The LBS linear piezo motor represents a quantum leap in the design of small size high-performance DC motors. Manufactured from light weight reinforced engineering thermoplastics with a precision linear slide, this motor provides superior precision and ultrafast response/start-stop characteristics with an affordable design. Highly energy efficient, the motor consumes zero power in hold position while still providing significant force. Available in a variety of configurations (including non-magnetic) it is the ideal choice for OEM applications where superior performance and competitive unit cost are important factors.

| Motor Specifications	Encoder
Mode of Operation	Stepping & Continuous
Push/Pull Force	>2N
Self Braking Force	>2N
Response Time	20µs to 30µs
Velocity Range	0.014 to 140mm/s
Travel Range	10 mm
Minimum Linear Step (resolution)	<0.05 µm
Minimum controlled Linear Step	2.6 µm
Dynamic Range	4kHz
Bi-Directional Repeatability	±2.6 µm
Angular Hysteresis at Direction Change	< 1.5 arc.min
Supply Voltage for Driver	12 VDC
Operating Temperature	-20° to 80°C
Maximum Current over velocity range	350mA Note 1
Motor Weight	25g
Motor Dimensions (mm)	40x34x11
Driver PCB Dimensions (mm)	48x63x25
Control	Closed loop

Load Curve
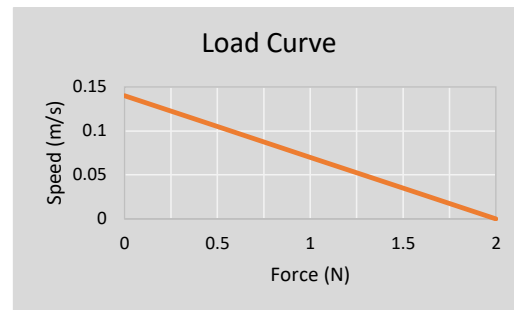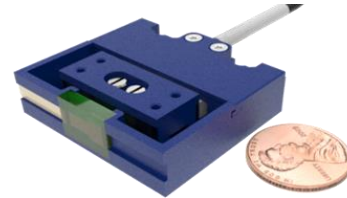
Note 1: Maximum current in continous mode. Different duty will proportionally reduce average current.

Principle of Operation

DTI' s linear piezomotors work on a patented principle of excitation of ultrasonic standing waves within a piezoelectric resonator. The resulting superposition of two orthogonal ultrasonic waves causes linear movement of the motor (for more details visit www.dtimotors.com). DTI's electronic driver's have been designed to provide an economical user-control interface. Each driver PCB is supplied pre-programmed for the specific motor model and is software configurable to provide optimization of drive signals and integrated controls. Closed loop control of the motor is achieved via an optical encoder mounted on the back of the motor. Refer to the Electronic Drvier 'ED' technical data sheet for full details of Electronic Drivers.

Performance and Key benefits vs. Electromagnetic Motors

Improved Resolution:	With a control step size of just 0.05 µm at full thrust or holding force these linear motors offer 20,000 steps per mm of control
Faster reaction time:	Within 20µs to 30µs the Piezomotor has made its first step and motion has commenced compared to a stepper motor with typical 5ms to start motion.
High Force Density	For its size and weight these motors offer superior force density, particularly when compared with stepper and lead screw solutions
Energy and Cost Saving	The Piezomotor consumes zero power at holding force and very low power at slow speed (0.06 W at 1 mm/s) yielding the possibility of very efficient overal duty.
Special Properties	Is immune to EM and RF interference and emits no interference.
Economical Design	The innovative design and Patent protected technology packaged in stable reinforced engineering thermoplastic makes this high performance technology affordable for OEM equipment designers
Lightweight	The Piezomotor contains no copper windings, iron laminations or permanent magnets and is significantly more powerful by weight than EM solutions. This makes them ideally suited to weight critial applications.
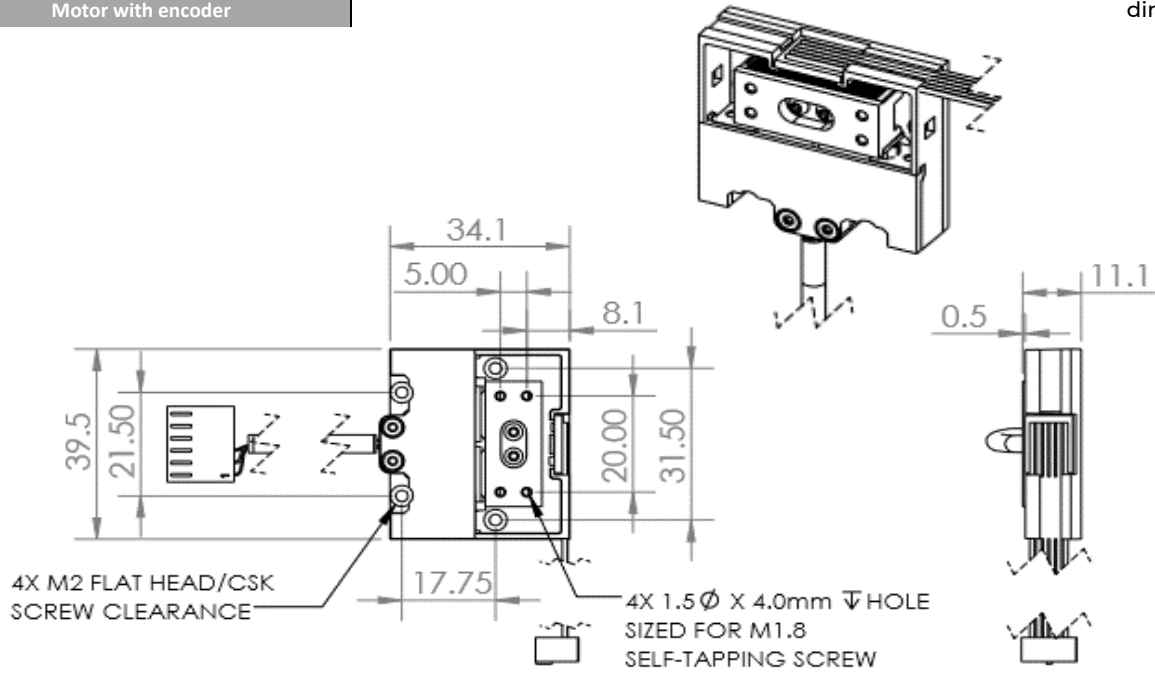
4X M2 FLAT HEAD/CSK
SCREW CLEARANCE

4X 1.5 Ø X 4.0mm ⊽ HOLE
SIZED FOR M1.8
SELF-TAPPING SCREW

Motor Control
Motor

Control of DTI Piezomotors is straightforward. Each motor requires a driver board which will convert motion input instructions to the necessary electrical processes with specific frequency and amplitude to create excitation of the Piezo resonator and make the motor perform the motion path instructed. The LBS002 Series of Piezomotors are designed for Closed loop control using DTI's Motion Control Algorithms.

Advantages of this include:
Increase in the range of speed control range during continuous mode operation.
Reduction in ultrasonic vibrational noise during speed control.
Substantial increase in the accuracy of speed control (speed stabilization) with external load changes.
Dramatic increase in system response time during speed stabilization

Control Options
Serial connection between Controller/PC and the serial connector on the board can be used with structured data commands being used to control the motor.
DTI Motion control Software can be used to give improved motion control with connection to the micro usb connector
Or, Motor Control can be implemented with Python commands using DTI's Motor API. The API and examples are available on our GitHub.com account - https://github.com/dti-motors/Public/tree/master/Python%20API

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6968 Professional Pkwy E. Sarasota, Florida 34240

www.dtimotors.com   Tel. 941-907-4444
info@dtimotors.com

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LBS002-V3

MADE IN U.S.A

	Windows OS	3rd Party controller

Motor with Encoder	DTI GUI and Control Software Connection to Micro USB	Motor Control with:
		 -DTI Python API,
		    Connection to micro USB
		      or
		 -Serial Port (RS232) Commands
		    Connection to Serial input

Encoder Driver Board

Output to Serial Port

Daughter Board

Micro USB Connector

Encoder Connector

Encoder Pins
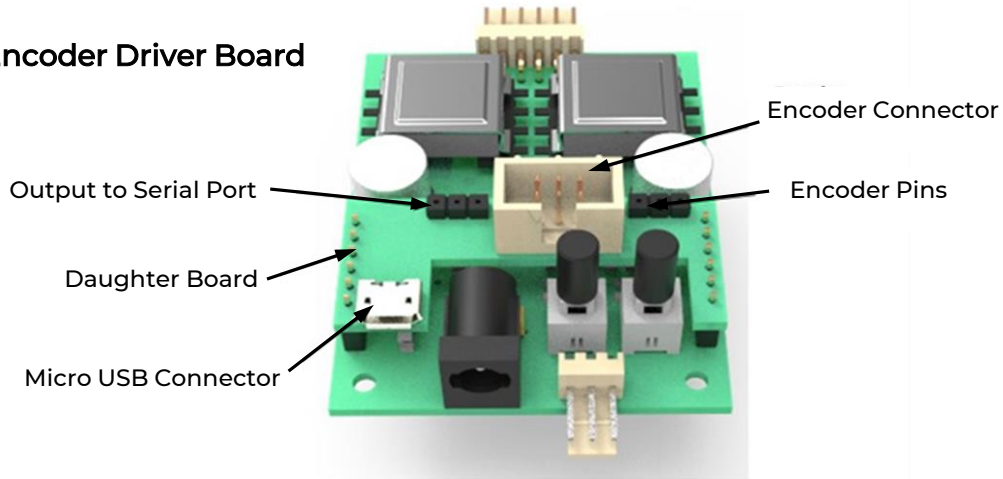
Ordering Information

Motor

Part Number

LBS002010LAC30-E	Linear Piezomotor with Encoder, 10 mm travel, 2N Force, 30 cm cable with connector
LBS002010LAC30-EK	Linear Piezomotor with Encoder Evaluation Kit (2N piezomotor+Encoder, 10 mm travel, electronic driver , cables, 12 VDC
LBS002010LAW15-E	Linear Piezomotor with Encoder, 10 mm travel, 2N Force, 15 cm wires, no connector

Electronic Driver

EDB60V011CB	Electronic Driver pcb - Closed Loop Loop board only
EDB60V011CE	Electronic Driver pcb - Closed Loop, with enclosure

Refer to Electronic Driver 'ED' Data Sheet for further information on Piezomotor control techniques and driver electronics