

# ProAct™ P-Series FL Position Controller

## Electric Actuators with Integral Driver

### Applications

The ProAct™ P-Series FL Position Controller is a family of electric actuators intended to be mounted on-engine to control varying functions including (but not limited to): fuel rack positioning, timing control, throttle valve, and wastegate positioning. The actuator is effectively a positioner which accepts a position command signal from another device in the system such as a speed control.

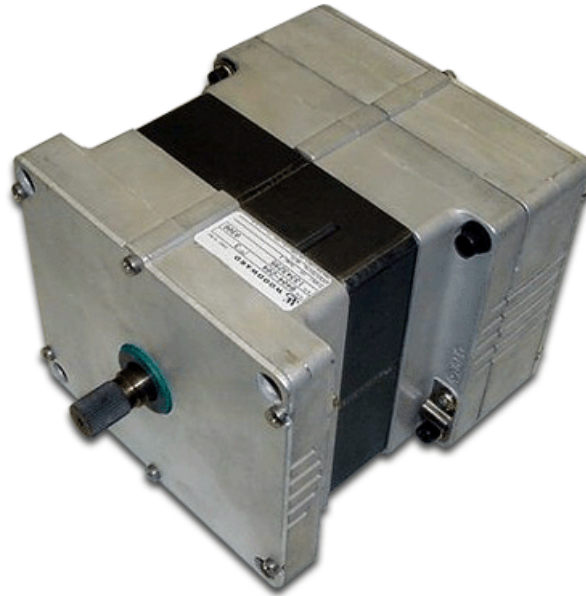
It includes an integral digital driver capable of controlling the actuator, communicating with the outside control system, and containing on-board software and intelligence to realize monitoring and customizing functions.

### Description

The actuators are designed to be base- or flange-mounted (Model IV is base-mounted only) in an on-engine environment and can therefore withstand high levels of vibration and temperature extremes. They all have a 0.625-36 serrated tooth terminal shaft, and an optional rotation scale and indicator are available for visible travel detection. The actuators accept analog (jumper-selectable 0 to 5 Vdc, 4 to 20 mA, or 0 to 200 mA), CAN, or PWM position command signals and can be configured with a primary and backup position command signal input, providing redundancy with automatic failover and backup logic. It monitors all available internal and external signals, and annunciates any detected faults through a discrete output. An analog output (0 to 5 Vdc or 4 to 20 mA) provides actual position indication, and a discrete input is available to remotely shut down the actuator.

Additionally, the ProAct P-Series FL includes on-line and off-line diagnostics, current limiting based on driver electronics temperature, CAN communications, and service port communications. It is field programmable, allowing a single design to be used in many different applications. It must be configured and calibrated to the specific engine with a personal computer (PC) and a Woodward ProAct Service Tool that communicates serially to the driver via RS-232. The Service Tool (part number 9927-1187) can be downloaded from the Woodward website ([www.woodward.com](http://www.woodward.com)). Data files for subsequent applications of the same engine model can be downloaded off-engine.

Refer to manual 26659 for more detailed information.



- Extremely fast, bi-directional actuator, electronically positioned in both directions
- All-electric actuator requires no drive or hydraulic supply
- Integral driver compatible with broad range of control systems
- 75° ( $\pm 2^\circ$ ) rotary output allows direct coupling to butterfly, eliminating linkage
- Multiple sizes to fit broad range of applications
- Single or redundant position command signals
- Configurable parameters to tailor to varied applications
- CAN communications
- Advanced Diagnostics

## General Specifications

Actuator Model	Weight	Torque Output		Maximum Input Power		Maximum Current	
		Transient	Continuous	Transient	Continuous	Transient	Steady State
<b>Model II</b>	11 kg 25 lbs	5.2 N•m 46 lb-in	2.6 N•m 23 lb-in	251 W	65 W	13 A	3.5 A
<b>Model III</b>	15 kg 32 lbs	10.4 N•m 92 lb-in	5.2 N•m 46 lb-in	282 W	73 W	15 A	6.5 A
<b>Model IV</b>	24 kg 52 lbs	20.8 N•m 184 lb-in	10.4 N•m 92 lb-in	370 W	100 W	20 A	6.5 A

## End User I/O Description

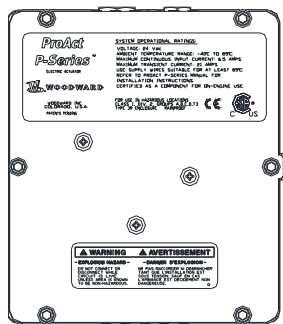
<b>Power Input</b>	18–32 Vdc with out-of-range diagnostics
<b>Command Input</b>	PWM: 8.4–32 V, 300 to 2000 Hz Analog: 0–200 mA, 0–25 mA, or 0–5 Vdc CAN
<b>Position Feedback Output</b>	0–25 mA or 0–5 Vdc
<b>Discrete Inputs</b>	Low Power standby mode Four CAN address combinations
<b>Discrete Output</b>	Normally “ON” turns “OFF” to indicate a detected fault
<b>RS-232 Serial Communications</b>	For connection to PC Service Tool
<b>CAN 2.0B Communications</b>	Complies with SAE J1939 but uses proprietary group extensions. Supports position command signal and monitoring of all shutdown and alarm conditions as well as some system variables.

## Environmental Specifications

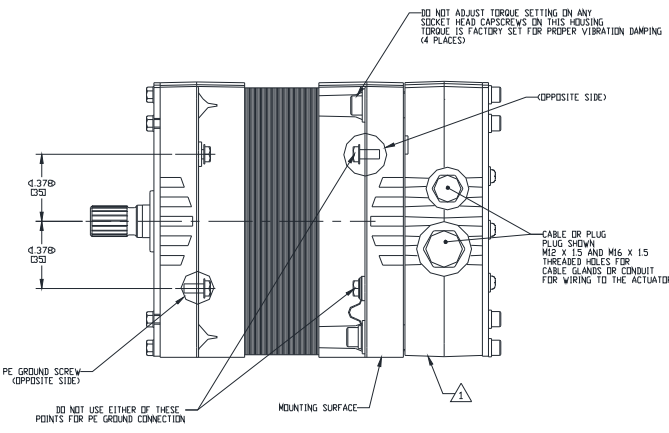
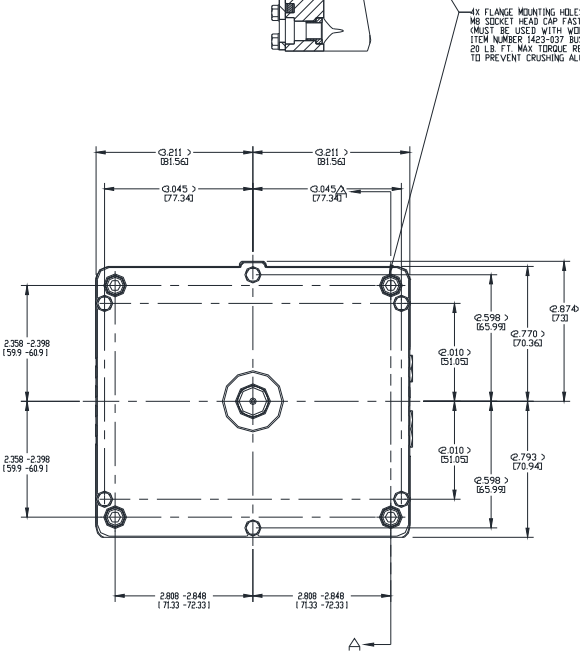
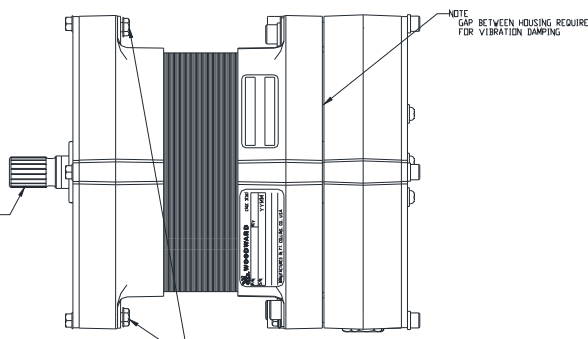
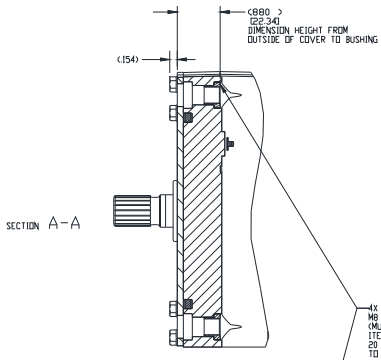
Specification Item	Acceptable Range or Qualification Condition	Comments
Operating Temperature Limits	–40 to +85 °C. Under all conditions the Temperature Monitoring Zone must remain below 90 °C.	See Mechanical Installation section of manual 26659 for discussion of this specification item.
Storage Temperature	–40 to +125 °C, unpowered.	
Mechanical Vibration	RV2: US MIL-STD-202F, procedure 214A: 0.1 G <sup>2</sup> /Hz, 10 Hz to 2000 Hz, 3 hr/axis, 12.8 Grms	
Mechanical Shock	US MIL-STD-810C, Method 516.3, 516.4 procedure 1	
Ingress Protection	IP56 per IEC 60529	
Humidity	H2: (Woodward) profile	
Chemical Resistance	The actuator uses materials proven capable of withstanding normal engine environment chemicals per SAE J1455, such as diesel fuel, engine oil, and antifreeze.	

## Performance Specifications

Parameter	Specification
<b>Max Slew Rate</b>	> 1000 degrees/second > 18.5 rad/s (10% to 90% travel)
<b>Position Feedback Accuracy</b>	< 1.0% of full stroke at 25 °C after calibration < 350 ppm/°C, maximum after calibration
<b>Position Feedback Repeatability</b>	< ±1.0% of full stroke at 25 °C after calibration



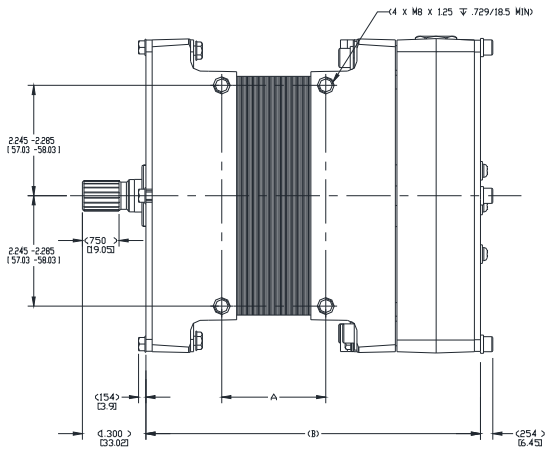
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DIMENSION TABLE (BY MODEL)				
	A (INCH)	A (METRIC)	B (INCH)	B (METRIC)
MODEL II	2.182	(55.42)	(6.859)	(174.22)
MODEL III	3.395	(86.23)	(8.058)	(204.67)
MODEL IV	5.845	(148.46)	(10.509)	(266.93)

NOTES:  
 ▲ A MINIMUM GAP OF 0.5MM MUST BE MAINTAINED  
 AROUND THE ELECTRONICS ENCLOSURE AND  
 ANY MOUNTING SURFACE AFTER INSTALLATION  
 PER MANUAL.

DIMENSIONING FORMAT: INCH  
 [METRIC]



**P-Series FL Position Controller Outline Drawing**  
 (Do not use for construction)

## Regulatory Compliance

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### European Compliance for CE Mark:

- EMC Directive: Declared to 2004/108/EC COUNCIL DIRECTIVE of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility.

### Other European Compliance:

- Machinery Directive: Compliance as partly completed machinery with Directive 2006/42/EC of the European Parliament and the Council of 17 May 2006 on machinery.

### Agency Listings:

- CSA Certified for ordinary locations
- CSA Class I, Division 2 component listing

## Customer Electrical Connections

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All input and output signals run through an M12 and/or M16 threaded port, using cable glands and/or conduit as needed to maintain the Class I, Division 2 and Type 3R Enclosure Rainproof. Field wiring is connected to internal screwless cage-clamp-style terminal blocks.



PO Box 1519, Fort Collins CO, USA 80522-1519  
 1000 East Drake Road, Fort Collins CO 80525  
 Tel.: +1 (970) 482-5811 ♦ Fax: +1 (970) 498-3058  
[www.woodward.com](http://www.woodward.com)

#### Distributors & Service

Woodward has an international network of distributors and service facilities. For your nearest representative, call the Fort Collins plant or see the Worldwide Directory on our website.

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For more information contact:



U.S. Toll Free 877-544-5201  
 Lada S/C Mexico 888-418-DRAK (3725)  
[www.drakecontrols.com](http://www.drakecontrols.com)