

# Miniature Linear Motion Series · P16

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

The P16 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. Several gear ratios are available to give you varied speed/force configurations.

The parallel design makes the P16 significantly shorter than the same stroke length L16, but the most attractive feature of this model is its high cycle life. Premium components in this model include: large sealed stainless steel bearings, planetary gearbox, stainless steel lead screw, and glass re-enforced nylon housing.



P16 Actual Size

## Applications

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

## P16 Specifications

Gearing Option	22:1	64:1	256:1	
Peak Power Point	40N @26mm/s	80N @9mm/s	250N @2.5mm/s	
Peak Efficiency Point	25N @34mm/s	40N @14mm/s	150N @3.4mm/s	
Max Speed (no load)	46mm/s	18mm/s	4.8mm/s	
Max Force Lifted	50N	90N	300N	
Back Drive Force	75N	200N	>500N	
Stroke Option	50mm	100mm	150mm	200mm
Mass	95g	110g	125g	140g
Repeatability (-P & LAC)	0.3mm	0.4mm	0.6mm	0.8mm
Max Side Load	20N	15N	10N	4N
Closed Length hole to hole	97mm	147mm	197mm	247mm
Feedback Potentiometer	6kΩ±50%	11kΩ±50%	20kΩ±50%	23kΩ±50%
Feedback Linearity	Less than 2.00%			
Input Voltage	0-15 VDC. Rated at 12VDC.			
Stall Current	1000mA @ 12V			
Operating Temperature	-10°C to +50°C			
Audible Noise	62 dB @ 45cm			
Ingress Protection	IP-54			
Mechanical Backlash	0.3mm			
Limit Switches (-S)	Max. Current Leakage: 8uA			
Maximum Static Force	500N			
Maximum Duty Cycle	20%			

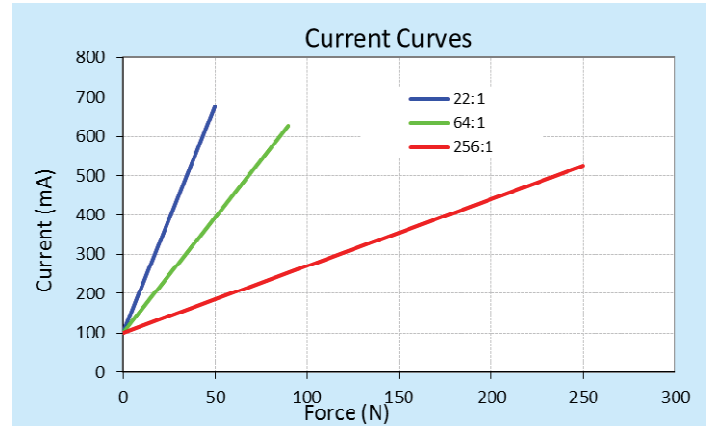
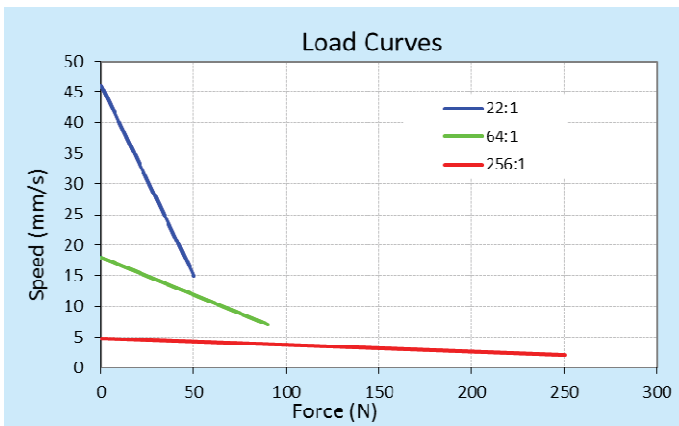
## Basis of Operation

The P16 is designed to push or pull a load axially along its full stroke length. The speed of travel is determined by the load applied (See the Load Curves). Actuator speed can be reduced by lowering the drive voltage. When power is removed the actuator will hold its position, unless the applied load exceeds the back drive force. Repeated stalling or stalling for more than a few seconds 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.

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### Model Selection

The P16 has 3 configuration choices: Stroke, Gear Ratio and Controller. P16 options are identified according to the following model numbering scheme:

### P16-SS-GG-VV-C

Feature	Options
<b>SS:</b> Stroke	<b>50, 100, 150, 200</b> (mm)
<b>GG:</b> Gear reduction ratio (refer to load curves above)	<b>22, 64, 256</b> :1 (lower ratios are faster but push less force, and vice versa)
<b>VV:</b> Voltage	<b>12</b> Volts DC
<b>C:</b> Controller	<b>P</b> Potentiometer Feedback <b>S</b> Limit Switches

### P16 Controller Options

#### Option S – End of Stroke Limit Switches

WIRING: (see last page for pin numbering)

- 1 - Red – Motor V+ (12V)
- 2 – Black – Motor V- (Ground)

–S actuators are ideal for manually controlled applications and simple two position automated mechanisms. 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. The –S model cannot be used with the LAC control board.

### Ordering

Small quantity orders can be placed directly online at [www.Actuonix.com](http://www.Actuonix.com). Purchase orders, volume quotes, and custom order requests can be sent to [sales@actuonix.com](mailto:sales@actuonix.com). MOQ for custom strokes, cables or connectors is typically 500pcs. 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. The thread in the end of the round aluminum shaft is M8x1.25.

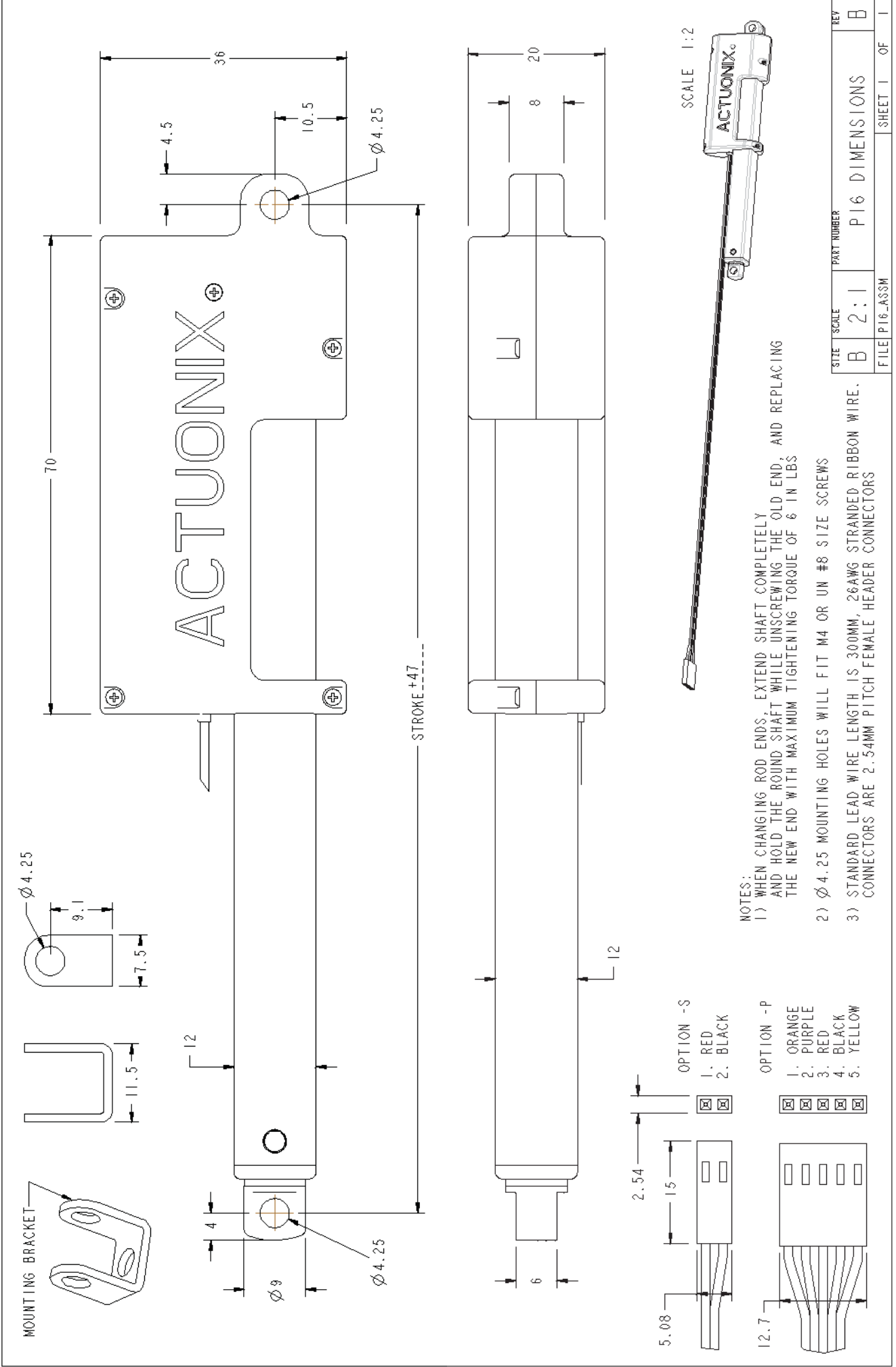
#### Option P – Potentiometer Position Feedback

WIRING: (see last page for pin numbering)

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

–P actuators are suited to automatically controlled positioning systems, but they can also be driven manually. The –P actuators have no built in controller, but do provide an analog position feedback signal that can be input to an external closed loop 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 P16 –P actuator can be used as a linear servo by connecting the actuator to an external controller such as the LAC board offered by Actuonix. This control board reads the position signal from the P16, 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 0-3.3V or 4-20mA, or Digital 0-5V PWM, 1-2ms Standard RC, or USB. The RC input effectively transforms your P16 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.



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