

EControls®

by **ENOVATION** CONTROLS

HELPS CARRY YOUR HEAVY LOADS

EControls by Enovation Controls delivers the most dependable, reliable systems ensuring optimal operation and uptime. We are the largest supplier of emissions-certified, spark-ignited engine controls and fuel systems to the material handling industry.

Our systems are used by every major forklift manufacturer in the world. Why? It could be our superior governor tuning capabilities that allow the forklift operators to be most efficient. It might be because our fuel system does not clog when the fuel has contaminants or heavy ends in the LPG. Or, it may be a result of our superior LPG regulator that allows operation in the coldest environments. It might simply be because our systems run your forklift every time and in every possible condition.

We offer systems for CNG and LPG, which use the exact same components, and we have a bi-fuel system that allows for operation on either LPG or Petrol.

Some of the value we bring our customers include:

- Integrated, hydraulic control circuits in the ECM, saving them money in component and manufacturing costs
- Improved uptime as our closed-loop control system accounts for all potential variations
- Low, upfront development costs to bring a spark-ignited, alternative-fueled engine to market

We offer a one-stop shop for the complete engine control system, reducing our customers supply base.



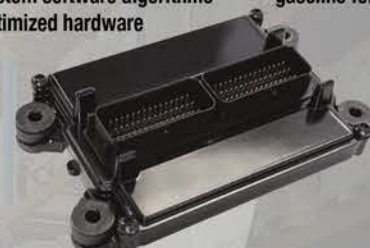
INTERGRATED ENGINE CONTROL SYSTEM

Spark Ignited Engine Control Module (ECM)

- Full Authority – controls spark, fueling, governing and includes all diagnostics and I/O
- Custom software algorithms
- Optimized hardware
- Qualified for engine mounting
- Application function integration
- Compatible with LPG, NG and gasoline for reduced systems cost

Diesel Engine Control Module (ECM)

- Full Authority – fueling, EGR, governing, common rail pump control and includes all diagnostics and I/O
- Custom software algorithms
- Optimized hardware
- Qualified for engine mounting
- Application function integration



Direct Electronic Pressure Regulator (DEPR)

- Electronic fuel pressure control
- No injector clogging issues
- Full-authority fuel control

Electronic Throttle Body

- High performance speed governing
- Proven durability and reliability



GASOLINE OR LPG INJECTORS

IGNITION COIL

KNOCK

CAM

TEMP

CRANK

OIL PRESSURE

ENGINE

INTAKE AIR

EXHAUST

AIR FUEL MIXTURE

LPG

ENGINE COOLANT

GASOLINE



ENGINE CONTROL MODULE (ECU)

HEGO

HEGO

3 WAY CATALYST

FUEL PRESSURE/TEMPERATURE MANIFOLD

GASOLINE OR LPG TANK



DUAL STAGE REGULATOR

LOCK OFF VALVE



CNG OR LPG

Mixer

- Provides superior air/fuel ratio control
- Extremely durable diaphragm for extended life



Lock off Valve

- High durability
- High temperature rating



Returnless Gasoline Fuel Pressure Manifold

- Allows electronic fuel pump management
- Eliminates tank heating and vapor management concerns



HEGO Sensor

Sensor options include both switching and wide band oxygen, knock, pressure, temperature and speed



TMAP Sensor



Light-Duty Dual Stage Regulator

- High heat transfer for full power operation at start up
- High durability components
- Robust to fuel contaminants



INDUSTRIAL ENGINE CONTROL SYSTEM FOR CNG, LNG, LPG, PETROL AND DIESEL

The EControls Advantage

Since 1994, EControls products have delivered innovation and customer satisfaction to the material handling industries through:

- State-of-the-art engine application, calibration, development and testing to meet emissions, drivability and fuel economy requirements*
- Design, development, qualification and production of Engine Control Units that are more robust than automotive grade*
- Creation of critical components – fueling systems, harnesses, sensors and actuators*
- High-quality, rugged and robust systems used in the most demanding environments*



www.econtrols.com

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1411504 5-2014