**Description**

The Woodward UG-25\(^{+}\) Actuator is a microprocessor-controlled, mechanical-hydraulic amplified, actuator for controlling diesel, gas, and dual fuel engines, and steam turbines, and obtains the muscle needed from a standard UG-type engine drive. It takes a standard 4 mA to 20 mA position command control signal from an electronic control system and converts it into a proportional 42 degrees of terminal shaft position to control engine fuel flow.

This fast-acting, high-work-output actuator has no need for any auxiliary devices such as a start booster or oil cooler. Two work output versions are available: 34 J (25 ft-lb) and 41 J (31 ft-lb) with maximum continuous speeds of 1200 rpm (drive shaft speed) for the 0.875 inch (22.22 mm) pump and 1700 rpm (drive shaft speed) for the 0.625 inch (15.88 mm) pump.

The UG-25\(^{+}\) Actuator uses a 1034 kPa (150 psi) internal operating pressure with an internal oil pump driven from the actuator's drive shaft. Oil pressure is maintained by a relief valve system with a drain to an internal oil sump. No separate oil supply is required.

- Suitable for gasoline, gaseous, and diesel fueled engines
- Standard 4 mA to 20 mA position command control signal
- Discrete output driver for status indication
- Drop-in replacement in UG-8 and 3161 applications
- 34 J (25 ft-lb) & 41 J (31 ft-lb) versions available
- Fast slew rate
- Available with either a keyed or serrated drive shaft
- Self-contained oil supply
- Compliant with applicable CE Directives—EMC, Pressure Equipment, Machinery
- Certified for use in marine applications
## Specifications

### Actuator

<table>
<thead>
<tr>
<th>Power Supply</th>
<th>(18 to 32) V (dc), dual inputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Consumption</td>
<td>Reverse polarity protection, 32 W max</td>
</tr>
</tbody>
</table>

**Torque/Work Output (minimum):**

- **Standard Version**
  - (0.625 inch diameter terminal shaft)
  - 45.4 N·m (33.5 lb-ft) torque; 32.9 J (24.3 ft-lb) of work over 42 degrees

- **Increased Output Version**
  - (0.75 inch diameter terminal shaft)
  - 55.5 N·m (40.9 lb-ft) torque; 40.2 J (29.6 ft-lb) of work over 42 degrees

- **Max. Continuous Speed**
  - 1700 rpm (drive shaft) max (0.625 inch pump);
  - 1200 rpm (drive shaft) max (0.875 inch pump)

- **Hysteresis**
  - 1.0 % or less (measured over full terminal shaft travel)

- **Temperature Drift**
  - 1.0 % or less of full terminal shaft travel between 27 °C and 77 °C (80 °F and 170 °F)

- **Linearity**
  - 2.5 % or less (measured over full terminal shaft travel)

- **Slew Rate**
  - 180 degrees/second or better at full actuator oil pressure for 34 J (25 ft-lb) of work output
  - 145 degrees/second or better at full actuator oil pressure for 41 J (31 ft-lb) of work output

**NOTE**—All performance specifications are valid while operating at a case temperature between 71 °C and 93 °C (160 °F to 200 °F) with an oil viscosity of 20 cSt to 65 cSt (100 to 300 SUS).

- **Weight**
  - 27 kg (60 lb), dry weight

- **Customer Connections**
  - Terminal blocks located inside front access plate (field wiring enters the top of the unit through a cable gland available commercially or from Woodward)

### Actuator Drive / Hydraulic System

**Input Shaft Options**

- 0.625 keyed drive shaft with 0.625-18 threads or 0.625-36 serrated

**Output**

- 42.2 ± 0.6 degrees rotary

**Terminal Shaft Options**

- 0.625-36 serration (standard), 0.750-36 serration (increased output version)

**Drive Power Requirement**

- 335 W (0.45 hp) max.

**Internal Hydraulic Pressure**

- 1034 kPa (150 psi)

**Oil**


**Drive Speed**

- Available with either high or low speed pump

  - **High-speed pump:** 500 rpm to 1700 rpm (drive shaft)
  - **Low Speed pump:** 350 rpm to 1200 rpm (drive shaft)

**Drive Rotation**

- Pump can be configured to operate in CW or CCW direction

### Functions

**I/O**

- 4 mA to 20 mA position command control signal from electronic control system

**Front Panel Indications**

- Unit Healthy discrete out

- Unit Healthy status indication
UG-25° Actuator Outline Drawing
(Do Not Use for Construction)

Drive Shaft Options
Specifications (continued)

Environment

Ambient Operating Temperature 0 °C to 55 °C (32 °F to 131 °F)
Actuator Case Temperature 100 °C (212 °F) maximum
Storage Temperature –40 °C to +85 °C (–40 °F to +185 °F), limited by electronics
EMC EN61000-6-2: Immunity for Industrial Environments
EN61000-6-4: Emissions for Industrial Environments
Humidity US MIL-STD 810E, Method 507.3, Procedure III
Shock MS1-40G 11 ms saw tooth
Vibration Validation Power Spectral Density (PSD) must not exceed the level or frequency as shown in the curve while the governor is running on a loaded engine, as measured at governor base.

UG25 Maximum Allowed Application Vibration PSD vs. Frequency

<table>
<thead>
<tr>
<th>Frequency (Hz)</th>
<th>Allowed PSD Level (G^2/Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>0.00240</td>
</tr>
<tr>
<td>40</td>
<td>0.00414</td>
</tr>
<tr>
<td>80</td>
<td>0.00736</td>
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<td>220</td>
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<td>540</td>
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<td>700</td>
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<td>1480</td>
<td>0.05339</td>
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<tr>
<td>1960</td>
<td>0.01595</td>
</tr>
</tbody>
</table>

Thermal Shock SAE J1455, Paragraph 4.1.3.2
Ingress Protection IP45 for entire unit. IP56 for User Interface per EN60529 and only if proper cable glands are used as described in the technical manual.

Regulatory Compliance

European Compliance for CE Marking:

Other European Compliance:
(Compliance with the following European Directives or standards does not qualify this product for application of the CE Marking)
Machinery Directive: Compliant as partly completed machinery per 2006/42/EC
Pressure Equipment Directive: Compliant as “SEP” per Article 3.3 to 97/23/EC

Marine Compliance:
Models are available that are suitable for marine applications. Contact your sales representative for more information.

Technical Manual 26580

For more information contact: