

BMR 2200 S E R I E S



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 2200 series is no exception.

With fast response, accurate control and high torque-to-inertia ratios, you can count on the TORQUEMASTER 2200 Series of servo motors to provide smooth operation throughout a full speed range. The BMR 2200 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 2200 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 2200 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 2200 Series is ruggedly designed and manufactured for reliable performance. To satisfy many different applications, TORQUEMASTER 2200 Series motors are manufactured to NEMA/IEC specifications.

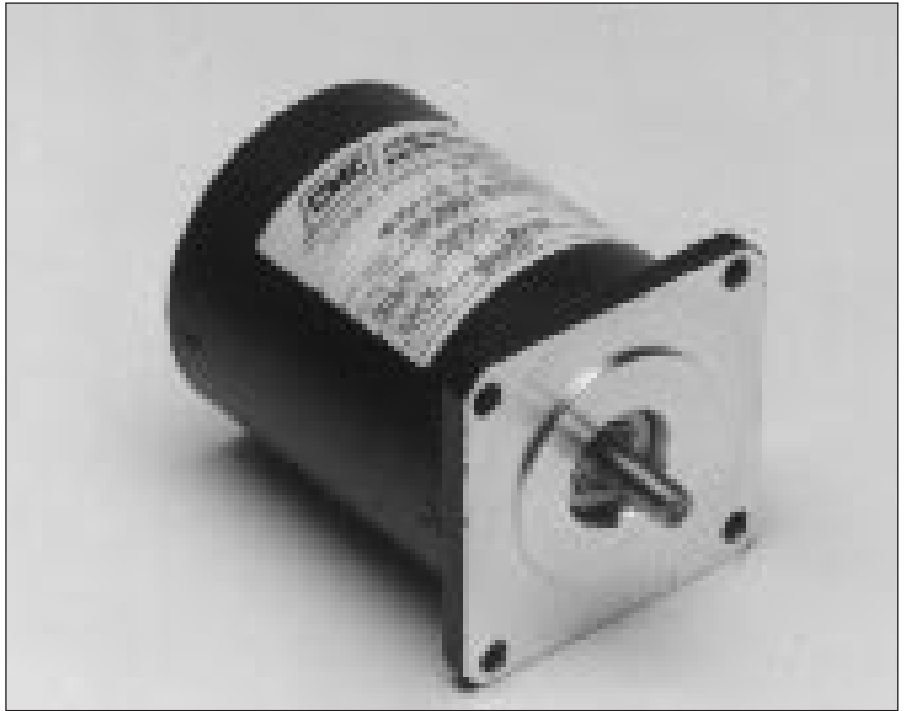
TORQUEMASTER BMR 2200 Series servo motors come standard with hall sensor or resolver commutation. Encoders, brakes, gearheads and other options available.

Series 2200, 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

BMR 2200 S E R I E S

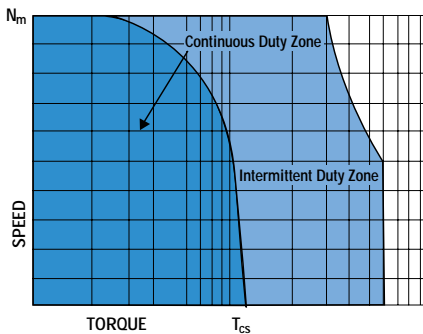
- Continuous torque range of 5 lb.-in. to 10 lb.-in.
- Neodymium magnet construction
- More torque per smaller frame size
- Speeds to 10,000 RPM
- High torque-to-inertia ratios



MOTOR CHARACTERISTICS

| SYMBOL | MOTOR PARAMETER | UNITS | BMR2005T | BMR2010B |
|-----------------|-------------------------|--|------------------|----------------|
| P | Power | KW | .214 | .35 |
| N _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 (Kg-m ²) | .0004 .000045 | .0009 .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.

$$K_e = \text{Line-to-line volts-peak} / \text{Krpm}^*$$

$$K_T = \text{Pound-inches (lb-in)} / \text{peak phase amps}$$

K_e is related to K_T as follows:

$$K_T = K_e / 11.834 \text{ for 3 phase square wave current driven amplifiers}$$

$$K_T = K_e / 13.662 \text{ for 3 phase sinusoidal wave current driven amplifiers}$$

$$*\text{Krpm} = 1000 \text{ rpm}$$

For "RMS" values, divide peak values by $\sqrt{3}$

STANDARD SPEED/TORQUE CURVE DATA FOR SIZING A SERVO MOTOR

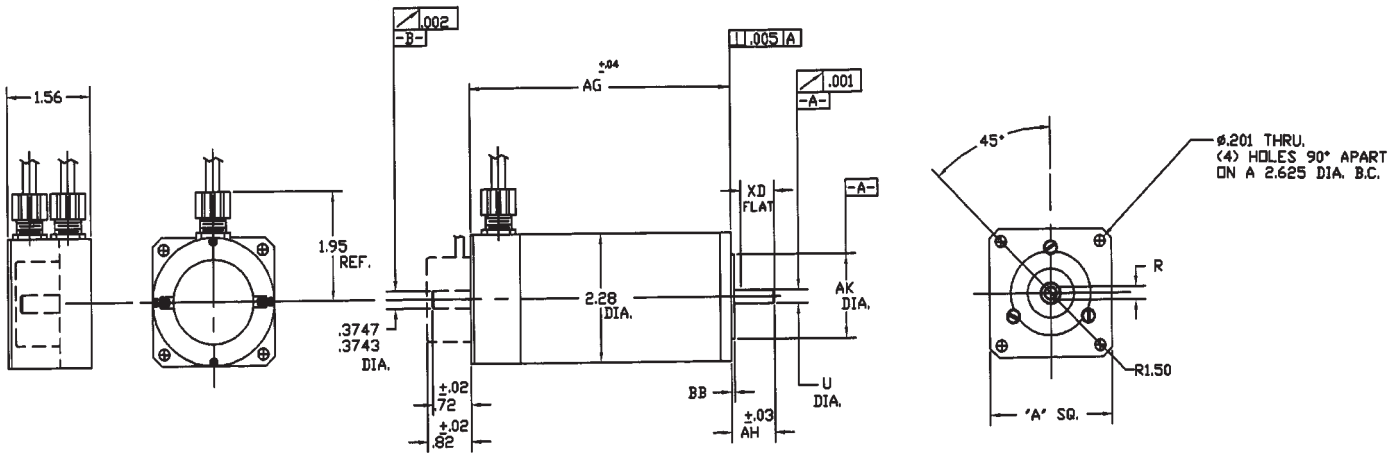
N_m = Maximum speed, continuous operation

T_{cs} = Continuous stall torque

All specifications subject to change without notice.

MECHANICAL SPECIFICATIONS

BMR 2200 SERIES

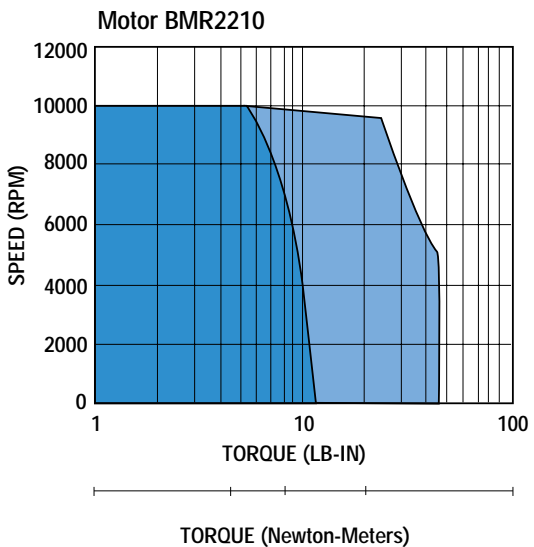
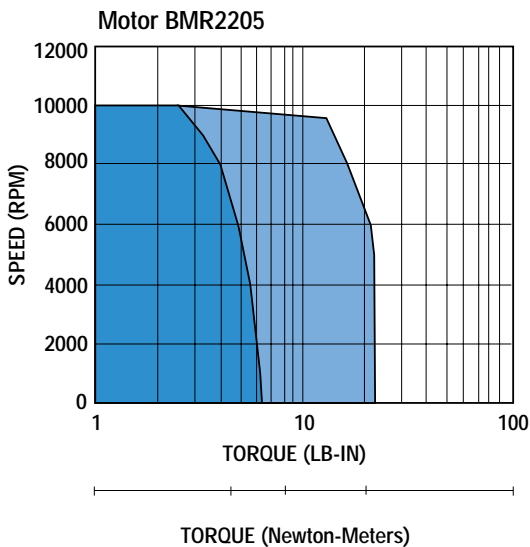


DIMENSION CHART (Dimensions may change depending upon options)

| PART NUMBER | AG | A | AK | BB | U | AH | R | XD |
|---------------------|-------|------|-------|-----|-------|-----|-----------|----------|
| Dimension in inches | | | | | | | | |
| BMR2205 | 5.71 | 2.28 | 1.500 | .06 | .3750 | .77 | .357/.353 | .70 FLAT |
| BMR2210 | 7.21 | 2.28 | 1.500 | .06 | .3750 | .77 | .357/.353 | .70 FLAT |
| IEC72 (mm) | | | | | | | | |
| BMR2205 | 145.0 | 57.9 | 50j6 | 1.5 | 8j6 | 30 | 14 | 2.0 |
| BMR2210 | 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 2200 SERIES

TERMINATION CHART

MOTOR/CABLE CODE

| Function | Wire Color |
|----------|------------|
| Motor M1 | White |
| Motor M2 | Black |
| Motor M3 | Red |

HALL CONNECTIONS

| | |
|--------|--------|
| +5-24V | Red |
| Common | Black |
| H1 | Yellow |
| H2 | Orange |
| H3 | Green |

Note: Separate drain wires for motor power and halls

ENCODER WIRING CONNECTION CODE

| Function | Wire Color |
|--------------------------|------------|
| Encoder Output A | Green |
| Encoder Output \bar{A} | Brown |
| Encoder Output B | Orange |
| Encoder Output \bar{B} | Yellow |
| Encoder Output M | White |
| Encoder Output \bar{M} | Blue |
| Encoder +5 VDC | Red |
| Encoder Common | Black |
| Case Ground | Drain |

Note 1. Hall Sensor Specifications

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

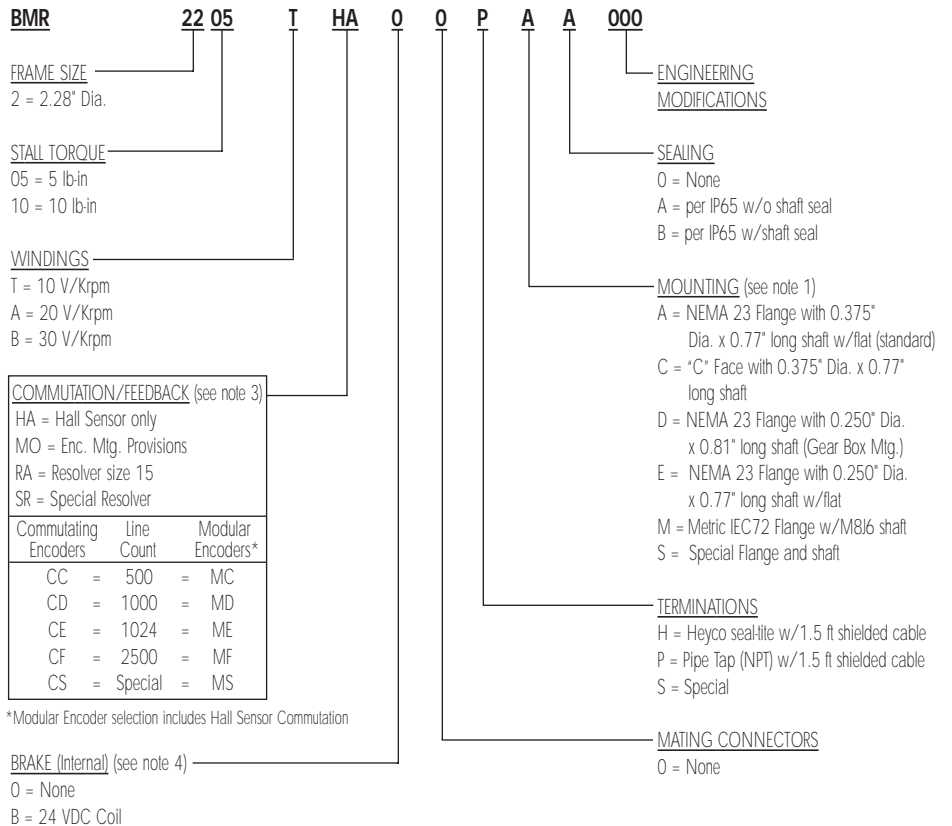
Note 2. Com. Encoder

Current = 250 ma

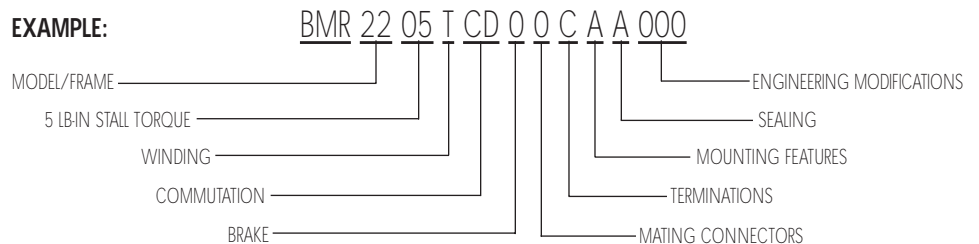
Customize The BMR 2200 To Your Exact Requirements

To satisfy various applications with cost-effective solutions, BMR 2200 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 BMR2200 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.
- 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.

TORQUE SYSTEMS DIVISION

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