

The Eaton logo is displayed in white, bold, sans-serif capital letters on a blue background. The letters 'A' and 'O' contain a white dot.

Hybrid Power

Roadranger[®]

More time on the road[®]

**Eaton Hybrid Power: A breath of fresh air
in the commercial vehicle industry.**

A large, vibrant green leaf is shown on the right side of the image, partially overlapping a dark grey rectangular area at the top. Below the leaf, its reflection is visible in a body of water, creating a symmetrical effect. The background consists of a clear blue sky above a calm body of water, with the overall scene conveying a sense of freshness and nature.

Eaton's hybrid power system for commercial vehicles.

Eaton® has emerged as a market leader in the development and production of hybrid power systems for commercial vehicle fleets. Following years of successful development and extensive real-world testing, Eaton is proud to introduce the first hybrid electric system for commercial vehicles.



At UPS, Brown® is turning into green.

UPS is investing in low-emission vehicles, including this delivery van with the Eaton Hybrid Electric System and a hybrid hydraulic delivery van.



Reliable. Efficient.

“Our new truck with Eaton’s hybrid electric powertrain system is definitely working for us. So much so, we’re using it on two shifts.

On the night shift, it’s real quiet and that’s an added bonus for not only us, but also for our customers.”

– Tommy Bowden, shop foreman for Alabama Power – Mobile Division

The time has arrived for hybrid power.

For over 20 years, Eaton has pioneered electric and hybrid power systems for commercial vehicles. Eaton is now a leader in the development and commercialization of hybrid power for the world’s commercial vehicle fleet. Eaton’s hybrid power systems can provide significant fuel savings and reduce vehicle emissions. Hybrid power is particularly appealing for Class 6, 7, and 8 vehicles — especially in stop-and-go applications. Hybrid power provides further savings in frequent engine-off and power take-off operations at a worksite. For many applications, hybrid power can provide significant fuel savings, increased functionality, quieter operation, and improved performance.

Clean, reliable, and highly efficient.



For spec'ing information on Eaton's hybrid electric system, please visit www.eaton.com/hybrid

Clean.

Hybrid hydraulics offers choices to the end user.

Eaton is developing two hybrid hydraulic power systems. The first, which is scheduled for production release in 2008, is the Eaton Hydraulic Launch Assist™ (HLA®) system.

This is a parallel hydraulic regenerative braking system that supplements the vehicle's conventional powertrain. In applications with high stop-and-go duty cycles — such as refuse trucks — 20 to 30% fuel economy improvements are typical.

Eaton is also developing a series hybrid hydraulic power system.

Here, the transmission, driveshaft, etc. are replaced by the hybrid hydraulic powertrain and energy is transferred from the engine to the drive wheels through fluid power.

The system is suited to a much broader range of applications than parallel hybrid hydraulic systems. The value is provided by improved engine efficiency, through regeneration of braking energy, and by shutting the engine off when not needed. Fuel economy improvements of 50 to 70 percent have been demonstrated with this technology.

Eaton's parallel electric system delivers powerful benefits.

Eaton couples a vehicle's diesel engine with an electric motor/generator and batteries to create Eaton's patented hybrid electric system.

The hybrid electric system maintains conventional drivetrain architecture — such as Fuller® automated transmissions — while adding the ability to augment engine torque with electrical torque. As an additional benefit, should the hybrid system go off-line, conventional engine-powered operation continues.

This integrated system delivers a number of benefits, including:

- Fuel savings of up to 60 percent
- Up to 87 percent reduction in idle times*
- Reduced maintenance and lower life cycle costs
- Reduced emissions*
- Quieter operations and better acceleration

*Based on third-party test results.



Eaton HLA® System

- A. Transfer Case
- B. Accumulator
- C. Hybrid Control Unit
- D. Pump/Motor
- E. Reservoir

Inserts go here



Hybrid Electric System

- | | |
|---|---|
| A. Electric Clutch Assembly | E. Power Electronics Carrier (PEC), Lithium Ion Batteries, and Battery Controls |
| B. Hybrid Electric Motor | F. Motor Controller/Inverter |
| C. Hybrid Control Module (HCM) with Patented Hybrid System Software | G. DC/DC Converter (Optional) |
| D. Fuller® Automated Transmission (AMT) | H. Auxiliary Power Generator (APG) Inverter (Optional) |
| | I. 120VAC/60Hz Power Panel (Optional) |



The Roadranger® Promise

The Roadranger® System is an unbeatable combination of the best products from Eaton Corporation and Dana Corporation, backed by the Roadrangers — the most experienced, expert, and accessible drivetrain consultants in the business. The Roadranger mission is to provide the most comprehensive customer support offerings available. This begins with a 24-hour-a-day technical support call center network, an excellent source of information on warranty coverage, parts and vehicle specifications, parts and service literature, repair strategies, and warranty claim decisions.

Roadranger®



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For spec'ing or service assistance, call 1-800-826-HELP (4357) 24 hours a day, 7 days a week, for more time on the road (Mexico: 001-800-826-4357). Or visit our Web site at www.roadranger.com.

Roadranger: Eaton, Dana, and other trusted partners providing the best products and services in the industry, ensuring more time on the road.