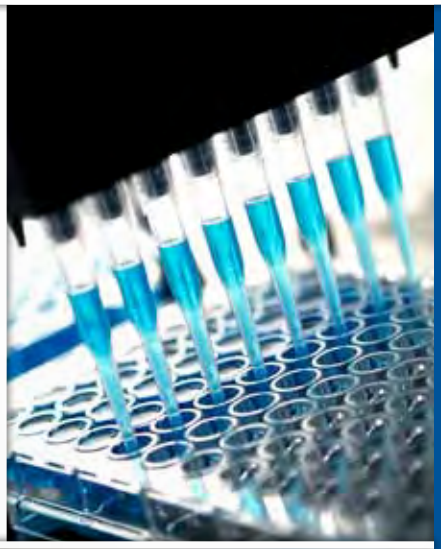
Portescap

Disc Magnet Stepper Motion Solutions



Put some pep in your step...

Your unique motion challenges call for revolutionary Portescap solutions. Leveraging over 70 years of experience in precision micro motor technology, we put your ideas in motion.

Our disc magnet motors provide exceptional dynamic performance unparalleled by any other stepper in the market. The unique thin disc magnet enables finer step resolutions in a given envelope, significantly higher acceleration and greater top speed than conventional steppers.

Disc magnet motors excel in applications that require the precision of a stepepr and the speed and acceleration of a Brushless DC motor. Closing the loop provides a competitive advantage against a servo solution. Whatever your next design challenge, Portescap can deliver the right power and precision in the smallest of spaces.

PRODUCT OFFERING

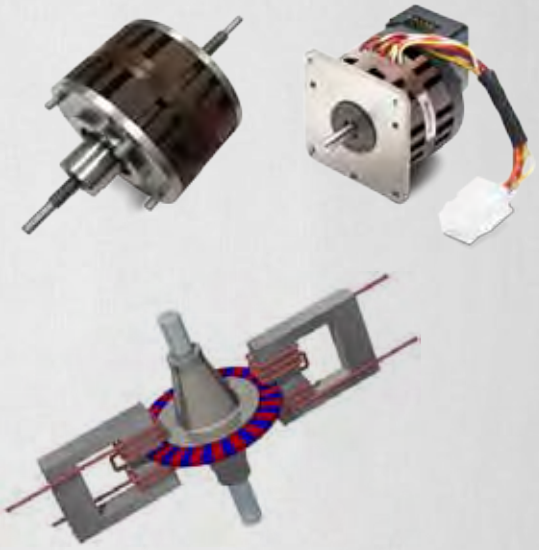
Model	Ø mm (inch)	L mm (inch)	Holding Torque mNm (oz-in)	Step Angle +/- 10%	Weight g (lbs)	Available with:		
						Various Windings	Gearbox	Encoder
P010 064	10 (0.39)	16.4 (0.65)	1.85 (0.26)	15°	9 (0.02)	Yes	Yes	Yes
P010 104	10 (0.39)	16.4 (0.65)	1.85 (0.26)	9°	9 (0.02)	Yes	Yes	Yes
P110 064	16 (0.63)	19 (0.75)	7.0 (1.0)	15°	23 (0.05)	Yes	Yes	Yes
P110 104	16 (0.63)	19 (0.75)	6.1 (0.86)	9°	23 (0.05)	Yes	Yes	Yes
P310	32 (1.26)	17.4 (0.69)	14 (2.0)	6°	40 (0.09)	Yes	Yes	Yes
P430	39 (1.54)	26.4 (1.04)	60 (8.5)	3.6°	100 (0.22)	Yes	Yes	Yes
P520	52 (2.05)	23.1 (0.91)	120 (17)	3.6°	180 (0.40)	Yes	Yes	Yes
P530	52 (2.05)	32.6 (1.28)	175 (25)	3.6°	250 (0.55)	Yes	Yes	Yes
P532	52 (2.05)	32.6 (1.28)	205 (29)	3.6°	250 (0.55)	Yes	Yes	Yes
P760	81 (3.19)	57.6 (2.27)	325 (46)	7.5°	700 (1.54)	Yes	Yes	Yes
P852	90.9 (3.58)	48.3 (1.90)	1,060 (150)	1.8°	1,000 (2.19)	Yes	Yes	Yes

The exceptional possibilities offered by our line of disc magnet stepper motors are unequalled by any other kind of stepper motor.

Their advanced technology, developed by Portescap in Switzerland, allows for truly exceptional dynamic performance. The rotor of these motors consists of a rare earth magnet having the shape of a thin disc which is axially magnetized.

A specific magnetization method allows for a high number of magnetic poles, optimized for the motor size, giving much smaller step angles than conventional two-phase permanent magnet stepper motors.

Their very low moment of inertia results in outstanding acceleration and dynamic behaviour. These features, together with high peak speeds, mean that any incremental movement is carried out in the shortest possible time. Low inertia also means high start and stop frequencies allowing to save time during the first step and solve motion problems without applying a ramp.



Technology Features	Motor Characteristics	Advantages for the Application
Thin multipolar rare earth disc magnet	Low rotor inertia	High acceleration, high start and stop frequencies High power rate (T^2/J)
Short iron circuit made of SiFe laminations Coils placed near the airgap	Low iron losses More torque at high step rates	High speeds High power to volume ratio
Simple magnetic circuit	No coupling between phases Sinusoidal torque function Low detent torque	Superior angular resolution in microstep mode
Optimally dimensioned iron circuit	Torque constant is linear up to 2 times nominal current	High peak torques Capability to boost current

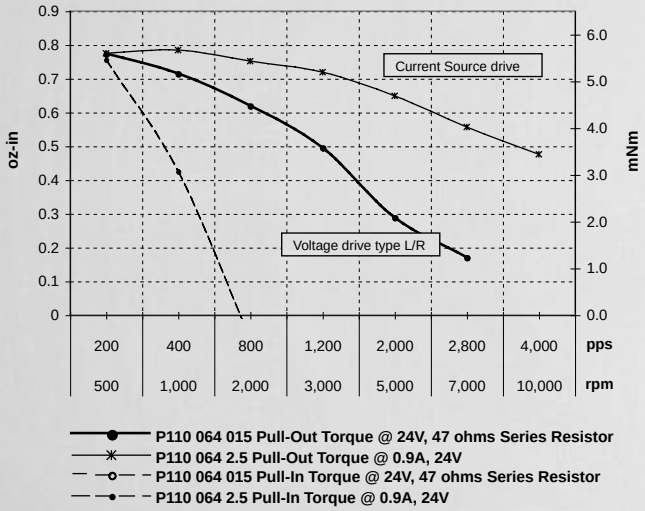
A WORLD OF APPLICATIONS

- Clinical Diagnostics
- Laboratory automation and pipettes
- Syringe pumps
- Insulin pumps
- Dental milling machines
- Prosthetics
- Pick and place mechanisms
- Positioning systems
- Electronic assembly feeders
- Die bonding
- Wafer handling
- Machine tools
- Yarn monitoring systems
- Electronic wire winding
- Thread guide mechanisms
- Optical attenuation and focus
- Aircraft docking systems

Disc Magnet Motor Performance

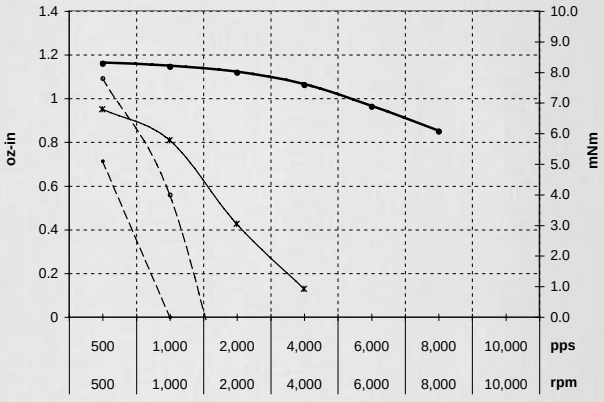
Model	Units	Top Speed	Holding Torque	Detent Torque	Torque/Inertia Ratio	Angular Acceleration
		RPM	mNm	mNm	mNm/gcm²	rad/s²
P010 064		9,500	1.85	0.4	26.43	265,000
P010 104		9,500	1.85	0.4	26.43	265,000
P110 064		9,500	7	1	17.50	167,000
P110 104		9,500	6.1	1	17.50	167,000
P310		11,500	14	2.5	16.28	140,000
P430		7,000	60	3.5	20.00	200,000
P520		7,000	120	10	10.00	100,000
P530		6,000	175	10	14.58	141,000
P532		6,000	205	28	17.08	171,000
P760		4,000	325	20	19.12	190,000
Performance Comparison	NEMA17 short stack	2,000	210	11	5.25	

P110 064 015 / P110 064 003
Torque vs Speed
Full step, bipolar voltage



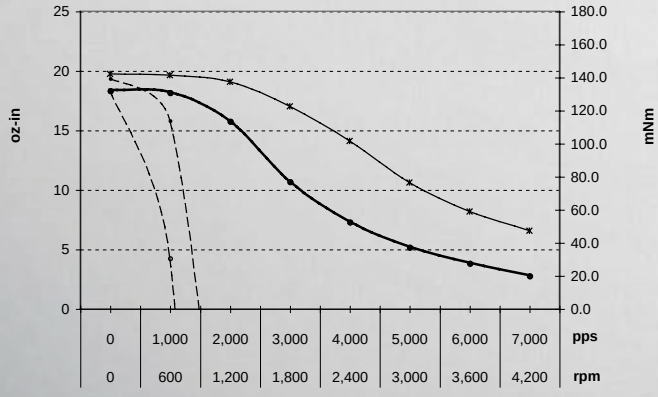
P110 064 015 Pull-Out Torque @ 24V, 47 ohms Series Resistor
P110 064 2.5 Pull-Out Torque @ 0.9A, 24V
P110 064 015 Pull-In Torque @ 24V, 47 ohms Series Resistor
P110 064 2.5 Pull-In Torque @ 0.9A, 24V

P310 158 005, P310 158 170 Parallel
Torque vs Speed
Full step, bipolar voltage drive



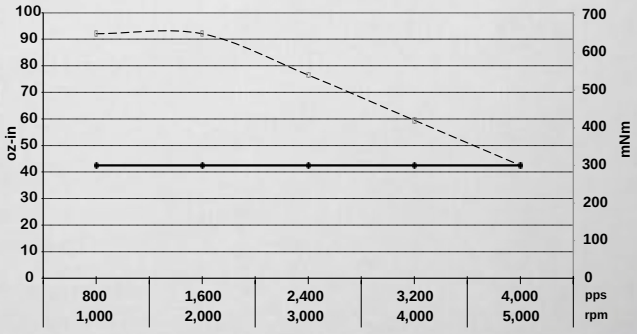
P310 158 005 Pull-Out Torque @ 1A, 24V
P310 158 170 Pull-Out Torque @ 24V, 120 ohm ext resistor
P310 158 005 Pull-In Torque @ 1A, 24V
P310 158 170 Pull-In Torque @ 24V, 120 ohm ext resistor

P530 258 004, P532 258 004 Parallel
Torque vs Speed
Full step, bipolar voltage drive



P530 258 004 Pull-Out Torque @ 2A, 36V
P530 258 004 Pull-In Torque @ 2A, 36V
P532 258 004 Pull-Out Torque @ 2A, 36V
P532 258 004 Pull-In Torque @ 2A, 36V

P760 0.4 10 HEDS 5540
Torque vs Speed
65 vdc, BLDC Mode



P760 0.4 10 HEDS 5540 A14 Pull-Out Torque @ 65 V, 12 A driven in BLDC mode
P760 0.4 10 HEDS 5540 A14 Pull-Out Torque @ 65 V, 6 A driven in BLDC mode

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Custom Motion Solutions

Sintered or ball bearings

Winding options

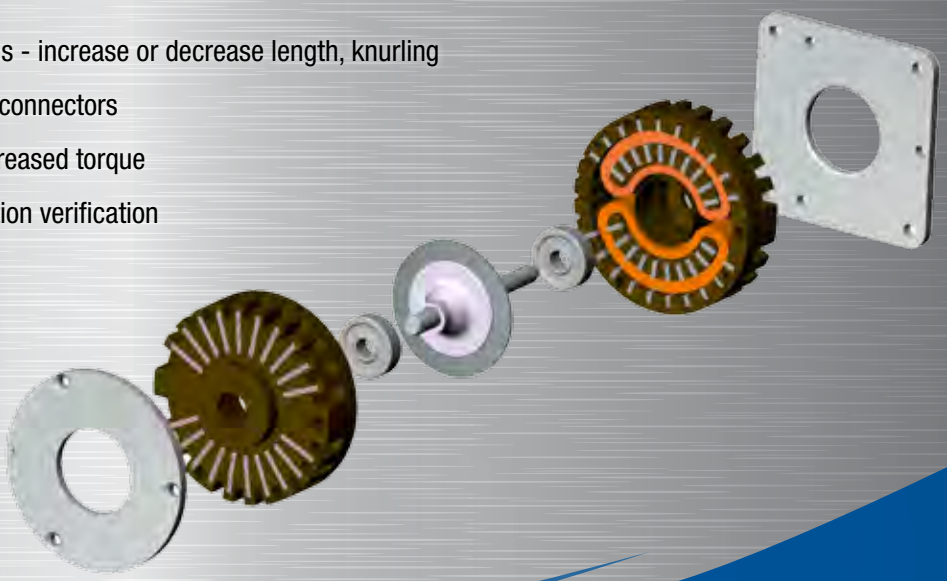
Shaft modifications - increase or decrease length, knurling

Longer leads and connectors

Gearheads for increased torque

Encoders for position verification

Lead screw shaft



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