

# Silencer<sup>®</sup> Series Brushless DC Motor

## TYPICAL APPLICATIONS

- Medical equipment - pumps, blowers and electric scooters and wheelchairs
- Automatic door and window openers
- Computer-controlled embroidery machines
- Scanners
- Packaging equipment and printing products
- HVAC equipment (air handling)
- Robotic tape storage and retrieval
- Semiconductor handling and insertion machines
- Actuators

## FEATURES

- Inside rotor construction for quick acceleration
- 8 pole motor standard, 4 pole motors optional for high speed applications
- Compact size – lengths from 1.8 to 2.8 inches
- Continuous torques from 29 to 58 oz-in
- High energy sintered neodymium magnets
- Safe, arcless operation
- High torque per dollar ratio

## BENEFITS

- Operation at any single speed - not limited to AC frequency
- Motor life is not limited to brush or commutator life
- An essentially linear speed / torque curve
- Efficient operation without losses associated with brushes and commutation or armature induction
- Precise, variable speed control
- Extremely quiet operation
- Long-life operation

## BS23 High Performance



Utilizing high energy sintered neodymium magnets, the BS23 brushless motor offers almost 2 times the torque capability of the standard BN23. When maximum performance and minimum size are important, the BS23 offers an effective solution.

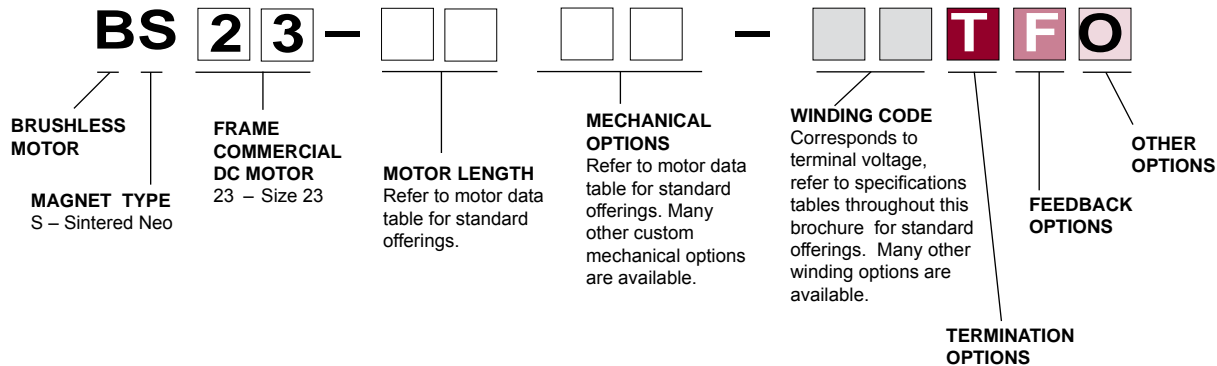
Finned black motor housing offers excellent heat transfer characteristics. Typical options include electronic drives, encoders, gearheads, as well as Hall effect, resolvers, and sensorless feedback.

For more information about how this product can be tailored to fit your specific application, contact our application engineers.

# Brushless Motors

## SPECIFICATION AND NUMBERING SYSTEM

### Part Numbering System Guide



## BS23 SPECIFICATIONS - *Continuous Stall Torque 36 - 70 oz-in (0.25 - 0.49 Nm)* *Peak Torque 238 - 729 oz-in (1.68 - 5.15 Nm)*

Part Number*		BS23-18HP- [ ] [ ] T F O			BS23-23-HP [ ] [ ] T F O			BS23-28HP [ ] [ ] T F O		
Winding Code**		01	02	03	01	02	03	01	02	03
L = Length	inches	1.91			2.41			2.91		
	millimeters	48.5			61.2			73.9		
Terminal Voltage	volts DC	24	36	48	24	36	48	24	36	48
Peak Torque	oz-in	238	287	307	514	637	684	556	681	729
	Nm	1.68	2.03	2.17	3.63	4.50	4.83	3.93	4.81	5.15
Continuous Stall Torque	oz-in	36	35	35	52	53	53	68	69	70
	Nm	0.25	0.25	0.25	0.37	0.37	0.37	0.48	0.49	0.49
Rated Speed	RPM	3000	3881	4198	4022	4800	5151	2796	3368	3628
	rad/sec	314	406	440	421	503	539	293	353	380
Rated Torque	oz-in	32	30	29	40	37	36	58	56	55
	Nm	0.23	0.21	0.20	0.28	0.26	0.25	0.41	0.40	0.39
Rated Current	Amps	3.7	2.9	2.3	5.9	4.3	3.3	6.1	4.6	3.6
Rated Power	watts	71	86	90	119	131	137	120	140	148
Torque Sensitivity	oz-in/amp	9.11	11.02	13.71	7.26	9.38	11.76	10.06	12.94	16.37
	Nm/amp	0.064	0.078	0.097	0.051	0.066	0.083	0.071	0.091	0.116
Back EMF	volts/KRPM	6.74	8.15	10.14	5.37	6.94	8.70	7.44	9.57	12.10
	volts/rad/sec	0.064	0.078	0.097	0.051	0.066	0.083	0.071	0.091	0.116
Terminal Resistance	ohms	0.90	1.36	2.13	0.33	0.52	0.82	0.43	0.68	1.06
Terminal Inductance	mH	0.86	1.26	1.98	0.34	0.57	0.90	0.48	0.79	1.25
Motor Constant	oz-in/sq.rt.watt	9.60	9.45	9.39	12.64	13.0	13.0	15.34	15.69	15.90
	Nm/sq.rt.watt	0.068	0.067	0.066	0.089	0.092	0.092	0.108	0.111	0.112
Rotor Inertia	oz-in-sec <sup>2</sup> x10 <sup>-3</sup>	0.99	0.99	0.99	1.50	1.50	1.50	1.90	1.90	1.90
	g-cm <sup>2</sup>	69.9	69.9	69.9	105.9	105.9	105.9	134.1	134.1	134.1
Weight	oz	15	15	15	21	21	21	26	26	26
	g	426	426	426	596	596	596	738	738	738
# of Poles		8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Timing		120°	120°	120°	120°	120°	120°	120°	120°	120°
Mech. Time Constant	ms	1.5	1.6	1.6	1.3	1.3	1.3	1.1	1.1	1.1
Electrical Time Constant	ms	0.96	0.93	0.93	1.03	1.10	1.10	1.12	1.16	1.18
Thermal Resistivity	deg. C/watt	5.9	5.7	5.2	4.6	4.5	4.9	4.0	4.0	4.2
Speed/Torque Gradient	rpm/oz-in	14.7	15.1	15.3	8.5	8.0	8.0	5.7	5.5	5.4

**Notes:**

- Motor mounted to a 4" x 4" x 1/4" aluminum plate, still air.
- Maximum winding temperature of 155°C.
- Typical electrical specifications at 25°C.
- Motor Terminal Voltages are representative only; motors may be operated at voltages other than those listed in the table. For assistance please contact an applications engineer.
- For MS (military style) connector, please specify connector housing and terminal.
- Data for informational purposes only. Should not be considered a binding performance agreement. For specific applications, please contact the factory.

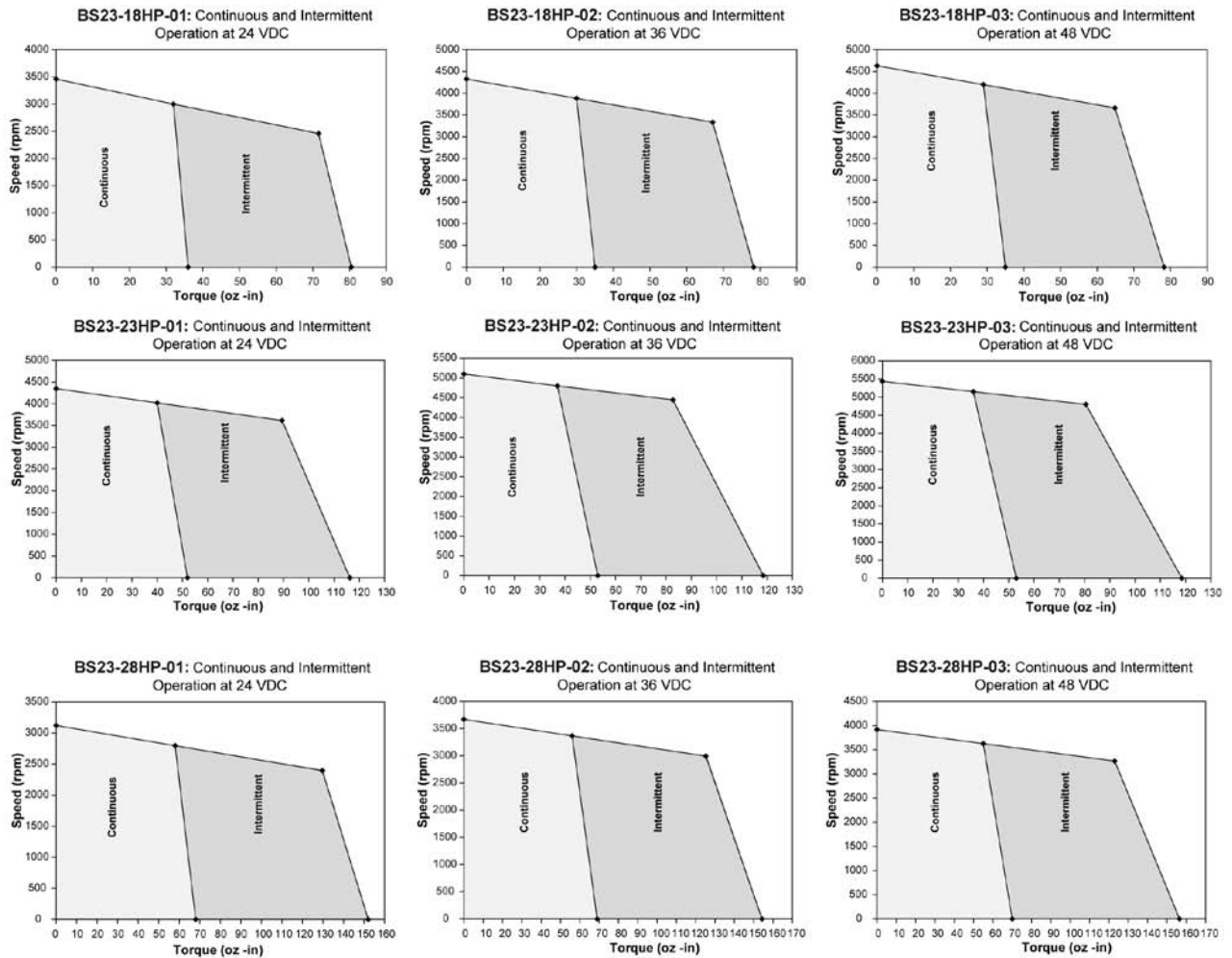
\*Many other custom mechanical options are available – consult factory.

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Select your options below and place their code in its corresponding block as shown above.

- |                      |                           |                        |
|----------------------|---------------------------|------------------------|
| <b>T</b> TERMINATION | <b>F</b> FEEDBACK OPTIONS | <b>O</b> OTHER OPTIONS |
| L – Leads (std)      | H – Hall Effect (std)     | E – Encoder            |
| C – Connector        | R – Resolver              | G – Gearhead           |
| M – MS Connector     | S – Sensorless            |                        |

## BS23 Performance Curves

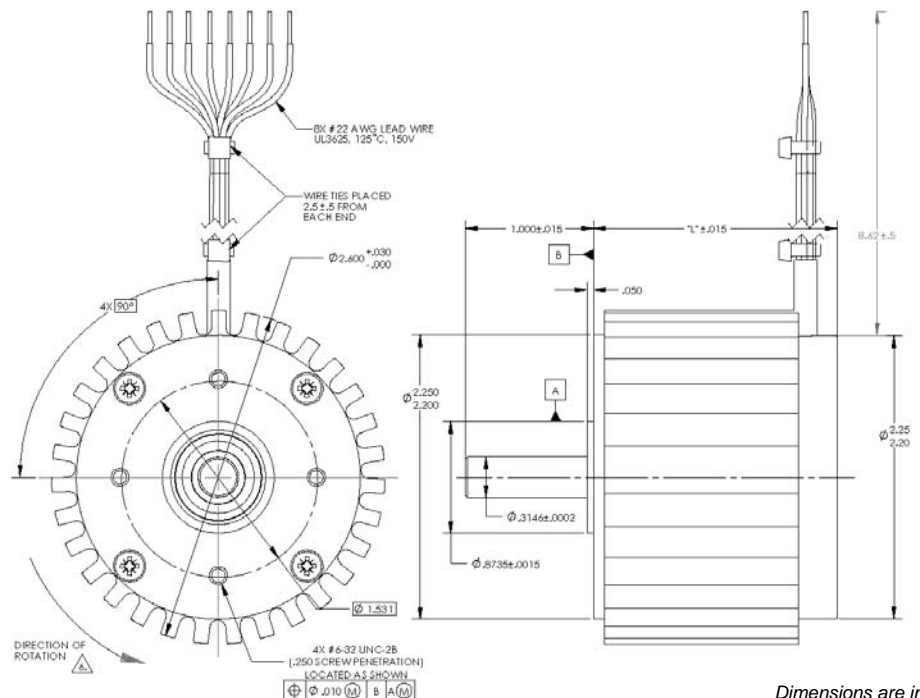


## Typical Outline Drawing - BS23

Termination Table\*

MOTOR LEADS		SENSOR LEADS	
COLOR	CONNECTION	COLOR	CONNECTION
VIOLET	A COIL	YELLOW	Vcc
BLACK	B COIL	BROWN	S1 OUT
GREEN	C COIL	BLUE	S2 OUT
		WHITE	S3 OUT
		GRAY	GROUND

\*We reserve the right to use solid color wires or white wires with color trace.



Note: Standard housing  $\varnothing 2.250$  is available.