



# EMI Limit Detector (ELD)

## One Sheet Summary

### What It's For

The ELD system monitors catenary emission current on the return side of the main transformer for the presence of excessive harmonic interference.

Specifically, it monitors the four nominal frequencies of 100 Hz, 150 Hz, 200 Hz, and 250 Hz, which are commonly used by wayside and cab signaling equipment.

The purpose of the system is to detect interference generated on-board by the propulsion system, and minimize the possibility of adverse effects on the signaling systems due to that interference.

### What It Does

The ELD enforces independent amplitude and duration thresholds for each of the frequency bands monitored.

It responds to excessive interference by removing traction power, which is referred to as "tripping".

Normally, the ELD automatically allows traction power to be recovered within several seconds after the interference has been reduced to under-threshold levels.

A lockout of traction power occurs if the interference repeatedly exceeds a predetermined limit within a relatively short period of time. Manual intervention is required at the ELD to reset a lockout.

### How It Works

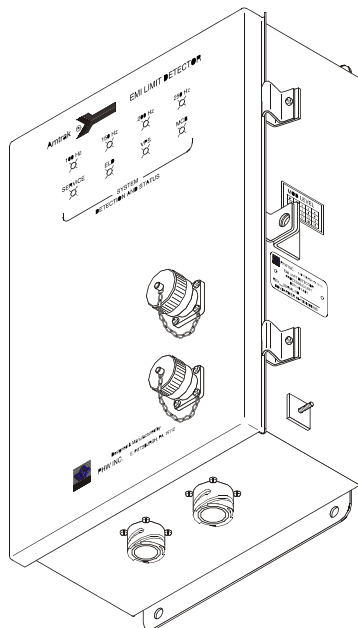
The ELD interfaces to the propulsion system by providing isolated power to control the Main Circuit Breaker (MCB).

This power is routed to the MCB through an external interlock circuit, which allows other systems within the vehicle to open the MCB, independently of the ELD.

For troubleshooting, the unit provides front panel status LEDs and connectors for portable test equipment.

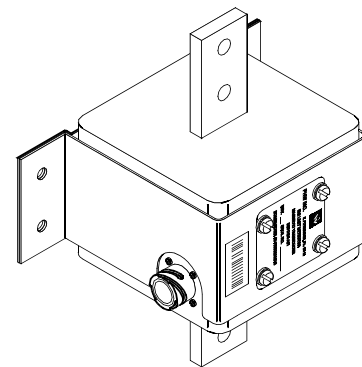
It provides maintenance and status information to the Car Monitoring Unit (CMU) over the Car Internal Network (CIN).

### ELD Processing Unit



- Is the "brain" of the ELD system
- Stainless steel enclosure containing six circuit boards
- Eight status indicators on the front panel
- Two connectors on front for test equipment
- Two connectors on the bottom for connections to car wiring
- Grounding stud at bottom of right side.

### ELD Magnetic Transducer



- Is the sensor for the ELD system
- Installed in the catenary return as a bus bar
- Contains coils to produce signals proportional to current in catenary return

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## Interpreting the Indicators

### 100 Hz

Red, Normally OFF

- ON - ELD system is detecting interference in this frequency band
- OFF - ELD system is not detecting interference in this frequency band

### 150 Hz

Red, Normally OFF

- ON - ELD system is detecting interference in this frequency band
- OFF - ELD system is not detecting interference in this frequency band

### 200 Hz

Red, Normally OFF

- ON - ELD system is detecting interference in this frequency band
- OFF - ELD system is not detecting interference in this frequency band

### 250 Hz

Red, Normally OFF

- ON - ELD system is detecting interference in this frequency band
- OFF - ELD system is not detecting interference in this frequency band

## SERVICE

Red, Normally OFF

- ON - CIN Service push-button is being pressed
- OFF - ELD is communicating normally with CIN
- FLASHING - CIN communication problem

## ELD

Green, Normally ON

- ON - ELD is operating normally
- OFF - ELD is not on, or is operating abnormally
- FLASHING - Traction power is locked out

## VPS

Green, Normally ON

- ON - ELD's vital power supply is operating normally
- OFF - ELD's vital power supply is not operating

## MCB

Green, Normally ON

- ON - ELD's MCB output is energized
- OFF - ELD's MCB output is de-energized.

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## System Connectors

### PTE

Used to connect the laptop computer (PTE) to the ELD system for monitoring and configuration. The laptop computer operates as a terminal to communicate with the ELD's PTE interface. (Enter "help" at the PTE prompt for a list of available commands.)

### PORTABLE TESTER

Used to power test equipment and inject test signals for inspection.

### R1

Connects the ELD Processing Unit to the ELD Magnetic transducer via car wiring.

### R2

Connects the ELD Processing unit to other systems within the vehicle. LVDN power, network, and MCB connections are all combined in this connector.

### Grounding Stud

Connects the ELD Processing UNit enclosure to ground through a grounding strap installed in the equipment locker.

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## System Controls

### Lockout Reset Push-Button

This control is located in the upper left of the enclosure, directly beneath the connector. Press down on this push-button to recover the ELD from a lockout.

### CIN Service Push-Button

This control is located on the inside of the enclosure's front panel. Press this push-button to the side to force the ELD to broadcast its ID to the CIN.

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## System Inspections

Perform the following inspections in the 92 day period:

- ELD Ground Fault Test
- ELD Operational Test

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## System Safety

### ELD Processing Unit

Before removing or installing:

- Open the ELD circuit breaker
- Perform grounding procedure on the vehicle

### ELD Magnetic Transducer

Before removing or installing:

- Perform grounding procedure on the vehicle