Miniature Linear Motion Series · L16

Firgelli Technologies' 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 linear actuators are a superior alternative to designing your own push/pull mechanisms.

The L16 actuators are complete, self contained linear motion devices with position feedback for sophisticated position control capabilities, or end of stroke limit switches for simple two position automation. Driving them couldn't be easier, simply apply a DC voltage to extend the actuator, and reverse the polarity to retract it. Several gear ratio's are available to give you varied speed/force configurations.

L16 Specifications

Gearing Option	35:1	63:1	150:1
Peak Power Point	50N @16mm/s	75N @10mm/s	175N @4mm/s
Peak Efficiency Point	24N @24mm/s	38N @15mm/s	75N @7mm/s
Max Speed (no load)	32mm/s	20mm/s	8mm/s
Max Force (lifted)	50N	100N	200N
Back Drive Force	31N	46N	102N
Stroke Option	50mm	100mm	140mm
Mass	56g	74g	84g
Positional Accuracy	0.3mm	0.4mm	0.5mm
Max Side Load (extended)	40N	30N	20N
Feedback Potentiometer	9kΩ±30%	18kΩ±30%	25kΩ±30%
Electrical Stroke	48mm	98mm	138mm
Input Voltage	0-15 VDC. Rated at 12VDC.		
Stall Current	650mA @ 12V		
Operating Temperature	-10°C to +50°C		
Audible Noise	57dB @ 45cm		
Ingress Protection	IP-54		
Mechanical Backlash	0.2mm		
Limit Switches	Max. Current Leakage: 8uA		

Basis of Operation

The L16 is designed to push or pull a load along its full stroke length. The speed of travel is determined by the load applied. (See the Load Curves). When power is removed the actuator will hold its position, unless the applied load exceeds the backdrive force. Stalling the actuator will not cause damage, however repeated stalling will shorten the life of the actuator significantly. Actuators should be tested in each specific application to determine their effective life under those loading conditions and environment.

Ordering

Small quantity orders can be placed directly online at www.firgelli.com. Each actuator ships with two mounting brackets and #8-32 mounting hardware. The cable length is approximately 300mm and connector is a 0.1" pitch female socket connector.

Applications

- → **Robotics**
- → **Consumer appliances**
- → **Toys**
- → **RC vehicles**
- → **Automotive**
- → **Industrial Automation**

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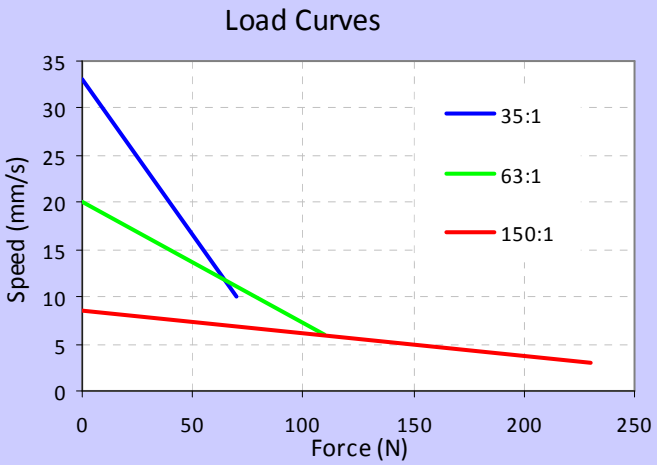
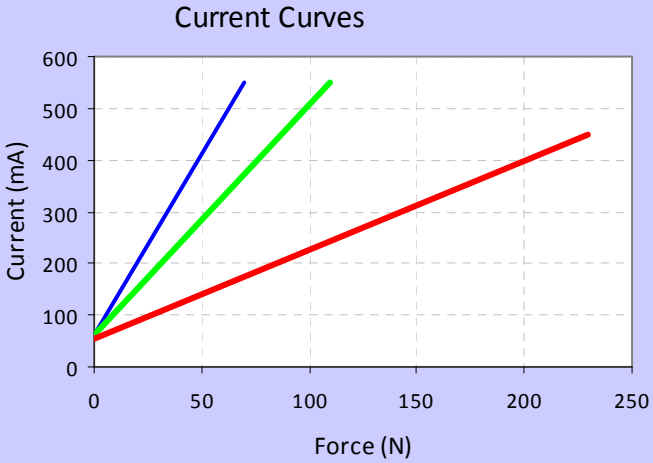
L16 Specifications





Model Selection

The L16 has 3 configuration choices: Stroke, Gear Ratio and Controller. L16 options are identified according to the following model numbering scheme:

L16-SS-GG-VV-C

feature	*options*
SS: Stroke	**50, 100, 140 (mm)**
GG: Gear reduction ratio (refer to load curves above)	**35**, **63**, **150** (lower ratios are faster but push less force, and vice versa)
VV: Voltage	**12** (DC volts)
C: Controller	**P** Potentiometer Feedback **S** Limit Switches

L16 Controller Options

Option S – End of Stroke Limit Switches
WIRING: (see next page for pin numbering)
1 (red) - Actuator Motor Power
2 (black) - Actuator Motor Power

The –S actuators have limit switches that will turn off power to the motor when the actuator reaches within 1mm of the end of stroke. Internal diodes allow the actuator to reverse away from the limit switch. The limit switches cannot be moved. While voltage is applied to the motor power pins 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 CIB control board.

Option P – Potentiometer Position Feedback
WIRING: (see next page for pin numbering)
1 (orange) – Feedback Potentiometer negative reference rail
2 (purple) – Feedback Potentiometer wiper
3 (red) – Actuator Motor Power
4 (black) – Actuator Motor Power
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 L16 –P actuators can be used as a linear servo by connecting the actuator to a microcontroller such as the CIB control board offered by Firgelli. This control board reads the position signal from the L16, compares it with your input control signal then commands the actuator to move via an on-board H-bridge circuit. The CIB allows any one of the following control inputs: Analog 0-5V or 4-20mA, or Digital 0-5V PWM or 1-2ms standard RC. The RC input effectively transforms your L16 into a linear servo which is a direct replacement for any common hobby servo used in RC toys and robotics. Refer to the CIB datasheet for more details.

Special Notes:

Currently in development are the RC versions of the L16 .

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