

Warner Electric

Boston Gear

TB Wood's

Formsprag Clutch

Wichita Clutch

Marland Clutch

Industrial Clutch

Bauer Gear Motor

Nuttall Gear

Warner Linear

Delroyd Worm Gear

Stieber Clutch

Ameridrives Couplings

Inertia Dynamics

Matrix International

Huco Dynatork

Bibby Turboflex

Twiflex Limited

Kilian Manufacturing

Lamiflex Couplings

Ameridrives Power  
Transmission

# How to Select a Clutch or Brake



As seen in  
**Design World**  
August, 2012

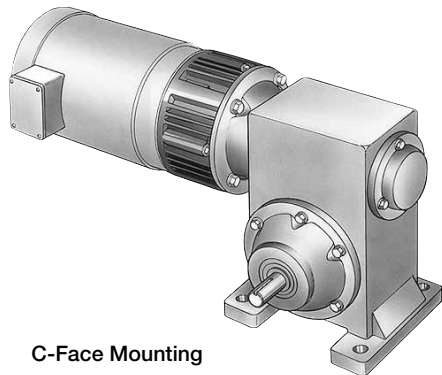
As seen in  
**Design World**  
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An Altra Industrial Motion Company

# Clutch and Brake Selection Process

By Greg Cober, Altra Industrial Motion Sales and Product Training Manager



C-Face Mounting

## Clutch and/or Brake

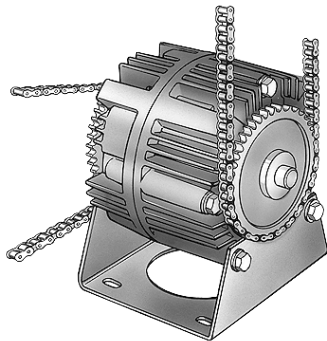
At the most basic level, the designer will identify if the application calls for a clutch, a brake or a combination clutch and brake. A **clutch** would be used in applications where it is desirable to engage/disengage the load and motor while leaving the motor to run all of the time. When a clutch is used the load will be allowed to coast to a stop.

A **brake** would be used in applications where accurate stopping of the load is needed and the motor will stop as well. A **clutch and brake combination** would be used where the load will be started and stopped while the motor continues to rotate.

For C-face mounted designs, all three choices are available. When making a unit selection there are several key steps that are common.

## Mounting

The next choice is unit mounting. Both clutches and clutch brakes can mount to the motor shaft or be base mounted and have input via a belt drive, chain drive or coupling.



Base Mounting

## Motor Horsepower and Frame Size

Once function is determined, the next step is to define motor HP and motor frame size. In the case of base mounted units it may be necessary to define the RPM at that location.

Manufacturers provide quick selection charts where unit size is determined by finding the intersection of Motor HP and Speed at the Clutch shaft. The charts are commonly created using the dynamic torque capacity for the product and the torque capacity for the motor plus an overload factor of some value. Using this method presumes that the designer has selected a motor that is sized appropriately to the application. In applications where cycle rates are considered aggressive for the inertia of the load, consulting with the application support staff of the manufacturer regarding heat dissipation capacity would be wise.

### 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											UM-50							
3/4																		
1																		
1-1/2																		
2																		
3																		
5																		
7-1/2																		

In some cases, a given motor HP may have more than one frame size choice. For instance, 1 HP motors can be either a 56C frame or a 143TC frame. Since this impacts shaft size, it is critical to know this. As with HP/RPM selection, manufacturers will provide charts such as the one below where unit size and frame size are shown. Since frame size determines unit shaft size, that factor would be pre-determined.

### 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.

### Coil Voltage

The last remaining variable is coil voltage: 6, 24 and 90 volt DC are common options with 90 volt being widely preferred in North American markets, while 24 volt is more common in Europe. In both cases, clutch/brake manufacturers can provide power supplies to convert AC power to DC.

## About Altra Industrial Motion

Altra Industrial Motion (NASDAQ:AIMC) is a leading multi-national designer, producer and marketer of a wide range of electromechanical power transmission products. The company brings together strong brands covering over 40 product lines with production facilities in nine countries.

Altra's leading brands include Boston Gear, Warner Electric, TB Wood's, Formsprag Clutch, Wichita Clutch, Industrial Clutch, Ameridrives Couplings, Kilian Manufacturing, Marland Clutch, Nuttall Gear, Bauer Gear Motor, Stieber Clutch, Twiflex Limited, Bibby Turboflex, Matrix International, Inertia Dynamics, Huco Dynatork, Lamiflex Couplings, Ameridrives Power Transmission, Delroyd Worm Gear and Warner Linear. For information on any of these technology leaders, visit [www.AltraMotion.com](http://www.AltraMotion.com) or call 815-389-3771.



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### **US (Application Assistance)**

800-825-9050  
[www.warnerelectric.com](http://www.warnerelectric.com)

### **Europe**

+33 (0) 2 41 21 24 76

### **Asia Pacific**

For a list of our AP sales offices:  
[www.AltraMotion.com/ContactUs](http://www.AltraMotion.com/ContactUs)