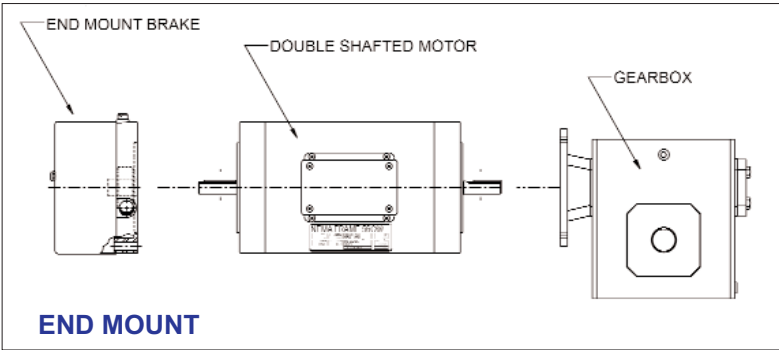


# DIRECT-ACTING BRAKES

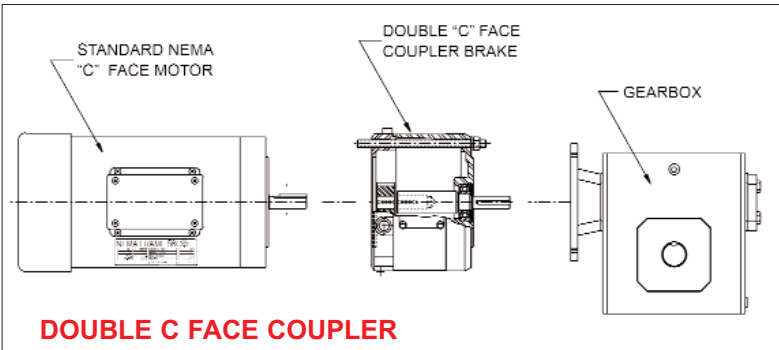
## BRAKE SELECTION GUIDE

Complete Line of Spring-Set, Direct-Acting Brakes

## CHOOSING A BRAKE TYPE



Brake mounts to the non-drive end of a motor C face. Match to motor frame size and mounting dimensions.



Brake mounts between a C face motor and C face gearbox (match to frame size and mounting dimensions).

## TORQUE REQUIREMENTS

To effectively determine which brake is appropriate for your particular application, you must first calculate the amount of torque required by the system. There are two types of situations in which a brake may be used:

**Non-Overhauling** load and **Overhauling** load.

In the case of a non-overhauling load, gravitational forces do not change the energy in the system and the internal friction of the system is sufficient to hold the load, i.e. an external means is not required to maintain system stability after it has stopped. Examples of this situation would include grinders, horizontal conveyors, etc. To calculate the torque required in a non-overhauling load situation, refer to the formula below. For overhauling loads, refer to Technical Data in the brake catalog, publication #BK4700.

To calculate torque for a non-overhauling application:

$$T_S = \frac{5252 \times P}{N} \times SF$$

Where,

$T_S$  = Static torque, lb-ft

$P$  = Motor horsepower, hp

$N$  = Motor full load speed, rpm

$SF$  = Service Factor

5252 = Constant

## BRAKE SELECTION GUIDE - NEMA C FACE BRAKES

x= mounts directly,

Brake Type	NEMA 2 / Dripproof Enclosure								NEMA 4 / IP56 Enclosure					
	End Mount Brakes							Double C face Coupler brakes		End Mount Brakes				Double Coupler
Brake Series	40	50	60 - 5600	60	70	80	90	60	70	60	70	80	90	60
Torque Rating	3/8 and 3/4 lb-ft	1.5 to 6 lb-ft	1.5 to 15 lb-ft	1.5 to 25 lb-ft	10 to 75 lb-ft	25 to 175 lb-ft	125 to 450 lb-ft	1.5 to 25 lb-ft	10 to 75 lb-ft	1.5 to 25 lb-ft	10 to 75 lb-ft	25 to 175 lb-ft	125 to 450 lb-ft	1.5 to 25 lb-ft
Frame Size														
small/fractional hp	X													
48C		X	①	①				①		①				
56C 143/145TC		①	X	X	①			X	①	X	①			X
182/184TC 213/215TC 254/256TC			①	①	X	①		①	X	①	X	①		①
284TC- 286TC			①	①	①	X	①	①	①	①	①	X	①	①
324/326TC 354/356TC 404/405TC					①	①	X				①	①	X	
444-445TC 444-445UC						①	①					①	①	

## ENCLOSURE TYPE

### NEMA 2 / IP41

Type 2 enclosures are intended for general purpose indoor use primarily to provide a degree of protection against limited amounts of falling water and dirt.

### NEMA 4 / IP56

Type 4 enclosures are intended for general purpose indoor or outdoor use primarily to provide a degree of protection against windblown dust and rain, splashing water, and hose directed water; and to be undamaged by the formation of ice on the enclosure.

### NEMA 4X / IP56 with BISSC (Baking Industry Sanitation Standards Committee) Certification

Type 4X enclosures are intended for general purpose indoor and outdoor use primarily to provide a degree of protection against corrosion, windblown dust and rain, splashing water, and hose-directed water; and to be undamaged by the formation of ice on the enclosure.

### NEMA 4 / IP56 Marine, Maritime, Navy

#### Built for Harsh Environments:

**Maritime Brakes - Designed for shipboard & dockside applications that are exposed to water and seawater. Compliant with IEEE 45 (IEEE 45 nameplate must be requested)**

**Marine Brakes - Designed for shipboard & Coast Guard applications that are exposed to seawater. Compliant with IEEE 45 (IEEE 45 Nameplate must be requested).**

**Navy Brakes - Built in accordance with MIL-B-16392 specifications.**

### HAZARDOUS LOCATION

Dings hazardous location brakes are UL listed for use in Division 1, Class I, Groups C and D and Division 1, Class II, Groups E, F and G locations.

Refer to <http://www.ul.com/global/eng/pages/offering/services/hazardouslocations/techsummary/> for more information regarding hazardous locations.














### Service Factor Selection

A service factor is a value that is applied to the calculated system torque. This value helps to account for any inaccuracies or variations that may occur within the system. By multiplying the service factor by the result of the basic torque equation ( $Torque = HP * 5252 / RPM$ ), a new resultant torque value would be obtained. For overhung load applications, the service factor would be multiplied by the calculated system torque to determine the resultant torque value. The resultant torque value would then be used in sizing the brake(s). Typically, a service factor will range from 1.0 to 2.0, but these values can sometimes fall outside of this range.

It is highly recommended that if the service factor is less than 1.0 or greater than 2.0, that the application be discussed with a Dings Representative or the designer of the system or machinery.

The most common service factors are 1.0, 1.4 and 2.0. For most standard applications, a 1.4 service factor would be used. These types of application would include dynamic stopping and holding applications where the brake would typically provide a slightly greater amount of torque than the motor output but still not create a high shock stop. A 1.0 service factor would typically be used in any non-critical or non-holding applications where a soft stop (longer stop time) would be required. A 2.0 service factor would be used for applications where extra torque is required to ensure adequate holding. These brakes would also have a faster stop time and thus put more shock into the system. In all cases, thermal capacity and/or stop time (dynamic shock) should be considered for the application to ensure proper brake sizing, torque level and service factor.

①= adaptor required

End Mount Brakes	NEMA 4X / IP56				MARINE MARITIME NAVY						HAZ. LOCATION	
	End Mount Brakes		Double C face Coupler brakes		End Mount Brakes				Double C face Coupler brakes		End Mount Brakes	
70	60	70	60	70	60 Marine Maritime	70 Marine Maritime Navy	80 Marine Maritime Navy	90 Marine Maritime	60	70	60	70
10 to 75 lb-ft	1.5 to 25 lb-ft	10 to 75 lb-ft	1.5 to 25 lb-ft	10 to 75 lb-ft	1.5 to 25 lb-ft	10 to 75 lb-ft	25 to 175 lb-ft	125 to 450 lb-ft	1.5 to 25 lb-ft	10 to 75 lb-ft	1.5 to 25 lb-ft	10 to 75 lb-ft
												
	①		①		①				①		①	
①	X	①	X	①	X	①			X	①	X	①
X	①	X	①	X	①	X	①		①	X	①	X
①	①	①	①	①	①	①	X	①	①	①	①	①
①		①		①		①	①	X		①		①
							①	①				



## SPECIAL APPLICATIONS BRAKE OPTIONS

Options can be added to the standard brakes to meet your application requirements. The most common options are listed here; other options are available. It is recommended that special or demanding applications be discussed with a Dings representative to ensure that all aspects of the application are considered.

Application Requirements	Suggested Options	Description
Special mounting	Motor frame adaptor	Adapting to larger or smaller motor frame
	Foot mounting bracket	Floor mounting bracket if no c face is available
	Vertical mounting above or below motor	Motor shaft is vertical, brake mounts above or below motor
Internal corrosion resistance	Aluminum bronze stationary discs	Provides extra corrosion resistance
	Internal space heater	Helps dissipate moisture due to cold or humid conditions
	Stainless steel stationary disc	Provides extra corrosion resistance
	External breather	Prevents ingress of moisture in humid conditions
Sea/salt water dockside and ship applications	Marine finish and plating	Military paint and special plating for protection against severe weather conditions
	Harsh environment	Special paint and plating for severe weather conditions; intended for non-military offshore applications
Heavy duty high cycle/shock applications	Ductile iron stationary discs	Ductile iron provides greater strength for high cycle applications
	Heavy duty friction discs and hardened hub	Metal disc center provides extra tooth support
	High tensile studs	Studs are made from high strength steel
High humidity	Fungal protection	Anti-fungal coating on electrical coils
	Internal space heater	Special resistor helps dissipate moisture in brakes
	External breather	Prevents ingress of moisture in humid conditions
High temperature	Class "H" insulation	High temperature coil wire insulation for extra thermal protection
Tach / Encoder Mounting	Tach machining	Machined face on brake cover allows mounting of tachometer
	Through shaft	Hole in brake cover allows motor shaft to continue through the brake enclosure
	"Smart" brake	Internally mounted encoder provides feedback on motor positioning and speed
Brake monitoring	Manual release indicator switch	Indicates if brake is manually released
	Electrical release indicator switch	Indicates if brake is electrically released
	Wear indicator	Indicates when brake requires air gap adjustment
High inertia loads	Heavy duty friction discs and hardened hub	Metal disc center provides extra tooth support



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