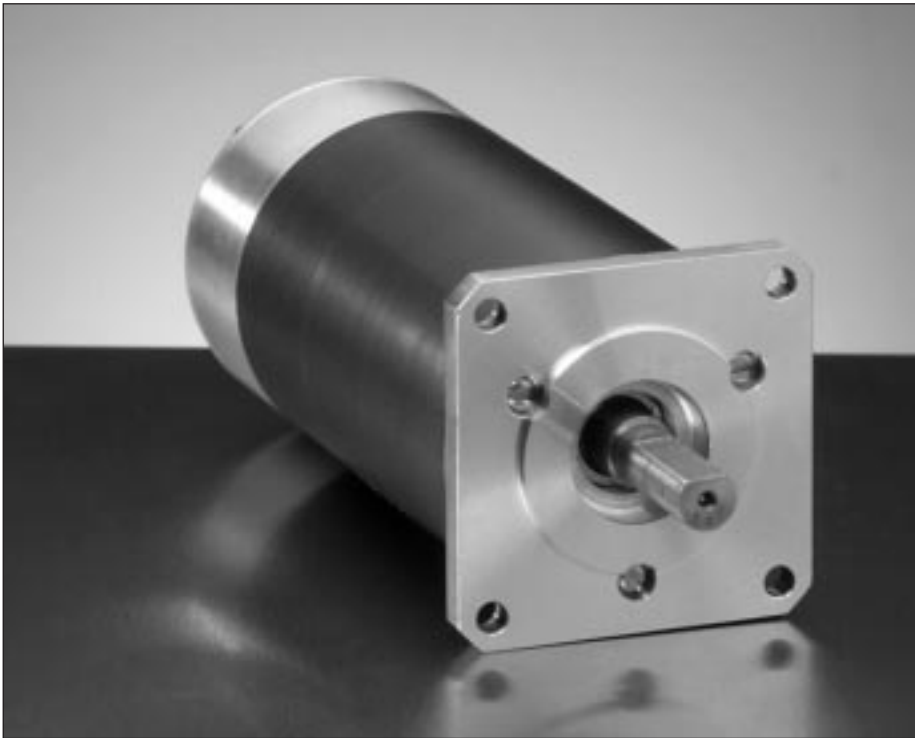


### **BMR 2000** **S E R I E S**

Series 2000, 325 VDC brushless servo motor — provides fast response, accurate control and high torque-to-inertia ratios

- Trouble-free brushless construction
- Continuous torque ratings up to 10 lb.-in. —with speeds up to 10,000 RPM
- IP65 Sealing available
- NEMA mounting features available
- IEC 72 Metric specifications available
- Maximum torque per frame size with high performance Neodymium magnets
- Superior low speed performance
- Numerous custom options available



#### Performance Benefits

Cleveland Motion Controls specializes in the design of high performance brushless servo motors that provide efficiency, flexibility of application, and a long and trouble-free service life. Our TORQUEMASTER™ BMR 2000 series is no exception.

With fast response, accurate control and high torque-to-inertia ratios, you can count on the TORQUEMASTER 2000 Series of servo motors to provide smooth operation throughout a full speed range. The BMR 2000 Series delivers smooth and superior low speed performance and maximum power ratings with low thermal resistance for high speed performance. In addition, with maximum torque in a smaller package, you can count on better pricing for a better overall value.

When integrated with high performance brushless amplifiers, TORQUEMASTER BMR 2000 servo motors provide effective and highly efficient motion control solutions for a wide range of applications—including factory automation, packaging, robotics, semi-conductor, machine tools, medical instrumentation, and more.

#### Design Features

TORQUEMASTER BMR 2000 Series servo motors are rated from 5 lb.-in. to 10 lb.-in. with speeds and torque stability up to 10,000 RPM—accommodating DC bus voltages up to 325 volts. They utilize the latest in high performance Neodymium, permanent magnet technology, and are available in several standard windings (as well as custom windings) to meet your most demanding applications.

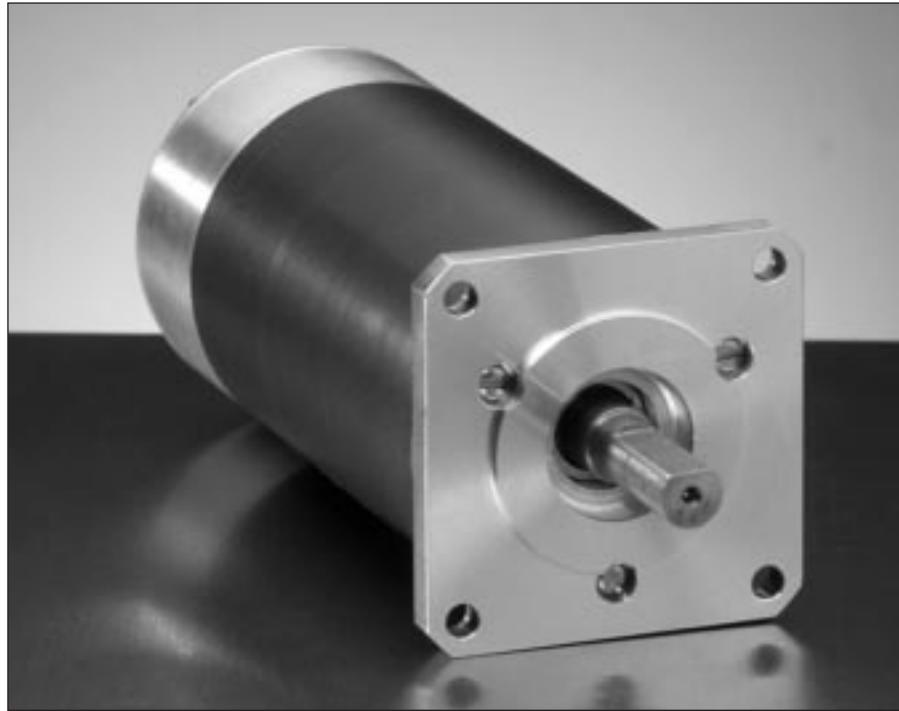
Each servo motor in the TORQUEMASTER 2000 Series is ruggedly designed and manufactured for reliable performance. To satisfy many different applications, TORQUEMASTER 2000 Series motors are manufactured to NEMA/IEC specifications.

TORQUEMASTER BMR 2000 Series servo motors come standard with hall sensor or resolver commutation. Encoders, brakes, gearheads and other options available.



## BMR 2000 S E R I E S

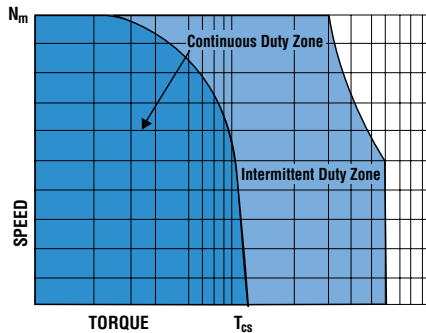
- Continuous torque range of 5 lb.-in. to 10 lb.-in.
- Neodymium magnet construction
- More torque per smaller frame size
- Speeds to 10,000 RPM
- High torque-to-inertia ratios



### MOTOR CHARACTERISTICS

SYMBOL	MOTOR PARAMETER	UNITS	BMR2005T	BMR2010B
P	Power	KW	.214	.35
N <sub>m</sub>	Max Operating Speed	RPM	10,000	10,000
T <sub>C</sub>	Max Stall Torque	lb.-in.(Nm)	5 (.57)	10 (1.13)
T <sub>pk</sub>	Peak Torque	lb.-in.(Nm)	23 (2.6)	45 (5.1)
K <sub>T</sub>	Torque Sensitivity	lb.-in./AMP(Nm/Amp)	.84 (.095)	2.53 (.286)
K <sub>e</sub>	Back E.M.F.	Volts/Krpm	10	30
R <sub>a</sub>	Resistance Line to Line	Ohms	1.61	3.69
L	Inductance Line to Line	MilliHenry	1.2	3.69
J <sub>m</sub>	Rotor Inertia	lb.-in.-sec <sup>2</sup> (Kg-m <sup>2</sup> )	.0004 .000045	.0009 .0001
T <sub>F</sub>	Static Friction	lb.-in.(Nm)	.16 (.018)	.16 (.018)
W <sub>T</sub>	Motor Weight	Lbs(Kg)	3.0 (1.35)	4.0 (1.8)

### TORQUE PERFORMANCE CURVES



**NOTE:** Continuous torque specifications obtained with motor mounted to an 8.5"×12"× 0.25" aluminum plate at 25°C ambient. Typical values are within ±10% of rating.

#### Relationship Between K<sub>e</sub> & K<sub>T</sub>

Torque Systems uses the following important motor performance parameters for the 3 phase square wave and 3 phase sine wave brushless motors in order to properly account for the British Imperial unit system currently used in the US.

**K<sub>e</sub>** = Line-to-line volts-peak / Krpm\*

**K<sub>T</sub>** = Pound-inches (lb-in) / peak phase amps

**K<sub>e</sub> is related to K<sub>T</sub> as follows:**

**K<sub>T</sub>** = K<sub>e</sub>/11.834 for 3 phase square wave current driven amplifiers

**K<sub>T</sub>** = K<sub>e</sub>/13.662 for 3 phase sinusoidal wave current driven amplifiers

\*Krpm = 1000 rpm

For "RMS" values, divide peak values by √3

#### STANDARD SPEED/TORQUE CURVE DATA FOR SIZING A SERVO MOTOR

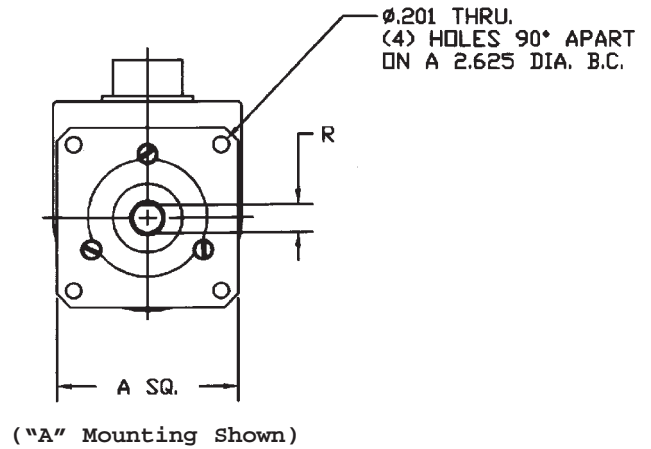
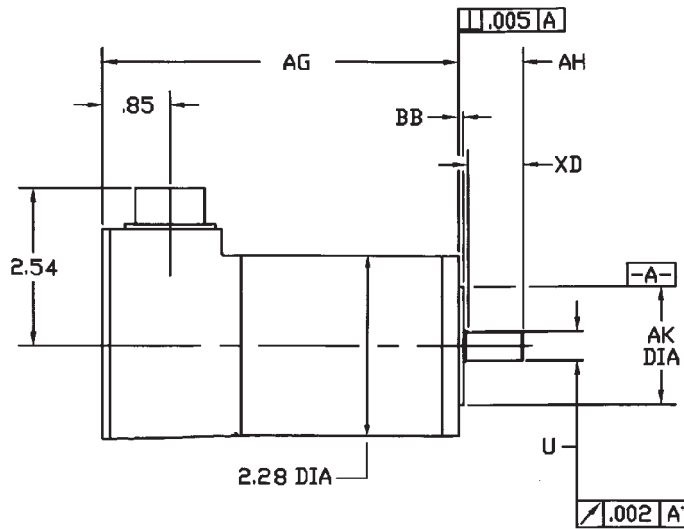
**N<sub>m</sub>** = Maximum speed, continuous operation

**T<sub>cs</sub>** = Continuous stall torque

All specifications subject to change without notice.

## MECHANICAL SPECIFICATIONS

# BMR 2000 SERIES



Note: BMR 2000 Series is available with modular encoder option (not shown). Please consult factory.

## DIMENSION CHART (Dimensions may change depending upon options)

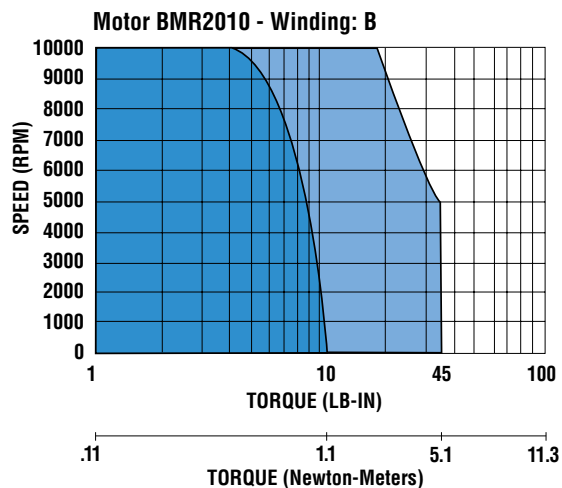
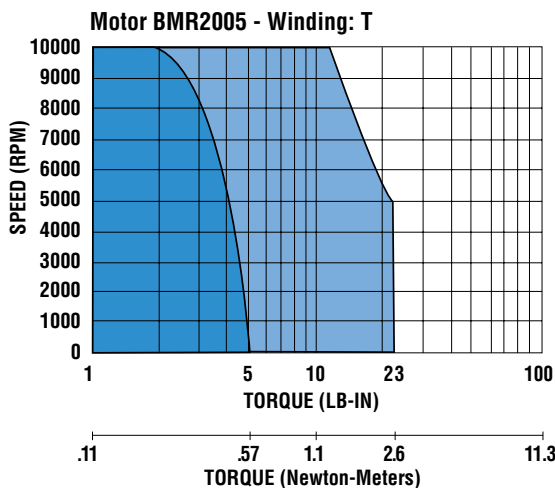
PART NUMBER	AG	A	AK	BB	U	AH	R	XD
Dimension in inches								
BMR2005	5.71	2.28	1.500	.06	.3750	.77	.357/.353	.70 FLAT
BMR2010	7.21	2.28	1.500	.06	.3750	.77	.357/.353	.70 FLAT

### IEC72 (mm)

BMR2005	145.0	57.9	50j6	1.5	8j6	30	14	2.0
BMR2010	183.1	57.9	50j6	1.5	8j6	30	14	2.0

NOTE: Dimension "AG" includes commutation feedback device and/or model M22 modular encoder shown on ordering information under COMMUTATION. For internal brake add 2.0" to dimension "AG"

## TORQUE PERFORMANCE CURVES



# BRUSHLESS SERVO MOTORS

# TORQUEMASTER™

## BMR 2000 SERIES

### TERMINATION CHART

#### FEEDBACK OPTIONS

##### (B STANDARD) MS3112E-14-19P

PIN	Com. Encoder	Resolver	Hall (Note 1)
A	Brake+	Brake+	Brake+
B	Brake-	Brake-	Brake-
C	-	S2 (Sine+)	-
D	-	S4 (Sine-)	-
E	Encoder A	-	-
F	Encoder B	-	-
G	Hall U	S1 (Cosine+)	H1
H	Hall V	S3 (Cosine-)	H2
J	Hall W	-	H3
K	Encoder 5V	R1 (Excit.+)	+5V to +24V
L	Encoder Com	R2 (Excit.-)	Common
M	Ø M1	Ø M1	Ø M1
N	Ø M2	Ø M2	Ø M2
P	Ø M3	Ø M3	Ø M3
R	Encoder B	-	-
S	Encoder B	-	-
T	Encoder M	-	-
U	Case Gnd.	Case Gnd.	Case Gnd.
V	Encoder M	-	-

#### Note 1. Hall Sensor Specifications

Voltage = 5V to 24V  
Current = 10 ma typical, 25 ma max.  
Output = Open collector

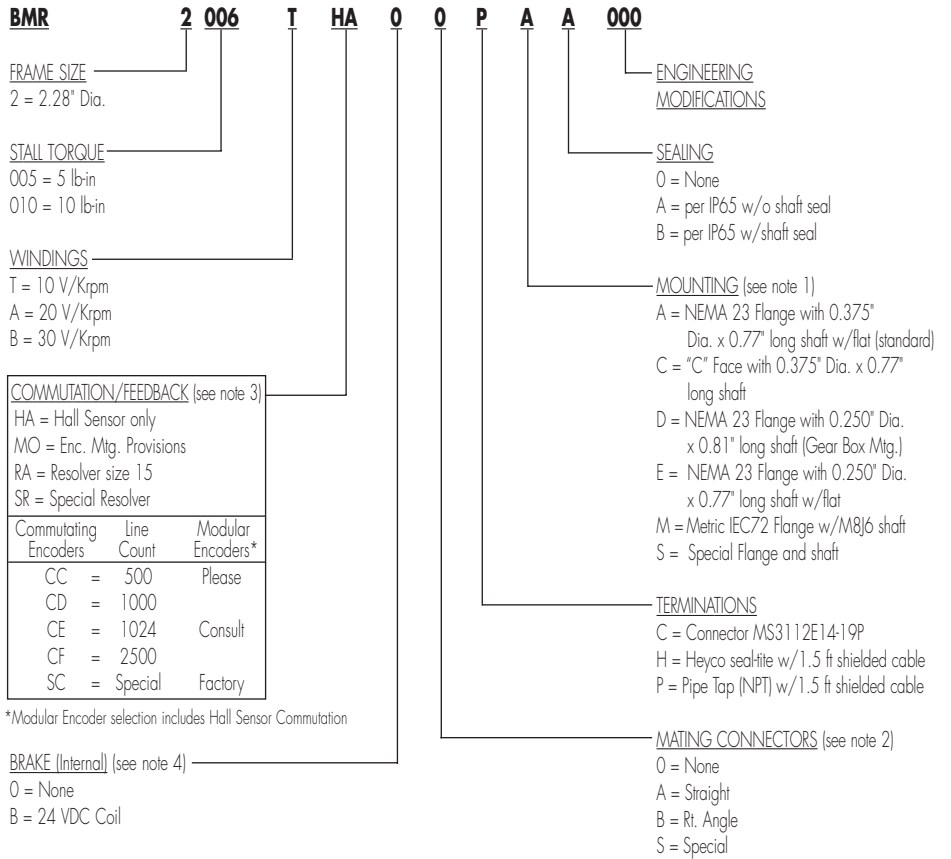
#### Note 2. Com. Encoder

Current = 250 ma

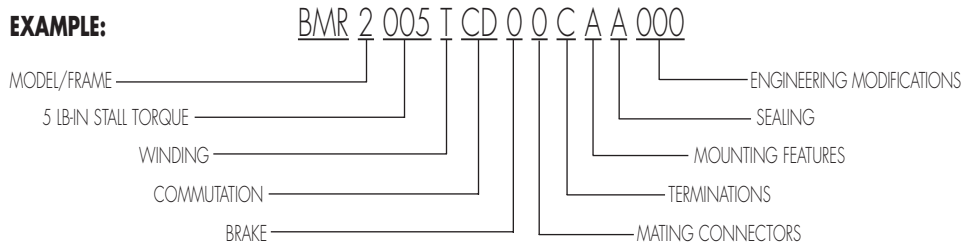
### Customize The BMR 2000 To Your Exact Requirements

To satisfy various applications with cost-effective solutions, BMR 2000 Series motors are readily available with a wide range of standard capabilities. Final designs are often the result of cooperative efforts between the customer's engineering department and CMC. For assistance, call your local CMC distributor or CMC direct. We look forward to meeting your custom requirements.

### BMR ORDERING INFORMATION - (For Standard Options)



#### EXAMPLE:



#### Notes:

- Standard BMR2000 motor mounting flanges use NEMA 23 standards but allow oversized shaft diameters to carry the rated torque load. Standard NEMA shaft diameters are typically undersized for most servo ratings and are not recommended. Consult factory regarding acceptable load limits before ordering or applying this option.
- The above motors include standard MS connectors. Connector mates or cables must be ordered separately.
- Standard encoders are dual channel line driver output with a marker pulse and complementary outputs.
- Brakes are for holding static loads and not designed to stop moving loads. Standard coils are 24 volts DC.

