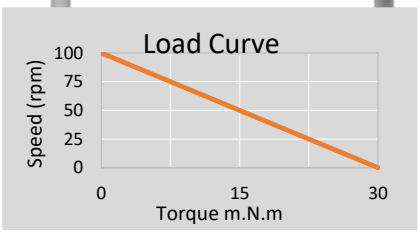
Technical Data Sheet

Rotary Piezomotor RBS Series

The RBS Rotary piezo motor represents a quantum leap in the design of small size high-performance DC motors. Manufactured from light weight reinforced engineering thermoplastics, 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 torque. 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	Standard	Encoder	
Mode of Operation	Stepping & Continuous		
Maximum Torque	>30mN.m		
Self Braking Torque	>40mN.m		
Response Time	30µs to 50µs		
Maximum Speed	>100rpm		
Minimum Angular Step (resolution)	<10µrad	<10µrad	
Minimum controlled angular Step	N/A	196µrad	
Uni-directional Repeatability	N/A	+/- 1 arc-min	
Dynamic Range	4 kHz		
Angular Hysteresis of Rotational Axis at Direction	<10µrad	<10µrad	
Supply Voltage for Driver	12 VDC		
Operating Temperature	-20° to 80°C		
Max Current over velocity range	350mA		Note 1
Motor Weight	68g	76g	
Motor Dimensions (mm)	66x52x20	66x52x31	Note 2
Driver PCB Dimensions (mm)	48x63x15	48x63x25	
Control	Open loop	Closed loop	



Note 1: Maximum current in continous mode. Use of PWM with different duty will proportionally reduce average current.

Note 2: Dimensions do not include shaft, refer to dimension drawings

Principle of Operation

DTI' s rotary 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 eliptical movement of the resonator tip which drives the Rotor (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 encoder mounted on the back of the motor. Refer to the Electronic Driver 'ED' technical data sheet for full details of Electronic Drivers.

Performance and Key benefits vs. Electromagnetic Motors

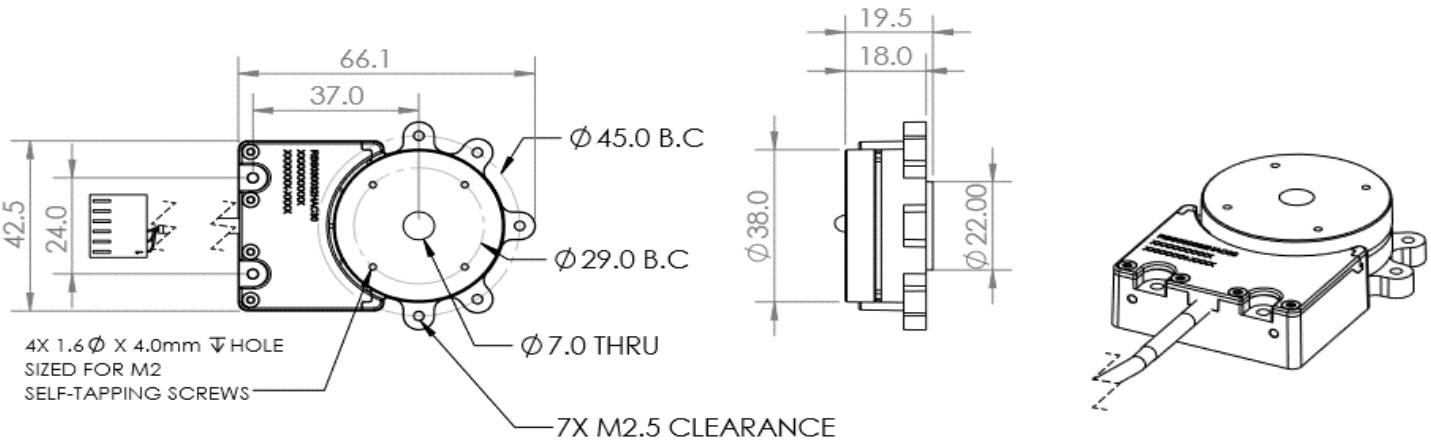
Improved Resolution:	With a minimum step size of just 10µrad at full Torque these rotary motors offer >600000 steps per revolution of control
Faster reaction time:	Within 30µs to 50µs the Piezomotor has made its first step and motion has commenced compared to a stepper motor with typical 5ms to start motion.
Higher specific power stall torque:	For the same power as a comparable sized Stepper motor the Piezomotor has a stall torque of up to 10x greater for the same power rating.
Energy and Cost Saving	The Piezomotor consumes zero power at holding torque and very low power at slow speed (0.1W at 1 RPM), yielding the possibility of very efficient overal duty.
Special Properties	Can be supplied with low permeability material construction suitable for MRI applications or even completely non-magnetic. Is immune to EM and RF interference and has no emissions
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.

6968 Professional Pkwy E. Sarasota, Florida 34240

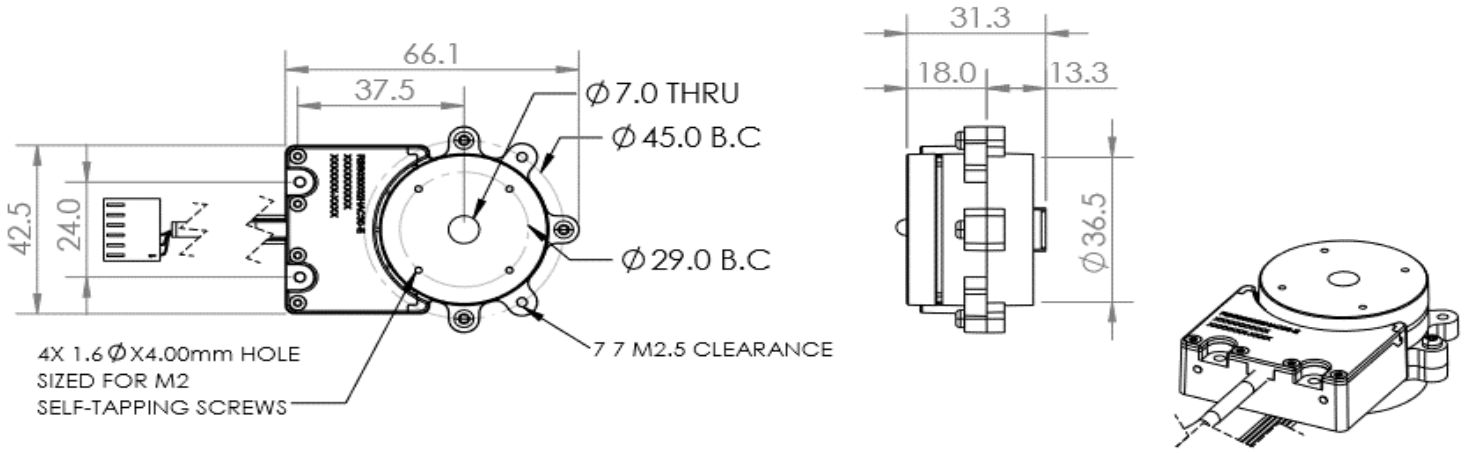
Dimensional Drawings

Standard Model Hollow Shaft

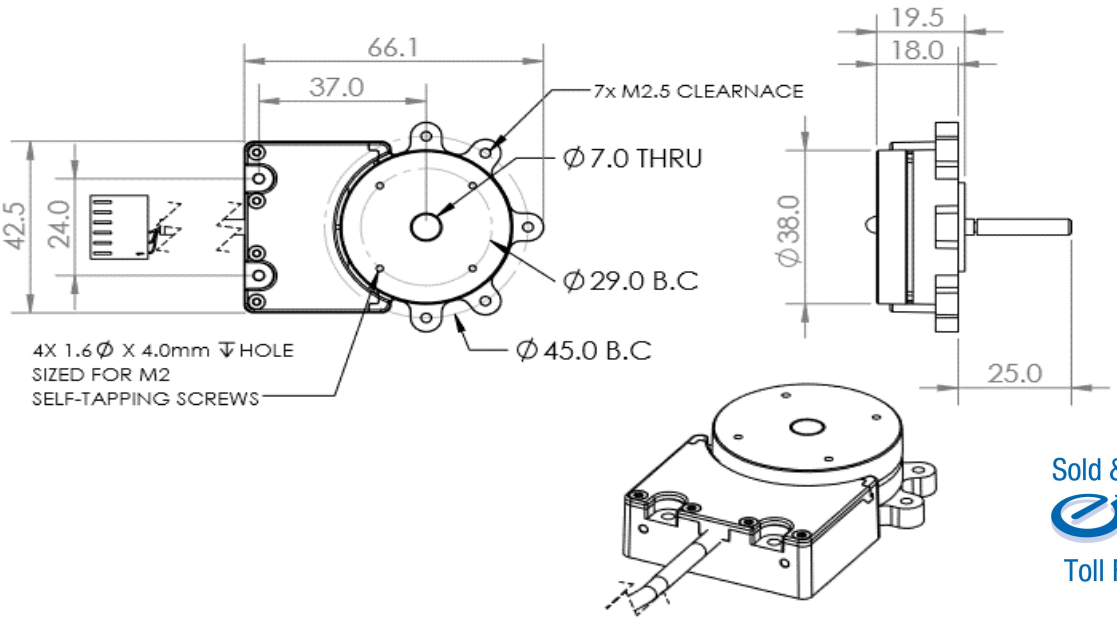
dimensions in mm



Encoder Model Hollow Shaft

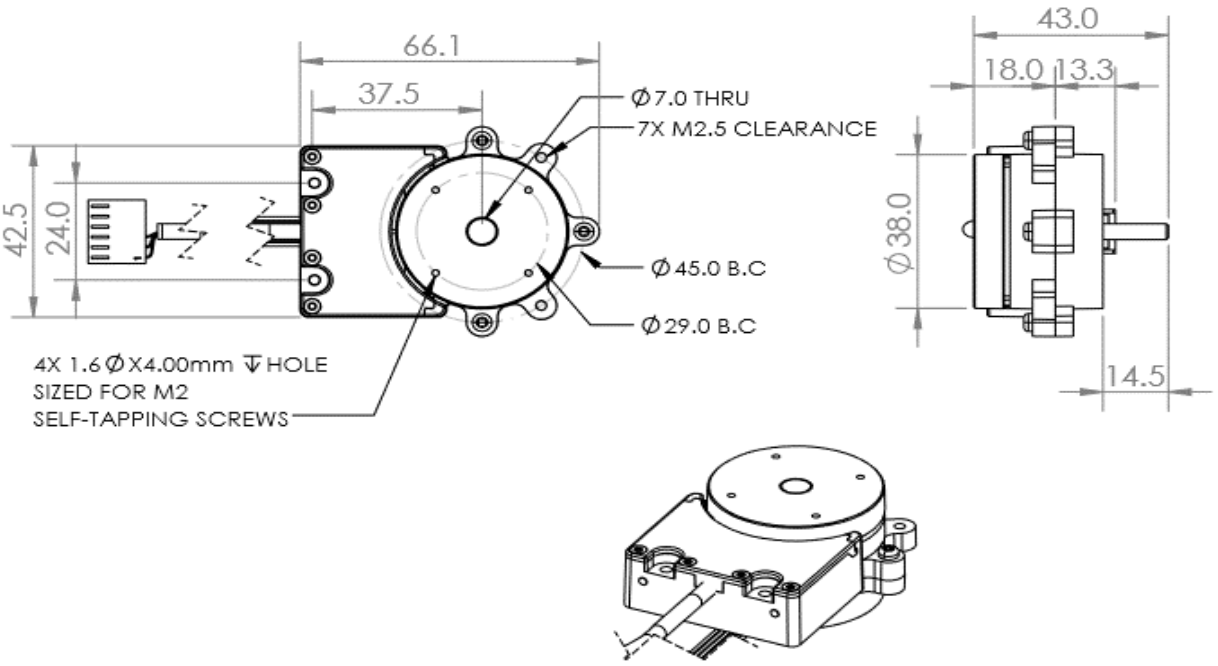


Standard Model Solid Shaft



Dimensional Drawings

Encoder Model Solid Shaft



Motor Conrol

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.

Control Options

Where fitted, motors can be manually controlled to move in either direction with two pushbuttons on the Driver PCB.

The two input control pins can be used to provide control signals to the Driver board to move the motor in either direction. PWM can be used to control speed and step size.

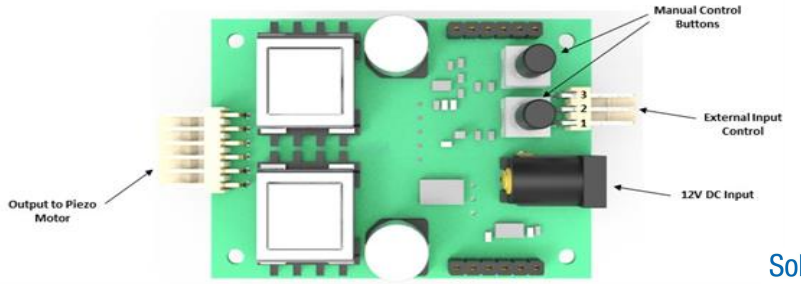
Serial connection between Controller/PC and the serial connector on the board can be used with structured data commands being used to control the motor

When DTI motor encoder and Drive board with encoder are used:

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



Control Architecture

DTI Motors are available as a basic motor or with a fitted encoder.
DTI Drivers are available as open loop drivers or closed loop drivers which are fitted with an encoder daughter board.
Motors can be simply controlled in open loop mode or there are several options for achieving closed loop motion control

	Open Loop Driver	Closed Loop Driver with Encoder Board
Base Motor	Open Loop Control or 3rd Party controller command motor with PWM control and close control loop with external sensor	N/A
Motor with Encoder	Open Loop Control or 3rd Party controller command motor with PWM control and close control loop DTI Encoder output	Motor Control with: -DTI Control Software on Windows OS device, or -DTI Python API on 3rd party controller, or -Serial Port (RS232) Commands

Ordering Information

Motor

RBS030032 [ ][ ] - [ ][ ]

Add all required option Codes after dash in alphabetical order

Hollow Shaft =	HA
Solid Shaft =	SA
Solid Shaft with Flat=	SD

Connector and 30cm cable =	C30
15cm Wires =	W15

E K = Incremental Encoder

= Evaluation Kit including Motor, Electronic Driver, Cables, manual (Must have C30 = Connector) Refer to the Configuration table to determing the number to insert where the # sign is shown to define the desired kit.

Example: RBS030032SAC30-EK is a Solid Shaft Motor with Connector and Encoder Evaluation Kit

Electronic Driver

EDB60V006BB	Electronic Driver pcb - Open Loop board only
EDB60V006BE	Electronic Driver pcb - Open Loop, with enclosure
EDB60V007CB	Electronic Driver pcb - Closed Loop Loop board only
EDB60V007BE	Electronic Driver pcb - Closed Loop, with enclosure

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