TORQUEMASTER
BRUSH SERVO MOTORS

ITT
ENGINEERED FOR LIFE

2000 SERIES

Performance Benefits

Torque Systems specializes in the design of high performance brush servo motors that provide efficiency, flexibility of application, and a long and trouble-free service life. Our TORQUEMASTER® 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 brush servo motors to provide smooth operation throughout a full speed range. The 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 brush amplifiers, TORQUE-MASTER 2000 Series brush servo motors provide effective and highly efficient motion control solutions for a wide range of applications—including factory automation, packaging, robotics, 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 TORQUE-MASTER 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.
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Series 2000, 325 VDC brushless servo motor — provides fast response, accurate control and high torque-to-inertia ratios

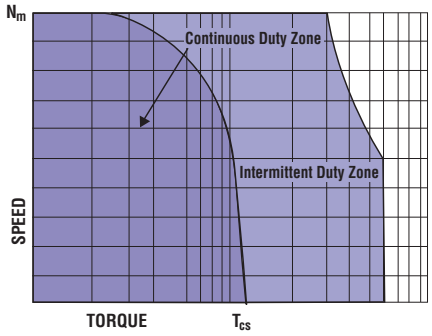
- Continuous torque ratings up to 10 lb.-in.—with speeds up to 10,000 RPM
- IP65 Sealing available
- NEMA mounting features available
- IEC 72 Metric specifications available
- Maximum torque per frame size with high performance Neodymium magnets
- Superior low speed performance
- Numerous custom options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

CE UL®

BRUSHLESS SERVO MOTOR CHARACTERISTICS

SYMBOL	MOTOR PARAMETER	UNITS	BMR2005T	BMR2010B
P	Power	KW	.214	.35
N_m	Max Operating Speed	RPM	10,000	10,000
T_C	Max Stall Torque	lb.-in.(Nm)	5 (.57)	10 (1.13)
T_{Pk}	Peak Torque	lb.-in.(Nm)	23 (2.6)	45 (5.1)
K_T	Torque Sensitivity	lb.-in./AMP(Nm/Amp)	.84 (.095)	2.53 (.286)
K_e	Back E.M.F.	Volts/Krpm	10	30
R_a	Resistance Line to Line	Ohms	1.61	3.69
L	Inductance Line to Line	MilliHenry	1.2	3.69
J_m	Rotor Inertia	lb.-in.-sec^2	.0004	.0009
		(Kg-m^2)	.000045	.0001
T_F	Static Friction	lb.-in.(Nm)	.16 (.018)	.16 (.018)
W_T	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"x12"x 0.25" aluminum plate at 25°C ambient. Typical values are within ±10% of rating.

Relationship Between K_e & K_T
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_e = Line-to-line volts-peak / Krpm*

K_T = Pound-inches (lb-in) / peak phase amps

K_e is related to Kt as follows:

$K_T = K_e/11.834$ for 3 phase square wave current driven amplifiers

$K_T = K_e/13.662$ for 3 phase sinusoidal wave current driven amplifiers

*Krpm = 1000 rpm

For "RMS" values, divide peak values by $\sqrt{2}$

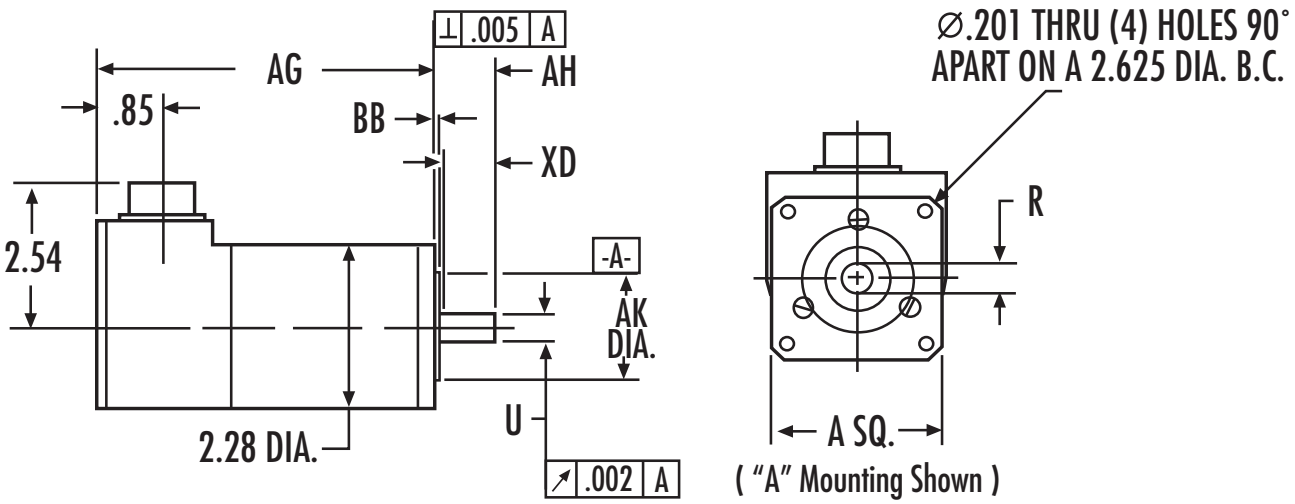
STANDARD SPEED/TORQUE CURVE DATA FOR SIZING A SERVO MOTOR

N_m = Maximum speed, continuous operation

T_{cs} = Continuous stall torque

All specifications subject to change without notice.

MECHANICAL SPECIFICATIONS*



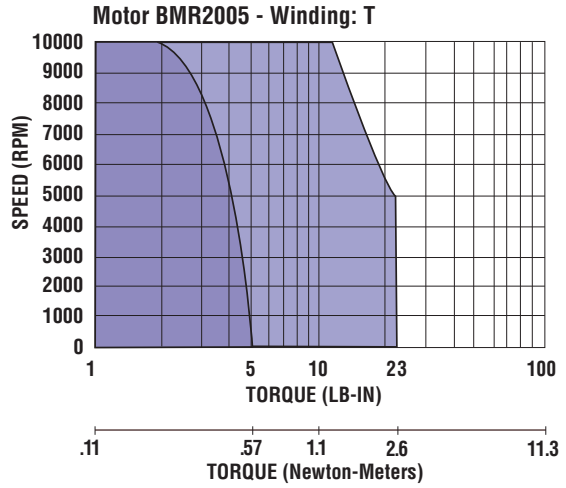
Note: BMR 2000 Series is available with modular encoder option (not shown). Please consult factory.

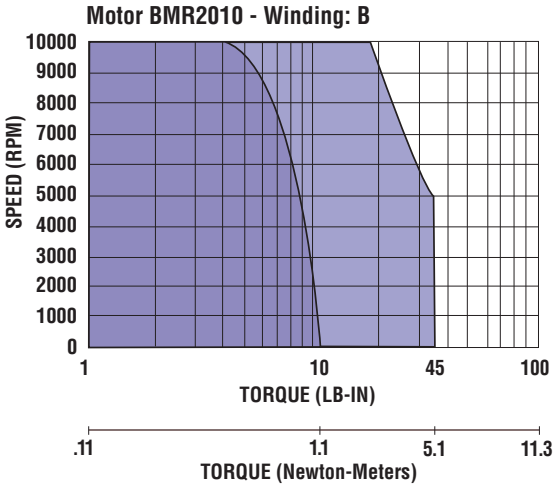
DIMENSION CHART* (Dimensions may change based upon options)

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 modular encoder shown on ordering information under COMMUTATION.
For internal brake add 2.0" to dimension "AG"

TORQUE PERFORMANCE CURVES





TORQUE SPEED CURVES OF OTHER WINDINGS AVAILABLE, CONSULT FACTORY.

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 $\bar{A}$	–	–
F	Encoder A	–	–
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 $\bar{B}$	–	–
S	Encoder B	–	–
T	Encoder M	–	–
U	Case Gnd.	Case Gnd.	Case Gnd.
V	Encoder $\bar{M}$	–	–

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 2000 SERIES TO YOUR EXACT REQUIREMENTS

To satisfy various applications with cost-effective solutions, 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 Torque Systems. For assistance, call your local distributor or Torque Systems direct. We look forward to meeting your custom requirements.

BMR ORDERING INFORMATION – (For Standard Options)

BMR 2 006 T HA 0 0 P A A 000

FRAME SIZE
2 = 2.28" Dia.

STALL TORQUE
005 = 5 lb-in
010 = 10 lb-in

WINDINGS
T = 10 V/Krpm
A = 20 V/Krpm
B = 30 V/Krpm

COMMUTATION/FEEDBACK (see note 3)
HA = Hall Sensor only
MO = Enc. Mtg. Provisions
RA = Resolver size 15
SR = Special Resolver

Commutating Encoders		Line Count	Modular Encoders*
CC	=	500	Please
CD	=	1000	
CE	=	1024	Consult
CF	=	2500	
SC	=	Special	Factory

*Modular Encoder selection includes Hall Sensor Commutation

BRAKE (Internal) (see note 4)
0 = None
B = 24 VDC Coil

MATING CONNECTORS (see note 2)
0 = None
A = Straight
B = Rt. Angle
S = Special

TERMINATIONS
C = Connector MS3112E14-19P
H = Heyco seal-tite w/1.5 ft shielded cable
P = Pipe Tap (NPT) w/1.5 ft shielded cable

MOUNTING (see note 1)
A = NEMA 23 Flange with 0.375" Dia. x 0.77" long shaft w/flat (standard)
C = "C" Face with 0.375" Dia. x 0.77" long shaft
D = NEMA 23 Flange with 0.250" Dia. x 0.81" long shaft (Gear Box Mtg.)
E = NEMA 23 Flange with 0.250" Dia. x 0.77" long shaft w/flat
M = Metric IEC72 Flange w/M8J6 shaft
S = Special Flange and shaft

SEALING
0 = None
A = per IP65 w/o shaft seal
B = per IP65 w/shaft seal

ENGINEERING MODIFICATIONS

EXAMPLE: BMR 2 005 T CD 0 0 C A A 000

- MODEL/FRAME
- 5 LB-IN STALL TORQUE
- WINDING
- COMMUTATION
- BRAKE
- MATING CONNECTORS
- TERMINATIONS
- MOUNTING FEATURES
- SEALING
- ENGINEERING MODIFICATIONS

Notes:

1. 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.
2. The above motors include standard MS connectors. Connector mates or cables must be ordered separately.
3. Standard encoders are dual channel line driver output with a marker pulse and complementary outputs.
4. Brakes are for holding static loads and not designed to stop moving loads. Standard coils are 24 volts DC.