



NEMA C-Face Compatible Clutches, Brakes & Clutch Brake Combinations



WARNER ELECTRIC™

**PRODUCT
CATALOG**

Warner Electric™

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

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

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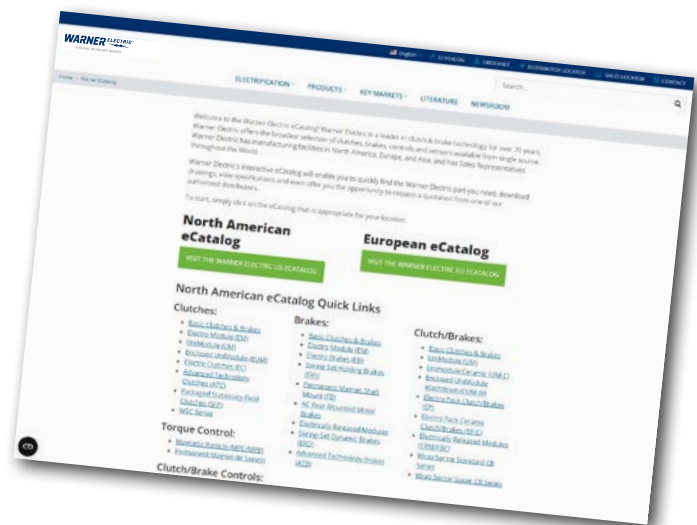


Check Out warnerelectric.com

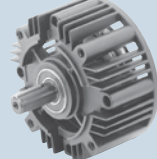
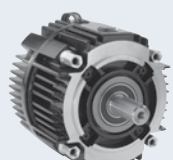
warnerelectric.com features an interactive eCATALOG making it faster and easier to find and spec the motion control products you need.

Within the Warner Electric Interactive eCATALOG, you can start your search for basic components, such as clutches or brakes, and then quickly refine your search from hundreds of possibilities to one 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 an RFQ for any of your selections.

Find it fast at warnerelectric.com



NEMA C-face Clutches, Brakes and Clutch/Brake Combinations

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Packaged Performance Products

Electromagnetic Clutches and Brakes

Packaged Products Benefits

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

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

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

Warner Electric Packaged designs are available for:

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

The Basics

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

Reliable Performance

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

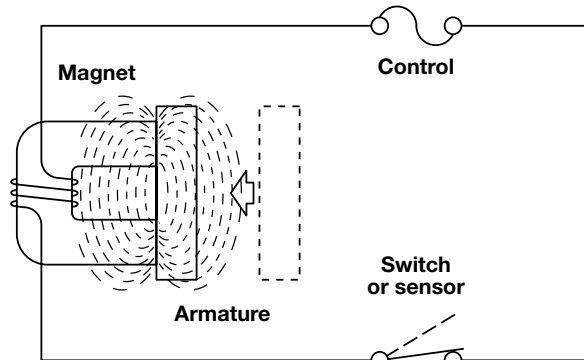


Packaged Performance Products

Electromagnetic Clutches and Brakes

Principle of Operation

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



Fast and Accurate

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

Controllable

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



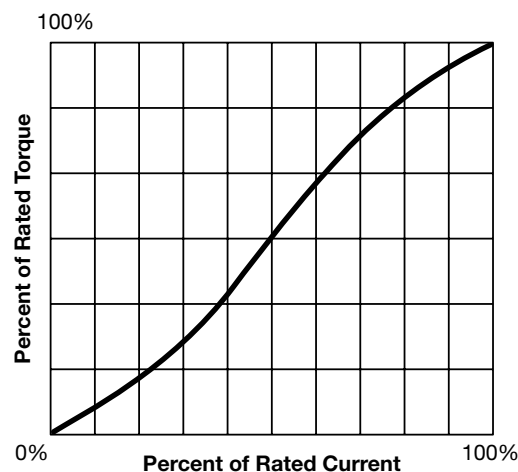
Easy to Select

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

Maintenance Free

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

Torque/Current Curve



Packaged Performance Products



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

Electro Module

Individual Clutch and Brake Modules



EM Series

Modular Components that are Easily Combined

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

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

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

See P-8586-WE for Service Parts

UniModule®

One Piece Preassembled Clutches and Clutch/Brakes



UM Series

C-face or Base Mounted Units

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

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

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

See P-8586-WE for Service Parts

UM Smooth-Start

Soft Engage Designs

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

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

UM-C Series

High Performance Version for High Cycle Rate Applications

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

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

Enclosed UniModule®

Preassembled Units Offer Clean, Quiet Operation



EUM Series

Totally Enclosed Clutch and Brake Packages

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

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

See P-8586-WE for Service Parts

EUM-W Series

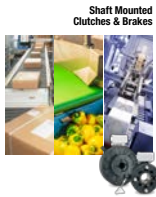
Washdown Version

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

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

See P-8586-WE for Service Parts

Packaged Performance Products



Shaft Mounted Clutches & Brakes P-8587-WE

WARNER ELECTRIC



Base Mounted Clutch/Brake Combinations P-8588-WE

WARNER ELECTRIC

Electro Clutches Electro Brakes

Shaft Mounted Units



EC Series Clutches

Pre-Packaged Convenience

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

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

See P-8587-WE for Service Parts

EB Series Brakes

Torque Arm Mounting

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

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

See P-8587-WE for Service Parts

Advanced Technology Clutches and Brakes

Extra Rugged Design



ATC Series Clutches ATB Series Brakes

Replaceable Friction Faces

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

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

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

See P-8587-WE for Service Parts

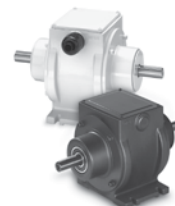
SFP Series Clutches

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

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

Electro Pack Clutch/Brakes

Foot Mounted Units



EP Series

Totally Enclosed Units

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

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

See P-8588-WE for Service Parts

EP-C Series

High Performance Version

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

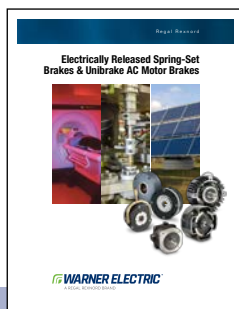
Ceramic faced wear components provide long life for high cycle rate use. Consistent torque and cycle repeatability with Smooth-Start/stop control.

EP-W Series

Washdown Design

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

Packaged Performance Products



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

Spring-Set Brakes

For Power-Off Static Holding and Emergency Stopping Applications

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



ERS Series

Static Engaged

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

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

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

Spring Set Brake Module

- 7 to 100 lb. ft. holding torque

NEMA C-face version of the ERS Series



ERD Series

Dynamic Braking

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

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

Unibrake Series AC Motor Brakes

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

Permanent Magnet Brakes

For Power-Off Dynamic Stopping and Cycling Applications



FB Series

Shaft Mounted, Dynamic Braking

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

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

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

See P-8590-WE for Service Parts.

ER Series

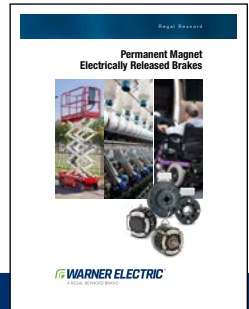
Flange Mounted, Dynamic Braking

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

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

See P-8590-WE for Service Parts.

Permanent Magnet Electrically Released Brakes P-8590-WE



Electro Module

C-face Brake Modules



EM-FBC Clutch/Brakes

Individual Module Components

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

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

EM-FBB

Brake Modules

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

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

EM-MBFB

Motor Brakes

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

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

UniModule

C-face Brake Modules



UM-FBC Clutch/Brakes

One Piece Packages

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

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

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

Enclosed UniModule

C-face Brake Modules



EUM-FBB Brake Modules

Totally Enclosed

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

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

EUM-MBFB

Motor Brakes

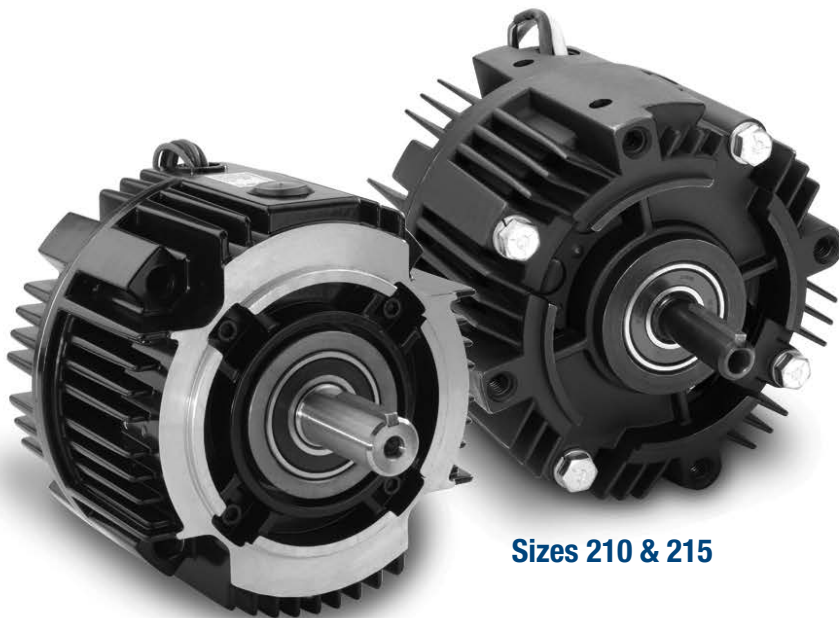
- ❑ 4 sizes
- ❑ 56C to 215C frame motors

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

[illegible]

Electro Modules UniModules Enclosed UniModules

A



Sizes 50, 100 & 180

Sizes 210 & 215

- **Modular Design Flexibility**
- **Outstanding Controllability**
- **Accurate, Consistent Performance**
- **Bidirectional**

EM Series Electro Module

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

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

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

- Modular design flexibility
- 1/4 to 7-1/2 HP at 1800 RPM
- Outstanding controllability
- Fast cycling
- Smooth starts and stops
- Accurate
- Bidirectional
- Consistent performance
- Complete control capability
- Conduit box relocation simplifies installation. Use of integrated mounting bolts allows for conduit box location directly on the top of the unit (sizes 50, 100, 180 only)



Sizes 50, 100 & 180

Sizes 210 & 215

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 P-8590-WE 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 page CTL-1.

Modular Components

Clutch Modules



10 Motor Clutch

Fan cooled for long life and consistent performance. See page A-8.



30 Input Clutch

Fan cooled. Sealed coil. Twin bearing mounted shaft maintains tight concentricities. See page A-11.



40 Output Clutch

Autogap™ automatically adjust armature for wear. Does not have a coil – use in combination with a 10 Motor Clutch or 30 Input Clutch module. See page A-12.

Brake Modules



20 Brake

Bolts directly to C-face components. See page A-9.



20MB Motor Brake

Does not have a shaft. Has end cap. See page A-10.

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 A-14.



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 A-16.



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 A-16.

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 A-13.



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 A-15.



20/30-B

Brake/Input Clutch-Base Mounted

Stand alone units attach with pulleys, sprockets, etc. See page A-15.

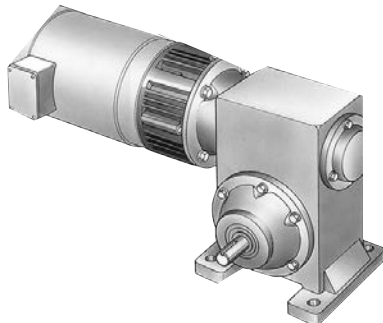
EM Series Electro Module

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.

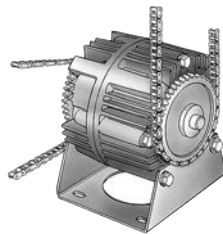
Frame Size Selection

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 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



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.

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																		

*For applications with speeds below 100RPM, please contact Warner Electric Application Support.

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)

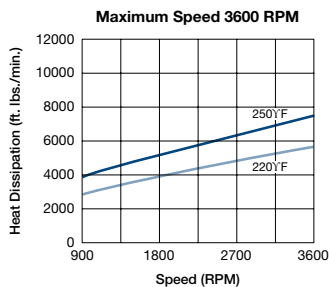
N = Speed in revolutions per minute (RPM)

F = Cycle rate in cycles per minute (CPM)

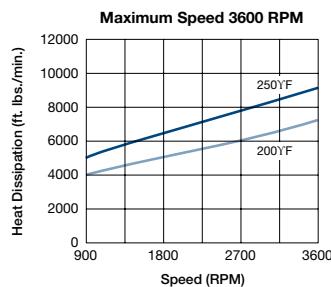
Compare the calculated heat generated in the application to the unit ratings using the heat dissipation curves. Select the appropriate unit that has adequate heat dissipation ability.

Heat Dissipation Curves

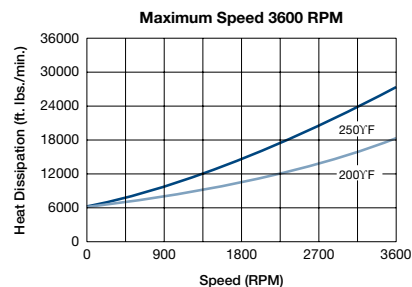
Size 50



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:

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

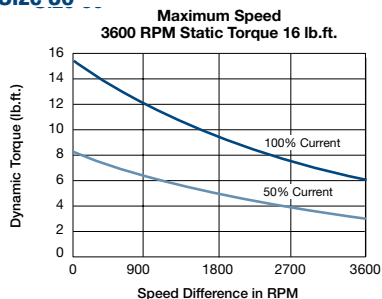
WR^2 = Total reflected inertia at the clutch/brake shaft. Include the clutch/brake output inertia. (lb. ft.²)

N = Speed in revolutions per minute (RPM)

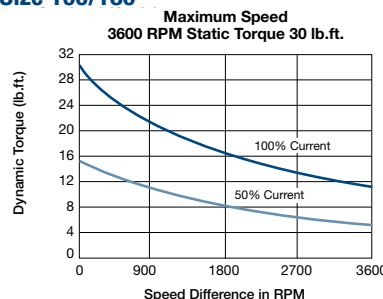
t = Time allowed for the engagement (sec)

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

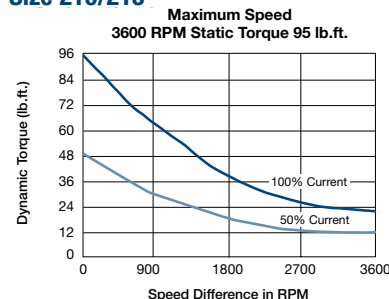
Size 50



Size 100/180



Size 210/215



EM Series Electro Module

Specifications

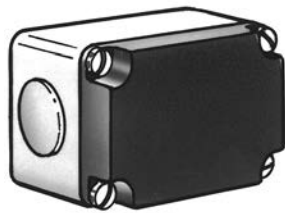
EM Size	Static Torque lb. ft.	Maximum RPM	Voltage DC
50	16	3600	6, 24, or 90
100	30	3600	6, 24, or 90
180	30	3600	6, 24, or 90
210	95	3600	6, 24, or 90
215	95	3600	90

3. Accessories

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

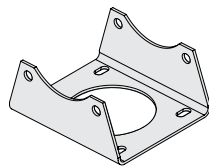
a. Conduit Box

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

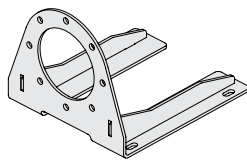


b. Mounting Brackets

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 20, 10/20 and 10/40 units and motor.

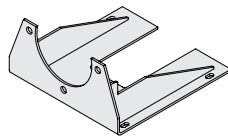


Base Mount



Motor Mount

For 50, 100 & 180 sizes



Motor Mount

For 210 & 215 sizes

c. Cover Kit – For sizes 50, 100 & 180



Each cover kit includes two (2) vent covers, two (2) gaskets and four (4) screws needed to convert a vented design into an enclosed design. For brake only modules, a cover plate is included to enclose the back of the brake.

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 CTL-1 for complete information.

Ordering Information

Part Numbers

Model No.	Voltage D.C.	Part No.
10 Motor Clutch Module		
EM-50-10	6	5370-270-201
EM-50-10	24	5370-270-203
EM-50-10	90	5370-270-204
EM-100-10	6	5370-270-206
EM-100-10	24	5370-270-208
EM-100-10	90	5370-270-209
EM-180-10	6	5370-270-211
EM-180-10	24	5370-270-213
EM-180-10	90	5370-270-214
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	5370-169-201
EM-50-20	24	5370-169-203
EM-50-20	90	5370-169-204
EM-100-20	6	5370-169-206
EM-100-20	24	5370-169-208
EM-100-20	90	5370-169-209
EM-180-20	6	5370-169-211
EM-180-20	24	5370-169-213
EM-180-20	90	5370-169-214
EM-210-20	6	5371-169-022
EM-210-20	24	5371-169-034
EM-210-20	90	5371-169-023
EM-215-20	24	5371-169-102
EM-215-20	90	5371-169-076
20MB Motor Brake		
EM-50-20MB	6	5370-169-216
EM-50-20MB	24	5370-169-218
EM-50-20MB	90	5370-169-219
EM-180-20MB	6	5370-169-221
EM-180-20MB	24	5370-169-223
EM-180-20MB	90	5370-169-224
EM-210-20MB	6	5371-169-025
EM-210-20MB	24	5371-169-035
EM-210-20MB	90	5371-169-026
30 Input Clutch Module		
EM-50-30	6	5370-270-216
EM-50-30	24	5370-270-218
EM-50-30	90	5370-270-219
EM-100-30	6	5370-270-221
EM-100-30	24	5370-270-223
EM-100-30	90	5370-270-224
EM-180-30	6	5370-270-226
EM-180-30	24	5370-270-228
EM-180-30	90	5370-270-229
EM-210-30	6	5371-270-023
EM-210-30	24	5371-270-026
EM-210-30	90	5371-270-024

Model No.	Voltage D.C.	Part No.
40 Output Clutch Module		
EM-50-40		5370-536-200
EM-100-40		5370-536-201
EM-180-40		5370-536-202
EM-210-40		5371-536-005

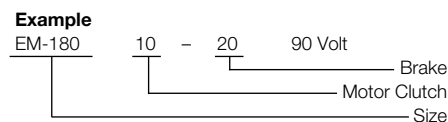
Accessories

Description	EM Size	Part No.
Conduit Box	All sizes	5370-101-042
Base Mount Kit	50/100	5370-101-004
for 2030, 3040	180	5370-101-002
	210/215	5371-101-001
Motor Mount Kit	50/100	5370-101-078
for 20, 1020, 1040	180	5370-101-079
	210/215	5371-101-012
Cover Kit	50/100/180	5370-101-076
	50/100/180 (20 or 20MB)	5370-101-082

How to Order

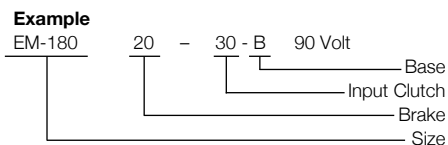
Motor or Reducer Mounted

Simply combine the size number with the configuration of the modular combination from page A-3. Specify voltage. See chart for specific part numbers. Electrically released spring-set brakes and Unibrakes AC motor brakes in P-8589-WE. Permanent Magnet electrically released brakes in P-8590-WE. Order optional conduit box if desired.



Base Mounted

Simply combine the size number with the configuration of the modular combination from page A-3. Specify voltage. See chart for specific part numbers. Electrically released spring-set brakes and Unibrakes AC motor brakes in P-8589-WE. Permanent Magnet electrically released brakes in P-8590-WE. Order optional conduit box if desired.

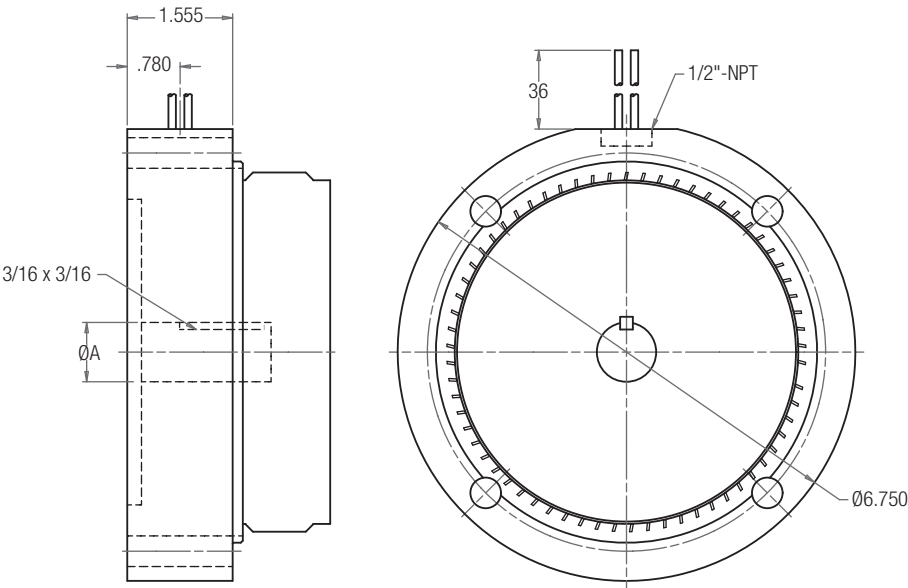


Select Appropriate Power Supply/Control. See the Controls Section beginning on page CTL-1.

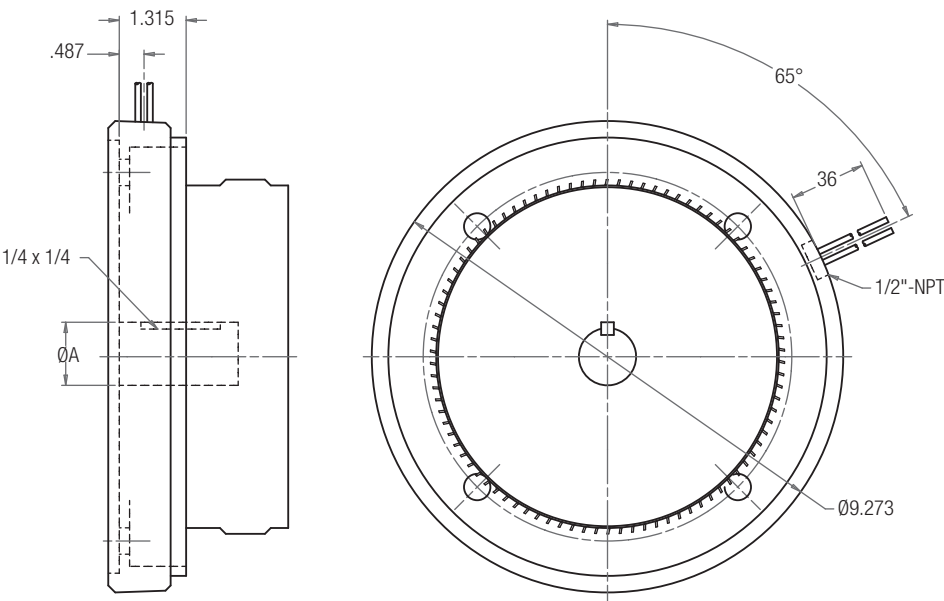
EM Series Electro Module

10 Motor Clutch Module

SIZE 50/100/180



SIZE 210



Dimensions

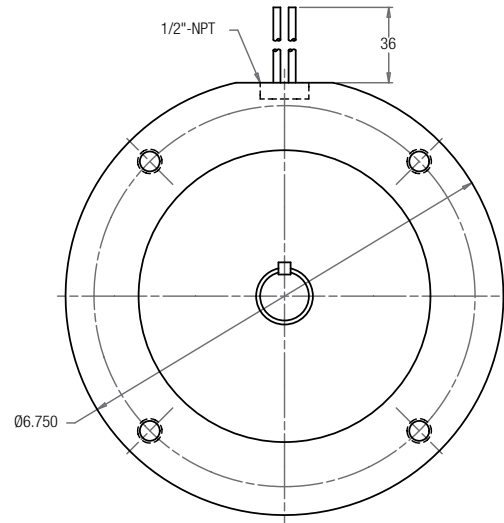
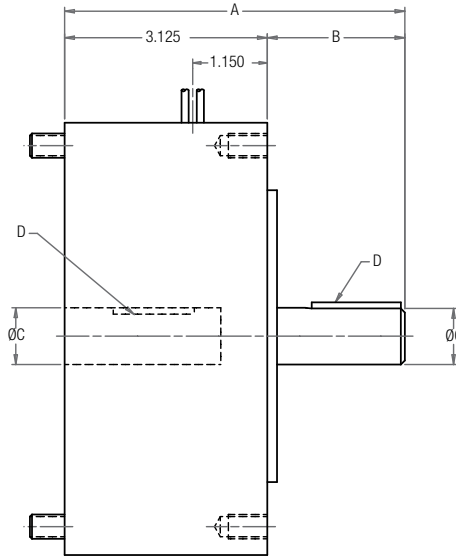
Size	A
50	0.625
100	0.625
180	0.875
210	1.125

Specifications

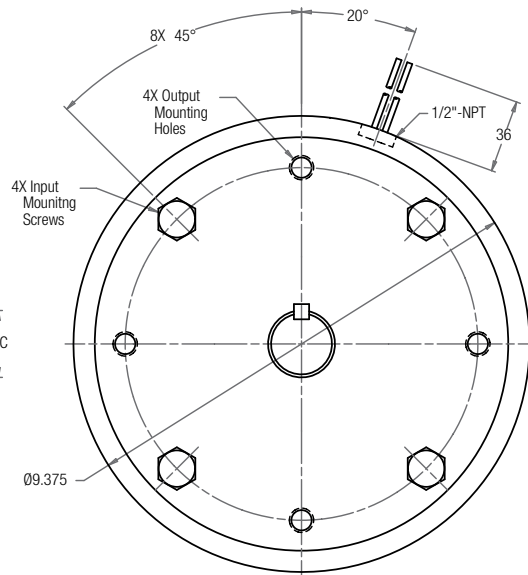
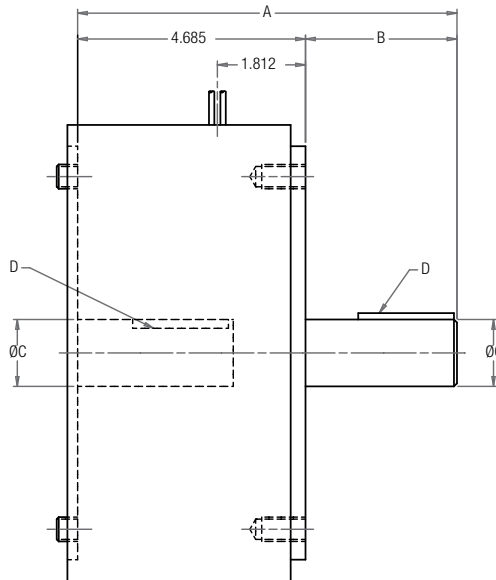
Model Size	Voltage DC	Static Torque (lb. ft.)	Max. RPM	Inertia-WR ² (lb.ft. ²)	Weight (lbs)	NEMA Frame Size
50	6, 24, 90	16	3600	.020	6.4	56C/48Y*
100	6, 24, 90	30	3600	.046	7.6	56C/48Y**
180	6, 24, 90	30	3600	.046	7.6	182C/143TC 184C/145TC
210	6, 24, 90	95	3600	.188	9.1	213C/182TC 215C/184TC

* For 56C/48Y Frame motors 3/4 HP and smaller the UM-100 size may be used where extended life is desirable.
** UM-100 size is recommended for motors 1 HP and larger.
For standard NEMA frame dimensions, see page G-3.

SIZE 50/100/180



SIZE 210/215



Dimensions

Size	A	B	C	D
50	5.165	2.040	0.625	3/16 x 3/16
100	5.186	2.061	0.625	3/16 x 3/16
180	5.246	2.121	0.875	3/16 x 3/16
210	7.299	2.614	1.125	1/4 x 1/4
215	7.799	3.114	1.375	5/16 x 5/16

Specifications

Model Size	Voltage DC	Static Torque (lb. ft.)	Max. RPM	Armatures (lb.ft. ²)	Inertia-WR2 Arm. Hub (lb.ft. ²)	Shaft (lb.ft. ²)	Weight (lbs)	NEMA Frame Size
50	6, 24, 90	16	3600	.014	.002	.001	9.2	56C/48Y*
100	6, 24, 90	30	3600	.036	.003	.002	11.2	56C/48Y**
180	6, 24, 90	30	3600	.036	.003	.002	11.2	182C/143TC 184C/145TC
210	6, 24, 90	95	3600	.162	.021	.017	21.5	213C/182TC 215C/184TC
215	24, 90	95	3600	.081(1)	.021	.022	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.

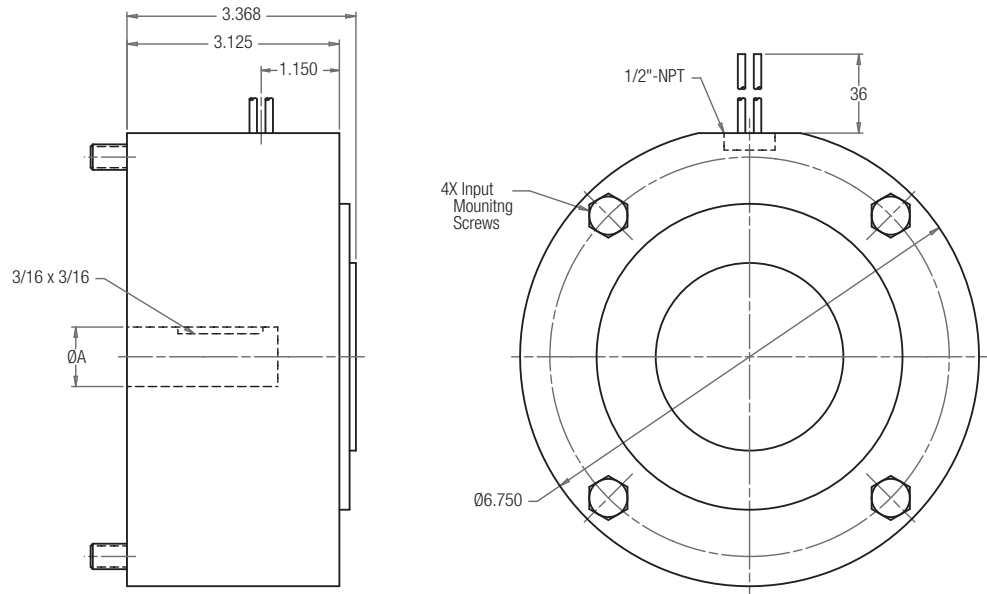
*** For 7-1/2 HP max.

For standard NEMA frame dimensions, see page G-3.

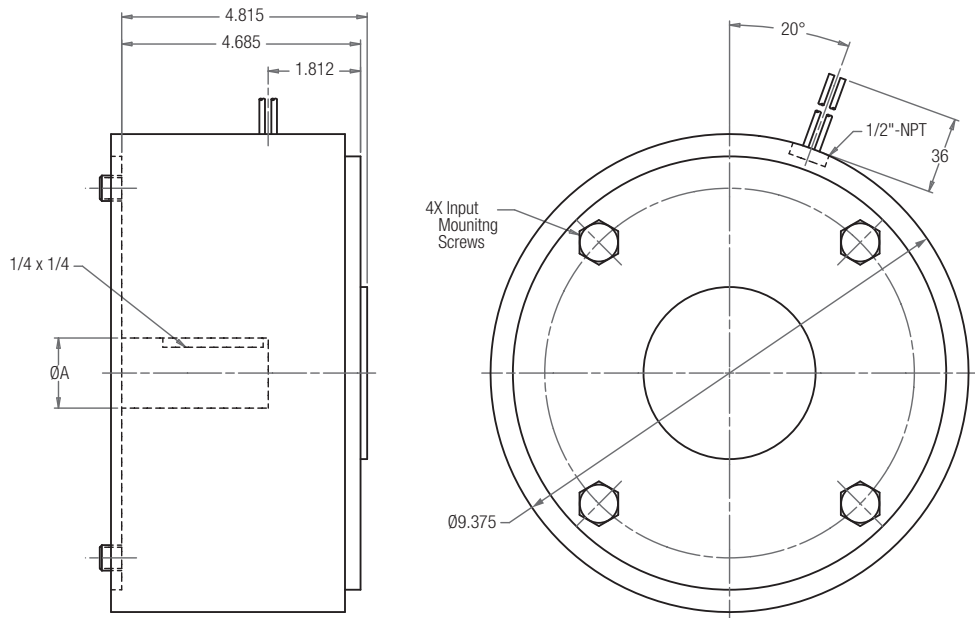
EM Series Electro Module

20MB Motor Brake Module

SIZE 50/180



SIZE 210



Dimensions

Size	A
50	0.625
180	0.875
210	1.125

Specifications

Model Size	Voltage DC	Static Torque lb. ft.	Max. RPM	Armatures	Inertia-WR2 Arm. Hub	Input Hub	Weight (lbs)	NEMA Frame Size
50	6, 24, 90	16	3600	.014	.002	.001	9.2	56C/48Y*
180	6, 24, 90	30	3600	.036	.003	.002	11.2	182C/143TC 184C/145TC
210	6, 24, 90	95	3600	.162	.021	.017	21.5	213C/182TC 215C/184TC

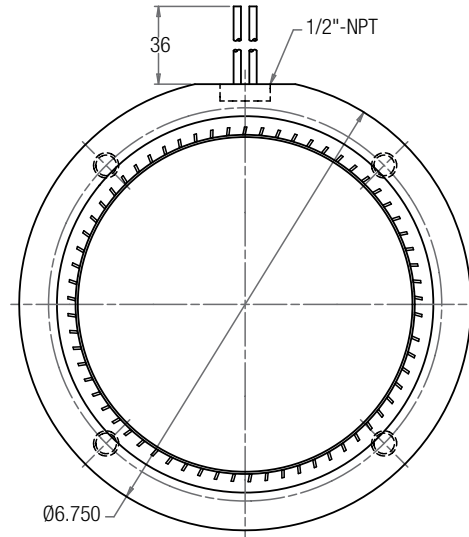
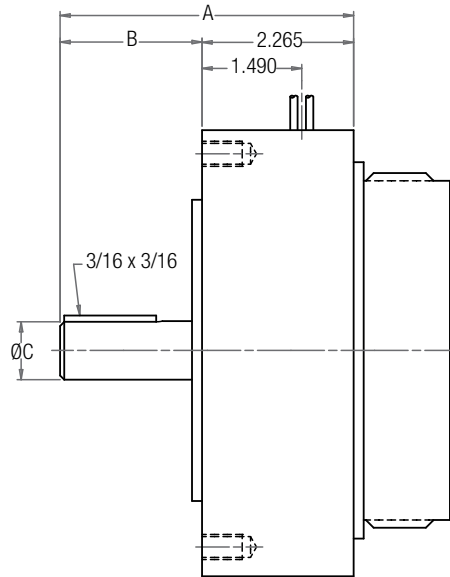
*For 56C/48Y Frame motors 3/4 HP and smaller the EM-100 size may be used where extended life is desirable.

For standard NEMA frame dimensions, see page G-3.

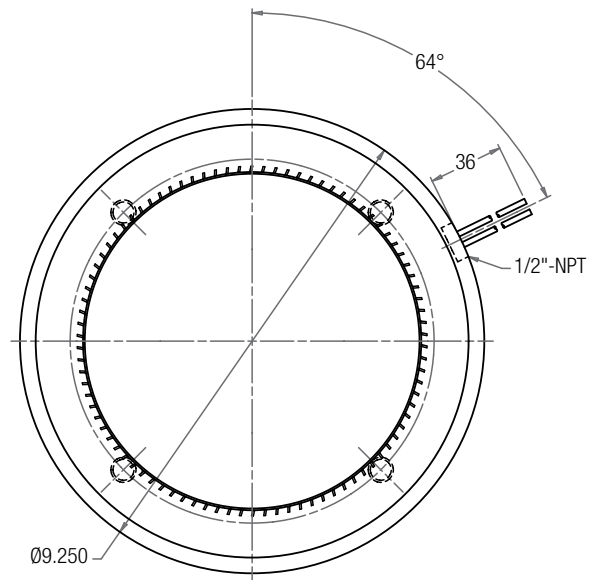
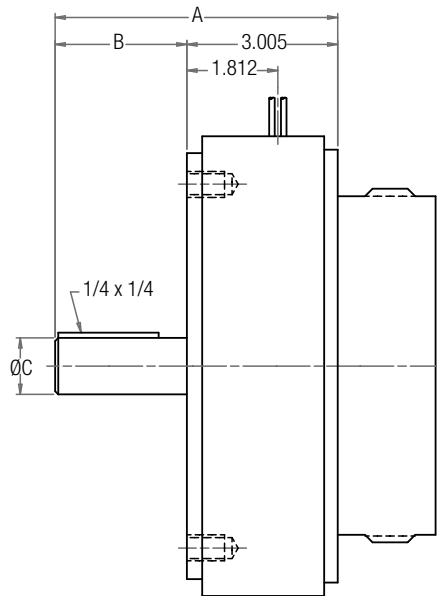
EM Series Electro Module

30 Input Clutch Module

SIZE 50/100/180



SIZE 210



Dimensions

Size	A	B	C
50	4.327	2.040	0.625
100	4.326	2.061	0.625
180	4.386	2.121	0.875
210	5.630	2.625	1.125

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	9.2	56C/48Y*
100	6, 24, 90	30	3600	.046	.002	10.5	56C/48Y**
180	6, 24, 90	30	3600	.046	.002	10.5	182C/143TC 184C/145TC
210	6, 24, 90	95	3600	.188	.017	19.8	213C/182TC 215C/184TC

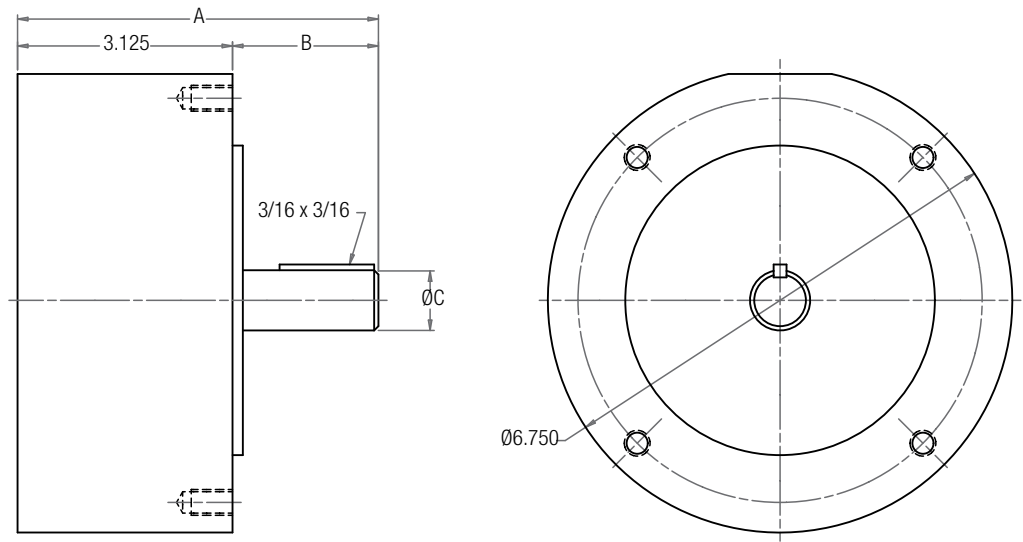
* For 56C/48Y Frame motors 3/4 HP and smaller the EM-100 size may be used where extended life is desirable.

** EM-100 size is recommended for motors 1 HP and larger. For standard NEMA frame dimensions, see page G-3.

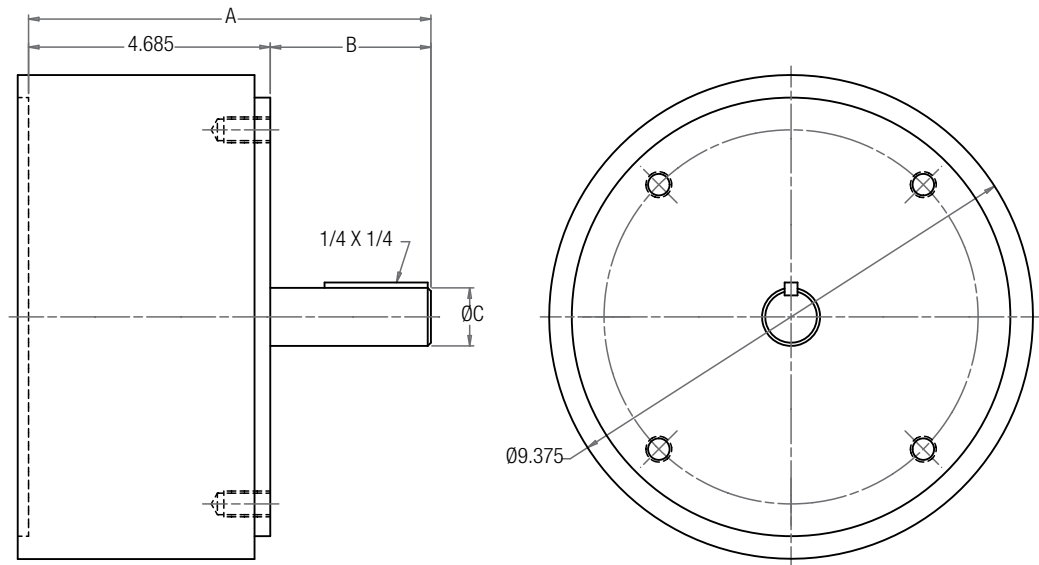
EM Series Electro Module

40 Output Clutch Module

SIZE 50/100/180



SIZE 210



Dimensions

Size	A	B	C
50	5.165	2.040	0.625
100	5.186	2.061	0.625
180	5.246	2.121	0.875
210	7.299	2.614	1.125

Specifications

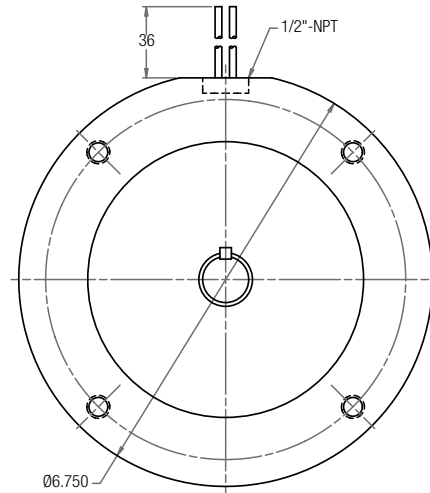
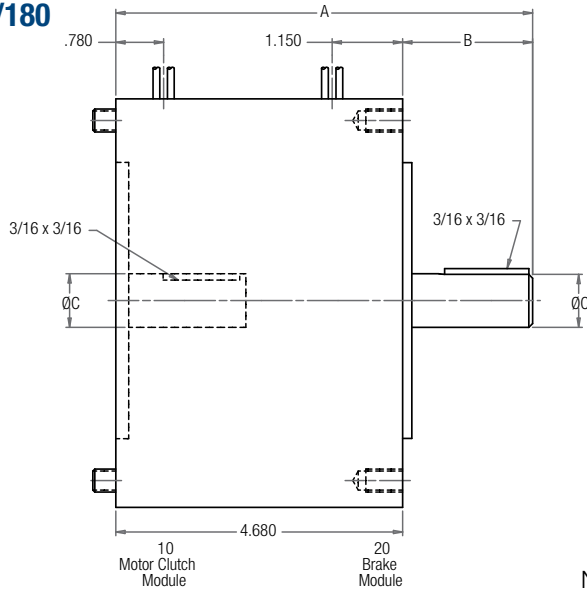
Model Size	Voltage DC	Static Torque lb. ft.	Max. RPM	Armatures	Inertia-WR ² Arm. Hub	Shaft	Weight (lbs)	NEMA Frame Size
50	6, 24, 90	16	3600	.007	.002	.001	7.6	56C/48Y*
100	6, 24, 90	30	3600	.018	.003	.002	9.0	56C/48Y**
180	6, 24, 90	30	3600	.018	.003	.002	9.0	182C/143TC 184C/145TC
210	6, 24, 90	95	3600	.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 standard NEMA frame dimensions, see page G-3.

EM Series Electro Module

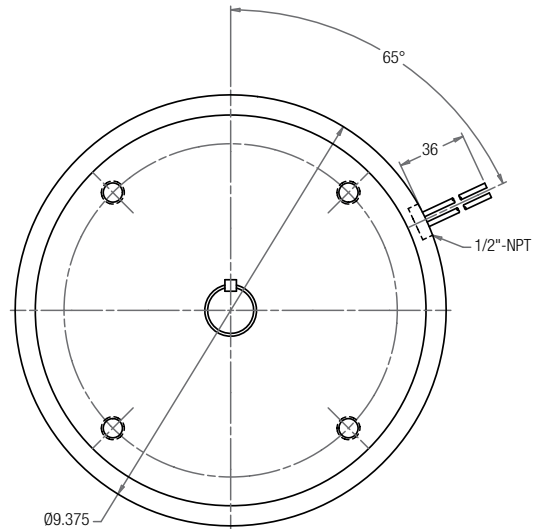
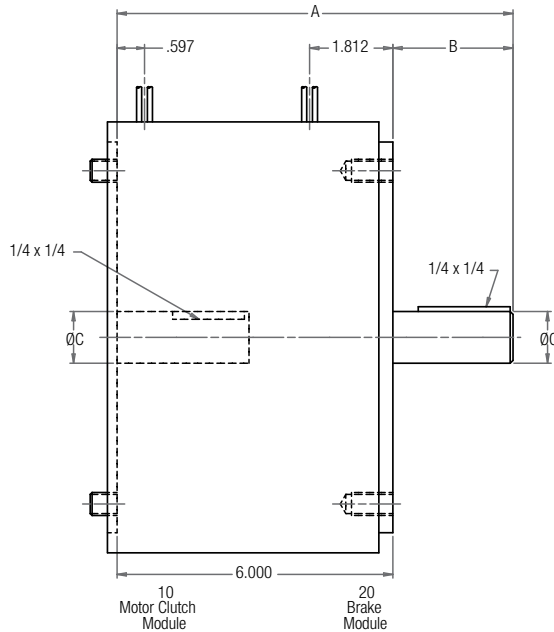
EM-10/20 Motor Clutch/Brake Combination

SIZE 50/100/180



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

SIZE 210



Dimensions

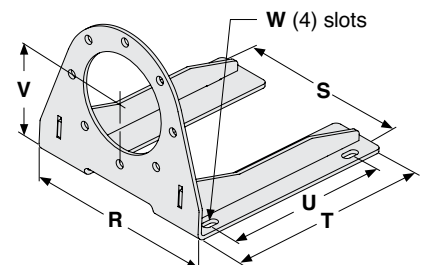
Size	A	B	C
50	6.720	2.040	0.625
100	6.741	2.061	0.625
180	6.801	2.121	0.875
210	8.614	2.614	1.125

* 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 standard NEMA frame dimensions, see page G-3.

Motor Mount (M) Dimensions

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

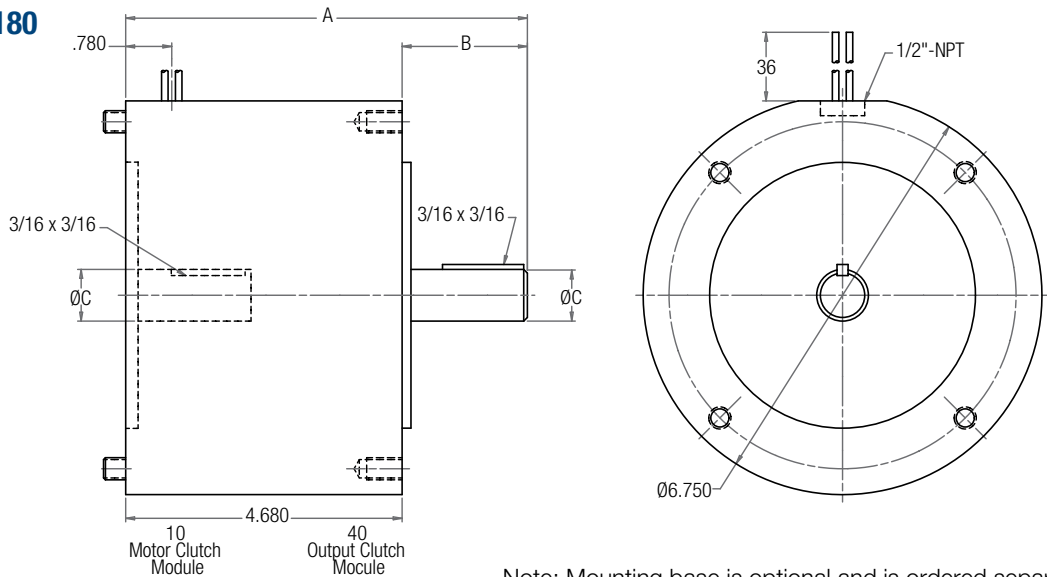
Size	R	S	T	U	V	W	Part No.
50/100	9.250	8.250	10.500	8.000	3.500	.800 x .406	5370-101-078
180	9.250	8.250	10.500	8.000	4.500	.800 x .406	5370-101-079
210/215	11.500	10.500	12.000	9.000	5.250	.750 x .409	5371-101-012



EM Series Electro Module

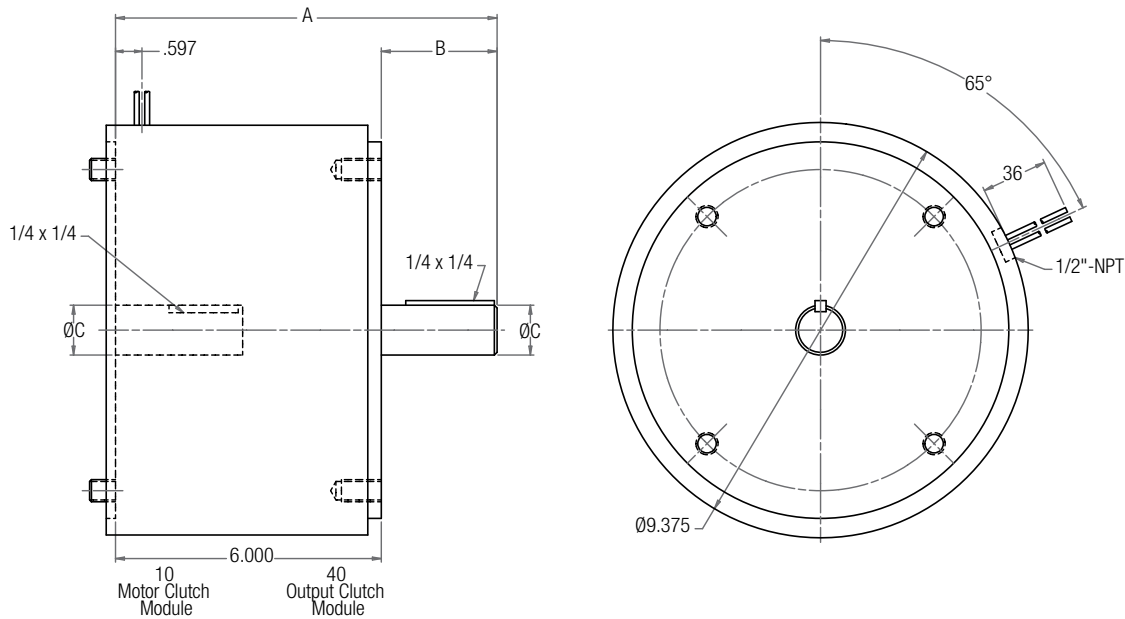
EM-10/40 Motor Clutch/Output Clutch Combination

SIZE 50/100/180



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

SIZE 210



Dimensions

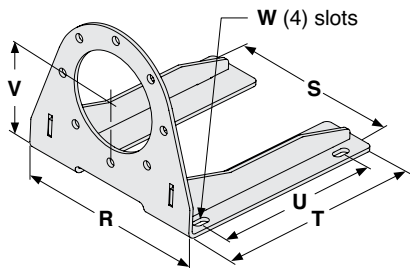
Size	A	B	C
50	6.720	2.040	0.625
100	6.741	2.061	0.625
180	6.801	2.121	0.875
210	8.614	2.614	1.125

* 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 standard NEMA frame dimensions, see page G-3.

Motor Mount (M) Dimensions

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

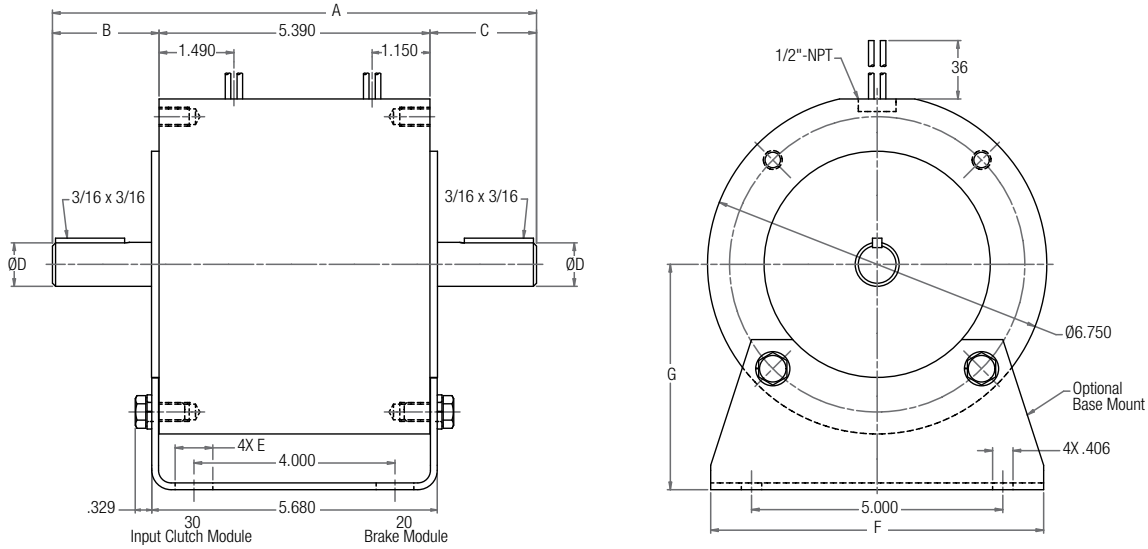
Size	R	S	T	U	V	W	Part No.
50/100	9.250	8.250	10.500	8.000	3.500	.800 x .406	5370-101-078
180	9.250	8.250	10.500	8.000	4.500	.800 x .406	5370-101-079
210/215	11.500	10.500	12.000	9.000	5.250	.750 x .409	5371-101-012



EM Series Electro Module

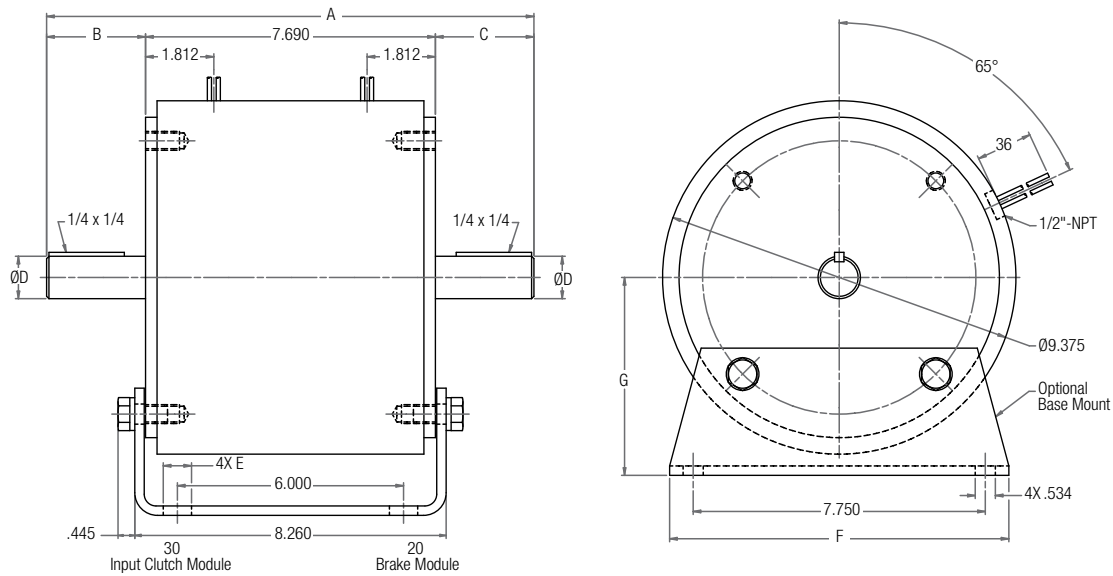
EM-20/30 Brake/Input Clutch Combination EM-20/30-B Brake/Input Clutch Combination – Base Mounted

SIZE 50/100/180



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

SIZE 210



Dimensions

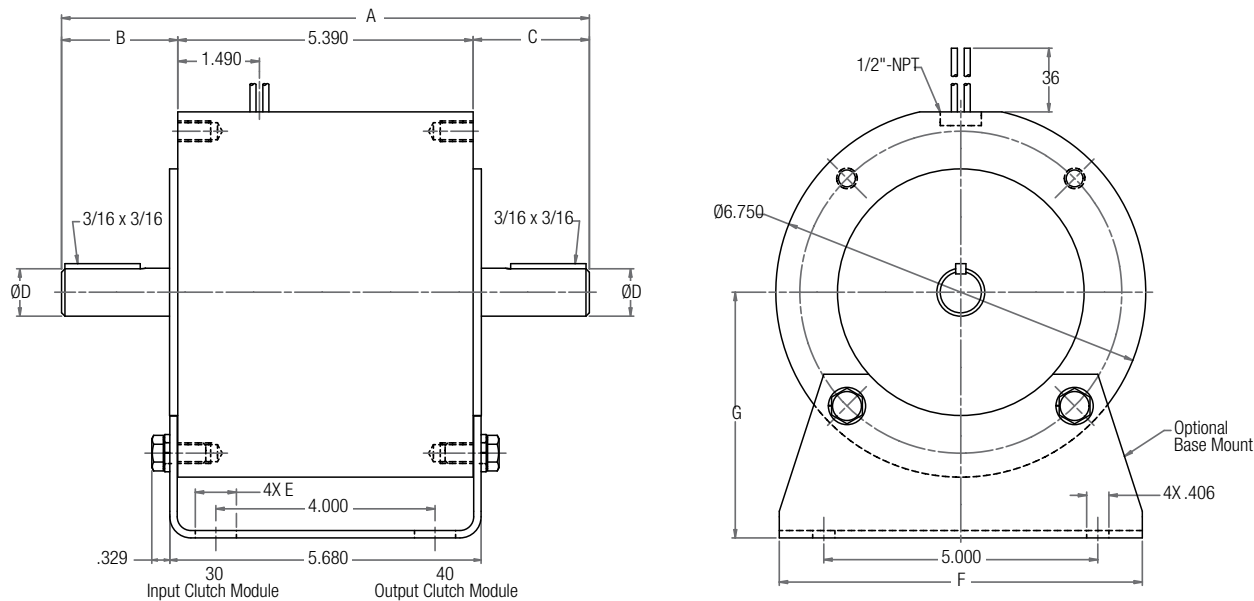
For standard NEMA frame dimensions, see page G-3.

Size	A	B	C	D	E	F	G
50	9.492	2.062	2.040	0.625	0.800	6.000	3.500
100	9.512	2.061	2.061	0.625	0.800	6.000	3.500
180	9.632	2.121	2.121	0.875	0.750	6.625	4.500
210	12.929	2.625	2.614	1.125	0.750	9.000	5.250

EM Series Electro Module

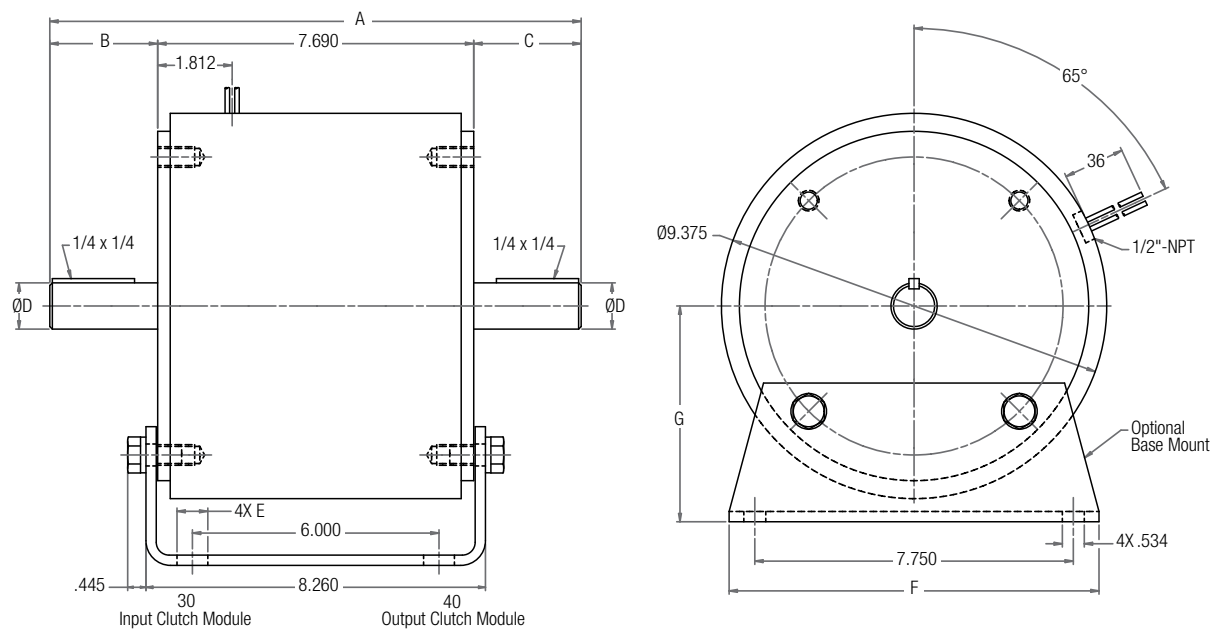
EM-30/40 Input Clutch/Output Clutch Combination EM-30/40-B Input Clutch/Output Clutch Combination – Base Mounted

SIZE 50/100/180



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

SIZE 210



Dimensions

For standard NEMA frame dimensions, see page G-3.

Size	A	B	C	D	E	F	G
50	9.492	2.062	2.040	0.625	0.800	6.000	3.500
100	9.512	2.061	2.061	0.625	0.800	6.000	3.500
180	9.632	2.121	2.121	0.875	0.750	6.625	4.500
210	12.929	2.625	2.614	1.125	0.750	9.000	5.250

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.

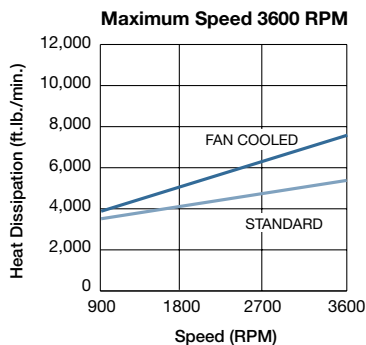
Totally Enclosed Version

The Enclosed Electro Module packages the hardworking components from EM products into a totally enclosed housing. This rugged housing keeps wear particles in and contaminants out and provides quiet operation. When enclosed, units are suitable for most industrial applications and tolerate infrequent, light washing.

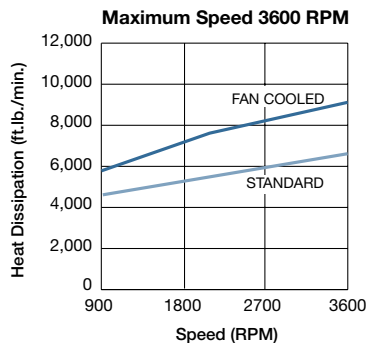
- Keeps contaminants out
- Keeps wear particles in
- Quiet operation
- Finned for heat dissipation
- UL listed when optional conduit box is installed

Heat Dissipation Curves

EM-50 with Cover Kit



EM-100/180 with Cover Kit

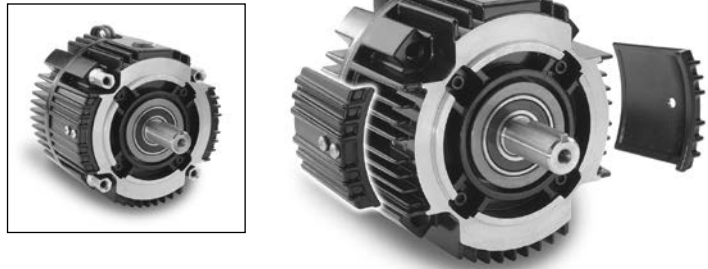


To convert any EM Series Electro Module 50, 100, and 180 sizes to an enclosed model, purchase optional Cover Kit

Enclosed Electro Module 10/20, 10/40, 20/30, 30/40

Part Number 5370-101-076

An optional cover kit can be purchased separately to enclose the open vents in the housing. Each cover kit includes two vent covers, two gaskets and four screws needed to convert a vented Electro Module to an enclosed design (non-washdown).



Enclosed Electro Module-Brake Only 20 or 20MB

Part Number 5370-101-082 For Brake Only

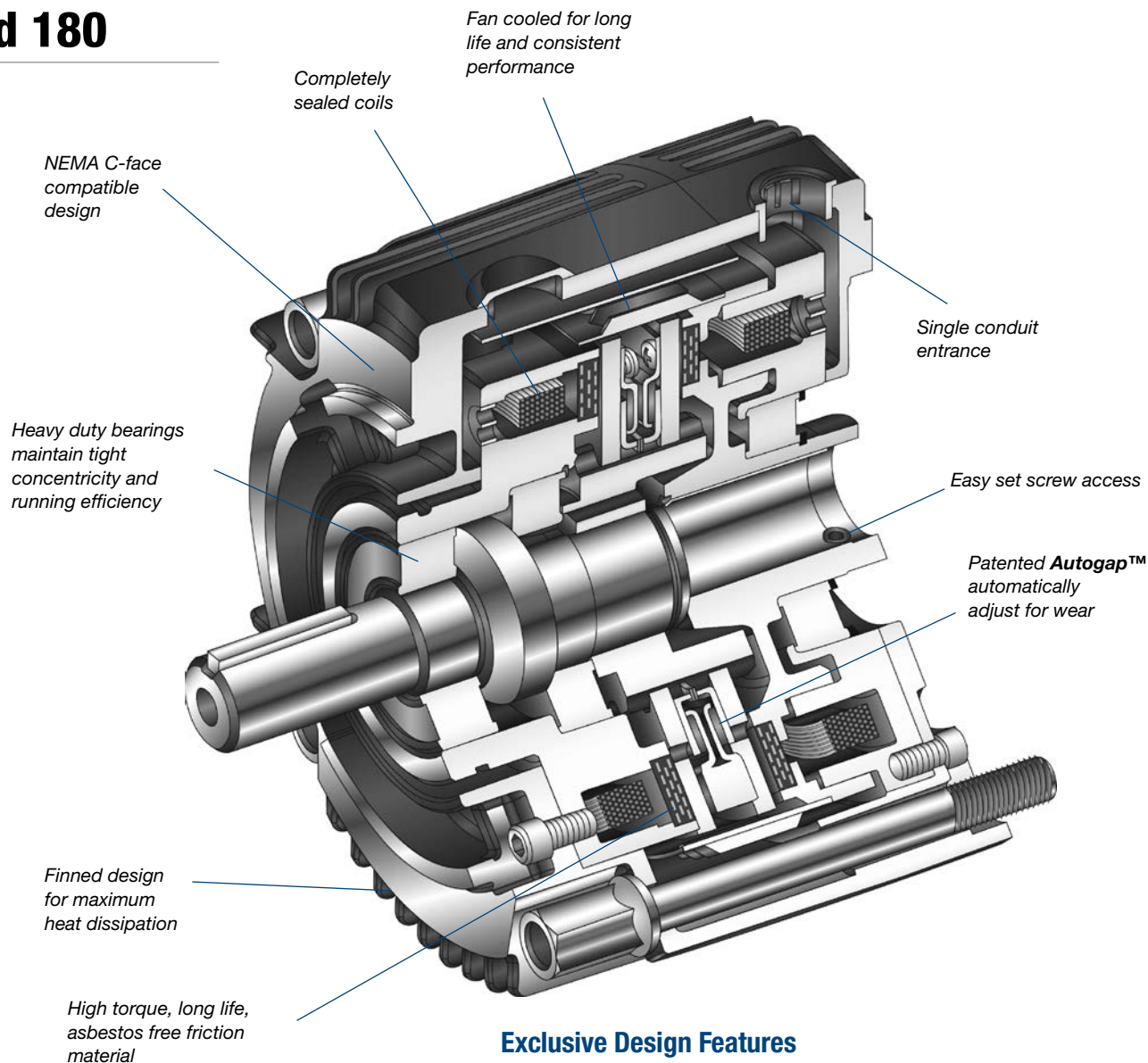
An optional cover kit can be purchased separately to enclose the open vents in the housing and a cover plate to close off the back of the module. Each cover kit includes two vent covers, two gaskets, four screws and one cover plate needed to convert a vented Electro Module 20 to an enclosed design (non-washdown).



NOTE:

Enclosed option is not available for existing 210 & 215 size Electro Modules (EM). See page A-45 for enclosed versions of size 210 & 215

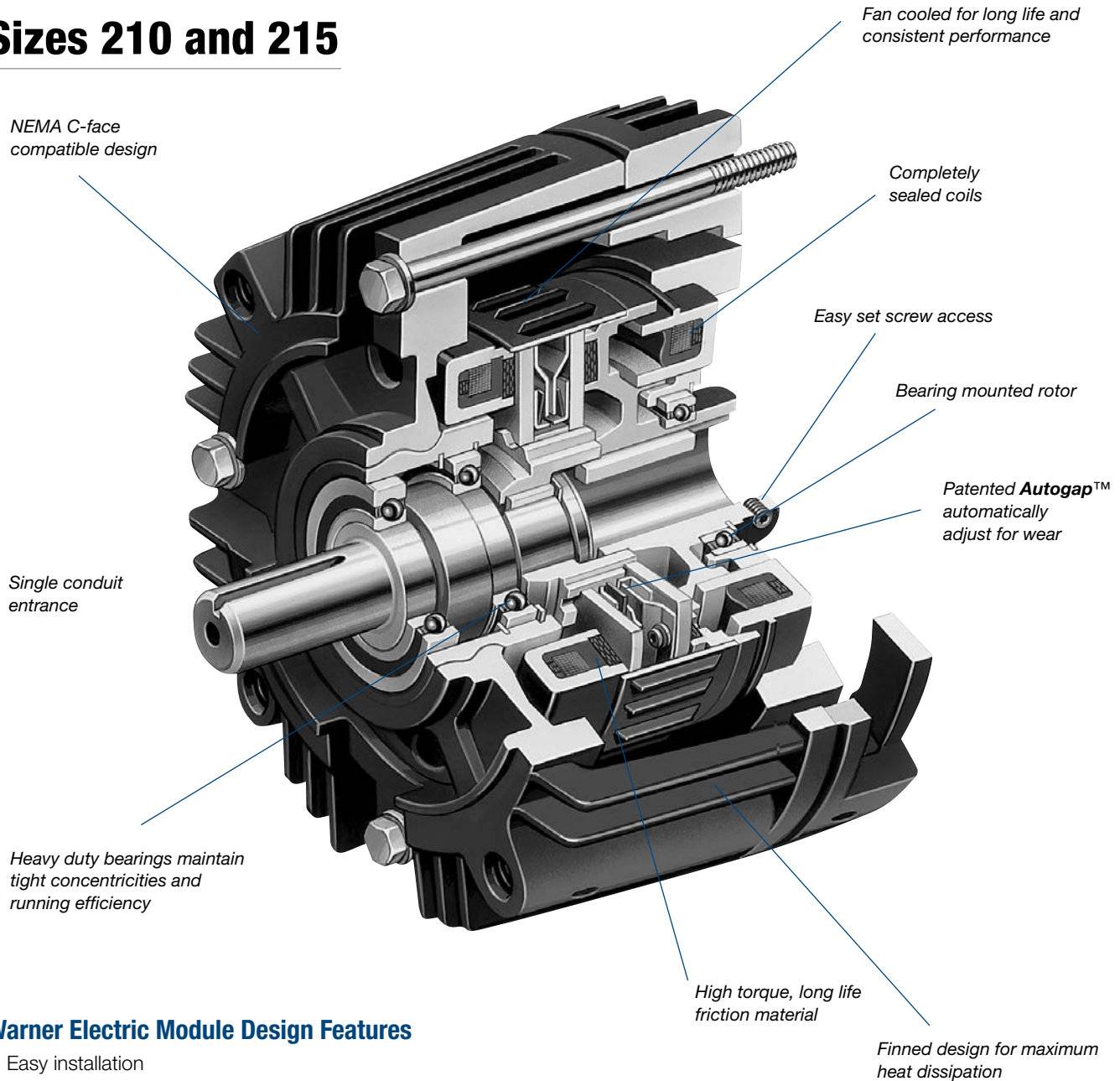
Sizes 50, 100, and 180



Exclusive Design Features

- Internal component changes make installation easier and faster
- Symmetric housing fin design increases heat dissipation capacity
- Available only in 50, 100, and 180 sizes, NEMA C-face design
- Conduit box relocation simplifies installation. Use of integrated mounting bolts allows for conduit box location directly on the top of the unit
- Available field installed conversion kit creates a totally enclosed clutch/ brake package without the need to replace entire unit
- New design allows for more efficient assembly which yields greater availability and shorter lead times
- Improved input to output axis design reduces vibration and improves noise and wear factors
- Heavy-duty models available with increased spline length and higher load capacity bearings.

Sizes 210 and 215



Warner Electric Module Design Features

- Easy installation
- Available with standard power-on and electrically released power-off brake units
- Fan cooled for high cycle rate operation
- Maintenance Free
- UL listed
- Can be applied with control fitted as standard
- Bearing mounted clutch rotor eases assembly alignment
- Single access hole for all wires

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.

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



Sizes 50, 100 & 180

Sizes 210 & 215

UniModule Combinations

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 A-27 in this catalog.



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 coil. Twin bearing mounted shafts maintain tight concentricities. The Output Clutch utilizes Autogap™ which automatically adjusts armature for wear. Basic components are field, rotor and armature. See page A-29 in this catalog.



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 A-29 in this catalog.

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 A-26 in this catalog.

Heavy-duty models available with increased spline length and higher load capacity bearings.

Smooth-Start Motor Clutch/Brake

See page A-30

Ceramic Faced Motor Clutch/Brake

See page A-37



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 A-28 in this catalog.

Ceramic Faced Input Clutch/Brake

See page A-38



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 A-28 in this catalog.

Ceramic Faced Input Clutch/Brake – with Accessory Base Mounting

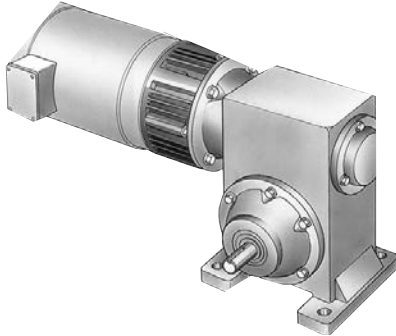
See page A-38

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.

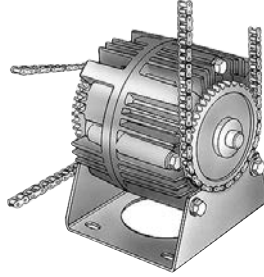
Frame Size Selection

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

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

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

b. Base Mounting



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

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

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

2. Determine Technical Requirements

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

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

Horsepower vs. Shaft Speed

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

*For applications with speeds below 100RPM, please contact Warner Electric Application Support.

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)

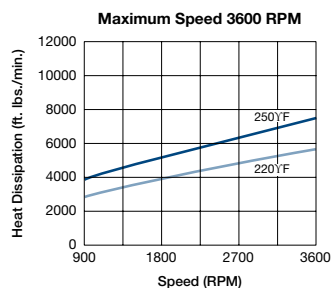
N = Speed in revolutions per minute. (RPM)

F = Cycle rate in cycles per minute (CPM)

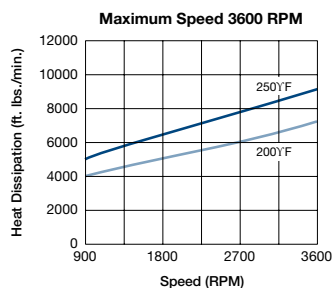
Compare the calculated heat generated in the application to the unit ratings using the heat dissipation curves. Select the appropriate unit that has adequate heat dissipation ability.

Heat Dissipation Curves

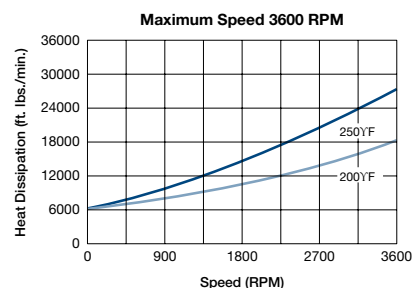
UM 50



UM 100/180



UM 210/215



b. Torque Sizing

For most applications, the correct size clutch/brake can be selected from the Horsepower vs. Shaft Speed chart on page 16. 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:

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

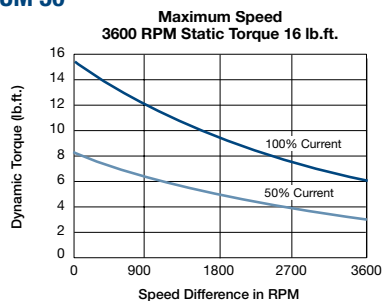
WR^2 = Total reflected inertia at the clutch/brake shaft. Include the clutch/brake output inertia. (lb. ft.²)

N = Speed in revolutions per minute. (RPM)

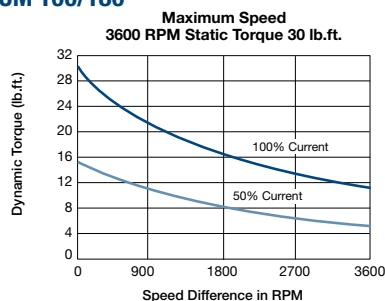
t = Time allowed for the engagement (sec)

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

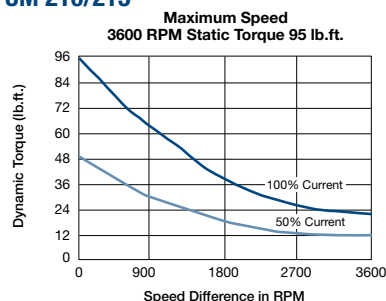
UM 50



UM 100/180



UM 210/215



Specifications

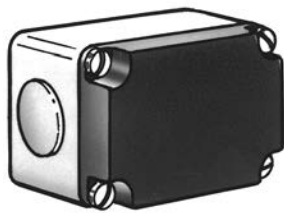
UM Size	Static Torque lb. ft.	Maximum RPM	Voltage DC
50	16	3600	6, 24, or 90
100	30	3600	6, 24, or 90
180	30	3600	6, 24, or 90
210	95	3600	6, 24, or 90
215	95	3600	6, 24, or 90

3. Accessories

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

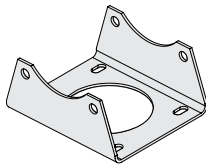
a. Conduit Box

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

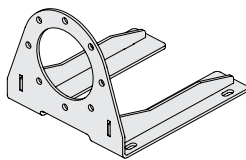


b. Mounting Brackets

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.

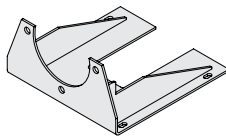


Base Mount



Motor Mount

For 50, 100 & 180 sizes



Motor Mount

For 210 & 215 sizes

c. Cover Kit – For sizes 50, 100 & 180



Each cover kit includes two (2) vent covers, two (2) gaskets and four (4) screws needed to convert a vented design into an enclosed design (non-washdown).

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 201 for complete information.

Ordering Information

Part Numbers

Model No.	Voltage D.C.	Part No.
1020 Motor Clutch/Brake		
UM-50-1020	6	5370-273-201
UM-50-1020	24	5370-273-203
UM-50-1020	90	5370-273-204
UM-100-1020	6	5370-273-206
UM-100-1020	24	5370-273-208
UM-100-1020	90	5370-273-209
UM-180-1020	6	5370-273-211
UM-180-1020	24	5370-273-213
UM-180-1020	90	5370-273-214
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
Heavy-Duty Motor Clutch/Brake		
UM-180-1020HD	90	5370-273-323
UM-1020 w/Pre-installed control		
UM50-1020 w/CBC-150-1	90	5370-273-230
UM100-1020 w/CBC-150-1	90	5370-273-231
UM180-1020 w/CBC-150-1	90	5370-273-232
UM180-1020HD w/CBC-150-1	90	5370-273-324
UM210-1020 w/CBC-150-1	90	5371-4
UM215-1020 w/CBC-150-1	90	5371-273-090
1040 Motor Clutch Output Clutch		
UM-50-1040	6	5370-271-201
UM-50-1040	24	5370-271-203
UM-50-1040	90	5370-271-204
UM-100-1040	6	5370-271-206
UM-100-1040	24	5370-271-208
UM-100-1040	90	5370-271-209
UM-180-1040	6	5370-271-211
UM-180-1040	24	5370-271-213
UM-180-1040	90	5370-271-214
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
2030 Input Clutch/Brake		
UM-50-2030	6	5370-273-216
UM-50-2030	24	5370-273-218
UM-50-2030	90	5370-273-219
UM-100-2030	6	5370-273-221
UM-100-2030	24	5370-273-223
UM-100-2030	90	5370-273-224
UM-180-2030	6	5370-273-226
UM-180-2030	24	5370-273-228
UM-180-2030	90	5370-273-229
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

Model No.	Voltage D.C.	Part No.
3040 Input Clutch Output Clutch		
UM-50-3040	6	5370-271-216
UM-50-3040	24	5370-271-218
UM-50-3040	90	5370-271-219
UM-100-3040	6	5370-271-221
UM-100-3040	24	5370-271-223
UM-100-3040	90	5370-271-224
UM-180-3040	6	5370-271-226
UM-180-3040	24	5370-271-228
UM-180-3040	90	5370-271-229
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

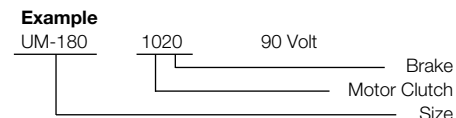
Accessories

Description	UM Size	Part No.
Conduit Box	All sizes	5370-101-042
Base Mount Kit	50/100	5370-101-004
for 2030, 3040	180	5370-101-002
	210/215	5371-101-001
Motor Mount Kit	50/100	5370-101-078
for 1020, 1040	180	5370-101-079
	210/215	5371-101-012
Cover Kit	50/100/180	5370-101-076

How to Order

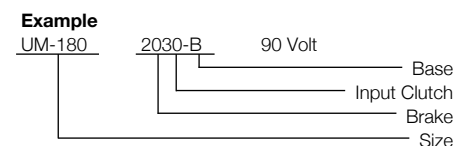
Motor or Reducer Mounted

Simply combine the size number with the configuration of the required UniModule. Specify voltage. See chart for specific part numbers. Permanent Magnet electrically released brakes in P-8590-WE. Order optional conduit box if desired.



Base Mounted

Simply combine the size number with the configuration of the required UniModule. Specify voltage. See chart for specific part numbers. Permanent Magnet electrically released brakes in P-8590-WE. Order optional conduit box if desired.

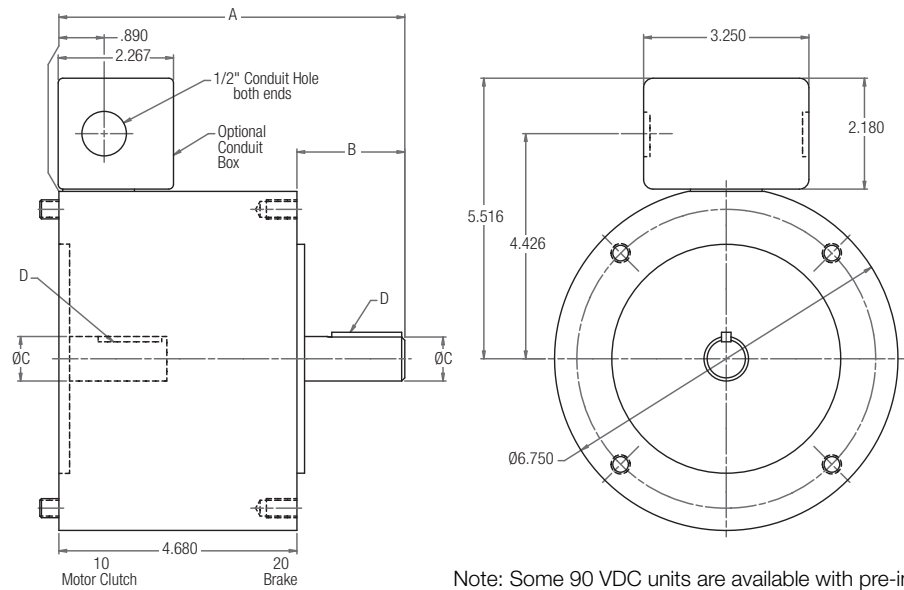


Select Appropriate Power Supply/Control.

UM Series UniModule

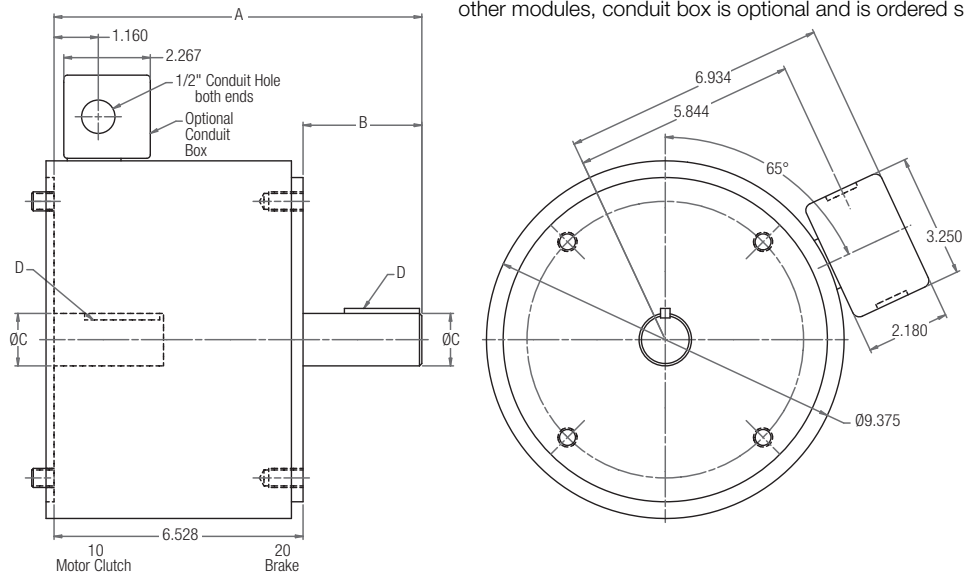
UM-1020 Motor Clutch/Brake Combination

SIZE 50/100/180



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

SIZE 210/215



Dimensions

Size	A	B	C	D
50	6.720	2.040	0.625	3/16 x 3/16
100	6.741	2.061	0.625	3/16 x 3/16
180	6.801	2.121	0.875	3/16 x 3/16
210	9.142	2.614	1.125	1/4 x 1/4
215	9.642	3.114	1.375	5/16 x 5/16

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

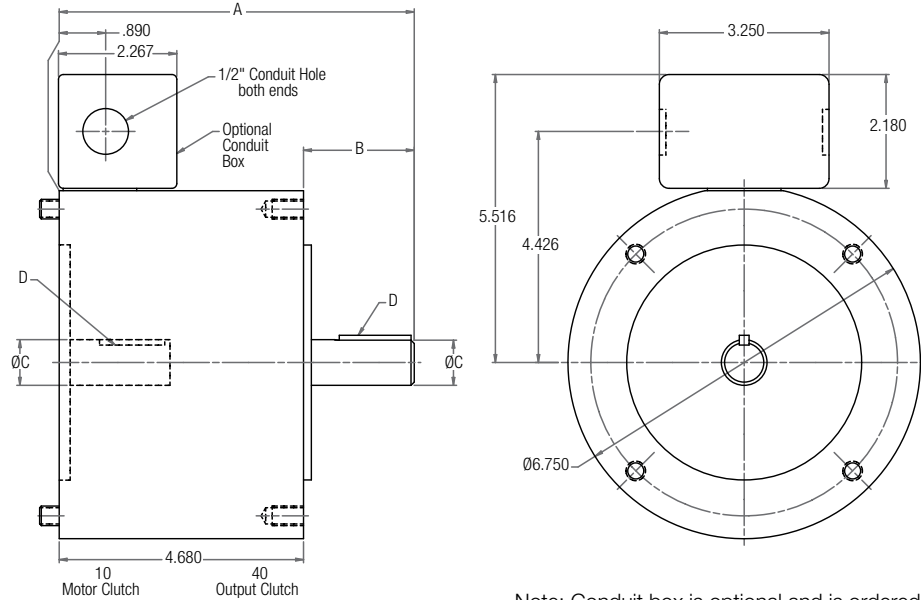
* For 56C/48Y Frame motors 3/4 HP and smaller the UM-100 size may be used where extended life is desirable.

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

For standard NEMA frame dimensions, see page G-3.

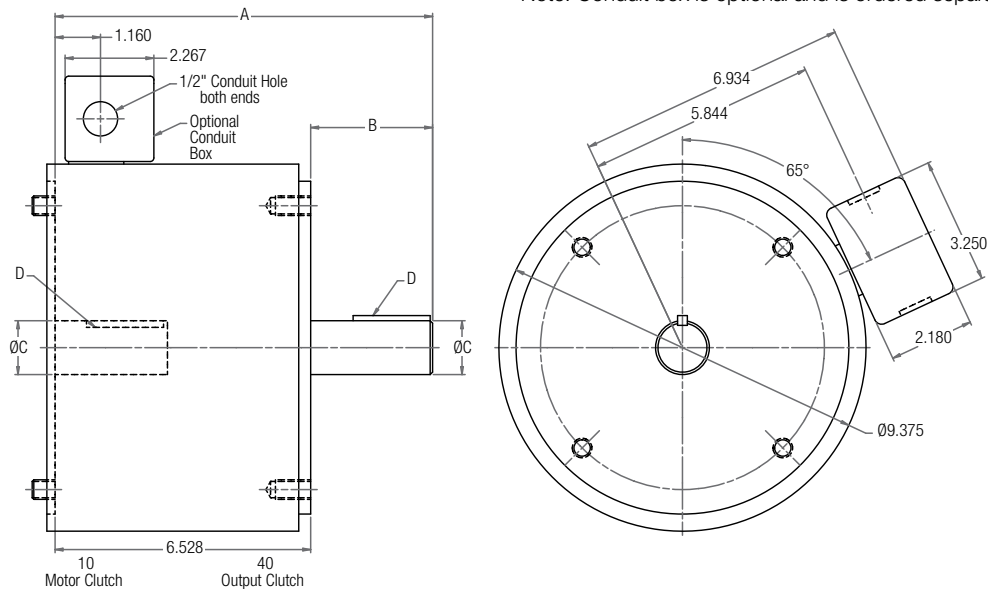
UM-1040 Motor Clutch/Output Clutch Combination

SIZE 50/100/180



Note: Conduit box is optional and is ordered separately.

SIZE 210/215



Dimensions

Size	A	B	C	D
50	6.720	2.040	0.625	3/16 x 3/16
100	6.741	2.061	0.625	3/16 x 3/16
180	6.801	2.121	0.875	3/16 x 3/16
210	9.142	2.614	1.125	1/4 x 1/4
215	9.642	3.114	1.375	5/16 x 5/16

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.

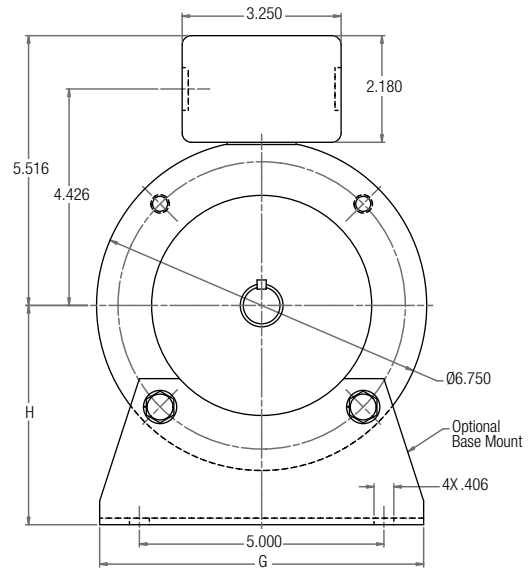
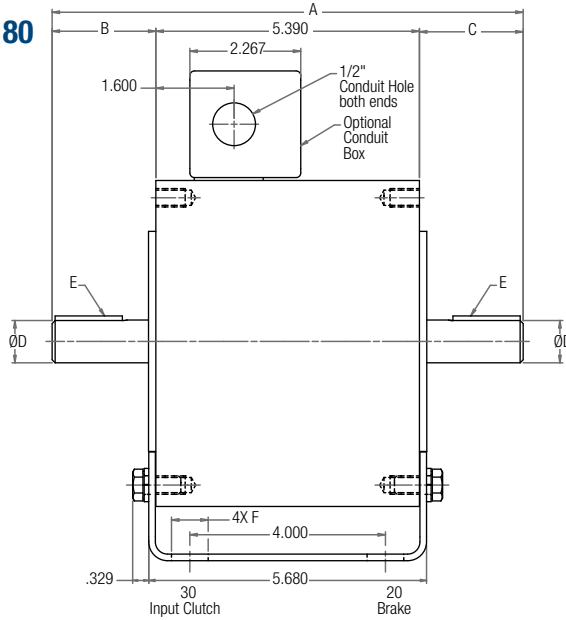
For standard NEMA frame dimensions, see page G-3.

UM Series UniModule

UM-2030 Input Clutch/Brake Combination

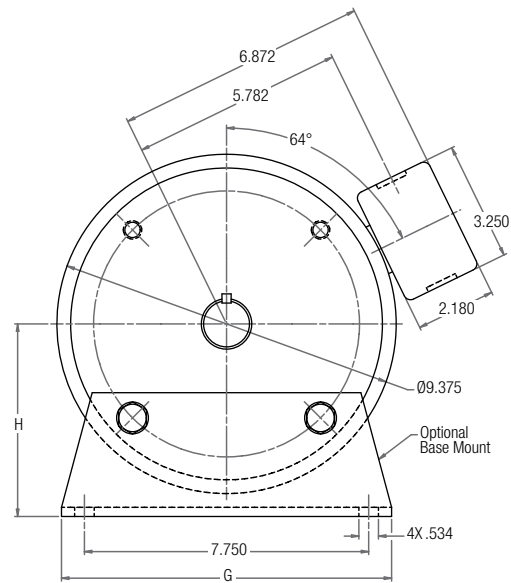
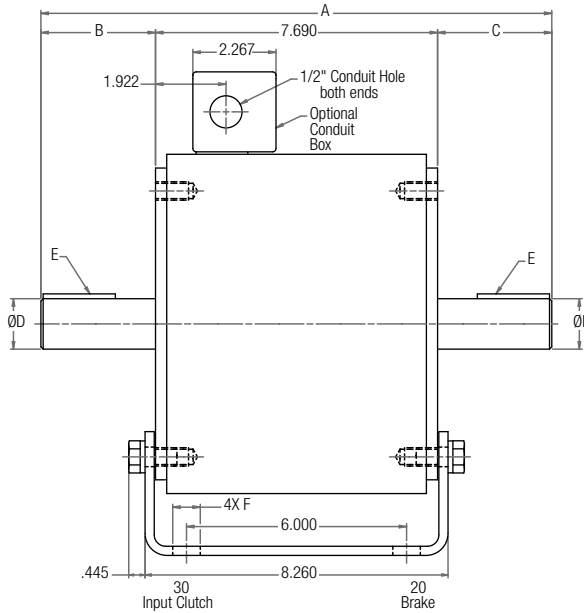
UM-2030-B Input Clutch/Brake Combination – Base Mounted

SIZE 50/100/180



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

SIZE 210/215



Dimensions

Size	A	B	C	D	E	F	G	H
50	9.492	2.062	2.040	0.625	3/16 x 3/16	0.800	6.000	3.500
100	9.512	2.061	2.061	0.625	3/16 x 3/16	0.800	6.000	3.500
180	9.632	2.121	2.121	0.875	3/16 x 3/16	0.750	6.625	4.500
210	12.929	2.625	2.614	1.125	1/4 x 1/4	0.750	9.000	5.250
215	13.929	3.125	3.114	1.375	5/16 x 5/16	0.750	9.000	5.250

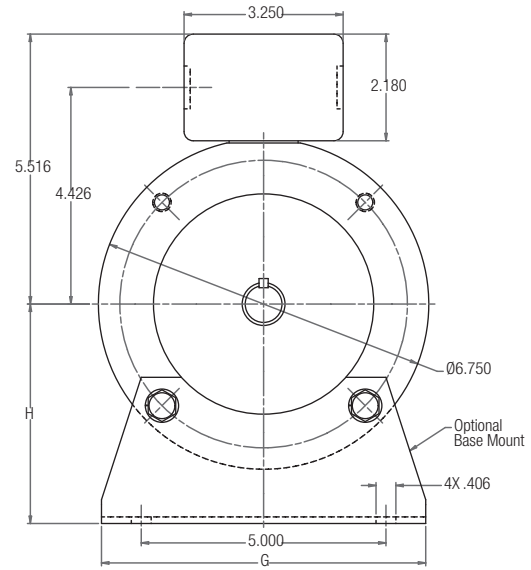
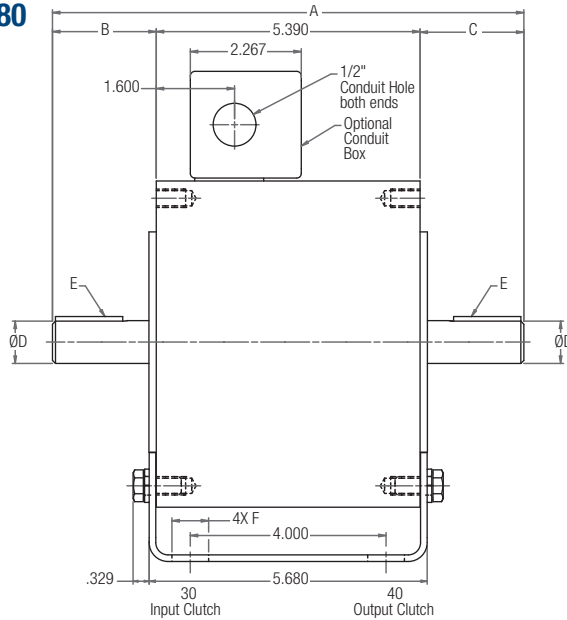
Specifications

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

For standard NEMA frame dimensions, see page G-3.

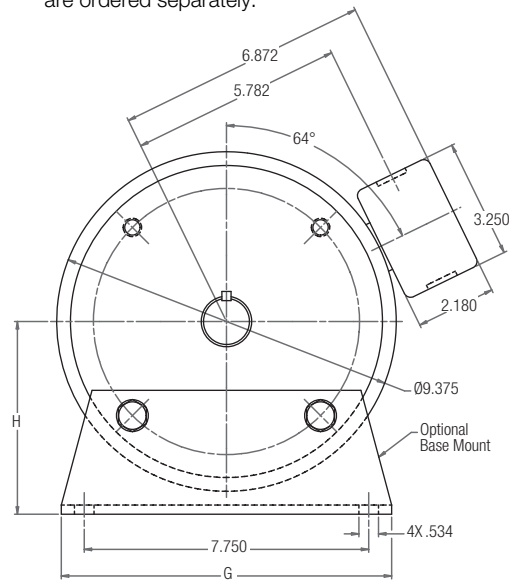
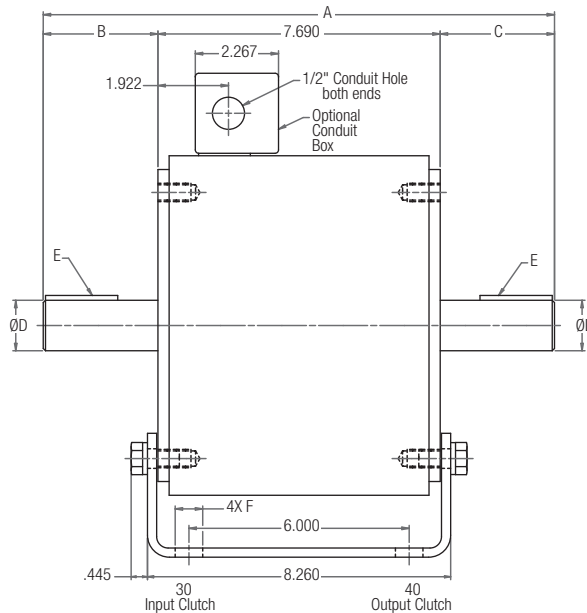
UM-3040 Input Clutch/Output Clutch Combination UM-3040-B Input Clutch/Output Clutch Combination–Base Mounted

SIZE 50/100/180



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

SIZE 210/215



Dimensions

Size	A	B	C	D	E	F	G	H
50	9.492	2.062	2.040	0.625	3/16 x 3/16	0.800	6.000	3.500
100	9.512	2.061	2.061	0.625	3/16 x 3/16	0.800	6.000	3.500
180	9.632	2.121	2.121	0.875	3/16 x 3/16	0.750	6.625	4.500
210	12.929	2.625	2.614	1.125	1/4 x 1/4	0.750	9.000	5.250
215	13.929	3.125	3.114	1.375	5/16 x 5/16	0.750	9.000	5.250

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

For standard NEMA frame dimensions, see page G-3.

UM Series Smooth-Start UniModules

Warner Electric Smooth-Start™ UniModules are designed for applications that require a softer than standard engagement. Through the use of LK friction material, the Smooth-Start design provides reduced torque to provide a less aggressive engagement, without suffering a loss of overall life due to the longer slip times.

When used with an adjustable power supply such as the CBC 300 or CBC 500/550, the Smooth-Start designs can provide a soft engagement that can be adjusted to meet specific application needs.

Smooth-Start™ UniModules

Warner Electric's Smooth-Start UniModules are offered in 90 volt configurations as listed below. If you require another voltage, size or mounting configuration, please contact Warner Electric for assistance.



UniModule Size	NEMA Frame	Max. RPM	Static Torque (lb-ft)	Voltage (DC)	Part Number
50	56C/48Y	3600	10	90	5370-273-236
100	56C/48Y	3600	18	90	5370-273-237
180	182C/143TC 184C/145TC	3600	18	90	5370-273-238
210	213C/182TC 215C/184TC	3600	57	90	5371-273-103
215	213TC/215TC	3600	57	90	5371-273-080

CBC-300 Dual Channel Torque Adjust Clutch/Brake Control

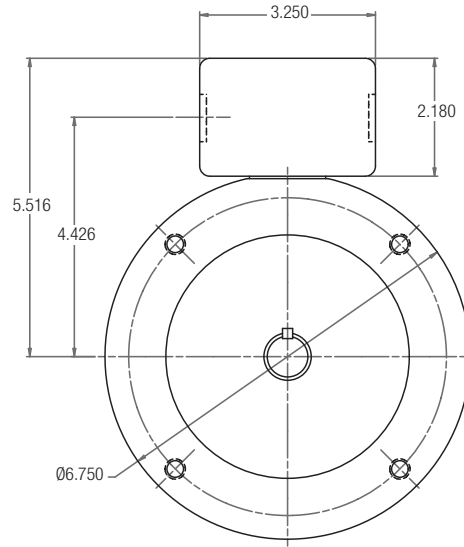
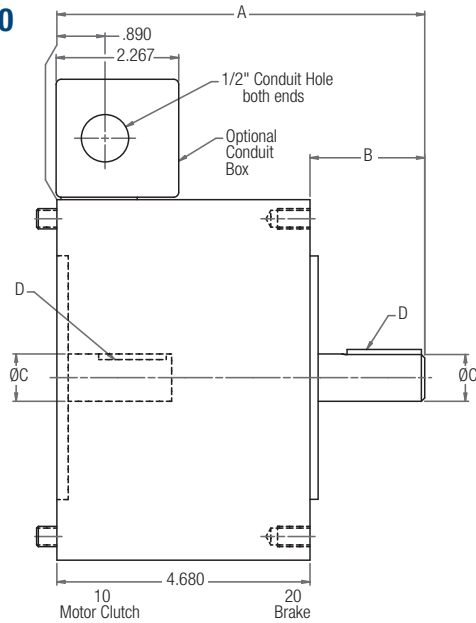
Conveyor applications occasionally require more clutch torque to start the line, and less brake torque to stop the line. With two independently adjustable channels, Warner Electric's CBC-300 allows you to set the torque levels for the clutch and brake independently of each other, so each can be tailored to every application to achieve optimum system performance.

Part Number	6021-448-009
Input Power	120 VAC +10% -15%, 50/60 Hz, single phase, 215 VA max.
Output	Pulse-width modulated full wave rectified D.C. Constant current, switch selectable ranges, 0-90 volt.
Current Adjust	Dual adjustable channels. Adjust via front panel potentiometers.
Other Features	UL listed; short circuit protection, line to line; torque limiting protects machine components from damage.

UM Series Smooth-Start UniModules

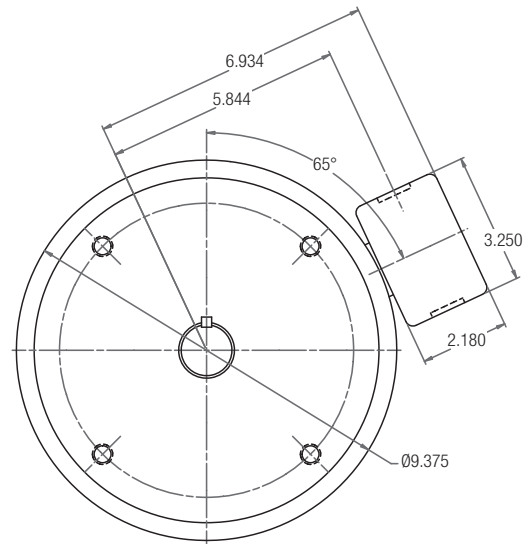
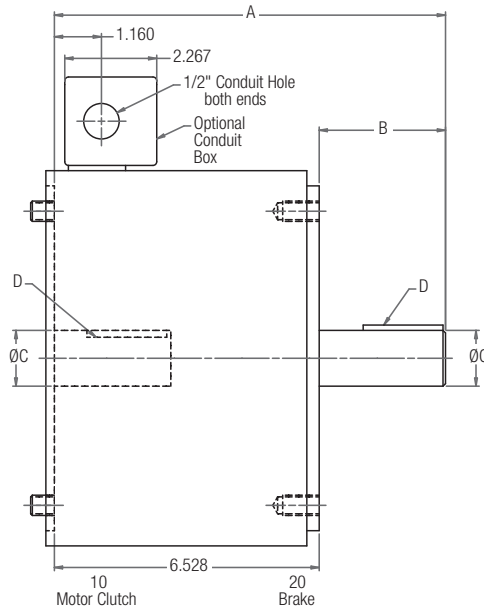
UM-1020 Motor Clutch/Brake Combination

SIZE 50/100/180



Note: Conduit box is optional and is ordered separately.

SIZE 210/215



Dimensions

Size	A	B	C	D
50	6.720	2.040	0.625	3/16 x 3/16
100	6.741	2.061	0.625	3/16 x 3/16
180	6.801	2.121	0.875	3/16 x 3/16
210	9.142	2.614	1.125	1/4 x 1/4
215	9.642	3.114	1.375	5/16 x 5/16

Specifications

For standard NEMA frame dimensions, see page G-3.

Model Size	Voltage DC	Static Torque lb. ft.	Max. RPM	NEMA Frame Size
50	90	10	3600	56C/48Y*
100	90	18	3600	56C/48Y*
180	90	18	3600	182C/143TC 184C/145TC
210	90	57	3600	213C/182TC 215C/184TC
215	90	57	3600	213TC/215TC

UM-C Series UniModule – Ceramic Faced

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 6V, 24V and 90V DC
- C-face or foot mounted
- No maintenance required
- Accurate positioning when used with CBC-700 OEX control

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. Autogap™ is not required.

Controllability and Accuracy – 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 or CBC-300, exceptional clutch/brake performance can be achieved approaching that of more expensive motion control technologies—The PerformancePlus difference!

Controls - see page CTL-18.

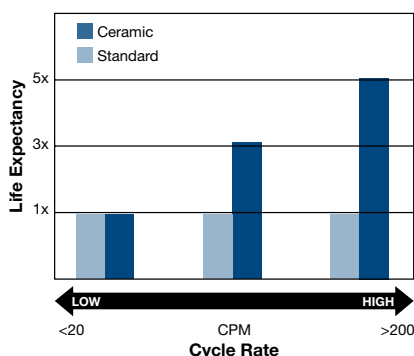


Sizes 50 & 180

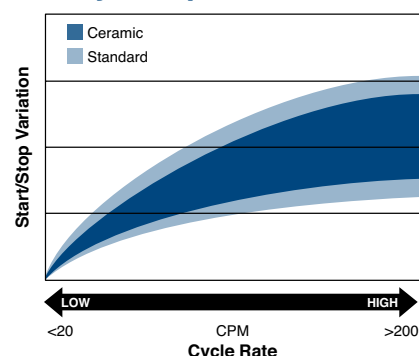
Size 210



UM-C Product Life



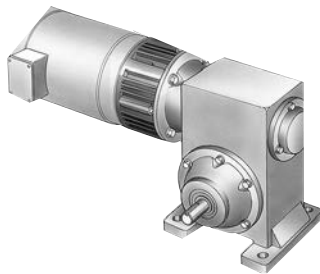
UM-C Cycle Repeat



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

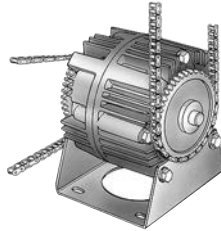
1. Determine Mounting Configuration

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																		

*For applications with speeds below 100RPM, please contact Warner Electric Application Support.

UM-C Series UniModule – Ceramic Faced

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)

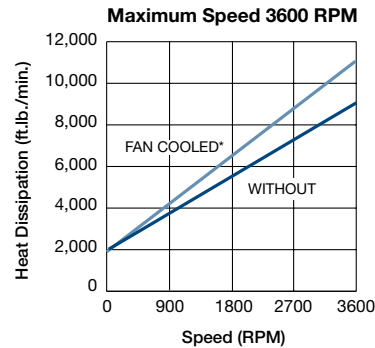
F = Cycle rate in cycles per minute (CPM)

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.

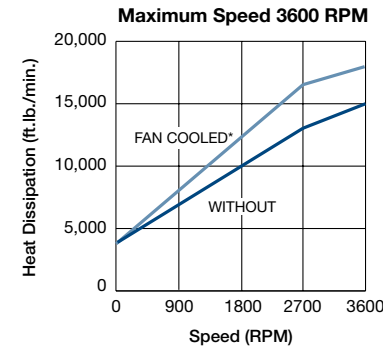
Note: At low cycle rates, the ceramic designs provide no additional wear life than standard designs.

Heat Dissipation Curves

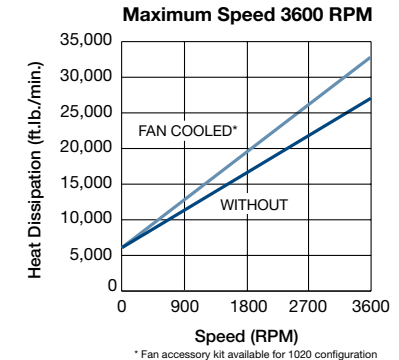
UM 50-C



UM 180-C



UM 210-C



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 = Average Dynamic Torque (lb. ft.)

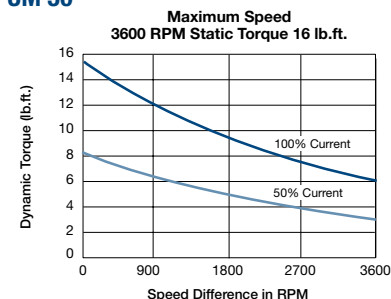
WR^2 = Total reflected inertia at the clutch/brake shaft. Include the clutch/brake output inertia. (lb. ft.²)

N = Speed in revolutions per minute (RPM)

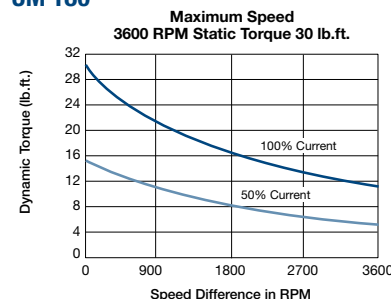
t = Time allowed for the engagement (sec)

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

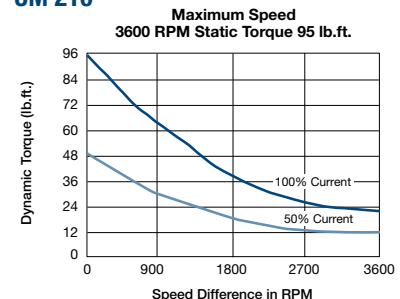
UM 50



UM 180



UM 210



UM-C Series UniModule – Ceramic Faced

Selection/Ordering Information

Specifications

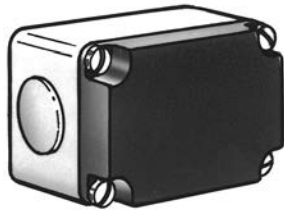
UM Size	Shaft Dia	Static Torque (lb. ft.)	Horsepower	Maximum RPM	Voltage DC	NEMA Frame Size
UM50-C	5/8"	16	1/4-3/4	3600	6, 24 and 90	56C/48Y
UM180-C	7/8"	30	1-2	3600	6, 24 and 90	182C/143TC 184C/145TC
UM210-C	1-1/8"	95	3-5	3600	6, 24 and 90	213/182TC 215C/184TC

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.



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

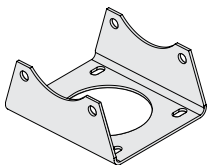
Warner Electric manufactures clutch/brake controls to meet several system functions including:

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

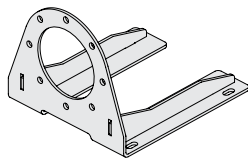
Many requirements beyond function can impact control selection. See the Controls Section on page CTL-1 for complete information.

b. Mounting Brackets

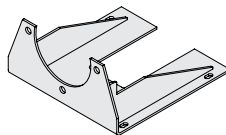
Two styles of mounting brackets are available for simplified installation. The base mount is used with the 2030 configuration. A motor mount is also available and provides sturdy support for the 1020 and a motor.



Base Mount



Motor Mount
For 50, 100 & 180 sizes



Motor Mount
For 210 size

UM-C Series UniModule – Ceramic Faced

Selection/Ordering Information

Part Numbers

Model No.	Voltage D.C.	Part No.
1020 (Motor Clutch/Brake)		
UM 50-1020-C	6	5370-273-271
UM 50-1020-C	24	5370-273-273
UM 50-1020-C	90	5370-273-274
UM 180-1020-C	6	5370-273-276
UM 180-1020-C	24	5370-273-278
UM 180-1020-C	90	5370-273-279
UM 210-1020-C	6	5371-273-035
UM 210-1020-C	24	5371-273-036
UM 210-1020-C	90	5371-273-037
2030 (Input Clutch/Brake)		
UM 50-2030-C	6	5370-273-281
UM 50-2030-C	24	5370-273-283
UM 50-2030-C	90	5370-273-284
UM 180-2030-C	6	5370-273-286
UM 180-2030-C	24	5370-273-288
UM 180-2030-C	90	5370-273-289
UM 210-2030-C	6	5371-273-039
UM 210-2030-C	24	5371-273-040
UM 210-2030-C	90	5371-273-041

Accessories

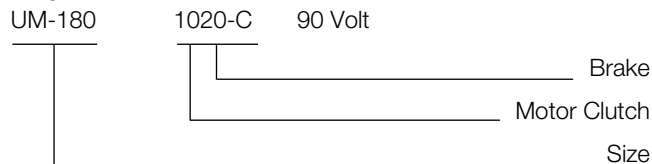
Description	UM-C Size	Part Number
Conduit Box	All sizes	5370-101-042
Fan Kits 1020	50	5370-101-055
	180	5370-101-054
	210	5371-101-029
Base Mount Kits for 2030-C	50	5370-101-004
	180	5370-101-002
	210	5371-101-001
Motor Mount Kits for 1020-C	50	5370-101-078
	180	5370-101-079
	210	5371-101-012

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.

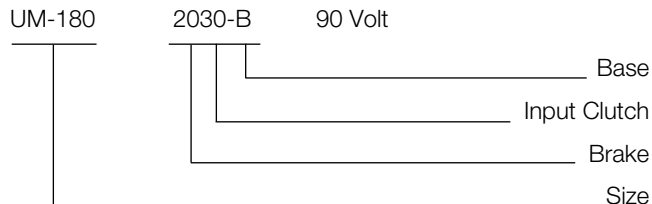
Example



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.

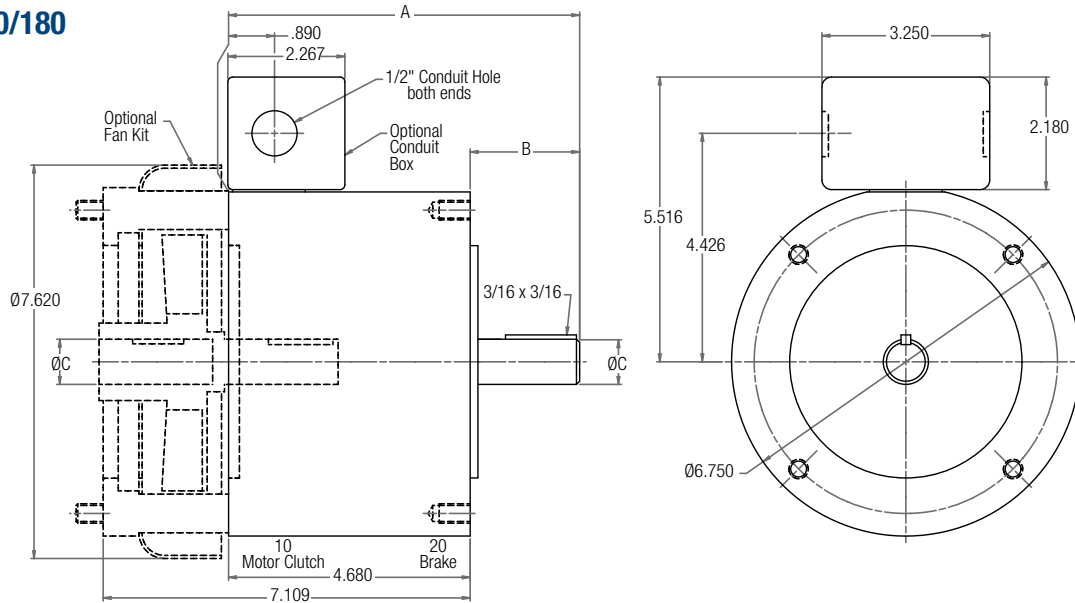
Example



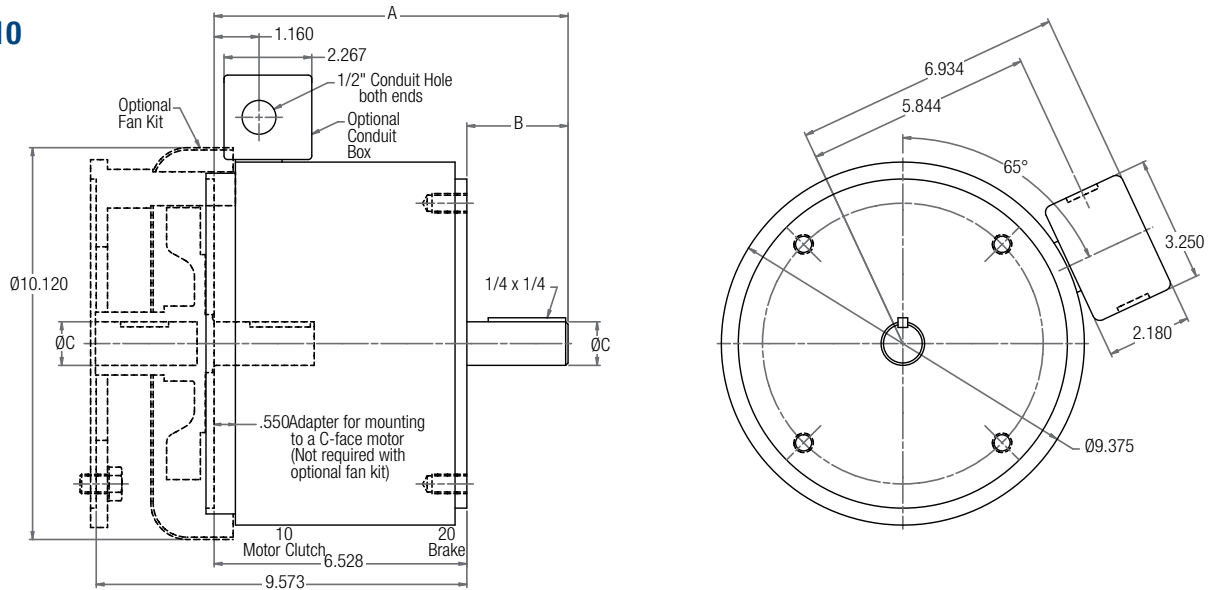
UM-C Series UniModule – Ceramic Faced

UM-1020-C Motor Clutch/Brake Combination

SIZE 50/180



SIZE 210



Dimensions

Size	A	B	C
50	6.720	2.040	0.625
180	6.801	2.121	0.875
210	9.142	2.614	1.125

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

Specifications

For standard NEMA frame dimensions, see page G-3.

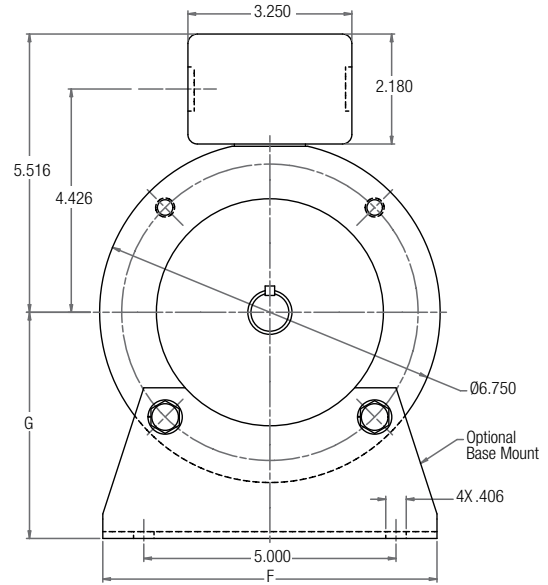
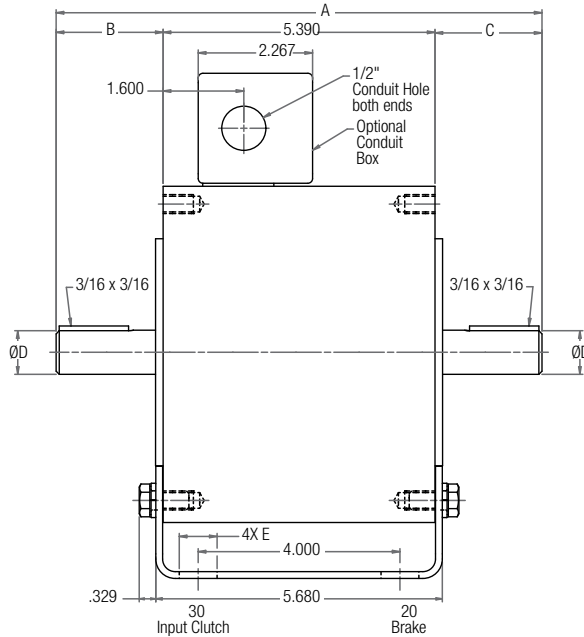
UniModule Size	Static Torque lb. ft.	Horsepower	Max. RPM	Voltage DC	NEMA Frame Size
UM50-C	16	1/4-3/4	3600	6, 24 and 90	56C/48Y
UM180-C	30	1-2	3600	6, 24 and 90	182C/143TC 184C/145TC
UM210-C	95	3-5	3600	6, 24 and 90	213/182TC 215C/184TC

UM-C Series UniModule – Ceramic Faced

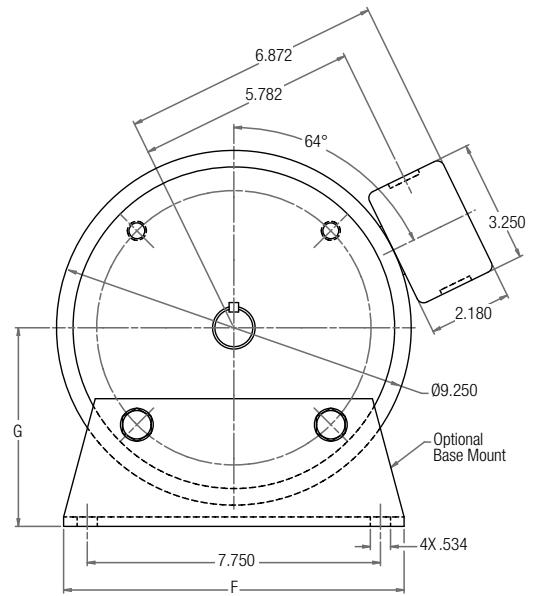
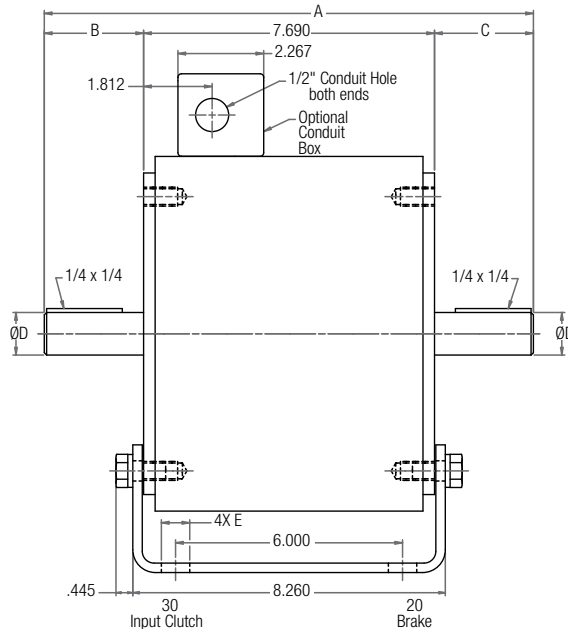
UM-2030-C Brake/Input Clutch Combination

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

SIZE 50/180



SIZE 210



Dimensions

Size	A	B	C	D	E	F	G
50	9.492	2.062	2.040	0.625	0.800	6.000	3.500
180	9.632	2.121	2.121	0.875	0.750	6.625	4.500
210	12.929	2.625	2.614	1.125	0.750	9.000	5.250

Specifications

For standard NEMA frame dimensions, see page G-3.

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

EUM and EUM-W Series Enclosed UniModule

Enclosed and Washdown UniModule Combinations

Clutch/Brake Combinations



1020

Motor Clutch/Brake
Sizes 50, 100, 180, 210, 215

Use for clutch/brake applications, available dust tight (IP 60) and washdown (IP 65). Has hollow bore input for mounting directly to C-face motors. Brake shaft and C-face on output side accommodate reducer, parallel drive or coupling. Basic components: field, rotor, 2 armatures and power on magnet. See page A-46 (dust tight) and page A-55 (washdown) in this catalog.



2030

Input Clutch/Brake
Sizes 50, 180, 210

Use for clutch/brake applications, available dust tight (IP 60) and washdown (IP 65). Features dual C-faces and shafts. Input from parallel drive or coupling. Output to reducer. Basic components: field, rotor, 2 armatures and power on magnet. See page A-48 (dust tight) and page A-56 (washdown) in this catalog.



2030-B

Input Clutch/Brake – with Accessory Base Mounting
Sizes 50, 180, 210

Base mounting allows Input Clutch/Brake combinations to be utilized as separate drive units. Attach with pulleys, sprockets, etc. See page A-48 (dust tight) and page A-56 (washdown) in this catalog.

Clutch Combinations



1040

Motor Clutch/Output Clutch
Sizes 50, 100, 180, 210

Use for clutch only applications, available dust tight (IP 60). Has hollow bore input for mounting directly to C-face motors. Output shaft and C-face on output side accommodate reducer, parallel drive or coupling. Basic components: field, rotor, 1 armature. See page A-47 in this catalog.

EUM Series Enclosed UniModule

50, 100, and 180 Sizes

Totally Enclosed Versions

Warner Electric Series Enclosed UniModules (EUM and EUM-W) package the same hard working, rugged components and features of our standard Electro Modules (EM) and UniModules (UM), sealed coils; twin bearing supported output shafts for maintaining close concentricity's; Warner Electric's exclusive Autogap[™] which automatically adjusts the armature for wear; and close fitting hardened keys into a totally enclosed housing. The rugged housing keeps wear particles in and contaminants out and provides quiet operation. Washdown versions offer additional protection from water intrusion. Pre-burnished at the factor for reliable and consistent operation out-of-box.

- Keeps wear particles in.
- Keeps contaminants out.
- Washdown versions protect against water intrusion.
- Quiet operation.
- Non-washdown units are finned for heat dissipation.
- Optional fan kits available for enhanced heat dissipation.
- UL listed when optional conduit box (washdown version available) is installed.

A note about the content of this section:

All size 50, 100 and 180 modules including EM, UM, UM-C, UM-SS previously described in this catalog can be converted to an enclosed unit (EUM non-washdown) simply with the addition of a cover kit (5370-101-076 for clutches and clutch/brakes, 5370-101-082 for standalone brakes). Warner Electric size 50, 100 and 180 EUM configurations previously supplied with dedicated enclosed housings are included here for your convenience as well as dedicated size 210 and 215 EUMs.

EUM starts on page A-46.

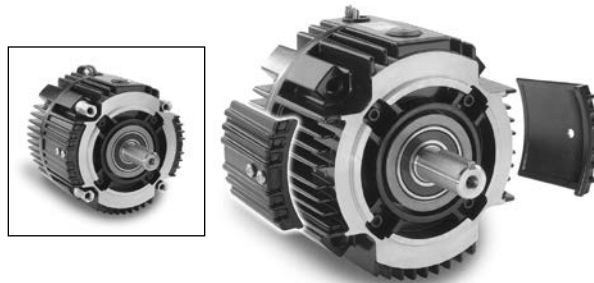
EUM-W starts on page A-55.

To convert any UniModule 50, 100, and 180 sizes to an EUM, purchase optional Cover Kit

Enclosed UniModule Conversion

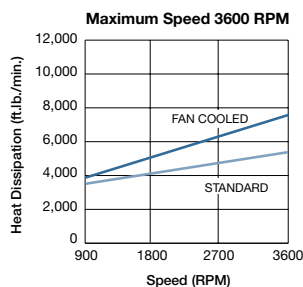
Part Number 5370-101-076

Enclosed UniModules, (EUMs) for 50, 100, and 180 sizes, are being replaced by UniModules (UMs) and an easy to install cover kit. Each kit contains (2) vent covers, (2) gaskets and (4) screws. A vent cover bolts to both sides of the UniModule unit to enclose the open vents of the housing creating a totally enclosed (non-washdown) brake package which keeps contaminants out and wear particles in for clean, quiet operation.

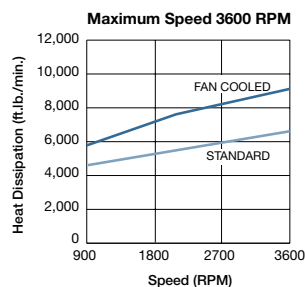


Heat Dissipation Curves

EUM 50



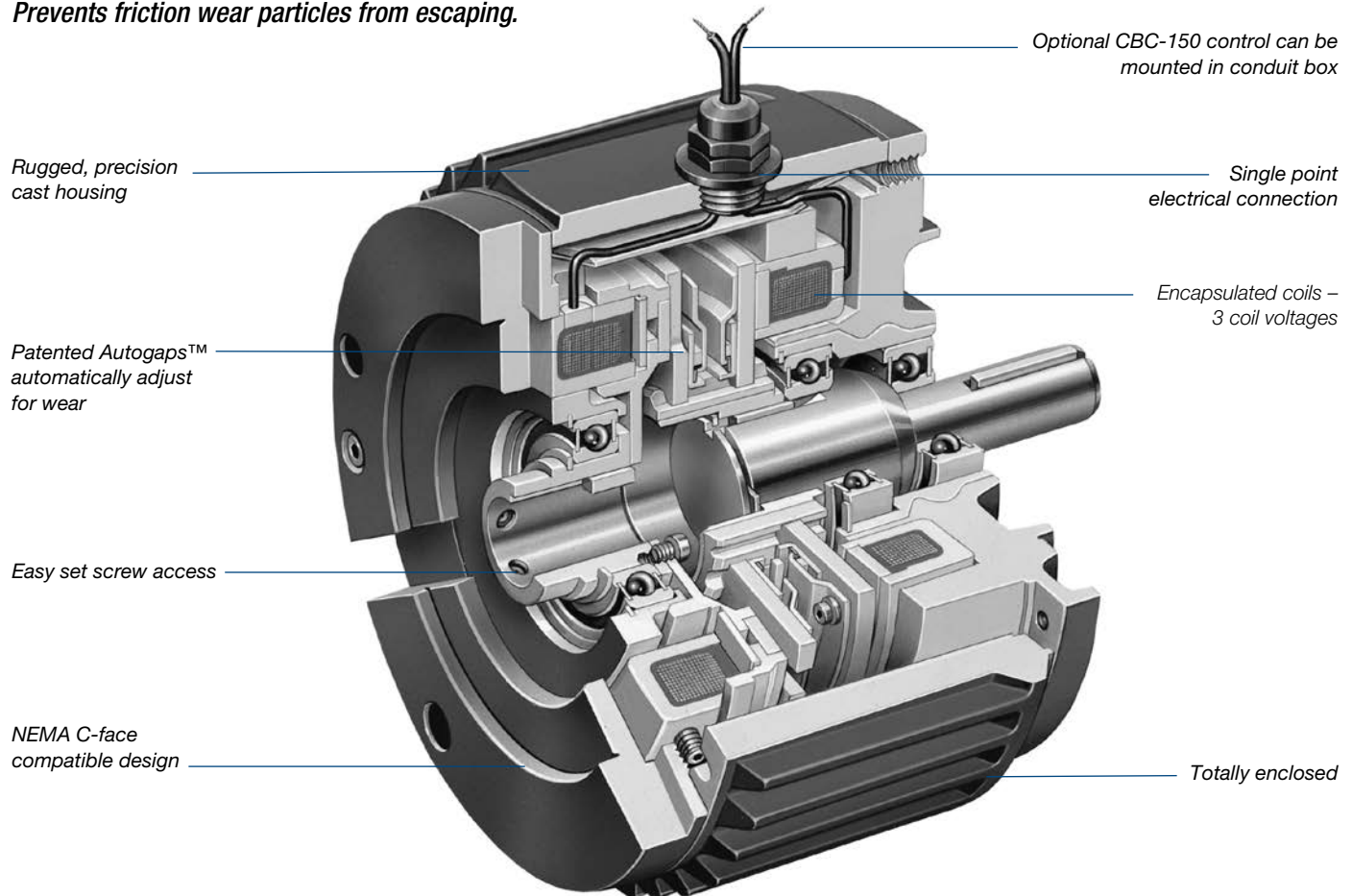
EUM 100/180



EUM Series Enclosed UniModule

210 and 215 Sizes

*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

EUM Totally Enclosed

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

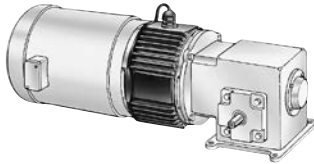
EUM Series Enclosed UniModule

Selection

EUM - 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 Frame motors 3/4 HP and smaller the EUM-100 size may be used where extended life is desirable.

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

b. Base Mounting (2030 Configuration)



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

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

2. Determine Technical Requirements

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

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

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

Horsepower vs. Shaft Speed

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

*For applications with speeds below 100RPM, please contact Warner Electric Application Support.

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)

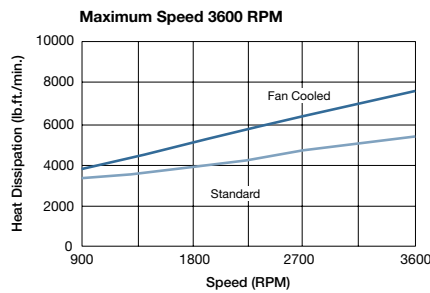
N = Speed in revolutions per minute (RPM)

F = Cycle rate in cycles per minute (CPM)

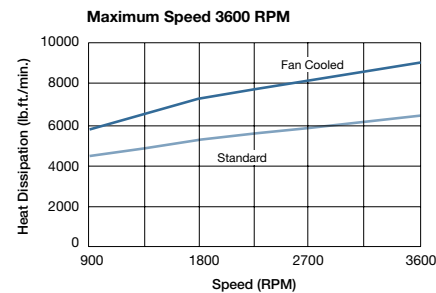
Compare the calculated heat generated in the application to the unit ratings using the heat dissipation curves. Select the appropriate unit that has adequate heat dissipation ability.

Enclosed UniModule Heat Dissipation Curves

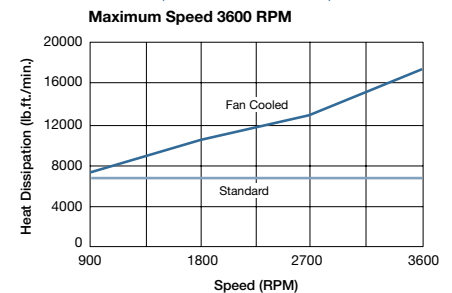
EUM 50



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.

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:

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

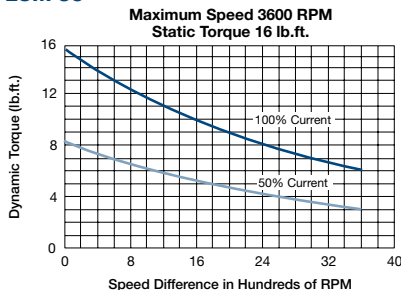
WR^2 = Total reflected inertia at the clutch/brake shaft. Include the clutch/brake output inertia. (lb. ft.²)

N = Speed in revolutions per minute (RPM)

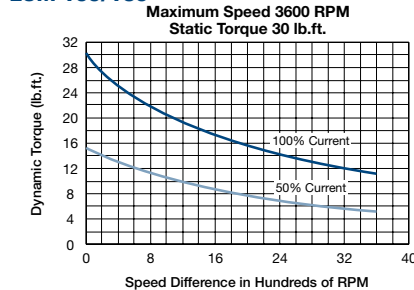
t = Time allowed for the engagement (sec)

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

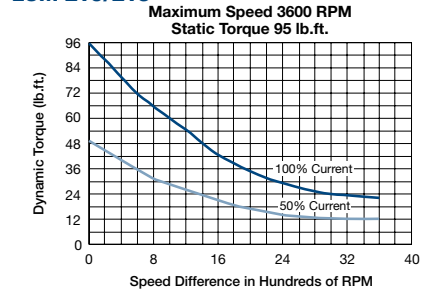
EUM 50



EUM 100/180



EUM 210/215



EUM Series Enclosed UniModule

Specifications

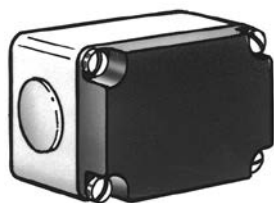
UniModule Size	Shaft Dia.	Static Torque lb. ft.	Horsepower	Max. RPM	Voltage DC	NEMA Frame Size
EUM50	.625	16	1/4-3/4	3600	6, 24 and 90	56C/48Y
EUM100	.625	30	1-2	3600	6, 24 and 90	56C/48Y
EUM180	.875	30	1-2	3600	6, 24 and 90	182C/143TC 184C/145TC
EUM210	1.125	95	3-5	3600	6, 24 and 90	213/182TC 215C/184TC
EUM215	1.375	95	7-1/2-10	3600	6, 24 and 90	213TC/215TC

Accessories

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.

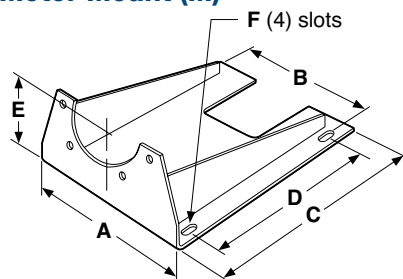


Mounting Brackets

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)

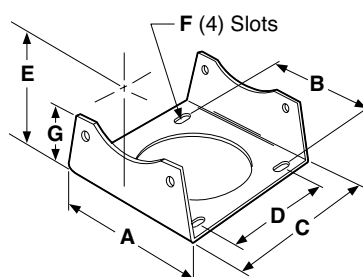
Motor Mount (M)



For use with 1020 and 1040 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	5370-101-078
180	9.25	8.25	11.00	8.000	4.50	.797 x .406	5370-101-079
210/215	11.50	10.50	12.00	9.000	5.25	.750 x .406	5371-101-012

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
210/215	9.000	7.750	8.203	6.000	5.250	.750 x .531	3.385	5371-101-001

EUM Series Enclosed UniModule

Selection and Ordering Information

Totally Enclosed EUM Model No.	Voltage D.C.	COMBINED		OR	SEPARATE	
		Part No.			Part Numbers	
		UniModule w/kit			UniModule	and
1020 Configuration – Enclosed EUM						
EUM-50-1020	6	5370-15		5370-273-201	and	5370-101-076
	24	5370-16		5370-273-203	and	5370-101-076
	90	5370-17		5370-273-204	and	5370-101-076
EUM-100-1020	6	5370-18		5370-273-206	and	5370-101-076
	24	5370-19		5370-273-208	and	5370-101-076
	90	5370-20		5370-273-209	and	5370-101-076
EUM-180-1020	6	5370-21		5370-273-211	and	5370-101-076
	24	5370-22		5370-273-213	and	5370-101-076
	90	5370-23		5370-273-214	and	5370-101-076
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		
20 Configuration (Power On Brake Only) – Enclosed EUM						
EUM-210-20	24			5371-169-105		
	90			5371-169-104		
EUM-215-20	24			5371-169-109		
	90			5371-169-108		
1040 Configuration – Enclosed EUM						
EUM-50-1040	90	5370-24		5370-271-204	and	5370-101-076
EUM-180-1040	90	5370-25		5370-271-214	and	5370-101-076
EUM-210-1040	90			5371-271-024		
2030 Configuration – Enclosed EUM						
EUM-50-2030	6	5370-26		5370-273-216	and	5370-101-076
	24	5370-27		5370-273-218	and	5370-101-076
	90	5370-28		5370-273-219	and	5370-101-076
EUM-180-2030	6	5370-29		5370-273-226	and	5370-101-076
	24	5370-30		5370-273-228	and	5370-101-076
	90	5370-31		5370-273-229	and	5370-101-076
EUM-210-2030	6			5371-273-032		
	24			5371-273-033		
	90			5371-273-031		

Accessories

Option	Size	Enclosed UniModule
Conduit box	All sizes	5370-101-042
Control	CBC-150-1	6004-448-001
	CBC-150-2	6004-448-002
Base Mount Kits for 2030	50	5370-101-004
	50/180*	5370-101-002
	210	5371-101-001
Motor Mount Kits for 1020, 1040, 20	50/100	5370-101-078
	50/100/180*	5370-101-079
	210/215	5371-101-012
Fan Kits for 1020, 1040	50/100	5370-101-055
	180	5370-101-054
	210	5371-101-029

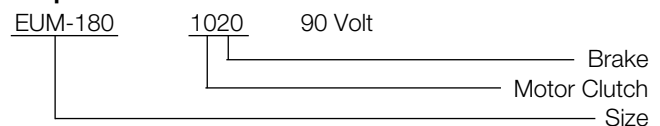
* Because of diameter limitations, bases for original design EUMs are available in 4.5" center height (143/145TC) only.

How to Order

Motor or Reducer Mounted

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

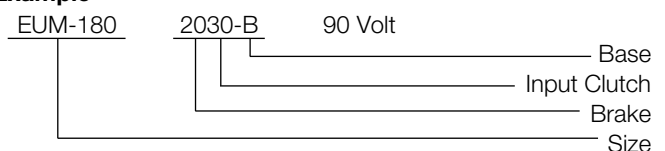
Example



Base Mounted

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

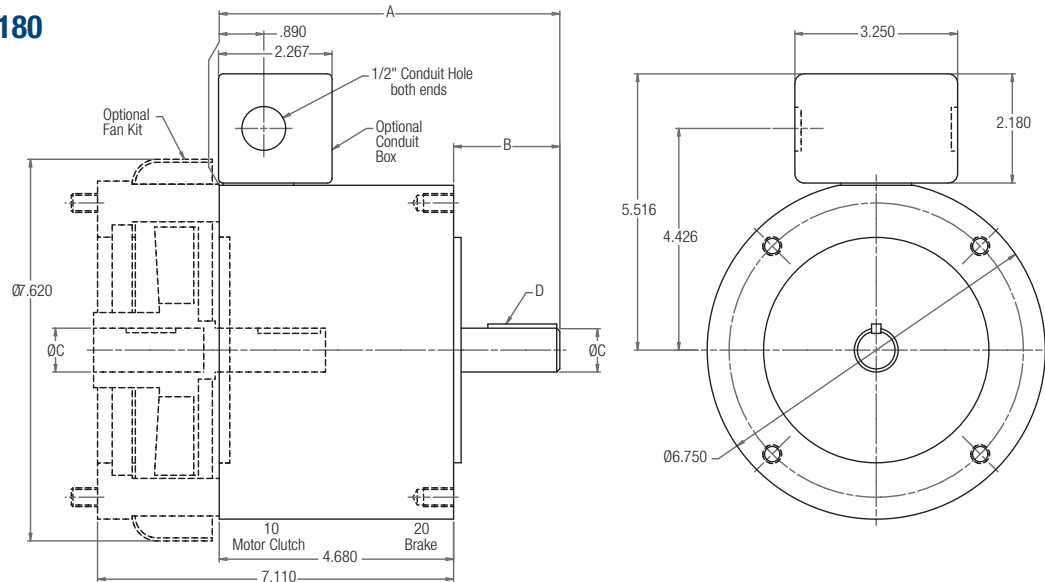
Example



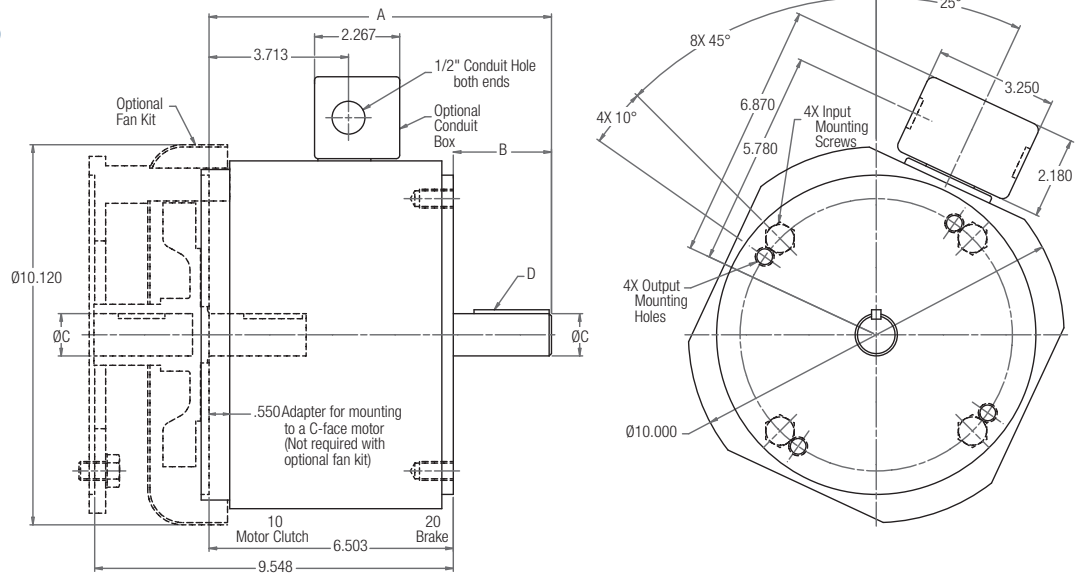
EUM Series Enclosed UniModule

EUM-1020 Motor Clutch/Brake Combination

SIZE 50/100/180



SIZE 210/215



Dimensions

Size	A	B	C	D
50	6.720	2.040	0.625	3/16 x 3/16
100	6.741	2.061	0.625	3/16 x 3/16
180	6.801	2.121	0.875	3/16 x 3/16
210	9.117	2.614	1.125	1/4 x 1/4
215	9.617	3.114	1.375	5/16 x 5/16

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

Specifications

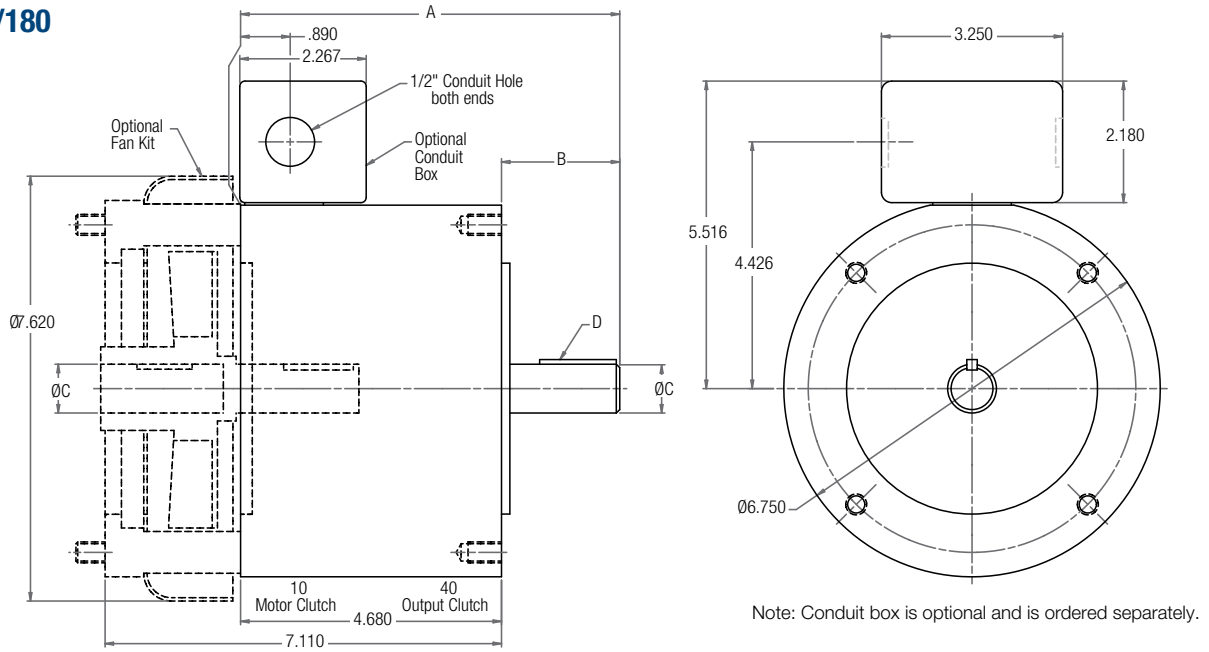
Model Size	Voltage DC	Static Torque lb. ft.	Max. RPM	NEMA Frame Size
50	6, 24, 90	16	3600	56C/48Y*
100	6, 24, 90	30	3600	56C/48Y**
180	6, 24, 90	30	3600	182C/143TC 184C/145TC
210	6, 24, 90	95	3600	213C/182TC 215C/184TC
215	6, 24, 90	95	3600	213TC/215TC

For standard NEMA frame dimensions, see page G-3.

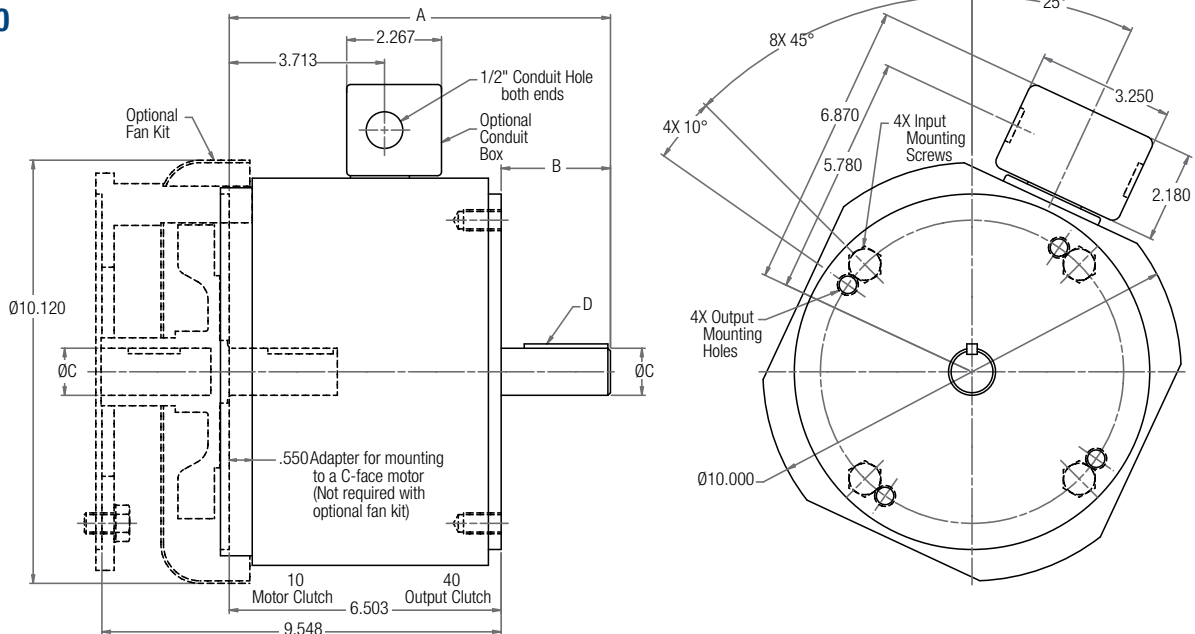
EUM Series Enclosed UniModule

EUM-1040 Motor Clutch/Output Clutch Combination

SIZE 50/180



SIZE 210



Dimensions

Size	A	B	C	D
50	6.720	2.040	0.625	3/16 x 3/16
180	6.801	2.121	0.875	3/16 x 3/16
210	9.117	2.614	1.125	1/4 x 1/4

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

Specifications

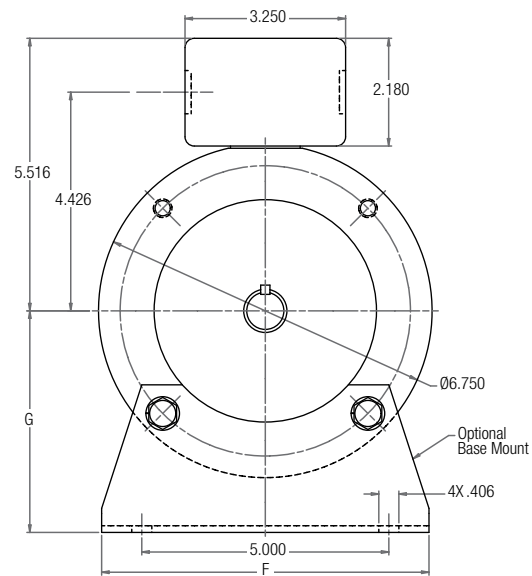
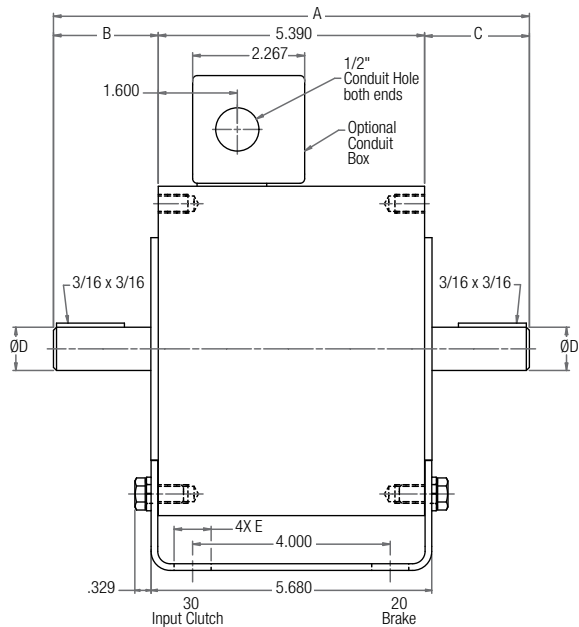
Model Size	Voltage DC	Static Torque lb. ft.	Max. RPM	NEMA Frame Size
50	90	16	3600	56C/48Y
180	90	30	3600	182C/143TC 184C/145TC
210	90	95	3600	213C/182TC 215C/184TC

For standard NEMA frame dimensions, see page G-3.

EUM Series Enclosed UniModule

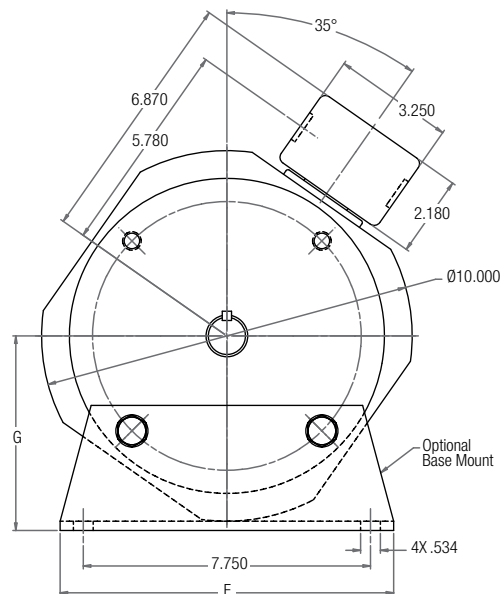
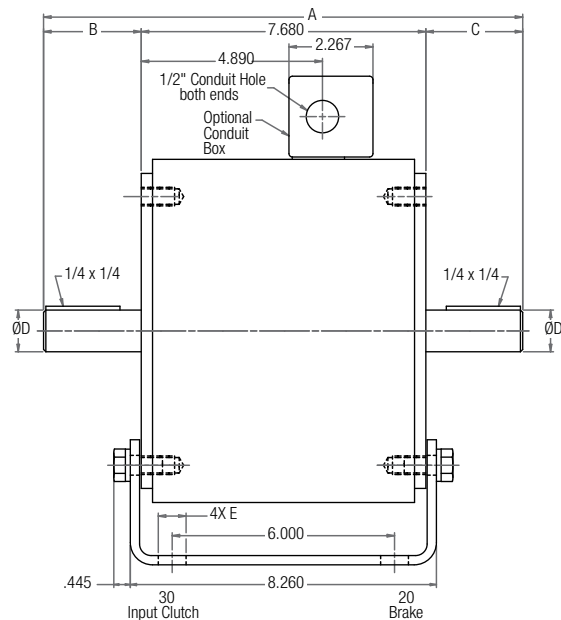
EUM-2030 Input Clutch/Brake Combination EUM-2030-B Input Clutch/Brake Combination – Base Mounted

SIZE 50/180



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

SIZE 210



Dimensions

Size	A	B	C	D	E	F	G
50	9.492	2.062	2.040	0.625	0.800	6.000	3.500
180	9.632	2.121	2.121	0.875	0.750	6.625	4.500
210	12.930	2.636	2.614	1.125	0.750	9.000	5.250

Specifications

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

For standard NEMA frame dimensions, see page G-3.

EUM-W Series Enclosed UniModule

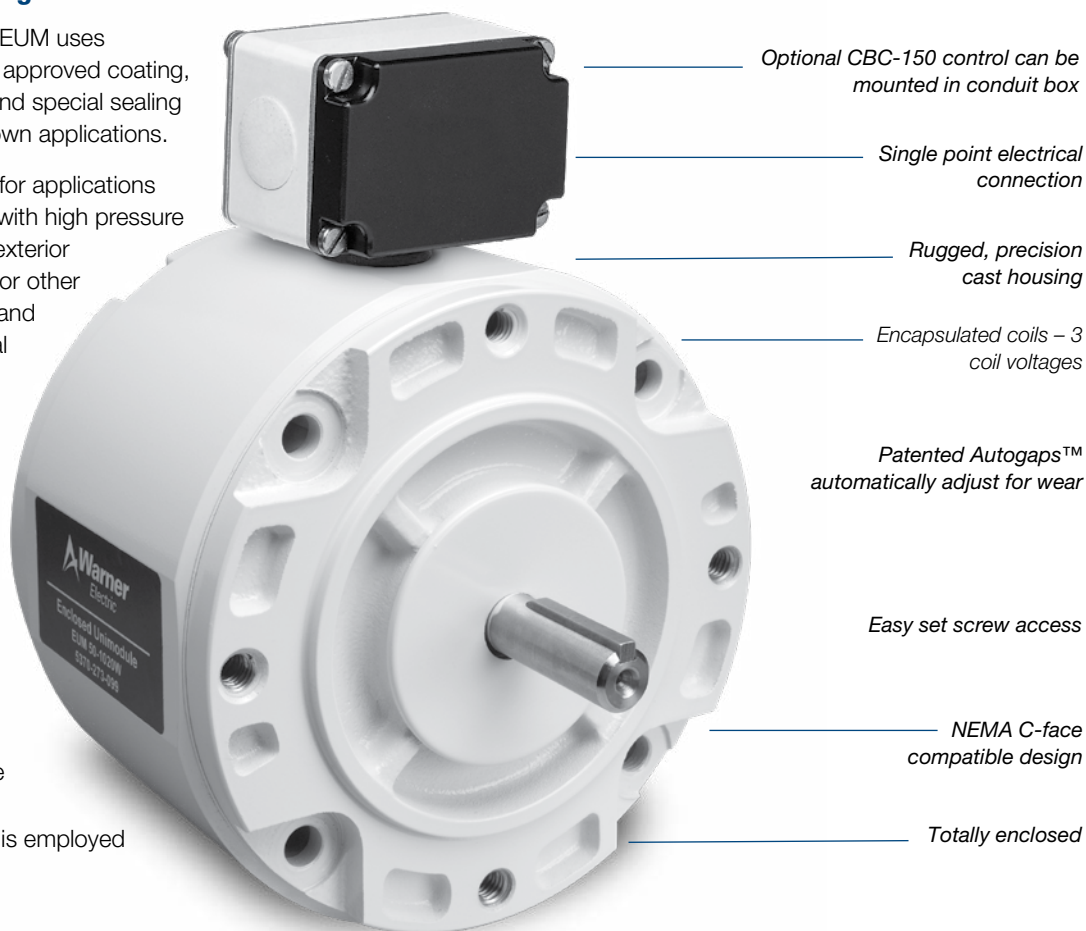
EUM-W Series Clutch/Brakes and Clutch Combinations

Contamination-Proof Design

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



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

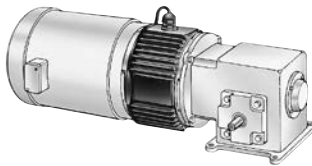
EUM-W Washdown Unit

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

EUM-W - Selection Procedure

Warner Electric EUM-W 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-W 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-W Size
56C/48Y	EUM50-W* EUM100-W**
182C/143TC 184C/145TC	EUM180-W
213C/182TC 215C/184TC	EUM210-W
213TC/215TC	EUM215-W

* For 56C/48Y Frame motors 3/4 HP and smaller the EUM100-W size may be used where extended life is desirable.

** EUM100-W size is recommended for motors 1 HP and larger.

b. Base Mounting (2030 Configuration)



Washdown 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-W is shown at the intersection of the HP and operating speed. For additional sizing information, refer to the technical sizing procedure (step 2).

2. Determine Technical Requirements

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

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

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

Horsepower vs. Shaft Speed

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

*For applications with speeds below 100RPM, please contact Warner Electric Application Support.

EUM-W Series Enclosed UniModule

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)

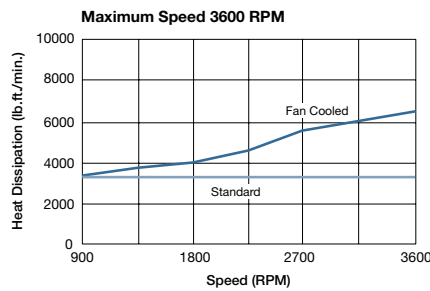
N = Speed in revolutions per minute (RPM)

F = Cycle rate in cycles per minute (CPM)

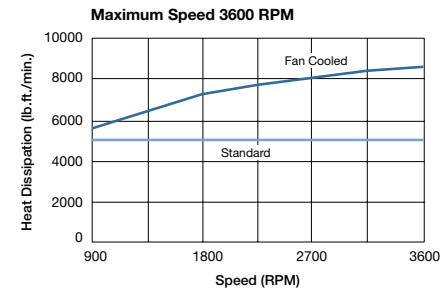
Compare the calculated heat generated in the application to the unit ratings using the heat dissipation curves. Select the appropriate unit that has adequate heat dissipation ability.

Washdown Enclosed UniModule Heat Dissipation Curves

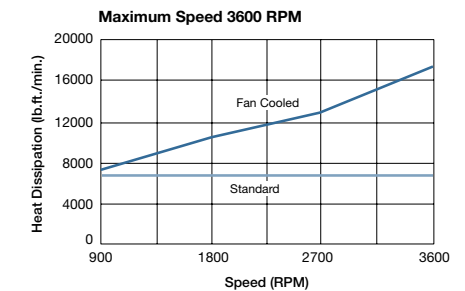
EUM 50-W



EUM 100/180-W



EUM 210/215-W (fan not available for 215)



b. Torque Sizing

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

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

If the static torque requirements are known, refer to the 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:

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

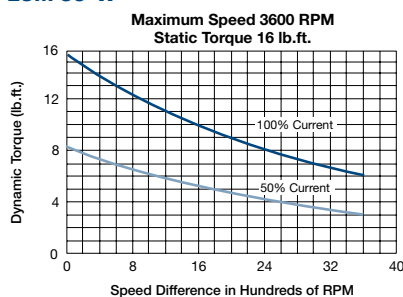
WR^2 = Total reflected inertia at the clutch/brake shaft. Include the clutch/brake output inertia. (lb. ft.²)

N = Speed in revolutions per minute (RPM)

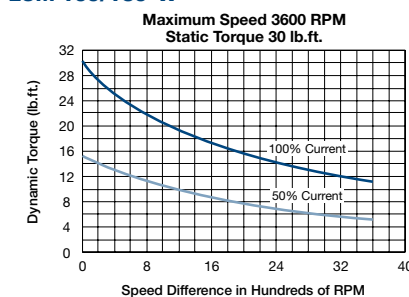
t = Time allowed for the engagement (sec)

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

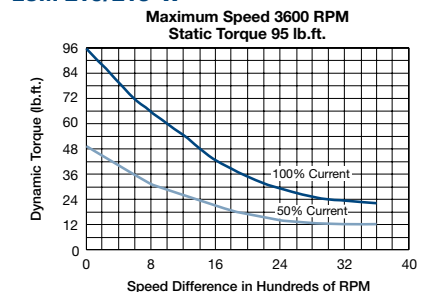
EUM 50-W



EUM 100/180-W



EUM 210/215-W



EUM-W Series Enclosed UniModule

Specifications

UniModule Size	Shaft Dia.	Static Torque (lb. ft.)	Horsepower	Max. RPM	Voltage DC	NEMA Frame Size
EUM50-W	.625	16	1/4-3/4	3600	6, 24 and 90	56C/48Y
EUM100-W	.625	30	1-2	3600	6, 24 and 90	56C/48Y
EUM180-W	.875	30	1-2	3600	6, 24 and 90	182C/143TC 184C/145TC
EUM210-W	1.125	95	3-5	3600	6, 24 and 90	213/182TC 215C/184TC
EUM215-W	1.375	95	7-1/2-10	3600	6, 24 and 90	213TC/215TC

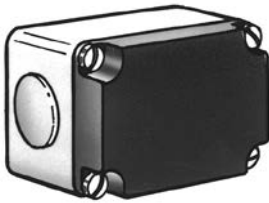
3. Select Options

Accessories

Warner Electric Enclosed Washdown 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-W. Mounts between motor and EUM-W, includes shaft, fan, guard and hardware. Available in standard black coating or food grade approved white coating.

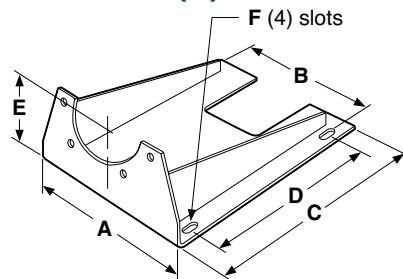


Mounting Brackets

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)

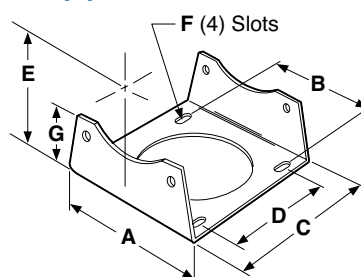


For use with 1020 and 1040 Combinations.

Size	A	B	C	D	E	F	Part No.
50/100/180*	9.25	8.25	10.50	8.000	4.50	.800 x .406	5370-101-080
210/215	11.50	10.50	12.00	9.000	5.25	.750 x .406	5371-101-026

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

Base (B)



For use with 2030 and 3040 units.

Size	A	B	C	D	E	F	G	Part No.
50/180*	6.625	5.680	5.672	4.000	4.500	.750 x .406	3.000	5370-101-047
210	9.000	7.750	8.260	6.000	5.250	.750 x .531	3.375	5371-101-025

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

EUM-W Series Enclosed UniModule

Selection and Ordering Information

Part Numbers

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

Accessories

Option	Size	Washdown UniModule
Conduit box	All sizes	5370-101-045
Control	CBC-150-1	6004-448-001
	CBC-150-2	6004-448-002
Base Mount Kits	50/180*	5370-101-047
	210	5371-101-025
Motor Mount Kits	50/100/180*	5370-101-080
	210/215	5371-101-026
Fan Kits	50/100	5370-101-060
	180	5370-101-061
	210	5371-101-033

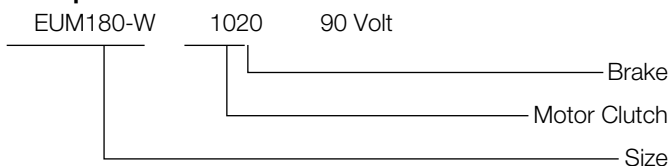
* Because of diameter limitations, EUM bases are available in 4.5" center height (143/145TC) only.

How to Order

Motor or Reducer Mounted

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

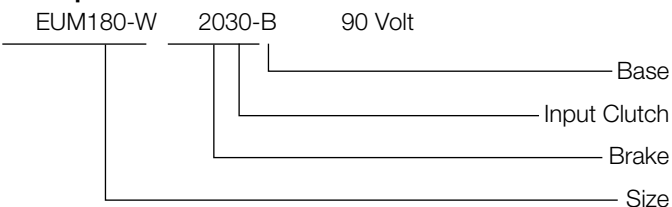
Example



Base Mounted

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

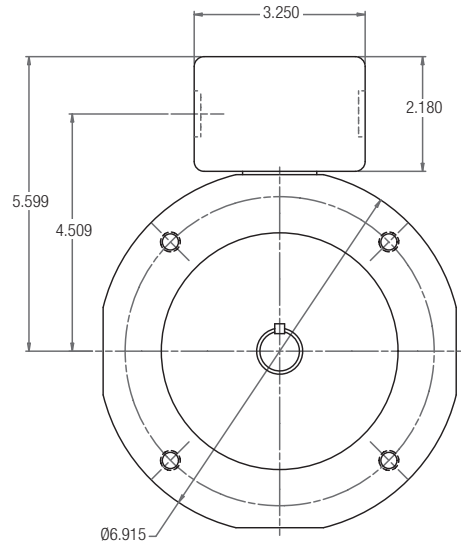
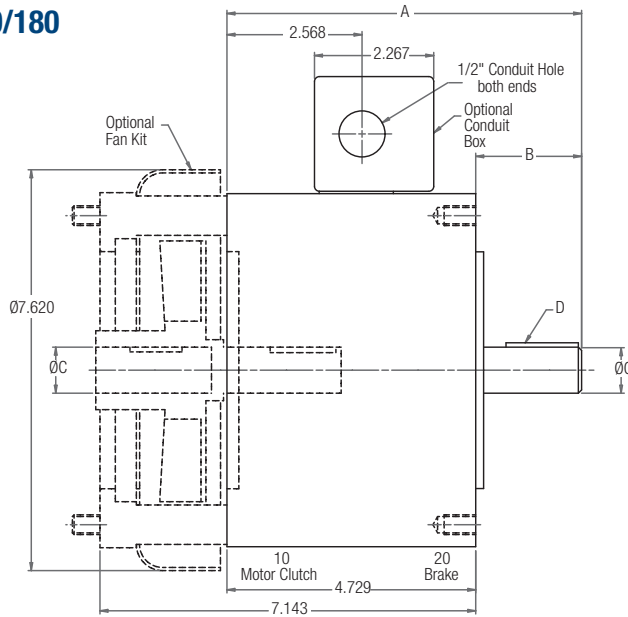
Example



EUM-W Series Enclosed UniModule

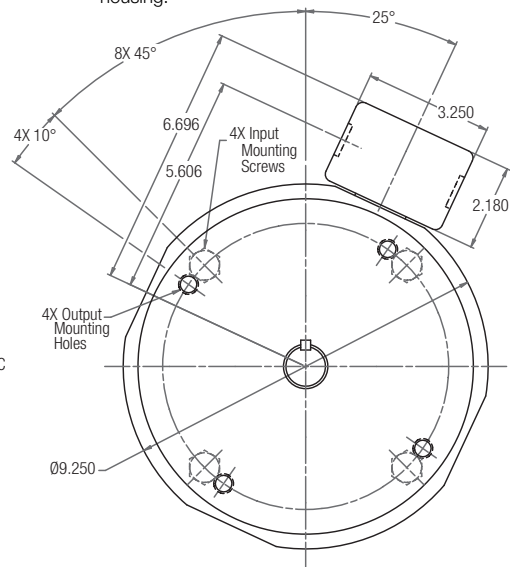
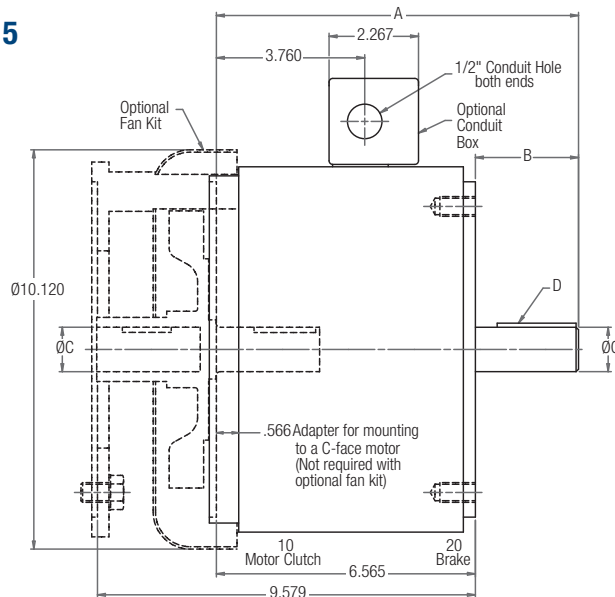
EUM-W-1020 Clutch/Brake Combination

SIZE 50/100/180



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

SIZE 210/215



All dimensions are nominal, unless otherwise noted.

Dimensions

Size	A	B	C	D
50	6.742	2.013	0.625	3/16 x 3/16
100	6.757	2.028	0.625	3/16 x 3/16
180	6.757	2.028	0.875	3/16 x 3/16
210	9.179	2.614	1.125	1/4 x 1/4
215	9.679	3.114	1.375	5/16 x 5/16

Specifications

For standard NEMA frame dimensions, see page G-3.

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

Packaged Performance Products Service Parts for C-face Compatible Units

UniModules

UM Series Clutch and Clutch/Brake Combinations SP-2

UM-C Series Ceramic Faced Clutch/Brakes N/A

Smooth-Start Clutch/Brakes SP-38

Electro Modules

EM Series Modular Clutches, Brakes and Motor Brakes SP-18

Enclosed UniModules

EUM Series Clutch and Clutch/Brake Combinations SP-32

EUM-W Series Washdown Clutch/Brakes SP-32



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

Common Replacement Practices:

EM/UM/EUM clutches

- Replace rotor and armature
- Inspect splined hub

EM/UM/EUM clutch/brakes

- Replace clutch rotor and armature
- Replace brake magnet and armature
- Inspect splined hub

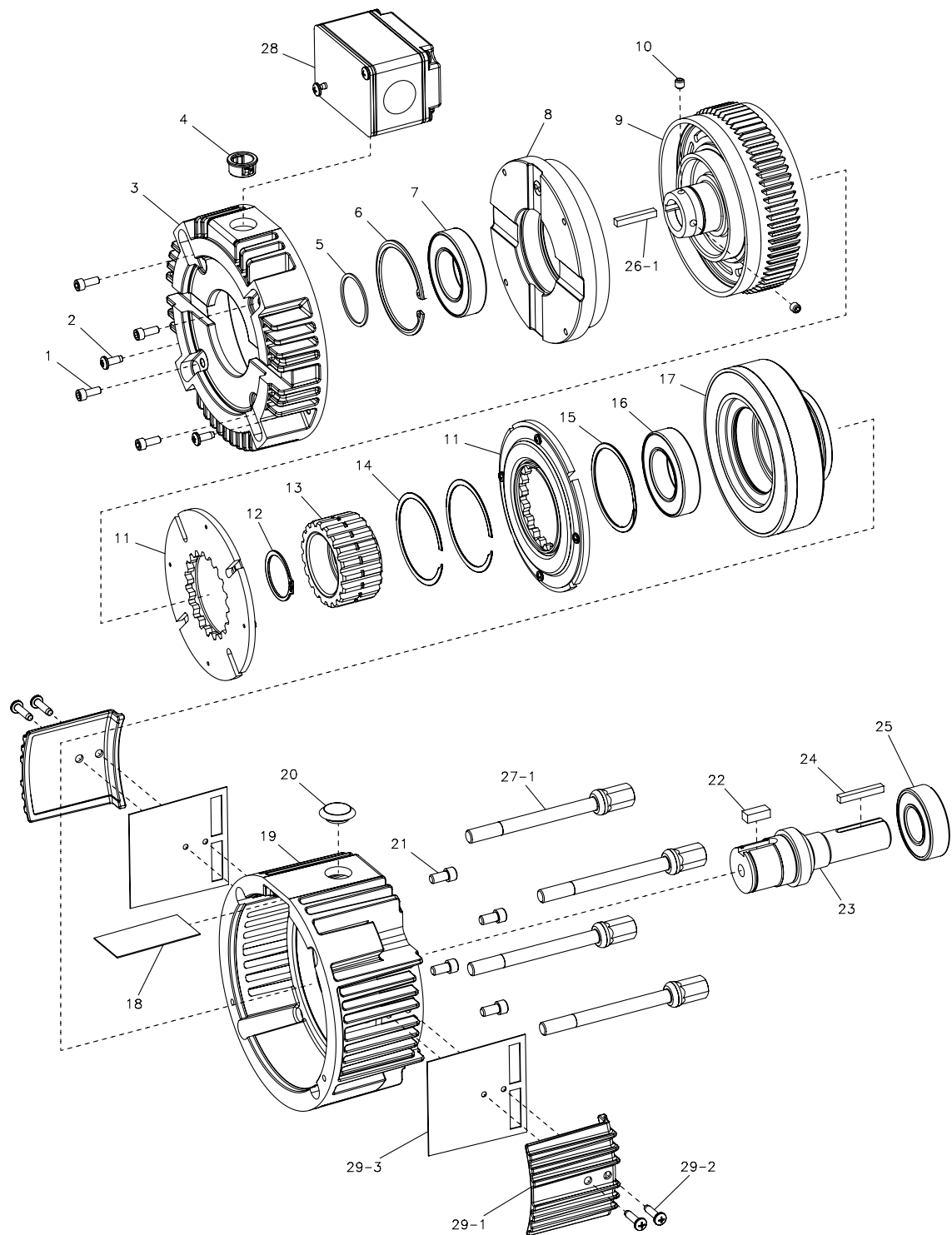
A note on burnishing:

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

UM Series UniModule

UM-1020 Clutch/Brake Combination

Sizes 50, 100 and 180



Service Parts

UM-1020 Clutch/Brake Combination Sizes 50, 100 and 180

Component Parts

Item	Description	UM-50		UM-100		UM-180	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1	Field Mounting Screw	797-1214	4	797-1214	4	797-1214	4
2	Screw	797-1568	2	797-1568	2	797-1568	2
3	Housing	535-0204	1	535-0204	1	535-0204	1
4	Bushing	572-0522	1	572-0522	1	572-0522	1
5	Retaining Ring	748-0018	1	748-0018	1	748-0018	1
6	Retaining Ring	748-0561	1	748-0561	1	748-0561	1
7	Ball Bearing	166-0150	1	166-0150	1	166-0150	1
8	Field Assembly		1		1		1
	6 Volt	5370-451-201		5370-451-206		5370-451-206	
	24 Volt	5370-451-203		5370-451-208		5370-451-208	
	90 Volt	5370-451-204		5370-451-209		5370-451-209	
9	Rotor Assembly	5370-751-019	1	5370-751-049	1	5370-751-051	1
10	Set Screw	797-1098	2	797-0069	2	797-0069	2
11	Armature Assembly	5370-111-022	2	5370-111-013	2	5370-111-013	2
12	Retaining Ring	748-0445	1	748-0676	1	748-0676	1
13	Armature Hub	540-1638	1	540-2038	1	540-2038	1
14	Armature Hub Retaining Ring			748-0450	2	748-0450	2
15	Retaining Ring	748-2044	1	748-0101	1	748-0101	1
16	Ball Bearing	166-0143	1	166-0150	1	166-0150	1
17	Magnet Assembly		1		1		1
	6 Volt	5370-631-201		5370-631-216		5370-631-216	
	24 Volt	5370-631-203		5370-631-218		5370-631-218	
	90 Volt	5370-631-204		5370-631-219		5370-631-219	
18	Insulator	572-1029	1	572-1029	1	572-1029	1
19	Housing	535-0206	1	535-0206	1	535-0206	1
20	Plug	680-0037	1	680-0037	1	680-0037	1
21	Magnet Mounting Screw	797-0077	4	797-1358	4	797-1358	4
22	Key	590-0043	1	590-0084	1	590-0084	1
23	Shaft	798-0298	1	798-0301	1	798-0304	1
24	Key	590-0029	1	590-0029	1	590-0029	1
25	Ball Bearing	166-0143	1	166-0143	1	166-0143	1
26	Mounting Accessory	5370-101-072	1	5370-101-072	1	5370-101-072	1
	26-1 Key	590-0142	1	590-0142	1	590-0142	1
27	Mounting Accessory	5370-101-075	1	5370-101-075	1	5370-101-075	1
	27-1 Tie Bolt	825-0014	4	825-0014	4	825-0014	4
28	Conduit Box (Optional)	5370-101-042	1	5370-101-042	1	5370-101-042	1
29	Cover Kit (Optional)	5370-101-076	1	5370-101-076	1	5370-101-076	1
	29-1 Cover	258-1227	2	258-1227	2	258-1227	2
	29-2 Screw	797-1562	4	797-1562	4	797-1562	4
	29-3 Gasket	495-0042	2	495-0042	2	495-0042	2

Refer to service manual P-273-4-WE.
These units meet the standards of UL 508 and are listed under guide card #NMTR2, file #59164.

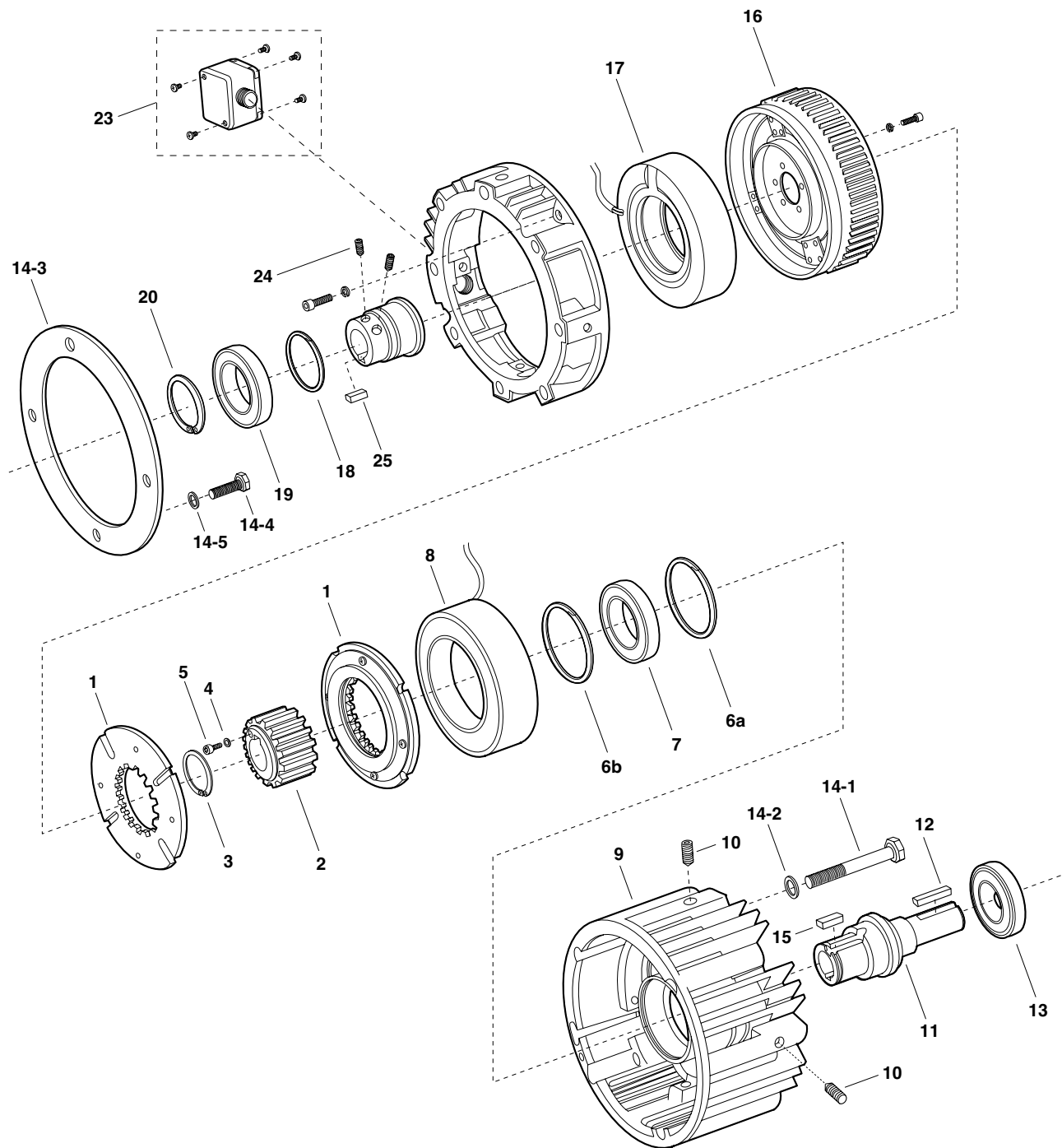


Service Parts

UM Series UniModule

UM-1020 Clutch/Brake Combination

Sizes 210 and 215



Service Parts

UM-1020 Clutch/Brake Combination Sizes 210 and 215

Component Parts

Item	Description	UM-210		UM-215	
		Part No.	Qty.	Part No.	Qty.
1	Armature Assembly	5371-111-005	2	5371-111-005	2
2	Armature Hub	540-2053	1	540-2053	1
3	Retaining Ring				
4	Lockwasher	950-0372	6	950-0372	6
5	Capscrew	797-0081	6	797-0081	6
6a	Retaining Ring	748-0112	1	748-0112	1
6b	Retaining Ring				
7	Ball Bearing	166-0142	1	166-0142	1
	Magnet		1		1
8	6 volt	5371-631-002		5371-631-002	
	24 volt	5371-631-005		5371-631-005	
	90 volt	5371-631-003		5371-631-003	
9	Housing	535-0163	1	535-0163	1
10	Setscrew	797-0103	4	797-0103	4
11	Shaft	798-0051	1	798-0254	1
12	Key	590-0019	1	590-0124	1
13	Ball Bearing	166-0144	1	166-0144	1
14	Mounting Accessory	5371-101-020	1	5371-101-020	1
	14-1 Capscrew	797-1440	4	797-1440	4
	14-2 Washer	950-0111	4	950-0111	4
	14-3 Adapter	104-0321	1	104-0321	1
	14-4 Capscrew	797-1442	4	797-1442	4
	14-5 Washer	950-0101	4	950-0101	4
15	Key				
16	Rotor Assembly (with fan and hub)	5371-751-012	1	5371-751-031	1
	Field (with housing)		1		1
17	6 volt	5371-451-027		5371-451-027	
	24 volt	5371-451-029		5371-451-029	
	90 volt	5371-451-028		5371-451-028	
18	Retaining Ring	748-0558	1	748-0558	1
19	Bearing	166-0168	1	166-0168	1
20	Retaining Ring	748-0067	1	748-0067	1
23	Conduit Box (Optional)	5370-101-042	1	5370-101-042	1
24	Set Screw	797-1098	2	797-1098	2
25	Input Key	5371-101-043	1	5371-101-044	1

Note: As of June, 2000 all rotors are manufactured as a single piece design.
The rotor assembly part number remains the same and now includes the hub and set screws.

Refer to Service Manual P-0213-WE.
These units meet the standards of UL 508 and are listed under guide card #NMTR 2, file #59164.

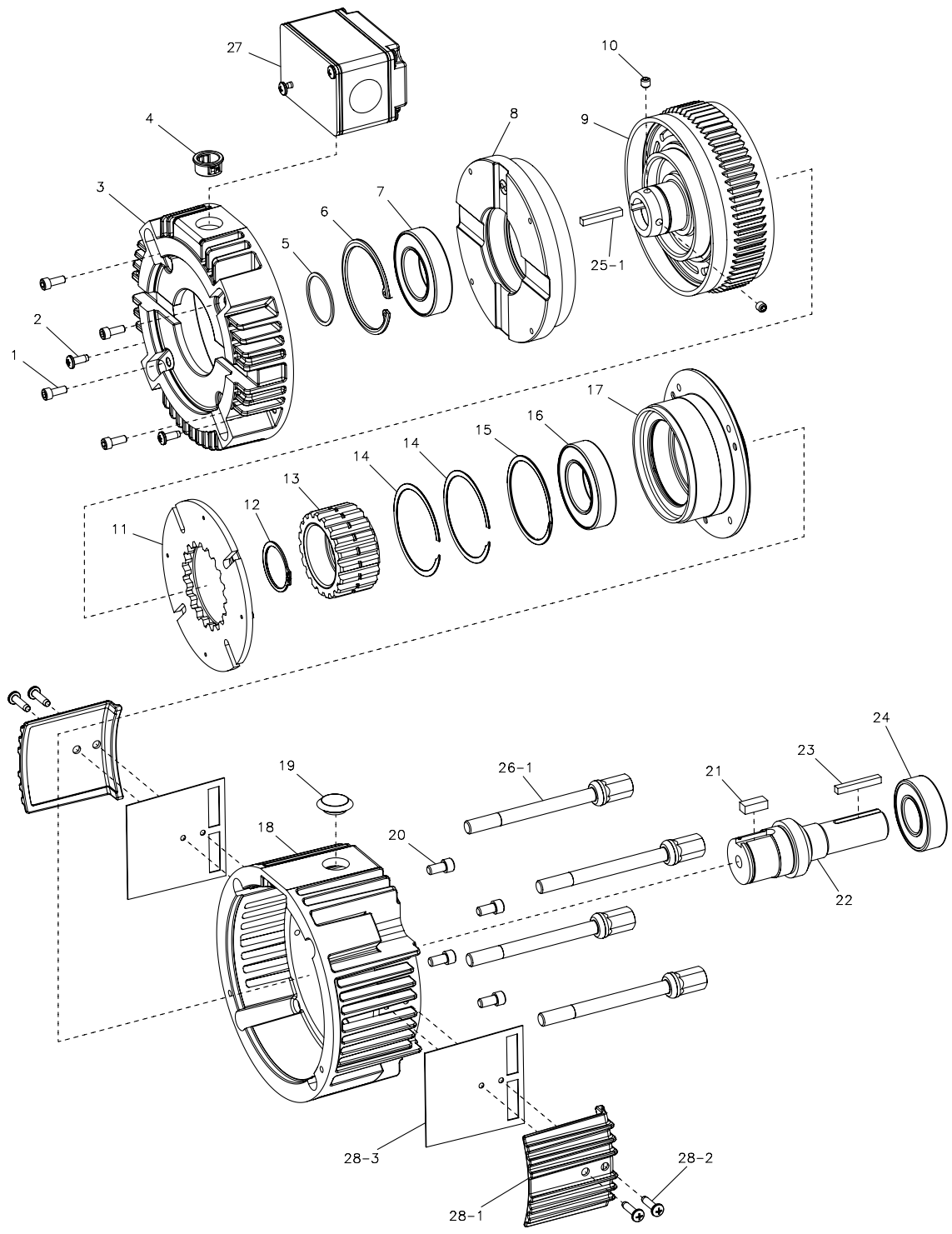


Service Parts

UM Series UniModule

UM-1040 Clutch/Brake Combination

Sizes 50, 100 and 180



Service Parts

UM-1040 Clutch/Brake Combination Sizes 50, 100 and 180

Component Parts

Item	Description	UM-50		UM-100		UM-180	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1	Field Mounting Screw	797-1214	4	797-1214	4	797-1214	4
2	Screw	797-1568	2	797-1568	2	797-1568	2
3	Housing	535-0204	1	535-0204	1	535-0204	1
4	Bushing	572-0522	1	572-0522	1	572-0522	1
5	Retaining Ring	748-0018	1	748-0018	1	748-0018	1
6	Retaining Ring	748-0561	1	748-0561	1	748-0561	1
7	Ball Bearing	166-0150	1	166-0150	1	166-0150	1
	Field Assembly		1		1		1
	6 Volt	5370-451-201		5370-451-206		5370-451-206	
8	24 Volt	5370-451-203		5370-451-208		5370-451-208	
	90 Volt	5370-451-204		5370-451-209		5370-451-209	
9	Rotor Assembly	5370-751-019	1	5370-751-049	1	5370-751-051	1
10	Set Screw	797-1098	2	797-0069	2	797-0069	2
11	Armature Assembly	5370-111-022	1	5370-111-013	1	5370-111-013	1
12	Retaining Ring	748-0445	1	748-0676	1	748-0676	1
13	Armature Hub	540-1638	1	540-2038	1	540-2038	1
14	Armature Hub Retaining Ring			748-0450	2	748-0450	2
15	Retaining Ring	748-2044	1	748-0101	1	748-0101	1
16	Ball Bearing	166-0143	1	166-0150	1	166-0150	1
17	Bearing Hub	690-0276	1	690-0278	1	690-0278	1
18	Housing	535-0207	1	535-0207	1	535-0207	1
19	Plug	680-0037	1	680-0037	1	680-0037	1
20	Hub Mounting Screw	797-0077	4	797-1358	4	797-1358	4
21	Key	590-0043	1	590-0084	1	590-0084	1
22	Shaft	798-0298	1	798-0301	1	798-0304	1
23	Key	590-0029	1	590-0029	1	590-0029	1
24	Ball Bearing	166-0143	1	166-0143	1	166-0143	1
25	Mounting Accessory	5370-101-072	1	5370-101-072	1	5370-101-072	1
	25-1 Key	590-0142	1	590-0142	1	590-0142	1
26	Mounting Accessory	5370-101-075	1	5370-101-075	1	5370-101-075	1
	26-1 Tie Bolt	825-0014	4	825-0014	4	825-0014	4
27	Conduit Box (Optional)	5370-101-042	1	5370-101-042	1	5370-101-042	1
	Cover Kit (Optional)	5370-101-076	1	5370-101-076	1	5370-101-076	1
28	28-1 Cover	258-1227	2	258-1227	2	258-1227	2
	28-2 Screw	797-1562	4	797-1562	4	797-1562	4
	28-3 Gasket	495-0042	2	495-0042	2	495-0042	2

Refer to service manual P-273-4-WE.
These units meet the standards of UL 508 and are listed under guide card #NMTR2, file #59164.

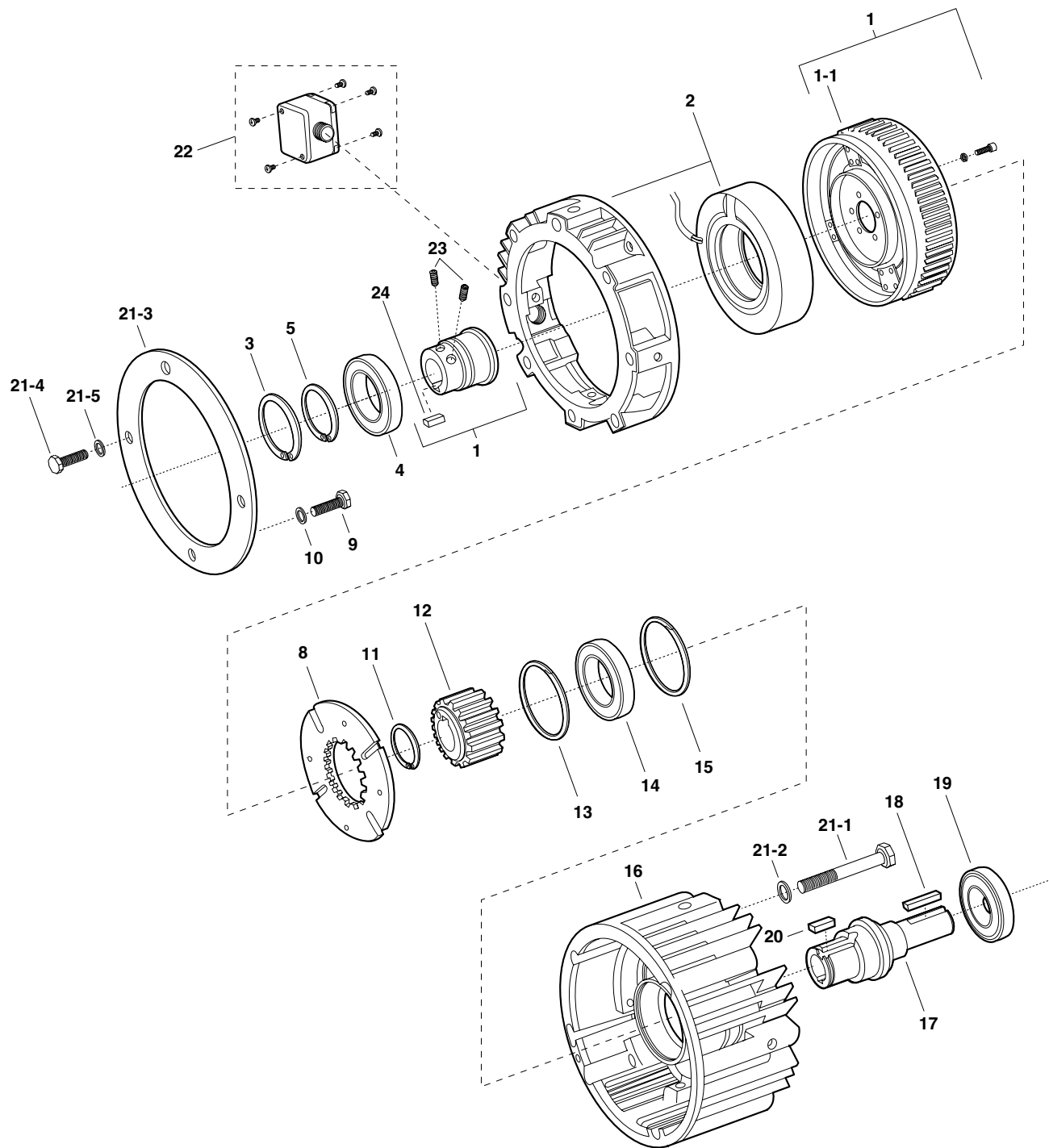


Service Parts

UM Series UniModule

UM-1040 Clutch Combination

Sizes 210 and 215



Service Parts

UM-1040 Clutch Combination Sizes 210 and 215

Component Parts

Item	Description	UM-210		UM-215	
		Part No.	Qty.	Part No.	Qty.
1	Rotor Assembly (with fan and hub)	5371-751-012	1	5371-751-031	1
2	Field (with housing)		1		1
	6 volt	5371-451-027		5371-451-027	
	24 volt	5371-451-029		5371-451-029	
	90 volt	5371-451-028		5371-451-028	
3	Retaining Ring	748-0558	1	748-0558	1
4	Bearing	166-0168	1	166-0168	1
5	Retaining Ring	748-0067	1	748-0067	1
8	Armature Assembly	5371-111-005	1	5371-111-005	1
9	Capscrew	797-0081	6	797-0081	6
10	Lockwasher	950-0372	6	950-0372	6
11	Retaining Ring				
12	Hub	540-2053	1	540-2053	1
13	Retaining Ring	748-0112	1	748-0112	1
14	Ball Bearing	166-0142	1	166-0142	1
15	Retaining Ring				
16	Housing	535-0169	1	535-0169	1
17	Shaft	798-0051	1	798-0254	1
18	Key	590-0019	1	590-0124	1
19	Ball Bearing	166-0144	1	166-0144	1
20	Key				
21	Mounting Accessory	5371-101-020	1	5371-101-020	1
	21-1 Capscrew	797-1440	4	797-1440	4
	21-2 Lockwasher	950-0111	4	950-0111	4
	21-3 Adapter	104-0321	1	104-0321	1
	21-4 Capscrew	797-1442	4	797-1442	4
	21-5 Lockwasher	950-0101	4	950-0101	4
22	Conduit Box (Optional)	5370-101-042	1	5370-101-042	1
23	Set Screw	797-1098	2	797-1098	2
24	Input Key	5371-101-043	1	5371-101-044	1

Note: As of June, 2000 all rotors are manufactured as a single piece design.
The rotor assembly part number remains the same and now includes the hub and set screws.

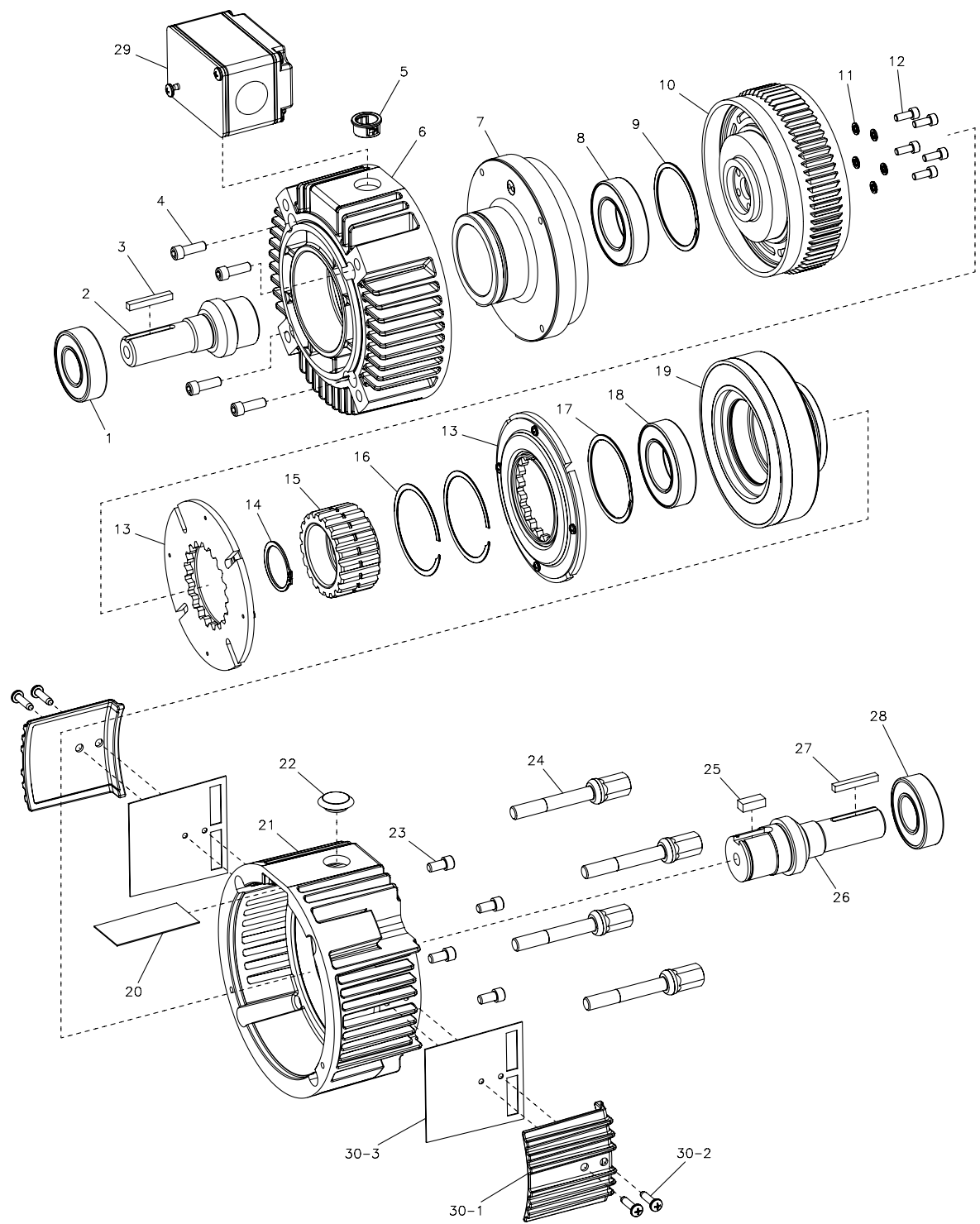
Refer to Service Manual P-0213-WE.
These units meet the standards of UL 508 and are listed under guide card #NMTR 2, file #59164.



UM Series UniModule

UM-2030 Clutch/Brake Combination

Sizes 50, 100 and 180



Service Parts

UM-2030 Clutch/Brake Combination

Sizes 50, 100 and 180

Component Parts

Item	Description	UM-50		UM-100		UM-180	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1	Ball Bearing	166-0143	1	166-0143	1	166-0143	1
2	Shaft	798-0300	1	798-0303	1	798-0306	1
3	Key	590-0029	1	590-0029	1	590-0029	1
4	Field Mounting Screw	797-0077	4	797-0077	4	797-0077	4
5	Bushing	572-0522	1	572-0522	1	572-0522	1
6	Housing	535-0205	1	535-0205	1	535-0205	1
	Field Assembly		1		1		1
	6 Volt	5370-451-211		5370-451-216		5370-451-216	
7	24 Volt	5370-451-213		5370-451-218		5370-451-218	
	90 Volt	5370-451-214		5370-451-219		5370-451-219	
8	Ball Bearing	166-0143	1	166-0150	1	166-0150	1
9	Retaining Ring	748-2044	1	748-0101	1	748-0101	1
10	Rotor Assembly	5370-751-006	1	5370-751-053	1	5370-751-053	1
11	Washer	950-0436	4	950-0436	5	950-0436	5
12	Screw	797-1294	4	797-1214	5	797-1214	5
13	Armature Assembly	5370-111-022	2	5370-111-013	2	5370-111-013	2
14	Retaining Ring	748-0445	1	748-0676	1	748-0676	1
15	Armature Hub	540-1638	1	540-2038	1	540-2038	1
16	Armature Hub Retaining Ring			748-0450	2	748-0450	2
17	Retaining Ring	748-2044	1	748-0101	1	748-0101	1
18	Ball Bearing	166-0143	1	166-0150	1	166-0150	1
	Magnet Assembly		1		1		1
	6 Volt	5370-631-201		5370-631-216		5370-631-216	
19	24 Volt	5370-631-203		5370-631-218		5370-631-218	
	90 Volt	5370-631-204		5370-631-219		5370-631-219	
20	Insulator	572-1029	1	572-1029	1	572-1029	1
21	Housing	535-0206	1	535-0206	1	535-0206	1
22	Plug	680-0037	1	680-0037	1	680-0037	1
23	Magnet Mounting Screw	797-0077	4	797-1358	4	797-1358	4
24	Tie Bolt	825-0013	4	825-0013	4	825-0013	4
25	Key	590-0043	1	590-0084	1	590-0084	1
26	Shaft	798-0298	1	798-0301	1	798-0304	1
27	Key	590-0029	1	590-0029	1	590-0029	1
28	Ball Bearing	166-0143	1	166-0143	1	166-0143	1
29	Conduit Box (Optional)	5370-101-042	1	5370-101-042	1	5370-101-042	1
	Cover Kit (Optional)	5370-101-076	1	5370-101-076	1	5370-101-076	1
30	30-1 Cover	258-1227	2	258-1227	2	258-1227	2
	30-2 Screw	797-1562	4	797-1562	4	797-1562	4
	30-3 Gasket	495-0042	2	495-0042	2	495-0042	2

Refer to service manual P-273-4-WE.
These units meet the standards of UL 508 and are listed under guide card #NMTR2, file #59164.

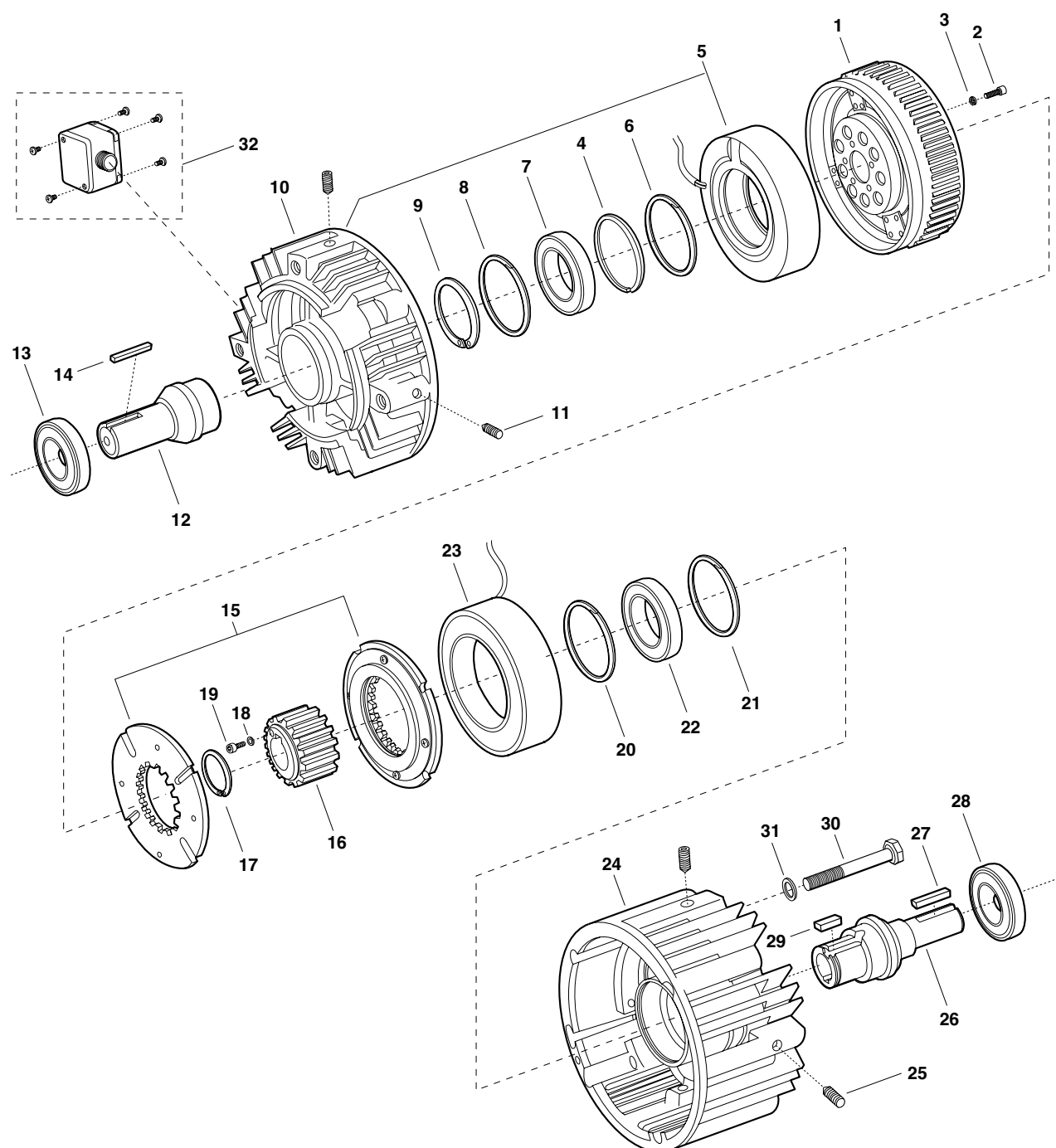


Service Parts

UM Series UniModule

UM-2030 Clutch/Brake Combination

Sizes 210 and 215



Service Parts

UM-2030 Clutch/Brake Combination Sizes 210 and 215

Component Parts

Item	Description	UM-210		UM-215	
		Part No.	Qty.	Part No.	Qty.
1	Rotor Assembly w/fan	5371-751-007	1	5371-751-007	1
2	Capscrew	797-0083	6	797-0083	6
3	Lockwasher	950-0372	6	950-0372	6
4	Spacer	807-0061	1		
	Field (with housing UM-50-2030 only)		1		1
5	6 volt	5371-451-002		5371-451-002	
	24 volt	5371-451-005		5371-451-005	
	90 volt	5371-451-003		5371-451-003	
6	Retaining Ring	748-0112	1	748-0112	1
7	Ball Bearing	166-0142	1	166-0142	1
8	Retaining Ring				
9	Retaining Ring				
10	Housing	535-0129	1	535-0129	1
11	Setscrew	797-0103	4	797-0103	4
12	Shaft	798-0123	1	798-0255	1
13	Bearing	166-0144	1	166-0144	1
14	Key	590-0019	1	590-0124	1
15	Armature Assembly	5371-111-005	2	5371-111-005	2
16	Armature Hub	540-2053	1	540-2053	1
17	Retaining Ring				
18	Lockwasher	950-0372	6	950-0372	6
19	Capscrew	797-0081	6	797-0081	6
20	Retaining Ring	748-0112	1	748-0112	1
21	Retaining Ring				
22	Ball Bearing	166-0142	1	166-0142	1
	Magnet		1		1
23	6 volt	5371-631-002		5371-631-002	
	24 volt	5371-631-005		5371-631-005	
	90 volt	5371-631-003		5371-631-003	
24	Housing	535-0163	1	535-0163	1
25	Setscrew	797-0103	4	797-0103	4
26	Shaft	798-0051	1	798-0251	1
27	Key	590-0019	1	590-0124	1
28	Ball Bearing	166-0144	1	166-0144	1
29	Key				
30	Capscrew	797-1075	4	797-1075	4
31	Lockwasher	950-0032	4	950-0032	4
32	Conduit Box (Optional)	5370-101-042	1	5370-101-042	1

Refer to Service Manual P-0213-WE.
These units meet the standards of UL 508 and are listed under guide card #NMTR2, file #59164.

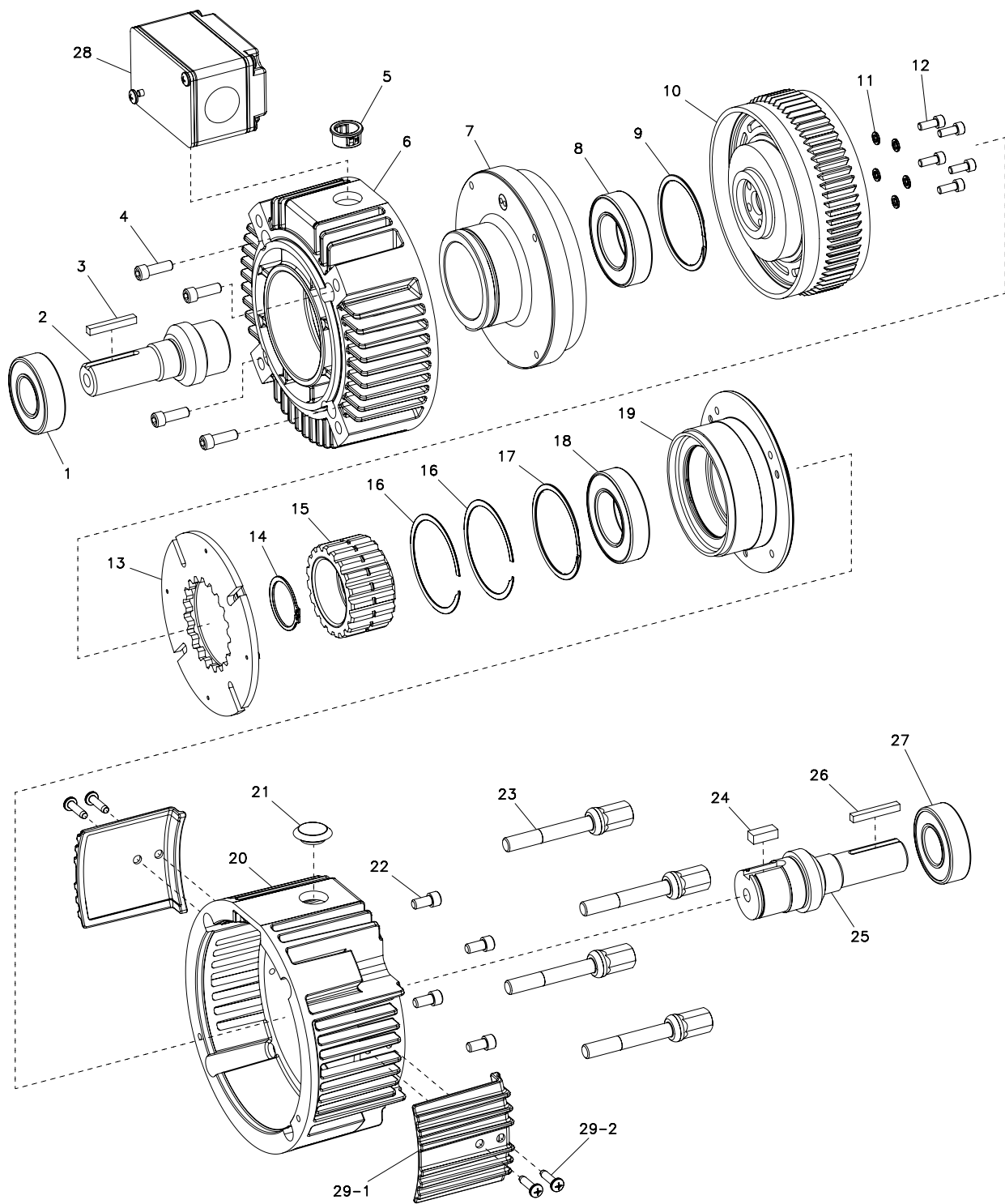


Service Parts

UM Series UniModule

UM-3040 Clutch Combination-Base Mounted

Sizes 50, 100 and 180



Service Parts

UM-3040 Clutch Combination-Base Mounted Sizes 50, 100 and 180

Component Parts

Item	Description	UM-50		UM-100		UM-180	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1	Ball Bearing	166-0143	1	166-0143	1	166-0143	1
2	Shaft	798-0300	1	798-0303	1	798-0306	1
3	Key	590-0029	1	590-0029	1	590-0029	1
4	Field Mounting Screw	797-0077	4	797-0077	4	797-0077	4
5	Bushing	572-0522	1	572-0522	1	572-0522	1
6	Housing	535-0205	1	535-0205	1	535-0205	1
	Field Assembly		1		1		1
	6 Volt	5370-451-211		5370-451-216		5370-451-216	
7	24 Volt	5370-451-213		5370-451-218		5370-451-218	
	90 Volt	5370-451-214		5370-451-219		5370-451-219	
8	Ball Bearing	166-0143	1	166-0150	1	166-0150	1
9	Retaining Ring	748-2044	1	748-0101	1	748-0101	1
10	Rotor Assembly	5370-751-006	1	5370-751-053	1	5370-751-053	1
11	Washer	950-0436	4	950-0436	5	950-0436	5
12	Screw	797-1294	4	797-1214	5	797-1214	5
13	Armature Assembly	5370-111-022	1	5370-111-013	1	5370-111-013	1
14	Retaining Ring	748-0445	1	748-0676	1	748-0676	1
15	Armature Hub	540-1638	1	540-2038	1	540-2038	1
16	Armature Hub Retaining Ring			748-0450	2	748-0450	2
17	Retaining Ring	748-2044	1	748-0101	1	748-0101	1
18	Ball Bearing	166-0143	1	166-0150	1	166-0150	1
19	Bearing Hub	690-0276	1	690-0278	1	690-0278	1
20	Housing	535-0207	1	535-0207	1	535-0207	1
21	Plug	680-0037	1	680-0037	1	680-0037	1
22	Hub Mounting Screw	797-0077	4	797-1358	4	797-1358	4
23	Tie Bolt	825-0013	4	825-0013	4	825-0013	4
24	Key	590-0043	1	590-0084	1	590-0084	1
25	Shaft	798-0298	1	798-0301	1	798-0304	1
26	Key	590-0029	1	590-0029	1	590-0029	1
27	Ball Bearing	166-0143	1	166-0143	1	166-0143	1
28	Conduit Box (Optional)	5370-101-042	1	5370-101-042	1	5370-101-042	1
	Cover Kit (Optional)	5370-101-076	1	5370-101-076	1	5370-101-076	1
29	29-1 Cover	258-1227	2	258-1227	2	258-1227	2
	29-2 Screw	797-1562	4	797-1562	4	797-1562	4

Refer to service manual P-273-4-WE.
These units meet the standards of UL 508 and are listed under guide card #NMTR2, file #59164.

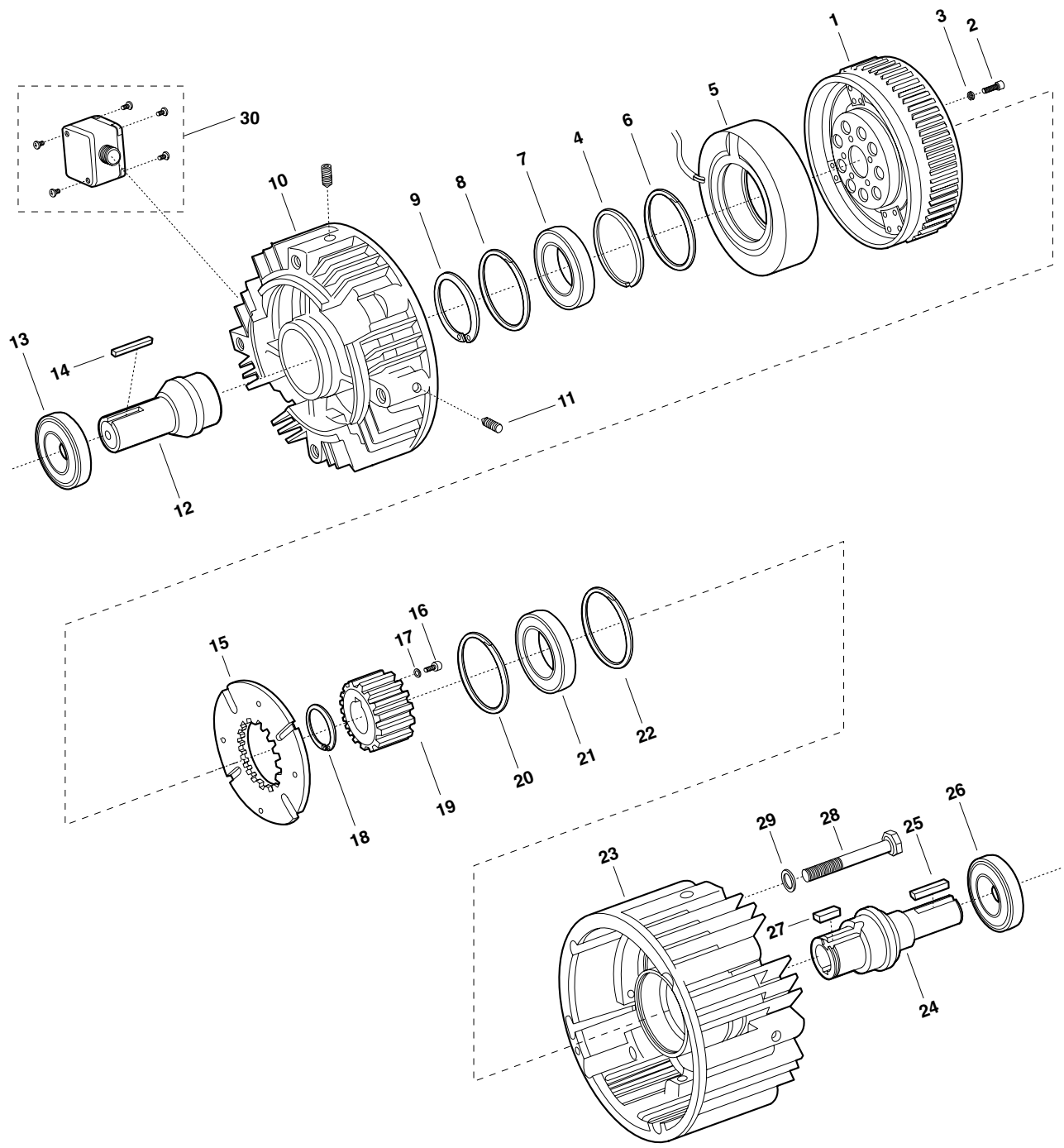


Service Parts

UM Series UniModule

UM-3040 Clutch Combination—Base Mounted

Sizes 210 and 215



Service Parts

UM-3040 Clutch Combination–Base Mounted Sizes 210 and 215

Component Parts

Item	Description	UM-210		UM-215	
		Part No.	Qty.	Part No.	Qty.
1	Rotor Assembly w/fan	5371-751-007	1	5371-751-007	1
2	Capscrew	797-0083	6	797-0083	6
3	Lockwasher	950-0372	6	950-0372	6
4	Spacer	807-0061	1	807-0061	1
5	Field (with housing UM-50-3040 only)		1		1
	6 volt	5371-451-002		5371-451-002	
	24 volt	5371-451-005		5371-451-005	
	90 volt	5371-451-003		5371-451-003	
6	Retaining Ring	748-0112	1	748-0112	1
7	Ball Bearing	166-0142	1	166-0142	1
8	Retaining Ring				
9	Retaining Ring				
10	Housing	535-0129	1	535-0129	1
11	Setscrew	797-0471	4	797-0471	4
12	Shaft	798-0123	1	798-0255	1
13	Bearing	166-0144	1	166-0144	1
14	Key	590-0019	1	590-0124	1
15	Armature Assembly	5371-111-005	1	5371-111-005	1
16	Capscrew	797-0081	6	797-0081	6
17	Lockwasher	950-0372	6	950-0372	6
18	Retaining Ring				
19	Hub	540-0741	1	540-0741	1
20	Retaining Ring	748-0112	1	748-0112	1
21	Ball Bearing	166-0142	1	166-0142	1
22	Retaining Ring				
23	Housing	535-0169	1	535-0169	1
24	Shaft	798-0051	1	798-0251	1
25	Key	590-0019	1	590-0124	1
26	Ball Bearing	166-0144	1	166-0144	1
27	Key				
28	Capscrew	797-1075	4	797-1075	4
29	Lockwasher	950-0032	4	950-0032	4
30	Conduit Box (Optional)	5370-101-042	1	5370-101-042	1

Refer to Service Manual P-0213-WE.

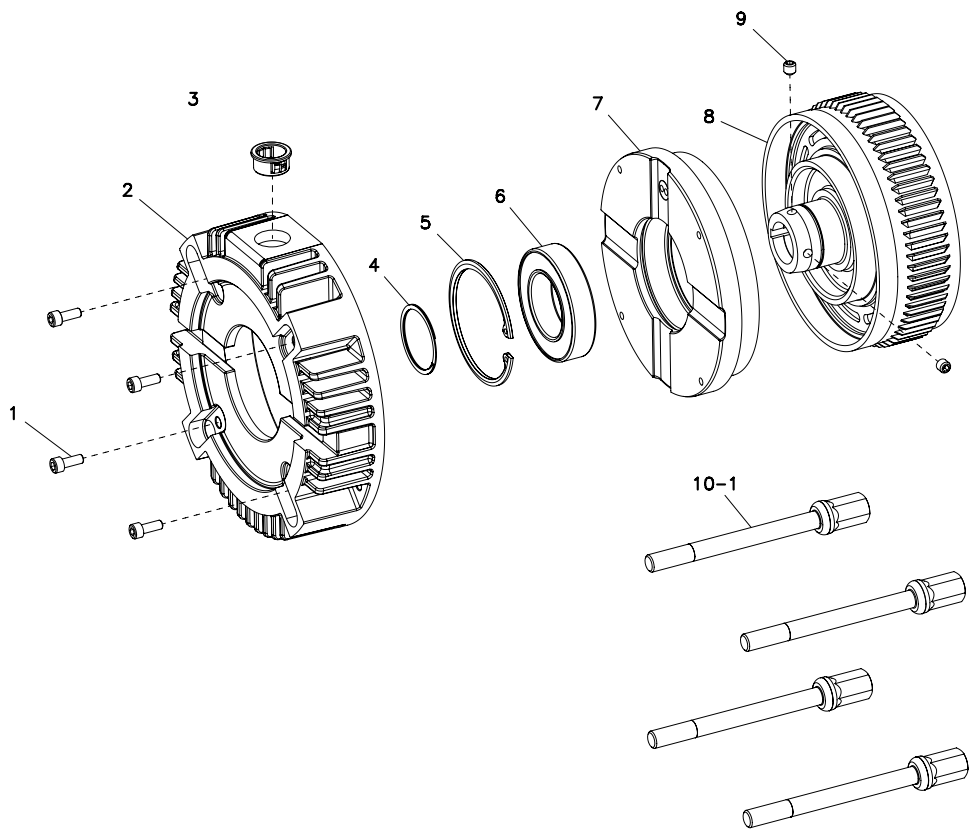
These units meet the standards of UL 508 and are listed under guide card #NMTR2, file #59164.



EM Series Electro Module

EM-10 Motor Clutch Module

Sizes 50, 100 and 180



Component Parts

Item	Description	EM-50		EM-100		EM-180	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1	Field Mounting Screw	797-1214	4	797-1214	4	797-1214	4
2	Housing	535-0204	1	535-0204	1	535-0204	1
3	Bushing	572-0522	1	572-0522	1	572-0522	1
4	Retaining Ring	748-0018	1	748-0018	1	748-0018	1
5	Retaining Ring	748-0561	1	748-0561	1	748-0561	1
6	Bearing	166-0150	1	166-0150	1	166-0150	1
7	Field Assembly		1		1		1
	6 Volt	5370-451-201		5370-451-206		5370-451-206	
	24 Volt	5370-451-203		5370-451-208		5370-451-208	
	90 Volt	5370-451-204		5370-451-209		5370-451-209	
8	Rotor Assembly	5370-751-019	1	5370-751-049	1	5370-751-051	1
9	Set Screw	797-1098	2	797-0069	2	797-0069	2
10	Mounting Accessory	5370-101-075	1	5370-101-075	1	5370-101-075	1
	10-1 Tie Bolt	825-0014	4	825-0014	4	825-0014	4

Refer to Service Manual P-273-5-WE.
These units meet the standards of UL 508 and are listed under guide card #NMTR2, file #59164.

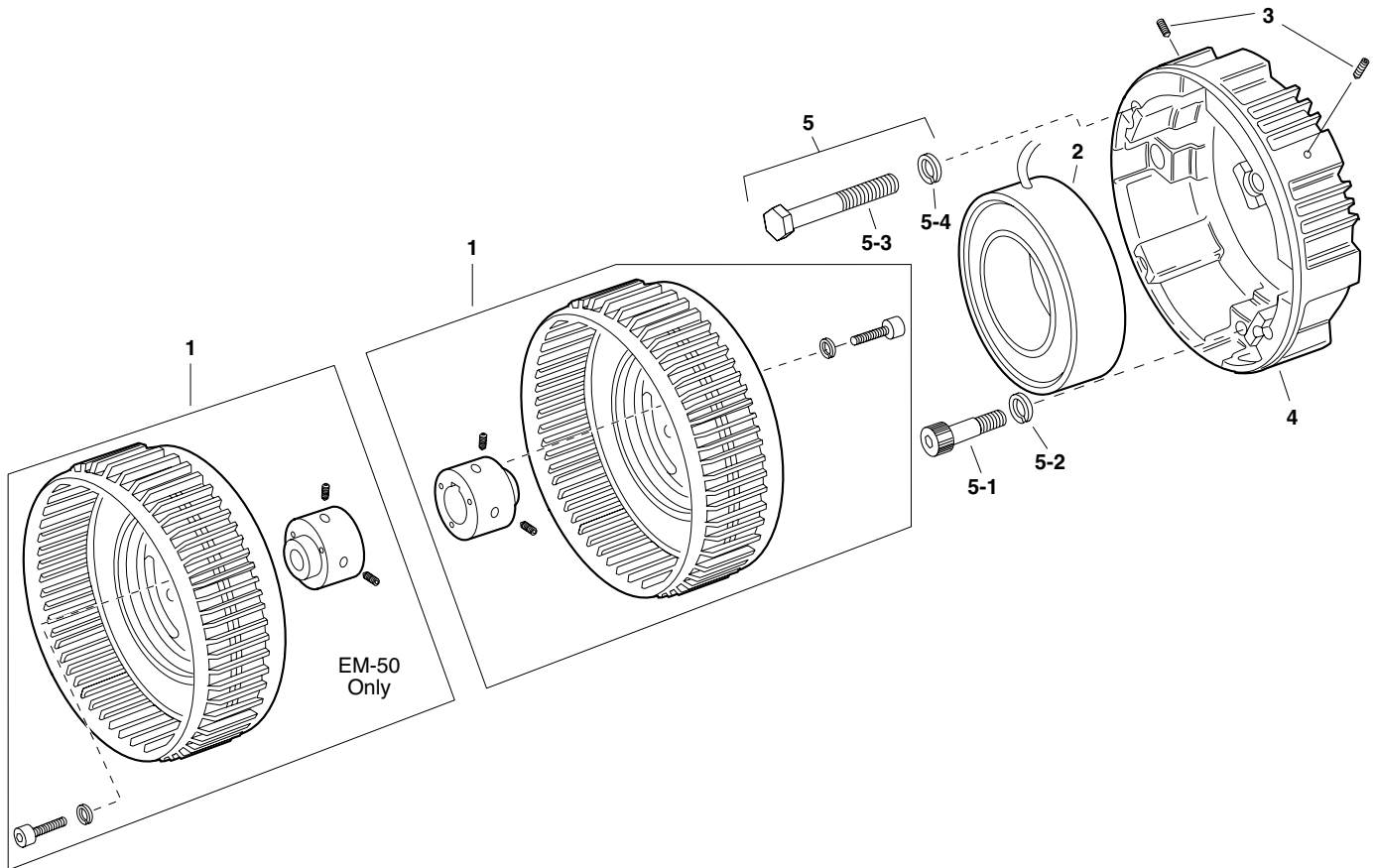


Service Parts

EM Series Electro Module

EM-10 Motor Clutch Module

Size 210



Component Parts

EM-210			
Item	Description	Part No.	Qty.
1*	Rotor Assembly w/fan & hub	5371-751-005	1
	Field		1
2	6 volt	5371-451-010	
	24 volt	5371-451-013	
	90 volt	5371-451-011	
3	Setscrew	797-0471	4
4	Adapter	104-0096	1
	Mounting Accessory	5371-101-008	1
5	5-1 Capscrew	797-1078	4
	5-2 Lockwasher	950-0101	4
	5-3 Capscrew	797-1075	4
	5-4 Lockwasher	950-0032	4

*Shipped Assembled
Refer to Service Manual P-0213-WE.
These units meet the standards of UL 508 and are listed under guide card #NMTR2, file #59164.

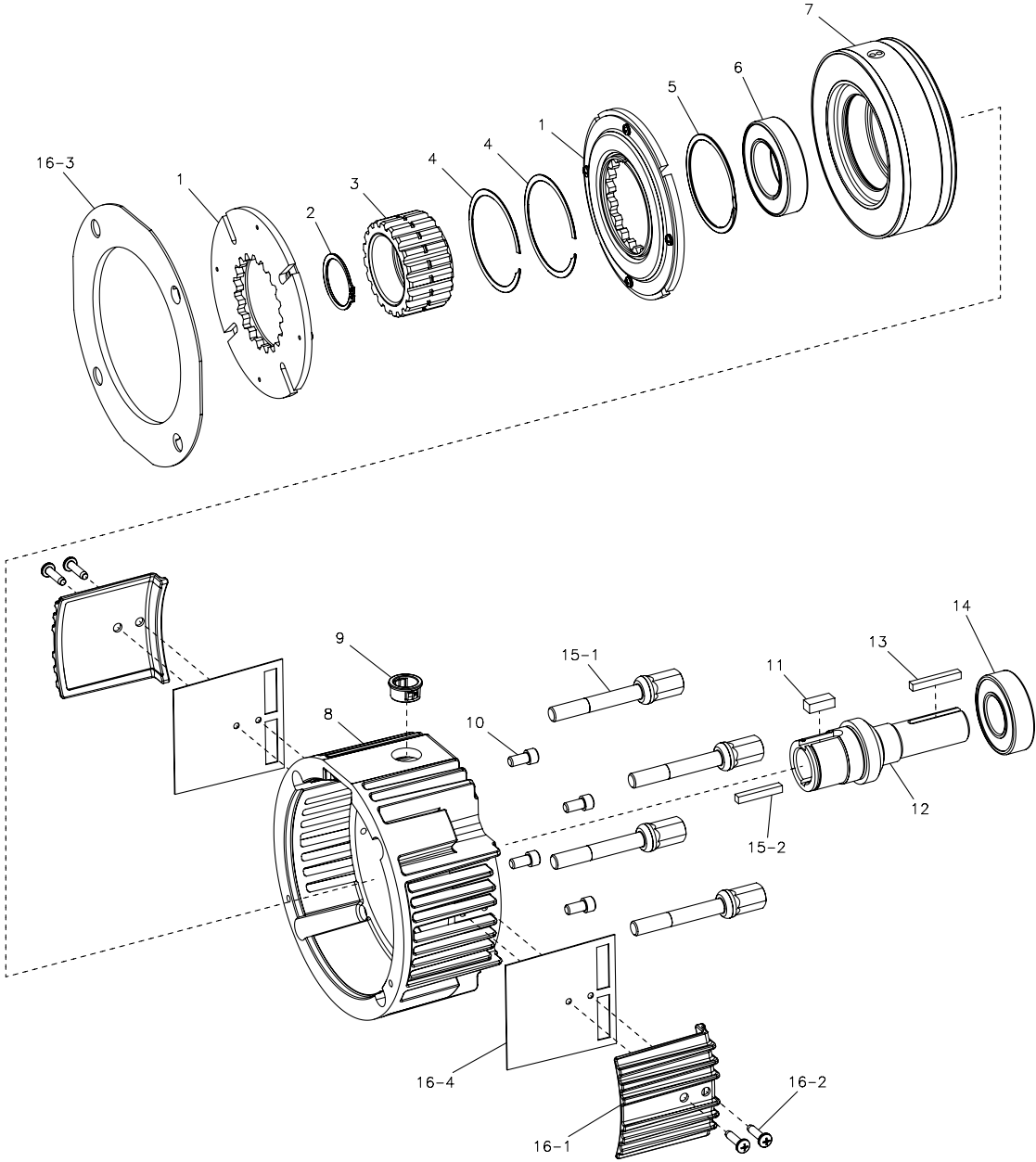


Service Parts

EM Series Electro Module

EM-20 Brake Module

Sizes 50, 100 and 180



Service Parts

EM-20 Brake Module

Sizes 50, 100 and 180

Component Parts

Item	Description	EM-50		EM-100		EM-180	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1	Armature Assembly	5370-111-022	2	5370-111-013	2	5370-111-013	2
2	Retaining Ring	748-0445	1	748-0676	1	748-0676	1
3	Armature Hub	540-1638	1	540-2038	1	540-2038	1
4	Armature Hub Retaining Ring			748-0450	2	748-0450	2
5	Retaining Ring	748-2044	1	748-0101	1	748-0101	1
6	Ball Bearing	166-0143	1	166-0150	1	166-0150	1
	Magnet Assembly		1		1		1
7	6 Volt	5370-631-201		5370-631-216		5370-631-216	
	24 Volt	5370-631-203		5370-631-218		5370-631-218	
	90 Volt	5370-631-204		5370-631-219		5370-631-219	
8	Housing	535-0206	1	535-0206	1	535-0206	1
9	Bushing	572-0522	1	572-0522	1	572-0522	1
10	Magnet Mounting Screw	797-0077	4	797-1358	4	797-1358	4
11	Key	590-0043	1	590-0084	1	590-0084	1
12	Shaft	798-0299	1	798-0302	1	798-0305	1
13	Key	590-0029	1	590-0029	1	590-0029	1
14	Ball Bearing	166-0143	1	166-0143	1	166-0143	1
	Mounting Accessory	5370-101-077	1	5370-101-077	1	5370-101-077	1
15	15-1 Tie Bolt	825-0013	4	825-0013	4	825-0013	4
	15-2 Key	590-0142	1	590-0142	1	590-0142	1
	Cover Kit (Optional, for brake only)	5370-101-082	1	5370-101-082	1	5370-101-082	1
16a	16-1 Vent Cover	258-1227	2	258-1227	2	258-1227	2
	16-2 Screw	797-1562	4	797-1562	4	797-1562	4
	16-3 Cover Plate	287-0135	1	287-0135	1	287-0135	1
	16-4 Gasket	495-0042	2	495-0042	2	495-0042	2
	Cover Kit (Optional, for clutch/brake combination)	5370-101-076	1	5370-101-076	1	5370-101-076	1
16b	16-1 Vent Cover	258-1227	2	258-1227	2	258-1227	2
	16-2 Screw	797-1562	4	797-1562	4	797-1562	4
	16-4 Gasket	495-0042	2	495-0042	2	495-0042	2

Refer to service manual P-273-5-WE.

These units meet the standards of UL 508 and are listed under guide card #NMTR2, file #59164.

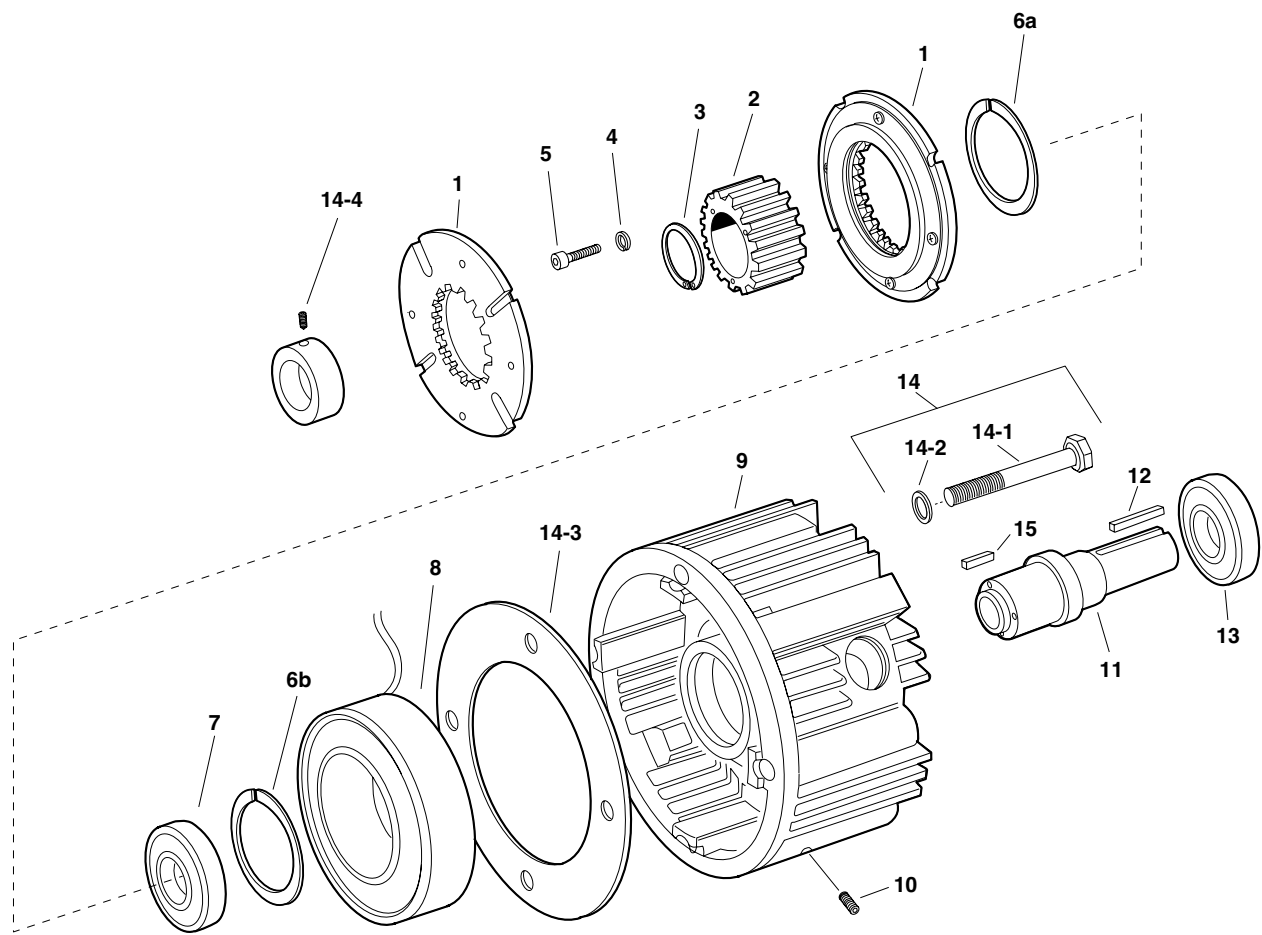


Service Parts

EM Series Electro Module

EM-20 Brake Module

Sizes 210 and 215



Service Parts

Component Parts

Item	Description	EM-210		EM-215	
		Part No.	Qty.	Part No.	Qty.
1	Armature	5371-111-005	2	5371-111-005	1
2	Armature Hub	540-2053	1	540-2039	1
3	Retaining Ring				
4	Lockwasher	950-0372	6	950-0372	6
5	Capscrew	797-0081	6	797-008	6
6a	Retaining Ring	748-0112	1	748-0112	1
6b	Retaining Ring			748-2002	1
7	Ball Bearing	166-0142	1	166-0142	1
	Magnet		1		
8	6 Volt	5371-631-002			
	24 Volt	5371-631-005		5371-631-005	1
	90 Volt	5371-631-003		5371-631-003	1
9	Housing	535-0033	1	535-0033	1
10	Setscrew	797-0103	4	797-0103	4
11	Shaft	798-0050	1	798-0268	1
12	Key - Output	590-0019	1	590-0124	1
13	Ball Bearing	166-0144	1	166-0144	1
	Mounting Accessory	5371-101-007	1	5371-101-007	1
14	14-1 Capscrew	797-1081	4	797-1081	4
	14-2 Washer	950-0033	4	950-0033	4
	14-3 Spacer				
	14-4 Collar	266-0003	1	266-0003	1
15	Key				
	Key Accessory - Input	5371-101-043	1	5371-101-044	1

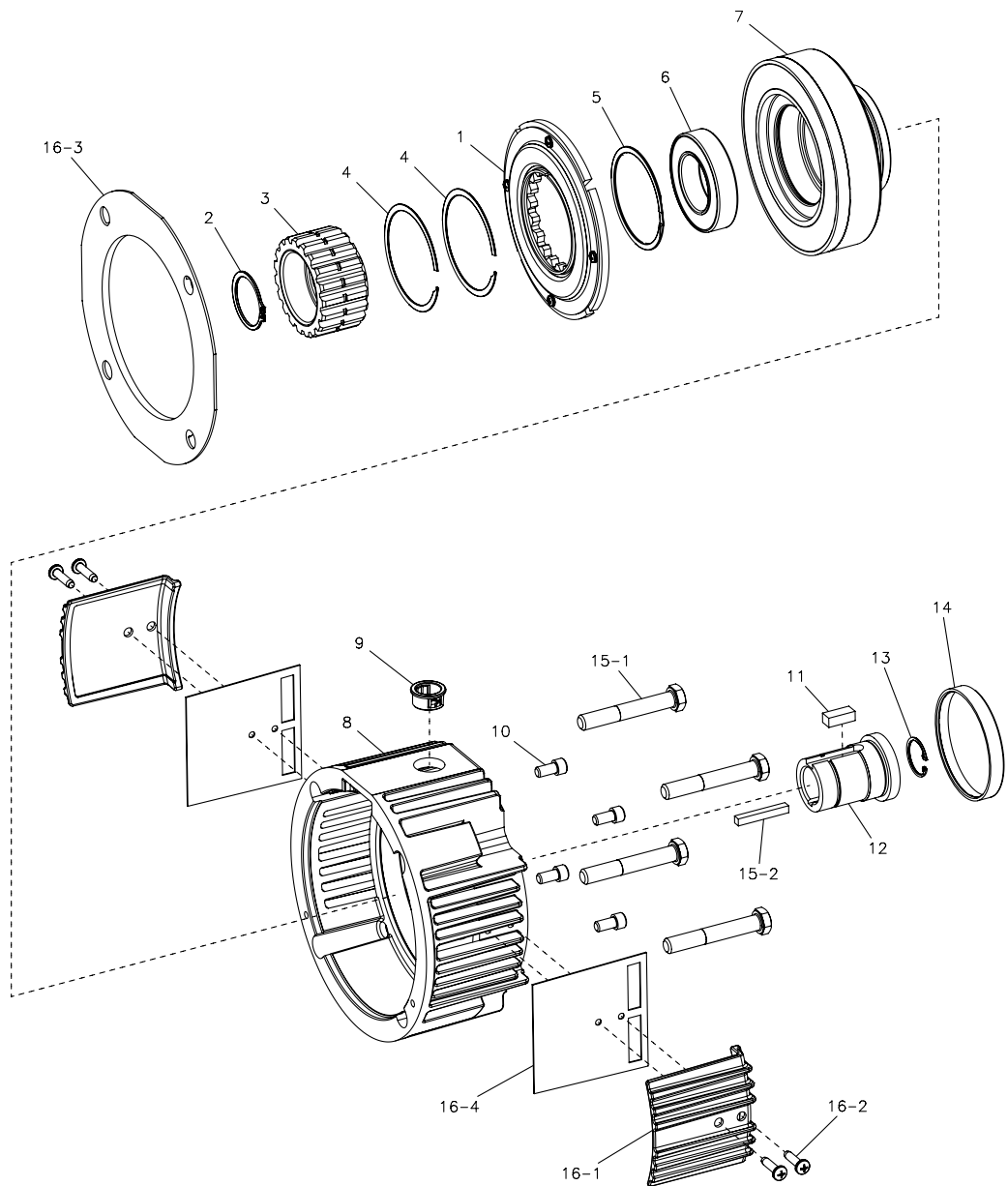
Refer to Service Manual P-0213-WE.
These units meet the standards of UL 508 and are listed under guide card #NMTR2, file #59164.



EM Series Electro Module

EM-20MB Motor Brake Module

Sizes 50 and 180



Service Parts

EM Series Electro Module

EM-20MB Motor Brake Module

Sizes 50 and 180

Component Parts

Item	Description	EM-50		EM-180	
		Part No.	Qty.	Part No.	Qty.
1	Armature Assembly	5370-111-022	1	5370-111-013	1
2	Retaining Ring	748-0445	1	748-0676	1
3	Armature Hub	540-1638	1	540-2038	1
4	Armature Hub Retaining Ring			748-0450	2
5	Retaining Ring	748-2044	1	748-0101	1
6	Ball Bearing	166-0143	1	166-0150	1
7	Magnet Assembly		1		1
	6 Volt	5370-631-201		5370-631-216	
	24 Volt	5370-631-203		5370-631-218	
	90 Volt	5370-631-204		5370-631-219	
8	Housing	535-0206	1	535-0206	1
9	Bushing	572-0522	1	572-0522	1
10	Magnet Mounting Screw	797-0077	4	797-1358	4
11	Key	590-0043	1	590-0084	1
12	Hub	540-2076	1	540-2078	1
13	Retaining Ring	748-0556	1	748-0555	1
14	Cap	248-1004	1	248-1004	1
15	Mounting Accessory	5370-101-081	1	5370-101-081	1
	15-1 Tie Bolt	797-1563	4	797-1563	4
	15-2 Key	590-0029	1	590-0029	1
16	Cover Kit (Optional)	5370-101-082	1	5370-101-082	1
	16-1 Vent Cover	258-1227	2	258-1227	2
	16-2 Screw	797-1562	4	797-1562	4
	16-3 Cover Plate	287-0135	1	287-0135	1
	16-4 Gasket	495-0042	2	495-0042	2

Refer to service manual P-273-5-WE.

These units meet the standards of UL 508 and are listed under guide card #NMTR2, file #59164.

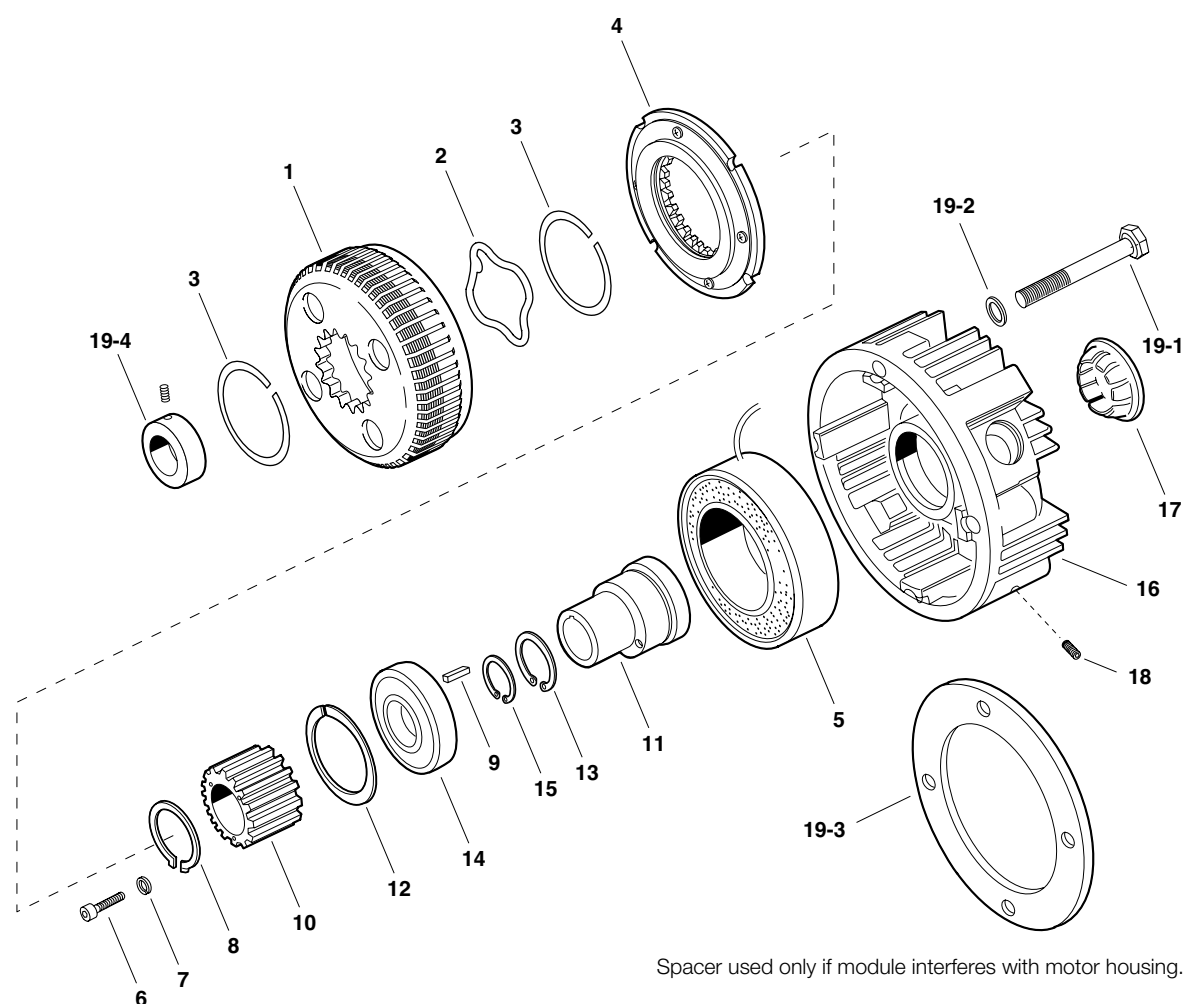


Service Parts

EM Series Electro Module

20MB Motor Brake Module

Size 210



Spacer used only if module interferes with motor housing.

Service Parts

Component Parts

EM-210			
Item	Description	Part No.	Qty.
1	Fan Assembly	748-1052	1
2	Follow-up Spring	808-0109	1
3	Retaining Ring	748-0455	2
4	Armature	5371-111-005	1
	Magnet		1
5	6 Volt	5371-631-002	
	24 Volt	5371-631-005	
	90 Volt	5371-631-003	
6	Capscrew	797-0081	6
7	Lockwasher	950-0372	6
8	Retaining Ring		
9	Key		
10	Splined Hub	540-2041	1
11	Hub	540-1020	1
12	Retaining Ring	748-0112	1
13	Retaining Ring		
14	Bearing	166-0142	1
15	Retaining Ring	748-0554	1
16	Housing	535-0050	1
17	Plug	680-0027	1
18	Setscrew	797-0103	4
	Mounting Accessory	5371-101-007	1
19	19-1 Capscrew	797-1081	4
	19-2 Lockwasher	950-0033	4
	19-3 Spacer		
	19-4 Collar	266-0003	1
	Key Accessory - Input	5371-101-043	1

Refer to service manual P-273-5-WE.

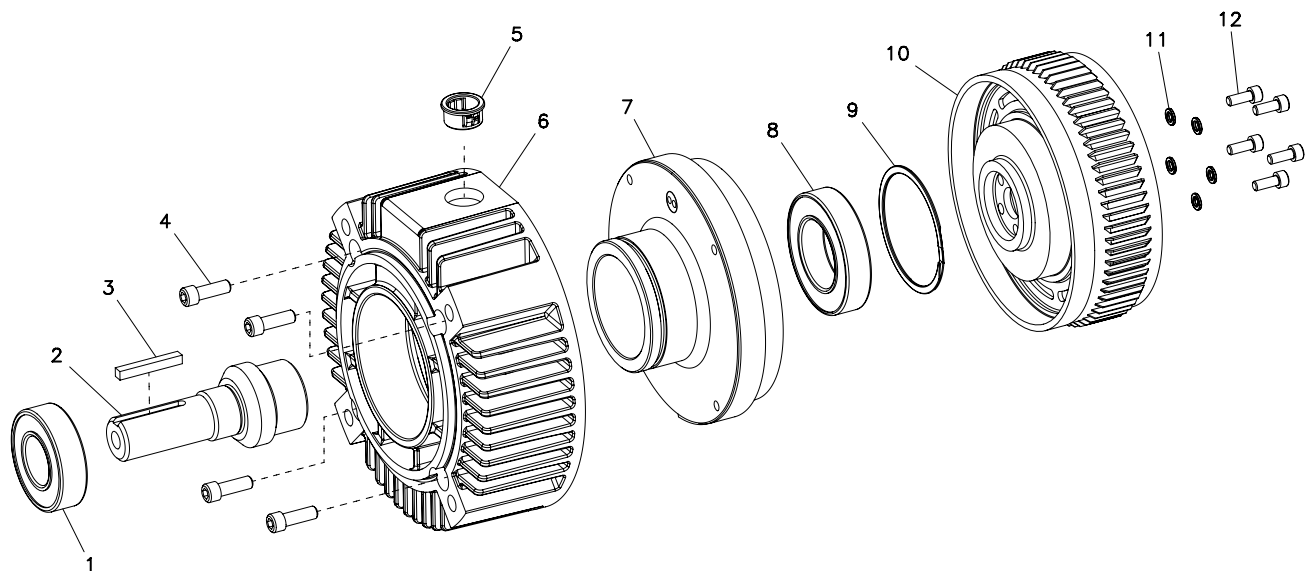
These units meet the standards of UL 508 and are listed under guide card #NMTR2, file #59164.



EM Series Electro Module

30 Motor Clutch Module

Sizes 50, 100 and 180



Component Parts

Item	Description	EM-50		EM-100		EM-180	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1	Ball Bearing	166-0143	1	166-0143	1	166-0143	1
2	Shaft	798-0300	1	798-0303	1	798-0306	1
3	Key	590-0029	1	590-0029	1	590-0029	1
4	Field Mounting Screw	797-0077	4	797-0077	4	797-0077	4
5	Bushing	572-0522	1	572-0522	1	572-0522	1
6	Housing	535-0205	1	535-0205	1	535-0205	1
7	Field Assembly		1		1		1
	6 Volt	5370-451-211		5370-451-216		5370-451-216	
	24 Volt	5370-451-213		5370-451-218		5370-451-218	
	90 Volt	5370-451-214		5370-451-219		5370-451-219	
8	Ball Bearing	166-0143	1	166-0150	1	166-0150	1
9	Retaining Ring	748-2044	1	748-0101	1	748-0101	1
10	Rotor Assembly	5370-751-006	1	5370-751-053	1	5370-751-053	1
11	Washer	950-0436	4	950-0436	5	950-0436	5
12	Screw	797-1294	4	797-1214	5	797-1214	5

Refer to service manual P-273-5-WE.
These units meet the standards of UL 508 and are listed under guide card #NMTR2, file #59164.

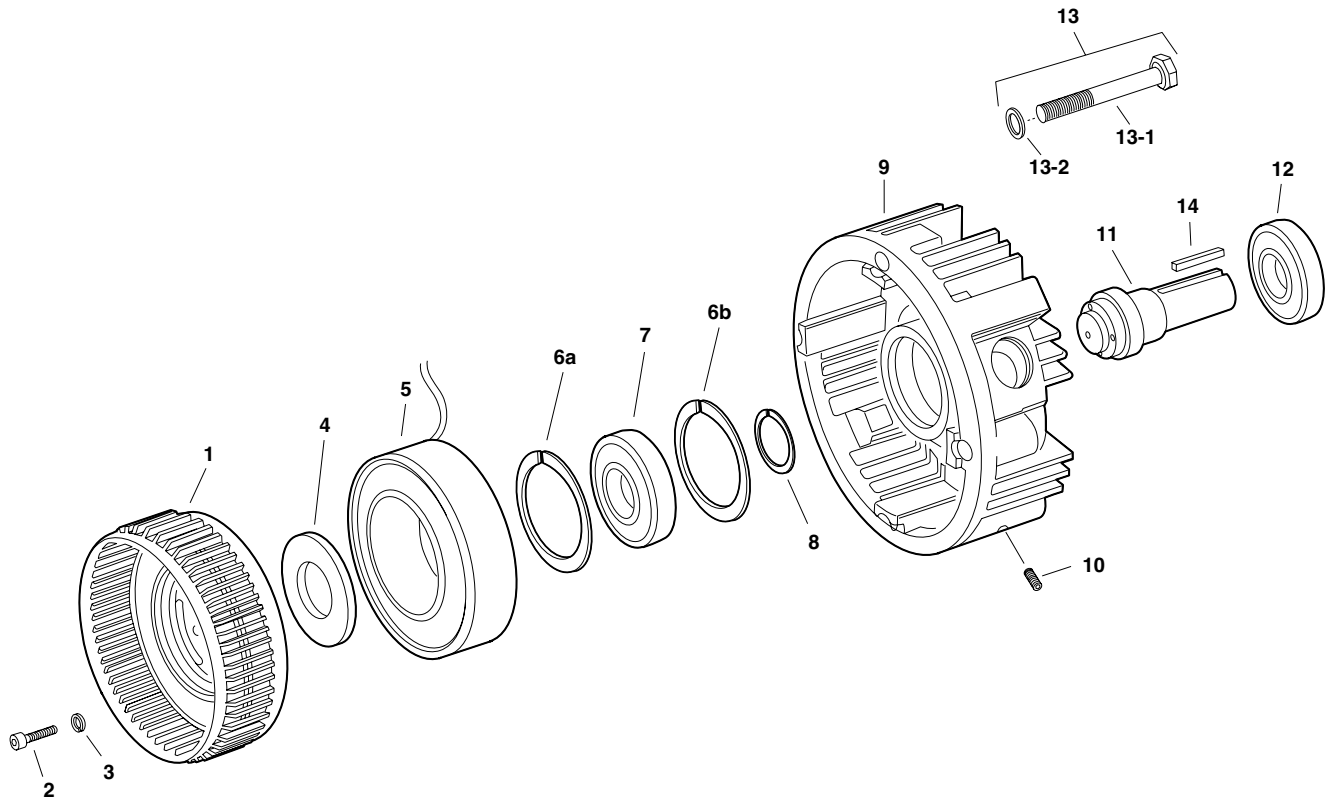


Service Parts

EM Series Electro Module

30 Motor Clutch Module

Size 210



Component Parts

EM-210			
Item	Description	Part No.	Qty.
1	Rotor Assembly w/fan	5371-751-007	1
2	Capscrew	797-0083	6
3	Lockwasher	950-0372	6
4	Spacer	807-0061	1
5	Field (with housing EM-50-30 only)		1
	6 volt	5371-451-002	
	24 volt	5371-451-005	
	90 volt	5371-451-003	
6a	Retaining Ring	748-0112	1
6b	Retaining Ring		
7	Ball Bearing	166-0142	1
8	Retaining Ring		
9	Housing	535-0129	1
10	Setscrew	797-0471	4
11	Shaft	798-0123	1
12	Ball Bearing	166-0144	1
	Mounting Accessory	5371-101-010	1
13	13-1 Capscrew	797-1075	4
	13-2 Lockwasher	950-0032	4
14	Key	590-0019	1

Refer to service manual P-273-5-WE.
These units meet the standards of UL 508 and are listed under guide card #NMTR2, file #59164.

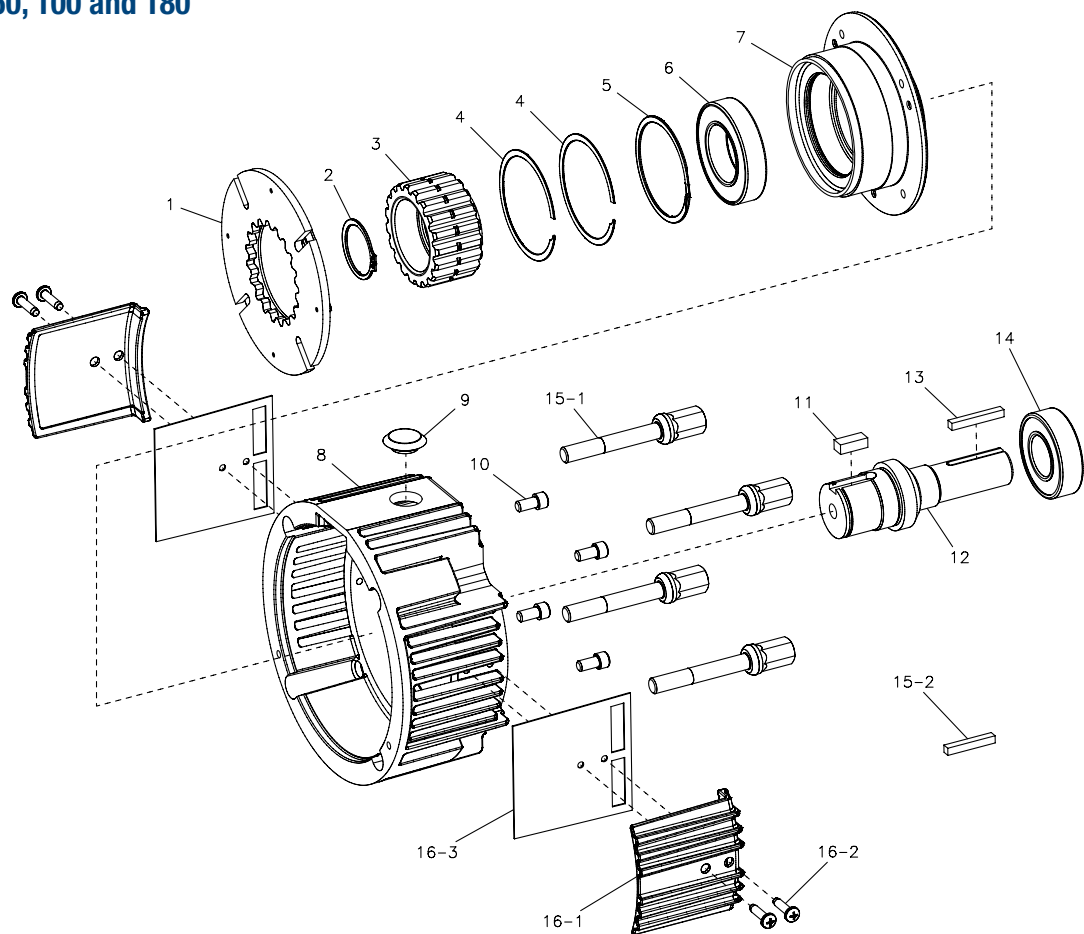


Service Parts

EM Series Electro Module

40 Output Clutch Module

Sizes 50, 100 and 180



Component Parts

Item	Description	EM-50		EM-100		EM-180	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1	Armature Assembly	5370-111-022	1	5370-111-013	1	5370-111-013	1
2	Retaining Ring	748-0445	1	748-0676	1	748-0676	1
3	Armature Hub	540-1638	1	540-2038	1	540-2038	1
4	Armature Hub Retaining Ring			748-0450	2	748-0450	2
5	Retaining Ring	748-2044	1	748-0101	1	748-0101	1
6	Ball Bearing	166-0143	1	166-0150	1	166-0150	1
7	Bearing Hub	690-0276	1	690-0278	1	690-0278	1
8	Housing	535-0207	1	535-0207	1	535-0207	1
9	Plug	680-0037	1	680-0037	1	680-0037	1
10	Hub Mounting Screw	797-0077	4	797-1358	4	797-1358	4
11	Key	590-0043	1	590-0084	1	590-0084	1
12	Shaft	798-0298	1	798-0301	1	798-0304	1
13	Key	590-0029	1	590-0029	1	590-0029	1
14	Ball Bearing	166-0143	1	166-0143	1	166-0143	1
15	Mounting Accessory	5370-101-077	1	5370-101-077	1	5370-101-077	1
	15-1 Tie Bolt	825-0013	4	825-0013	4	825-0013	4
	15-2 Key	590-0142	1	590-0142	1	590-0142	1
16	Cover Kit (Optional)	5370-101-076	1	5370-101-076	1	5370-101-076	1
	16-1 Cover	258-1227	2	258-1227	2	258-1227	2
	16-2 Screw	797-1562	4	797-1562	4	797-1562	4
	16-3 Gasket	495-0042	2	495-0042	2	495-0042	2

Refer to service manual P-273-5-WE.
These units meet the standards of UL 508 and are listed under guide card #NMTR2, file #59164.

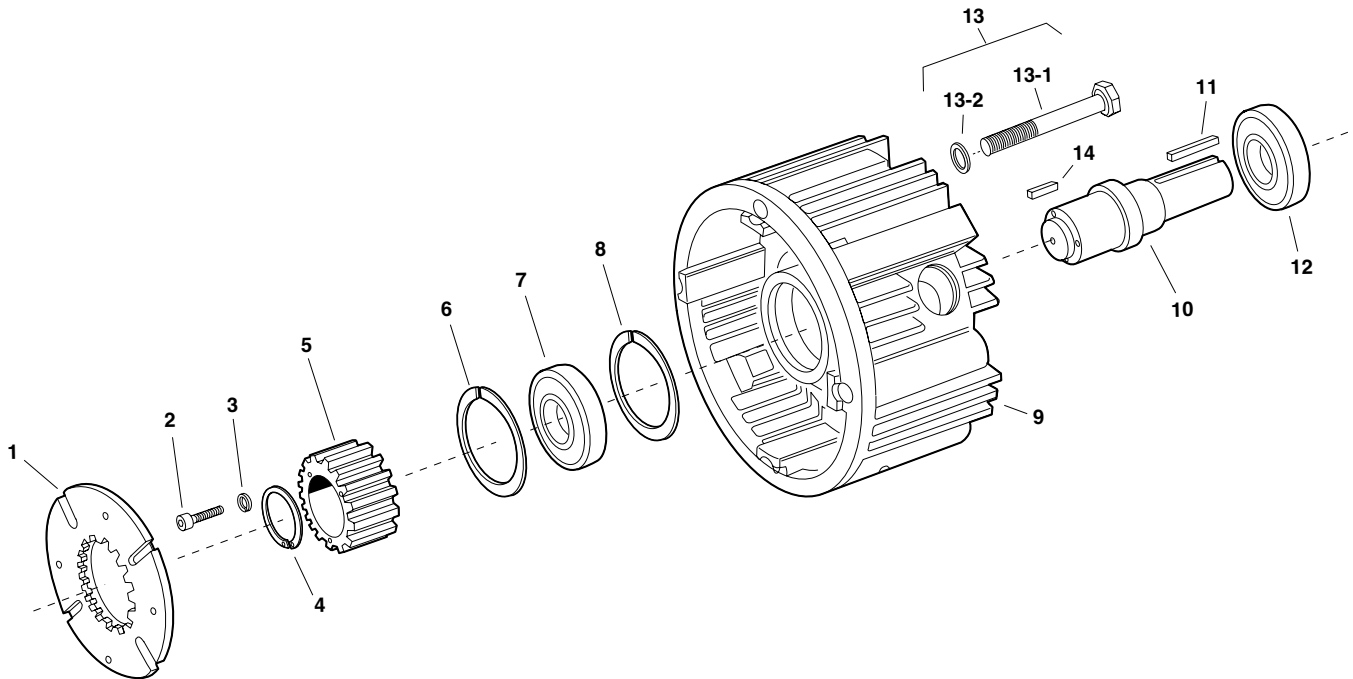


Service Parts

EM Series Electro Module

40 Output Clutch Module

Size 210



Component Parts

EM-210			
Item	Description	Part No.	Qty.
1	Armature	5371-111-005	1
2	Capscrew	797-0081	1
3	Lockwasher	950-0372	6
4	Retaining Ring		
5	Hub	540-2053	1
6	Retaining Ring	748-0112	1
7	Ball Bearing	166-0142	1
8	Retaining Ring		
9	Housing	535-0034	1
10	Shaft	798-0051	1
11	Key	590-0019	1
12	Ball Bearing	166-0144	1
Mounting Accessory			
13	13-1 Capscrew		
	13-2 Lockwasher		
14	Key		
	Key Accessory - Input	5371-101-043	1

Refer to service manual P-273-5-WE.

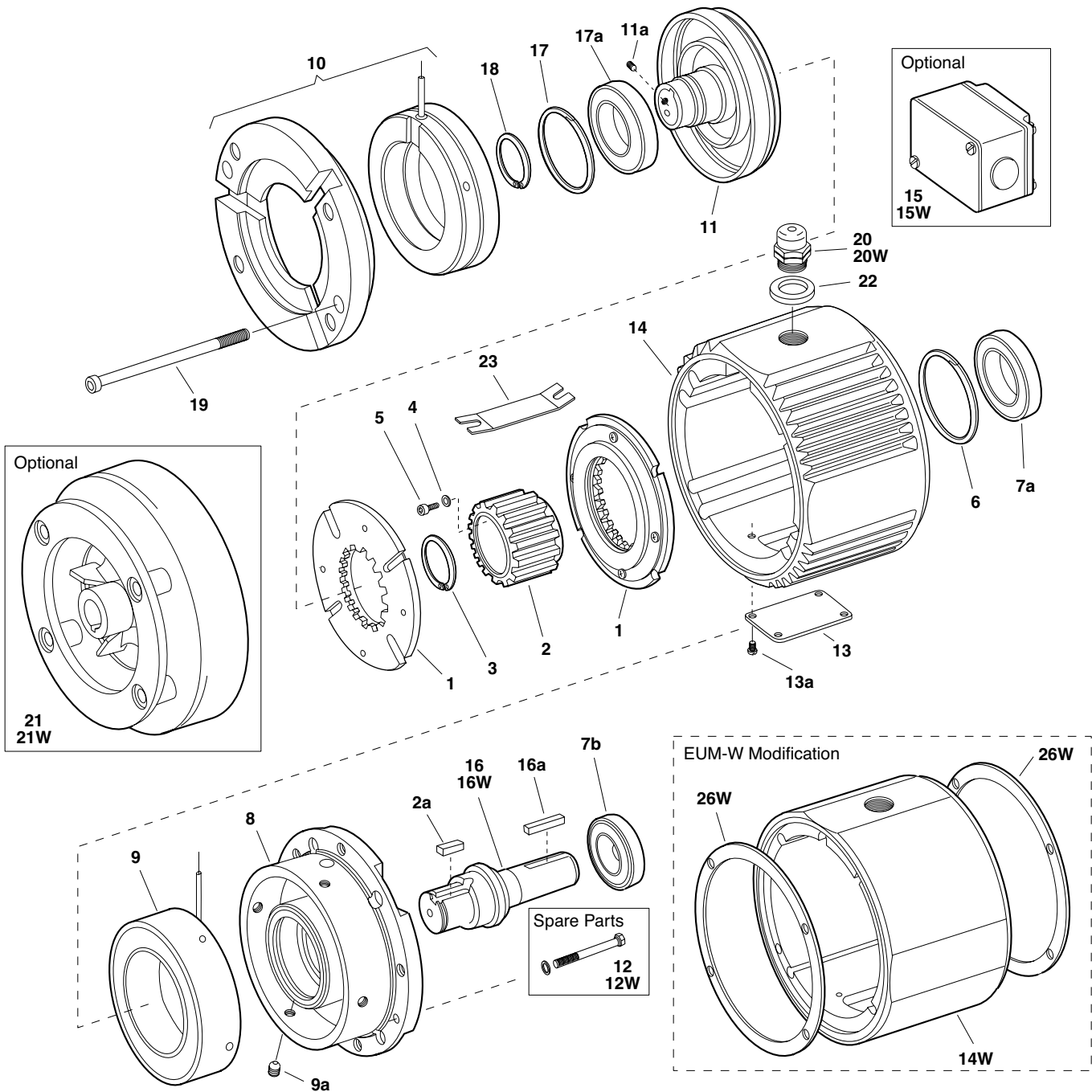
These units meet the standards of UL 508 and are listed under guide card #NMTR2, file #59164.



Service Parts

EUM/EUM-W Series Electro Module

EUM-1020 Clutch/Brake Combination EUM-W-1020 Clutch/Brake Combination Sizes 50, 100, 180, 210 and 215



Service Parts

EUM/EUM-W Series Electro Module

EUM-1020 Clutch/Brake Combination EUM-W-1020 Clutch/Brake Combination Sizes 50, 100, 180, 210 and 215

Component Parts

Item	Description	EUM-50		EUM-100		EUM-180		EUM-210		EUM-215	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1	Armature Assembly	5370-111-011	2	5370-111-013	2	5370-111-013	2	5371-111-005	2	5371-111-005	2
2	Armature Hub	540-1638	1	540-1642	1	540-1642	1	540-2053	1	540-2053	1
2a	Key	590-0043	1	590-0084	1	590-0084	1				
3	Retaining Ring	748-0445	1	748-0676	1	748-0676	1				
4	Lockwasher							950-0121	6	950-0121	6
5	Capscrew							797-0081	6	797-0081	6
6	Retaining Ring	748-0113	2	748-0101	1	748-0101	1	748-0112	1	748-0112	1
7a	Ball Bearing	166-0149	1	166-0101	1	166-0101	1	166-0142	1	166-0142	1
7b	Ball Bearing	166-0155	1	166-0143	1	166-0143	1	166-0144	1	166-0144	1
8	Endbell/Brake	456-1014	1	456-1019	1	456-1019	1	456-1017	1	456-1017	1
	Brake Magnet		1		1		1		1		1
9	6 volt	5370-631-037		5370-631-002		5370-631-002		5371-631-002		5371-631-002	
	24 volt	5370-631-038		5370-631-005		5370-631-005		5371-631-005		5371-631-005	
	90 volt	5370-631-036		5370-631-003		5370-631-003		5371-631-003		5371-631-003	
9a	Set Screws	797-0471	4	797-0471	4	797-0471	4	797-0471	4	797-0471	4
	Clutch Field/Endbell Assembly		1		1		1		1		1
10	6 volt	5370-451-077		5370-451-086		5370-451-086		5371-451-033		5371-451-033	
	24 volt	5370-451-078		5370-451-087		5370-451-087		5371-451-034		5371-451-034	
	90 volt	5370-451-076		5370-451-085		5370-451-085		5371-451-032		5371-451-032	
11	Rotor/Hub Assembly	5370-751-023	1	5370-751-035	1	5370-751-024	1	5371-751-014	1	5371-751-033	1
11a	Set Screws	797-1098	2	797-0069	2	797-0069	2	797-1098	2	797-1098	2
12	Mounting Accessory Kit							5371-101-024	1	5371-101-024	1
13	Cover Plate	686-1055	1	686-1055	1	686-1055	1	686-1055	1	686-1055	1
13a	Cover Plate Screws	797-0575	4	797-0575	4	797-0575	4	797-0575	4	797-0575	4
14	Center Housing							535-0177	1	535-0177	1
15	Conduit Box (optional)							5370-101-042	1	5370-101-042	1
16	Shaft							798-0051	1	798-0254	1
16a	Key	590-0029	1	590-0029	1	590-0029	1	590-0019	1	590-0124	1
17	Retaining Ring	748-0101	2	748-0101	1	748-0101	1	748-0558	1	748-0558	1
17a	Ball Bearing	166-0150	1	166-0300	1	166-0300	1	166-0168	1	166-0168	1
18	Retaining Ring	748-0018	1	748-0018	1	748-0018	1	748-0067	1	748-0067	1
19	Assembly Bolts	797-1433	2	797-1433	2	797-1433	2	797-1438	2	797-1438	2
20	Connector							280-0038	1	280-0038	1
21	Accessory Fan (optional)							5371-101-029	1	N/A	
22	Washer	950-0441	1	950-0441	1	950-0441	1	950-0441	1	950-0441	1
23	Insulator	572-0327	1	572-0327	1	572-0327	1	572-0327	1	572-0327	1
EUM-W Unique Parts											
12W	Washdown Mounting Kit	5370-101-052	1	5370-101-052	1	5370-101-052	1	5371-101-028	1	5371-101-028	1
14W	Center Housing for Washdown	535-0181	1	535-0181	1	535-0181	1	535-0182	1	535-0182	1
15W	Conduit Box Kit	5370-101-045	1	5370-101-045	1	5370-101-045	1	5370-101-045	1	5370-101-045	1
16W	Shaft	798-0263	1	798-0265	1	798-0262	1	798-0259	1	798-0267	1
20W	Conduit Connector	280-0058	1	280-0058	1	280-0058	1	280-0058	1	280-0058	1
21W	Fan Kit (optional)	5370-101-060	1	5370-101-060	1	5370-101-061	1	5371-101-033	1	N/A	
26W	Gasket/Seal Repair Kit	5370-101-058	1	5370-101-058	1	5370-101-058	1	5371-101-032	1	5371-101-032	1
	Key	5370-101-072	1	5370-101-072	1	5370-101-072	1	5371-101-043	1	5371-101-044	1

Refer to service manual P-273-5-WE.

These units meet the standards of UL 508 and are listed under guide card #NMTR2, file #59164.

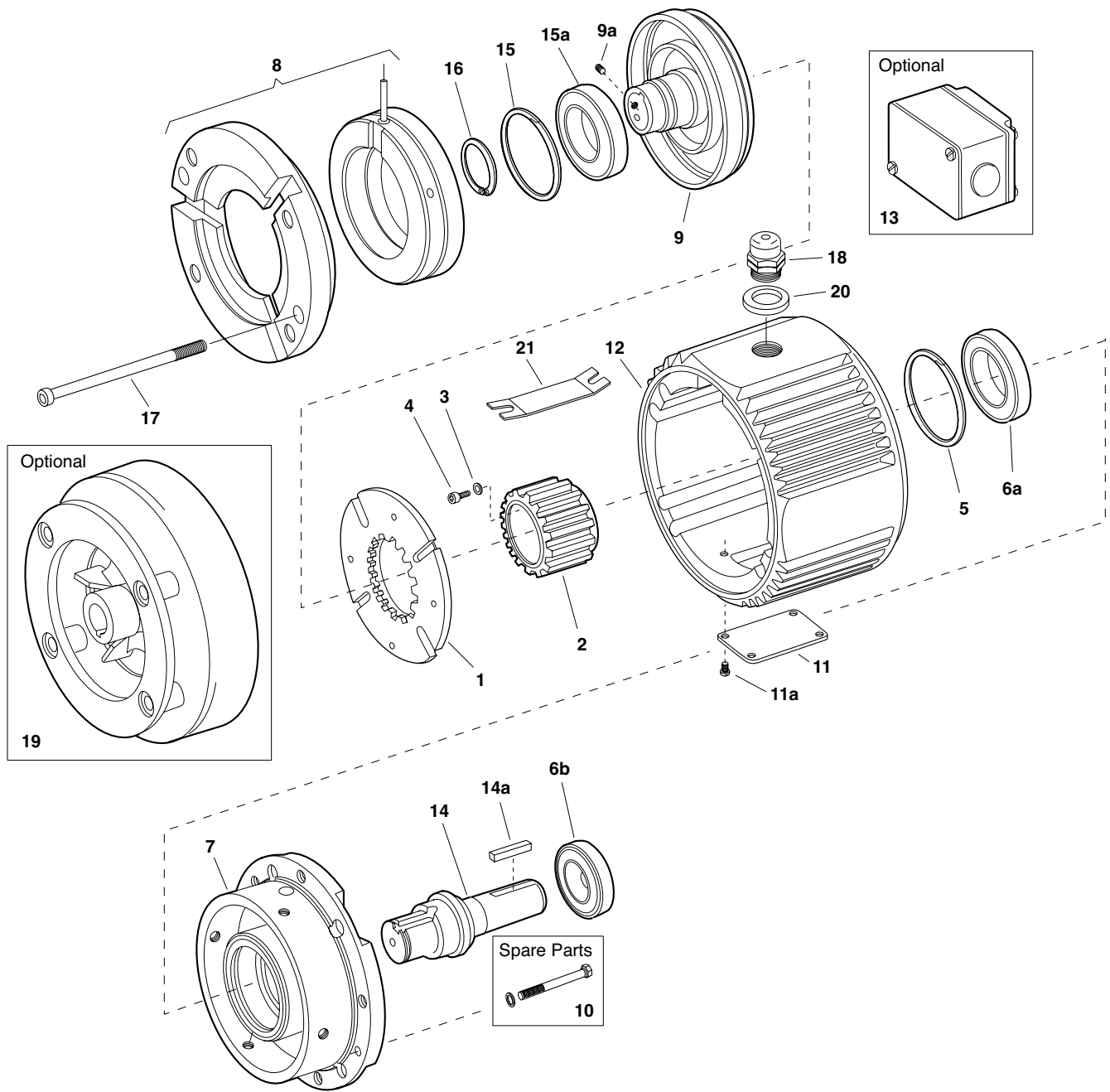


Service Parts

EUM Series Electro Module

EUM-1040 Clutch Combination

Size 210



Service Parts

EUM-1040 Clutch Combination Size 210

Component Parts

EUM-210			
Item	Description	Part No.	Qty.
1	Armature Assembly	5371-111-005	1
2	Armature Hub	540-2053	1
3	Lockwasher	950-0121	6
4	Capscrew	797-0081	6
5	Retaining Ring	748-0112	1
6a	Ball Bearing	166-0142	1
6b	Ball Bearing	166-0144	1
7	Endbell	456-1017	1
8	Clutch Field/Endbell Assembly 90 Volt	5371-451-032	1
9	Rotor/Hub Assembly	5371-751-014	1
9a	Set Screws	797-1098	2
10	Mounting Accessory Kit	5371-101-024	1
11	Cover Plate	686-1055	1
11a	Cover Plate Screws	797-0575	4
12	Center Housing	535-0177	1
13	Conduit Box (optional)	5370-101-042	1
14	Shaft	798-0051	1
14a	Key	590-0019	1
15	Retaining Ring	748-0558	1
15a	Ball Bearing	166-0168	1
16	Retaining Ring	748-0067	1
17	Assembly Bolts	797-1438	2
18	Connector	280-0038	1
19	Accessory Fan (optional)	5371-101-029	1
20	Washer	950-0441	1
21	Insulator	572-0327	1
	Key Accessory	5371-101-043	1

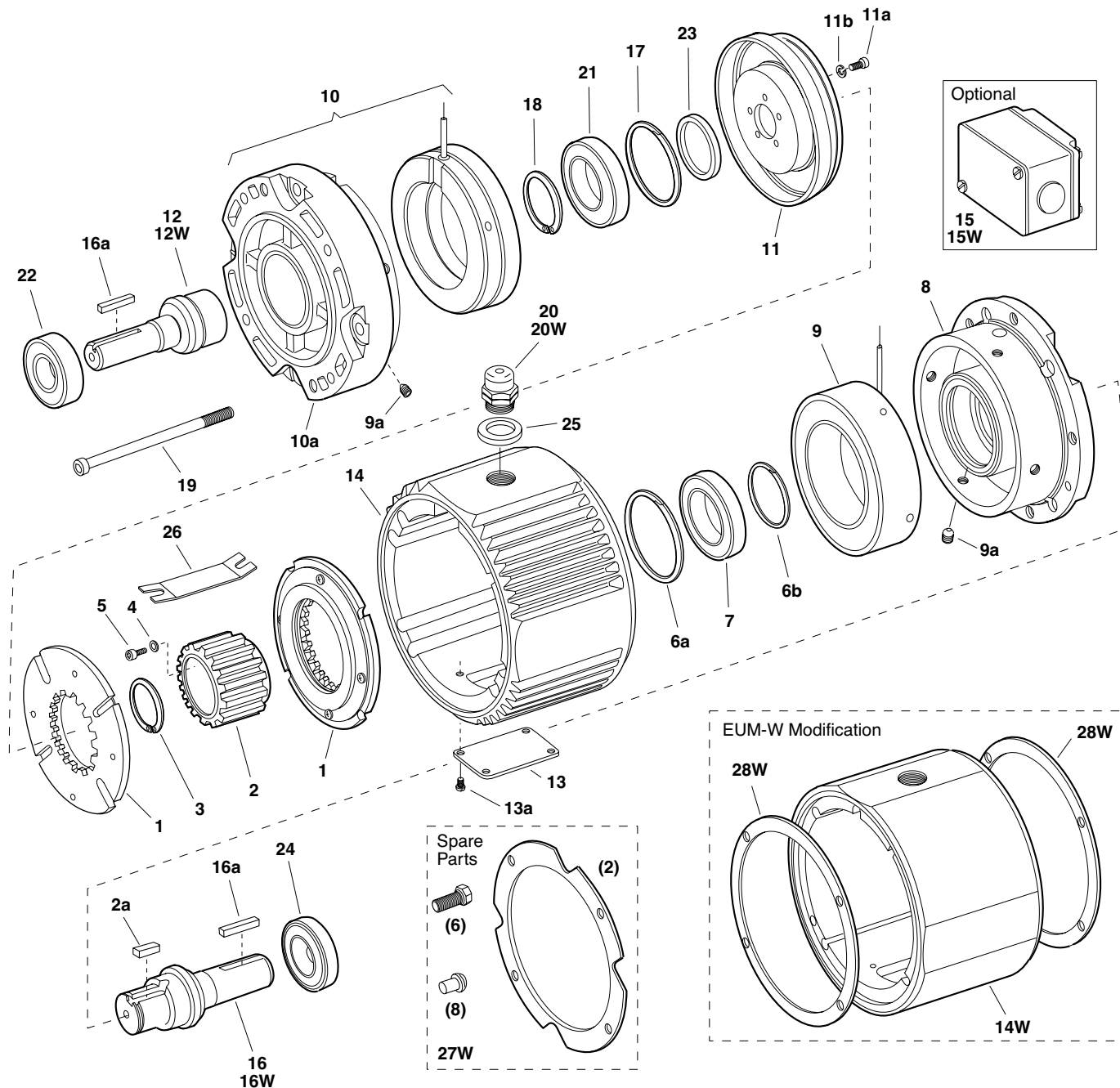
Refer to service manual P-273-5-WE.
These units meet the standards of UL 508 and are listed under guide card #NMTR2, file #59164.



Service Parts

EUM/EUM-W Series Electro Module

EUM-2030 Clutch/Brake Combination EUM-W-2030 Clutch/Brake Combination Sizes 50, 180 and 210



Service Parts

EUM/EUM-W Series Electro Module

EUM-2030 Clutch/Brake Combination EUM-W-2030 Clutch/Brake Combination Sizes 50, 180 and 210

Component Parts

Item	Description	EUM-50		EUM-180		EUM-210	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1	Armature Assembly	5370-111-011	2	5370-111-013	2	5371-111-005	2
2	Armature Hub	540-1638	1	540-1642	1	540-2053	1
2a	Key	590-0043	1	590-0084	1		
3	Retaining Ring	748-0445	1	748-0676	1		
4	Lockwasher					950-0121	6
5	Capscrew					797-0081	6
6a	Retaining Ring	748-0113	2	748-0101	1	748-0112	1
6b	Retaining Ring					748-2002	1
7	Ball Bearing	166-0149	1	166-0101	1	166-0142	1
8	Endbell/Brake	456-1014	1	456-1019	1	456-1017	1
	Brake Magnet		1		1		1
9	6 volt	5370-631-037		5370-631-002		5371-631-002	
	24 volt	5370-631-038		5370-631-005		5371-631-005	
	90 volt	5370-631-036		5370-631-003		5371-631-003	
9a	Set Screws	797-0471	4	797-0471	4	797-0471	8
	Field (with Endbell EUM-50 and EUM-180)		1		1		1
10	6 volt	5370-451-082		5370-451-090		5371-451-002	
	24 volt	5370-451-083		5370-451-091		5371-451-005	
	90 volt	5370-451-081		5370-451-089		5371-451-003	
10a	Endbell (EUM-210 only)					456-1018	1
11	Rotor	5370-751-033	1	5370-751-034	1	5371-751-006	1
11a	Screw	797-1294	4	797-1214	5	797-0081	6
11b	Washer	950-0102	4	950-0102	5	950-0121	6
12	Shaft/Clutch					798-0123	1
13	Cover Plate	686-1055	1	686-1055	1	686-1055	1
13a	Screws	797-0575	4	797-0575	4	797-0575	4
14	Center Housing					535-0177	1
15	Conduit Box (optional)					5370-101-042	1
16	Shaft/Brake					798-0051	1
16a	Key	590-0029	2	590-0029	2	590-0019	2
17	Retaining Ring	748-0113	2	748-0101	1	748-0112	1
18	Retaining Ring	748-0017	1			748-0202	1
19	Assembly Bolts	797-1477	2	797-1477	2	797-1476	2
20	Connector					280-0038	1
21	Bearing	166-0149	1	166-0101	1	166-0142	1
22	Bearing	166-0155	1	166-0143	1	166-0144	1
23	Spacer			807-0062	1	807-0061	1
24	Bearing	166-0155	1	166-0143	1	166-0144	1
25	Washer	950-0441	1	950-0441	1	950-0441	1
26	Insulator	572-0327	1	572-0327	1	572-0327	1
EUM-W Unique Parts							
12W	Shaft/Clutch	798-0264	1	798-0261	1	798-0260	1
14W	Center Housing for Washdown	535-0181	1	535-0181	1	535-0182	1
15W	Conduit Box Kit (optional)	5370-101-045	1	5370-101-045	1	5370-101-045	1
16W	Shaft/Brake	798-0263	1	798-0262	1	798-0259	1
20W	Conduit Connector	280-0058	1	280-0058	1	280-0058	1
27W	Washdown Mounting Kit	5370-101-051	1	5370-101-051	1	5371-101-027	1
28W	Gasket/Seal Repair Kit	5370-101-058	1	5370-101-058	1	5371-101-032	1

Refer to service manual P-273-5-WE.

These units meet the standards of UL 508 and are listed under guide card #NMTR2, file #59164.

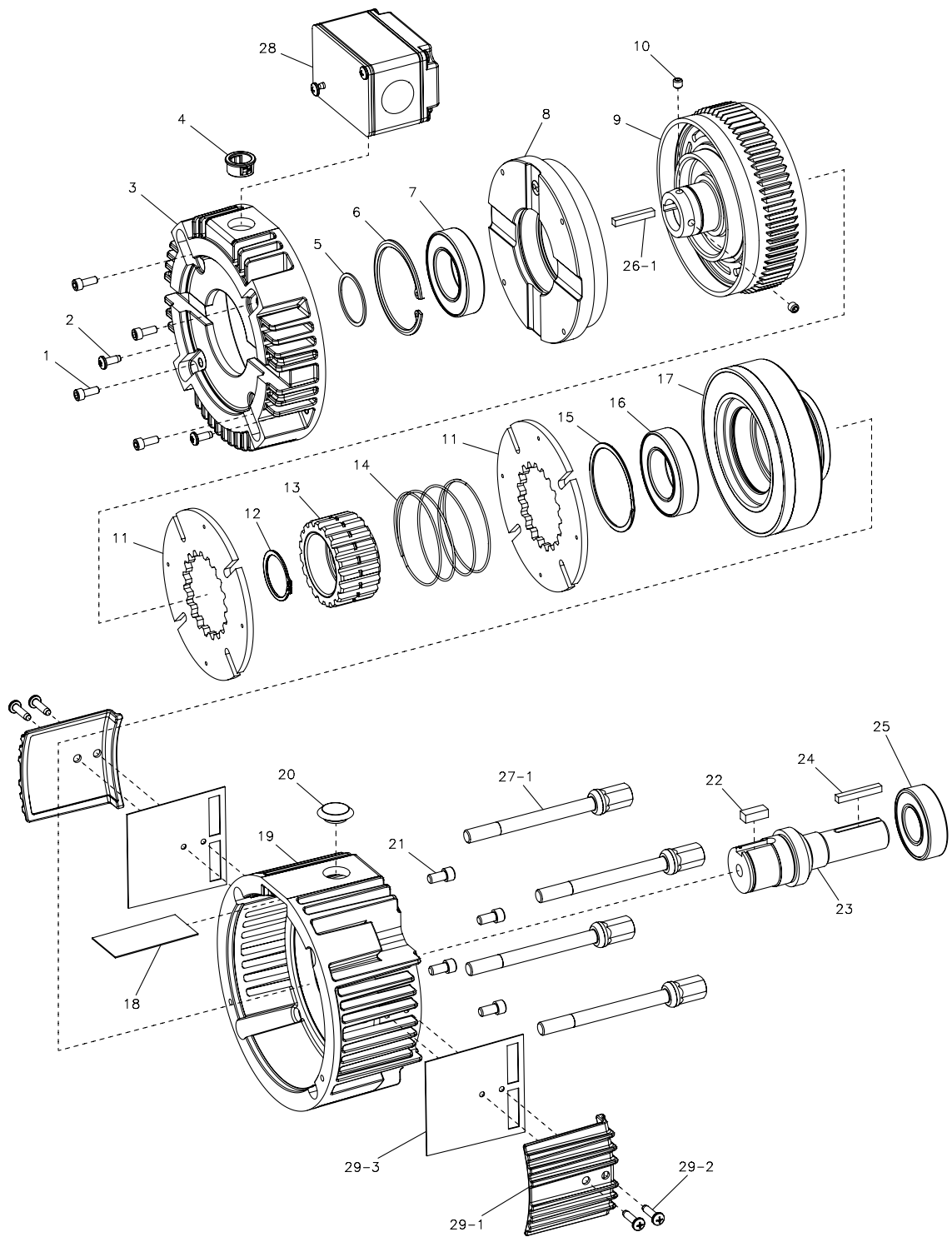


Service Parts

UM Series Smooth-Start UniModules

UM-1020-LK Clutch/Brake Combination

Sizes 50, 180 and 210



Service Parts

UM Series Smooth-Start UniModules

UM-1020-LK Clutch/Brake Combination

Sizes 50, 180 and 210

Component Parts

Item	Description	UM-50		UM-180		UM-210	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1	Field Mounting Screw	797-1214	4	797-1214	4	797-1214	4
2	Screw	797-1568	2	797-1568	2	797-1568	2
3	Housing	535-0204	1	535-0204	1	535-0204	1
4	Bushing	572-0522	1	572-0522	1	572-0522	1
5	Retaining Ring	748-0018	1	748-0018	1	748-0018	1
6	Retaining Ring	748-0561	1	748-0561	1	748-0561	1
7	Ball Bearing	166-0150	1	166-0150	1	166-0150	1
8	Field Assembly 90 Volt	5370-451-204	1	5370-451-209	1	5370-451-209	1
9	Rotor Assembly	5370-751-046	1	5370-751-050	1	5370-751-051	1
10	Set Screw	797-1098	2	797-0069	2	797-0069	2
11	Armature	110-0067	2	110-0075	2	110-0075	2
12	Retaining Ring	748-0445	1	748-0676	1	748-0676	1
13	Armature Hub	540-1638	1	540-2038	1	540-2038	1
14	Spring	808-0449	1	808-0450	1	808-0450	1
15	Retaining Ring	748-2044	1	748-0101	1	748-0101	1
16	Ball Bearing	166-0143	1	166-0150	1	166-0150	1
17	Magnet Assembly 90 Volt	5370-631-214	1	5370-631-229	1	5370-631-229	1
18	Insulator	572-1029	1	572-1029	1	572-1029	1
19	Housing	535-0206	1	535-0206	1	535-0206	1
20	Plug	680-0037	1	680-0037	1	680-0037	1
21	Magnet Mounting Screw	797-0077	4	797-1358	4	797-1358	4
22	Key	590-0043	1	590-0084	1	590-0084	1
23	Shaft	798-0298	1	798-0301	1	798-0304	1
24	Key	590-0029	1	590-0029	1	590-0029	1
25	Ball Bearing	166-0143	1	166-0143	1	166-0143	1
26	Mounting Accessory	5370-101-072	1	5370-101-072	1	5370-101-072	1
	26-1 Key	590-0142	1	590-0142	1	590-0142	1
27	Mounting Accessory	5370-101-075	1	5370-101-075	1	5370-101-075	1
	27-1 Tie Bolt	825-0014	4	825-0014	4	825-0014	4
28	Conduit Box (Optional)	5370-101-042	1	5370-101-042	1	5370-101-042	1
	Cover Kit (Optional)	5370-101-076	1	5370-101-076	1	5370-101-076	1
29	29-1 Cover	258-1227	2	258-1227	2	258-1227	2
	29-2 Screw	797-1562	4	797-1562	4	797-1562	4
	29-3 Gasket	495-0042	2	495-0042	2	495-0042	2

Refer to service manual P-273-5-WE.

These units meet the standards of UL 508 and are listed under guide card #NMTR2, file #59164.



Service Parts

[illegible]

General Engineering Data



G

Ordering Information / Standard NEMA Frame Dimensions..... G-3

Mechanical Data / Dynamic Torque G-4

Mechanical Data / Rotational Speed G-6

Mechanical Data / Clutch Field Restraining Devices..... G-7

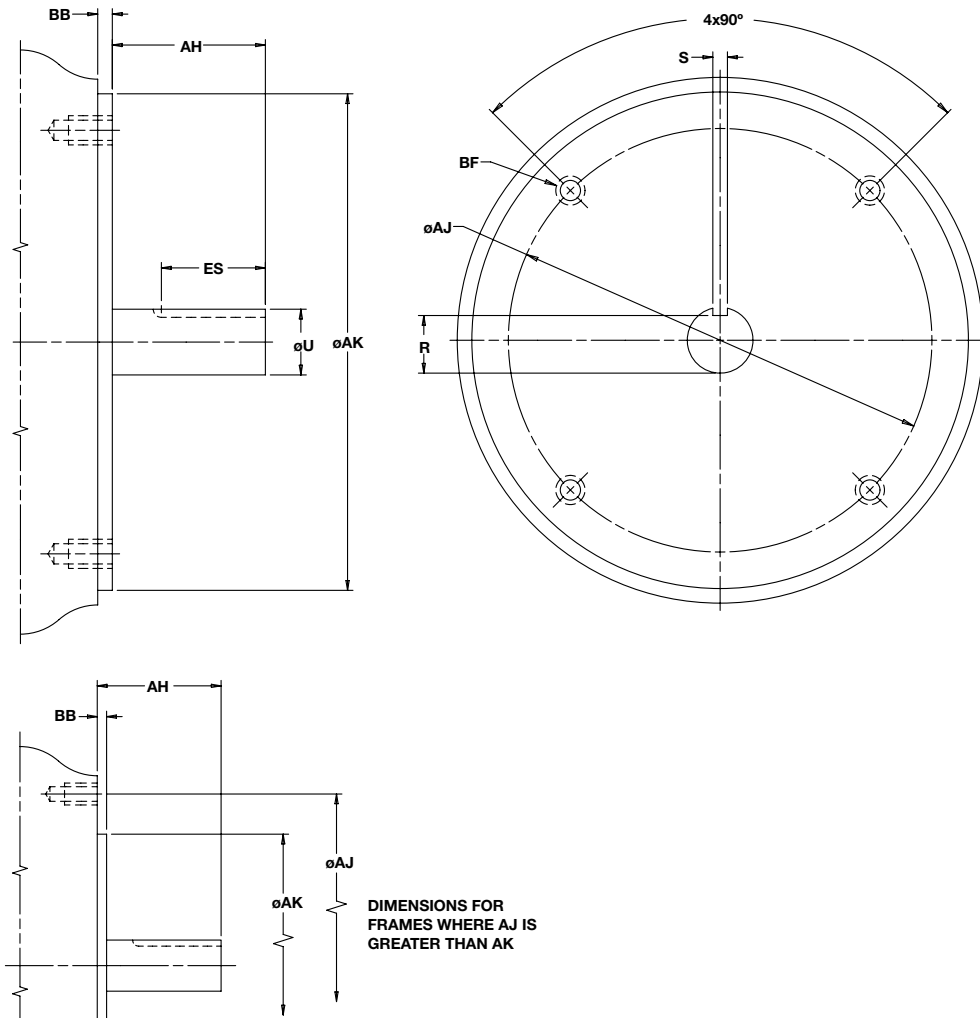
Electrical Data / Coil Ratings G-8

Electrical Data / Installation Procedure G-11

Electrical Data / Coil Suppression & Clutch/Brake Overlap G-12

Electrical Data / Overexcitation G-13

Standard NEMA Frame Dimensions Ordering Information



Specifications

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

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

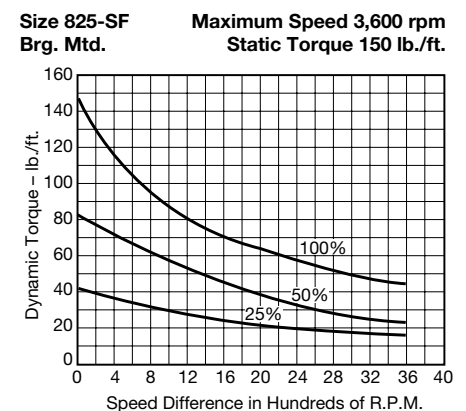
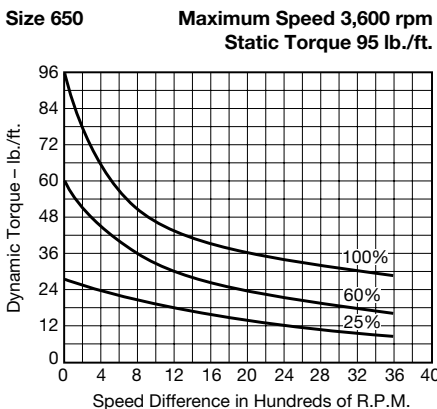
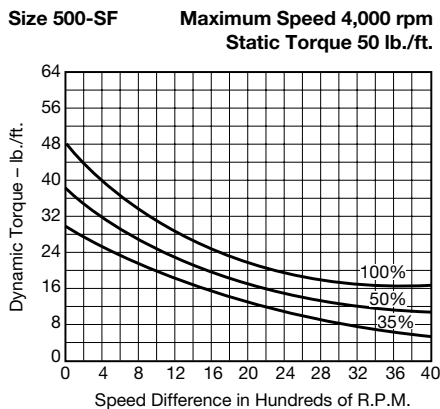
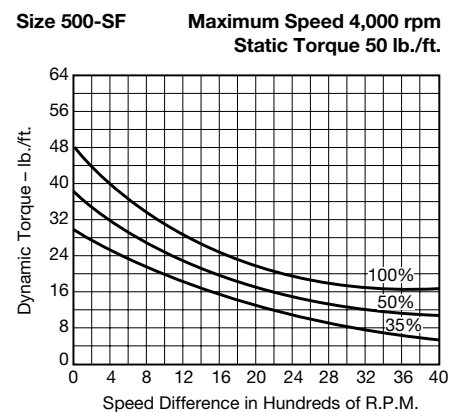
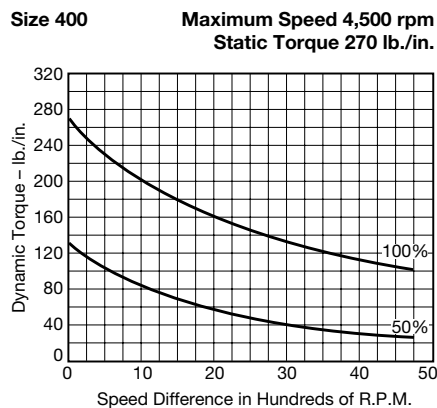
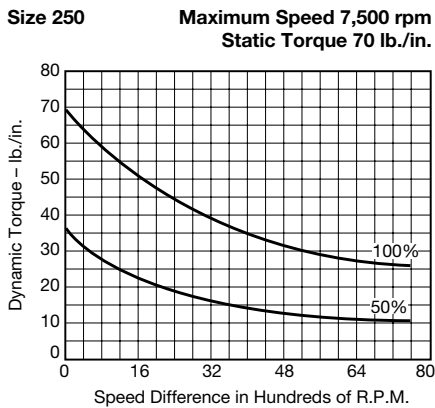
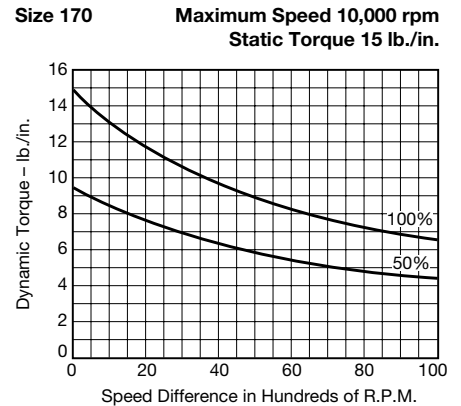
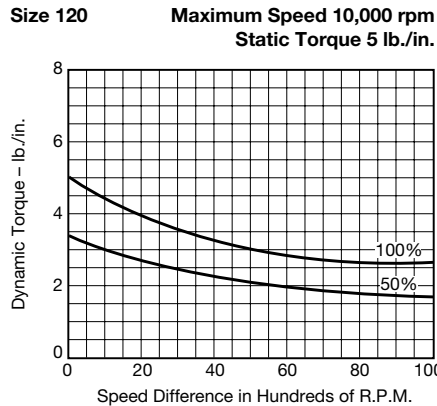
Mechanical Data Dynamic Torque

NOTES:

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

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

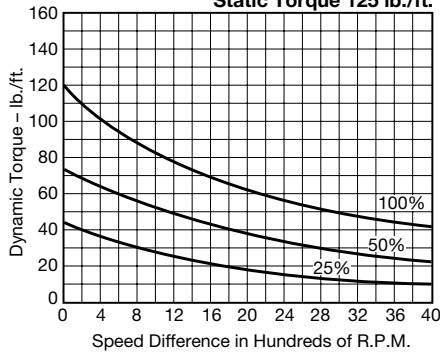
Average Torque = Dynamic Torque at $\frac{1}{2}$ operating speed. Example: If operating speed is 1800, use dynamic torque at 900.



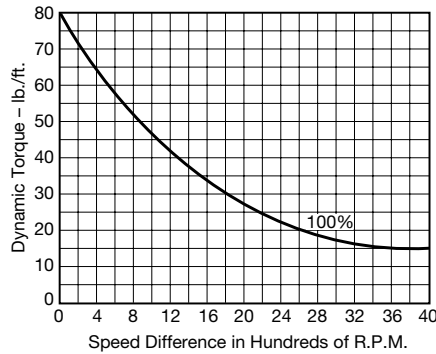
NOTE: Torque values are in inch lbs. for size 400 and smaller, and in ft.lbs. for size 500 and larger.

Mechanical Data Dynamic Torque

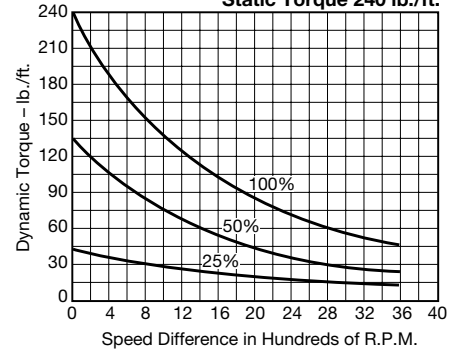
Size 825 Maximum Speed 4,000 rpm
Electro-Pack 3,600 rpm
Static Torque 125 lb./ft.



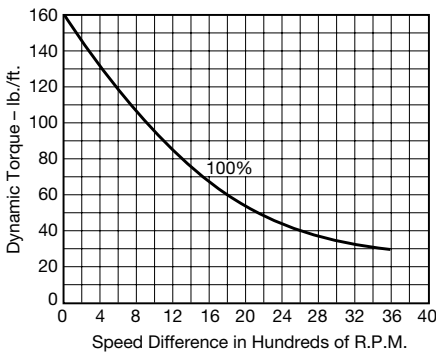
Size 825-MB Maximum Speed 4,000 rpm
Static Torque 80 lb./ft.



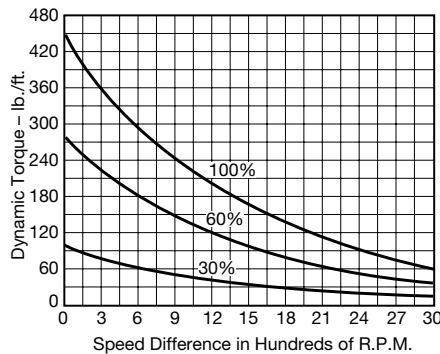
Size 1000 Maximum Speed 3,600 rpm
Electro-Pack 3,000 rpm
Static Torque 240 lb./ft.



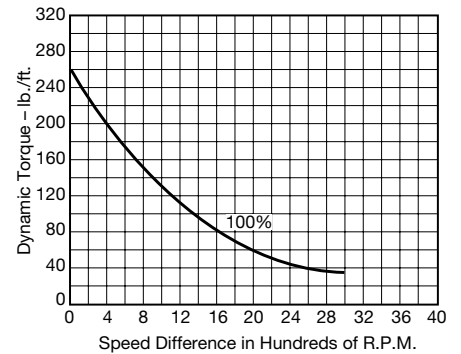
Size 1000-MB Maximum Speed 3,600 rpm
Static Torque 160 lb./ft.



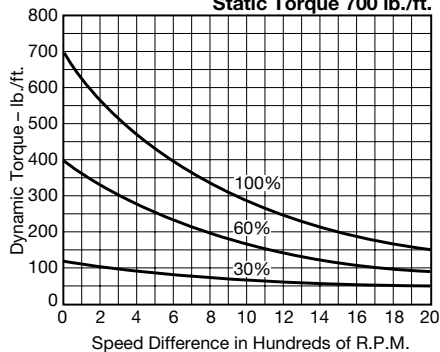
Size 1225 Maximum Speed 3,000 rpm
Static Torque 465 lb./ft.



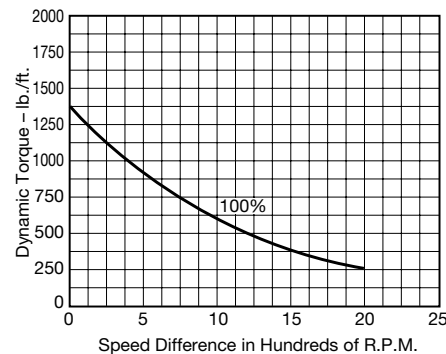
Size 1225-MB Maximum Speed 3,000 rpm
Static Torque 260 lb./ft.



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



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



Rotational Speed

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

Maximum RPM Rating

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

Dynamic Torque

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

Heat Dissipation

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

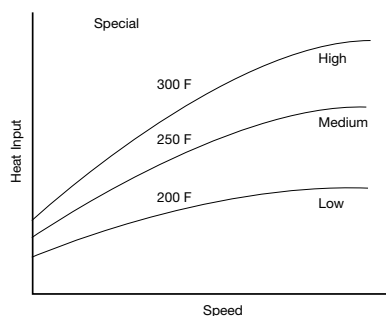


Figure 1: Typical Heat Dissipation Characteristics

Wear Rate

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

Low Speed Operation

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

Wear In

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

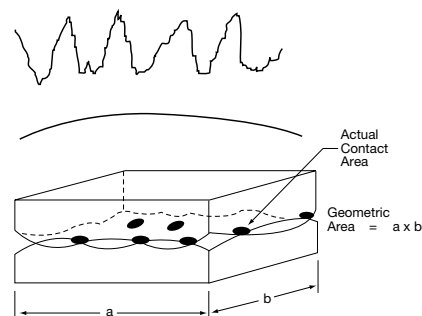


Figure 2: Unburnished Contact Areas

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

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

Mechanical Data Clutch Field Restraining Devices

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

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

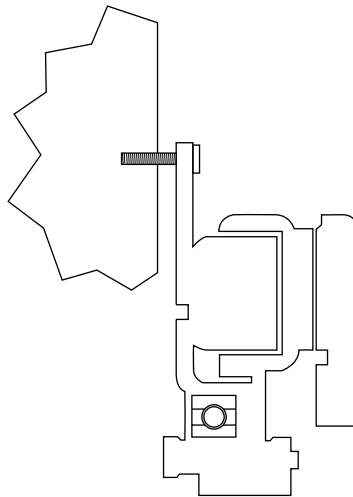


Figure 1:
Rigid member

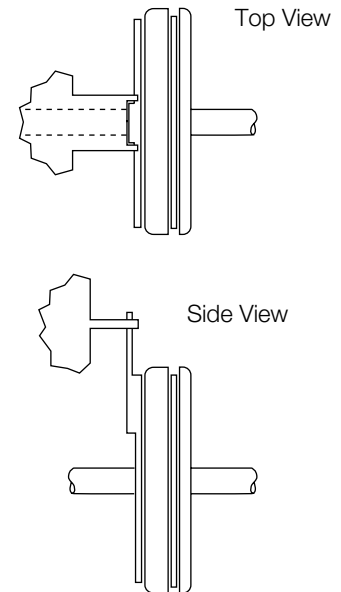


Figure 2:
Rigid Member with Slot
Straddling Tab
(Preferred)

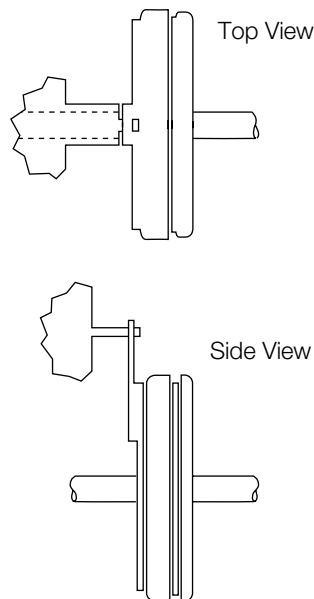


Figure 3:
Pin in Hole
Loosely
(Preferred)

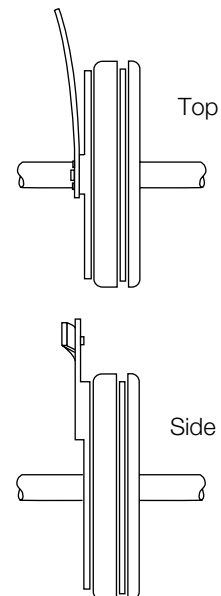


Figure 4:
Flexible Strap
(Preferred)

Electrical Data Coil Ratings

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

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

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

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

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

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

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

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

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

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

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

Electrical Data Coil Ratings

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

Electrical Data Coil Ratings

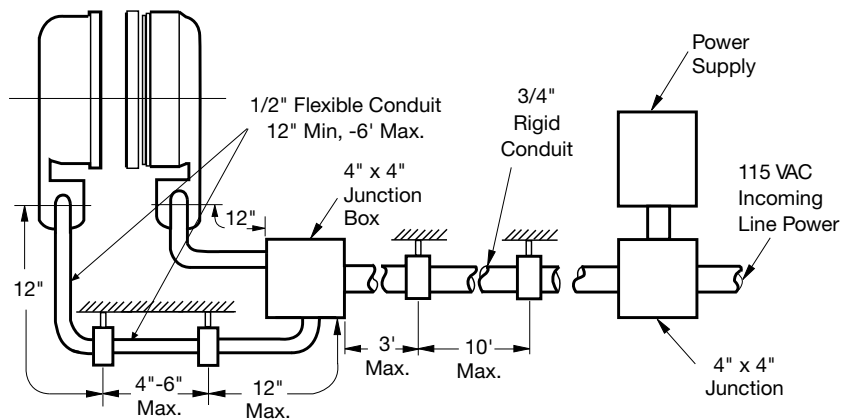
Unit Size	SF/PB 120			SF/PB 170			SF/PB 250		
Voltage – DC	6	24	90	6	24	90	6	24	90
Resistance @ 20°C – Ohms	6.32	104	1386	6.96	111.2	1506	5	76.4	1079
Current – Amperes	.949	.230	.065	.861	.215	.060	1.2	.314	.084
Watts	5.69	5.52	5.85	5.85	5.16	5.37	7.2	7.5	7.51
Coil Build-up – milliseconds	12	12	11	17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

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

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

Unit Size	SF-1225			PB & PC 1225			SF-1525			PB & PC 1525			SF-1525 H.T.		
Voltage – DC	6	24	90	6	24	90	6	24	90	6	24	90	6	24	90
Resistance @ 20°C – Ohms	1.21	19.5	268.3	1.33	22.3	261.7	1.11	15.5	239.1	1.45	19.8	258.4	.55	7.63	113.4
Current – Amperes	4.97	1.23	.34	4.5	1.08	.34	5.41	1.55	.38	4.13	1.21	.35	10.83	3.14	.794
Watts	30	30	30	27	26	31	32	37	34	25	29	31	65	75	72
Coil Build-up – milliseconds	475	490	510	300	320	350	505	535	575	470	490	512	480		560
Coil Decay – milliseconds	240	230	220	190	190	190	230	237	215	200	170	140	210		160

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



Recommended Electrical Installation Procedure for Warner Electric Clutches and Brakes

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

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

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

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

Recommended wire size versus maximum distance

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

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

Electrical Data Coil Suppression & Clutch/Brake Overlap

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

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

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

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

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

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

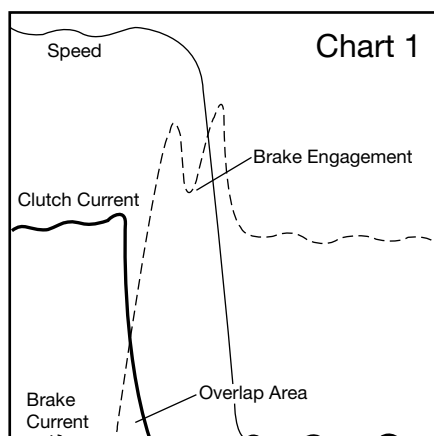
a sufficiently high but safe level, has two major benefits:

- Hastens coil decay
- Protects the switching contacts

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

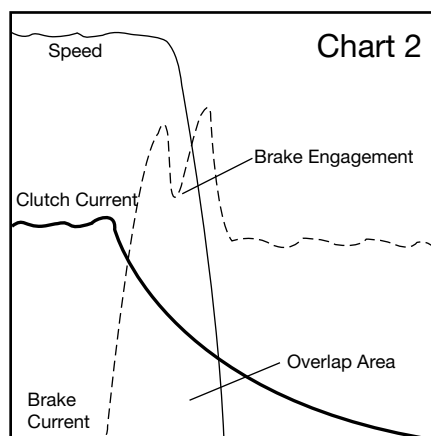
The rapid coil decay of Zener diode suppression lets users enjoy the major advantages which dual armatures have over single, “shuttle” armatures. These include:

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



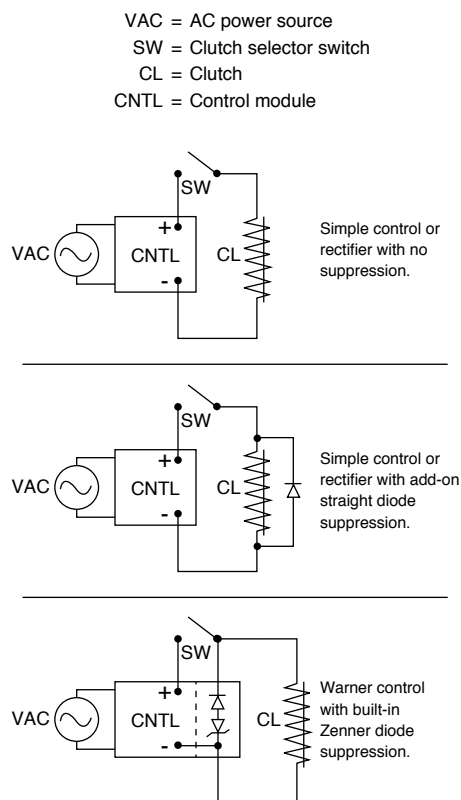
Brake Engagement with Zener Diode Suppression

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



Brake Engagement with Straight Diode Suppression

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



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

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

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

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

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

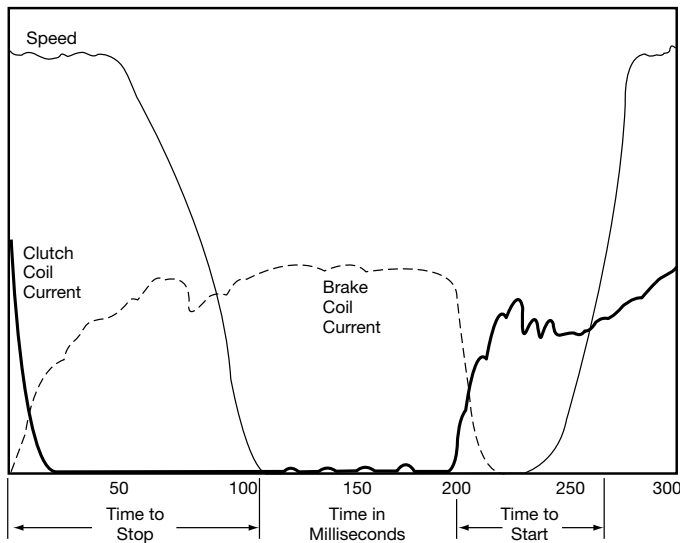


Chart 1

Without Overexcitation

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

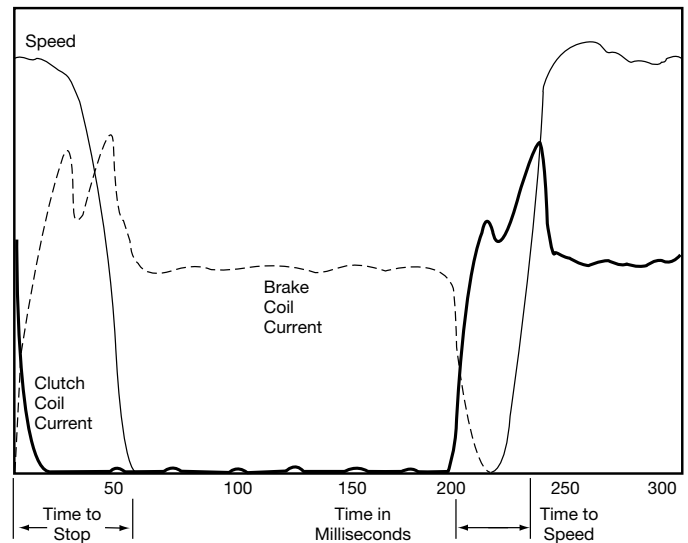


Chart 2

With Overexcitation

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

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Application Data Form

Email, Mail or FAX to:

Warner Electric

Brake and Clutch Application Engineering
449 Gardner Street, South Beloit, Illinois 61080
info@warnerelectric.com • Phone number: 800-825-9050 • FAX number: 815-389-2582

Date _____

Company _____

Address _____

City _____

State _____

Zip _____

Name _____

Title _____

Phone (_____) _____

Application: ☐ New ☐ Existing

Desired life:

Cycles _____ Months _____ Years _____

Basic Function: ☐ Starting Only (clutch) ☐ Stopping only (brake)
☐ Starting and Stopping (clutch and brake)

Environmental ambient temp:_____°F

If brake: ☐ Power-on ☐ Power-off (electrically released)

If brake: ☐ Dynamic stopping only ☐ Static holding only ☐ Both

If power-off, is manually released required: ☐ Yes ☐ No

Torque required: ____ oz. in. ____ lb. in. ____ lb. ft.
☐ Static ☐ Dynamic

Prime mover:

Mounting: ☐ Flange ☐ Shaft ☐ NEMA

NEMA Frame size _____

H.P. _____

Speed of Clutch/Brake _____

Load inertia to be accelerated and/or decelerated (WR^2):

State units _____

How is clutch/brake to be controlled?

On/off _____ Torque adjust _____ OEX _____

Power supply/Control: ☐ Warner supplied ☐ Other

Total single cycle time: _____

Maximum cycle rate:

Per min. _____ Per hour _____ Per day _____

Additional comments about application or sketch:

[illegible]

info@warnerelectric.com • Application Support: 800-825-9050

[illegible]

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

Selection

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

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

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

Clutch and Brake Controls CTL-2

On-Off Controls

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

Adjustable Torque Controls

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

Overexcitation Controls

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

Appendix CTL-22

Questions & Answers CTL-23

Ordering Information CTL-24



Clutch and Brake Controls

Functions

On-Off (Basic start-stop)

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

Adjustable Torque

(Soft start-stop)

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

Adjustable Accel-Decel

(Soft start-stop with full torque)

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

Overexcitation

(Rapid cycling)

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

Control Type

On-Off Conduit Box Mount



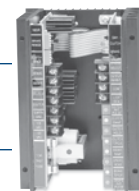
On-Off Octal Socket Mount



Adjustable Torque



Adjustable Accel-Decel



Overexcitation



Clutch and Brake Controls

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

CBC-100/CBC-150 On-Off Controls

Integral/Conduit Box Mounted Controls

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



CBC-100 series Single unit capacity

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

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



CBC-150 series Dual channel capacity

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

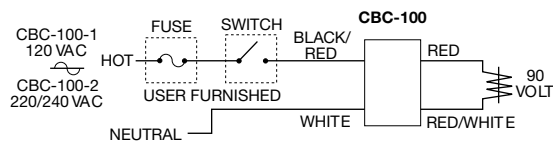
- cULus
- Dual channel
- Replaces the cover on the module conduit box

Specifications

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

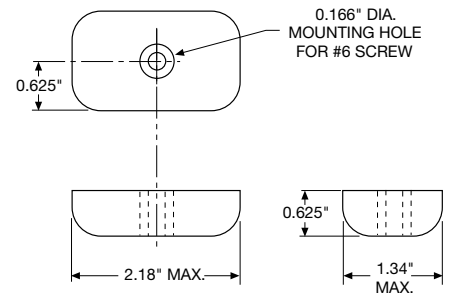
Connection diagrams

CBC-100-1, -2

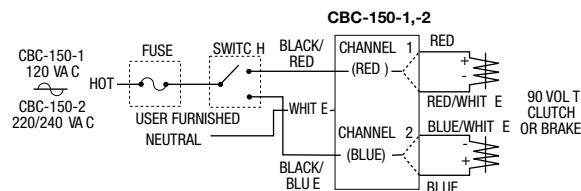


Dimensions

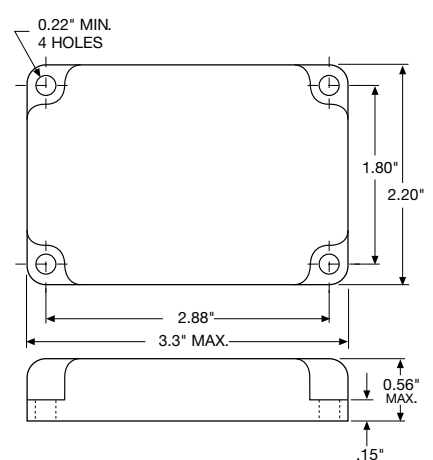
CBC-100-1, -2



CBC-150-1, -2



CBC-150-1, -2



All dimensions nominal unless otherwise specified.

Integral/Electrically Released Motor Brake Controls

CBC-160

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



CBC-160-1

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

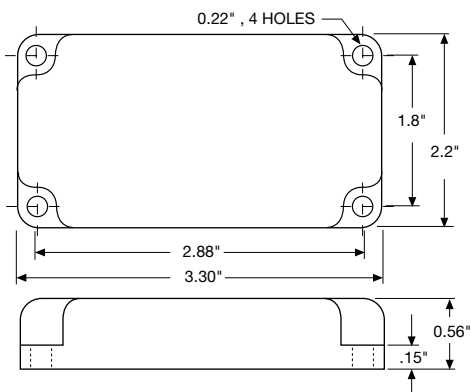
-  US
- Adjustable 30-100 VDC
- LED indicator
- 120 volt A.C. input

CBC-160-2

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

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

Dimensions

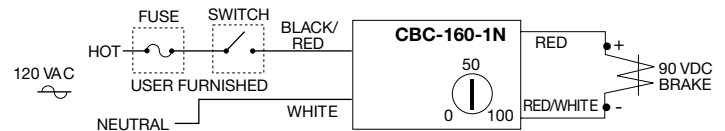


All dimensions nominal unless otherwise specified.

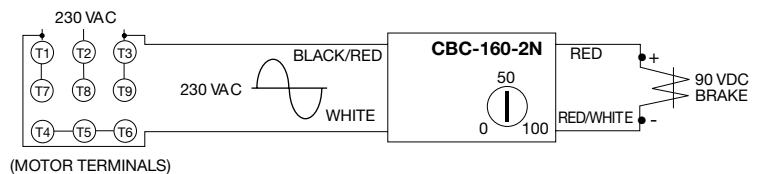
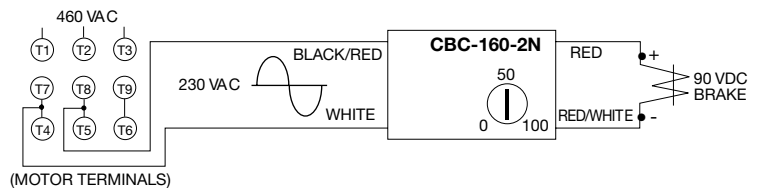
Specifications

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

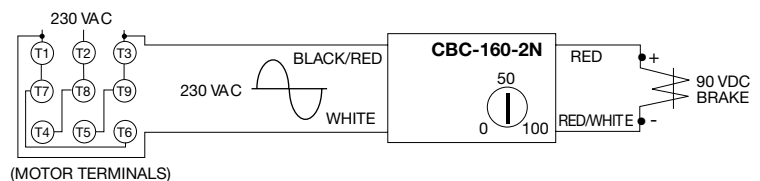
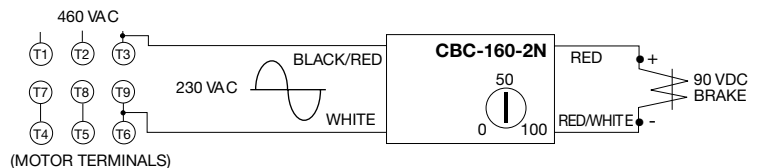
Connection Diagrams



WYE Connected Motor



DELTA Connected Motor



CBC-801 On-Off Controls

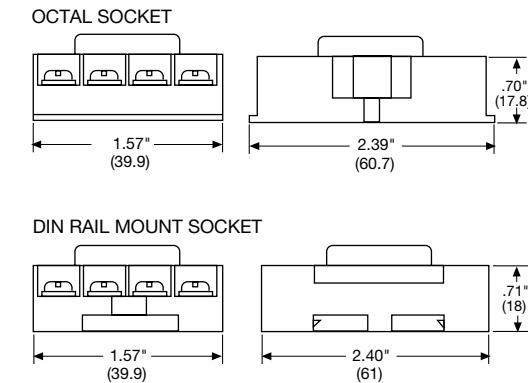
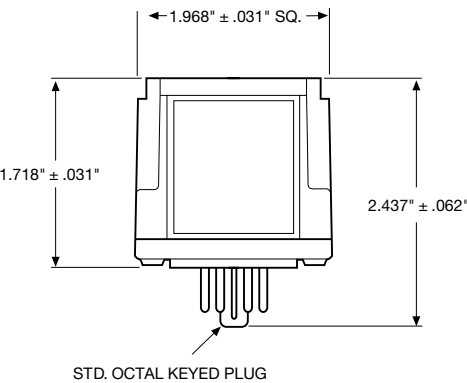
Plug-in Octal Socket Power Supplies

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

CBC-801 series Multi-unit capacity

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

Dimensions



All dimensions nominal unless otherwise specified.

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

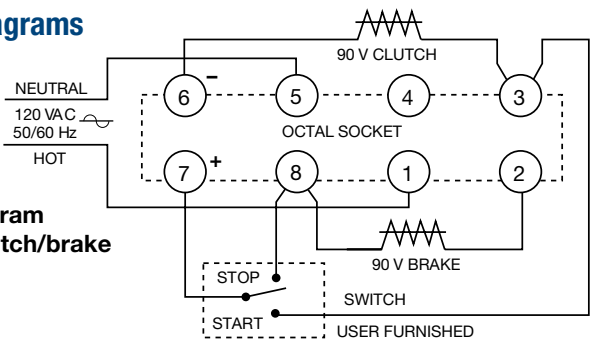


Specifications

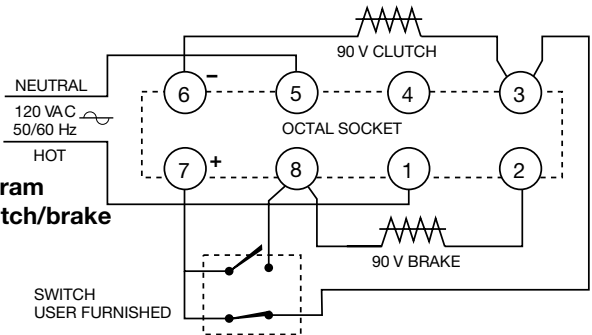
	CBC-801-1	CBC-801-2
Part No.	6001-448-004	6001-448-006
Input Voltage	120 VAC, 50/60 Hz	220/240 VAC, 50/60 Hz
Output	90 VDC, 1.25 A max.	
Circuit Protection	Fused 1.6 Amp, 250 V fast-blo	
Ambient Temperature	-23° to 116°F (-31° to 47°C)	
Max. Cycle Rate	Limited by the clutch or brake, variable with application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

Connection Diagrams

Connection diagram for operating clutch/brake separately.



Connection diagram for operating clutch/brake simultaneously.



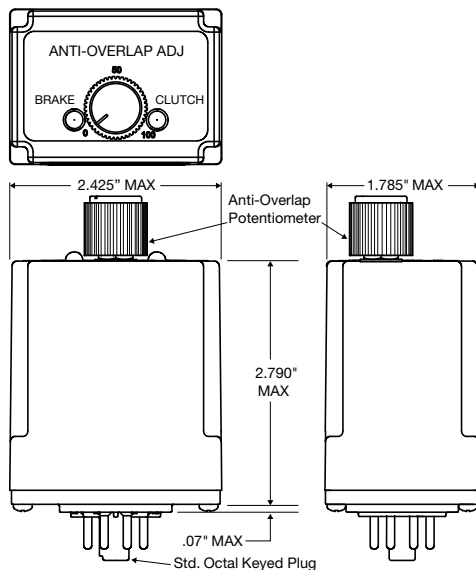


CBC-802 PLC compatible

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

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

Dimensions

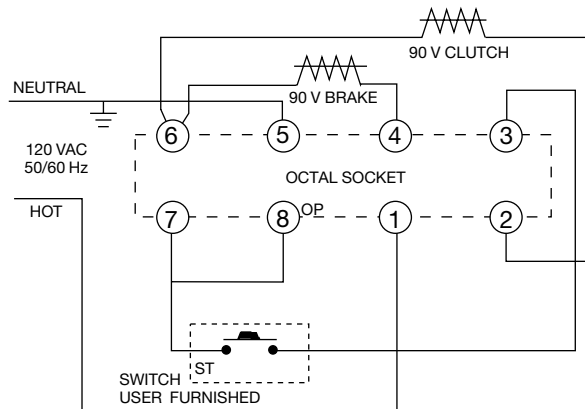


All dimensions nominal unless otherwise specified.

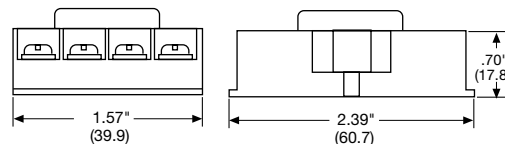
Specifications

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

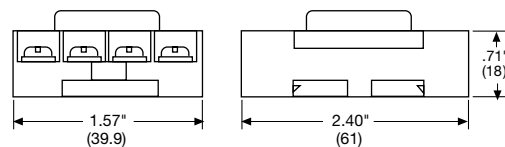
Connection Diagram



OCTAL SOCKET



DIN RAIL MOUNT SOCKET



MCS-103-1 Adjustable Torque Controls

Adjustable Torque Control

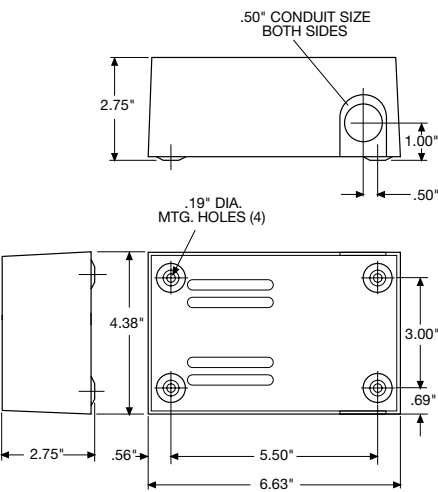
The MCS-103-1 is an enclosed control complete with a cover and mounting provisions. A brake and clutch may be operated separately with this control – or up to four units, two at a time. The external wiring is connected to the terminal strip located behind the cover.

-  **US**
- Can be used with electrically released brakes

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



Dimensions

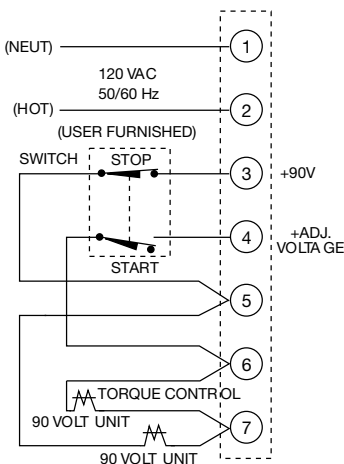


All dimensions nominal unless otherwise specified.

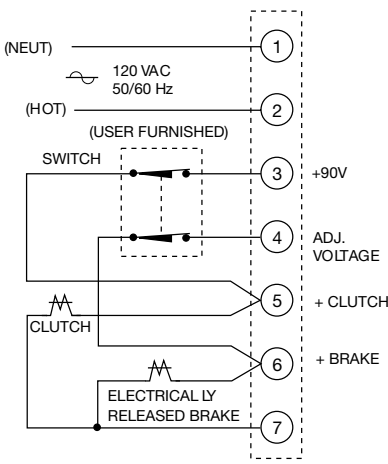
Specifications

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

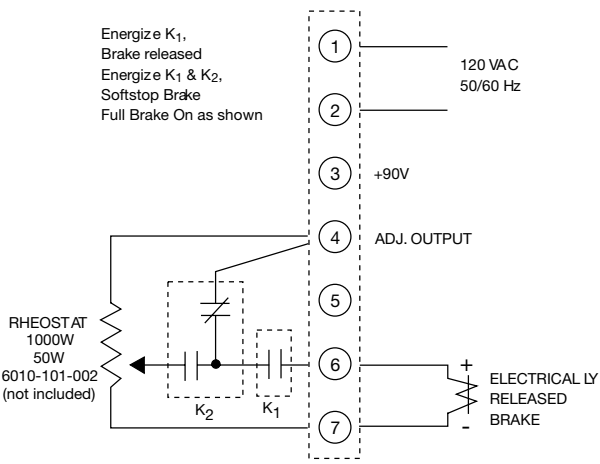
Connection Diagrams



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



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



Soft Stop for
Electrically Released Brake

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

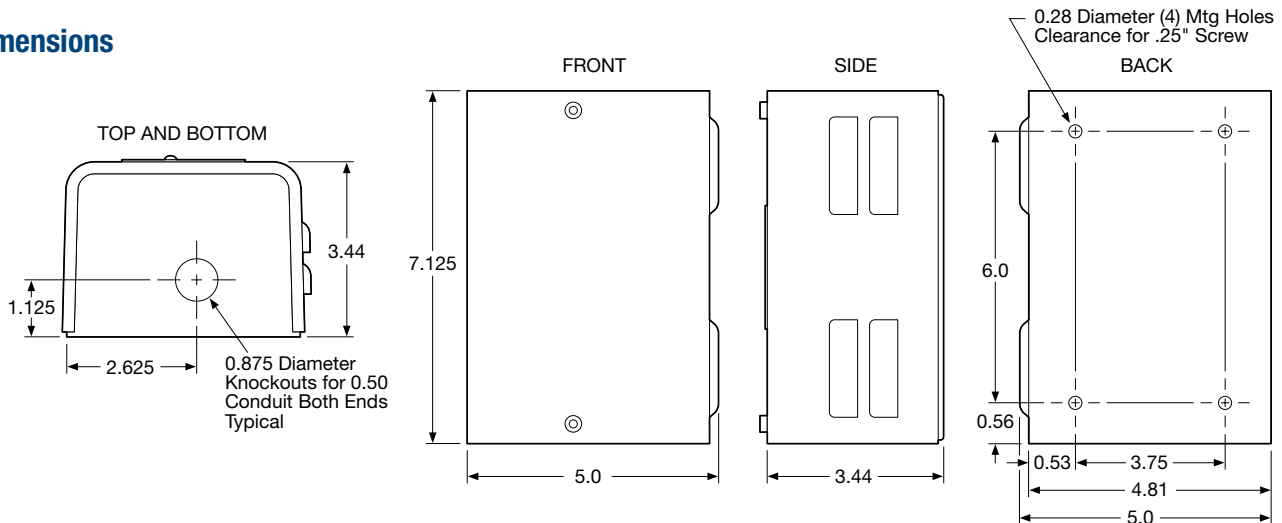
The DC voltage required to release the Warner Electric ER-1225 Brake is supplied by the MCS-805-1 or MCS-805-2 Power Supply. The correct brake release voltage—approximately 35-75 volts DC—is set by adjusting the power supply at the time of brake installation. Temperature compensating circuits provide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

Specifications

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



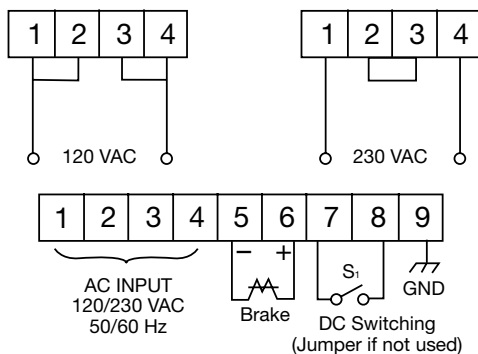
Dimensions



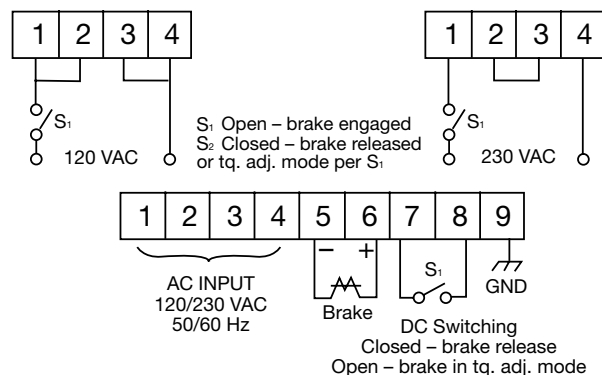
Connection Diagrams

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

MCS 805-1



MCS 805-2



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

CBC-300 Adjustable Torque Controls

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

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



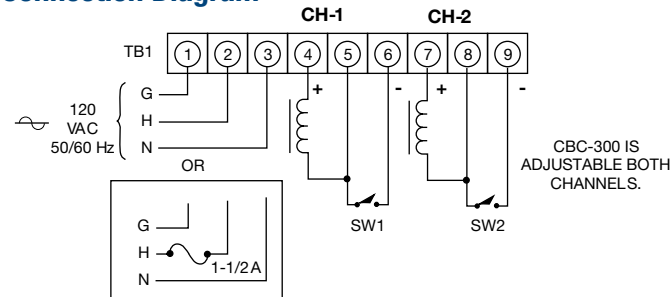
CBC-300 Series Dual channel/Dual channel torque adjust

The CBC-300 has two adjustable current channels.

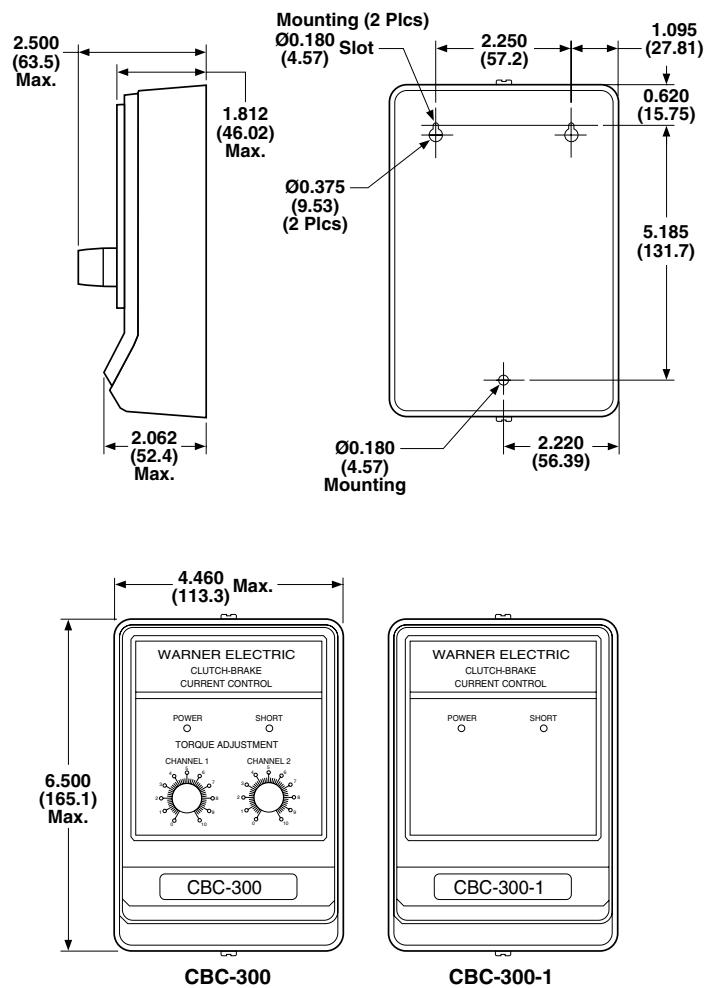
Specifications

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

Connection Diagram



CBC-300 Adjustable Torque Controls



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

Selection Guide

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

CBC-500 Adjustable Torque Controls

Panel Mounted



Specifications

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

CBC-500 series Dual torque adjustable power supplies

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

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

Enclosure (Optional)

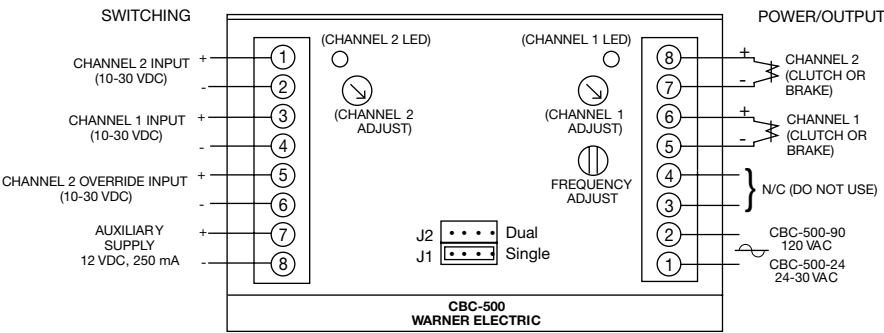


- Lift off hinge
- Quick-release latches
- Conforms to NEMA Type 13
- European Standard IEC 529, IP65

CBC-500 Adjustable Torque Controls

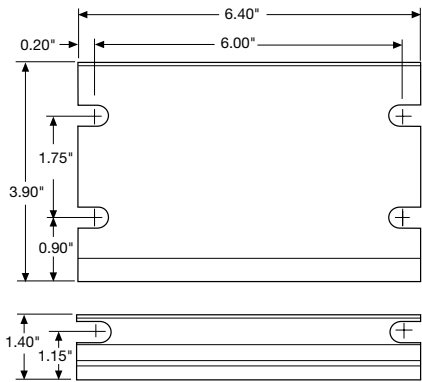
Panel Mounted

Connection Diagram



All dimensions nominal unless otherwise specified.

Dimensions



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

CBC-550 Adjustable Torque Controls

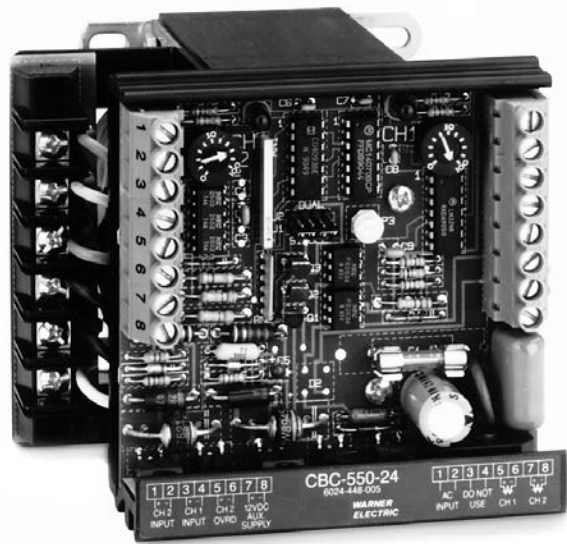
Panel Mounted

CBC-550 series Dual adjustable with power transformer

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

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

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



Specifications

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

Enclosure (Optional)



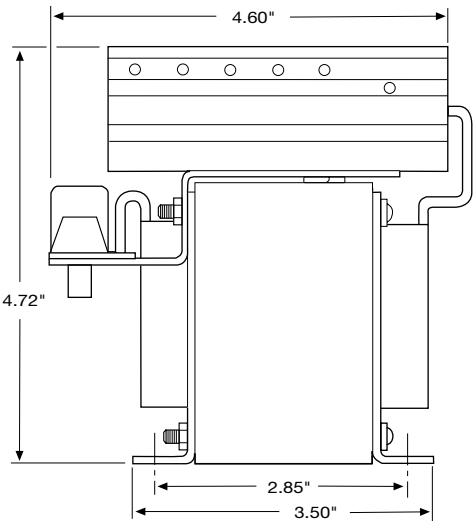
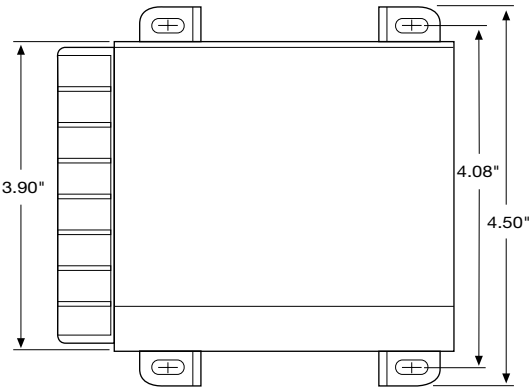
- Lift off hinge
- Quick-release latches
- Conforms to NEMA Type 13
- European Standard IEC 529, IP65

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

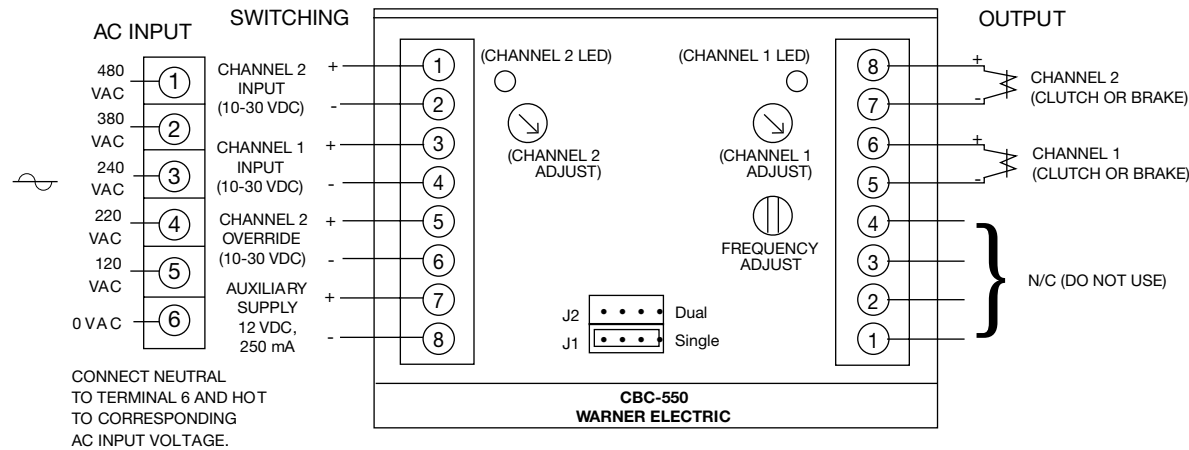
CBC-550 Adjustable Torque Controls

Panel Mounted

Dimensions



Connection Diagram



All dimensions nominal unless otherwise specified.

CBC-1825R Adjustable Torque Controls

Panel Mounted

CBC-1825R series

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

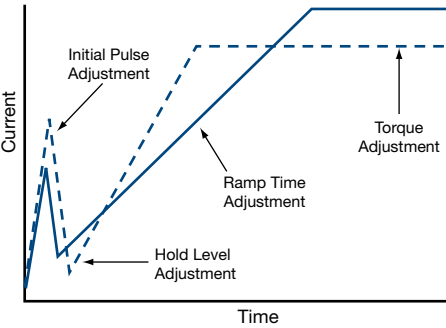
Note: It is recommended that the auto-gap springs be removed from the clutch and brake for successful accel-decel application.



Specifications

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

Set-up

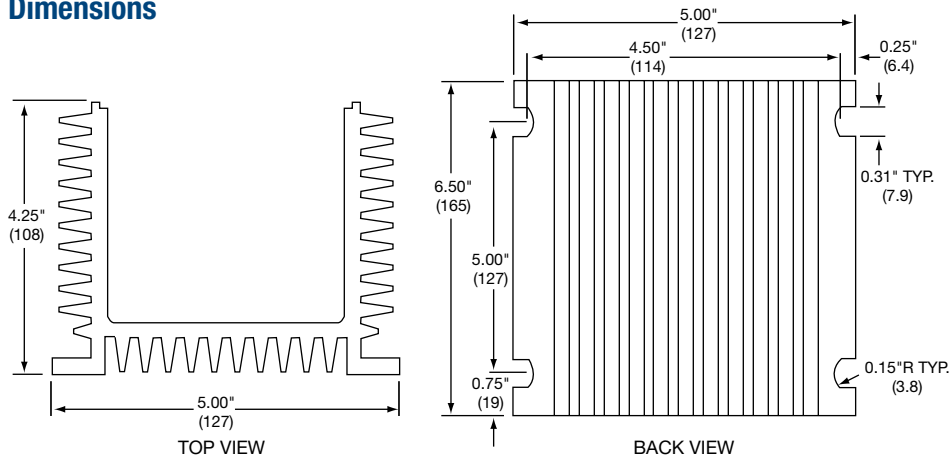


All dimensions nominal unless otherwise specified.

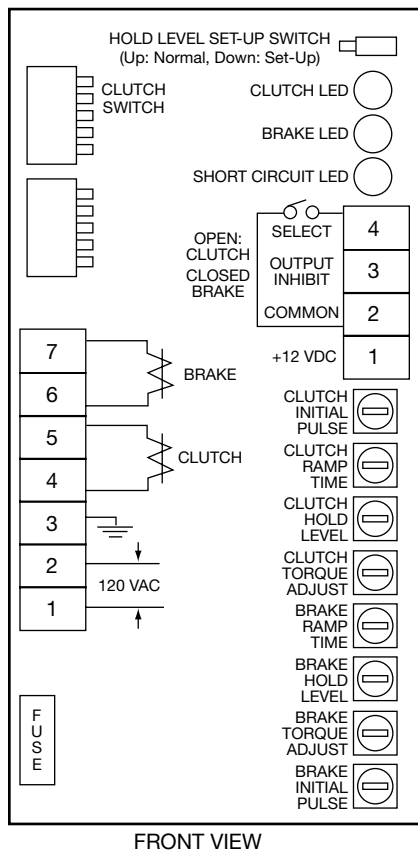
CBC-1825R Adjustable Torque Controls

Panel Mounted

Dimensions



Connection Diagram



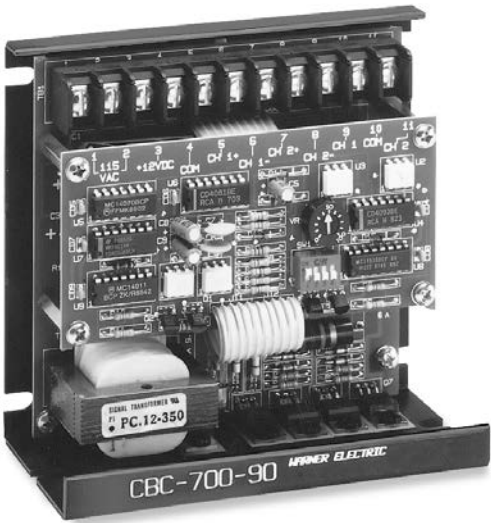
CBC-700 Overexcitation Controls

General Purpose OEX Control

CBC-700 Series

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

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



Specifications

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

Enclosure (Optional)



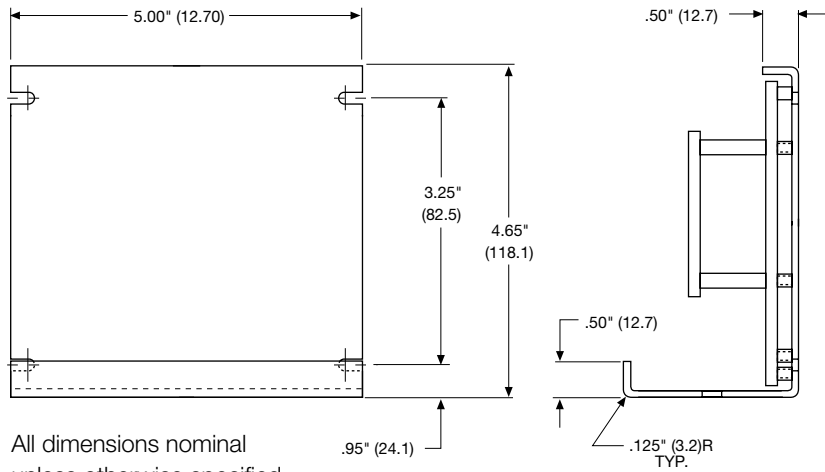
- Lift off hinge
- Quick-release latches
- Conforms to NEMA Type 13
- European Standard IEC 529, IP65

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

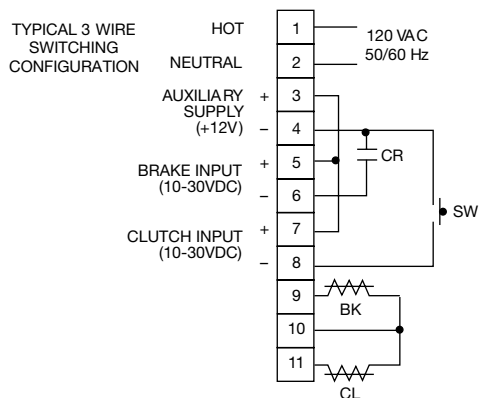
CBC-700 Overexcitation Controls

General Purpose OEX Control

Dimensions



Connection Diagram



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

CBC-750 Overexcitation Control

Rapid Acceleration/Deceleration

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

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

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

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

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



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

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

Specifications

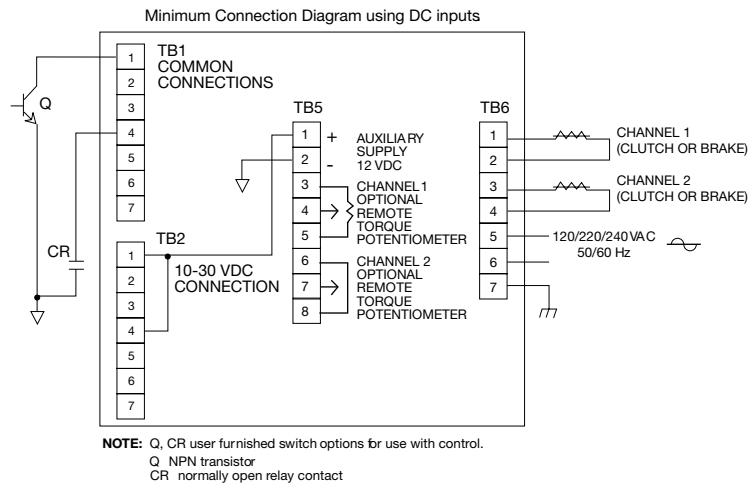
CBC-750-6	
Part No.	6041-448-001
Input Power	120/220/240 VAC, $\pm 10\%$, 50/60 Hz, 350 VA (switch selectable)
Control Inputs	Opto-isolated 10-30 VDC @ 10-35 mA nominal sinking or sourcing, or 24 VAC (50/60Hz) @ 22 mA nominal, or 120 VAC (50/60 Hz) @ 20 mA nominal
Clutch/brake Output	
Steady State Output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

Rapid Acceleration/Deceleration

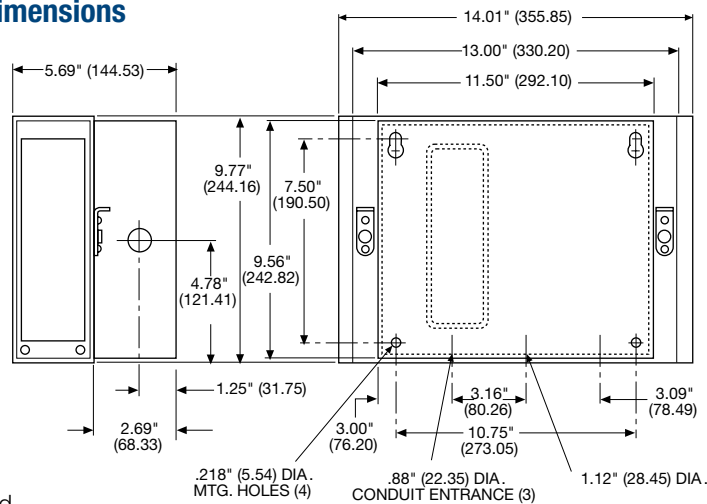
Seven optically isolated inputs accept 10-30V A.C./D.C. (TB2) or 120 VAC (TB3), configured through set-up switches

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

Connection Diagram



Dimensions



All dimensions nominal unless otherwise specified.

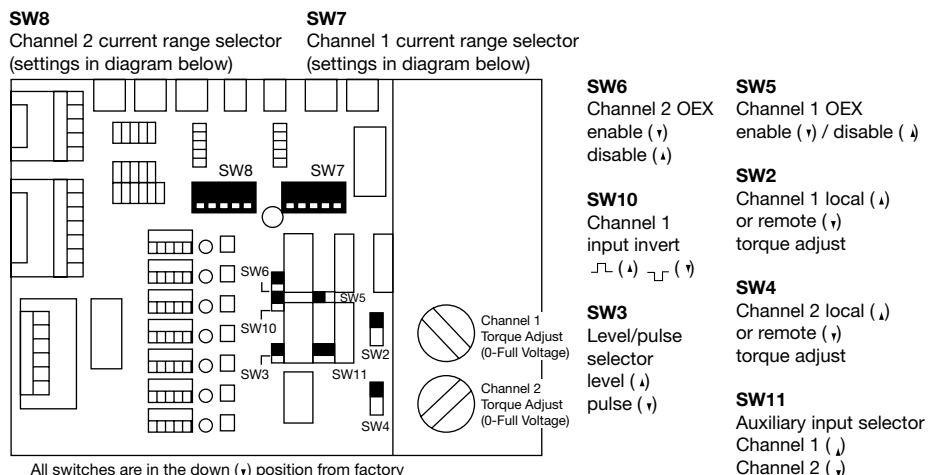
Setup Switches

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

Max. Current Output

(SW7 & SW8 settings)

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

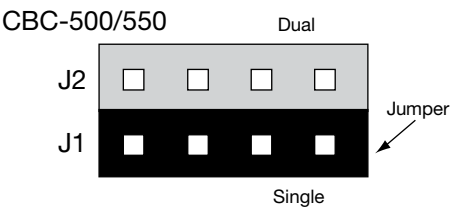


Appendix

CBC-500/550 Single vs. Dual Operation

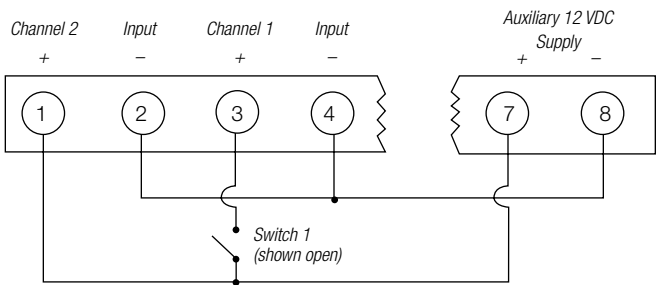
The CBC-500/550 series controls allow operation in either a single or dual mode. The mode of operation is determined via the position of a jumper on the main control board.

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



2-wire Switching Option

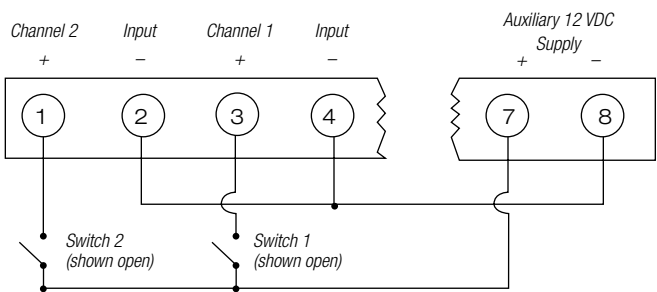
Control's switching terminal block



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

3-wire Switching Option

Control's switching terminal block



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

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

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

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

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

3. Which power supplies can be used with the SF 1525HT and SFC 1525HT (used in the EP-1525HT) coil?

90V:

The SF and SFC 1525 High Torque 90V clutch coils require .794 amps of current to produce full rated torque. The following power supplies and controls will provide the needed power.

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

24V:

The SF and SFC 1525 High Torque 24V clutch coils require 3.14 amps of current to produce full rated torque.

Any of our 24V controls (CBC-500, CBC-550, CBC-700) will provide this current.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Ordering Information

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

Part Numbers Ordering Information

PN

Part Numbers Ordering Information

C-face Compatible Units

Electro Modules - EM

Description	Model	Part No.	Voltage	Pg. No.	
Motor Clutch Module	EM-50-10	5370-270-201	6	A-2	
		5370-270-203	24		
		5370-270-204	90		
	EM-100-10	5370-270-206	6	A-2	
		5370-270-208	24		
		5370-270-209	90		
	EM-180-10	5370-270-211	6	A-2	
		5370-270-213	24		
		5370-270-214	90		
	EM-210-10	5371-270-011	6	A-2	
		5371-270-027	24		
		5371-270-009	90		
Brake Module	EM-50-20	5370-169-201	6	A-2	
		5370-169-203	24		
		5370-169-204	90		
	EM-100-20	5370-169-206	6	A-2	
		5370-169-208	24		
		5370-169-209	90		
	EM-180-20	5370-169-211	6	A-2	
		5370-169-213	24		
		5370-169-214	90		
	EM-210-20	5371-169-022	6	A-2	
		5371-169-034	24		
		5371-169-023	90		
EM-215-20	5371-169-076	90	A-2		
Motor Brake	EM-50-20MB	5370-169-216	6	A-2	
		5370-169-218	24		
		5370-169-219	90		
	EM-180-20MB	5370-169-221	6	A-2	
		5370-169-223	24		
		5370-169-224	90		
	EM-210-20MB	5371-169-025	6	A-2	
		5371-169-035	24		
		5371-169-026	90		
	Input Clutch Module	EM-50-30	5370-270-216	6	A-2
			5370-270-218	24	
			5370-270-219	90	
EM-100-30		5370-270-221	6	A-2	
		5370-270-223	24		
		5370-270-224	90		
EM-180-30		5370-270-226	6	A-2	
		5370-270-228	24		
		5370-270-229	90		
EM-210-30		5371-270-023	6	A-2	
		5371-270-026	24		
		5371-270-024	90		
Output Clutch Module	EM-50-40	5370-536-200	—	A-2	
	EM-100-40	5370-536-201		A-2	
	EM-180-40	5370-536-202		A-2	
	EM-210-40	5371-536-005		A-2	

UniModules - UM

Description	Model	Part No.	Voltage	Pg. No.
Clutch/Brake UniModule Fully Assembled Brake/Clutch Unit	UM-50-1020	5370-273-201	6	A-18
		5370-273-203	24	
		5370-273-204	90	
	UM-50-2030	5370-273-216	6	A-18
		5370-273-218	24	
		5370-273-219	90	
	UM-100-1020	5370-273-206	6	A-18
		5370-273-208	24	
		5370-273-209	90	
	UM-100-2030	5370-273-221	6	A-18
		5370-273-223	24	
		5370-273-224	90	
	UM-180-1020	5370-273-211	6	A-18
		5370-273-213	24	
		5370-273-214	90	
	UM-180-1020 Heavy-Duty	5370-273-323	90	A-18
		5370-273-226	6	
		5370-273-228	24	
Clutch UniModule Fully Assembled Clutch Unit	UM-180-2030	5370-273-229	90	A-18
		5371-273-002	6	
		5371-273-004	24	
	UM-210-1020	5371-273-003	90	A-18
		5371-273-007	6	
		5371-273-009	24	
	UM-210-2030	5371-273-008	90	A-18
		5371-273-076	6	
		5371-273-077	24	
	UM-215-1020	5371-273-078	90	A-18
		5371-273-043	6	
		5371-273-044	24	
	UM-215-2030	5371-273-045	90	A-18
		5370-271-201	6	
		5370-271-203	24	
	UM-50-1040	5370-271-204	90	A-18
		5370-271-216	6	
		5370-271-218	24	
UM 1020 with Pre-Installed Controls (CBC 150-1)	UM-50-3040	5370-271-219	90	A-18
		5370-271-206	6	
		5370-271-208	24	
	UM-100-1040	5370-271-209	90	A-18
		5370-271-221	6	
		5370-271-223	24	
	UM-100-3040	5370-271-224	90	A-18
		5370-271-211	6	
		5370-271-213	24	
	UM-180-1040	5370-271-214	90	A-18
		5370-271-226	6	
		5370-271-228	24	
	UM-180-3040	5370-271-229	90	A-18
		5371-271-002	6	
		5371-271-004	24	
	UM-210-1040	5371-271-003	90	A-18
		5371-271-007	6	
		5371-271-009	24	
	UM-210-3040	5371-271-008	90	A-18
		5371-271-026	6	
		5371-271-027	24	
UM 1020 with Pre-Installed Controls (CBC 150-1)	UM-215-1040	5371-271-028	90	A-18
		5371-271-021	6	
		5371-271-022	24	
	UM-215-3040	5371-271-023	90	A-18
		5370-273-230	90	
		5370-273-231	90	
	UM-180-1020 Heavy-Duty	5370-273-232	90	A-18
		5370-237-324	90	
		5371-4	90	
	UM-210-1020	5371-4	90	
	UM-215-1020	5371-273-090	90	

Part Numbers Ordering Information

C-face Compatible Units

UniModules – Ceramic Faced – UM-C

Description	Model	Part No.	Voltage	Pg. No.
C-face Mount	UM-50-1020-C	5370-273-271	6	A-32
		5370-273-273	24	
		5370-273-274	90	
	UM-180-1020-C	5370-273-276	6	A-32
		5370-273-278	24	
		5370-273-279	90	
Base/Foot Mount	UM-50-2030-C	5371-273-035	6	A-32
		5371-273-036	24	
		5371-273-037	90	
	UM-180-2030-C	5370-273-281	6	A-32
		5370-273-283	24	
		5370-273-284	90	
	UM-210-2030-C	5370-273-286	6	A-32
		5370-273-288	24	
		5370-273-289	90	
		5371-273-039	6	A-32
		5371-273-040	24	
		5371-273-041	90	

Smooth-Start UniModules

Description	Model	Part No.	Voltage	Pg. No.
Smooth-Start	UM-50-1020	5370-273-236	90	A-30
	UM-100-1020	5370-273-237	90	A-30
	UM-180-1020	5370-273-238	90	A-30
	UM-210-1020	5371-273-103	90	A-30
	UM-215-1020	5371-273-080	90	A-30

Enclosed UniModules – EUM

Description	Model	Part No.	Voltage	Pg. No.
C-face Mount	EUM-50-1020	5370-15	6	A-39
		5370-16	24	
		5370-17	90	
	EUM-50-1040	5370-24	90	A-39
		5370-18	6	
		5370-19	24	
	EUM-100-1020	5370-20	90	A-39
		5370-21	6	
		5370-22	24	
	EUM-180-1020	5370-23	90	A-39
		5370-25	90	
		5371-169-105	24	A-45
	EUM-210-20	5371-169-104	90	
		5371-273-028	6	
	EUM-210-1020	5371-273-029	24	A-39
		5371-273-027	90	
		5371-271-024	90	A-39
	EUM-210-1040	5371-169-109	24	
		5371-169-108	90	
		5371-273-082	6	A-39
	EUM-215-20	5371-273-083	24	
		5371-273-084	90	
Base/Foot Mount	EUM-50-2030	5370-26	6	A-39
		5370-27	24	
		5370-28	90	
	EUM-180-2030	5370-29	6	A-39
		5370-30	24	
		5370-31	90	
	EUM-210-2030	5371-273-032	6	A-39
		5371-273-033	24	
		5371-273-031	90	

Accessories for EM, UM, UM-C and EUM

Description	Model	Part No.	Voltage	Pg. No.
Conduit Box	All Sizes	5370-101-042		A-6
	CBC-150-1	6004-448-001	110 VAC	CTL-4
Controls	CBC-150-2	6004-448-002	220 VAC	CTL-4
	EM/UM-50/100	5370-101-004	—	A-6
Base Mount Kits for 2030 and 3040	EM/UM-180	5370-101-002		A-6
	EM/EUM/UM-210	5371-101-001		A-44
	EM/EUM/UM-215	5371-101-001		A-44
Motor Mount Kits for 20, 1020, 1040	EM/UM-50/100	5370-101-078	—	A-44
	EM/UM-180	5370-101-079		A-44
	EUM-50/100/180	5371-101-012		A-44
	EM/EUM/UM-210	5371-101-012		A-44
Fan Kits for 1020	EUM-50/100	5370-101-055		A-44
	UM-50-C	5370-101-055		A-44
	EUM-180	5370-101-054		A-44
	UM-180-C	5370-101-054		A-44
	EUM-210	5371-101-029		A-44

Enclosed UniModules – Washdown Models – EUM-W

Description	Model	Part No.	Voltage	Pg. No.
C-face Mount	EUM-50-1020W	5370-273-100	6	A-49
		5370-273-101	24	
		5370-273-099	90	
	EUM-100-1020W	5370-273-108	6	A-49
		5370-273-109	24	
		5370-273-107	90	
	EUM-180-1020W	5370-273-116	6	A-49
		5370-273-117	24	
		5370-273-115	90	
	EUM-210-1020W	5371-273-056	6	A-49
		5371-273-057	24	
		5371-273-055	90	
Base/Foot Mount	EUM-215-1020W	5371-273-086	6	A-49
		5371-273-087	24	
		5371-273-088	90	
	EUM-50-2030W	5370-273-104	6	A-49
		5370-273-105	24	
		5370-273-103	90	
	EUM-180-2030W	5370-273-120	6	A-49
		5370-273-121	24	
		5370-273-119	90	
	EUM-210-2030W	5371-273-060	6	A-49
		5371-273-061	24	
		5371-273-059	90	

Accessories for EUM-W

ConduitBox	All Sizes	5370-101-045		A-53
Controls	CBC-150-1	6004-448-001	110 VAC	CTL-4
	CBC-150-2	6004-448-002	220 VAC	CTL-4
Base Mount	All Sizes	5370-101-047		A-53
	EUM-50W/180W	5371-101-025		A-53
Motor Mount	EUM-50W	5370-101-080		A-53
	EUM-100W	5370-101-080		A-53
	EUM-180W	5371-101-026		A-53
	EUM-210W	5371-101-026		A-53
	EUM-215W	5371-101-026		A-53
Fan Kits	EUM-50W/100W	5370-101-060		A-53
	EUM-180W	5370-101-061		A-53
	EUM-210W	5371-101-033		A-53

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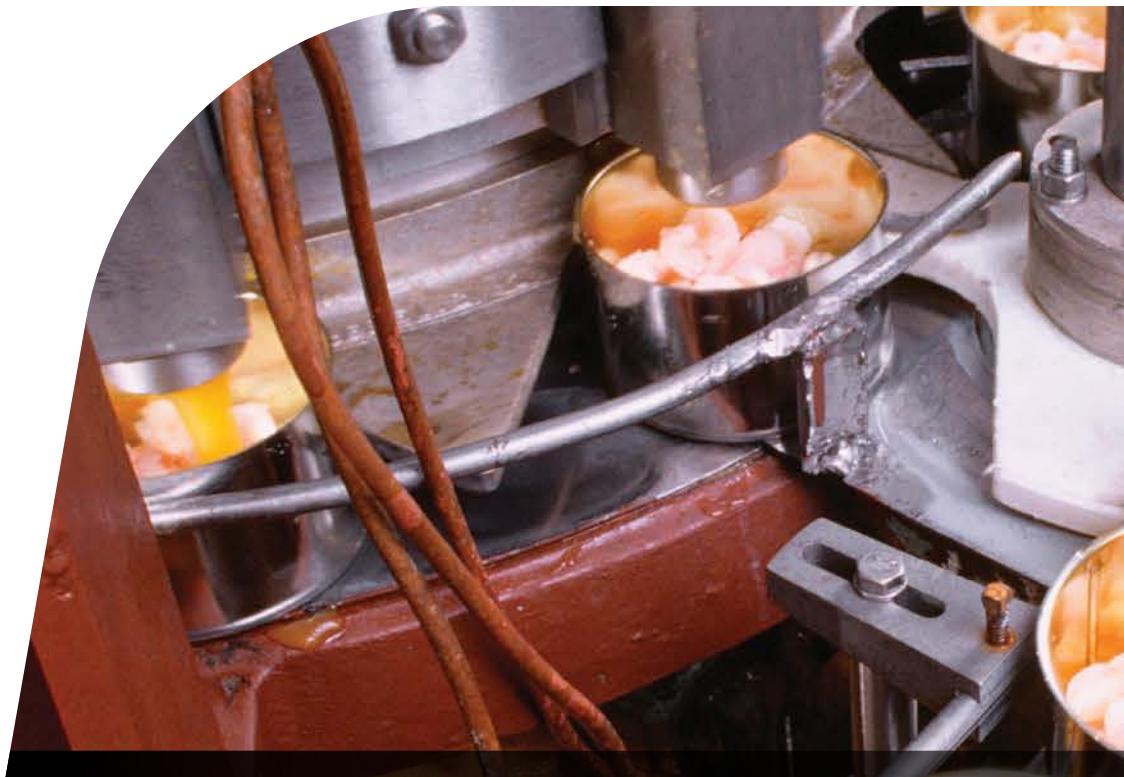


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