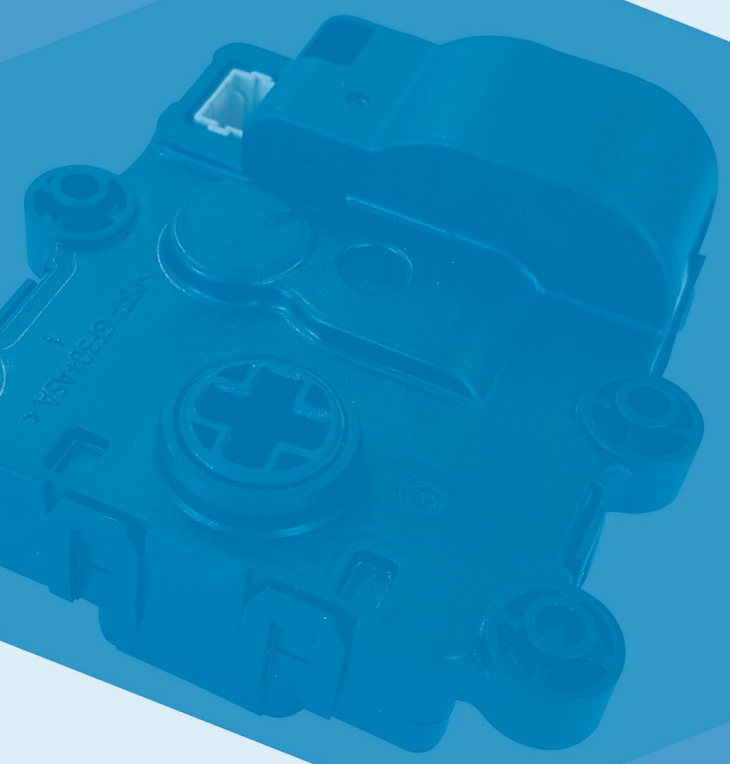


We pursue the world best



We pursue  
the world best

*and make much of the customer's proposal.  
Moatech families make a promise to do our best continuously.*

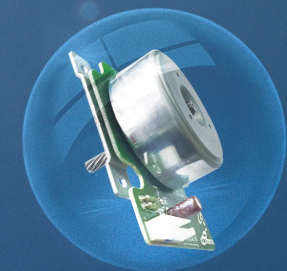


# Company History

- 1985** Established "KOREA WINDING TECHNOLOGY"
- 1994** Concluded a technical contract with TOSHIBA TEC
- 1995** Began manufacturing "PM Stepping Motor for OA"
- 1996** Began manufacturing "Stepping Motor for air\_Con. louver"
- 1997** Started up CHINA Factory (DONG MA Electronics)  
Changed the name to "MOATECH CO., LTD."  
Listed KOSDAQ
- 1998** Achieved ISO 9001 certification (KQC-0559)  
Established R&D Center in Korea  
Began manufacturing "Stepping Motor for Optical Disk Drive"
- 2002** Established "MOATECH PHILIPPINES INC."  
Achieved ISO 9001 certification for China Factory
- 2003** Achieved TS16949 and ISO14001 certification
- 2004** Established "New R&D Center"  
Developed "BLDC Motor"
- 2005** Awarded "World Best Commodity" (Step. Motor of LS Type for ODD)
- 2006** Take over "HYSONIC CO., LTD." (Produce VCM for Camera module in Cell phone)  
Developed "Stepping Motor for DSC and IRIS Meter for CCTV Camera"
- 2007** Achieved SQ certification from Hyundai and KIA Motors  
Line up AFS actuator for automobile
- 2008** Started up Philippines Factory (MOATECH MFG. PHILIPPINES, INC)
- 2009** Korea Technology Award 2009 'Excellence Award' (Digital steel Camera用  $\phi$ 6 Step Motor)
- 2011** Developed "Parking Release Actuator For Automobile"
- 2012** Minebea group took over 50.8% shares of Moatech Co., Ltd. through M&A.
- 2014** Developed "AFS Swivel Actuator(1.6G) For Automobile"
- 2016** Developed "Rotary Solenoid Actuator For Automobile"

## Introduction of item

# MOATECH



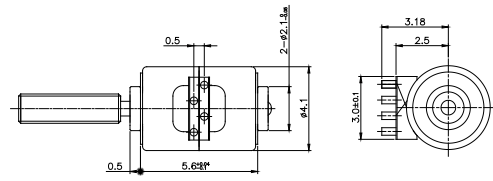


# STEPPING MOTOR

## SP-04RG Type

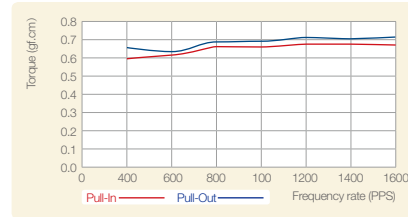


• DIMENSIONS(mm)



SP-04RG-100

• CHARACTERISTICS (gf-Cm)

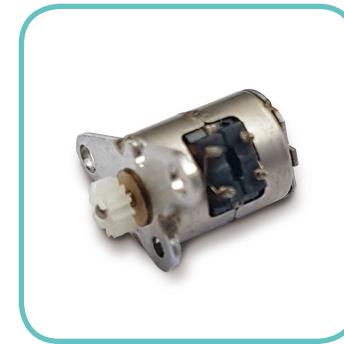


• SPECIFICATION

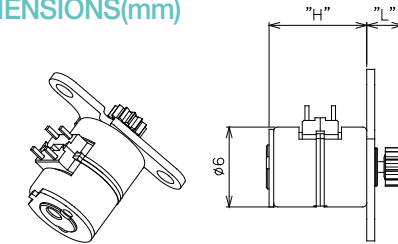
Series	Step Angle Degree	Voltage VDC	Resistance $\Omega \pm 10\%$	Phase -	Drive Circuit -	Max. No Road Response PPS	Max. Slew speed PPS	Torque (gf-cm)		
								Holding	Pull In 600 PPS	Pull Out 600 PPS
100	22.5	3	22	2	Bipolar V Const	1200	5000	-	0.6	0.6

• APPLICATION : smart phone,slime blu-ray Optical pick-up, etc

## SPS-06RF Non Bracket Type

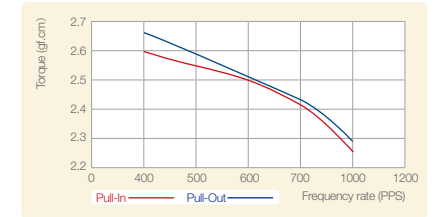


• DIMENSIONS(mm)



SPS-060RF-140L

• CHARACTERISTICS (gf-Cm)

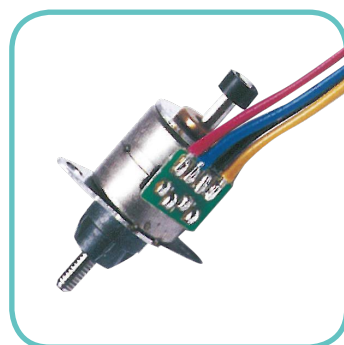


• SPECIFICATION

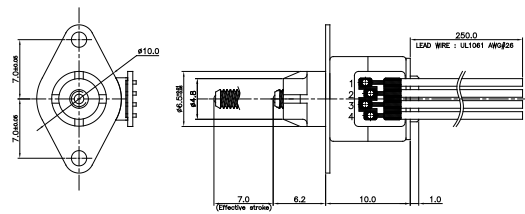
Model	Step Angle Degree	Drive Volt VDC	Resistance $\Omega \pm 7\%$	Phase -	Drive Circuit -	Max. No Road Response PPS	Max. Slew Speed PPS	Torque (gf-cm)			Lead Screw		Size	
								Holding 0PPS	Pull in 800PPS	Pull out 800PPS	Pitch mm	Diameter mm	H mm	L mm
100S	18°	5.0	20	2	Bipolar/Constant Volt.	1000	3000	1.5	1.7	1.8	0.3	φ1.7	4.7	10.6
200M	18°	5.0	40	2	Bipolar/Constant Volt.	1000	3000	2	2.0	2.2	0.3	φ1.7	5.8	11.9
140L	18°	4.5	30	2	Bipolar/Constant Volt.	1000	3000	2.5	2.3	2.7	-	φ1.0	7.5	2.6
300L	18°	5.0	30	2	Bipolar/Constant Volt.	1000	3000	3	3.0	3.5	-	φ1.0	7.5	2.6

• APPLICATION : DSC (Digital Steel Camera)

## LM-10RF Type

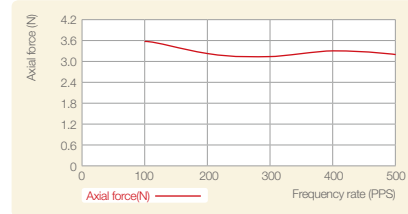


• DIMENSIONS(mm)



LM10RF-010

• CHARACTERISTICS (N)

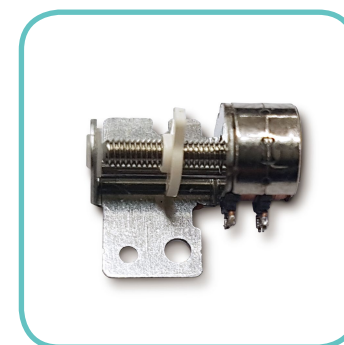


• SPECIFICATION

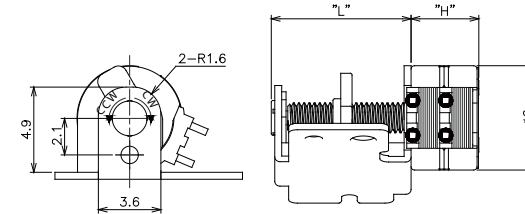
Model	Step Angle Degree	Drive Volt VDC	Resistance $\Omega \pm 2.5$	Phase -	Drive Circuit -	Max. No Road Response PPS	Max. Slew speed PPS	Axial force (N) 100 PPS	Lead Screw		Lead wire
									Lead Pitch mm	Diameter mm	L(mm) mm
10	18°	5.0	22	2	Bipolar V Const	1000	2000	1.96	0.4	2.2	250

• APPLICATION : Optical Fiber Fusion Splicer

## SPS-06RF Bracket Type

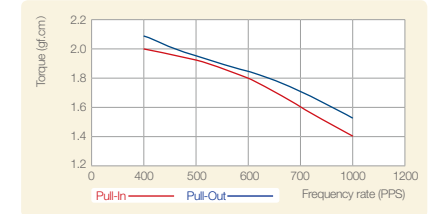


• DIMENSIONS(mm)



SPS-060RF-520T

• CHARACTERISTICS (gf-Cm)



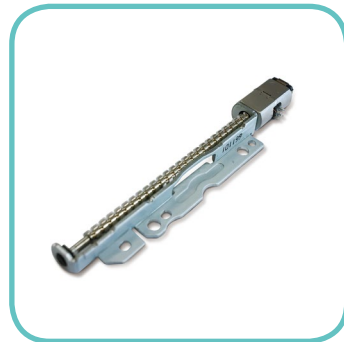
• SPECIFICATION

Model	Step Angle Degree	Drive Volt VDC	Resistance $\Omega \pm 7\%$	Phase -	Drive Circuit -	Max. No Road Response PPS	Max. Slew Speed PPS	Torque (gf-cm)			Lead Screw		Size	
								Holding 0PPS	Pull in 800PPS	Pull out 800PPS	Pitch mm	Diameter mm	H mm	L mm
520T	18°	4.5	30	2	Bipolar/Constant Volt.	1000	3000	1.5	1.4	1.6	0.3	φ1.7	3.8	7.5
521T	18°	4.5	30	2	Bipolar/Constant Volt.	1000	3000	1.5	1.4	1.6	0.25	φ1.7	3.8	14.3
201S	18°	4.5	30	2	Bipolar/Constant Volt.	1000	3000	1.5	1.7	1.9	0.3	φ1.7	4.7	11.4

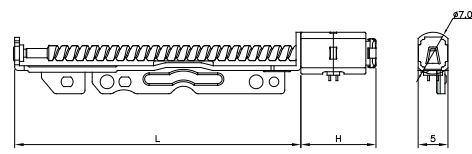
• APPLICATION : DSC (Digital Steel Camera)

# STEPPING MOTOR

## SPS-S07RG Type

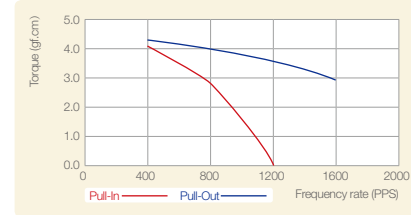


• DIMENSIONS(mm)



SPS-S07RG-208

• CHARACTERISTICS (gf-Cm)

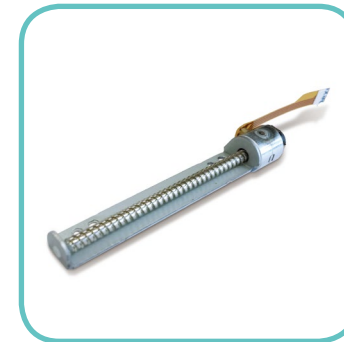


• SPECIFICATION

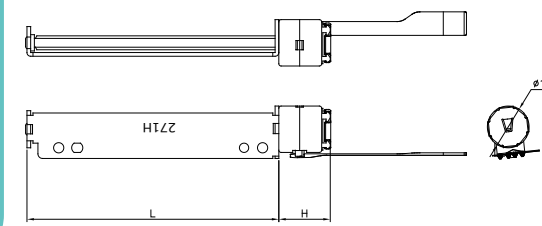
Model	Step Angle Degree	Drive Volt VDC	Resistance $\Omega \pm 1.5$	Phase -	Drive Circuit -	Max. No Road Response PPS	Max. Slew speed PPS	Torque (gf-cm)			Lead Screw		Size	
								Holding	Pull In	Pull Out	Lead Pitch mm	Diameter mm	H mm	L mm
208	22.5°	4.0	14.5	2	Bipolar/ Constant Volt	1000	3000	(3.8)	3.1	3.1	1.7	2.5	12.6	48
301A	22.5°	4.0	14.5	2	Bipolar/ Constant Volt	1000	3500	(5)	4.0	3.0	1.6	2.5	14.6	50.6

• APPLICATION : 9.0mm OPTICAL DISK DRIVE

## SPS-10RF Type

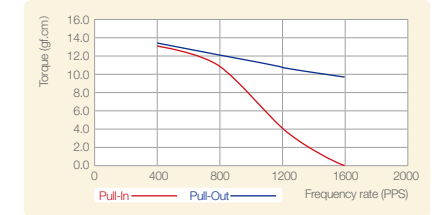


• DIMENSIONS(mm)



SPS-10RF-271H

• CHARACTERISTICS (gf-Cm)



• SPECIFICATION

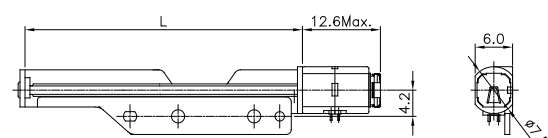
Model	Step Angle Degree	Drive Volt VDC	Resistance $\Omega \pm 2.5$	Phase -	Drive Circuit -	Max. No Road Response PPS	Max. Slew Speed PPS	Torque (gf-cm)			Lead Screw		Size	
								Holding	Pull in	Pull out	Lead Pitch mm	Diameter mm	H mm	L mm
271H	18°	7.5	25.1	2	Bipolar/ Constant Volt.	1000	2000	(11.7)	8.8	4.9	3	3.0	11.1	54.4

• APPLICATION : VIDEO GAME CONSOLE

## SPS-S08RG Type

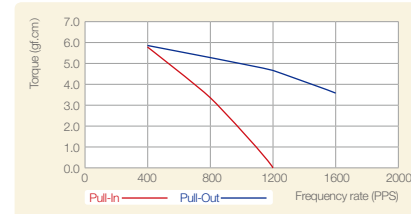


• DIMENSIONS(mm)



SPS-S08RG-230

• CHARACTERISTICS (gf-Cm)



• SPECIFICATION

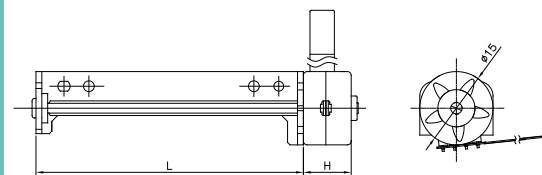
Model	Step Angle Degree	Drive Volt VDC	Resistance $\Omega \pm 1$	Phase -	Drive Circuit -	Max. No Road Response PPS	Max. Slew speed PPS	Torque (gf-cm)			Lead Screw		Size	
								Holding	Pull In	Pull Out	Lead Pitch mm	Diameter mm	H mm	L mm
230	22.5°	4.0	15	2	Bipolar/ Constant Volt	1050	3100	(6)	3.5	3.2	2	2.5	12.6	46.8
360HA	22.5°	4.0	13	2	Bipolar/ Constant Volt	1000	3000	(5)	3.3	2.4	1.6	2.5	14.6	46

• APPLICATION : 12.5mm OPTICAL DISK DRIVE

## SPS-15RF Type

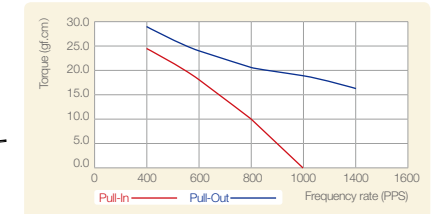


• DIMENSIONS(mm)



SPS-15RF-172FH

• CHARACTERISTICS (gf-Cm)



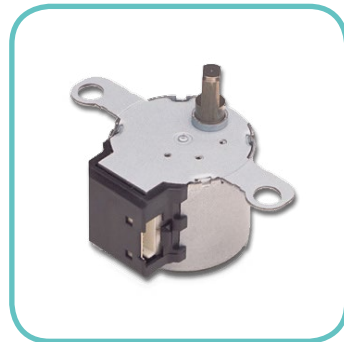
• SPECIFICATION

Model	Step Angle Degree	Drive Volt VDC	Resistance $\Omega \pm 7\%$	Phase -	Drive Circuit -	Max. No Road Response PPS	Max. Slew Speed PPS	Torque (gf-cm)			Lead Screw		Size	
								Holding	Pull in	Pull out	Lead Pitch mm	Diameter mm	H mm	L mm
172FH	18°	5.0	10	2	Bipolar/ Constant Volt.	1000	1700	(25)	21.0	11.0	3	3.0	12.5	54.6
189FH	18°	5.0	10	2	Bipolar/ Constant Volt.	1200	1780	(35)	23.2	13.9 (1600PPS)	3	3.0	12.5	63.0
276_B	18°	4.5	10	2	Bipolar/ Constant Volt.	1000	1700	(19.6)	14.7	6.8	3	3.0	12.5	55.9
888FH	18°	4.5	10	2	Bipolar/ Constant Volt.	900	1700	25	18.0	9.0	3	3.0	12.5	53.0

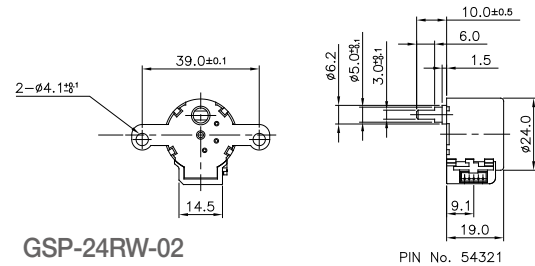
• APPLICATION : OPTICAL DISK DRIVE

# STEPPING MOTOR

## GSP-24RW Non Bush Type



• DIMENSIONS(mm)



• SPECIFICATION

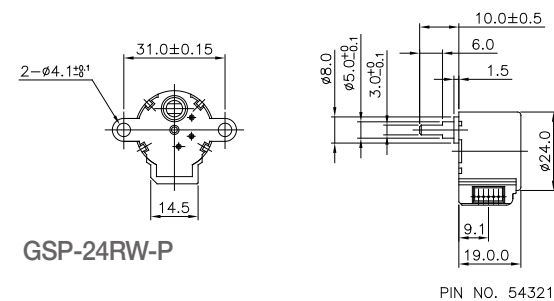
Model	Step Angle Degree	Drive Volt VDC	Phase	Resistance $\Omega \pm 7\%$	Drive Circuit	Max. No Road Response PPS	Max. Slew speed PPS	Noise 100PPS	Torque (gf-cm)			Lead Wire Ass'y		
									Pull-in (PPS)	Friction	Detent	Housing	Contact Terminal	L mm
02	5.625/64	12	1-2	300	UNIPOLAR	400	700	Max 40dB	Min 600(100)	700~2400	Min 600	Without lead wire		
011(60)	5.625/64	12	1-2	300	UNIPOLAR	400	700	Max 40dB	Min 650(100)	700~2400	Min 600	Without lead wire		
011F	11.25/64	12	2-2	190	UNIPOLAR	450	900	Max 40dB	Min 900(182)	Non Friction	Min 600	SMH250-05L	YST025L-3	145
SP1	5.625/64	12	1-2	300	UNIPOLAR	400	700	Max 40dB	Min 650(100)	700~2400	Min 600	JST PAP-05V-S	JST SPHD-002T-P0.5	260
PS1	5.625/64	12	1-2	300	UNIPOLAR	400	700	Max 40dB	Min 650(100)	700~2400	Min 600	JST PAP-05V-S	JST SPHD-002T-P0.5	145

• APPLICATION : Air Conditioner / Ice maker / Electric Fan / Bidet / Automobile

## GSP-24RW Bush Type



• DIMENSIONS(mm)



• SPECIFICATION

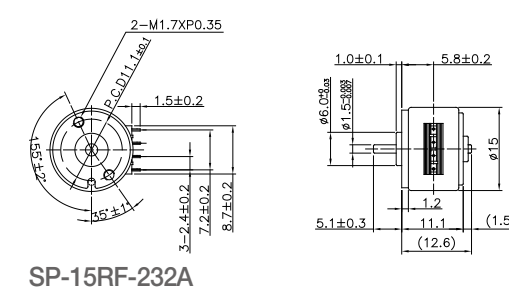
Model	Step Angle Degree	Drive Volt VDC	Phase	Resistance $\Omega \pm 7\%$	Drive Circuit	Max. No Road Response PPS	Max. Slew speed PPS	Noise 100PPS	Torque (gf-cm)			Lead Wire Ass'y		
									Pull-in (PPS)	Friction	Detent	Housing	Contact Terminal	L mm
P	5.625/64	12	1-2	300	UNIPOLAR	500	800	Max 40dB	Min 600(100)	600~2000	Min 600	Without lead wire		
PA	5.625/64	12	1-2	300	UNIPOLAR	500	800	Max 40dB	Min 600(100)	600~2000	Min 600	Without lead wire		

• APPLICATION : Air Conditioner, Auto Mobile

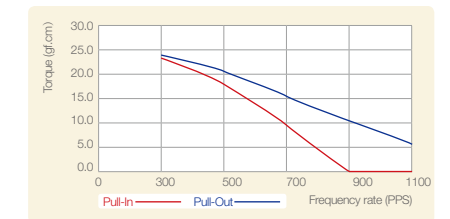
## SP-15RF Type



• DIMENSIONS(mm)



• CHARACTERISTICS (gf-Cm)



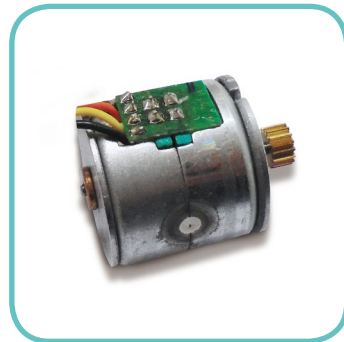
• SPECIFICATION

Series	Step Angle Degree	Voltage VDC	Resistance $\Omega \pm 7\%$	Phase	Drive Circuit	Max. No Road Response PPS	Max. Slew Speed PPS	Torque (gf-cm)			Pinion			L/W Ass'y			
								Holding	Pull in (PPS)	Pull out (PPS)	Module	PCD	Z	Housing Terminal	L/W	L(mm)	
011K	18	7.2	30	2-2	Bipolar V Const	930	-	24	-	14 (800)	0.25	$\Phi 3.5$	14	NONE			
015K		8.5	20			1050	-	40	-	20/16 (800/1200)	0.3	$\Phi 4.2$	14	MOLEX 5264-04P MOLEX 5263 PBT	UL1007 AWG#26	110	
080K		7.2	17.7			1100	-	35	-	19.4 (800)	0.3	$\Phi 4.8$	16	MOLEX 51021-0900 MOLEX 50058-8000	UL1685 AWG#30	170	
082		8.5	5			1100	2500	30	-	13 (1500)	0.25	$\Phi 3.0$	12	MOLEX 51021-0900 MOLEX 50058-8000	UL1685 AWG#30	140	
085		8.5	7			1100	2500	30	-	22 (1280)	0.25	$\Phi 3.0$	12	MOLEX 51021-0900 MOLEX 50058-8000	UL1685 AWG#30	140	
210AP		8.5	43			980	-	40	-	7 (1200)	NONE		NONE				
232A		4.2	10			1000	1200	35	-	23 (600)	NONE		NONE				
600K		5	30			700	-	25	-	8 (800)	0.35	$\Phi 4.55$	13	FPC(SPS15RF 100K 공용)		45	
235		5	4.7					Bipolar A Const (370mA)	1000	2500	28	-	15 (1440)	NONE		NONE	

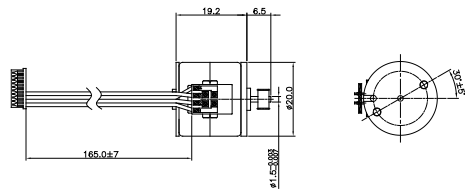
• APPLICATION : Mini printer, Camera, DVD-Plater, Medical Instrument, etc.

# STEPPING MOTOR

## SP-20RF Type

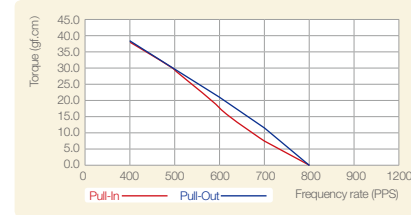


• DIMENSIONS(mm)



SP-20RF-060K

• CHARACTERISTICS (gf-Cm)



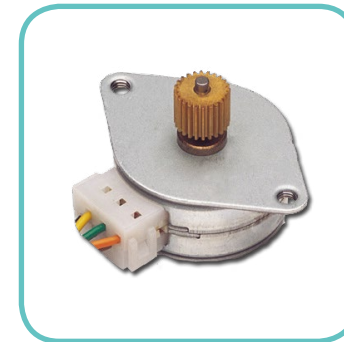
• SPECIFICATION

Series	Step Angle Degree	Voltage VDC	Resistance Ω±7%	Phase	Drive Circuit	Max. No Road Response PPS	Max. Slew Speed PPS	Torque (gf-cm)			Pinion			L/W Ass'y		
								Holding	Pull in (PPS)	Pull Out (PPS)	Module	PCD	Z	Housing Terminal	L/W	L(mm)
060K	18	5	13		Bipolar/V Const	650	-	85	-	30 (400)	0.3	Φ4.8	16	MOLEX 51021-1000 MOLEX 50058-8000	UL1061 AWG#28	165
091		24	20		Bipolar/V Const	1800	-	80	-	50 (1200)	0.5	Φ4.0	8	None	UL1061 AWG#28	54
310		24	12		Bipolar A Const (350mA)	1250	2000	85	-	45 (1600)	0.35	Φ4.55	13	MOLEX 51004-0400 MOLEX 53014-04	UL1061 AWG#28	300
410		24	20		Bipolar A Const (220mA)	800	2000	85	-	50 (600)	0.4	Φ5.6	14	MOLEX 5264-04 MOLEX 5263PBT	UL1061 AWG#28	165

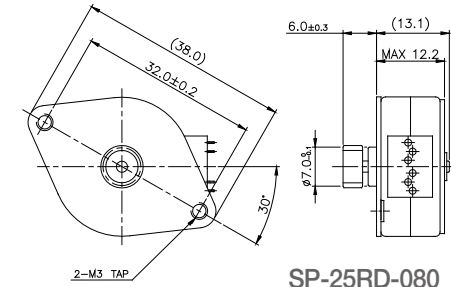
• APPLICATION : Mini Printer

\*Because of Torque Margin, There is the difference between torque Value in "SPECIFICATION and "CHARACTERISTICS"

## SP-25RD Type

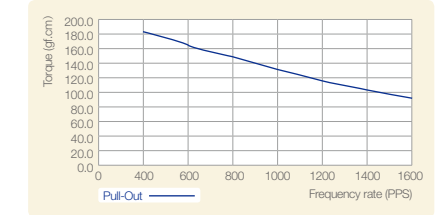


• DIMENSIONS(mm)



SP-25RD-080

• CHARACTERISTICS (gf-Cm)



• SPECIFICATION

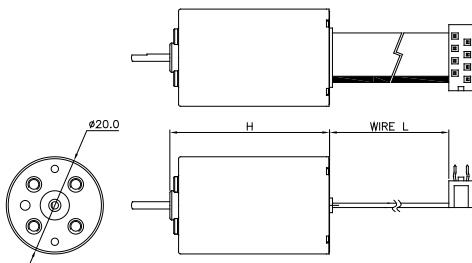
Series	Step Angle Degree	Voltage VDC	Resistance Ω±7%	Phase	Drive Circuit	Max. No Road Response PPS	Max. Slew Speed PPS	Torque (gf-cm)			Pinion			L/W Ass'y			
								Holding	Pull in (PPS)	Pull out (PPS)	Module	PCD	Z	Housing Terminal	L/W	L(mm)	
040	7.5	24	65	1-2	Unipolar V Const	500	1500	200	-	110 (500)		LEAD SCREW			JST CZHR-06V-S SCZH-002T-P0.5	UL1061 AWG#26	85
080		8	6.7	1-2	Bipolar A Const (600mA)	1700	3500	183	-	77 (1600)	0.4	Φ6.8	17	NONE			
600		24	33	1-2	Bipolar A Const (200mA)	1150	1800	120	-	90 (1100)	0.3	Φ4.905	LEAD SCREW	NONE			

• APPLICATION : Mini printer, Type writer, etc.

## SP-20RF HALL IC Type

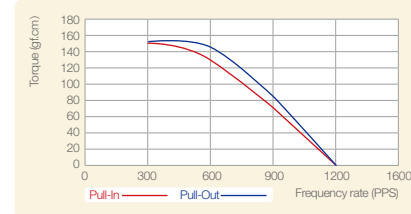


• DIMENSIONS(mm)



SP-20RF-107

• CHARACTERISTICS (gf-Cm)



• SPECIFICATION

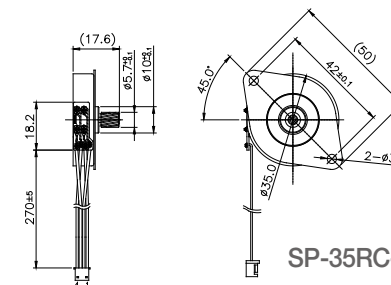
Model	Step Angle Degree	Drive Volt VDC	Resistance Ω±7%	Phase	Drive Circuit	Max. No Road Response PPS	Max. Slew speed PPS	Torque (gf-cm)			HALL IC FEED BACK SIGNAL/1 ROTATION	Size	
								Holding	Pull in	Pull out		H	WIRE L
107	18°	12.0	7.3	2	Bipolar/Constant Current	4000 (1/4 Micro step)	5000 (1/4 Micro step)	(105)	-	63 (3225PPS)	1	33	(75)
108	18°	12.0	7.3	2	Bipolar/Constant Current	1000	1100	(105)	-	75 (313PPS)	1	33	(100)
900	18°	12.0	7.3	2	Bipolar/Constant Current	4000 (1/4 Micro step)	5000 (1/4 Micro step)	(105)	-	63 (3225PPS)	4	33	(100)

• APPLICATION : (OUTDOOR) ACTUATOR DEVICE

## SP-35 Type (H=8.4)

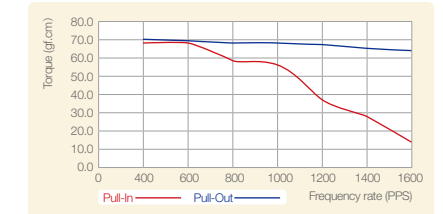


• DIMENSIONS(mm)



SP-35RC-800S

• CHARACTERISTICS (gf-Cm)



• SPECIFICATION

Series	Step Angle Degree	Drive Volt VDC	Resistance Ω±7%	Phase	Drive Circuit	Max. No Road Response PPS	Max. Slew Speed PPS	Torque (gf-cm)			Pinion			L/W Ass'y		
								Holding	Pull in (PPS)	Pull out (PPS)	Module	PCD	Z	Housing Terminal	L/W	L(mm)
800S	3.75	24	23	1-2	Bipolar A Const (RMS200mA)	1100	10000	62	45 (500)	41 (2441)	0.4	Φ4.4	11	TYCO 173977-4	UL10272 AWG #26	270
900S		42	10	1-2	Bipolar A Const (RMS340mA)	800	10000	4.5	-	20.4 (3636)	0.4	Φ6.4	16	JST PHR-4	UL1430 AWG #30	357

• APPLICATION : SCANNER

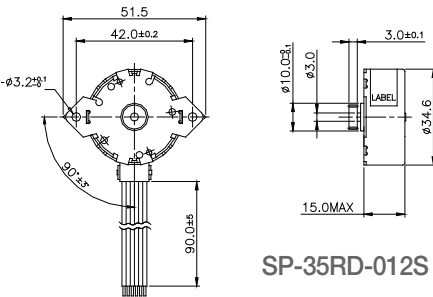


# STEPPING MOTOR

## SP-35 Type (H=15)

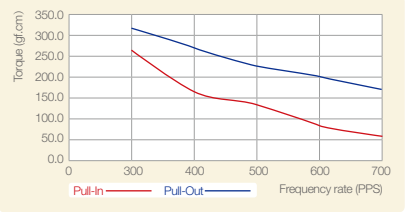


• DIMENSIONS(mm)



SP-35RD-012S

• CHARACTERISTICS (gf-Cm)

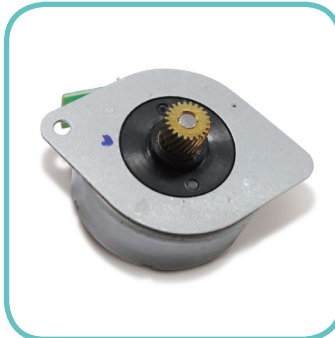


• SPECIFICATION

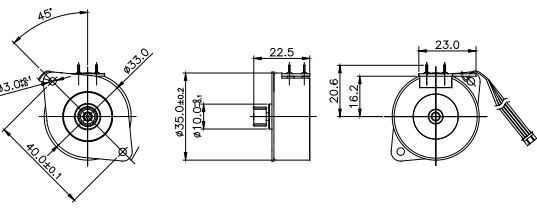
Series	Step Angle Degree	Voltage VDC	Resistance Ω±10%	Phase -	Drive Circuit -	Max. No Road Response PPS	Max. Slew Speed PPS	Torque (gf-cm)			Pinion			L/W Ass'y		
								Holding	Pull in (PPS)	Pull out (PPS)	Module	PCD	Z	Housing Terminal	L/W	L(mm)
030KS	7.5	24	13	2-2	Bipolar A Const (300mA)	700	1300	400	-	260/220 (800/1200)	0.4	Φ4.8	12	HAN LIM CH 0500-04 CT0500	UL1007 AWG#26	80
032KS		24	50	1-2	Unipolar V Const	1400	3000	500	300 (400)	310 (400)	0.4	Φ6.0	15	JST PHR-6 JST SHP- 002T-P0.5S	UL1061 AWG#28	80
320SB		12	36	2-2	Unipolar V Const	600	700	400	180 (333)	180 (333)	0.35	Φ3.5	10	Wafer YEONHO 15005WS-05		
012S		24	83	2-2	Unipolar V Const	650	850	420	-	190 (500)	0.4	Φ8.0	20	NONE	UL1061 AWG#26	110

• APPLICATION : Mini Printer, Copy Machine, Fax Machine, Printer, etc  
 \*Because of Touque Margin, There is the difference between torque Value in \*SPECIFICATION and \*CHARACTERISTICS"

## SP-35 Type (H=15.2)

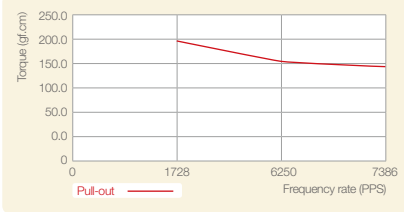


• DIMENSIONS(mm)



SP-35RD-270S

• CHARACTERISTICS (gf-Cm)



• SPECIFICATION

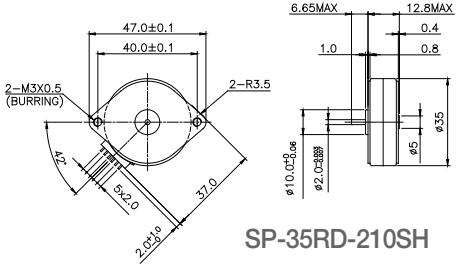
Series	Step Angle Degree	Voltage VDC	Resistance Ω±10%	Phase -	Drive Circuit -	Max. No Road Response PPS	Max. Slew Speed PPS	Torque (gf-cm)			Pinion			L/W Ass'y		
								Holding	Pull in (PPS)	Pull out (PPS)	Module	PCD	Z	Housing Terminal	L/W	L(mm)
270S	3.75	24	2.3	1-2	Bipolar A Const (600mA)	1600	10000	-	-	170/130/120 (1728/6250/7396)	0.3	Φ7.024	22	YEON HO 20010HS- 04 20010TS	UL1007 AWG#26	125

• APPLICATION : Mini Printer, Copy Machine, Fax Machine, Printer, etc  
 \*Because of Touque Margin, There is the difference between torque Value in \*SPECIFICATION and \*CHARACTERISTICS"

## SP-35 Type (H=12.2)

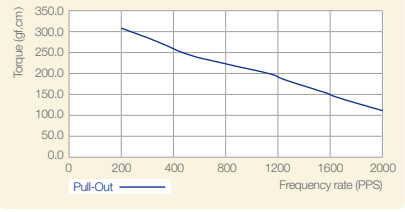


• DIMENSIONS(mm)



SP-35RD-210SH

• CHARACTERISTICS (gf-Cm)



• SPECIFICATION

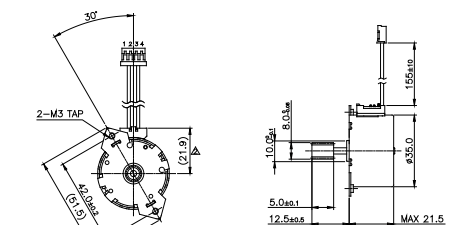
Series	Step Angle Degree	Voltage VDC	Resistance Ω±10%	Phase -	Drive Circuit -	Max. No Road Response PPS	Max. Slew Speed PPS	Torque (gf-cm)			Pinion			L/W Ass'y		
								Holding	Pull in (PPS)	Pull out (PPS)	Module	PCD	Z	Housing Terminal	L/W	L(mm)
210SH	7.5	24	10.4	2-2	Bipolar A Const (480mA)	1200	1500	360	-	180 (1200)	0.4	Φ6.4	16	MOLEX 51004-0800 MOLEX 50011-8000	UL10272 AWG#26	250

• APPLICATION : Mini Printer, etc.

## SP-35 Type (H=21.5)

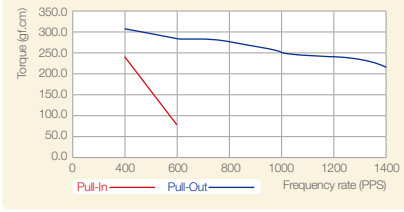


• DIMENSIONS(mm)



SP-35RD-750L

• CHARACTERISTICS (gf-Cm)



• SPECIFICATION

Series	Step Angle Degree	Voltage VDC	Resistance Ω±10%	Phase -	Drive Circuit -	Max. No Road Response PPS	Max. Slew Speed PPS	Torque (gf-cm)			Pinion			L/W Ass'y		
								Holding	Pull in (PPS)	Pull out (PPS)	Module	PCD	Z	Housing Terminal	L/W	L(mm)
750L	7.5	24	5.5	2-2	Bipolar A Const (500mA)	730	1350	-	-	224.5 (1064)	0.5	Φ7.0	14	YEONHO 20010HS- 04 20010TS	UL1007 AWG#26	155
800L								500	-	357	0.5	Φ8.0	16	AMP 179228-4 AMP 179227-1	UL1007 AWG#26	155

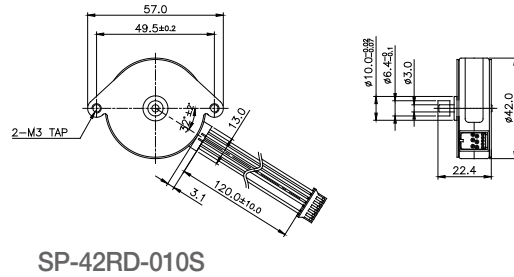
• APPLICATION : Mini Printer, etc

# STEPPING MOTOR

## SP-42 Type (H=14.6)

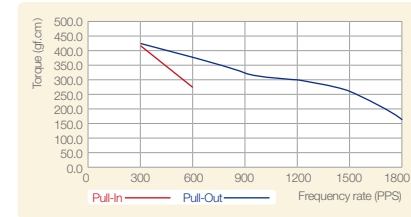


• DIMENSIONS(mm)



SP-42RD-010S

• CHARACTERISTICS (gf-Cm)



• SPECIFICATION

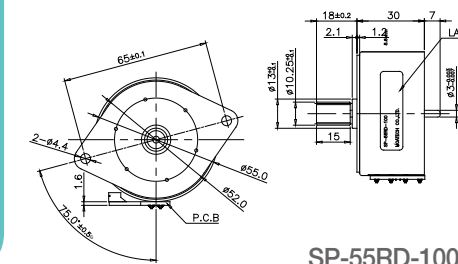
Series	Step Angle Degree	Voltage VDC	Resistance Ω±10%	Phase	Drive Circuit	Max. No Road Response PPS	Max. Slow Speed PPS	Torque (gf-cm)			Pinion			L/W Ass'y		
								Holding	Pull in (PPS)	Pull Out (PPS)	Module	PCD	Z	Housing Terminal	L/W	L(mm)
010S	7.5	24	12	2-2	Unipolar A Const (450mA)	600	1800	540	-	230 (1200)	0.5	Φ9.5	19	MOLEX 51004-0600 MOLEX 50011-8000	UL1061 AWG#26	80
020S								16	2-2	Unipolar A Const (500mA)	700	1400	650	120 (800)	320 (1000)	0.4

• APPLICATION : Printer, etc

## SP-55 Type

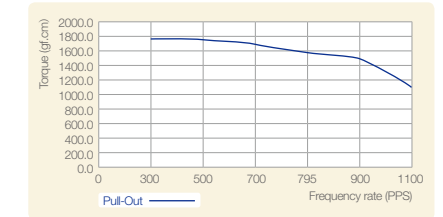


• DIMENSIONS(mm)



SP-55RD-100

• CHARACTERISTICS (gf-Cm)



• SPECIFICATION

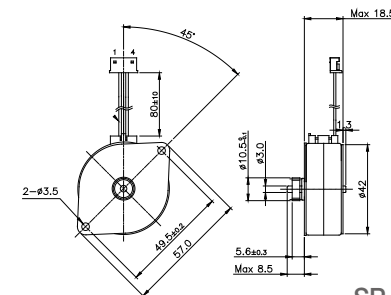
Series	Step Angle Degree	Voltage VDC	Resistance Ω±10%	Phase	Drive Circuit	Max. No Road Response PPS	Max. Slow Speed PPS	Torque (gf-cm)			Pinion			L/W Ass'y		
								Holding	Pull in (PPS)	Pull out (PPS)	Module	PCD	Z	Housing Terminal	L/W	L(mm)
100	7.5	24	5.6	2-2	Bipolar A Const (1.2A)	467	1031	-	-	1490 (795)	0.5	Φ9.046	17	WAFFER MOLEX 53015-0410		

• APPLICATION : Printer, etc

## SP-42 Type (H=18.5)

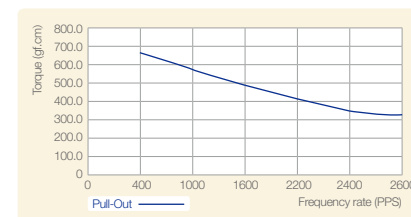


• DIMENSIONS(mm)



SP-42RD-191M

• CHARACTERISTICS (gf-Cm)



• SPECIFICATION

Series	Step Angle Degree	Voltage VDC	Resistance Ω±10%	Phase	Drive Circuit	Max. No Road Response PPS	Max. Slow Speed PPS	Torque (gf-cm)			Pinion			L/W Ass'y		
								Holding	Pull in (PPS)	Pull Out (PPS)	Module	PCD	Z	Housing Terminal	L/W	L(mm)
080M	7.5	24	7.9	2-2	Bipolar A Const (600mA)	600	1000	100	-	561 (800)	0.5	Φ8.0	16	AMP 179228-4 AMP 179227-1	UL1007 AWG#26	50
110MAT		17	13	1-2	Unipolar A Const (300mA)	1000	1700	710	-	480 (1000)	NONE			MOLEX 51004-0500 MOLEX 50011-8000	UL1007 AWG#26	135
140M	3.75	24	5.8	2-2	Bipolar A Const (400mA)	650	4000	550	-	140 (1410)	0.5	Φ9.0	18	MOLEX 51004-0400 MOLEX 50011-8000	UL1007 AWG#26	285
191M	7.5	24	5.2	1-2	Bipolar A Const (540mA)	1300	3500	703	-	360 (2650)	0.5	Φ9.6	19	YEONHO 20017HS-04	UL1007 AWG#28	80

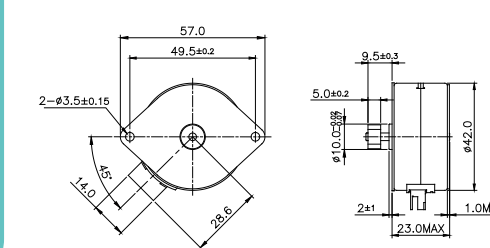
• APPLICATION : Mini Printer, Copy Machine, Fax Machine, Printer, etc

\*Because of Torque Margin, There is the difference between torque Value in "SPECIFICATION and "CHARACTERISTICS"

## SP-42 Type (H=23)

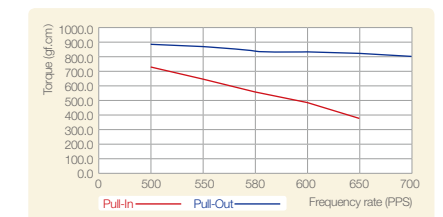


• DIMENSIONS(mm)



SP-42RD-200L

• CHARACTERISTICS (gf-Cm)



• SPECIFICATION

Series	Step Angle Degree	Voltage VDC	Resistance Ω±10%	Phase	Drive Circuit	Max. No Road Response PPS	Max. Slow Speed PPS	Torque (gf-cm)			Pinion			L/W Ass'y		
								Holding	Pull in (PPS)	Pull out (PPS)	Module	PCD	Z	Housing Terminal	L/W	L(mm)
041L	7.5	24	20	1-2	Unipolar V Const	1600	2000	1000	500 (1000)	550 (1000)	S2M	Φ7.64	12	AMP 179228-6 AMP 175227-1	UL1007 AWG#26	100
043L		24	30	1-2	Unipolar V Const	1600	2000	1000	320 (1200)	380 (1200)	0.5	Φ8.0	16	AMP 179228-6 AMP 175227-1	UL1007 AWG#26	100
100L		24	6.3	2-2	Bipolar A Const (440mA)	700	1200	750	450 (800)	300 (1000)	0.5	Φ8.0	16	GIL-S-4S-S2C2 GIL-S-C2-S-10000	UL1007 AWG#26	80
200L		24	10.4	2-2	Bipolar A Const (600mA)	500	900	1000	-	600 (850)	0.8	Φ7.2	9	AMP 175487-6	NONE	

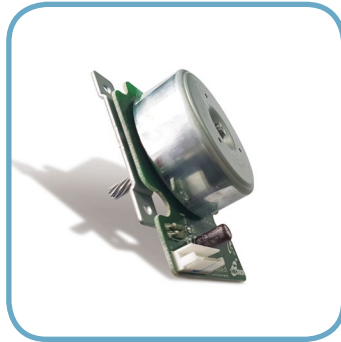
• APPLICATION : Printer, Facsimile, Finisher, Mini Printer, Copy Machine, etc



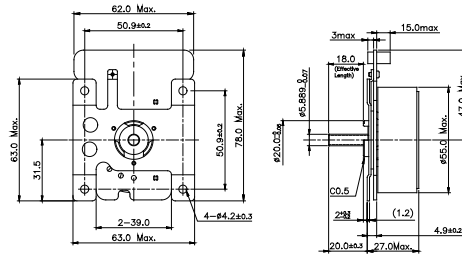
# BLDC MOTOR

# ACTUATOR

## BLDC

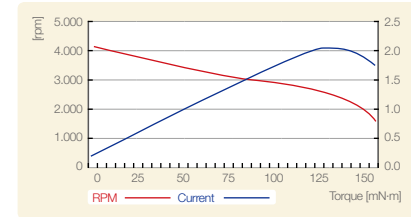


### DIMENSIONS(mm)



BL55B

### T-I CHARACTERISTICS

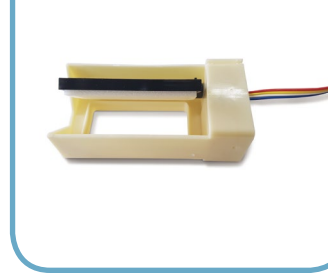


### SPECIFICATION

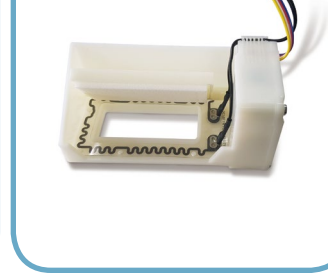
Series	Drive voltage	Torque Constant	Cogging Torque	Rated speed	Rated Torque	Rated Current	Noise	Position sensor method	Magnet type	Drive circuit
	[VDC]	[Nm/A]	[gf-cm]	[rpm]	[mN-m]	[A]	[dB]			
BL24D	24	0.025	0.5	4000	8	0.18	30	Hall IC	Nd-Fe-B	X
BL38A	24	0.045	120	800	30	0.54	35		Nd-Fe-B	X
BL38B	24	0.045	9	800	25	0.54	35		Ferrite	X
BL55B	24	0.096	200	1800	138	2.30	35	Hall Element	Ferrite	O
BL55M	24	0.096	200	2200	125	2.00	35		Ferrite	O
BL55T	24	0.096	200	1800	157	2.30	35		Ferrite	O
BL55Q	24	0.096	200	3000	108	2.00	35		Nd-Fe-B	O

## DAMPER

### DU24 Series



### DU25 Series



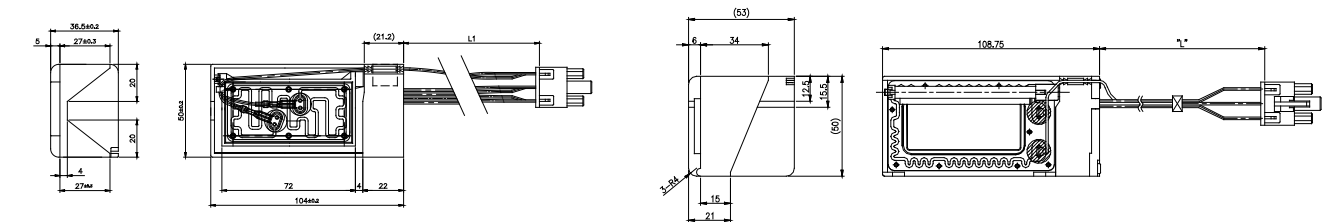
### Product Features

1. Stepping motor type.
2. Bi-polar control.
3. Fine control is possible because there is little error in step angle.
4. Low noise driving.
5. Open and closing operation in low temperature environment.

### Usage

1. Electrical refrigerator
2. Heat exchanger

### DIMENSIONS(mm)



DU24 Series

DU25 Series

### SPECIFICATION

Series	Step Angle	Drive Volt	Resistance	Phase	Drive Mode	Max. No Road Response	Max. Slew speed	Torque (gf-cm)			Lead wire	Noise
	Degree	VDC	$\Omega \pm 7\%$	-	-	PPS	PPS	Detent torque [gf-cm]	Pull In PPS	Pull Out PPS	L(mm)	
DU24-011 DU24-014	11.25	12	300	2-2	Bipolar	500	600	500	1000[100]	-	220	35
DU25-010 DU25-020 DU25-034 DU25-073	7.5		415			400	800	500	1000[300]	-	450	
									-	350		
									-	700		
									-	700		

# ACTUATOR

## Step Actuator : VS35 Series / VSW35 Series



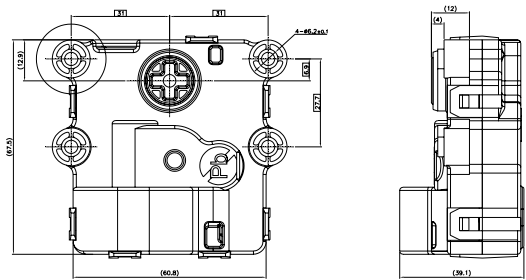
**Product Features**

1. Stepping Motor Type.
2. LIN communication control and PWM control are possible.
3. Fine control is possible because there is little error in step angle.
4. Output torque is higher than Linear Type.
5. Anti-reverse function is possible.

**Usage**

1. Home electric appliances
2. Automobile

**DIMENSIONS(mm)**



Connector : KH1300004-10(UJU ELECTRONICS製)

**SPECIFICATION**

ITEM	SPECIFICATION	UNIT	REMARK
Operating voltage	9~16	VDC	
Operating Temperature	-40 ~ +110	°C	
Nominal voltage	12.6	VDC	
Nominal frequency	395	Hz	
Nomial speed	3	rpm	
Nomial thrust	Min13.0	kgf·cm	12.6V (@25°C)
Current / Phase	566	mA	A Constant
Resistance	5.2~5.6	Ohm	Ref.
Operating Angle	±15	deg	max
Noise Level	35	dB	max(@1M)

## Linear Step Actuator : VL35XX-Series



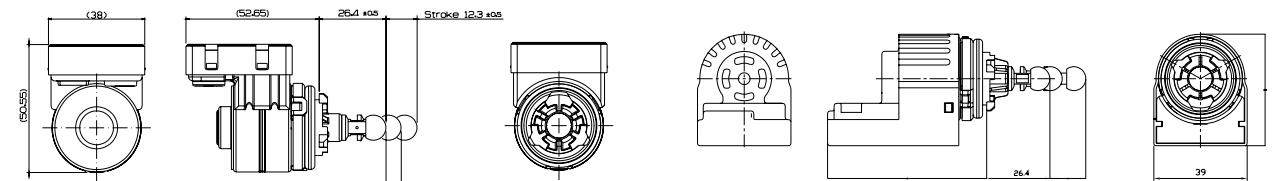
**Product Features**

1. Stepping Motor Type.
2. LIN communication control and PWM control are possible.
3. Fine control is possible because there is little error in step angle.
4. Linear type allows linear operation and wide range of operation.
5. It has good responsiveness of start, stop, forward and reverse.

**Usage**

1. Industrial equipment : Flow control valve
2. Automotive : Optical axis control device
3. Communication equipment : Antenna adjustment device

**DIMENSIONS(mm)**



VL35AG-H03

VL35AA-H01

Connector : KH1300004-10(UJU ELECTRONICS製)

**SPECIFICATION**

Operating Temperature : -40 ~ +110°C

ITEM	SPECIFICATION		UNIT	REMARK
	PART No.	VL35AG-H03		
Motor Type	35	35	∅	
Pitch(screw)	0.8	0.8	mm	
Operating Speed	15.2	15.2	mm/s	
Time for Full Stroke	0.81	0.99	sec.	
Phase	2ph / Bipolar	2ph / Bipolar		
Working Voltage Range	9~16	16~32	V	
Rated Voltage	12	24	V	
Current / Phase	566	800	mA	
Rated Frequency	456	456	pps	max.
Motor Resistance	7.5±10%	7.5±10%	Ω	
Motor Pullin Torque	110	160	gf·cm	min. 12V (@25°C)
Axial Force	2.2	2.2	kgf	min.(@25°C)
Full Stroke	12.3±0.5	15±0.5	mm	min.
Noise Level	40	40	dB	max.

## Linear Step Actuator : VS25AA-Series



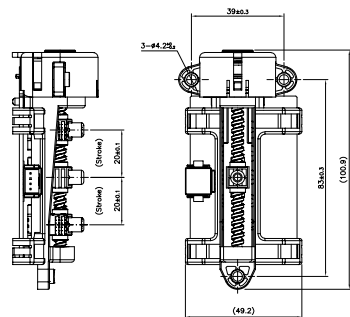
**Product Features**

1. Stepping Motor Type.
2. LIN communication control and PWM control are possible.
3. Fine control is possible because there is little error in step angle.
4. Linear type allows linear operation and wide range of operation
5. Precise control is possible with simple control unit.

**Usage**

1. Home electric appliances
2. Automobile
3. Automation

**DIMENSIONS(mm)**



Connector : HSC04HB-B(KUM製)

**SPECIFICATION**

ITEM	SPECIFICATION	UNIT	REMARK
Operating voltage	9~16	V	
Operating Temperature	-40 ~ +110	°C	
Nominal voltage	12	V	
Nominal frequency	395	Hz	
Nomial speed	21.8	mm/sec	
Nomial thrust	<900	gf	12V (@25°C)
Current / Phase	<200	mA	
Resistance	20	Ohm	
Operating Stroke	±20	mm	max
Noise Level	35	dB	max(@1M)



# ACTUATOR

## Linear Step Actuator : VL25AM-Series



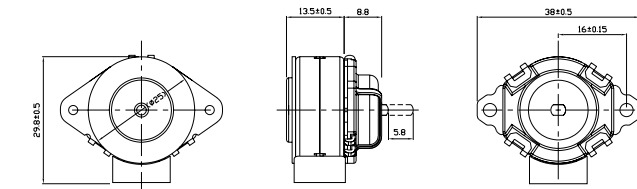
**Product Features**

1. Stepping Motor Type.
2. LIN communication control and PWM control are possible.
3. Fine control is possible because there is little error in step angle.
4. Linear type allows linear operation and wide range of operation
5. It has good responsiveness of start, stop, forward and reverse.

**Usage**

1. Industrial equipment : Flow control valve
2. Automotive : Optical axis control device
3. Communication equipment : Antenna adjustment device

**DIMENSIONS(mm)**



VL25AM-H01

**SPECIFICATION**

Operating Temperature : -40 ~ +110°C

ITEM	SPECIFICATION	UNIT	REMARK
PART No.	VL25AM-H01		
Motor Type	25	∅	
Pitch(screw)	0.3	mm	
Operating Speed	2.9	mm/s	
Time for Full Stroke	2.1	sec.	
Phase	2ph / Bipolar		
Working Voltage Range	9~16	V	
Rated Voltage	12	V	
Rated Current	336	mA	
Rated Frquency	456	pps	max.
Motor Resistance	20±7%	Ω	
Motor Pullin Torque	110	gf·cm	min. 12V (@25°C)
Axial Force	2.5	kgf	min.(@25°C)
Full Storke	6	mm	min.
Noise Level	45	dB	max.

## Linear Step Actuator : MHU15 Series



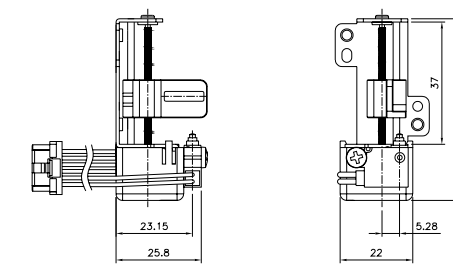
**Product Features**

1. Actuator that acts as a step motor drive source.
2. Lead Screw is applied to convert the rotational motion of the motor into linear motion and output.
3. Initial position can be detected by Micro Switch.
4. Open loop control is possible by using step motor.
5. 0.01mm resolution is realized by applying fine pitch lead screw.

**Usage**

1. OA : Printers, Scanners
2. Automotive : HUD

**DIMENSIONS(mm)**



Connector : KYOCERA P/No. 60-8339-006-231-000

**SPECIFICATION**

ITEM	SPECIFICATION	UNIT	REMARK
Operating voltage	9~16	VDC	
Operating Temperature	-30 ~ +85	°C	
Operating voltage	12	VDC	
Step Angle	18	deg	
Lead Screw Pitch	0.2	mm	
Axial Force	Min. 120	gf	@ 12.6V, 75pps
Stroke	22.0	mm	@ 12.6V, 60mA
Max. Slewing Pulse Rate	Min. 700	pps	@ 12.6V, 60mA
Noise	Max. 30	dB(A)	@ 12.6V, 60mA, 1m

## Brush DC Motor Actuator : PA24 Series



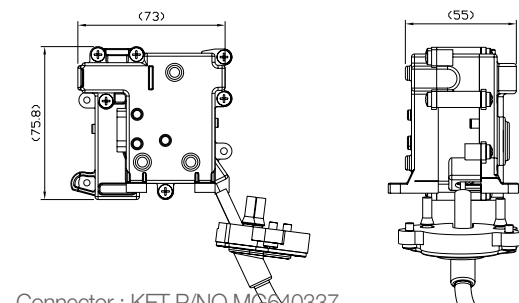
**Product Features**

1. Actuator for functioning as Brush DC motor drive source.
2. Linear cable can be mounted on the output side gear, and linear movement of cable is possible when the output side is rotated.
3. Stroke distance is controlled by input value of 2D sensor, and it is possible to control the conversion of constant stroke.
4. Constant strokes can be maintained without the need of a separate stopper.

**Usage**

1. Home electric appliances
2. Automotive

**DIMENSIONS(mm)**



Connector : KET P/NO.MG640337

**SPECIFICATION**

ITEM	SPECIFICATION	UNIT	REMARK
Operating voltage	9~16	VDC	
Operating Temperature	-40 ~ +80	°C	
Operating voltage	12	VDC	
Operating speed	Max 1.6	sec	@OP Gear 90deg
Operating force	Min 12.0	kgf	12V (@25°C)
Operating current	Max 1.7	A	
Operating Stroke	22±1	mm	@OP Gear 90deg
Operating Stroke (max)	35	mm	@OP Gear 140deg
Noise Level	62	dB	max(@300mm)

## Rotary Solenoid : LIMP HOME Series



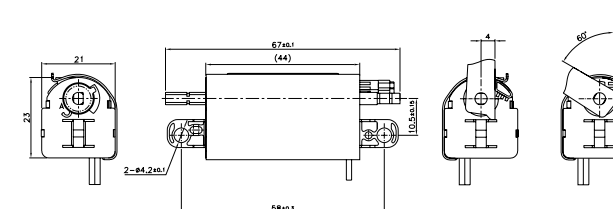
**Product Features**

1. Rotary solenoids that function as solenoids.
2. Simple structure and miniaturization possible by directly moving shield (direct type, angle control type, two-stage control)
3. It has a swinging solenoid structure and operates fast. (0.03 sec or less)
4. It can be applied to various applications.

**Usage**

1. Automotive : Optical axis control device

**DIMENSIONS(mm)**



**SPECIFICATION**

ITEM	SPECIFICATION	UNIT	REMARK
Rated Voltage	13.5	V	
Operating Temperature	-40 ~ +110	°C	
First angle holding torque (0°)	30	gf·cm	
Operation torque	50	gf·cm	
Second angle holding torque (60°)	30	gf·cm	
Resistance	50	Ω	@25°C
Weight	80	g	

# FAN MOTOR

## Fan Motor for Automobile : VFA-070CF Series



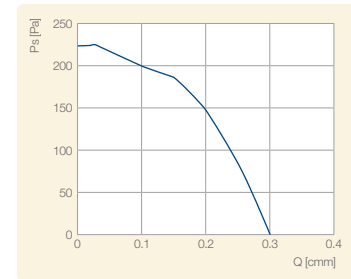
• **Battery Cooling Fan**

- Application : 48V Li-ion Battery Cooling System
- Function : Cooling system for stable operation of lithium secondary battery in 48V Lithium secondary battery system

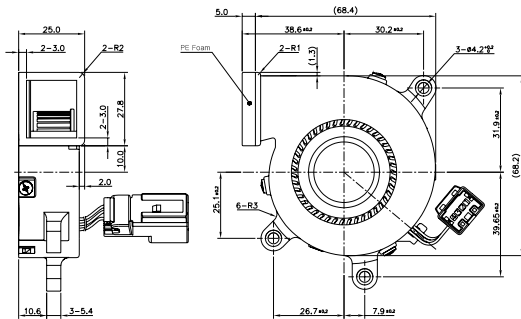
- **Product Features**

1. FAN Motor that functions as a drive source for 3 phase BLDC motor.
2. Compact · Thin, Low Noise, High Performance Centrifugal FAN
3. Single outlet structure

• **P-Q Curve**



• **DIMENSIONS(mm)**



• **SPECIFICATION**

Expected life : 25°C 20,000HR

ITEM	SPECIFICATION	UNIT	REMARK
Appearance Size	Φ70×23L	mm	
Operating Temperature	-40 ~ +85	°C	
Max. Static Pressure	220	Pa	
Max. Air Flow	0.298	cmm	cmm= m <sup>3</sup> /minute
Rotating Speed	5200	rpm	Free air
Rated Voltage	12	VDC	
Rated Current	0.35	A	
Noise Level	Max. 49	dB(A)	Free air

※ Noise : 1m from Inlet side of FAN

## Fan Motor for Automobile : VFA-115CF Series



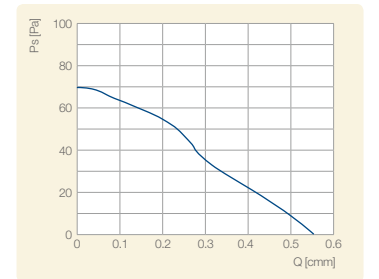
• **Ventilation Seat Fan Motor**

- Application : Ventilated Seat of Automobile
- Function : To circulate the air inside the seat

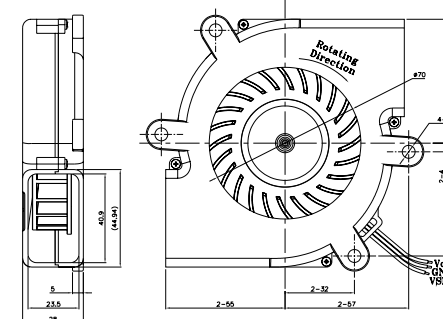
- **Product Features**

1. FAN Motor that functions as a drive source for 3 phase BLDC motor.
2. Compact · Thin, Low Noise, High Performance Centrifugal FAN
3. Dual outlet structure

• **P-Q Curve**



• **DIMENSIONS(mm)**



• **SPECIFICATION**

Expected life : 25°C 20,000HR

ITEM	SPECIFICATION	UNIT	REMARK
Appearance Size	Φ115×28L	mm	
Operating Temperature	-40 ~ +85	°C	
Max. Static Pressure	70	Pa	
Max. Air Flow	0.56	cmm	cmm= m <sup>3</sup> /minute
Rotating Speed	2400	rpm	Free air
Rated Voltage	12	VDC	
Rated Current	0.3	A	Free air
Noise Level	Max. 40	dB(A)	Free air

※ Noise : 1m from Inlet side of FAN

## Fan Motor for Automobile : VFA-100CF Series



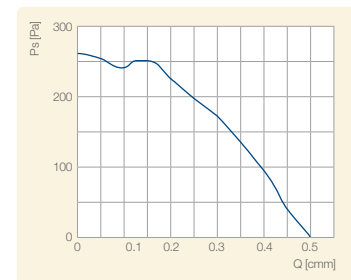
• **Ventilation Seat Fan Motor**

- Application : Ventilated Seat of Automobile
- Function : To circulate the air inside the seat

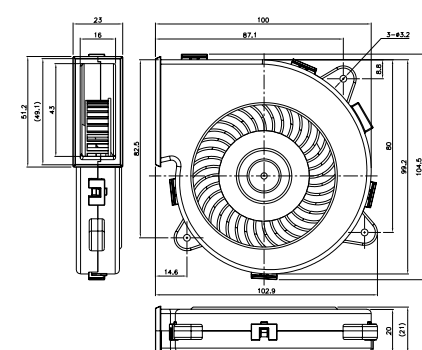
- **Product Features**

1. FAN Motor that functions as a drive source for 3 phase BLDC motor.
2. Compact · Thin, Low Noise, High Performance Centrifugal FAN
3. Single outlet structure

• **P-Q Curve**



• **DIMENSIONS(mm)**



• **SPECIFICATION**

Expected life : 25°C 20,000HR

ITEM	SPECIFICATION	UNIT	REMARK
Appearance Size	Φ100×20L	mm	
Operating Temperature	-40 ~ +85	°C	
Max. Static Pressure	250	Pa	
Max. Air Flow	0.5	cmm	cmm= m <sup>3</sup> /minute
Rotating Speed	3900	rpm	Free air
Rated Voltage	13.5	VDC	
Rated Current	0.55	A	
Noise Level	Max. 52	dB(A)	Free air

※ Noise : 1m from Inlet side of FAN

## Fan Motor for Automobile : VF23 Series



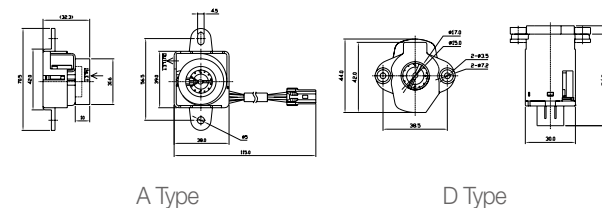
• **Active Incar**

- Application : Inside of car's temperature and humidity adjustment
- Function : temperature and humidity detection mounted in the vehicle interior

- **Product Features**

1. BLDC FAN Motor that functions as a motor.
2. Hall Sensor Type Driver.
3. Compact, low noise Centrifugal FAN

• **DIMENSIONS(mm)**



• **SPECIFICATION**

ITEM	UNIT	SPECIFICATION		REMARK
		A Type	D Type	
Voltage Range	VDC	8~16	8~16	
Nominal Voltage	VDC	12	12	
Nominal Current	mA	<60	<50	Free air
Nominal Speed	rpm	2,900	2,100	Free air
Max. Flow Rate	X 10 <sup>-3</sup> m <sup>3</sup> /min	25.5	20.1	cmm= m <sup>3</sup> /min.
Air Flow	CFM	0.9	0.71	
Operating Temp.	°C	-40~+95	-40~+95	
Storage Temp.	°C	-40~+100	-40~+100	
Service Life	h	5,000	5,000	at 23°C
Noise	dB(A)	<30	<26	Free air
Mass	g	28	30	

※ Noise : 10cm from Inlet side of FAN



# Terminology and Characteristics

## STEPPING MOTOR TERMINOLOGY

### • Holding Torque

The maximum torque generated to the counter an external torque applied on the output shaft in condition where the motor is at a halt in an excitation condition.

### • Detent Torque

The maximum torque generated to the counter an external torque applied on the output shaft in condition where the motor is at a halt in a non-excitation condition.

### • Line A: Pull-in(Starting) Characteristic

Showing the relationship between input frequency and the maximum torque(pull-in torque) capable of starting the motor at that input frequency

### • Line B: Pull-out(Slewing) Characteristic

Showing the relationship between input frequency and the maximum torque(pull-out torque) obtainable by synchronizing the motor rotation with that input frequency which is gradually increased from the pull-in characteristic range after start of the motor.

### • Point C: Max No Load Response

The maximum frequency at which the motor can start and stop, synchronized with input signals under a no-load condition.

### • Step Accuracy

Difference between theoretical and actual step angle.

### • Point D: Max Slew Speed

The maximum frequency at which the motor can rotate in synchronized with the starting frequency which is gradually increased toward the maximum starting rate under no-load condition.

### • Area E: Pull-in Area

The responses of start, stop and rotation is possible in this area. The motor is driven without problems as long as the operating point is found in this area.

### • Area F: Pull-out Area

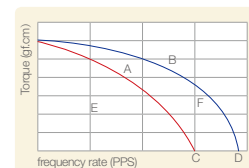
The response is possible without losing synchronization in this area when the load torque is added above the frequency of pull-in area.

### • Rotational Speed

The rotational speed(frequency) of stepping motor is normally expressed in pps(pulse per second.)  
The drive frequency and rotational speed has the following relationship. Rotational Speed RPM(revolution per minute) = Frequency (PPS)X60sec÷(360°/single step angle)

### • Hysteresis Accuracy

Difference between step angle of CW rotation and CCW rotation.

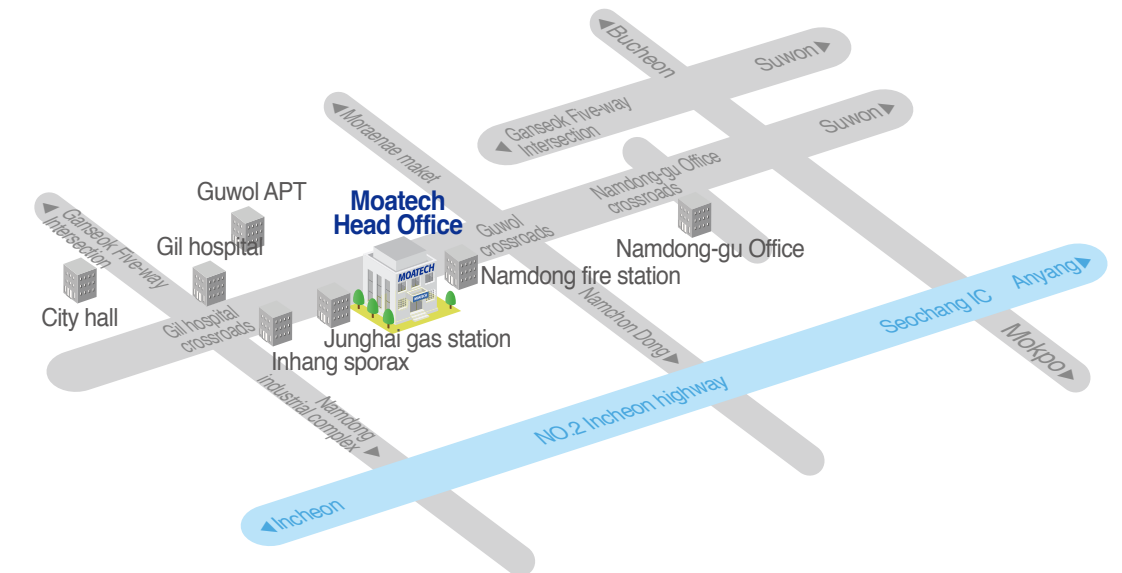


## STEPPING MOTOR CHARACTERISTICS

Stepping Motor is the motor which rotates a definite angle as the excitation condition varies with the input pulse signal.

- 1) The angular velocity of motor is exactly proportional to the number of input pulses.
- 2) The angular error per 1 step is small and the error is not accumulated.
- 3) The responses of stopping and rotating are excellent.
- 4) Open-Loop-control is practicable and circuit structure of system is simple.
- 5) It is possible to get low speed driving with a load directly connected to the axis of the motor.
- 6) The control of stop position is possible without break.
- 7) The rotational speed is obtained with proportional to the frequency of pulse signal. And it is possible to change speed widely from low to high.

# Your Contact



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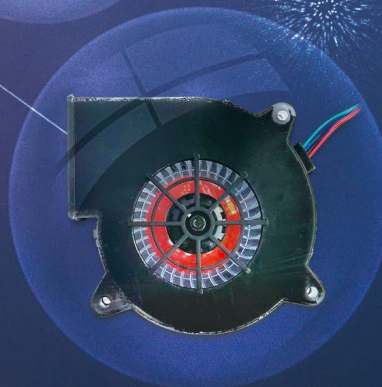
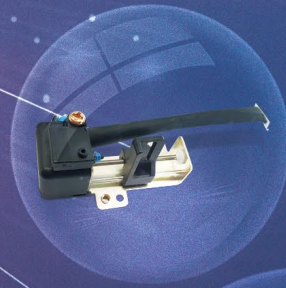
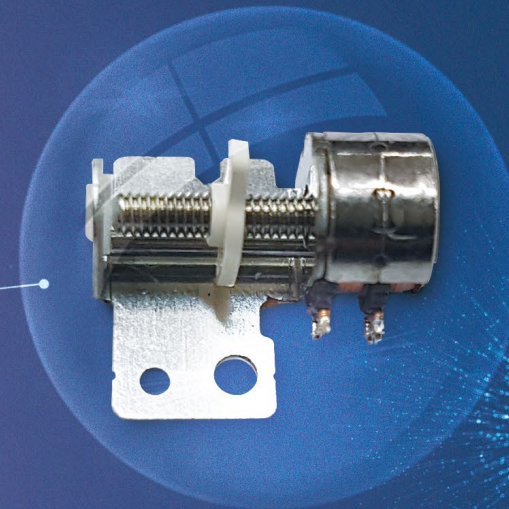
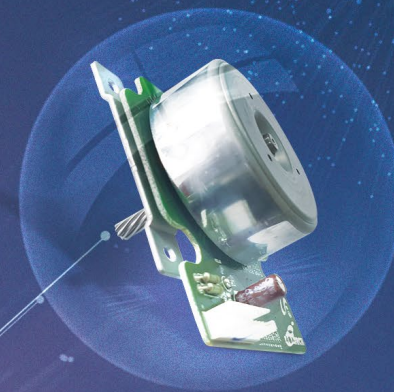
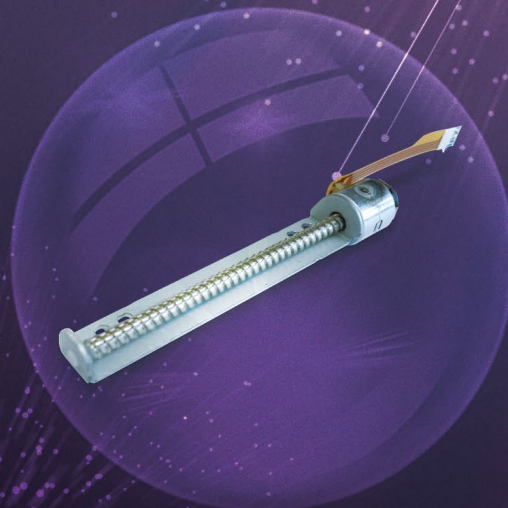
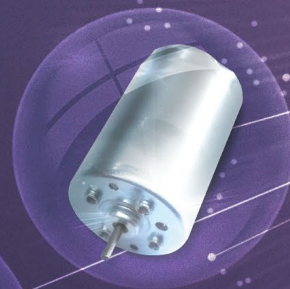
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