMA C-face frame size of your motor and/or reducer, and choose the corresponding size Enclosed UniModule MBFB from the Frame Size Selection chart, and verify that the motor shaft diameter and mounting bolt circle are the same for the brake and the motor.

Size EUM-100 modules utilize a 5/8" diameter shaft to fit 56C/48Y motor frames with components of EUM-180 units for higher torque and heat dissipation capacity than the EUM-50.

EUM-MBFB Frame Size Selection

NEMA Frame Size	EUM Brake Size	Bolt Hole Mounting Circle	Motor Shaft Dia.
56C/48Y	EUM-50* EUM-100**	5.875	0.625
182C/143TC 184C/145TC	EUM-180	5.875	0.875
213C/182TC 215C/184TC	EUM-210-7/8 EUM-210	7.25 7.25	0.875 1.125

*For 56C/48Y C-frame motors 3/4 HP and smaller, the EUM-100 size may be used where extended life is desirable.

**The EUM-100 size is recommended for motors 1 HP and larger.

2. Determine Technical Requirements

Technical considerations for sizing and selection are torque and heat dissipation. Each merits careful consideration, especially heat dissipation as over time, use in excessive temperature environments will have an adverse effect on bearing life and coil wire insulation integrity.

Compare the calculated torque requirement with the average dynamic torque ratings. Select a unit with adequate torque. If the unit selected on torque is different than the unit selected based on heat, select the larger size unit.

Horsepower vs. Shaft Speed

HP	SHAFT SPEED AT CLUTCH (IN RPM)																	
▼	100	200	300	400	500	600	700	800	900	1000	1100	1200	1500	1800	2000	2400	3000	3600
1/4																		
1/2																		
3/4																		
1																		
1-1/2																		
2																		
3																		
5																		
7-1/2																		
10																		

a. Heat Dissipation Sizing

Friction surfaces slip during the initial period of engagement and, as a result, heat is generated. The clutch/brake selected must have a heat dissipation rating greater than the heat generated by the application. Therefore, in high inertia or high cycle rate applications, it is necessary to check the heat dissipation carefully. Inertia, speed and cycle rate are the required parameters.

Heat dissipation requirement is calculated as follows:

$$E = 1.7 \times WR^2 \times (N/100)^2 \times F$$

where:

$$E = \text{Heat (lb. ft./min.)}$$

WR^2 = Total reflected inertia at the clutch/brake shaft. Include the clutch/brake output inertia. (lb.ft.²)

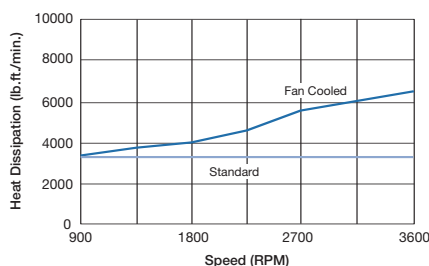
N = Speed in revolutions per minute. (RPM)

F = Cycle rate in cycles per minute (CPM)

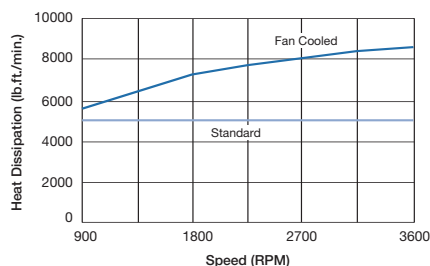
Compare the calculated heat generated in the application to the unit ratings using the heat dissipation curves. Select the appropriate unit that has adequate heat dissipation ability.

Heat Dissipation Curves

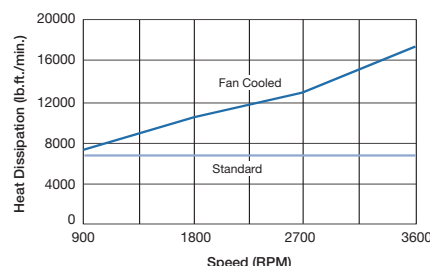
EUM 50



EUM 100/180



EUM 210/215 (fan not available for 215)



b. Torque Sizing

For most applications, the correct size clutch/brake can be selected from the Horsepower vs. Shaft Speed chart. Determine the motor horsepower and the RPM at the clutch/brake. The correct size unit is shown at the intersection of horsepower and shaft speed.

If the static torque requirements are known, refer to the technical ratings chart to select a unit.

For some applications, the torque requirement is determined by the time allowed to accelerate and decelerate the load. (This time is generally specified in milliseconds.) For these applications, it is necessary to determine the torque requirement based on load inertia and the time allowed for engagement.

The torque requirements are calculated as follows:

$$T = (WR^2 \times N) / (308 \times t)$$

where:

T = Average Dynamic Torque (lb. ft.)

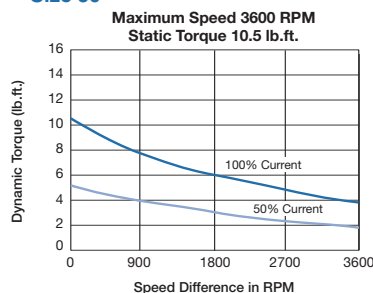
WR^2 = Total reflected inertia at the clutch/brake shaft. Include the clutch/brake output inertia. (lb. ft.²)

N = Speed in revolutions per minute. (RPM)

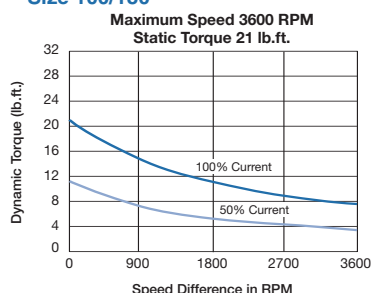
t = Time allowed for the engagement (sec)

C-face Electrically Released Brakes Dynamic Torque Curves

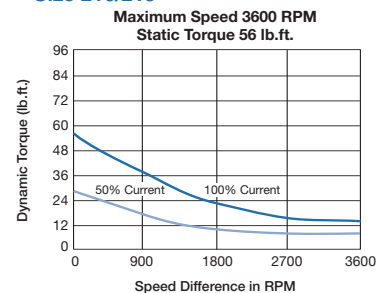
Size 50



Size 100/180



Size 210/215



Preassembled, Totally Enclosed, Electrically Released Brake Units

Specifications

						Component Inertia –WR ² (lb.ft. ²)				
						FBB		MBFB		NEMA Frame Size
						Hub	Shaft	Hub Spliced	Shaft Input	
Size	Voltage DC	Static Torque (lb.ft.)	Max. Speed (RPM)	Total Weight (lbs.)	Armature (lb.ft. ²)	Hub	Shaft	Hub Spliced	Shaft Input	NEMA Frame Size
50	90	6	3600	8.6	.009	.001	.0005	.001	.0003	56C/48Y
100	90	12	3600	10.5	.023	.002	.002	.002	.002	56C/48Y
180	90	12	3600	10.5	.023	.002	.002	.002	.002	182C/143TC 184C/145TC
210	90	32	3600	27	.081	.016	.016	.016	.007	213C/182TC 215C/184TC

3. Select Options

Warner Electric Enclosed UniModules can be fitted with several accessories to extend their capacity and ease of mounting.

4. Select Control

All electrically released modules require a control with a potentiometer that will vary brake channel output. For FBB and MBFB brake modules, the CBC-160, CBC-200, CBC-300, or CBC-500/550 is recommended. The FBC units require either a CBC-300 or a CBC 500/550 control.

Selection Procedure

Note: Care must be exercised when selecting the proper brake size for your application.

The selection charts list NEMA motor frame sizes, motor shaft diameters, and the matching FBB or MBFB brakes.

To select a brake:

1. Determine the motor NEMA C-face frame size.
2. Select brake configuration
 - a. FBB to mount between a NEMA C-face motor and a gear reducer.
 - b. MBFB to mount on double shafted NEMA C-face motors.
3. Select the brake model from the charts by the torque required – higher torque for faster stopping, lower torque for longer, “soft” stopping.

Note: Size 100 brakes are typically used on motors with a rating of 1 HP or greater.

4. **Important:** Verify that the motor shaft diameter and mounting bolt circle dimensions are the same for the brake selected and the motor.

Control Selection

An optional conduit box enclosure is available. All electrically released units require a control with a potentiometer to vary brake channel output. For FBB and MBFB brake modules, control models CBC-160, CBC-200, CBC-300, or CBC-500/550 are recommended. (See Controls Section.)

Frame Size

EUM Size	NEMA Frame Size	Bolt Hole Mounting Circle	FBB Motor to Reducer Shaft Dia.	MBFB Motor Brake Shaft Dia.
EUM-50	56C	5 7/8	5/8	5/8
EUM-100	56C	5 7/8	5/8	5/8
EUM-180	143TC 145TC	5 7/8	7/8	7/8
EUM-210-7/8	213TC 215TC	7 1/4	N/A	7/8
EUM-210	182TC 184TC	7 1/4	1 1/8	1 1/8
EUM-215	213TC 215TC	7 1/4	1 3/8	N/A

How to Order

1. Specify model number and voltage or the corresponding part number.
2. Specify conduit box, if desired. See the Controls Section.
3. Specify required control unit. See the Controls Section.

Ordering Example

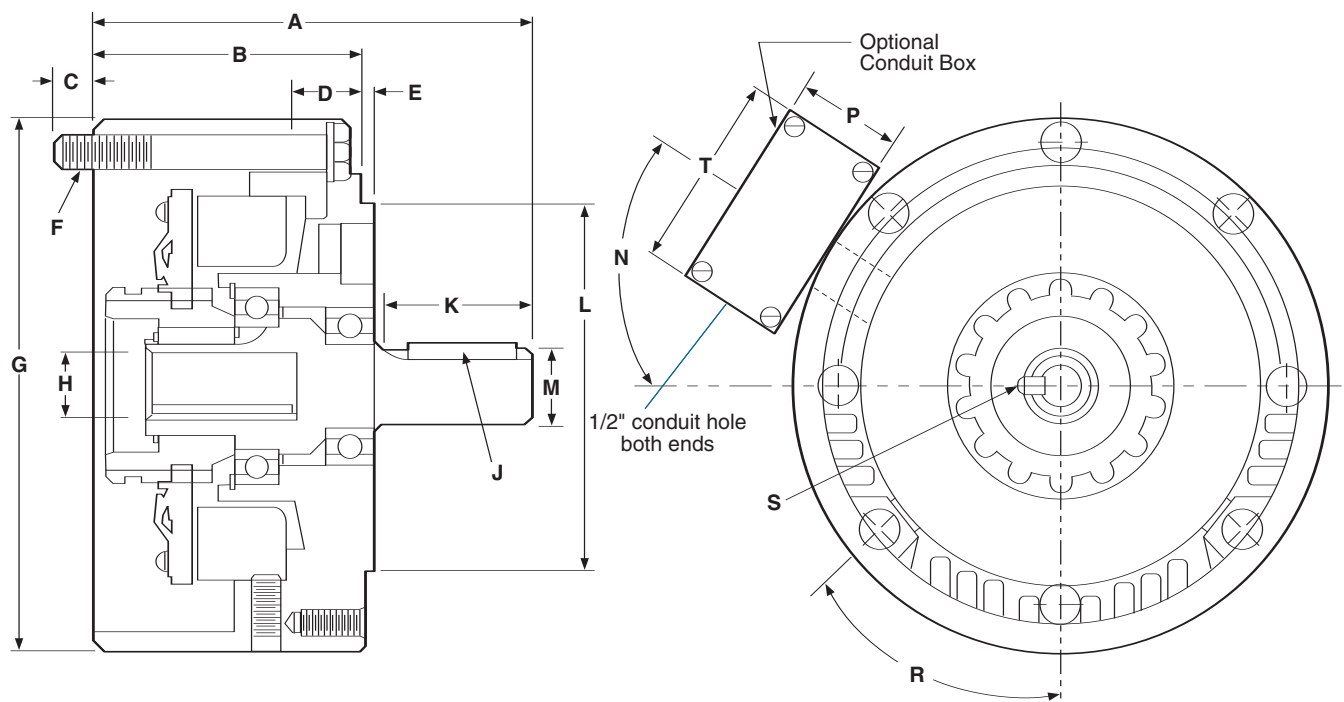
EUM-50-20FBB-6, 90V or 5370-169-983; 5370-101-042 conduit box; CBC-160-2 control.

EUM Description	EUM Model No.	Static Torque (lb.ft.)	Part No.
FBB Brake Module (90VDC)	EUM-50-20FBB-6	6	5370-169-983
	EUM-50-20FBB-10	10.5	5370-169-986
	EUM-100-20FBB-12	12	5370-169-989
	EUM-100-20FBB-21	21	5370-169-992
	EUM-180-20FBB-12	12	5370-169-995
	EUM-180-20FBB-21	21	5370-169-998
	EUM-210-20FBB-32	32	5371-169-078
	EUM-210-20FBB-56	56	5371-169-082
	EUM-215-20FBB-32	32	5371-169-086
	EUM-215-20FBB-56	56	5371-169-090
	EUM-50-20MBFB-6	6	5370-169-965
	EUM-50-20MBFB-10	10.5	5370-169-968
	EUM-100-20MBFB-12	12	5370-169-971
	EUM-100-20MBFB-21	21	5370-169-974
	EUM-180-20MBFB-12	12	5370-169-977
	EUM-180-20MBFB-21	21	5370-169-980
MBFB Motor Brake Module (90VDC)	EUM-210-7/8-20MBFB-32	32	5371-169-064
	EUM-210-7/8-20MBFB-56	56	5371-169-068
	EUM-210-20MBFB-32	32	5371-169-056
	EUM-210-20MBFB-56	56	5371-169-060

Accessories

Description	FBB Size	Part No.
Conduit Box	FBB series All sizes	5370-101-042
Motor Mount Kit for 20 FBB	50/100/180 210/215	5370-101-012 5371-101-012

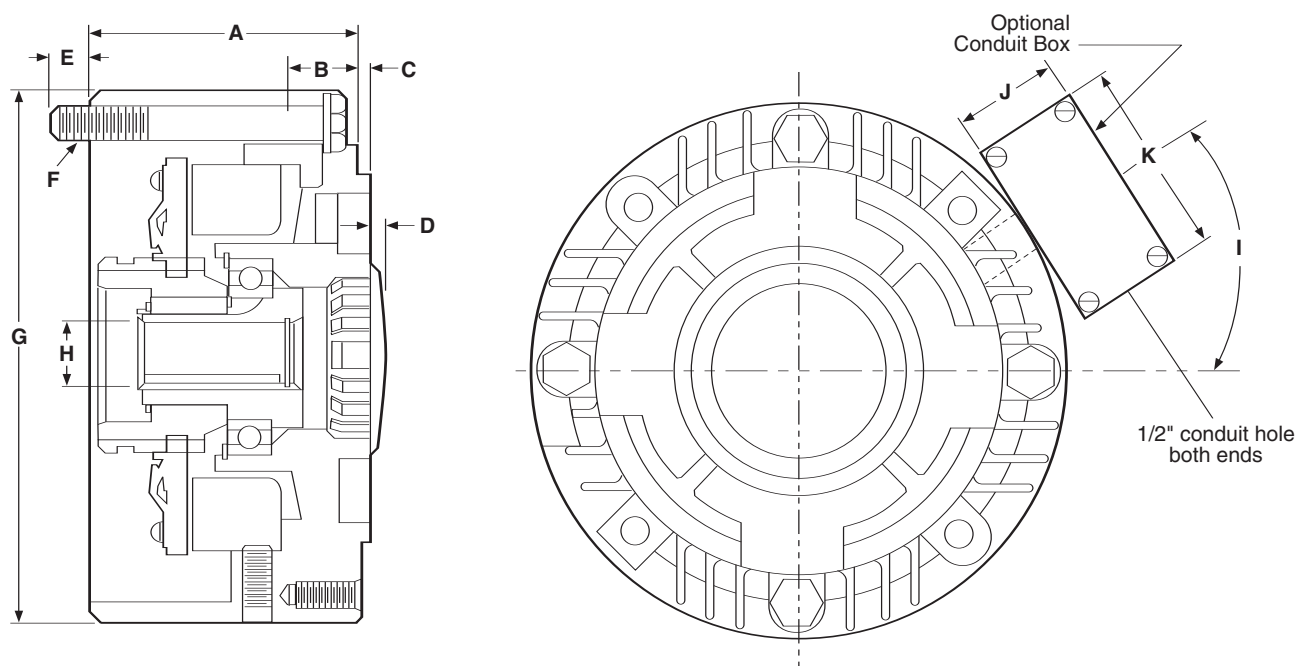
EUM-FBB Brake Module



All dimensions are nominal, unless otherwise noted.

Size	A Max.	B	C Max.	D	E Max.	F	G Dia.	H Dia.
50	5.188	3.125	.500	1.000	.156	3/8-16 UNC-2A (4) Equally Spaced on 5.875 Dia.	6.688	.625
100	5.266	3.125	.500	1.000	.156	3/8-16 UNC-2A (4) Equally Spaced on 5.875 Dia.	6.688	.625
180	5.266	3.125	.500	1.000	.156	3/8-16 UNC-2A (4) Equally Spaced on 5.875 Dia.	6.688	.875
210	7.578	4.609	.594	1.500	.313	1/2-13 UNC-2A (4) Equally Spaced on 7.250 Dia.	9.344	1.125
215	7.578	4.609	.594	1.500	.313	1/2-13 UNC-2A (4) Equally Spaced on 7.250 Dia.	9.344	1.375

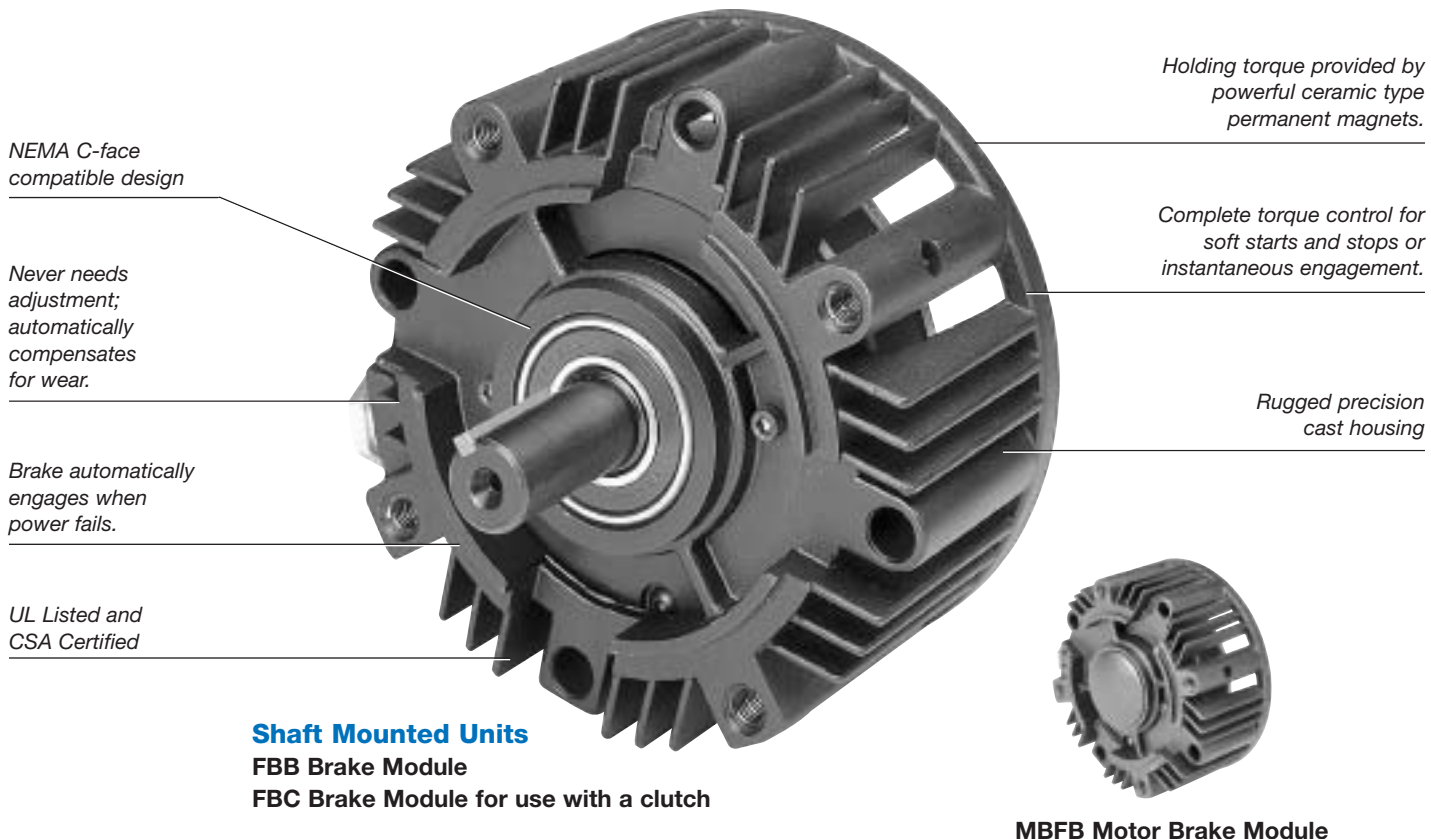
Size	J Key	K Min.	L Pilot Dia.	M Dia.	N	P	R	S Integral Key	T
50	3/16 x 3/16 x 1-1/4	1.813	4.500	.625	30°	2.188	45°	3/16 x 3/16	3.125
100	3/16 x 3/16 x 1-1/4	1.891	4.500	.625	30°	2.188	45°	3/16 x 3/16	3.125
180	3/16 x 3/16 x 1-1/4	1.891	4.500	.875	30°	2.188	45°	3/16 x 3/16	3.125
210	1/4 x 1/4 x 2	2.500	8.500	1.125	25°	2.188	45°	1/4 x 1/4	3.125
215	5/16 x 5/16 x 2	2.500	8.500	1.375	25°	2.188	45°	5/16 x 5/16	3.125



All dimensions are nominal, unless otherwise noted.

Size	A	B	C Max.	D	E Max.	F	G Dia.	H					
								Dia.	Max. Length	Integral Key	I	J	K
50	3.125	1.000	.156	.219	.300	3/8-16 UNC-2A	6.688	.625	2.094	3/16 x 3/16	30°	2.188	3.125
100	3.125	1.000	.156	.219	.300	3/8-16 UNC-2A	6.688	.625	2.094	3/16 x 3/16	30°	2.188	3.125
180	3.125	1.000	.156	.219	.500	3/8-16 UNC-2A	6.688	.875	2.063	3/16 x 3/16	30°	2.188	3.125
210-7/8"	4.609	1.500	.313	.250	.594	1/2-13 UNC-2A	9.344	.875	2.766	3/16 x 3/16	30°	2.188	3.125
210	4.609	1.500	.313	.250	.594	1/2-13 UNC-2A	9.344	1.125	2.766	1/4 x 1/4	30°	2.188	3.125

Electro Module, Electrically Released Brakes and Clutch/Brake Units for Dynamic Stopping and Cycling Applications



Warner Electric's 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' force and the brake releases. No springs to limit cycle rates. Never nay adjustment. No lubrication. These brakes are recommended for dynamic cycling operations only.

Available in Three Design Styles

EM-FBB Brake Module

Use for brake alone applications. Mounts between a C-face motor and a gear box or reducer. Available in five sizes.

EM-MBFB Motor Brake Module

Mounts to the back of a double shafted motor. Available in four sizes.

EM-FBC Brake Module for use with a Clutch

Combine with a motor or input clutch for clutch/brake applications. Three sizes are available.

Specifications

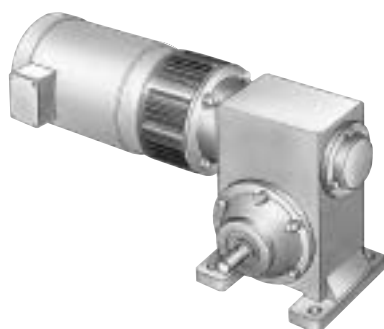
						Component Inertia –WR ² (lb.ft. ²)				
Size	Voltage DC	Static Torque (lb.ft.)		Max. Speed (RPM)	Total Weight (lbs.)	Armature				NEMA Frame Size
		Brake	Clutch			FBB/MBFB	FBC			
EM-50	24 90	10.5	16	3600	8.6	.0071	.014	.003	.001	56C/48Y
EM-100	90	21	—	3600	10.5	.018	—	.004	.002	56C/48Y
EM-180	24 90	21	30	3600	10.5	.018	.036	.004	.002	182C/143TC 184C/145TC
EM-210	24 90	56	95	3600	27	.081	.162	.027	.017	213C/182TC 215C/184TC

Warner Electric Electrically Released Electro Modules are available in three styles. The EM-FBB Brake Module is used in brake only applications and mounts between a C-face motor and a gear box or reducer. The EM-MBFB Motor Brake Module mounts to the back of a double shafted motor. The EM-FBC Brake Module is combined with a motor clutch (EM-10) or an input clutch (EM-30) for clutch/electrically released brake applications.

Note: Care must be exercised when selecting a brake to ensure it is sized properly for your application.

1. Select Configuration

a. For FBB and MBFB Modules NEMA C-face Mounting



Verify that the brake will be cycled frequently.

Determine the NEMA C-face frame size of your motor and/or reducer, and choose the corresponding size Electro Module from the Frame Size Selection chart.

Size EM-100 modules utilize a 5/8" diameter shaft to fit 56C/48Y motor frames with components of EM-180 units for higher torque and heat dissipation capacity than the EM-50

Select Brake Configuration: use an EM-FBB for mounting between a motor and a reducer; or an EM-MBFB for mounting on the rear of a double shafted motor.

NOTE: When selecting an MBFB, ensure the shaft dimensions on the rear of the motor are compatible with the EM-MBFB unit selected.

b. For FBC Modular Units, NEMA C-face Mounting

Verify that brake will be cycled frequently, and will be used with a motor mounted clutch (EM-10) for C-face mounting.

Determine the NEMA C-face frame size of your motor and/or reducer, and choose the corresponding size Electro Module from the Frame Size Selection chart.

FBC Frame Size Selection

NEMA Frame Size	EM Size
56C/48Y	EM-50* EM-100**
182C/143TC 184C/145TC	EM-180
213C/182TC 215C/184TC	EM-210

For torque ratings, refer to the "Specifications" chart. Note that separate torque ratings are listed for the clutch and brake segments of the module.

* For 56C/48Y C-frame motors 3/4 HP and smaller, the EM-100 size may be used where extended life is desirable.

** The EM-100 size is recommended for motors 1 HP and larger.

c. For FBC Modular Units, Base Mounting



Verify that brake will be cycled frequently, and will be used with an input clutch (EM-30) for base mounting.

Select the correct size module from the Horsepower vs. Shaft Speed chart (at the bottom of this page) by determining the motor horsepower and RPM at the module location. The correct size EM is shown at the intersection of the HP and operating speed. For additional sizing information, refer to the technical sizing procedure (step 2).

FBB AND MBFB Frame Size Selection

NEMA Frame Size	EM Size
56C/48Y	EM-50* EM-100**
182C/143TC 184C/145TC	EM-180
213C/182TC 215C/184TC	EM-210
213TC/215TC	EM-215

*For 56C/48Y C-frame motors 3/4 HP and smaller, the EM-100 size may be used where extended life is desirable.

**The EM-100 size is recommended for motors 1 HP and larger.

Horsepower vs. Shaft Speed

HP	SHAFT SPEED AT CLUTCH (IN RPM)																	
▼	100	200	300	400	500	600	700	800	900	1000	1100	1200	1500	1800	2000	2400	3000	3600
1/4																		
1/2																		
3/4																		
1																		
1-1/2																		
2																		
3																		
5																		
7-1/2																		

EM-50

EM-100 or EM-180

EM-210 or EM-215

2. Determine Technical Requirements

Technical considerations for sizing and selection are torque and heat dissipation. Each merits careful consideration, especially heat dissipation as over time, use in excessive temperature environments will have an adverse effect on bearing life and coil wire insulation integrity.

Compare the calculated torque requirement with the average dynamic torque ratings. Select a unit with adequate torque. If the unit selected on torque is different than the unit selected based on heat, select the larger size unit.

a. Heat Dissipation Sizing

Friction surfaces slip during the initial period of engagement and, as a result, heat is generated. The clutch/brake selected must have a heat dissipation rating greater than the heat generated by the application. Therefore, in high inertia or high cycle rate applications, it is necessary to check the heat dissipation carefully. Inertia, speed and cycle rate are the required parameters.

Heat dissipation requirement is calculated as follows:

$$E = 1.7 \times WR^2 \times (N/100)^2 \times F$$

where:

$$E = \text{Heat (lb. ft./min.)}$$

WR^2 = Total reflected inertia at the clutch/brake shaft. Include the clutch/brake output inertia. (lb.ft.²)

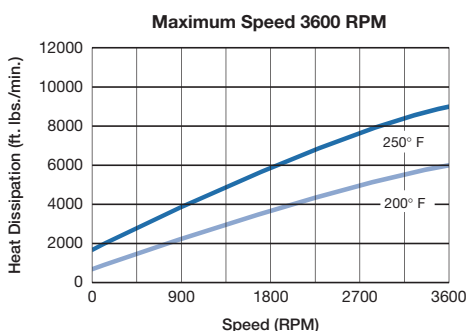
N = Speed in revolutions per minute. (RPM)

F = Cycle rate in cycles per minute (CPM)

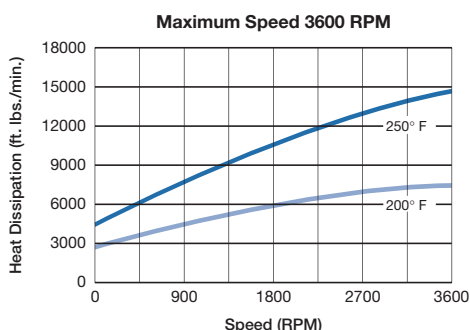
Compare the calculated heat generated in the application to the unit ratings using the heat dissipation curves. Select the appropriate unit that has adequate heat dissipation ability.

Heat Dissipation Curves

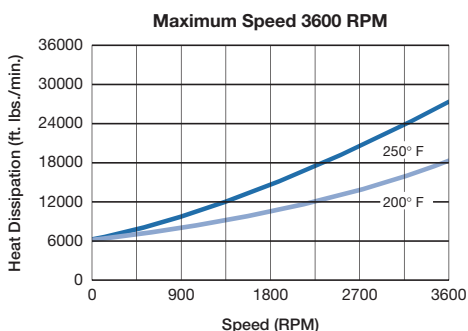
Size 50



Size 100/180



Size 210/215



b. Torque Sizing

For most applications, the correct size clutch/brake can be selected from the Horsepower vs. Shaft Speed chart on page 131. Determine the motor horsepower and the RPM at the clutch/brake. The correct size unit is shown at the intersection of horsepower and shaft speed.

If the static torque requirements are known, refer to the technical ratings chart to select a unit.

For some applications, the torque requirement is determined by the time allowed to accelerate and decelerate the load. (This time is generally specified in milliseconds.) For these applications, it is necessary to determine the torque requirement based on load inertia and the time allowed for engagement.

The torque requirements are calculated as follows:

$$T = (WR^2 \times N) / (308 \times t)$$

where:

T = Average Dynamic Torque (lb. ft.)

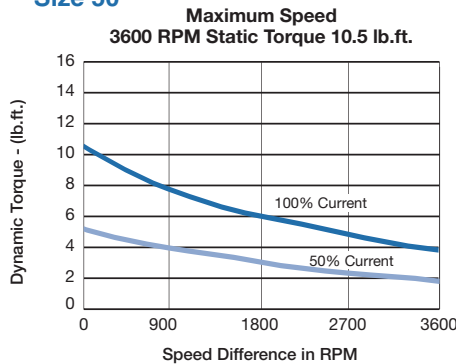
WR^2 = Total reflected inertia at the clutch/brake shaft. Include the clutch/brake output inertia. (lb. ft.²)

N = Speed in revolutions per minute. (RPM)

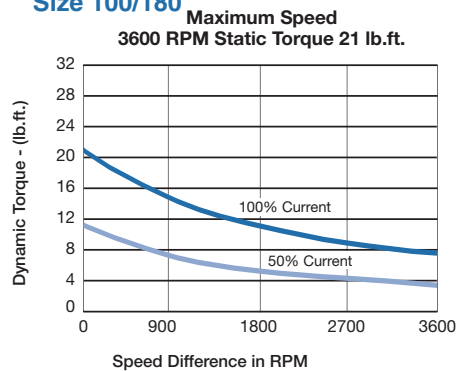
t = Time allowed for the engagement (sec)

C-face Electrically Released Brakes Dynamic Torque Curves

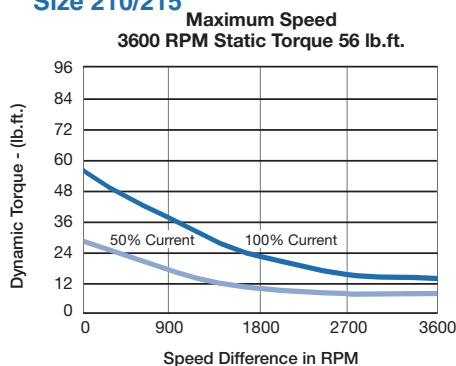
Size 50



Size 100/180



Size 210/215



3. Select Accessories

Warner Electric Electro Modules can be fitted with several accessories to extend their capacity and ease of mounting.

4. Select Control

All electrically released modules require a control with a potentiometer that will vary brake channel output. For FBB and MBFB brake modules, the CBC-160, CBC-200, CBC-300, or CBC-500/550 is recommended. The FBC units require either a CBC-300 or a CBC 500/550 control.

How to Order

1. Specify model number and voltage or the corresponding part number.
2. Specify conduit box, if desired. See the Controls Section.
3. Specify required control. See the Controls Section.

Ordering Example

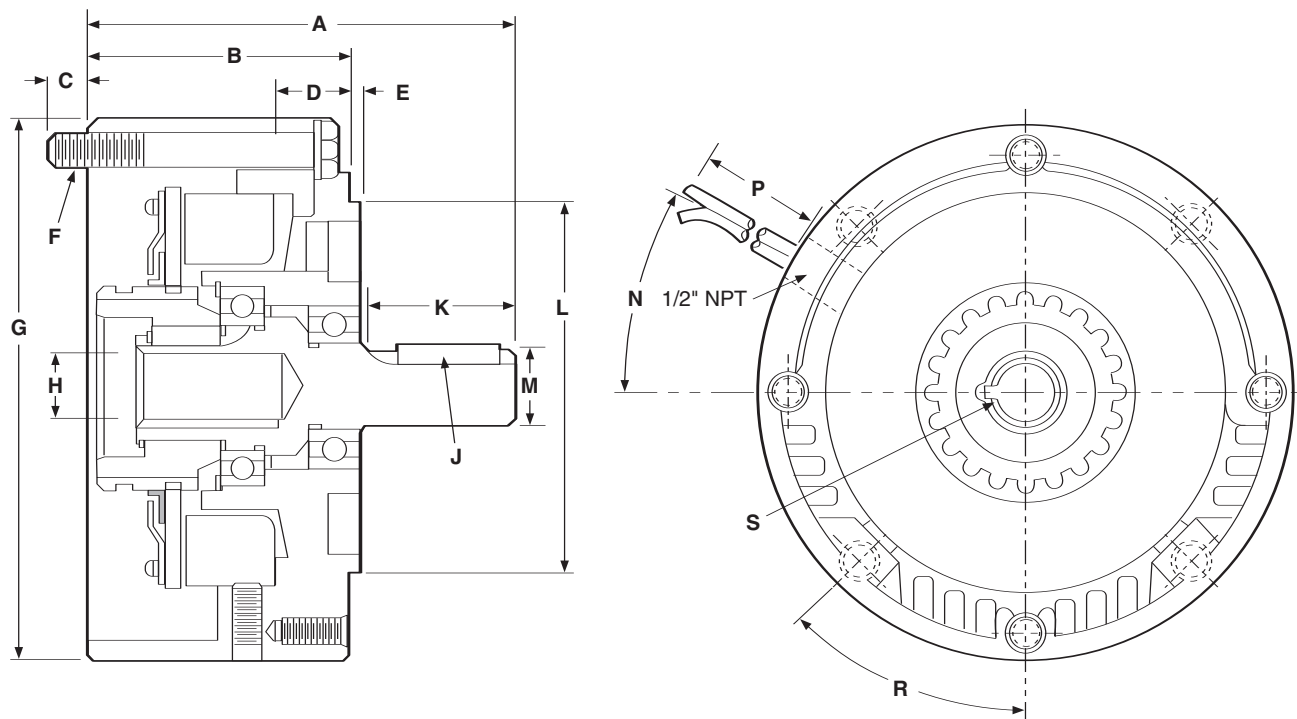
EM-50-20FBB, 90V or 5370-169-058;
5370-101-042 conduit box; CBC-160-2 control.

EM Description	EM Model No.	Voltage DC	Part No.
FBB Brake Module for use as brake only	EM-50-20FBB	24	5370-169-066
	EM-50-20FBB	90	5370-169-058
	EM-100-20FBB	24	5370-169-020
	EM-100-20FBB	90	5370-169-084
	EM-180-20FBB	24	5370-169-068
	EM-180-20FBB	90	5370-169-059
	EM-210-20FBB	24	5371-169-032
	EM-210-20FBB	90	5371-169-029
	EM-215-20FBB	24	5371-169-100
	EM-215-20FBB	90	5371-169-054
FBC Brake Module for use with EM clutch	EM-50-20FBC	24	5370-169-065
	EM-50-20FBC	90	5370-169-056
	EM-100-20FBC	24	5370-169-109
	EM-100-20FBC	90	5370-169-108
	EM-180-20FBC	24	5370-169-067
	EM-180-20FBC	90	5370-169-057
	EM-210-20FBC	24	5371-169-031
	EM-210-20FBC	90	5371-169-028
MBFB Motor Brake Module	EM-50-20MBFB	24	5370-169-063
	EM-50-20MBFB	90	5370-169-060
	EM-100-20MBFB	24	5370-169-007
	EM-100-20MBFB	90	5370-169-085
	EM-180-20MBFB	24	5370-169-069
	EM-180-20MBFB	90	5370-169-061
	EM-210-7/8-20MBFB	24	5371-169-101
	EM-210-7/8-20MBFB	90	5371-169-072
	EM-210-20MBFB	24	5371-169-033
	EM-210-20MBFB	90	5371-169-030

Accessories

Description	EM Size	Part No.
Conduit Box	EM series	5370-101-042
	All sizes	
Base Mount Kit for 2030 FBC	50/100	5370-101-036
	180	5370-101-037
	210/215	5371-101-019
Motor Mount Kit for 20 FBB, 1020 FBC	50/100	5370-101-010
	180	5370-101-012
	210/215	5371-101-012

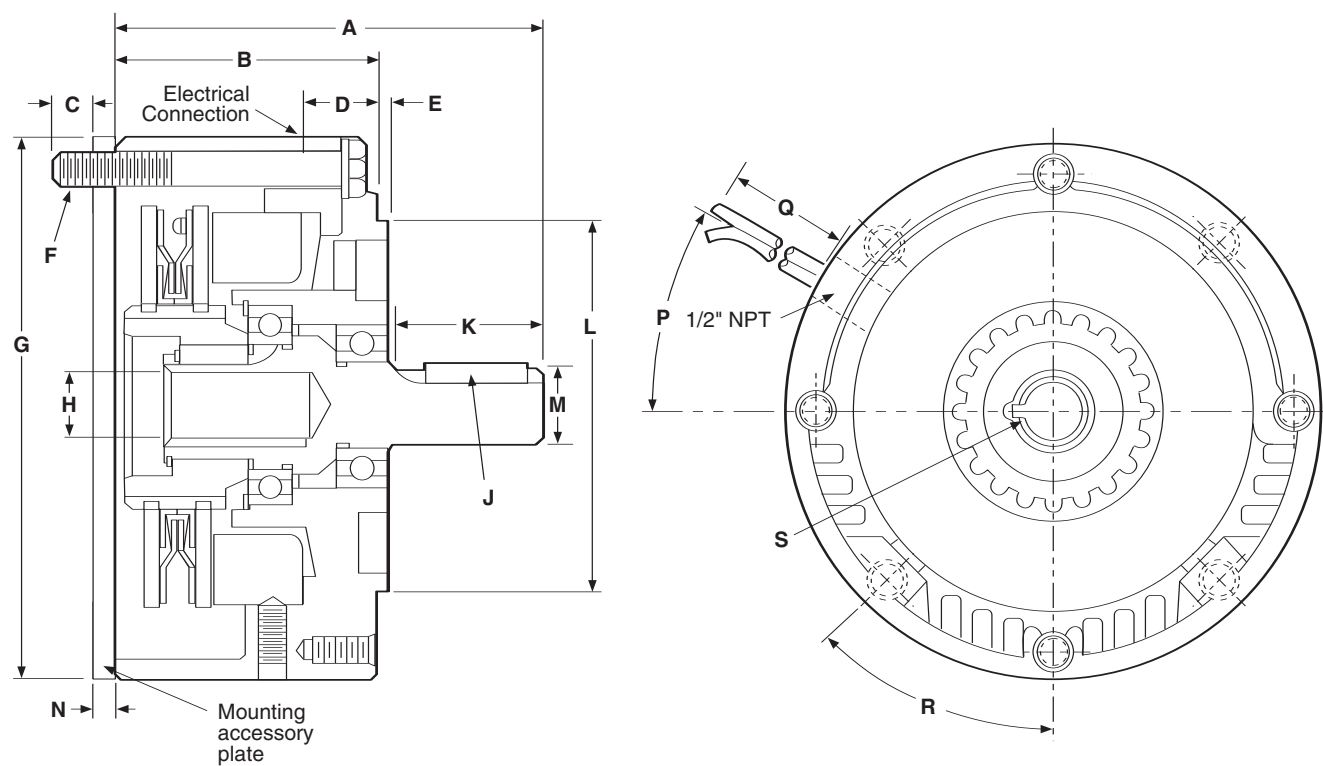
EM-20 FBB Brake Module



All dimensions are nominal, unless otherwise noted.

Size	A Max.	B	C Max.	D	E Max.	F	G Dia.	H Dia.	J	K Min.	L Pilot Dia.	M Dia.	N	P Min.	R	S Key
50/100	5.188	3.125	.500	1.000	.156	3/8-16 UNC-2A (4) Equally Spaced on 5.875 Dia.	6.688	.625	3/16 x 3/16 x 1-3/8	1.813	4.500	.625	30°	36	45°	3/16 x 3/16
180	5.266	3.125	.500	1.000	.156	3/8-16 UNC-2A (4) Equally Spaced on 5.875 Dia.	6.688	.875	3/16 x 3/16 x 1-3/8	1.891	4.500	.875	30°	36	45°	3/16 x 3/16
210	7.578	4.609	.594	1.500	.313	1/2-13 UNC-2A (4) Equally Spaced on 7.250 Dia.	9.344	1.125	1/4 x 1/4 x 2	2.500	8.500	1.125	25°	36	45°	1/4 x 1/4
215	7.578	4.609	.594	1.500	.313	1/2-13 UNC-2A (4) Equally Spaced on 7.250 Dia.	9.344	1.375	5/16 x 5/16 x 2	2.500	8.500	1.375	25°	36	45°	5/16 x 5/16

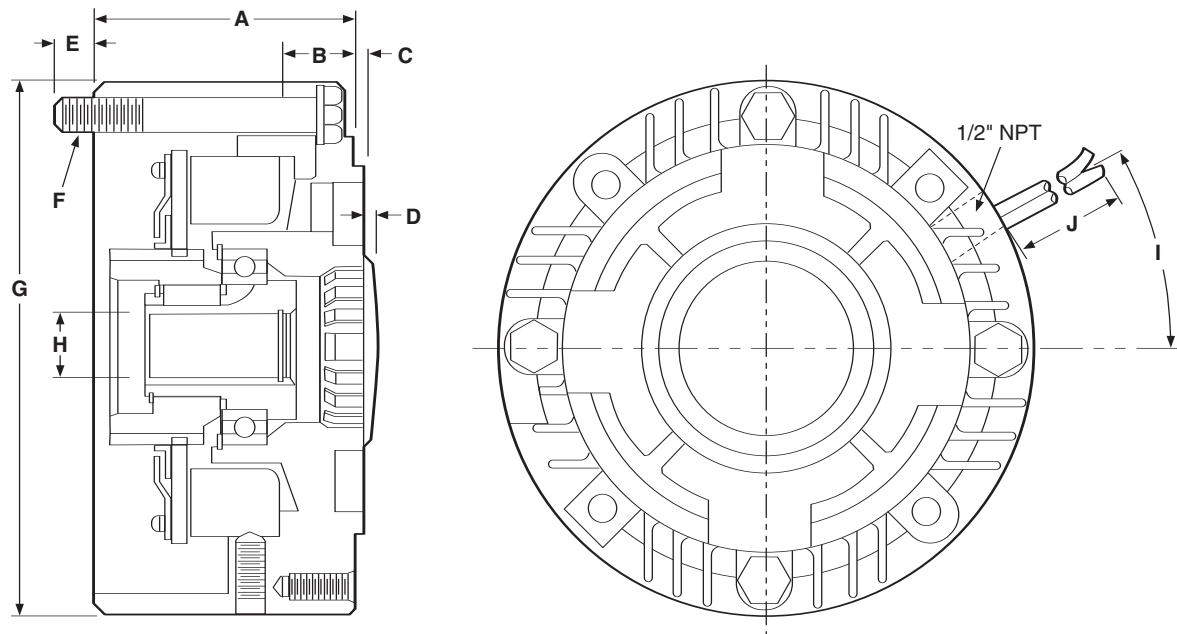
EM-20FBC Brake Module for use with a Clutch



All dimensions are nominal, unless otherwise noted.

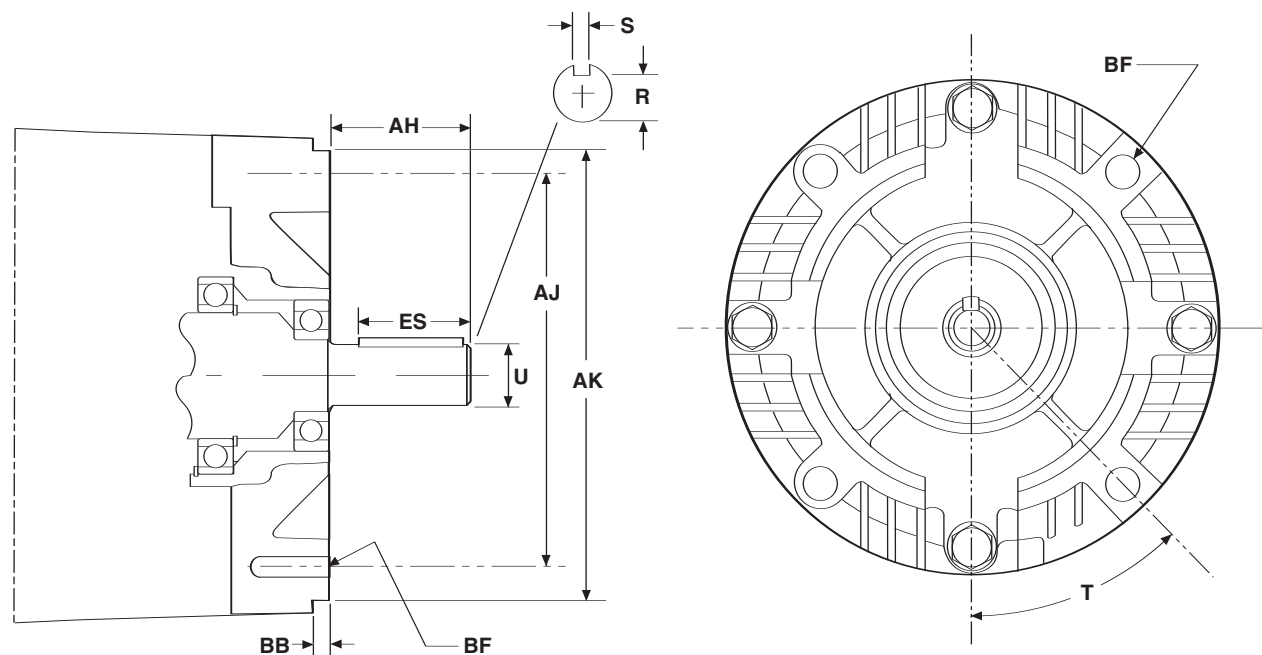
Size	A Max.	B	C Max.	D	E Max.	F	G Dia.	H Dia.	J	K Min.	L Pilot Dia.	M Dia.	N Max.	P	Q Min.	R	S Key
50/100	5.188	3.125	.500	1.000	.156	3/8-16 UNC-2A (4) Equally Spaced on 5.875 Dia.	6.688	.625	3/16 x 3/16 x 1-3/8	1.813	4.500	.625	.531	30°	36	45°	3/16 x 3/16
180	5.266	3.125	.500	1.000	.156	3/8-16 UNC-2A (4) Equally Spaced on 5.875 Dia.	6.688	.875	3/16 x 3/16 x 1-3/8	1.891	4.500	.875	.531	30°	36	45°	3/16 x 3/16
210	7.578	4.609	.594	1.500	.313	1/2-13 UNC-2A (4) Equally Spaced on 7.250 Dia.	9.344	1.125	1/4 x 1/4 x 2	2.500	8.500	1.125	.797	25°	36	45°	1/4 x 1/4

EM-20 MBFB Motor Brake Module



All dimensions are nominal, unless otherwise noted.

Size	A	B	C Max.	D	E Max.	F	G Dia.	H		Required Key Size	I	J Min.
								Diameter	Max. Length			
50/100	3.125	1.000	.156	.219	.300	3/8-16 UNC-2A	6.688	.625	2.094	3/16 x 3/16	30°	36
180	3.125	1.000	.156	.219	.500	3/8-16 UNC-2A	6.688	.875	2.063	3/16 x 3/16	30°	36
210-7/8"	4.609	1.500	.313	.250	.594	1/2-13 UNC-2A	9.344	.875	2.766	3/16 x 3/16	30°	36
210	4.609	1.500	.313	.250	.594	1/2-13 UNC-2A	9.344	1.125	2.766	1/4 x 1/4	30°	36



Specifications

Module Size	AH Shaft Length	AJ Mtg. Bolt Center Dia.	AK Mtg. Flange Pilot Dia.	BB Pilot Depth	BF Mtg. Bolt Size, Qty.	ES Keyway Length	R Depth Over Keyway	S Keyway Width	T Mtg. Bolt Ref.	U Shaft Dia.
50	2.06	5.875	4.500	5/32	3/8-16 UNC 4 @ 90°	1-1/4	.517	3/16	45°	.625
100	2.06	5.875	4.500	5/32	3/8-16 UNC 4 @ 90°	1-1/4	.517	3/16	45°	.625
180	2.04	5.875	4.500	5/32	3/8-16 UNC 4 @ 90°	1-1/4	.771	3/16	45°	.87 ⁵
210	2.56	7.250	8.500	5/16	1/2-13 UNC 4 @ 90°	2	.986	1/4	45°	1.125
215	3.12	7.250	8.500	5/16	1/2-13 UNC 4 @ 90°	2	1.201	5/16	45°	1.375

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

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		35-75	
Resistance @ 20° C – Ohms	304		235	
Current – Amperes	.29		.383	
Watts	26		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

UM/EM/UMFB/EMFB								
		Clutch	UM/EM Brake	Clutch	Brake	Clutch	Brake	UMFB/EMFB Brake
Voltage – DC Resistance (ohms)	EM-50	90	90	24	24	6	6	90
	EM-100	452	452	31.8	31.8	1.86	1.86	446
	EM-180	392	392	26.7	26.7	1.80	1.80	310
	EM-210/215	392	392	26.7	26.7	1.80	1.80	310
Amperes	EM-50	248	248	17.9	17.9	1.22	1.22	205
	EM-100	.199	.199	.755	.755	3.23	3.23	.210
	EM-180	.230	.230	.896	.896	3.30	3.30	.300
	EM-210/215	.230	.230	.896	.896	3.30	3.30	.300
Watts	EM-50	.363	.363	1.34	1.34	4.90	4.90	.380
	EM-100	18	18	18	18	19	19	18
	EM-180	21	21	21.5	21.5	20	20	27
	EM-210/215	21	21	21.5	21.5	20	20	27
Build-up (millisecond)	EM-50	33	33	32	32	30	30	34
	EM-100	52	53	52	53	52	53	40
	EM-180	72	75	72	75	72	70	80
	EM-210/215	72	75	72	75	72	70	80
Decay (millisecond)	EM-50	120	100	120	100	110	100	90
	EM-100	6.2	5.0	6.2	5.0	6.5	5.0	5
	EM-180	12	10	12	10	12	10	8
	EM-210/215	12	10	12	10	12	10	8
		20	10	20	10	20	10	10

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 142

On-Off Controls

CBC-100	144
CBC-150	144
CBC-160	145
CBC-801	146
CBC-802	147
CBC-400	148
CBC-450	149

Adjustable Torque Controls

MCS-103-1	150
MCS-805-1	151
MCS-805-2	151
CBC-200	152
CBC-300	152
CBC-500	153
CBC-550	154
CBC-1825R	156

Overexcitation Controls

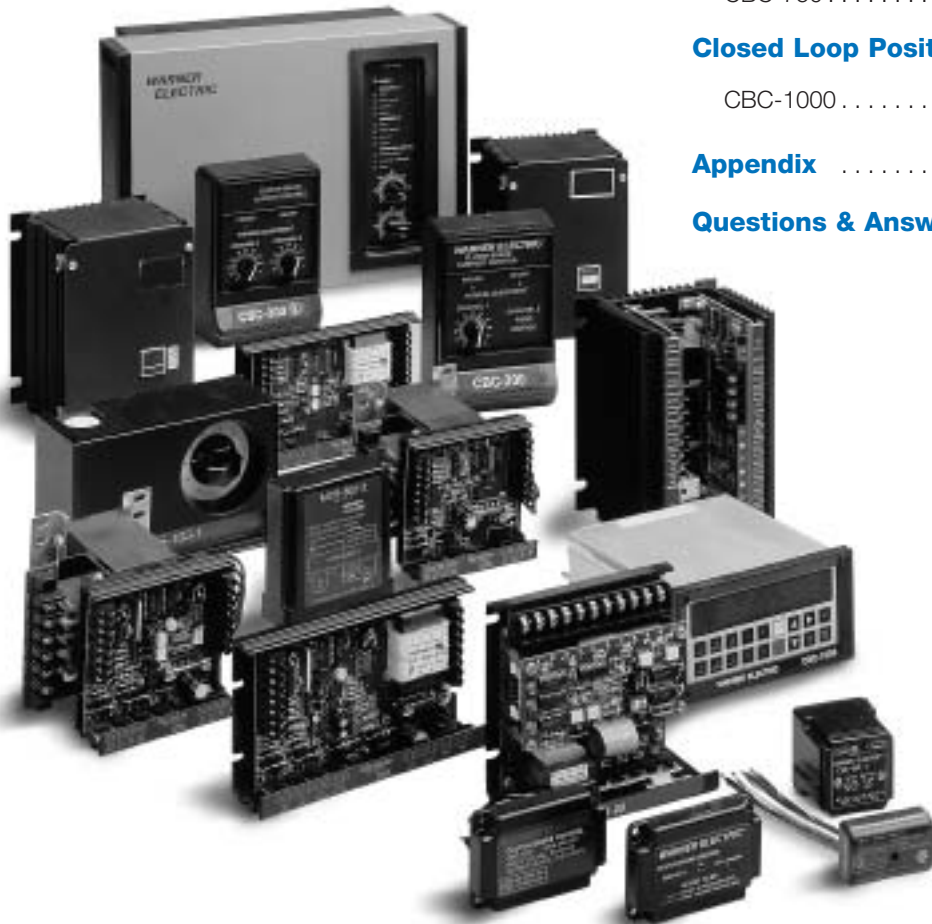
CBC-700	158
CBC-750	160

Closed Loop Position Control

CBC-1000	162
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Appendix 164

Questions & Answers 165



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

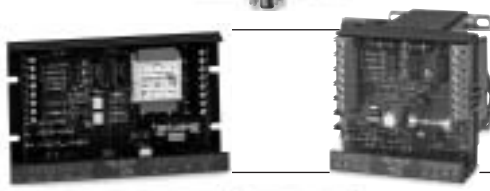
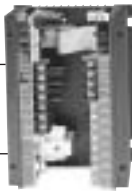
(Rapid cycling)

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.

Position Loop

(Programmable cycling)

Warner Electric's CBC-1000 position loop control system offers servo system performance with electric clutch/brake economy in high accuracy indexing applications. The unique error correction capability of the CBC-1000 to achieve repeatability and accuracy makes this an ideal control for many applications.

Control Type	
On-Off Conduit Box Mount	
On-Off Octal Socket Mount	
On-Off Panel Mount	
Adjustable Torque	
Adjustable Accel-Decel	
Overexcitation	
Position Loop	

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	144
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	144
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	145
CBC-160-2	1		220/240					
CBC-801-1	2	No	120	90	No	Relay D.C.	Dual channel control for 2 clutches and/or brakes	146
CBC-801-2	2		220/240					
CBC-802	2	No	120	90	No	Transistor or Relay D.C.	Dual channel control with transistor switching	147
CBC-400-90	2	No	120	90	No		Dual channel control for use with 2 clutches	148-
CBC-400-24	2	No	24-30	24	No	Transistor or Relay D.C.	and/or brakes;	149
CBC-450-90	2	No	120/220/240/380/480	90	No		Emergency stop input and AUX power supply	
CBC-450-24	2	No	120/220/240/380/480	24	No			
MCS-103-1	2	1	120	90	No	Relay D.C.	Dual channel control with torque adjust for one channel	150
MCS-805-1	1	1	120/240	35-75	No	Relay D.C.	Single adjustable channel control for use with ER-1225 brake.	151
MCS-805-2	1							
CBC-200	2	1	120	90	No	Transistor or Relay D.C.	Dual channel control with one adjustable current and one fixed voltage	152
CBC-300	2	2	120	90	No	Transistor or Relay D.C.	Dual channel adjustable current control	152
CBC-500-90	2	2	120	90	No		Dual channel control for two clutches and/or brakes with	153-
CBC-500-24	2	2	24-30	24	No	Transistor or Relay D.C.	two torque adjust channels;	155
CBC-550-90	2	2	120/220/240/380/480	90	No		Emergency stop input	
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	156
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	158
CBC-700-24	2		24-28	24				
CBC-750-6-24-90	2	2	120/220/240	6,24,90	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	160
CBC-1000	2	N.A.	120/230	N.A.	N.A.	N.A.	Error correction control to be used with one of the above	162

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.

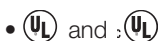


- Compact
- Single channel
- Mounts inside conduit box



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.



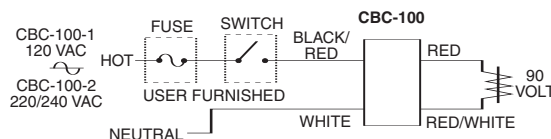
- Dual channel
- Replaces the cover on the module conduit box

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.

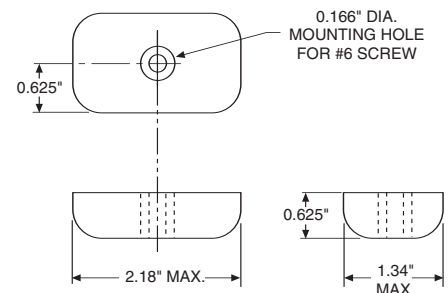
Connection diagrams

CBC-100-1, -2

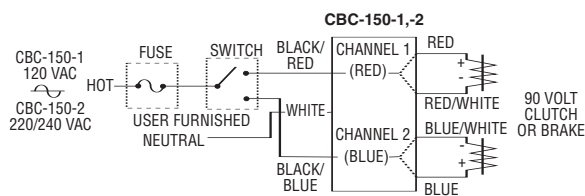


Dimensions

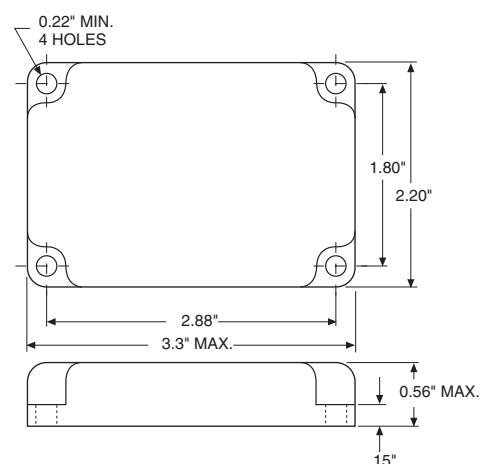
CBC-100-1, -2



CBC-150-1, -2



CBC-150-1, -2



All dimensions nominal unless otherwise specified.

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).

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



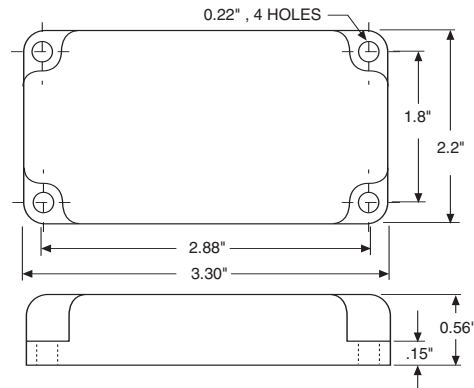
- Adjustable 30-100 VDC
- LED indicator
- 120 volt A.C. input

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.



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

Dimensions



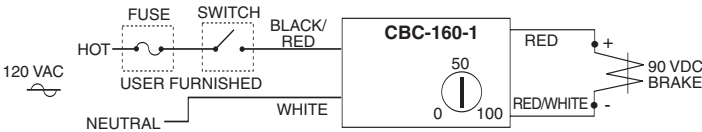
All dimensions nominal unless otherwise specified.



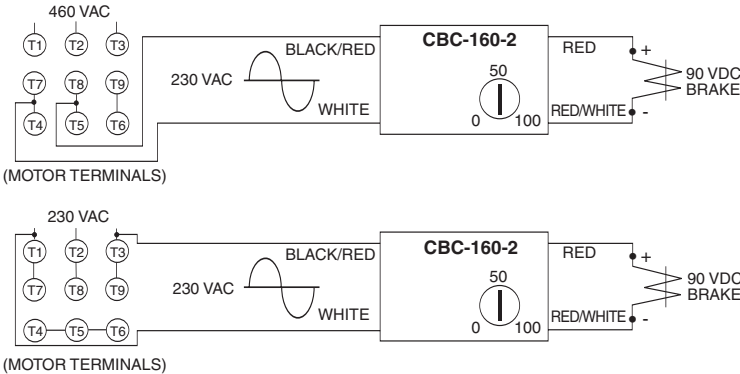
Specifications

	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	

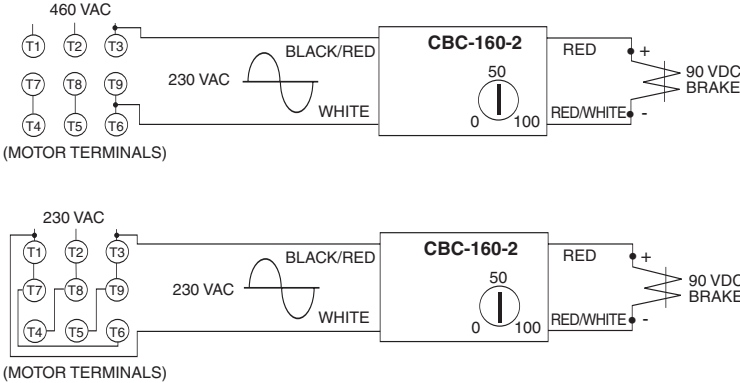
Connection Diagram



WYE Connected Motor



DELTA Connected Motor



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.



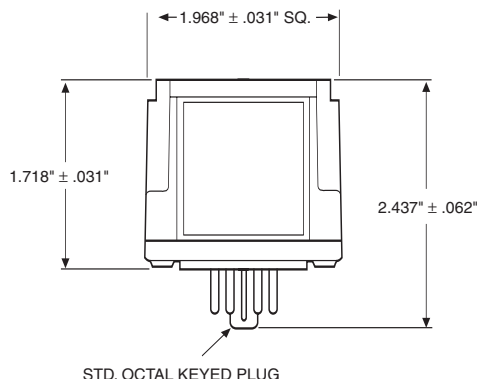
- For basic on-off operation
- Wiring connections made at octal socket
- Arc suppression circuitry extends switch life
- Fused for overload protection
- LED output indicators
- DIN rail mountable



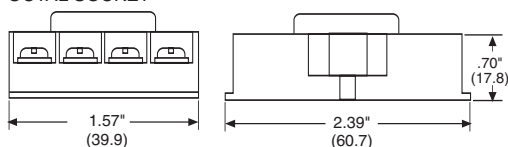
Specifications

	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	

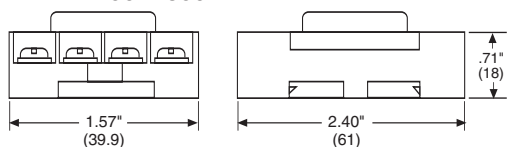
Dimensions



OCTAL SOCKET



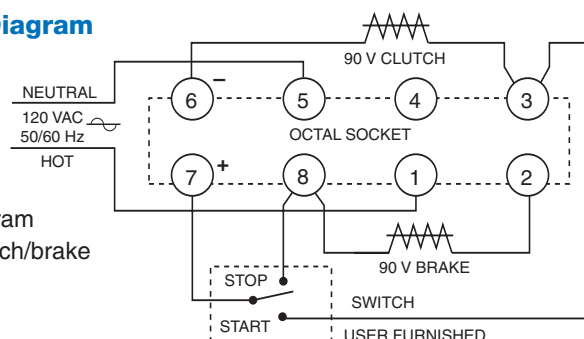
DIN RAIL MOUNT SOCKET



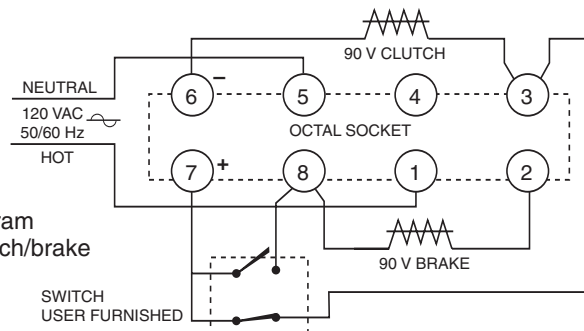
All dimensions nominal unless otherwise specified.

Connection Diagram

Connection diagram for operating clutch/brake separately.



Connection diagram for operating clutch/brake simultaneously.



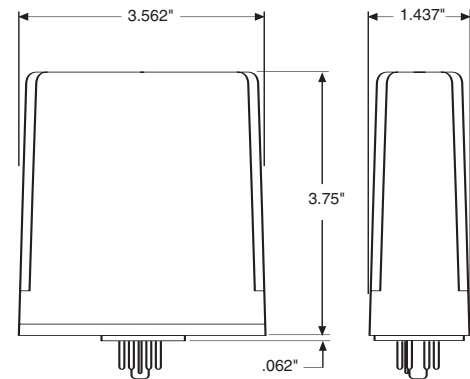


CBC-802 PLC compatible

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



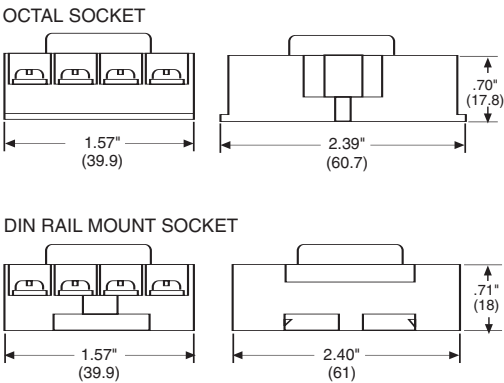
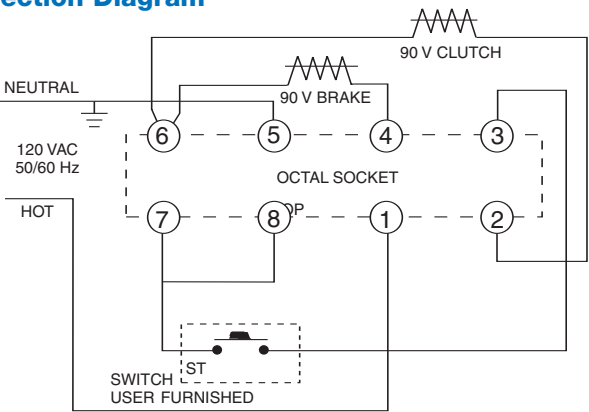
STD. OCTAL KEYED PLUG

All dimensions nominal unless otherwise specified.

Specifications

CBC-802	
Part No.	6002-448-001
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



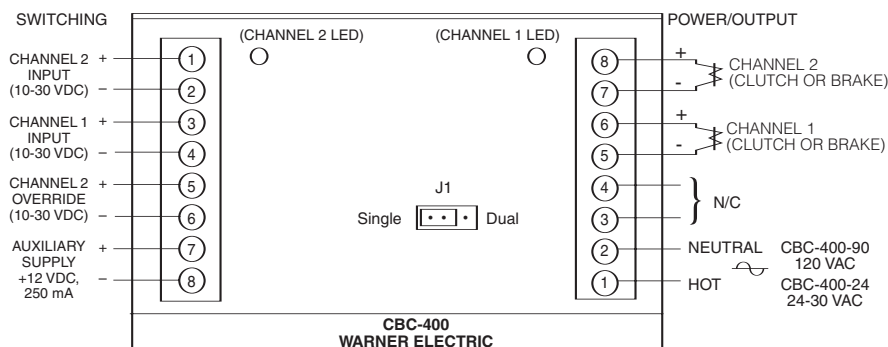
Panel Mounted Control



Specifications

	CBC-400-90	CBC-400-24
Part No.	6006-448-003	6006-448-002
Input Voltage	120 VAC	24-30 VAC
Output Voltage	90 VDC	24 VDC
Output Current	1 Amp/Channel 2 Amps Total	5 Amps/Channel 5 Amps Total
Auxiliary Supply	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	Jumper for single or dual operation. See appendix for explanation.	
Inputs	3 Optically isolated, 10-30 VDC, 3-9 mA for Channel 1, Channel 2 and Channel 2 override (applies full voltage to channel 1 output).	

Connection Diagram



All dimensions nominal unless otherwise specified.

CBC-400 series Dual channel controls

The CBC-400 series is a basic on-off control which supplies 24 or 90 VDC for electric clutch/brake operation. They offer optically isolated switching inputs for start, stop, and emergency stop (E-stop). These controls can be set up to operate the two outputs alternately (single) or simultaneously (dual). Refer to the Appendix for additional setup and switching information.



- 24 or 90 Volt DC output
- Auxiliary 12V supply
- Fast coil suppression
- Single or dual channel operation
- Optically isolated input switching

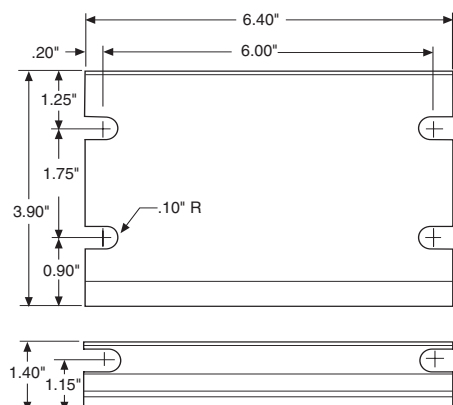
Enclosure (Optional)



- 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)

Dimensions



CBC-450 series Dual channel control with transformer for variable input voltage

The CBC-450 series is a basic on-off control which supplies 24 or 90 VDC for electric clutch/brake operation. They offer optically isolated switching inputs for start, stop, and emergency stop (E-stop). These controls can be set up to operate the two outputs, alternately (single) or simultaneously (dual). Refer to the Appendix for additional setup and switching information. The CBC-450 series has a power transformer which will operate with a 120, 220, 240, 380 or 480 VAC input.

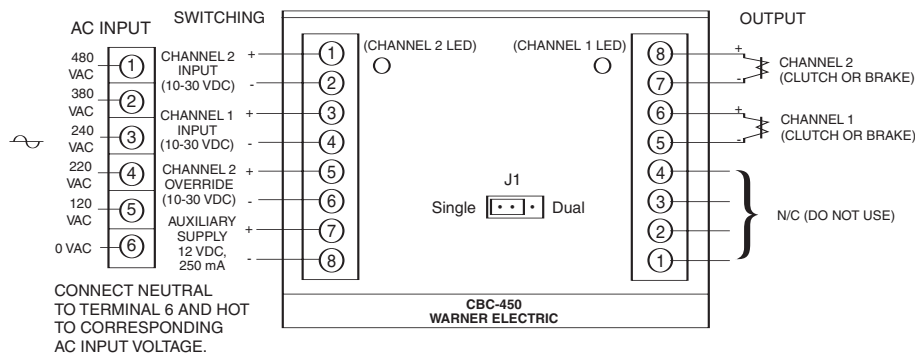


- 24 or 90 Volt DC output
- Auxiliary 12V supply
- Fast coil suppression
- Single or dual channel operation
- Optically isolated switching

Specifications

	CBC-450-90	CBC-450-24
Part No.	6006-448-006	6006-448-005
Input Voltage	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	
Circuit Protection	Fused 1.5 Amp	Fused 5 Amp
Ambient Temperature	+32° to 122°F (0° to 50°C)	
Status Indicators	Red LED indicates channel is energized.	
Adjustments	Jumper for single or dual operation. See appendix for explanation.	
Inputs	3 Optically isolated, 10-30 VDC, 3-9 mA for Channel 1, Channel 2 and Channel 2 override (E-stop).	

Connection Diagram



All dimensions nominal unless otherwise specified.

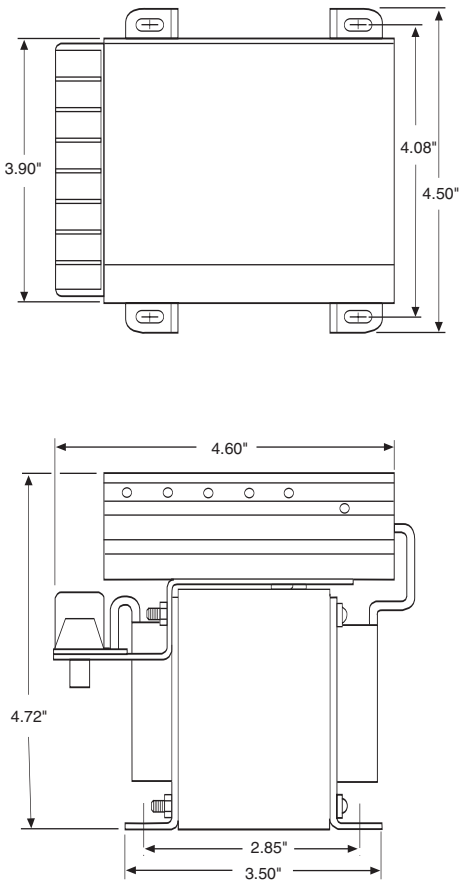
Enclosure (Optional)



- 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)

Dimensions



Adjustable Torque Control

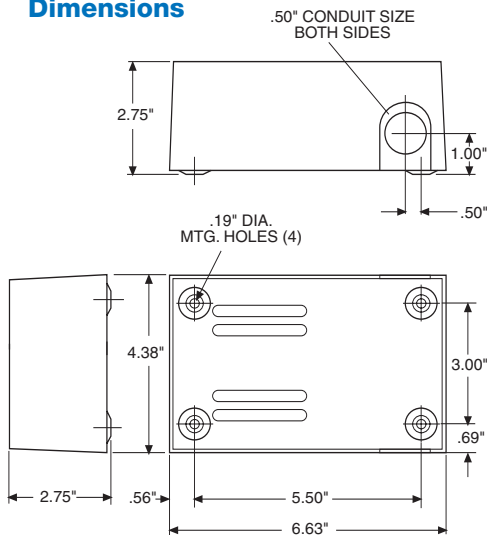
The MCS-103-1 is an enclosed control complete with a cover and mounting provisions. A brake and clutch may be operated separately with this control – or up to four units, two at a time. The external wiring is connected to the terminal strip located behind the cover.

-  
- 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

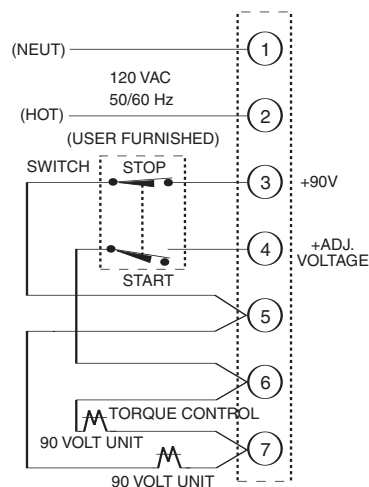


All dimensions nominal unless otherwise specified.

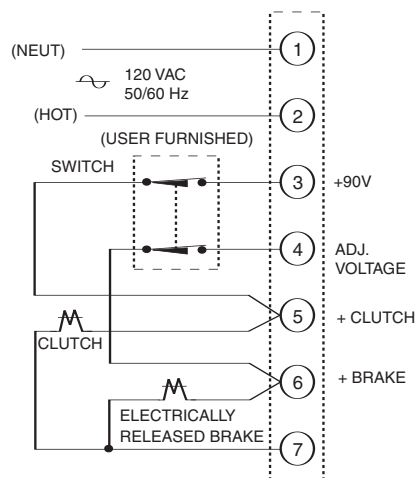
Specifications

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.

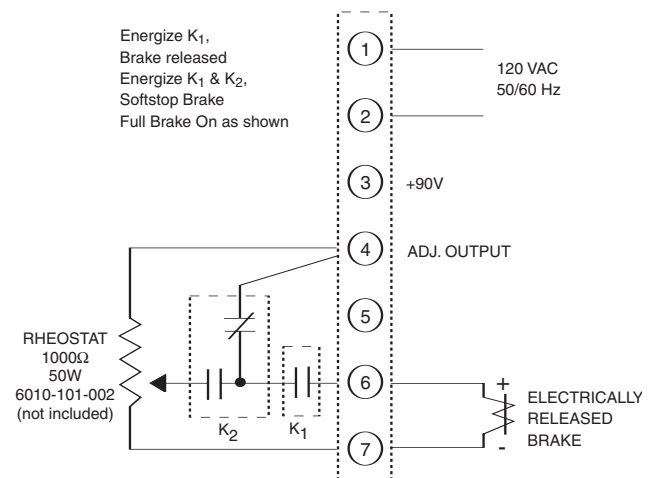
Connection Diagrams



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

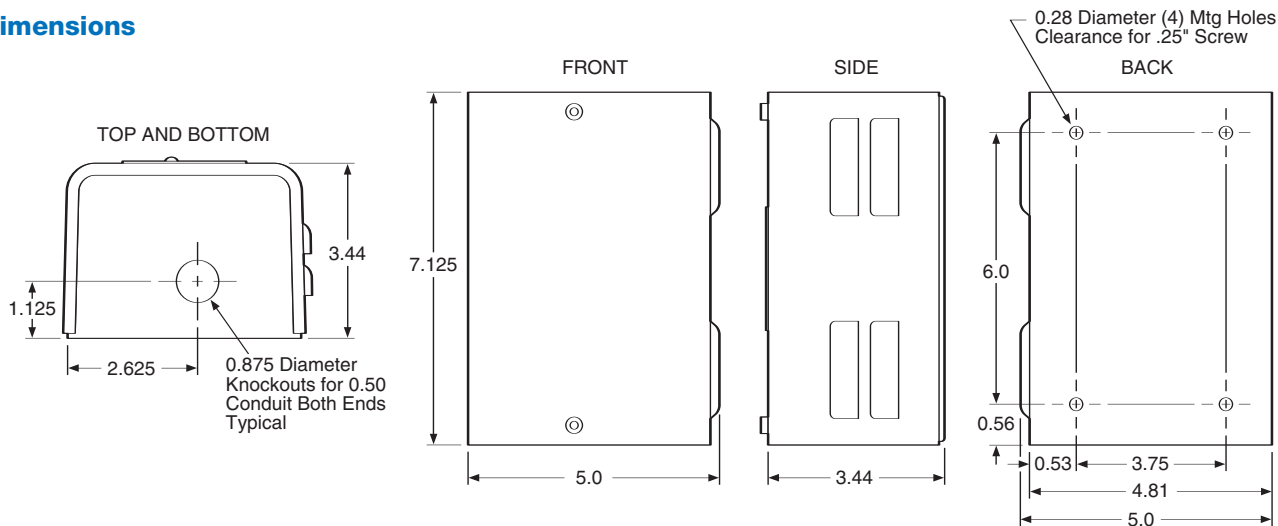
The DC voltage required to release the Warner Electric ER-1225 Brake is supplied by the MCS-805-1 or MCS-805-2 Power Supply. The correct brake release voltage—approximately 35-75 volts DC—is set by adjusting the power supply at the time of brake installation. Temperature compensating circuits provide 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	



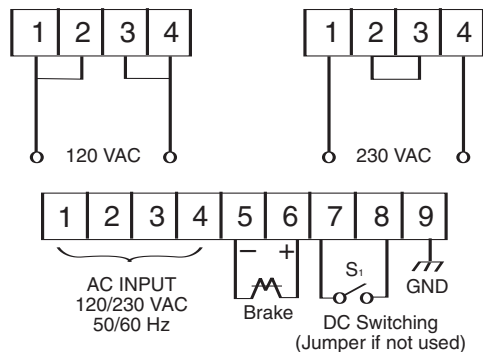
Dimensions



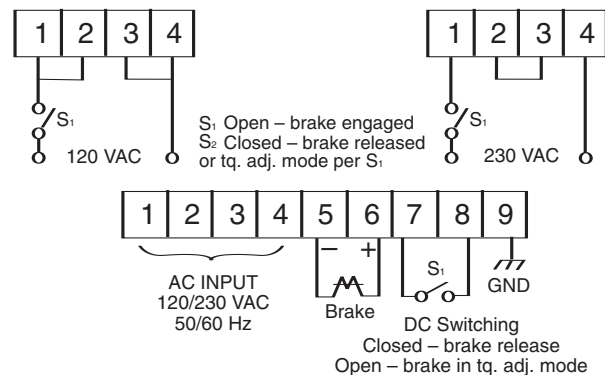
Connection Diagram

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.

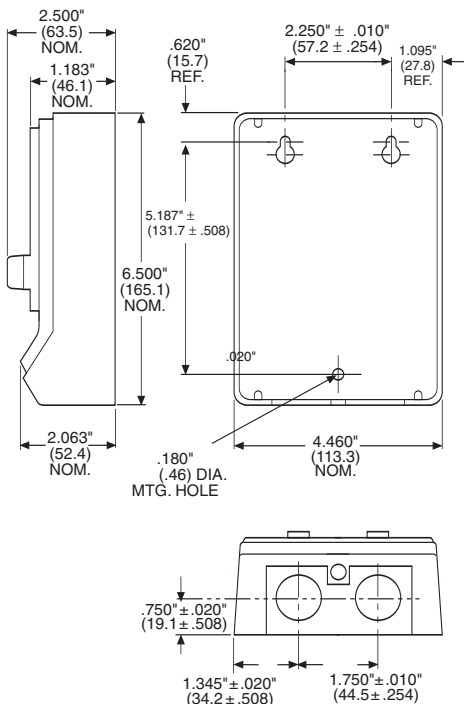
Single or Dual Channel Adjustable Torque Control

The CBC-200 and CBC-300 Controls provide single/dual torque control when connected to any of Warner Electric's 90 volt clutches and brakes.

Common features

-  and 
- Current monitored output maintains consistent torque regardless of variation in coil temperature.
- Switch selection tunes control to exactly match power 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.

Dimensions



CBC-200 Dual channel/Single channel torque adjust

The CBC-200 is a dual channel control with one adjustable current and one fixed voltage.



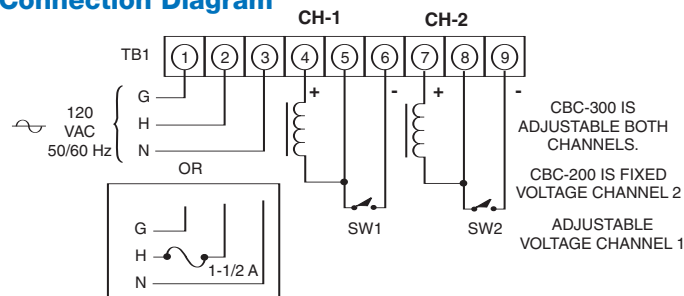
CBC-300 Dual channel/Dual channel torque adjust

The CBC-300 has two adjustable current channels.

Specifications

	CBC-200	CBC-300
Part No.	6011-448-001	6021-448-001
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 recommended	
Current Adjust (via front panel potentiometers)	Single adjustable channel	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:	
	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

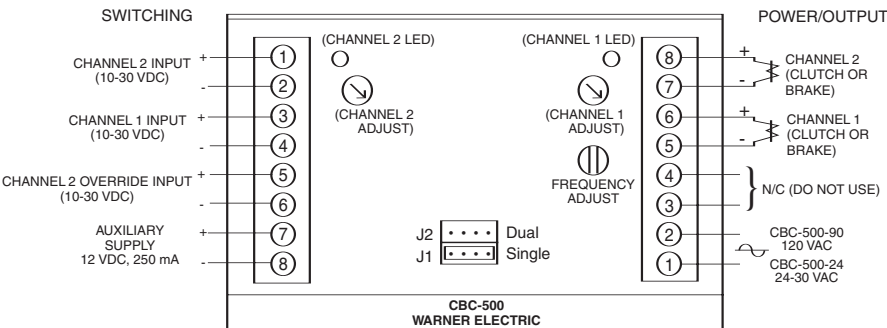




Specifications

	CBC-500-90	CBC-500-24
Part No.	6024-448-003	6024-448-002
Input Voltage	120 VAC	24-30 VAC
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)	

Connection Diagram



All dimensions nominal unless otherwise specified.

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

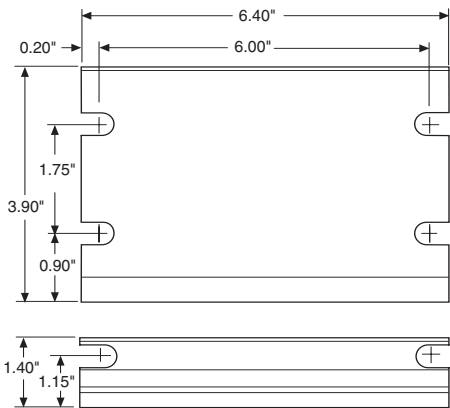
Enclosure (Optional)



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

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

Dimensions



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 alternately (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)	

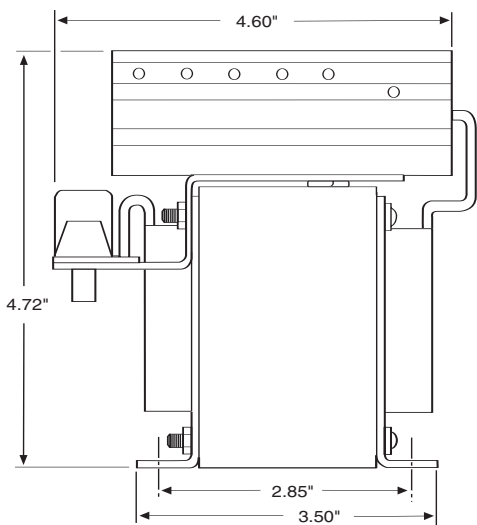
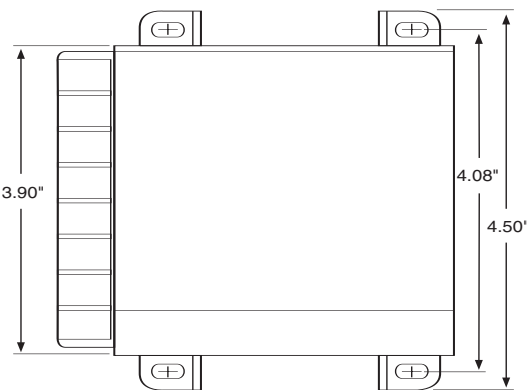
Enclosure (Optional)



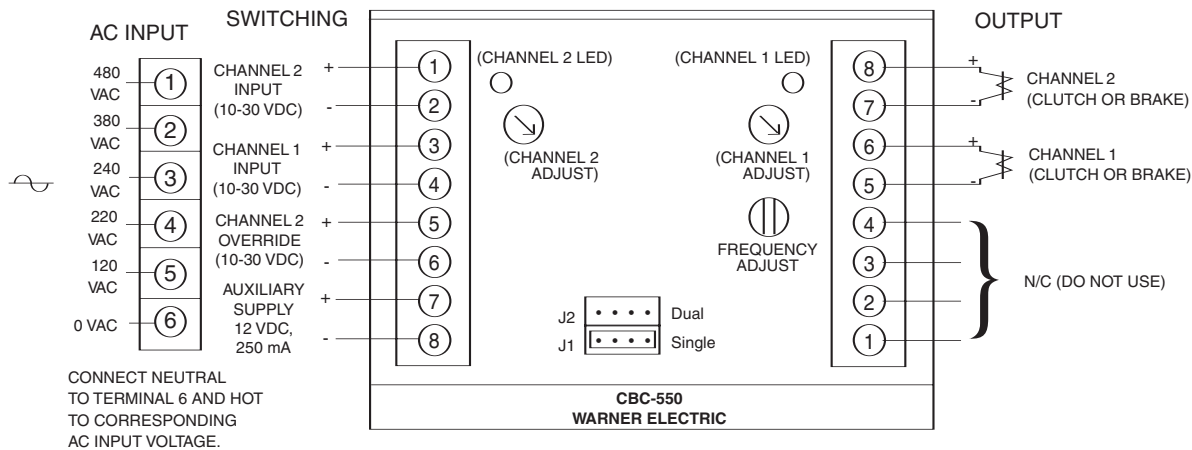
- Lift off hinge
- Quick-release latches
- Conforms to NEMA Type 13
- European Standard IEC 529, IP65

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

Dimensions



Connection Diagram



All dimensions nominal unless otherwise specified.

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.

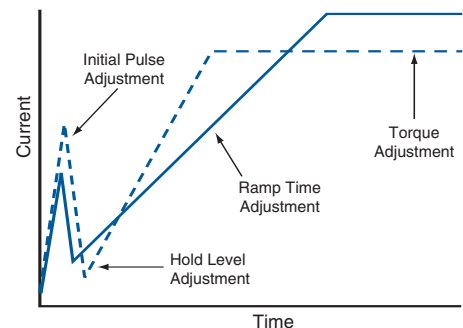
Note: It is recommended that the auto-gap springs be removed from the clutch and brake for successful accel-decel application.



Specifications

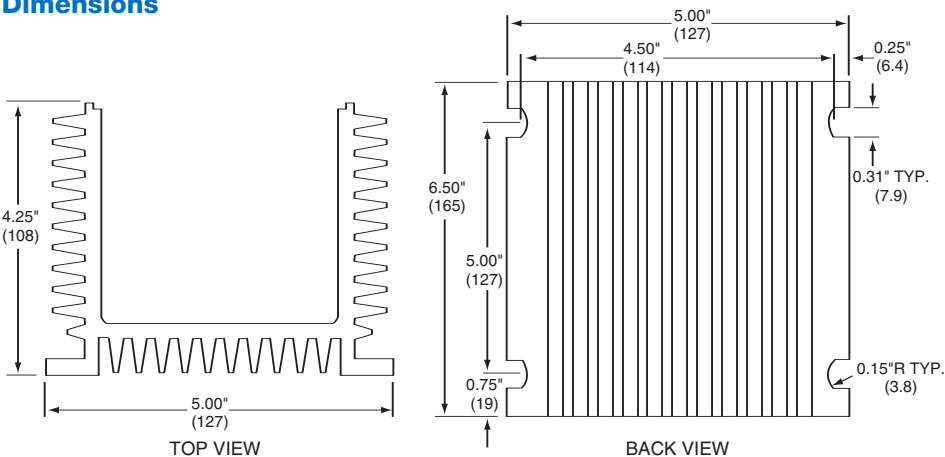
CBC-1825R	
Part No.	1825-448-001
Input Voltage	120 VAC, 50/60 Hz, 100 VA maximum
Output Current	Current driven PWM, compatible with 90 VDC clutch/brake (switch selectable current output)
Auxiliary Supply	12 VDC 250 mA
Circuit Protection	Input Fused 1.5 Amp, 250 V fast-blo clutch and brake outputs are 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

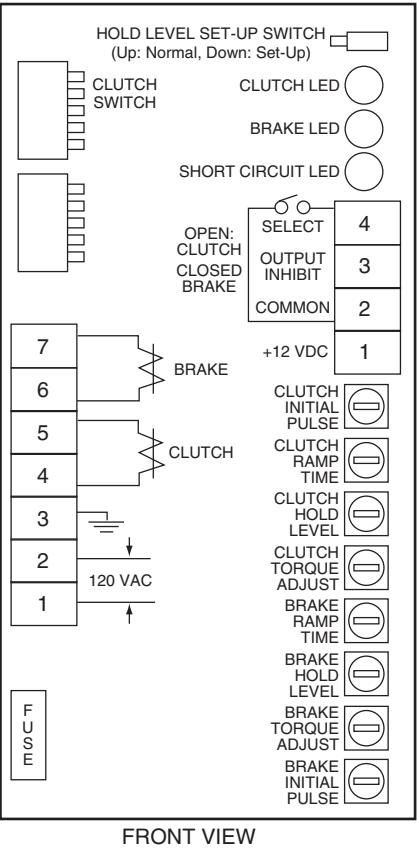


All dimensions nominal unless otherwise specified.

Dimensions



Connection Diagram



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	2.5A Slo-Blo (5 x 20 mm)	5A Slo-Blo (5 x 20 mm)
Auxiliary Supply	12 VDC, 250 mA maximum	

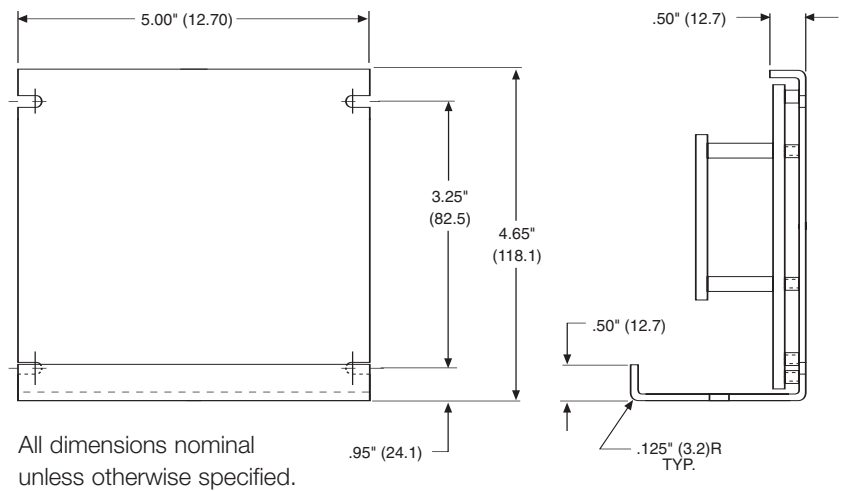
Enclosure (Optional)



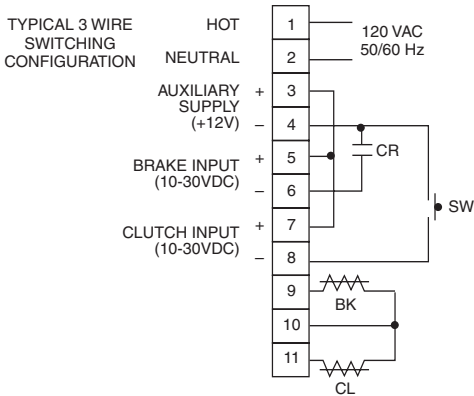
- Lift off hinge
- Quick-release latches
- Conforms to NEMA Type 13
- European Standard IEC 529, IP65

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

Dimensions



Connection Diagram



Rapid Acceleration/Deceleration

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

Warner Electric's CBC-750 series of Constant Current Overexcitation Clutch/Brake Controls are solid-state electronic controls designed to increase the cycle rate capabilities and accuracies of electromagnetic clutches and brakes. The controls 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. Models for 6 volt, 24 volt, or 90 volt clutches and brakes are available.



- High performance OEX control
- Constant current output capability
- Models for 6, 24, and 90 V 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



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

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

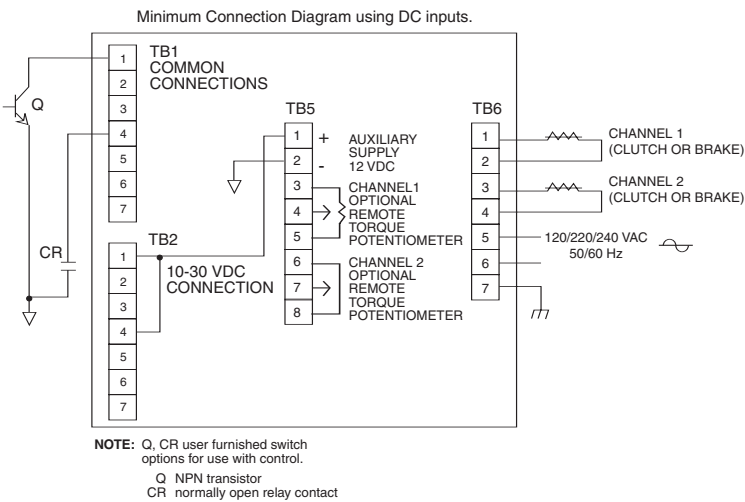
Specifications

	CBC-750-6	CBC-750-24	CBC-750-90
Part No.	6041-448-001	6041-448-002	6041-448-003
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.	.227 to 1.175 A max.	.060-.310 A max.
Current Rise Time	Dependent on clutch/brake size		
Current Fall Time	Depending on clutch/brake size		
Overexcitation Voltage	75 VDC nom.	240 VDC nom.	450 VDC nom.
Overexcitation Time	Automatic adjustment by control feedback		
Anti-overlap Time	Automatic adjustment by control feedback		
Power Supply Output	12 VDC, ± 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	5 Amp, 250 V Slo-Blo	1 Amp, 250 V Slo-Blo
OEX Supply	10 Amp, 32 V Slo-Blo		

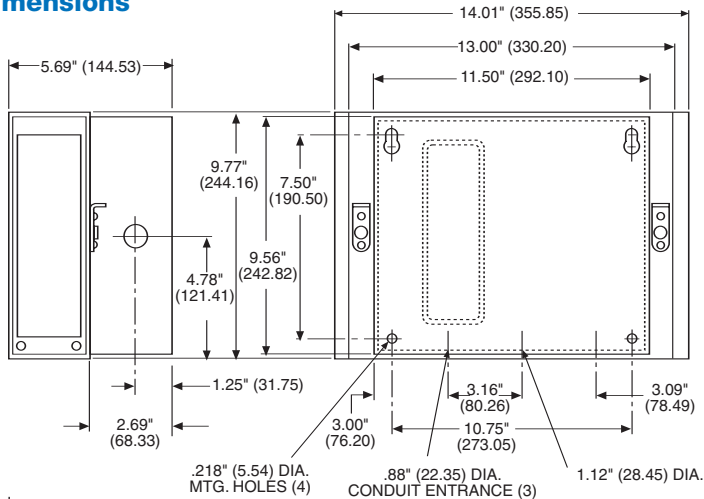
Seven optically isolated inputs accept 10-30V A.C./D.C. (TB2) or 120 VAC (TB3), configured through set-up switches

- 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



Dimensions



All dimensions nominal unless otherwise specified.

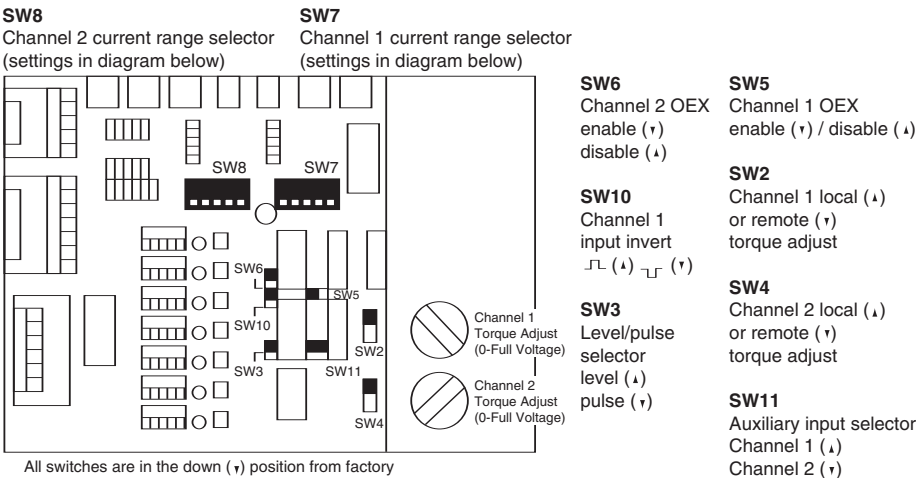
Setup Switches

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
24	0.227	0.641	0.881	0.940	1.175
90	0.060	0.176	0.256	0.282	0.310



System Accuracy

CBC-1000

Position-loop control with error correction compensation

Warner Electric's CBC-1000 is a closed-loop positioning control with error compensation designed for industrial clutch/brake applications. The position loop is closed through encoder feedback which generates pulses proportional to load motion. The CBC-1000 uses this feedback to determine the optimum brake actuation point. The control can be programmed to operate in one of two distinct modes: absolute or incremental. The CBC-1000 includes eight solid state control outputs, a batch counter and a serial communications interface.

The CBC-1000 system consists of four key elements: the CBC-1000, a clutch/brake, a clutch/brake control, and an encoder. Nearly any electric clutch/brake size and configuration can be used. The clutch/brake control should have solid-state compatibility. Simple on-off, soft start/stop, and overexcitation controls may all be utilized based on the desired velocity profile.

Accessories

Description	Part Number
Encoder Cable (Accessory)	6060-101-001
100 PPR Encoder w/10' cable	6060-101-010
250 PPR Encoder w/10' cable	6060-101-025
600 PPR Encoder w/10' cable	6060-101-060
1200 PPR Encoder w/10' cable	6060-101-120
2500 PPR Encoder w/10' cable	6060-101-250
5000 PPR Encoder w/10' cable	6060-101-500

(PPR=Pulse Per Revolution)

Serial Interface Module



Performs the necessary voltage level conversions to interface the RS-422A/485 output of the CBC-1000 to RS-232C equipment.

Part Number: 6060-101-232



Specifications

Part No.	6060-448-001
Input Power	100 to 130 VAC, 50/60 Hz, 20VA (200 to 260 VAC selectable)
Auxiliary Supply	12 VDC @ 175 mA Used for powering encoder, etc.
Main Counter	
Range	6 Decades
Reset Input	External and front panel
Count Rate	(20 kHz external input frequency)
Batch Counter	
Range	6 Decades
Reset	Through front panel only
Signal A and B Inputs	
Input Frequency	D.C., 20 kHz quadrature max.
Input High Level	3.25 VDC min.
Input Low Level	1.75 VDC max.
Control Inputs	
Input Frequency	D.C. to 20 Hz max. each input
Input Type	Single ended, current sinking
Input Logic	Both Edge and Level sensitive as defined by input use
Input High Level	10 VDC min. to 20 VDC max.
Input Low Level	0 VDC min. to 2 VDC max.
Input Current	2.5 mA steady state
Display	
Decades	7 Decade, 0.6" red LED
Decimal Point	User programmable
	Range: xxx.xxx to xxxxxx
Program Security	Program LOCK of lines 1 - 33
Control Outputs	
Type	8 Solid State 100 mA sink max., 24 VDC max.
Serial Interface	
Type	RS-422A/485 compatible
Baud Rate	Selectable: 300, 600, 1200, 2400
Parity	Selectable: None, Odd, Even
Data	ASCII
Diagnostics	Nine Self-Test Diagnostics
Mechanical	
Enclosure	Aluminum extrusion with molded VALOX bezel.
Weight	2.5 lbs.
Environmental	
Operating Temp.	0° to +50°C (32° to 122°F)
Storage Temp.	-18° to 85°C (0° to 186°F)
Ambient Humidity	90% and noncondensing

1. Select the proper clutch/brake

- Determine torque and inertia requirements
- Calculate heat dissipation for required cycle rate
- For best accuracy, mount clutch/brake directly on nip or drive shaft; avoid backlash

2. Select quadrature encoder

- Select encoder PPR for desired system resolution (i.e. inches/pulse, degrees/pulse, etc.)
- Determine input frequency; do not exceed 20,000 pulses/sec.
- Mount encoder directly to nip or drive shaft for best accuracy

3. Select clutch/brake power supply

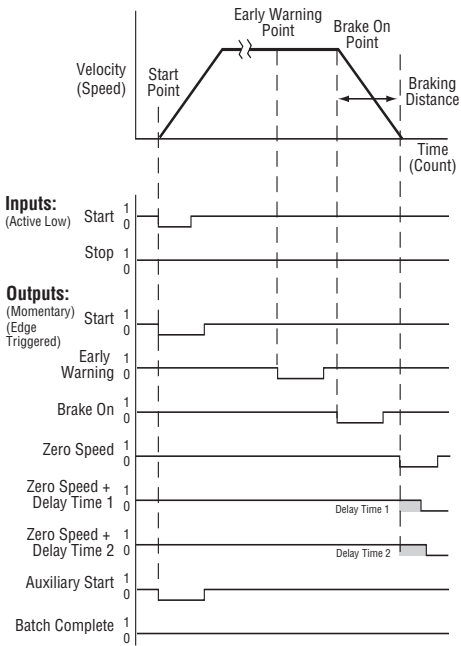
- Use CBC-700 overexcitation control for best accuracy
- Use CBC-500/550 for soft starting and/or stopping
- Brake autogap may have to be removed for best accuracy

4. Plan system logic (switching requirements)

- Use absolute mode for indexing applications such as conveyors and turntables or cutoff applications where close registration is required
- Use incremental mode for cutoff applications
- Determine switching and relays required for machine operation

5. Select serial interface module if applicable.

Timing Diagram



Operation

Successful operation will require knowledge of the following definitions and their relationships to the timing diagram.

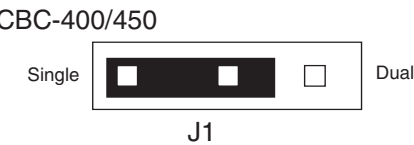
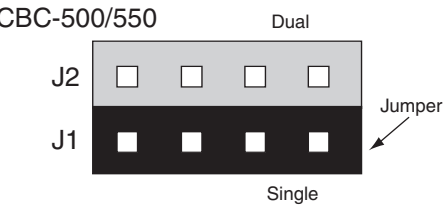
Function Key Definitions

Count	1 COUNT	The actual move distance, in pulses or scaled into engineering units (inches, feet, rotations, degrees, etc.) displayed dynamically.
Move Present	2 MOV PST	The desired move distance in pulses or scaled into engineering units. This is the value the operator enters to select a new move distance.
Early Warning	3 E.W.	A distance prior to Move Preset at which the early warning output is activated. Expressed as pulses or engineering units, this output can be used to accomplish a soft brake (slow down), energize valves, etc.
Batch	6 BATCH	A cumulative batch counter that can be dynamically displayed to show the number of operations, cycles, etc. When this counter reaches the value programmed by the Batch Preset (key 7) the Batch Complete Output is activated. The batch counter can be manually or automatically reset.
Batch Preset	7 BCH PST	A programmable batch counter activates the batch complete output when the value programmed has been reached by the batch (key 6)
Braking Distance	8 BRK DIS	The actual distance required to stop. This value is dynamically updated to determine the brake actuation point. Factory default is 25 pulses or engineering units which is only used for the first cycle after power-up. After the first cycle the CBC-1000 will tune to the particular brake being utilized. The amount of cycles needed for tuning depends on how far the true braking distance value is from the default of 25.

CBC-400/450/500/550
Single vs Dual Operation

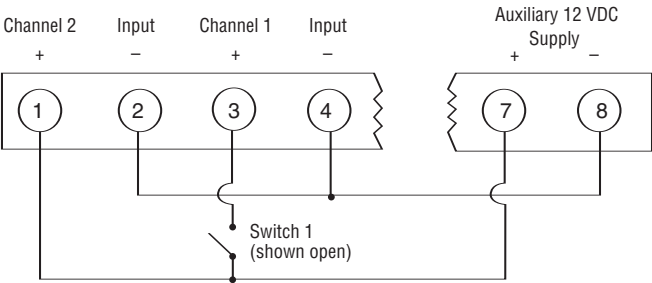
The CBC 400 and 500 series controls allow operation in either a single or dual mode. The mode of operation is determined via the position of a jumper on the main control board.

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

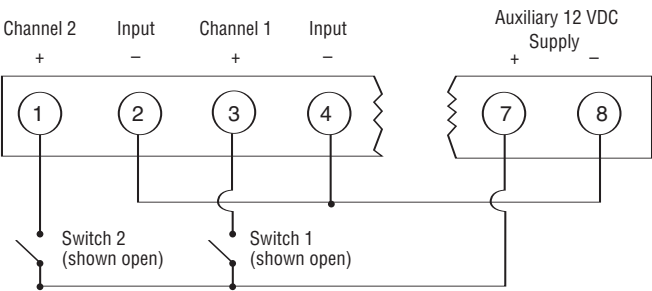
Control's switching terminal block



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

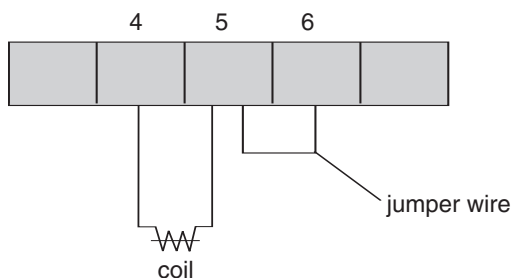


Jumper Mode	Switch 1	Switch 2	Channel 1	Channel 2
J1-Single	Closed	Open	Latched On	Off
	Open	Closed	Off	Latched On
J2-Dual	Closed	Open	Off	Off
	Open	Closed	Latched On	Latched On

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. When a single clutch or brake is used with a CBC-200 and no switch is used, a jumper wire is required across terminals 5 & 6 to get output at terminals 4 & 5.



3. 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.

4. 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	CBC-450	1 amp
CBC-150	.8 amps	MCS-103-1	1.25 amps
CBC-801	1.25 amps	CBC-500	1 amp
CBC-400	1 amp	CBC-550	1 amp

5. 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.

6. 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-400, CBC-450, CBC-500,
CBC-550, CBC-700, CBC-750

7. Is the CBC-1000 a stand-alone control?

No. The CBC-1000 provides closed loop feedback for a clutch/brake system. A common system will consist of four components:

- a Warner Electric brake and clutch
- a Warner Electric power supply
- an Encoder
- a CBC-1000 position control

The application criteria will determine which clutch/brake and which control will be appropriate selections.

8. 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-200, CBC-300

The CBC-400/450 and CBC-500/550 allow 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.

9. Are there any controls that can be used to control the torque of a 90 volt clutch or brake via an analog signal input?

Not currently. However, the TCS-200 and TCS-200-1 both provide signal following capabilities for use with units with 24 volt coils. These units can follow a 0-10 volt or 4-24 ma input signal.

10. 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-200, 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.

Model	Part Number	Page
CBC-100-1	6003-448-101	144
CBC-100-2	6003-448-103	144
MCS-103-1	6010-448-002	150
CBC-150-1	6004-448-001	144
CBC-150-2	6004-448-002	144
CBC-160-1	6013-448-001	145
CBC-160-2	6013-448-002	145
CBC-200	6011-448-001	152
CBC-300	6021-448-001	152
CBC-400-24	6006-448-002	148
CBC-400-90	6006-448-003	148
CBC-450-24	6006-448-005	149
CBC-450-90	6006-448-006	149
CBC-500-24	6024-448-002	153
CBC-500-90	6024-448-003	153
CBC-550-24	6024-448-005	154
CBC-550-90	6024-448-006	154
CBC-1825R	1825-448-001	156
CBC-700-24	6042-448-002	158
CBC-700-90	6042-448-003	158
CBC-750-6	6041-448-001	160
CBC-750-24	6041-448-002	160
CBC-750-90	6041-448-003	160
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CBC-802	6002-448-001	147
CBC-1000	6060-448-001	162
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Encoders: Cable (Accessory)	6090-101-001	162
100 PPR	6060-101-010	162
250 PPR	6060-101-025	162
600 PPR	6060-101-060	162
1200 PPR	6060-101-120	162
2500PPR	6060-101-250	162
5000PPR	6060-101-500	162
Optional Enclosure: CBC-400, CBC-500, CBC-700	6042-101-004	148, 153,158
Optional Enclosure CBC-450, CBC-550	6006-101-007	149, 154
MCS-805-1	6090-448-006	151
MCS-805-2	6090-448-007	151

C-face Compatible Units

Electro Modules

EM Series Modular Clutches, Brakes and Motor Brakes 169

UniModules

UM Series Clutch and Clutch/Brake Combinations 176

UM-C Series Ceramic Faced Clutch/Brakes N/A

Enclosed UniModules

EUM Series Clutch and Clutch/Brake Combinations 184

EUM-W Series Washdown Clutch/Brakes 184

Shaft and Base Mounted Units

Electro Clutches and Brakes

EC Series Shaft Mounted Clutches 190

EB Series Shaft Mounted Brakes 196

Advanced Technology Clutches and Brakes

ATC Series Clutches 202

ATB Series Brakes 204

Packaged Stationary Field Clutches

SFP Clutches N/A

Electro Pack

EP Series Base Mounted Clutch/Brakes 206

EP-C Series Ceramic Faced Base Mounted Clutch/Brakes N/A

Electrically Released Brakes

Spring-Set Brakes

ERS Series Static Engaged Brakes N/A

ERD Series Dual Purpose Engagement Brakes N/A

Permanent Magnet Brakes

FB Series Shaft Mounted Brakes 214

ER Series Flange Mounted Brakes 216

EM

UM-FBC Series Clutch/Electrically Released Brakes 218

EM-FBB, EM-FBC, EM-MBFB Series Brake Modules 222

Bushing Part Numbers 235

Replacement Service Parts

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:

EM/UM/EUM clutches

- Replace rotor and armature
- Inspect splined hub

EM/UM/EUM clutch/brakes

- Replace clutch rotor and armature
- Replace brake magnet and armature
- Inspect splined hub

EC clutches

- Replace clutch rotor and armature

EB brakes

- Replace magnet and armature

ATC clutches

- Replace clutch rotor facing and armature facing
- Inspect splined hub

ATB brakes

- Replace magnet facing and armature facing
- Inspect splined hub

Electro-Pack clutch/brake

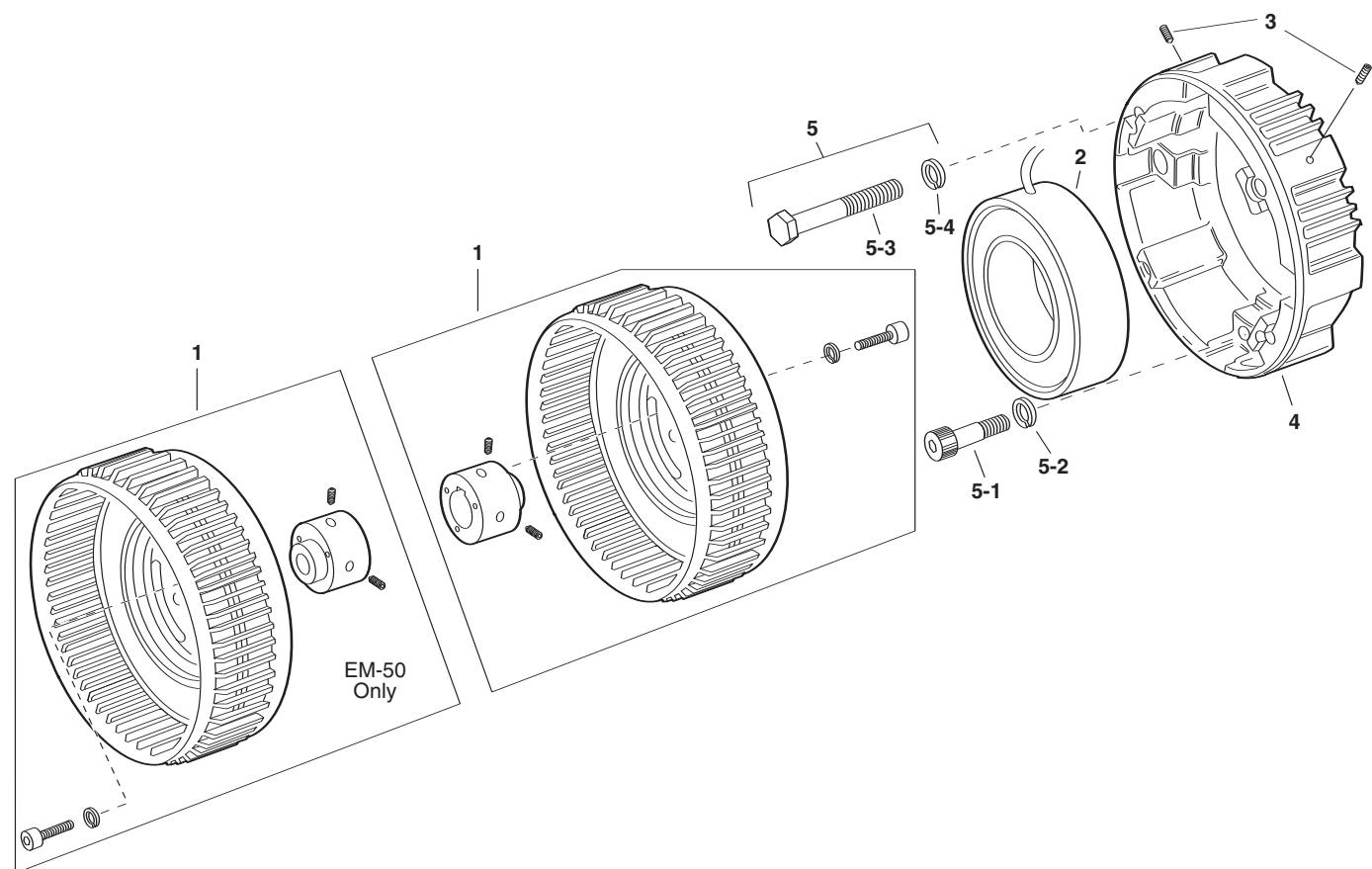
- Replace clutch rotor and armature
- Replace brake magnet and armature
- Inspect splined hub

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.



Note: As of June, 2000 all rotors are manufactured as a single piece design. The rotor assembly part number remains the same and now includes the hub and set screws.

Component Parts

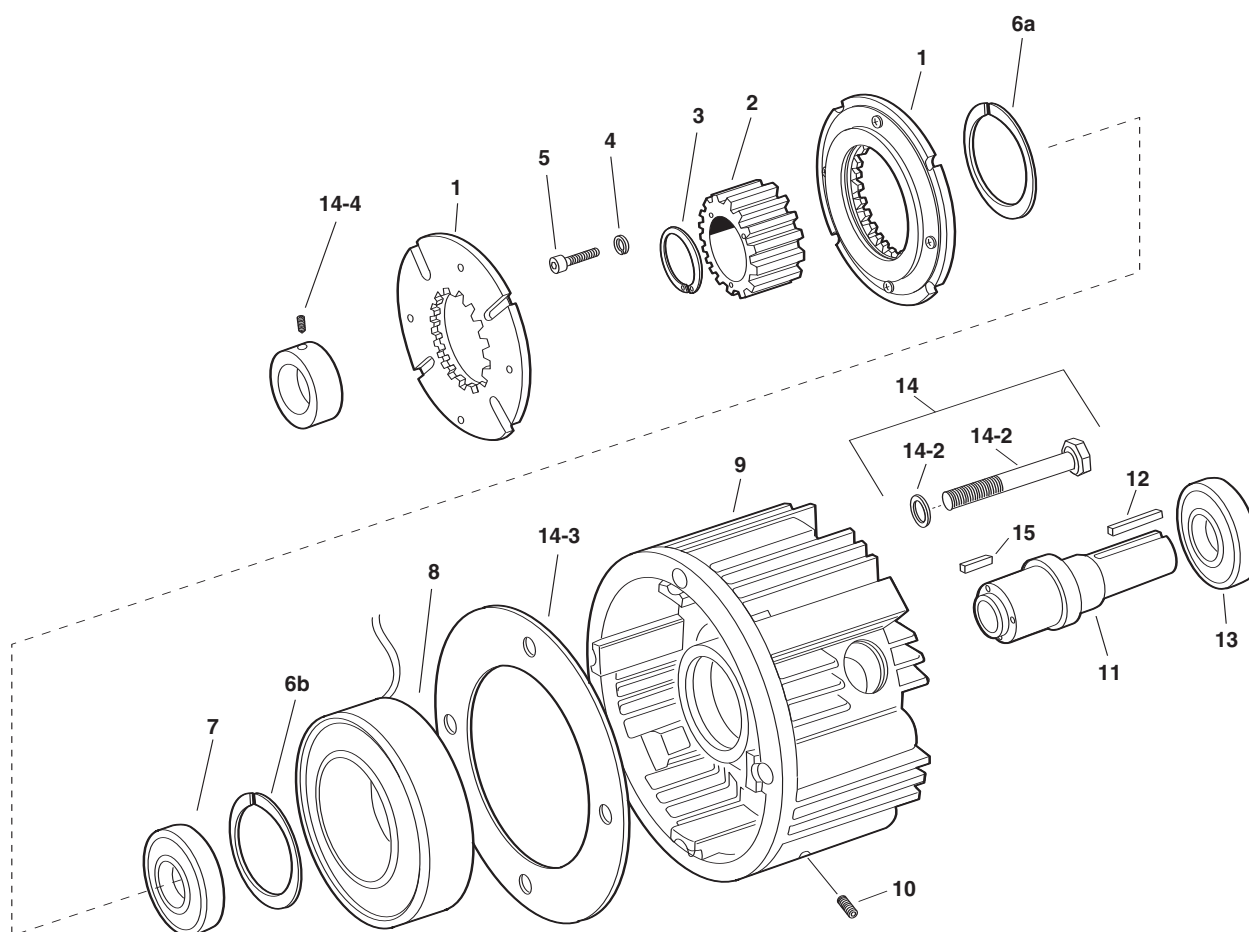
Item	Description	EM-50		EM-100		EM-180		EM-210	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1*	Rotor Assembly w/fan & hub	5370-751-010	1	5370-751-013	1	5370-751-007	1	5371-751-005	1
	Field		1		1		1		1
2	6 volt	5370-451-011		5370-451-021		5370-451-021		5371-451-010	
	24 volt	5370-451-014		5370-451-024		5370-451-024		5371-451-013	
	90 volt	5370-451-012		5370-451-022		5370-451-022		5371-451-011	
3	Setscrew							797-0471	4
4	Adapter							104-0096	1
	Mounting Accessory	5370-101-028	1	5370-101-013	1	5370-101-013	1	5371-101-008	1
5	5-1 Capscrew	797-0293	4	797-0293	4	797-0293	4	797-1078	4
	5-2 Lockwasher	950-0128	4	950-0128	4	950-0128	4	950-0101	4
	5-3 Capscrew							797-1075	4
	5-4 Lockwasher							950-0032	4

*Shipped Assembled

Refer to Service Manual P-213.

These units meet the standards of UL 508 and are listed under guide card #NMTR2, file #59164. These units are CSA certified under file #LR11543.

20 Brake Module



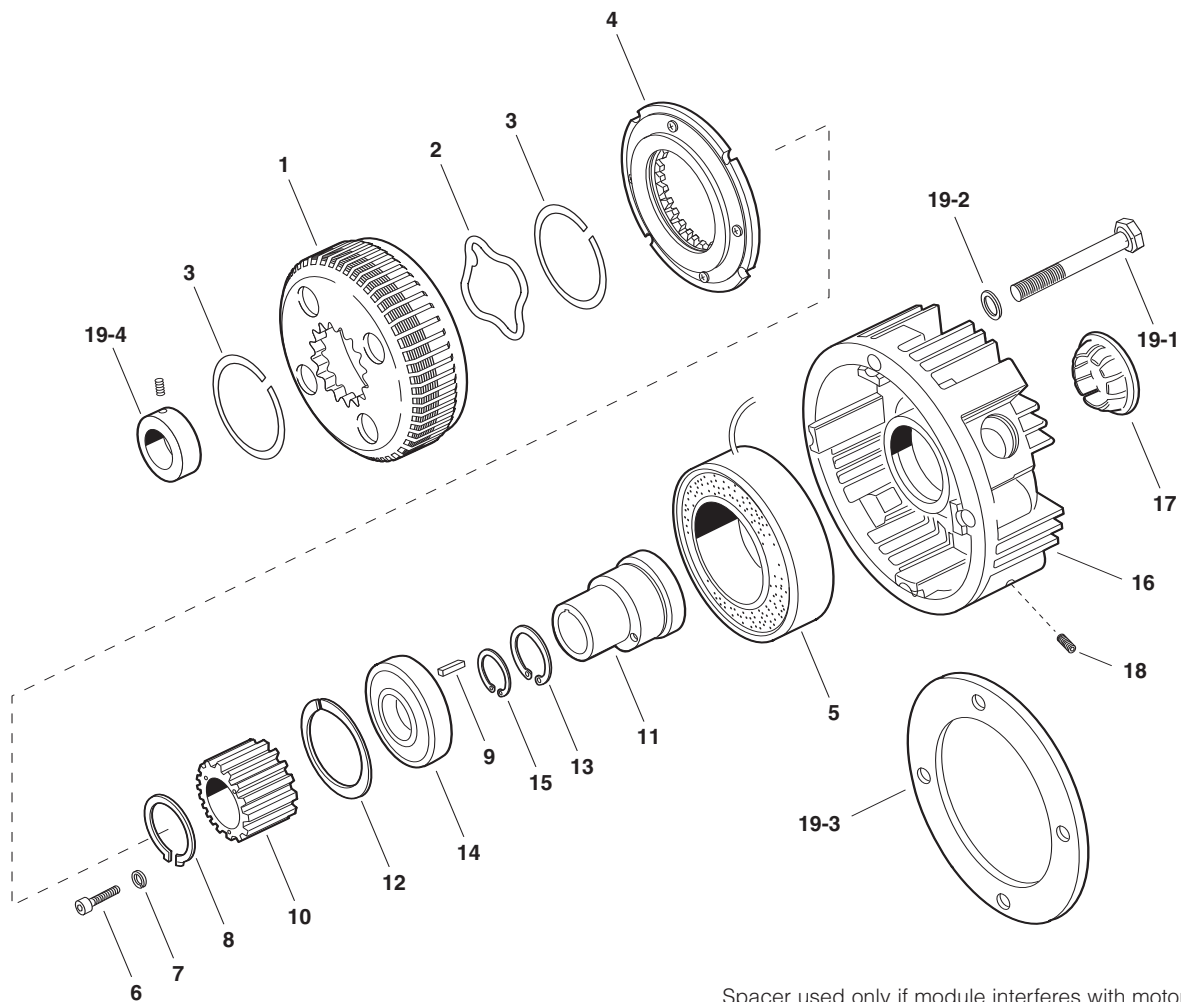
Component Parts

Item	Description	EM-50		EM-100		EM-180		EM-210		EM-215	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1	Armature	5370-111-011	2	5370-111-013	2	5370-111-013	2	5371-111-005	2	5371-111-005	1
2	Armature Hub	540-1638	1	540-1684	1	540-1642	1	540-0741	1	540-2039	1
3	Retaining Ring	748-0445	1	748-0676	1	748-0676	1				
4	Lockwasher							950-0372	6	950-0372	6
5	Capscrew							797-0081	6	797-008	6
6a	Retaining Ring	748-0113	1	748-0101	1	748-0101	1	748-0112	1	748-0112	1
6b	Retaining Ring	748-0113	1							748-2002	1
7	Ball Bearing	166-0149	1	166-0101	1	166-0101	1	166-0142	1	166-0142	1
8	Magnet		1		1		1		1		
	6 Volt	5370-631-008		5370-631-002		5370-631-002		5371-631-002			
	24 Volt	5370-631-010		5370-631-005		5370-631-005		5371-631-005			
	90 Volt	5370-631-007		5370-631-003		5370-631-003		5371-631-003		5371-631-003	1
9	Housing	535-0130	1	535-0132	1	535-0132	1	535-0033	1	535-0033	1
10	Setscrew	797-0471	4	797-0471	4	797-0471	4	797-0471	4	797-0471	4
11	Shaft	798-0045	1	798-0127	1	798-0086	1	798-0050	1	798-0268	1
12	Key - Output	590-0029	1	590-0029	1	590-0029	1	590-0019	1	590-0124	1
13	Ball Bearing	166-0155	1	166-0143	1	166-0143	1	166-0144	1	166-0144	1
14	Mounting Accessory	5370-101-017	1	5370-101-017	1	5370-101-023	1	5371-101-007	1	5371-101-007	1
	14-1 Capscrew	797-0353	4	797-0353	4	797-0353	4	797-1081	4	797-1081	4
	14-2 Washer	950-0354	4	950-0354	4	950-0354	4	950-0033	4	950-0033	4
	14-3 Spacer					807-0218	1				
	14-4 Collar					266-0002	1	266-0003	1	266-0003	1
15	Key	590-0043	1	590-0084	1	590-0084	1				
	Key Accessory - Input	5370-101-072	1	5370-101-072	1	5370-101-072	1	5371-101-043	1	5371-101-044	1

Refer to Service Manual P-213.

These units meet the standards of UL 508 and are listed under guide card #NMTR2, file #59164. These units are CSA certified under file #LR11543.

EM-50-20MB, EM-180-20MB, EM-210-20MB



Spacer used only if module interferes with motor housing.

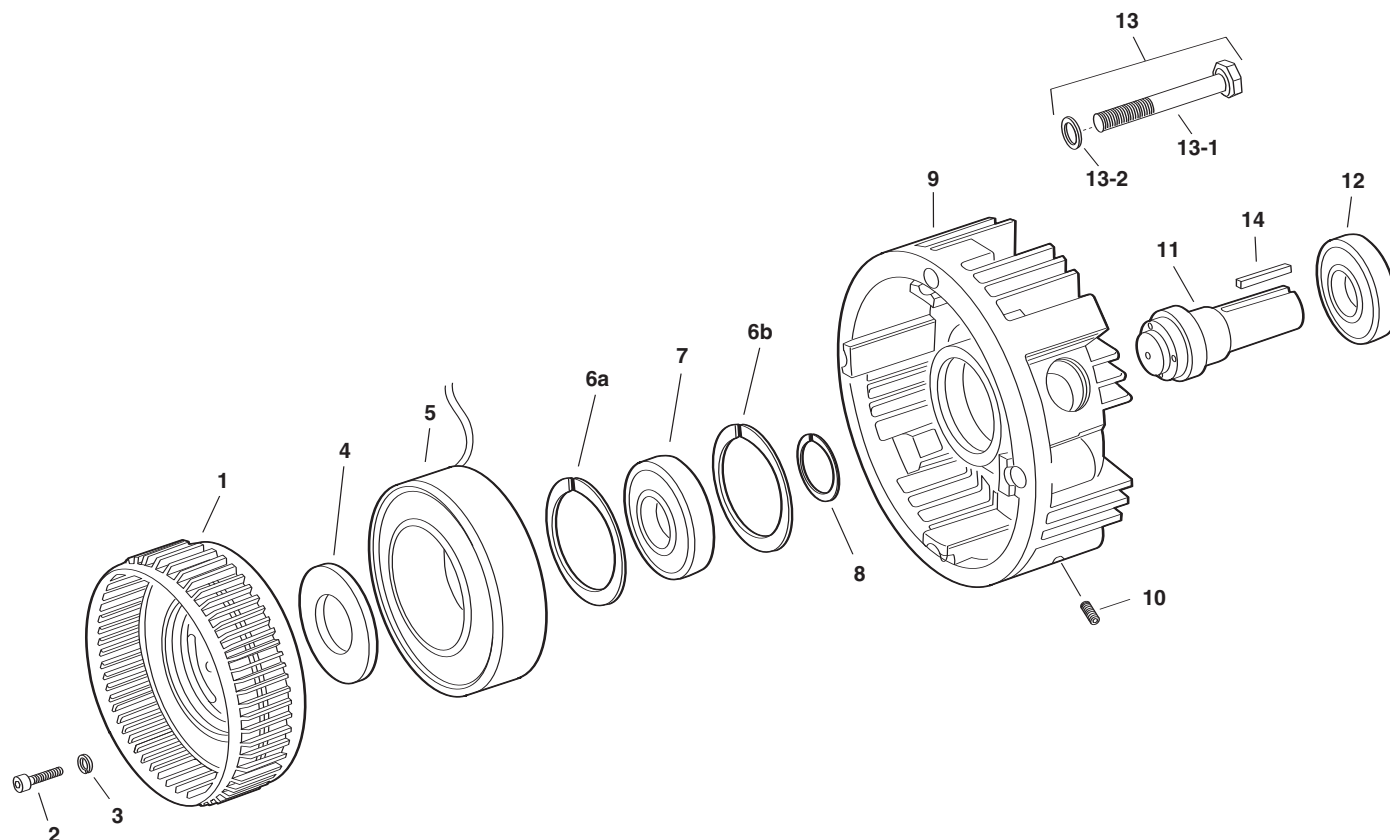
Component Parts

Item	Description	EM-50		EM-180		EM-210	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1	Fan Assembly	5370-104-002	1	5370-104-001	1	748-1052	1
2	Follow-up Spring	808-0104	1	808-0107	1	808-0109	1
3	Retaining Ring	748-0440	2	748-0450	2	748-0455	2
4	Armature	5370-111-011	1	5370-111-013	1	5371-111-005	1
5	Magnet						
	6 Volt	5370-631-008	11	5370-631-002	1	5371-631-002	1
	24 Volt	5370-631-010	1	5370-631-005	1	5371-631-005	1
	90 Volt	5370-631-007	1	5370-631-003	1	5371-631-003	1
6	Capscrew					797-0081	6
7	Lockwasher					950-0372	6
8	Retaining Ring	748-0445	1				
9	Key	590-0043	1	590-0084	1		
10	Splined Hub	540-1646	1	540-1647	1	540-2041	1
11	Hub	540-1018	1	540-0726	1	540-1020	1
12	Retaining Ring	748-0113	2	748-0101	1	748-0112	1
13	Retaining Ring			748-0676	1		
14	Bearing	166-0149	1	166-0101	1	166-0142	1
15	Retaining Ring	748-0556	1	748-0555	1	748-0554	1
16	Housing	535-0136	1	535-0134	1	535-0050	1
17	Plug	680-0028	1	680-0028	1	680-0027	1
18	Setscrew	797-0471	4	797-0471	4	797-0471	4
19	Mounting Accessory	5370-101-017	1	5370-101-023	1	5371-101-007	1
	19-1 Capscrew	797-0353	4	797-0353	4	797-1081	4
	19-2 Lockwasher	950-0354	4	950-0354	4	950-0033	4
	19-3 Spacer			807-0218	1		
	19-4 Collar			266-0002	1	266-0003	1
	Key Accessory - Input	5370-101-073	1	5370-101-073	1	5371-101-043	1

Refer to Service Manual P-213.

These units meet the standards of UL 508 and are listed under guide card #NMTR2, file #59164. These units are CSA certified under file #LR11543.

30 Input Clutch Module



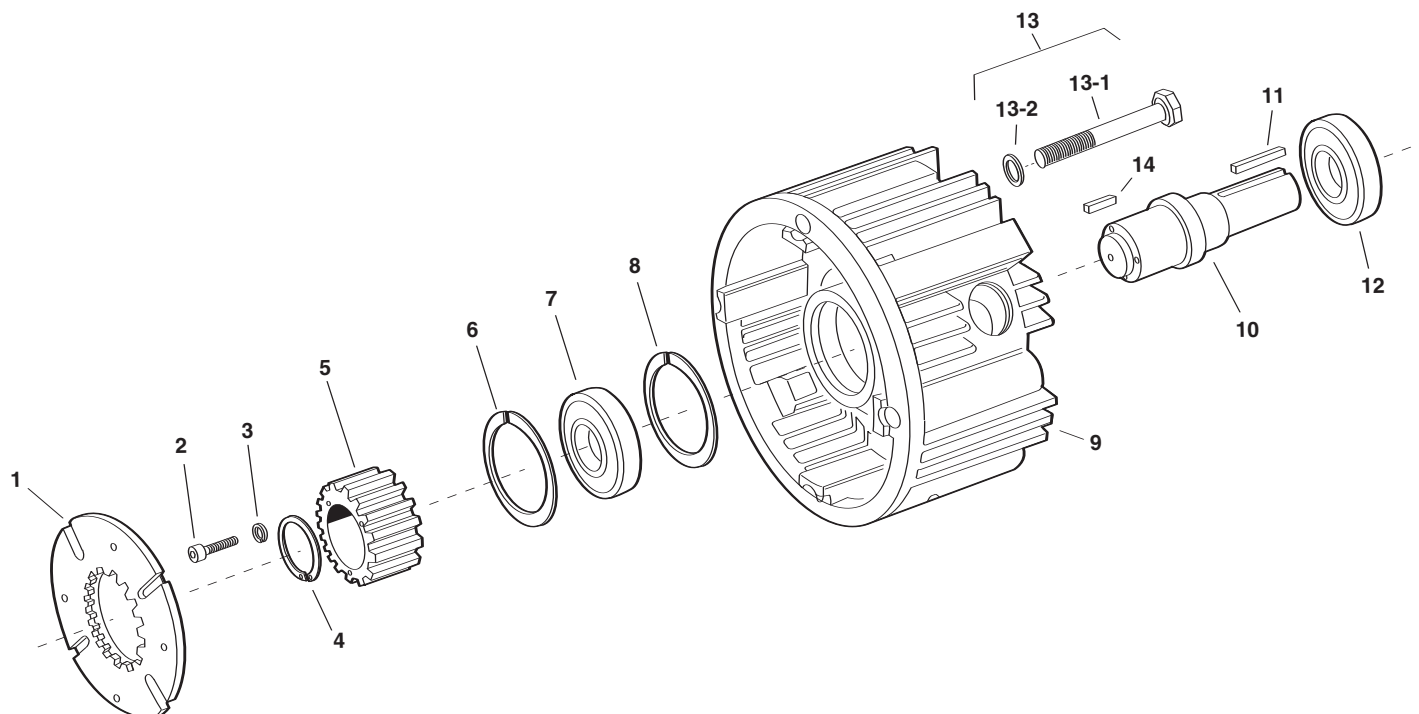
Component Parts

Item	Description	EM-50		EM-100		EM-180		EM-210	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1	Rotor Assembly w/fan	5370-751-006	1	5370-751-009	1	5370-751-009	1	5371-751-007	1
2	Capscrew	797-1039	4	797-1214	5	797-1214	5	797-0083	6
3	Lockwasher	950-0436	4	950-0436	5	950-0436	5	950-0372	6
4	Spacer			807-0062	1	807-0062	1	807-0061	1
5	Field (with housing EM-50-30 only)		1		1		1		1
	6 volt	5370-451-072		5370-451-007		5370-451-007		5371-451-002	
	24 volt	5370-451-074		5370-451-005		5370-451-005		5371-451-005	
	90 volt	5370-451-073		5370-451-008		5370-451-008		5371-451-003	
6a	Retaining Ring	748-0113	1	748-0101	1	748-0101	1	748-0112	1
6b	Retaining Ring	748-0113	1						
7	Ball Bearing	166-0149	1	166-0101	1	166-0101	1	166-0142	1
8	Retaining Ring	748-0017	1						
9	Housing			535-0164	1	535-0164	1	535-0129	1
10	Setscrew	797-0471	4	797-0471	4	797-0471	4	797-0471	4
11	Shaft	798-0047	1	798-0129	1	798-0124	1	798-0123	1
12	Ball Bearing	166-0155	1	166-0143	1	166-0143	1	166-0144	1
13	Mounting Accessory							5371-101-010	1
	13-1 Capscrew							797-1075	4
	13-2 Lockwasher							950-0032	4
14	Key	590-0029	1	590-0029	1	590-0029	1	590-0019	1

Refer to Service Manual P-213.

These units meet the standards of UL 508 and are listed under guide card #NMTR2, file #59164. These units are CSA certified under file #LR11543.

Service Parts



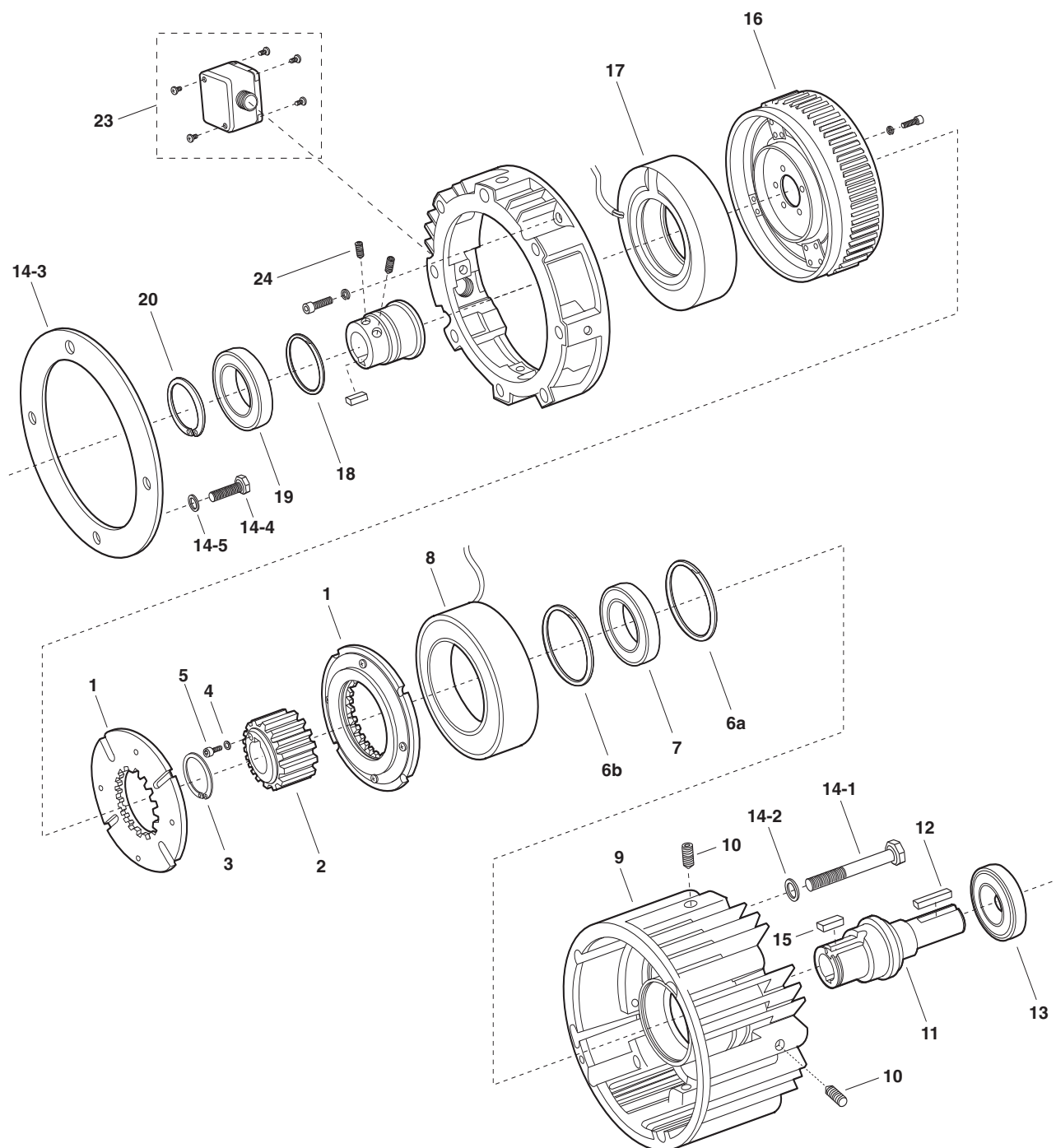
Component Parts

Item	Description	EM-50		EM-100		EM-180		EM-210	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1	Armature	5370-111-011	1	5370-111-013	1	5370-111-013	1	5371-111-005	1
2	Capscrew							797-0081	1
3	Lockwasher							950-0372	6
4	Retaining Ring	748-0445	1	748-0676	1	748-0676	1		
5	Hub	540-1638	1	540-1642	1	540-1642	1	540-0741	1
6	Retaining Ring	748-0113	1	748-0101	1	748-0101	1	748-0112	1
7	Ball Bearing	166-0149	1	166-0101	1	166-0101	1	166-0142	1
8	Retaining Ring	748-0113	2						
9	Housing	535-0131	1	535-0133	1	535-0133	1	535-0034	1
10	Shaft	798-0046	1	798-0128	1	798-0085	1	798-0051	1
11	Key	590-0029	1	590-0029	1	590-0029	1	590-0019	1
12	Ball Bearing	166-0155	1	166-0143	1	166-0143	1	166-0144	1
13	Mounting Accessory	5370-101-017	1	5370-101-017	1	5370-101-017	1		
	13-1 Capscrew	797-0353	4	797-0353	4	797-0353	4		
	13-2 Lockwasher	950-0354	4	950-0354	4	950-0354	4		
14	Key	590-0043	1	590-0084	1	590-0084	1		
	Key Accessory - Input	5370-101-072	1	5370-101-072	1	5370-101-072	1	5371-101-043	1

Refer to Service Manual P-213.

These units meet the standards of UL 508 and are listed under guide card #NMTR2, file #59164. These units are CSA certified under file #LR11543.

UM-1020 Clutch/Brake Combination



UM-1020 Clutch/Brake Combination

Component Parts

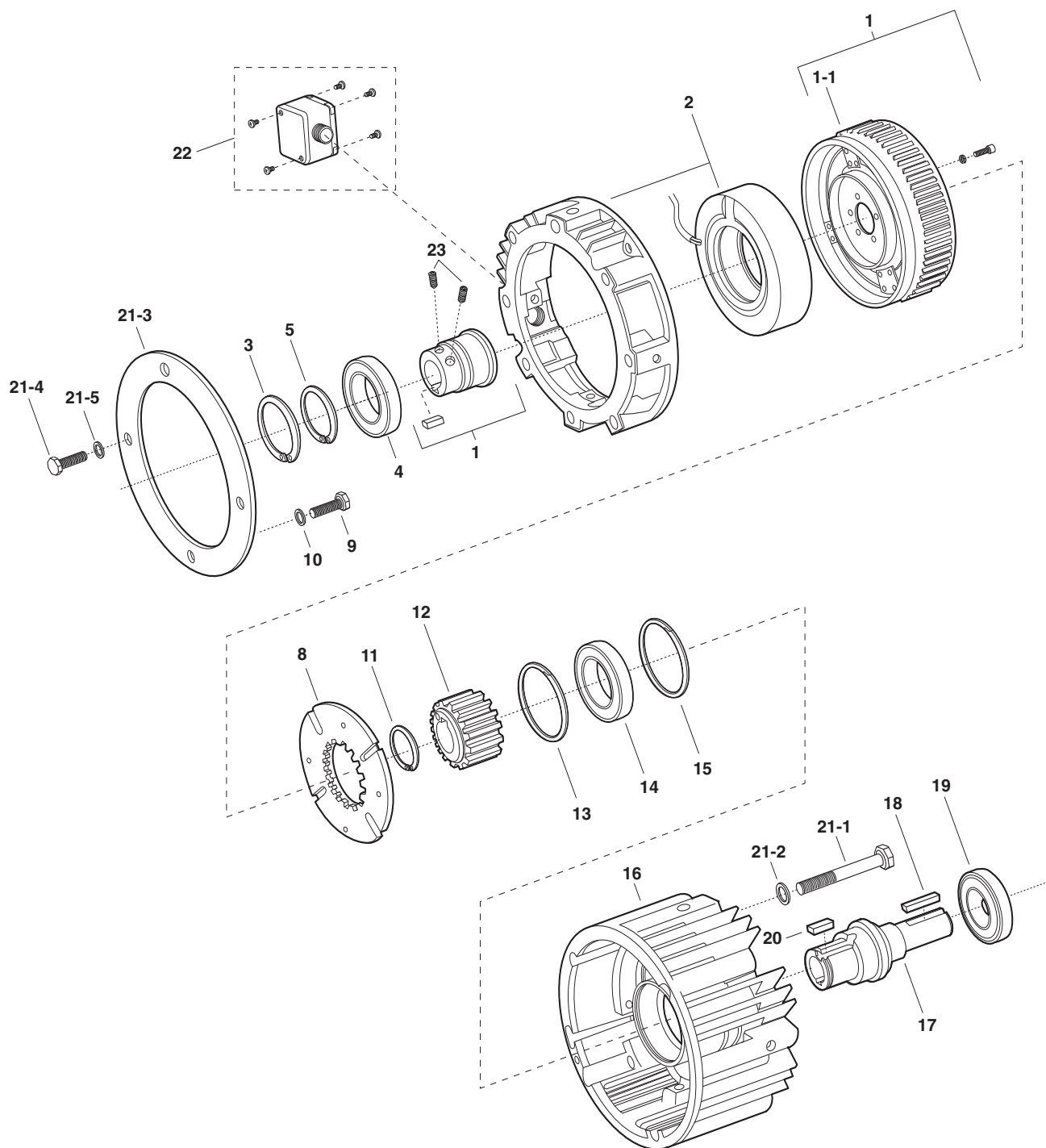
Item	Description	UM-50		UM-100		UM-180		UM-210		UM-215	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1	Armature Assembly	5370-111-011	2	5370-111-013	2	5370-111-013	2	5371-111-005	2	5371-111-005	2
2	Armature Hub	540-1638	1	540-1642	1	540-1642	1	540-0741	1	540-0741	1
3	Retaining Ring	748-0445	1	748-0676	1	748-0676	1				
4	Lockwasher							950-0372	6	950-0372	6
5	Capscrew							797-0081	6	797-0081	6
6a	Retaining Ring	748-0113	1	748-0101	1	748-0101	1	748-0112	1	748-0112	1
6b	Retaining Ring	748-0113	1								
7	Ball Bearing	166-0149	1	166-0101	1	166-0101	1	166-0142	1	166-0142	1
8	Magnet		1		1		1		1		1
	6 volt	5370-631-008		5370-631-002		5370-631-002		5371-631-002		5371-631-002	
	24 volt	5370-631-010		5370-631-005		5370-631-005		5371-631-005		5371-631-005	
	90 volt	5370-631-007		5370-631-003		5370-631-003		5371-631-003		5371-631-003	
9	Housing	535-0165	1	535-0162	1	535-0162	1	535-0163	1	535-0163	1
10	Setscrew	797-0471	4	797-0471	4	797-0471	4	797-0471	4	797-0471	4
11	Shaft	798-0046	1	798-0128	1	798-0085	1	798-0051	1	798-0254	1
12	Key	590-0029	1	590-0029	1	590-0029	1	590-0019	1	590-0124	1
13	Ball Bearing	166-0155	1	166-0143	1	166-0143	1	166-0144	1	166-0144	1
14	Mounting Accessory	5370-101-040	1	5370-101-040	1	5370-101-040	1	5371-101-020	1	5371-101-020	1
	14-1 Capscrew	797-1378	4	797-1378	4	797-1378	4	797-1440	4	797-1440	4
	14-2 Washer	950-0354	4	950-0354	4	950-0354	4	950-0111	4	950-0111	4
	14-3 Adapter			807-0218	1			104-0321	1	104-0321	1
	14-4 Capscrew							797-1442	4	797-1442	4
	14-5 Washer							950-0101	4	950-0101	4
15	Key	590-0043	1	590-0084	1	590-0084	1				
16	Rotor Assembly (with fan and hub)	5370-751-019	1	5370-751-022	1	5370-751-017	1	5371-751-012	1	5371-751-031	1
17	Field (with housing)		1		1		1		1		1
	6 volt	5370-451-062		5370-451-057		5370-451-057		5371-451-027		5371-451-027	
	24 volt	5370-451-064		5370-451-059		5370-451-059		5371-451-029		5371-451-029	
	90 volt	5370-451-063		5370-451-058		5370-451-058		5371-451-028		5371-451-028	
18	Retaining Ring	748-0101	1	748-0101	1	748-0101	1	748-0558	1	748-0558	1
19	Bearing	166-0150	1	166-0101	1	166-0101	1	166-0168	1	166-0168	1
20	Retaining Ring	748-0018	1	748-0001	1	748-0001	1	748-0067	1	748-0067	1
23	Conduit Box (Optional)	5370-101-042	1	5370-101-042	1	5370-101-042	1	5370-101-042	1	5370-101-042	1
24	Set Screw	797-1098	2	797-0069	2	797-0069	2	797-1098	2	797-1098	2
	Key	5370-101-072	1	5370-101-072	1	5370-101-072	1	5371-101-043	1	5371-101-044	1

Refer to Service Manual P-213.

These units meet the standards of UL 508 and are listed under guide card #NMTR 2, file #59164. These units are CSA certified under file #LR11543.

Note: As of June, 2000 all rotors are manufactured as a single piece design. The rotor assembly part number remains the same and now includes the hub and set screws.

UM-1040 Clutch Combination



UM-1040 Clutch Combination

Component Parts

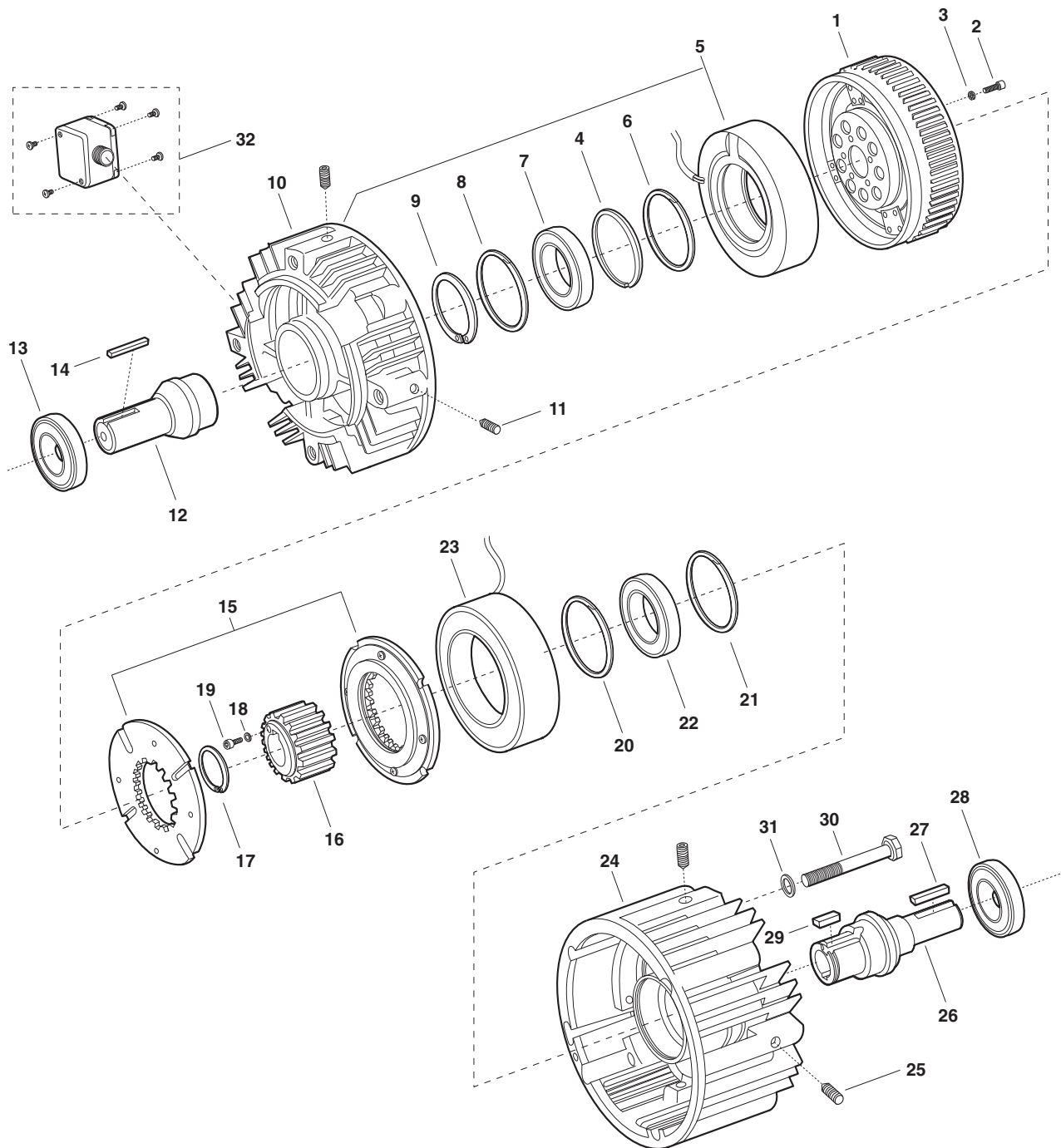
Item	Description	UM-50		UM-100		UM-180		UM-210		UM-215	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1	Rotor Assembly (with fan and hub)	5370-751-019	1	5370-751-022	1	5370-751-017	1	5371-751-012	1	5371-751-031	1
2	Field (with housing)		1		1		1		1		1
	6 volt	5370-451-062		5370-451-057		5370-451-057		5371-451-027		5371-451-027	
	24 volt	5370-451-064		5370-451-059		5370-451-059		5371-451-029		5371-451-029	
	90 volt	5370-451-063		5370-451-058		5370-451-058		5371-451-028		5371-451-028	
3	Retaining Ring	748-0101	1	748-0101	1	748-0101	1	748-0558	1	748-0558	1
4	Bearing	166-0150	1	166-0101	1	166-0101	1	166-0168	1	166-0168	1
5	Retaining Ring	748-0018	1	748-0001	1	748-0001	1	748-0067	1	748-0067	1
8	Armature Assembly	5370-111-011	1	5370-111-013	1	5370-111-013	1	5371-111-005	1	5371-111-005	1
9	Capscrew							797-0081	6	797-0081	6
10	Lockwasher							950-0372	6	950-0372	6
11	Retaining Ring	748-0445	1	748-0676	1	748-0676	1				
12	Hub	540-1638	1	540-1642	1	540-1642	1	540-0741	1	540-0741	1
13	Retaining Ring	748-0113	1	748-0101	1	748-0101	1	748-0112	1	748-0112	1
14	Ball Bearing	166-0149	1	166-0101	1	166-0101	1	166-0142	1	166-0142	1
15	Retaining Ring	748-0113	1								
16	Housing	535-0167	1	535-0168	1	535-0168	1	535-0169	1	535-0169	1
17	Shaft	798-0046	1	798-0128	1	798-0085	1	798-0051	1	798-0254	1
18	Key	590-0029	1	590-0029	1	590-0029	1	590-0019	1	590-0124	1
19	Ball Bearing	166-0155	1	166-0143	1	166-0143	1	166-0144	1	166-0144	1
20	Key	590-0043	1	590-0084	1	590-0084	1				
21	Mounting Accessory	5370-101-040	1	5370-101-040	1	5370-101-040	1	5371-101-020	1	5371-101-020	1
	21-1 Capscrew	797-1378	4	797-1378	4	797-1378	4	797-1440	4	797-1440	4
	21-2 Lockwasher	950-0354	4	950-0354	4	950-0354	4	950-0111	4	950-0111	4
	21-3 Adapter			807-0218	1			104-0321	1	104-0321	1
	21-4 Capscrew							797-1442	4	797-1442	4
	21-5 Lockwasher							950-0101	4	950-0101	4
22	Conduit Box (Optional)	5370-101-042	1	5370-101-042	1	5370-101-042	1	5370-101-042	1	5370-101-042	1
23	Set Screw	797-1098	2	797-0069	2	797-0069	2	797-1098	2	797-1098	2
	Key	5370-101-072	1	5370-101-072	1	5370-101-072	1	5371-101-043	1	5371-101-044	1

Refer to Service Manual P-213.

These units meet the standards of UL 508 and are listed under guide card #NMTR 2, file #59164. These units are CSA certified under file #LR11543.

Note: As of June, 2000 all rotors are manufactured as a single piece design. The rotor assembly part number remains the same and now includes the hub and set screws.

UM-2030 Clutch/Brake Combination



UM-2030 Clutch/Brake Combination

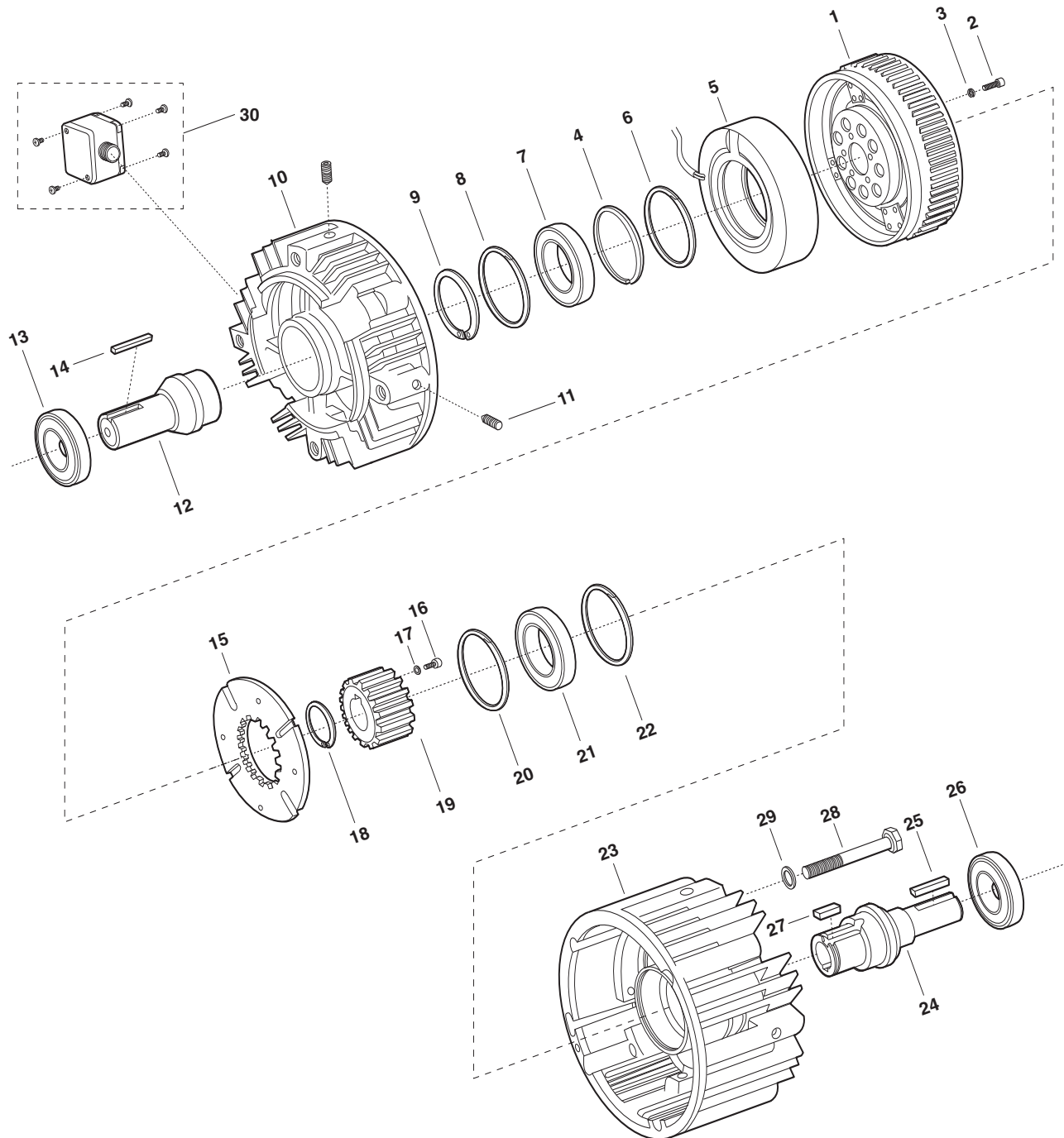
Component Parts

Item	Description	UM-50		UM-100		UM-180		UM-210		UM-215	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1	Rotor Assembly w/fan	5370-751-006	1	5370-751-009	1	5370-751-009	1	5371-751-007	1	5371-751-007	1
2	Capscrew	797-1294	4	797-1214	5	797-1214	5	797-0083	6	797-0083	6
3	Lockwasher	950-0436	4	950-0436	5	950-0436	5	950-0372	6	950-0372	6
4	Spacer			807-0062	1	807-0062	1	807-0061	1	807-0061	1
5	Field (with housing UM-50-2030 only)		1		1		1		1		1
	6 volt	5370-451-072		5370-451-007		5370-451-007		5371-451-002		5371-451-002	
	24 volt	5370-451-074		5370-451-005		5370-451-005		5371-451-005		5371-451-005	
	90 volt	5370-451-073		5370-451-008		5370-451-008		5371-451-003		5371-451-003	
6	Retaining Ring	748-0113	1	748-0101	1	748-0101	1	748-0112	1	748-0112	1
7	Ball Bearing	166-0149	1	166-0101	1	166-0101	1	166-0142	1	166-0142	1
8	Retaining Ring	748-0113	1								
9	Retaining Ring	748-0017	1								
10	Housing			535-0164	1	535-0164	1	535-0129	1	535-0129	1
11	Setscrew			797-0471	4	797-0471	4	797-0471	4	797-0471	4
12	Shaft	798-0047	1	798-0129	1	798-0124	1	798-0123	1	798-0255	1
13	Bearing	166-0155	1	166-0143	1	166-0143	1	166-0144	1	166-0144	1
14	Key	590-0029	1	590-0029	1	590-0029	1	590-0019	1	590-0124	1
15	Armature Assembly	5370-111-011	2	5370-111-013	2	5370-111-013	2	5371-111-005	2	5371-111-005	2
16	Armature Hub	540-1638	1	540-1642	1	540-1642	1	540-0741	1	540-0741	1
17	Retaining Ring	748-0445	1	748-0676	1	748-0676	1				
18	Lockwasher							950-0372	6	950-0372	6
19	Capscrew							797-0081	6	797-0081	6
20	Retaining Ring	748-0113	1	748-0101	1	748-0101	1	748-0112	1	748-0112	1
21	Retaining Ring	748-0113	1								
22	Ball Bearing	166-0149	1	166-0101	1	166-0101	1	166-0142	1	166-0142	1
23	Magnet		1		1		1		1		1
	6 volt	5370-631-008		5370-631-002		5370-631-002		5371-631-002		5371-631-002	
	24 volt	5370-631-010		5370-631-005		5370-631-005		5371-631-005		5371-631-005	
	90 volt	5370-631-007		5370-631-003		5370-631-003		5371-631-003		5371-631-003	
24	Housing	535-0165	1	535-0162	1	535-0162	1	535-0163	1	535-0163	1
25	Setscrew	797-0471	4	797-0471	4	797-0471	4	797-0471	4	797-0471	4
26	Shaft	798-0046	1	798-0128	1	798-0085	1	798-0051	1	798-0251	1
27	Key	590-0029	1	590-0029	1	590-0029	1	590-0019	1	590-0124	1
28	Ball Bearing	166-0155	1	166-0143	1	166-0143	1	166-0144	1	166-0144	1
29	Key	590-0043	1	590-0084	1	590-0084	1				
30	Capscrew	797-0353	4	797-0353	4	797-0353	4	797-1075	4	797-1075	4
31	Lockwasher	950-0354	4	950-0354	4	950-0354	4	950-0032	4	950-0032	4
32	Conduit Box (Optional)	5370-101-042	1	5370-101-042	1	5370-101-042	1	5370-101-042	1	5370-101-042	1

Refer to Service Manual P-213.

These units meet the standards of UL 508 and are listed under guide card #NMTR2, file #59164. These units are CSA certified under file #LR11543.

UM-3040 Clutch Combination–Base Mounted



UM-3040 Clutch Combination–Base Mounted

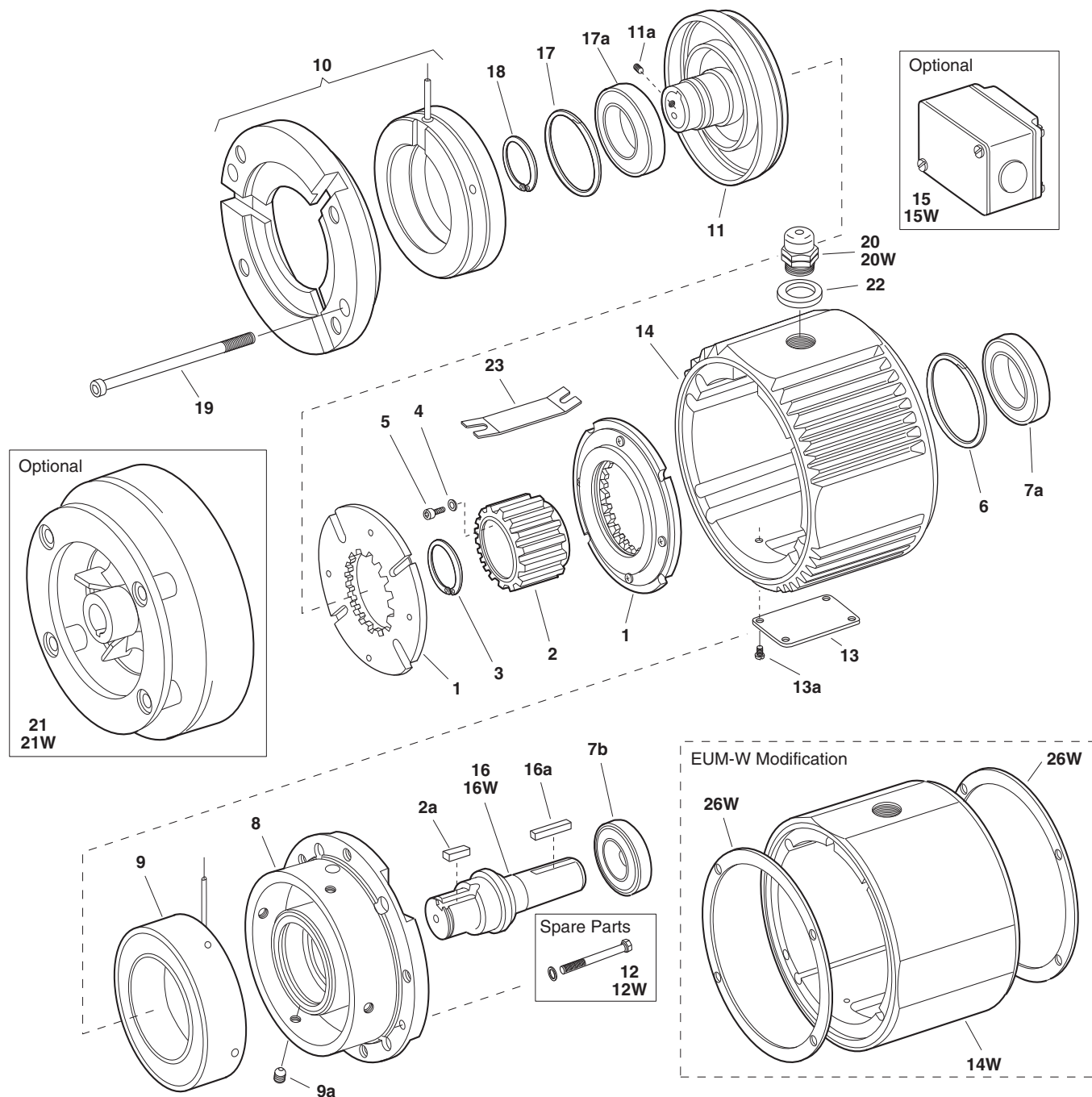
Component Parts

Item	Description	UM-50		UM-100		UM-180		UM-210		UM-215	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1	Rotor Assembly w/fan	5370-751-006	1	5370-751-009	1	5370-751-009	1	5371-751-007	1	5371-751-007	1
2	Capscrew	797-1294	4	797-1214	5	797-1214	5	797-0083	6	797-0083	6
3	Lockwasher	950-0436	4	950-0436	5	950-0436	5	950-0372	6	950-0372	6
4	Spacer			807-0062	1	807-0062	1	807-0061	1	807-0061	1
5	Field (with housing UM-50-3040 only)		1		1		1		1		1
	6 volt	5370-451-072		5370-451-007		5370-451-007		5371-451-002		5371-451-002	
	24 volt	5370-451-074		5370-451-005		5370-451-005		5371-451-005		5371-451-005	
	90 volt	5370-451-073		5370-451-008		5370-451-008		5371-451-003		5371-451-003	
6	Retaining Ring	748-0113	1	748-0101	1	748-0101	1	748-0112	1	748-0112	1
7	Ball Bearing	166-0149	1	166-0101	1	166-0101	1	166-0142	1	166-0142	1
8	Retaining Ring	748-0113	1								
9	Retaining Ring	748-0017	1								
10	Housing			535-0164	1	535-0164	4	535-0129	1	535-0129	1
11	Setscrew			797-0471	4	797-0471	4	797-0471	4	797-0471	4
12	Shaft	798-0047	1	798-0129	1	798-0124	1	798-0123	1	798-0255	1
13	Bearing	166-0155	1	166-0143	1	166-0143	1	166-0144	1	166-0144	1
14	Key	590-0029	1	590-0029	1	590-0029	1	590-0019	1	590-0124	1
15	Armature Assembly	5370-111-011	1	5370-111-013	1	5370-111-013	1	5371-111-005	1	5371-111-005	1
16	Capscrew							797-0081	6	797-0081	6
17	Lockwasher							950-0372	6	950-0372	6
18	Retaining Ring	748-0445	1	748-0676	1	748-0676	1				
19	Hub	540-1638	1	540-1642	1	540-1642	1	540-0741	1	540-0741	1
20	Retaining Ring	748-0113	1	748-0101	1	748-0101	1	748-0112	1	748-0112	1
21	Ball Bearing	166-0149	1	166-0101	1	166-0101	1	166-0142	1	166-0142	1
22	Retaining Ring	748-0113	1								
23	Housing	535-0167	1	535-0168	1	535-0168	1	535-0169	1	535-0169	1
24	Shaft	798-0046	1	798-0128	1	798-0085	1	798-0051	1	798-0251	1
25	Key	590-0029	1	590-0029	1	590-0029	1	590-0019	1	590-0124	1
26	Ball Bearing	166-0155	1	166-0143	1	166-0143	1	166-0144	1	166-0144	1
27	Key	590-0043	1	590-0084	1	590-0084	1				
28	Capscrew	797-0353	4	797-0353	4	797-0353	4	797-1075	4	797-1075	4
29	Lockwasher	950-0354	4	950-0354	4	950-0354	4	950-0032	4	950-0032	4
30	Conduit Box (Optional)	5370-101-042	1	5370-101-042	1	5370-101-042	1	5370-101-042	1	5370-101-042	1

Refer to Service Manual P-213.

These units meet the standards of UL 508 and are listed under guide card #NMTR2, file #59164. These units are CSA certified under file #LR11543.

EUM-1020 Clutch/Brake Combination EUM-W-1020 Clutch/Brake Combination



EUM-1020 Clutch/Brake Combination EUM-W-1020 Clutch/Brake Combination

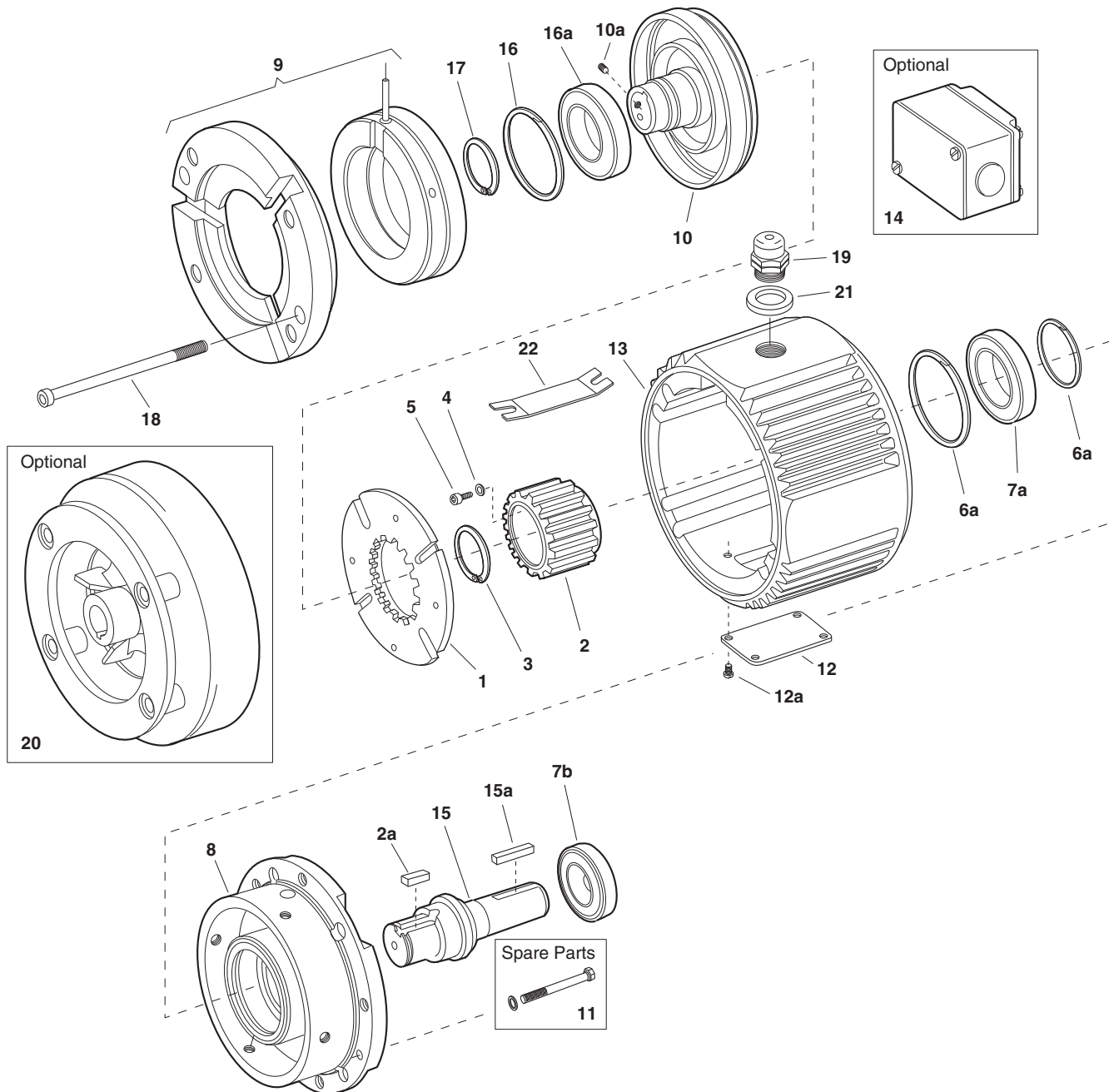
Component Parts

Item	Description	EUM-50		EUM-100		EUM-180		EUM-210		EUM-215	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1	Armature Assembly	5370-111-011	2	5370-111-013	2	5370-111-013	2	5371-111-005	2	5371-111-005	2
2	Armature Hub	540-1638	1	540-1642	1	540-1642	1	540-0741	1	540-0741	1
2a	Key	590-0043	1	590-0084	1	590-0084	1				
3	Retaining Ring	748-0445	1	748-0676	1	748-0676	1				
4	Lockwasher							950-0121	6	950-0121	6
5	Capscrew							797-0081	6	797-0081	6
6	Retaining Ring	748-0113	2	748-0101	1	748-0101	1	748-0112	1	748-0112	1
7a	Ball Bearing	166-0149	1	166-0101	1	166-0101	1	166-0142	1	166-0142	1
7b	Ball Bearing	166-0155	1	166-0143	1	166-0143	1	166-0144	1	166-0144	1
8	Endbell/Brake	456-1014	1	456-1019	1	456-1019	1	456-1017	1	456-1017	1
9	Brake Magnet										
	6 volt	5370-631-037		5370-631-002		5370-631-002		5371-631-002		5371-631-002	
	24 volt	5370-631-038		5370-631-005		5370-631-005		5371-631-005		5371-631-005	
	90 volt	5370-631-036		5370-631-003		5370-631-003		5371-631-003		5371-631-003	
9a	Set Screws	797-0471	4	797-0471	4	797-0471	4	797-0471	4	797-0471	4
10	Clutch Field/Endbell Assembly										
	6 volt	5370-451-077	1	5370-451-086	1	5370-451-086	1	5371-451-033	1	5371-451-033	1
	24 volt	5370-451-078	1	5370-451-087	1	5370-451-087	1	5371-451-034	1	5371-451-034	1
	90 volt	5370-451-076	1	5370-451-085	1	5370-451-085	1	5371-451-032	1	5371-451-032	1
11	Rotor/Hub Assembly	5370-751-023	1	5370-751-035	1	5370-751-024	1	5371-751-014	1	5371-751-033	1
11a	Set Screws	797-1098	2	797-0069	2	797-0069	2	797-1098	2	797-1098	2
12	Mounting Accessory Kit	5370-101-040	1	5370-101-040	1	5370-101-040	1	5371-101-024	1	5371-101-024	1
13	Cover Plate	686-1055	1	686-1055	1	686-1055	1	686-1055	1	686-1055	1
13a	Cover Plate Screws	797-0575	4	797-0575	4	797-0575	4	797-0575	4	797-0575	4
14	Center Housing	535-0176	1	535-0176	1	535-0176	1	535-0177	1	535-0177	1
15	Conduit Box (optional)	5370-101-042	1	5370-101-042	1	5370-101-042	1	5370-101-042	1	5370-101-042	1
16	Shaft	798-0046	1	798-0128	1	798-0085	1	798-0051	1	798-0254	1
16a	Key	590-0029	1	590-0029	1	590-0029	1	590-0019	1	590-0124	1
17	Retaining Ring	748-0101	2	748-0101	1	748-0101	1	748-0558	1	748-0558	1
17a	Ball Bearing	166-0150	1	166-0300	1	166-0300	1	166-0168	1	166-0168	1
18	Retaining Ring	748-0018	1	748-0018	1	748-0018	1	748-0067	1	748-0067	1
19	Assembly Bolts	797-1433	2	797-1433	2	797-1433	2	797-1438	2	797-1438	2
20	Connector	280-0038	1	280-0038	1	280-0038	1	280-0038	1	280-0038	1
21	Accessory Fan (optional)	5370-101-055	1	5370-101-055	1	5370-101-054	1	5371-101-029	1	N/A	
22	Washer	950-0441	1	950-0441	1	950-0441	1	950-0441	1	950-0441	1
23	Insulator	572-0327	1	572-0327	1	572-0327	1	572-0327	1	572-0327	1
EUM-W Unique Parts											
12W	Washdown Mounting Kit	5370-101-052	1	5370-101-052	1	5370-101-052	1	5371-101-028	1	5371-101-028	1
14W	Center Housing for Washdown	535-0181	1	535-0181	1	535-0181	1	535-0182	1	535-0182	1
15W	Conduit Box Kit	5370-101-045	1	5370-101-045	1	5370-101-045	1	5370-101-045	1	5370-101-045	1
16W	Shaft	798-0263	1	798-0265	1	798-0262	1	798-0259	1	798-0267	1
20W	Conduit Connector	280-0058	1	280-0058	1	280-0058	1	280-0058	1	280-0058	1
21W	Fan Kit (optional)	5370-101-060	1	5370-101-060	1	5370-101-061	1	5371-101-033	1	N/A	
26W	Gasket/Seal Repair Kit	5370-101-058	1	5370-101-058	1	5370-101-058	1	5371-101-032	1	5371-101-032	1
	Key	5370-101-072	1	5370-101-072	1	5370-101-072	1	5371-101-043	1	5371-101-044	1

Refer to Service Manual P-213.

These units meet the standards of UL 508 and are listed under guide card #NMTR 2, file #59164. These units are CSA certified under file #LR11543.

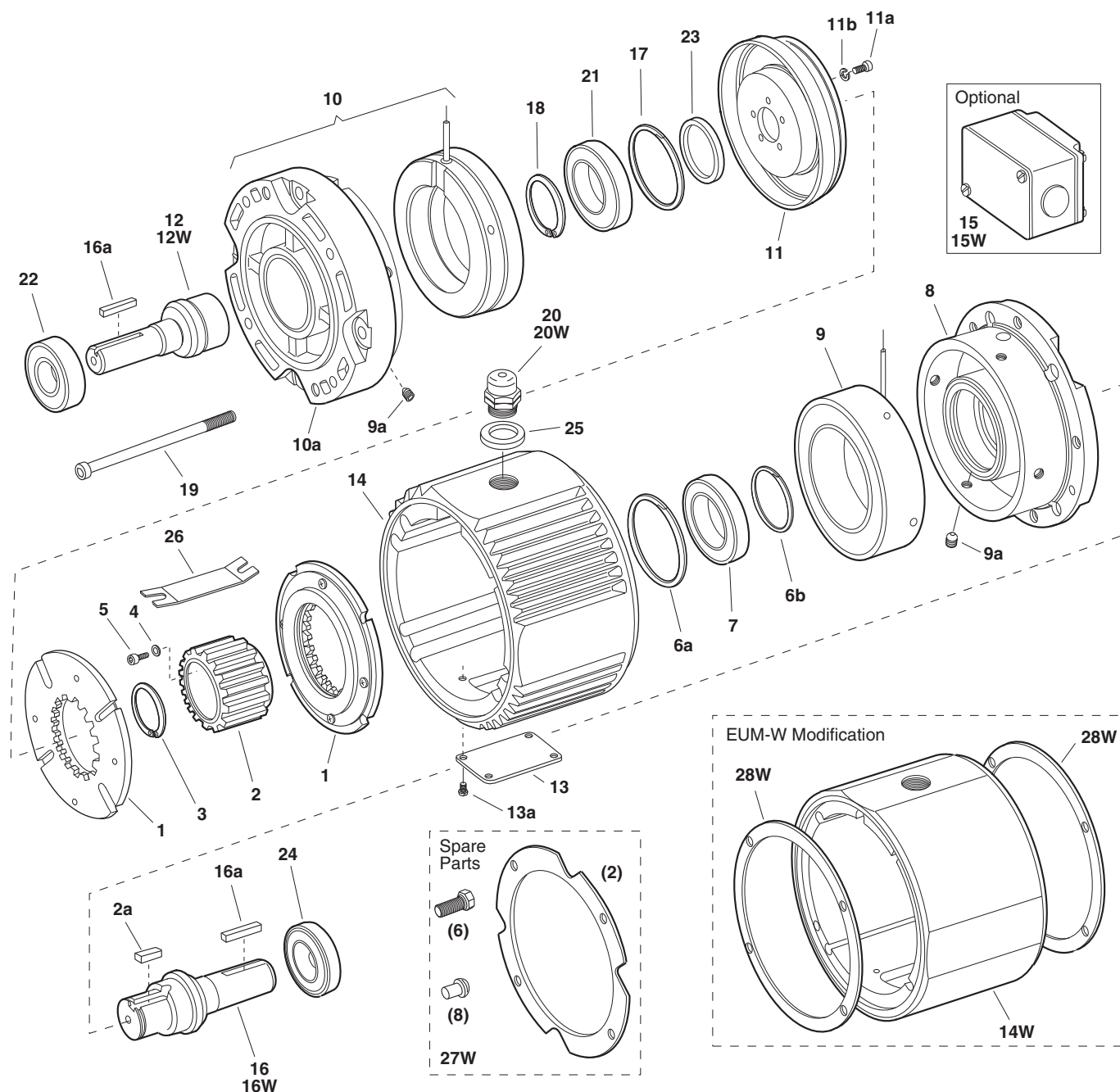
Service Parts



Component Parts

Item	Description	EUM-50		EUM-180		EUM-210	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1	Armature Assembly	5370-111-011	1	5370-111-013	1	5371-111-005	1
2	Armature Hub	540-1638	1	540-1642	1	540-0741	1
2a	Key	590-0043	1	590-0084	1		
3	Retaining Ring	748-0445	1	748-0676	1		
4	Lockwasher					950-0121	6
5	Capscrew					797-0081	6
6a	Retaining Ring	748-0113	1	748-0101	1	748-0112	1
6b	Retaining Ring	748-0113	1				
7a	Ball Bearing	166-0149	1	166-0101	1	166-0142	1
7b	Ball Bearing	166-0155	1	166-0143	1	166-0144	1
8	Endbell	456-1014	1	456-1019	1	456-1017	1
9	Clutch Field/Endbell Assembly 90 Volt	5370-451-076	1	5370-451-085	1	5371-451-032	1
10	Rotor/Hub Assembly	5370-751-023	1	5370-751-024	1	5371-751-014	1
10a	Set Screws	797-1098	2	797-0069	2	797-1098	2
11	Mounting Accessory Kit	5370-101-040	1	5370-101-040	1	5371-101-024	1
12	Cover Plate	686-1055	1	686-1055	1	686-1055	1
12a	Cover Plate Screws	797-0575	4	797-0575	4	797-0575	4
13	Center Housing	535-0176	1	535-0176	1	535-0177	1
14	Conduit Box (optional)	5370-101-042	1	5370-101-042	1	5370-101-042	1
15	Shaft	798-0046	1	798-0085	1	798-0051	1
15a	Key	590-0029	1	590-0029	1	590-0019	1
16	Retaining Ring	748-0101	2	748-0101	1	748-0558	1
16a	Ball Bearing	166-0150	1	166-0300	1	166-0168	1
17	Retaining Ring	748-0018	1	748-0018	1	748-0067	1
18	Assembly Bolts	797-1433	2	797-1433	2	797-1438	2
19	Connector	280-0038	1	280-0038	1	280-0038	1
20	Accessory Fan (optional)	5370-101-055	1	5370-101-054	1	5371-101-029	1
21	Washer	950-0441	1	950-0441	1	950-0441	1
22	Insulator	572-0327	1	572-0327	1	572-0327	1
	Key	5370-101-072	1	5370-101-072	1	5371-101-043	1

EUM-2030 Clutch/Brake Combination EUM-W-2030 Clutch/Brake Combination



EUM-2030 Clutch/Brake Combination EUM-W-2030 Clutch/Brake Combination

Component Parts

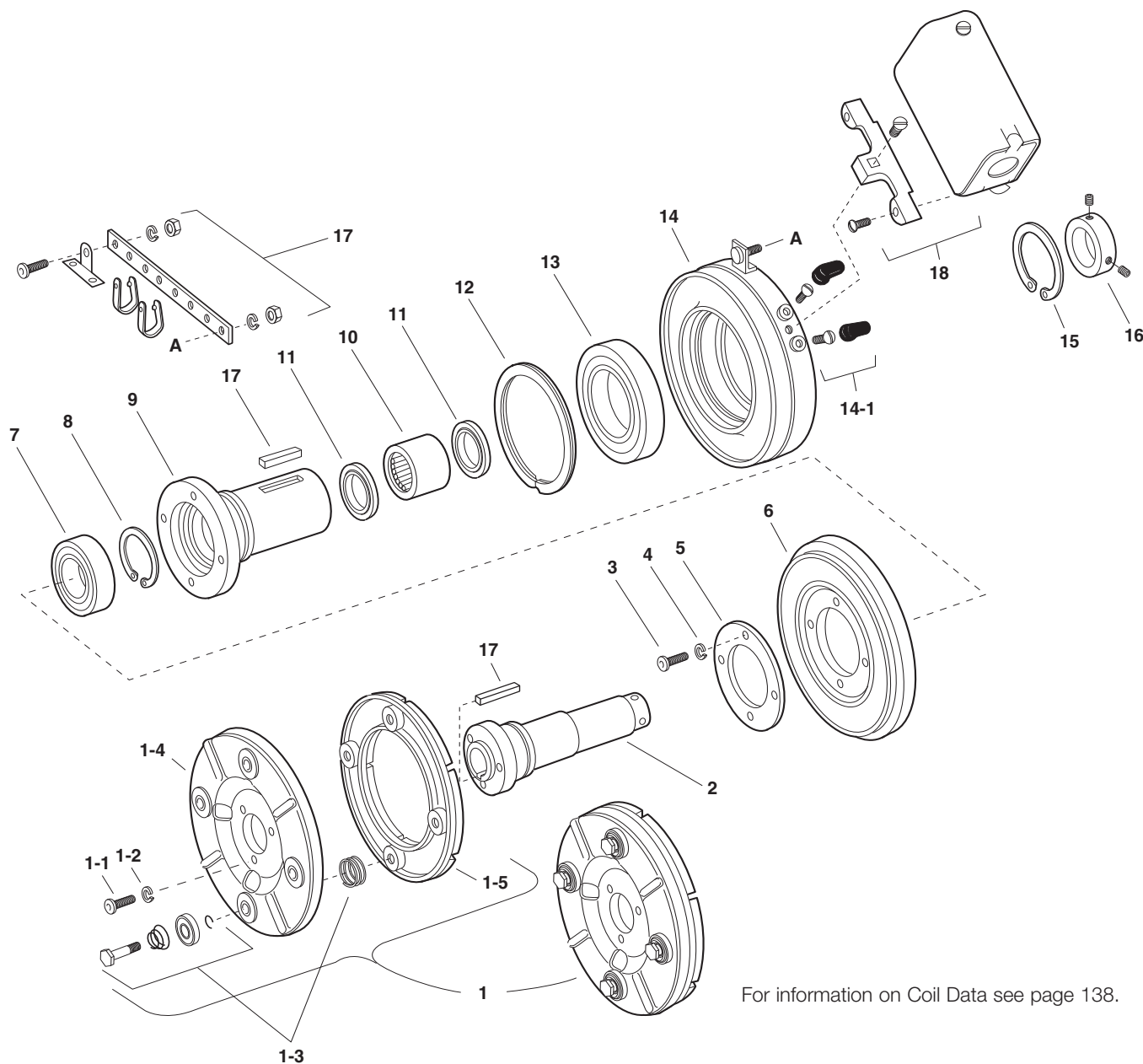
Item	Description	EUM-50		EUM-180		EUM-210	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1	Armature Assembly	5370-111-011	2	5370-111-013	2	5371-111-005	2
2	Armature Hub	540-1638	1	540-1642	1	540-0741	1
2a	Key	590-0043	1	590-0084	1		
3	Retaining Ring	748-0445	1	748-0676	1		
4	Lockwasher					950-0121	6
5	Capscrew					797-0081	6
6a	Retaining Ring	748-0113	2	748-0101	1	748-0112	1
6b	Retaining Ring					748-2002	1
7	Ball Bearing	166-0149	1	166-0101	1	166-0142	1
8	Endbell/Brake	456-1014	1	456-1019	1	456-1017	1
9	Brake Magnet						
	6 volt	5370-631-037	1	5370-631-002	1	5371-631-002	1
	24 volt	5370-631-038	1	5370-631-005	1	5371-631-005	1
	90 volt	5370-631-036	1	5370-631-003	1	5371-631-003	1
9a	Set Screws	797-0471	4	797-0471	4	797-0471	8
10	Field (with Endbell EUM-50 and EUM-180)						
	6 volt	5370-451-082	1	5370-451-090	1	5371-451-002	1
	24 volt	5370-451-083	1	5370-451-091	1	5371-451-005	1
	90 volt	5370-451-081	1	5370-451-089	1	5371-451-003	1
10a	Endbell (EUM-210 only)					456-1018	1
11	Rotor	5370-751-033	1	5370-751-034	1	5371-751-006	1
11a	Screw	797-1294	4	797-1214	5	797-0081	6
11b	Washer	950-0102	4	950-0102	5	950-0121	6
12	Shaft/Clutch	798-0047	1	798-0124	1	798-0123	1
13	Cover Plate	686-1055	1	686-1055	1	686-1055	1
13a	Screws	797-0575	4	797-0575	4	797-0575	4
14	Center Housing	535-0176	1	535-0176	1	535-0177	1
15	Conduit Box (optional)	5370-101-042	1	5370-101-042	1	5370-101-042	1
16	Shaft/Brake	798-0046	1	798-0085	1	798-0051	1
16a	Key	590-0029	2	590-0029	2	590-0019	2
17	Retaining Ring	748-0113	2	748-0101	1	748-0112	1
18	Retaining Ring	748-0017	1			748-0202	1
19	Assembly Bolts	797-1477	2	797-1477	2	797-1476	2
20	Connector	280-0038	1	280-0038	1	280-0038	1
21	Bearing	166-0149	1	166-0101	1	166-0142	1
22	Bearing	166-0155	1	166-0143	1	166-0144	1
23	Spacer			807-0062	1	807-0061	1
24	Bearing	166-0155	1	166-0143	1	166-0144	1
25	Washer	950-0441	1	950-0441	1	950-0441	1
26	Insulator	572-0327	1	572-0327	1	572-0327	1
EUM-W Unique Parts							
12W	Shaft/Clutch	798-0264	1	798-0261	1	798-0260	1
14W	Center Housing for Washdown	535-0181	1	535-0181	1	535-0182	1
15W	Conduit Box Kit (optional)	5370-101-045	1	5370-101-045	1	5370-101-045	1
16W	Shaft/Brake	798-0263	1	798-0262	1	798-0259	1
20W	Conduit Connector	280-0058	1	280-0058	1	280-0058	1
27W	Washdown Mounting Kit	5370-101-051	1	5370-101-051	1	5371-101-027	1
28W	Gasket/Seal Repair Kit	5370-101-058	1	5370-101-058	1	5371-101-032	1

Refer to Service Manual P-213.

These units meet the standards of UL 508 and are listed under guide card #NMTR 2, file #59164. These units are CSA certified under file #LR11543.

Service Parts

EC-375, EC-475, EC-650



Electrical and Mechanical Data

Model Size	Voltage DC	Static Torque (lb. ft.)	Max. Speed RPM	Inertia-WR ² (lb. ft ²)			Total Inner Sleeve	Weight lbs.
				Armature & Carrier	Rotor	Outer Sleeve		
EC-375	6	16 lb. ft.	5000	.010	.018	.001	.001	4
	24	16 lb. ft.	5000	.010	.018	.001	.001	4
	90	16 lb. ft.	5000	.010	.018	.001	.001	4
EC-475	6	30 lb. ft.	4500	.072	.033	.006	.002	8
	24	30 lb. ft.	4500	.072	.033	.006	.002	8
	90	30 lb. ft.	4500	.072	.033	.006	.002	8
EC-650	6	95 lb. ft.	3600	.106	.202	.010	.013	18
	24	95 lb. ft.	3600	.106	.202	.010	.013	18
	90	95 lb. ft.	3600	.106	.202	.010	.013	18

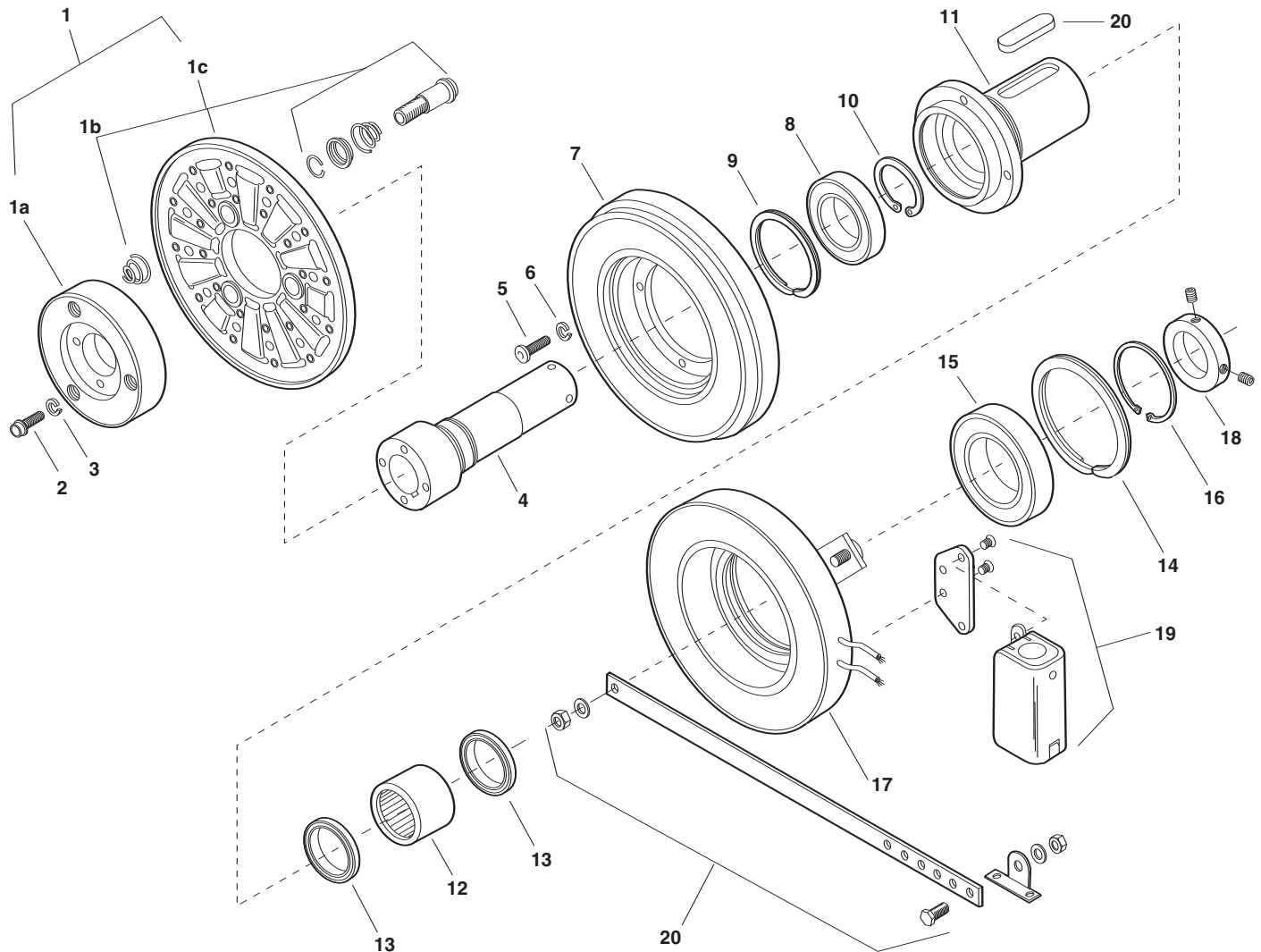
Service Parts

Component Parts

Item	Description	EC-375		EC-475		EC-650	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1	Armature & Carrier Assembly	5380-101-006	1	5181-101-003	1	5281-101-003	1
	1-1 Capscrew	797-1214	3	797-1214	3	797-0086	3
	1-2 Lockwasher	950-0102	3	950-0102	3	950-0102	3
	1-3 Autogap Accessory	5180-101-011	3	5181-101-010	4	5181-101-010	4
	1-4 Carrier	5380-295-002	1	5181-295-002	1	5281-295-002	1
	1-5 Armature	5180-111-002	1	5181-111-002	1	5281-111-002	1
2	Inner Sleeve		1		1		1
	1/2" Bore	803-0054					
	5/8" Bore	803-0055		803-0044			
	3/4" Bore			803-0042			
	7/8" Bore			803-0043			
	1" Bore					803-0047	
	1-1/8" Bore					803-0049	
	1-1/4" Bore					803-0048	
	1-3/8" Bore					803-0050	
3	Screw	797-1050	6	797-1039	4	797-0083	4
4	Lockwasher	950-0105	6	950-0102	4	950-0103	4
5	Retainer Plate	748-0391	1	748-0393	1	748-0389	1
6	Rotor	5180-751-001	1	5181-751-001	1	5281-751-001	1
7	Ball Bearing	166-0149	1	166-0109	1	166-0110	1
8	Retainer ring	748-0017	1	748-0023	1	748-0002	1
9	Outer Sleeve	5180-104-001	1	5181-014-001	1	5281-104-001	1
10	Sleeve Bearing	166-0177	1	166-0179	1	166-0178	1
11	Oil Seal	795-0027	2	795-0028	2	795-0026	2
12	Retainer Ring	748-0101	1	748-0102	1	748-0104	1
13	Ball Bearing	166-0150	1	166-0110	1	166-0104	1
14	Field		1		1		1
	6 volt	5180-451-002		5181-451-002		5281-451-002	
	24 volt	5180-451-004		5181-451-004		5281-451-004	
	90 volt	5180-451-005		5181-451-005		5281-451-005	
	14-1 Terminal Accessory	5103-101-002	1	5103-101-002	1	5311-101-001	1
15	Retainer Ring	748-0018	1	748-0002	1	748-0004	1
16	Set Collar	266-0011	1	266-0012	1	266-0010	1
17	Accessory, W/Keys		1		1		1
	1/2" Bore	5180-101-001					
	5/8" Bore	5180-101-001		5181-101-001			
	3/4" Bore			5181-101-001			
	7/8" Bore			5181-101-002			
	1" Bore					5281-101-001	
	1-1/8" Bore					5281-101-001	
	1-1/4" Bore					5281-101-001	
	1-3/8" Bore					5281-101-002	
18	Conduit Box	5200-101-010	1	5200-101-010	1	5200-101-010	1

These units when used with the correct Warner Electric conduit box, meets the standards of UL508 and are listed under guide care #NMTR, file #59164. These units are CSA Certified under file #LR11543.
Refer to Service Manual P-210.

EC-825



Component Parts

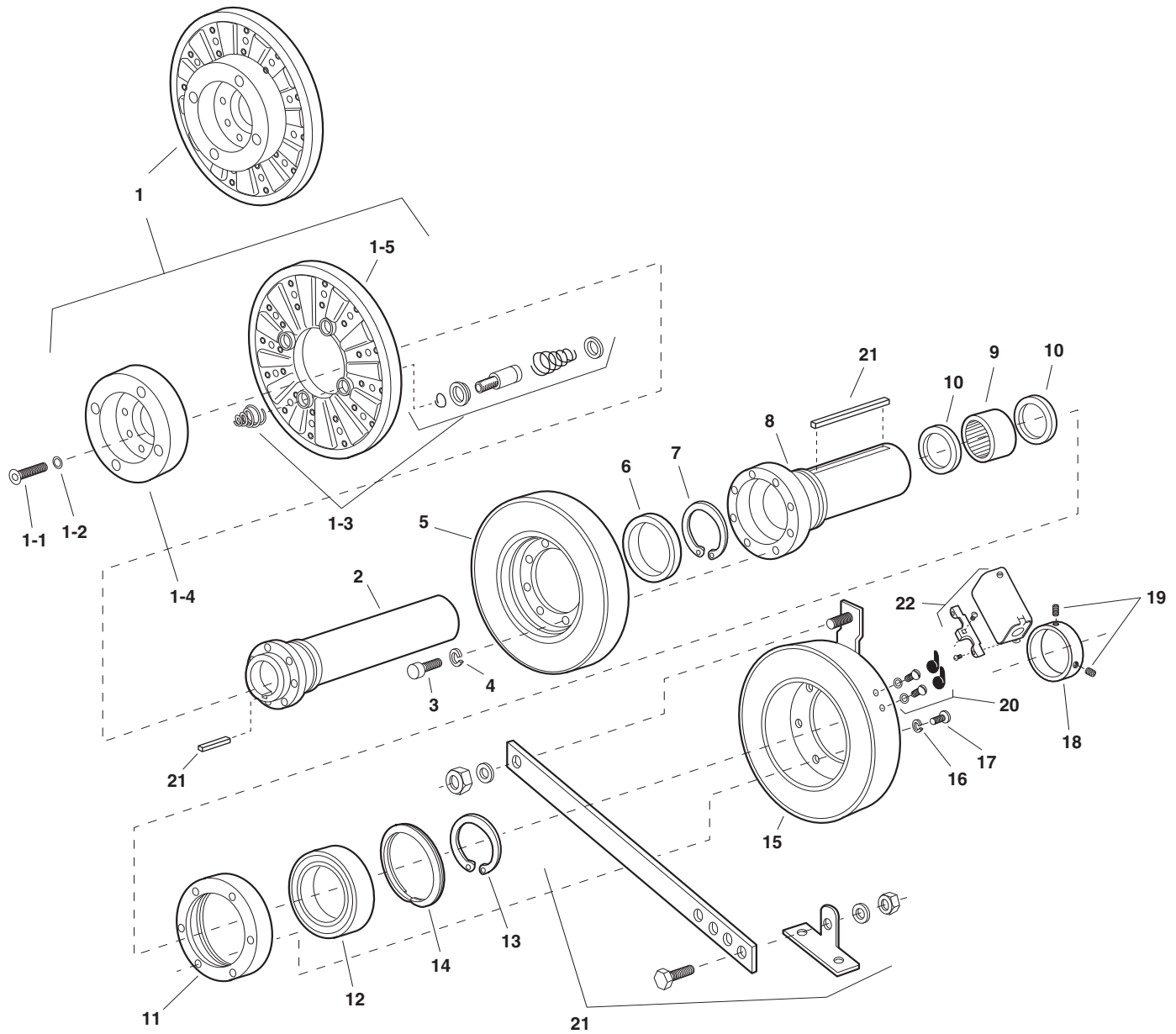
EC-825			
Item	Description	Part No.	Qty.
1	Armature Assembly	5282-111-002	1
	1a Hub	540-1298	1
	1b Autogap Accessory	5201-101-068	3
	1c Armature	5282-111-001	1
2	Capscrew	797-0081	4
3	Lockwasher	950-0103	4
4	Inner Sleeve		1
	1-1/8" Bore	803-0069	
	1-1/4" Bore	803-0070	
	1-3/8" Bore	803-0071	
5	Capscrew	797-0086	4
6	Lockwasher	950-0103	4
7	Rotor Assembly	5282-751-001	1
8	Ball Bearing	166-0110	1
9	Retainer Ring	748-0102	1
10	Retainer Ring	748-0002	1
11	Rotor Adapter	5282-105-002	1

EC-825			
Item	Description	Part No.	Qty.
12	Roller Bearing	166-0178	1
13	Oil Seal	795-0026	2
14	Retainer Ring	748-0104	1
15	Ball Bearing	166-0104	1
16	Retainer Ring	748-0004	1
17	Field		
	6 volt	5282-451-002	
	24 volt	5282-451-004	
	90 volt	5282-451-005	
18	Set Collar	266-0010	1
19	Conduit Box	5200-101-012	1
20	Mounting Accessory with Keys	5282-101-001	1

Refer to Service Manual P-210.

These units when used with the correct Warner Electric conduit box, meets the standards of UL508 and are listed under guide care #NMTR, file #59164. These units are CSA Certified under file #LR11543.

EC-1000, EC-1225

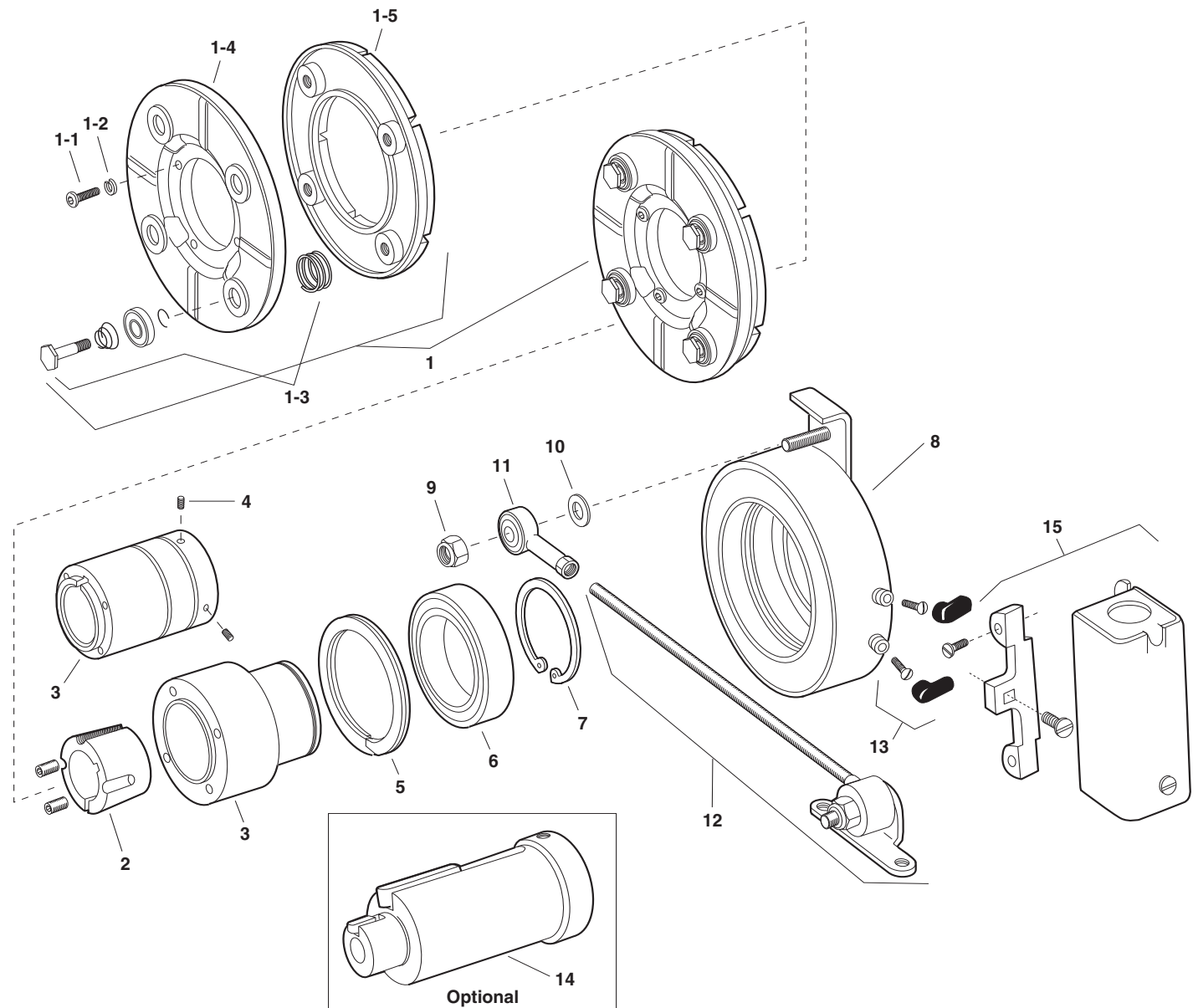


Component Parts

Item	Description	EC-1000		EC-1225	
		Part No.	Qty.	Part No.	Qty.
1	Armature & Carrier Assembly	5283-111-001	1	5284-111-001	1
	1-1 Capscrew	797-1163	6	797-1163	8
	1-2 Lockwasher	950-0111	6	950-0111	8
	1-3 Autogap Accessory	5201-101-008	3	5201-101-008	4
	1-4 Hub	540-1338	1	540-1340	1
	1-5 Armature	5302-111-013	1	5385-111-003	1
2	Inner Sleeve		1		1
	3/8" Bore	803-0027			
	1-1/2" Bore	803-0166			
	1-5/8" Bore	803-0028			
	1-5/8" Bore			803-0078	
	1-7/8" Bore			803-0030	
	2-1/8" Bore			803-0031	
3	Capscrew	797-0083	8	797-0416	8
4	Lockwasher	950-0103	8	950-0106	8
5	Rotor Assembly	5283-101-002	1	5284-101-006	1
6	Ball Bearing	166-0168	1	166-0170	1
7	Retainer Ring	748-0067	1	748-0503	1
8	Outer Sleeve	803-0025	1	803-0032	1
9	Roller Bearing	166-0180	1	166-0181	1
10	Oil Seal	795-0029	2	795-0033	2
11	Adapter Ring	748-0480	1	748-0466	1
12	Ball Bearing	166-0163	1	166-0163	1
13	Retainer Ring	748-0502	1	748-0502	1
14	Retainer Ring	748-0114	1	748-0114	1
15	Field		1		1
	6 volt	5283-451-002		5284-451-002	
	24 volt	5283-451-010		5284-451-010	
	90 volt	5283-451-003		5284-451-003	
16	Lockwasher	950-0355	6	950-0359	6
17	Capscrew	797-0083	6	797-0416	6
18	Set Collar	266-0015	1	266-0016	1
19	Set Screw	797-0468	2	797-0130	2
20	Terminal Accessory	5311-101-001	1	5311-101-001	1
21	Mounting Accessory with Keys		1		1
	1-3/8" Bore	5283-101-005			
	1-1/2" Bore	5283-101-009			
	1-5/8" Bore	5283-101-006		5284-101-007	
	1-7/8" Bore			5284-101-001	
	2-1/8" Bore			5284-101-002	
22	Conduit Box	5200-101-011	1	5200-101-011	1

Refer to Service Manual P-210.

These units when used with the correct Warner Electric conduit box, meets the standards of UL508 and are listed under guide care #NMTR, file #59164. These units are CSA Certified under file #LR11543.



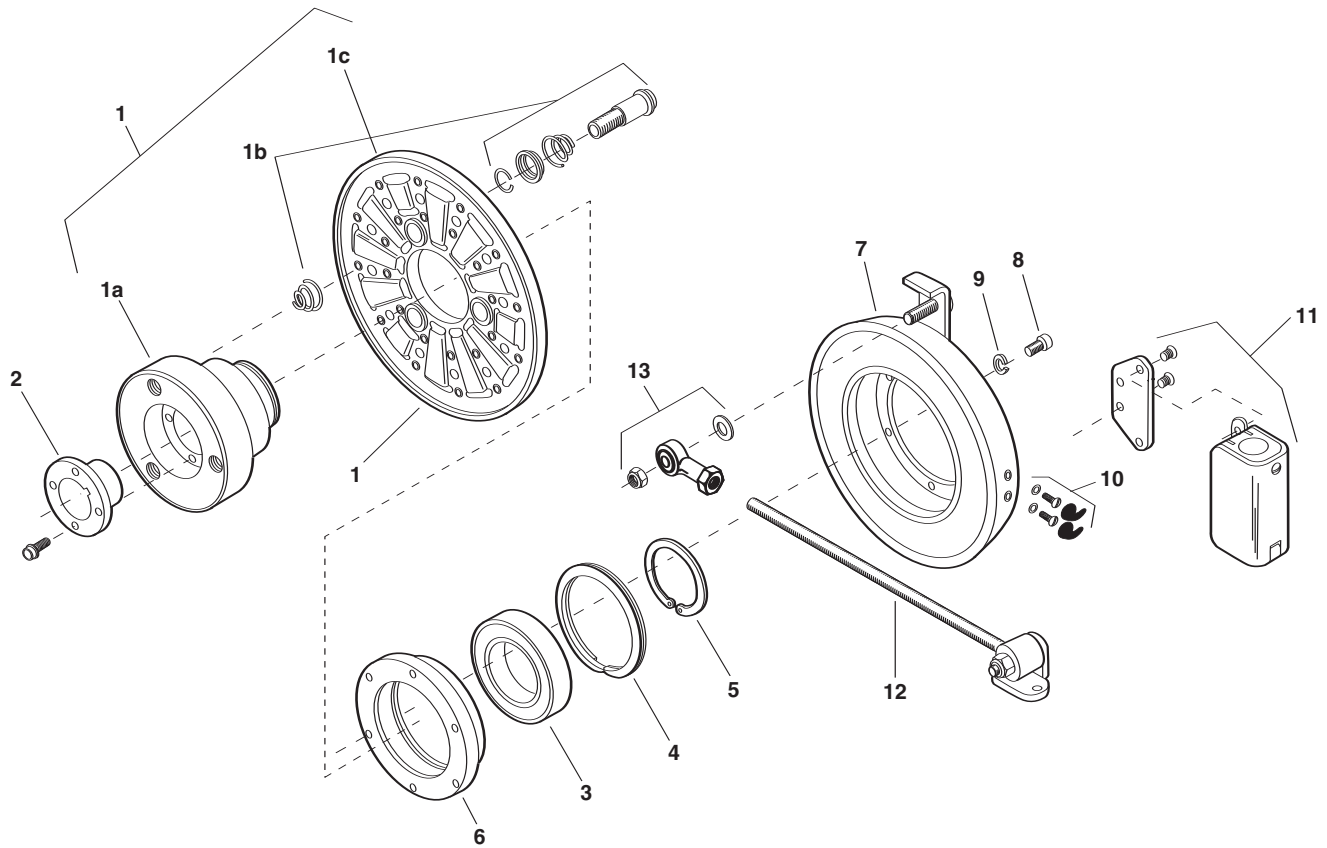
Component Parts

Item	Description	EB-375		EB-475		EB-650	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1	Armature & Carrier Assembly	5380-101-006	1	5381-101-004	1	5382-101-005	1
	1-1 Capscrew	797-1214	3	797-1214	4	797-0086	4
	1-2 Lockwasher	950-0102	3	950-0102	4	950-0103	4
	1-3 Autogap Accessory	5180-101-011	3	5181-101-010	4	5181-101-010	4
	1-4 Carrier	5380-295-002	1	5381-295-003	1	5382-295-002	1
	1-5 Armature	5180-111-002	1	5181-111-002	1	5281-111-002	1
2	*Bushing			180-0410-180-0418 1/2" to 1" bore	1	180-0421-180-0435 1/2" to 1-3/8" bore	1
3	Hub		1	540-0524	1	540-0523	1
	1/2" Bore	540-0520					
	5/8" Bore	540-0519					
4	Set Screw		2				
	1/2" Bore	797-0368					
	5/8" Bore	797-0366					
5	Retainer Ring	748-0101	1	748-0102	1	748-0104	1
6	Ball Bearing	166-0150	1	166-0110	1	166-0104	1
7	Retainer Ring	748-0018	1	748-0002	1	748-0004	1
8	Magnet		1		1		1
	6 volt	5380-631-003		5381-631-003		5382-631-003	
	24 volt	5380-631-004		5381-631-004		5382-631-005	
	90 volt	5380-631-002		5381-631-002		5382-631-002	
9	Locknut	661-0050	1	661-0051	1	661-0004	1
10	Washer	950-0029	1	950-0026	1	950-0030	1
11	Rod End Bearing	166-0186	1	166-0187	1	166-0188	1
12	Torque Arm Rod Assembly	5380-112-001	1	5381-112-001	1	5382-112-001	1
13	Terminal Accessory	5311-101-001	1	5311-101-001	1	5311-101-001	1
14	Adapter (optional)		1		1		1
	5/8" Motor Shaft	5380-101-005					
	7/8" Motor Shaft	5380-101-004					
	1-1/8" Motor Shaft			5381-101-003			
	1-3/8" Motor Shaft					5382-101-003	
	1-5/8" Motor Shaft					5382-101-002	
15	Conduit Box	5200-101-010	1	5200-101-010	1	5200-101-010	1

*See page 235 for specific part numbers.

Refer to Service Manual P-211.

These units when used with the correct Warner Electric conduit box, meets the standards of UL508 and are listed under guide care #NMTR, file #59164. These units are CSA Certified under file #LR11543.



Component Parts

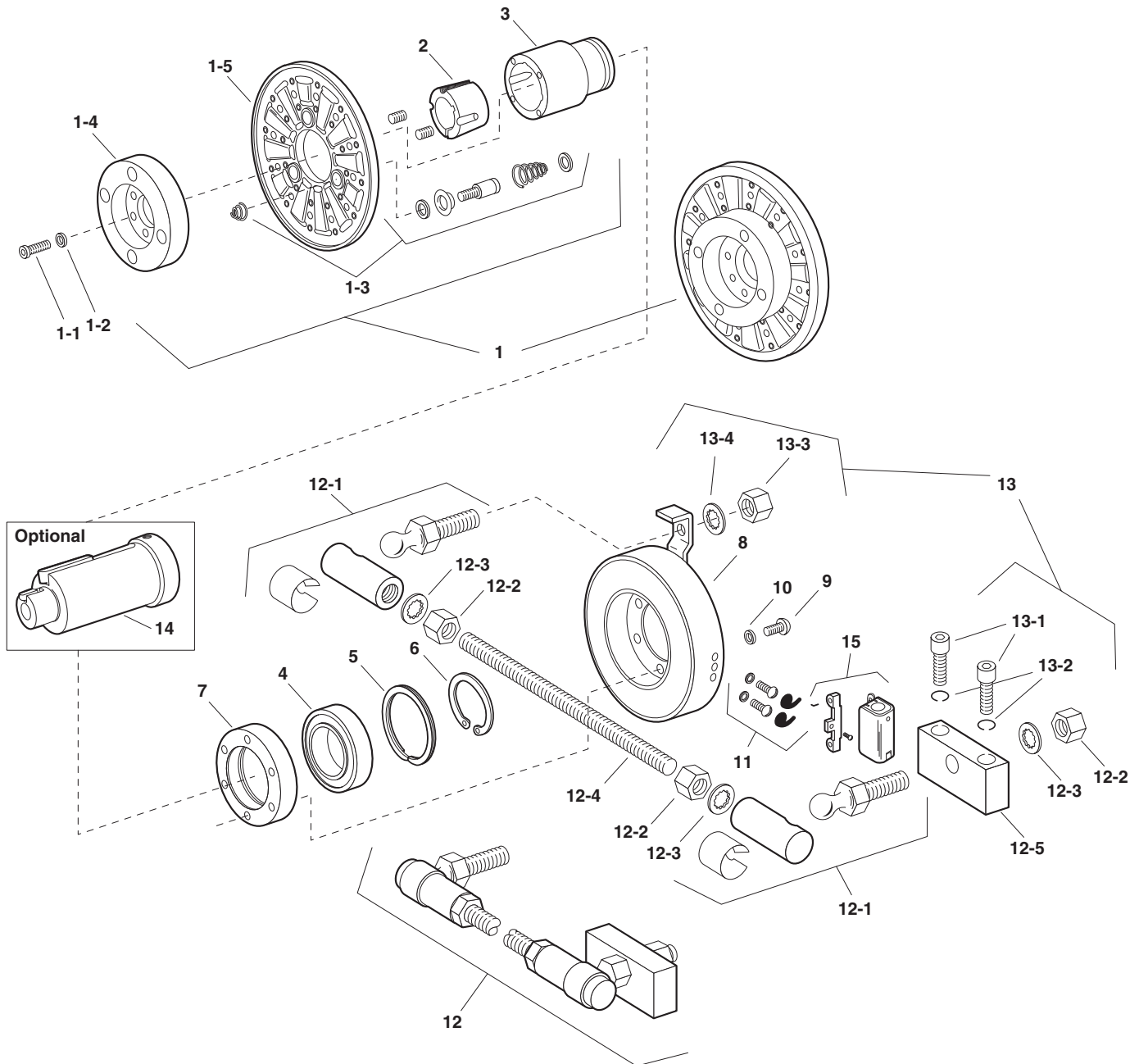
EB-825			
Item	Description	Part No.	Qty.
1	Armature Assembly	5383-111-001	1
	1a Hub	540-1299	1
	1b Autogap Assembly	5201-101-008	3
	1c Armature	5282-111-001	1
2	*Bushing	180-0002 to 180-0018 1/2" to 1-1/2" Bore	1
3	Ball Bearing	166-0168	1
4	Retainer Ring	748-0120	1
5	Retainer Ring	748-0584	1
6	Adapter Ring	748-0631	1

EB-825			
Item	Description	Part No.	Qty.
7	Magnet Assembly		1
	6 volt	5383-631-002	
	24 volt	5383-631-004	
	90 volt	5383-631-005	
8	Capscrew	797-0079	6
9	Lockwasher	950-0372	6
10	Terminal Accessory	5311-101-001	1
11	Conduit Box	5200-101-011	1
12	Torque Arm Rod Assembly	5382-112-001	1
13	Rod End Assembly	5382-101-007	1

*See page 235 for specific part numbers.

Refer to Service Manual P-211.

These units when used with the correct Warner Electric conduit box, meets the standards of UL508 and are listed under guide care #NMTR, file #59164.



Component Parts

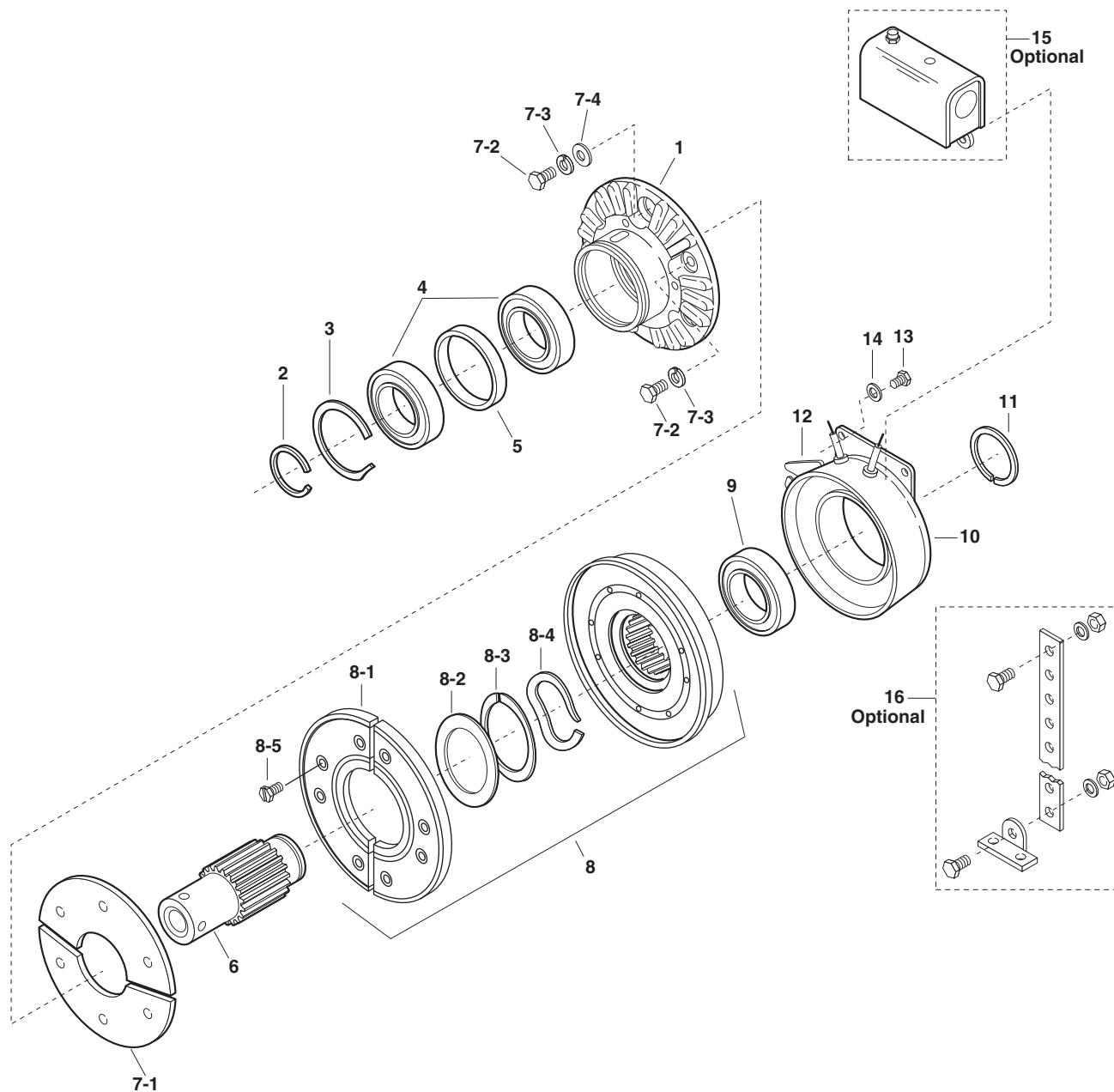
Item	Description	EB-1000		EB-1225	
		Part No.	Qty.	Part No.	Qty.
1	Armature & Carrier Assembly	5384-111-003	1	5385-111-004	1
	1-1 Capscrew	797-1163	6	797-1163	8
	1-2 Lockwasher	950-0111	6	950-0111	8
	1-3 Autogap Accessory	5201-101-008	3	5201-101-008	4
	1-4 Hub	540-1339	1	540-1341	1
	1-5 Armature	5302-111-013	1	5385-111-003	1
2	*Bushing	180-0131-180-0149 1/2" to 1-5/8" bore	1	180-0185-180-0217 1/2" to 2-1/2" bore	1
3	Hub	540-0579	1	540-0578	1
4	Ball Bearing	166-0164	1	166-0163	1
5	Retainer Ring	748-0116	1	748-0114	1
6	Retiner Ring	748-0501	1	748-0074	1
7	Adapter Ring	748-0467	1	748-0465	1
8	Magnet Assembly		1		1
	6 volt	5384-631-002		5385-631-002	
	24 volt	5384-631-009		5385-631-009	
	90 volt	5384-631-003		5385-631-003	
9	Capscrew	797-0416	6	797-0416	6
10	Lockwasher	950-0106	6	950-0106	6
11	Terminal Accessory	5311-101-001	1	5311-101-001	1
12	Torque Arm Rod Assembly	5385-757-001	1	5385-757-001	1
	12-1 Ball Joint	585-0001	2	585-0001	2
	12-2 Jam Nut	661-0012	3	661-0012	3
	12-3 Lockwasher	950-0114	3	950-0114	3
	12-4 Threaded Rod	756-0030	1	756-0030	1
	12-5 Bracket	174-0073	1	174-0073	1
13	Torque Arm Mounting Accessory	5385-101-001	1	5385-101-001	1
	13-1 Capscrew	797-0293	2	797-0293	2
	13-2 Lockwasher	950-0354	2	950-0354	2
	13-3 Jam Nut	661-0012	1	661-0012	1
	13-4 Lockwasher	950-0114	1	950-0114	1
14	Adapter (optional)		1		1
	1-5/8" Motor Shaft	5384-101-008			
	1-7/8" Motor Shaft	5384-101-007			
	2-1/8" Motor Shaft	5384-101-010		5385-101-008	
	2-3/8" Motor Shaft			5385-101-007	
15	Conduit Box	5200-101-011	1	5200-101-011	1

*See page 235 for specific part numbers.

Refer to Service Manual P-211.

These units when used with the correct Warner Electric conduit box, meets the standards of UL508 and are listed under guide care #NMTR, file #59164. These units are CSA Certified under file #LR11543.

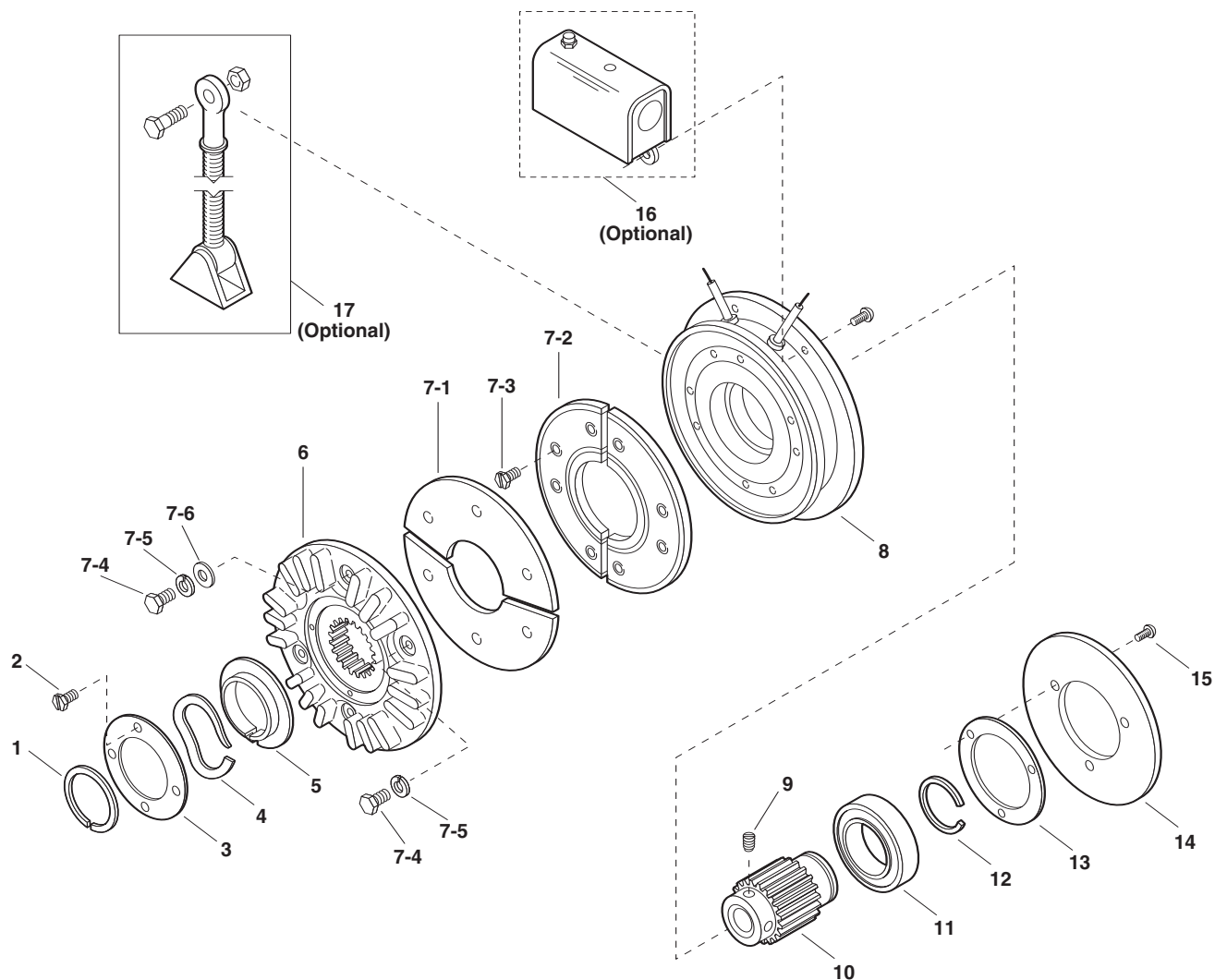
ATC-25, ATC-55, ATC-115



Component Parts

ATC-25		ATC-55		ATC-115			
Item	Description	Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1	Armature Hub	540-0907	1	540-0852	1	540-0863	1
2	Retaining Ring	748-0732	1	748-0726	1	748-0737	1
3	Retaining Ring	748-0731	1	748-0728	1	748-0736	1
4	Bearing	166-0278	2	166-0277	2	166-0279	2
5	Spacer	807-0119	1	807-1061	1	807-1063	1
6	Splined Hub		1		1		1
	1/2" Bore	540-0910					
	5/8" Bore	540-0911					
	3/4" Bore	540-0912		540-1501			
	7/8" Bore	540-0913		540-1502			
	1" Bore			540-1503			
	1-1/8" Bore			540-1504		540-0857	
	1-1/4" Bore					540-0858	
	1-3/8" Bore					540-0859	
	1-1/2" Bore					540-0860	
*7-1	Armature	110-0220	1	110-0218	1	110-0223	1
*7-2	Screw	797-1519	4	797-1462	6	797-1463	6
*7-3	Lockwasher	950-0436	4	950-0355	6	950-0355	6
*7-4	Flatwasher			950-0023	2	950-0023	2
*8	Rotor	5161-751-001	1	5162-751-001	1	5163-751-001	1
8-1	Facing Assembly	5161-445-003	1	5162-445-003	1	5163-445-003	1
8-2	Retainer Plate					686-0108	1
8-3	Detent Ring	748-2031	1	748-2038	1	748-2020	1
8-4	Wave Spring	808-0404	1	808-0401	1	808-0384	2
8-5	Machine Screw	797-1389	8	797-1389	8	797-1389	8
*9	Bearing	166-0283	1	166-0284	1	166-0279	1
10	Field Assembly		1		1		1
	6 volts DC	5161-451-002		5162-451-002		5163-451-002	
	90 volts DC	5161-451-003		5162-451-003		5163-451-003	
	24 volts DC	5161-451-004		5162-451-004		5163-451-004	
*11	Retainer Ring	748-0018	1	748-0727	1	748-0737	1
12	Adapter					104-0300	2
13	Screw					797-1396	4
14	Lockwasher					950-0102	4
Optional Accessory Items							
15	Conduit box 100-1	5162-101-002	1	5162-101-002	1	5162-101-002	1
16	Restraining Arm Assembly	5162-101-004	1	5162-101-004	1	5163-101-004	1
Kit Items							
	* Clutch Rebuild Kit	5161-101-011	1	5162-101-011	1	5163-101-011	1
	(includes items 7-1, 7-2, 7-3, 7-4, 8, 9, 11)						
	Note: In some versions of this product, item 8 consists of a one (1) piece rotor.						
	Friction Face Replacement Kit	5161-101-007		5162-101-007		5163-101-007	
	For Clutches with Replaceable Friction Face Only						
Mounting Accessory Kits (not shown)							
1	1/2" Bore - 3/4" Bore	5161-101-001					
1-1	Ring Retainer Ext.	748-0734	1				
1-2	Wire Retainer	742-0027	1				
1-3	Key	590-0104	1				
1-4	Setscrew	797-1393	2				
1	7/8" Bore	5161-101-002					
1-1	Ring Retainer Ext.	748-0734	1				
1-2	Wire Retainer	742-0027	1				
1-3	Key	590-0104	1				
1-4	Collar and Setscrew	266-0031	1				
1	3/4" Bore - 1" Bore			5162-101-001			
1-1	Ring Retainer Ext.			748-0725	1		
1-2	Wire Retainer			742-0026	1		
1-3	Key			590-0103	1		
1-4	Setscrew			797-1386	2		
1	1-1/8" Bore			5162-101-010			
1-1	Ring Retainer Ext.			748-0725	1		
1-2	Wire Retainer			742-0026	1		
1-3	Key			590-0103	1		
1-4	Setscrew			797-1077	2		
1-5	Collar			266-0032	1		
1	All bore sizes					5163-101-001	
1-1	Ring Retainer Ext.					748-0738	1
1-2	Wire Retainer					742-0026	1
1-3	Key					590-0105	1
1-4	Setscrew					797-1395	

ATB-25, ATB-55, ATB-115



Electrical and Mechanical Data

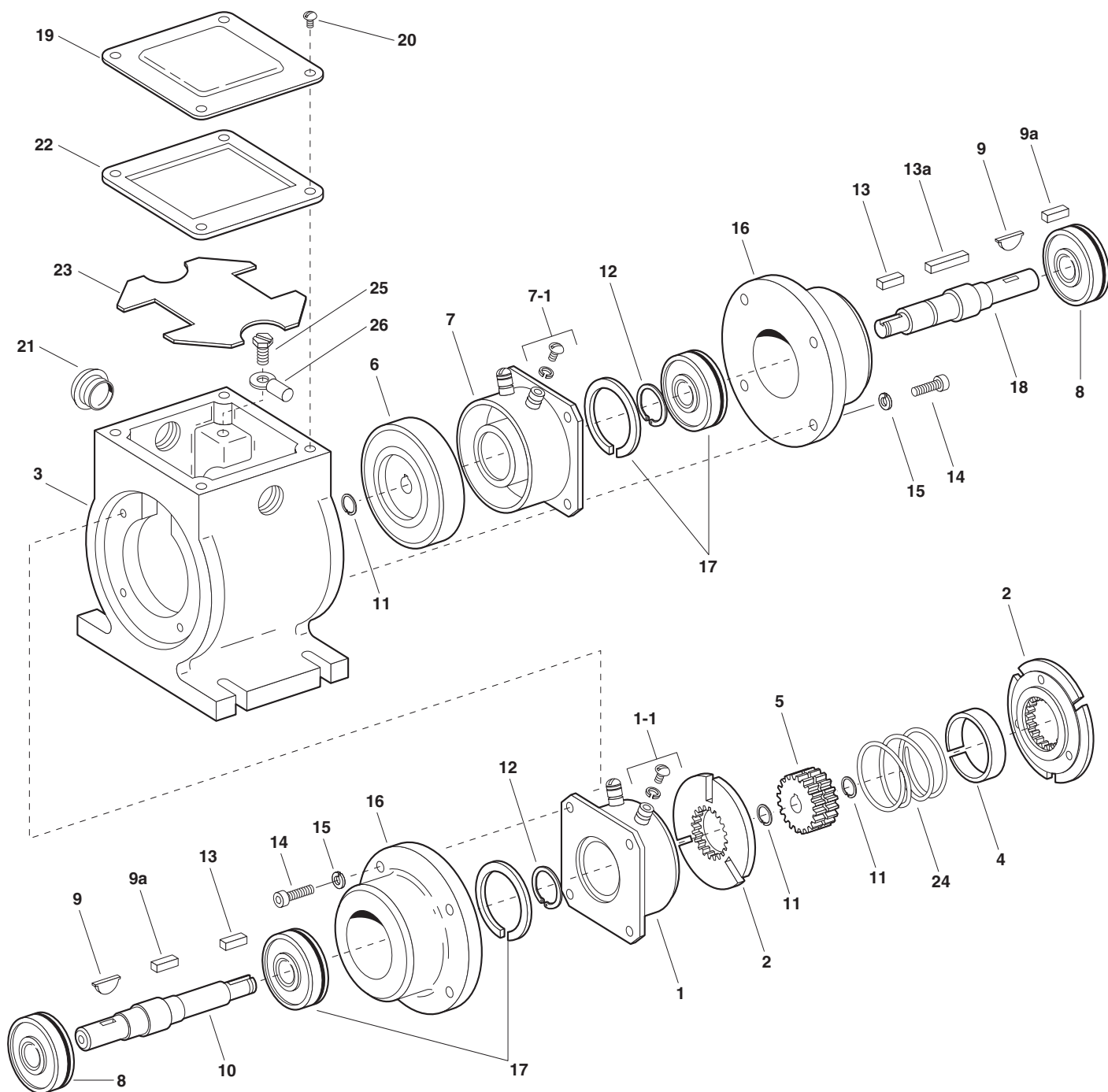
Model Size	Voltage DC	Unit	Resistance (Ohms)	Current (Amps)	Watts	Coil Build Up (MMS)	Coil Decay (MMS)	Inertia*-WR ² (lb.ft. ²)	Max. RPM	Weight lbs.
25	6	Brake	1.37	4.38	26.3	145	9	.048	3600	8
	24		20.2	1.19	28.6	145	9	.048	3600	8
	90		290	.31	27.9	145	9	.048	3600	8
55	6	Brake	1.21	4.96	29.8	210	35	.173	3600	18
	24		19.6	1.22	29.3	210	35	.173	3600	18
	90		230	.39	35.2	210	35	.173	3600	18
115	6	Brake	1.02	5.91	35.4	150	45	.483	3600	28
	24		16.5	1.46	35	150	45	.483	3600	28
	90		182	.50	44.6	150	45	.483	3600	28

Component Parts

Item	Description	ATB-25		ATB-55		ATB-115	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
†1	Retainer	748-0018	1	748-0727	1	748-0737	1
†2	Screw	797-0321	3	797-0321	4	797-0321	4
3	Plate	686-0166	1	686-0162	1	686-0171	1
†4	Wave Spring	808-0404	1	808-0401	1	808-0384	2
†5	Detent Ring	748-2031	1	748-2038	1	748-2020	1
6	Armature Hub	540-0908	1	540-0851	1	540-0864	1
*†7-1	Armature	110-0220	1	110-0218	1	110-0223	1
*†7-2	Facing Assembly	5161-445-003	1	5162-445-003	1	5163-445-003	1
*†7-3	Screw	797-1389	6	797-1389	8	797-1389	8
*†7-4	Screw	797-1519	4	797-1462	6	797-1463	6
*†7-5	Lockwasher	950-0436	4	950-0355	4	950-0355	6
*†7-6	Flatwasher			950-0023	2	950-0023	2
8	Magnet Assembly		1		1		1
	6 volts DC	5191-631-002		5192-631-002		5193-631-002	
	24 volts DC	5191-631-004		5192-631-004		5193-631-004	
	90 volts DC	5191-631-003		5192-631-003		5193-631-003	
†9	Setscrew	797-1393	2	797-1386	2	797-1395	2
10	Splined Hub		1		1		1
	1/2" Bore	540-0901					
	5/8" Bore	540-0902					
	3/4" Bore	540-0903		540-1512			
	7/8" Bore	540-0904		540-1513			
	1" Bore			540-1514			
	1-1/8" Bore			540-1515		540-0866	
	1-1/4" Bore					540-0867	
	1-3/8" Bore					540-0868	1
	1-1/2" Bore					540-0869	1
†11	Ball Bearing	166-0283	1	166-0277	1	166-0279	1
†12	Retainer Ring	748-0018	1	748-0276	1	748-0737	1
13	Shim	801-1035	1	801-1034	1	801-1036	1
14	Backplate	686-0167	1	686-0163	1	686-0172	1
†15	Screw	797-1392	4	797-0437	3	797-0447	3
Optional Accessory Items							
16	Conduit box	5162-101-002	1	5162-101-002	1	5162-101-002	1
17	Torque Arm	5191-101-001	1	5192-101-001	1	5193-101-001	1
Kit Items							
*†18	Friction Face Replacement Kit (includes items 7-1, 7-2, 7-3, 7-4, 7-5, 7-6)	5161-101-007	1	5162-101-007	1	5163-101-007	1
†19	Brake Rebuild Kit (includes items, 1, 2, 4, 5, 7-1, 7-2, 7-3, 7-4, 7-5, 7-6, 9, 11, 12, 15)	5191-101-006	1	5192-101-006	1	5193-101-006	1

Refer to Service Manual P-218.

EP-170, EP-250, EP-400

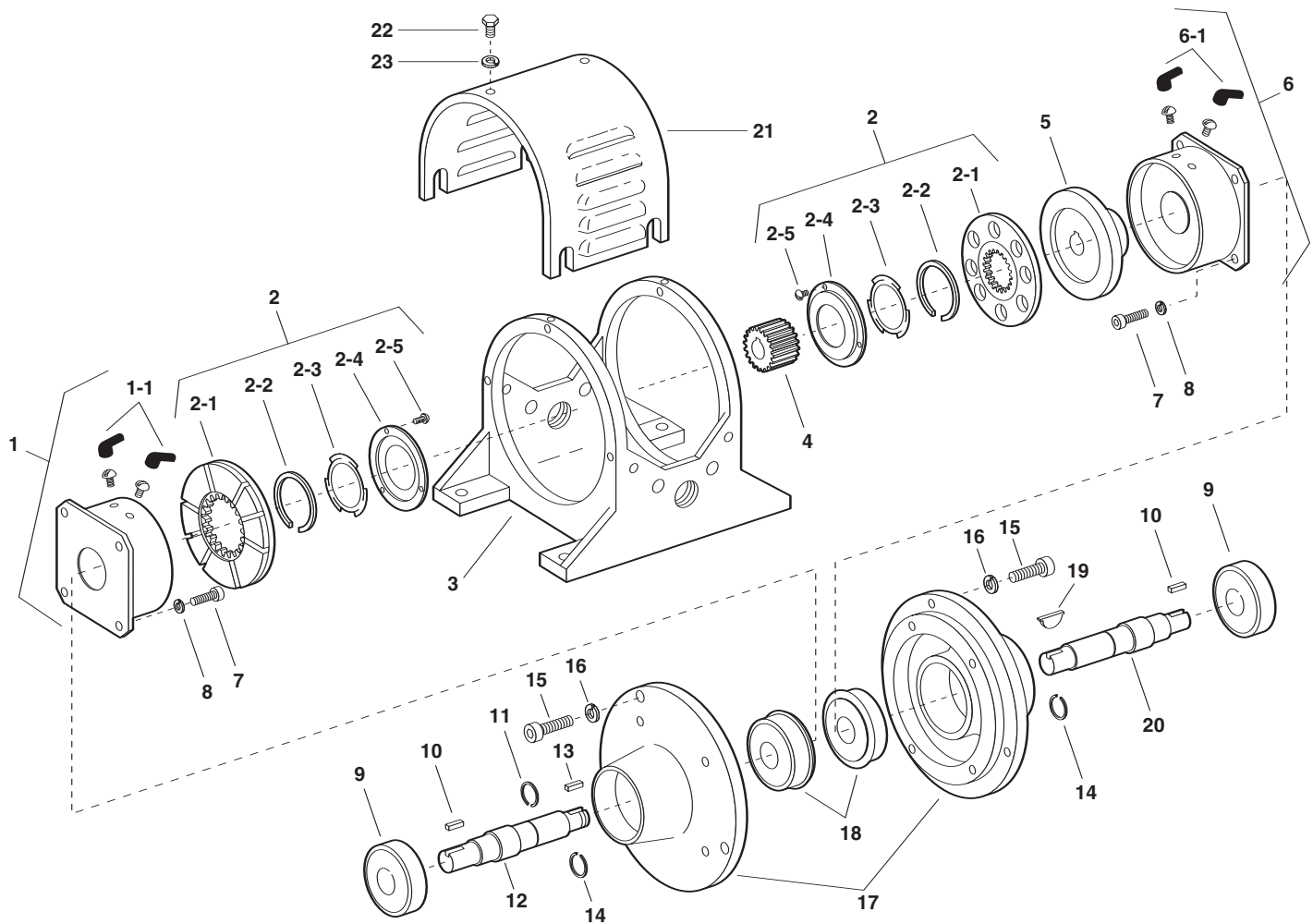


Component Parts

Item	Description	EP-170		EP-250		EP-400	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1	Magnet Assembly		1		1		1
	6 volt	5375-631-003		5319-631-002		5115-631-002	
	24 volt	5375-631-005		5319-631-003		5115-631-003	
	90 volt	5375-631-007		5319-631-005		5115-631-004	
1-1	Terminal Accessory	†		5103-101-002	1	5103-101-002	1
2	Armature Assembly with Autogap	110-0111	2	5130-111-008	2	5131-111-001	2
3	Housing	535-0079	1	535-0082	1	535-0083	1
4	Armature Spacer	807-1021	1				
5	Splined Armature Hub	540-1250	1	540-1635	1	540-2034	1
6	Rotor Assembly	5603-751-029	1	5103-751-010	1	5104-751-034	1
7	Field Assembly		1		1		1
	6 volt	5603-451-047		5103-451-002		5104-451-032	
	24 volt	5603-451-049		5103-451-004		5104-451-033	
	90 volt	5603-451-051		5103-451-007		5104-451-034	
7-1	Terminal Accessory	†		5103-101-002	1	5103-101-002	1
8	Ball Bearing	166-0112	2	166-0114	2	166-0116	2
9	Key	590-0095	2	590-0014	2		
9a	Key					590-0016	2
10	Shaft, Brake	798-0136	1	798-0133	1	798-0131	1
11	Retainer Ring	748-0346	2	748-0347	2	748-0348	2
12	Retainer Ring	748-0042	2	748-0024	2	748-0022	2
13	Key	590-0089	2	590-0088	2	590-0087	1
13a	Key					590-0106	1
14	Capscrew	797-1219	8	797-1219	8	797-1220	8
15	Lockwasher	950-0351	8	950-0351	8	950-0355	8
16	Bearing Housing	535-0080	2	535-0081	2	535-0084	2
17	Ball Bearing, with Retainer	166-0111	2	166-0113	2	166-0115	2
18	Shaft, Clutch	798-0135	1	798-0134	1	798-0132	1
19	Cover Plate	686-1017	1	686-1018	1	686-1019	1
20	Screw	797-0015	4	797-0015	4	797-0015	4
21	Dust Plug	680-0037	2	680-0037	2	680-0037	2
22	Gasket	495-0003	1	495-0004	1	495-0005	1
23	Insulator	572-0573	1	572-0572	1	572-0574	1
24	Vertical Mfg. Spring Kit Optional	5603-101-001	1	5103-101-006	1	5104-101-005	1
25	Ground Screw		1	797-1245	1	797-1245	1
26	Terminal		1	900-0116	1	900-0016	1

†Lead wires used on EP-170.

These units meet the standards of UL508 and are listed under guide card #NMTR, file #59164. These units are CSA certified under file #LR11543.



Component Parts

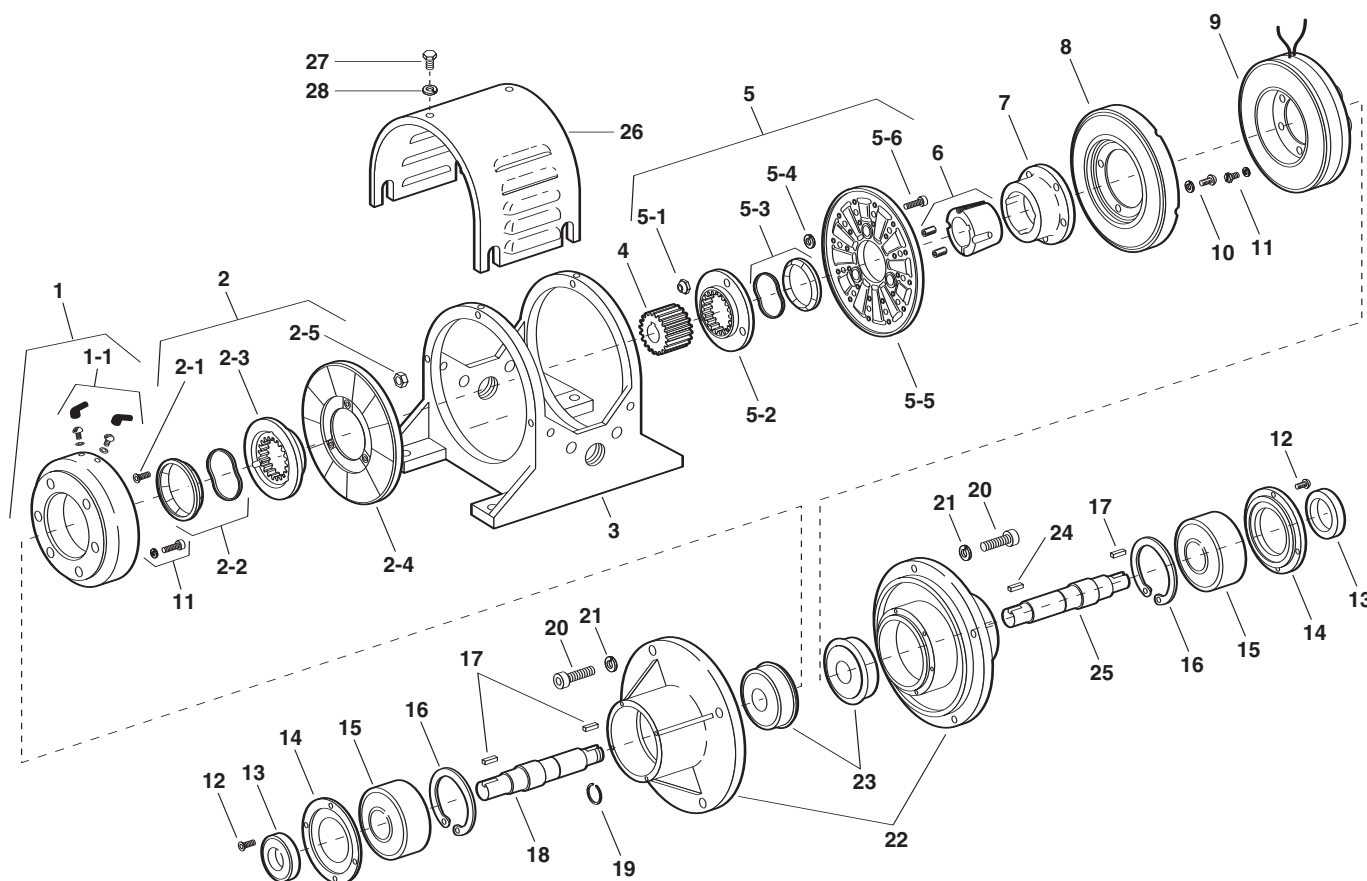
Item	Description	Part No.	Qty.
1	Magnet Assembly		1
	6 volt	5300-631-009	
	24 volt	5300-631-010	
	90 volt	5300-631-011	
1-1	Terminal Accessory	5311-101-001	1
2	Armature Assembly	5230-111-002	2
2-1	Armature	5230-111-001	2
2-2	Retainer Ring	748-0355	2
2-3	Spring	808-0412	2
2-4	Retainer Plate	748-0364	2
2-5	Screw	797-0028	12
3	Mounting Frame	174-0028	1
4	Splined Hub	540-2035	1
5	Rotor	5230-751-001	1
6	Field		1
	6 volt	5230-451-003	
	24 volt	5230-451-005	
	90 volt	5230-451-002	

Refer to Service Manual P-212.

These units meet the standards of UL508 and are listed under guide card #NMTR, file #59164. These units are CSA certified under file #LR11543.

Item	Description	Part No.	Qty.
6-1	Terminal Accessory	5311-101-001	1
7	Capscrew	797-0416	8
8	Lockwasher	950-0107	8
9	Ball Bearing	166-0125	2
10	Key	590-0020	2
11	Retainer Ring	748-0361	1
12	Shaft, Brake	798-0022	1
13	Key	590-0022	1
14	Retainer Ring	748-0335	2
15	Capscrew	797-0418	8
16	Lockwasher	950-0107	8
17	Endbell Housing	535-0010	2
18	Ball Bearing	166-0127	2
19	Key	590-0021	1
20	Shaft, Clutch	798-0028	1
21	Cover Drip Proof	287-0068	1
22	Capscrew	797-1214	6
23	Lockwasher	950-0102	6

Service Parts



Component Parts

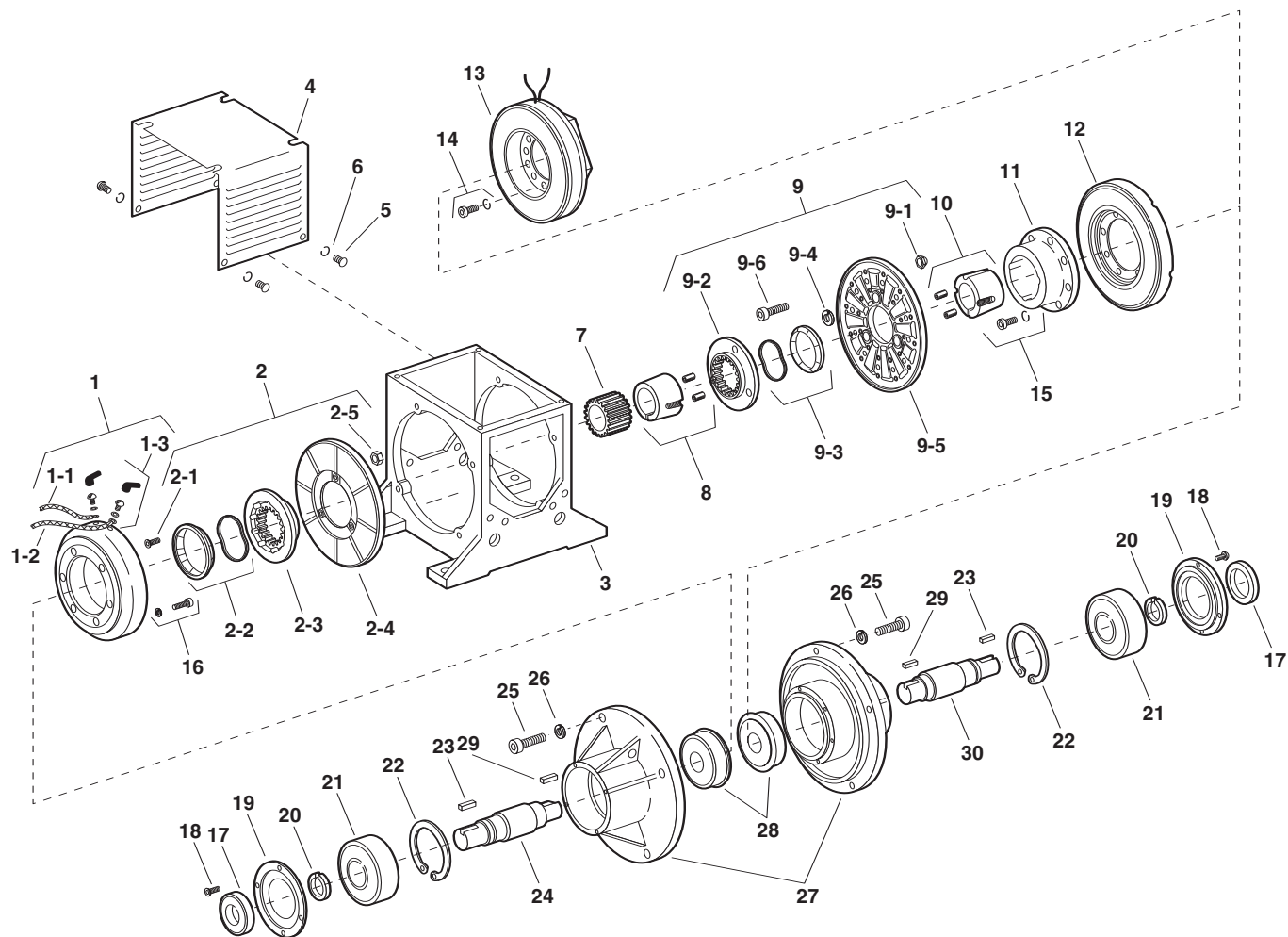
Item	Description	Part No.	Qty.
1	Magnet Assembly		1
	6 volt	5311-631-002	
	24 volt	5311-631-003	
	90 volt	5311-631-004	
2	Armature Assembly & Splined Adapter	5321-111-001	1
2-1	Screw	797-0272	3
2-2	Autogap Accessory	5321-101-006	1
2-3	Splined Adapter	104-0008	1
2-4	Armature	5321-111-022	1
2-5	Locknut	661-0004	3
3	Frame	174-0019	1
4	Splined Hub	540-0320	1
5	Armature & Splined Adapter	5201-111-001	1
5-1	Locknut	661-0004	3
5-2	Splined Adapter	104-0008	1
5-3	Autogap Accessory	5321-101-006	1
5-4	Spacer	748-0333	3
5-5	Armature	5321-111-022	1
5-6	Screw	797-0341	3
6	Bushing, 1-1/4" Bore	180-0113	1
7	Rotor Hub	540-0013	1
8	Rotor	5201-751-003	1
9	Field		1
	6 volt	5201-451-006	
	24 volt	5201-451-008	
	90 volt	5201-451-010	

Item	Description	Part No.	Qty.
10	Mounting Accessory	5201-101-007	1
11	Mounting Accessory	5321-101-001	2
12	Screw	797-1008	8
13	Oil Seal	795-0023	2
14	Retainer Plate	686-0031	2
15	Ball Bearing	166-0126	2
16	Retainer Ring	748-0336	2
17	Key	590-0019	3
18	Shaft, Brake	798-0019	1
19	Retainer Ring	748-0335	1
20	Capscrew	797-0351	8
21	Lockwasher	950-0354	8
22	Endbell Housing	535-0005	2
23	Ball Bearing	166-0125	2
24	Key	590-0018	1
25	Shaft, Clutch	798-0020	1
26	Cover, Drip Proof	287-0069	1
27	Capscrew	797-1214	6
28	Lockwasher	540-0102	6

Refer to Service Manual P-212.

These units meet the standards of UL508 and are listed under guide card #NMTR, file #59164. These units are CSA certified under file #LR11543.

EP-1000



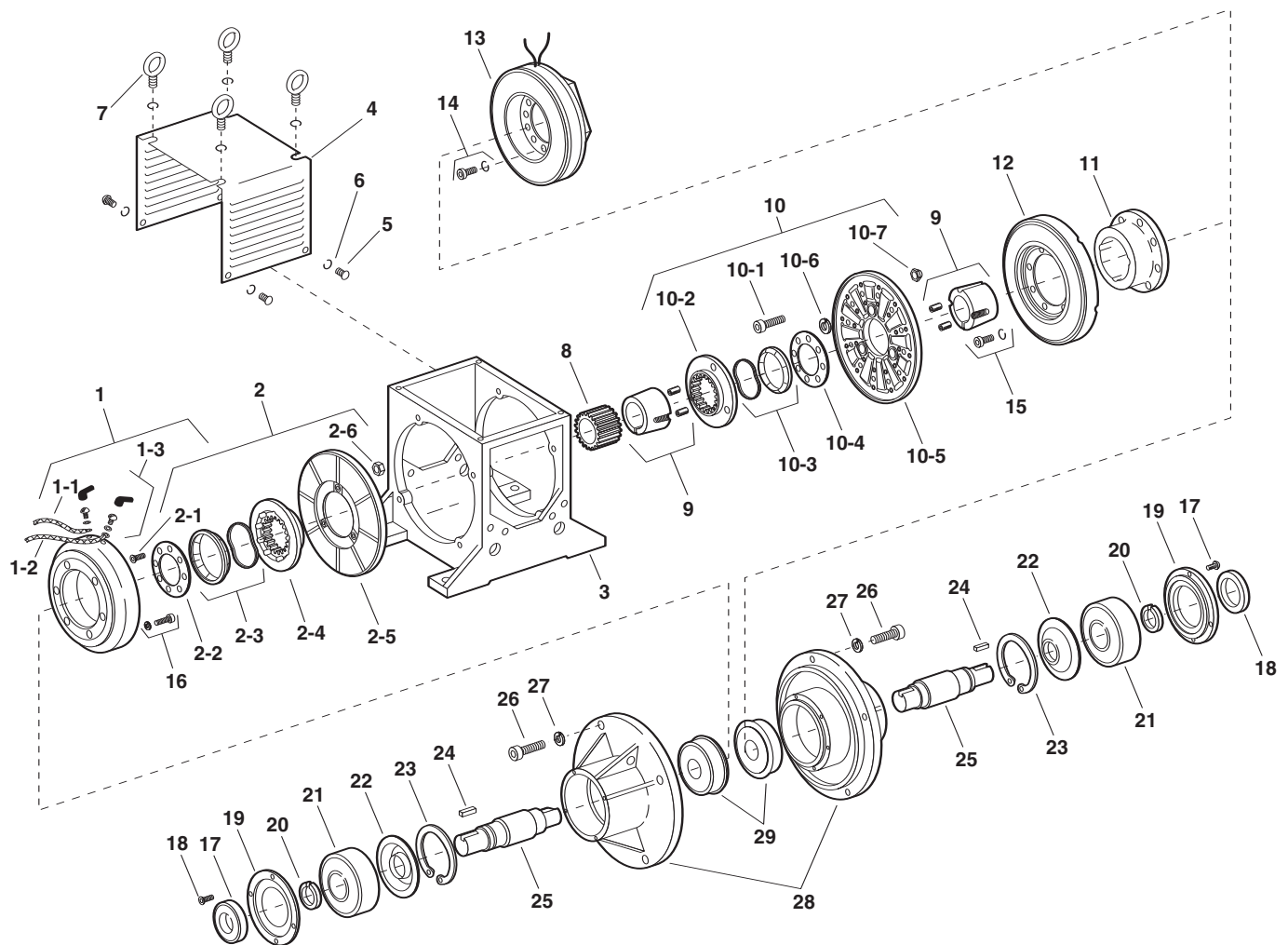
Component Parts

Item	Description	Part No.	Qty.
1	Magnet Assembly		1
	6 volt	5312-631-004	
	24 volt	5312-631-005	
	90 volt	5312-631-006	
1-1	Wire Assembly	5232-954-003	1
1-2	Wire Assembly	5232-954-004	1
1-3	Terminal Accessory	5311-101-001	1
2	Armature & Splined Adapter	5322-111-002	1
2-1	Button Head Screw	797-0272	1
2-2	Autocap Accessory	5322-101-004	1
2-3	Splined Arm, Adapter	104-0009	1
2-4	Armature	5322-111-036	1
2-5	Locknut	661-0004	3
3	Frame	174-0043	1
4	Dust Cover	287-0052	1
5	Button Head Screw	797-1175	8
6	Lockwasher	950-0103	8
7	Splined Armature Hub	540-0061	1
8	Bushing, 1-7/8" Bore	180-0177	1
9	Armature & Splined Adapter	5202-111-001	1
9-1	Locknut	661-0004	3
9-2	Splined Armature Adapter	104-0009	1
9-3	Autogap Accessory	5322-101-004	1
9-4	Spacer	748-0333	3
9-5	Armature	5322-111-036	1

Item	Description	Part No.	Qty.
9-6	Cap Screw	797-0341	3
10	Bushing, 2" Bore	180-0179	1
11	Rotor Hub	540-0315	1
12	Rotor	5202-751-003	1
13	Field Assembly		1
	6 volt	5202-451-004	
	24 volt	5202-451-006	
	90 volt	5202-451-007	
14	Mounting Accessory	5321-101-001	1
15	Mounting Accessory	5201-101-007	1
16	Mounting Accessory	5321-101-001	1
17	Oil Seal	795-0024	2
18	Button Head Screw	797-1008	8
19	Retainer Plate	686-0047	2
20	Retainer Ring – External	748-0504	2
21	Ball Bearing	166-0130	2
22	Retainer Ring – Internal	748-0375	2
23	Key	590-0024	2
24	Shaft, Brake	798-0026	1
25	Cap Screw	797-0361	8
26	Lockwasher	950-0362	8
27	Bearing Housing	535-0012	2
28	Ball Bearing	166-0131	2
29	Key	590-0025	2
30	Shaft, Clutch	798-0025	1

Refer to Service Manual P-212.

These units meet the standards of UL508 and are listed under guide card #NMTR, file #59164. These units are CSA certified under file #LR11543.



Component Parts

Item	Description	EP-1525		EP-1525HT	
		Part No.	Qty.	Part No.	Qty.
1	Magnet		1		1
	6 volt	5314-631-004			
	24 volt			5314-631-006	
	90 volt	5314-631-005		5314-631-005	
*1-1	Wire Assembly	5232-954-003	1	5232-954-003	1
*1-2	Wire Assembly	5232-954-004	1	5232-954-004	1
*1-3	Terminal Accessory	5311-101-001	1	5311-101-001	1
2	Armature & Splined Adapter	5324-111-001	1	5324-111-001	1
*2-1	Button Head Screw	797-0272	8	797-0272	8
*2-2	Armature Plate	686-0003	1	686-0003	1
*2-3	Autogap Accessory	5323-101-002	1	5323-101-002	1
*2-4	Splined Armature Adapter	104-0011	1	104-0011	1
*2-5	Armature	5324-111-034	1	5324-111-034	1
*2-6	Locknut	661-0004	8	661-0004	8
3	Frame	174-0044	1	174-0044	1
4	Dust Cover	287-0040	1	287-1002	1
5	Button Head Screw	797-1175	8	797-1175	8
6	Lock Washer	950-0103	8	950-0103	8
7	Eye Bolts	171-0006	4	171-0006	4
8	Splined Armature Hub	540-0063	1	540-0063	1
9	Bushing, 2-3/8" Bore	180-0215	2	180-0215	2
10	Armature & Splined Adapter	5204-111-004	1	5204-111-004	1
*10-1	Cap Screw	797-0342	8	797-0342	8
*10-2	Splined Armature Adapter	104-0011	1	104-0011	1
*10-3	Autogap Accessory	5323-101-002	1	5323-101-002	1
*10-4	Retainer Plate	686-0003	1	686-0003	1
*10-5	Armature	5324-111-034	1	5324-111-034	1
*10-6	Spacer	748-0333	8	748-0333	8
*10-7	Locknut	661-0004	8	661-0004	8
11	Rotor Hub	5234-541-001	1	5234-541-001	1
12	Rotor	5204-751-002	1	5204-751-001	1
13	Field Assembly		1		1
	6 volt	5204-451-013			
	24 volt			5204-451-066	
	90 volt	5204-451-016		5204-451-006	
14	Mounting Accessory	5321-101-002	2	5321-101-002	2
15	Mounting Accessory	5321-101-001	2	5321-101-001	2
16	Mounting Accessory	5321-101-001	2	5321-101-001	2
17	Screw	797-0294	8	797-0294	8
18	Oil Seal	795-0025	2	795-0025	2
19	Retainer Plate	686-0048	2	686-0048	2
20	Retaining Ring – External	748-0503	2	748-0503	2
21	Ball Bearing	166-0132	2	166-0132	2
22	Bearing Seal	795-0036	2	795-0036	2
23	Retainer Ring – Internal	748-0552	2	748-0052	2
24	Key	590-0028	2	590-0028	2
25	Shaft	798-0027	2	798-0027	2
26	Cap Screw	797-0362	12	797-0362	12
27	Lock Washer	950-0362	12	950-0362	12
28	Bearing Housing	535-0013	2	535-0013	2
29	Ball Bearing	166-0133	2	166-0133	2

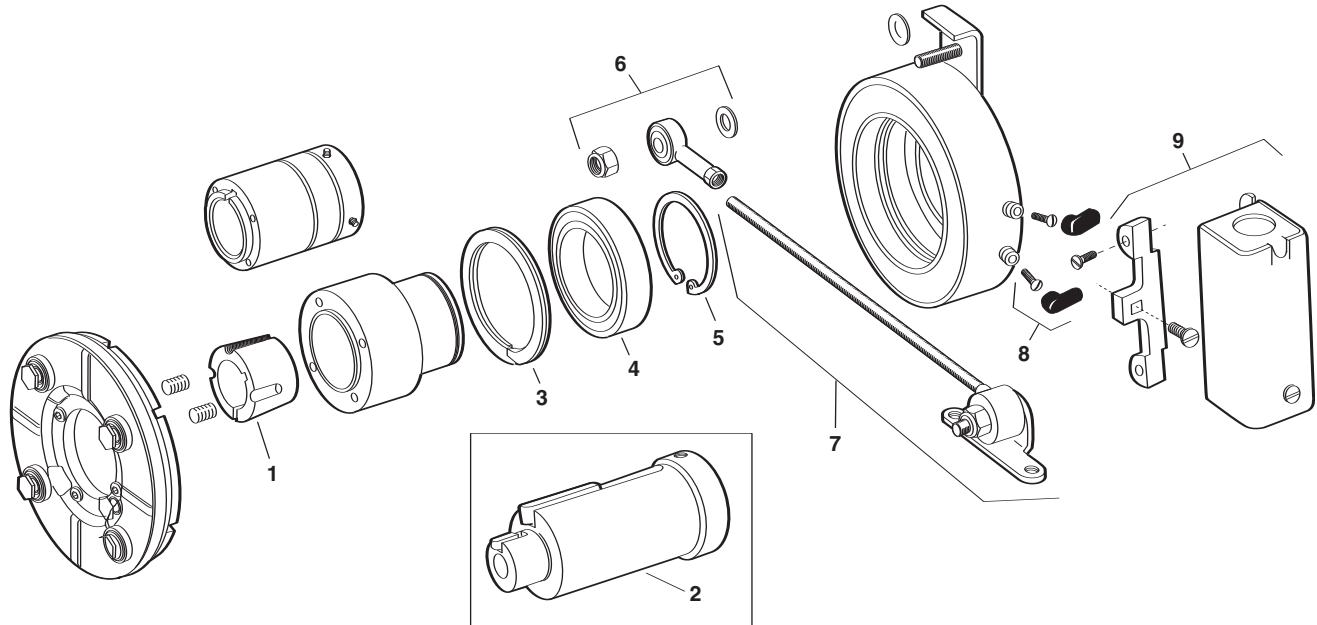
* Shipped Assembled

Refer to Service Manual P-212.

These units meet the standards of UL508 and are listed under guide card #NMTR, file #59164. These units are CSA certified under file #LR11543.

Service Parts

FB-375, FB-475, FB-650



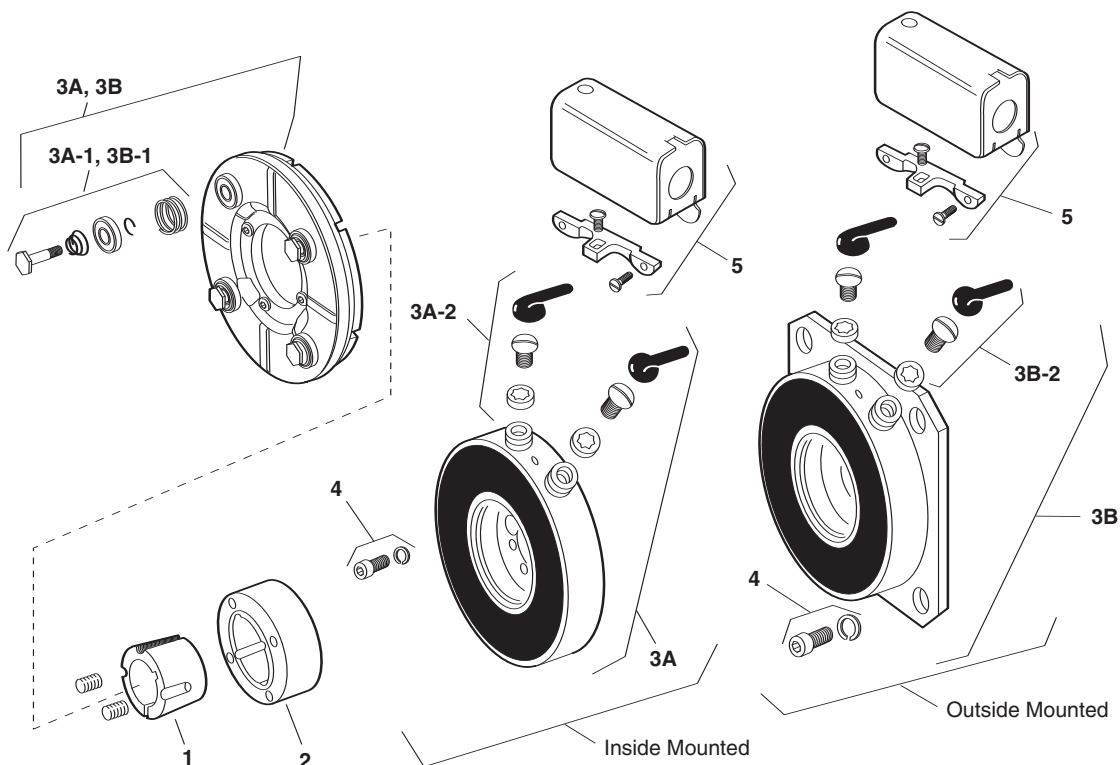
FB-375				FB-475		FB-650	
Item	Description	Part Number	Qty	Part Number	Qty	Part Number	Qty
Optional Parts							
1	*Bushing	N/A		180-0410 1/2" bore to 180-0418 1" bore	1	180-0421 1/2" bore to 180-0435 1-3/8" bore	1
2	Adapter (optional)		1		1		1
	5/8" motor shaft	5380-101-005					
	7/8" motor shaft	5380-101-004					
	1-1/8" motor shaft			5381-101-003			
	1-3/8" motor shaft					5382-101-003	
	1-5/8" motor shaft					5382-101-002	
Service Parts							
3	Retainer ring	748-0101	1	748-0102	1	748-0104	1
4	Ball bearing	166-0150	1	166-0110	1	166-0104	1
5	Retainer ring	748-0018	1	748-0002	1	748-0004	1
6	Torque arm mount assembly	5380-101-007	1	5381-101-006	1	5382-101-007	1
7	Torque arm rod assembly	5380-112-001	1	5381-112-001	1	5382-112-001	1
8	Terminal accessory	5311-101-001	1	5311-101-001	1	5311-101-001	1
9	Conduit Box	5200-101-010	1	5200-101-010	1	5200-101-010	1

*See page 235 for specific part numbers.

These units, when used with the correct Warner Electric conduit box, meet the standards of UL508 and are listed under guide card #NMTR2, file #59164 and are CSA certified under file #LR11543.

Magnet and armature are not field replaceable.

ER-375, ER-475, ER-650



Component Parts

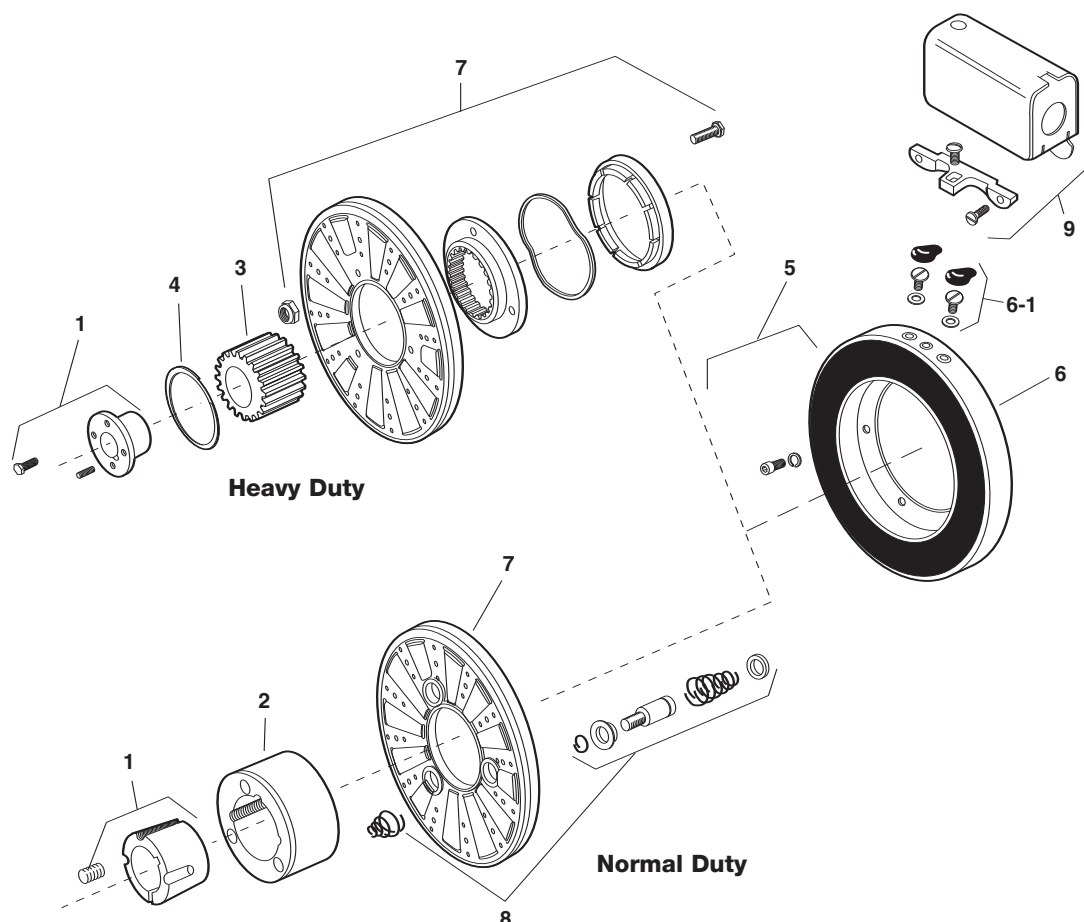
Item	Description	ER-375		ER-475		ER-650	
		Part Number	Qty	Part Number	Qty	Part Number	Qty
1	†Bushing			180-0410-0418 (1/2" to 1" Bore)	1	180-0421-0435 (1/2" to 1-3/8" Bore)	1
2	Hub			540-0849	1	540-0848	1
	1/2" Bore	540-0846	1				
	5/8" Bore	540-0847	1				
3A	Magnet and Armature (Inside Mounted, 90 Volt) Sold only in matched pairs*			5255-5	1	5256-6	1
3A-1	Autogap Accessory			5391-101-003	4	5392-101-003	4
3A-2	Terminal Accessory			5103-101-002	1	5103-101-002	1
3B	Magnet and Armature (Outside Mounted, 90 Volt) Sold only in matched pairs*	5254-1	1	5255-6	1	5256-7	1
3B-1	Autogap Accessory	5390-101-002	3	5391-101-003	4	5392-101-003	1
3B-2	Terminal Accessory	5103-101-002	1	5103-101-002	1	5103-101-002	1
4	Mounting Accessory						
	Inside Mount			5255-101-001	1	5256-101-003	1
	Outside Mount	5254-101-002	1	5255-101-002	1	5256-101-003	1
5	Conduit Box	5200-101-010	1	5200-101-010	1	5200-101-010	1

† See page 235 for specific part numbers.

* Magnets and armatures sold only in pre-burnished sets to assure rated torque available upon installation.

These units, when used with the correct Warner Electric conduit box, meet the standards of UL508 and are listed under guide card #NMTR2, file #59164 and are CSA certified under file #LR11543.

Service Parts



Component Parts

Item	Description	ER-825 Normal Duty		ER-825 Heavy Duty		ER-1225 Normal Duty		ER-1225 Heavy Duty	
		Part Number	Qty.	Part Number	Qty.	Part Number	Qty.	Part Number	Qty.
1	†Bushing	180-0137-180-0149 7/8" to 1-5/8" Bore	1	180-0008-180-0018 7/8" to 1-1/2" Bore	1	180-0262-180-0295 15/16" to 3" Bore	1	180-0026-180-0057 3/4" to 2-11/16" Bore	1
2	Armature Hub	540-0394	1			540-0015	1		
3	Splined Hub			540-0057	1			540-0064	1
4	Retainer Ring			748-0006	1			748-0005	1
5	Mounting Accessory, I.M.	5321-101-001	1	5321-101-001	1	5321-101-001	1	5321-101-001	1
6 & 7	Magnet (I.M., 90 volt) and Armature sold only in matched pairs*	5250-30	1	5250-25	1	5252-9	1	5252-4	1
6-1	Terminal Accessory	5311-101-001	1	5311-101-001	1	5311-101-001	1	5311-101-001	1
8	Autogap Accessory	5201-101-008	3			5201-101-008	4		
9	Conduit Box	5200-101-010	1	5200-101-010	1	5200-101-010	1	5200-101-010	1

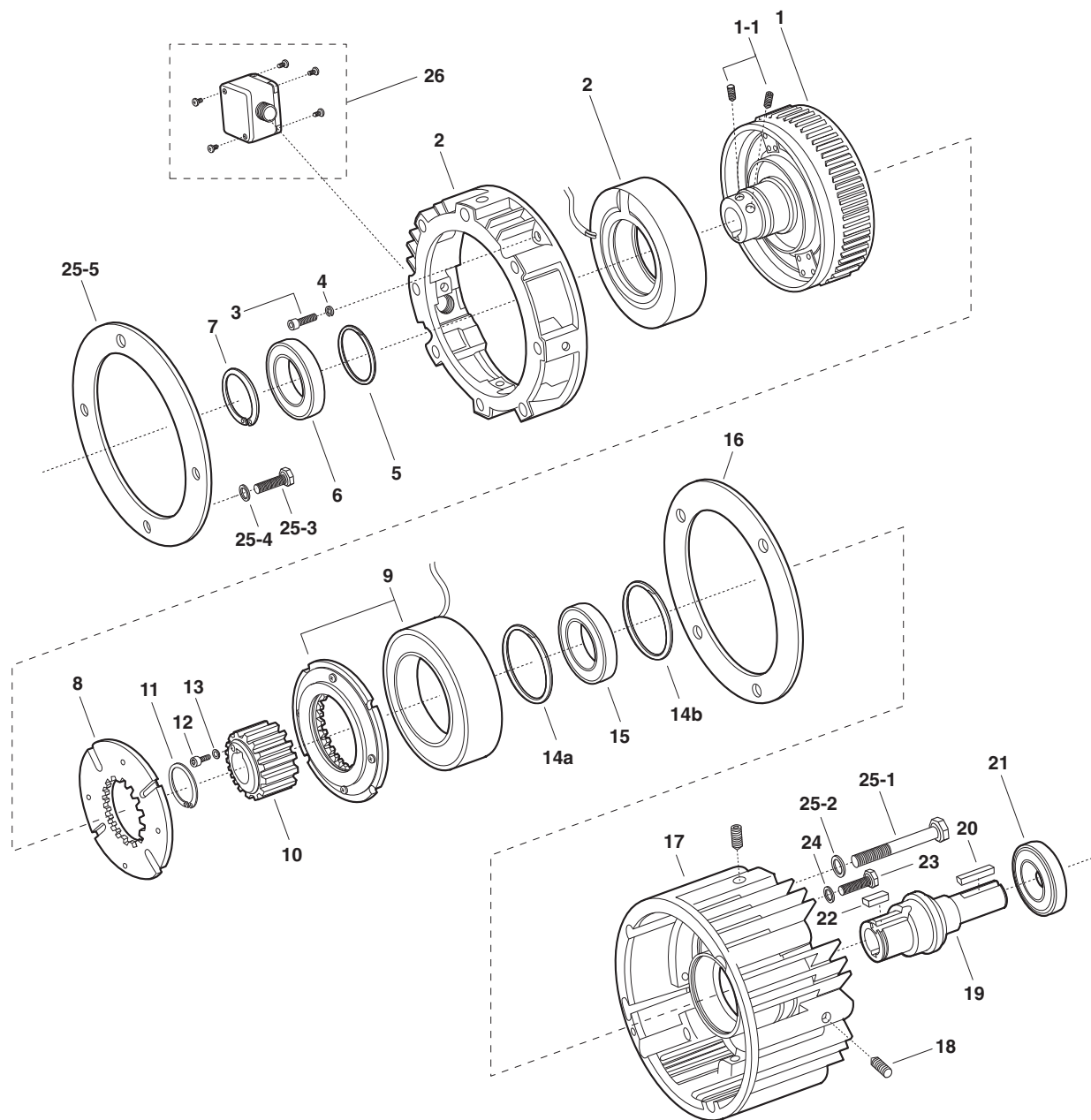
† See page 235 for specific part numbers.

* Magnets and armatures sold only in pre-burnished sets to assure rated torque available upon installation.

These units, when used with the correct Warner Electric conduit box, meet the standards of UL508 and are listed under guide card #NMTR2, file #59164 and are CSA certified under file #LR11543.

Service Parts

UM-1020 FBC Motor Clutch/Electrically Released Brake



UM-1020 FBC Motor Clutch/Electrically Released Brake

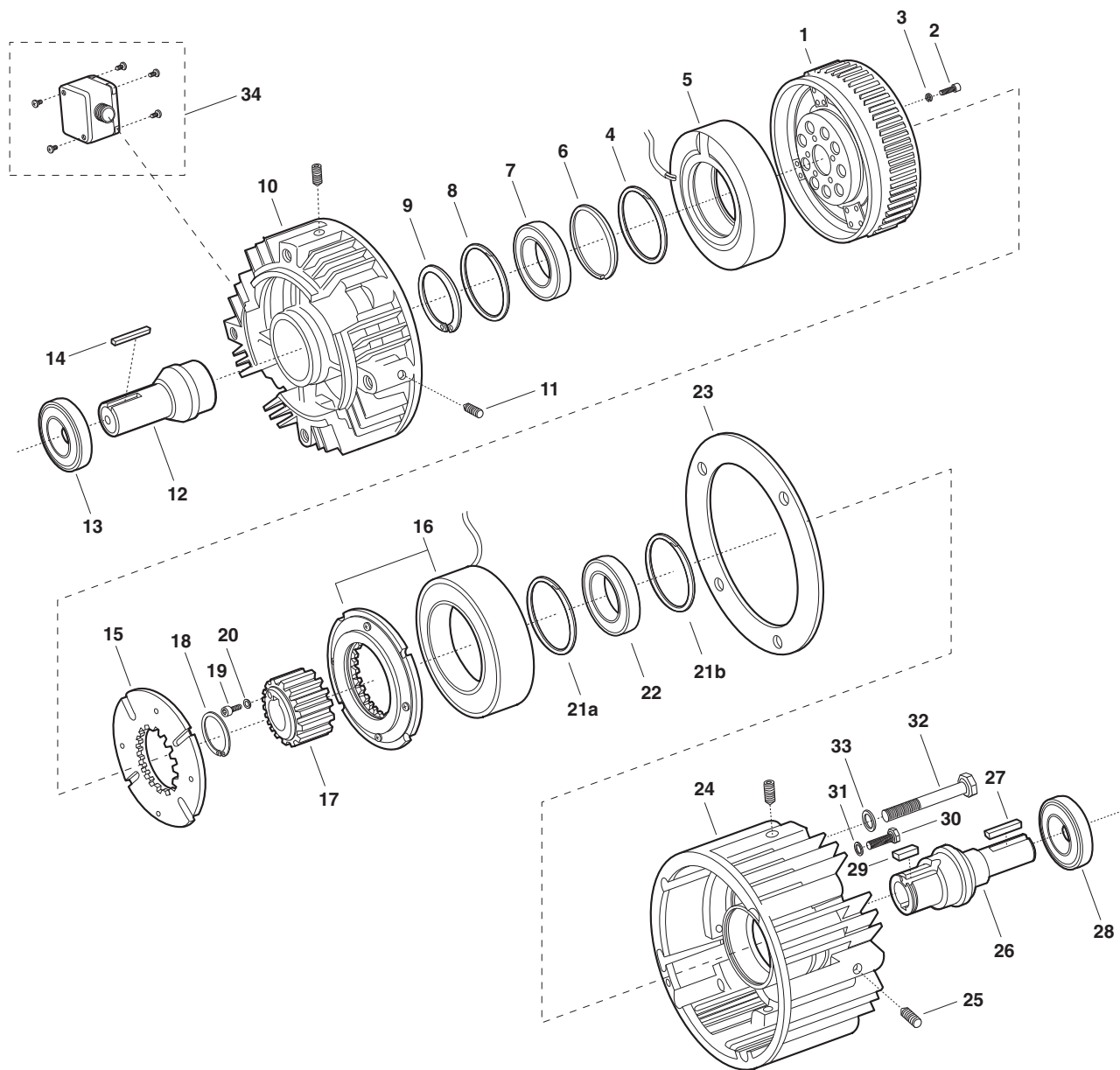
Component Parts

Item	Description	UM-50		UM-100		UM-180		UM-210		UM-215	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1	Rotor Assembly w/fan and hub 1-1 Setscrew	5370-751-019 797-1098	1 2	5370-751-022 797-0069	1 2	5370-751-017 797-0069	1 2	5371-751-012 797-1098	1 2	5371-751-031 798-1098	1 2
2	Field w/housing 24 volt 90 volt	5370-451-064 5370-451-063	1	5370-451-058	1	5370-451-059 5370-451-058	1	5371-451-029 5371-451-028	1	5371-451-028	1
3	Capscrew	797-1451	2	797-1451	2	797-1451	1	797-1452	2	797-1452	2
4	Lockwasher	950-0436	4	950-0102	2	950-0436	5	950-0372	2	950-0102	2
5	Retaining Ring	748-0101	1	748-0101	1	748-0101	1	748-0558	1	748-0558	1
6	Ball Bearing	166-0150	1	166-0101	1	166-0101	1	166-0168	1	166-0168	1
7	Retaining Ring	748-0018	1	748-0101	1	748-0001	1	748-0067	1		
8	Armature	5370-111-011	1	5370-111-013	1	5370-111-013	1	5371-111-005	1	5371-111-005	1
9	Magnet and Armature (sold only in matched pairs)* 24 volt 90 volt	5370-6 5370-1	1	5370-2	1	5370-8 5370-2	1	5371-3 5371-1	1	5371-1	1
10	Armature Hub	540-1640	1	540-1644	1	540-1644	1	540-0835	1	540-2040	1
11	Retaining Ring	748-0445	1	748-0676	1	748-0676	1				
12	Capscrew							797-0081	6	797-0081	6
13	Lockwasher							950-0372	6	950-0372	6
14a	Retaining Ring	748-0113	1	748-0101	1	748-0101	1	748-0112	1	748-0112	1
14b	Retaining Ring	748-0113	1								
15	Ball Bearing	166-0149	1	166-0101	1	166-0101	1	166-0142	1	166-0142	1
16	Spacer	807-1085	1	807-1085	1	807-1085	1	807-1053	1	807-1053	1
17	Housing	535-0170	1	535-0171	1	535-0171	1	535-0172	1	535-0172	1
18	Setscrew	797-0471	4	797-0471	4	797-0471	4	797-0471	4	797-0471	1
19	Shaft	798-0046	1	798-0128	1	798-0085	1	798-0051	1	798-0254	1
20	Key	590-0029	1	590-0029	1	590-0029	1	590-0019	1	590-0124	1
21	Ball Bearing	166-0155	1	166-0143	1	166-0143	1	166-0144	1	166-0144	1
22	Key	590-0043	1	590-0084	1	590-0084	1				
23	Capscrew			797-1294	2	797-1294	2	797-0083	4	797-0083	4
24	Lockwasher							950-0372	4	950-0372	4
	Mounting Accessory	5370-101-043	1	5370-101-043	1	5370-101-043	1	5371-101-039	1	5371-101-039	1
25	25-1 capscrew	797-1440	4	797-1440	4	797-1440	4	797-1453	4		
	25-2 lockwasher	950-0354	4	950-0354	4	950-0354	4	950-0111	4		
	25-3 capscrew							797-1442	4		
	25-4 lockwasher							950-0101	4		
	25-5 adapter							104-0321	1		
26	Conduit Box (Optional)	5370-101-042	1	5370-101-042	1	5370-101-042	1	5370-101-042	1		
	Key for rotary assembly-not shown	5370-101-072	1	5370-101-072	1	5370-101-072	1	5371-101-043	1		

Refer to Service Manual P-213.

*Magnets and armatures sold only in pre-burnished sets to assure maximum torque is available upon installation.

UM-2030FBC Input Clutch/Electrically Released Brake



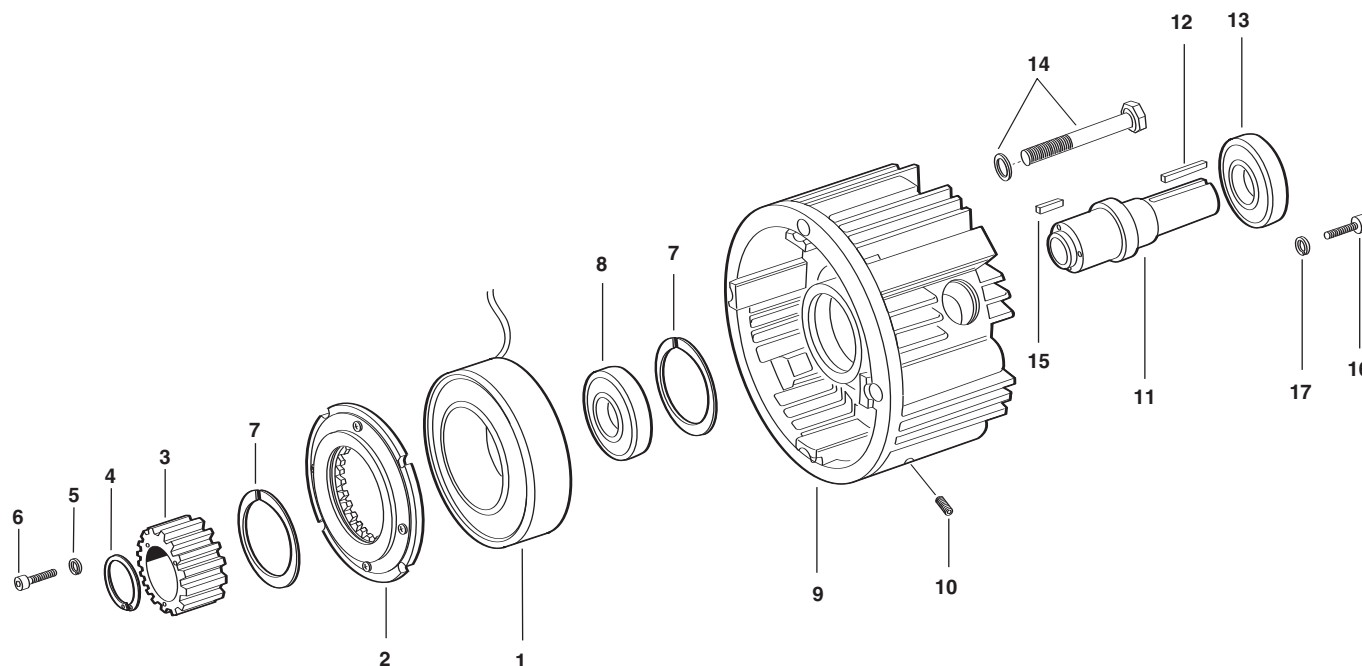
Component Parts

Item	Description	UM-50		UM-180		UM-210	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1	Rotor Assembly w/fan	5370-751-006	1	5370-751-009	1	5371-751-007	1
2	Capscrew	797-1294	4	797-1214	5	797-0083	6
3	Lockwasher	950-0436	4	950-0436	5	950-0372	6
4	Spacer			807-0062	1	807-0061	1
5	Field (with housing UM-50-20FBC only)		1		1		1
	24 volt	5370-451-074		5370-451-005		5371-451-005	
	90 volt	5370-451-073		5370-451-008		5371-451-003	
6	Retaining Ring	748-0113	1	748-0101	1	748-0112	1
7	Ball Bearing	166-0149	1	166-0101	1	166-0142	1
8	Retaining Ring	748-0113	1				
9	Retaining Ring	748-0017	1				
10	Housing			535-0164	1	535-0129	1
11	Setscrew			797-0471	4	797-0471	4
12	Shaft	798-0047	1	798-0124	1	798-0123	1
13	Bearing	166-0155	1	166-0143	1	166-0144	1
14	Key	590-0029	1	590-0029	1	590-0019	1
15	Armature Assembly	5370-111-011	1	5370-111-013	1	5371-111-005	1
16	Magnet and Armature (sold only in pairs)*		1		1		1
	24 volt	5370-6		5370-8		5371-3	
	90 volt	5370-1		5370-2		5371-1	
17	Armature Hub	540-1640	1	540-1644	1	540-0835	1
18	Retaining Ring	748-0445	1	748-0676	1		
19	Capscrew					797-0081	6
20	Lockwasher					950-0372	6
21a	Retaining Ring	748-0113	1	748-0101	1	748-0112	1
21b	Retaining Ring	748-0113	1	—		—	
22	Ball Bearing	166-0149	1	166-0101	1	166-0142	1
23	Spacer	807-1085	1	807-1085	1	807-1053	1
24	Housing	535-0170	1	535-0171	1	535-0172	1
25	Setscrew	797-0471	4	797-0471	4	797-0471	4
26	Shaft	798-0046	1	798-0085	1	798-0051	1
27	Key	590-0029	1	590-0029	1	590-0019	1
28	Ball Bearing	166-0155	1	166-0143	1	166-0144	1
29	Key	590-0043	1	590-0084	1		
30	Capscrew			797-1294	2	797-0083	4
31	Lockwasher					950-0372	4
32	Capscrew	797-0346	4	797-0346	4	797-1357	4
33	Lockwasher	950-0354	4	950-0354	4	950-0033	4
34	Conduit Box (Optional)	5370-101-042	1	5370-101-042	1	5370-101-042	1

Refer to Service Manual P-213.

*Magnets and armatures sold only in pre-burnished sets to assure maximum torque is available upon installation.

EM-20FBB Brake Module



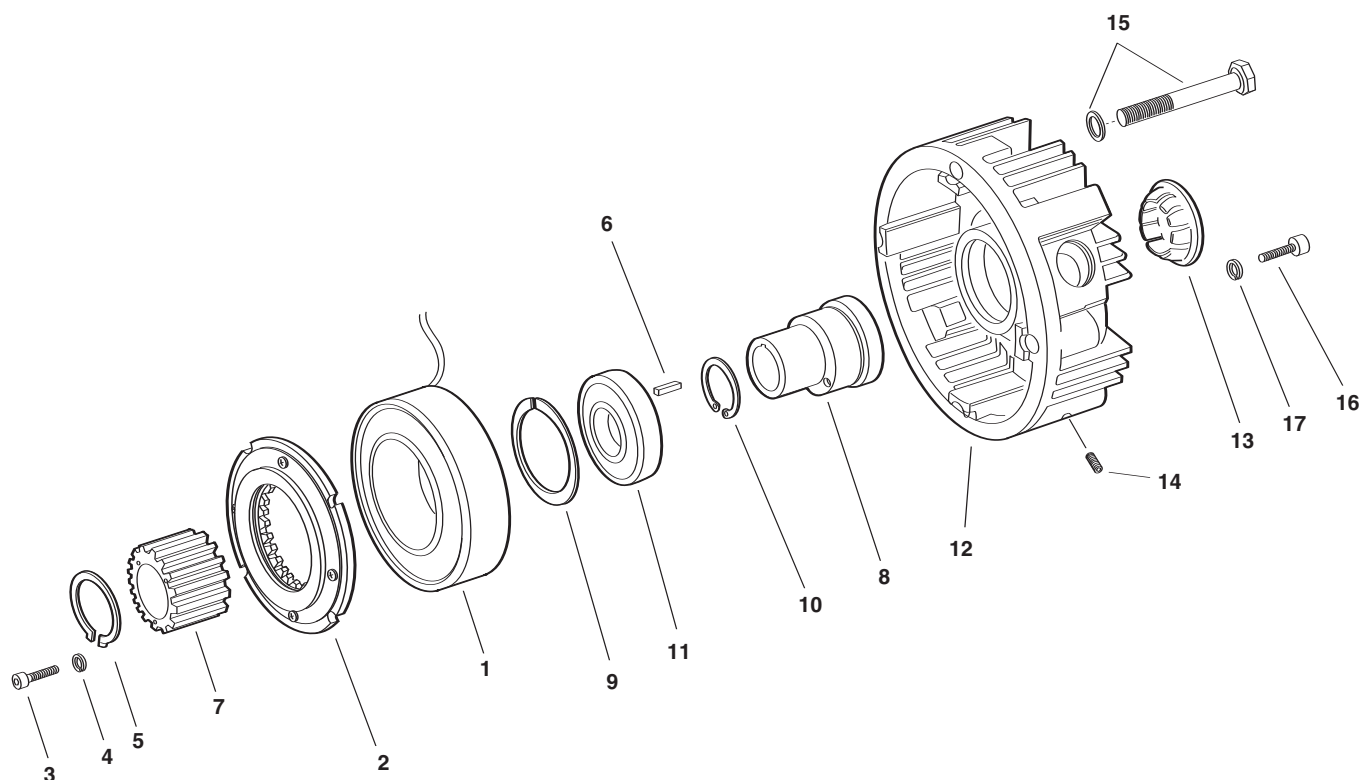
Component Parts

Item	Description	EM-50		EM-100		EM-180		EM-210	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1 & 2	Magnet and Armature (sold only in matched pairs)* 24 volt 90 volt	5370-6 5370-1	1	5370-8 5370-2	1	5370-8 5370-2	1	5371-3 5371-1	1
3	Armature Hub	540-1638	1	540-1677	1	540-1642	1	540-0741	1
4	Retaining Ring	758-0445	1	748-0676	1	748-0676	1	748-0112	1
5	Lockwasher							950-0372	6
6	Capscrew							797-0081	6
7	Retaining Ring	748-0113	2	748-0101	1	748-0101	1		
8	Bearing	166-0149	1	166-0101	1	166-0101	1	166-0142	1
9	Housing	535-0130	1	535-0148	1	535-0148	1	535-0144	1
10	Setscrew	797-0471	4	797-0471	4	797-0471	4	797-0471	4
11	Shaft	5370-798-001	1	5370-798-005	1	5370-798-002	1	5371-798-001	1
12	Key	590-0029	1	590-0029	1	590-0029	1	590-0019	1
13	Bearing	166-0155	1	166-0143	1	166-0143	1	166-0144	1
14	Mounting Accessory	5370-101-017	1	5370-101-017	1	5370-101-017	1	5371-101-007	1
15	Key	590-0043	1	590-0084	1	590-0084	1		
16	Capscrew			797-1214	2	797-1214	2	797-0083	2
17	Lockwasher							950-0372	2

Refer to Service Manual P-213.

*Magnets and armatures sold only in pre-burnished sets to assure maximum torque is available upon installation.

Service Parts



Component Parts

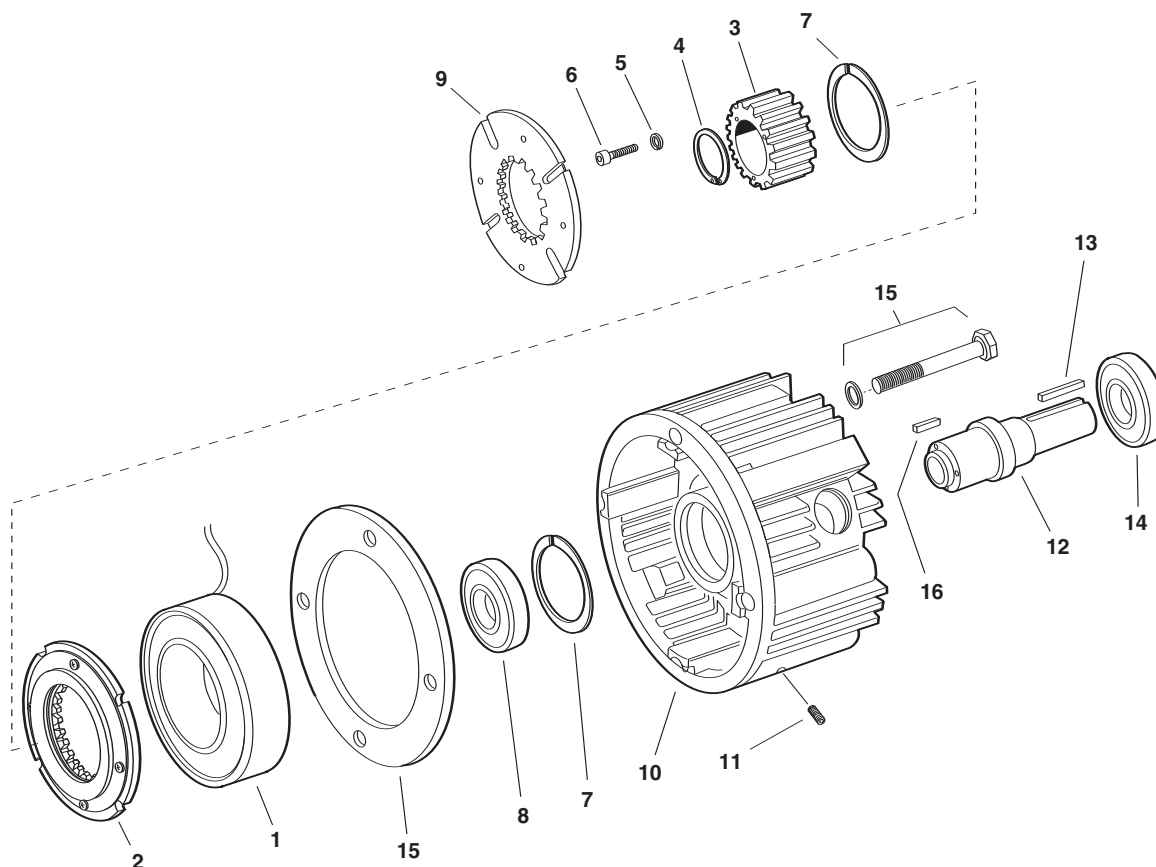
Item	Description	EM-50		EM-100		EM-180		EM-210	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1 & 2	Magnet and Armature (sold only in matched pairs)* 24 volt 90 volt	5370-6 5370-1	1	5370-8 5370-2	1	5370-8 5370-2	1	5371-3 5371-1	1
3	Capscrew							797-0081	6
4	Lockwasher							950-0372	6
5	Retaining Ring	748-0445	1						
6	Key	590-0043	1	590-0084	1	590-0084	1		
7	Splined Hub	540-1638	1	540-1677	1	540-1642	1	540-0741	1
8	Hub	5370-541-002	1	5370-541-004	1	5370-541-003	1	5371-541-001	1
9	Retaining Ring	748-0013	2	748-0101	1	748-0101	1	748-0112	1
10	Retaining Ring			748-0676	1	748-0676	1		
11	Bearing	166-0149	1	166-0101	1	166-0101	1	166-142	1
12	Housing	535-0136	1	535-0150	1	535-0150	1	535-0149	1
13	Plug	680-0028	1	680-0028	1	680-0028	1	680-0027	1
14	Setscrew	797-0471	4	797-0471	4	797-0471	4	797-0471	4
15	Mounting Accessory	5370-101-017	1	5370-101-017	1	5370-101-023	1	5371-101-007	1
16	Magnet mounting Screw			797-1214	2	797-1214	2	797-0083	2
17	Lockwasher							950-0372	2

Refer to Service Manual P-213.

*Magnets and armatures sold only in pre-burnished sets to assure maximum torque is available upon installation.

Service Parts

EM-20FBC Clutch/Brake Module



Component Parts

Item	Description	EM-50		EM-180		EM-210	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1 & 2	Magnet and Armature (sold only in matched pairs)* 24 volt 90 volt	5370-6 5370-1	1	5370-8 5370-2	1	5371-3 5371-1	1
3	Armature Hub	540-1640	1	540-1644	1	540-0835	1
4	Retaining Ring	758-0445	1	748-0676	1	748-0112	1
5	Lockwasher					950-0372	6
6	Capscrew					797-0081	6
7	Retaining Ring	748-0113	2	748-0101	1		
8	Bearing	166-0149	1	166-0101	1	166-0142	1
9	Armature	5370-111-011	1	5370-111-013	1	5371-111-005	1
10	Housing	535-0130	1	535-0145	1	535-0144	1
11	Setscrew	797-0471	4	797-0471	4	797-0471	4
12	Shaft	798-0045	1	798-0086	1	798-0050	1
13	Key	590-0029	1	590-0029	1	590-0019	1
14	Bearing	166-0155	1	166-0143	1	166-0144	1
15	Mounting Accessory	5370-101-033	1	5370-101-034	1	5371-101-018	1
16	Key	590-0043	1	590-0084	1		
17	Capscrew			797-1214	2	797-0083	2
18	Lockwasher					950-0372	2

Refer to Service Manual P-213.

*Magnets and armatures sold only in pre-burnished sets to assure maximum torque is available upon installation.

Service Parts

C-face Compatible Units

Electro Modules - EM

Description	Model	Part No.	Voltage	Pg. No.
Motor Clutch Module	EM-50-10	5370-270-020	6	13
		5370-270-030	24	
		5370-270-015	90	
	EM-100-10	5370-270-045	6	13
		5370-270-056	24	
		5370-270-046	90	
	EM-180-10	5370-270-021	6	13
		5370-270-055	24	
		5370-270-017	90	
	EM-210-10	5371-270-011	6	13
		5371-270-027	24	
		5371-270-009	90	
Brake Module	EM-50-20	5370-169-043	6	13
		5370-169-045	24	
		5370-169-042	90	
	EM-100-20	5370-169-040	6	13
		5370-169-072	24	
		5370-169-041	90	
	EM-180-20	5370-169-050	6	13
		5370-169-071	24	
		5370-169-051	90	
	EM-210-20	5371-169-022	6	13
		5371-169-034	24	
		5371-169-023	90	
Motor Brake	EM-215-20	5371-169-076	90	13
		5370-169-047	6	
		5370-169-062	24	
	EM-50-20MB	5370-169-048	90	13
		5370-169-053	6	
		5370-169-073	24	
	EM-180-20MB	5370-169-054	90	13
		5371-169-025	6	
		5371-169-035	24	
	EM-210-20MB	5371-169-026	90	13
		5370-270-019	6	
		5370-270-052	24	
Input Clutch Module	EM-50-30	5370-270-016	90	13
		5370-270-047	6	
		5370-270-054	24	
	EM-100-30	5370-270-048	90	13
		5370-270-049	6	
		5370-270-053	24	
	EM-180-30	5370-270-050	90	13
		5371-270-023	6	
		5371-270-026	24	
	EM-210-30	5371-270-024	90	13
		5370-536-008	–	
		5370-536-007		
Output Clutch Module	EM-50-40	5370-536-008	–	13
	EM-100-40	5370-536-007		13
	EM-180-40	5370-536-009		13
	EM-210-40	5371-536-005		13

UniModules - UM

Description	Model	Part No.	Voltage	Pg. No.
Clutch/Brake UniModule Fully Assembled Brake/Clutch Unit	UM-50-1020	5370-273-016	6	27
		5370-273-018	24	
		5370-273-017	90	
	UM-50-2030	5370-273-021	6	27
		5370-237-023	24	
		5370-273-022	90	
	UM-100-1020	5370-273-026	6	27
		5370-273-028	24	
		5370-273-027	90	
	UM-100-2030	5370-273-031	6	27
		5370-273-033	24	
		5370-273-032	90	
Clutch UniModule Fully Assembled Clutch Unit	UM-180-1020	5370-273-006	6	27
		5370-273-008	24	
		5370-273-007	90	
	UM-180-2030	5370-273-011	6	27
		5370-273-013	24	
		5370-273-012	90	
	UM-210-1020	5371-273-002	6	27
		5371-273-004	24	
		5371-273-003	90	
	UM-210-2030	5371-273-007	6	27
		5371-273-009	24	
		5371-273-008	90	
UM 1020 with Pre-Installed Controls (CBC 150-1)	UM-215-1020	5371-273-076	6	27
		5371-273-077	24	
		5371-273-078	90	
	UM-215-2030	5371-273-043	6	27
		5371-273-044	24	
		5371-273-045	90	
	UM-50-1040	5370-271-004	6	27
		5370-271-006	24	
		5370-271-005	90	
	UM-50-3040	5370-271-009	6	27
		5370-271-011	24	
		5370-271-010	90	
	UM-100-1040	5370-271-024	6	27
		5370-271-026	24	
		5370-271-025	90	
	UM-100-3040	5370-271-029	6	27
		5370-271-031	24	
		5370-271-030	90	
	UM-180-1040	5370-271-014	6	27
		5370-271-016	24	
		5370-271-015	90	
	UM-180-3040	5370-271-019	6	27
		5370-271-021	24	
		5370-271-020	90	
	UM-210-1040	5371-271-002	6	27
		5371-271-004	24	
		5371-271-003	90	
	UM-210-3040	5371-271-007	6	27
		5371-271-009	24	
		5371-271-008	90	
	UM-215-1040	5371-271-026	6	27
		5371-271-027	24	
		5371-271-028	90	
	UM-215-3040	5371-271-021	6	27
		5371-271-022	24	
		5371-271-023	90	
	UM 1020 with Pre-Installed Controls (CBC 150-1)	UM-50-1020	5370-9	27
		UM-100-1020	5370-10	
		UM-180-1020	5370-273-122	
		UM-210-1020	5371-4	
		UM-215-1020	5371-273-090	

C-face Compatible Units

UniModules – Ceramic Faced – UM-C

Description	Model	Part No.	Voltage	Pg. No.
C-face Mount	UM-50-1020-C	5370-273-077	6	37
		5370-273-078	24	
		5370-273-079	90	
	UM-180-1020-C	5370-273-073	6	37
		5370-273-074	24	
		5370-273-075	90	
	UM-210-1020-C	5371-273-035	6	37
		5371-273-036	24	
		5371-273-037	90	
Base/Foot Mount	UM-50-2030-C	5370-273-085	6	37
		5370-273-086	24	
		5370-273-087	90	
	UM-180-2030-C	5370-273-081	6	37
		5370-273-082	24	
		5370-273-083	90	
	UM-210-2030-C	5371-273-039	6	37
		5371-273-040	24	
		5371-273-041	90	

Enclosed UniModules – EUM

Description	Model	Part No.	Voltage	Pg. No.
C-face Mount	EUM-50-1020	5370-273-058	6	46
		5370-273-059	24	
		5370-273-057	90	
	EUM-50-1040	5370-271-050	90	46
		5370-273-092	6	
		5370-273-093	24	
	EUM-100-1020	5370-273-091	90	46
		5370-273-066	6	
		5370-273-067	24	
	EUM-180-1020	5370-273-065	90	46
		5370-271-051	90	
		5371-273-028	6	
	EUM-210-1020	5371-273-029	24	46
		5371-273-027	90	
		5371-271-024	90	
	EUM-210-1040	5371-273-082	6	46
		5371-273-083	24	
		5371-273-084	90	
Base/Foot Mount	EUM-50-2030	5370-273-062	6	46
		5370-273-063	24	
		5370-273-061	90	
	EUM-180-2030	5370-273-070	6	46
		5370-273-071	24	
		5370-273-069	90	
	EUM-210-2030	5371-273-032	6	46
		5371-273-033	24	
		5371-273-031	90	

Accessories for EM, UM, UM-C and EUM

Description	Model	Part No.	Voltage	Pg. No.
Conduit Box	All Sizes	5370-101-042		13
Controls	CBC-150-1	6004-448-001	110 VAC	37, 128
	CBC-150-2	6004-448-002	220 VAC	37, 128
Base Mount Kits for 2030 and 3040	EM/UM-50/100	5370-101-004	—	27, 37
	EM/UM-180	5370-101-002		27, 37, 50
	EUM-50/100/180	5370-101-012		124
	EM/EUM/UM-210 EM/EUM/UM-215	5371-101-001		27, 37
Motor Mount Kits for 20, 1020, 1040	EM/UM-50/100	5370-101-010	—	27
	EM/UM-180	5370-101-012		27
	EUM-50/100/180	5371-101-012		27
	EM/EUM/UM-210 EM/EUM/UM-215	5371-101-012		27
Fan Kits for 1020	EUM-50/100	5370-101-055		37, 46
	UM-50-C	5370-101-055		37, 46
	EUM-180	5370-101-054		37, 46
	UM-180-C	5370-101-054		37, 46
	EUM-210	5371-101-029		37, 46
	UM-210-C	5371-101-029		37, 46

Enclosed UniModules – Washdown Models – EUM-W

Description	Model	Part No.	Voltage	Pg. No.
C-face Mount	EUM-50-1020W	5370-273-100	6	46
		5370-273-101	24	
		5370-273-099	90	
	EUM-100-1020W	5370-273-108	6	46
		5370-273-109	24	
		5370-273-107	90	
	EUM-180-1020W	5370-273-116	6	46
		5370-273-117	24	
		5370-273-115	90	
	EUM-210-1020W	5371-273-056	6	46
		5371-273-057	24	
		5371-273-055	90	
	EUM-215-1020W	5371-273-086	6	46
		5371-273-087	24	
		5371-273-088	90	
Base/Foot Mount	EUM-50-2030W	5370-273-104	6	46
		5370-273-105	24	
		5370-273-103	90	
	EUM-180-2030W	5370-273-120	6	46
		5370-273-121	24	
		5370-273-119	90	
	EUM-210-2030W	5371-273-060	6	46
		5371-273-061	24	
		5371-273-059	90	

Accessories for EUM-W

ConduitBox	All Sizes	5370-101-047		46
Controls	CBC-150-1	6004-448-001	110 VAC	46
	All Sizes	CBC-150-2	6004-448-002	220 VAC 46
Base	EUM-50W/180W	5370-101-047		46
Mount	EUM-210W	5371-101-025		46
Motor Mount	EUM-50W	5370-101-049		46
	EUM-100W			
	EUM-180W			
Fan Kits	EUM-210W	5371-101-026		46
	EUM-215W			
	EUM-50W/100W	5370-101-060		46
	EUM-180W	5370-101-061		46
	EUM-210W	5371-101-033		46

Electro Clutches - EC

Description	Model	Part No.	Voltage	Pg. No.
EC-375	EC-375-1/2	5180-271-006	6	53
		5180-271-004	24	
		5180-271-009	90	
	EC-375-5/8	5180-271-002	6	53
		5180-271-008	24	
		5180-271-005	90	
EC-475	EC-475-5/8	5181-271-004	6	53
		5181-271-008	24	
		5181-271-007	90	
	EC-475-3/4	5181-271-003	6	53
		5181-271-009	24	
		5181-271-005	90	
	EC-475-7/8	5181-271-002	6	53
		5181-271-010	24	
		5181-271-006	90	
EC-650	EC-650-1	5281-271-004	6	53
		5281-271-018	24	
		5281-271-007	90	
	EC-650-1-1/8	5281-271-002	6	53
		5281-271-019	24	
		5281-271-005	90	
	EC-650-1-1/4	5281-271-009	6	53
		5281-271-020	24	
		5281-271-008	90	
	EC-650-1-3/8	5281-271-003	6	53
		5281-271-016	24	
		5281-271-006	90	
EC-825	EC-825-1-1/8	5282-271-002	6	53
		5282-271-008	24	
		5282-271-011	90	
	EC-825-1-1/4	5282-271-003	6	53
		5282-271-009	24	
		5282-271-012	90	
	EC-825-1-3/8	5282-271-004	6	53
		5282-271-010	24	
		5282-271-013	90	
EC-1000	EC-1000-1-3/8	5283-271-002	6	53
		5283-271-010	24	
		5283-271-003	90	
	EC-1000-1-1/2	5283-271-012	24	53
		5283-271-013	90	
		5283-271-004	6	
	EC-1000-1-5/8	5283-271-011	24	53
		5283-271-005	90	
		5283-271-005	90	
EC-1225	EC-1225-1-5/8	5284-271-008	6	53
		5284-271-013	24	
		5284-271-010	90	
	EC-1225-1-7/8	5284-271-002	6	53
		5284-271-014	24	
		5284-271-003	90	
	EC-1225-2-1/8	5284-271-004	6	53
		5284-271-015	24	
		5284-271-005	90	

Electro Brakes - EB

Description	Model	Part No.	Voltage	Pg. No.
EB-375	EB-375-1/2	5380-170-005	6	59
		5380-170-006	24	
		5380-170-004	90	
	EB-375-5/8	5380-170-003	6	59
		5380-170-007	24	
		5380-170-002	90	
EB-475	EB-475	5381-170-003	6	59
		5381-170-004	24	
		5381-170-002	90	
EB-650	EB-650	5382-170-003	6	59
		5382-170-005	24	
		5382-170-002	90	
EB-825	EB-825	5383-170-002	6	59
		5383-170-004	24	
		5383-170-005	90	
EB-1000	EB-1000	5384-170-003	6	59
		5384-170-005	24	
		5384-170-002	90	
EB-1225	EB-1225	5385-170-003	6	59
		5385-170-005	24	
		5385-170-002	90	

Adapters for Electro Brakes

Adapter No.	Part Number	Pg. No.
375-3/8	5380-101-005	108
375-7/8	5380-101-004	108
475-1-1/8	5381-101-003	108
650-1-3/8	5382-101-003	108
650-1-5/8	5382-101-002	108
1000-1-5/8	5384-101-008	60
1000-1-7/8	5384-101-007	60
1000-2-1/8	5384-101-010	60
1225-2-1/8	5385-101-008	60
1225-2-3/8	5383-101-007	60

Bushings for Electro Brakes

Bushing No.	Part Number	Pg. No.
1008	Specify Bore Size 180-0410 to 180-0418	111
1310	Specify Bore Size 180-0421 to 180-0435	111
H-1, H-2	Specify Bore Size 180-0002 to 180-0018	111
1615	Specify Bore Size 180-0131 to 180-0149	111
2517	Specify Bore Size 180-0185 to 180-0217	111

Shaft Mounted Units

AT Clutches - ATC

Description	Model	Part No.	Voltage	Pg. No.
ATC-25	ATC-25-1/2	5161-271-002	6	69
		5161-271-010	24	
		5161-271-003	90	
	ATC-25-5/8	5161-271-004	6	69
		5161-271-011	24	
		5161-271-005	90	
	ATC-25-3/4	5161-271-006	6	69
		5161-271-012	24	
		5161-271-007	90	
ATC-55	ATC-55-3/4	5162-271-002	6	69
		5162-271-010	24	
		5162-271-003	90	
	ATC-55-7/8	5162-271-004	6	69
		5162-271-011	24	
		5162-271-005	90	
	ATC-55-1	5162-271-006	6	69
		5162-271-012	24	
		5162-271-007	90	
ATC-115	ATC-115-1-1/8	5162-271-008	6	69
		5162-271-013	24	
		5162-271-009	90	
	ATC-115-1-1/4	5163-271-002	6	69
		5163-271-010	24	
		5163-271-003	90	
	ATC-115-1-1/2	5163-271-004	6	69
		5163-271-011	24	
		5163-271-005	90	
ATC-115	ATC-115-1-3/8	5163-271-006	6	69
		5163-271-012	24	
		5163-271-007	90	
	ATC-115-1-1/2	5163-271-008	6	69
		5163-271-013	24	
		5163-271-009	90	

AT Brakes - ATB

Description	Model	Part No.	Voltage	Pg. No.
ATB-25	ATB-25-1/2	5191-170-002	6	72
		5191-170-010	24	
		5191-170-003	90	
	ATB-25-5/8	5191-170-004	6	72
		5191-170-011	24	
		5191-170-005	90	
	ATB-25-3/4	5191-170-006	6	72
		5191-170-012	24	
		5191-170-007	90	
ATB-55	ATB-55-3/4	5191-170-008	6	72
		5191-170-013	24	
		5191-170-009	90	
	ATB-55-7/8	5192-170-002	6	72
		5192-170-010	24	
		5192-170-003	90	
	ATB-55-1	5192-170-004	6	72
		5192-170-011	24	
		5192-170-005	90	
ATB-115	ATB-115-1-1/8	5192-170-006	6	72
		5192-170-012	24	
		5192-170-007	90	
	ATB-115-1-1/4	5192-170-008	6	72
		5192-170-013	24	
		5192-170-009	90	
	ATB-115-1-1/2	5193-170-002	6	72
		5193-170-010	24	
		5193-170-003	90	
ATB-115	ATB-115-1-3/8	5193-170-004	6	72
		5193-170-011	24	
		5193-170-005	90	
	ATB-115-1-1/2	5193-170-006	6	72
		5193-170-012	24	
		5193-170-007	90	
	ATB-115-1-1/2	5193-170-008	6	72
		5193-170-013	24	
		5193-170-009	90	

Stationary Field Clutches - SFP

Description	Model	Part No.	Voltage	Pg. No.
SFP-250	SFP-250-3/8	5103-271-002	6	75
		5103-271-006	24	
		5103-271-010	90	
	SFP-250-7/16	5103-271-003	6	75
		5103-271-007	24	
		5103-271-011	90	
	SFP-250-1/2	5103-271-004	6	75
		5103-271-009	24	
		5103-271-012	90	
SFP-250-5/8	SFP-250-5/8	5103-271-005	6	75
		5103-271-008	24	
		5103-271-013	90	

Description	Model	Part No.	Voltage	Pg. No.
SFP-400	SFP-400-1/2	5104-271-006	6	75
		5104-271-016	24	
		5104-271-021	90	
	SFP-400-5/8	5104-271-007	6	75
		5104-271-017	24	
		5104-271-022	90	
	SFP-400-3/4	5104-271-008	6	75
		5104-271-018	24	
		5104-271-023	90	
SFP-400-7/8	SFP-400-7/8	5104-271-009	6	75
		5104-271-019	24	
		5104-271-024	90	
	SFP-400-1	5104-271-010	6	75
		5104-271-020	24	
		5104-271-025	90	

Part Numbers

Ordering Information

Base Mounted Units

Electro Pack - EP

Model	Part No.	Voltage	Pg. No.
EP-170	5633-273-002	6	77
	5633-273-003	24	
	5633-273-005	90	
EP-250	5130-273-031	6	77
	5130-273-032	24	
	5130-273-034	90	
EP-400	5131-273-009	6	77
	5131-273-010	24	
	5131-273-011	90	
EP-500	5230-273-003	6	77
	5230-273-011	24	
	5230-273-002	90	
EP-825	5231-273-003	6	77
	5231-273-004	24	
	5231-273-002	90	
EP-1000	5232-273-003	6	77
	5232-273-005	24	
	5232-273-002	90	
EP-1525	5234-273-003	6	77
	5234-273-002	90	
EP-1525HT	5234-273-017	24	77
	5234-273-012	90	

Electro Pack - Ceramic Faced - EP-C

Model	Part No.	Voltage	Pg. No.
EP-170-C	5633-273-018	24	84
	5633-273-019	90	
EP-250-C	5130-273-053	24	84
	5130-273-054	90	

Spring-Set Brakes (Static Holding) - ERS

Description	Model	Part No.	Voltage	Pg. No.
ERS	ERS-26	5158-170-016	24	93
		5158-170-015	90	
	ERS-42	5151-170-002	24	93
		5151-170-001	90	
	ERS-49	5155-170-002	24	93
		5155-170-001	90	
	ERS-57	5153-170-003	24	93
		5153-170-002	90	
	ERS-68	5154-170-002	24	93
		5154-170-001	90	

ERS Mounting Flanges (Optional)

Model	Part No.	Pg. No.
ERS-26	686-0182	93
ERS-42	686-0183	93
ERS-49	686-0184	93
ERS-57	686-0185	93
ERS-68	686-0186	93

Spring-Set Electrically Released Brakes

ERS Splined Hubs - ERS

Model	Bore Size	Part No.	Pg. No.
ERS-26	.250	5158-541-006	93
	.312	5158-541-007	93
	.375	5158-541-008	93
ERS-42	.375	5151-541-002	93
	.500	5151-541-003	93
	.625	5151-541-004	93
	.750	5151-541-005	93
ERS-49	.375	5155-541-002	93
	.500	5155-541-003	93
	.625	5155-541-004	93
	.750	5155-541-005	93
ERS-57	.875	5155-541-006	93
	.500	5153-541-004	93
	.625	5153-541-005	93
	.750	5153-541-006	93
	.875	5153-541-007	93
ERS-68	1.000	5153-541-008	93
	1.000	5154-541-005	93
	1.125	5154-541-006	93
	1.250	5154-541-007	93
	1.375	5154-541-008	93
Conduit Box	1.500	5154-541-009	93
		5154-101-001	93

EM/ERS Spring-Set Brake Modules

Model	Part No.	Voltage	Pg. No.
EM-50/ERS-42	5370-170-122	24	96
	5370-170-123	90	
EM-50/ERS-49	5370-170-124	24	96
	5370-170-125	90	
EM-180/ERS-57	5370-170-126	24	96
	5370-170-127	90	
EM-210/ERS-68	5371-170-042	24	96
	5371-170-043	90	

Spring-Set Brakes - ERD

Model	Part No.	Pg. No.
ERD 5		100
ERD 10		100
ERD 20		100
ERD 35		100
ERD 60		100
ERD 100		100
ERD 170		100
ERD 300		100
ERD Rectifiers	ACG830A1P1	103
	ACG830A1P2	103

Electrically Released Brakes-Permanent Magnet

Permanent Magnet Brakes (Dynamic Cycling)

Description	Model	Part No.	Voltage	Pg. No.
FB	FB-375-1/2	5390-170-021	90	107
		5390-170-024	24	
	FB-375-5/8	5390-170-022	90	107
		5390-170-023	24	
	FB-475	5391-170-009	90	107
		5391-170-012	24	
	FB-650	5392-170-007	90	107
		5392-170-010	24	
ER	ER-375	Drawing I-25766	90	111
	ER-475	Drawing I-25755	90	111
	ER-650	Drawing I-25767	90	111
	ER-825 (N.D.)	Drawing I-25577	90	111
	ER-825 (H.D.)	Drawing I-25578	90	111
	ER-1225 (N.D.)	Drawing I-25619	36-75	111
	ER-1225 (H.D.)	Drawing I-25620	35-75	111

UniModules - UM-FBC

Description	Model	Part No.	Voltage	Pg. No.
Clutch/Brake UniModules	UM-50-1020FBC	5370-273-037	24	120
		5370-273-036	90	
	UM-100-1020FBC	5370-273-153	24	120
		5370-273-125	90	
	UM-180-1020FBC	5370-273-047	24	120
		5370-273-046	90	
	UM-210-1020FBC	5371-273-013	24	120
		5371-273-012	90	
	UM-215-1020FBC	5370-273-099	24	120
		5371-273-079	90	
	UM-50-2030FBC	5370-273-042	24	120
		5370-273-041	90	
	UM-100-2030FBC	5370-273-154	24	120
		5370-273-155	90	
	UM-180-2030FBC	5370-273-052	24	120
		5370-273-051	90	
	UM-210-2030FBC	5371-273-018	24	120
		5371-273-017	90	
	UM-215-2030FBC	5371-273-100	24	120
		5371-273-101	90	

Accessories for UM-FBC, EUM-FBB/MBFB, and EM-FBB/FBC/MBFB

Description	Model	Part No.	Voltage	Pg. No.
Conduit Box	All Sizes	5370-101-042		109
Controls All Sizes	CBC-160-1	6013-448-001	110 VAC	129
	CBC-160-2	6013-448-002	220 VAC	129
Base Mount Kits 2030 (FB only)	UM-50/100	5370-101-036	—	122
	UM-180	5370-101-037		122
	UM-210	5371-101-019		122
Motor Mount Kits for 20FBB and 1020FBC	EM/UM-50/100	5370-101-010	—	37, 121
	EM/UM-180			37, 121
	EUM-50/100/180	5370-101-012		
	EM/EUM/UM-210 EM/EUM/UM-215	5371-101-012		37, 121

Shaft Mounted, Flange Mounted and C-face Compatible Units

Electro Modules

Description	Model	Part No.	Voltage	Pg. No.
Brake Module	EM-50-20FBB	5370-169-066	24	133
		5370-169-058	90	
	EM-100-20FBB	5370-169-020	24	133
		5370-169-084	90	
	EM-180-20FBB	5370-169-068	24	133
		5370-169-059	90	
	EM-210-20FBB	5371-169-032	24	133
		5371-169-029	90	
	EM-215-20FBB	5371-169-100	24	133
		5371-169-054	90	
	EM-50-20FBC	5370-169-065	24	133
		5370-169-056	90	
Motor Brake	EM-100-20FBC	5370-169-109	24	133
		5370-169-108	90	
	EM-180-20FBC	5370-169-067	24	133
		5370-169-057	90	
	EM-210-20FBC	5371-169-031	24	133
		5371-169-028	90	
	EM-50-20MBFB	5370-169-063	24	133
		5370-169-060	90	
	EM-100-20MBFB	5370-169-007	24	133
		5370-169-085	90	
	EM-180-20MBFB	5370-169-069	24	133
		5370-169-061	90	
	EM-210-7/8-20MBFB	5371-169-101	24	133
		5371-169-072	90	
	EM-210-20MBFB	5371-169-033	24	133
		5371-169-030	90	

Enclosed UniModules

Description	Model	Part No.	Voltage	Pg. No.
Brake Module	EUM-50-20FBB-6	5370-169-983	90	127
	EUM-50-20FBB-10	5370-169-986	90	127
	EUM-100-20FBB-12	5370-169-989	90	127
	EUM-100-20-FBB-21	5370-169-992	90	127
	EUM-180-20FBB-12	5370-169-995	90	127
	EUM-180-20FBB-21	5370-169-998	90	127
	EUM-210-20FBB-32	5371-169-078	90	127
	EUM-210-20FBB-56	5371-169-082	90	127
	EUM-215-20FBB-32	5371-169-086	90	127
	EUM-215-20FBB-56	5371-169-090	90	127
Motor Brake	EUM-50-20MBFB-6	5370-169-965	90	127
	EUM-50-20MBFB-10	5370-169-968	90	127
	EUM-100-20MBFB-12	5370-169-971	90	127
	EUM-100-20MBFB-21	5370-169-974	90	127
	EUM-180-20MBFB-12	5370-169-977	90	127
	EUM-180-20MBFB-21	5370-169-980	90	127
	EUM-210-7/8-20MBFB-32	5371-169-064	90	127
	EUM-210-7/8-20MBFB-56	5371-169-068	90	127
	EUM-210-20MBFB-32	5371-169-056	90	127
	EUM-210-20MBFB-56	5371-169-060	90	127

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37	UM 180-2030C	5370-273-083	
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27	UM210-2030	5371-273-008	180
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120	UM210-2030FBC	5371-273-018	220
46	EUM210-1020	5371-273-027	184
46	EUM210-1020	5371-273-028	184
46	EUM210-1020	5371-273-029	184
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59	EB650	5382-170-003	196
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Service Parts

Browning® Bushing

Shaft Size	Keyway Size	Bushing Number	
		Warner Electric	Browning
1/2	1/8 x 1/16	180-0002	H Type-1
9/16	1/8 x 1/16	180-0003	
5/8	3/16 x 3/32	180-0004	
11/16	3/16 x 3/32	180-0005	
3/4	3/16 x 3/32	180-0006	
13/16	3/16 x 3/32	180-0007	
7/8	3/16 x 3/32	180-0008	
15/16	1/4 x 1/8	180-0009	
1	1/4 x 1/8	180-0010	
1 1/16	1/4 x 1/8	180-0011	
1 1/8	1/4 x 1/8	180-0012	
1 3/16	1/4 x 1/8	180-0013	
1 1/4	1/4 x 1/8	180-0014	
1 5/16	5/16 x 5/32	180-0015	
1 3/8	5/16 x 5/32	180-0016	
1 7/16	3/8 x 3/16	180-0017	H Type-2
1 1/2	3/8 x 3/16	180-0018	
3/4	3/16 x 3/32	180-0026	Q1 Type-1
13/16	3/16 x 3/32	180-0027	
7/8	3/16 x 3/32	180-0028	
15/16	1/4 x 1/8	180-0029	
1	1/4 x 1/8	180-0030	
1 1/16	1/4 x 1/8	180-0031	
1 1/8	1/4 x 1/8	180-0032	
1 3/16	1/4 x 1/8	180-0033	
1 1/4	1/4 x 1/8	180-0034	
1 5/16	5/16 x 5/32	180-0035	
1 3/8	5/16 x 5/32	180-0036	
1 7/16	3/8 x 3/16	180-0037	
1 1/2	3/8 x 3/16	180-0038	
1 9/16	3/8 x 3/16	180-0039	
1 5/8	3/8 x 3/16	180-0040	
1 11/16	3/8 x 3/16	180-0041	
1 3/4	3/8 x 3/16	180-0042	
1 13/16	1/2 x 1/4	180-0043	
1 7/8	1/2 x 1/4	180-0044	
1 15/16	1/2 x 1/4	180-0045	
2	1/2 x 1/4	180-0046	Q1 Type-2
2 1/16	1/2 x 1/4	180-0047	
2 1/8	1/2 x 1/4	180-0048	
2 3/16	1/2 x 1/4	180-0049	
2 1/4	1/2 x 1/4	180-0050	
2 5/16	5/8 x 5/16	180-0051	
2 3/8	5/8 x 5/16	180-0052	
2 7/16	5/8 x 5/16	180-0053	
2 1/2	5/8 x 5/16	180-0054	
2 9/16	5/8 x 5/16	180-0055	
2 5/8	5/8 x 5/16	180-0056	
2 11/16	5/8 x 5/16	180-0057	

(Browning® is registered to Emerson Electric Co.)

Dodge Bushing

Shaft Size	Keyway Size	Bushing Number	
		Warner Electric	Dodge
1/2	1/8 x 1/16	180-0101	1210
9/16	1/8 x 1/16	180-0102	
5/8	3/16 x 3/32	180-0103	
11/16	3/16 x 3/32	180-0104	
3/4	3/16 x 3/32	180-0105	
13/16	3/16 x 3/32	180-0106	
7/8	3/16 x 3/32	180-0107	
15/16	1/4 x 1/8	180-0108	
1	1/4 x 1/8	180-0109	
1 1/16	1/4 x 1/8	180-0110	
1 1/8	1/4 x 1/8	180-0111	
1 3/16	1/4 x 1/8	180-0112	
1 1/4	1/4 x 1/8	180-0113	
1/2	1/8 x 1/16	180-0116	1215
9/16	1/8 x 1/16	180-0117	
5/8	3/16 x 3/32	180-0118	
11/16	3/16 x 3/32	180-0119	
3/4	3/16 x 3/32	180-0120	
13/16	3/16 x 3/32	180-0121	
7/8	3/16 x 3/32	180-0122	
15/16	1/4 x 1/8	180-0123	
1	1/4 x 1/8	180-0124	
1 1/16	1/4 x 1/8	180-0125	
1 1/8	1/4 x 1/8	180-0126	
1 3/16	1/4 x 1/8	180-0127	
1 1/4	1/4 x 1/8	180-0128	
1/2	1/8 x 1/16	180-0131	1615
9/16	1/8 x 1/16	180-0132	
5/8	3/16 x 3/32	180-0133	
11/16	3/16 x 3/32	180-0134	
3/4	3/16 x 3/32	180-0135	
13/16	3/16 x 3/32	180-0136	
7/8	3/16 x 3/32	180-0137	
15/16	1/4 x 1/8	180-0138	
1	1/4 x 1/8	180-0139	
1 1/16	1/4 x 1/8	180-0140	
1 1/8	1/4 x 1/8	180-0141	
1 3/16	1/4 x 1/8	180-0142	
1 1/4	1/4 x 1/8	180-0143	
1 5/16	5/16 x 5/32	180-0144	
1 3/8	5/16 x 5/32	180-0145	
1 7/16	3/8 x 3/16	180-0146	
1 1/2	3/8 x 3/16	180-0147	
1 9/16	3/8 x 3/16	180-0148	
1 5/8	3/8 x 3/16	180-0149	
1/2	1/8 x 1/16	180-0155	2012
9/16	1/8 x 1/16	180-0156	
5/8	3/16 x 3/32	180-0157	
11/16	3/16 x 3/32	180-0158	
3/4	3/16 x 3/32	180-0159	
13/16	3/16 x 3/32	180-0160	
7/8	3/16 x 3/32	180-0161	
15/16	1/4 x 1/8	180-0162	
1	1/4 x 1/8	180-0163	
1 1/16	1/4 x 1/8	180-0164	
1 1/8	1/4 x 1/8	180-0165	
1 3/16	1/4 x 1/8	180-0166	
1 1/4	1/4 x 1/8	180-0167	

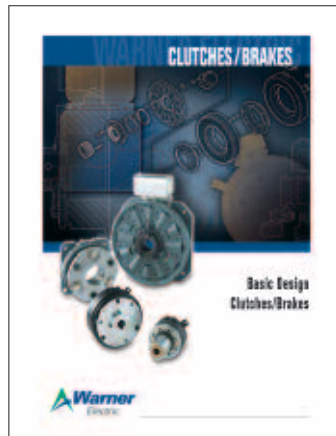
Bushing Part Numbers

Shaft Size	Keyway Size	Bushing Number	
		Warner Electric	Dodge
15/16	5/16 x 5/32	180-0168	2012
13/8	5/16 x 5/32	180-0169	
17/16	3/8 x 3/16	180-0170	
11/2	3/8 x 3/16	180-0171	
19/16	3/8 x 3/16	180-0172	
15/8	3/8 x 3/16	180-0173	
111/16	3/8 x 3/16	180-0174	
13/4	3/8 x 3/16	180-0175	
113/16	1/2 x 1/4	180-0176	
17/8	1/2 x 1/4	180-0177	
115/16	1/2 x 1/4	180-0178	
2	1/2 x 1/4	180-0179	
1/2	1/8 x 1/16	180-0185	2517
9/16	1/8 x 1/16	180-0186	
5/8	3/16 x 3/32	180-0187	
11/16	3/16 x 3/32	180-0188	
3/4	3/16 x 3/32	180-0189	
13/16	3/16 x 3/32	180-0190	
7/8	3/16 x 3/32	180-0191	
15/16	1/4 x 1/8	180-0192	
1	1/4 x 1/8	180-0193	
11/16	1/4 x 1/8	180-0194	
11/8	1/4 x 1/8	180-0195	
13/16	1/4 x 1/8	180-0196	
11/4	1/4 x 1/8	180-0197	
15/16	5/16 x 5/32	180-0198	
13/8	5/16 x 5/32	180-0199	
17/16	3/8 x 3/16	180-0200	
11/2	3/8 x 3/16	180-0201	
19/16	3/8 x 3/16	180-0202	
15/8	3/8 x 3/16	180-0203	
111/16	3/8 x 3/16	180-0204	
13/4	3/8 x 3/16	180-0205	
113/16	1/2 x 1/4	180-0206	
17/8	1/2 x 1/4	180-0207	
115/16	1/2 x 1/4	180-0208	
2	1/2 x 1/4	180-0209	
21/16	1/2 x 1/4	180-0210	
21/8	1/2 x 1/4	180-0211	
23/16	1/2 x 1/4	180-0212	
21/4	1/2 x 1/4	180-0213	
25/16	5/8 x 5/16	180-0214	
23/8	5/8 x 5/16	180-0215	
27/16	5/8 x 5/16	180-0216	
21/2	5/8 x 5/16	180-0217	
15/16	1/4 x 1/8	180-0223	3020
1	1/4 x 1/8	180-0224	
11/16	1/4 x 1/8	180-0225	
11/8	1/4 x 1/8	180-0226	
13/16	1/4 x 1/8	180-0227	
11/4	1/4 x 1/8	180-0228	
15/16	5/16 x 5/32	180-0229	
13/8	5/16 x 5/32	180-0230	
17/16	3/8 x 3/16	180-0231	
11/2	3/8 x 3/16	180-0232	
19/16	3/8 x 3/16	180-0233	
15/8	3/8 x 3/16	180-0234	

Shaft Size	Keyway Size	Bushing Number	
		Warner Electric	Dodge
111/16	3/8 x 3/16	180-0235	3020
13/4	3/8 x 3/16	180-0236	
113/16	1/2 x 1/4	180-0237	
17/8	1/2 x 1/4	180-0238	
115/16	1/2 x 1/4	180-0239	
2	1/2 x 1/4	180-0240	
21/16	1/2 x 1/4	180-0241	
21/8	1/2 x 1/4	180-0242	
23/16	1/2 x 1/4	180-0243	
21/4	1/2 x 1/4	180-0244	
25/16	5/8 x 5/16	180-0245	
23/8	5/8 x 5/16	180-0246	
27/16	5/8 x 5/16	180-0247	
21/2	5/8 x 5/16	180-0248	
29/16	5/8 x 5/16	180-0249	
25/8	5/8 x 5/16	180-0250	
211/16	5/8 x 5/16	180-0251	
23/4	5/8 x 5/16	180-0252	
213/16	3/4 x 3/8	180-0253	
27/8	3/4 x 3/8	180-0254	
215/16	3/4 x 3/8	180-0255	
3	3/4 x 3/8	180-0256	
15/16	1/4 x 1/8	180-0262	3030
1	1/4 x 1/8	180-0263	
11/16	1/4 x 1/8	180-0264	
11/8	1/4 x 1/8	180-0265	
13/16	1/4 x 1/8	180-0266	
11/4	1/4 x 1/8	180-0267	
15/16	5/16 x 5/32	180-0268	
13/8	5/16 x 5/32	180-0269	
17/16	3/8 x 3/16	180-0270	
11/2	3/8 x 3/16	180-0271	
19/16	3/8 x 3/16	180-0272	
15/8	3/8 x 3/16	180-0273	
111/16	3/8 x 3/16	180-0274	
13/4	3/8 x 3/16	180-0275	
113/16	1/2 x 1/4	180-0276	
17/8	1/2 x 1/4	180-0277	
115/16	1/2 x 1/4	180-0278	
2	1/2 x 1/4	180-0279	
21/16	1/2 x 1/4	180-0280	
21/8	1/2 x 1/4	180-0281	
23/16	1/2 x 1/4	180-0282	
21/4	1/2 x 1/4	180-0283	
215/16	5/8 x 5/16	180-0284	
23/8	5/8 x 5/16	180-0285	
27/16	5/8 x 5/16	180-0286	
21/2	5/8 x 5/16	180-0287	
29/16	5/8 x 5/16	180-0288	
25/8	5/8 x 5/16	180-0289	
211/16	5/8 x 5/16	180-0290	
23/4	5/8 x 5/16	180-0291	
213/16	3/4 x 3/8	180-0292	
27/8	3/4 x 3/8	180-0293	
215/16	3/4 x 3/8	180-0294	
3	3/4 x 3/8	180-0295	

Shaft Size	Keyway Size	Bushing Number	
		Warner Electric	Dodge
1/2	1/8 x 1/16	180-0326	1610
9/16	1/8 x 1/16	180-0327	
5/8	3/16 x 3/32	180-0328	
11/16	3/16 x 3/32	180-0329	
3/4	3/16 x 3/32	180-0330	
13/16	3/16 x 3/32	180-0331	
7/8	3/16 x 3/32	180-0332	
15/16	1/4 x 1/8	180-0333	
1	1/4 x 1/8	180-0334	
11/16	1/4 x 1/8	180-0335	
11/8	1/4 x 1/8	180-0336	
13/16	1/4 x 1/8	180-0337	
11/4	1/4 x 1/8	180-0338	
15/16	5/16 x 5/32	180-0339	
13/8	5/16 x 5/32	180-0340	
17/16	3/8 x 3/16	180-0341	
11/2	3/8 x 3/16	180-0342	1008
19/16	3/8 x 3/16	180-0343	
15/8	3/8 x 3/16	180-0344	
1/2	1/8 x 1/16	180-0410	
9/16	1/8 x 1/16	180-0411	
5/8	3/16 x 3/32	180-0412	
11/16	3/16 x 3/32	180-0413	
3/4	3/16 x 3/32	180-0414	
3/16	3/16 x 3/32	180-0415	
7/8	3/16 x 3/32	180-0416	
15/16	1/4 x 1/8	180-0417	
1	1/4 x 1/8	180-0418	
1/2	1/8 x 1/16	180-0421	1310
9/16	1/8 x 1/16	180-0422	
5/8	3/16 x 3/32	180-0423	
11/16	3/16 x 3/32	180-0424	
3/4	3/16 x 3/32	180-0425	
13/16	3/16 x 3/32	180-0426	
7/8	3/16 x 3/32	180-0427	
15/16	1/4 x 1/16	180-0428	
1	1/4 x 1/8	180-0429	
11/16	1/4 x 1/8	180-0430	
11/8	1/4 x 1/8	180-0431	
13/16	1/4 x 1/8	180-0432	
11/4	1/4 x 1/8	180-0433	
15/16	5/16 x 5/32	180-0434	
13/8	5/16 x 5/32	180-0435	

Other Warner Electric Clutch/Brake Products



Warner Electric engineers, manufactures and markets, electromechanical components and systems for controlling motion. Designed to help increase productivity, our products are incorporated into new equipment designs and are used to upgrade performance on machines already in service. With an international organization of stocking distributors and sales centers, Warner Electric offers the most extensive network of its kind for locally available products and professional, on-the-spot customer service.

Basic Design Clutches/Brakes

- Electromagnetic clutches and brakes
- Custom design with off-the-shelf components
- Maximum mounting versatility
- Wide range of sizes, torque ratings and configurations
- Ideal for space restrictive applications

Catalog P-1264



Tension Control Systems

- Up to 21,500 lb. ft. stopping torque*
- Complete system for unwind applications
 - Patented, new technology electric brakes
 - Sophisticated control systems
 - Load cell controls
 - Accurate, smooth, long life
- Magnetic Particle Clutches & Brakes*
- Torque range 2 in. lb. to 240 in. lb.*
- For controlled starts and stops, tension control, torque limiting and cycling applications
 - High thermal ratings
 - Smooth, quiet frictionless operation

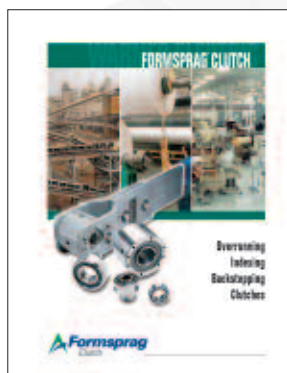
Catalog P-771



Wrap Spring Clutches and Clutch/Brakes

- Accurate positioning with high torque-to-size ratio
- Long life, Maintenance free
- Fast, repeatable performance
- Pre-assembled, easy to install
- Torque range from 25 lb.in. to 2,500 lb.in.
- Over 25 sizes available

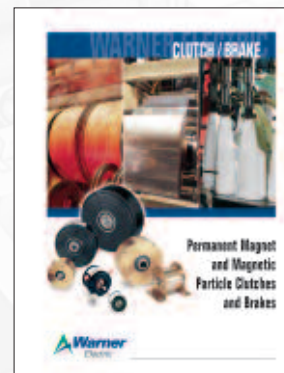
Catalog P-1310



Overrunning Clutches

- Torque loads to 700,000 lb. ft. (949200 Nm)*
- Overrunning, indexing and backstopping applications
 - Instantaneous action, no backlash
 - More torque, less space
 - Full sprag complement with infinitely changing wear parts

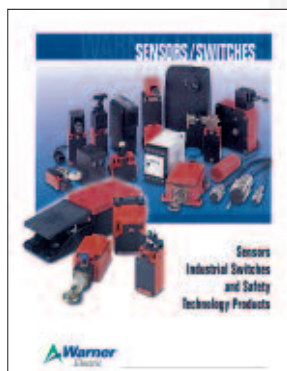
Catalog P-956



Precision Tork

- Fast, precise torque
- Smooth, consistent torque to speed
- No external control or power source required
- Long life, accurate
- Versatile mounting: Easy to retrofit
- Off-the-shelf availability

Catalog P-1316



Sensors, Switches & Safety Technology Products

- Full line of Sensing, Switching and Safety Technology Products*
- Non Contact—Photoelectric, Ultrasonic, Inductive, Capacitive and Magnetic Sensors
 - Contact—Limit Switches, Footswitches, Cable Pull Switches, and Conveyor Belt Alignment Switches
 - Safety Switches—Safety Interlock Switches (key and hinge styles), Solenoid Lock, Spring Lock, Cable Pull, Footswitch and Coded Magnetic Safety Switches

Catalog P-1201A



ERD

- Designed to keep load in position in the event of power failure
- Sizes from 3.3 in. to 9.9 in., 4 to 221 ft.lbs. of torque
- Stops loads from speeds up to 3600 RPM
- Quiet operation
- Bi-directional stopping capability
- Metric and inch standard bore sizes

Catalog P-1083

ALTRA INDUSTRIAL MOTION

Warner Electric

*Electromagnetic Clutches
and Brakes - USA*

South Beloit, IL 61080
815-389-3771

For application assistance:
1-800-825-9050

*Electromagnetic Clutches
and Brakes - Europe*

St Barthelemy d'Anjou, France
+33 (0)2 41 21 24 24

For sales office:
+33 (0)2 41 21 24 26

*Precision Electric Coils and
Electromagnetic Clutches and
Brakes - USA*

Columbia City, IN 46725
260-244-6183

Inertia Dynamics

*Spring Set Brakes; Power On and
Wrap Spring Clutch/Brakes*

Torrington, CT 06790
860-482-4444

Matrix International

*Electromagnetic Clutches
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Clutches and Brakes*

Brechin, Scotland
+44 (0) 1356 602000

Warner Linear

*Linear Actuators and
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Belvidere, IL 61008
815-547-1106

For application assistance:
1-800-825-9050

Boston Gear

*Enclosed and Open Gearing,
Electrical and Mechanical P.T.
Components, Precision
Gearheads, Precision Couplings*

Quincy, MA 02171
617-328-3300

For customer service:
1-888-999-9860

For application assistance:
1-800-816-5608

Huco Dynatork

*Precision Couplings
and Air Motors*

Hertford, England
+44 (0) 1992 501900

Formsprag Clutch

*Overrunning Clutches
and Holdbacks*

Warren, MI 48089
586-758-5000

For application assistance:
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Marland Clutch

*Roller Ramp and Sprag Type
Overrunning Clutches
and Backstops*

Burr Ridge, IL 60527
630-455-1752

Stieber Clutch

*Overrunning Clutches
and Holdbacks*

Heidelberg, Germany
+49 (0)6221 30 47 0

Wichita Clutch and Industrial Clutch

*Pneumatic and Oil Immersed
Clutches and Brakes - USA*

Wichita Falls, TX 76302
940-723-3400

*Pneumatic Clutches
and Brakes - Europe*

Bedford, England
+44 (0)1234 350311

Twiflex Limited

Caliper Brakes and Thrusters

Twickenham, England
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Ameridrives Couplings

*Gear Couplings, Mill Spindles,
Universal Joints*

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Bibby Transmissions

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Overload Clutches*

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Nuttall Gear and Delroyd Worm Gear

*Worm Gear and
Helical Speed Reducers*

Niagara Falls, NY 14302
716-298-4100

Saftek Friction

*Non-asbestos Brake and Clutch
Materials*

Telford, England
+44 (0) 1952 581122

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