

CLUTCH / BRAKE

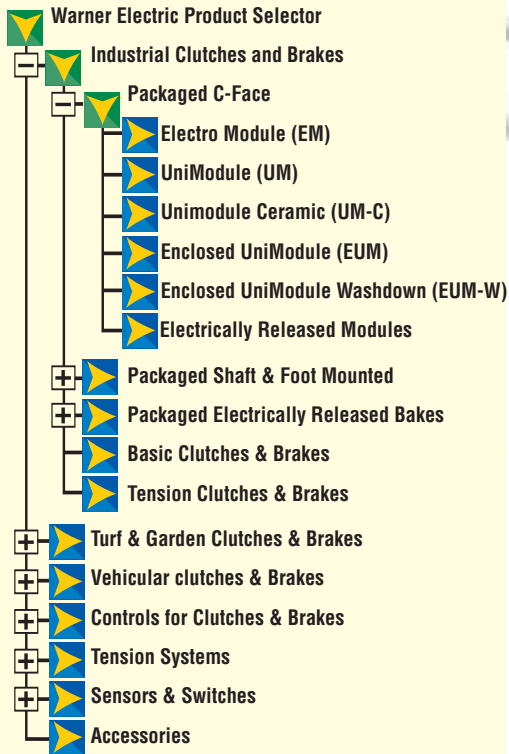


Packaged Electromagnetic Clutches/Brakes

Warner **TEKMATIC**
Electric

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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.

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Part No.	Description	Pricing
3215-01	1/2" Dia. x 1/2" Thick	\$1.50
3215-02	3/4" Dia. x 1/2" Thick	\$2.50
3215-03	1" Dia. x 1/2" Thick	\$3.50
3215-04	1 1/4" Dia. x 1/2" Thick	\$4.50
3215-05	1 1/2" Dia. x 1/2" Thick	\$5.50
3215-06	1 3/4" Dia. x 1/2" Thick	\$6.50
3215-07	2" Dia. x 1/2" Thick	\$7.50
3215-08	2 1/4" Dia. x 1/2" Thick	\$8.50
3215-09	2 1/2" Dia. x 1/2" Thick	\$9.50
3215-10	2 3/4" Dia. x 1/2" Thick	\$10.50
3215-11	3" Dia. x 1/2" Thick	\$11.50
3215-12	3 1/4" Dia. x 1/2" Thick	\$12.50
3215-13	3 1/2" Dia. x 1/2" Thick	\$13.50
3215-14	3 3/4" Dia. x 1/2" Thick	\$14.50
3215-15	4" Dia. x 1/2" Thick	\$15.50



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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Permanent Magnet NEMA C-face Modules

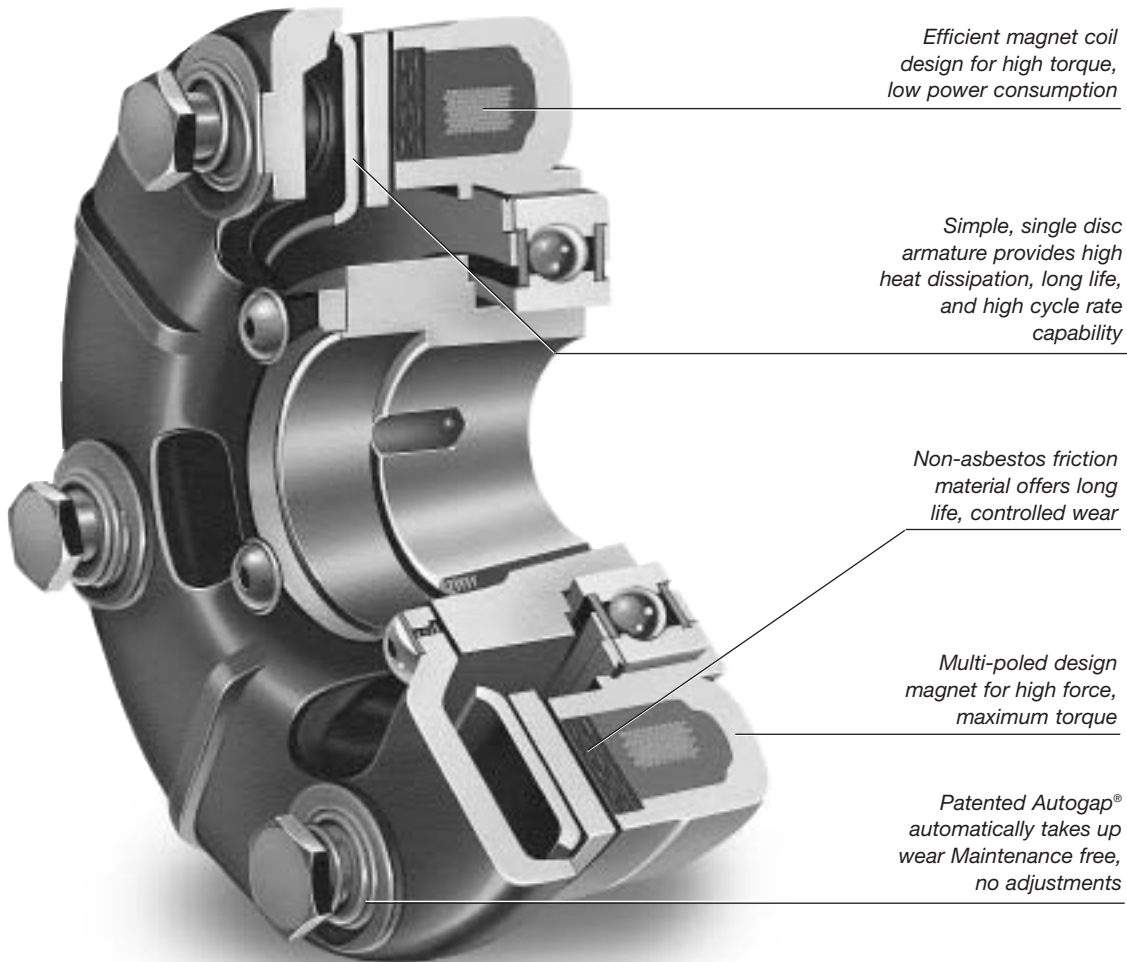
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Electromagnetic Clutches and Brakes



Efficient magnet coil design for high torque, low power consumption

Simple, single disc armature provides high heat dissipation, long life, and high cycle rate capability

Non-asbestos friction material offers long life, controlled wear

Multi-poled design magnet for high force, maximum torque

Patented Autogap® automatically takes up wear Maintenance free, no adjustments

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.

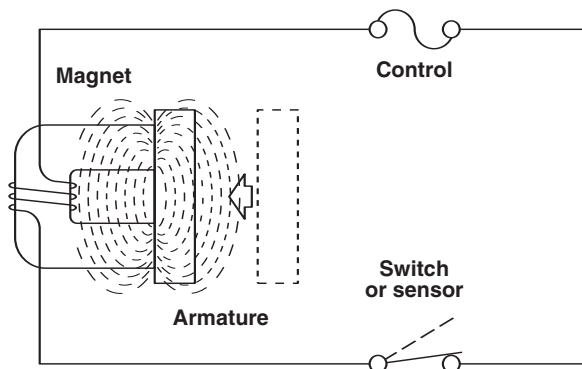
Reliable Performance

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

Electromagnetic Clutches and Brakes

Principle of Operation

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



Fast and Accurate

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

Controllable

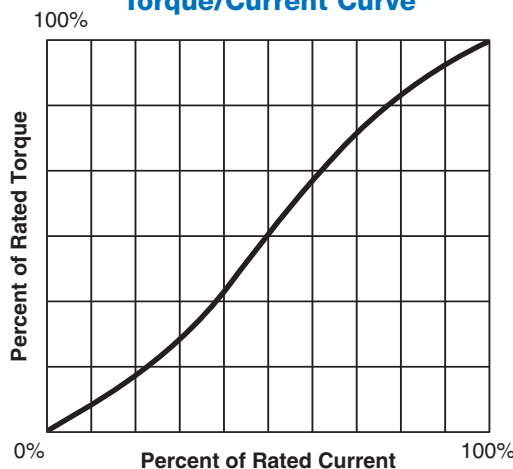
Electric brakes and clutches are incredibly easy to control. The shift from positive, instantaneous engagement to soft, cushioned starts and stops is as simple as turning a knob.



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.

Torque/Current Curve



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.

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**

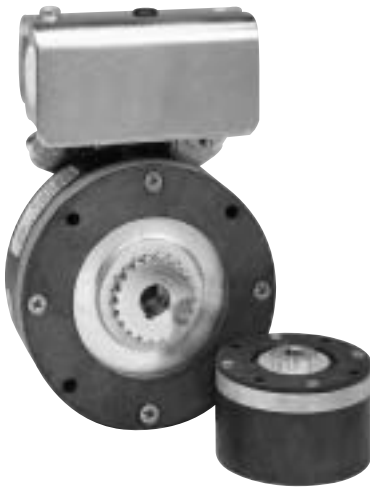
- 2 sizes
- 15 and 70 lb. in. torque

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

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



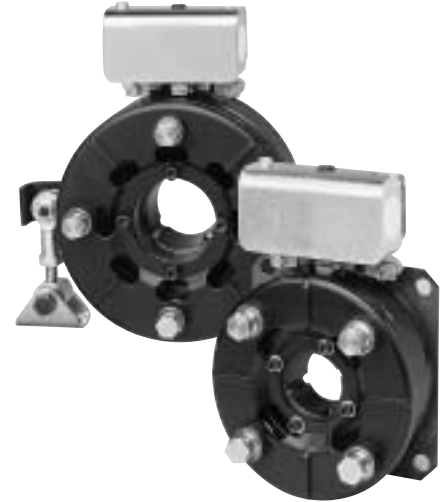
ERD Series **Page 100** Dynamic Braking

- ❑ 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.

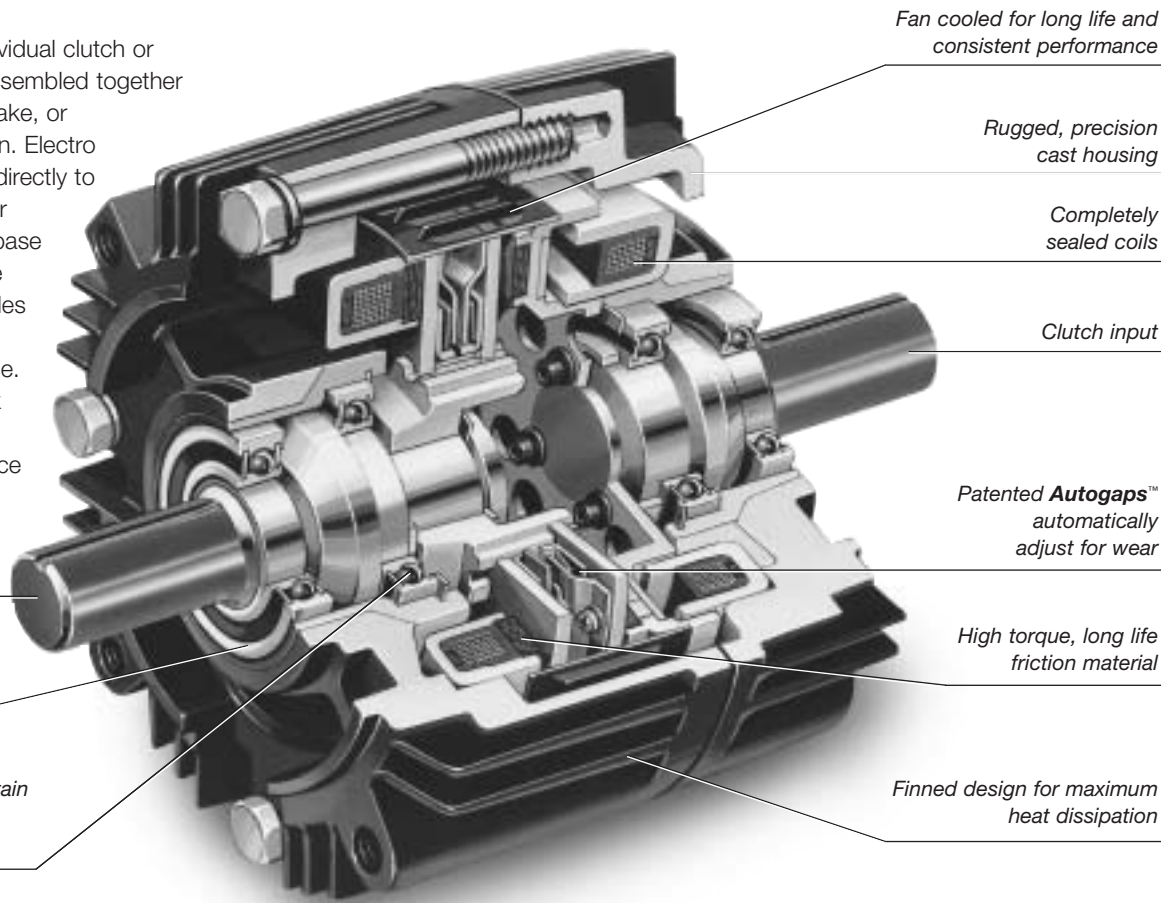
EUM-MBFB (Motor Brakes)

- 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.



Brake output

NEMA C-face compatible design

Heavy duty bearings maintain tight concentricities and running efficiency

Fan cooled for long life and consistent performance

Rugged, precision cast housing

Completely sealed coils

Clutch input

Patented **Autogaps™** automatically adjust for wear

High torque, long life friction material

Finned design for maximum heat dissipation

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 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

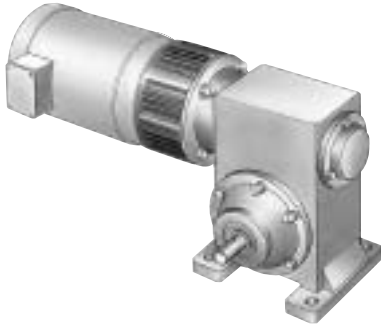
Stand alone units attach with pulleys, sprockets, etc. See page 122.

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
1/4	EM-50																
1/2																	
3/4	EM-100 or EM-180																
1																	
1-1/2	EM-210 or EM-215																
2																	
3																	
5																	
7-1/2																	

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)

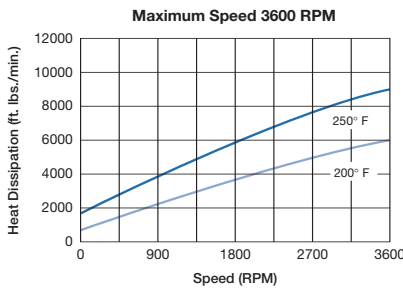
N = Speed in revolutions per minute. (RPM)

F = Cycle rate in cycles per minute (CPM)

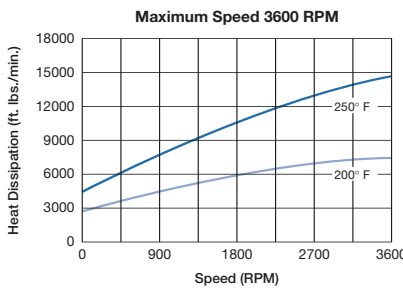
Compare the calculated heat generated in the application to the unit ratings using the heat dissipation curves. Select the appropriate unit that has adequate heat dissipation ability.

Heat Dissipation Curves

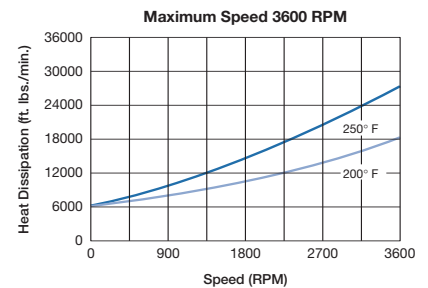
Size 50



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:

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

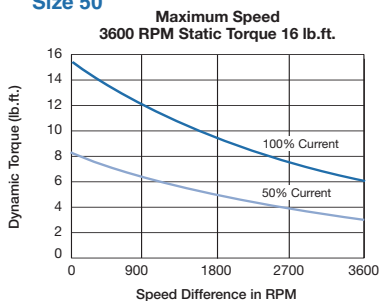
WR^2 = Total reflected inertia at the clutch/brake shaft. Include the clutch/brake output inertia. (lb. ft.²)

N = Speed in revolutions per minute. (RPM)

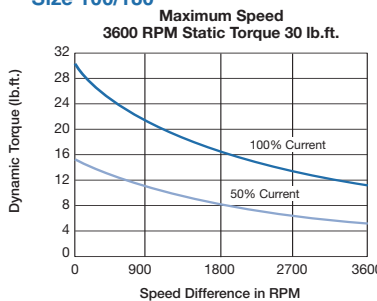
t = Time allowed for the engagement (sec)

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

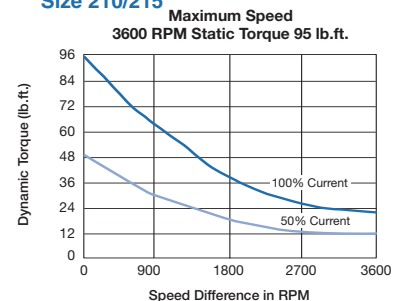
Size 50



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.



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.



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

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
30 Input Clutch Module	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
	EM-50-30	6	5370-270-019
	EM-50-30	24	5370-270-052
40 Output Clutch Module	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

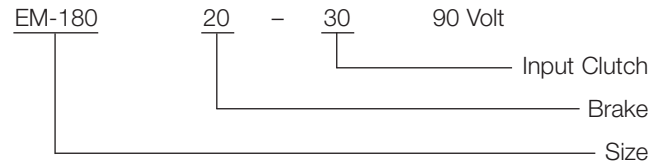
How to Order

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

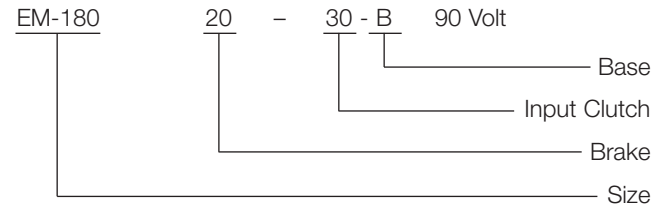


Base Mounted

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

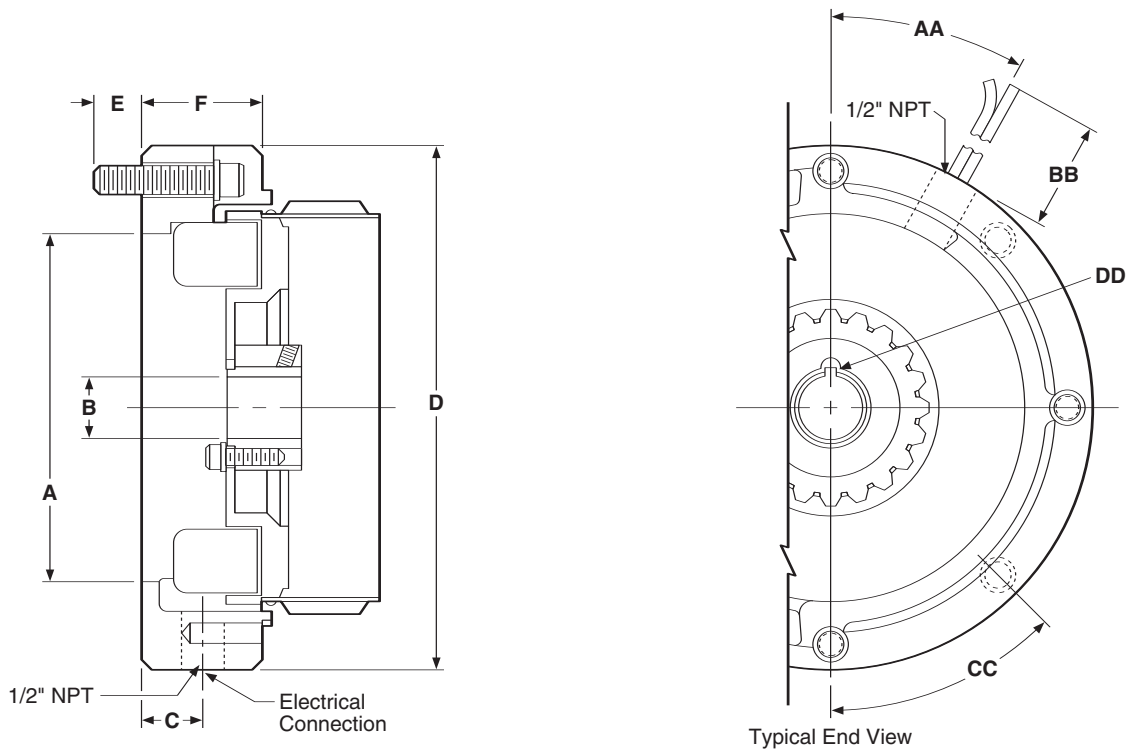
Specify voltage and whether 20 brake module is power-on (20) or electrically released (20FBB). See chart for specific part numbers. Order optional conduit box if desired.

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

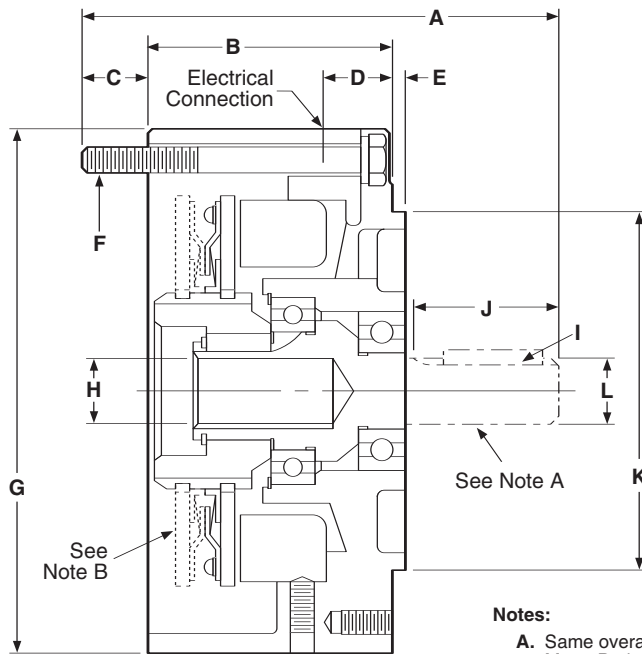
Model Size	Voltage DC	Static Torque lb. ft.	Max. RPM	Inertia-WR ² (lb.ft. ²)	Weight (lbs)	NEMA Frame Size
50	6, 24, 90	16	3600	.020	3.4	56C/48Y*
100	6, 24, 90	30	3600	.046	5.1	56C/48Y**
180	6, 24, 90	30	3600	.046	5.1	182C/143TC 184C/145TC
210	6, 24, 90	95	3600	.188	9.1	213C/182TC 215C/184TC

* 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.

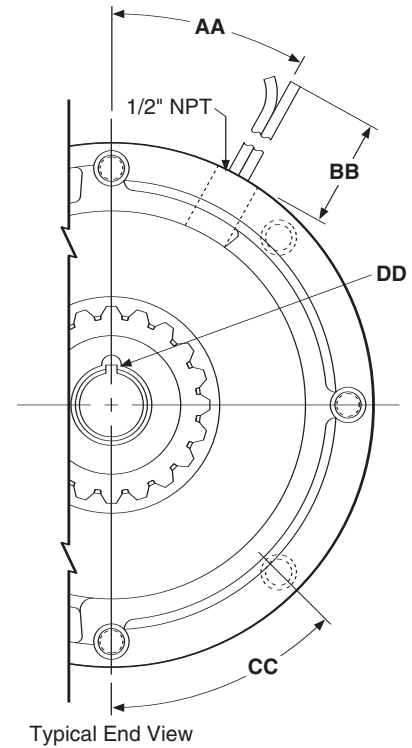
For NEMA Standard frame sizes, see page 137.

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.



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***

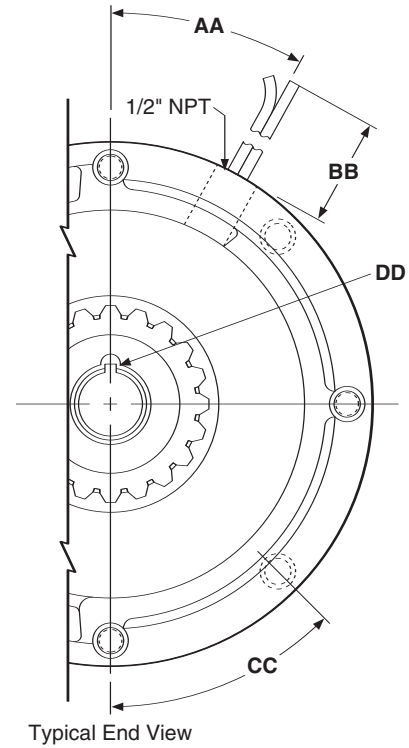
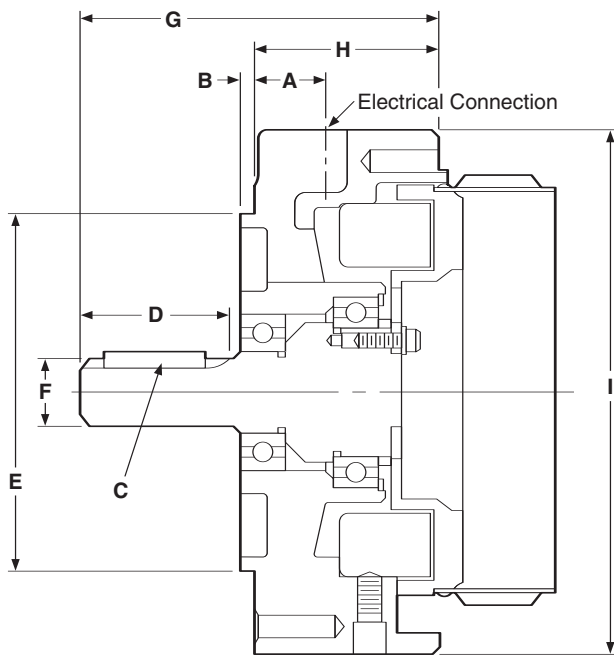
* For 56C/48Y Frame motors 3/4 HP and smaller the EM-100 size may be used where extended life is desirable.

** 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

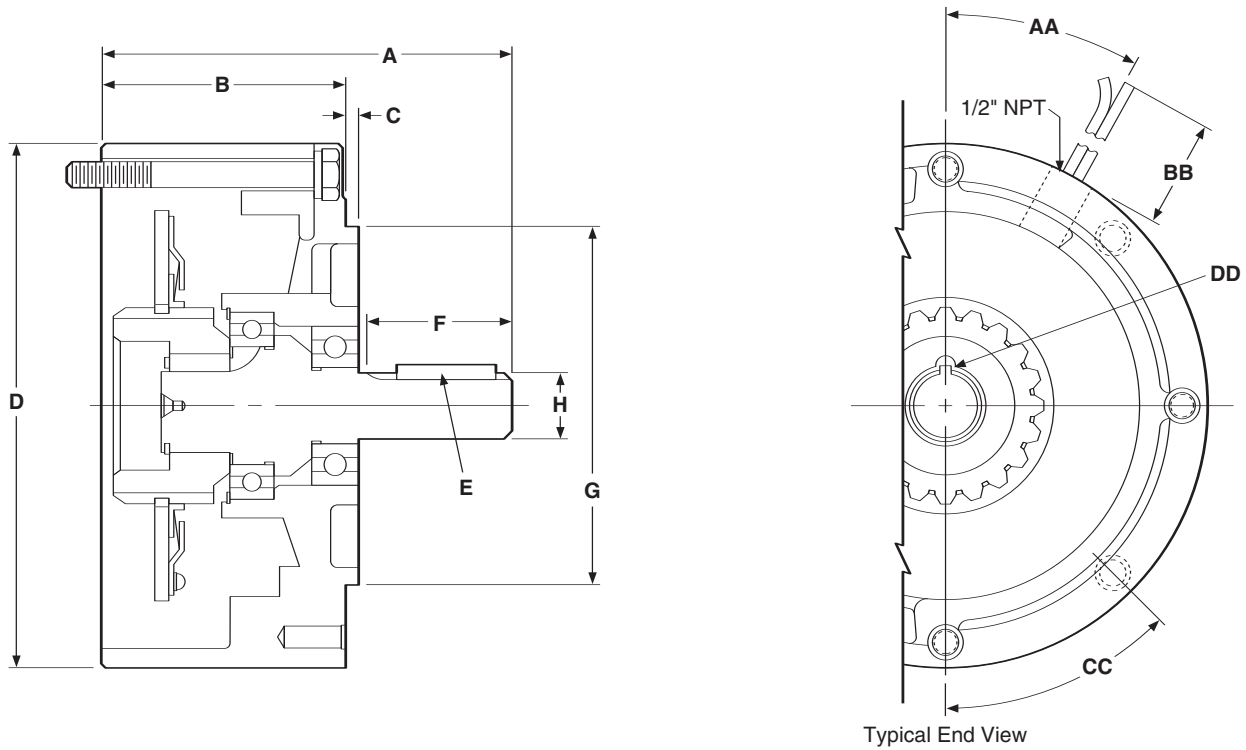
Specifications

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

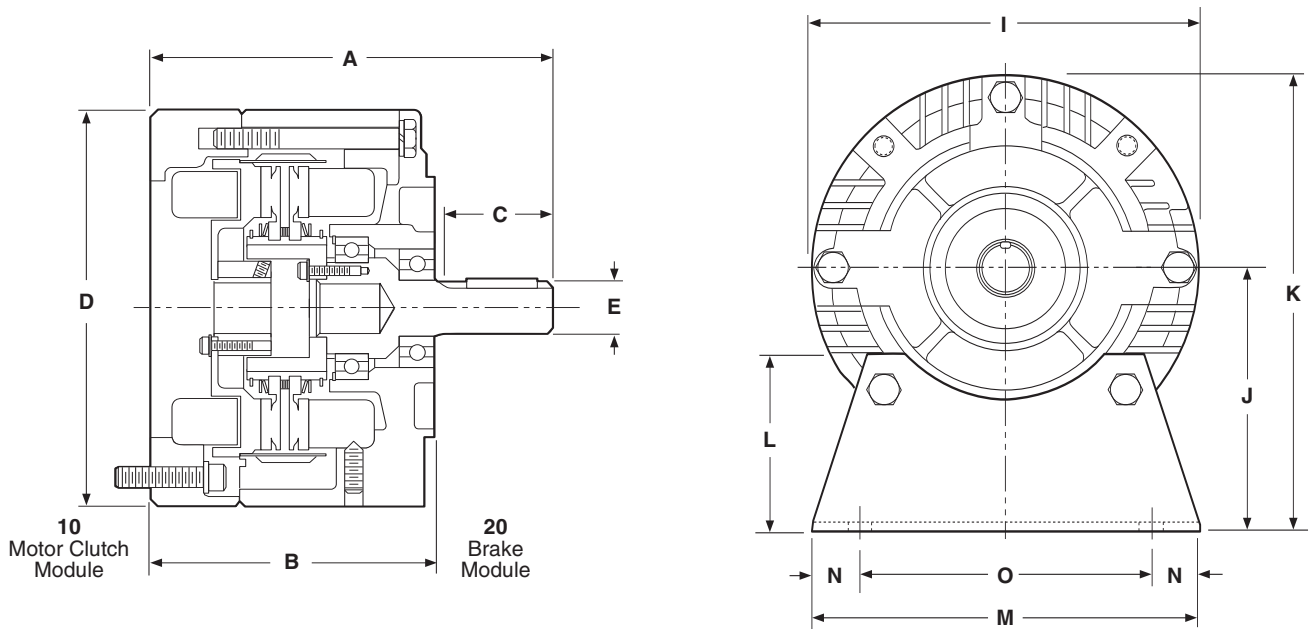
Model Size	Voltage DC	Static Torque lb. ft.	Max. RPM	Armatures	Inertia-WR ²		Shaft	Weight (lbs)	NEMA Frame Size
					Arm. Hub				
50	6, 24, 90	16	3600	.007	.002	.001	4.9	56C/48Y*	
100	6, 24, 90	30	3600	.018	.003	.002	5.2	56C/48Y**	
180	6, 24, 90	30	3600	.018	.003	.002	5.2	182C/143TC 184C/145TC	
210	6,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

EM-10/20 Clutch/Brake Combination



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.

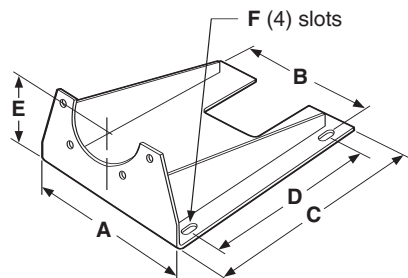
Size	A	B	C	D	E	I	J	K	L	M	N	O	NEMA Frame Size
50	6.750	4.844	1.813	6.750	.625	6.688	3.500	6.844	2.000	6.000	.500	5.000	56C/48Y*
100	6.750	4.844	1.813	6.750	.625	6.688	3.500	6.844	2.000	6.000	.500	5.000	56C/48Y**
180	6.828	4.844	1.891	6.750	.875	6.688	4.500	7.844	3.000	6.625	.813	5.000	182C/143TC 184C/145TC
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.

For NEMA standard frame sizes, see page 137.

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

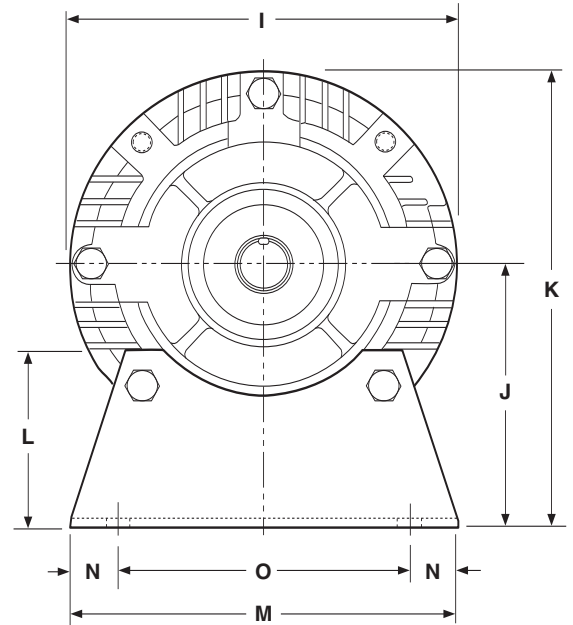
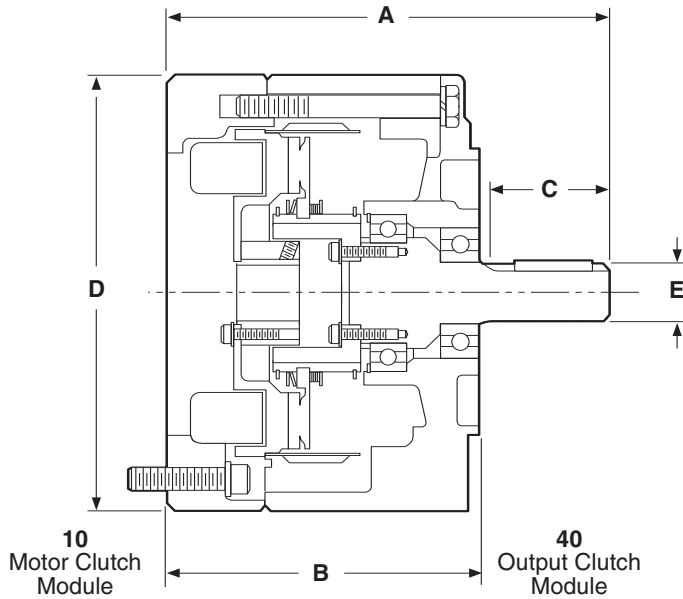
Motor Mount (M)



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-10/40 Motor Clutch/Output Clutch Combination



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.

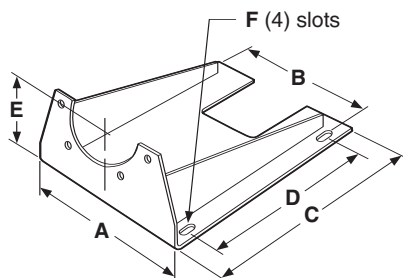
Size	A	B	C	D	E	I	J	K	L	M	N	O	NEMA Frame Size
50	6.750	4.844	1.813	6.750	.625	6.688	3.500	6.844	2.000	6.000	.500	5.000	56C/48Y*
100	6.750	4.844	1.813	6.750	.625	6.688	3.500	6.844	2.000	6.000	.500	5.000	56C/48Y**
180	6.828	4.844	1.891	6.750	.875	6.688	4.500	7.844	3.000	6.625	.813	5.000	182C/143TC 184C/145TC
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.

For NEMA standard frame sizes, see page 137.

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

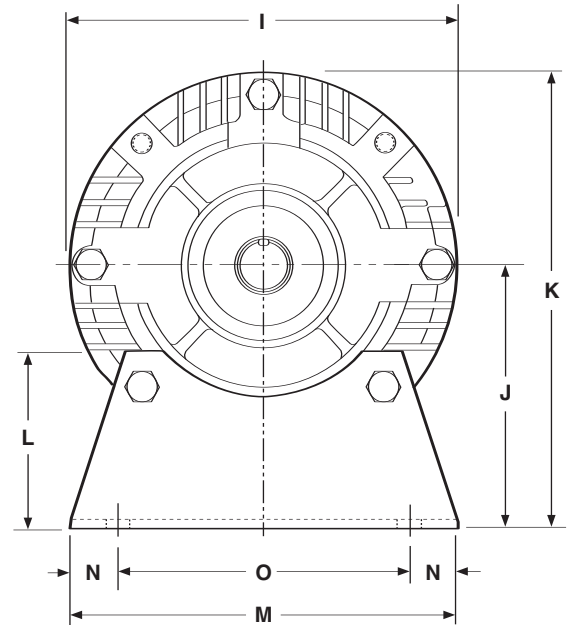
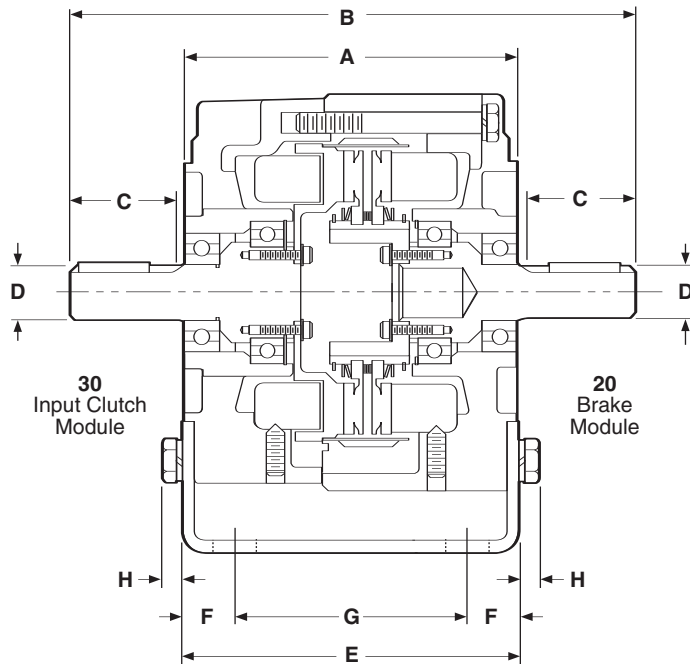
Motor Mount (M)



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

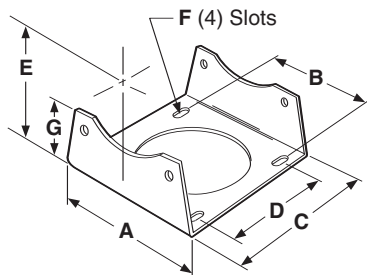


Note: Mounting base is optional and is ordered separately. Input Clutch (30) module and Brake Module (20) are ordered separately.

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

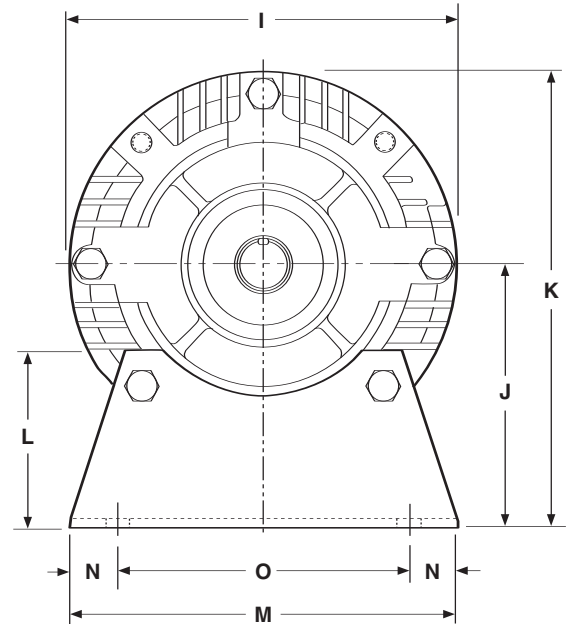
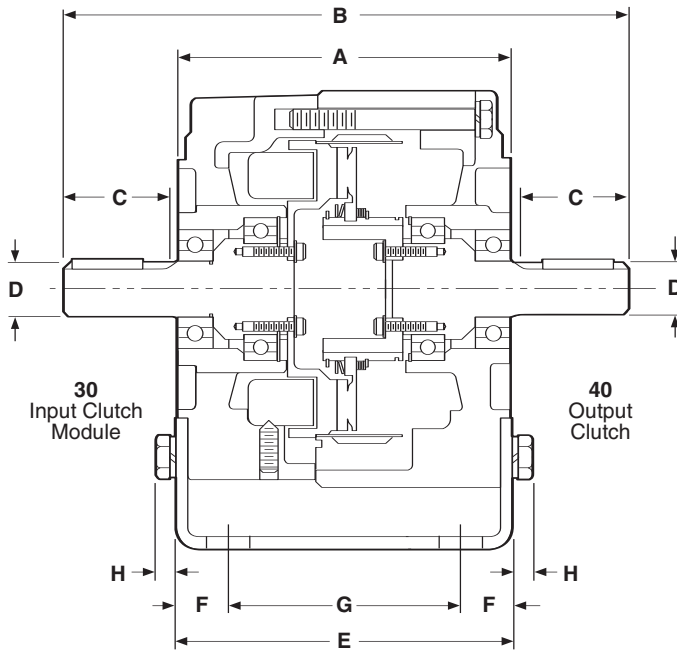
Base (B)



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

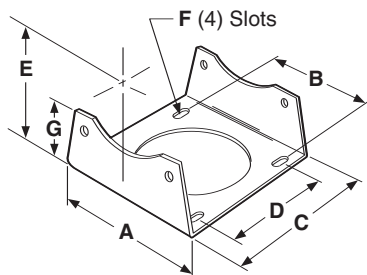


Note: Mounting base is optional and is ordered separately.
 Input Clutch (30) module and Output Clutch (40) are ordered separately.

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.

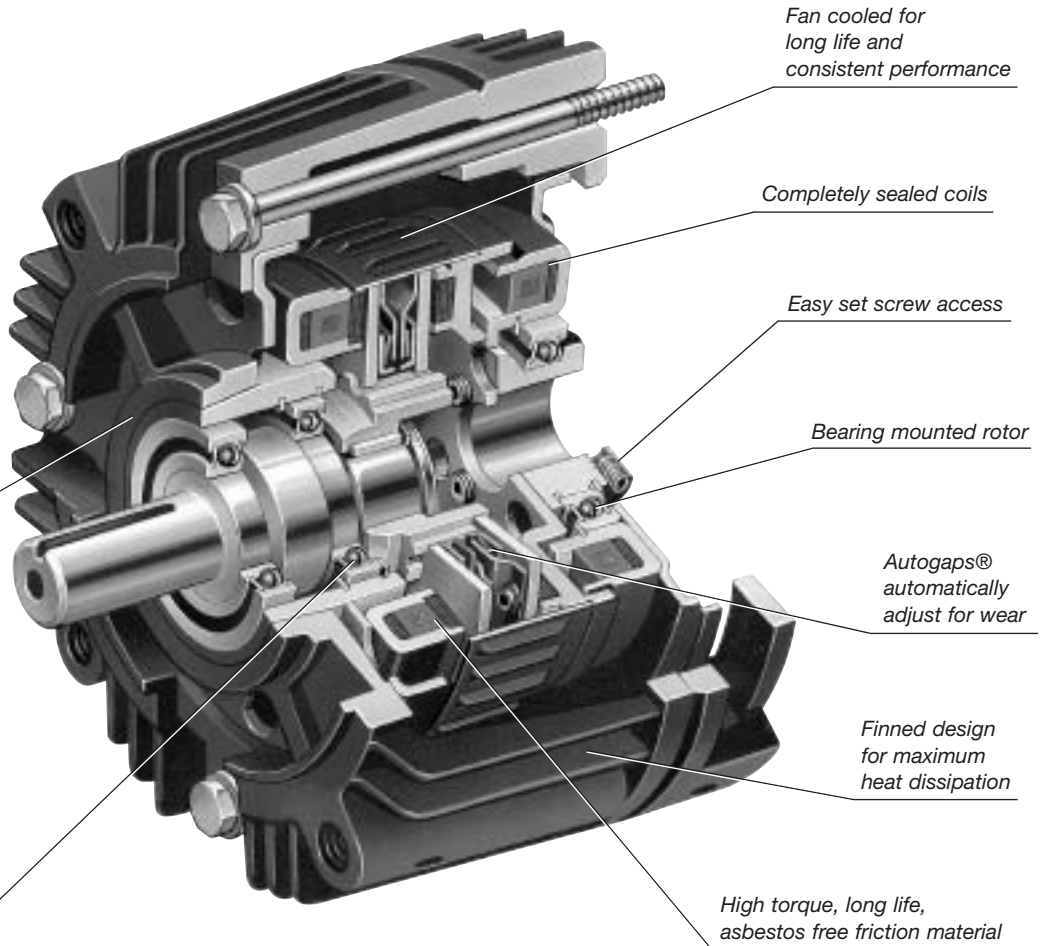
Size	A	B	C	D	F	E	G	Part No.
50/100	6.000	5.000	5.672	4.000	.750 X .406	3.500	2.000	5370-101-004
180	6.625	5.000	5.672	4.000	.750 X .406	4.500	3.000	5370-101-002/5370-101-049
210/215	9.000	7.750	8.203	6.000	.750 X .531	5.250	3.385	5371-101-001/5371-101-026

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

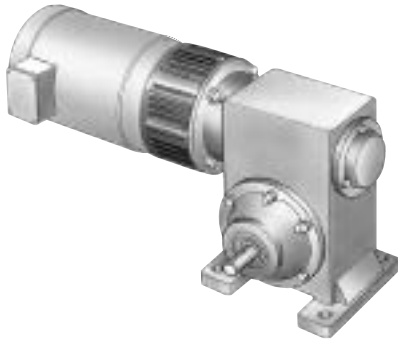
See page 130 for Electrically Released Brake specifications.

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.

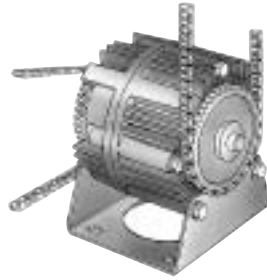
Frame Size Selection

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	UM-50																	
1/2	UM-50																	
3/4	UM-100 or UM-180																	
1	UM-100 or UM-180																	
1-1/2	UM-100 or UM-180																	
2	UM-210 OR UM-215																	
3	UM-210 OR UM-215																	
5	UM-215																	
7-1/2	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)

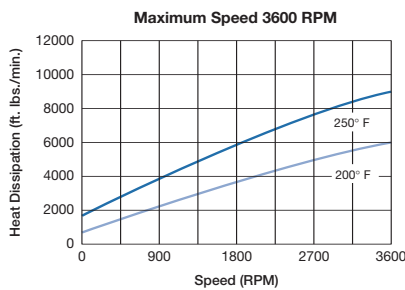
N = Speed in revolutions per minute. (RPM)

F = Cycle rate in cycles per minute (CPM)

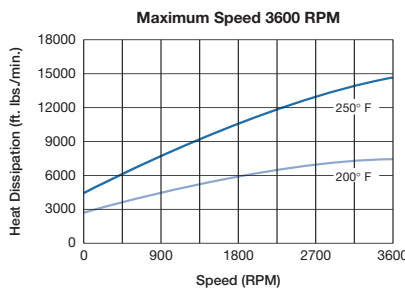
Compare the calculated heat generated in the application to the unit ratings using the heat dissipation curves. Select the appropriate unit that has adequate heat dissipation ability.

Heat Dissipation Curves

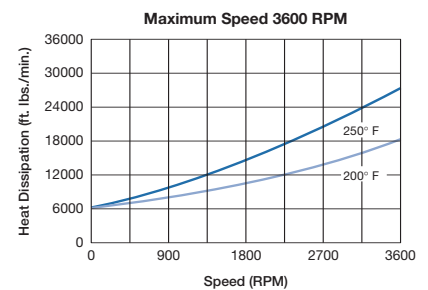
Size 50



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:

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

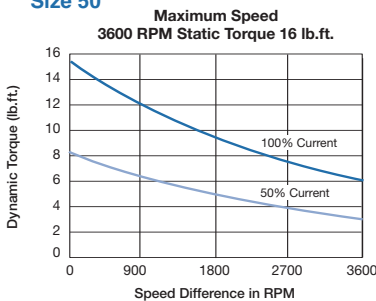
WR^2 = Total reflected inertia at the clutch/brake shaft. Include the clutch/brake output inertia. (lb. ft.²)

N = Speed in revolutions per minute. (RPM)

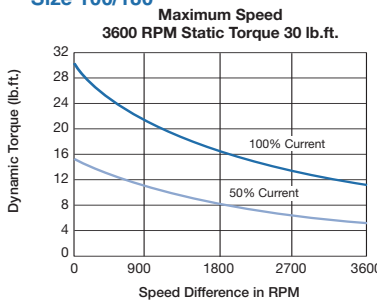
t = Time allowed for the engagement (sec)

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

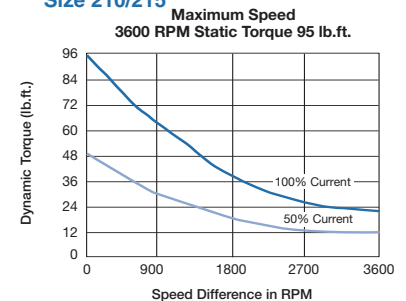
Size 50



Size 100/180



Size 210/215



Specifications

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		
	UM-215-1020	6 5371-273-076		
	UM-215-1020	24 5371-273-077		
	UM-215-1020	90 5371-273-078		
Motor Clutch/Brake				
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		
	UM-215-1040	6 5371-271-026		
	UM-215-1040	24 5371-271-027		
	UM-215-1040	90 5371-271-028		
Motor Clutch Output Clutch				
	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		
	UM-215-2030	6 5371-273-043		
	UM-215-2030	24 5371-273-044		
	UM-215-2030	90 5371-273-045		
Input Clutch/Brake				
	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		
	UM-215-3040	6 5371-271-021		
	UM-215-3040	24 5371-271-022		
	UM-215-3040	90 5371-271-023		
	Input Clutch Output Clutch			

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

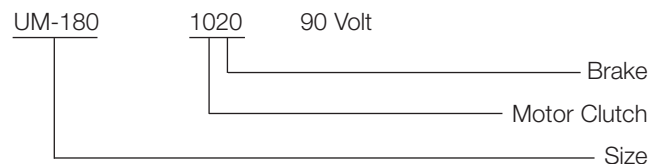
How to Order

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.

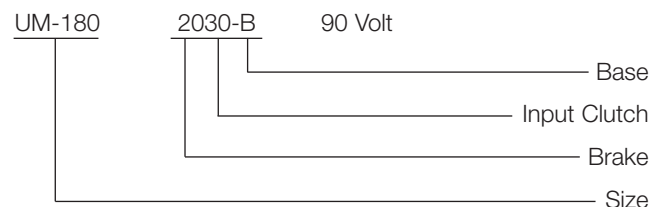
Example



Base Mounted

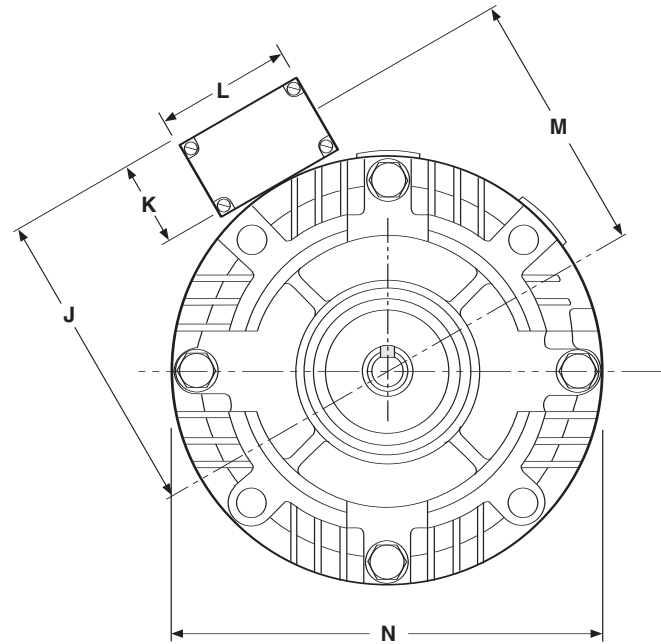
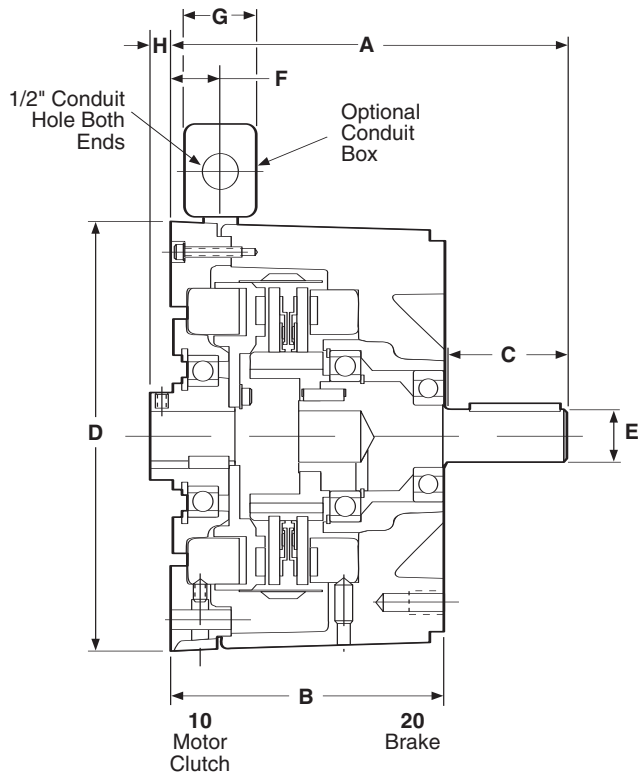
Simply combine the size number with the configuration of the required UniModule. Specify voltage. See chart for specific part numbers. Power-off brake UniModules are found on page 120. Order optional conduit box if desired.

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

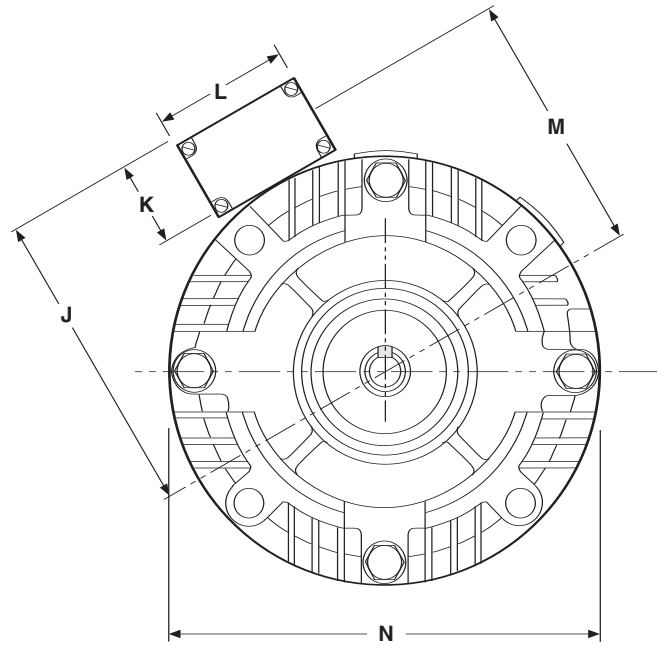
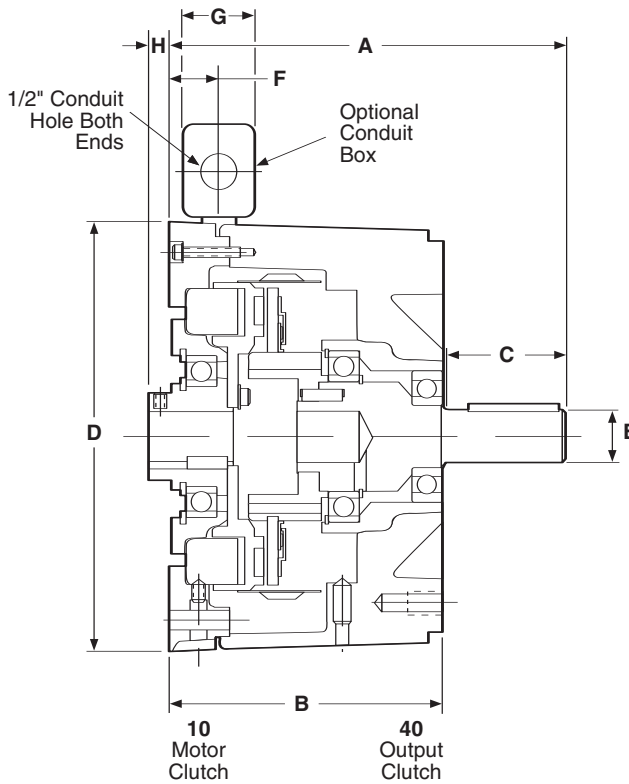
Model Size	Voltage DC	Static Torque lb. ft.	Max. RPM	NEMA Frame Size
50	6, 24, 90	16	3600	56C/48Y*
100	6, 24, 90	30	3600	56C/48Y**
180	6, 24, 90	30	3600	182C/143TC 184C/145TC
210	6, 24, 90	95	3600	213C/182TC 215C/184TC
215	6, 24, 90	95	3600	213TC/215TC

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

For NEMA standard frame sizes, see page 137.

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

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

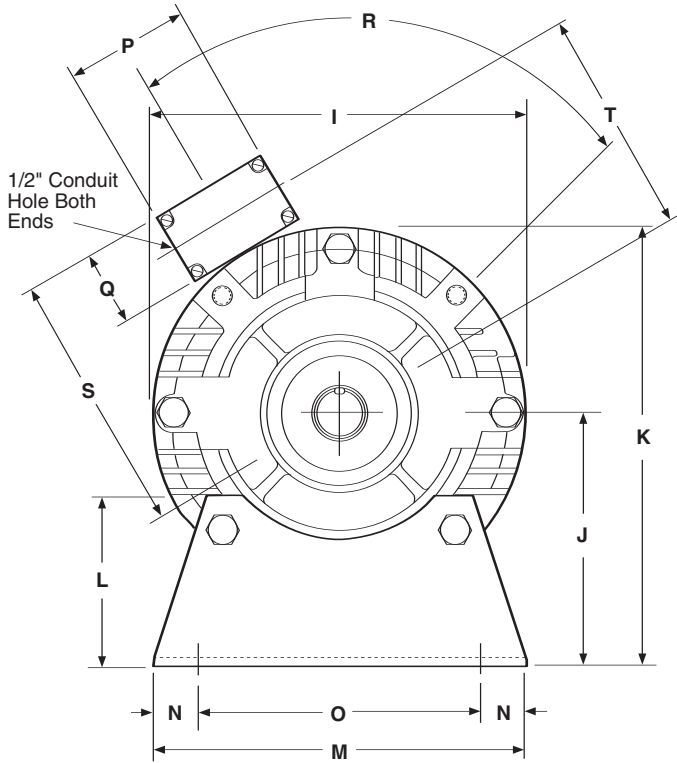
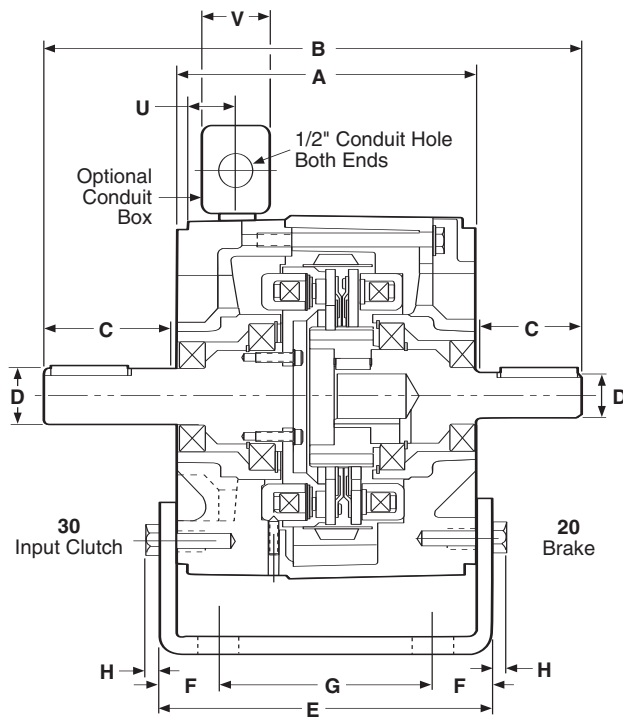
Model Size	Voltage DC	Static Torque lb. ft.	Max. RPM	NEMA Frame Size
50	6, 24, 90	16	3600	56C/48Y*
100	6, 24, 90	30	3600	56C/48Y**
180	6, 24, 90	30	3600	182C/143TC 184C/145TC
210	6, 24, 90	95	3600	213C/182TC 215C/184TC
215	6, 24, 90	95	3600	213TC/215TC

* 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.

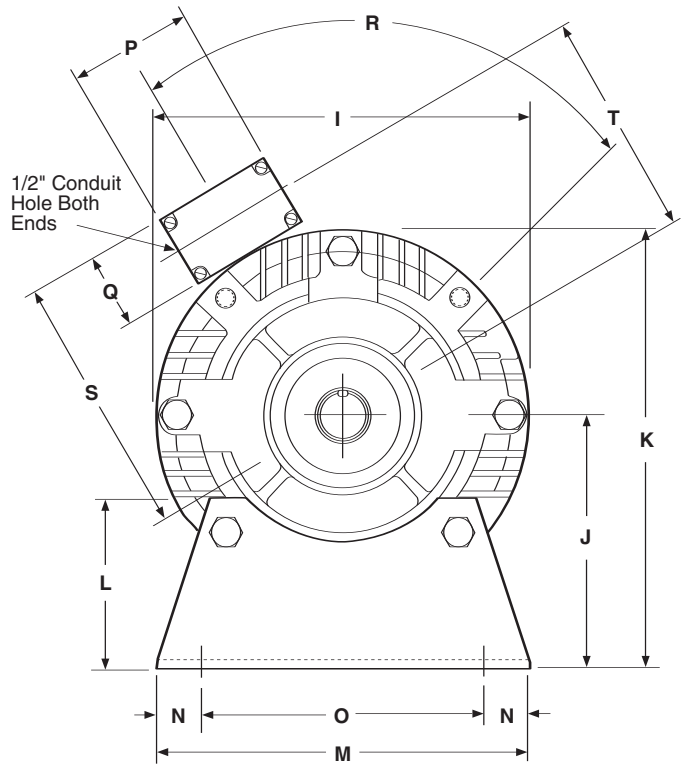
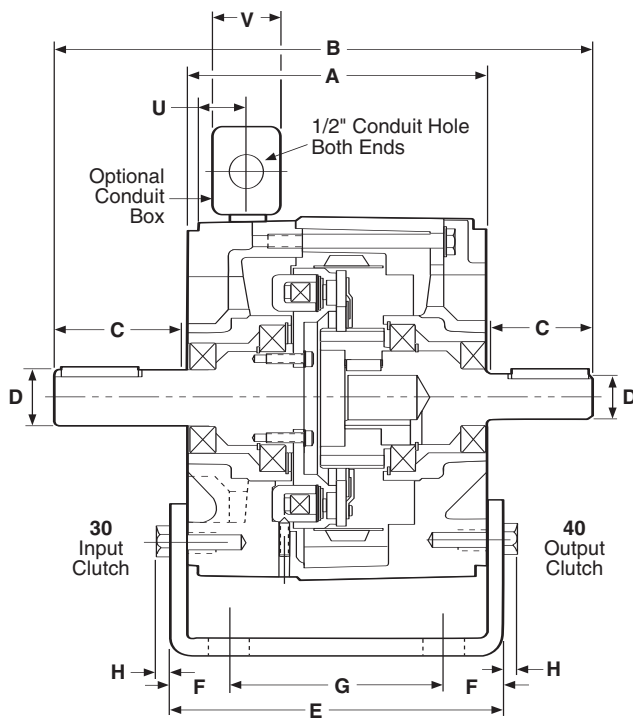
Size	A	B	C Min.	D	E	F	G	H	I	J	K	L	M
50	5.719	9.516	1.813	.625	5.672	.844	4.000	.344	6.688	3.500	6.844	2.000	6.000
100	5.719	9.516	1.890	.625	5.672	.844	4.000	.344	6.688	3.500	6.844	2.000	6.000
180	5.719	9.656	1.890	.875	5.672	.844	4.000	.344	6.688	4.500	7.844	3.000	6.625
210	7.719	12.969	2.500	1.125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

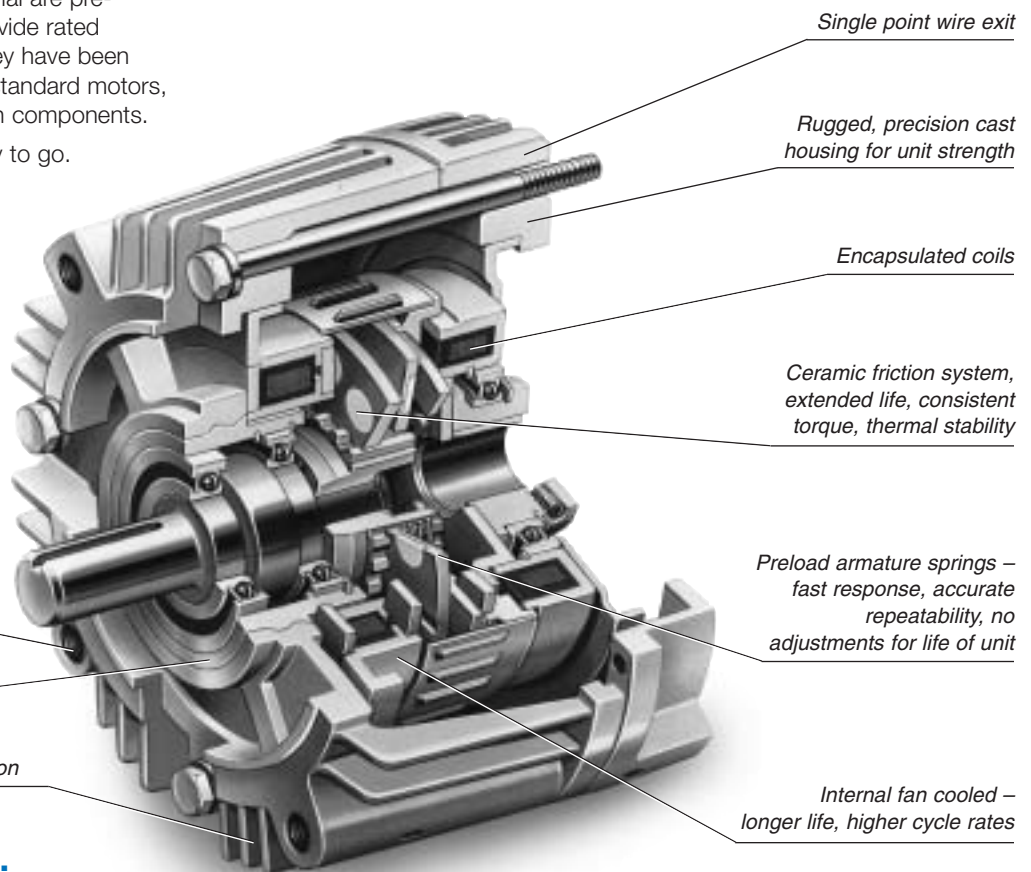
UniModules with ceramic friction material are pre-burnished during manufacturing to provide rated torque performance upon start up. They have been designed to mate easily with industry standard motors, reducers and other power transmission components.

- 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.



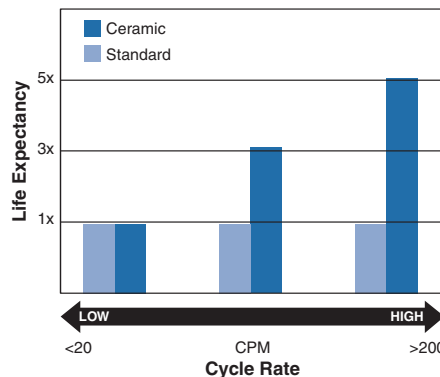
Consistent Torque and Cycle Repeatability

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.

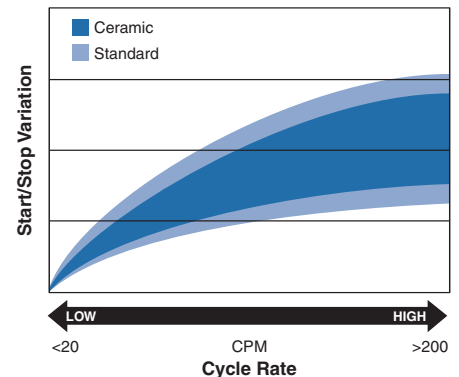
Controllability – Smooth Start/Stop

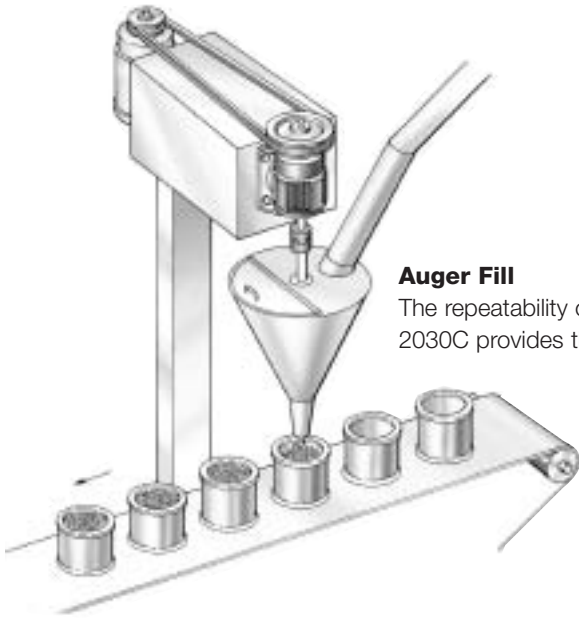
With the ceramic friction surfaces always in contact, dynamic torque response is fast and precise. When used with a CBC-700 over-excitation control and CBC-1000 programmable counter, exceptional closed loop clutch/brake performance can be achieved approaching that of more expensive motion control technologies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

UM-C Product Life



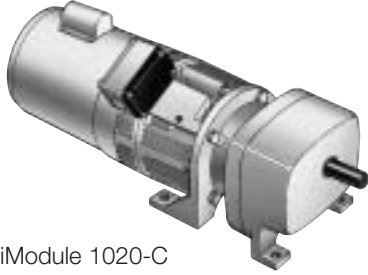
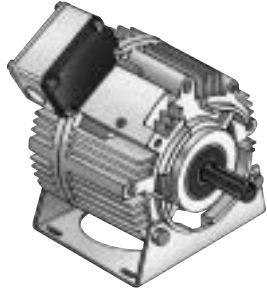
UM-C Cycle Repeat



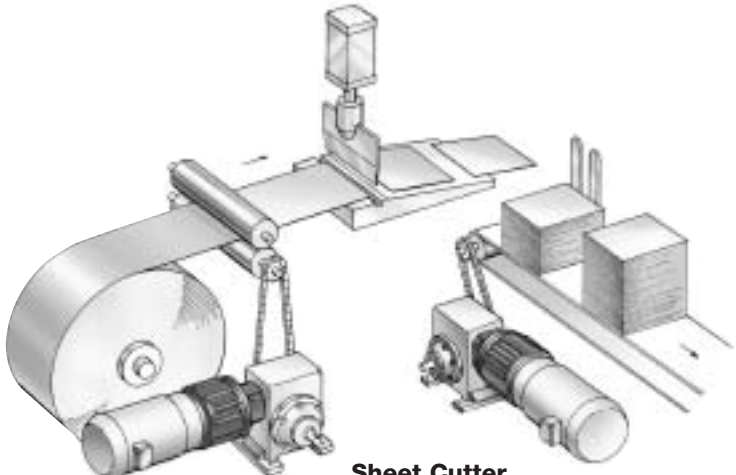


Auger Fill
The repeatability of the Ceramic UniModule 2030C provides the consistent fill levels.

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



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



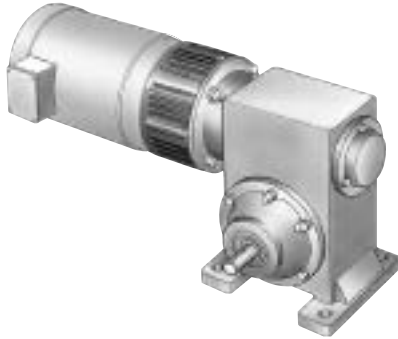
Sheet Cutter
The Ceramic UniModules provide high cycle rate clutch/brake indexing.

Selection

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

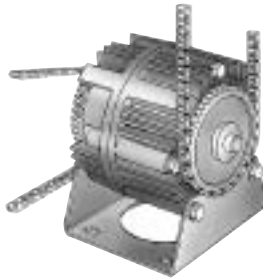
1. Determine Mounting Configuration

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																		
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)

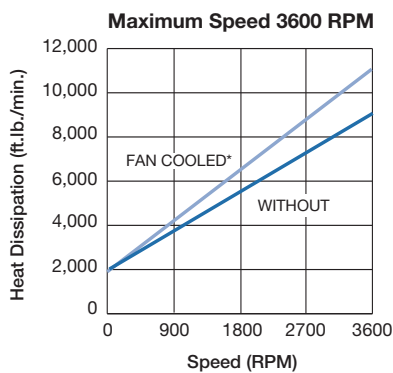
N = Speed in revolutions per minute. (RPM)

F = Cycle rate in cycles per minute (CPM)

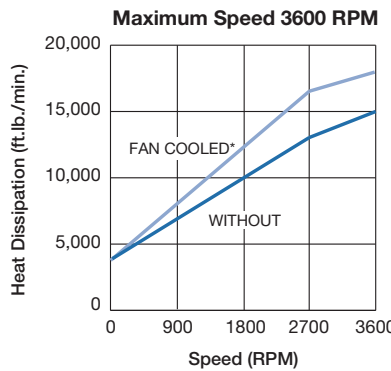
Compare the calculated heat generated in the application to the unit ratings using the heat dissipation curves. Select the appropriate unit that has adequate heat dissipation ability.

Heat Dissipation Curves

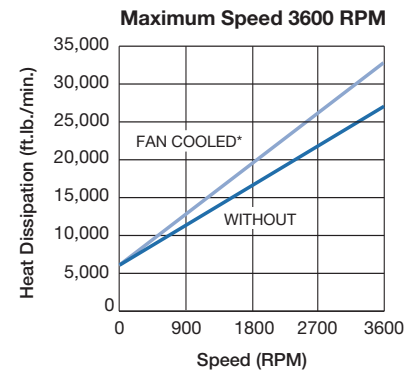
UM-50-C



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.)

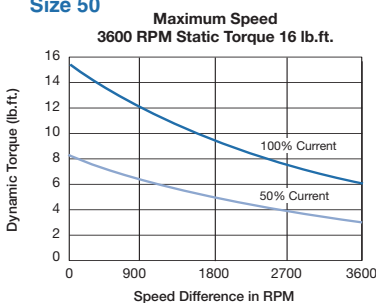
WR^2 = Total reflected inertia at the clutch/brake shaft. Include the clutch/brake output inertia. (lb. ft.²)

N = Speed in revolutions per minute. (RPM)

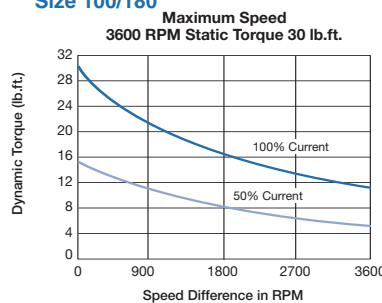
t = Time allowed for the engagement (sec)

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

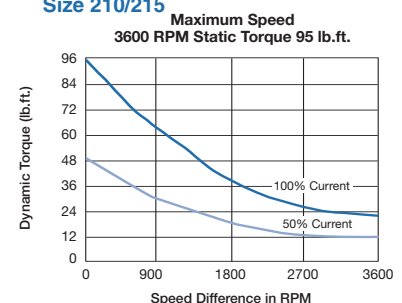
Size 50



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

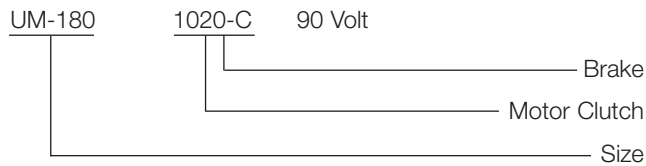
Description	UM-C Size	Part Number
Conduit Box Conduit Control	All sizes	5370-101-042
	CBC-150-1 (120 V)	6004-448-001
	CBC-150-2 (220 V)	6004-448-002
Fan Kits 1020	50	5370-101-055
	180	5370-101-054
	210	5371-101-029
Base Mount Kits for 1020-C	50	5370-101-004
	180	5370-101-002
	210	5371-101-001
Motor Mount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

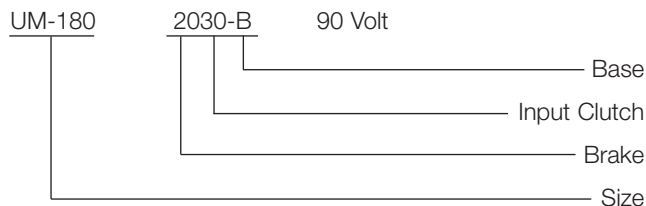
Example



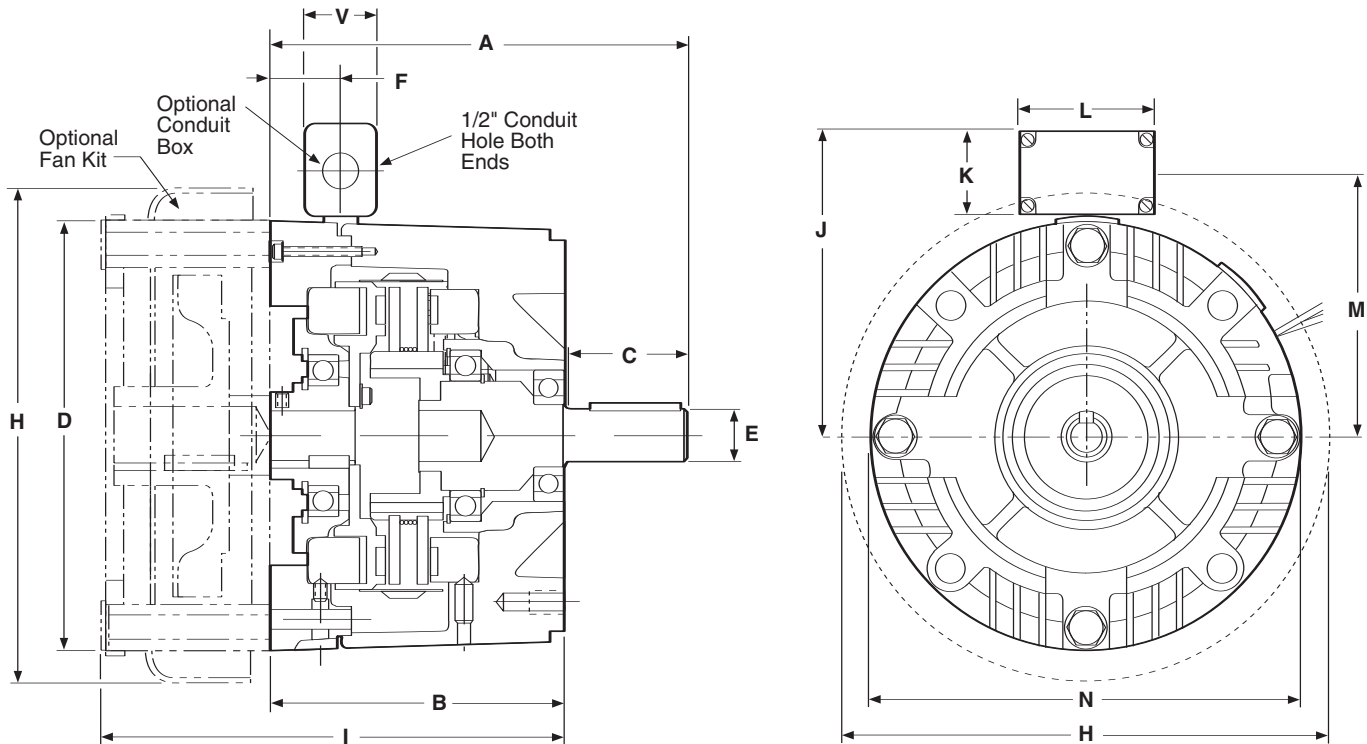
Base Mounted

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

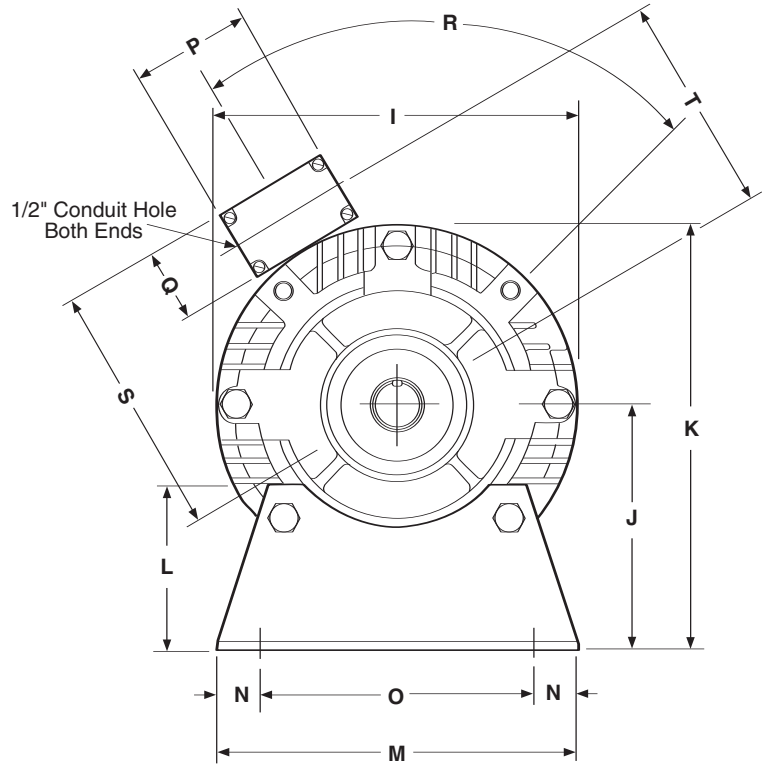
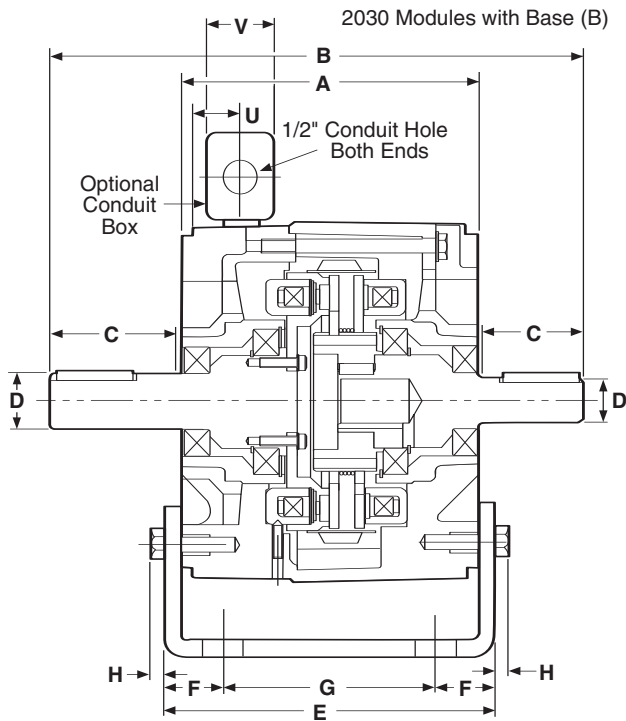
UniModule Size	Shaft Dia.	Static Torque lb. ft.	Horsepower	Max. RPM	Voltage DC	NEMA Frame Size
UM50-C	.625	16	1/4-3/4	3600	6, 24 and 90	56C/48Y
UM180-C	.875	30	1-2	3600	6, 24 and 90	182C/143TC 184C/145TC
UM210-C	1.125	95	3-5	3600	6, 24 and 90	213/182TC 215C/184TC

For NEMA Standard Frame size, see page 137.



Tel: (011) 4222-5040 Fax: (011) 4201-2478.
info@tekmatic.com.ar - www.tekmatic.com.ar

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

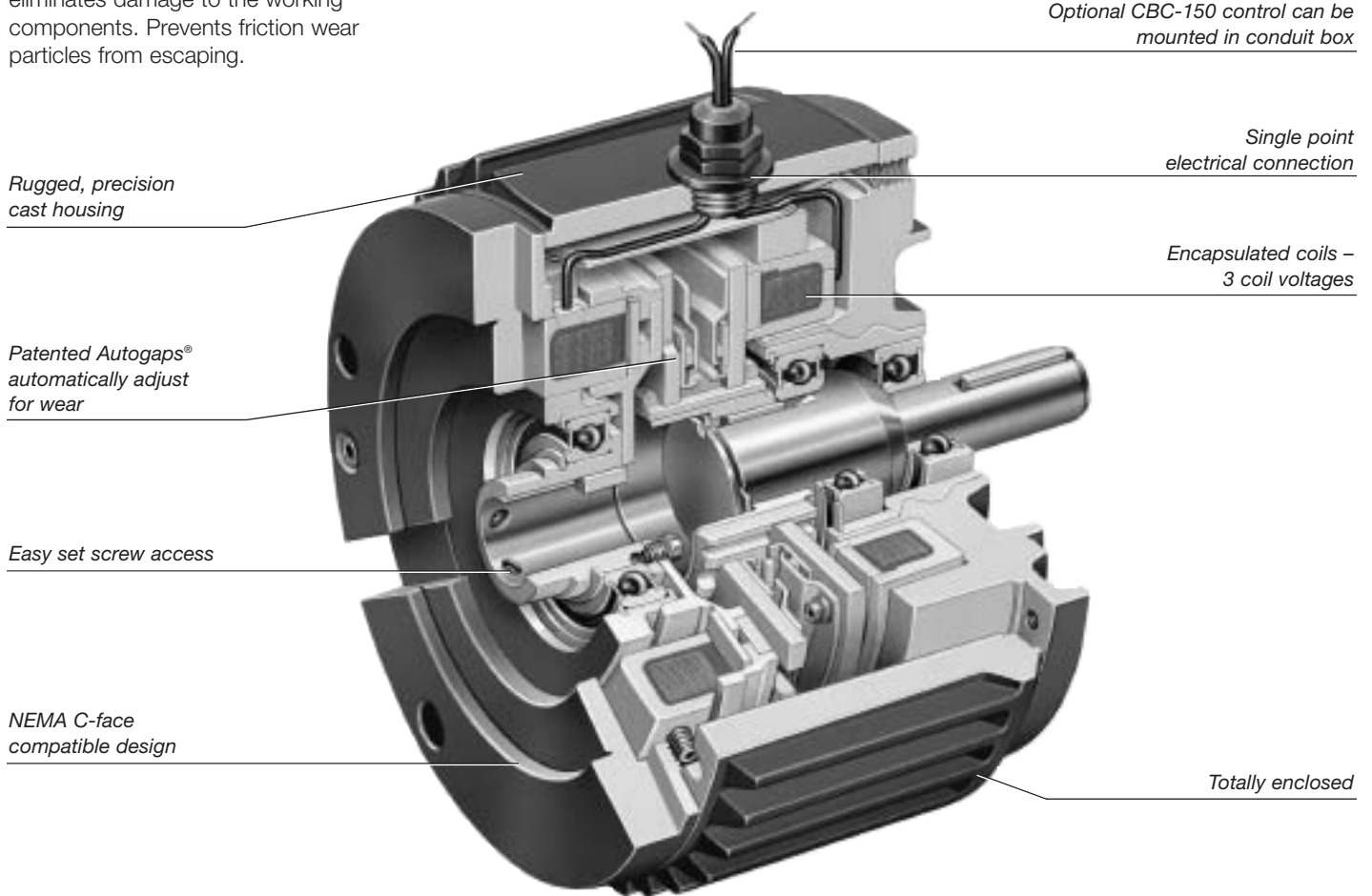
For NEMA standard frame sizes, see page 137.



Tel: (011) 4222-5040 Fax: (011) 4201-2478.
info@tekmat.com.ar - www.tekmat.com.ar

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



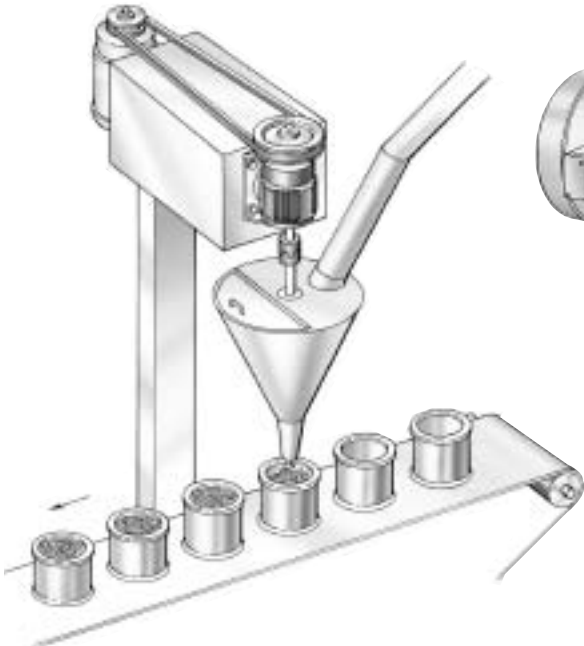
EUM-W Series Clutch/Brakes Washdown Unit

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.

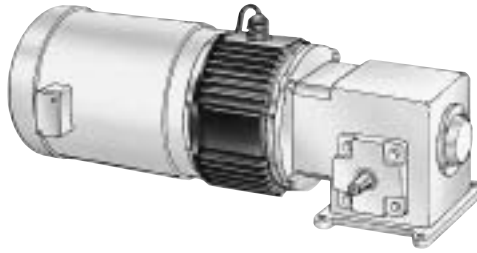
- USDA approved coating
- Stainless steel shafting
- Sealing (gaskets and plugs)
- Smooth exterior – easy washdown
- Corrosion resistant hardware
- Sealed/shielded bearings
- Baffled ventilation system
- Designed for IP65 enclosure requirements
- UL listed when conduit box is employed
- BISSC Certified

Applications and Mounting Configurations

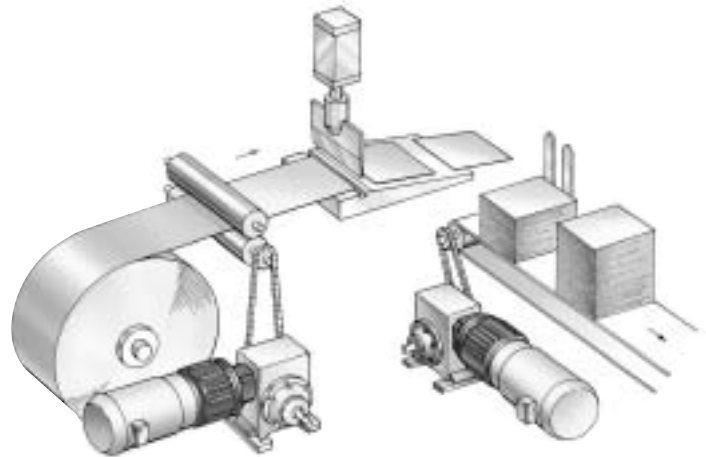


Auger Filler

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

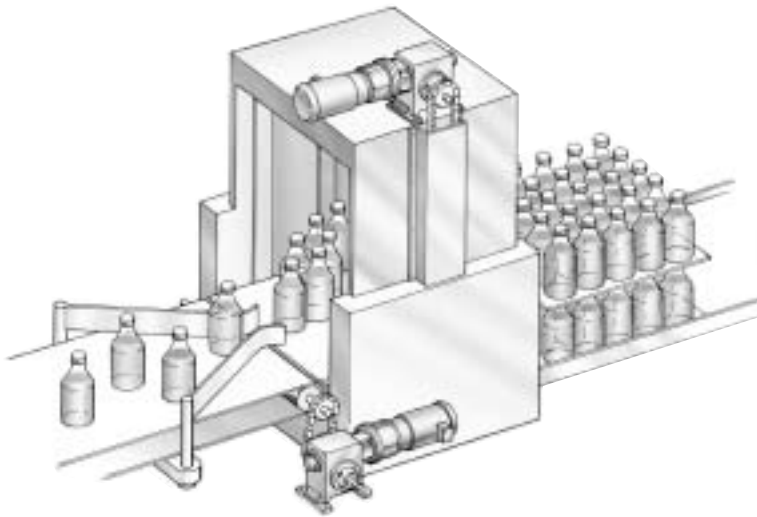


Enclosed UniModule 1040 clutch unit mounted between a C-face motor and reducer.



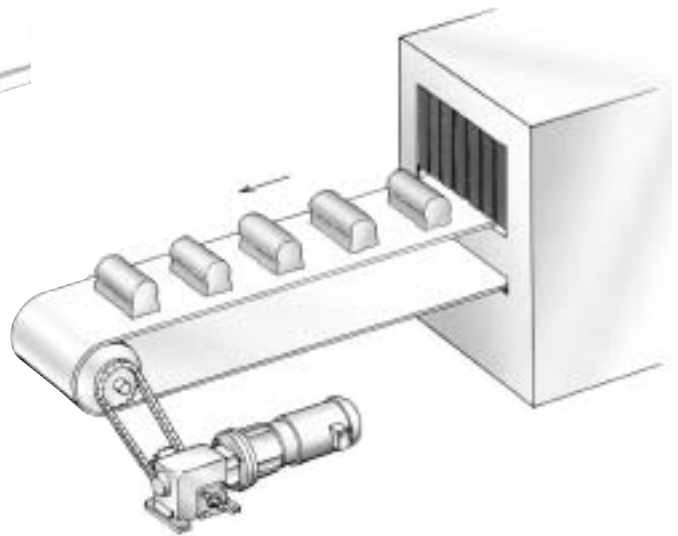
Sheet Cutter

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.



Food Handling

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

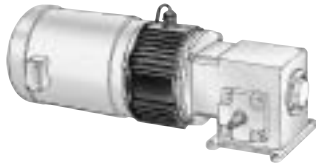


Enclosed UniModule 2030 assembly base mounted for separate drive mounting.

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.

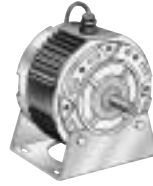
Frame Size Selection

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	Shaded																		
1/2	Shaded													EUM-50					
3/4		Shaded																	
1		Shaded								EUM-100/180									
1-1/2			Shaded																
2				Shaded						EUM-210/215									
3					Shaded														
5						Shaded													
7-1/2							Shaded												
10								Shaded											

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)

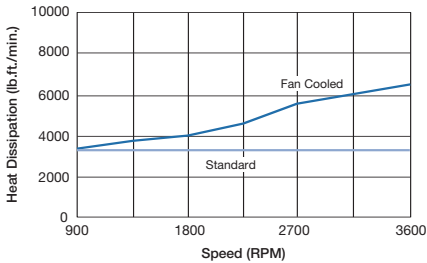
N = Speed in revolutions per minute. (RPM)

F = Cycle rate in cycles per minute (CPM)

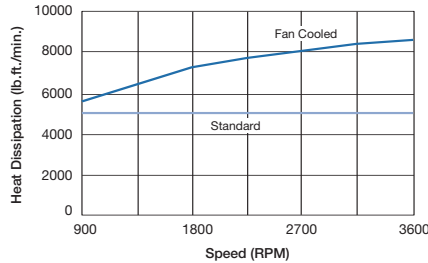
Compare the calculated heat generated in the application to the unit ratings using the heat dissipation curves. Select the appropriate unit that has adequate heat dissipation ability.

Enclosed UniModule Heat Dissipation Curves

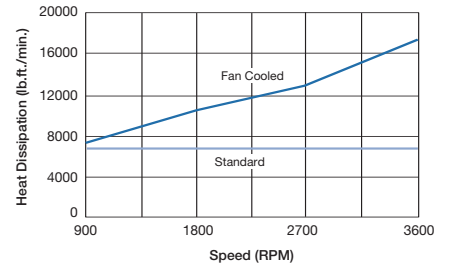
EUM 50



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 = Average Dynamic Torque (lb. ft.)

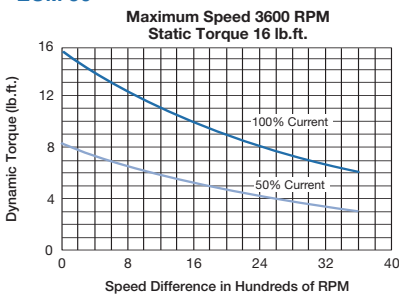
WR^2 = Total reflected inertia at the clutch/brake shaft. Include the clutch/brake output inertia. (lb. ft.²)

N = Speed in revolutions per minute. (RPM)

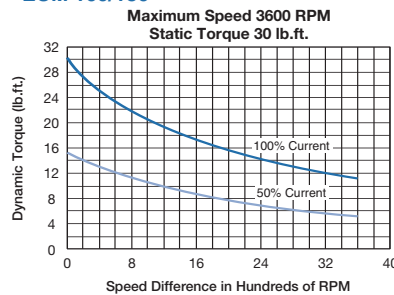
t = Time allowed for the engagement (sec)

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

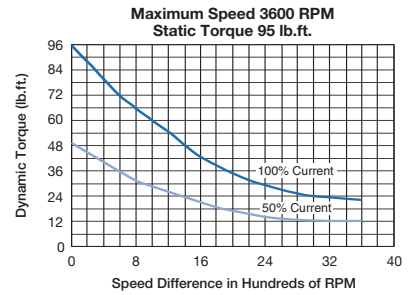
EUM 50



EUM 100/180



EUM 210/215



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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.



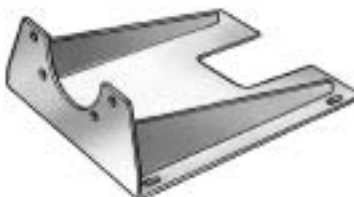
c. Fan Kit (1020 only)

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		
	6	5370-273-058
EUM-50-1020	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		
	6	5370-273-100
EUM-50-1020W	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		
	6	5370-273-104
EUM-50-2030W	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

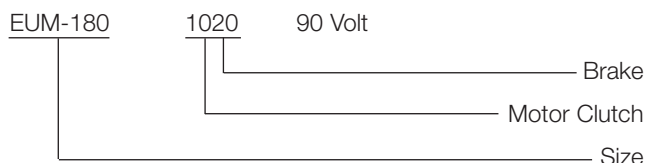
* Because of diameter limitations, EUM bases are available in 4.5" center height (143/145TC) only.

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.

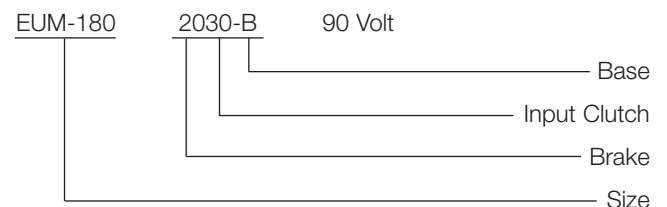
Example



Base Mounted

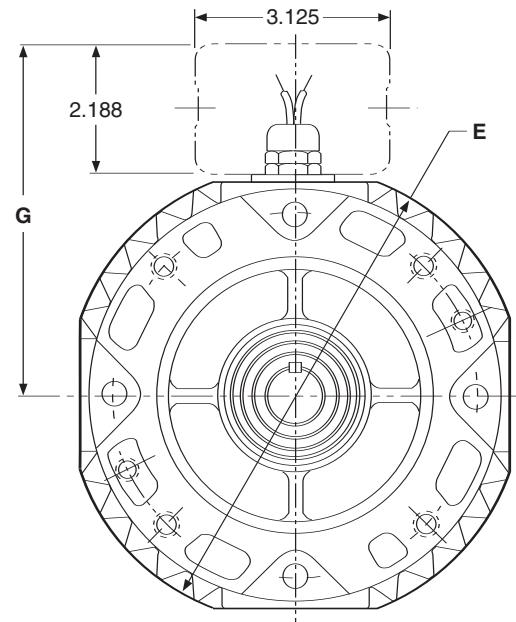
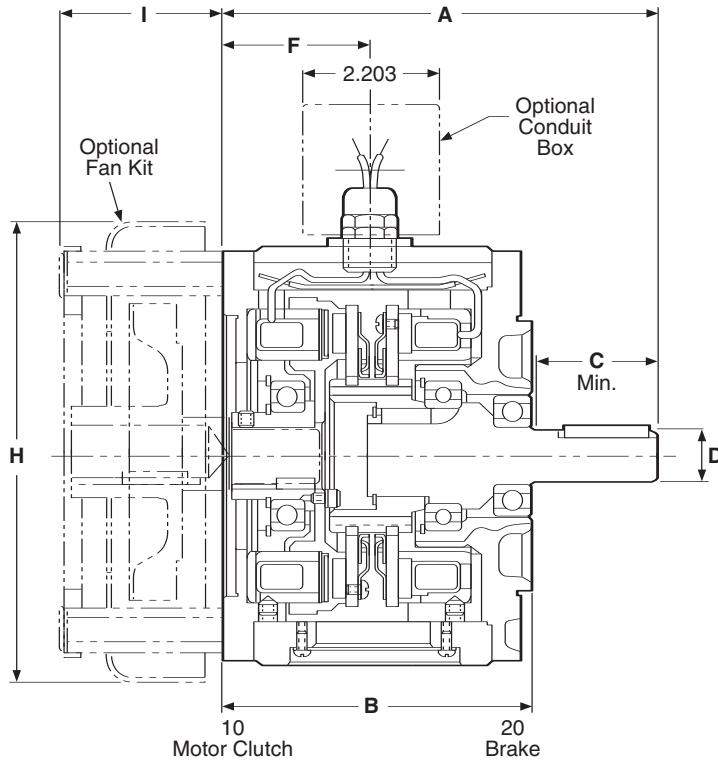
Simply combine the size number with the configuration of the required UniModule. Specify voltage. See chart for specific part numbers. Order optional conduit box if desired.

Example



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



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				
50/100	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

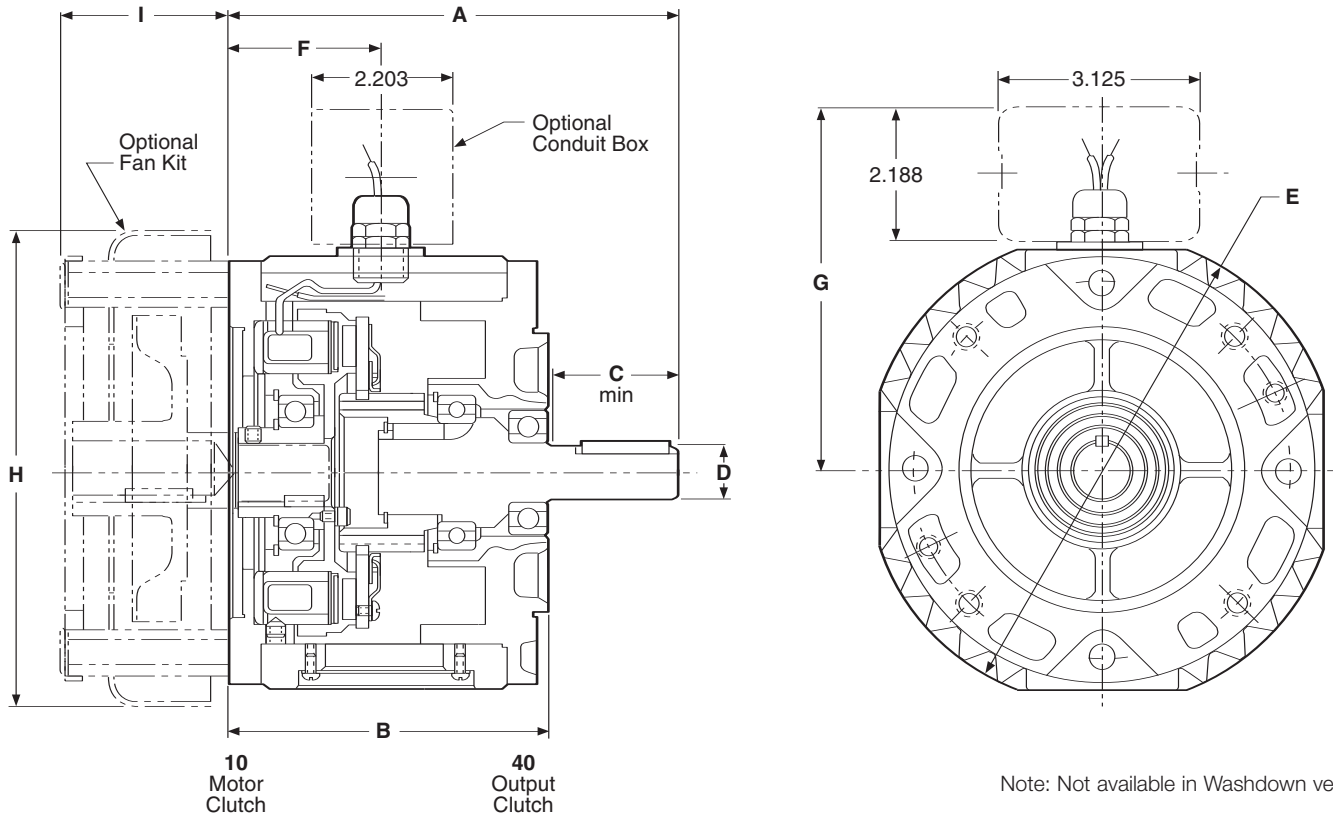
UniModule Size	Shaft Dia.	Horsepower	Static Torque lb. ft.	CPM @1750 RPM	Max. RPM	Voltage DC	NEMA Frame Size
EUM50	.625	1/4-3/4	16	125	3600	6, 24 or 90	56C/48Y
EUM100	.625	1	30	90	3600	6, 24 or 90	56C/48Y
EUM180	.875	1-2	30	90	3600	6, 24 or 90	182C/143TC 184C/145TC
EUM210	1.125	3-5	95	37	3600	6, 24 or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



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EUM-1040 Clutch Combination



Note: Not available in Washdown version.

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

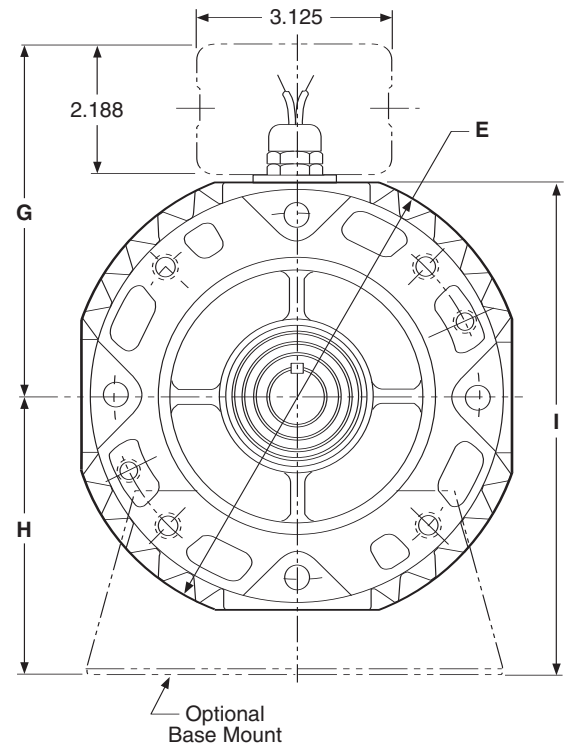
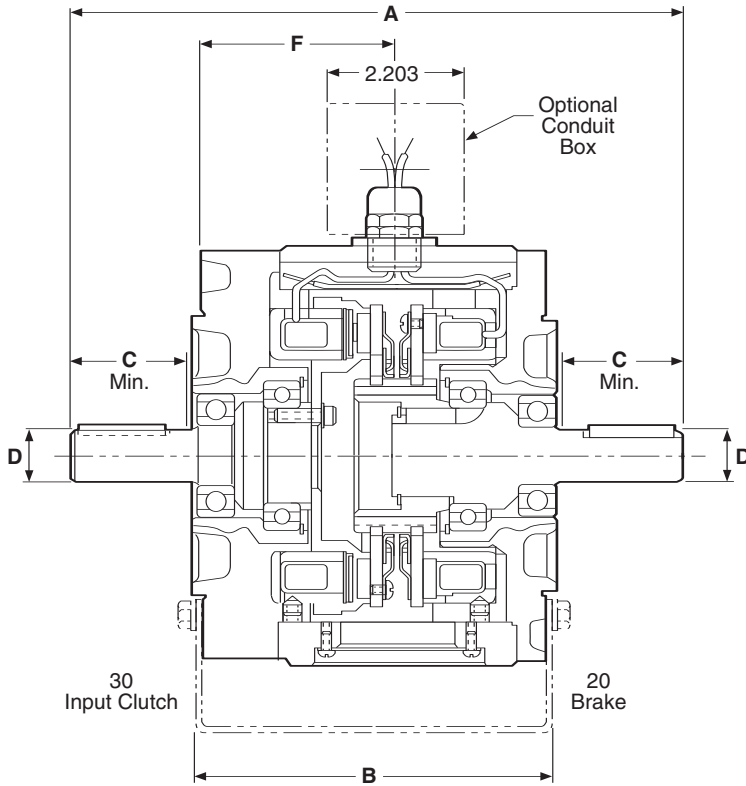
UniModule Size	Shaft Dia.	Horsepower	Static Torque lb. ft.	CPM @1750 RPM	Max. RPM	Voltage DC	NEMA Frame Size
EUM50	.625	1/4-3/4	16	125	3600	6, 24 or 90	56C/48Y
EUM100	.625	1	30	175	3600	6, 24 or 90	56C/48Y
EUM180	.875	1-2	30	175	3600	6, 24 or 90	182C/143TC 184C/145TC
EUM210	1.125	3-5	95	32	3600	6, 24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

For NEMA standard frame sizes, see page 137.



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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.



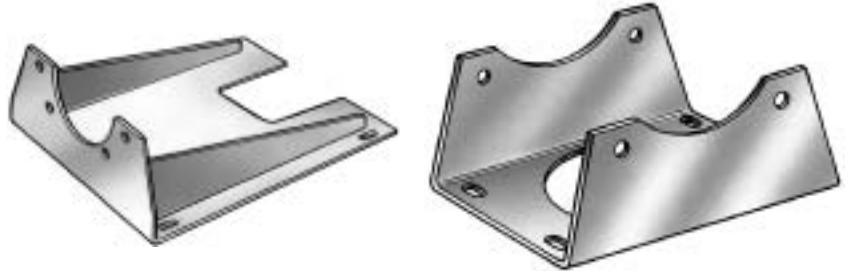
Fan Kit (UM and EUM 1020 only)

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.



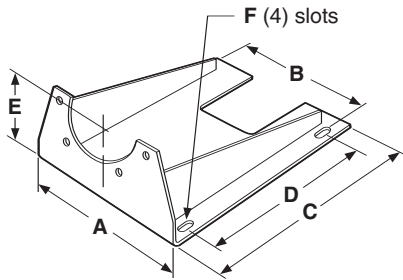
Mounting Brackets

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)

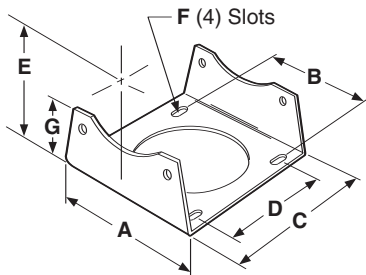
Motor Mount (M)



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

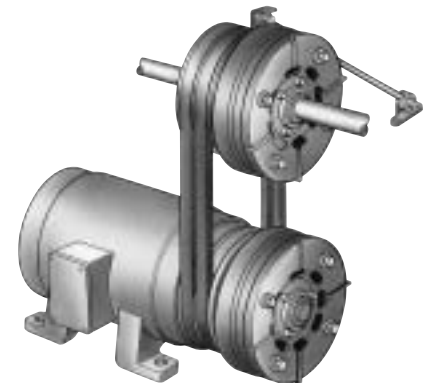
EB Series

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

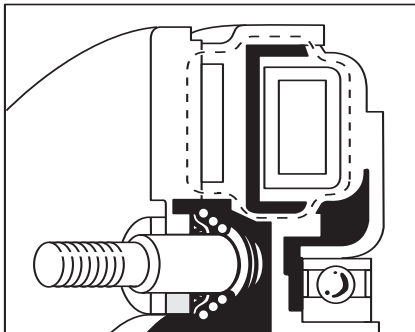
Torque arm feature makes Electro Brakes easy to install on any through shaft or double shaft motor.

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

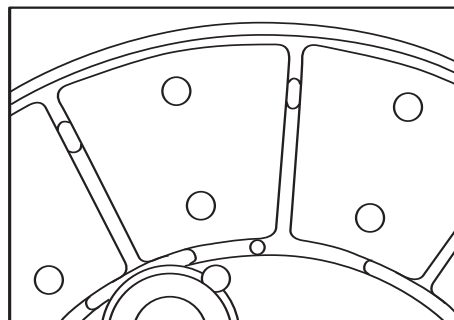


Motor mounted Electro Clutch used in combination with an Electro Brake on a through shaft installation.



Brushless Design

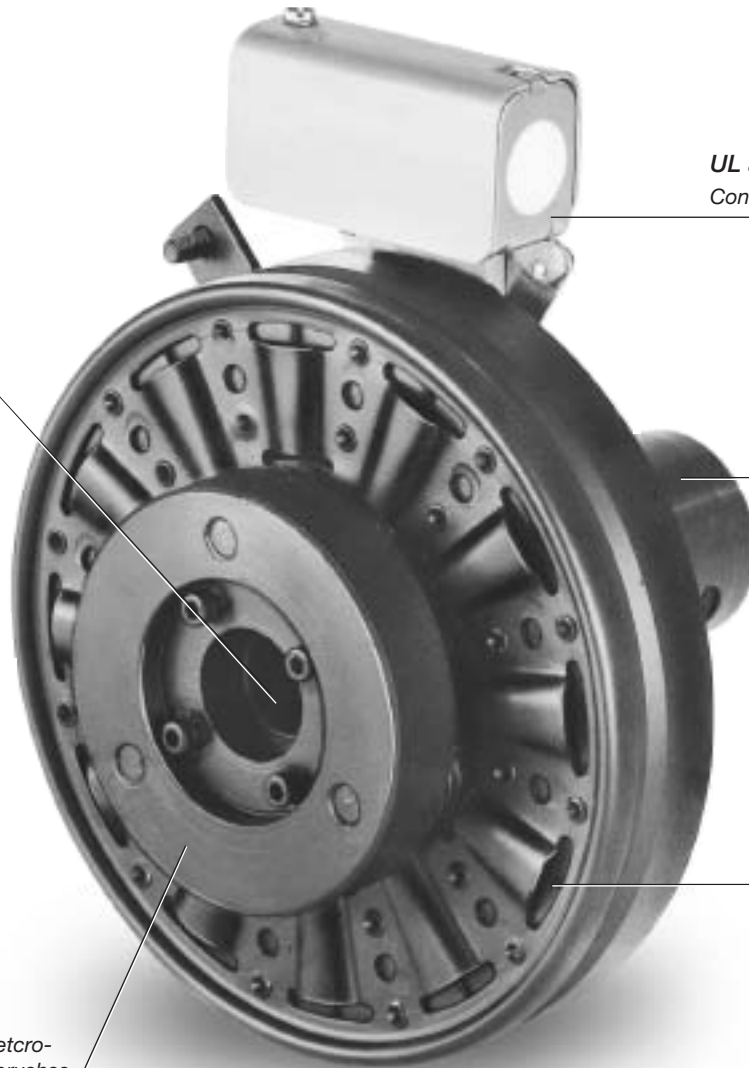
Warner Electric designed electromagnetic circuit eliminates brushes.



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



Mounting flexibility

Standard Electro Clutches are offered in a wide variety of bore sizes.

UL and CSA listed

Conduit box meets industry standards.

Simple installation

Easy-to-install a pulley, sprocket, sheave or gear on the Electro Clutch shaft extension.

Long life – no maintenance

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

No brushes to wear out

Warner Electric designed electro-magnetic circuit eliminates brushes.

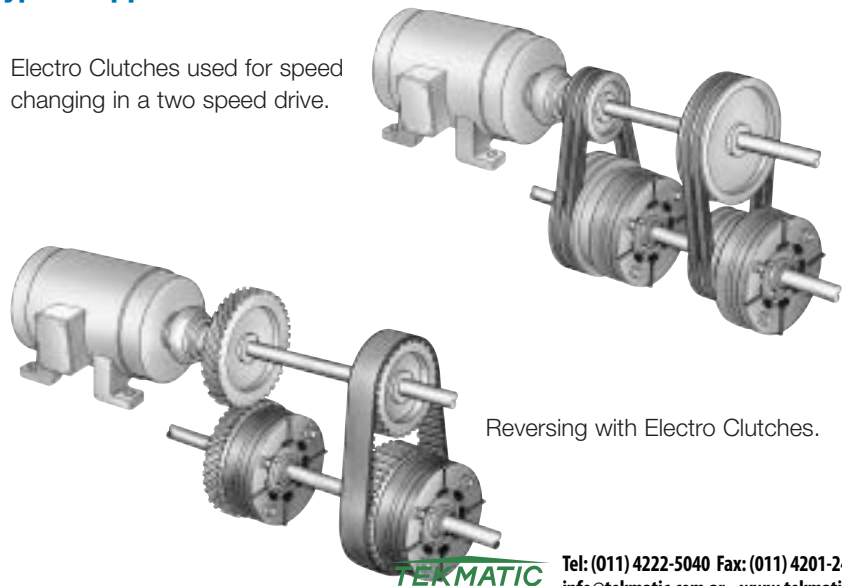
Packaged Performance

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

- Determine the motor horsepower and r.p.m. at the clutch location.
- Use the Horsepower vs. Shaft Speed chart to determine the right size Electro Clutch.
- When ordering, specify bore size and voltage.
- 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.

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																						
1/6																						
1/4																						
1/2																						
3/4																						
1																						
1-1/2																						
2																						
3																						
5																						
7-1/2																						
10																						
15																						
20																						

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

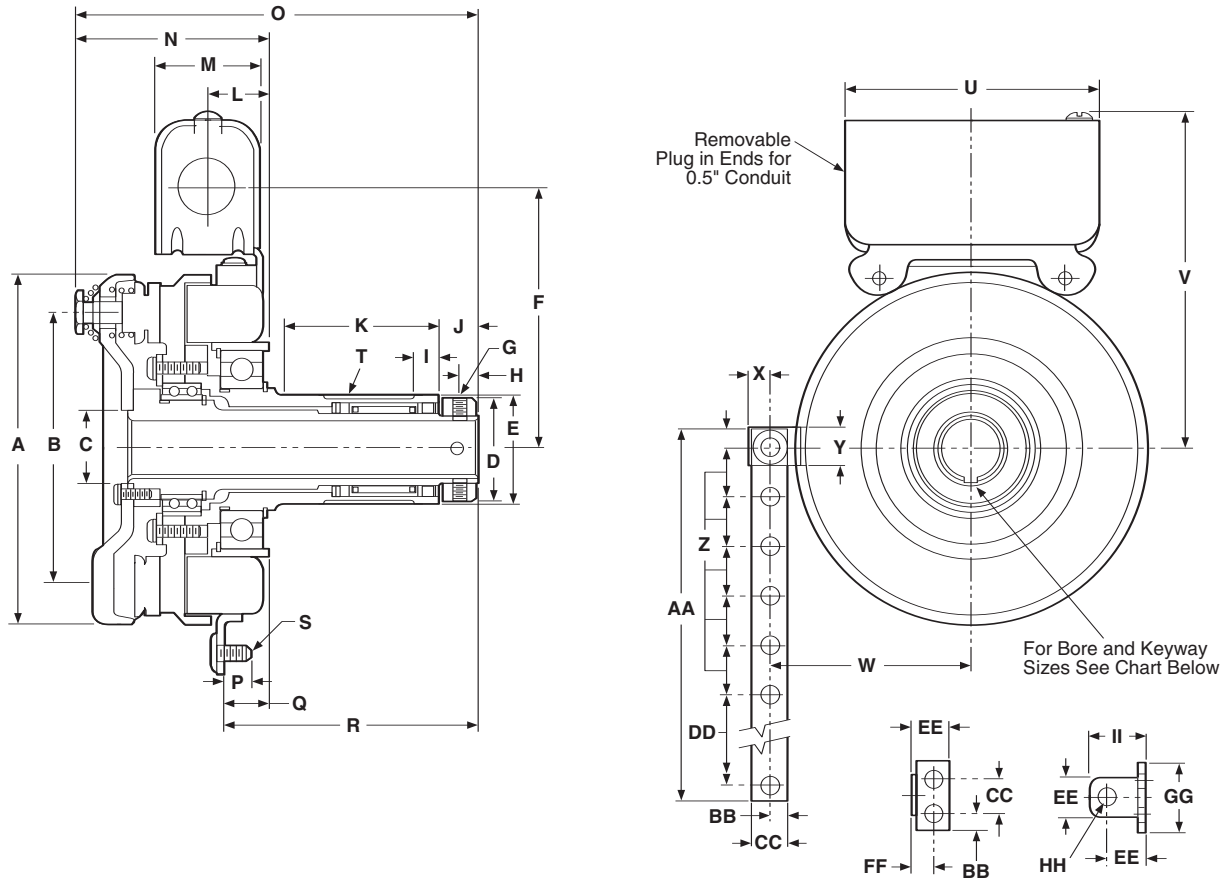
Part Numbers

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-1000	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
		EC-1225	1-5/8"
24	5283-271-011		
90	5283-271-005		
1-5/8"	6		5284-271-008
	24		5284-271-013
	90		5284-271-010
EC-1225	1-7/8"	6	5284-271-002
		24	5284-271-014
		90	5284-271-003
	2-1/8"	6	5284-271-004
		24	5284-271-015
		90	5284-271-005

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

Electro Clutch

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	1.375	3.344	10-24 UNC	.188	.375	.344	2.047	.781	1.547
					1.374		-3A x 5/15						
475	5.172	4.000	1.0625	1.563	1.625	3.922	1/4-20 UNC	.281	.375	.578	2.359	.875	1.547
					1.624		-3A x 7/16						
650	6.578	5.125	1.625	2.375	2.5000	4.625	1/4-20 UNC	.281	.188	.563	3.047	.953	1.547
					2.4985		-3A x 1/2						

Bore Sizes and Keyways

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

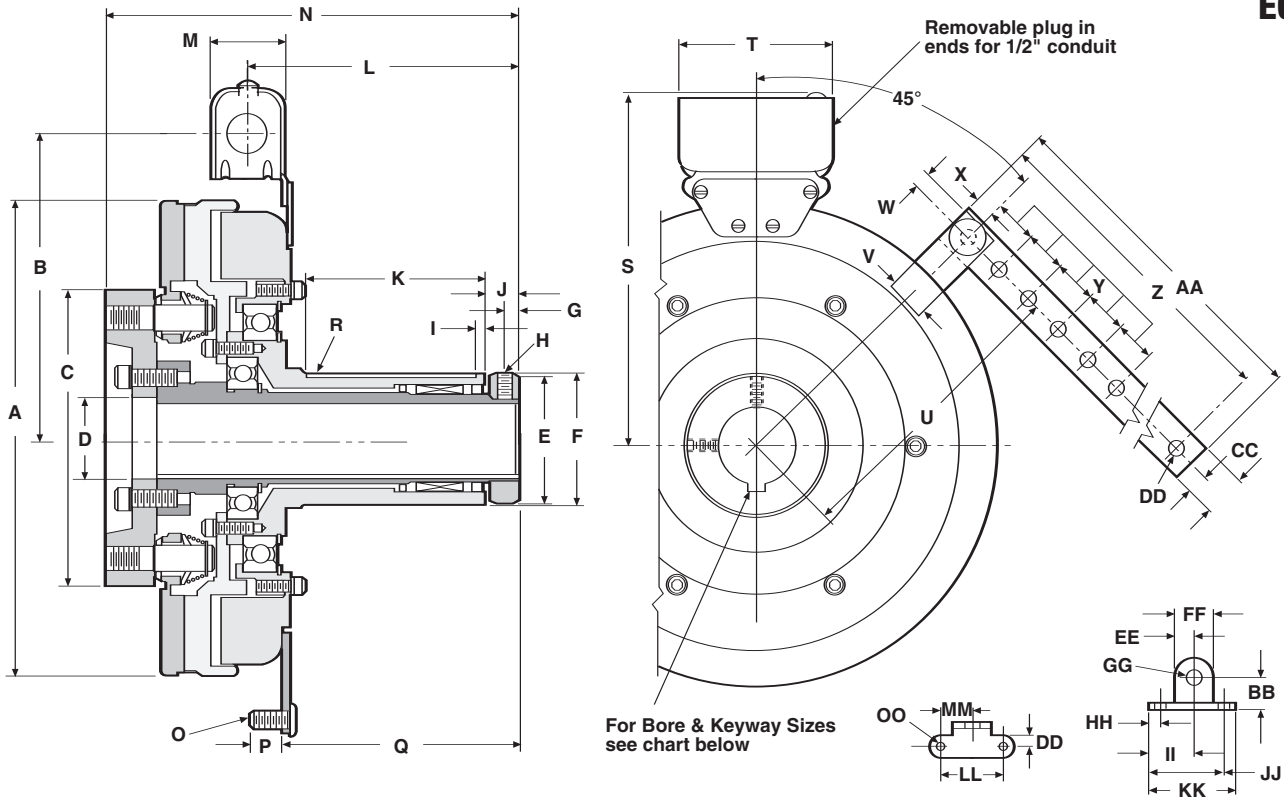
*Key Furnished

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	.270	.828
										.260	
475	.578	.750	5.000	.250	.500	.750	.563	.313	1.000	.270	.828
										.260	
650	.563	.750	10.000	.250	.500	5.750	.563	.313	1.000	.270	.828
										.260	

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

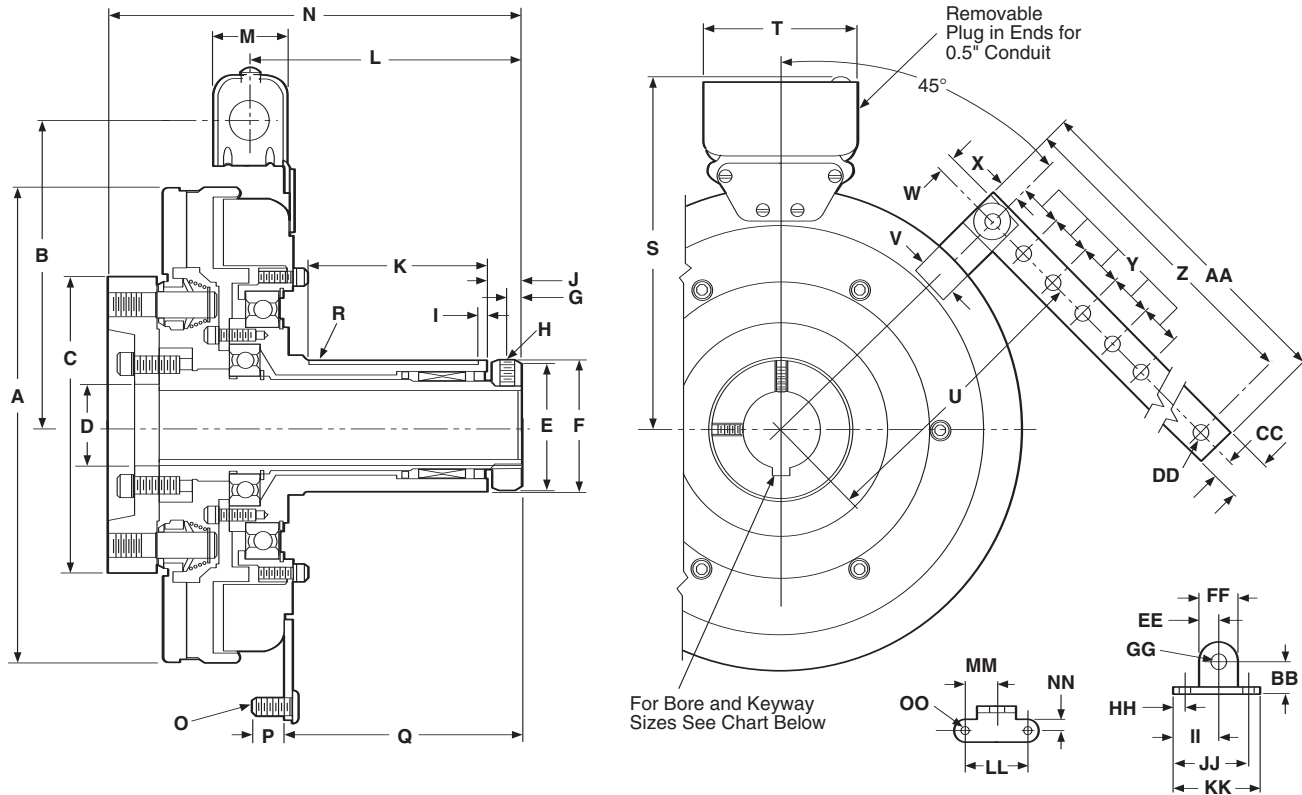
Size	EE	FF	GG Dia.	HH	II	JJ	KK	LL	MM	NN	OO
825	.438	.875	.313	.250	1.000	1.750	2.000	1.500	.750	.250	.270 .260

* 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	5/81-16 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

Electro Brake

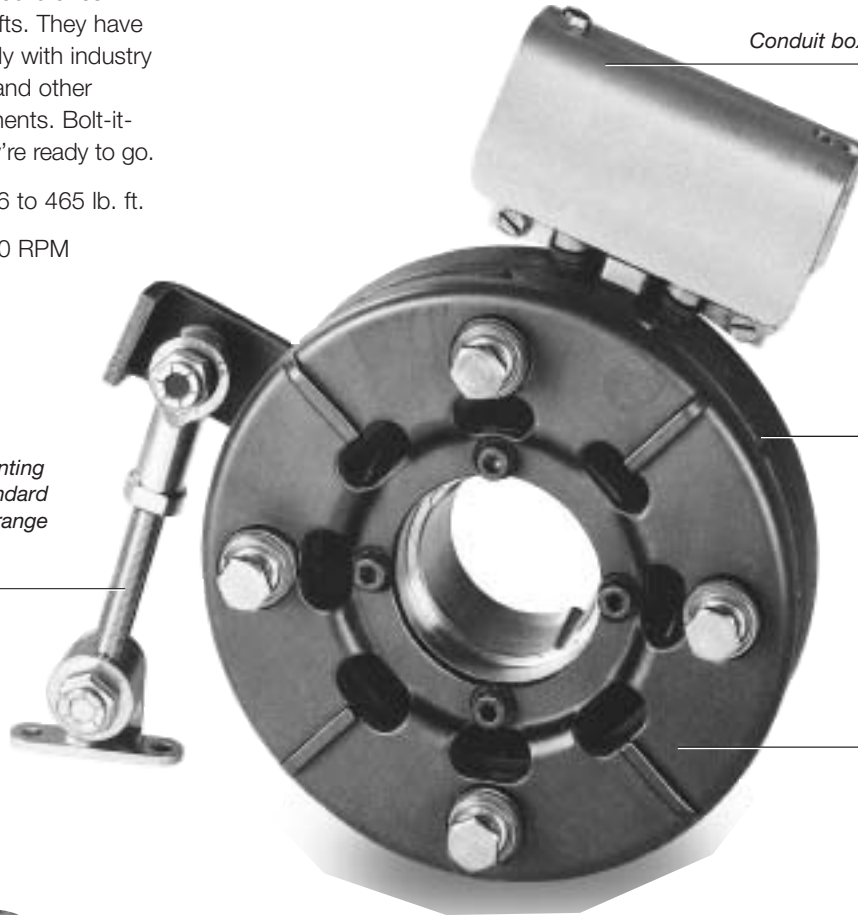
Shaft Mounted Brakes for Power-On Applications

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.

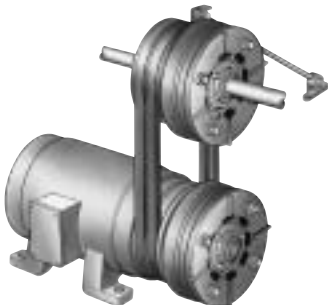


UL and CSA Listed
 Conduit box meets industry standards.

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

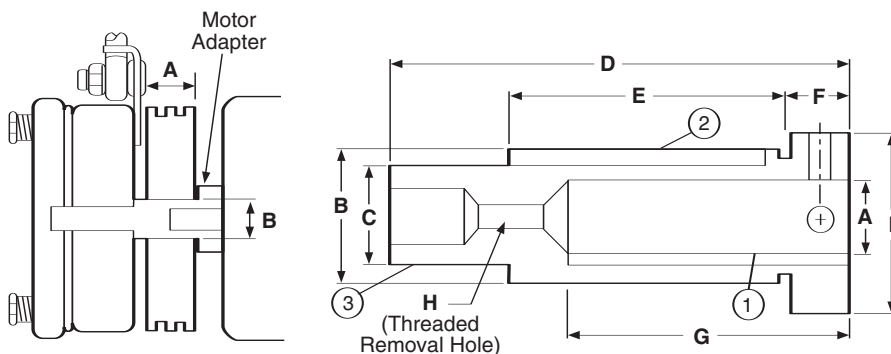
1. Determine the motor horsepower and r.p.m. at the brake location.
2. Use the Horsepower vs. Shaft Speed chart to determine the right size Electro Brake.
3. When ordering, specify bore size and voltage.
4. To get maximum performance from your Electro Clutch, use a Warner Electric Control. See the Controls 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	4500	5000
1/12																					
1/8																					
1/6																					
1/4																					
1/3																					
1/2																					
3/4																					
1																					
1-1/2																					
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3																					
5																					
7-1/2																					
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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 Kwy. Part No. ①	B	Key Kwy. Part No. ②	C	Key Kwy. Part No. ③	Dodge Bushing Size	D	E	F	G	H	I		
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 *	2-15/16	3/4x 5/16	590-0062	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.

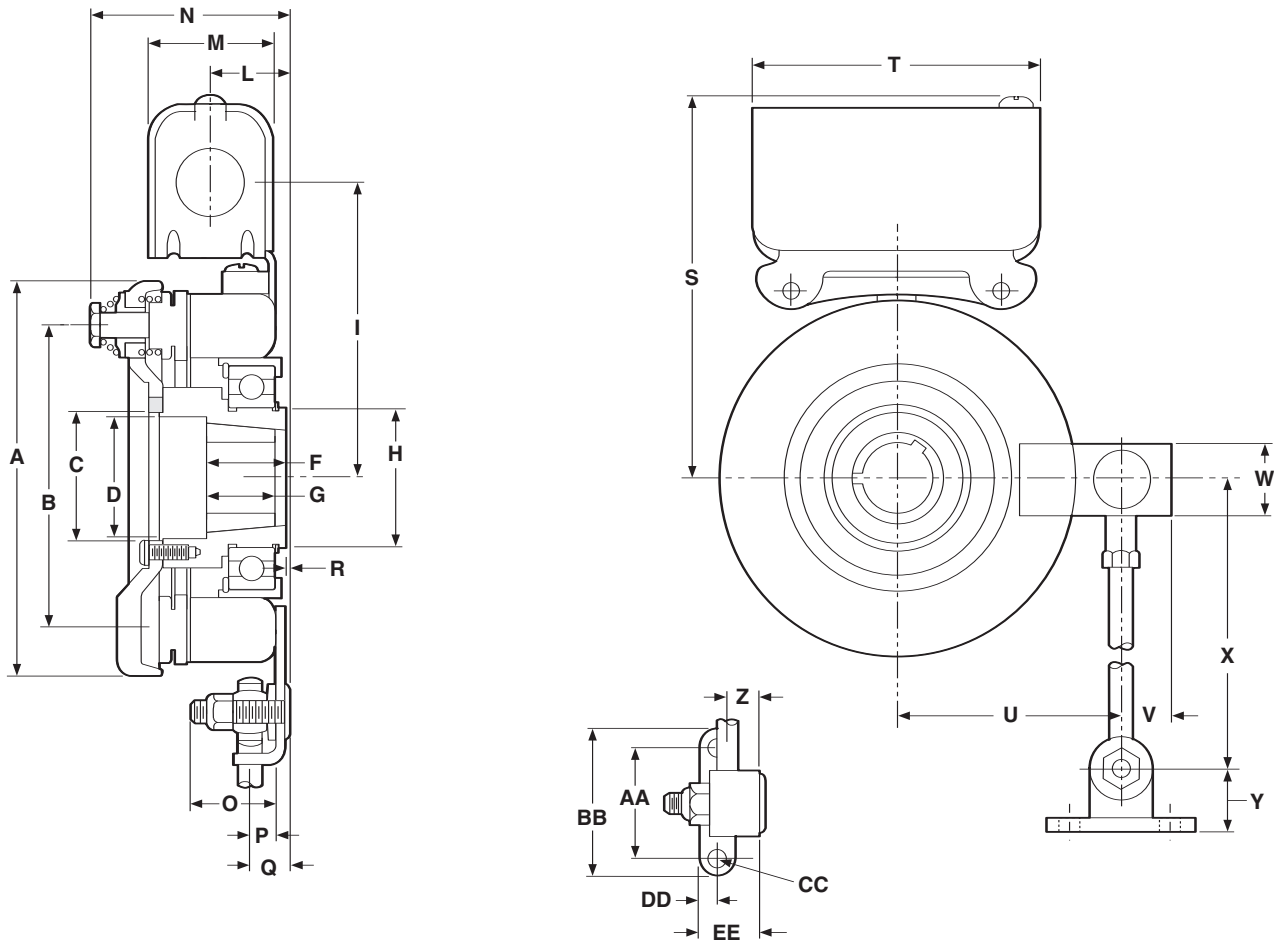
Part Numbers

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.

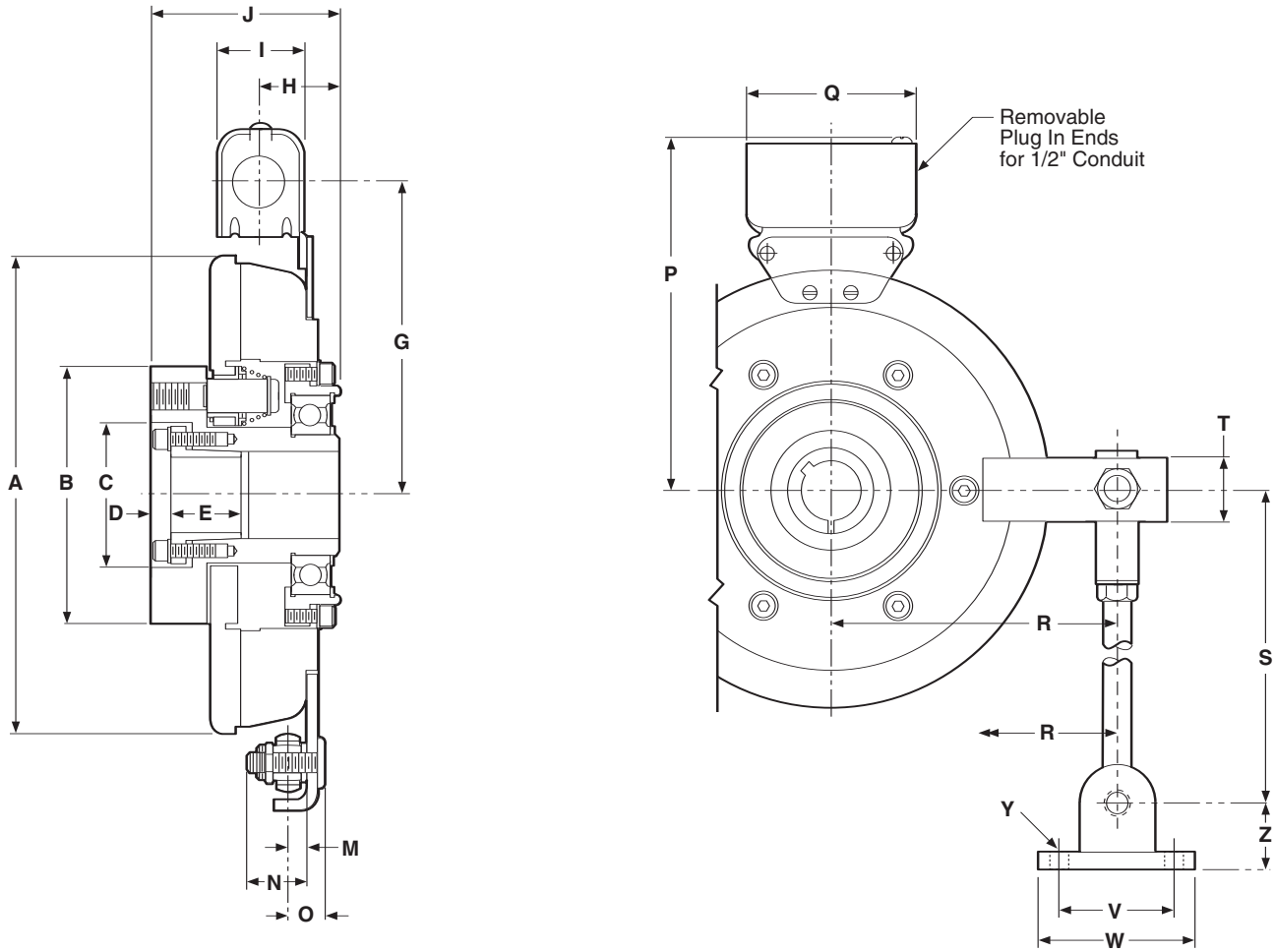
Size	A Max.	B Dia.	C Min.	D Dia.	E	F	G	H Dia.	I	J	K	L	M	N Max.	O
375	4.078	3.125	.7505	–	.031	1.656	–	1.375	3.344	10-32 UNF -3A x 1/4	.188	1.047	1.547	2.438	.844
475	5.172	4.000	1.663	1.594	–	1.000	1.000	1.781	3.875	–	–	.986	1.547	2.922	1.094
650	6.578	5.125	2.343	2.281	–	1.313	1.000	2.563	4.656	–	–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

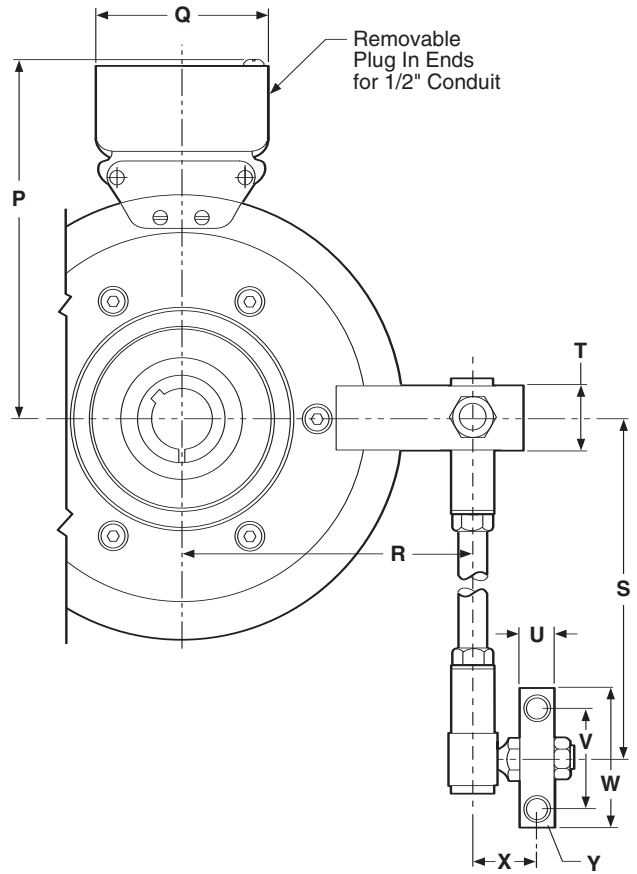
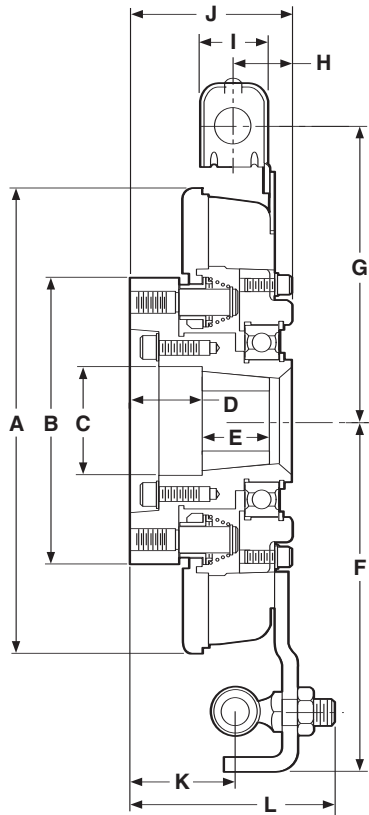


Size	A Max.	B Max.	C Dia.	D	E	F	G	H	I	J Max.	K	L	M
825	8.656	4.625	2.625	.563	1.250	-	5.281	1.344	1.547	3.375	-	-	.344

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

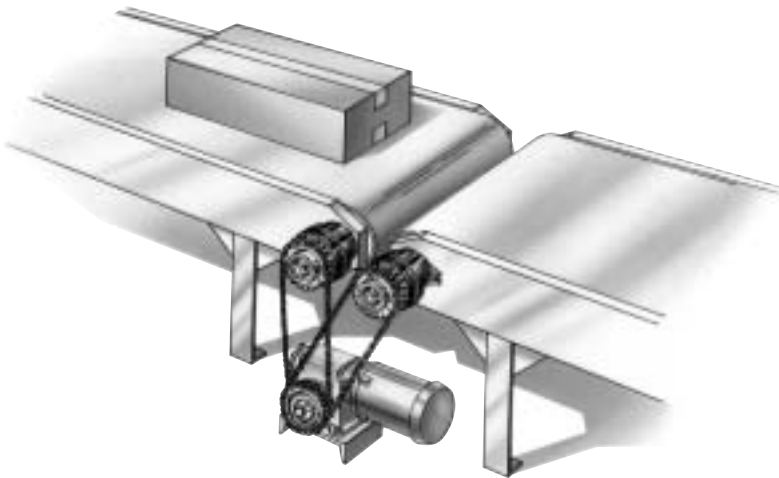
- Replaceable friction face
- Steel wear surface and cast iron hub/armature carrier
- Non-asbestos, split molded friction disc.
- Autogap™ provides automatic wear take-up for consistent engagement.
- Cast iron components—finned, cast iron armature carriers
- Special coil design for high temperature operation.
- 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:

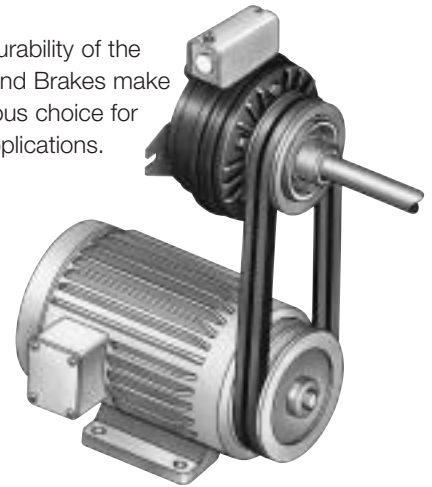
- Clutch field restraining straps
- Brake torque arms
- Conduit boxes
- Clutch pulleys
- Service kits

Applications/Mounting Configurations

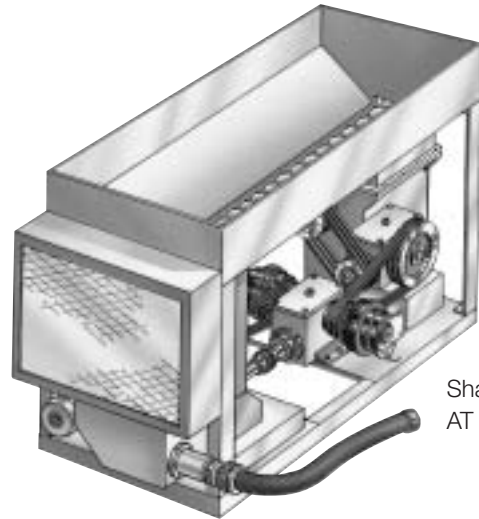
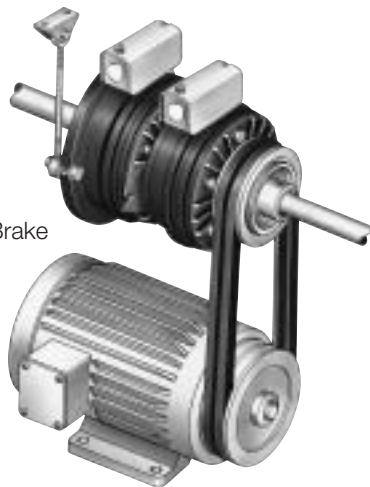


Two AT Clutches, easily mounted on conveyor headshafts, allow conveyor sections to be separately powered from a single drive.

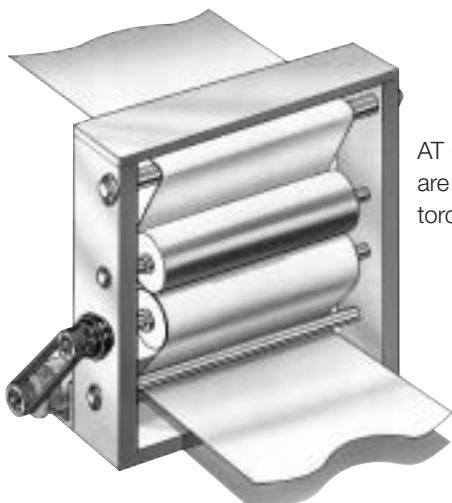
The rugged durability of the AT Clutches and Brakes make them an obvious choice for heavy duty applications.



AT Clutch and AT Brake on through shaft

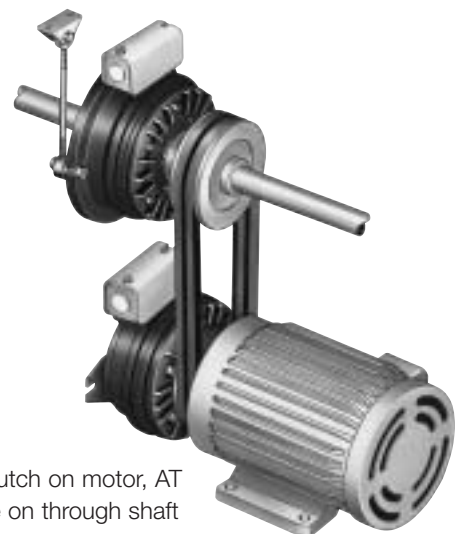


Shaft mounted AT Clutch



AT Clutches and Brakes are excellent for controlled torque applications.

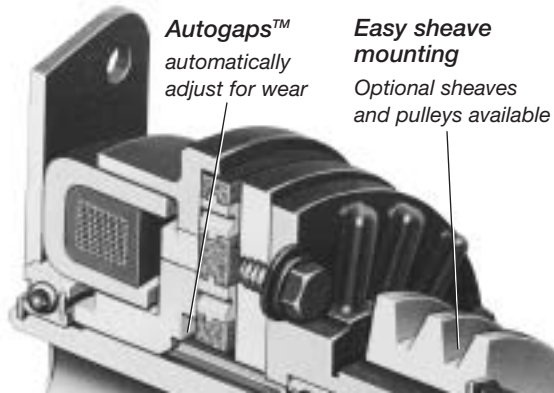
AT Clutch on motor, AT Brake on through shaft



Performance Advantages

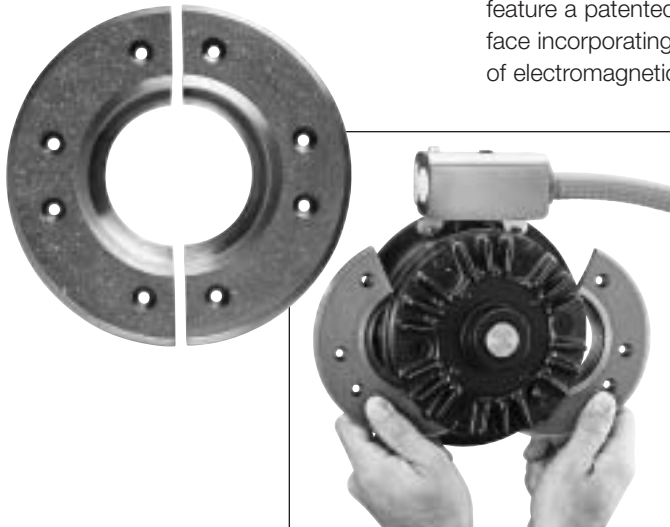
Principle of Operation

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

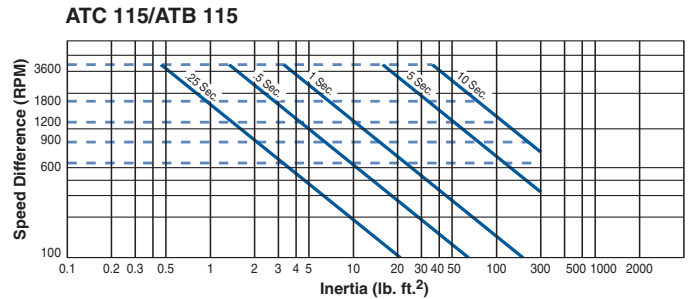
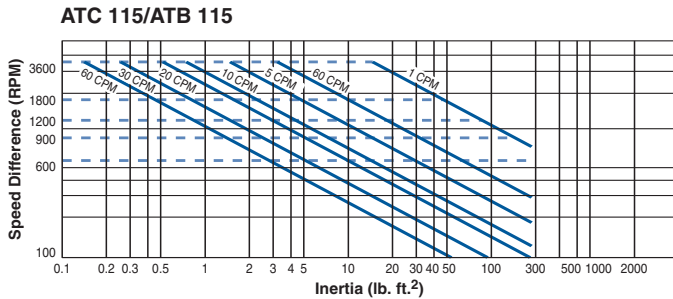
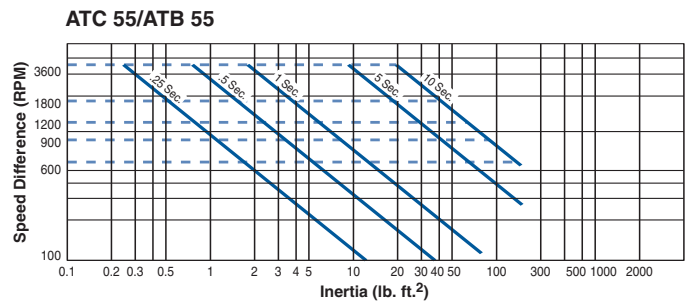
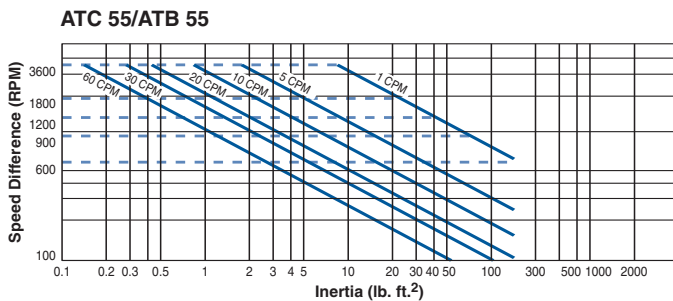
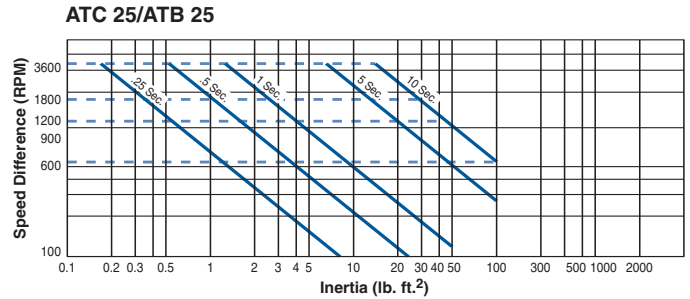
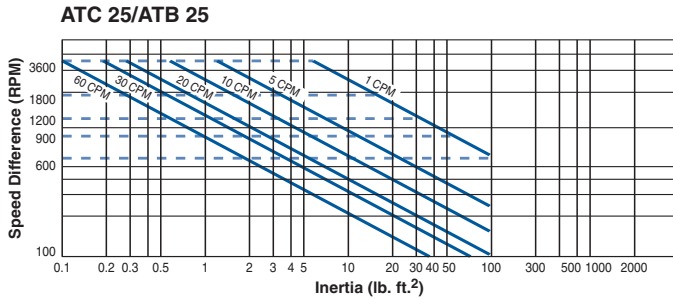
Cycle rate capability is often an important selection criteria. Cycle rate is usually defined as the number of times the clutch and/or brake is switched on and off in a minute or Cycles per Minute (CPM). In order to determine the correct size unit, both required cycle rate and reflected inertia must 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.

ATC/ATB Series

Cycle Rate Capability

Stop/Start Time Capability



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.

AT Clutch

Rugged and Durable Operation

Autogaps™

automatically adjust for wear.

Rugged spline drive

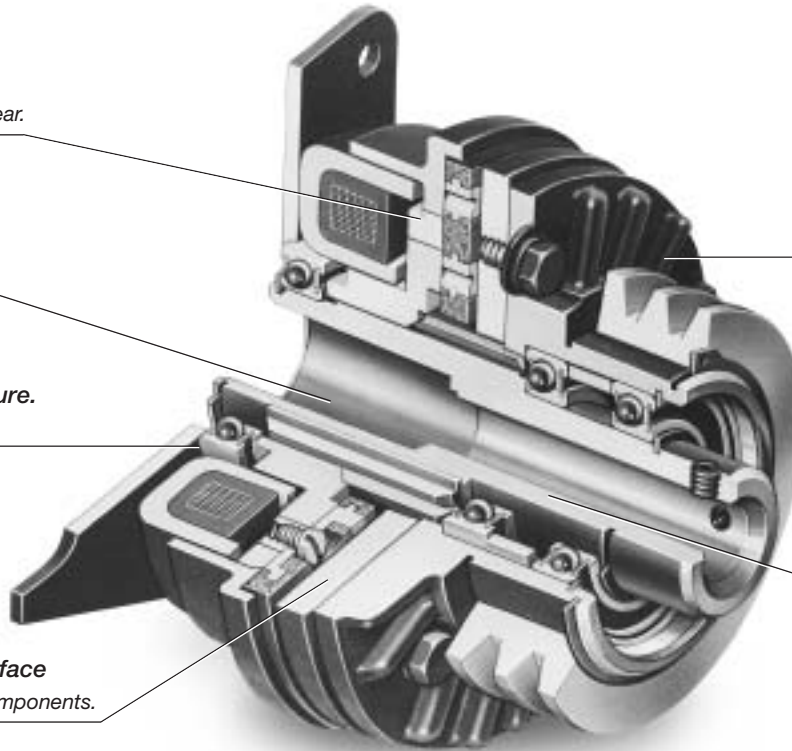
for maximum durability.

Sealed, high temperature.

UL recognized.

Rugged steel wear surface

and precision cast iron components.



Easy sheave mounting.

Optional sheaves and pulleys available from Warner Electric.

Sealed heavy duty bearings

with high temperature lubricant.

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																		
10											AT-115							
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

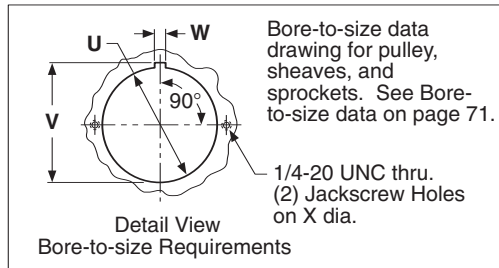
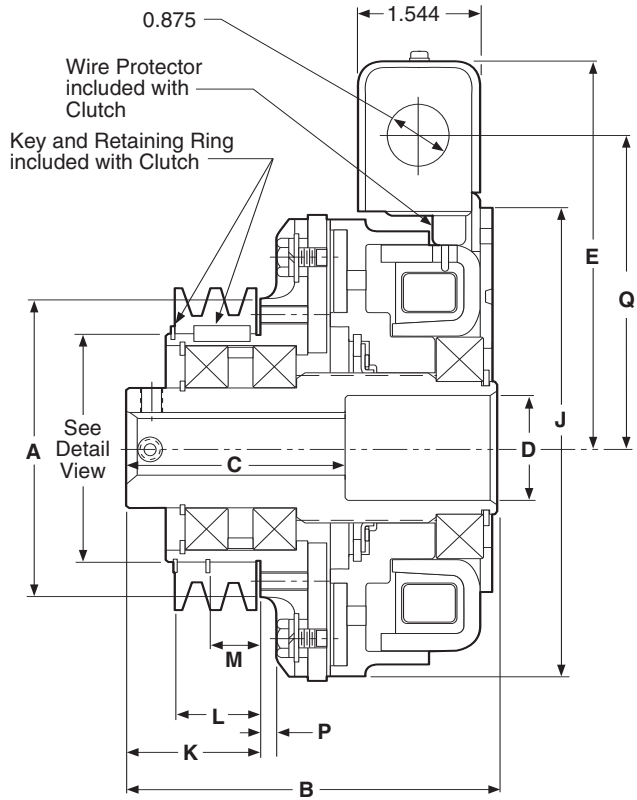
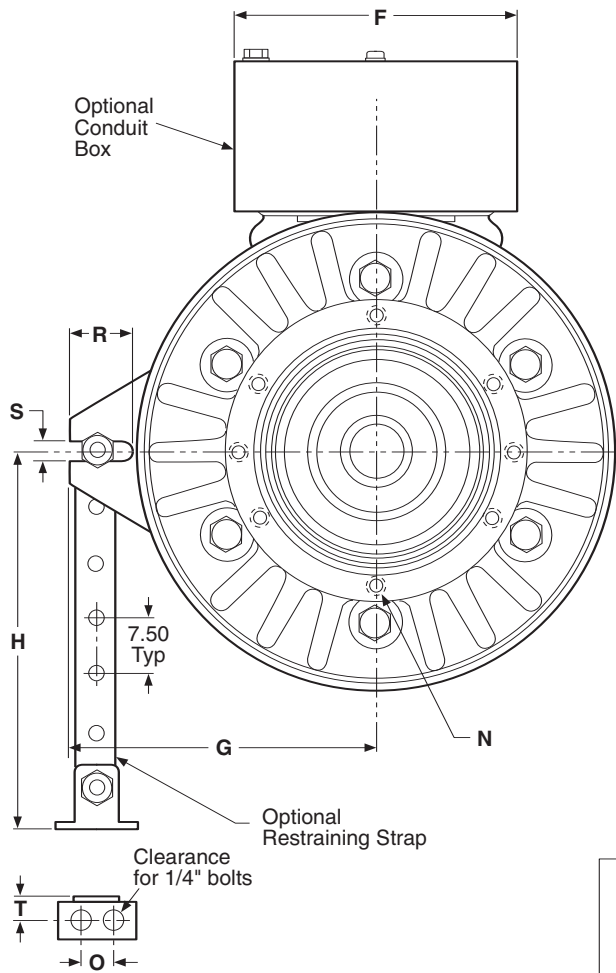
Model Size	Bore Size	Voltage DC	Part No.
ATC-25	1/2"	6	5161-271-002
		24	5161-271-010
		90	5161-271-003
	5/8"	6	5161-271-004
		24	5161-271-011
		90	5161-271-005
	3/4"	6	5161-271-006
		24	5161-271-012
		90	5161-271-007
	7/8"	6	5161-271-008
		24	5161-271-013
		90	5161-271-009
ATC-55	3/4"	6	5162-271-002
		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)	1.003/1.991 (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.
.6255	15.89		
ATC-25	.7525	19.11	3/16 Sq.
ATC-55	.7505	19.06	
ATC-25	.8775	22.29	3/16 Sq.
ATC-55	.8755	22.24	
ATC-55	1.0025	25.46	1/4 Sq.
ATC-55	1.0005	25.41	
ATC-55	1.1275	28.64	1/4 Sq.
ATC-115	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

Rugged, two piece replaceable steel wear surface and precision cast iron components. Superior wear life, torque capacity and magnetic characteristics.

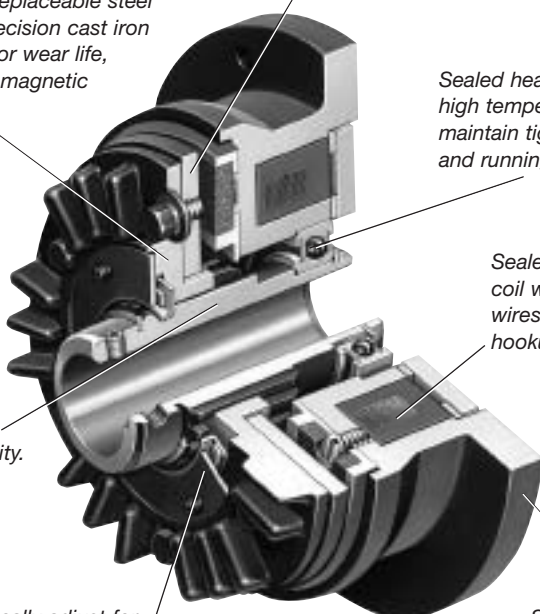
Two piece molded friction disc replaceable without disassembly of unit in most applications. Long life, low noise.

Sealed heavy duty bearing with high temperature lubricant maintain tight concentricities and running efficiency.

Sealed, high temperature coil with tough teflon lead wires for easy power hookup. UL recognized.

Rugged spline drive for maximum durability.

Autogaps™ automatically adjust for wear. Consistent engagement times and repeatability for the life of the unit.



Shaft mounted with torque arm restraint.

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	

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.

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

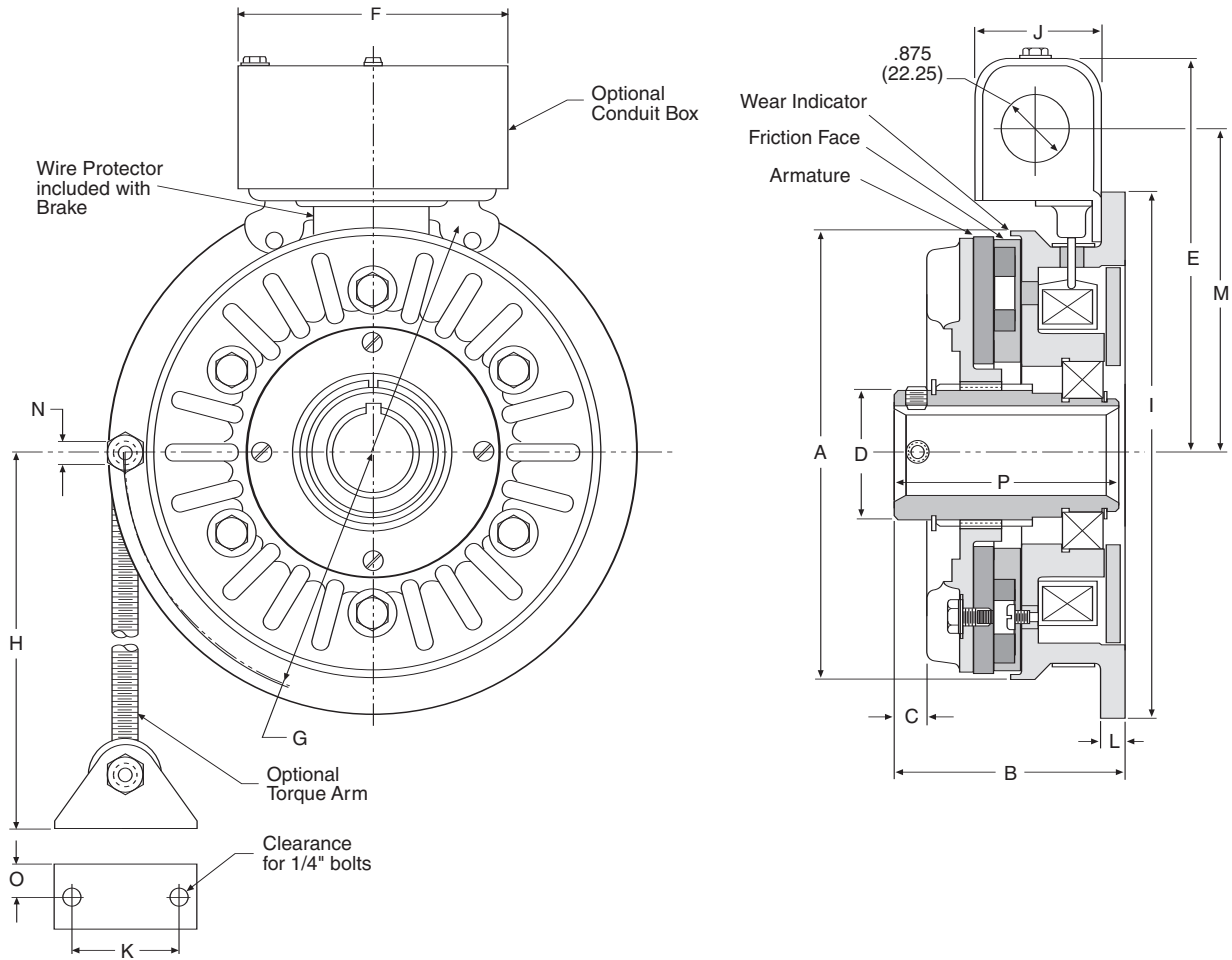
Select bore size and determine part number for correct size brake from parts lists starting on this page.

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																		
1-1/2																		
2																		
3																		
5																		
7-1/2																		
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
	.5005	12.71
	.6275	15.94
ATB-25	.6255	15.89
	.6255	15.89
ATB-25	.7525	19.11
ATB-55	.7505	19.06
ATB-25	.8775	22.29
ATB-55	.8755	22.24
ATB-55	1.0025	25.46
	1.0005	25.41
ATB-55	1.1275	28.64
ATB-115	1.1255	28.59
ATB-115	1.2525	31.81
	1.2505	31.76
	1.3775	34.99
	1.3755	34.94
	1.5025	38.16
1.5005	38.11	

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" *

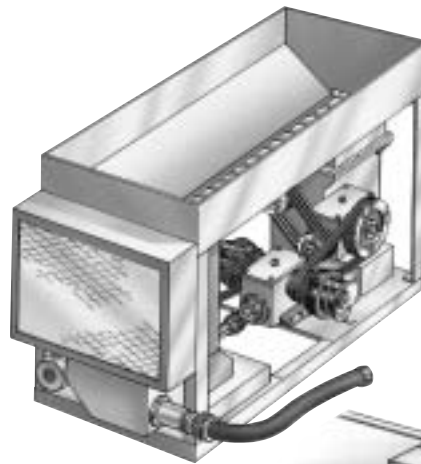
Three standard voltages:
6, 24 and 90 Volts DC

*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

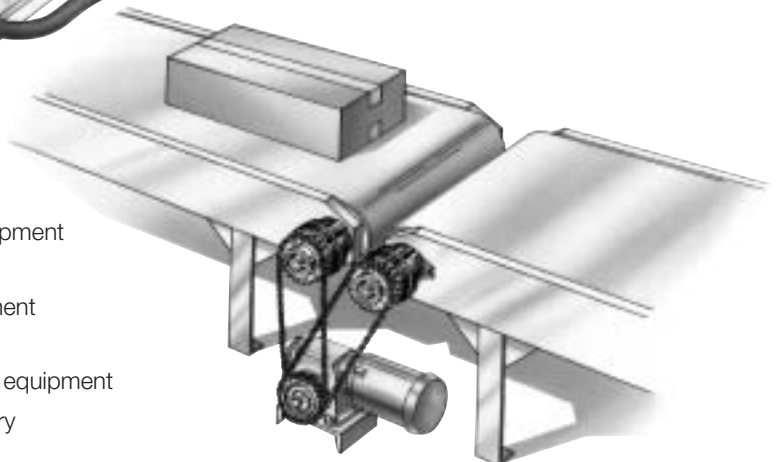


Applications

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

Functions

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



Specifications

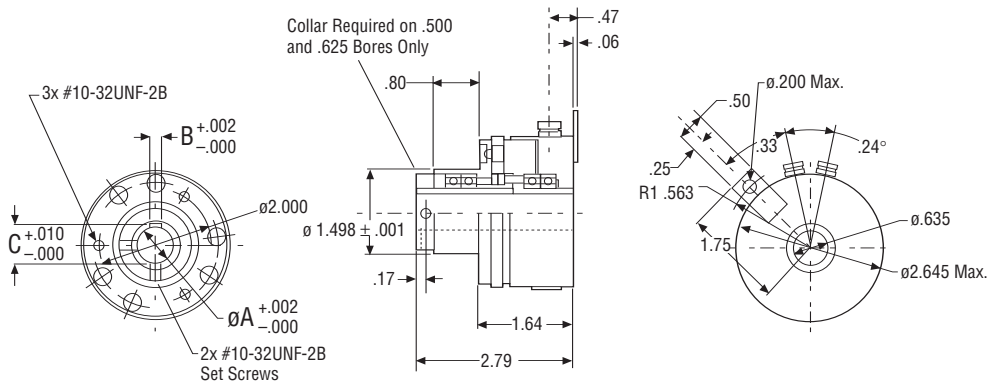
Model	Static Torque	Max.RPM
SFP-250	70 in.lb.	7500
SFP-400	270 in.lb.	5000

How to Order

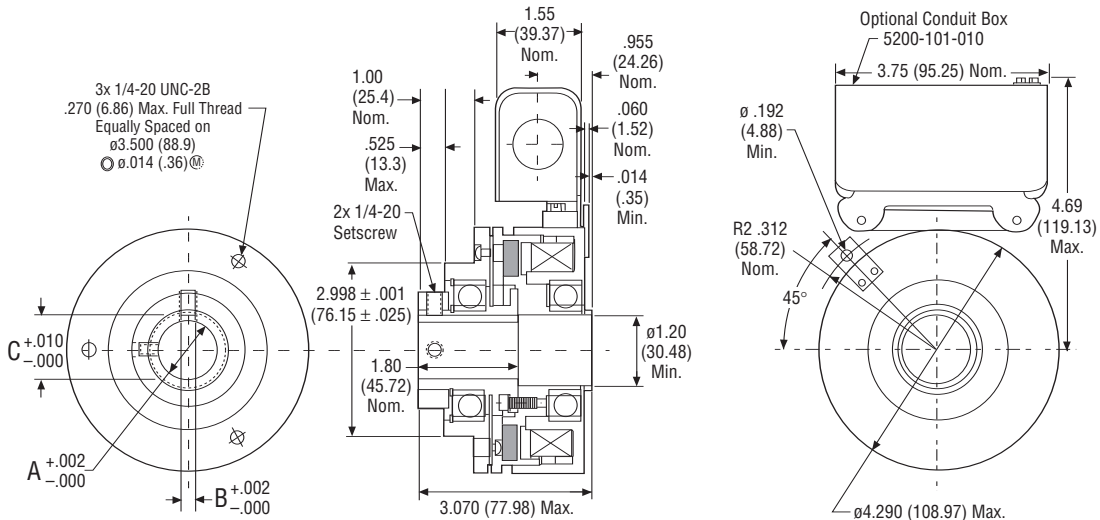
1. Select the proper size from the chart (right).
2. Select the bore size and voltage.
3. Find the corresponding part number from the table below.
4. Select a Warner Electric Control if appropriate.

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



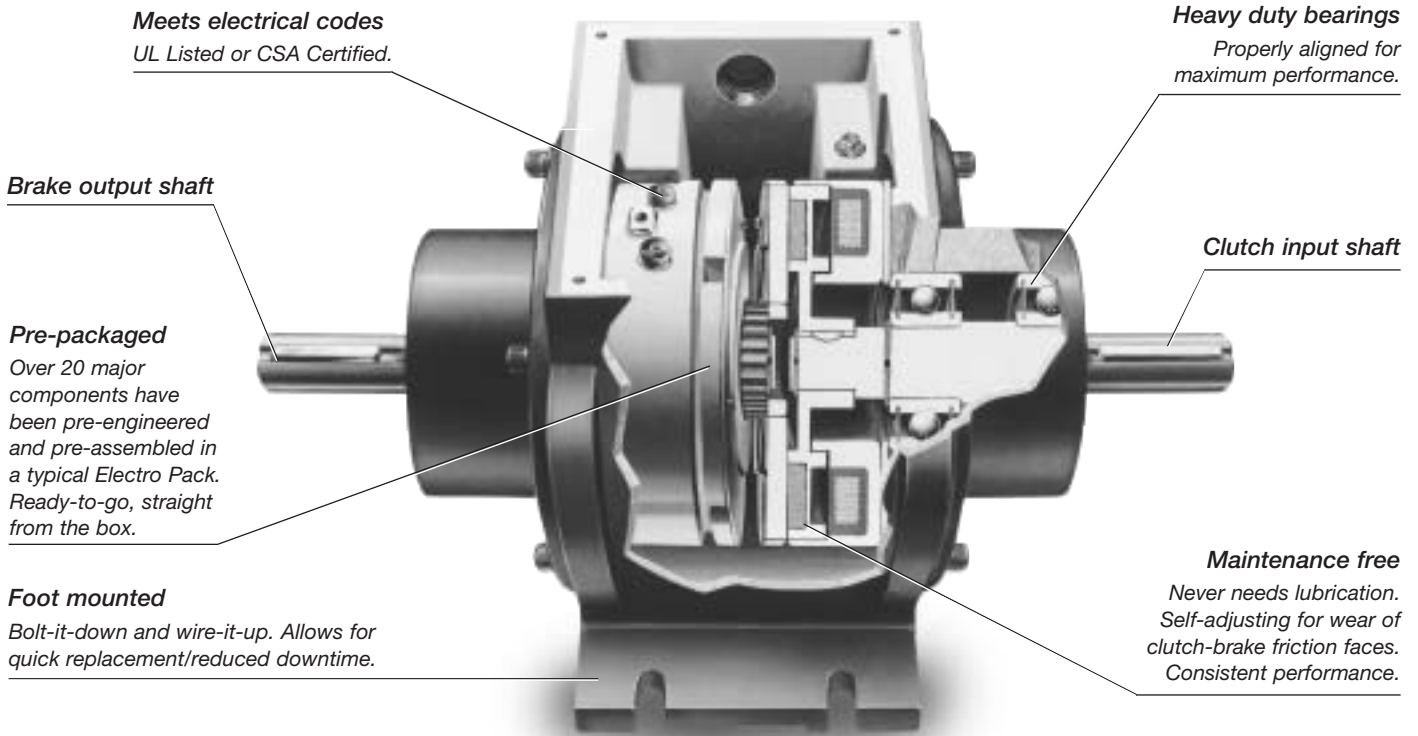
SFP-400



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
SFP-400	.5005"	.125	.560	5104-271-006	5104-271-016	5104-271-021
	.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**



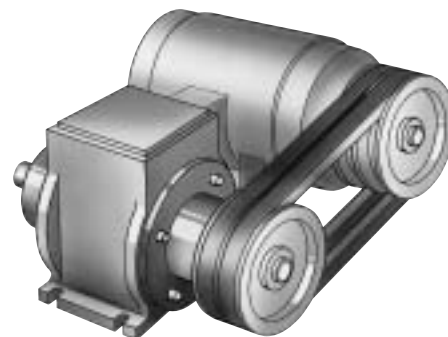
Electro Packs are rugged, pre-assembled clutch and brake combinations in an enclosed, foot mounted housing.

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																						
1/20										EP-170												
1/12																						
1/8																						
1/6																						
1/4										EP-250												
1/3																						
1/2																						
3/4										EP-400												
1																						
1-1/2																						
2										EP-500												
3																						
5																						
7-1/2																						
10										EP-825												
15																						
20																						
25																						
30																						
40																						

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

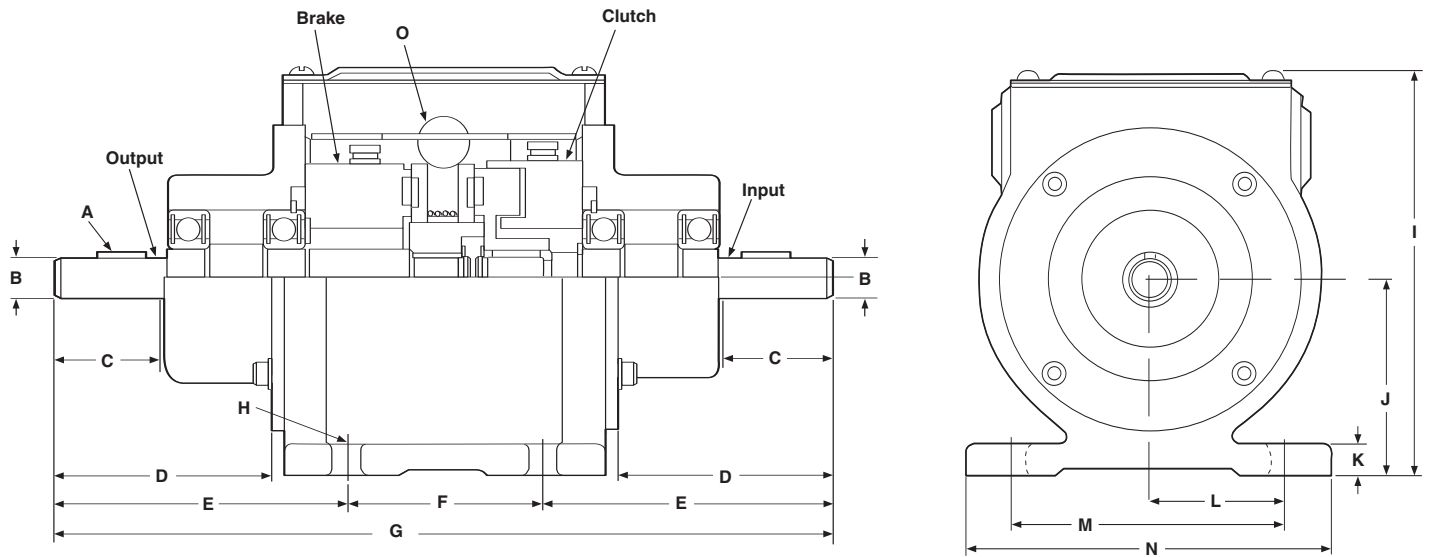
Model No.	Voltage DC	Part No.
EP-170	6	5633-273-002
	24	5633-273-003
	90	5633-273-005
EP-250	6	5130-273-031
	24	5130-273-032
	90	5130-273-034
EP-400	6	5131-273-009
	24	5131-273-010
	90	5131-273-011
EP-500	6	5230-273-003
	24	5230-273-011
	90	5230-273-002
EP-825	6	5231-273-003
	24	5231-273-004
	90	5231-273-002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

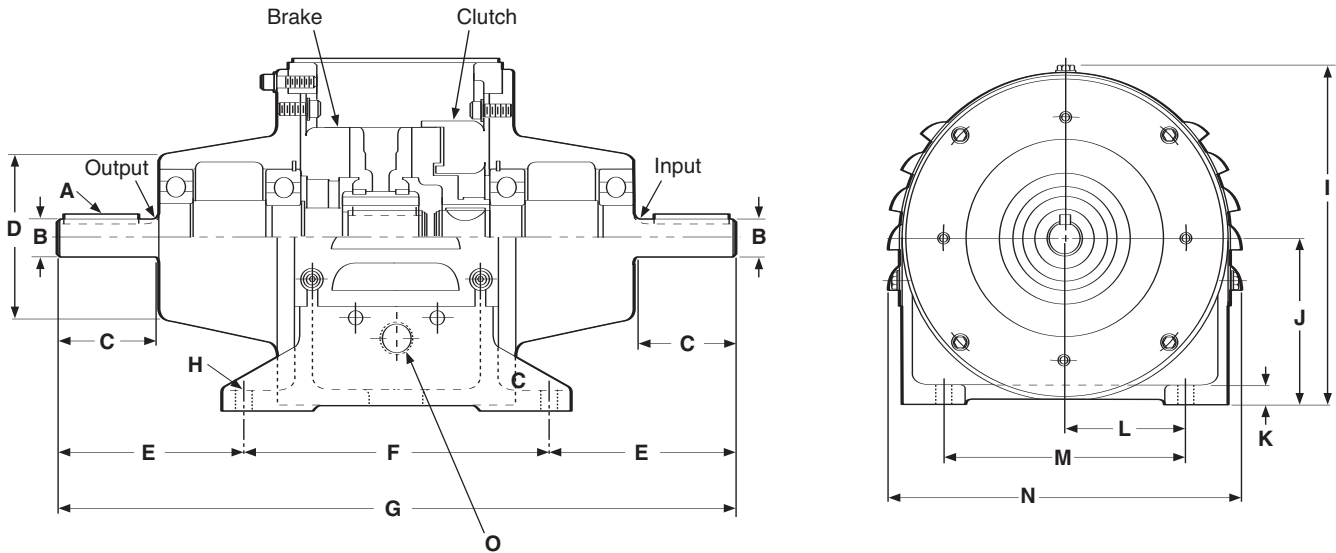


All dimensions are nominal, unless otherwise noted.

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



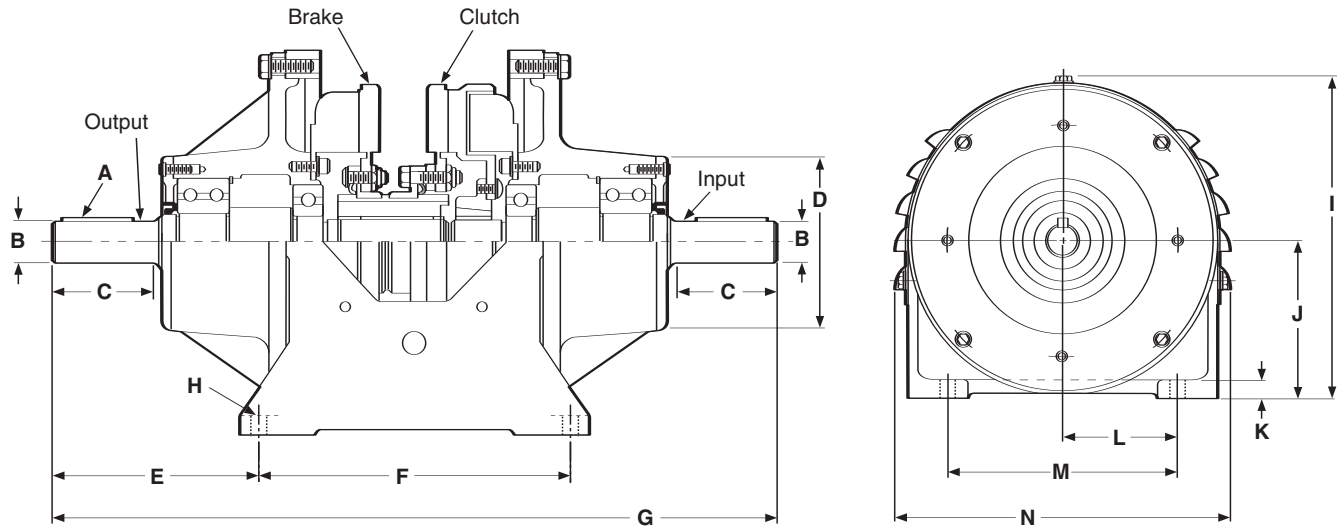
All dimensions are nominal, unless otherwise noted.

Size	A	B Dia.	C Min.	D Max. Dia.	E	F	G Max.	H Dia.	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	1.1250 1.1245	2.875	5.000	5.734	8.500	20.031	.406 Dia. (4 holes)	10.812	5.254 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		

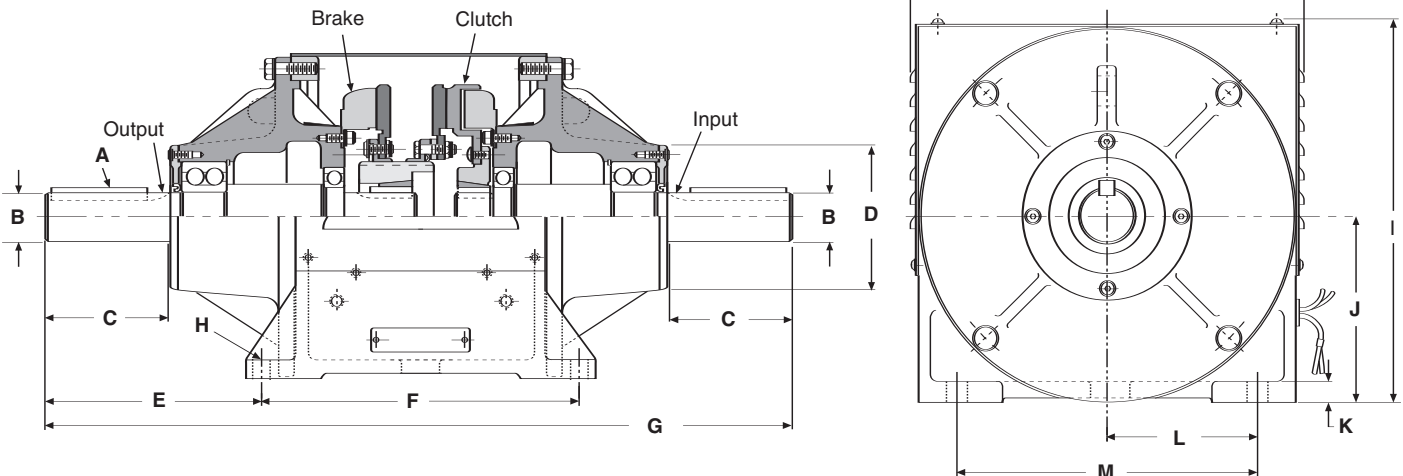
Specifications EP-1000

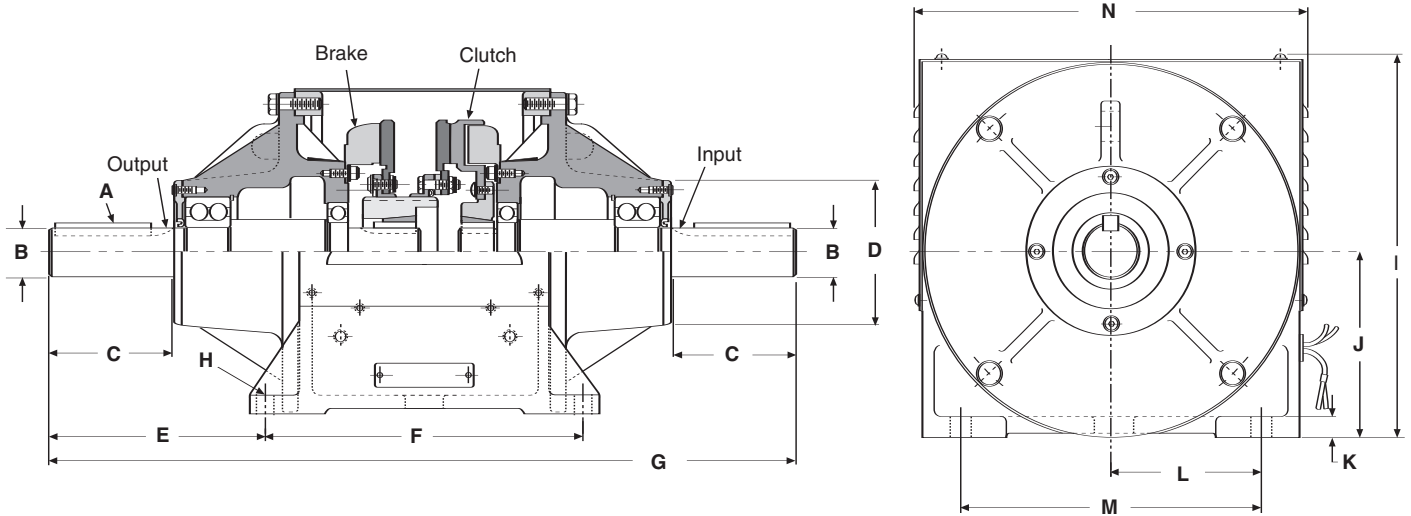
Model Size	Voltage DC	Static Torque	Inertia*–WR ² (lb-ft ²)		Max. RPM	Weight lbs.
			Output Side	Input Side		
EP-1000	6	240 lb.ft.	1.45	1.01	3000	288
	24	240 lb.ft.	1.45	1.01	3000	288
	90	240 lb.ft.	1.45	1.01	3000	288

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	1.875	4.750	5.687	8.250	12.250	28.750	.656 Dia. (4 holes)	12.500	6.255	.718	5.000	10.000	12.875
	1/2 x	1.874								6.241				
	3-3/4													

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.

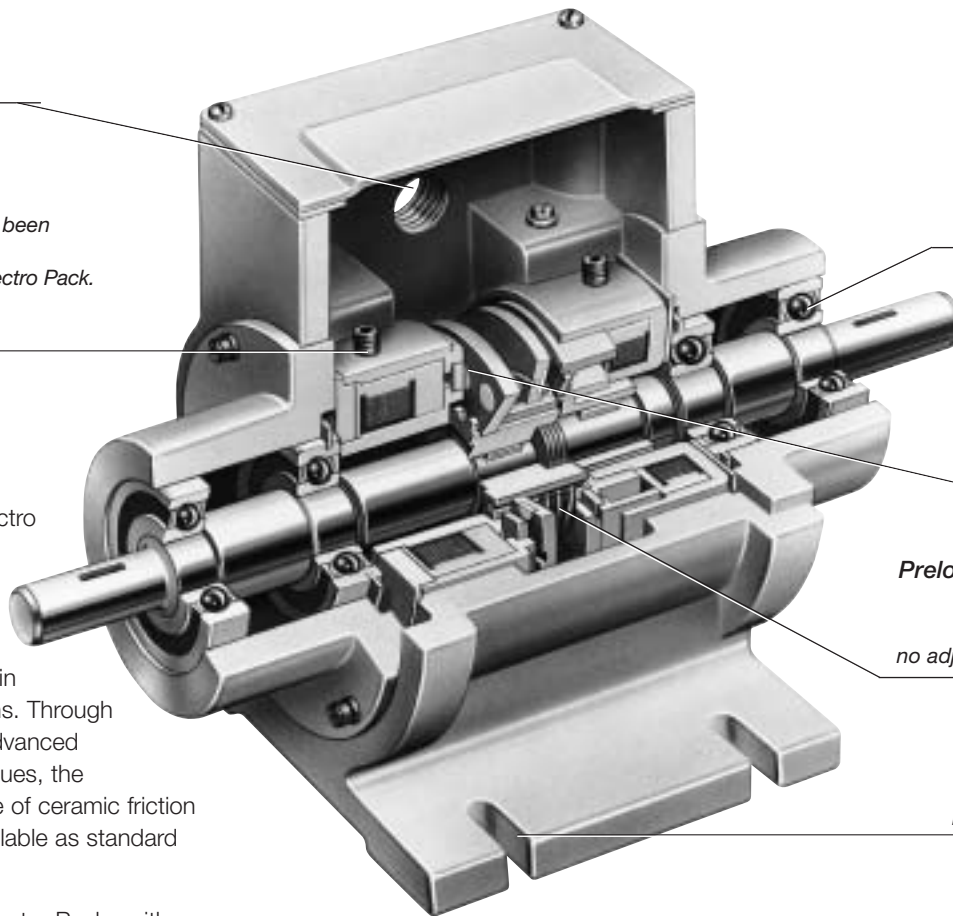
PerformancePlus™ Electro Packs use ceramic friction system technology. This technology has been in use for many years in specialized applications. Through the development of advanced manufacturing techniques, the improved performance of ceramic friction materials are now available as standard products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

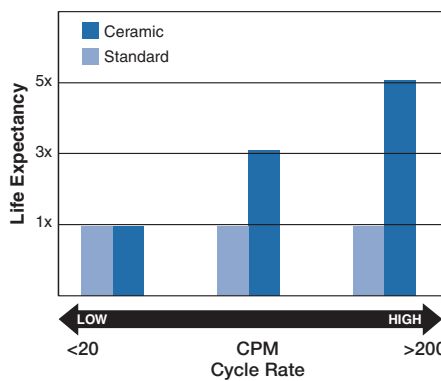
When your application calls for a long life clutch/brake because of high cycle rates or demanding consistency, choose the PerformancePlus solution.

- 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.



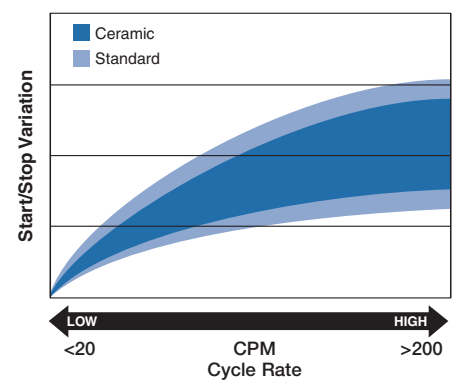
EP-C Product Life



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

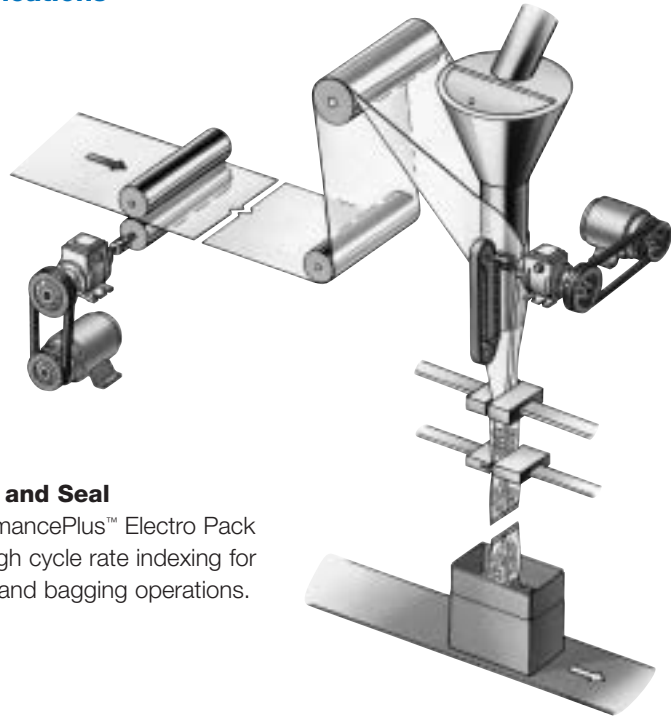
PerformancePlus Electro Packs are best suited for high energy applications where long life is a premium concern. The harder a ceramic friction surface is worked, the more wear life benefit is achieved. For slower cycle rates, up to 75 cycles per minute, dependable standard clutch/brakes are still a good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

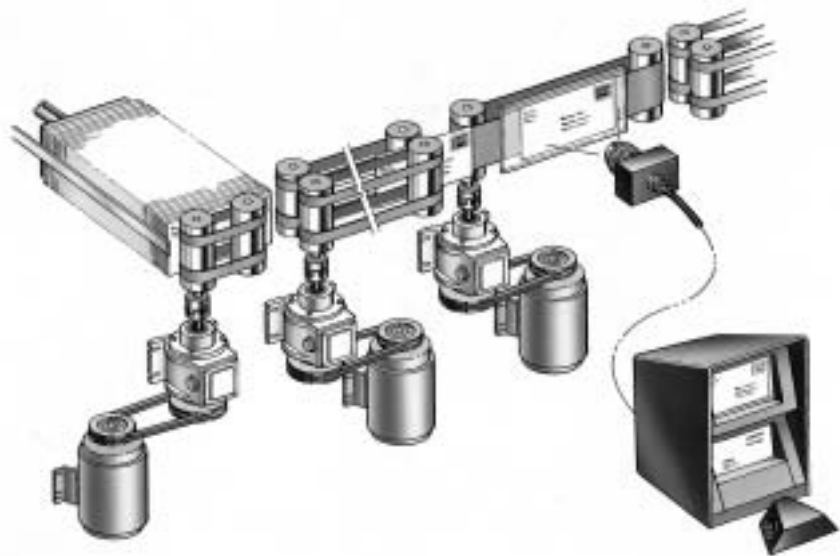
For proper sizing information, refer to the Horsepower vs. Shaft Speed chart, and the technical sizing considerations below. When ordering, specify size, voltage, and part number.

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	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1/12	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1/8	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1/6	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1/4	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1/3	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1/2	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■



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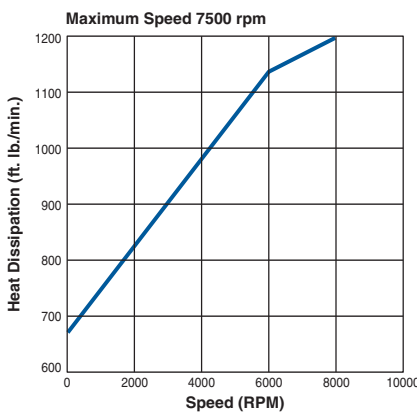
Selection/Ordering Information

Heat Dissipation Sizing

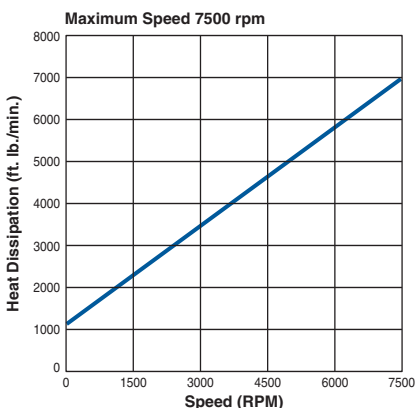
Friction surfaces slip during the initial period of engagement and, as a result, heat is generated. The clutch/brake selected must have a heat dissipation rating greater than the heat generated by the application. Therefore, in high inertia or high cycle rate applications, it is necessary to check the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

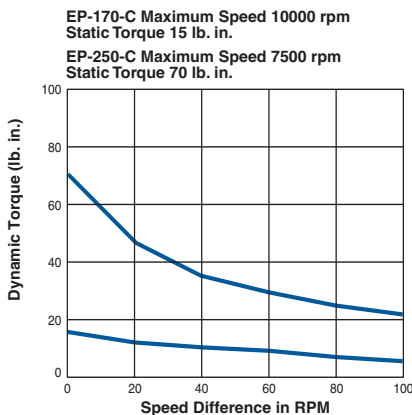
- E = Heat (lb.ft./min.)
 WR² = Total reflected inertia at the clutch/brake shaft. Include the clutch/brake output inertia. (lb.ft.²)
 N = Speed in revolutions per minute. (RPM)
 F = Cycle rate in cycles per minute. (CPM)

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:

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

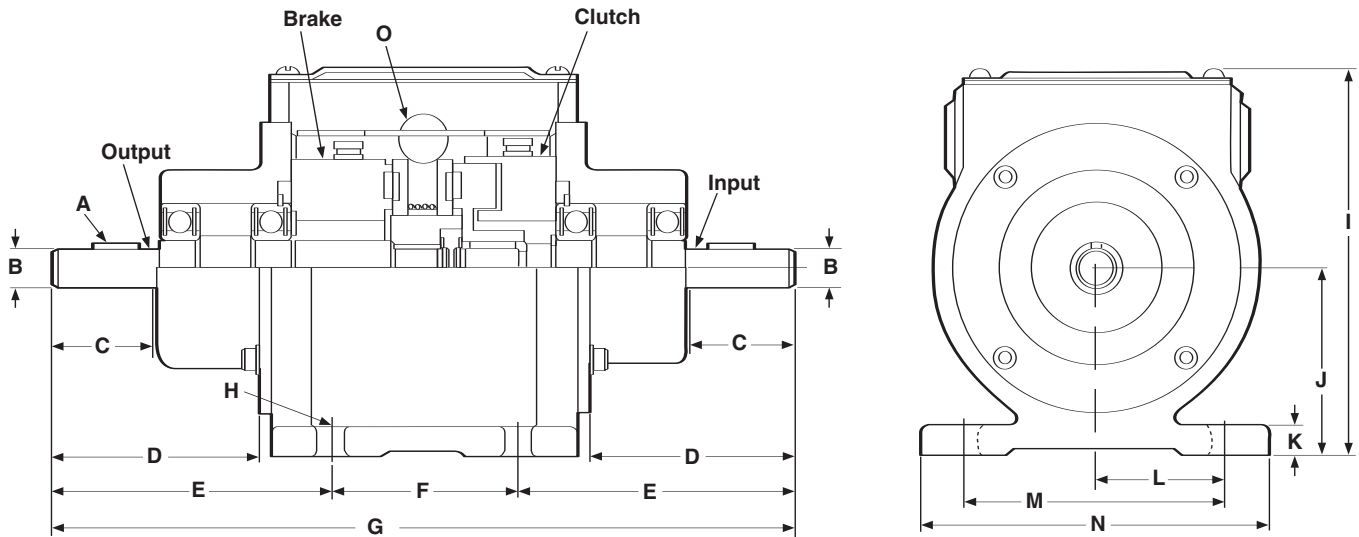
where:

- 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

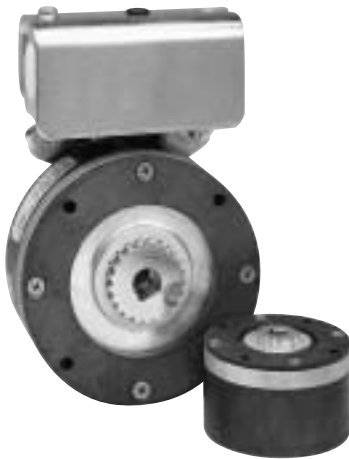
Specifications

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.

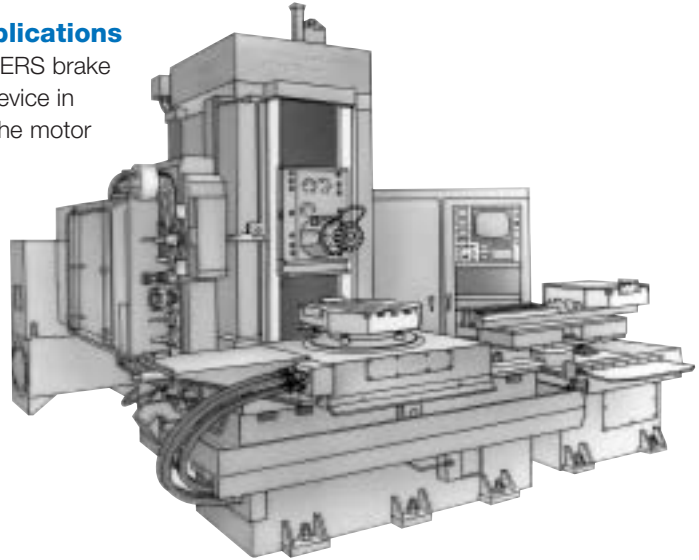
ERD Series Dual Purpose Engagement Brakes



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.

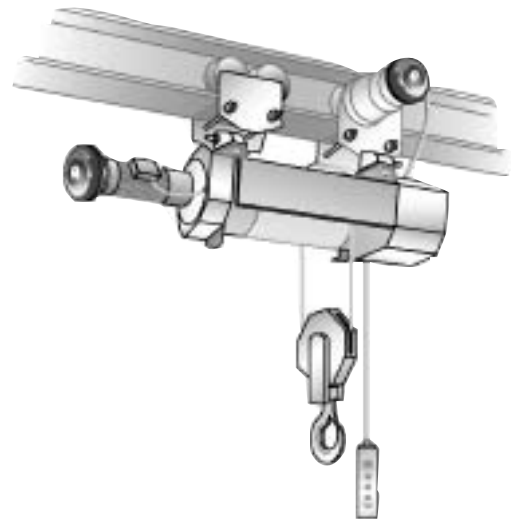


Machine Tools

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

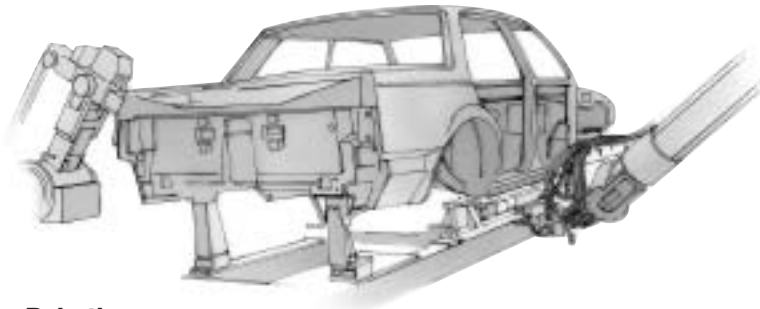
ERD Typical Applications

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.



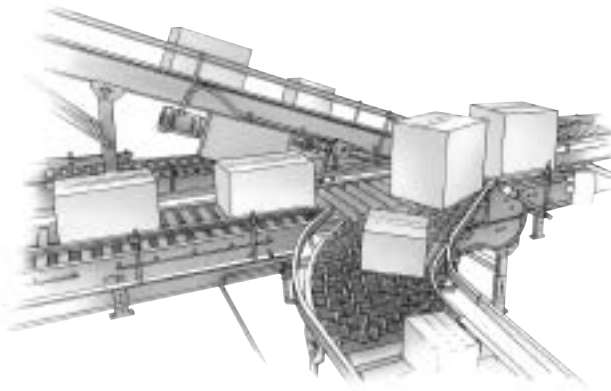
Hoist/Winch

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.



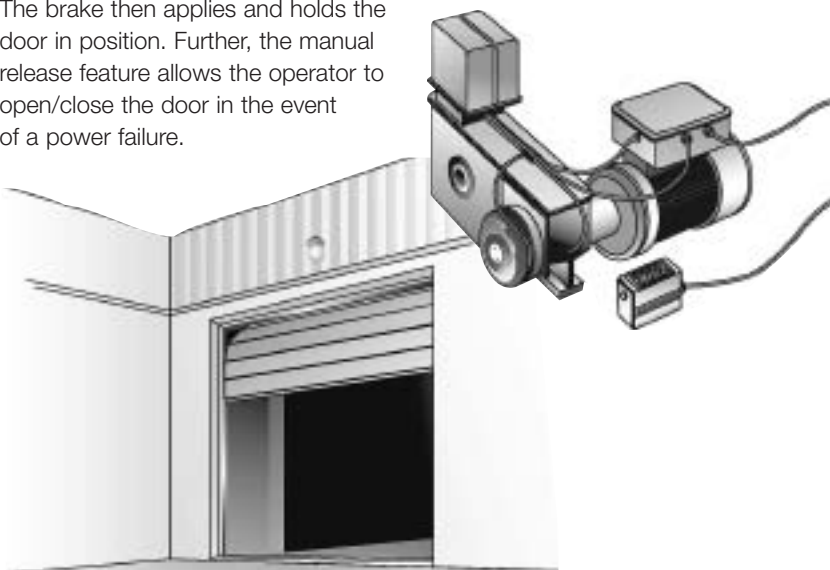
Medical Equipment

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.

Advanced corrosion protection

Provided for use in the toughest industrial environments.

Through holes

Standard for flexible mounting.

Class H magnet wire

For high temperature use.

Rugged spline drive

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

Large diameter

Through bore allows for drop-through hub attachment.

Friction disc

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

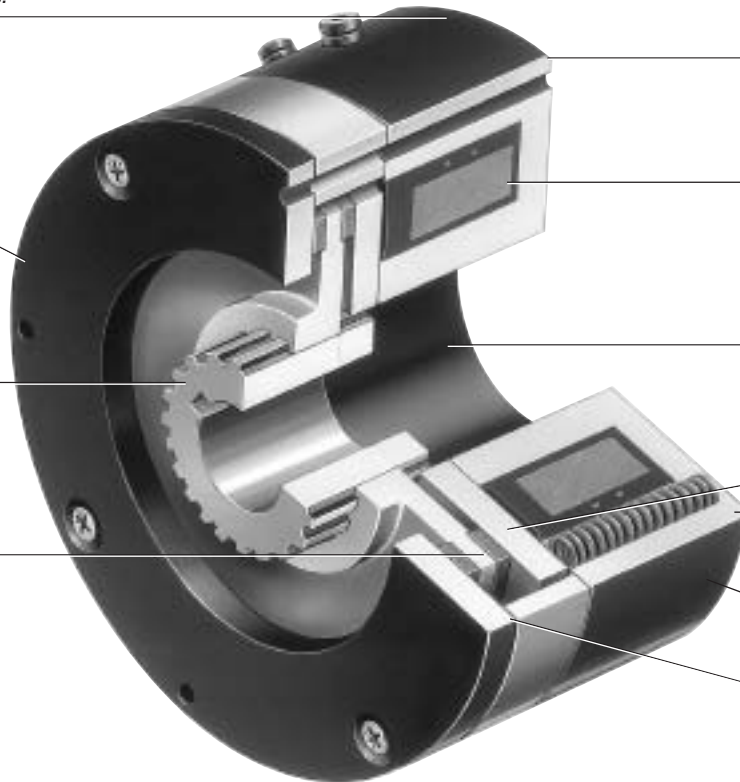
Armature

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

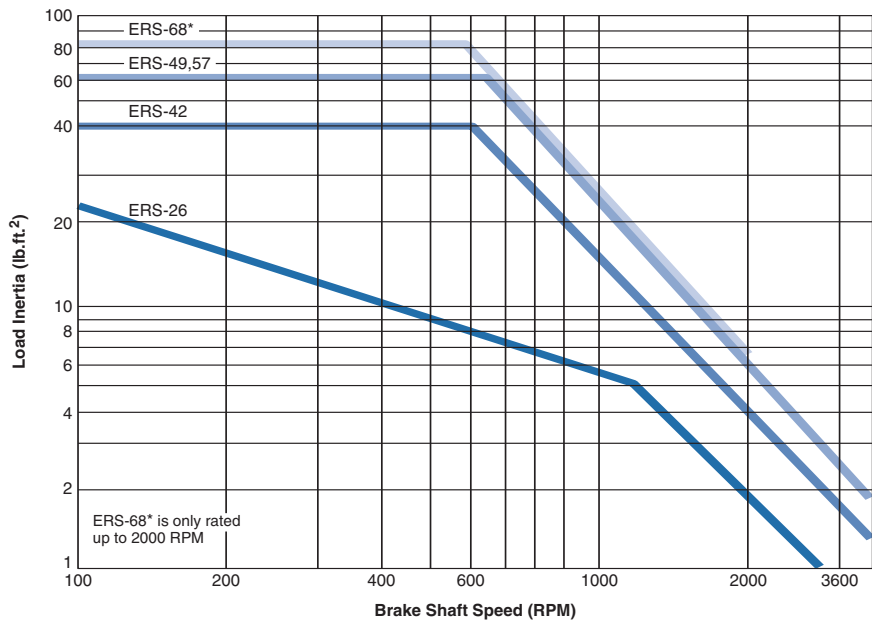
ERS Brakes are available in five models for an optimum size to match your application requirements. Static torque capabilities range from 1.5 lb.ft. to 100 lb.ft.

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:

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

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

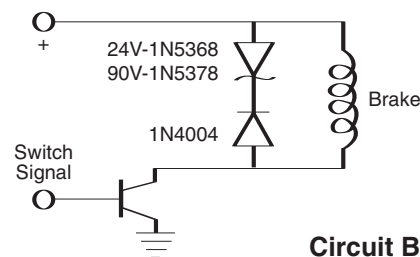
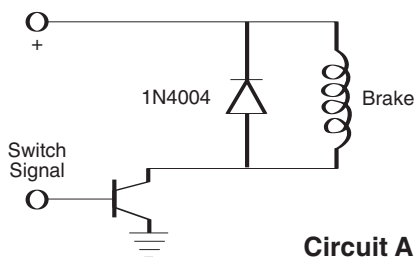
Select Control

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.

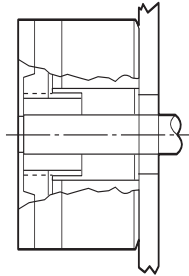


Armature Drives

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.

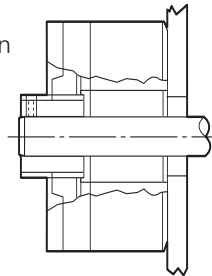
Recessed Hub

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



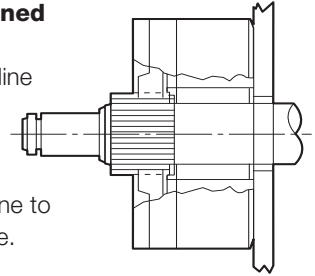
Extended Hub

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	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						
		.8775/.8755	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

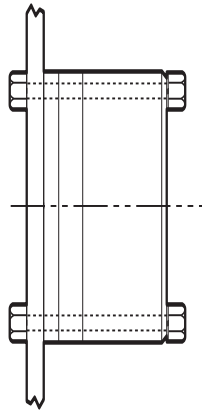
ERS Brakes are easily modified to accommodate different mounting orientations. The brake can be mounted with either face against the mounting surface. The following mountings are possible with the standard ERS brake.

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.

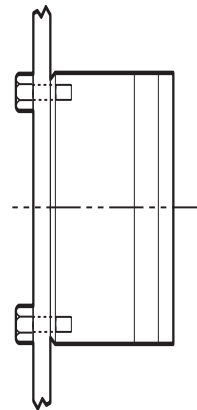
Through Bolt

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



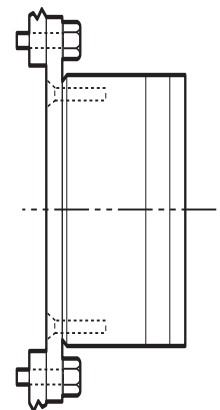
Tapped Hole

Works well where through bolt mounting is impractical.

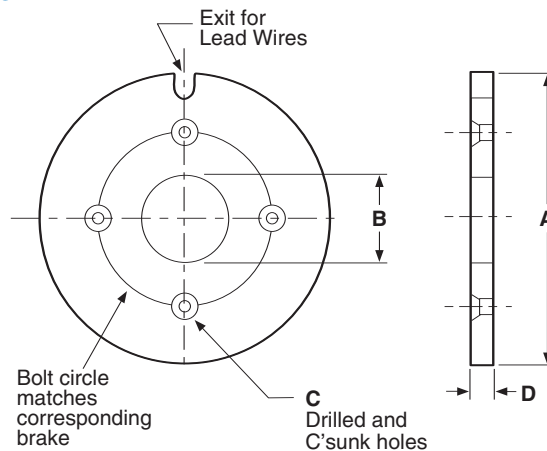


Flange

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



Optional Adapter Mounting Flange

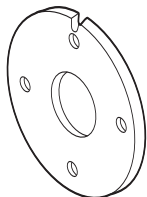


Model	A Nom.	B Nom.	C Holes	D Nom.
ERS-26	4.000	.935	#4	.100
ERS-42	5.000	1.450	#6	.144
ERS-49	6.250	1.575	#8	.193
ERS-57	7.500	1.825	#10	.193
ERS-68	9.500	2.500	1/4	.224

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

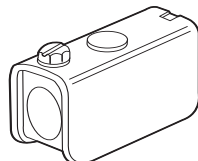
Accessories

Adapter Flanges



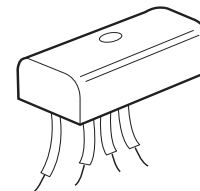
Model	Part Number
ERS-26	686-0182
ERS-42	686-0183
ERS-49	686-0184
ERS-57	686-0185
ERS-68	686-0186

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
	.375	5155-541-002
ERS-49	.500	5155-541-003
	.625	5155-541-004
	.750	5155-541-005
	.875	5155-541-006
	.500	5153-541-004
ERS-57	.625	5153-541-005
	.750	5153-541-006
	.875	5153-541-007
	1.000	5153-541-008
	1.000	5154-541-005
ERS-68	1.125	5154-541-006
	1.250	5154-541-007
	1.375	5154-541-008
	1.500	5154-541-009
	1.500	5154-541-009

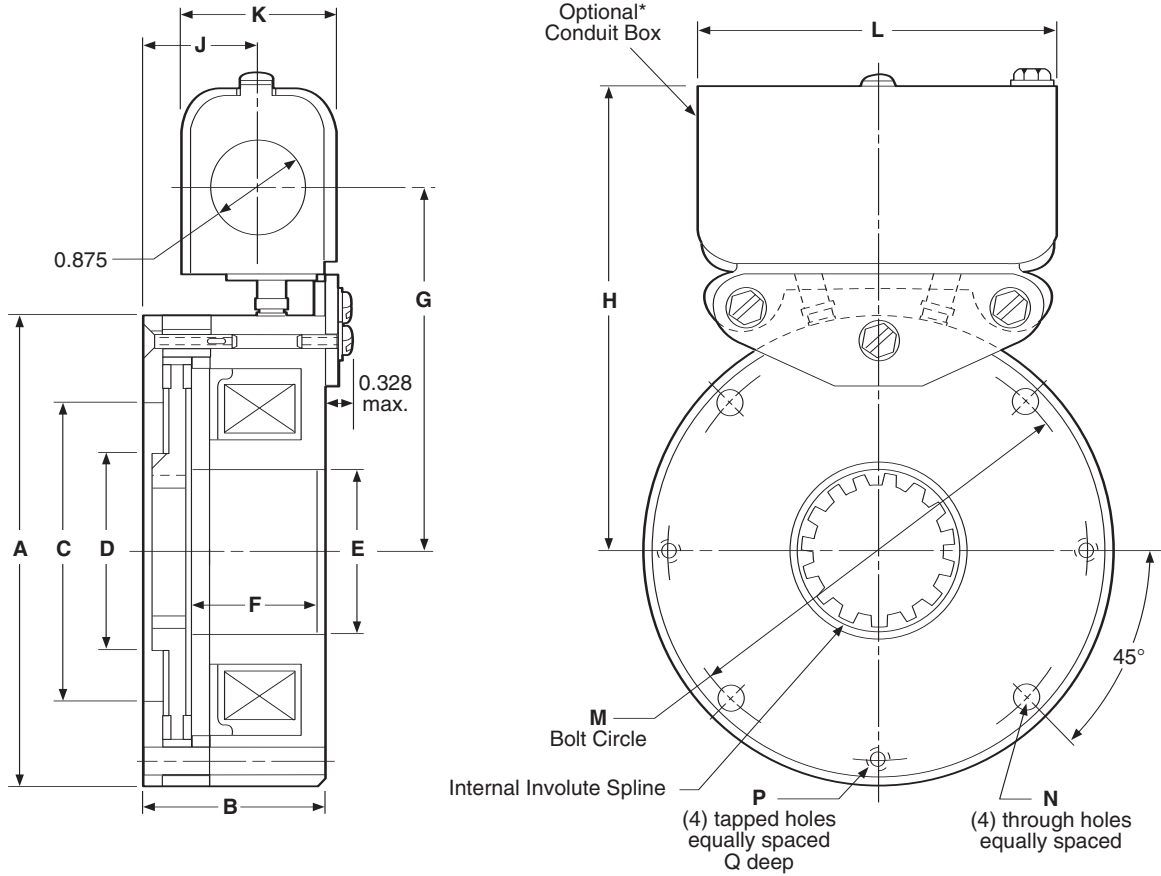
Special Requirements

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

Electrically Released Brakes

ERS Series

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



*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

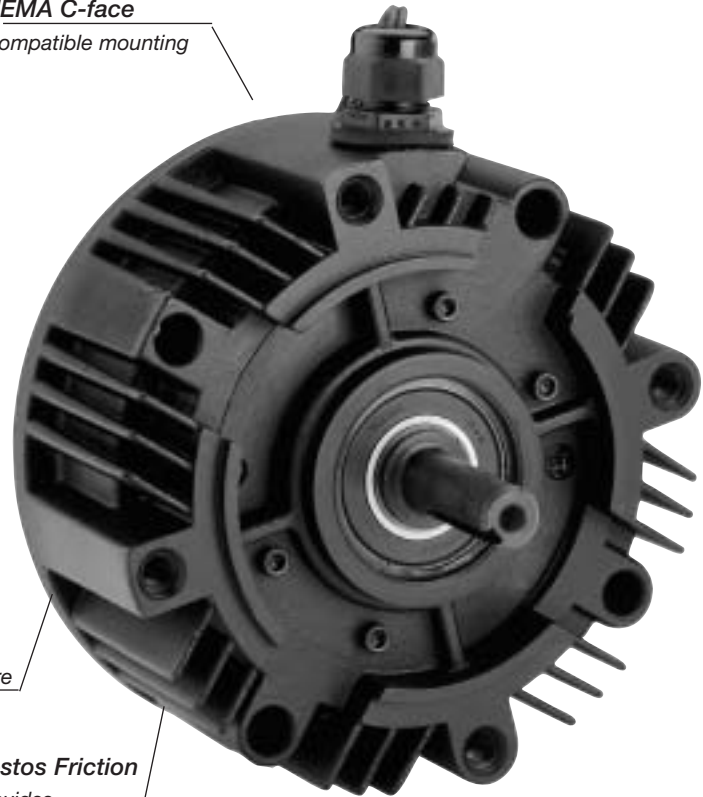
Packaged Spring-Set Brake Module for Holding Applications

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

*NEMA C-face
Compatible mounting*



*Class H
magnet wire*

*Non-Asbestos Friction
Material provides
consistent
torque and long life*

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.

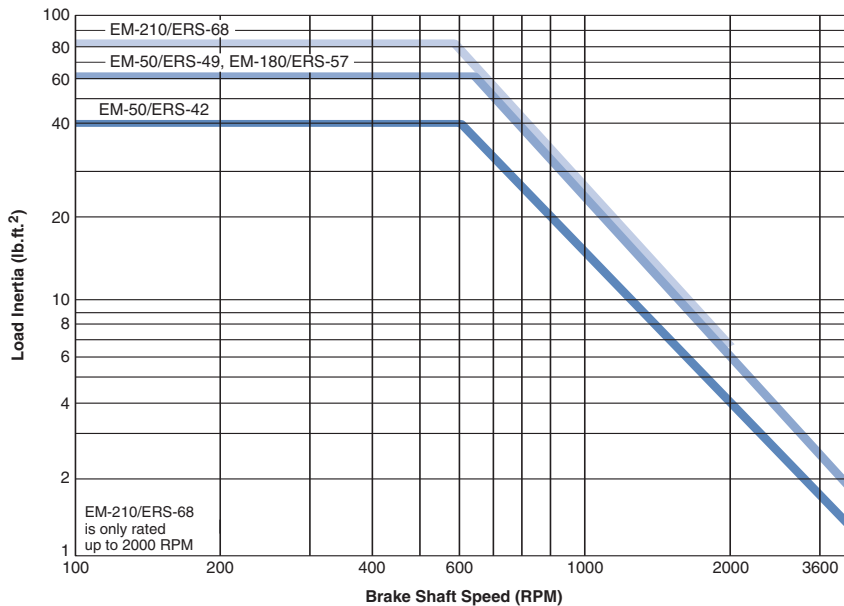
Holding Torque Rating (ft.lb.)	Brake Model
7.0	EM-50/ERS-42
15.0	EM-50/ERS-49
34.0	EM-180/ERS-57
100.0	EM-210/ERS-68

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

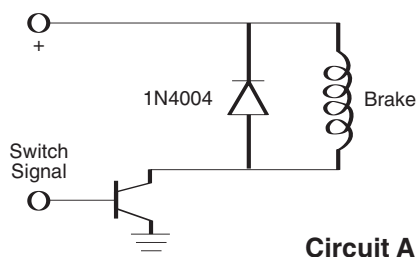
SSBM brake modifications, such as special voltages, rear motor mounting, and low torque units are available.

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

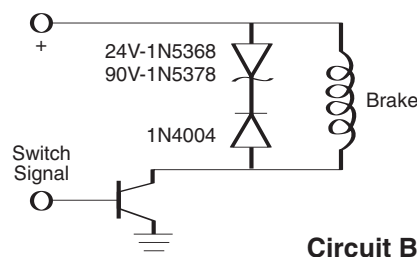
Brake Apply/Release Time (Typical Values)

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

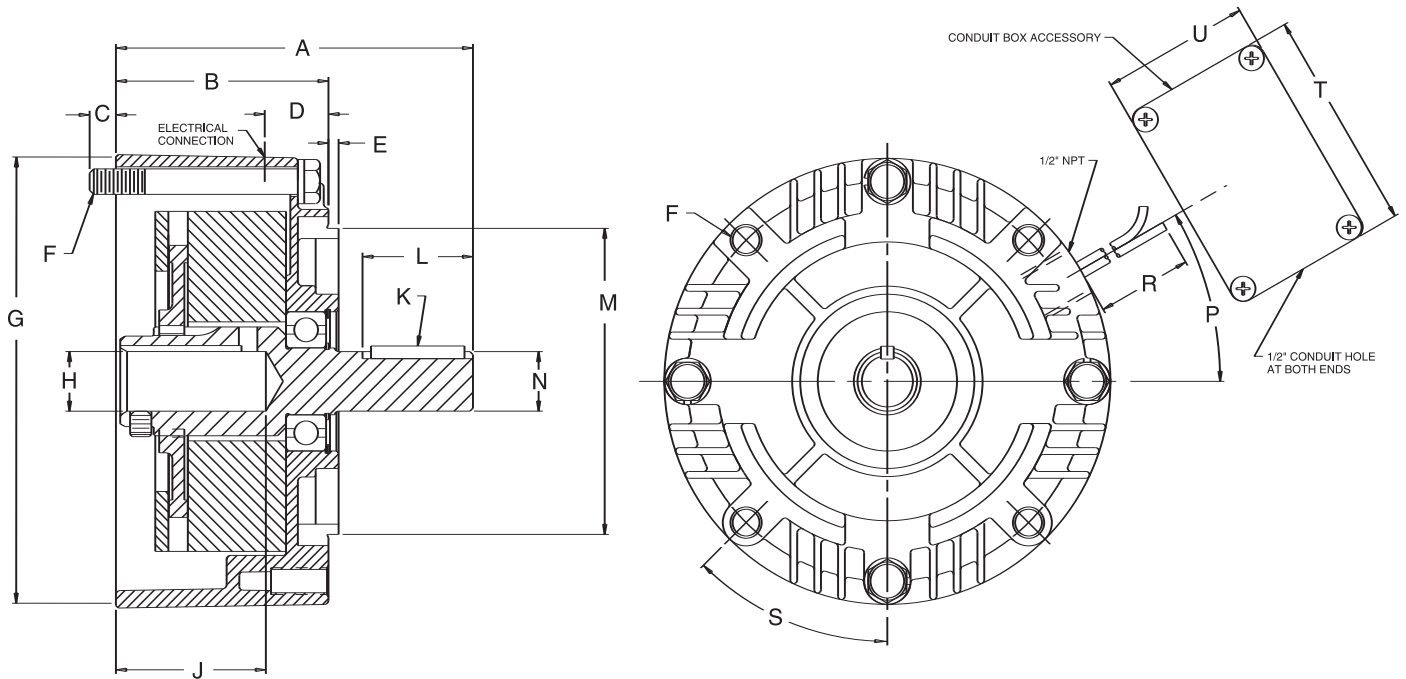
Note: Release and Apply Times are armature engagement and release only.



Circuit A



Circuit B



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

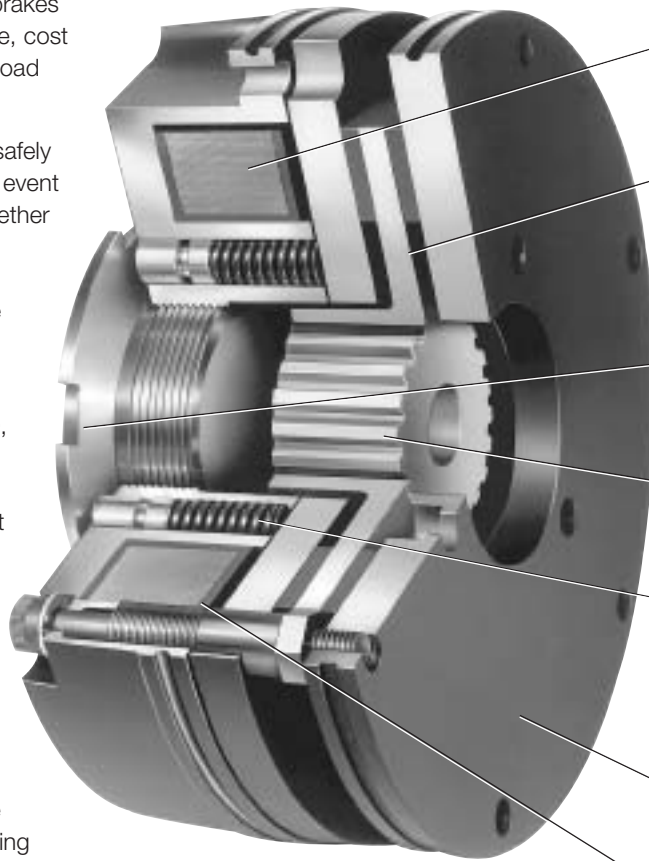
Model	J	K	L	M	N	P	R	S	T	U
EM-50	2.212	3/16x3/16	1.437	4.500 Pilot Dia	.625 Dia	30°	36	45°	3.25	2.188
EM-180	2.216	3/16x3/16	1.437	4.500 Pilot Dia	.875 Dia	30°	36	45°	3.25	2.188
EM-210	3.002	1/4x1/4	2.125	8.500 Pilot Dia	1.125 Dia	25°	36	45°	3.25	2.188

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

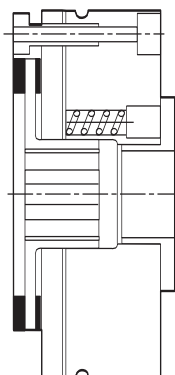
Brakes are factory set at the minimum torque rating shown in the Specifications chart.

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

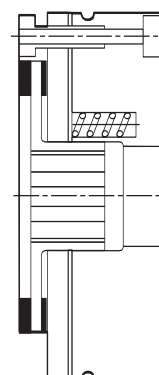
Design Variations



VAR 2

Central ring nut adjusts torque

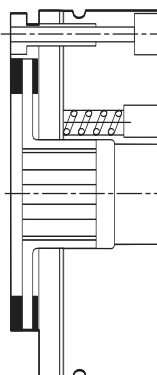
- Up to 50% torque reduction possible
- Available in all sizes



VAR 0

Torque preset and constant

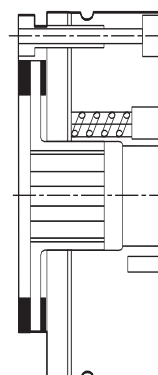
- No torque adjustments possible
- Available in all sizes



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

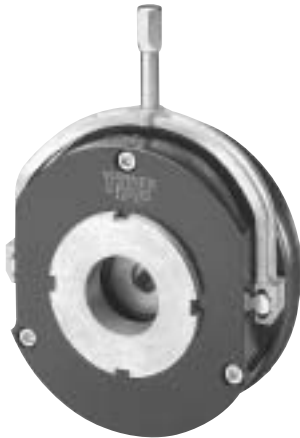
- Up to 50% torque reduction possible
- Mounting holes for tachometer
- Available in sizes 5, 10, 20 and 35 only

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:

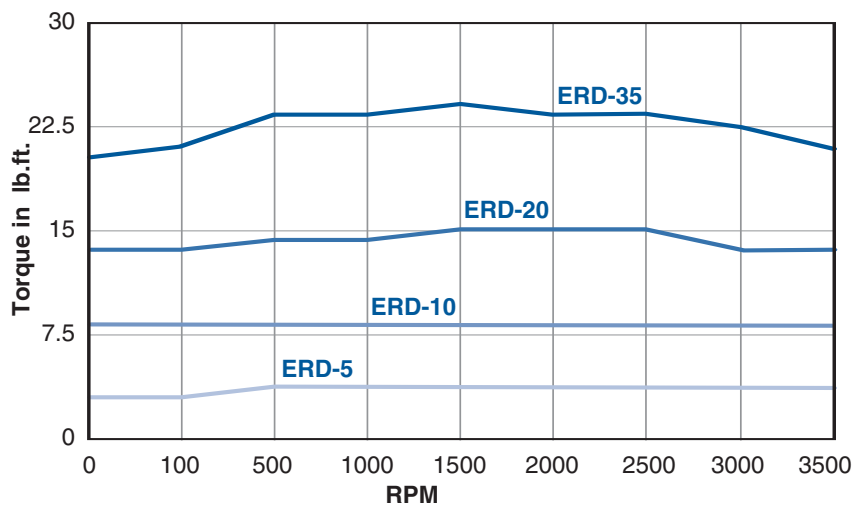
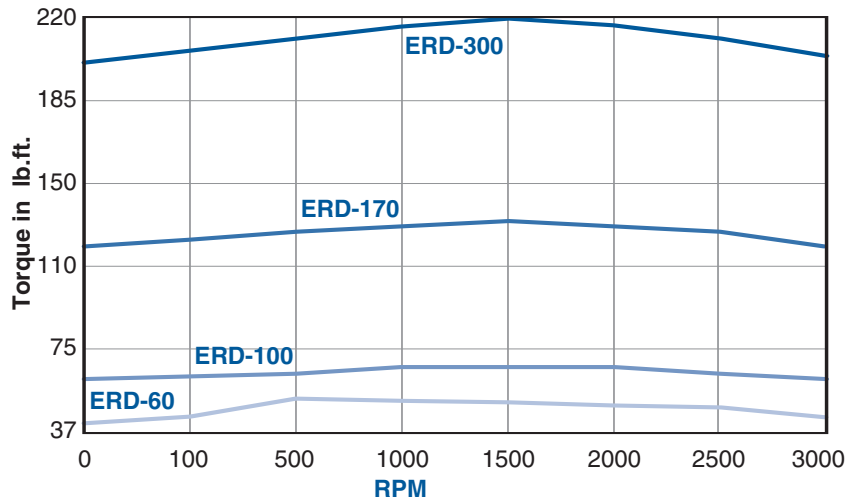
E = Single Cycle Energy in lb.ft.

WR² = Load Inertia in lb.ft²

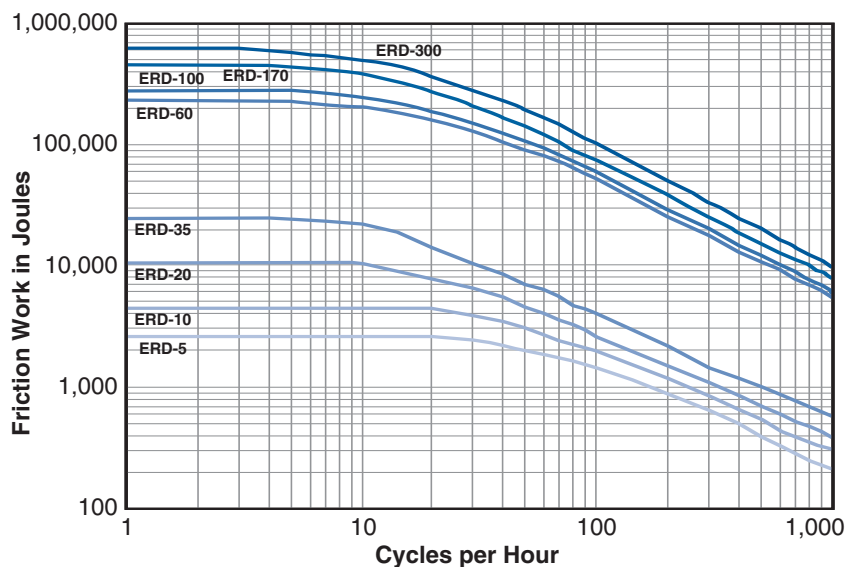
N = Speed in RPM

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

Dynamic Torque

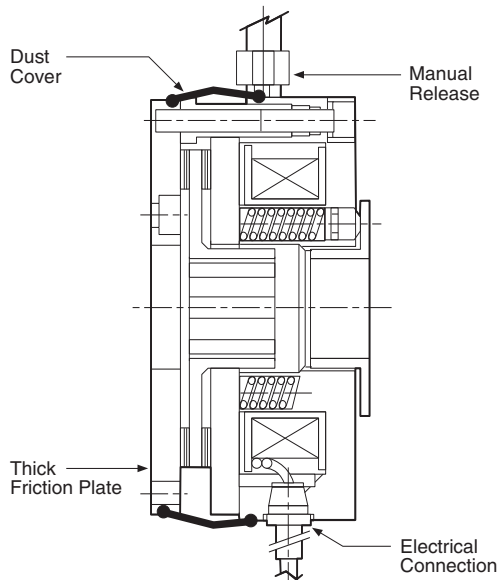


Energy Capacity



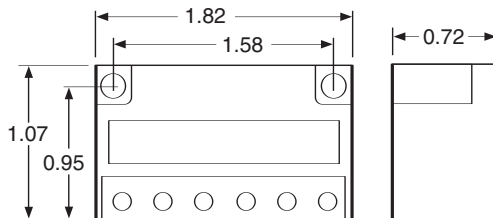
Note: To convert Joules/min. to ft.lbs./min, multiply times .7376

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

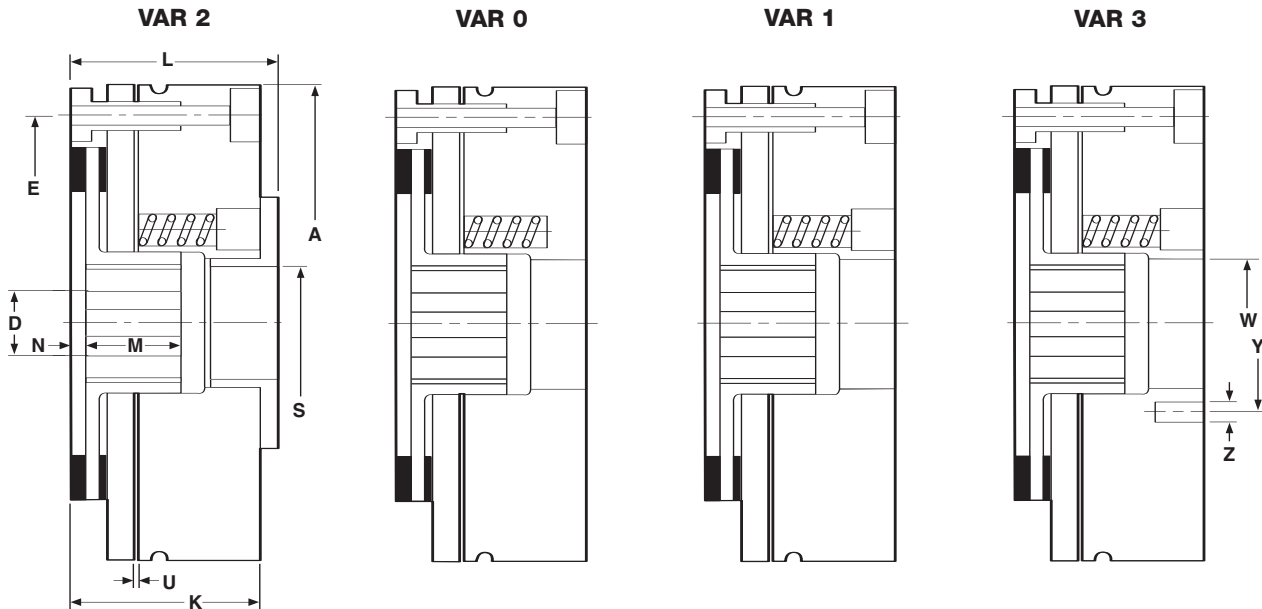
Flange Type	Screw Kit	Mounting Style
Thick	Short	Standard – Customer Mounting via Hole Pattern H
Thin	Long	Customer Mounting via Hole Pattern E
None	Long	Customer Mounting via Hole Pattern E

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

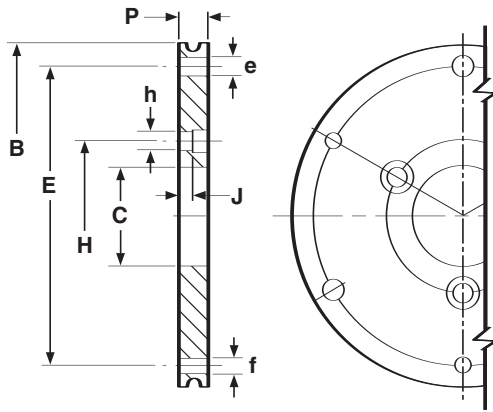


ERD Size	A	D Max.	E	K	L Max.	M +0.000/-0.008	N
5	3.307	0.5	2.835	1.378	1.575	0.709	0.071
10	4.016	0.625	3.543	1.614	1.831	0.787	0.098
20	5.000	1	4.409	1.870	2.165	0.787	0.138
35	5.787	1.125	5.197	2.146	2.559	0.984	0.118
60	6.378	1.25	5.709	2.520	2.933	1.181	0.118
100	7.402	1.375	6.693	2.795	3.209	1.181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

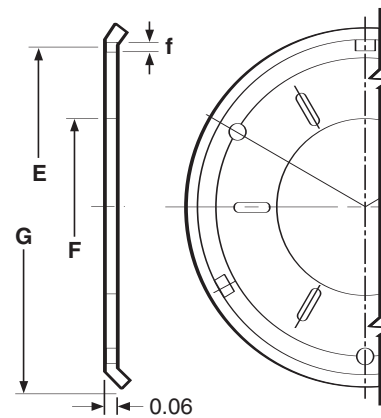
ERD Size	S	U +/-0.002	W	Y	Z Bolt Pattern	Variations Available
5	0.748	0.006	0.925	1.299	4xM4	0, 1, 2, 3
10	0.945	0.006	1.122	1.594	4xM5	0, 1, 2, 3
20	1.378	0.008	1.594	2.224	4xM5	0, 1, 2, 3
35	1.575	0.008	1.909	2.244	4xM5	0, 1, 2, 3
60	1.890	0.012	2.303			0, 2
100	2.047	0.012	2.500			0, 2
170	2.362	0.012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

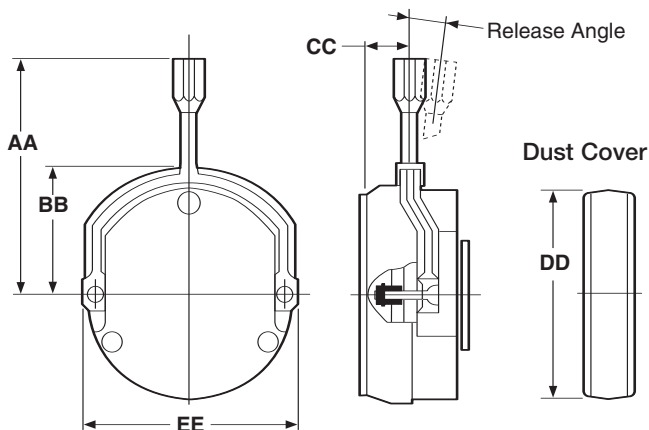


Thin Friction Plate (Sizes 5 thru 35 only)

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)

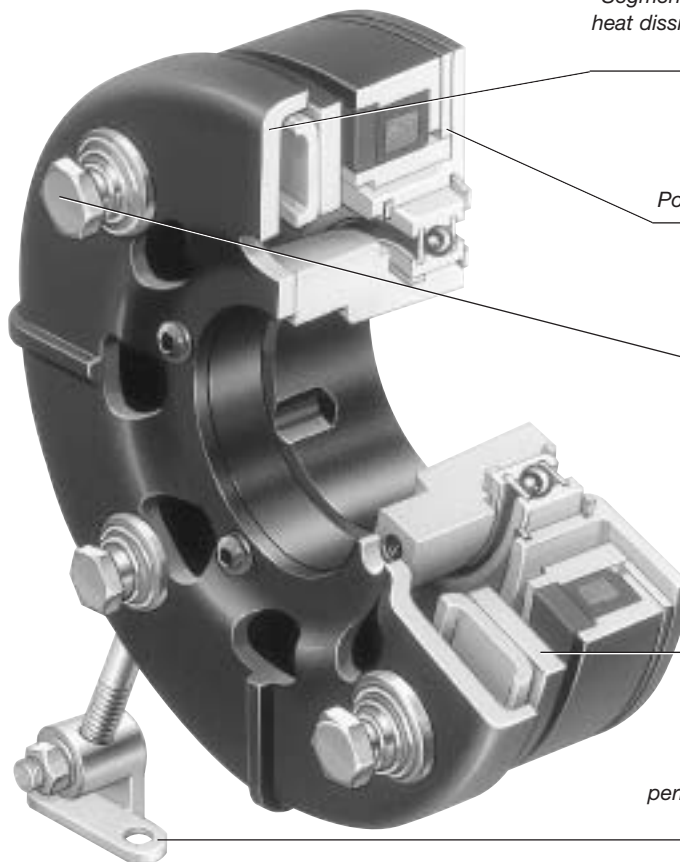


ER Series permanent magnet brakes allow customers added flexibility and larger sizes. 825 and 1225 are available in both standard and heavy duty models.

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.

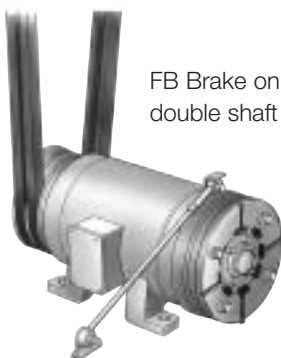
Electrically Released
 Brake automatically engages when power is turned off– releases when power is applied.

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	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																					

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

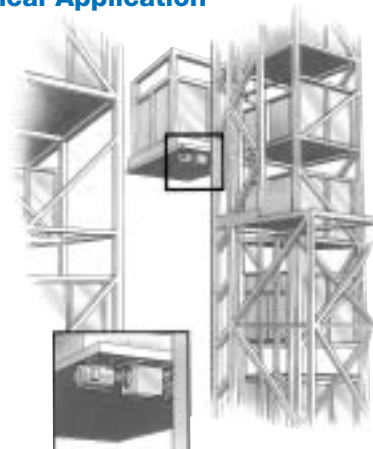
Specifications

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

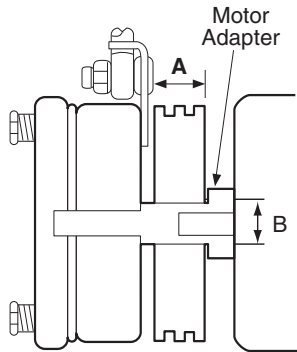


Storage Elevator

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

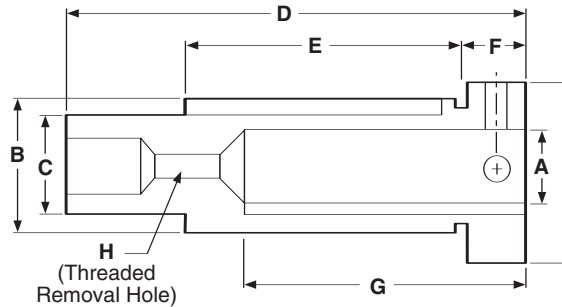


Model Size	Motor Shaft Size	A Usable Length	B Dia.	When using an adapter order the following Dodge Bushing	
375	.625	2.000	.875	5380-101-005	*None
	.875	2.250	1.250	5380-101-004	*None
475	1.125	2.750	1.625	5381-101-003	#1008 1"
650	1.375	3.000	2.000	5382-101-003	#1310 1.375"
	1.625	3.625	2.250	5382-101-002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

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

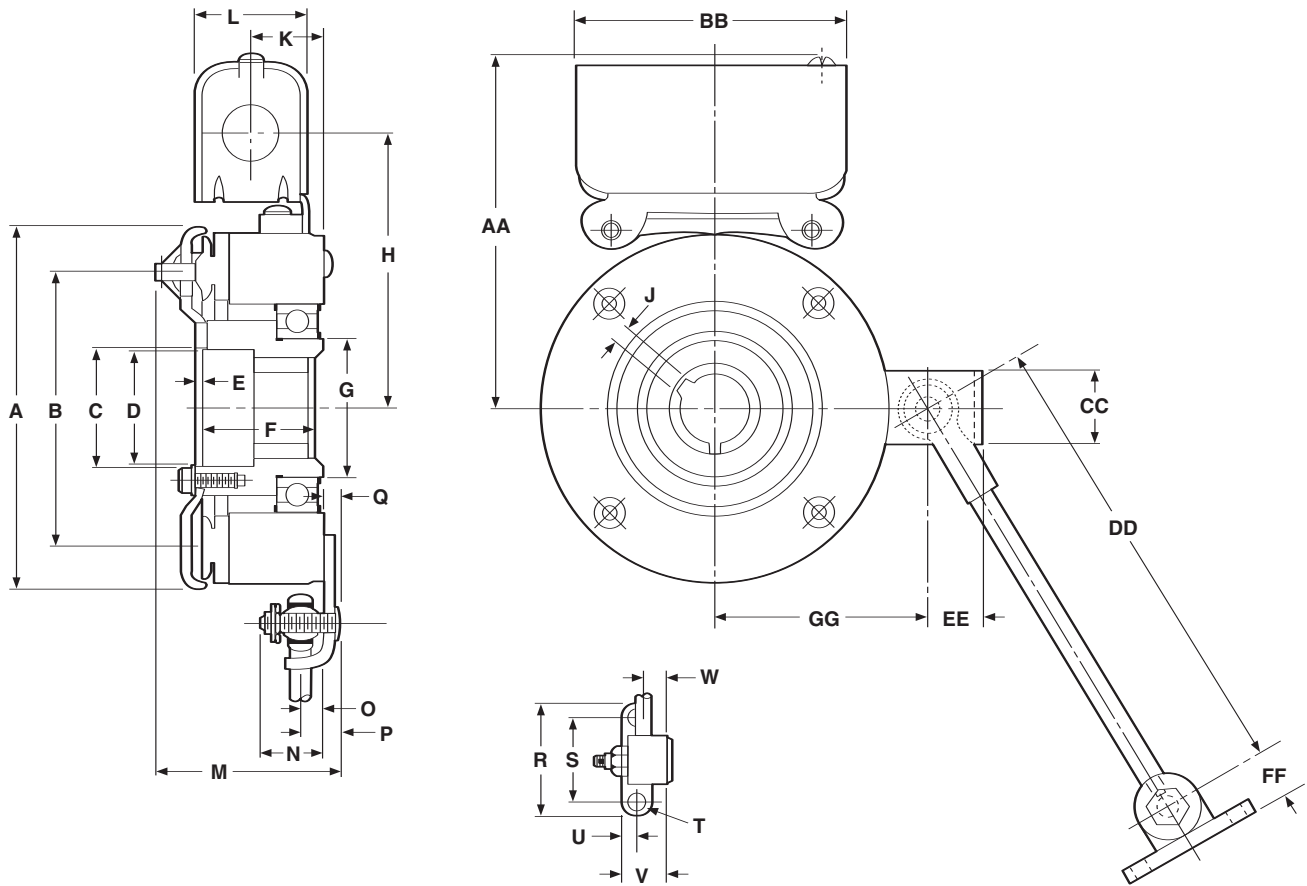
FB Shaft Adapter

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	.500 – .562	1/8 x 1/16
	.625 – .875	3/16 x 3/32
Dodge #1008	.937 – 1.000	1/4 x 1/8
	.500 – .562	1/8 x 1/16
FB-650	.625 – .875	3/16 x 3/32
	.937 – 1.250	1/4 x 1/8
Dodge #1310	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																				
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