BMS Series

DC Brushless Torque Motors

Slotless, brushless stator design provides zero-cogging torque for unsurpassed velocity control

Smoother velocity than with standard DC brush-type motors with the advantage of reliable brushless technology

Standard NEMA frame sizes

Ultra-high resolution capability with amplified sine-wave encoder and multiplier

Follows the 2011/65/EU RoHS 2 Directive

Aerotech's BMS series brushless, slotless servomotors represent the ultimate in high-performance rotary motors. Available in standard NEMA frame sizes, these motors utilize a slotless rotor design for superior velocity smoothness and control.

Featuring rare-earth magnets and a high pole-count rotor, the BMS series provides maximum torque and acceleration in a small package. Custom mechanical or electrical variations of the BMS can be engineered with minimal lead time.

Smoother than DC Motors

The BMS series motors can replace standard brushless or brush-type motors when superior velocity smoothness and control are required. DC brush-type motors have been popular in applications such as machine tool and scanning because of their smooth low-speed control. The BMS motors provide superior smoothness and have higher acceleration capability than a DC brush motor. Higher acceleration results in higher machine throughput and performance.

High Performance Design

The BMS series is unlike conventional brushless servomotors because it incorporates a totally slotless stator design that provides the ultimate in smooth velocity control. These motors are designed for applications requiring superior torque and stability performance. The unique design of the BMS series motors provides a closer inertia match with mechanical systems than comparable models. This means better stability and easier tuning.

Ultra-High Encoder Resolution

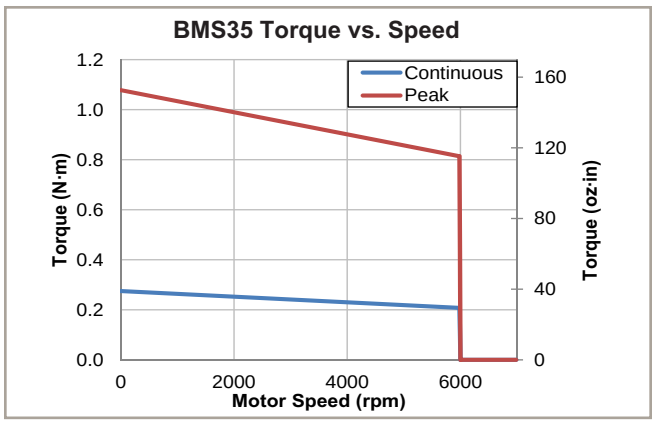
The BMS series motors can be equipped with a variety of encoder resolution options for any application. In addition to the standard RS-422 line driver output, an optional amplified sine-wave encoder can be used to provide ultra-high resolution. Aerotech offers encoder multipliers as an option for drives connected to the A3200 system, as well as external multiplier boxes. Resolutions as high as 1,000,000 counts per revolution are achievable.

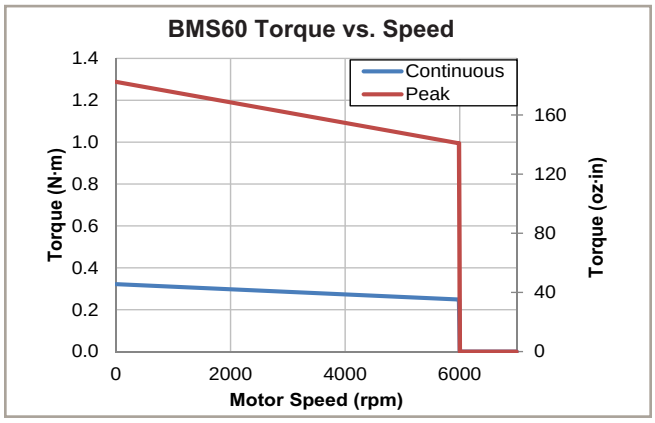
BMS Series SPECIFICATIONS

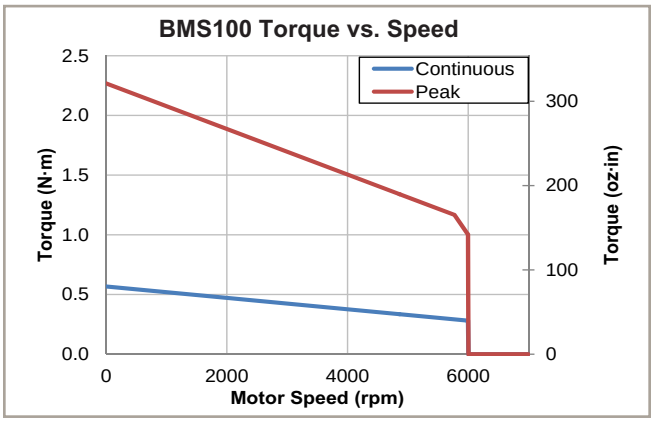
Model		BMS35	BMS60	BMS100	BMS280	BMS465
Winding Designation		-A	-A	-A	-A	-A
Performance Specifications[1, 5]						
Stall Torque, Continuous[2]	N·m	0.27	0.33	0.56	1.60	2.86
	oz·in	38.0	46.2	80.0	227.0	404.8
Peak Torque[3]	N·m	1.07	1.31	2.26	6.41	11.43
	oz·in	152.0	184.9	320.0	908.0	1619.2
Rated Speed	rpm	4,000	4,000	3,000	3,000	2,000
Rated Power Output, Continuous	watts	96.0	112	133	381	457
Electrical Specifications[5]						
BEMF Constant (line to line, max)	$Volts_{pk}$/krpm	12.9	19	40	57	79
Continuous Current, Stall[2]	Amp_{pk}	2.5	2.3	2.1	3.8	4.9
	Amp_{rms}	1.7	1.6	1.5	2.7	3.5
Peak Current, Stall[3]	Amp_{pk}	9.8	9.2	8.4	15.2	19.6
	Amp_{rms}	6.9	6.5	5.9	10.7	13.9
Torque Constant[4,8]	N·m /Amp_{pk}	0.11	0.14	0.27	0.42	0.58
	oz·in /Amp_{pk}	15.5	20.1	38.1	59.7	82.6
	N·m /Amp_{rms}	0.15	0.20	0.38	0.60	0.82
	oz·in /Amp_{rms}	21.9	28.4	53.9	84.5	116.8
Motor Constant[2,4]	N·m/√W	0.046	0.050	0.076	0.179	0.280
	oz·m/√W	6.52	7.02	10.74	25.34	39.70
Resistance, 25˚C (line to line)	ohms	5.8	8.4	12.9	5.7	4.4
Inductance (line to line)	mH	1.7	1.30	2.40	1.10	0.87
Maximum Bus Voltage	VDC	340	340	340	340	340
Thermal Resistance	C/W	2.21	1.73	1.35	0.93	0.72
Number of Poles	P	8	8	8	14	14
Mechanical Specifications						
Frame Size	NEMA	17	23	23	34	34
Motor Weight	kg	0.6	1.1	1.5	3.60	5.00
	lb	1.3	2.4	3.3	7.9	11.0
Rotor Moment of Inertia	$kg·m^2$	$1.96x10^{-5}$	$1.96x10^{-5}$	$3.71x10^{-5}$	$4.66x10^{-4}$	$9.28x10^{-4}$
	$oz·in·s^2$	0.0028	0.0028	0.0053	0.0660	0.1314
Max. Radial Load	N	45	89	89	178	178
	lb	10	20	20	40	40
Max. Axial Load	N	45	89	89	89	89
	lb	10	20	20	20	20
Standards		2011/65/EU RoHS 2 Directive				

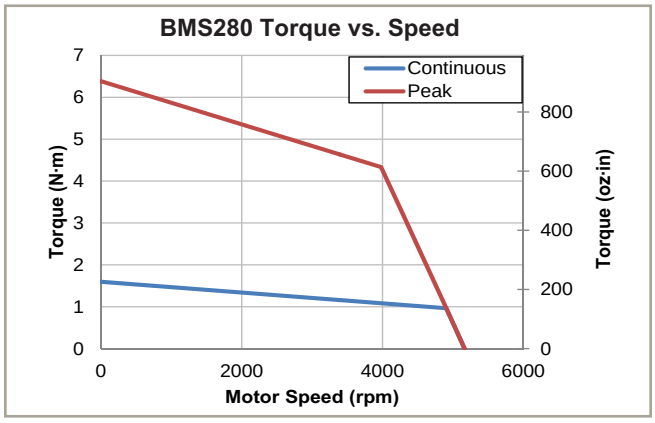
Notes:
1. Performance is dependent upon heat sink configuration, system cooling conditions, and ambient temperature.
2. Values shown @ 75°C rise above a 25°C ambient temperature, with housed motor mounted to a 250 mm x 250 mm x 6 mm aluminum heat sink.
3. Peak torque assumes correct rms current; consult Aerotech.
4. Torque constant and motor constant specified at stall.
5. All performance and electrical specifications ±10%.
6. Maximum winding temperature is 100°C; thermistor trips at 100°C.
7. Ambient operating temperature range 0°C - 25°C. Consult Aerotech for performance in elevated ambient temperatures.
8. All Aerotech amplifiers are rated A_{pk}; use torque constant in N·m/A_{pk} when sizing.

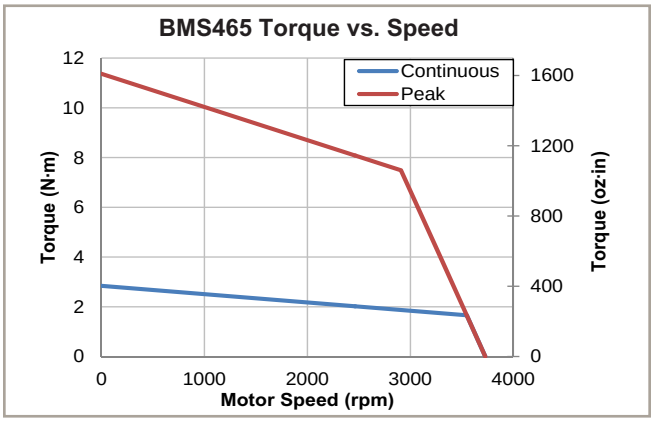
BMS Series PERFORMANCE





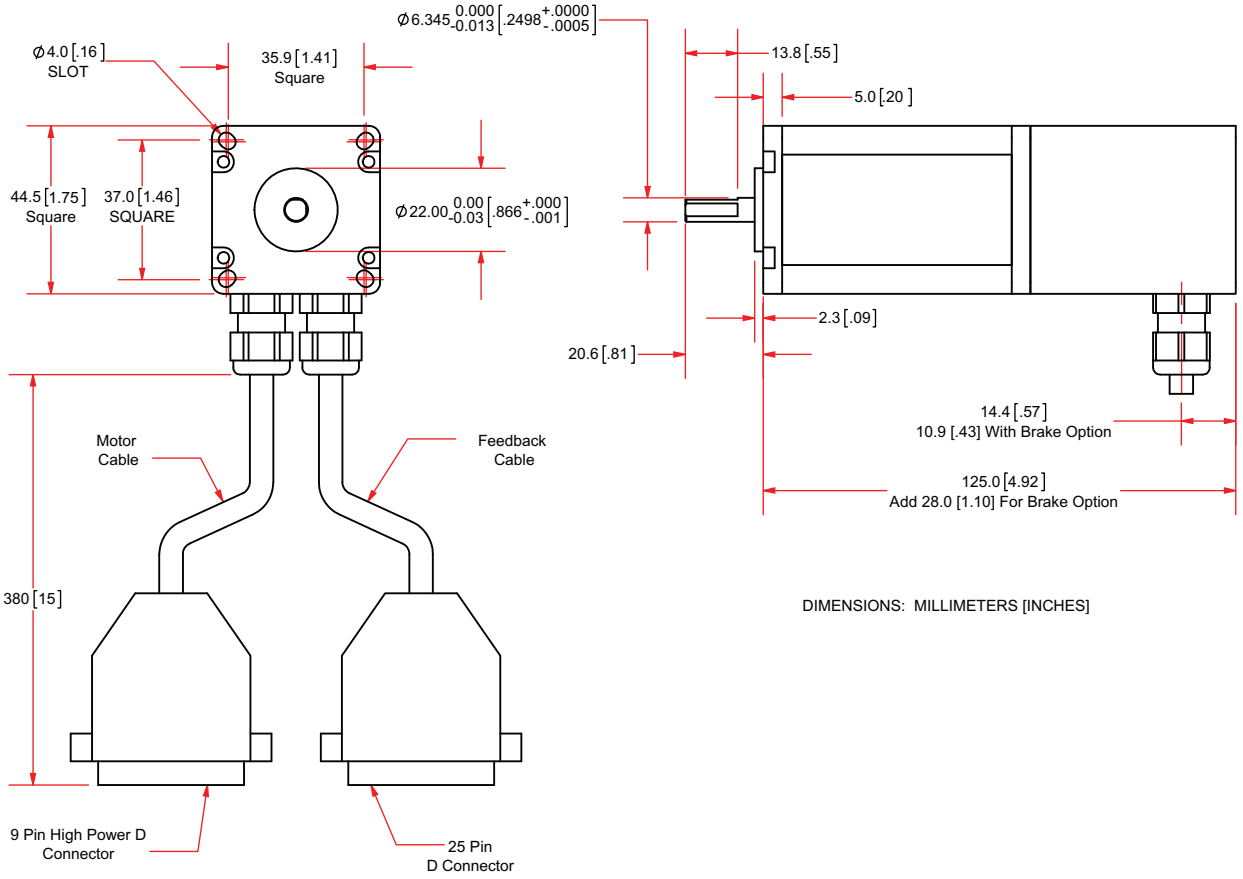






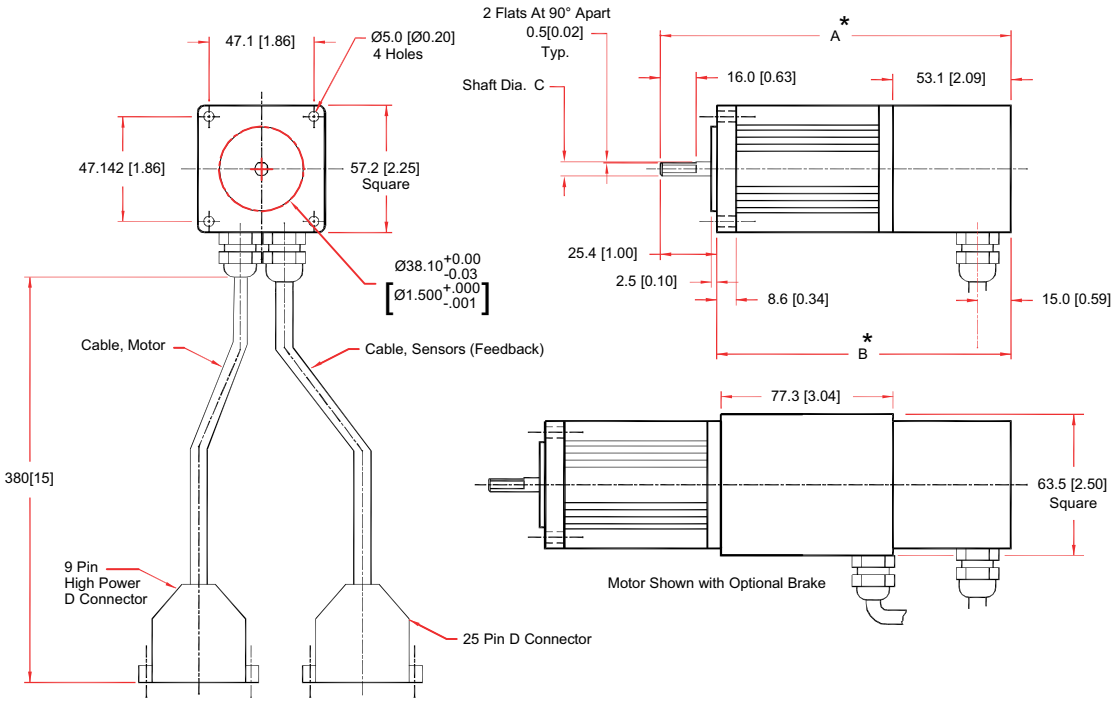
BMS Series DIMENSIONS

NEMA 17



BMS Series DIMENSIONS

NEMA 23



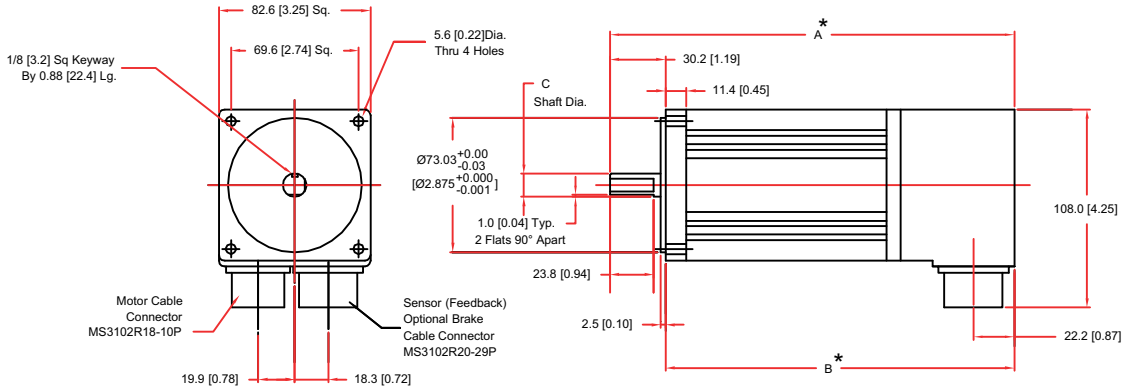
Dimensions - millimeters [inches]

Motor Model No.	A *	B *	C
BMS60	157.5 / 6.20"	132.1 / 5.20"	Ø 6,345 / 0.2498" +0.000, -0.013 / +0.0000", -0.0005"
BMS100	187.9 / 7.40"	162.6 / 6.40"	Ø 9,517 / 0.3747" +0.000, -0.013 / +0.0000", -0.0005"

* Add 77.3 [3.04 IN.] To Length For Optional Brake.

Note: Additional motor sizes available. Please consult factory and website for latest information

NEMA 34



Dimensions - millimeters [inches]

Motor Model No.	A *	B *	C
BMS280	220.3 / 8.67"	190.0 / 7.48"	Ø 12.69 / 0.4997" +0.000, -0.013 / +0.0000", -0.0005"
BMS465	275.1 / 10.83"	244.9 / 9.64"	Ø 12.69 / 0.4997" +0.000, -0.013 / +0.0000", -0.0005"

*Add 55.6[2.19 IN.] To Length For Optional Brake.

BMS Series (NEMA 17) ORDERING INFORMATION

Ordering Example

BMS	35	-A	-D25	-E1000H	-BK
Motor Series	**Model**	**Motor Winding**	**Connector Option**	**Encoder Resolution**	**Options**
BMS	35	-A	-D25 -FLY	-E1000H -E2000H -E5000H -E1000ASH	-NBK -BK -VAC6

Brushless Rotary Servomotors

BMS35	NEMA 17 - Tcont = 0.27 N·m (38.0 oz·in) brushless motor

Winding Options

-A	Standard winding

Connectors

-DB25	25 conductor plastic D-Shell for feedback and motor power (std)
-FLY-x	Flying leads for feedback and motor power with custom length cable

Feedback Options

-E1000H	1000 line incremental square wave encoder with marker and hall effect tracks (RS-422 line driver output)
-E2000H	2000 line incremental square wave encoder with marker and hall effect tracks (RS-422 line driver output)
-E5000H	5000 line incremental square wave encoder with marker and hall effect tracks (RS-422 line driver output)
-E1000ASH	1000 line incremental amplified sine wave encoder with marker and Hall tracks

Options

-NBK	No brake
-BK	Brake, 0.2 N·m (29 oz·in), 24 VDC, 0.2 A for BMS35
-VAC6	Vacuum preparation to 10^{-6} Torr

BMS Series (NEMA 23) ORDERING INFORMATION

Ordering Example

BMS	100	-A	-D25	-E1000H	-BK1
Motor Series	**Model**	**Motor Winding**	**Connector Option**	**Encoder Resolution**	**Options**
BMS	60 100	-A	-D25 -FLY -MS	-E1000H -E2000H -E2500H -E5000H -E1000ASH	-BK1 -VAC6

Brushless Rotary Servomotors

BMS60	NEMA 23 - Tcont = 0.33 N·m (46.2 oz·in) brushless motor
BMS100	NEMA 23 - Tcont = 0.56 N·m (80.0 oz·in) brushless motor

Winding Options

-A	Standard winding

Connectors

-DB25	25 conductor plastic D-Shell for feedback and motor power (std)
-MS	MS connectors for feedback and motor power
-FLY-x	Flying leads for feedback and motor power with custom length cable

Feedback Options

-E1000H	1000 line incremental square wave encoder with marker and hall effect tracks (RS-422 line driver output)
-E2000H	2000 line incremental square wave encoder with marker and hall effect tracks (RS-422 line driver output)
-E2500H	2500 line incremental square wave encoder with marker and hall effect tracks (RS-422 line driver output)
-E5000H	5000 line incremental square wave encoder with marker and hall effect tracks (RS-422 line driver output)
-E1000ASH	1000 line incremental amplified sine wave encoder with marker and Hall tracks

Options

-BK1	Brake, 112 oz·in (0.8 N·m), 24 VDC, 0.3 A for BMS60, BMS100
-VAC6	Vacuum preparation to 10^{-6} Torr

Accessories

MC-HPD25-M	Connector; HPD25 motor power mate for BMS60, BMS100 motors
MC-DB25-F	Connector; DB25 motor feedback mate for BMS60, BMS100 motors
MCM-3	Connector; MS motor power mate for BMS60, BMS100
MCF-3	Connector; MS motor feedback mate for BMS60, BMS100

BMS Series (NEMA 34) ORDERING INFORMATION

Ordering Example

BMS	280	-A	-MS	-E2000H	-BK2
Motor Series	**Model**	**Motor Winding**	**Connector Option**	**Encoder Resolution**	**Options**
BMS	280 465	-A	-MS	-E1000H -E2000H -E2500H -E5000H -E1000ASH	-BK2 -NS -VAC6

Brushless Rotary Servomotors

BMS280	NEMA 34 - Tcont = 1.6 N·m (227.0 oz·in) brushless motor
BMS465	NEMA 34 - Tcont = 2.86 N·m (404.8 oz·in) brushless motor

Winding Options

-A	Standard winding

Connectors

-MS	MS connectors for feedback and motor power (std)

Feedback Options

-E1000H	1000 line incremental square wave encoder with marker and hall effect tracks (RS-422 line driver output)
-E2000H	2000 line incremental square wave encoder with marker and hall effect tracks (RS-422 line driver output)
-E2500H	2500 line incremental square wave encoder with marker and hall effect tracks (RS-422 line driver output)
-E5000H	5000 line incremental square wave encoder with marker and hall effect tracks (RS-422 line driver output)
-E1000ASH	1000 line incremental amplified sine wave encoder with marker and Hall tracks

Options

-BK2	Brake; holding torque = 1.7 N·m (240 oz·in), 24 VDC, 0.4 A
-NS	IP65 rated Nitrile front shaft seal
-VAC6	Vacuum preparation to 10^{-6} Torr

Example: Motor with 2000-line encoder and Nitrile shaft seal: BMS280-AH-MS-E2000H-NS

Accessories

MCM-3	Connector; MS motor power mate
MCF-3	Connector; MS motor feedback mate