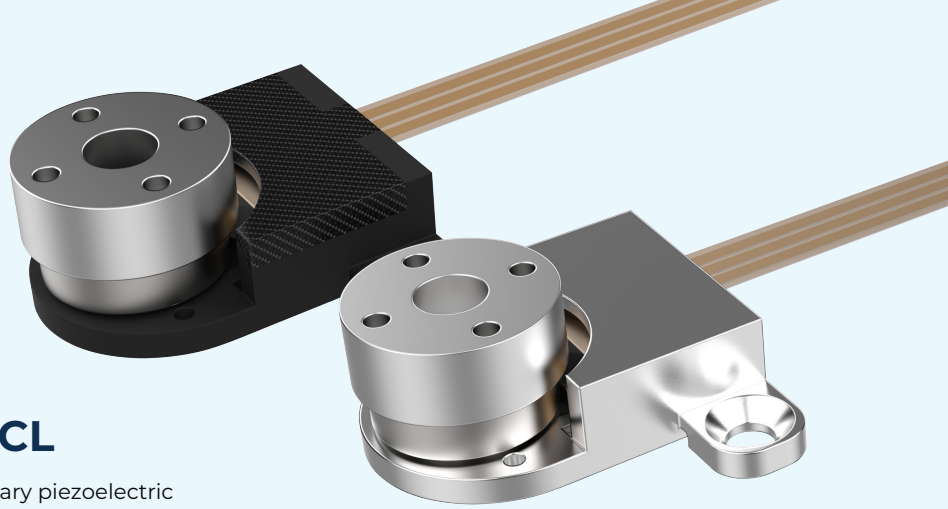
PMC
PIEZO
MOTOR COMPANY

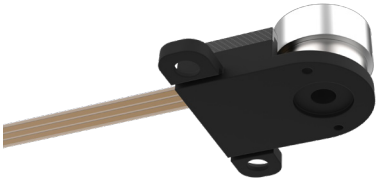


Miniature Piezoelectric Rotary Actuators ROMO, ROMO-E, ROMO-E-CL

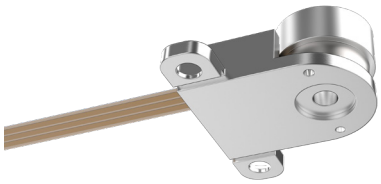
Introducing our new range of compact, lightweight rotary piezoelectric actuators with hollow shaft, designed to deliver superior precision and expanded functionality for advanced applications.

Performance and Benefits of ROMO Series Rotary Actuators

- New US patented design
- Superior stability of velocity control
- Flexible PCB electrical connection facilitates system integration
- Economical construction using thermoplastics or machined metal for reliability and affordability
- Unmatched precision and resolution
- Ultra-fast response times and exceptional start-stop capabilities
- High torque relative to size, optimized for direct-drive applications
- Stepping and continuous modes of operation
- Silent operation and low voltage



ROMO Series Rotary Actuators
Plastic Enclosure



ROMO Series Rotary Actuators
Metal Enclosure

UNIQUE PROPERTIES

- Torque: >4.0 mN.m
- Resolution: > 30 µRad = 200,000 steps per rotation
- Max Speed: >600 RPM
- Fast Response Time: ≈30 µs
- Low Voltage: 5.0 to 7.5 V DC
- Low Current: 30 mA to 300 mA (max)
- Energy efficient: Zero power consumption in hold

ROMO Series Motor Specifications

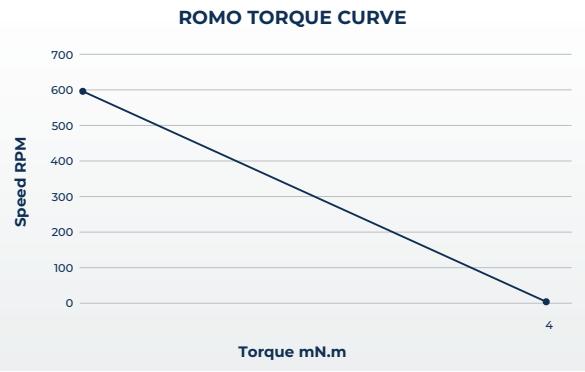
Model No.s Plastic or Metal Enclosures	**ROMO (Plastic) ROMO-M (Metal)**	
Power Supply Voltage*	**5.0 to 7.5 V DC**	**Note 1**
Stall Torque	**≥ 4 mNm**	
Self-Braking Torque	**≥ 5 mNm**	
Actuator Response Time	**≈30 µs**	
Max Speed	**> 600 rpm**	
Minimum Angular Step	**≈30 µrad**	
Angular Backlash	**30 µrad**	
Angular Hysteresis	**30 µrad**	
Frequency Response	**4 kHz**	
Minimum Controlled Angular Step**	**6.1 mrad**	**Note 2**
Uni-directional Repeatability**	**6.1 mrad**	**Note 2**
Operating Temperature	**-20 °C to 80 °C**	
Maximum Axial Load	**200 g**	
Maximum Radial Load	**200 g**	
Moment of Inertia	**29.2 g·mm²**	
Max Current over velocity range	**30 mA to 300 mA**	
Rotor Runout	**≤50 µm**	
Actuator Weight (Plastic or Metal enclosure)	**3.5 g or 4.0 g (metal)**	
Actuator Dimensions (no shaft)	**13 x 18.7 x 9.1 mm**	
Driver PCB Dimensions	**28 X 31 X 9.6 mm**	
Driver PCB Weight	**4.3 g**	

Note 1: *At 5 V DC power - specifications for torque and speed will be approximately 25% lower compared to 7.5 V DC.

Note 2: **Motor model with factory fitted encoder.

ROMO-E Series Rotary Actuators
Plastic Enclosure

ROMO-E Series Rotary Actuators
Metal Enclosure



Python API
Closed-Loop Control System

ROMO-E (encoder version) is also available as a fully closed-loop system including Python API software.

- **Closed-Loop Feedback Control:** Utilizes encoder feedback for precision control. Run Python scripts for precise motion control.
- **High Performance:** Ultra-fast <30 µs Response Time, ≥ 4 mNm Stall Torque, Resolution 30 µRad, Max speeds > 600 rpm.
- **Low Voltage & Low Current:** 5 VDC to 7.5 VDC, 30 mA to 300 mA (max)
- **Versatile Operation:** Supports stepping and continuous modes.
- **Easy Integration:** Connect driver PCB/Piezomotor to computer via USB.

EXAMPLE PYTHON API COMMANDS:

Home (direction) – Moves the motor to the zero position (Clockwise/Counterclockwise).

getPosition() – Retrieves current motor position in encoder pulses.

Velocity(value) – Sets motor speed (0.2 - 600 RPM).

Move(action) – Moves motor Left/Right or Stops.

Position(value) – Moves motor to a specific encoder pulses position (1024 pulses per revolution).

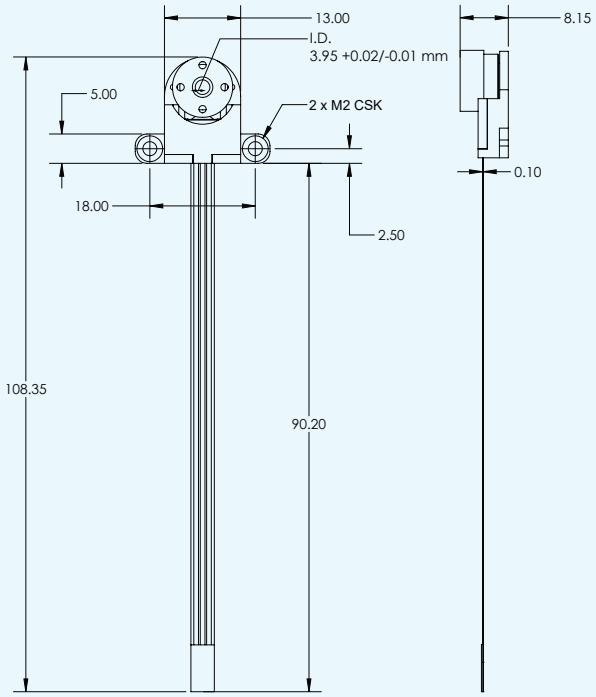
setPWMsettings(duty_cycle_percent, frequency_Hz)
Configures velocity by PWM parameters.

Principle of operation

The ROMO rotary piezo actuator operates based on a US patented technology. Electrical excitation of its piezoceramic body, or resonator, induces simultaneously two independent longitudinal and bending ultrasonic standing waves in two perpendicular directions. This action generates elliptical vibrations at the resonator's center, resulting in linear motion of the motor, which is passively in contact with the resonator body.

ROMO Series Hollow Shaft Dimensional Drawings

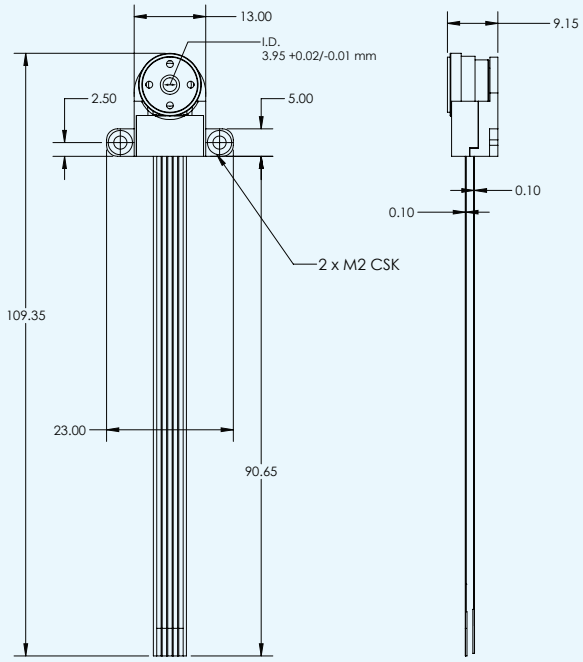
STANDARD MODEL HOLLOW SHAFT



Dimensions in mm

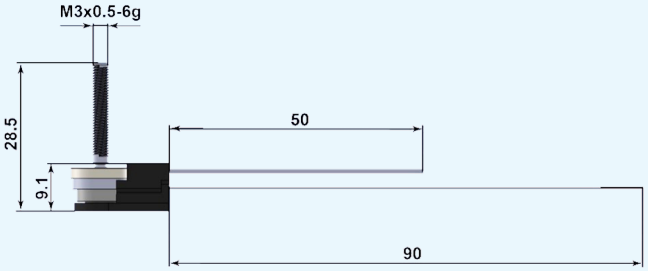
ENCODER MODEL

HOLLOW SHAFT



Dimensions in mm

SOLID SHAFT LEADSCREEW VERSION



ROMO is also available with precision leadscrew

Contact PMC for details

Dimensions in mm

Motor control

The electronic driver is designed to offer an economical interface for user control. Motion of the motor is achieved via PWM (Pulse Width Modulation) control signals via the J1 connector on the driver. The driver PCB also supports UART and I2C interfaces. Each driver PCB is pre-programmed for the specific motor model and allows for software configurability, optimizing drive signals and integrating controls. Motor operation can be finely regulated through closed-loop control using an optional encoder factory-installed on the actuator.

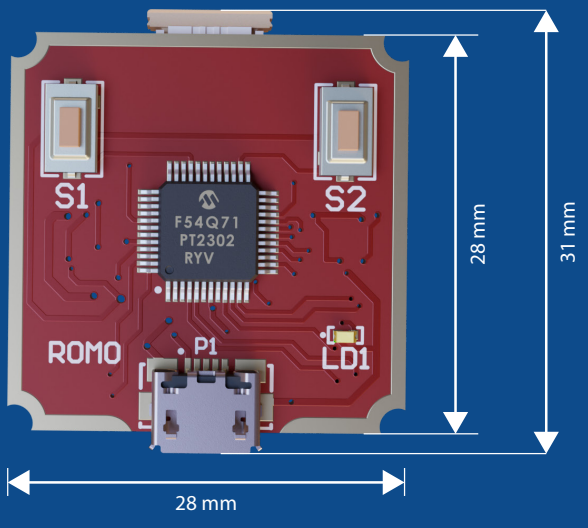
OPEN LOOP

The driver board can be controlled using an external signal source PWM (Pulse Width Modulation) mode. Control signals are applied to the External Signal Connector to generate the desired rotation and speed. Control of speed using PWM is implemented by varying the pulse duration and repetition rate of input signals onto the two directional control pins. Size of step is determined by the pulse duration, and speed is determined by pulse rate. The minimum pulse duration is approximately 30 µs.

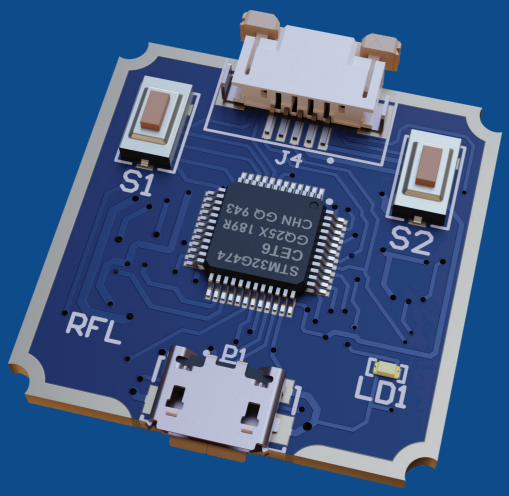
CLOSED-LOOP

Pre-programmed motion control algorithms enable the implementation of several commands for specific motion control. The key commands are for defining the speed and the movement to a defined position. These commands are resident within a library which can be accessed using either Piezo Motor Company's control software or via the serial port using TTL serial commands. Motor Control can also be implemented with Python commands using Piezo Motor Company's Motor API.

Electronic PCB Driver for **ROMO Series Piezo Actuators**



ROMO & ROMO-E
Electronic Driver PCB



ROMO-E-CL
Electronic Driver PCB

Control architecture & options

Piezo Motor Company motors are available as a basic motor or with a fitted encoder. Piezo Motor Company electronic drivers are available as open-loop or closed-loop drivers. Motors can be simply controlled in open-loop mode with several options for achieving closed-loop motion control. To learn more, visit https://piezomotors.com/products/

	Open-Loop Driver	Closed-Loop Driver with Encoder board
Base Motor	Open-Loop Control or third party controller command motor with PWM control and close control loop with external sensor	
Motor with Encoder	Open-Loop control or third party controller commands motor with PWM control and closes loop via encoder signal output.	Motor Control with: Piezo Motor Company's Control Software on Windows OS device or Piezo Motor Company Python API on third party controller or TTL Serial Port Commands

DRIVER BOARDS ROMO, ROMO-E, ROMO-E-CL SERIES

Model	ROMO, ROMO-E Series	ROMO-E-CL Series
Part Number	ROLR-PCB-001	ROMO-E-PCB003
Description	Electronic Driver Board (5.0 – 7.5 VDC) for use with ROMO & LRMO motors	Close-Loop Driver PCB (5 VDC) for use with ROMO-E-CL

Performance Chart and Motor/Driver Part Configurations

Motor Type	ROMO Series		ROMO-E Series		ROMO-E-CL Series	
Model	ROMO	ROMO-M	ROMO-E	ROMO-E-M	ROMO-E-CL-KIT	ROMO-E-CL-M-KIT
Part Number	ROMO-011-0370	ROMO-012-0370	ROMO-011-1370	ROMO-012-1370	ROMO-011-1371	ROMO-012-1371
Encoder	Without Encoder	Without Encoder	With Encoder	With Encoder	With Encoder	With Encoder
Enclosure	Plastic	Metal	Plastic	Metal	Plastic	Metal
Torque (mN.m)	≥ 4 mNm	≥ 4 mNm	≥ 4 mNm	≥ 4 mNm	≥ 4 mNm	≥ 4 mNm
Resolution	> 30 µRad = 200,000 steps per rotation	> 30 µRad = 200,000 steps per rotation	> 30 µRad = 200,000 steps per rotation	> 30 µRad = 200,000 steps per rotation	> 30 µRad = 200,000 steps per rotation	> 30 µRad = 200,000 steps per rotation
Max speed	>600 RPM	>600 RPM	>600 RPM	>600 RPM	>600 RPM	>600 RPM
Supply	5.0 to 7.5 V DC	5.0 to 7.5 V DC	5.0 to 7.5 V DC	5.0 to 7.5 V DC	5.0 to 7.5 V DC	5.0 to 7.5 V DC
Kit Ordering Number	ROMO-KIT	ROMO-M-KIT	ROMO-E-KIT	ROMO-E-M-KIT	ROMO-E-CL-KIT	ROMO-E-CL-M-KIT
Part	ROMO-011-0371	ROMO-012-0371	ROMO-011-1371	ROMO-012-1371	ROMO-011-1371	ROMO-012-1371
Includes	Rotary motor, Plastic Enclosure Evaluation Kit*	Rotary motor, Metal Enclosure Evaluation Kit*	Rotary motor with encoder Plastic Enclosure Evaluation Kit*	Rotary motor with encoder Metal Enclosure Evaluation Kit*	Rotary motor with encoder** closed-loop System Evaluation Kit. Includes: motor/encoder with plastic enclosure electronic driver PCB, Micro USB to USB adapter (5 V DC), cables and Python API software	Rotary motor with encoder** closed-loop System Evaluation Kit. Includes: motor/encoder with metal enclosure electronic driver PCB, Micro USB to USB adapter (5 V DC), cables and Python API software

***Evaluation Kit: includes ROMO motor, Electronic Driver PCB, cables, 120/240 VAC to 5.0 VDC or 7.5 VDC wall power adapter**

For custom inquires, contact us at info@piezomotorco.com

About Piezo Motor Company LLC

Founded in 2024, Piezo Motor Company is at the forefront of innovation in the design and manufacturing of piezoelectric motors. Headquartered in the USA, we have a global reach through a network of international distributors, delivering cutting-edge technology to clients worldwide.

Our team comprises highly skilled experts with extensive experience in piezoelectric motor and actuator design and physics. We are passionate about harnessing the unique properties of piezoelectric materials to create motors that offer unmatched precision, efficiency, and reliability. Our solutions are tailored to meet the diverse needs of industries ranging from medical devices to aerospace and robotics.

We pride ourselves on our commitment to excellence and innovation, continuously pushing the boundaries of what piezoelectric technology can achieve. Our dedication to research and development ensures that we remain leaders in this dynamic field, providing our clients with the most advanced and effective solutions available. Join us on our journey as we revolutionize the world of motion control with piezoelectric technology.

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