

FUELING PROGRESS

Diesel & Gas Engine Solutions



At the Heart of the System

Fueling Progress

Our customers are the OEMs and packagers of industrial engines and turbines. By focusing on the success of our customers, Woodward Industrial Controls has become one of the **largest independent suppliers** of energy control technologies for gas and diesel engines and industrial turbines in the world.

Woodward controls are operating on engines **all over the globe**, keeping equipment running safely and operations running efficiently.

Today, Industrial Controls is focusing on the technology that made us a **leader in engine control**: on-engine controls and fuel systems. What we refer to as **Core Fuel and Combustion Control (CFCC)** is a strategy that truly places us back at the heart of the system, providing state-of-the-art fuel systems, actuators, valves, and controls that will maximize **fuel economy, efficiency, and emissions control** while **minimizing system costs**.

Industrial Controls is building on its existing electrically operated valves and actuators and digital controls to bring **“smart” components** to market and to enable a truly intelligent, **“Networked Engine.”**

Maximize your **FUEL ECONOMY**
and **EFFICIENCY** and reduce your
EMISSIONS



Real world Solutions

In this era of low cost processing power and inexpensive, high volume components, Industrial Controls has set itself apart from other vendors.

The accumulated knowledge gained over decades of working on prime movers and developing, manufacturing, and applying **Core Fuel and Combustion Control** solutions for precision control of fuel, air, and unit control make us unique.

No other vendor can offer the depth of expertise and experience specifically in the area of engine and turbine control devices. Anyone can apply PCs and commercial operating systems to control applications, but Woodward takes advantage of PC economics to drive down costs and then provides specialized software and I/O to apply those tools effectively to the demanding engine or turbine control environment. Combine this with our extensive experience and Woodward becomes the obvious choice.

Today, Industrial Controls offers a complete range of actuators, valves, fuel delivery systems, and digital engine controls and is utilizing cutting-edge technology to produce the next generation of solutions.

Gas Engines

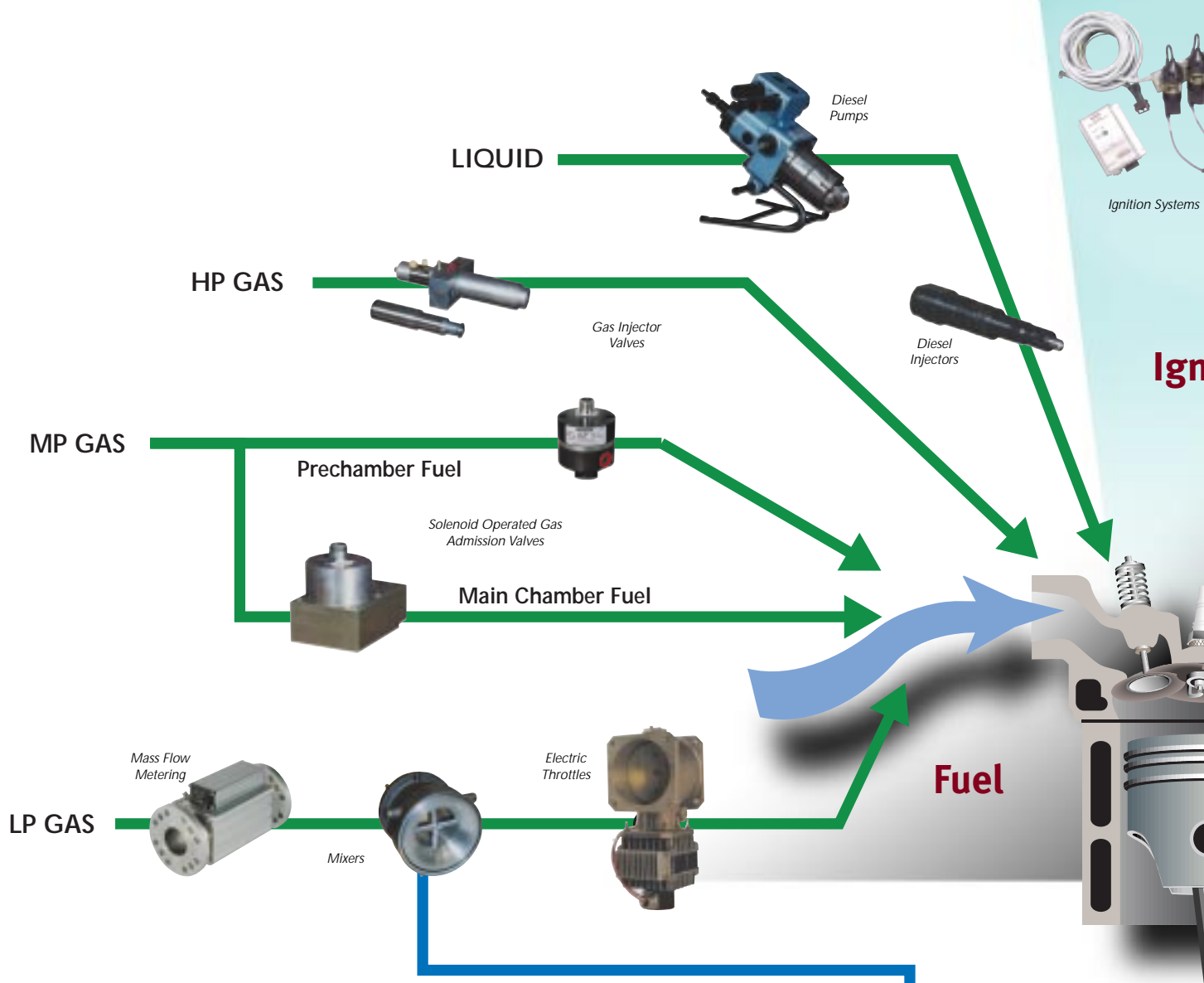
- Mass Flow Metering Systems
- Electronic Fuel Admission
- Mixers and Carburetors
- High Temp Exhaust Valves
- Detonation/Misfire Detection
- Air/Fuel Ratio Control
- Control Software Expertise
- Distributed Control
- Networked Engine Control
- Integrated Generator Control
- Ignition Systems
- Sophisticated Engine Control Solutions

Diesel Engines

- Mechanical Fuel Injection
- Electronic Fuel Injection
- Electrical Actuation
- Distributed Control
- Control Software Expertise
- Mechanical Actuation and Governing
- Sophisticated Engine Control Solutions
- Networked Engine Control
- Integrated Generator Control

WOODWARD offers you a **GREATER**
depth of **EXPERTISE** and **experience**

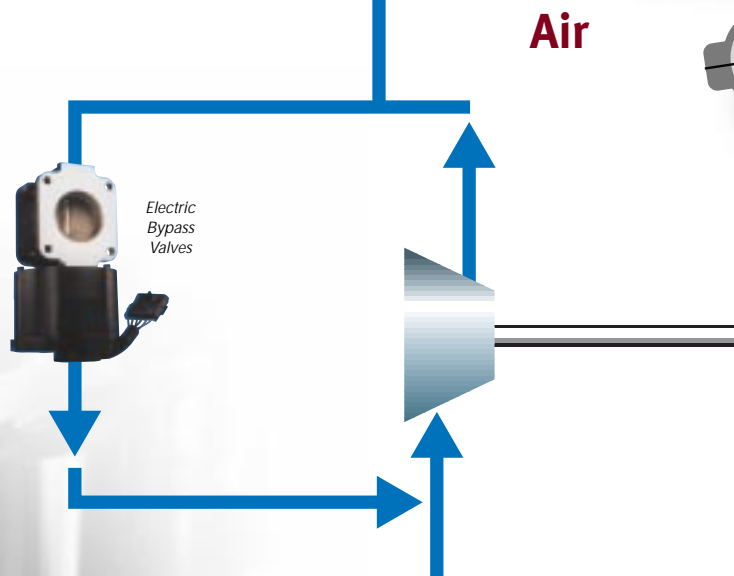
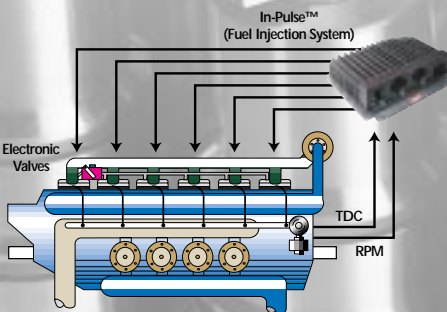




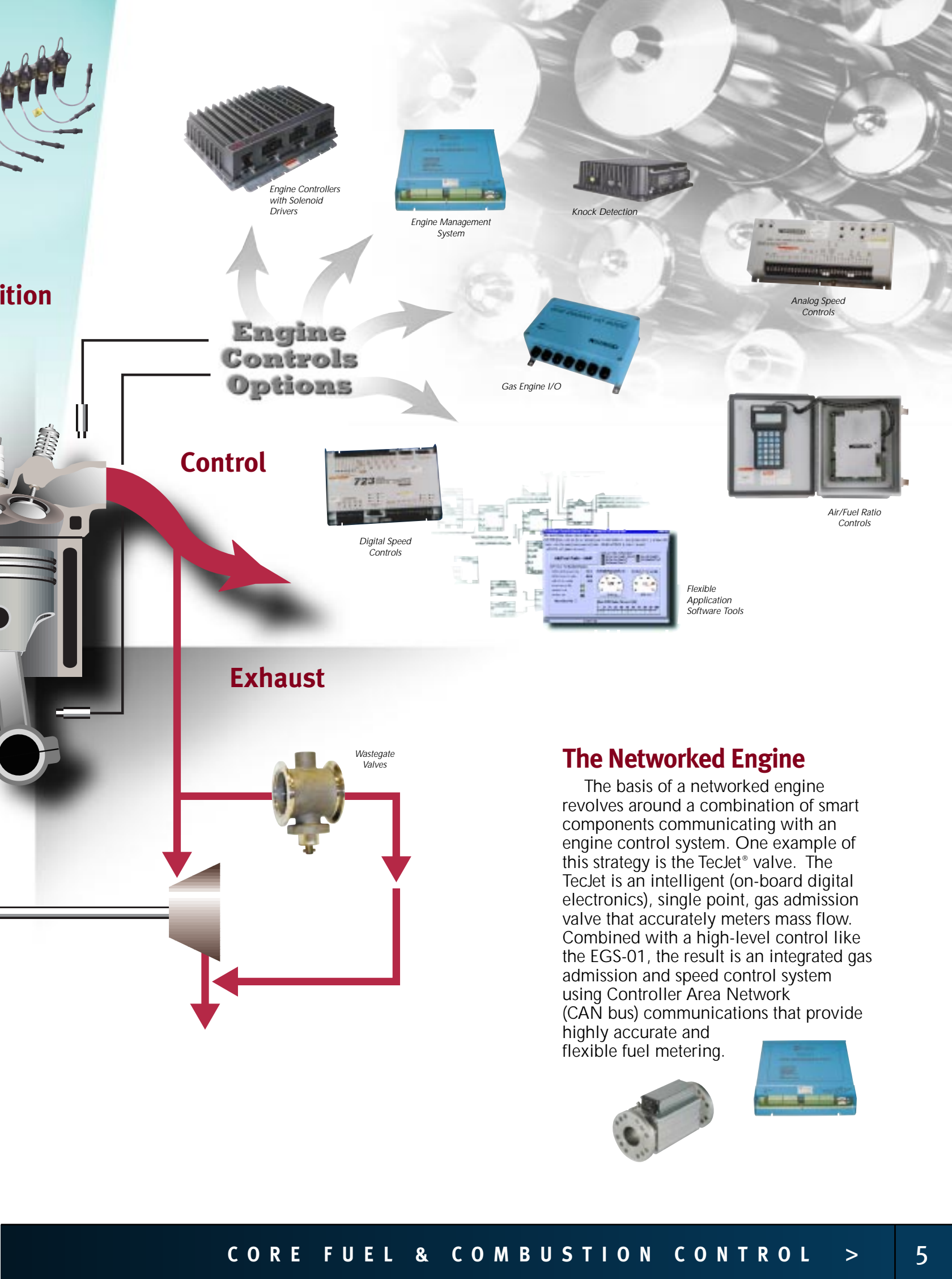
Electronic Fuel System

With a full range of solenoid operated gas admission valves for both main chambers and pre-chambers, Woodward provides complete electronic fuel systems for gas engines. Used in conjunction with a Woodward In-Pulse™ programmable control or other engine control unit, SOGAV valves provide precise cylinder-by-cylinder control of fuel injection timing and duration to maximize fuel efficiency and minimize harmful exhaust emissions.

For diesel and heavy fuel engines, Woodward is developing EDIS (electronic diesel injection system) and common rail fuel injection system technologies that provide the high fuel injection pressures and precise injection ramp rates required to achieve the ultimate in high fuel efficiency, low emissions engine designs.



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Control

Engine Controls Options

Exhaust

Wastegate Valves

Engine Controllers with Solenoid Drivers

Engine Management System

Knock Detection

Analog Speed Controls

Gas Engine I/O

Digital Speed Controls

Air/Fuel Ratio Controls

Flexible Application Software Tools

The Networked Engine

The basis of a networked engine revolves around a combination of smart components communicating with an engine control system. One example of this strategy is the TecJet® valve. The TecJet is an intelligent (on-board digital electronics), single point, gas admission valve that accurately meters mass flow. Combined with a high-level control like the EGS-01, the result is an integrated gas admission and speed control system using Controller Area Network (CAN bus) communications that provide highly accurate and flexible fuel metering.



ISO 9001 Six Sigma

Quality—It's a way of life

With decades of experience in designing, manufacturing, and applying actuators, governors, valves, and engine control systems, Industrial Controls has established itself as a dynamic leader in the Gas and Diesel engine market.

Our reputation has been built on the quality and reliability of our products, our extensive manufacturing capabilities, our global support, and our unmatched service.

However, if our customer is not successful, Woodward is not successful, therefore Woodward emphasizes customer satisfaction in four important areas known as **QDRC**:

Quality. The first time, every time. This is our first priority.

Delivery. On-time delivery so you get our products when you need them.

Responsiveness.

We respond to your needs without delay.

Cost. We constantly strive to reduce costs.

We intend to reach our QDRC goals by systematically applying **Six Sigma** methodologies to all of our processes. Today all of these



characteristics are being enhanced by Woodward's corporate-wide implementation of the Six Sigma quality philosophy.

Additionally, to help ensure the success of our customers, Industrial Controls can provide:

- Engine/System modeling
- Application engineering support
- Extensive standard and custom training programs
- Worldwide service and technical assistance

Six Sigma is a philosophy of continuous improvement focused on reducing process variation and increasing the robustness of product designs. It relies on an improvement strategy that is used by all employees to improve the quality of products, services, and processes.

Quality

Responsiveness

delivery



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facilities, and distributors,
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our website.

Call us to talk to one of our
expert product managers or
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www.woodward.com/industrial