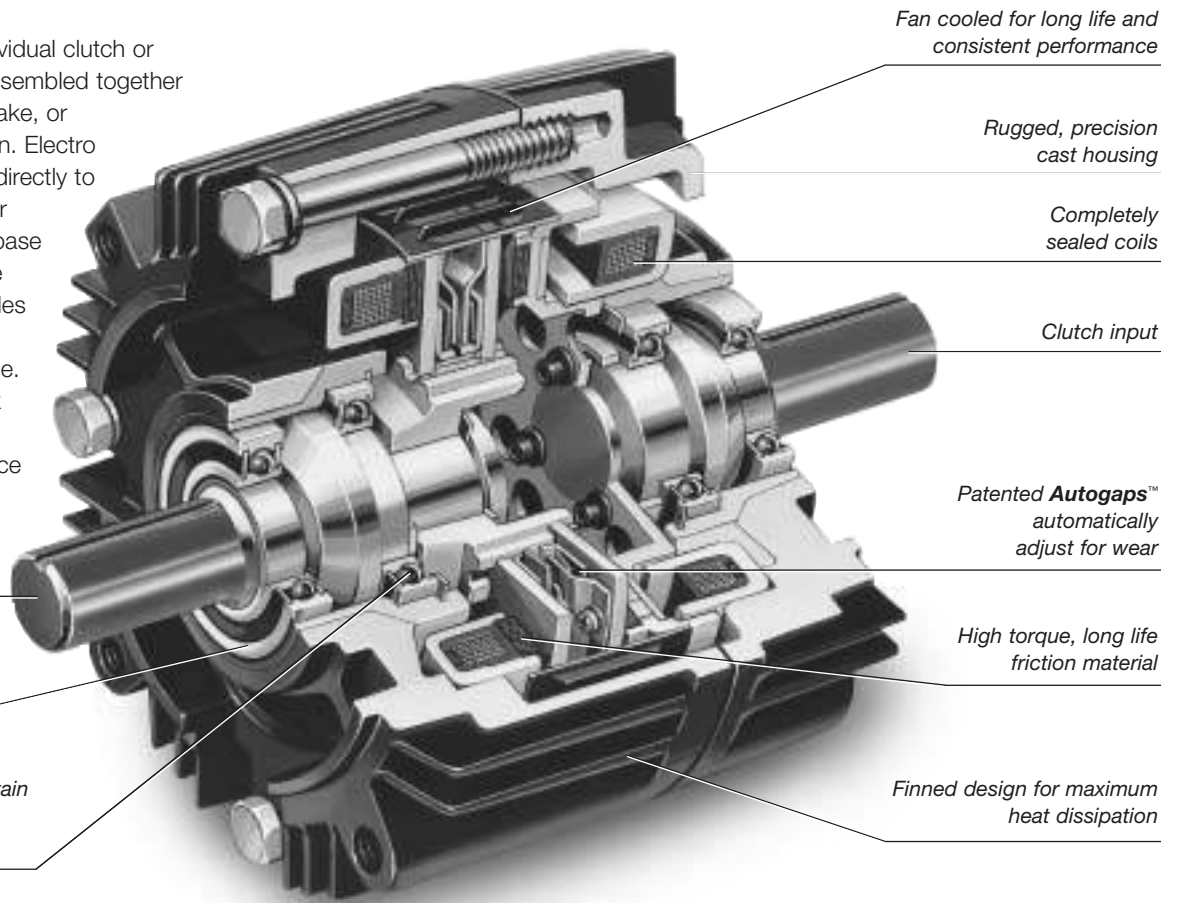


## Individual Clutch or Brake Module Combine to Comprise a Clutch, Brake or Clutch/Brake Combination!

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



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

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

### **Selection Flexibility Clutch/Brake Combination**

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

### **Power-On Applications**

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

### **Power-Off (Electrically Released) Applications**

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

### **Selection**

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

### **Controls**

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

### Clutch Modules

#### 10 Motor Clutch

Fan cooled for long life and consistent performance.

See page 14.



#### 30 Input Clutch

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

See page 16.



#### 40 Output Clutch

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

See page 17.



### Brake Modules



#### 20 Brake

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

#### 20-FBB Electrically Released Brake

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

#### 20-FBC Electrically Released Brake

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



#### 20MB Motor Brake

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

#### 20MBFB Electrically Released Motor Brake

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

### Clutch Combinations



#### 10/40

##### Motor Clutch/Output Clutch

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



#### 30/40

##### Input Clutch/Output Clutch

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



#### 30/40-B

##### Input Clutch/Output Clutch-Base Mounted

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

### Clutch/Brake Combinations



#### 10/20

##### Motor Clutch/Brake

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

#### 10/20-FBC

##### Motor Clutch/Electrically Released Brake

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



#### 20/30

##### Brake/Input Clutch

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

#### 20/30-FBC

##### Electrically Released Brake/Input Clutch

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



#### 20/30-B

##### Brake/Input Clutch-Base Mounted

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

#### 20/30-FBC-B

##### Electrically Released Brake/Input Clutch-Base Mounted

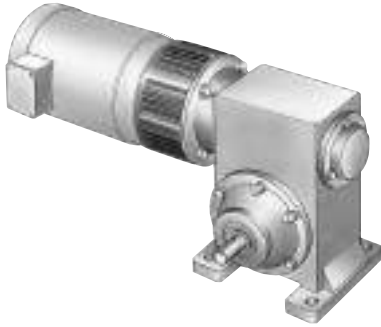
Stand alone units attach with pulleys, sprockets, etc. See page 122.

## Selection

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

### 1. Select Configuration

#### a. NEMA C-face Mounting



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

#### b. Base Mounting



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

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

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

### 2. Determine Technical Requirements

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

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

### Frame Size Selection

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

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

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

### Horsepower vs. Shaft Speed

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

## a. Heat Dissipation Sizing

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

Heat dissipation requirement is calculated as follows:

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

where:

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

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

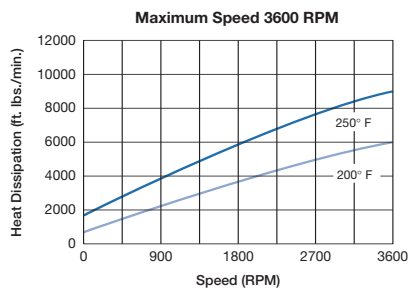
N = Speed in revolutions per minute. (RPM)

F = Cycle rate in cycles per minute (CPM)

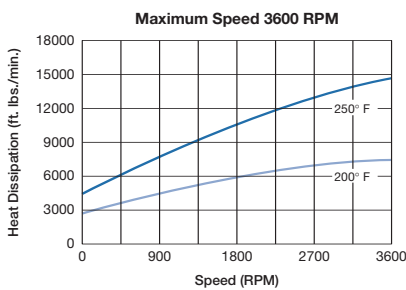
Compare the calculated heat generated in the application to the unit ratings using the heat dissipation curves. Select the appropriate unit that has adequate heat dissipation ability.

## Heat Dissipation Curves

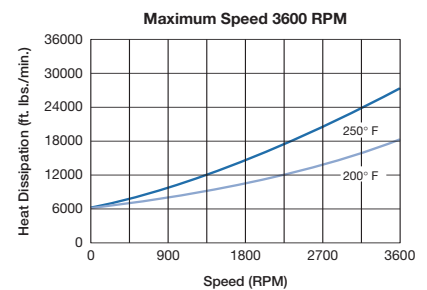
Size 50



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:

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

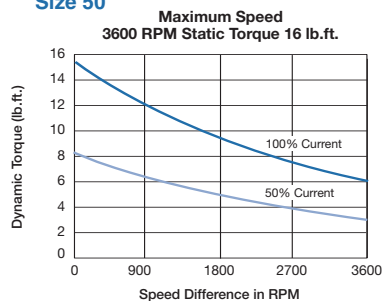
$WR^2$  = Total reflected inertia at the clutch/brake shaft. Include the clutch/brake output inertia. (lb. ft.<sup>2</sup>)

N = Speed in revolutions per minute. (RPM)

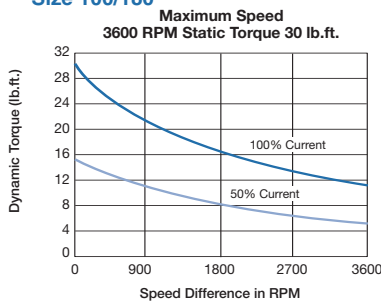
t = Time allowed for the engagement (sec)

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

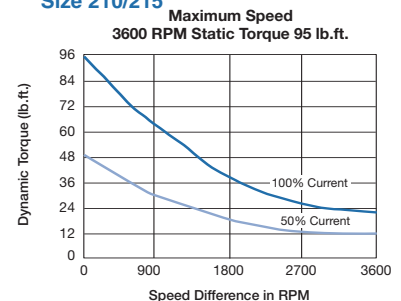
Size 50



Size 100/180



Size 210/215



## Specifications

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

### 3. Accessories

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

#### a. Conduit Box

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



#### a. Mounting Brackets

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



### 4. Select Control

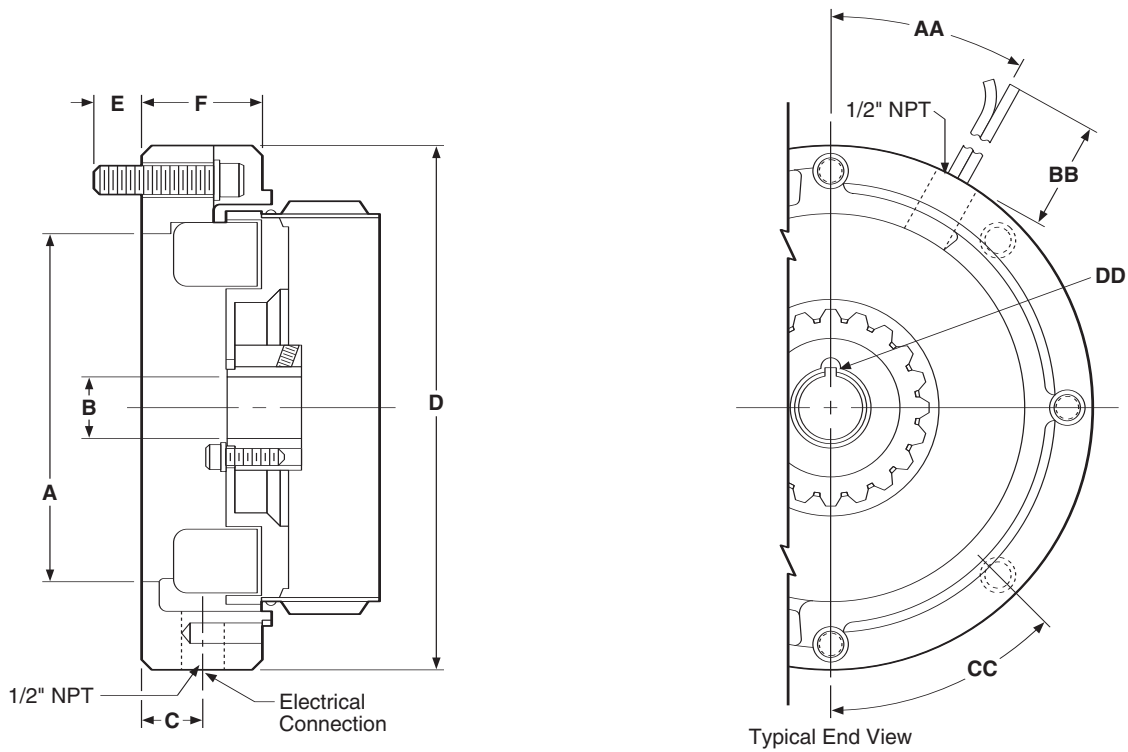
Warner Electric manufactures clutch/brake controls to meet several system functions including:

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

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



## 10 Motor Clutch Module



All dimensions are nominal, unless otherwise noted.

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

### Specifications

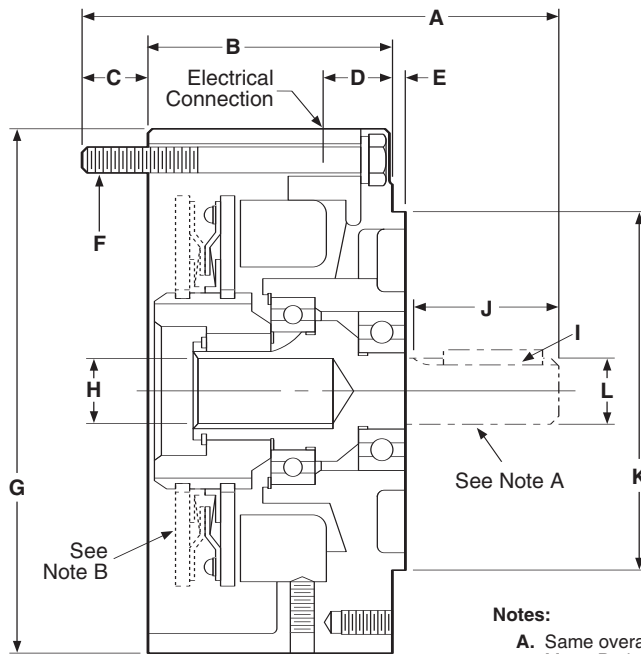
Model Size	Voltage DC	Static Torque lb. ft.	Max. RPM	Inertia-WR <sup>2</sup> (lb.ft. <sup>2</sup> )	Weight (lbs)	NEMA Frame Size
50	6, 24, 90	16	3600	.020	3.4	56C/48Y*
100	6, 24, 90	30	3600	.046	5.1	56C/48Y**
180	6, 24, 90	30	3600	.046	5.1	182C/143TC 184C/145TC
210	6, 24, 90	95	3600	.188	9.1	213C/182TC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

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

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

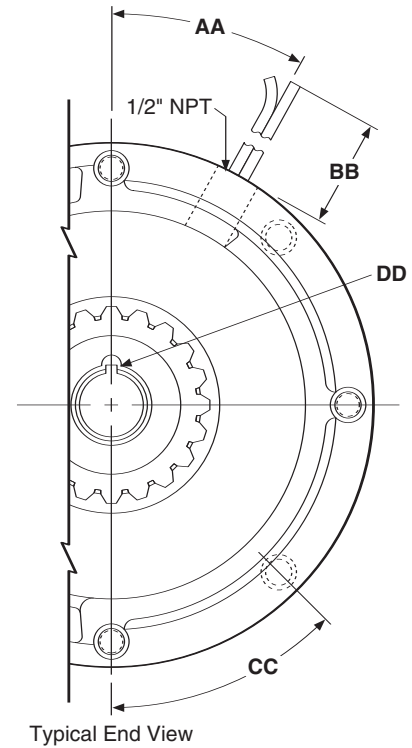
For NEMA Standard frame sizes, see page 137.

## 20 Brake Module 20MB Brake Module



**Notes:**

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



Typical End View

All dimensions are nominal, unless otherwise noted.

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

### Specifications

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

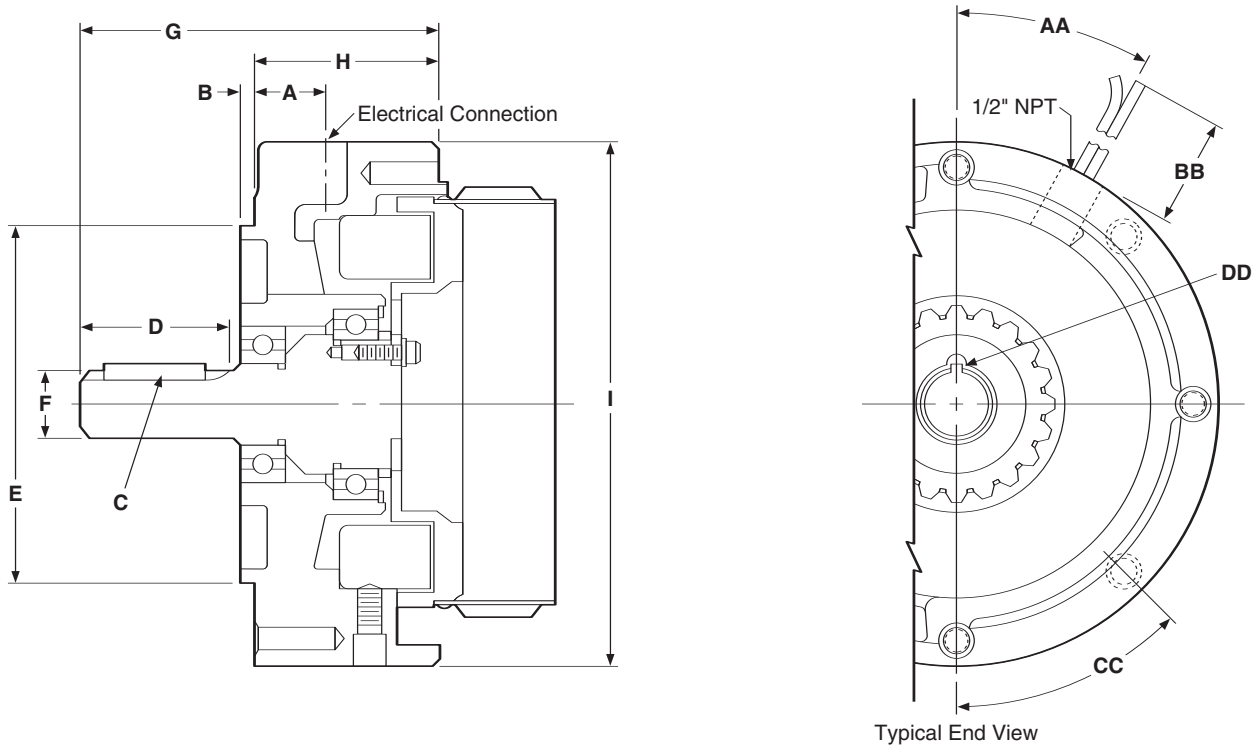
\* For 56C/48Y Frame motors 3/4 HP and smaller the EM-100 size may be used where extended life is desirable.

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

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

For NEMA standard frame sizes, see page 137.

## 30 Input Clutch Module



All dimensions are nominal, unless otherwise noted.

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

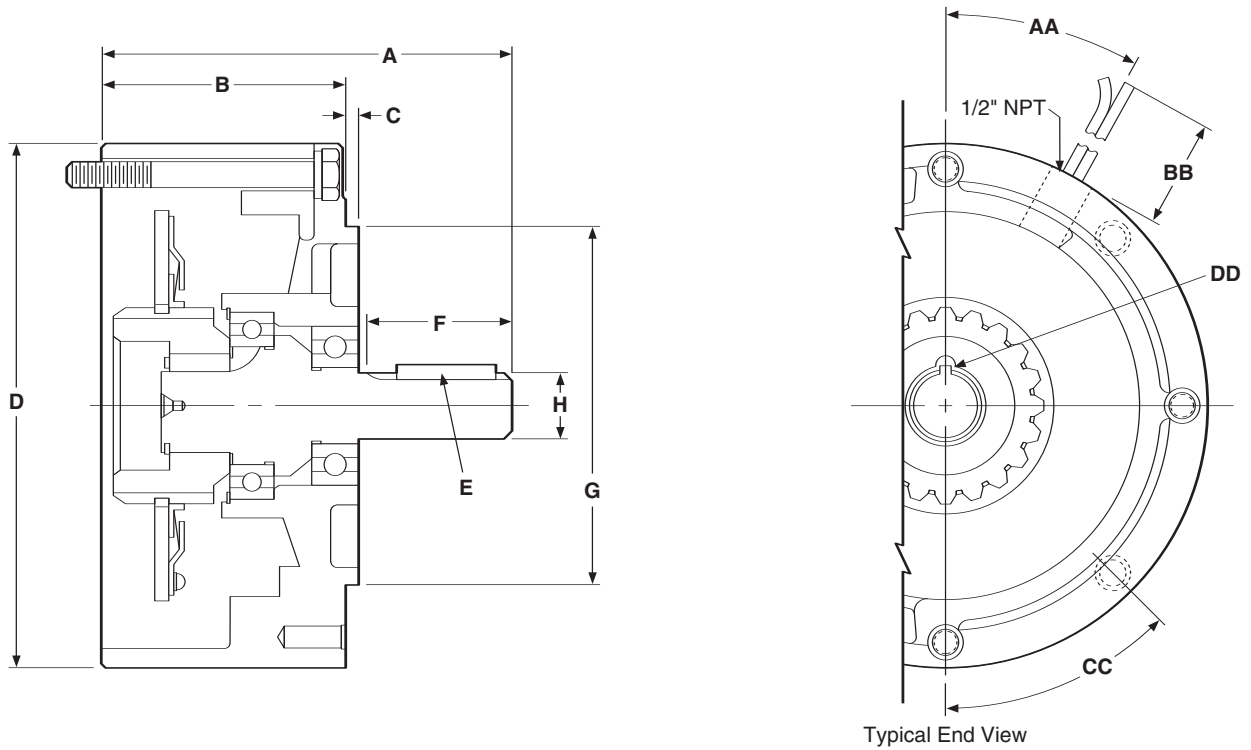
### Specifications

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

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

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

For NEMA standard frame sizes, see page 137.



All dimensions are nominal, unless otherwise noted.

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

### Specifications

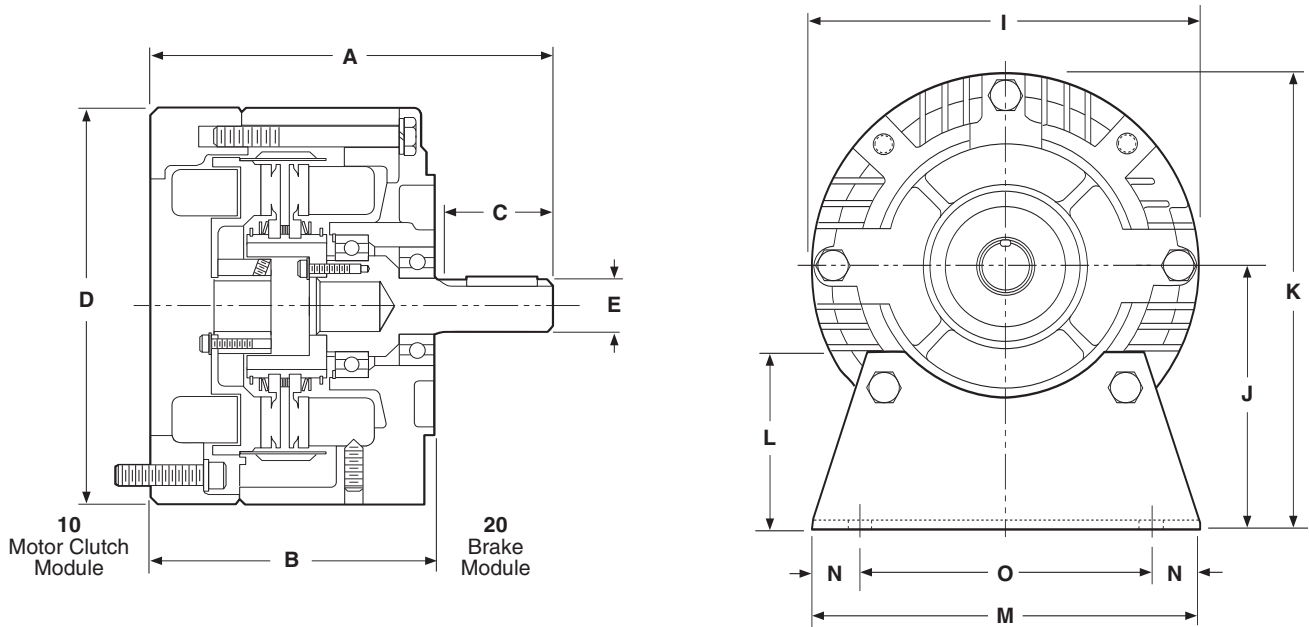
Model Size	Voltage DC	Static Torque lb. ft.	Max. RPM	Armatures	Inertia-WR <sup>2</sup>		Shaft	Weight (lbs)	NEMA Frame Size
					Arm. Hub				
50	6, 24, 90	16	3600	.007	.002	.001	4.9	56C/48Y*	
100	6, 24, 90	30	3600	.018	.003	.002	5.2	56C/48Y**	
180	6, 24, 90	30	3600	.018	.003	.002	5.2	182C/143TC 184C/145TC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

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

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

For NEMA standard frame sizes, see page 137.

**EM-10/20 Clutch/Brake Combination**



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

All dimensions are nominal, unless otherwise noted.

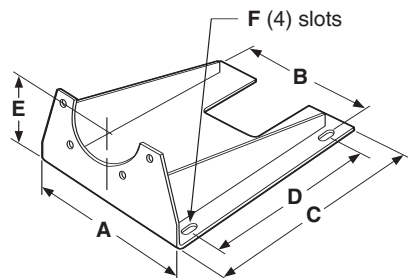
Size	A	B	C	D	E	I	J	K	L	M	N	O	NEMA Frame Size
50	6.750	4.844	1.813	6.750	.625	6.688	3.500	6.844	2.000	6.000	.500	5.000	56C/48Y*
100	6.750	4.844	1.813	6.750	.625	6.688	3.500	6.844	2.000	6.000	.500	5.000	56C/48Y**
180	6.828	4.844	1.891	6.750	.875	6.688	4.500	7.844	3.000	6.625	.813	5.000	182C/143TC 184C/145TC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

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

For NEMA standard frame sizes, see page 137.

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

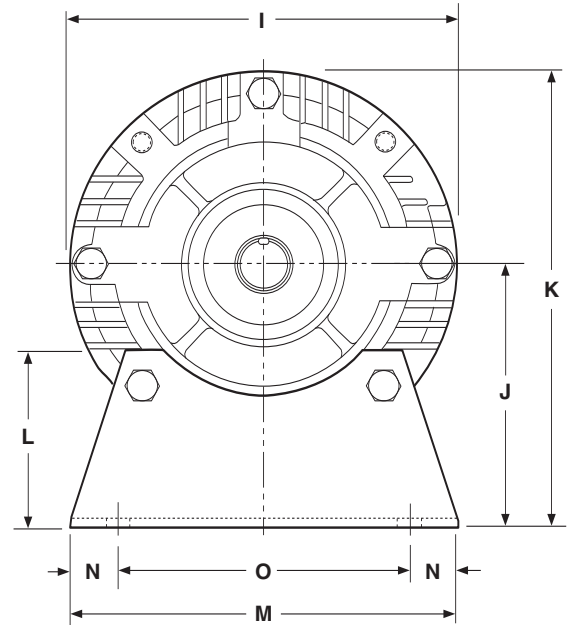
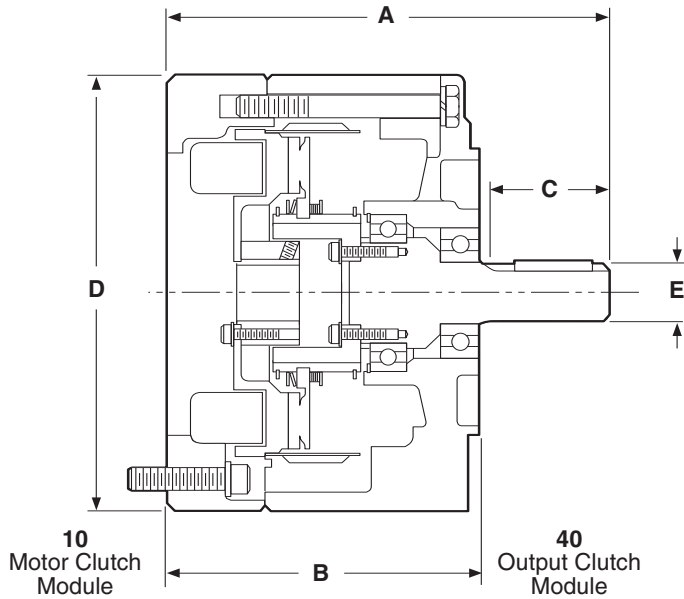
**Motor Mount (M)**



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

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

EM-10/40 Motor Clutch/Output Clutch Combination



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

All dimensions are nominal, unless otherwise noted.

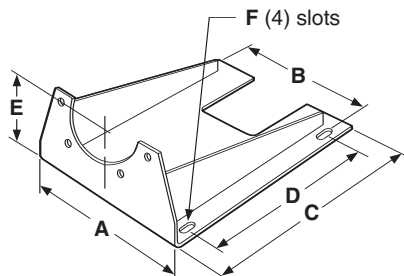
Size	A	B	C	D	E	I	J	K	L	M	N	O	NEMA Frame Size
50	6.750	4.844	1.813	6.750	.625	6.688	3.500	6.844	2.000	6.000	.500	5.000	56C/48Y*
100	6.750	4.844	1.813	6.750	.625	6.688	3.500	6.844	2.000	6.000	.500	5.000	56C/48Y**
180	6.828	4.844	1.891	6.750	.875	6.688	4.500	7.844	3.000	6.625	.813	5.000	182C/143TC 184C/145TC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

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

For NEMA standard frame sizes, see page 137.

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

Motor Mount (M)

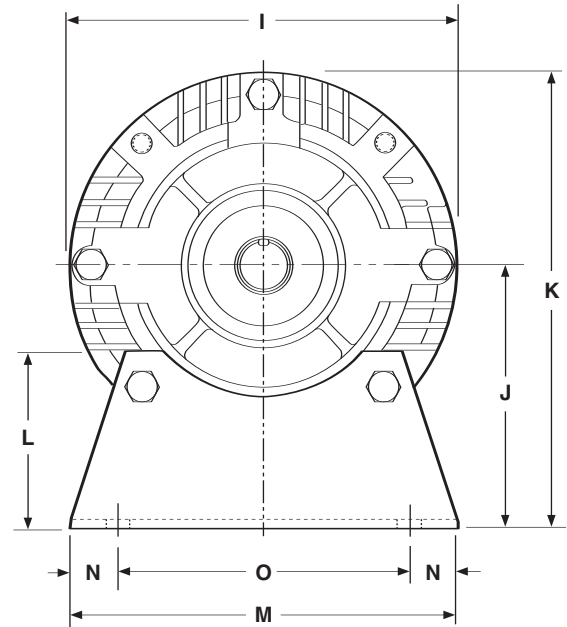
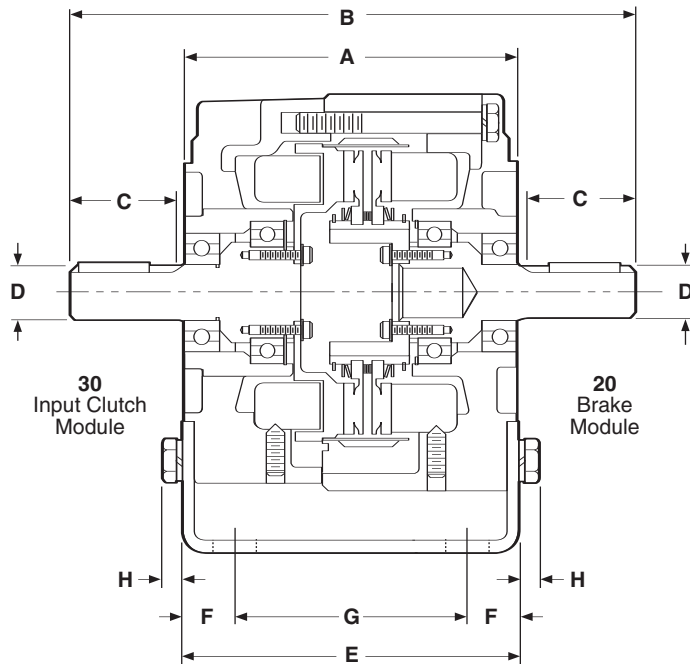


For use with 1020, 1040, 20, 20 FBB and 1020 FBC Combinations.

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

## EM-20/30 Brake/Input Clutch Combination

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

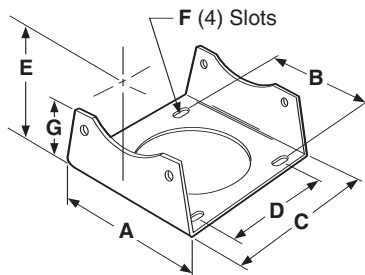


Note: Mounting base is optional and is ordered separately. Input Clutch (30) module and Brake Module (20) are ordered separately.

All dimensions are nominal, unless otherwise noted.

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

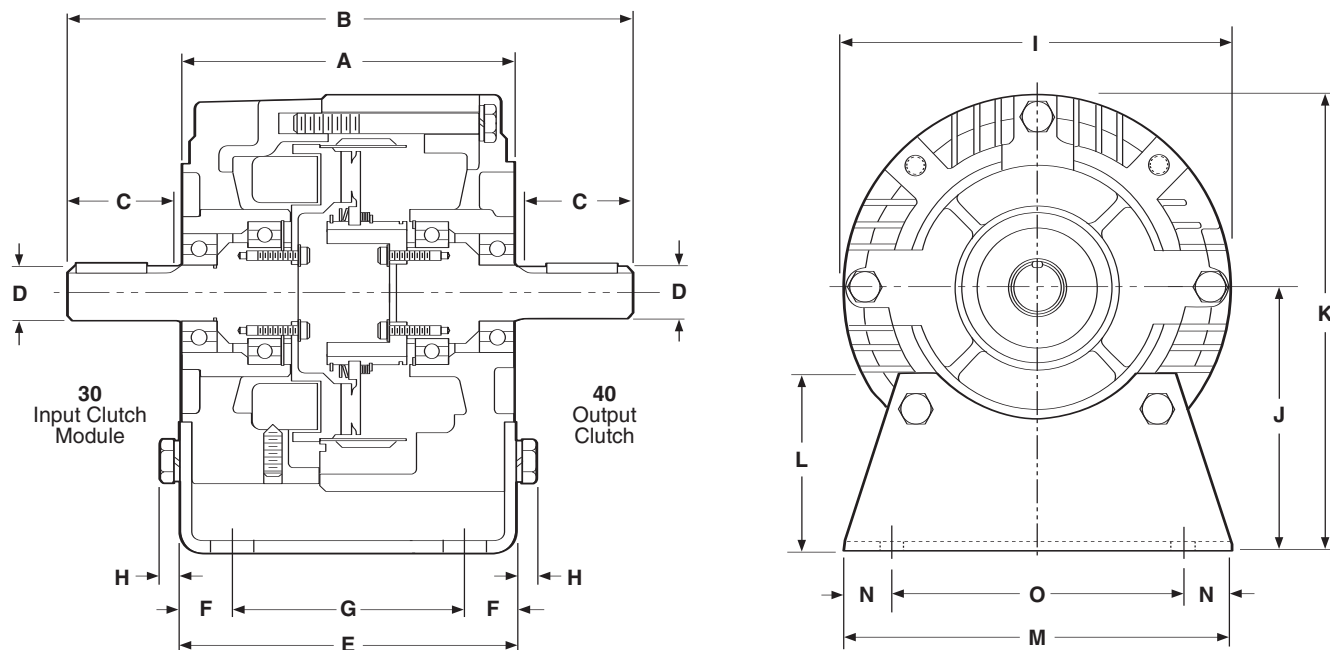
### Base (B)



For use with 2030 and 3040 units.

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

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

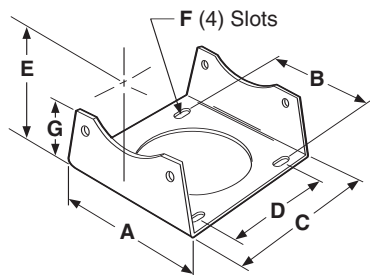


Note: Mounting base is optional and is ordered separately.  
Input Clutch (30) module and Output Clutch (40) are ordered separately.

All dimensions are nominal, unless otherwise noted.

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

**Base (B)**



For use with 2030 and 3040 units.

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

**Distribuidor Autorizado e Importador - Arten Freios e Embreagens Ltda.**

**Fone: (11) 5594-8333 • Fax (11) 5589-2422 - arten@arten.com.br • www.arten.com.br**