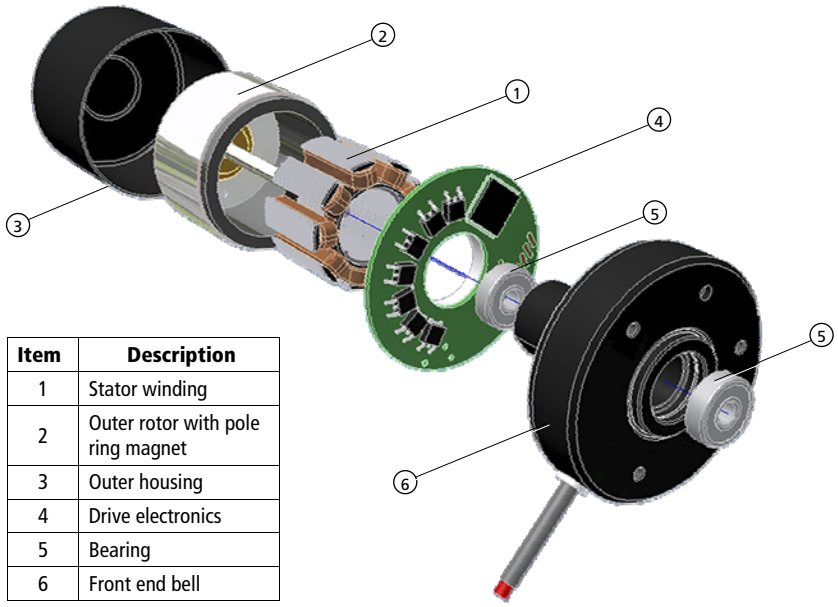
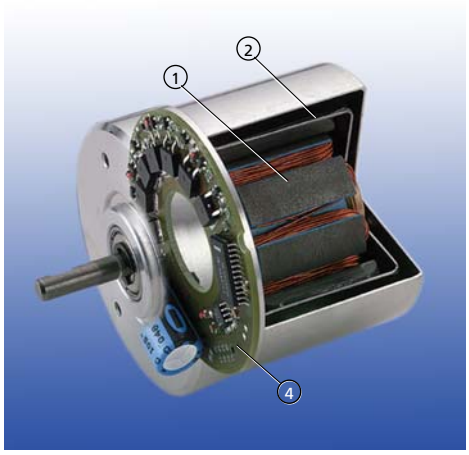
Outer Rotor Brushless DC Motors



Item	Description
1	Stator winding
2	Outer rotor with pole ring magnet
3	Outer housing
4	Drive electronics
5	Bearing
6	Front end bell



Cutaway view of a KinetiMax brushless DC Motor

Outer Rotor Brushless DC Motor Technology

Outer rotor brushless DC motors differ from typical brushless DC motors in that the rotor (item 2 above) is situated outside, instead of inside, the stator (item 1).

The stator consists of a multiphase winding on a laminated core, and the rotor consists of permanent magnet segments or a molded ring affixed to the inner surface of a steel cup-like component that is attached at one end to the motor's shaft.

The stator windings are fed with currents controlled in magnitude and sequence (commutated) to effect rotation of the rotor element just as in a typical brushless motor.

Many Allied Motion outer rotor brushless DC motors include integrated drive electronics (item 4). The sophistication of the integral drive can range from a simple unidirectional fixed speed control to one with bidirectional, variable speed characteristics.

Advantages of Outer Rotor Brushless DC Motors

Allied Motion's outer rotor brushless DC motors posses desirable attributes that make them an excellent choice for many applications:

- Higher inertia and optimized magnetic design of outer rotor technology minimizes cogging
- Outer rotor motors' larger air gap radius maximizes output torque
- Outer rotor's larger inertia helps "ride through" torque variations in pump applications
- Polygon mirrors can be directly mounted to the rotor for more robust and compact scanner equipment
- Higher pole count and inertia mean more stable low speed performance without feedback
- Lower audible noise due to greater inertia and reduced cogging is ideal for use in "quiet" applications
- Outer rotor designs are axially shorter than inner rotor designs for the same performance level

Outer Rotor Brushless DC Motor Applications

Here are some types of applications that benefit from the advantages of outer rotor brushless DC motors:

Medical Equipment

- Gas analyzer membrane pumps
- Dialysis peristaltic blood pumps and clean-cycle gear pumps
- CPAP sleep apnea machine membrane pump
- Anesthesia ventilator breathing system pump
- Dental instruments pumps
- Automated stirrers for medical (and chemical) instruments

Industrial Equipment

- Inkjet high-speed marking machine gear pumps
- Laser scanning instruments
- Industrial laser bar code readers

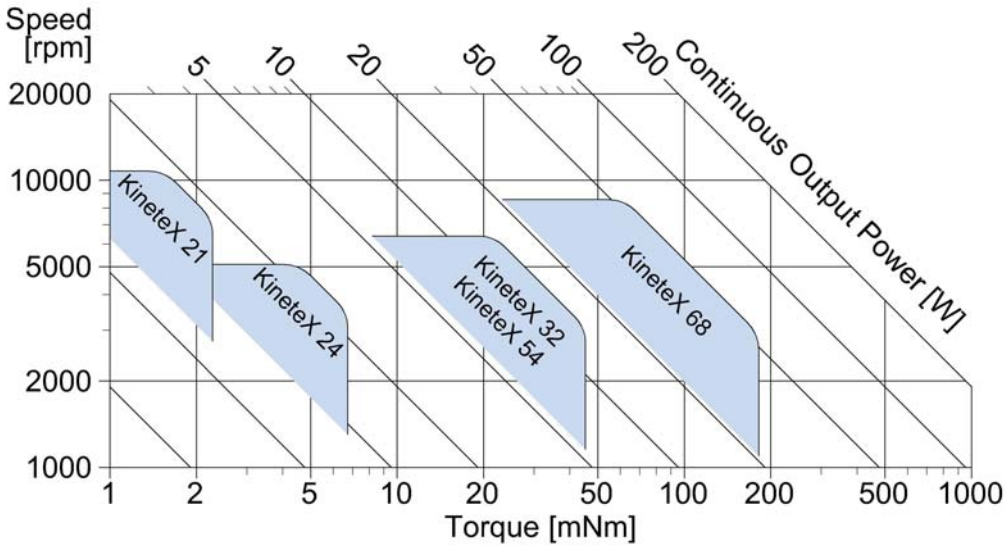
Other

- Liquid Petroleum Gas (LPG) fuel pumps for "green" vehicles
- Pilot flight suit microclimate cooling system pump
- Conveyor system check weighers

Outer Rotor Brushless DC Motors

	Size (OD) [mm (in)]	Power[1] [Watt]	Torque [mNm (oz-in)]	Speed No-load [RPM]	Inertia [kgm² (oz-in-s²)]	Voltages (VDC)	Options
KinetiMax 24 	21 (0.827) [EE] 24 (0.945) [EB]	1.5 2.7	6 (0.85)	Up to 10000 RPM Up to 7070 RPM	0.53E-6 (0.75E-4) 0.77E-6 (1.09E-4)	6, 12, 24	• Gearhead • IP30 protection • Custom leads and connector configuration • Custom shaft / flange
KinetiMax 32 EB 	31.2 (1.29)	12, 16	32 (4.53)	4600, 6000	4.7E-6 (6.66E-4)	12, 24	• Gearhead • IP54 protection • Custom leads and connector configuration • Custom shaft / flange
KinetiMax 54 EB 	54 (2.13)	8 12	22 (3.12) 30 (4.25)	4600	22E-6 (3.1E-3) 31E-6 (4.4E-3)	12, 24	• Gearhead • IP30 protection • Custom leads and connector configuration • Custom shaft / flange
KinetiMax 68 EB 	68 (2.68)	35 50 50	80 (11.3) 114 (16.2) 170 (24.1)	6000 6000 3650	0.75E-4 (1.06E-2) 1.2E-4 (1.7E-2) 1.2E-4 (1.7E-2)	24	• Gearhead • IP54 protection • Custom leads and connector configuration • Custom shaft / flange

1. Continuous ratings



Note: Blue-shaded area indicates optimum operational area for the motor