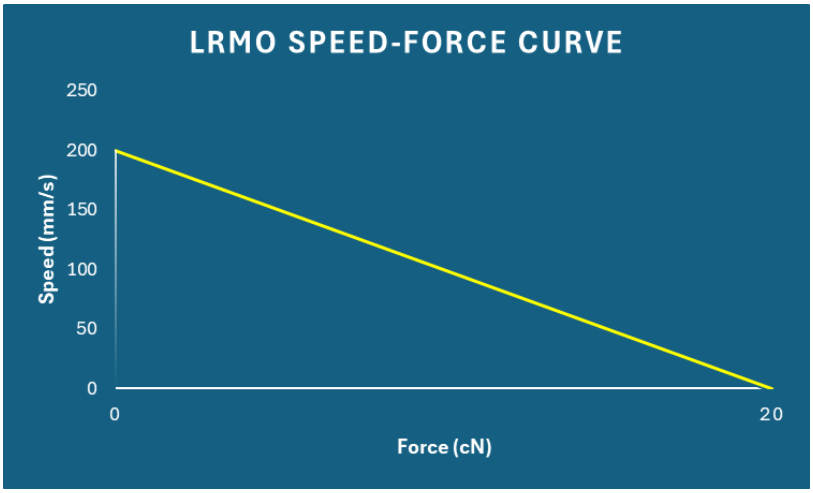
LRMO Series - Miniature Piezoelectric Linear Actuators

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

Key Advantages

- New US patented design.
- Superior stability of velocity control.
- Flexible pcb electrical connection facilitates system integration.
- Economical construction using thermoplastics for reliability and affordability.
- Unmatched precision and resolution.
- Ultra-fast response times and exceptional start-stop capabilities.
- High force density relative to size, provides excellent alternative to stepper lead screw designs.
- Stepping and continuous modes of operation with silent operation.
- Low power and low voltage requirement.



Key Features

- Superior Resolution: > 40 nm = 25,000 steps per mm of travel
- Max Speed: ≈0.15 m/s
- Fast Response Time: ≈30 µs
- Low Voltage Design: 5 V DC
- Low Power: 1.5 W (@ max speed) or 0.15 W (@ 10 mm/s PWM mode)
- Energy efficient: Zero power consumption in hold mode
- Optical encoder (optional): 2.66 µm close loop resolution

Principle of Operation

The LRMO Linear piezo actuator operates based on a new 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.

Electronic Driver Board Interface Supports UART & I2C

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.

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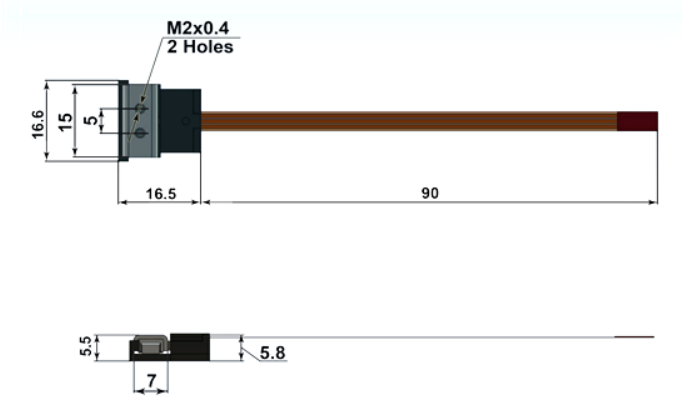
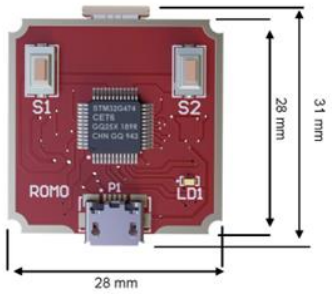
Technical Specifications

Part No. (Non-Encoder Version)	LRMO-011-0270
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 (<40 nm)
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 (at listed specification)	20 g
Maximum Tolerable Load	4.2 kgf
Max Current (continuous mode)	300 mA
Max. Current at the velocity 10mm/s (PWM mode)	30-40 mA
Motor Weight	4.7 g
Motor Dimensions	16.6x16.5x5.8mm
Driver PCB Dimensions	31x28x9.6 mm
Drive PCB Weight	6.8 g

Mechanical Drawings



Schematic drawing (mm) of standard LRMO (without factory installed encoder).



LROM Electronic Driver PCB

Ordering Information

Part Number	Description
LRMO-011-0270	Linear motor without encoder
LRMO-011-0271	Linear motor evaluation kit*
LRMO-011-1280	Linear motor with encoder
LRMO-011-1281	Linear motor with encoder evaluation kit*
ROLR-PCB	Electronic Driver Board (5.0 – 7.5 VDC) for use with LRMO & ROMO motors

*Evaluation kit includes LRMO motor, Electronic Driver PCB, cables, 120/240 VAC to 5.0 VDC wall power adapter

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