



Technical Data Sheet

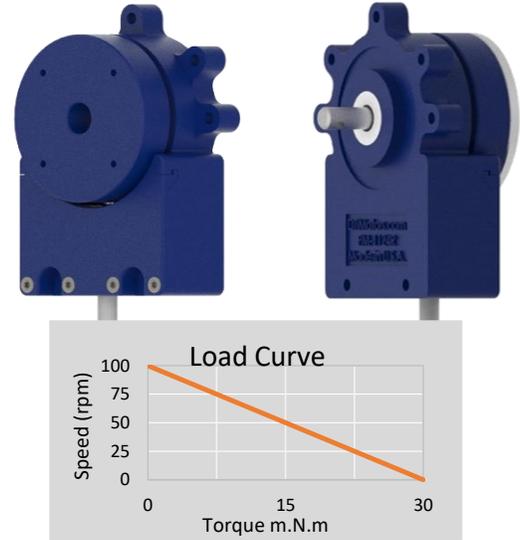
Rotary Piezomotor RBS Series

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 | |
| Motor Weight | 68g | 76g |
| Motor Dimensions (mm) | 66x52x20 | 66x52x31 |
| Driver PCB Dimensions (mm) | 48x63x15 | 48x63x25 |
| Control | Open loop | Closed loop |

Note 1

Note 2



Note 1: Maximum current in continuous 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 elliptical 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.

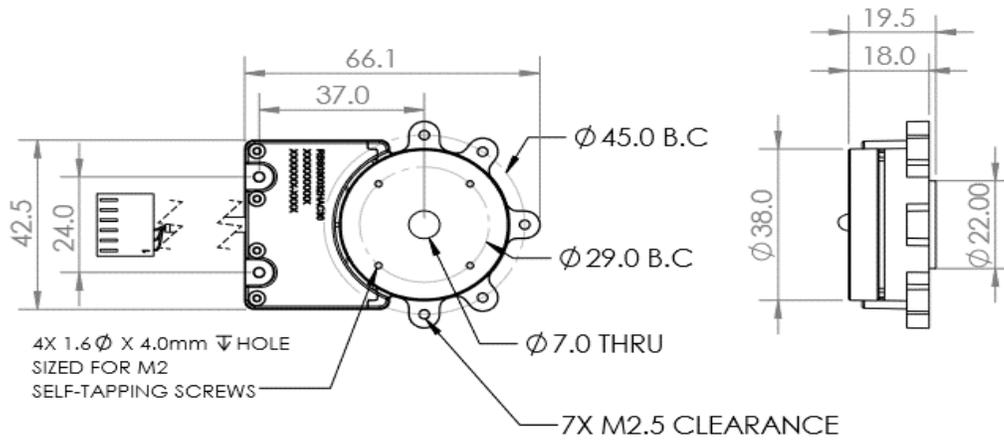
Performance and Key benefits vs. Electromagnetic Motors

| | |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 overall 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 critical applications. |

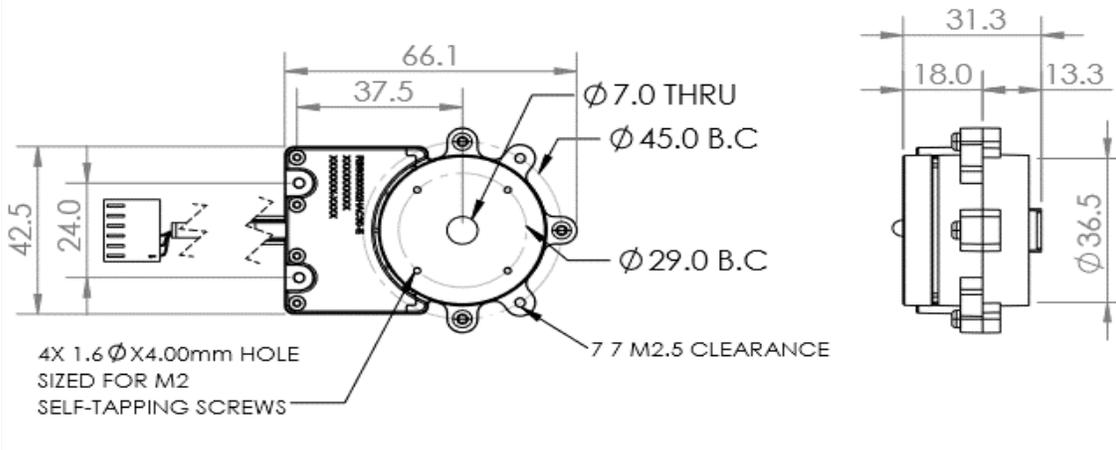


Standard Model Hollow Shaft

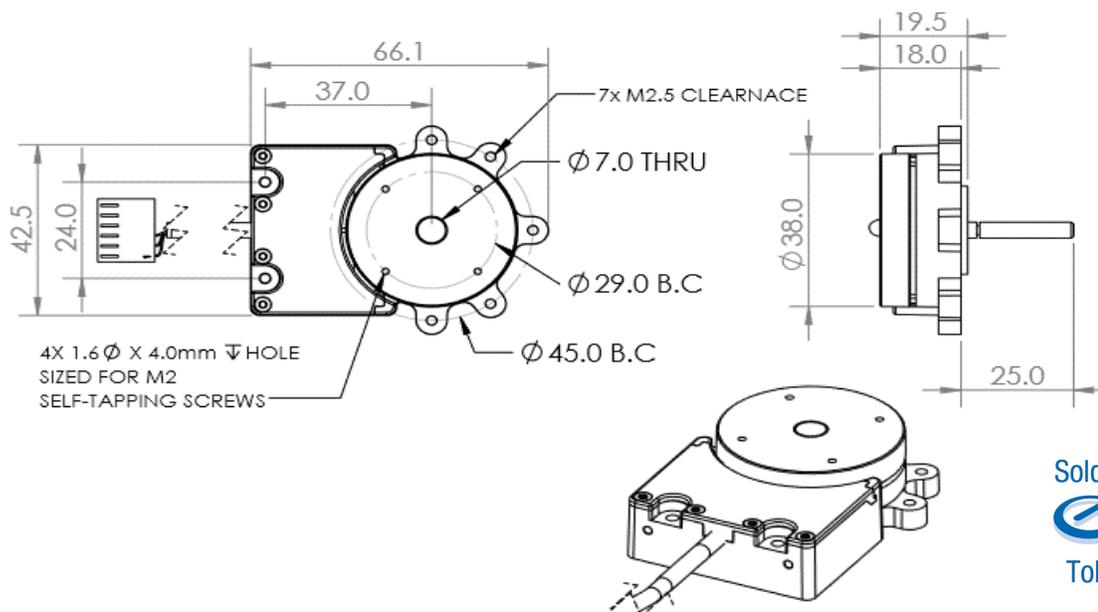
dimensions in mm



Encoder Model Hollow Shaft



Standard Model Solid Shaft



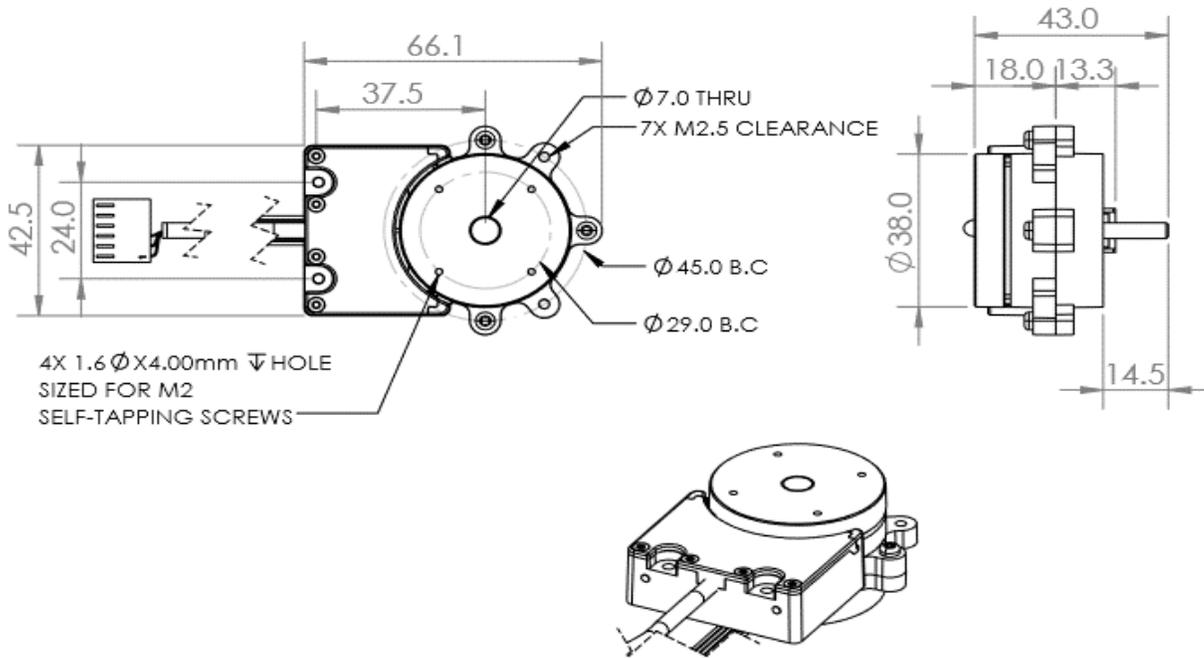
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Dimensional Drawings

Encoder Model Solid Shaft



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.

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.

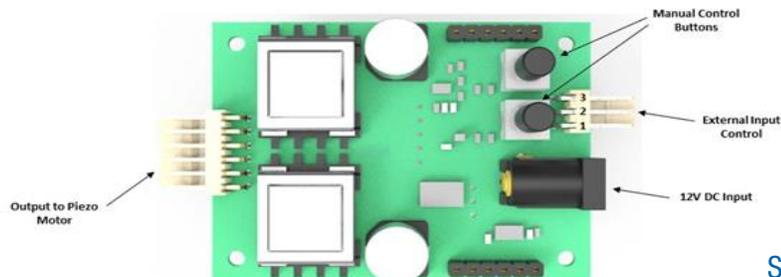
Serial connection between Controller/PC and the serial connector on the board can be used with structured data commands being used to control the motor

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



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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

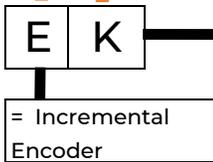
RBS030032

| | |
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| | |
|--|--|

Add all required option Codes after dash in alphabetical order

| | |
|--|--|
| | |
|--|--|

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



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

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

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 board only |
| EDB60V007BE | Electronic Driver pcb - Closed Loop, with enclosure |

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