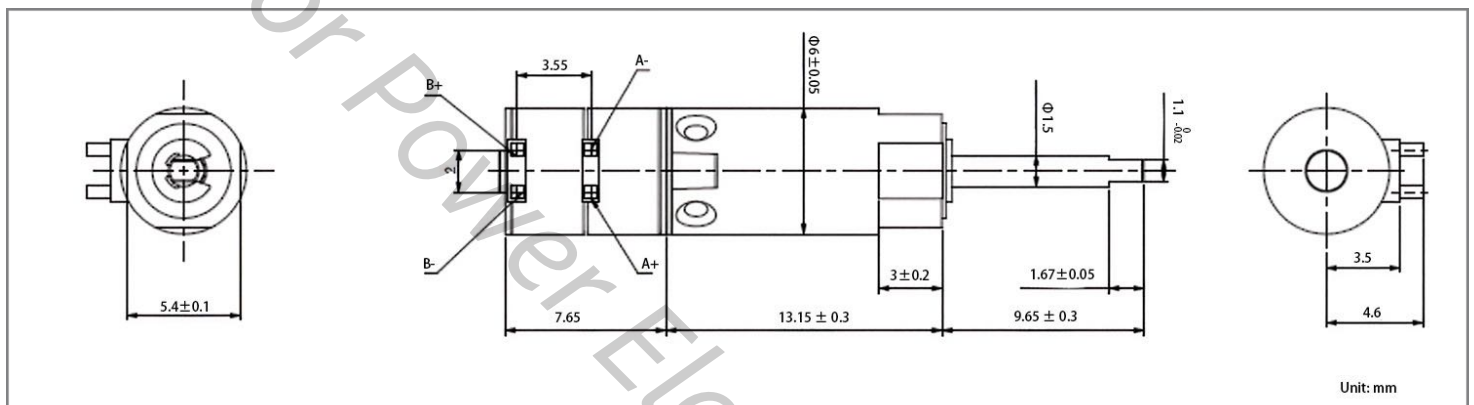


**Model No.****NFP-0620-531-MG**

1. Application

This article regulates the relevant technical requirements and test methods of model NFP-0620-531-MG Planetary Gearbox.

2. Outline Drawing



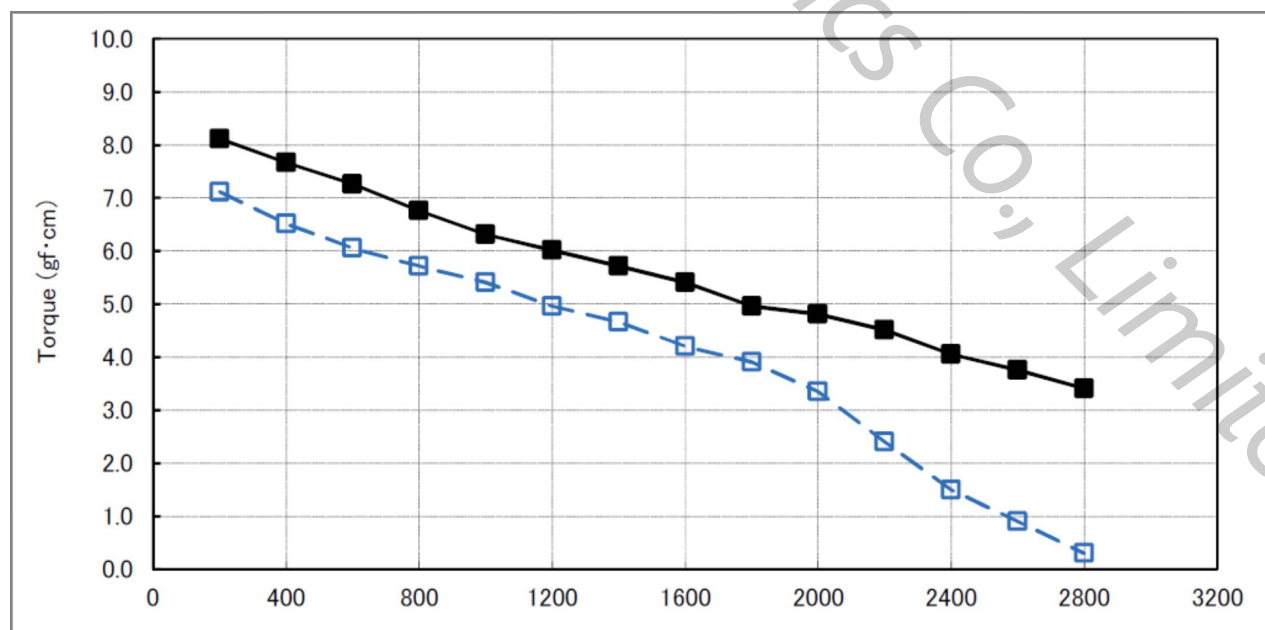
3. Operating Conditions

No.	Item	Specification	Remark
1	Power Supply	DC regulated power supply	
2	Rated Voltage	DC 5.0V	Stepper motor drive voltage
3	Operating Voltage Range	DC 3.0–7V	
4	Motor Type	Stepper motor	Refer to Section 4
5	Gearbox Reduction Ratio	530.842:1	
6	Minimum Load	$\geq 900\text{gf.cm}$	Under 2000pps condition
7	Efficiency per Gearbox Stage	0.8	
8	Number of Gearbox Stages	4 stages	
9	Gearbox Backlash	$\leq 4^\circ$	
10	Operating Environment	Temperature: $-10\sim 65^\circ$ CHumidity: 10–90%RH	
11	Storage and Transportation Environment	Temperature: $-30\sim 80^\circ$ CHumidity: 5–95%RH	
12	Weight	5g	Reference value

4. Motor Parameters

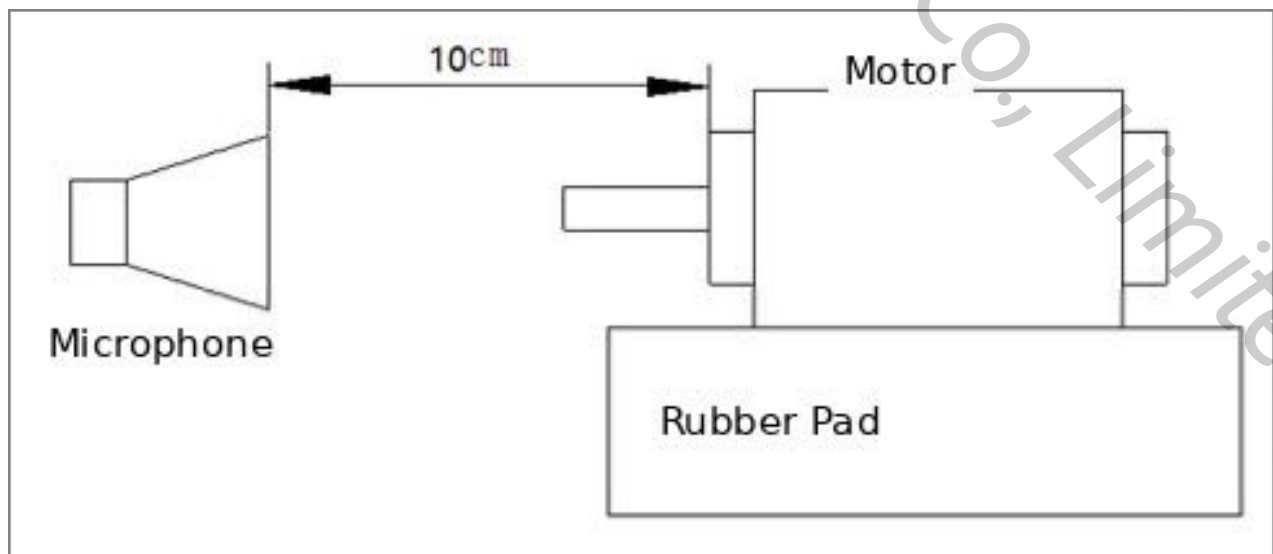
No.	Item	Specification	Remark
1	Motor Type	Stepper motor	/
2	Driving Method	Constant voltage drive	/
3	Excitation Method	2-2 phase excitation	/
4	Step Angle	18°	/
5	Rated Frequency	500PPS–1000PPS, approximately equal to 1500–3000rpm	/
6	Resistance	15Ω ±8%	/
7	Rotation Direction	CW / CCW	/
8	Insulation Class	Class F, 155°C	/
9	Overall Dimensions	Refer to Section 4.2	/
10	Mechanical Characteristics	Refer to Section 4.3	/
11	Weight	1.1g	Reference value
12	Other Information	Refer to the manufacturer's specification	Can be provided separately if required

5. Performance Curve



6. Noise Test

No.	Item	Test Method	Test Criteria	Test Tool
1	Input Condition	Connect the product FPC according to the specified drive program and drive the motor under rated conditions.	—	Dedicated motor drive box
2	Motion Condition	Under 5V voltage and 1000PPS condition, operate according to the specified motion cycle: CW running for 1s, stop for 1s, CCW running for 1s, stop for 1s. This is one working cycle.	Continuous operation for more than 5 minutes	Timer
3	Noise Test Distance	Along the axis direction of the output shaft, facing the upper end of the gearbox housing, the distance between the test point and the housing is 10cm.	10cm	Ruler
4	Background Noise	Test inside the noise test box.	≤26dBA	Noise meter
5	Noise Value	The maximum value recorded by the noise meter during continuous 5-minute operation.	≤55dBA	Noise meter



7. Reliability Test

No.	Item	Test Method	Test Criteria	Test Equipment
1	Normal Temperature Life Test	① Working cycle: under 500pps–1000pps condition with 900gf.cm load, CW running for 1s, stop for 1s, CCW running for 1s, stop for 1s. This is one working cycle.② Life test cycle requirement: the product runs for 150 cycles, approximately 15 minutes, then stops for 1 minute.	② Number of test cycles $\geq 50,000$ times.③ Noise ≤ 55 dBa.	① Dedicated fixture④ Noise test box
2	Constant Damp Heat Test	① Storage temperature: $55 \pm 2^{\circ}\text{C}$; storage humidity: $95 \pm 2\%$ RH; storage time: 168h. Normal temperature recovery time: 2h.	② Impedance change $< 10\%$.② After the test, under 500pps–1000pps condition, output torque ≥ 900 gf.cm.③ Noise requirement ≤ 55 dBa.④ After testing, the sample must not show coil detachment, housing deformation, pin detachment, gearbox damage, or gear tooth damage.	Constant temperature and humidity chamber
3	High Temperature Storage	① Storage temperature: $80 \pm 2^{\circ}\text{C}$; storage time: 48h.② Normal temperature recovery time: 2h.	① Impedance change $< 10\%$.② After the test, under 500pps–1000pps condition, output torque ≥ 900 gf.cm.③ Noise requirement ≤ 55 dBa.④ After testing, the sample must not show coil detachment, housing deformation, pin detachment, gearbox damage, or gear tooth damage.	High temperature chamber

No.	Item	Test Method	Test Criteria	Test Equipment
4	Low Temperature Storage	① Storage temperature: $-30\pm 2^{\circ}\text{C}$; storage time: 48h. Normal temperature recovery time: 2h.	① Impedance change $<10\%$. ② After the test, under 500pps–1000pps condition, output torque $\geq 900\text{gf.cm}$. ③ Noise requirement $\leq 55\text{dBA}$. ④ After testing, the sample must not show coil detachment, housing deformation, pin detachment, gearbox damage, or gear tooth damage.	Low temperature chamber
5	Temperature Shock Test	① Low temperature: -10°C , hold for 1h; high temperature: 65°C , hold for 1h; transition time: 5min; number of cycles: 40 cycles. ④ Normal temperature recovery time: 2h.	① Impedance change $<10\%$. ② After the test, under 500pps–1000pps condition, output torque $\geq 900\text{gf.cm}$. ③ Noise requirement $\leq 55\text{dBA}$. ④ After testing, the sample must not show coil detachment, housing deformation, pin detachment, gearbox damage, or gear tooth damage.	Temperature shock chamber

8. Wiring Sequence

Stepper Motor Rotation Direction and Wiring Sequence				
CCW Rotation				
Terminal	Step 1	Step 2	Step 3	Step 4
A+	+	+	-	-
B+	-	+	+	-
A-	-	-	+	+
B-	+	-	-	+

Two-phase 4-wire stepper motor: reverse the sequence for CW rotation.

This is a CCW full-step energizing sequence table for a two-phase four-wire stepper motor.

* A+ / A- are the two terminals of Phase A winding.

* B+ / B- are the two terminals of Phase B winding.

* "+ / -" indicates whether the terminal is connected to the positive or negative side of the driver output, which determines the current direction through each winding.

* Each column represents one step state.

* When the sequence runs as Step 1 → Step 2 → Step 3 → Step 4 → Step 1, the motor rotates counterclockwise, CCW.

* For clockwise, CW, rotation, reverse the sequence: Step 4 → Step 3 → Step 2 → Step 1.

In simple terms, this table is not controlling a standard DC motor by simply reversing polarity. Instead, it changes the current direction in Phase A and Phase B windings in sequence, causing the rotor to move step by step. Each transition from one column to the next advances the motor by one step.

9. Packaging Style

9.1 Packaging Requirements

(1). During shipment, the complete product shall be placed in trays. The product should lie flat naturally inside the tray. Bending or squeezing the FPC is prohibited. The tray must secure the product properly, and the gap between trays should be appropriate to prevent severe shaking of materials during transportation.

(2). The tray should reserve a handling position for convenient removal and assembly on the production line.

9.2 Packaging Example

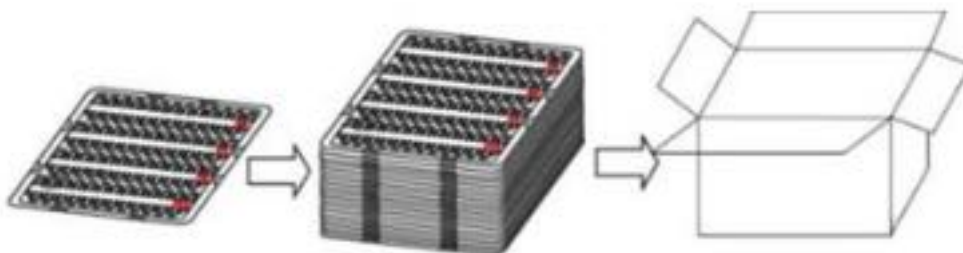
(1). Each carton contains 800 sets of module products.

Carton specification:

370mm × 270mm × 200mm, 800 pcs per carton, estimated.

(2). Each tray contains 40pcs as standard. Each carton contains 20 trays, totaling 800pcs as standard.

(3). The outside of the carton shall be marked with the product name, product number, and production batch number, and stamped with the outgoing inspection seal.



10. Precautions

- (1). Avoid using or storing the product in corrosive environments, especially environments containing sulfur gas.
- (2). When powered on, the motor must not be used under jamming or locked-rotor conditions, as this may damage the motor or gearbox.