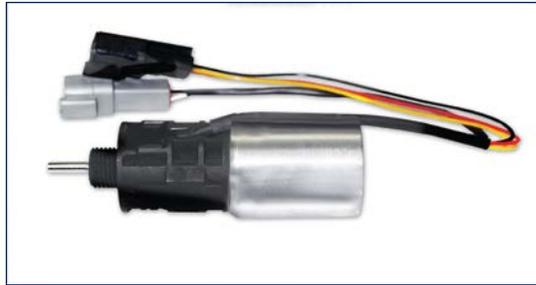


APECS™ 0154

Linear Actuator Integral to Fuel Pump

Applications

The APECS™ 0154 linear actuator provides proportional fuel control for diesel engines typically used in construction, industrial, power generation, and agricultural equipment. As the newest plank in Woodward's platform of solutions for on-engine actuation, it can be customized to OEM requirements for diesel engines using mechanical fuel pumps.



Integral actuator purpose built for engines equipped with certain PFR-style diesel fuel injection pumps

Description

Woodward's 0154 linear actuators deliver precise positioning and form the foundation for full electronic fuel control systems. They are designed for operation on diesel engines and can be tailored to suit customers' specific requirements.

The actuator design employs the principle of variable reluctance for consistent force over the entire stroke. This simple design of a proportional electric linear actuator utilizes a linear armature whose magnetic force is proportional to the input current to the coil.

The 0154 is available in two configurations—standard or LAPS (linear actuator with position sensor). Both actuators affect fuel control by applying current to move the plunger in or out. With the standard actuator, the shaft position is defined as a point between the energized and de-energized positions. With the LAPS actuator, the non-contacting position sensor allows feedback to the engine control module to indicate and control shaft position. This is particularly advantageous when position feedback is required for emissions control.

Another advantage of the non-contacting position sensor is that, unlike a brushed linear potentiometer, it will not wear out or become contaminated over time.

Purpose-built for specific diesel engines with mechanical fuel pumps, the 0154 is paired with an APECS electronic controller to accurately drive the fuel rack for optimal fuel-air ratio, compensating for changes in the fuel system. Spring force is tailored to specific fuel system force requirements.

The actuator is integrated into the fuel pump so no mounting apparatus or external linkage is necessary.

LAPS actuators should be used with an APECS 4800 controller for position feedback operation. Standard actuators can be used with any APECS controller with a pulse-width-modulating frequency of up to 250 Hz.

- Purpose built for specific engines
- Can be tailored to any application
- Position sensing feedback for the controller
- Non-contacting position sensor ensures less wear and contamination over time
- Precise positioning helps meet emissions control standards
- Corrosion-resistant components
- Reliable engine fuel control when used with APECS electronic controllers

Specifications

The charts below provide specifications for the 0154 standard or LAPS actuator and for the non-contacting position sensor.

Contact your Woodward account manager to discuss your customization requirements.

0154 STANDARD OR LAPS ACTUATOR	
Ambient Temperature Range	-30 °C to +105 °C (-22 °F to +221 °F)
Rated Voltage	12 Vdc ± 25%
Rated Current (nominal)	3.0 A @ 23 °C (73 °F)
Stroke	0.52" ± 0.04 (13.2mm ± 1.0)
Force	1.8 lbf (8.0 N) @ 23 °C (73 °F)
Work Rating	0.13 ft-lb (0.18 joules)
Response Time	30 ms full stroke
Resistance (nominal)	4.0 Ohms
Duty Cycle	Up to 100%
PWM Frequency	250 Hz maximum
Return Spring (preload)	0.6 lb (2.7 N) de-energized position
Vibration Test Level	Accelerated life tested to 15 G's*
Shock Test Level	30 Gs peak

(*) Acceptable on-engine vibration levels are significantly less, depending on specific application and life requirements.

NON-CONTACTING POSITION SENSOR SPECIFICATIONS	
Sensor Supply Voltage (Vdd)	5 Vdc ± 10%
Analog Sensor Output Voltage	5-85% Vdd (0 to min. stroke)
Position Accuracy over Temp Range of -30 °C to +105 °C:	
Inside Control Range of 0.11 to 0.35" (3 to 9mm)	± 2.5% full scale*
Outside Control Range of 0.02 to 0.11" and 0.35 to 0.48" (0.5 to 3mm and 9 to 12.3mm)	± 4% full scale*

(*) Full scale = 0.48" (12.2mm) min. stroke

Dimensions

The dimensions below are provided to show an approximate size of the 0154 integral actuator.

Contact your Woodward account manager for details on how the 0154 can be tailored to your specific requirements.

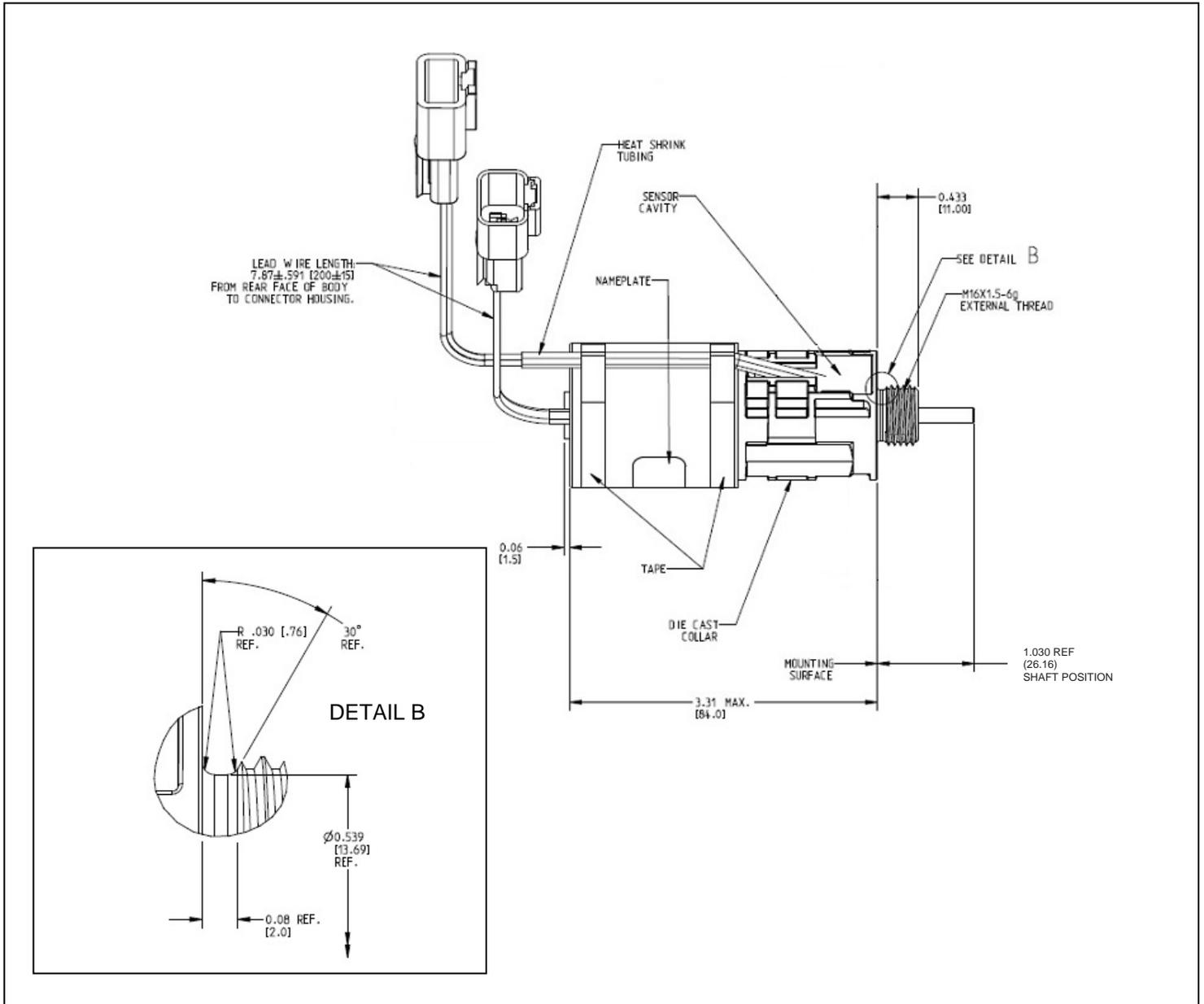


Figure 1. Mounting Dimensions for 0154 LAPS Actuator

Chart Notes:

1. Figures in parentheses are millimeters.
2. Plunger shown in de-energized position.
3. Installation torque 20 ± 5 Nm
4. Do not apply torque to actuator shaft.

Pinout

The chart below provides part numbers for the 0154 LAPS actuator's non-contacting sensor and coil connectors shown in Figure 2.

Connector	Housing	Terminal Pin	Wedge Lock	Mating Connector	
				Housing	Wedge Lock
Sensor	Deutsch DTM04-3P-E004	Deutsch 1060-20-0222	Deutsch WM-3P	DTM06-3S-E004	WM-3S
Coil	Deutsch DT04-2P	Deutsch 1060-16-0622	Deutsch W-2P	DTM06-2S	W-2S

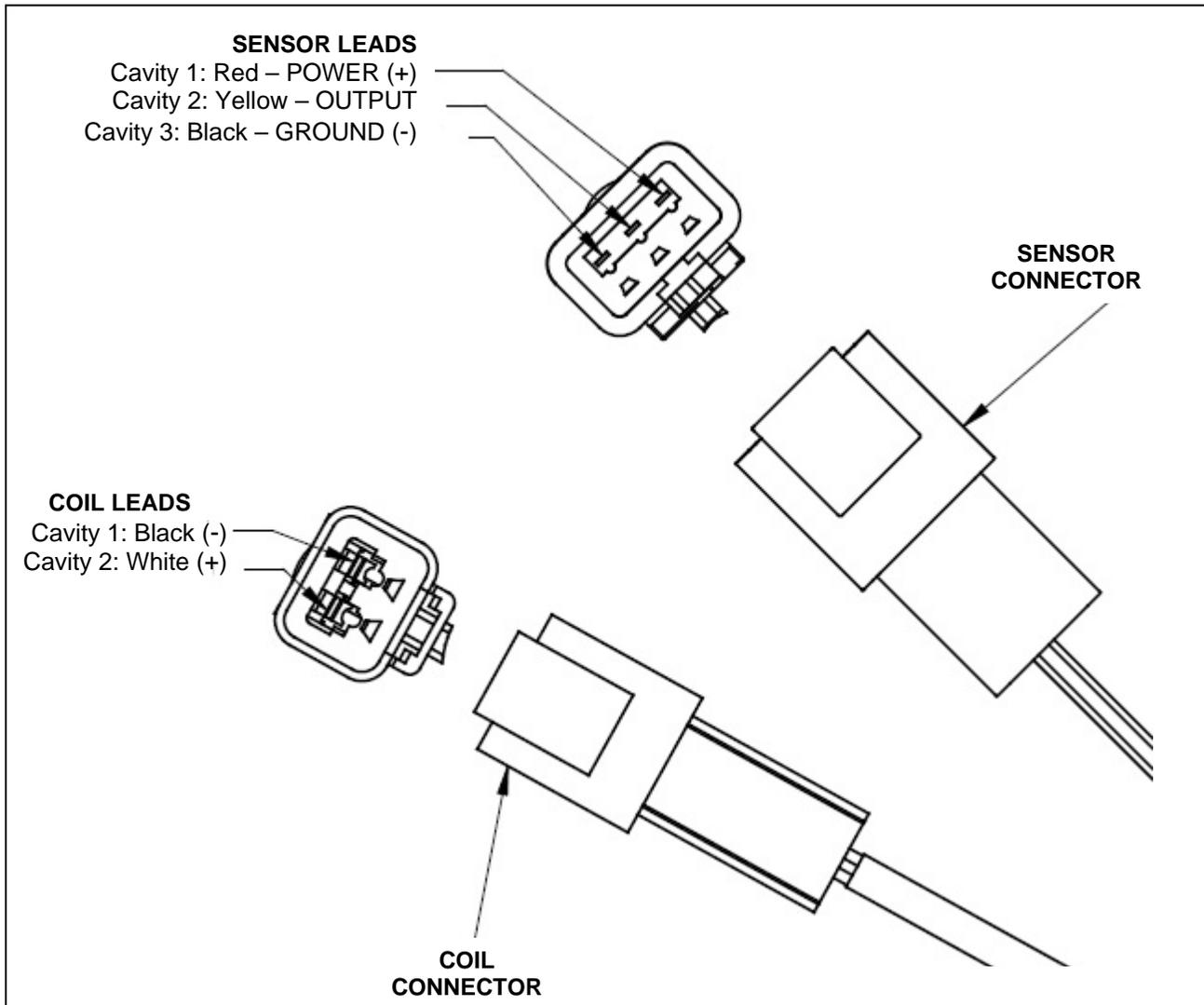


Figure 2. Sensor and Coil Connectors



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