



Brushless DC VS Brushed DC Motor



	Brushless DC	Brushed DC	
CONSTRUCTION	Rotor	Permanent magnet on rotor	Winding on rotor/armature
	Stator	Windings on the stator	Permanent magnet on stator
	Controller	Electric controller is required	No controller is required
FEATURE / PERFORMANCE	Torque	Suitable for high torque applications	Suitable for low torque applications
	Speed	Higher speed range due to no mechanical limitation imposed by brushes/commutator	Lower speed range due to mechanical limitations on the brushes
	Life	Typical life expectancy 10,000 to 20,000 hours	Typical life expectancy is 2,000 to 5,000 hours depending on the application and duty cycle
	Efficiency	High efficiency up to 90%	Typically 60-70% efficiency
BENEFITS / COMPARISON	Commutation Method	Electronic Commutation requiring a driver/controller	Uses mechanical commutator to reverse the polarity of the armature electromagnet
	Maintenance	Brushless design requires little to no maintenance	Periodic maintenance is required; can replace brushes for extended life if necessary
	Heat Dissipation	Superior thermal characteristics results in better heat dissipation	Internal rotor construction results in limited heat dissipation
	Noise	Low electric noise generation	Brushes emit audible noise during rotation
	Cost	Higher manufacturing cost	Lower manufacturing cost
	Operation Environment	More suitable for normal controlled environment	Can operate in more extreme environments due to the lack of electronics
	Applications	Fuel controls, missile fin actuators dental tools, respirators, R/C model airplanes, pumps, robotics, electric and hybrid vehicles, medical equipment, lawn mowers, factory automation, and gate operators.	Printers, toys, semiconductors equipments, packaging machines, automotive motors, wheelchairs, medical equipment, electric toothbrushes, vacuum cleaners, hair dryers, drill screwdrivers and gate operators.

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