

BRUSHLESS SERVO MOTORS

BMR 4400 SERIES

Series 4400, 350 VDC brushless servo motor — provides fast response, accurate control and high torque-to-inertia ratios

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 BMR 4400 series is no exception.

With fast response, accurate control and high torque-to-inertia ratios, you can count on the 4400 Series of servo motors to provide smooth operation throughout a full speed range. The BMR 4000 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, BMR 4400 servo motors provide effective and highly efficient motion control solutions for a wide range of applications — including factory automation, packaging, robotics, machine tools, semi-conductor, medical instrumentation, and more.

Design Features

BMR 4400 Series servo motors are rated from 27 lb-in. to 67 lb-in. with speeds and torque stability up to 10,000 RPM — accommodating DC bus voltages up to 350 volts. They utilize the latest in high performance Neodymium permanent magnet technology and are available in several standard windings to meet your most demanding applications.

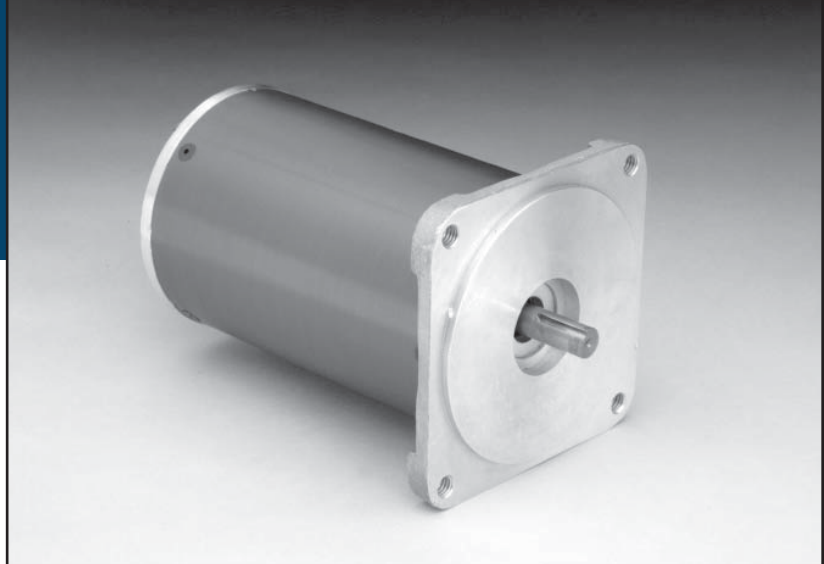
Each servo motor in the 4400 Series is ruggedly designed and manufactured for reliable performance. To satisfy many different applications, 4400 Series motors are manufactured to NEMA/IEC specifications. For severe duty environments, the BMR design is also available with IP65 sealing.

- Continuous torque ratings up to 67 lb-in. —with speeds up to 10,000 RPM
- UL Recognition
- 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



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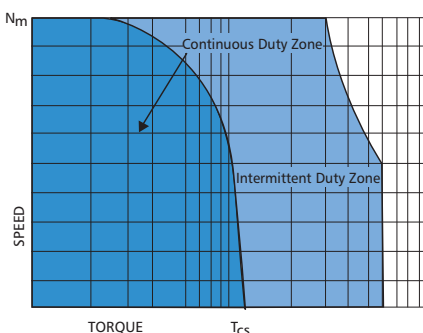
- Continuous torque range of 27 lb-in. to 67 lb-in.
- Neodymium magnet construction
- More torque per smaller frame size
- IP65 Sealing available
- Speeds to 10,000 RPM
- High torque-to-inertia ratios
- CE / UL



MOTOR SPECIFICATIONS

SYMBOL	MOTOR PARAMETER	UNITS	BMR4427D	BMR4445D	BMR4467D
N_m	Max Operating Speed	RPM	7000	7000	6600
T_C	Max Stall Torque	lb-in.(Nm)	27 (3.0)	45 (5.1)	67 (7.6)
T_{Pk}	Peak Torque	lb-in.(Nm)	115 (13.0)	200 (22.6)	300 (33.9)
K_T	Torque Sensitivity	lb-in./AMP(Nm/Amp)	4.2 (.47)	4.2 (.47)	4.2 (.47)
K_e	Back E.M.F.	Volts/Krpm	50	50	53
R_a	Resistance Line to Line	Ohms	2.56	0.92	0.53
L	Inductance Line to Line	Millihenry	9.36	5.73	3.34
J_m	Rotor Inertia	lb-in.-sec2 (Kg-m2)	0.0026 (0.00029)	0.0042 (0.00048)	0.0072 (0.00081)
T_F	Static Friction	lb-in.(Nm)	.125 (.014)	.156 (.0176)	.28 (.0316)
F_i	Viscous Friction	lb-in/Krpm	0.125	.188	.28
R_{th}	Thermal Resistance	Deg C/Watt	0.725	0.62	.567
T_m	Mechanical Time Const.	Millisec.	3.3	1.92	1.9
T_e	Electrical Time Const.	Millisec.	4	5.7	6.3
W_T	Motor Weight	lbs(Kg)	12 (5.4)	16 (7.24)	23 (10.41)

TORQUE PERFORMANCE CURVES



NOTE: Continuous torque specifications obtained with motor mounted to an 8.5"x12"x 0.50" steel plate at 25°C ambient. Typical values are within $\pm 10\%$ of rating.

Relationship Between K_e & K_T

Cleveland Motion Controls 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 $\sqrt{2}$

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.



BRUSHLESS SERVO MOTORS BMR 4400 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

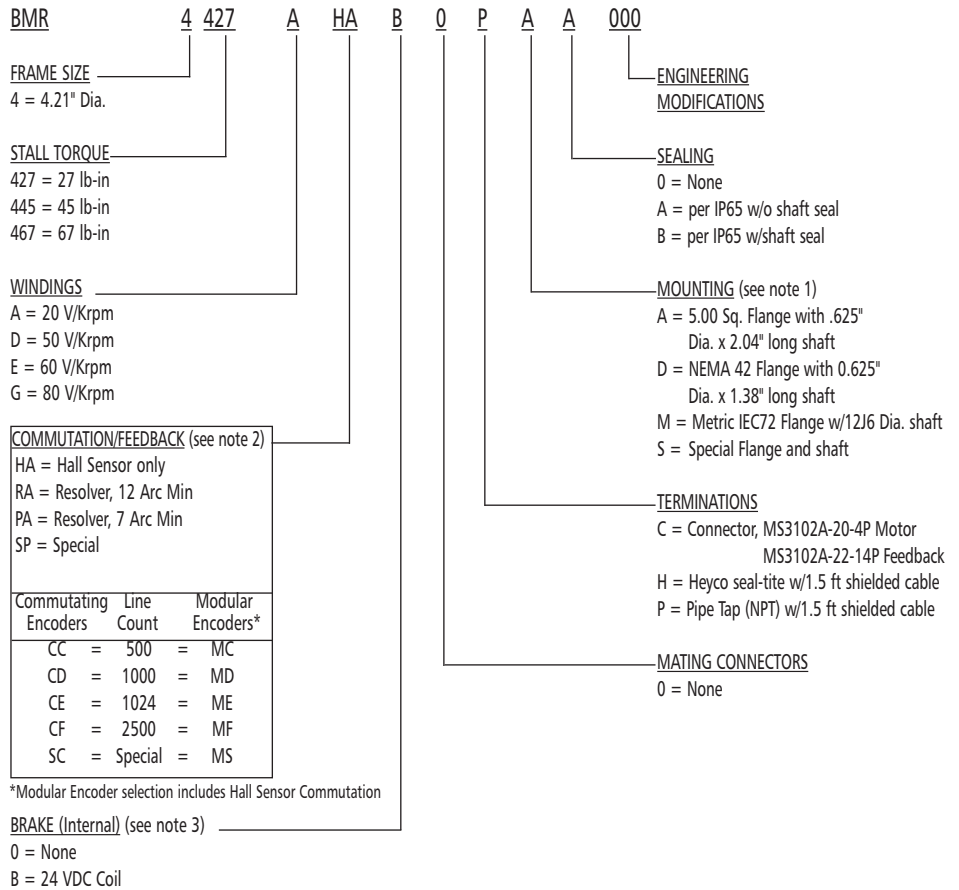
Note 1. Hall Sensor Specifications

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

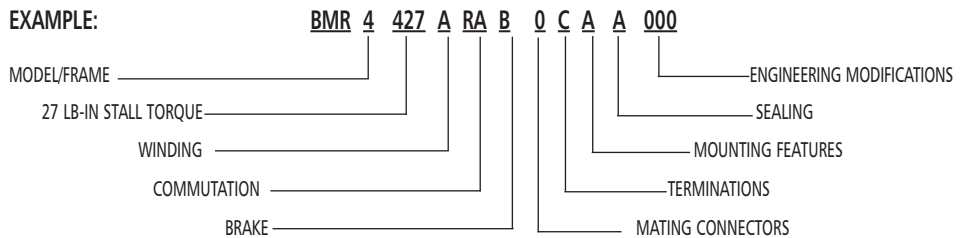
Note 2. Com. Encoder

Current = 250 ma

BMR ORDERING INFORMATION – (For Standard Options)



EXAMPLE:



Notes:

- Standard BMR4400 motor mounting flanges use NEMA 42 standards but have 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 CMC 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.

Customize The BMR 4400 To Your Exact Requirements

To satisfy various applications with cost-effective solutions, BMR 4400 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.

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