Applications

Woodward's E³ Rich Burn control provides highly stable, closed-loop control of air-fuel ratio on engines using three-way catalysts, to help engine owners meet regulated emission levels without operator adjustment. The exclusive StableSense* technology maintains uptime and catalyst performance by using the only industrial-gas-engine-specific O2 sensor.

The E³ Rich Burn control is designed for use on stoichiometric, spark-ignited natural-gas engines used in gas compression, power generation, pumping, and other stationary applications ranging from under 300 kW (400 hp) to over 2 MW (2700 hp).

The E³ Rich Burn control is part of the Woodward line of E³ All-Encompassing Engine and Emissions controls designed to meet the performance and reliability needs of gas engine manufacturers, owners and operators.

Control Overview

The E³ Rich Burn control is a fully integrated engine control solution. It can be used as a stand-alone air/fuel ratio controller or as a complete gas engine emissions and engine control. The control features exclusive StableSense technology, to optimize the amount of time the engine remains in compliance. The StableSense technology contains special software and uses an industrial natural gas O2 sensor that is unaffected by engine exhaust methane and hydrogen.

The E³ Rich Burn control has full authority over spark, fuel, and air. Additionally, diagnostics such as misfire detection as well as other health monitoring and engine protection are integrated into the control.

E³—A fully integrated control for increased reliability:
- Air-fuel ratio control (base control)
- Integrated speed/load control (optional)
- Ignition control (optional)
- Engine protection
  - Full misfire detection for increased catalyst life and engine diagnostics
  - Overspeed monitoring for immediate engine shutdown
- Start fuel limiting for easier, more consistent starting
- Scalable from small mono- to large stereo-fuel systems

The E³ Rich Burn control works in conjunction with Woodward’s full range of gas engine components:
- Woodward Integrated fuel valves and engine throttle bodies, from 16 mm to 180 mm
- Fixed-venturi mixers
- Ignition systems (Woodward IC-920 or IC-922)

Engine health and diagnostics are integrated to ensure the engine remains in a safe operating mode.

*Trademark of Woodard, Inc.  **—Trademark of Schneider Automation Inc.

Relevant Item Numbers

| Control - E3 Rich Burn AFR Only       | 8280-1104 | StableSense Mating Connector 8928-7363 |
| Control - E3 Rich Burn Speed Control | 8280-1105 | L-Series AFR Trim Valve Per Catalog |
| Pickup – Magnetic (.625-18,1680-622 P.U.) | 5430-929 | L-Series AFR Connector Kit 8928-396 |
| KIT - E3 - Mono AFR Sensor            | 8928-7264 | F-Series AFR Trim Valve Per Catalog |
| KIT - E3 - Stereo AFR Sensor          | 8928-7265 | F-Series AFR Connector Kit 8923-1312 |
| StableSense Sensor                   | 1689-1197 | E3 Rich Burn Control Manual 26473 |
**Typical Configurations**

The E³ Rich Burn control can be applied in a number of configurations, including mono and stereo fuel supply, air-fuel only or air-fuel plus speed control variations, as well as high-energy ignition control options.

**Mono-supply, Air-Fuel-Ratio (AFR) Control**

**Mono-supply, Air-Fuel-Ratio (AFR) + Speed Control**

Stereo systems are dual-bank engine configurations that have two separate fuel-supply systems and two separate exhaust manifolds with one pre-catalyst HEGO sensor for each bank.

**Environmental Specifications**

- **Operating Temperature:** –40 °C to +85 °C (–40 °F to +185 °F)
- **Storage Temperature:** –40 °C to +105 °C (–40 °F to +221 °F)
- **Mechanical Vibration:** Woodward Vibration Test RV2 (Procedure 3-04-6231): 0.1 G²/Hz, 10 Hz to 2000 Hz, 12.8 Grms, 3 h/axis w/vibration isolation dampeners
- **Mechanical Shock:** 50 G, 11 ms, half-sine wave, 4 shocks in each direction (24 total shocks)
- **Ingress Protection:** IP66 per EN60529
- **EMC Specifications:**
  - EN61000-6-2: Immunity for Industrial Environments
  - EN61000-6-4: Emissions for Industrial Environments

For environmental specifications of other system components, please refer to the applicable product specifications.

**Regulatory Compliance**

**European Compliance for CE Marking**—These listings are limited only to those units bearing the CE Marking.


**North American Compliance**—These listings are limited only to those units bearing the CSA agency identification.

**CSA:** CSA Certified for Class I, Division 2, Groups A, B, C, D, T4 at 85 °C ambient. For use in Canada and the United States. Certificate 1604047.

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