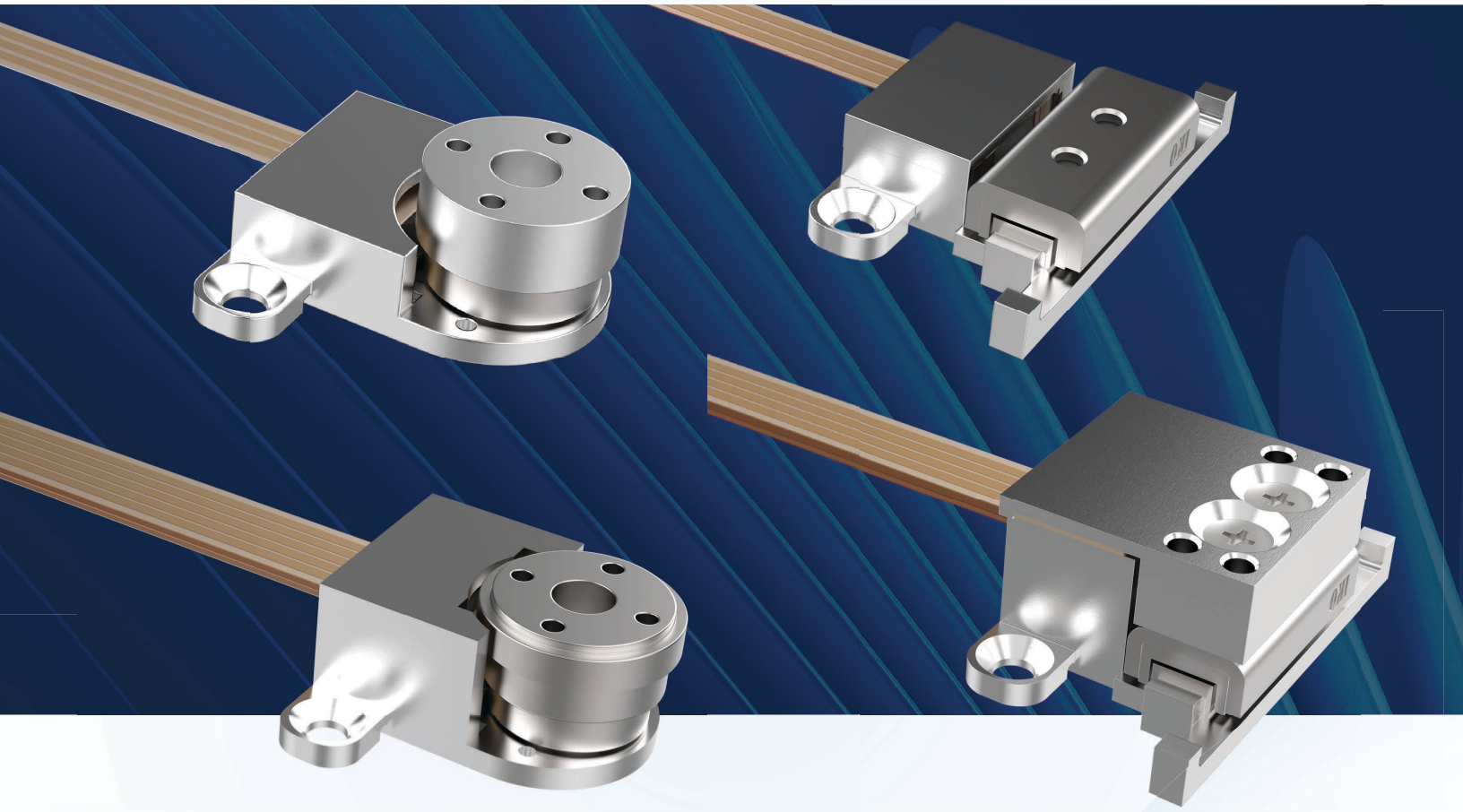
Piezo Motor Company, LLC



Piezoelectric Motors

PRODUCT CATALOG 2026

Innovation In The Design and Manufacturing of Piezoelectric Motors

www.piezomotors.com

Catalog V2 Rev 7 | Updated 5th June 2026

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CONTACT INFORMATION

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About Piezo Motor Company

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.

PIEZO MOTORS VS. CONVENTIONAL MOTOR TECHNOLOGIES

Feature	PMC Piezoelectric	DC Motor	Stepper Motor	Voice Coil
Zero holding power	✓ Zero current	— Continuous draw	— Current in hold	— Current in hold
Self-braking torque	✓ Yes	— None	— Detent only	— None
Non-magnetic*	✓ Yes*	— No	— No	✓ Yes
Sub-30 µs response	✓ ~30 µs	■ ~ms range	■ Step limited	✓ Fast
Positional resolution	✓ 30 µrad	■ Encoder limited	■ Step limited	■ Sensor limited
Silent operation	✓ Yes	■ Brushless: yes	■ Acoustic noise	✓ Yes
Voltage	✓ 7.5 V / 5 V	■ Varies	■ Varies	■ Varies

***Contact PMC for details**

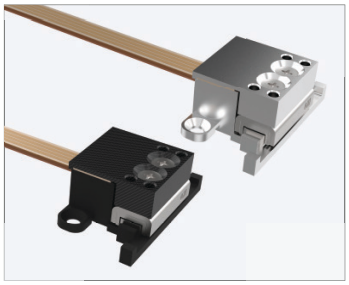
Product Family Overview

Piezoelectric Motors and Specialty Motion Stages

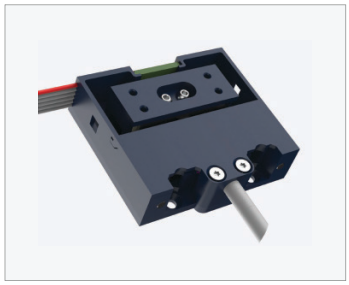
PMC's product portfolio is organized into two core motion families — Linear (LRMO) and Rotary (ROMO). Each family spans from compact miniature actuators, through higher-force / higher-torque large-format versions, to fully integrated multi-axis positioning systems. Across all product lines, PMC utilizes the same underlying ultrasonic piezoceramic drive technology, providing consistent operating principles, control architecture, and performance characteristics throughout the range.

Within each motion family, products follow a structured progression. Base models provide open-loop operation, while encoder-equipped variants enable user-implemented closed-loop control. Fully integrated closed-loop system versions combine PMC's driver electronics and Python-based API to manage the control loop internally, eliminating the need for an external motion controller.

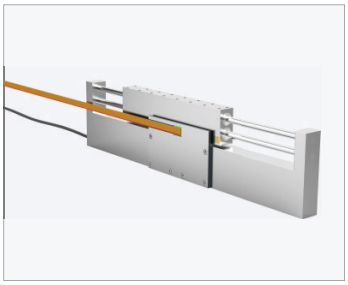
LINEAR ACTUATORS AND STAGE



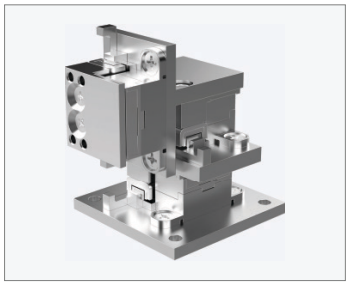
LRMO Series
Miniature Piezoelectric Linear Actuators



LRMO-LG Series
High-Force Miniature Piezoelectric Linear Actuators

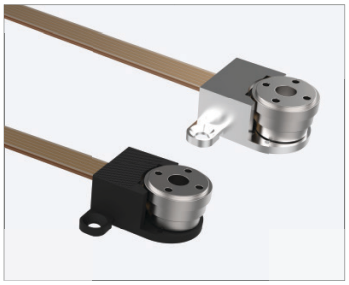


LRMO-150 Series
Extended-Travel Linear Piezoelectric Motor

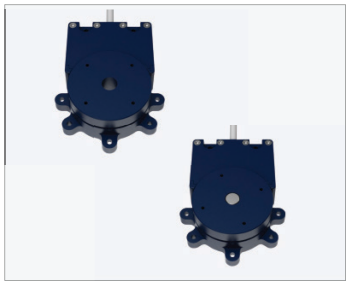


LRMO-XYZ
3-Axis Piezoelectric Positioning Platform

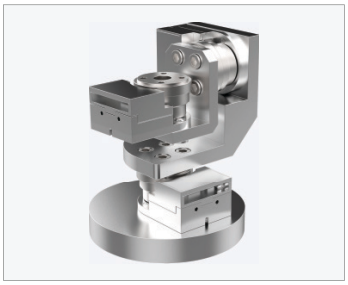
ROTARY ACTUATORS AND STAGE



ROMO Series
Miniature Piezoelectric Rotary Actuators



ROMO-LG Series
High-Torque Miniature Piezoelectric Rotary Actuators



ROMO-3AX
3-Axis Rotary Gimbal Stage

Applications

Our piezoelectric miniature actuators and stages are engineered for demanding OEM applications where precision, compactness, and energy efficiency are critical. The hollow shaft, zero holding-power consumption, and sub-30 µs response time open up design possibilities that are not achievable with conventional electromagnetic motors.

PHOTONICS & FIBER OPTICS
Polarisation control, variable attenuators, wavelength-selective switches.

MICROSCOPY & IMAGING
Objective turrets, polarisation rotators, confocal beam scanners.

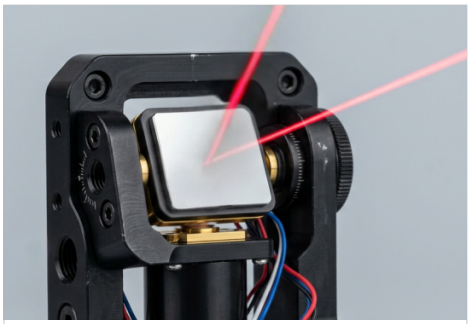
MEDICAL & DIAGNOSTIC
OCT scanners, surgical robotics, drug delivery micro-pumps

SCIENTIFIC INSTRUMENTATION
Cryogenic stages, vacuum-compatible mechanisms, spectroscopy platforms.

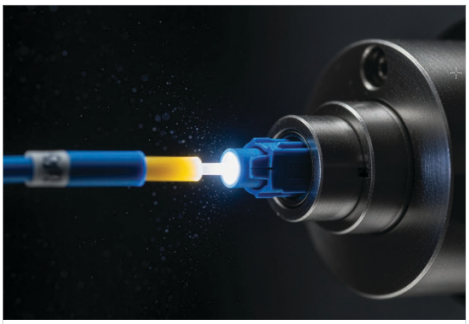
ROBOTICS & AUTOMATION
Pick-and-place, collaborative robot joints, gripper mechanisms.

AEROSPACE & DEFENCE
Antenna pointing, gimbal drives, electro-optical payloads.

OPTICAL FILTER WHEELS
Fast, silent filter changes in microscopy and spectroscopy.

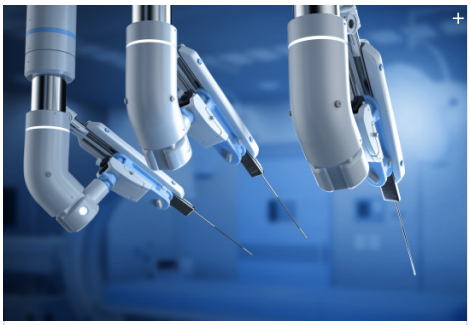


BEAM STEERING
Precision angular adjustment of optical paths and mirrors.

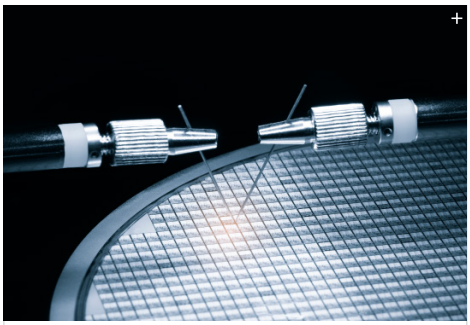


FIBRE ALIGNMENT
Sub-µrad alignment of fibre optic components.

MICRO ROBOTICS
Compact direct-drive joints and end-effectors.



MEDICAL DEVICES
Drug delivery, lab-on-chip, and surgical robotics.



SEMICONDUCTOR
Wafer handling and mask alignment systems.

+ = Stock Image

LRMO Series

Piezoelectric Linear Actuators

INTRODUCTION

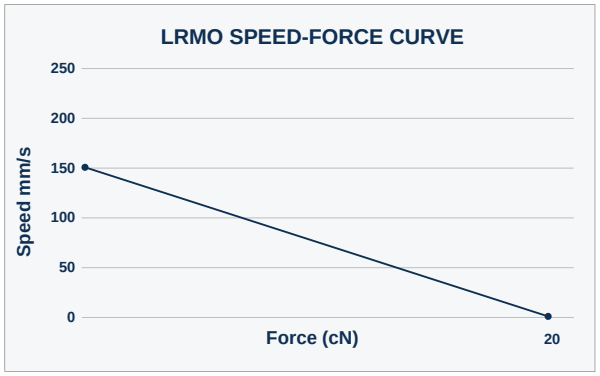
Piezo Motor Company's LRMO Series actuators deliver industry-leading performance in compact, lightweight linear motion solutions. Built around patented ultrasonic piezoceramic technology, LRMO motors achieve ultra-high resolution, fast response, and excellent force density, making them ideal for a broad spectrum of advanced automation and precision positioning tasks. Available in engineered thermoplastic or machined anodized aluminum enclosures, with or without encoder.

LRMO Series (Without Encoder) in Plastic & Metal Enclosures

PRINCIPLE OF OPERATION

US Patent Number 12,143,036

The LRMO-E Linear 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.

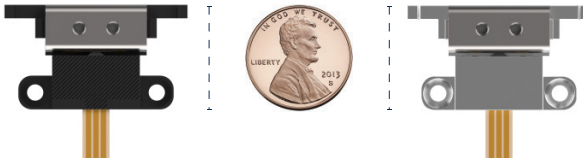


PERFORMANCE & BENEFITS

- Superior stability of velocity control.
- Flexible PCB electrical connection facilitates system integration.
- Unmatched precision and resolution.
- Silent operation and low voltage.
- Ultra-fast response times and exceptional start-stop capabilities.
- Stepping and continuous modes of operation.
- Optional factory-fitted magnetic encoder.

KEY FEATURES

- 9.0 mm travel range
- Ultra-fast response (~30 µs)
- Push/pull force ≥ 0.2 N with self-braking ≥ 0.25 N
- Silent operation
- Low voltage operation — 5.0 V DC



LRMO

Open Loop Linear Piezo Motor

Plastic & Metal Enclosures | No Encoder

LRMO-P Series (Without Encoder)
Plastic Enclosures

LRMO-M Series (Without Encoder)
Metal Enclosures

INTRODUCTION

Linear piezoelectric actuator, open-loop PWM control. Available in plastic (LRMO-P) or machined anodized aluminum (LRMO-M) enclosure.

MOTOR SPECIFICATIONS	
Power Supply Voltage	5.0 V DC
Push/Pull Force	≥0.2 N
Self-Braking Force	≥0.25 N
Motor Response Time	< 30 µs
Travel Range	9.0 mm
Max Speed (continuous mode)	≥150 mm/s
Minimum Linear Step	<0.04 µm
Linear Backlash at Change of Direction	<0.1 µm
Elastic Stiffness	< 200 mN/µm
Linear Hysteresis	<2.0 µm
Pitch	<1 mrad
Maximum Moment Mx	0.07 Nm
Roll	<0.5 mrad
Maximum Moment My	0.12 Nm
Yaw	<1 mrad
Maximum Moment Mz	0.9 Nm
Vertical Runout	3.0 µm
Horizontal Runout	6.0 µm
Frequency Response	4 kHz
Operating Temperature	-20 °C to 80 °C
Maximum Load (Vertical Orientation)	15 g
Maximum Load (Horizontal Orientation)	150 g
Max Current (continuous mode)	300 mA
Max Current at 10 mm/s (PWM mode)	30–40 mA
DIMENSIONS & WEIGHT	
Motor Weight	3.7 g / 6.7 g(metal)
Motor Dimensions	27.1 × 15.48 × 5.5 mm
Driver PCB Dimensions	28 × 28 × 9.6 mm
Driver PCB Weight	4.3 g

ORDERING INFORMATION

Model	Enclosure	Encoder	Part Number	Kit Number*
LRMO-P	Plastic	No	LRMO-P011-0270-0000	LRMO-P011-0271-0000
LRMO-M	Metal	No	LRMO-M012-0270-0000	LRMO-M012-0271-0000

***Evaluation kit includes motor, driver PCB, cables and 120/240 V AC to 5 V DC power adapter.**

LRMO-E

Linear Piezo Motor with Encoder

Plastic & Metal Enclosures | With Encoder

LRMO-E-P Series (With Encoder)
Plastic Enclosures

LRMO-E-M Series (With Encoder)
Metal Enclosures

INTRODUCTION

Identical to LRMO base motor with factory-fitted magnetic encoder. Encoder signal output enables closed-loop control via your controller. Plastic (LRMO-E-P) or anodized aluminum (LRMO-E-M) enclosure.

MOTOR SPECIFICATIONS	
Power Supply Voltage	5.0 V DC
Push/Pull Force	≥0.2 N
Self-Braking Force	≥0.25 N
Motor Response Time	< 30 µs
Travel Range	9.0 mm
Max Speed (continuous mode)	≥150 mm/s
Minimum Linear Step	<0.04 µm
Encoder Resolution (after quadrature)	2.66 µm
Minimum Controlled Linear Step	2.66 µm
Uni-directional Repeatability	2.66 µm
Linear Backlash at Change of Direction	<0.1 µm
Elastic Stiffness	< 200 mN/µm
Linear Hysteresis	<2.0 µm
Pitch	<1 mrad
Maximum Moment Mx	0.07 Nm
Roll	<0.5 mrad
Maximum Moment My	0.12 Nm
Yaw	<1 mrad
Maximum Moment Mz	0.9 Nm
Vertical Runout	3.0 µm
Horizontal Runout	6.0 µm
Frequency Response	4 kHz
Operating Temperature	-20 °C to 80 °C
Maximum Load (Vertical Orientation)	15 g
Maximum Load (Horizontal Orientation)	150 g
Max Current (continuous mode)	300 mA
Max Current at 10 mm/s (PWM mode)	30–40 mA
DIMENSIONS & WEIGHT	
Motor Weight	5.7 g or 6.7 g
Motor Dimensions	27.1x15.48x10.5mm
Driver PCB Dimensions	28 × 28 × 9.6 mm
Driver PCB Weight	4.3 g

ORDERING INFORMATION

Model	Enclosure	Encoder	Part Number	Kit Number*
LRMO-E-P	Plastic	Yes	LRMO-P011-1270-0000	LRMO-P011-1271-0000
LRMO-E-M	Metal	Yes	LRMO-M012-1270-0000	LRMO-M012-1271-0000

***Evaluation kit includes motor, driver PCB, cables and 120/240 V AC to 5 V DC power adapter.**

LRMO-E-CL

Linear Piezo Motor System with Closed-Loop Software

Plastic & Metal Enclosures | With Encoder

LRMO-E-P-CL (With Encoder) Plastic Enclosure
LRMO-E-M-CL Series (With Encoder) Metal Enclosures

INTRODUCTION

Fully integrated closed-loop system. Combines the LRMO-E encoder motor with PMC's dedicated closed-loop driver PCB and Python API software. Position and velocity commands via USB. Plastic or anodized aluminum enclosure.

EXAMPLE PYTHON API COMMANDS

Home(direction)
Move to zero (CW / CCW)

getPosition()
Read position in encoder pulses

Velocity(value)
Set speed: 0.01 – 150 mm/s

Move(action)
Move Left / Right / Stop

Position(value)
Go to absolute position (pulses)

setPWMsettings(dc, freq)
Configure velocity via PWM

MOTOR SPECIFICATIONS	
Power Supply Voltage	5.0 V DC
Push/Pull Force	≥0.2 N
Self-Braking Force	≥0.25 N
Motor Response Time	< 30 µs
Travel Range	9.0 mm
Max Speed (continuous mode)	≥150 mm/s
Minimum Linear Step	<0.04 µm
Encoder Resolution (after quadrature)	2.66 µm
Minimum Controlled Linear Step	2.66 µm
Uni-directional Repeatability	2.66 µm
Linear Backlash at Change of Direction	<0.1 µm
Elastic Stiffness	< 200 mN/µm
Linear Hysteresis	<2.0 µm
Pitch	<1 mrad
Maximum Moment Mx	0.07 Nm
Roll	<0.5 mrad
Maximum Moment My	0.12 Nm
Yaw	<1 mrad
Maximum Moment Mz	0.9 Nm
Vertical Runout	3.0 µm
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Operating Temperature	-20 °C to 80 °C
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Maximum Load (Horizontal Orientation)	150 g
Max Current (continuous mode)	300 mA
Max Current at 10 mm/s (PWM mode)	30–40 mA
DIMENSIONS & WEIGHT	
Motor Weight	5.7 g or 6.7 g
Motor Dimensions	27.1x15.48x10.5mm
Driver PCB Dimensions	28 × 28 × 9.6 mm
Driver PCB Weight	4.3 g

ORDERING INFORMATION

Model	Enclosure	Encoder	Part Number	Kit Number*
LRMO-E-P-CL	Plastic	Yes	LRMO-P011-1270-0000	LRMO-P011-1281-0000
LRMO-E-M-CL	Metal	Yes	LRMO-M012-1270-0000	LRMO-M012-1281-0000

***Evaluation kit includes motor, driver PCB, USB cable and Python API software.**

LRMO Motion Control

and Driver Electronics

PWM | UART | I²C | Open-loop & Closed-loop

INTRODUCTION

The LRMO 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.

LRMO OPEN LOOP DRIVER PCB OPTIONS

Standard Open Loop Driver PCB (Red)
For Single Channel Control

Part No.: ROLR-PPCB-0370-0000

PMC's **Open-Loop RED Driver PCB** provides open-loop motor control without positional feedback. Drive current is automatically stabilized to compensate for temperature and load variations.

The LRMO RED driver PCB is **available in two variants:** a **standard single-channel version** for controlling one motor, and an I²C-enabled version with full **I²C functionality for multi-channel (multi-motor) control.**

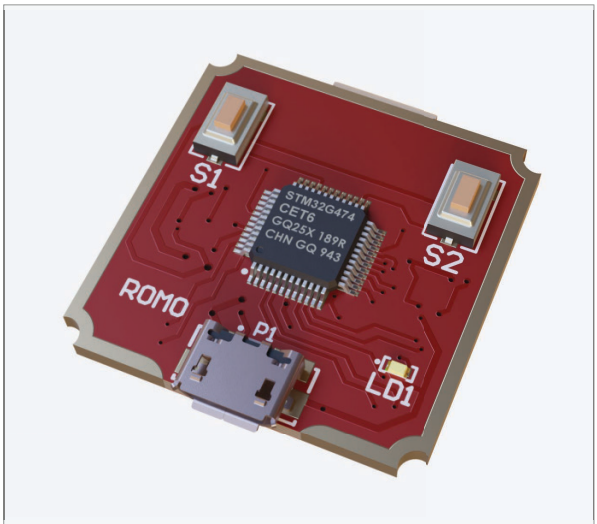
The LRMO RED driver PCB is compatible with both LRMO (non-encoder) and LRMO-E (encoder-equipped) motors. For applications requiring closed-loop control with the RED driver, the control loop must be implemented externally by the user using encoder feedback and a third-party controller.

Control Interfaces	
PWM (TTL-compatible)	via J1 connector
UART	Serial commands via J2 connector
I²C (Single-channel Control)	Serial commands via J2 connector

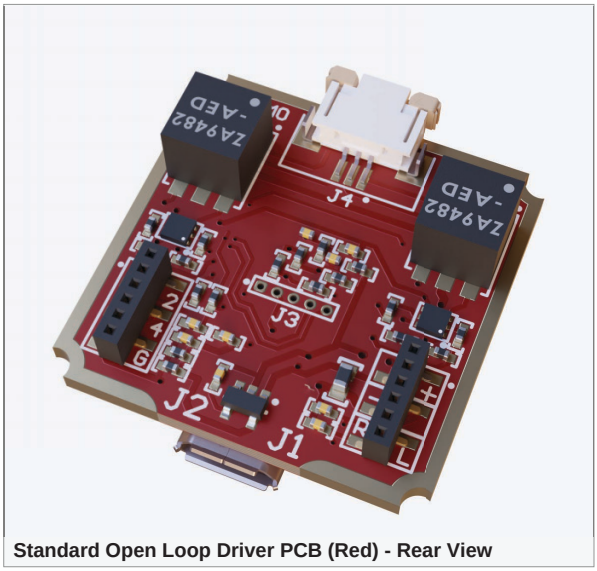
Each PCB is factory-configured for the selected serial interface.

Additional Features:

- Manual control via two onboard push-buttons.
- Compact, low-overhead solution for cost-sensitive for open-loop applications using a single motor.



Standard Open Loop Driver PCB (Red) - Top View



Standard Open Loop Driver PCB (Red) - Rear View

LRMO Motion Control
and Driver Electronics

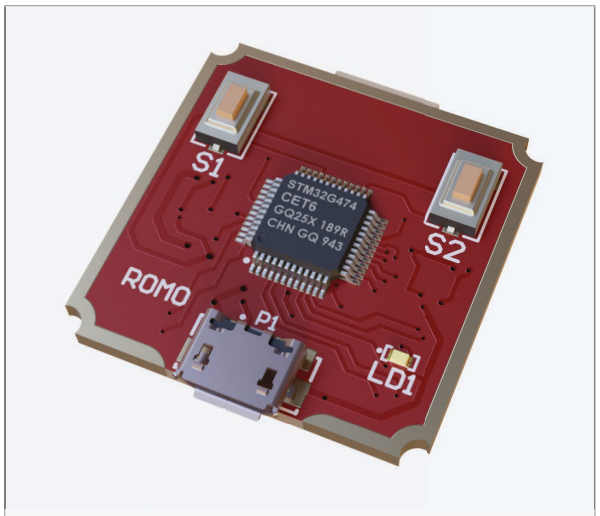
PWM | UART | I²C | Open-loop & Closed-loop

LRMO I²C Open-Loop Driver PCB (Red)
For Multi-Channel Control

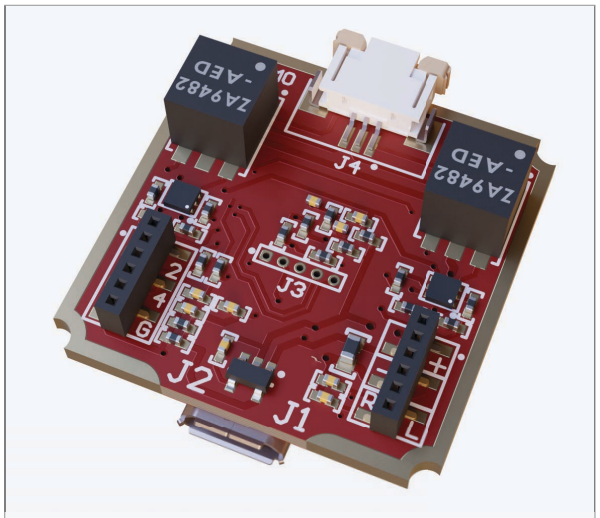
Part No.: ROLR-PPCB-0250-000

PMC's I²C RED driver PCB provides open-loop motor control without positional feedback using an I²C communication interface, enabling synchronized multi-axis operation. Drive current is automatically stabilized against temperature and load variations.

Control Interfaces	
I²C	Serial communication via J2 connector ◦ **SCL** – clock line ◦ **SDA** – data line



I²C Open-Loop Driver PCB (Red)
For Multi-Channel Control - Top View



I²C Open-Loop Driver PCB (Red)
For Multi-Channel Control - Rear View

Additional Features:

- Enables full I²C functionality with support for multiple driver PCBs on a shared bus.
- Unique, configurable I²C addresses per driver.
- Control of multiple motors.
- Compatible with PMC I²C adapter board.
- Scalable via daisy-chaining for multi-axis systems.
- Ideal for multi-axis, synchronized, or distributed motion control.

LRMO CLOSED LOOP DRIVER PCB OPTIONS

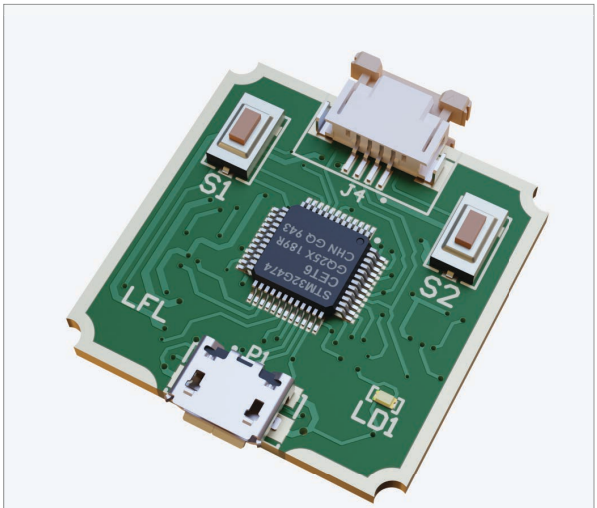
Standard Closed Loop Driver PCB (Green)
For Single Channel Control

Part No.: LRMO-PPCB-1280-0000

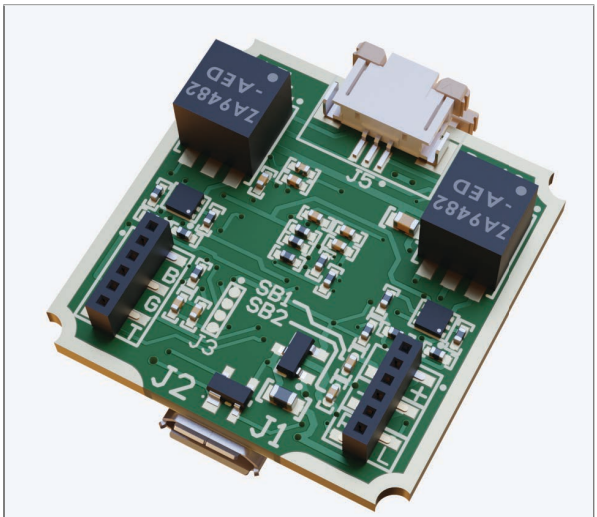
PMC's **Closed-Loop GREEN Driver PCB** provides precise motor control using positional feedback from an encoder. Drive current is automatically stabilized to compensate for temperature and load variations.

The GREEN driver PCB is **available in two variants: a standard single-channel version** for controlling one motor, and an I²C-enabled version with full **I²C functionality for multi-channel (multi-motor) control.**

The GREEN driver PCB is compatible with LRMO-E (encoder-equipped) motors only and is designed for use with PMC's Python™ API, enabling simple integration and high-precision motion control.



Standard Closed Loop Driver PCB (Green) - Top View



Standard Closed Loop Driver PCB (Green) - Rear View

Control Interfaces

PMC Python™ API

- Closed-loop control is executed onboard.
- Position and speed commands are issued via the Python™ API.
- Connection via Micro-USB.
- No external motion controller required.

UART	Serial commands via J2 connector.

Additional Features:

- Manual control via two onboard push-buttons.
- Compact, low-overhead solution for cost-sensitive for open-loop applications using a single motor.

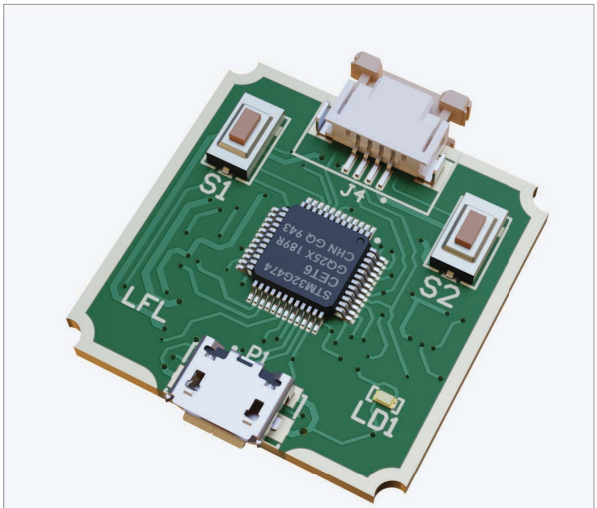
LRMO CLOSED LOOP DRIVER PCB OPTIONS

I²C Closed-Loop Driver PCB
For Multi-Channel Control

Part No.: LRMO-PPCB-1260-0000

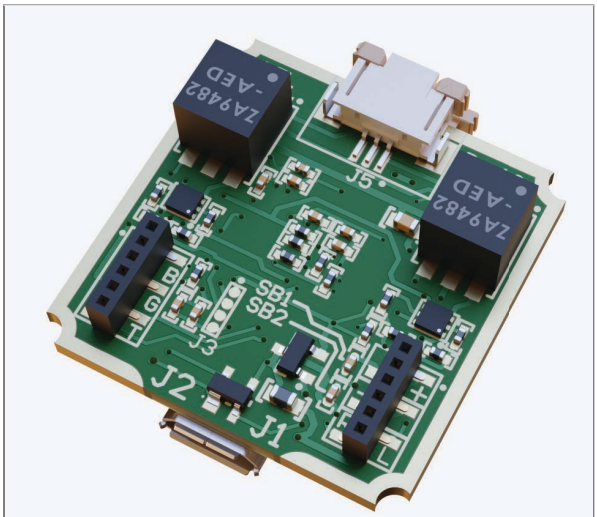
PMC's I²C GREEN driver PCB provides closed-loop control with encoder feedback using an I²C communication interface, enabling synchronized multi-axis operation. Drive current is automatically stabilized against temperature and load variations.

Control Interfaces	
I²C	Serial communication via J2 connector ◦ **SCL** – clock line ◦ **SDA** – data line



I²C Closed-Loop Driver PCB (Green)
For Multi-Channel Control - Top View

Additional Features:
- Enables full I²C functionality with support for multiple driver PCBs on a shared bus.
- Unique, configurable I²C addresses per driver.
- Control of multiple motors.
- Compatible with PMC I²C adapter board.
- Scalable via daisy-chaining for multi-axis systems.
- Ideal for multi-axis, synchronized, or distributed motion control.



I²C Closed-Loop Driver PCB (Green)
For Multi-Channel Control - Rear View

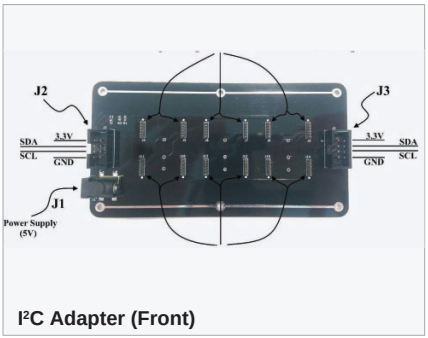
LRMO Motion Control
and Driver Electronics

PWM | UART | I²C | Open-loop & Closed-loop

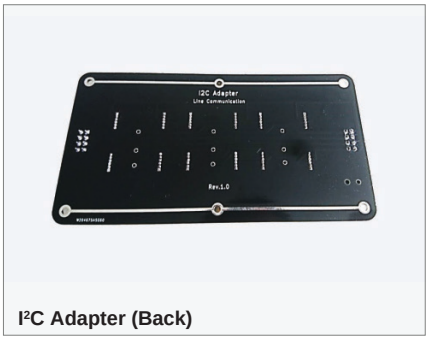
I²C ADAPTER

For use with up to six (6) **I²C Red or I²C Green Driver** PCB for OPEN-LOOP Control or Closed-Loop control.

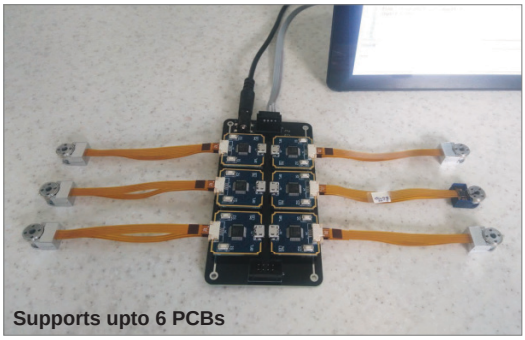
Part Number: **I2CX-PPCB-0290-0000**



I²C Adapter (Front)



I²C Adapter (Back)


Supports upto 6 PCBs

LRMO DRIVER PCB SPECIFICATIONS AND CONTROL ARCHITECTURE

Open Loop	Standard Open-Loop (Red)	I²C Driver Open-Loop (Red)
Key Feature	Basic open-loop	Multi-channel, daisy-chainable*
Control Interface	PWM / UART / Control I²C	I²C (Multi-channel functionality)
Applicable on Models	LRMO-P, LRMO-M, LRMO-E-P, LRMO-E-M	LRMO-P, LRMO-M, LRMO-E-P, LRMO-E-M
Part Number	ROLR-PPCB-0370-0000	ROLR-PPCB-0250-000

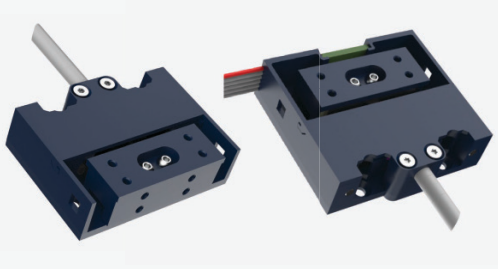
Closed-Loop	Standard Closed-Loop (Green)	I²C Driver Closed-Loop (Green)
Key Feature	Closed-loop, USB, single channel control	Closed-loop multi-channel, USB, daisy-chainable*
Control Interface	Python API / UART	I²C (Multi-channel functionality)
Applicable on Models	LRMO-E-P, LRMO-E-M	LRMO-E-P, LRMO-E-M
Part Number	LRMO-PPCB-1280-0000	LRMO-PPCB-1260-0000

LRMO-LG Series

Piezoelectric Linear Actuators

INTRODUCTION

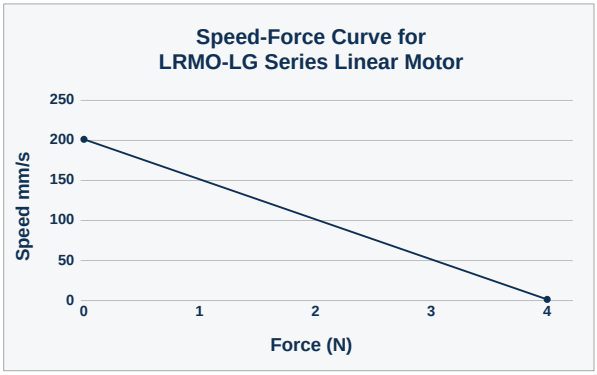
The LRMO-LG series of linear piezo motors represents a quantum leap in design of small size high-performance motors. Injection-molded using extremely durable, but light weight engineered reinforced thermoplastics, the LRMO-LG series provide low cost with superior precision and ultrafast response/start-stop characteristics. Highly energy efficient, the LRMO-LG series consume zero power in hold position while still providing significant force.



LRMO-LG Series
With & Without Encoder

PRINCIPLE OF OPERATION

The LRMO-LG Series linear piezo actuators operates based on the electrical excitation of the piezoceramic body, or resonator, which 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.

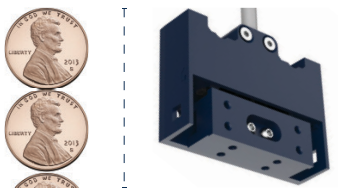


PERFORMANCE & BENEFITS

- High push/pull force: ≥4.0 N
- High self-braking force: ≥4.0 N (zero power in hold)
- Superior stability of velocity control across temperature and load variations.
- Unmatched precision and resolution — minimum linear step <0.05 µm (50 nm = 20,000 steps/mm).
- Stepping and continuous modes of operation.

KEY FEATURES

- 9.0 mm standard travel range.
- Ultra-fast response (~30 µs).
- Push/pull force ≥ 4.0 N
- Silent operation, stepping and continuous modes.
- Low voltage operation — 12.0 V DC.



LRMO-LG

Open-Loop Linear Piezo Motor

Plastic Enclosure | Without Encoder

LRMO-LG Series (Without Encoder)
Front View

LRMO-LG Series (Without Encoder)
Rear View

INTRODUCTION

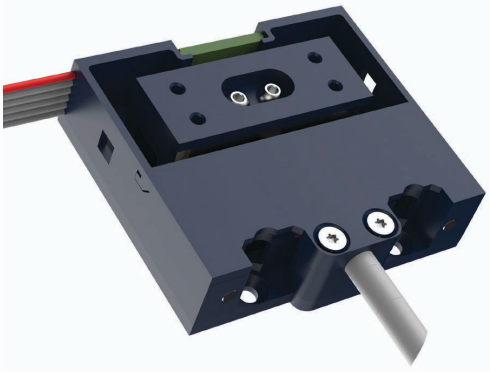
PMC's linear piezoelectric actuator, open-loop PWM control. Available in plastic enclosure (LRMO-LG).

MOTOR SPECIFICATIONS	
Power Supply Voltage	12 V
Push/Pull Force	≥ 4.0 N
Self Braking Force	≥ 4.0 N
Motor Response Time	≈ 30 µs
Max Speed	200 mm/s
Travel Range	9.0 mm
Minimum Linear Step	<0.05 µm
Pitch	≤450 µrad
Maximum Moment Mx	0.07 Nm
Roll	≤225 µrad
Maximum Moment My	0.12 Nm
Yaw	≤450 µrad
Maximum Moment Mz	0.9 Nm
Vertical Runout	3.0 µm
Horizontal Runout	6.0 µm
Frequency Response	4 kHz
Operating Temperature	-20 to 80°C
Maximum Load (at listed specification)	400 g
Max Current over velocity range	350 mA
DIMENSIONS & WEIGHT	
Actuator Dimensions	40 x 31 x 11 mm
Actuator Weight	22 g
Driver PCB Dimensions	40 x 63 x 25 mm
Driver PCB Weight	25g

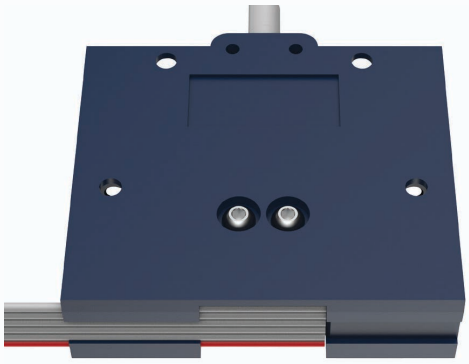
LRMO-E-LG

Close-Loop Linear Piezo Motor

Plastic Enclosure | With Encoder



LRMO-LG Series (With Encoder)
Front View



LRMO-LG Series (With Encoder)
Rear View

INTRODUCTION

Identical to LRMO-LG base motor with factory-fitted optical encoder. Encoder signal output enables closed-loop control via your controller. Plastic enclosure. The encoder resolution of 2.66 µm (after quadrature) enables precise controlled positioning for demanding applications.

MOTOR SPECIFICATIONS	
Power Supply Voltage	12 V
Push/Pull Force	≥ 4.0 N
Self Braking Force	≥ 4.0 N
Motor Response Time	≈ 30 µs
Max Speed	140 mm/s
Travel Range	9.0 mm
Minimum Linear Step	<0.05 µm
Encoder Resolution (after quadrature)	2.66 µm
Minimum Controlled Linear Step	2.66 µm
Uni-directional Repeatability	2.66 µm
Pitch	≤450 µrad
Maximum Moment Mx	0.07 Nm
Roll	≤225 µrad
Maximum Moment My	0.12 Nm
Yaw	≤450 µrad
Maximum Moment Mz	0.9 Nm
Vertical Runout	3.0 µm
Horizontal Runout	6.0 µm
Frequency Response	4 kHz
Operating Temperature	-20 to 80°C
Maximum Load (at listed specification)	400 g
Max Current over velocity range	350 mA
DIMENSIONS & WEIGHT	
Actuator Dimensions	40 x 34 x 11 mm
Actuator Weight	22 g
Driver PCB Dimensions	40 x 63 x 25 mm
Driver PCB Weight	25g

LRMO-LG Motion Control

and Driver Electronics

PWM | Serial | Open-loop & Closed-loop

INTRODUCTION

Control of the LRMO-LG Series Linear Motor is simple and flexible. Each motor is operated via a dedicated driver PCB, which converts motion commands into precise electrical excitation using optimized frequency and amplitude signals to actuate the piezo resonator.

The driver supports multiple control interfaces, including PWM & serial, enabling seamless integration into a wide range of systems. Each PCB is pre-configured for the specific motor model, with additional software configurability to optimize performance and system integration.

In this configuration, a companion daughter board provides closed-loop feedback and serial communication, enabling accurate position control via Piezo Motor Company's software or external controllers.

The LRMO-LG driver architecture offers a compact, cost-effective control solution, while enabling fine motion regulation through closed-loop operation when required.

LRMO-LG OPEN LOOP DRIVER PCB OPTIONS

Standard Open Loop Driver PCB
Part No.: ROLR-PPCB-0470-0000

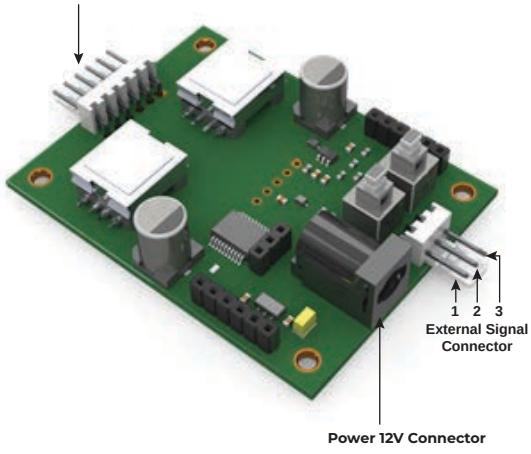
The driver board can be controlled using an external signal source PWM (Pulse Width Modulation) mode. Control signals are applied to the External Signal Connector to generate the desired rotation and speed. Control of speed using PWM is implemented by varying the pulse duration and repetition rate of 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 30µs.

The LRMO driver PCB is compatible with both LRMO-LG (non-encoder) and LRMO-LG-E (encoder-equipped) motors. For applications requiring closed-loop control with the Open-Loop driver, the control loop must be implemented externally by the user using encoder feedback and a third-party controller.

Control Interface	
PWM (TTL-compatible)	via J1 connector

Additional Features:

- Manual control via two onboard push-buttons.
- Compact, low-overhead solution for cost-sensitive for open-loop applications using a single motor.



Electronic PCB Driver for LRMO-LG Piezomotors

LRMO-E-LG CLOSED LOOP DRIVER PCB OPTIONS

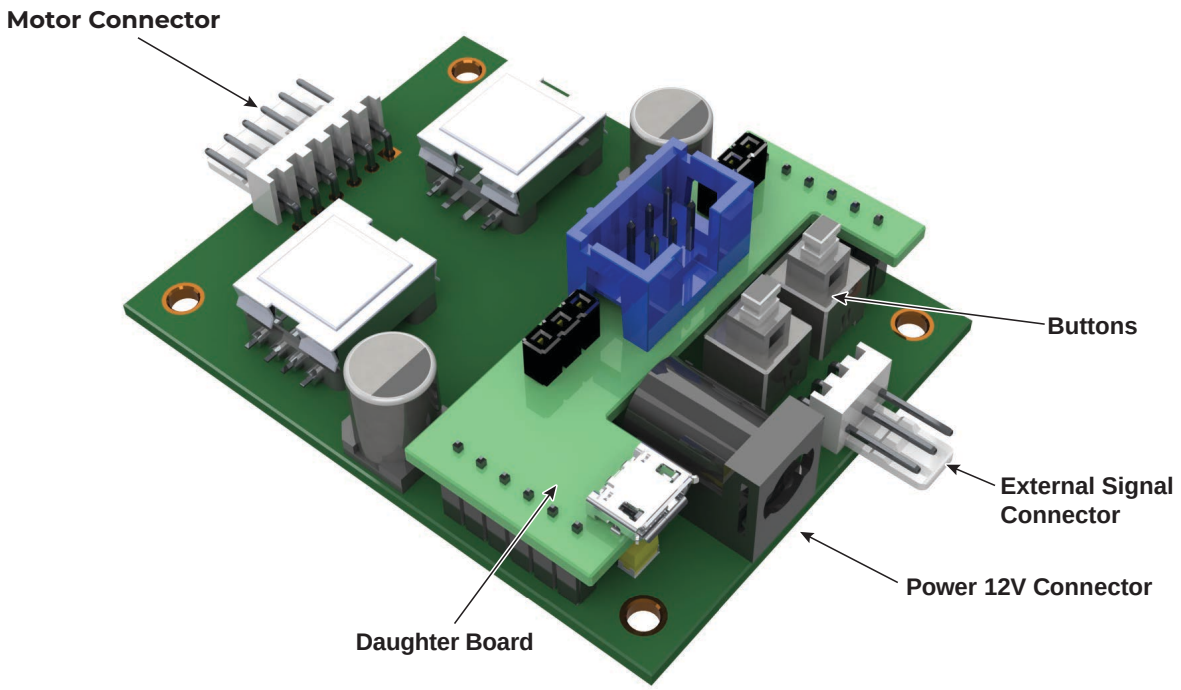
Standard Closed Loop Driver PCB
Part No.: ROLR-PPCB-1480-0000

In closed-loop control (feedback control) mode, an additional daughter PCB is mounted on driver PCB. Feedback from an external optical encoder, mounted on the piezo motor, is fed to the daughter board and used to close the loop. The position and speed of the motor can then be controlled through an elaborate set of commands via either a USB port (through Piezo Motor Company (PMC)'s GUI) or serial (RS 232) port commands.

The Close loop driver PCB is compatible with LRMO-LG-E (encoder-equipped) motors only and is designed for use with PMC's close loop software, enabling simple integration and high-precision motion control.

Control Interfaces	
PMC's PLC Software (Windows)	
RS 232	Serial commands

Additional Features:
- Manual control via two onboard push-buttons.
- Compact, low-overhead solution for cost-sensitive for open-loop applications using a single motor.

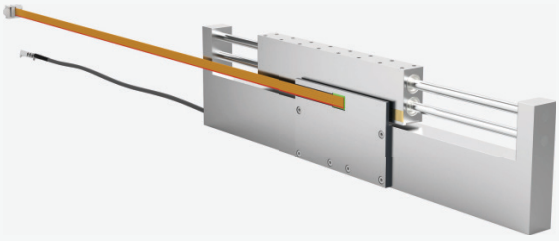


LRMO-150

Linear Piezoelectric Motor

INTRODUCTION

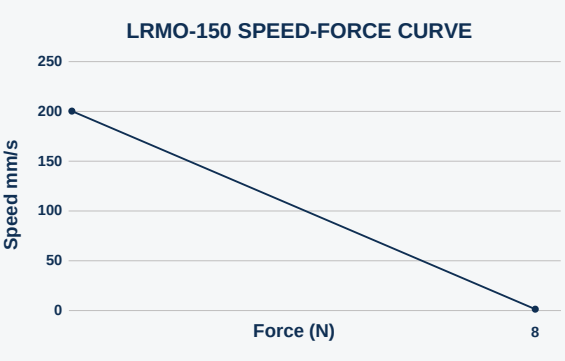
Piezo Motor Company's novel series of linear piezoelectric motors represents a quantum leap in design construction of compact, high-precision, performance linear motor technologies. This new range of linear motors combines extended travel range, superior nanometer precision and ultrafast response at a very economical cost. The LRMO-150 is available in both Open-Loop and Closed-Loop (with factory fitted encoder) versions.



LRMO-150

PRINCIPLE OF OPERATION

Piezo Motor Company's linear piezo motors work on a principle of excitation of ultrasonic standing waves within a piezoelectric resonator. Piezo Motor Company's electronic drivers have been designed to provide an economical user-control interface. Each driver PCB is 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 motor.



PERFORMANCE & BENEFITS

- Extended Stroke
  150 mm, (customizable lengths available.)
- Ultra-Fine Resolution: 0.04 µm open-loop (≈25,000 steps/mm).
- Fast Response: 20–30 µs
- High Force Density: Compact design with superior force-to-weight ratio.
- Low Power: 0 W at hold; ~0.5 W at 1 mm/s.
- EMI Immunity: No emissions; unaffected by EMI/RF
- Lightweight: No coils or magnets.

KEY FEATURES

- Low voltage — 12.0 V DC.
- 25,000 steps per mm of travel.
- Superior precision and resolution.
- Silent operation in continuous mode.
- Energy efficient, zero power consumption in hold mode.

LRMO-N-150

Open-Loop Linear Piezoelectric Motor

Without Encoder

LRMO-N-150

LRMO-N-150

INTRODUCTION

High-precision linear piezoelectric motor with 150 mm travel range. Open-loop PWM control for precision positioning applications.

MOTOR SPECIFICATIONS	
Power Supply Voltage	12.0 V DC
Push/Pull Force	≥8.0 N
Self-Braking Force	≥10.0 N
Motor Response Time	≈30 µs
Travel Range	150.0 mm
Max Speed	200 mm/s
Minimum Linear Step	<0.04 µm
Linear Backlash at Change of Direction	≤ 1 µm
Elastic Stiffness	≈ 220 mN/µm
Linear Hysteresis	≤ 2.0 µm
Pitch	≤450 µRad
Maximum Moment Mx	0.07 Nm
Roll	≤225 µRad
Maximum Moment My	0.12 Nm
Yaw	≤450 µRad
Maximum Moment Mz	0.9 Nm
Vertical Runout	3.0 µm
Horizontal Runout	6.0 µm
Frequency Response	4 kHz
Operating Temperature	-20 °C to 80 °C
Maximum Load (at listed specification)	1 kg
Max Current over velocity range	1.2 A
DIMENSIONS & WEIGHT	
Motor Weight	500g
Motor Dimensions	321x77x20 mm
Driver PCB Dimensions	40x63x25 mm
Driver PCB Weight	25 g

ORDERING INFORMATION

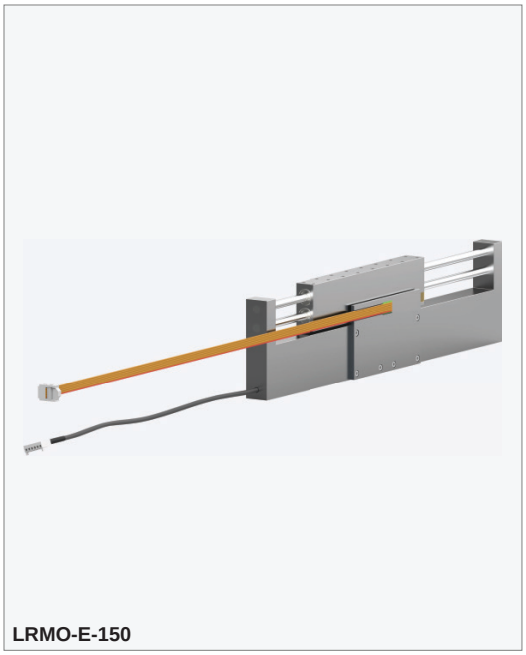
Model	Encoder	Part Number	Kit Number*
LRMO-N-150	No	LRMO-M012-0471-2002	LRMO-M012-0471-2002

***Evaluation Kit without Encoder, Includes; Linear motor, Open-loop Driver PCB, 110/240 VAC to12 V DC power adapter, cables.**

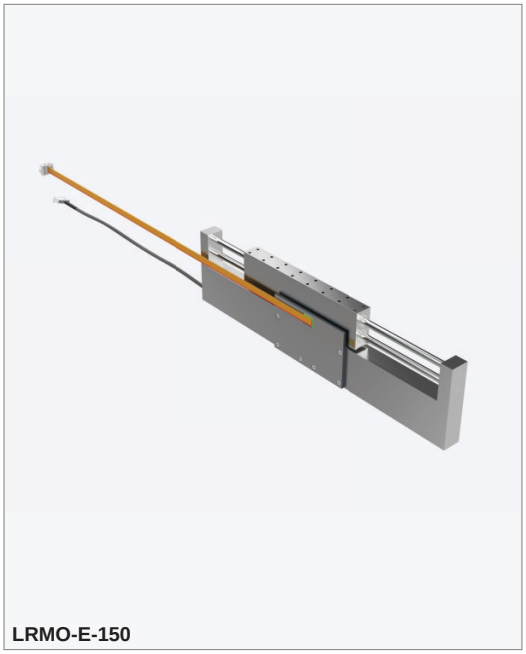
LRMO-E-150

Close-Loop Linear Piezoelectric Motor

With Encoder



LRMO-E-150



LRMO-E-150

INTRODUCTION

High-precision linear piezoelectric motor with 150 mm travel range and factory-fitted optical encoder. Closed-loop control enables precise positioning with 2.6 µm resolution.

MOTOR SPECIFICATIONS	
Power Supply Voltage	12.0 V DC
Push/Pull Force	≥8.0 N
Self-Braking Force	≥10.0 N
Motor Response Time	≈30 µs
Travel Range	150.0 mm
Max Speed	200 mm/s
Minimum Linear Step	<0.04 µm
Encoder Resolution (after quadrature)	2.6 µm
Minimum Controlled Linear Step	2.6 µm
Uni-directional Repeatability	2.6 µm
Linear Backlash at Change of Direction	≤ 1 µm
Elastic Stiffness	≈ 220 mN/µm
Linear Hysteresis	≤ 2.0 µm
Pitch	≤450 µRad
Maximum Moment Mx	0.07 Nm
Roll	≤225 µRad
Maximum Moment My	0.12 Nm
Yaw	≤450 µRad
Maximum Moment Mz	0.9 Nm
Vertical Runout	3.0 µm
Horizontal Runout	6.0 µm
Frequency Response	4 kHz
Operating Temperature	-20 °C to 80 °C
Maximum Load (at listed specification)	1 kg
Max Current over velocity range	1.2 A
DIMENSIONS & WEIGHT	
Motor Weight	500g
Motor Dimensions	321x77x20 mm
Driver PCB Dimensions	40x63x25 mm
Driver PCB Weight	25 g

ORDERING INFORMATION

Model	Encoder	Part Number	Kit Number*
LRMO-E-150	Yes	LRMO-M012-1471-2002	LRMO-M012-1471-2002

***Evaluation Kit with Optical Encoder, Closed Loop, Includes; Linear motor, Close-Loop Driver PCB, 110/240 VAC to12 V DC power adapter, cables.**

LRMO-N-150 Motion Control
and Driver Electronics

PWM | Serial | Open-loop & Closed-loop

INTRODUCTION

Control of the LRMO-150 Series Linear Motor is simple and flexible. Each motor is operated via a dedicated driver PCB, which converts motion commands into precise electrical excitation using optimized frequency and amplitude signals to actuate the piezo resonator.

The driver supports multiple control interfaces, including PWM & serial, enabling seamless integration into a wide range of systems. Each PCB is pre-configured for the specific motor model, with additional software configurability to optimize performance and system integration.

In the close-loop configuration, a companion daughter board provides closed-loop feedback and serial communication, enabling accurate position control via Piezo Motor Company's software or external controllers.

The LRMO-150 driver architecture offers a compact, cost-effective control solution, while enabling fine motion regulation through closed-loop operation when required.

LRMO-150 OPEN LOOP DRIVER PCB OPTIONS

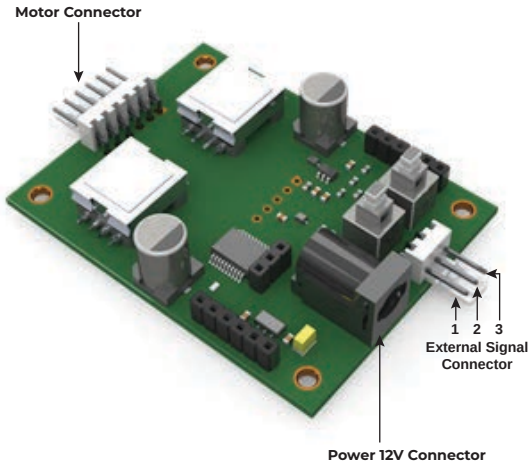
Standard Open Loop Driver PCB
Part No.: ROLR-PPCB-0470-0000

The driver board can be controlled using an external signal source PWM (Pulse Width Modulation). Control signals are applied to the External Signal Connector to generate the desired motion. 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 30µs.

The LRMO-150 driver PCB is compatible with both LRMO-150 (non-encoder) and LRMO-E-150 (encoder-equipped) motors. For applications requiring closed-loop control with the Open-Loop driver, the control loop must be implemented externally by the user using encoder feedback and a third-party controller.

Control Interface	
PWM (TTL-compatible)	via J1 connector

Additional Features:
- Manual control via two onboard push-buttons.
- Compact, low-overhead solution for cost-sensitive for open-loop applications using a single motor.



Electronic PCB Driver for LRMO-LG Piezomotors

LRMO-E-150 Motion Control
and Driver Electronics

PWM | Serial | Open-loop & Closed-loop

LRMO-E-150 CLOSED LOOP DRIVER PCB OPTIONS

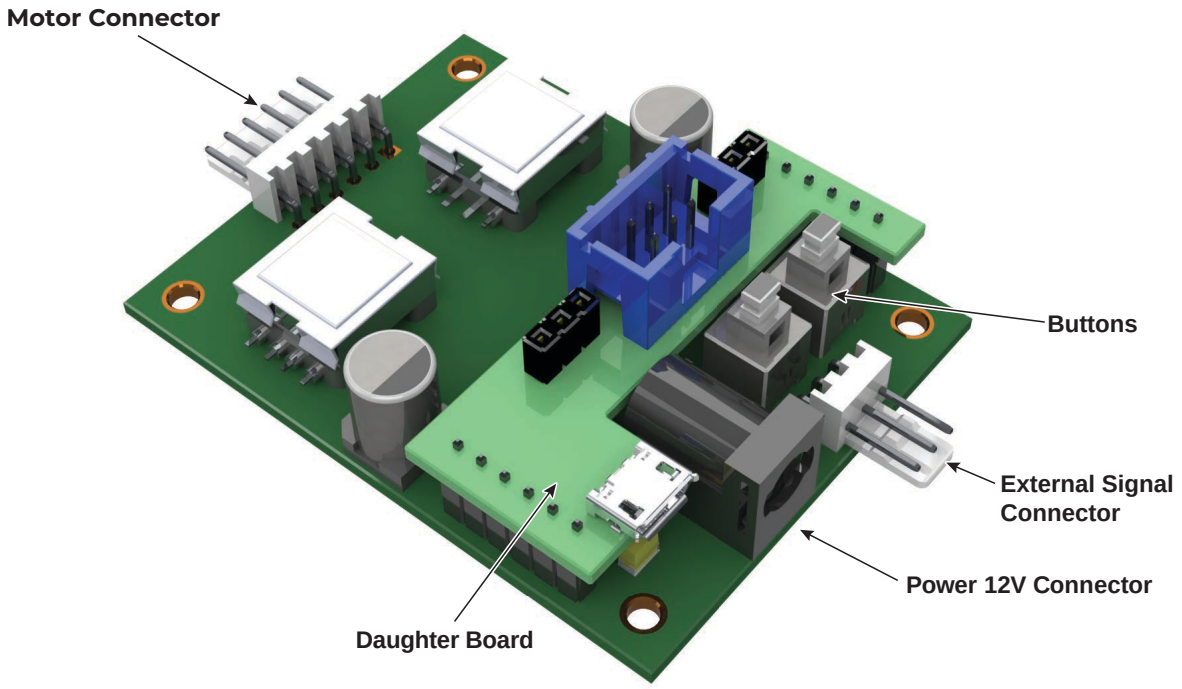
Standard Closed Loop Driver PCB
Part No.: ROLR-PPCB-1480-0000

In closed-loop control (feedback control) mode, an additional daughter PCB is mounted on driver PCB. Feedback from an external optical encoder, mounted on the piezo-motor, is fed to the daughter board and used to close the loop. The position and speed of the motor can then be controlled through an elaborate set of commands via either a USB port (through Piezo Motor Company (PMC)'s GUI) or serial (RS 232) port commands.

The Close loop driver PCB is compatible with LRMO-LG-E (encoder-equipped) motors only and is designed for use with PMC's close loop software, enabling simple integration and high-precision motion control.

Control Interfaces	
PMC's PLC Software (Windows)	
RS 232	Serial commands

Additional Features:
- Manual control via two onboard push-buttons.
- Compact, low-overhead solution for cost-sensitive for open-loop applications using a single motor.



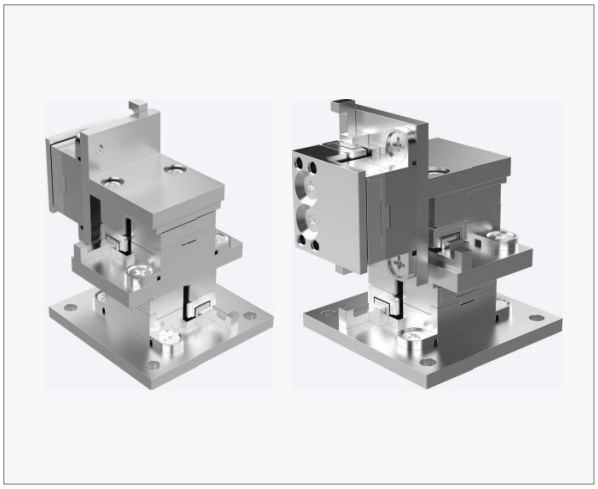
LRMO-XYZ Series

Miniature Piezoelectric 3-Axis XYZ Positioning Platform

INTRODUCTION

Piezo Motor Company's LRMO-XYZ Series combines three LRMO linear piezoelectric actuators into a compact, high-precision three-axis positioning platform. Built around patented ultrasonic piezoceramic technology, the XYZ systems deliver ultra-high resolution, fast response, and excellent force density — ideal for demanding multi-axis positioning tasks in photonics, microscopy, metrology, and precision automation.

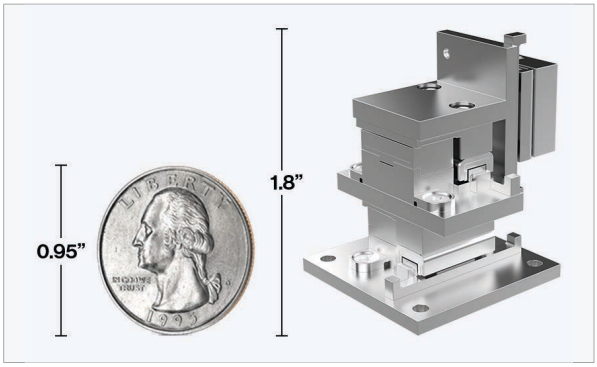
Each system is supplied as a complete, ready-to-run multi-axis solution with driver electronics, I²C adapter, Raspberry Pi controller and preloaded Python API. Available exclusively in machined anodized aluminum enclosures.



PRINCIPLE OF OPERATION

US Patent Number 12,143,036

Each linear axis of the XYZ system operates on the electrical excitation of the piezoceramic resonator which induces two independent longitudinal and bending standing waves in perpendicular directions, generating elliptical vibrations at the resonator tip. These vibrations produce linear motion of the passively coupled linear slide, enabling both smooth continuous motion and sub-micron stepped increments on every axis.



PERFORMANCE & BENEFITS

- Sub-micron positional resolution.
- Compact, lightweight machined aluminum design
- Stepping and continuous modes of motion on each axis.
- Silent operation and low-voltage (5.0 V DC) drive.
- Open-loop and closed-loop (encoder feedback) models.

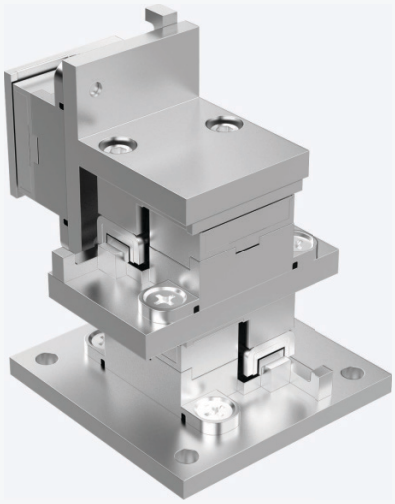
KEY FEATURES

- 9.0 mm travel per axis
- Ultra-fast response (~30 µs)
- Push/pull force ≥ 0.2 N with Self-braking ≥ 0.25 N
- Max speed ≥ 150 mm/s
- Minimum linear step < 0.04 µm
- I²C control
- Low voltage — 5.0 V DC

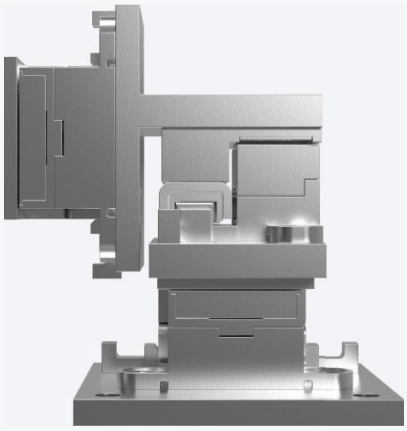
LRMO-N-XYZ

Open-Loop 3-Axis XYZ Positioning Platform

Anodized Aluminum Enclosure | No Encoder | I²C Control



LRMO-XYZ (Front View)



LRMO-XYZ (Side View)

INTRODUCTION

One of the world's smallest lightweight piezoelectric XYZ platform designed for superior precision.

MOTOR SPECIFICATIONS	
Power Supply Voltage	5.0 V DC
Push/Pull Force	≥0.2 N
Self-Braking Force	≥0.25 N
Motor Response Time	< 30 µs
Travel Range	9.0 mm
Max Speed (continuous mode)	≥150 mm/s
Minimum Linear Step	<0.04 µm
Linear Backlash at Change of Direction	<0.1 µm
Elastic Stiffness	< 200 mN/µm
Linear Hysteresis	<2.0 µm
Pitch	<1 mrad
Maximum Moment Mx	0.07 Nm
Roll	<0.5 mrad
Maximum Moment My	0.12 Nm
Yaw	<1 mrad
Maximum Moment Mz	0.9 Nm
Vertical Runout	3.0 µm
Horizontal Runout	6.0 µm
Frequency Response	4 kHz
Operating Temperature	-20 °C to 80 °C
Maximum Load (Vertical Orientation)	15 g
Maximum Load (Horizontal Orientation)	150 g
Max Current (continuous mode)	300 mA
Max Current at 10 mm/s (PWM mode)	30–40 mA
DIMENSIONS & WEIGHT	
Dimensions of the Controller (Adapter+Drivers)	10 (h) X 60 (w) x 120 (d)
Weight LRMO-XYZ	29g
Weight Controller	40g
Piezoelectric motor	LRMO

ORDERING INFORMATION

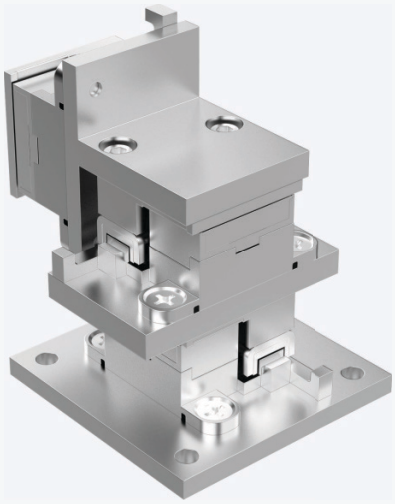
Model	Encoder	Part Number	Kit Number*
LRMO-N-XYZ	No	LRMO-MXYZ-0291-0000	LRMO-MXYZ-0291-0000

***System includes: LRMO-E-XYZ System, 3 × open-loop I²C driver PCBs, I²C adapter board, Raspberry Pi controller with preloaded Python API, dual 5 V DC power supplies, and interconnect cables.**

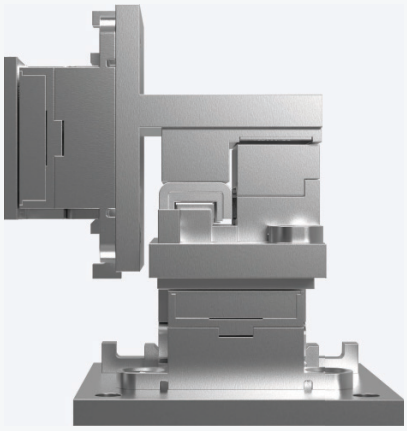
LRMO-E-XYZ

Closed-Loop 3-Axis XYZ Positioning Platform

Anodized Aluminum Enclosure | With Encoder | Python API



LRMO-E-XYZ (Front View)



LRMO-E-XYZ (Side View)

INTRODUCTION

One of the world's smallest lightweight piezoelectric XYZ platform designed for superior precision.

MOTOR SPECIFICATIONS	
Power Supply Voltage	5.0 V DC
Push/Pull Force	≥0.2 N
Self-Braking Force	≥0.25 N
Motor Response Time	< 30 µs
Travel Range	9.0 mm
Max Speed (continuous mode)	≥150 mm/s
Minimum Linear Step	<0.04 µm
Encoder Resolution (after quadrature)	2.66 µm
Minimum Controlled Linear Step	2.66 µm
Uni-directional Repeatability	2.66 µm
Linear Backlash at Change of Direction	<0.1 µm
Elastic Stiffness	< 200 mN/µm
Linear Hysteresis	<2.0 µm
Pitch	<1 mrad
Maximum Moment Mx	0.07 Nm
Roll	<0.5 mrad
Maximum Moment My	0.12 Nm
Yaw	<1 mrad
Maximum Moment Mz	0.9 Nm
Vertical Runout	3.0 µm
Horizontal Runout	6.0 µm
Frequency Response	4 kHz
Operating Temperature	-20 °C to 80 °C
Maximum Load (Vertical Orientation)	15 g
Maximum Load (Horizontal Orientation)	150 g
Max Current (continuous mode)	300 mA
Max Current at 10 mm/s (PWM mode)	30–40 mA
DIMENSIONS & WEIGHT	
Dimensions LRMO-E-XYZ	38 (h) x 30 (w) x 32 (d)
Dimensions of the Controller (Adapter+Drivers)	10 (h) X 60 (w) x 120 (d)
Weight LRMO-XYZ	30g
Weight Controller	40g
Piezoelectric motor	LRMO-E

ORDERING INFORMATION

Model	Encoder	Part Number	Kit Number*
LRMO-E-XYZ	Yes	LRMO-MXYZ-1291-0000	LRMO-MXYZ-1291-0000

***System includes: LRMO-E-XYZ System with factory-fitted magnetic encoders, 3 × closed-loop I²C driver PCBs, I²C adapter board, Raspberry Pi controller with preloaded Python API, dual 5 V DC power supplies, and interconnect cables.**

LRMO-N-XYZ & LRMO-E-XYZ

I²C / API Command Summary Commands

Open-loop & Closed-loop

SYSTEM CONTROL OVERVIEW (OPEN-LOOP OPERATION)

- **LRMO-N-XYZ (Open-Loop)** - Motion controlled via PWM signals, timing, and drive current. No encoder feedback; position determined indirectly via command duration and calibration. Simple, compact, high-speed architecture without feedback electronics.
- **LRMO-E-XYZ (Closed-Loop)** - Real-time encoder feedback (2.6 µm resolution) on every axis enables homing and absolute positioning (0–9000 µm) through the PMC Python API. Velocity stabilised across 0.01–200 mm/s. Precise, repeatable, fully programmable multi-axis control.

LRMO-N-XYZ - I²C / API Command Summary (Open-Loop)

Command	Function
PiezoMotor(Number_I2C_Bus)	Creates the motor controller object on the specified I²C bus (typically 1)
Move(address, param)	Executes directional motion (continuous or PWM-based)
MotorType(address, motorType)	Sets actuator type (Linear / Rotary)
PWMTimeSettings(address, direction, duty_cycle_percent, frequency_Hz)	Configures PWM timing (step behaviour)
PWMGeneratorSettings(address, direction, run_motor_periods, period_of_PWM, prescale)	Advanced PWM control
Current(address, current)	Sets motor drive current
setAddress(address, new_address)	Changes I²C address

LRMO-E-XYZ - I²C / API Command Summary (Close-Loop)

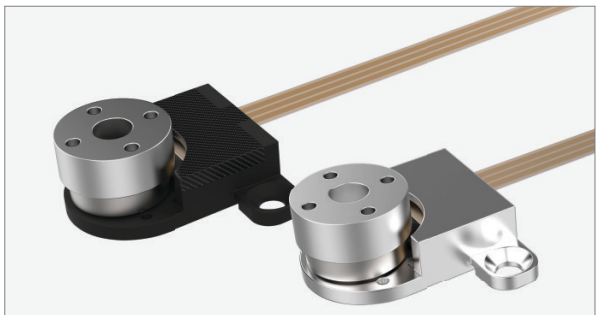
Command	Function
PiezoMotor(Number_I2C_Bus)	Creates the motor controller object on the specified I²C bus (typically 1)
Home(address)	Executes homing routine and blocks until complete
getPosition(address)	Reads back axis position and returns value in µm
Position(address, value)	Commands absolute position in µm (blocks until complete)
Velocity(address, value)	Sets velocity (mm/s)
Move(address, action)	Open-loop direction command (Left / Right / Stop)
setPWMsettings(address, duty_cycle_percent, frequency_Hz)	Configures PWM duty cycle and frequency
setAddress(address, new_address)	Changes I²C address

ROMO Series

Piezoelectric Rotary Motors

INTRODUCTION

Piezo Motor Company's ROMO Series represents a new generation of compact, lightweight hollow-shaft rotary piezoelectric actuators. Built on a US-patented ultrasonic standing wave technology, the ROMO delivers unmatched angular precision, ultra-fast response, and high torque in a miniature form factor - available in engineered thermoplastic or machined anodized aluminum enclosures, with or without encoder. The ROMO is also available in non-magnetic MRI-compatible materials.

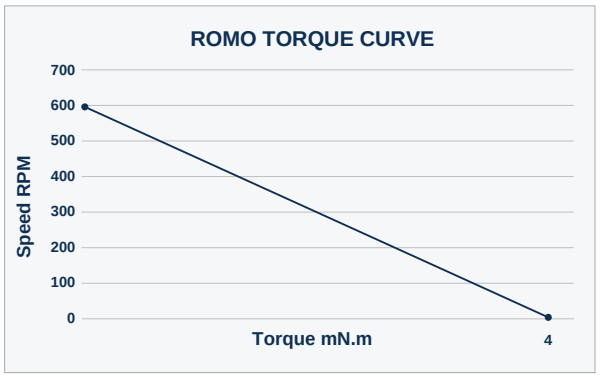


ROMO Series (Without Encoder) in Plastic & Metal Enclosures

PRINCIPLE OF OPERATION

US Patent Number 12,143,036

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 rotary motion of the motor, which is passively in contact with the resonator body.



PERFORMANCE & BENEFITS

- Superior stability of velocity control
- Flexible PCB electrical connection facilitates system integration
- Unmatched precision and resolution
- Silent operation and low voltage
- 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
- Hollow shaft with 2.5 mm I.D. (≈ 11.5 mm O.D.)

KEY FEATURES

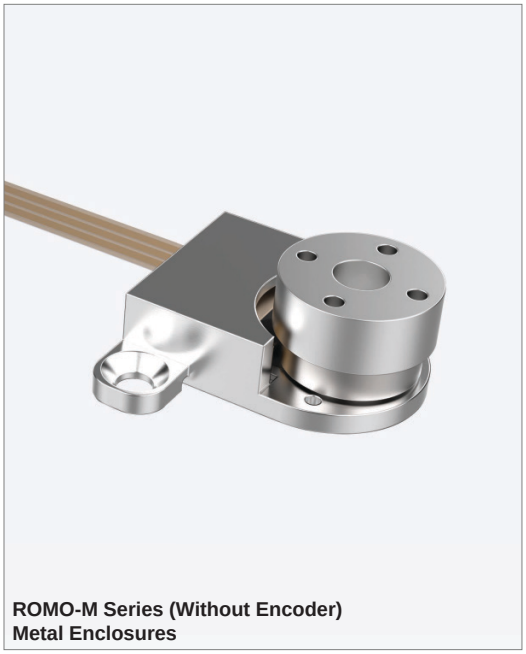
- Hollow shaft design
- Ultra-fast response (~30 µs)
- High torque relative to size
- Silent operation
- Stepping and continuous modes
- Low voltage operation (5–7.5 V DC)

ROMO

Open Loop Rotary Piezo Motor

Hollow Shaft Rotary | Plastic & Metal Enclosures | No Encoder

ROMO-P Series (Without Encoder)
Plastic Enclosures



ROMO-M Series (Without Encoder)
Metal Enclosures

INTRODUCTION

Hollow-shaft rotary piezoelectric actuator, open-loop PWM control. Available in plastic (ROMO-P) or machined anodized aluminum (ROMO-M) enclosure.

MOTOR SPECIFICATIONS	
Power Supply Voltage	7.5 V DC
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
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	300 mA
Rotor Runout	<= 50 µm
DIMENSIONS & WEIGHT	
Actuator Dimensions (no shaft)	13 x 18.7 x 8.15 mm
Actuator Weight	3.5 g / 4.0g
Driver PCB Dimensions	28x28x9.6 mm
Driver PCB Weight	4.3 g

ORDERING INFORMATION

Model	Enclosure	Encoder	Part Number	Kit Number*
ROMO-P	Plastic	No	ROMO-P011-0370-0000	ROMO-P011-0371-0000
ROMO-M	Metal	No	ROMO-M012-0370-0000	ROMO-M012-0371-0000

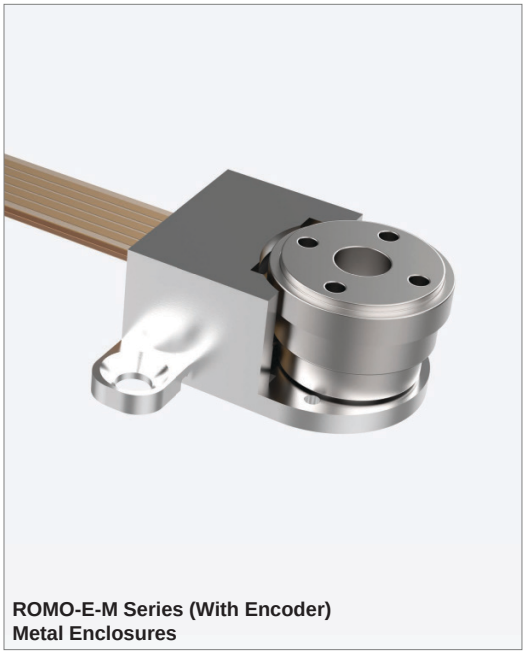
***Evaluation kit includes motor, driver PCB, cables and 120/240 V AC to 7.5 V DC power adapter.**

ROMO-E

Rotary Piezo Motor with Encoder

Piezoelectric Hollow Shaft Rotary | Plastic & Metal Enclosures | With Encoder

ROMO-E-P Series (With Encoder)
Plastic Enclosures



ROMO-E-M Series (With Encoder)
Metal Enclosures

INTRODUCTION

Identical to ROMO base motor with factory-fitted magnetic encoder. Encoder signal output enables closed-loop control via your controller. Plastic (ROMO-E-P) or anodized aluminum (ROMO-E-M) enclosure.

MOTOR SPECIFICATIONS	
Power Supply Voltage	7.5 V DC
Stall Torque	≥ 4 mNm
Self-Braking Torque	≥ 5 mNm
Actuator Response Time	< 30 µs
Max Speed	> 600 rpm
Minimum Angular Step	< 30 µrad
Encoder Resolution (after quadrature)	1,024 ppr
Minimum Controlled Angular Step	6.1 mrad
Uni-directional Repeatability	6.1 mrad
Angular Backlash	30 µrad
Angular Hysteresis	30 µrad
Frequency Response	4 kHz
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	300 mA
Rotor Runout	≤50 µm
DIMENSIONS & WEIGHT	
Actuator Dimensions (no shaft)	13 x 18.7 x 9.15 mm
Actuator Weight	4.2g / 5.2g
Driver PCB Dimensions	28x28x9.6 mm
Driver PCB Weight	4.3 g

ORDERING INFORMATION

Model	Enclosure	Encoder	Part Number	Kit Number*
ROMO-E-P	Plastic	Yes	ROMO-P011-1370-0000	ROMO-P011-1371-0000
ROMO-E-M	Metal	Yes	ROMO-M012-1370-0000	ROMO-M012-1371-0000

***Evaluation kit includes motor, driver PCB, cables and 120/240 V AC to 7.5 V DC power adapter.**

ROMO-E-CL

Rotary Piezo Motor System with Closed-Loop Software

Piezoelectric Hollow Shaft Rotary | Plastic & Metal Enclosures | With Encoder

ROMO-E-P-CL (With Encoder) Plastic Enclosure
ROMO-E-M-CL Series (With Encoder) Metal Enclosures

INTRODUCTION

Fully integrated closed-loop system. Combines the ROMO-E encoder motor with PMC's dedicated closed-loop driver PCB and Python API software. Position and velocity commands via USB. Plastic or anodized aluminum enclosure.

EXAMPLE PYTHON API COMMANDS

Home(direction)
Move to zero (CW / CCW)

getPosition()
Read position in encoder pulses

Velocity(value)
Set speed: 0.2 – 600 RPM

Move(action)
Move Left / Right / Stop

Position(value)
Go to absolute position (pulses)

setPWMsettings(dc, freq)
Configure velocity via PWM

MOTOR SPECIFICATIONS	
Power Supply Voltage	5 V DC
Stall Torque	≥ 4 mNm
Self-Braking Torque	≥ 5 mNm
Actuator Response Time	< 30 µs
Max Speed	> 600 rpm
Minimum Angular Step	< 30 µrad
Encoder Resolution (after quadrature)	1,024 ppr
Minimum Controlled Angular Step	6.1 mrad
Uni-directional Repeatability	6.1 mrad
Angular Backlash	30 µrad
Angular Hysteresis	30 µrad
Frequency Response	4 kHz
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	300 mA
Rotor Runout	≤50 µm
DIMENSIONS & WEIGHT	
Actuator Dimensions (no shaft)	13 x 18.7 x 9.15 mm
Actuator Weight	4.2g / 5.2g
Driver PCB Dimensions	28x28x9.6 mm
Driver PCB Weight	4.3 g

ORDERING INFORMATION

Model	Enclosure	Encoder	Part Number	Kit Number*
ROMO-E-P-CL	Plastic	Yes	ROMO-P011-1281-0000	ROMO-P011-1281-0000
ROMO-E-M-CL	Metal	Yes	ROMO-M012-1281-0000	ROMO-M012-1281-0000

***Evaluation kit includes motor, driver PCB, USB cable and Python API software.**

ROMO Motion Control

and Driver Electronics

PWM | UART | I²C | Open-loop & Closed-loop

INTRODUCTION

The ROMO 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.

ROMO OPEN LOOP DRIVER PCB OPTIONS

Standard Open Loop Driver PCB (Red)
For Single Channel Control

Part No.: ROLR-PPCB-0370-0000

PMC's **Open-Loop RED Driver PCB** provides open-loop motor control without positional feedback. Drive current is automatically stabilized to compensate for temperature and load variations.

The ROMO RED driver PCB is **available in two variants:** a **standard single-channel version** for controlling one motor, and an I²C-enabled version with full **I²C functionality for multi-channel (multi-motor) control.**

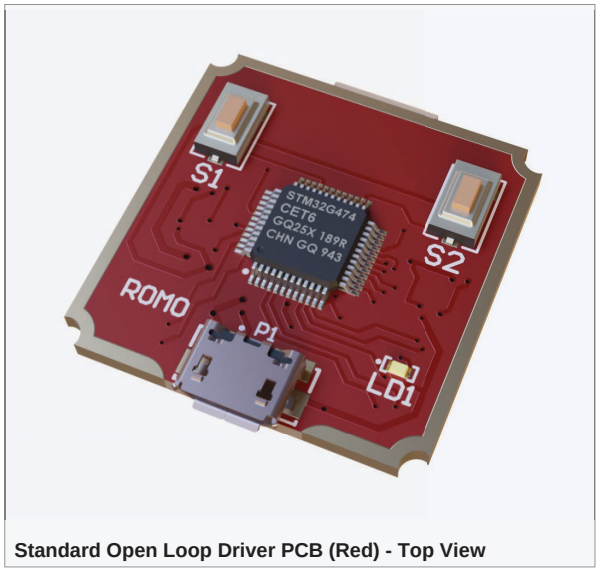
The ROMO RED driver PCB is compatible with both ROMO (non-encoder) and ROMO-E (encoder-equipped) motors. For applications requiring closed-loop control with the RED driver, the control loop must be implemented externally by the user using encoder feedback and a third-party controller.

Control Interfaces	
PWM (TTL-compatible)	via J1 connector
UART	Serial commands via J2 connector
I²C (Single-channel Control)	Serial commands via J2 connector

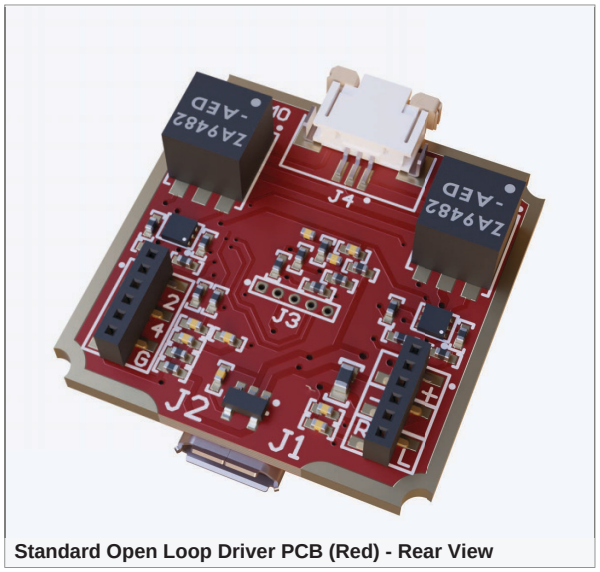
Each PCB is factory-configured for the selected serial interface.

Additional Features:

- Manual control via two onboard push-buttons.
- Compact, low-overhead solution for cost-sensitive for open-loop applications using a single motor.



Standard Open Loop Driver PCB (Red) - Top View



Standard Open Loop Driver PCB (Red) - Rear View

ROMO Motion Control
and Driver Electronics

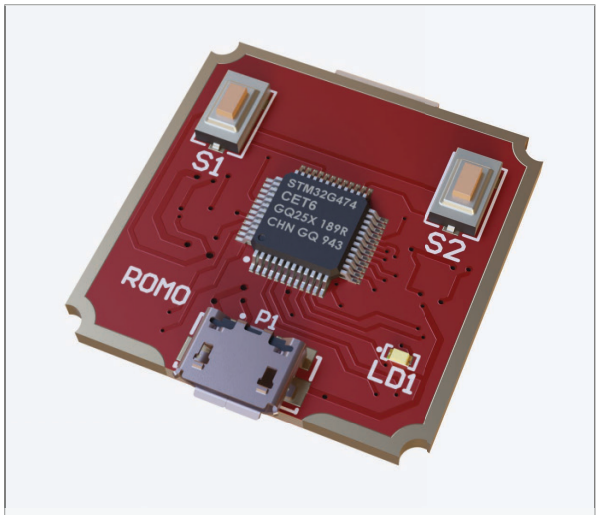
PWM | UART | I²C | Open-loop & Closed-loop

ROMO I²C Open-Loop Driver PCB (Red)
For Multi-Channel Control

Part No.: ROLR-PPCB-0250-000

PMC's I²C RED driver PCB provides open-loop motor control without positional feedback using an I²C communication interface, enabling synchronized multi-axis operation. Drive current is automatically stabilized against temperature and load variations.

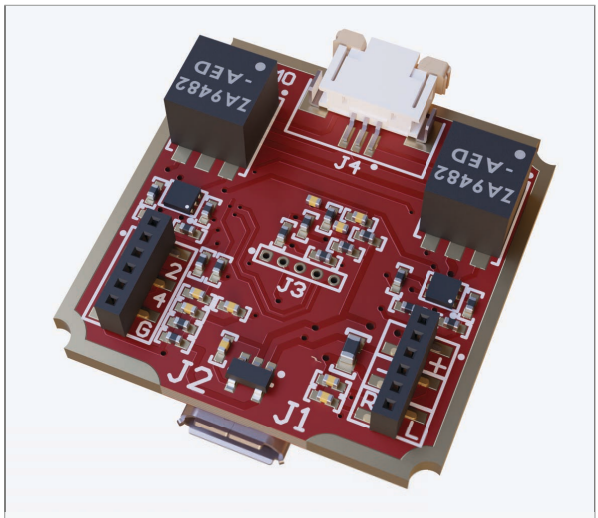
Control Interfaces	
I²C	Serial communication via J2 connector ◦ **SCL** – clock line ◦ **SDA** – data line



I²C Open-Loop Driver PCB (Red)
For Multi-Channel Control - Top View

Additional Features:

- Enables full I²C functionality with support for multiple driver PCBs on a shared bus.
- Unique, configurable I²C addresses per driver.
- Control of multiple motors.
- Compatible with PMC I²C adapter board.
- Scalable via daisy-chaining for multi-axis systems.
- Ideal for multi-axis, synchronized, or distributed motion control.



I²C Open-Loop Driver PCB (Red)
For Multi-Channel Control - Rear View

ROMO CLOSED LOOP DRIVER PCB OPTIONS

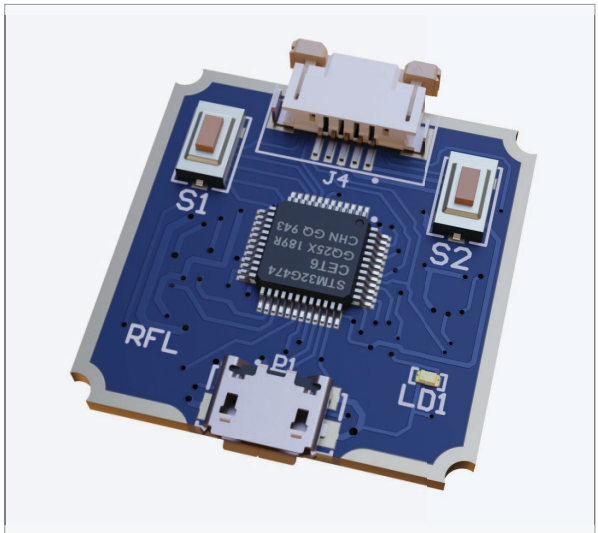
Standard Closed Loop Driver PCB (Blue)
For Single Channel Control

Part No.: ROMO-PPCB-1280-0000

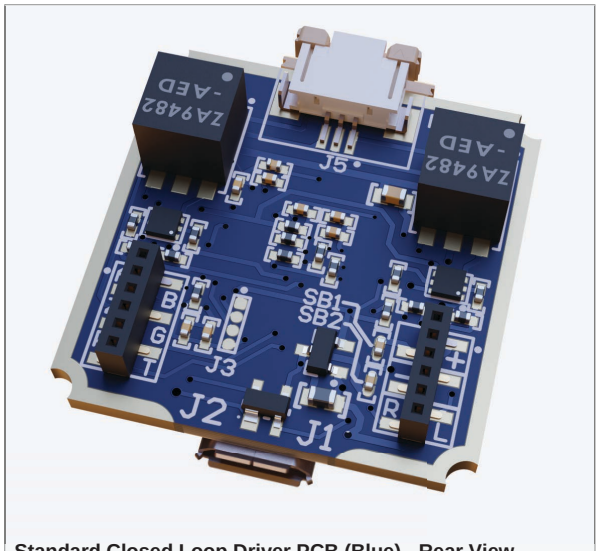
PMC's **Closed-Loop BLUE Driver PCB** provides precise motor control using positional feedback from an encoder. Drive current is automatically stabilized to compensate for temperature and load variations.

The BLUE driver PCB is **available in two variants: a standard single-channel version** for controlling one motor, and an I²C-enabled version with full **I²C functionality for multi-channel (multi-motor) control.**

The BLUE driver PCB is compatible with ROMO-E (encoder-equipped) motors only and is designed for use with PMC's Python™ API, enabling simple integration and high-precision motion control.



Standard Closed Loop Driver PCB (Blue) - Top View



Standard Closed Loop Driver PCB (Blue) - Rear View

Control Interfaces

PMC Python™ API
- Closed-loop control is executed onboard.
- Position and speed commands are issued via the Python™ API.
- Connection via Micro-USB.
- No external motion controller required.

UART	Serial commands via J2 connector.

Additional Features:
- Manual control via two onboard push-buttons.
- Compact, low-overhead solution for cost-sensitive for open-loop applications using a single motor.

ROMO CLOSED LOOP DRIVER PCB OPTIONS

I²C Closed-Loop Driver PCB
For Multi-Channel Control

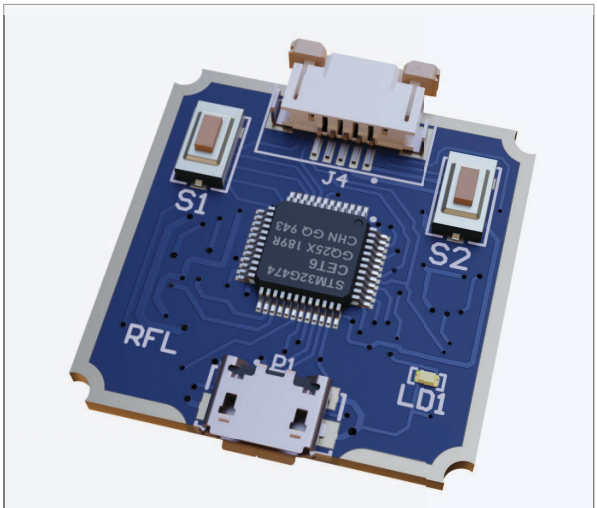
Part No.: ROMO-PPCB-1260-0000

PMC's I²C BLUE driver PCB provides closed-loop control with encoder feedback using an I²C communication interface, enabling synchronized multi-axis operation. Drive current is automatically stabilized against temperature and load variations.

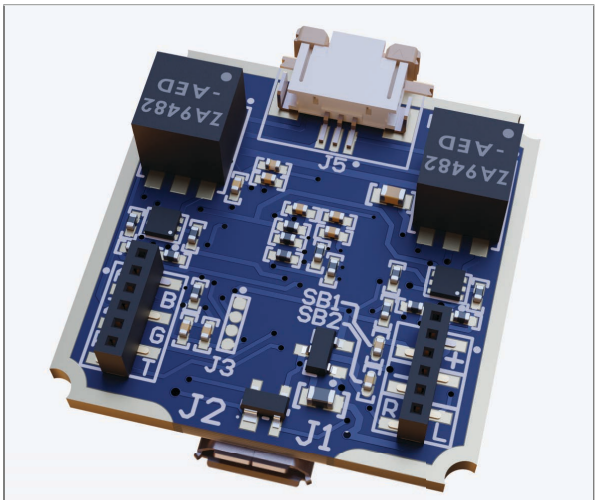
Control Interfaces	
I²C	Serial communication via J2 connector ◦ **SCL** – clock line ◦ **SDA** – data line

Additional Features:

- Enables full I²C functionality with support for multiple driver PCBs on a shared bus.
- Unique, configurable I²C addresses per driver.
- Control of multiple motors.
- Compatible with PMC I²C adapter board.
- Scalable via daisy-chaining for multi-axis systems.
- Ideal for multi-axis, synchronized, or distributed motion control.



I²C Closed-Loop Driver PCB (Blue)
For Multi-Channel Control - Top View



I²C Closed-Loop Driver PCB (Blue)
For Multi-Channel Control - Rear View

ROMO Motion Control

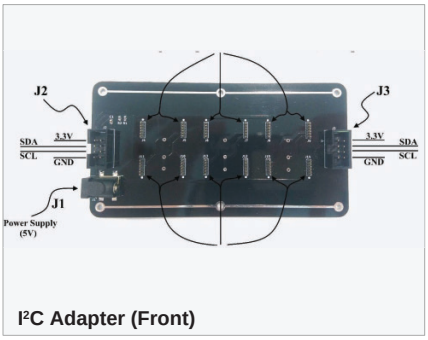
and Driver Electronics

PWM | UART | I²C | Open-loop & Closed-loop

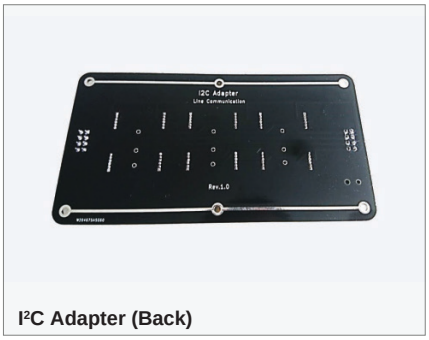
I²C ADAPTER

For use with up to six (6) **I²C Red or I²C Blue Driver** PCB for Open-Loop Control or Closed-Loop control.

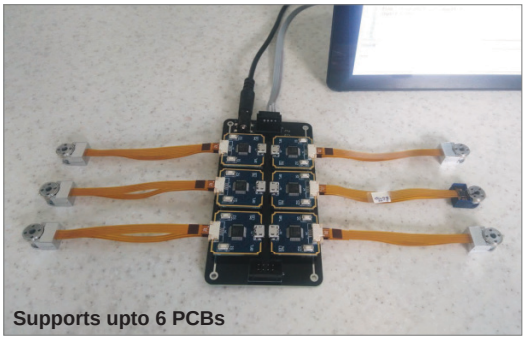
Part Number: **I2CX-PPCB-0290-0000**



I²C Adapter (Front)



I²C Adapter (Back)



Supports upto 6 PCBs

ROMO DRIVER PCB SPECIFICATIONS AND CONTROL ARCHITECTURE

Open Loop	Standard Open-Loop (Red)	I²C Driver Open-Loop (Red)
Key Feature	Basic open-loop	Multi-channel, daisy-chainable*
Control Interface	PWM / UART / Control I²C	I²C (Multi-channel functionality)
Applicable on Models	ROMO-P, ROMO-M, ROMO-E-P, ROMO-E-M	ROMO-P, ROMO-M, ROMO-E-P, ROMO-E-M
Part Number	ROLR-PPCB-0370-0000	ROLR-PPCB-0250-000

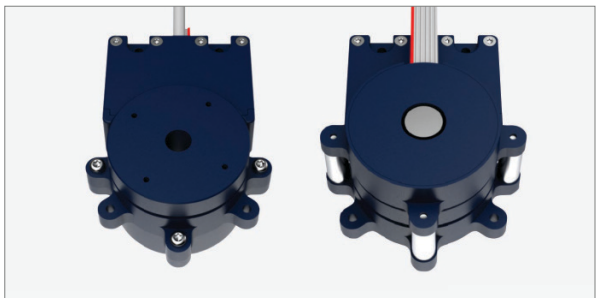
Closed-Loop	Standard Closed-Loop (Blue)	I²C Driver Closed-Loop (Blue)
Key Feature	Closed-loop, USB, single channel control	Closed-loop multi-channel, USB, daisy-chainable*
Control Interface	Python API / UART	I²C (Multi-channel functionality)
Applicable on Models	ROMO-E-P, ROMO-E-M	ROMO-E-P, ROMO-E-M
Part Number	ROMO-PPCB-1280-0000	ROMO-PPCB-1260-0000

ROMO-LG Series

Piezoelectric Rotary Motors

INTRODUCTION

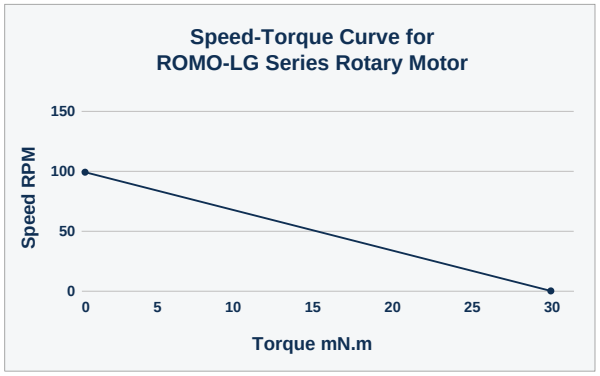
Piezo Motor Company's novel series of rotary piezoelectric motors represent a quantum leap in the design and construction of compact, high-precision performance rotary motor technologies. Manufactured from modern lightweight, reinforced thermoplastics, this new range of rotary motors combine superior angular precision and ultrafast response 30 µs to 50 µs with ~625,000 steps in a single rotation with each at full torque, stepping in <10 µrad increments.



ROMO-LG Series
Hollow Shaft & Solid Shaft (With Encoder)

PRINCIPLE OF OPERATION

Piezo Motor Company's rotary piezo motors work on a principle of excitation of ultrasonic standing waves within a piezoelectric resonator. Piezo Motor Company's electronic drivers have been designed to provide an economical user-control interface. Each driver PCB is 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 motor.

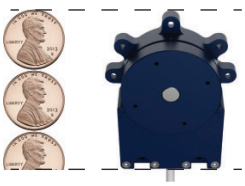


PERFORMANCE & BENEFITS

- ≥30 mNm stall torque for high-load direct drive.
- Stable velocity control across temperature and load changes.
- High precision: 10 µrad steps (>600k steps/rev).
- Fast response and start-stop (~30 µs).
- Supports stepping and continuous modes.
- Available in hollow-shaft (HS) and solid-shaft (SS) versions.

KEY FEATURES

- Hollow-shaft or solid-shaft design
- Ultra-fast response (~30 µs)
- High torque relative to size: ≥30 mNm
- Silent operation
- Stepping and continuous modes
- Low voltage operation: 12.0 V DC



ROMO-HS-LG

Open-Loop Rotary Piezo Motor - Hollow Shaft

Plastic Enclosure | Hollow Shaft | No Encoder

ROMO-HS-LG (Front)
Hollow Shaft, Without Encoder

ROMO-HS-LG (Rear)
Hollow Shaft, Without Encoder

INTRODUCTION

PMC's Hollow-shaft rotary piezoelectric actuator, open-loop PWM control. Available in plastic (ROMO-HS-LG) enclosure with metal rotor. The hollow shaft enables routing of wires, fibres, or light directly through the rotor axis.

MOTOR SPECIFICATIONS	
Power Supply Voltage	12.0 V DC
Stall Torque	≥ 30 mNm
Self-Braking Torque	≥ 40 mNm
Actuator Response Time	< 30 µs
Max Speed	> 100 rpm
Minimum Angular Step	10 µrad
Angular Backlash	<10 µrad
Angular Hysteresis	<10 µrad
Frequency Response	4 KHz
Operating Temperature	-20 °C to 80 °C
Maximum Axial Load	1000g
Maximum Radial Load	1000g
Moment Inertia	82 g.mm²
Current over velocity range	30 mA to 350 mA
Motor Runout	≤50 µm
DIMENSIONS & WEIGHT	
Actuator Dimensions	66 × 52 × 20 mm
Actuator Weight	69 g
Driver PCB Dimensions	48 x 63 x 15 mm
Driver PCB Weight	25g

ORDERING INFORMATION

Model	Enclosure	Shaft	Encoder	Part Number	Kit Number*
ROMO-HS-LG	Plastic	Hollow	No	ROMO-P011-0480-1000	ROMO-P011-0481-1000

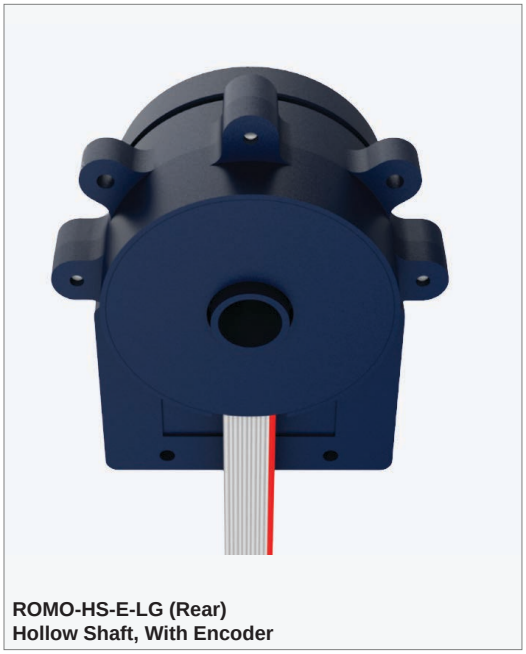
***Evaluation kit includes motor, Open-Loop Driver PCB, 110/240 VAC to 12 V DC power adapter, cables.**

ROMO-HS-E-LG

Close-Loop Rotary Piezo Motor - Hollow Shaft

Plastic Enclosure | Hollow Shaft | With Encoder

ROMO-HS-E-LG (Front)
Hollow Shaft, With Encoder



ROMO-HS-E-LG (Rear)
Hollow Shaft, With Encoder

INTRODUCTION

Identical to ROMO-LG base motor with factory-fitted optical encoder. Encoder signal output enables closed-loop control via your controller.

MOTOR SPECIFICATIONS	
Power Supply Voltage	12.0 V DC
Stall Torque	≥ 30 mNm
Self-Braking Torque	≥ 40 mNm
Actuator Response Time	< 30 µs
Max Speed	> 100 rpm
Minimum Angular Step	10 µrad
Encoder Resolution (after quadrature)	196 µrad
Minimum Controlled Angular Step	196 µrad
Uni-directional Repeatability	196 µrad
Angular Backlash	<10 µrad
Angular Hysteresis	<10 µrad
Frequency Response	4 KHz
Operating Temperature	-20 °C to 80 °C
Maximum Axial Load	1000g
Maximum Radial Load	1000g
Moment Inertia	82 g.mm²
Current over velocity range	30 mA to 350 mA
Motor Runout	≤50 µm
DIMENSIONS & WEIGHT	
Actuator Dimensions	66 × 52 × 31 mm
Actuator Weight	76 g
Driver PCB Dimensions	48 x 63 x 25 mm
Driver PCB Weight	25g

ORDERING INFORMATION

Model	Enclosure	Shaft	Encoder	Part Number	Kit Number*
ROMO-HS-E-LG	Plastic	Hollow	Yes	ROMO-P011-1480-1000	ROMO-P011-1481-1000

***Evaluation kit includes motor, Close-Loop Driver PCB, 110/240 VAC to 12 V DC power adapter, cables.**

ROMO-SS-LG

Open-Loop Rotary Piezo Motor - Solid Shaft

Plastic Enclosure | Solid Shaft | Without Encoder

ROMO-SS-LG (Front)
Solid Shaft, Without Encoder

ROMO-SS-LG (Rear)
Solid Shaft, Without Encoder

INTRODUCTION

PMC's solid-shaft rotary piezoelectric actuator, open-loop PWM control. Available in plastic (ROMO-SS-LG) enclosure with metal rotor and shaft. The solid shaft provides a robust mechanical interface for direct-drive coupling to loads.

MOTOR SPECIFICATIONS	
Power Supply Voltage	12.0 V DC
Stall Torque	≥ 30 mNm
Self-Braking Torque	≥ 40 mNm
Actuator Response Time	< 30 µs
Max Speed	> 100 rpm
Minimum Angular Step	10 µrad
Angular Backlash	10 µrad
Angular Hysteresis	10 µrad
Frequency Response	4 KHz
Operating Temperature	-20 °C to 80 °C
Maximum Axial Load	1000g
Maximum Radial Load	1000g
Moment Inertia (with metal rotor)	82 g.mm²
Current over velocity range	30 mA to 350 mA
Motor Runout (with metal rotor)	≤50 µm
DIMENSIONS & WEIGHT	
Actuator Dimensions	66 × 52 × 20 mm
Actuator Weight	86 g
Driver PCB Dimensions	48 x 63 x 15 mm
Driver PCB Weight	25g

ORDERING INFORMATION

Model	Enclosure	Shaft	Encoder	Part Number	Kit Number*
ROMO-SS-LG	Plastic	Solid	No	ROMO-P011-0470-1001	ROMO-P011-0471-1001

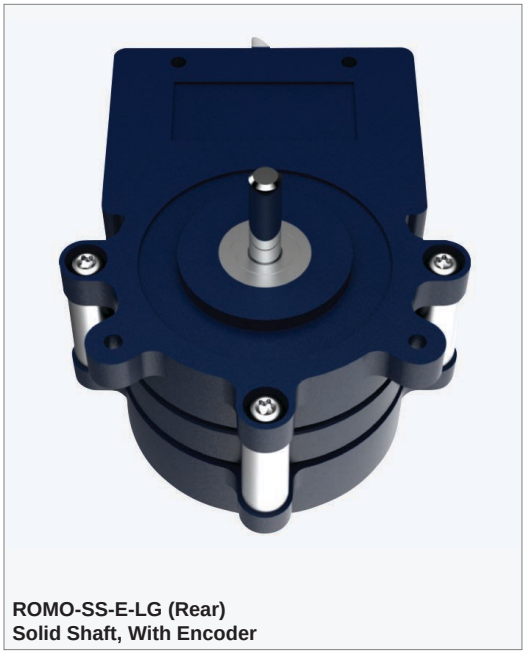
***Evaluation kit includes motor, Open-Loop driver PCB, 110/240 VAC to 12 V DC power adapter, cables.**

ROMO-SS-E-LG

Close-Loop Rotary Piezo Motor - Solid Shaft

Plastic Enclosure | Solid Shaft | With Encoder

ROMO-SS-E-LG (Front)
Solid Shaft, With Encoder



ROMO-SS-E-LG (Rear)
Solid Shaft, With Encoder

INTRODUCTION

PMC's solid-shaft rotary piezoelectric actuator, open-loop PWM control. Available in plastic (ROMO-SS-LG) enclosure with metal rotor and shaft. The solid shaft provides a robust mechanical interface for direct-drive coupling to loads.

MOTOR SPECIFICATIONS	
Power Supply Voltage	12.0 V DC
Stall Torque	≥ 30 mNm
Self-Braking Torque	≥ 40 mNm
Actuator Response Time	< 30 µs
Max Speed	> 100 rpm
Minimum Angular Step	10 µrad
Angular Backlash	10 µrad
Angular Hysteresis	10 µrad
Frequency Response	4 KHz
Operating Temperature	-20 °C to 80 °C
Maximum Axial Load	1000g
Maximum Radial Load	1000g
Moment Inertia (with metal rotor)	82 g.mm²
Current over velocity range	30 mA to 350 mA
Motor Runout (with metal rotor)	≤50 µm
DIMENSIONS & WEIGHT	
Actuator Dimensions	66 × 52 × 31 mm
Actuator Weight	94 g
Driver PCB Dimensions	48 x 63 x 25 mm
Driver PCB Weight	25g

ORDERING INFORMATION

Model	Enclosure	Shaft	Encoder	Part Number	Kit Number*
ROMO-SS-E-LG	Plastic	Solid	Yes	ROMO-P011-1470-1001	ROMO-P011-1471-1001

***Evaluation kit includes motor, Close-Loop driver PCB, 110/240 VAC to 12 V DC power adapter, cables.**

ROMO-LG Motion Control

and Driver Electronics

PLC | Serial | Open-loop & Closed-loop

INTRODUCTION

Control of the ROMO-LG Series Rotary Motor is simple and flexible. Each motor is operated via a dedicated driver PCB, which converts motion commands into precise electrical excitation using optimized frequency and amplitude signals to actuate the piezo resonator.

The driver supports multiple control interfaces, including PWM & serial, enabling seamless integration into a wide range of systems. Each PCB is pre-configured for the specific motor model, with additional software configurability to optimize performance and system integration.

A companion daughter board provides closed-loop feedback and serial communication, enabling accurate position control via Piezo Motor Company's software or external controllers.

The ROMO-LG driver architecture offers a compact, cost-effective control solution, while enabling fine motion regulation through closed-loop operation when required.

ROMO-LG OPEN LOOP DRIVER PCB OPTIONS

Standard Open Loop Driver PCB
Part No.: ROLR-PPCB-0470-0000

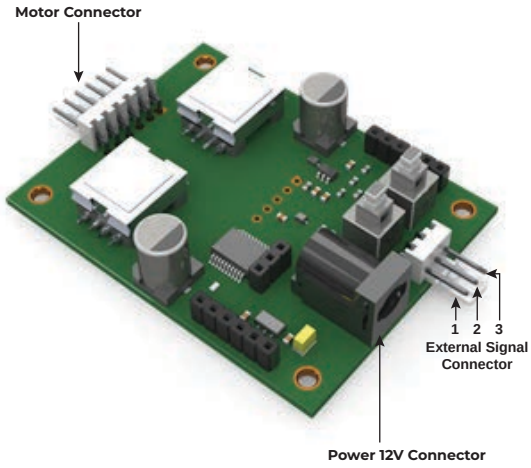
The driver board can be controlled using an external signal source PWM (Pulse Width Modulation) mode. Control signals are applied to the External Signal Connector to generate the desired rotation and speed. Control of speed using PWM is implemented by varying the pulse duration and repetition rate of 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 30µs.

The ROMO driver PCB is compatible with both ROMO-LG (non-encoder) and ROMO-LG-E (encoder-equipped) motors. For applications requiring closed-loop control with the Open-Loop driver, the control loop must be implemented externally by the user using encoder feedback and a third-party controller.

Control Interface	
PWM (TTL-compatible)	via J1 connector

Additional Features:

- Manual control via two onboard push-buttons.
- Compact, low-overhead solution for cost-sensitive for open-loop applications using a single motor.



Electronic PCB Driver for ROMO-LG Piezomotors

ROMO-E-LG CLOSED LOOP DRIVER PCB OPTIONS

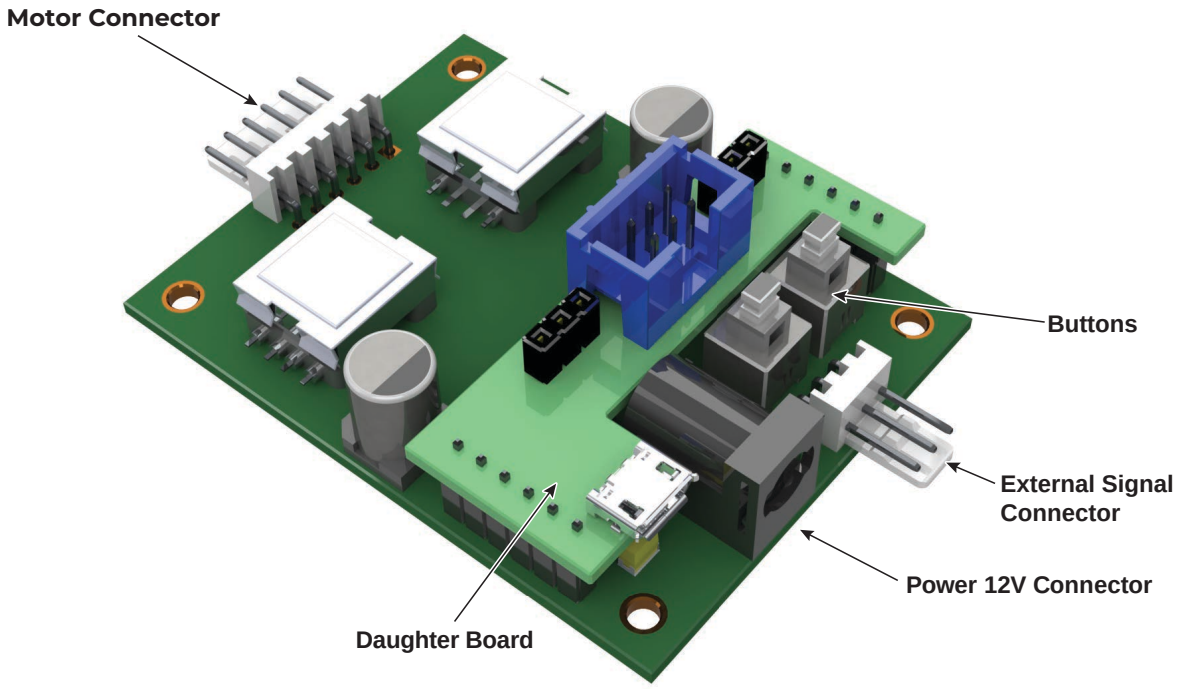
Standard Closed Loop Driver PCB
Part No.: ROLR-PPCB-1480-0000

In closed-loop control (feedback control) mode, an additional daughter PCB is mounted on driver PCB. Feedback from an external optical encoder, mounted on the piezo motor, is fed to the daughter board and used to close the loop. The position and speed of the motor can then be controlled through an elaborate set of commands via either a USB port (through Piezo Motor Company (PMC)'s GUI) or serial (RS 232) port commands.

The Close loop driver PCB is compatible with ROMO-LG-E (encoder-equipped) motors only and is designed for use with PMC's close loop software, enabling simple integration and high-precision motion control.

Control Interfaces	
PMC's PLC Software (Windows)	
RS 232	Serial commands

Additional Features:
- Manual control via two onboard push-buttons.
- Compact, low-overhead solution for cost-sensitive for open-loop applications using a single motor.

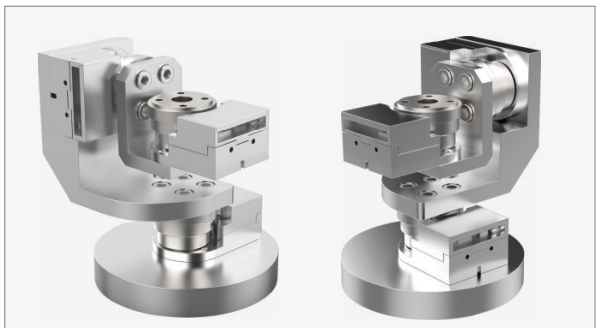


ROMO-3AX System

Ultra-Compact Rotary 3-Axis Gimbal Stage

INTRODUCTION

Piezo Motor Company's ROMO-3AX series is one of the world's smallest lightweight piezoelectric rotary 3-axis gimbal platform designed for superior precision and expanded functionality for advanced applications. The ROMO-3AX system integrates three precision miniature hollow-shaft rotary piezomotors (PMC Model# ROMO) into a compact rotary 3-axis gimbal stage, providing precise multi-axis motion in an ultra-small footprint.

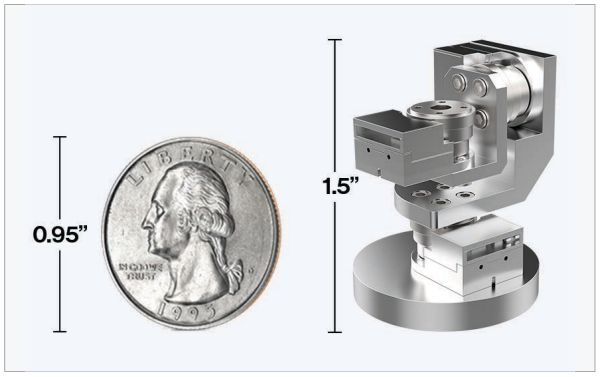


ROMO-3AX-SYS

PRINCIPLE OF OPERATION

US Patent Number 12,143,036

The ROMO-3AX system integrates three precision miniature hollow-shaft rotary piezomotors (PMC Model# ROMO) into a compact rotary 3-axis gimbal stage, providing precise multi-axis motion in an ultra-small footprint. It is ideal for space-limited applications where silent operation, zero backlash, and sub-microradian resolution are required. Ideal for next-generation motion solutions in photonics, life sciences, miniature drones and precision instrumentation.



PERFORMANCE & BENEFITS

- Sub-micron positional resolution.
- Compact, lightweight machined aluminum design
- Stepping and continuous modes of motion on each axis.
- Silent operation and low-voltage (5.0 V DC) drive.
- Open-loop and closed-loop (encoder feedback) models

KEY FEATURES

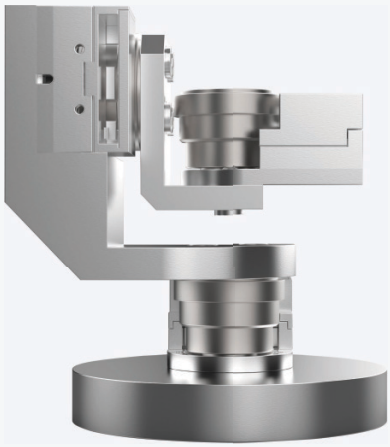
- Compact lightweight design
- Superior Resolution:
  <30 µrad (0.0017° per step) = >200,000 steps per full rotation
- Max Speed: > 600 rpm
- Fast Response Time: ≈30 µs
- Low Voltage Design: 5 V DC
- Zero power consumption in hold mode

ROMO-N-3AX

Rotary 3-Axis Gimbal Stage

3-Axis Gimbal Stage | No Encoder

ROMO-N-3AX (Top View)



ROMO-N-3AX (Side View)

INTRODUCTION

Introducing the ROMO-N-3AX one of the world's smallest lightweight piezoelectric rotary 3-axis gimbal platform designed for superior precision and expanded functionality for advanced applications.

MOTOR SPECIFICATIONS	
Power Supply Voltage	7.5 V DC
Control Type	Open-Loop
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
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 – 300 mA
Rotor Runout	≤50 µm
Rotor Diameter	13 mm
Encoder Type	Magnetic
DIMENSIONS & WEIGHT	
Actuator Type	ROMO (Hollow Shaft)
Actuator Dimensions (no shaft)	13 × 23.0 × 8.15 mm
Motor Weight	15.0 g

ORDERING INFORMATION

Model	Encoder	Part Number	Kit Number*
ROMO-N-3AX	No	ROMO-M3AX-0391-0000	ROMO-M3AX-0391-0000

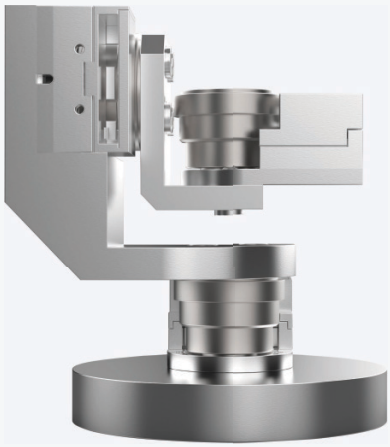
***Evaluation Kit Includes ROMO-3AX Positioning System, 3 Driver PCBs, i2c adapter board, Raspberyy Pi Controller LCD Display, Python API, 120/220 VAC to 5V DC power adapters and cables.**

ROMO-E-3AX

Rotary 3-Axis Gimbal Stage With Encoder

3-Axis Gimbal Stage | With Encoder

ROMO-E-3AX (Top View)



ROMO-E-3AX (Side View)

INTRODUCTION

One of the world's smallest lightweight piezoelectric rotary 3-axis gimbal platform with factory-fitted magnetic encoders.

MOTOR SPECIFICATIONS	
Power Supply Voltage	5.0 V DC
Control Type	Python™ API software included with Closed-Loop System
Stall Torque	4 mNm
Self-Braking Torque	5 mNm
Actuator Response Time	30 µs
Max Speed	600 rpm
Minimum Angular Step	30 µrad
Encoder Resolution (after quadrature)	1,024 ppr
Minimum Controlled Angular Step	6.1 mrad
Uni-directional Repeatability	6.1 mrad
Angular Backlash	30 µrad
Angular Hysteresis	30 µrad
Frequency Response	4 kHz
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 – 300 mA
Rotor Runout	≤50 µm
Rotor Diameter	13 mm
Encoder Type	Magnetic
DIMENSIONS & WEIGHT	
Actuator Type	ROMO-E (Hollow Shaft)
Actuator Dimensions (no shaft)	13 × 23.0 × 9.15 mm
Motor Weight	17.0 g

ORDERING INFORMATION

Model	Encoder	Part Number	Kit Number*
ROMO-E-3AX	Yes	ROMO-M3AX-1391-0000	ROMO-M3AX-1391-0000

***Evaluation Kit Includes ROMO-E-3AX positioning system (with optical encoders), 3 X Driver PCB's, I2C adapter board, Raspberry Pi Controller with LCD Display and Python API close-loop software, 120/240 VAC to 5 VDC power adapters and cables.**

ROMO-N-3AX & ROMO-E-3AX

I²C / API Command Summary Commands

Open-loop & Closed-loop

SYSTEM CONTROL OVERVIEW (OPEN-LOOP & CLOSE-LOOP OPERATION)

- **ROMO-N-3AX (Open-Loop)** - Motion controlled via PWM signals, timing, and drive current. No encoder feedback; position determined indirectly via command duration and calibration. Simple, compact, high-speed architecture without feedback electronics.
- **ROMO-E-3AX (Closed-Loop)** - Real-time encoder feedback (6.1 mrad resolution) on every axis enables homing and absolute positioning through the PMC Python API. Velocity stabilised across 0.01–200 mm/s. Precise, repeatable, fully programmable multi-axis control.

ROMO-N-3AX - I²C / API Command Summary (Open-Loop)

Command	Function
PiezoMotor(Number_I2C_Bus)	Creates the motor controller object on the specified I²C bus (typically 1)
Move(address, param)	Executes directional motion (continuous or PWM-based)
MotorType(address, motorType)	Sets actuator type (Linear / Rotary)
PWMTimeSettings(address, direction, duty_cycle_percent, frequency_Hz)	Configures PWM timing (step behaviour)
PWMGeneratorSettings(address, direction, run_motor_periods, period_of_PWM, prescale)	Advanced PWM control
Current(address, current)	Sets motor drive current
setAddress(address, new_address)	Changes I²C address

ROMO-E-3AX - I²C / API Command Summary (Close-Loop)

Command	Function
PiezoMotor(Number_I2C_Bus)	Creates the motor controller object on the specified I²C bus (typically 1)
Home(address)	Executes homing routine and blocks until complete
getPosition(address)	Reads back axis position and returns value in µm
Position(address, value)	Commands absolute position in µm (blocks until complete)
Velocity(address, value)	Sets velocity (mm/s)
Move(address, action)	Open-loop direction command (Left / Right / Stop)
setPWMsettings(address, duty_cycle_percent, frequency_Hz)	Configures PWM duty cycle and frequency
setAddress(address, new_address)	Changes I²C address

Part Numbering System

LRMO/ROMO SERIES PART NUMBERING

Series	—	Material	—	Encoder	Driver	Firmware	Kit	—	Customisation
ROMO	—	P011	—	1	2	8	1	—	0000
ROMO/ LRMO		P011 = Plastic M012 = Anodized Aluminum		0 = without 1 = with	3 = 7.5V 2 = 5V	7 = Open Loop 8 = Closed Loop	0 = Motor Only 1 = Eval Kit		0 = Hollow Shaft 1 = Solid Shaft

Example:

ROMO-P011-1281-0000: ROMO Series, Plastic, with Encoder, 5V Driver, Closed-Loop Firmware, Hollow Shift.

LRMO-P011-1281-0000: LRMO Series, Plastic, with Encoder, 5V Driver, Closed-Loop Firmware, Kit.

LRMO-LG PART NUMBERING

LRMO	—	Material	—	Encoder	Driver	Firmware	Kit	—	Customisation
LRMO	—	P011	—	1	4	7	1	—	1000
LRMO		P011 = Plastic		0 = without 1 = with	4 = 12V	7 = Open Loop 8 = Close Loop	0 = Motor Only 1 = Eval Kit		0 = Standard

LRMO-P011-1471-1001: LRMO Series, Plastic, with Encoder, 12V Driver, Open Loop Firmware, Evaluation Kit

ROMO-LG PART NUMBERING

ROMO	—	Material	—	Encoder	Driver	Firmware	Kit	—	Customisation
ROMO	—	P011	—	1	4	7	1	—	1001
ROMO		P011 = Plastic		0 = without 1 = with	4 = 12V	7 = Open Loop 8 = Close Loop	0 = Motor Only 1 = Eval Kit		0 = Hollow Shaft 1 = Solid Shaft

ROMO-P011-1471-1001: ROMO Series, Plastic, with Encoder, 12V Driver, Open Loop Firmware, Evaluation Kit, Solid Shaft

Combined Product Reference

LINEAR ACTUATORS CONFIGURATIONS - LRMO SERIES

Model	Encoder	Push/Pull	Min. step	Max Speed	Power Supply	Part Number	Kit Available
LRMO-P	No	≥ 0.2 N	< 0.04 µm	≥ 150 mm/s	5.0 V DC	LRMO-P011-0270-0000	✓
LRMO-M	No	≥ 0.2 N	< 0.04 µm	≥ 150 mm/s	5.0 V DC	LRMO-M012-0270-0000	✓
LRMO-E-P	Yes	≥ 0.2 N	< 0.04 µm	≥ 150 mm/s	5.0 V DC	LRMO-P011-1270-0000	✓
LRMO-E-M	Yes	≥ 0.2 N	< 0.04 µm	≥ 150 mm/s	5.0 V DC	LRMO-M012-1270-0000	✓
LRMO-E-P-CL	Yes	≥ 0.2 N	2.66 µm	≥ 150 mm/s	5.0 V DC	LRMO-P011-1280-0000	✓
LRMO-E-M-CL	Yes	≥ 0.2 N	2.66 µm	≥ 150 mm/s	5.0 V DC	LRMO-M012-1280-0000	✓

LINEAR ACTUATORS CONFIGURATIONS - LRMO-LG SERIES

Model	Encoder	Push/Pull	Min. step	Max Speed	Power Supply	Part Number	Kit Available
LRMO-LG	No	≥ 4.0 N	< 0.05 µm	200 mm/s	12.0 V DC	LRMO-P011-0470-1000	✓
LRMO-E-LG	Yes	≥ 4.0 N	2.66 µm	140 mm/s	12.0 V DC	LRMO-P011-1470-1000	✓

LINEAR ACTUATORS CONFIGURATIONS - LRMO-150 SERIES

Model	Encoder	Push/Pull	Min. step	Max Speed	Power Supply	Part Number	Kit Available
LRMO-N-150	No	≥ 8.0 N	< 0.04 µm	200 mm/s	12.0 V DC	LRMO-M012-0471-2002	✓
LRMO-E-150	Yes	≥ 8.0 N	2.6 µm	200 mm/s	12.0 V DC	LRMO-M012-1471-2002	✓

LINEAR SPECIALTY MOTION STAGE - LRMO-XYZ 3 AXIS POSITIONING STAGE

Model	Encoder	Push/Pull	Min. step	Max Speed	Power Supply	Part Number	Kit Available
LRMO-N-XYZ	No	≥ 0.2 N / axis	< 0.04 µm	≥ 150 mm/s	5.0 V DC	LRMO-MXYZ-0291-0000	✓
LRMO-E-XYZ	Yes	≥ 0.2 N / axis	2.66 µm	≥ 150 mm/s	5.0 V DC	LRMO-MXYZ-1291-0000	✓

Combined Product Reference

ROTARY ACTUATORS CONFIGURATIONS - ROMO SERIES

Model	Encoder	Push/Pull	Min. step	Max Speed	Power Supply	Part Number	Kit Available
ROMO-P	No	≥ 4 mNm	30 µrad	> 600 rpm	7.5 V DC	ROMO-P011-0370-0000	✓
ROMO-M	No	≥ 4 mNm	30 µrad	> 600 rpm	7.5 V DC	ROMO-M012-0370-0000	✓
ROMO-E-P	Yes	≥ 4 mNm	6.1 mrad	> 600 rpm	7.5 V DC	ROMO-P011-1370-0000	✓
ROMO-E-M	Yes	≥ 4 mNm	6.1 mrad	> 600 rpm	7.5 V DC	ROMO-M012-1370-0000	✓
ROMO-E-P-CL	Yes	≥ 4 mNm	6.1 mrad	> 600 rpm	5.0 V DC	ROMO-P011-1281-0000	✓
ROMO-E-M-CL	Yes	≥ 4 mNm	6.1 mrad	> 600 rpm	5.0 V DC	ROMO-M012-1281-0000	✓

ROTARY ACTUATORS CONFIGURATIONS - ROMO-LG SERIES

Model	Encoder	Push/Pull	Min. step	Max Speed	Power Supply	Part Number	Kit Available
ROMO-HS-LG	No	≥ 30 mNm	10 µrad	> 100 rpm	12.0 V DC	ROMO-P011-0480-1000	✓
ROMO-HS-E-LG	Yes	≥ 30 mNm	196 µrad	> 100 rpm	12.0 V DC	ROMO-P011-1480-1000	✓
ROMO-SS-LG	No	≥ 30 mNm	10 µrad	> 100 rpm	12.0 V DC	ROMO-P011-0470-1001	✓
ROMO-SS-E-LG	Yes	≥ 30 mNm	196 µrad	> 100 rpm	12.0 V DC	ROMO-P011-1470-1001	✓

ROTARY SPECIALTY MOTION STAGE - ROMO-3AX

Model	Encoder	Push/Pull	Min. step	Max Speed	Power Supply	Part Number	Kit Available
ROMO-N-3AX	No	4 mNm / axis	30 µrad	> 600 rpm	7.5 V DC	ROMO-M3AX-0391-0000	✓
ROMO-E-3AX	Yes	4 mNm / axis	6.1 mrad	> 600 rpm	5.0 V DC	ROMO-M3AX-1391-0000	✓

PMC
PIEZO
MOTOR COMPANY

Piezoelectric Motors

PRODUCT CATALOG 2026

Innovation In The Design and Manufacturing of Piezoelectric Motors

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