

FWMurphy, Miratech In Control Systems Joint Venture

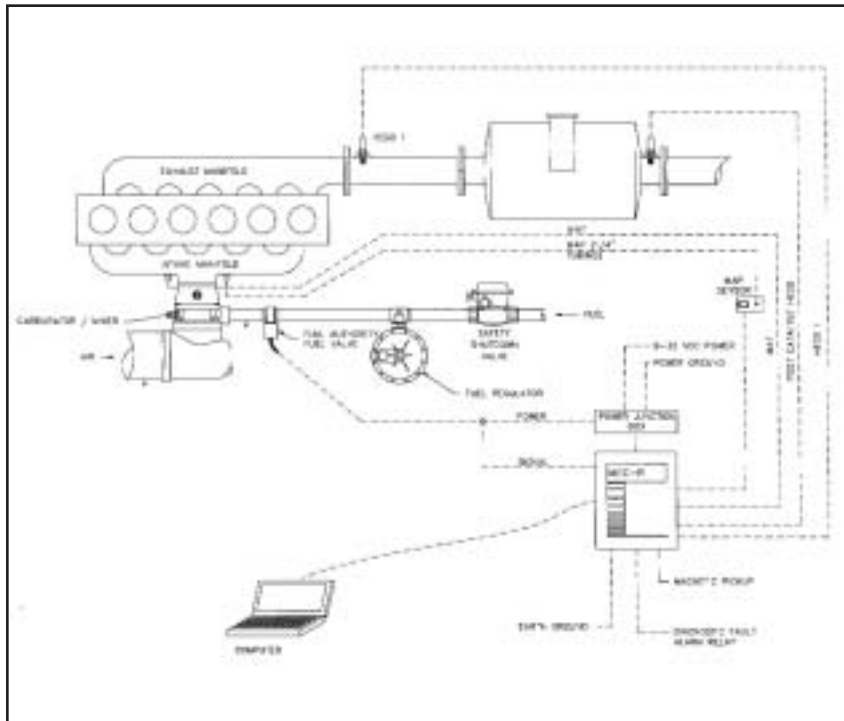
By Norm Shade

Two well-known companies, FWMurphy and Miratech Corp., recently joined forces to form Compliance Controls LLC. FWMurphy, established in 1939, is an ISO 9001 registered manufacturer of equipment management and control solutions for off-highway and construction equipment, gas compressors, standby generator controls, irrigation and water pumping. Privately held Miratech Corp. and its subsidiary, Miratech SCR Corp., are leaders in the development and engineering of emission control and engine performance technology for industrial engines. Compliance Controls and both parent companies are based in Tulsa, Okla., and have sales offices located across North America.

"The new organization is dedicated to sales, support and continuing development of its state-of-the-art, user-friendly Windows-based air-to-fuel ratio control systems," said Kevin O'Sullivan, president of Compliance Controls. "We saw a need in the industrial engine marketplace for more advanced, cost-effective, flexible, easy-to-install and easy-to-use engine control systems. Development of our rich-burn (MEC-R) and lean-burn (MEC-L) air-fuel control systems was a team effort to meet that need.

"Backed by our parent companies' distribution networks, Compliance Controls will focus exclusively on

Norm Shade is a field editor for Diesel Progress' sister publication COMPRESSORTech^{two}.



The new Compliance Controls MEC-R control system (right) includes pre-catalyst and post-catalyst closed loop exhaust O₂ feedback; cascade control for fast, real-time adaptation to changing catalyst performance; variable set-point for pre-catalyst and post-catalyst exhaust O₂ control for fast, real-time response to varying engine loads; catalyst temperature monitoring to protect emissions control catalysts from engine and fueling malfunctions; and two-dimensional open loop valve positioning, based on engine speed and load. It drives up to two fuel-metering valves for V engine configurations.

delivering and supporting air-fuel ratio control solutions tailored to our customers' specific requirements," he said.

Both control systems are designed for use on carbureted, spark-ignited natural gas and LPG engines. MEC-R is a rich-burn engine control system for use on engines equipped with three-way catalysts to reduce regulated pollutants such as oxides of nitrogen, carbon monoxide and hydrocarbons.

"The controller minimizes fuel con-

sumption while maximizing catalyst performance for precise, continuous compliance. It also cuts engine maintenance and includes a fail-safe diagnostic and troubleshooting system for operators and management," said Bill Clary, vice president of sales and marketing for Miratech.

MEC-L is a lean-burn engine control system that can control fuel with a variety of valves in full-authority ar-



FWMurphy and Miratech Corp. joined forces to form Compliance Controls LLC. The companies indicated that development of new rich-burn (MEC-R) and lean-burn (MEC-L) air-fuel control systems (left) was a team effort that provides a more advanced, cost-effective, flexible, easy-to-install and easy-to-use engine control system for the industrial engine marketplace.

rangements. "It reduces lean-burn engine maintenance costs, enhances performance and improves fuel economy," said Clary. "MEC-R and MEC-L air-fuel ratio control systems are the result of experience gained over the past decade and offer customers a dramatic upgrade in capabilities and user-friendliness at a competitive price," he added.

Jack Maley, vice president of operations for FWMurphy, pointed out that the MEC systems are closer in design to automotive-type air-fuel controllers than earlier engine control systems. "Using a reliable, high-performance air-fuel controller in conjunction with a three-way catalyst is the most effective method of cleaning rich-burn spark-ignition engine exhaust gases available today," he said.

The three-way catalytic converter that simultaneously oxidizes excess levels of exhaust carbon monoxide (CO) and nonmethane hydrocarbons (NMHC) and reduces nitric oxides (NO_x) becomes ineffective if the rich-burn engine air-fuel ratio differs by more than 1% from the stoichiometric value. The MEC-R system maximizes the efficiency of a three-way catalyst by maintaining a constant air-fuel ratio and continuous emissions compliance over varying engine loads, speeds, fuel quality, ambient temperatures and barometric pressures. It fits virtually any gas-fueled, carbureted, rich-burn industrial engine with any catalytic converter.

The MEC-R control scheme includes pre-catalyst closed loop, exhaust oxygen (O₂) feedback control, post-catalyst exhaust O₂ feedback; cascade control for fast, real-time adaptation to changing catalyst performance; variable set-point for pre-catalyst and post-

catalyst exhaust O₂ control for fast, real-time response to varying engine loads; catalyst temperature monitoring to protect emissions control catalysts from engine and fueling malfunctions; and two-dimensional open loop valve positioning, based on engine speed and load. It drives up to two fuel-metering valves for V engine configurations and can maintain compliance even with critical oxygen sensor malfunction.

Compliance Controls indicated that a crew of two could install and program the MEC-R system on an engine in two days for a new field installation with hard conduit, or less than a day with one technician for a retrofit project.

In addition to fuel control valve(s) and a microprocessor controller in a NEMA 12 enclosure, the system includes O₂ sensors downstream of the catalyst and in each exhaust bank upstream of the catalyst, air manifold pressure and temperature RTU's, pre- and post-catalyst temperature probes and a dedicated magnetic pickup for sensing engine rpm from the flywheel. The system includes all connectors and a selection of cables that can be cut to length at the terminal end where they connect to a terminal block inside the controller enclosure. A 9 to 30 Vdc power supply is required. The company and many of its distributors provide installation, set-up and operator training.

Three fuel control valve options are available with the MEC-R system. The most sophisticated is a Smart Valve electronic pressure regulator that controls all engine fuel with full authority and with differential fuel pressure control to maintain compliant operation in case of air-fuel controller signal failure. Other options are a full authority but-

terfly valve that controls all engine fuel or a trim fuel valve that adds supplemental fuel to the air intake system via a system controlled Teknocraft proportional fuel valve.

"The Teknocraft valve, which comes in three sizes for different pressure and flow requirements, can maintain emissions compliance over a load range of about 65% (e.g. 35 to 100%). The Smart Valve and the butterfly valve, both available in three sizes, have demonstrated an ability to control air-fuel ratio precisely over a load range from 10 to 100%," said Don Lambert, gas compression division manager for Miratech.

The control logic includes adaptive valve-learn software that continually updates internal look-up tables for rapid transient response and continued control in open loop mode. Also included are a comprehensive 44-fault on-board alarm, shutdown, diagnostics and troubleshooting system for continuous oxygen sensor health monitoring and detection of ashed catalysts and engine faults such as misfiring, overheating and valve sticking.

The system works automatically without operator intervention in normal operation. Software is Windows-based, compatible with laptops, PCs, Palm-type handheld devices or high-speed networks. At-a-glance dashboard on-screen graphics provide an immediate visual indication of system status and performance. Currently delivered on disk, the company indicated that software and documentation will soon be available for download by purchasers online from their website.

While lean-burn engine NO_x output is lower than in a rich-burn engine, it is difficult and expensive to further reduce lean-burn NO_x levels with emission after-treatment systems. "We engineered the MEC-L air-fuel control system specifically for lean-burn, spark-ignited natural gas engines to give operators an advanced technology retrofit option. It fits virtually any of these engines and maintains a precise air-to-fuel ratio over varying engine loads, speeds, fuel quality, ambient temperatures and barometric pressures," Clary said.

The look, feel and functionality of the



A Compliance Controls MEC-L control system was recently retrofitted on this 1400 rpm Caterpillar 3516TALE engine in a USA Compression gas gathering compressor package at a Migl/Mitchell lease in Lavaca County, Texas. The MEC-L control is housed in a NEMA 12 enclosure mounted below the main engine control panel (front center). Using a Flotech full authority fuel control valve (inset lower right) to precisely control the engine fuel, the system is set to maintain exhaust NO_x at 1.8 gm/hp-hp.

MEC-L system are similar to that of the MEC-R, and it uses the same NEMA 12 enclosure with different controller boards internally. The MEC-L can drive up to two fuel-metering valves for V engine configurations. Available fuel control valves include the Smart Valve Electronic Pressure Regulator and the Full Authority Valve.

“Another big MEC-R and MEC-L benefit is their support of high-speed RS 485/Modbus and CAN-link communications with networks and other advanced engine management systems, including the FWMurphy Millennium,” added Terry Baldwin, vice president of sales for FWMurphy. “The Compliance Controls systems deliver superior functionality and operational benefits at a competitive price. They offer customers a choice from multiple levels of functionality for differing applications,” he concluded.

Compliance Controls first introduced the new MEC systems to the field in early 2003. Applications for the new systems include stationary, spark-ignited natural gas and LPG engines used in natural gas compression, water treatment plants and liquid pumping

systems and marine power. “The Compliance Controls MEC gives operators all the benefits of today’s most advanced engine and emission system control technologies. That includes incredible ease of use, with minimal need for operator training. Our engineers have done all the hard work so operators don’t have to,” said Clary.

Compliance Controls indicated that future development work will target larger size Smart Valves to support larger engines; new fuel valve concepts; the addition of governing functions, ignition timing bias and air-fuel ratio dithering; additional communications options; and compliance assurance monitoring (CAM). ★