

# Miniature Linear Motion Series · P8

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 P8 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 P8 significantly shorter than the same stroke length L8, but the most attractive feature of this model is its high power output for its overall size. Premium components in this model include: Delrin shaft, stainless steel gearbox, brass lead screw, and glass re-enforced nylon housing.



P8-50mm Actual Size

## Applications

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

## P8 Specifications

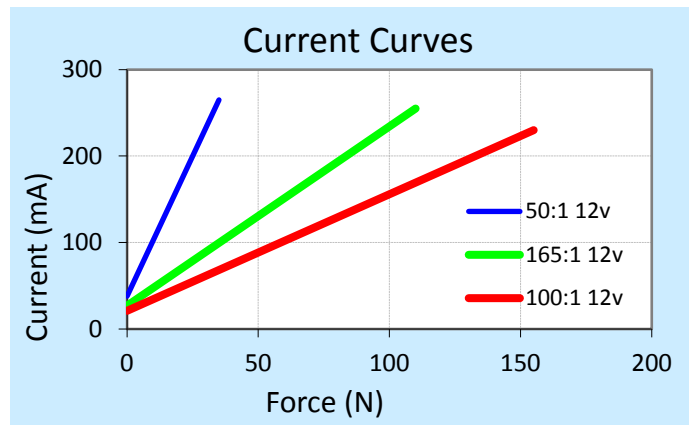
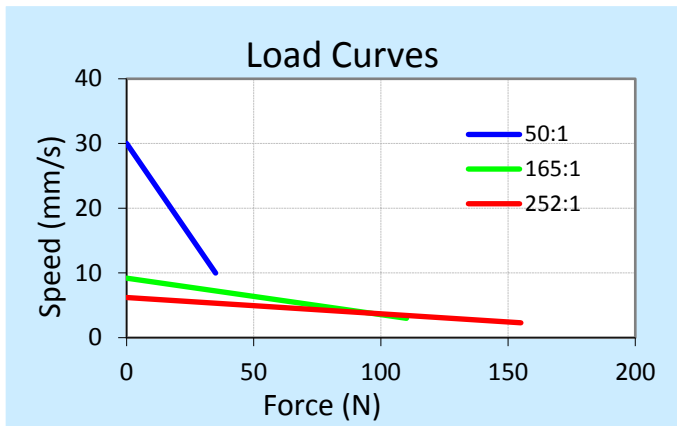
Gearing Option	50:1		165:1		252:1
Peak Power Point	26N @15mm/s	80N @4.8mm/s	122N @3mm/s		
Peak Efficiency Point	12N @23mm/s	35N @7.5mm/s	48N @5mm/s		
Max Speed (no load)	30mm/s	9.2mm/s	6.2mm/s		
Max Force Lifted	35N	110N	155N		
Back Drive Force	10N	40N	65N		
Stroke Option	10mm	25mm	50mm	75mm	100mm
Mass	24 g	26g	32g	38g	41g
Repeatability (-P & LAC)	0.1mm	0.2mm	0.3mm	0.4mm	0.5mm
Max Side Load	5N	5N	3N	2N	2N
Closed Length hole to hole	45mm	60mm	85mm	110mm	135mm
Feedback Potentiometer	3kΩ	8kΩ	16kΩ	23kΩ	32kΩ
	±60%	±60%	±60%	±60%	±60%
Feedback Linearity	Less than 2.00%				
Input Voltage	0-13.5 VDC. Rated at 12VDC.				
Stall Current	450mA @ 12V				
Operating Temperature	-10°C to +50°C				
Audible Noise	50 dB @ 45cm				
Ingress Protection	IP-54				
Mechanical Backlash	< 0.3mm				
Limit Switches (-S)	Max. Current Leakage: 8uA				
Maximum Static Force	180N				
Maximum Duty Cycle	20%				

## Basis of Operation

The P8 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.

**WARNING:** Impacting the physical extend limit will reduce life significantly.

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### Model Selection

The P8 has 3 configuration choices: Stroke, Gear Ratio and Controller. P8 options are identified according to the following model numbering scheme:

### P8-SS-GG-VV-C

Feature	Options
<b>SS:</b> Stroke	<b>10, 25, 50, 100</b> (mm)
<b>GG:</b> Gear reduction ratio (refer to load curves above)	<b>50, 165, 252:1</b> (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

### P8 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 M3 mounting hardware. The cable length is approximately 300mm and connector is a 0.1” pitch female socket connector.

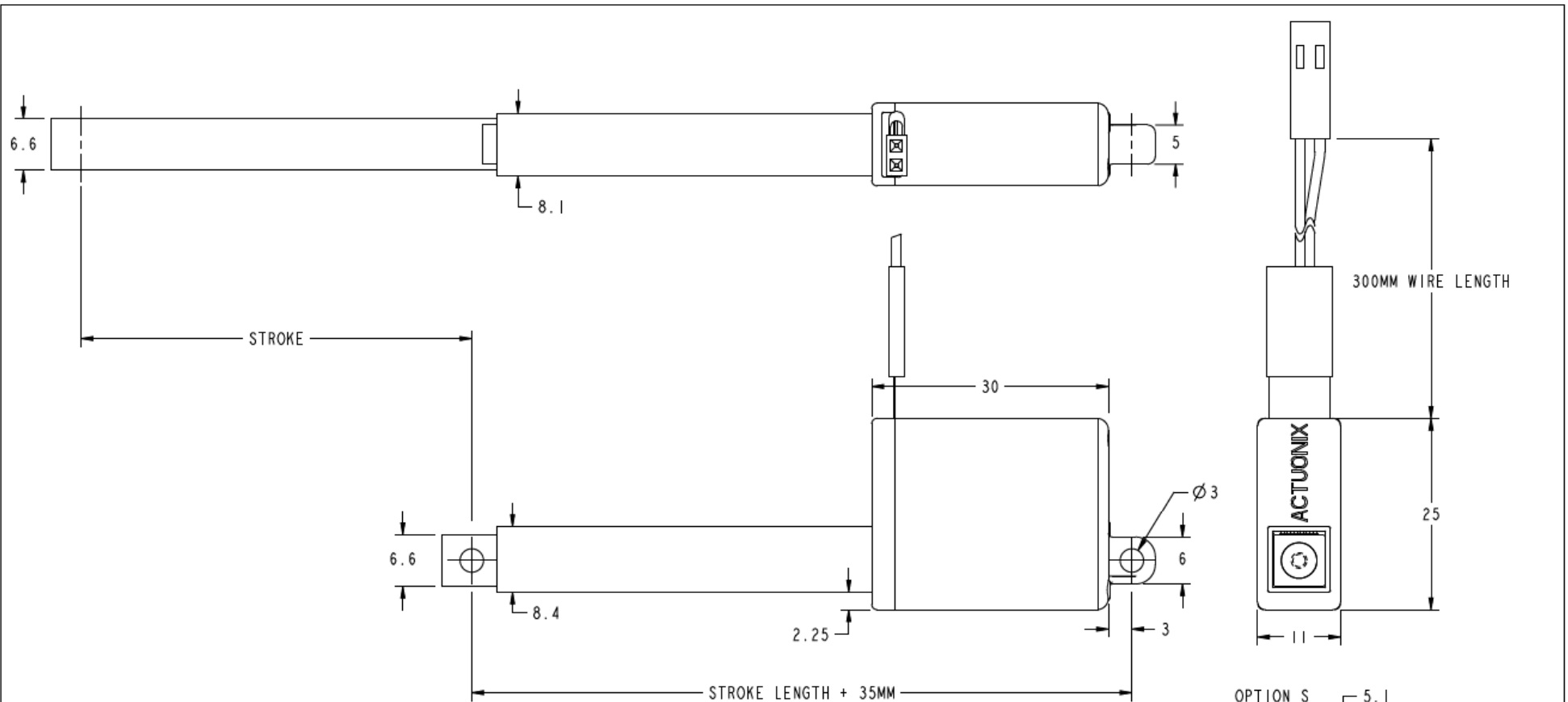
#### Option P – Potentiometer Position Feedback

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

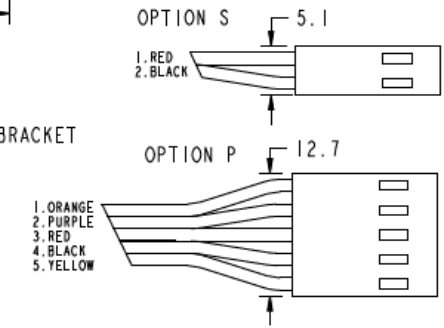
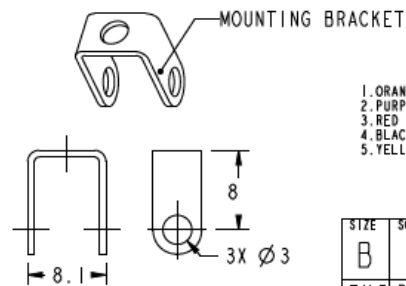
–P actuators are suited to automatically controlled positioning systems, but they can also be driven manually. The –P actuators have no built in controller, but do provide an analog position feedback signal that can be input to an external closed loop controller. While voltage is applied to the motor 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 P8 –P actuator can be used as a linear servo by connecting the actuator to an external controller such as the LAC or Ext-R board offered by Actuonix. These control boards read the position signal from the P8, compare it with your input control signal then command 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 Ext-R is much more compact but only offers the RC control input. 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 or Ext-R datasheet for more detail.



ALL DIMENSIONS IN MM

NAME	STROKE LENGTH	GEAR RATIO	ACTUATOR SERIES
P8_10MM	10MM	50:1	S-TYPE
P8_25MM	25MM	165:1	P-TYPE
P8_50MM	50MM	252:1	EXTERNAL R-TYPE
P8_75MM	75MM		
P8_100MM	100MM		



SIZE	SCALE	PART NUMBER	REV
B	2:1	P8 DATASHEET	A
FILE	P8_50MM	SHEET 3	OF 3

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