

# EM2000 CONTROL SYSTEM

## EM2000 Control System Retrofit Improves Performance and Reliability of Older Locomotives

The EMD EM2000™ Control System is the only microprocessor-based system in continuous use for over 16 years. That history has been supported by a continuous program of product development and enhancement. The EMD EM 2000 is installed in 7000 locomotives in service worldwide. The EM2000 control System Retrofit is a cost effective solution for upgrading older locomotives to the same full-featured microprocessor technology available in current model locomotives. In addition to managing all critical locomotives operating functions, the EM2000 system:

- Increases locomotive residual value
- Improves locomotive availability
- Improves tractive effort
- Lowers life cycle costs

## EM2000 Control System Retro Benefits

### Improved Adhesion

- Radar-based wheel slip control increases adhesion performance 33% over older WS10 control systems.
- Employs the same adhesion control logic as current EMD 70-Series locomotives.
- Radar system provides true ground speed sensor.
- Creep control improves both high and low speed adhesion.

### Interactive, User-Friendly Display Interface

- Diagnostic fault data is displayed as clear and concise values rather than numeric codes.
- Ability to store up to 600 fault messages.
- Reveals engine performance issues.
- Self-test routines reduce troubleshooting time.
- Data collected before and during fault provides snapshot of operating condition.
- Virtually eliminates NDF trouble reports.

### Integrated Automatic Engine Start Stop (AESS™)

- Average savings of 16 gallons of fuel per day per locomotive.
- Reduces idle time and emissions.

### Parts Standardization

- Commonality of parts with other EM2000-equipped locomotives in the fleet.
- Reduces inventory maintenance, and operating cost.
- Service personnel are familiar with the technology.

### Complete Traction Motor Management

- Utilizes the full available TE curve within a specified temperature criteria.
- Continuously stimulates traction motor temperature.
- Reduces operating times at higher temperatures to extend traction motor life.
- When temperature criteria is exceeded locomotive is limited to continuous current levels.



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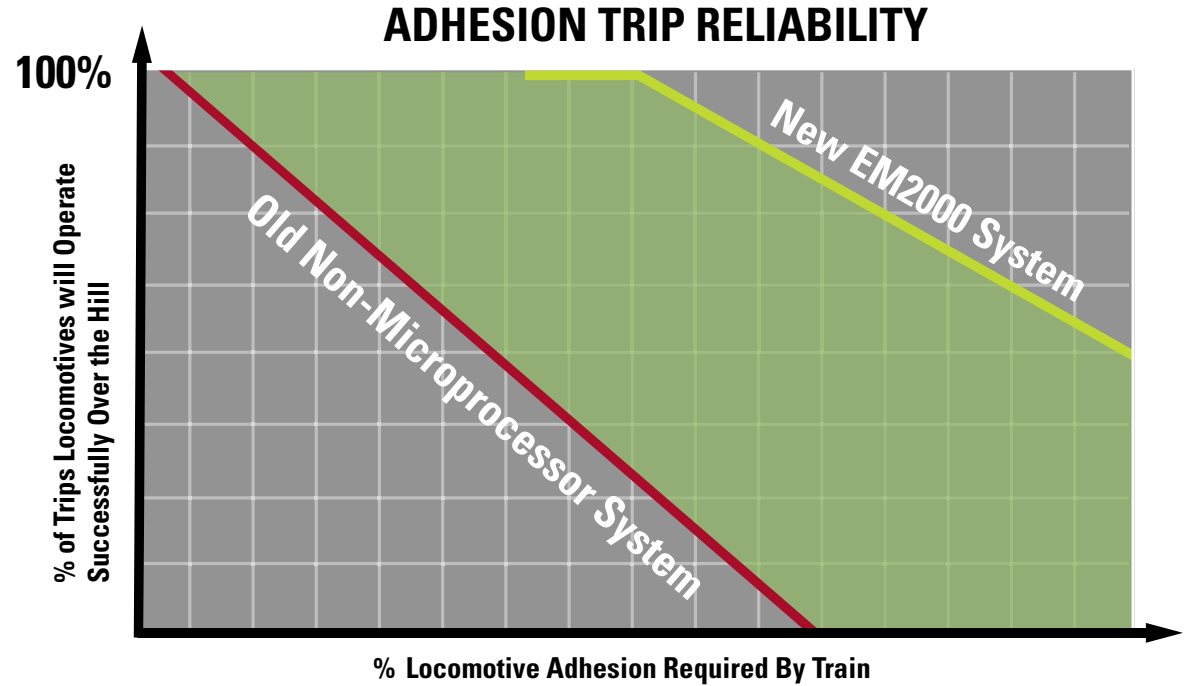
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## EM2000 Control System Retrofit Software Options

- Ground relay lockout reset switch
- EMD automatic horn sequencer
- Hot engine lead unit nullification
- Immersion heater protection
- Local alarm bell silencer
- Microprocessor-controlled cooling fan shutters
- Integrated traction motor cutout
- Cooling system automatic drain
- Engine purge control
- Inertial filter blower alarm
- Low engine water detection
- Low water temperature speedup
- Lube oil filter by-pass detection
- Starter motor protection
- Auto Engine Start Stop (AESS™)
- Extended range dynamic brake
- Self load test
- Serial link to event recorder
- Voltage compensation based on battery temperature
- Air compressor synchronization
- Air compressor low oil protection
- Microprocessor-controlled main reservoir drain heater
- Low main reservoir air pressure speed up
- Main reservoir blow down timer
- Lead truck sand detection
- Emergency sand cut out at 0 mph
- Aux Gen "circuit breaker open" alarm
- Unpowered locked wheel detection
- Slow speed control
- Winter isolation switch



Improved adhesion and radar based wheel slip control increase trip reliability allowing for better fleet utilization. Shaded area indicates improvement over WS 10.

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