

V1.55

Motor Gear Failure — Full Mechanical Redesign Initiated

PURPOSE

- Resolve motor gear retention on smooth motor shaft
 - Fix front cover plate clearance against rotor
 - Improve eccentric shaft gear alignment
 - First attempt at full bearing supported motor driven rotation
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HOUSING

Print Quality: 8/10

Issues: No new issues

Rating: 8/10

ROTOR

Print Quality: 8/10

Issues: Front cover plate rubbing against rotor — clearance insufficient

Rating: 8/10

INTERNAL GEARS

Mesh Quality: Good

Backlash: Minimal

Binding: None

Rating: 6/10

ECCENTRIC SHAFT

Orientation: Horizontal — correct

Issues: Rear eccentric shaft gear loose — angled off axis under load causing gear mesh failure

Rating: 5/10

MOTOR GEAR

Issues: Loose on smooth motor shaft. No flat spot for grub screw. Angled off axis. Slipped off shaft after 2-3 seconds of operation.

Rating: 4/10

MOTOR MOUNT

Issues: No bearing support for motor gear — allowed angular deviation under load

Rating: 5/10

MOTION TEST

Rotor Rotates: Yes — by hand with front plate removed

Full Orbit: Yes

Motor Driven: Yes — briefly, 2-3 seconds before motor gear slipped

Smoothness: 7/10 — bearing in rotor continues to impress

LESSONS LEARNED

- Motor gear must be constrained axially AND rotationally — smooth shaft with no bearing housing allows angular drift
 - Eccentric shaft gear and rear shaft must be one single part — two pieces introduce alignment failure
 - Front cover plate clearance against rotor must be increased — rubbing adds significant friction
 - A bearing housing for the motor gear will keep it perpendicular permanently
 - Every loose joint is a potential failure point — mechanical fastening required throughout
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CHANGES FOR NEXT VERSION

- Redesigned front cover plate with increased rotor clearance
 - Bearing housing added in main housing for motor gear
 - Eccentric shaft gear and rear section combined into single part
 - Extended rotor length to match new front cover plate geometry
 - New front eccentric shaft section to match updated assembly
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LOCKED PARAMETERS — CARRIED FORWARD

Generating Radius (R)	28mm
Eccentricity (e)	4mm
K Ratio	7 — RX-7 Proportion
Housing Width	64mm
Housing Height	48.7mm
Internal Gear Module	0.80
Fixed Gear Teeth	20
Rotor Gear Teeth	30
Internal Gear Ratio	3:2

Eccentric Shaft Offset	4mm
Drive Gear Module	0.80
Motor Gear Teeth	10
Output Gear Teeth	50
Drive Gear Ratio	5:1
Motor	YM2707 4.5VDC 100g/cm
Motor Mount Bore	24.5mm
Rotor Bearing	608RS — 8x22x7mm