ProAct™ I and II

Digital Electric Powered Governor Systems

Applications

The ProAct™ digital control system is an electric powered governor system designed to provide precise electronic control and limiting for gas and diesel engines.

ProAct I is designed for direct coupling to the butterfly valve shaft on small gas engines or for diesel engines which require less than 1.4 N·m (1.0 lb-ft) of torque to move the rack. ProAct II is designed for control of most diesel engines and larger carbureted gas engines.

Description

The ProAct control system is a combination of a 16-bit microprocessor control and a limited-angle rotational torque motor (actuator). The system features user-friendly menus to provide extreme flexibility in the development of special control schemes for different types of engines.

Two different ProAct actuators are available. The ProAct I actuator provides 1.4 N·m (1.0 lb-ft) of torque in steady state and 3.55 J (2.62 ft-lbs) of work over 75° of travel. The ProAct II provides 2.7 N·m (2.0 lb-ft) of torque in steady state and 7.11 J (5.24 ft-lbs) of work over the 75° of rotation.

The control has two complete sets of dynamic adjustments to aid when operating with such conditions as two different fuels, or in parallel/stand-alone electrical generation. A four-slope gain schedule is available in each set of dynamics. This permits programming for extremely responsive yet extremely stable operation of carbureted engines. Adjustment of the ProAct control is done through a hand held programmer. The programmer allows access to all of the tunable items. The programmer is separate from the control, and will normally be unplugged and removed during governor system operation. This provides security against unauthorized tampering with system adjustments. The control may be tuned or monitored with a PC rather than with the hand held programmer, if desired.

- 75° rotary output allows direct coupling to butterfly, eliminating linkage
- All-electric actuator requires no drive or hydraulic supply
- Programmable digital electronics permit tailoring control to various applications
- Actuators are extremely fast, electronically positioned in both directions
- Alternate dynamics for dual fuel applications or cogen/standby
- 3 speed-activated switches
- Start fuel limit and maximum fuel limit for derating
- Manifold pressure fuel limiting
- Two-slope torque limiting

Standard Features

The ProAct digital electronics include settings for either droop or isochronous operation. Start, idle, and rated speeds may be set. Separate droop schedules are available for rated and idle. Variable speeds may be controlled by external input. The rates that the speed setting can be raised or lowered may also be adjusted. Fuel limits may be imposed for No Load, Full Load, Start-up (start-fuel limit), and Idle speed. A two-slope torque limit is available. Separate ramp times may be established for acceleration and deceleration. Speeds for rated, idle, raise limit, and lower limit are also easily preset.

Specifications

Actuator

Output Shaft: 0.500-36 inch serration on output shaft. Opposite side used for feedback device. (Other configurations available upon request.)

Operating Temperature Range: –40 to +100 °C (–40 to +212 °F) operating environment. Contact Woodward for extreme temperature installation procedures.

Feedback: Brushless Hall effect feedback device directly connected to actuator shaft.

Installation: May be mounted on 2.250 inch (57.15 mm) diameter male pilot concentric to the terminal shaft using four bolts through the actuator or with four 0.312-18 inch bolts into the base (M8-6H metric optional). The actuator may be mounted in any attitude.

May be connected directly to butterfly shaft, or may be linked to rack or valve.

Weight: The ProAct I and ProAct II actuators each weigh 6.9 kg (15.25 lbs).

Construction: All external surfaces are resistant to water and salt water corrosion. Actuator is waterproof at normal water hose pressure. Do not high-pressure wash.

Vibration and Shock Tested: Tested to US MIL-STD-810C.

MIN Fuel Return Spring: The actuator is equipped with a light spring return toward min fuel to prevent drift in case of position signal interruption. Normal operating conditions do not require spring return, as the actuator is powered in both the increase and decrease directions.

Direction of Rotation: All models are capable of either clockwise or counterclockwise rotation to increase fuel.

Control

Speed: Dynamics maps are field selectable for either low speed (8–300 rpm) or high speed (300–2100 rpm).

Dynamics: Two menus for engine dynamics are switch-selectable for alternate fuel, alternate loads, etc. Four different gain settings in each dynamics menu tailor governor response to various conditions depending on load or non-linearity in the fuel control system.

Limiters: Limiters set minimum, idle, and maximum fuel settings, and minimum and maximum torque schedules. Two-slope torque limit schedule with program-selected breakpoint is available.

Speed Switches: Three speed switches are included with programmable on and off positions according to engine speed. The switches may be used to indicate cranking, idle, rated, or overspeed operation. Switch output is 500 mA when closed. Increase-speed trip points may vary from decrease-speed trip points.

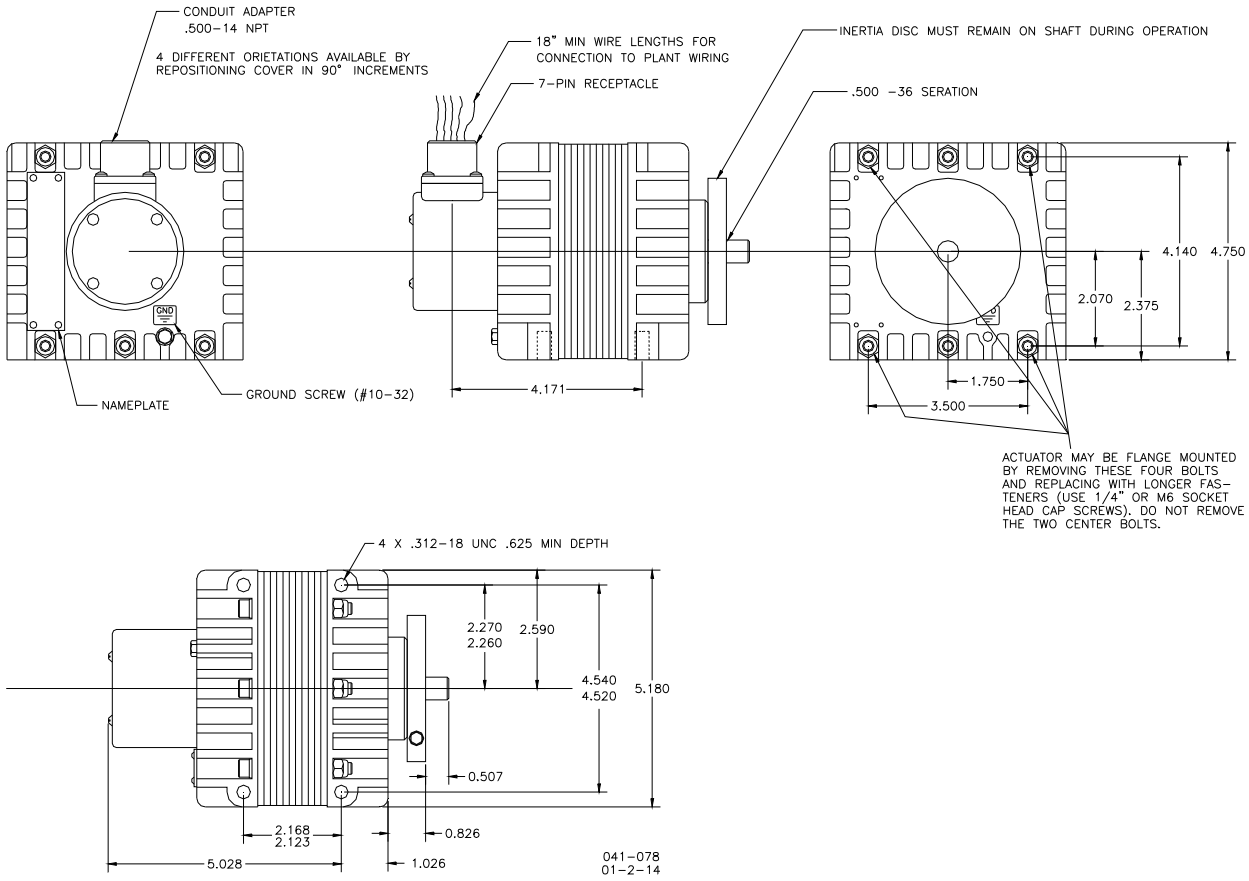
Droop: Two droop schedules are available, with a programmable switch point between idle droop and rated droop.

Speed Reference: Programmable minimum and maximum limiters with 4–20 mA remote reference to raise and lower the rated speed. Rate of change of speed reference may be programmed with different rates for raise and lower.

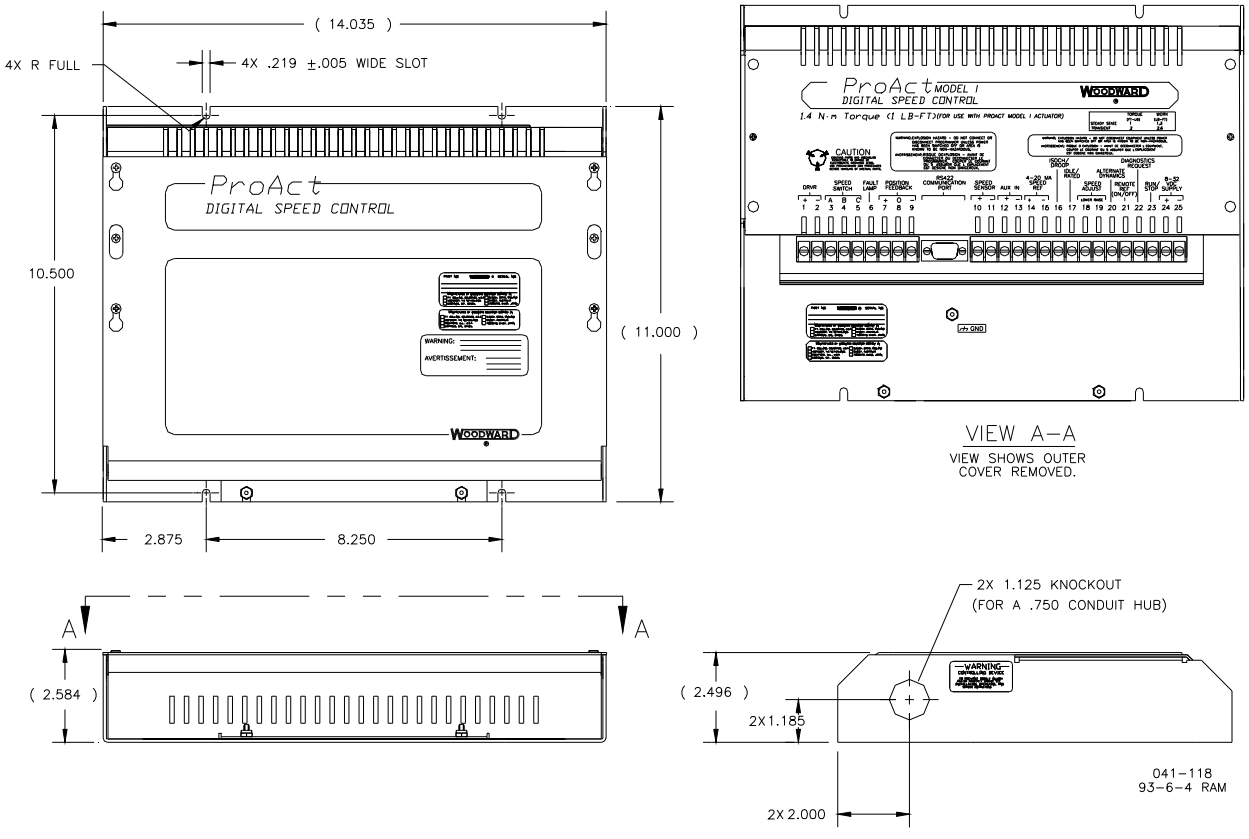
Accel and Decel Ramps: Acceleration and deceleration times may be programmed to protect engines from damage or to protect processes from sudden changes.

Supply Voltage Range:
8–32 Vdc for ProAct I
18–32 Vdc for ProAct II

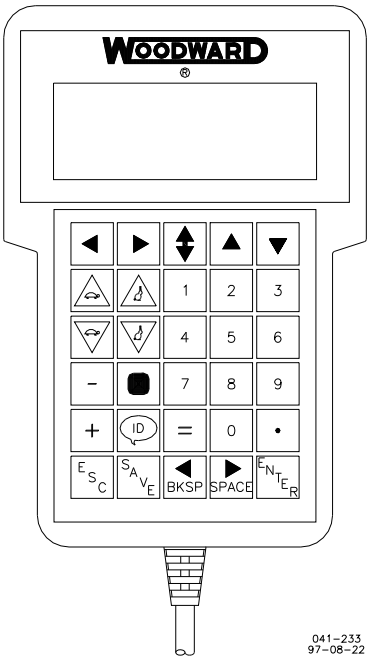
Technical Manual: 04121



Outline Drawing of ProAct™ I or II Actuator



Outline Drawing of ProAct Driver
(Do not use for construction)



Hand Held Programmer

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Distributors & Service

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