

OBJECTIVE

The Rotary Piezo Motor for High Precision Positioning (RPMHPP) is a Quasi-static (stepping) Rotary Piezoelectric Motor that displays the known advantages of a piezo motor (e.g. a standstill torque at rest of 0.6N.m without any power supply, a high positioning accuracy in the range of 100 nrad ...). The RPMHPP principle is patented by CEDRAT TECHNOLOGIES and has been developed and space evaluated in the frame of an ESA TRP contract.

The RPA uses ultrasonic vibrations to move the rotor through frictional forces. The friction material is bonded onto the rotor and displays a low wear rate, a high friction coefficient similar in the air and in vacuum): a polymer solution, already known and experienced by CEDRAT TECHNOLOGIES onto the Linear Piezo Motor is used. This motor is issued from a TRP program from ESTEC.

UPGRADE OF PIEZO MOTORS

The RPMHPP followed a space evaluation program including

- Functional tests
- Lifetime test (100 hours)
- Random vibration (20 Grms)
- Thermal vacuum test (-25 / 85 °C)
- Lifetime test (500.000 strokes)

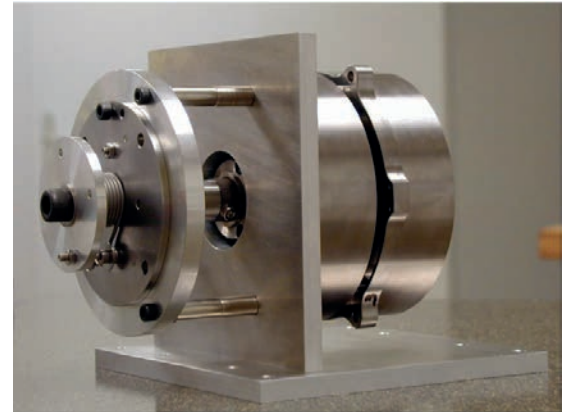
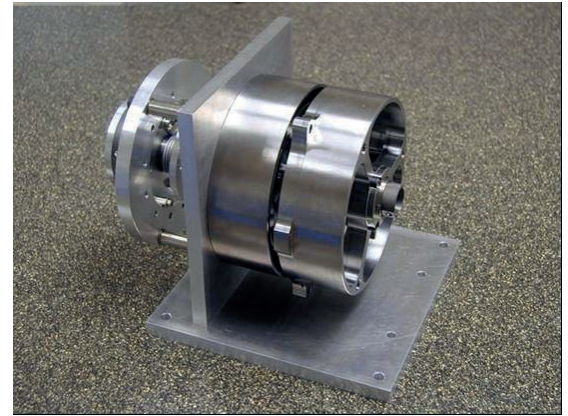
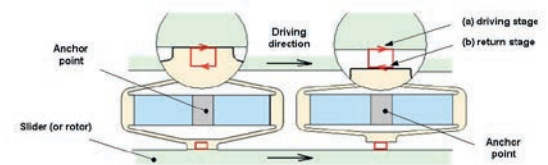


Fig. 1: RPMHPP motor



REFERENCES	UNIT	RPMHPP
> Notes		
Space product		
Normal displacement	µm (pk-pk)	10 - 16
Tangential displacement	µm (pk-pk)	4 - 12
Operating frequencies	Hz	0 - 50
Voltage max.	V	20 ... 150
Electrical power (per electrical port) at 10 Hz	W	5,6
Diameter	mm	120
Height (axial direction)	mm	100
Mass	g	1300
Capacitance (per electrical port)	µF	2,1
Stroke	°	-1 ... +1
Standstill torque	N.m	0,65
Maximal driving torque	N.m	0,5
Angular stiffness	N.m/rad	1,9e4
Position sensor	-	Differential eddy current
Positioning accuracy	nrad	80
No-load speed	rpm	0,05
Lifetime	hours	100
Electrical interfaces	4 RG178 B/U cables	