



Iris Dynamics Ltd.

Linear Actuator Joystick (IDL-20006)



Overview

Iris Dynamics' Linear Actuator Joystick technology is silent, has high force output, and is completely cog-less. Forces generated on each axis are fast, efficient, and unlike traditional technologies, contain no gearing or motor harmonics.

Through proprietary multidimensional magnetic field modeling and optimizations, two Iris actuators are arranged per axis to achieve high forces and good heat distribution.

The motor makes very efficient use of space. Traditional rotary motors and gear boxes are replaced by a sliding assembly that couples to the stick by a simple rotating bearing.

As low as 5 V can be used to drive these motors, and each axis motor moves through

IDL-20006 Data Sheet - revision 0

less than 360 electrical degrees over the entire travel. Low frequency power switching and low voltages make passing EMI easy.

Absolute position sensing is achieved through hall sensing of the shafts. Proprietary techniques are used to remove interference from coils during position sensing. Optionally, position sensing can be done with magneto resistive elements located on the gimbal.

A long mean time to failure is assured due to the touchless nature of the motor and touchless sensing elements.

Contactless motor design means the device is silent during operation.

Integration is made possible using one of two APIs (Microsoft DirectInput and Iris USB Serial), or by contracting the Iris Development team to put together firmware that works for a specific application.

Features and Benefits

- Superior feel
- Small footprint
- Robust components
- Simple mechanical and electrical design
- Low voltage and power requirements
- Low processing requirements
- High sustained forces
- Contactless, solid state position detection circuits
- Temperature sensing
- Imagined, designed, and proven in Canada

***Note the follow specifications only reflect Iris' current proof-of-concept device. Contact info@irisdynamics.com to find out how the technology scales to meet your specifications.**

Absolute Maximum Ratings

Logic Supply Voltage.....	5.5 V
Motor Supply Voltage.....	12.8 V
Peak Power Consumption	360 W
Sustained Power Consumption at 25 C	125 W
Maximum Y-axis Instant Force Output	44 N
Maximum X-axis Instant Force Output	30 N
Maximum Sustained Y-axis Force Output at 25 C	25 N
Maximum Sustained X-axis Force Output at 25 C	17.5 N

Specifications

Parameter	Notes	Min	Typ	Max	Unit
Electrical					
Logic Supply		4.5	5	5.5	V
Motor Supply		5	12	12.8	V
Winding Current	<i>Per axis</i>			15	Amps
Winding Resistance			0.71		ohm
Thermal					
Winding Temperature	<i>Limited by firmware</i>			110	C
Mechanical					
Gimbal Range			40	40	degrees
Weight			2.95		kg
Motor Length			15.2		cm
Motor Width			15.2		cm
Motor Height			10.5		cm
Forces (at 100 mm from pivot, windings at 25 degrees C)					
X-axis Sustained Force	<i>@ 62.5 W</i>		17		N/amp
Y-axis Sustained Force	<i>@ 62.5 W</i>		22		N/amp
X-axis Max Force	<i>@ 180 W</i>			28.5	N
Y-axis Max Force	<i>@ 180 W</i>			37	N
Forces (at 100 mm from pivot, windings at 80 degrees C)					
X-axis Sustained Force	<i>@ 62.5 W</i>		14		N/amp
Y-axis Sustained Force	<i>@ 62.5 W</i>		18		N/amp
X-axis Max Force	<i>@ 180 W</i>			23.5	N
Y-axis Max Force	<i>@ 180 W</i>			30.5	N
Effects					
Bandwidth			1.0		kHz
Sampling Frequency	<i>Motion-based / Frequency Based</i>			2.6 / 4	kHz
Position Sensor (magneto-resistive gimbal sensor)					
Angle Resolution			0.039		degrees
X- and Y-axis refresh				2.6	kHz