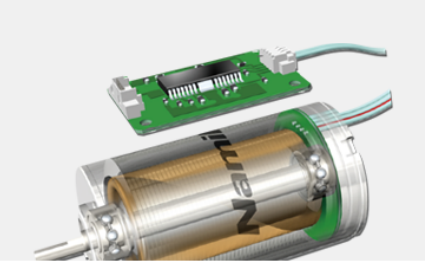
Brushless Motor

Because the rotor is free of other objects (no brush), it is designed for high power, and noise-less by principle. It is suitable for long-life use.



Output	Because of no-contact design (no brush/commutator like cored/coreless motor), large current can be input and heat in the coil dissipates quickly
Life	Long life time because of no-contact design
Control	Linear characteristics
Cogging	No magnetic cogging

In our brushless motor, we removed the mechanical contacts such as brushes and commutators used in conventional brushed motors, and applied an electric signal to take their place. The brushless motor requires an electric circuit board because there is no commutator. This motor (circuit board) has two types, one with a magnetic sensor, and the other with no sensor. The one with the magnetic sensor detects its position via the sensor, and the other detects the rotor magnet position via back-EMF. Brushless motor's features are as follows:

Features

1. Stator coil is located outside in inner rotor type brushless motor. Therefore, it is good in heat dissipation.
   Because there are no contacts (brush/commutator), large current can be input to answer to high power needs.
2. No mechanical noise and no electric noise for switching current(no brush and no commutator)
3. Long life and high reliability (due to no-contact design)

In Namiki's brushless motor, stator is a slot-less core with cup-shaped coil, and rotor is the magnet inside. Therefore, magnetic force is even regardless of coil/magnet position, and motor rotation is free of cogging.

Issues & Challenges in Brushless Motor

As brushless motors have no mechanical contacts for polarity switching, they have high power and long lifespan. However, due to the rotating magnet core, the inertia is much larger than that of coreless brushed motor and the response time slower. Namiki presents brushless motors that address these issues equally.

Brushless Motor Standard Model

				Nominal Values				No load		Stall				Option			
Products	Dia. [mm]	Length [mm]	Nominal Voltage [V]	Torque [mNm]	Speed [rpm]	Current [mA]	Output [W]	Speed [rpm]	Current [mA]	Torque [mNm]	Current [A]	Mechanical time constant [ms]	Max efficiency [%]	Connection		Bearing	
														Terminals	lead-wire	sleeve	BB
BMN04-0829	4	8	3.0	0.01	24,200	53	0.04	37,000	28	0.04	0.10	9.2	22	A (sensorless)		○	x
BMN07-1207	7	13	3.0	0.06	17,100	182	0.2	21,300	120	0.30	0.43	7.3	22	B(A※)		○	x
BMN07-1218			5.0	0.06	17,900	117	0.2	22,300	78	0.30	0.28	7.7	22	B(A※)		○	x
BMS10-1003	10	10	4.0	0.17	30,400	384	0.9	37,900	185	0.86	1.19	10.9	37	C		○	x

BMS10-1008			6.0	0.15	27,100	208	0.8	33,800	103	0.75	0.63	11.1	36	C	○	x
BMS10-1803			7.4	0.63	27,000	351	4.5	31,300	63	4.54	2.14	3.9	69	C	○	x
		18														
BMS10-1806			12.0	0.68	30,800	268	4.9	35,800	49	4.86	1.61	4.1	68	C	○	x
BMS12-1503			7.4	1.05	21,461	523	3.9	26,200	113	5.73	2.35	4.3	61	D	○	x
		15														
BMS12-1506			12.0	1.10	25,683	394	5.2	31,000	82	6.33	1.87	4.6	63	D	○	x
	12															
BMS12-2102			7.4	1.83	19,200	706	6.9	22,800	100	11.60	3.94	2.7	71	D	○	x
		21														
BMS12-2104			12.0	1.60	21,100	418	7.7	24,300	70	12.09	2.70	2.8	70	D	○	x
BMS16-2001			7.4	3.20	18,800	1305	9.4	23,800	188	15.06	5.45	5.7	66	D	○	△
BMS16-2004		20	12.0	2.42	19,700	620	9.7	23,200	113	15.97	3.46	5.3	67	D	○	△
BMS16-2013			24.0	2.45	21,100	334	10.6	24,800	60	16.30	1.88	5.5	67	D	○	△
	16															
BMS16-3001			7.4	3.25	12,600	807	9.5	14,500	123	25.10	5.39	3.6	72	D	○	△
BMS16-3002		30	12.0	3.90	14,800	660	15.4	16,600	86	35.33	5.29	2.9	76	D	○	△
BMS16-3010			24.0	3.86	14,000	311	14.0	15,800	41	33.84	2.41	2.9	76	D	○	△
BMS17-1821	17	18	24.0	2.36	16,000	291	6.2	20,000	72	11.80	1.17	16.3	57	D	x	○
BMS22-2113	22	22	24	5.50	10,000	381	10.2	12,000	80	32.30	1.85	7.9	62	D	x	○

Meaning

- ○ = Available as standard
- △ = Available as option
- × = Not available
- A～G = Pin assignment pattern (see table)

Brushless Motor Pin Assignment Pattern

Pattern		#1	#2	#3	#4	#5	#6	#7	#8	Applicable motor
A	FPC	coil U	coil V	COM	coil W	-	-	-	-	BMN04, BMS07 (sensorless時)
B		sensor V	sensor U	Gnd	Vdd	sensor W	coil V	coil W	coil U	BMS07
C		coil W	coil U	sensor U	sensor V	sensor W	coil V	Gnd	Vdd	BMS10 series
D	leadwire	coil U	coil V	coil W	Vdd	Gnd	sensor U	sensor V	sensor W	BMS12/ BMS16 series/ B4S12
E		coil W	coil V	coil U	Gnd	Vcc	sensor W	sensor V	sensor U	B4S22-3212
F	Terminals	coil W	sensor W	COM	coil W	-	-	-	-	BRS/BRT17-15 BRS/BRT17-18
G		H1 sensor U	H_2 Vcc	H_3 Gnd	H_4 sensor W	H_5 sensor W	L_1 coil U	L_2 coil V	L_3 coil W	BRS/BRT12-15

Outer Rotor Pancake Brushless Motor

Products	Dia. [mm]	Thickness [mm]	Nominal Voltage [V]	No-load		Stall	
				Speed [rpm]	Current [A]	Toreque [mNm]	Current [A]
SOBL23-1207	23	12	12	5730	0.127	26.8	1.38

Driver

Products	Voltage supply:VCC	Applicable motor types
SSD06-R5A	1.8~ 5.5	Sensorless brushless motors; BMN04-08XX, BMN07-13XX(sensorless option)
SHSD24-01A	7.5~ 26.4	All NAMIKI brushless motors