



## **DIRECT DRIVE BRUSHLESS DC TORQUE MOTORS**

DB / DBE MATRIX™ SERIES FOR AEROSPACE  
AND DEFENSE APPLICATIONS

# FRAMELESS BRUSHLESS DC TORQUE MOTORS

The DB / DBE Matrix™ Series brushless torque motors are used in applications that require high power density and / or quick accelerations. The designs are optimized to minimize input power for maximum efficiency.

Utilizing high energy rare earth magnets and dense slot fills, the DB Matrix Series achieves high Km values. This provides the highest performance per volume and minimizes the motor footprint within the system. The motors are supplied as a direct drive rotor / stator frameless part set that is directly attached to the load. This form of attachment eliminates backlash and increases servo stiffness for an optimized direct drive system.

Moog is a worldwide designer, manufacturer, and systems integrator of high-performance precision motion and fluid controls and control systems. Moog's high-performance systems control military and commercial aircraft, satellites, and space vehicles, launch vehicles, defense systems, missiles, automated industrial machinery, marine, and medical equipment.

Additional information about the company's offering of motors and motion solutions can be found at [www.moog.com](http://www.moog.com).

## FEATURES

- Compact
- Peak torque from 21 to over 650,000 oz-in (0.15 to 4,590 Nm)
- Double insulated high temp magnet wire minimizes leakage current and provides good thermal resistance
- Stable high temp encapsulation material minimizes movement or working of windings under large temperature variations
- Rare earth magnets
- High power density
- High torque to inertia ratio
- Low speed with high accuracy
- Large through bores

## BENEFITS

- Operate over a wide range of speeds - not limited to AC frequency
- Extremely quiet operation with long life capability
- Motor life is not limited to brush or commutator life
- Efficient operation without losses associated with brushes

## OPTIONS

- Winding options to adjust torque sensitivity, back EMF, DC resistance for matching a variety of system requirements
- Varying stack lengths from 0.10 to over 30 inches (2.54 to 762 mm)
- Mounting flanges, hubs, mounting holes and connectors may be added as required
- Hall Effect Sensors for commutation

## TYPICAL APPLICATIONS

- Speed and rotation control systems
- Gimbals for FLIR and inertial navigation systems
- Stabilized gun and fire control systems for combat vehicles
- Fire control radars for land and shipboard defense
- Cockpit instrumentation for military and commercial aircraft
- Space and vacuum instruments, actuation systems and momentum wheels





# MOTOR SERIES OVERVIEW

The DB / DBE Matrix Series is a family of motors consisting of a wide range of sizes, outside diameters from 1.5 to 22 inches (38 to 559 mm) with several stack sizes for each diameter.

Along with our standard Matrix motors, our engineers design custom solutions. If our existing models don't meet your needs, we will tailor them or provide options for a best value solution to meet your exact requirements.

**DB / DBE MATRIX™ SERIES OVERVIEW**

Model	Peak Torque oz-in (Nm)	Amps at Peak Torque amps	Torque Sensitivity oz-in / amp (Nm / amp)	Motor Constant oz-in / √W (Nm / √W)	Weight oz (nom) (Kg)	OD in (mm)	ID in (mm)	Length in Stack Length in (mm)
DB-1500	21 - 211 (.15 - 1.48)	15.0	1.43 - 14.1 (.01 - .10)	2.77 - 14.6 (.02 - .10)	2.7 - 15 (.08 - .43)	1.5 (38.1)	0.250 (6.35)	0.25 - 2.5 (6.35 - 63.5)
DB-2000	34 - 376 (.24 - 2.63)	5.0	6.89 - 75.2 (.05 - .53)	4.75 - 25.7 (.03 - .18)	4.0 - 33 (.11 - .93)	2.0 (50.80)	0.375 (9.53)	0.25 - 3.0 (6.35 - 76.2)
DBE-2000 (with Hall Effects)	43 - 377 (.30 - 2.64)	5.0	8.60 - 75.5 (.06 - .53)	5.93 - 25.8 (.04 - .18)	4.6 - 34 (.13 - .96)	2.0 (50.80)	0.375 (9.53)	0.25 - 3.0 (6.35 - 76.2)
DB-3000	151 - 1,214 (1.06 - 8.57)	10.0	15.1 - 121 (.11 - .85)	10.4 - 51.3 (.07 - .36)	10.7 - 41.0 (.30 - 1.16)	3.0 (76.2)	1.250 (31.75)	0.25 - 2.0 (6.35 - 50.8)
DB-4000	2,000 - 5,000 (14 - 35)	30.1	66.5 - 166.1 (.47 - 1.16)	67.2 - 129.7 (.47 - .91)	117 - 245 (3.31 - 6.94)	4.0 (101.6)	0.64 (16.2)	2.0 - 5.0 (50.8 - 127.0)
DB-5000	576 - 9,024 (4.07 - 63.72)	8.0	72 - 1128 (.51 - 7.97)	22.2 - 186.0 (.16 - 1.31)	31 - 255 (.88 - 7.23)	5.0 (127.0)	2.0 (50.8)	0.25 - 4.05 (6.35 - 102.8)
DB-6000	1,686 - 10,083 (11.80 - 70.58)	20.0	84.3 - 505.0 (0.59 - 3.56)	80.4 - 270.0 (0.57 - 1.89)	37 - 160 (1.05 - 4.54)	6.0 (152.4)	4.0 (101.6)	0.45 - 2.95 (11.43 - 74.93)
DBE-6000 (with Hall Effects)	1,686 - 10,083 (11.80 - 70.58)	20.0	84.3 - 505.0 (0.59 - 3.56)	80.4 - 270.0 (0.57 - 1.89)	45 - 168 (1.27 - 4.76)	6.0 (152.4)	4.0 (101.6)	0.45 - 2.95 (11.43 - 74.93)
DB-8000	1,865 - 18,458 (13.2 - 130.3)	14.5	129 - 1273 (0.91 - 8.99)	81.9 - 461.5 (0.578 - 3.26)	48 - 312 (1.36 - 8.85)	8.0 (203.2)	5.0 (127)	0.25 - 2.5 (6.35 - 63.5)
DBE-8000 (with Hall Effects)	1,865 - 18,458 (13.2 - 130.3)	14.5	129 - 1,273 (0.91 - 8.99)	81.9 - 461.5 (0.578 - 3.26)	56.5 - 312 (1.60 - 9.30)	8.0 (203.2)	5.0 (127)	0.25 - 2.5 (6.35 - 63.5)
DB-9000	4,915 - 30,682 (34.7 - 216.7)	20.0	246 - 1534 (1.74 - 10.83)	164.6 - 626.8 (1.16 - 4.43)	81.6 - 368 (2.31 - 10.4)	9.0 (228.6)	6.375 (161.93)	0.45 - 2.95 (11.43 - 74.93)
DB-14540	21,674 - 10,8319 (153.05 - 764.90)	34.0	639.4 - 3149.0 (4.52 - 22.24)	323.8 - 1142.2 (2.29 - 8.07)	160 - 624 (4.54 - 17.7)	14.540 (369.32)	11.46 (291.08)	0.5 - 2.5 (12.7 - 63.5)
DB-22000	10,2912 - 67,8912 (727 - 4794)	40.0	2573 - 16973 (18.17 - 119.85)	1218 - 4744 (8.60 - 33.50)	768 - 3964 (21.8 - 112.5)	22.0 (559)	17.50 (445)	1.00 - 7.00 (25.4 - 177.8)



**DB-1500**



**DB-3000**



**DB-4000**



**DB-6000**



**DB-9000**



**DB-14540**



**DB-22000**

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