PROGRESS RAIL SERVICES
A Caterpillar Company

SAL™ Microprocessor Control System Upgrade for Older Locomotives

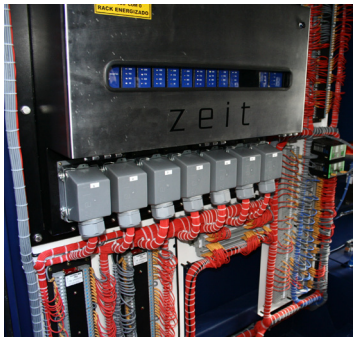
Complete Locomotive Control – With hundreds of units in service, the SAL™ System is the optimal choice for upgrading older locomotives with microprocessor control of key locomotive systems including:

- Advanced wheel slip and adhesion control for better pulling power
- Engine and cooling system control to maximize fuel efficiency
- Generator control for loading and dynamic brake
- Control of air compressor and other accessory systems
- Traction motor overload protection

Features

Rugged design application – Designed specifically for the locomotive work environment, the SAL system uses electronic components designed for severe vibration, shock, and thermal loads. Extremely rugged connectors are used to connect the locomotive control wiring harness to the SAL microprocessor rack system.

Modular Architecture – The control modules are mounted in a shock resistant rack, allowing the system to be customized for specific locomotive retrofits. Only the necessary locomotive control modules need be installed because the modular enclosure can be easily upgraded in the future.



Pre-Wired Control Panels and Harnesses – The SAL control system can be provided in pre-wired panels that allow and quicker installation. In many applications, the pre-made harnesses include virtually all low-voltage wiring, making setup even easier.

Display System – The color touch screen panel is the operator interface for tracking locomotive performance and troubleshooting. Locomotive and engine performance parameters can be displayed real-time during operation or load test (on applicable locomotives).

Telematics – an optional telematics package provides locomotive tracking and remote locomotive diagnostics, allowing the locomotive to be tracked from the office through secure internet-based services. Additionally, remote diagnostic services and technical assistance plans are available.

Benefits

Reliability – The SAL locomotive retrofit fundamentally replaces older locomotive control system components and wiring with modern, reliable components. The low-voltage control wiring on the locomotive is replaced with new exane or equivalent wiring. And most of the older relays are converted to modern, solid-state control.

Increased Locomotive Performance – The advanced microprocessor control algorithms and circuits within an SAL system result in a typical 8% to 12% improvement in all-weather adhesion. And some locomotives with SAL retrofits have achieved better than 30% adhesion at stall conditions.

On-Board Locomotive Diagnostics for Improved Availability - The SAL display panel offers improved locomotive diagnostics and performance tracking. Maintenance personnel can easily identify and rapidly remedy problems, reducing shop time.

Fuel and Cost Savings – The improved performance of the locomotive allows you to more reliably pull more freight and with greater mission reliability. This can improve overall fuel savings while reducing operating costs.

Automatic Engine Start/Stop System (AESS) – The SAL system can automatically shut down the diesel engine rather than wasting fuel with unnecessary idling. By monitoring many parameters, including coolant temperature, air pressures, battery voltages, and more, the engine can be automatically re-started to keep the locomotive in a safe operating condition and ready for service. Installations of AESS systems alone typically result in a 3% fuel savings.

Typical SAL Applications

C30-7 Locomotive

SD40-2 Locomotive

Zeit Control Engineering

Zeit has specialized in the design and manufacture of embedded systems for locomotives since 2001. It is a leader in the railway automation industry, primarily manufacturing the SAL microprocessor system for locomotive control, increased adhesion, and remote diagnostics. In 2010 Zeit became a subsidiary of Progress Rail Services, a Caterpillar Company

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