

# MI-07 Integrated Engine Control System



## **APPLICATIONS**

The MI-07 control system is an advanced control engine management system for propane and CNG engines in forklifts and other on or off-highway vehicles. MI-07 is emissions certified on 8 engines to the 2007 standards for Large Spark Ignited (LSI) engines as established by the California Air Resources Board (ARB) and the Environmental Protection Agency (EPA). The emission results are demonstrated to meet the 2010 emission standards that are proposed by the ARB.

The control system is applicable to naturally aspirated engines ranging in size from 1.5 L to 8.1 L (25 HP to 170 HP) with up to 8 cylinders running on LPG and/or gasoline in mobile industrial applications.

MI-07 delivers accurate, reliable, and durable control over the service life of the engine in the extreme operating environment found in heavy-duty, under hood, on-engine electronic controls. It also provides the assurance of 5,000 hour or 5-year emissions compliance.

## DESCRIPTION

MI-07 is a closed loop system utilizing a catalytic muffler to reduce the emission level in the exhaust gas. In order to obtain maximum effect from the catalyst, an accurate control of the air fuel ratio is required. A small engine control module (SECM) uses a heated exhaust gas oxygen sensor (HEGO) in the exhaust system to monitor exhaust gas content.

The SECM makes any necessary corrections to the air fuel ratio by controlling the inlet fuel pressure to the air/fuel mixer. Engine speed is monitored by the SECM, as are temperature and absolute pressure

MI-07 is a drive-by-wire system connecting the accelerator pedal to the electronic throttle through an electrical harness. A throttle position sensor monitors throttle position in relation to the accelerator pedal position sensor feedback. Even engine coolant temperature and adequate oil pressure are monitored by the SECM. The SECM controller has full adaptive learning capabilities, allowing it to adapt control function as operating conditions change. Factors such as ambient temperature, fuel variations, ignition component wear, clogged air filter, and other operating variables are compensated.

Product Specification 36544

- Helps OEMs meet EPA 2007 LSI emission standards (40 CFR Part 1048.101)
- Reduces fuel consumption and engine wear
- Complete packaged system minimizes integration costs
- Calibrations tailored to specific engine applications
- Closed-loop fuel control with adaptive-learn technology
- Sequential spark ignition increases torque and decreases hydrocarbon emissions



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**MI-07 CONTROL SYSTEM FEATURES** 

- Closed-loop control of air-fuel ratio improves equipment durability by reducing maintenance, fuel consumption, and engine component wear.
- Control strategy ensures optimal transient performance for efficient system response.
- Comparisons of actual engine operation to expected values allows the system to compensate for wear, tolerances and adverse operating environments.
- Programmable idle speed control includes speed setpoint modifications for coolant temperature and speed selector switch input.
- Monitoring and diagnostic communication allows immediate assessments and corrections either on-site or remotely.
- Individual diagnostic codes detect functional faults, intermittent faults, sensor and actuator failures, and engine protection problems.
- Malfunction indicator lamp (MIL) allows instant analysis and troubleshooting.
- Extensive engine protection features include monitoring of engine coolant temperature, oil pressure, and overspeed.
- Fault conditions can be calibrated to trigger a limited operating mode for diagnostics and troubleshooting.



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2007/12/Niles