LIMITED ANGLE TORQUE ACTUATORS

The Limited Angle Torque (LAT) actuators are rotating actuators over an angle below +/- 15°. They offer a smooth, accurate motion in conjunction with an elastic guiding for precise motion and pointing assemblies. The LAT have been initially developed for space applications, (and thus display some redunded coils) for pointing functions.

Fig. 1: view of the LAT100

OBJECTIVE

The purpose of the LAT family is to provide a controllable rotating actuator over an angle of +/- 15°. The LAT provide an almost constant torque over the functional angular range, providing a controllability similar to Voice Coil Actuator. It can therefore be used in a closed loop with a sensor and a linear amplifier (such as the LA24 amplifier) to get an accurate pointing system.

ASSEMBLY

The architecture of the device is composed of a toroidal stator including 2 nominal coils and 2 redunded coils. The rotor supports the magnets. It can be used as a position actuator and a closed loop can be set with a proximity sensor to get a high position accuracy. Limited Angle Torque Actuators find applications as pointing in gimbal systems, scanning systems, position controls.

Fig. 2: CAD Assembly of the LAT100

PERFORMANCES OF THE LAT ACTUATORS

The LAT actuators use a toroidal winding and can thus dissipate the Joule losses in the stator. The performances are given with a nominal centering of the rotor with a concentricity of 0.05 mm.
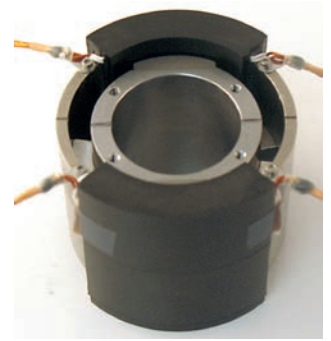

Fig. 3: Magnetic induction in the LAT 100
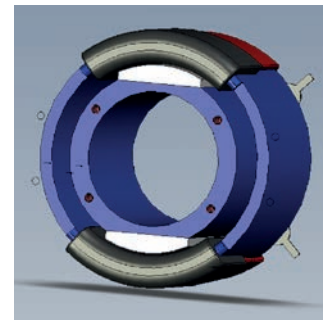
CUSTOMIZATION

Several LAT actuators can be designed and customized for a new application.

REFERENCES	UNIT	LAT20	LAT100
> **Notes**		**Preliminary**	
Stoke	°	+/-15	+/-15
Peak Torque	N.m	0.02	0.13
Nominal Torque	N.m	0.006	0.044
Peak power	W	1.77	4.86
Nominal power	W	0.16	0.541
Temperature range	°C	-40/80	-40/80
Torque constant	N.m/A	2.7	10
Motor constant	N.m/ W1/2	0.015	0.06
Electrical time response	ms	0.59	0.84
Winding resistance	Ohm	3.58	12
Nornal current	A	0.21	0.21
Electrical current		4AWG26 Kapton ins.	4AWG26 Kapton ins.
Total mass	g	117	621
Moment of inertia (rotor)	kg.m2	95.06E-6	14.04E-4
Outer diameter	mm	49	85
Height	mm	20	60