



100mm L12 Actuator  
Actual Size

## Miniature Linear Motion Series · L12

Actuonix Motion Devices unique line of Miniature Linear Actuators enables a new generation of motion-enabled product designs, with capabilities that have never before been combined in a device of this size. These small linear actuators are a superior alternative to designing with awkward gears, motors, servos, and linkages.

Actuonix's L series of micro linear actuators combine the best features of our existing micro actuator families into a highly flexible, configurable, and compact platform with an optional sophisticated on-board microcontroller. The first member of the L series, the L12, is an axial design with a powerful drive-train and a rectangular cross section for increased rigidity. But by far the most attractive feature of this actuator is the broad spectrum of available configurations.

### L12 Specifications

Gearing Option	50:1	100:1	210:1	
Peak Power Point	17N @ 14mm/s	31N @ 7mm/s	62N @ 3.2mm/s	
Peak Efficiency Point	10N @ 19mm/s	17N @ 10mm/s	36N @ 4.5mm/s	
Max Speed ( <i>no load</i> )	25mm/s	13mm/s	6.5mm/s	
Max Force ( <i>lifted</i> )	22N	42N	80N	
Back Drive Force ( <i>static</i> )	12N	22N	45N	
Stroke Option	10 mm	30mm	50mm	100mm
Mass	28 g	34 g	40 g	56 g
Repeatability (-I,-R,-P&LAC)	±0.1 mm	±0.2 mm	±0.3 mm	±0.5 mm
Max Side Load ( <i>extended</i> )	50N	40N	30N	15N
Closed Length ( <i>hole to hole</i> )	62mm	82mm	102mm	152mm
Potentiometer (-I, -R, -P)	1kΩ±50%	3kΩ±50%	6kΩ±50%	11kΩ±50%
Voltage Option	6VDC		12VDC	
Max Input Voltage	7.5V		13.5V	
Stall Current	460mA		185mA	
Standby Current (-I/-R)	7.2mA		3.3mA	
Operating Temperature	-10°C to +50°C			
Potentiometer Linearity	Less than 2.00%			
Max Duty Cycle	20 %			
Audible Noise	55dB @ 45cm			
Ingress Protection	IP-54			
Mechanical Backlash	0.2mm			
Limit Switches (-S)	Max. Current Leakage: 8uA			
Maximum Static Force	200N			

### Benefits

- Compact
- Simple control
- Low voltage
- Equal push/pull
- Easy mounting

### Applications

- Robotics
- Appliances
- Toys
- RC vehicles
- Automotive
- Industrial Automation

1 - Control Option Specific values are identified with -I, -R, -P, -S, and LAC

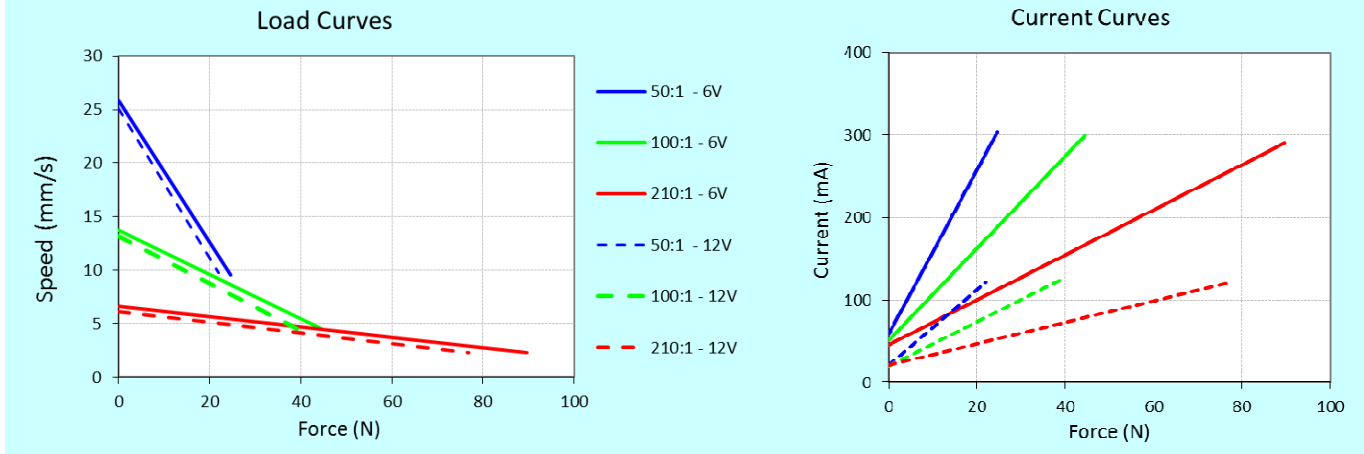
2 - 1 N (Newton) = 0.225 lbf (pound-force) & 25.4mm=1 Inch

3 - A powered-off actuator will statically hold a force up to the Backdrive Force

4 - Actuators should be tested in each specific application to determine their effective life under those loading conditions and environment.

All information provided on this datasheet is subject to change. Purchase or use of Actuonix actuators is subject to acceptance of our terms and conditions as posted here: <http://www.actuonix.com/terms.asp>

## L12 Specifications



## Model Selection

L12 options are identified according to the following scheme:

### L12-SS-GG-VV-C

feature	Options
<b>SS:</b> Stroke Length	<b>10, 30, 50, 100</b>
<b>GG:</b> Gear reduction ratio (refer to load curves above)	<b>50, 100, 210</b> (lower ratios are faster but push less force, and vice versa)
<b>VV:</b> Voltage	<b>6, 12</b> (DC volts)
<b>C:</b> Controller	<b>S</b> Limit Switches <b>P</b> Potentiometer Feedback <b>I</b> Integrated Controller <b>R</b> RC Servo Integrated Controller

## L12 Controller Options

### Option S – End of Stroke Limit Switches

WIRING: (see last page for pin numbering)

- 1 - Red – Motor V+
- 2 - Black – Motor V- (Gnd)

The –S actuators have limit switches that will turn off power to the motor when the actuator reaches within 0.5mm of the end of stroke. Internal diodes allow the actuator to reverse away from the limit switch. The limit switches cannot be moved once the actuator is manufactured. While voltage is applied to the motor power pins, (1 & 2) the actuator extends. Reverse the polarity and the actuator retracts. This can be accomplished manually with a DPDT switch or relay, or using an H-Bridge circuit. The –S model cannot be used with the LAC control board.

### Option P – Potentiometer Position Feedback

WIRING: (see last page for pin numbering)

- 1 - Orange – Feedback Potentiometer negative reference rail
- 2 - Purple – Feedback Potentiometer wiper
- 3 - Red – Motor V+ (6V or 12V)
- 4 - Black – Motor V- (Ground)
- 5 - Yellow – Feedback Potentiometer positive reference rail

The –P actuators have no built in controller, but do provide an analog position feedback signal that can be input to an external controller. While voltage is applied to the motor power pins, (3 & 4) the actuator extends. Reverse the polarity and the actuator retracts. This can be accomplished manually with a DPDT switch or relay, or using an H-Bridge circuit. Position of the actuator stroke can be monitored by providing any stable low and high reference voltage on pins 1 & 5, then reading the position signal on pin 2. The voltage on pin 2 will vary linearly between the two reference voltages in proportion to the position of the actuator stroke.

The L12 –P actuator can be used as a linear servo by connecting the actuator to an external controller such as the LAC board offered by Firgelli. This control board reads the position signal from the L12, compares it with your input control signal then commands the actuator to move via an on-board H-bridge circuit. The LAC allows any one of the following control inputs: Analog 0-5V or 4-20mA, or Digital 0-5V PWM, 1-2ms Standard RC, or USB. The RC input effectively transforms your L12 into a linear servo, which is a direct replacement for any common hobby servo used in RC toys and robotics. Refer to the LAC datasheet for more details.



