

The Eaton hybrid electric prototype truck

The Eaton hybrid electric vehicle uses the Freightliner Custom Chassis Model MT45 with a standard Utilimaster body. The baseline 5.9L six-cylinder diesel engine was replaced with a DaimlerChrysler OM904 4.3L four-cylinder diesel engine, and the automatic transmission was replaced with an Eaton Hybrid Drive Unit, containing the automatic clutch, electric traction motor and AutoShift® transmission.

The vehicle dimensions and operation remain virtually unchanged, so the vehicle drives and behaves like a conventional FedEx W700. All of the compo-

nents are packaged out-of-sight from the operator. The OM904 engine used in the Eaton prototype is a 4.3L four-cylinder turbo-charged diesel engine rated at 170 HP at 2,300 RPM and 420 lb.ft. at 1,600 RPM.

The following table compares the baseline FedEx truck with the Eaton hybrid electric truck that was designed to do the same job. It is important to note that the chassis and body were modified only minimally to enable hybridization. There were no changes to major chassis systems like the foundation brakes, wheels and tires.

SPECIFICATIONS OF BASELINE TRUCK vs. HYBRID ELECTRIC PROTOTYPE

	Baseline truck	Eaton hybrid electric prototype truck
Model	W700 Step Van	W700 Step Van
Body	Utilimaster	Utilimaster
Chassis	Freightliner MT45	Freightliner MT45
Cargo area	700 cubic feet	700 cubic feet
Engine	5.9L Cummins I6 Diesel	4.3L Mercedes OM904 I4 Diesel
Transmission	Allison AT542FE	Eaton FO-8406A-ASX
Rear axle ratio	4.10	3.31
Tires	Front: Goodyear G647 225/70R19.5 Rear: Goodyear G159 225/70R19.5	Front: Goodyear G647 225/70R19.5 Rear: Goodyear G159 225/70R19.5
Wheels	19.5 inch, steel	19.5 inch, steel
Brakes	Hydraulic	Hydraulic
Weight:		
GVWR (lbs.)	16,000	16,000
Payload (lbs.)	5,720	5,390
Test weight (lbs.)	13,280 (includes 3,000 lbs. of payload)	13,610 (includes 3,000 lbs. of payload)

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Hybrid system overview

The Eaton hybrid electric system has a parallel architecture (shown in Figure 1) and uses a straightforward drivetrain configuration providing electric motor assist and regenerative braking. Major components include the following:

- **Hybrid drive unit:** Contains the electric traction motor, automatic clutch and automated transmission (see Figure 2).
- **Power electronics carrier:** Contains the motor controller/inverter, battery modules, battery controller and coolant circulation components.
- **Supervisory powertrain controller:** The electronic control unit controls the operation of the hybrid system through multiple inputs and outputs, monitors system status and manages communication with other on-board systems.

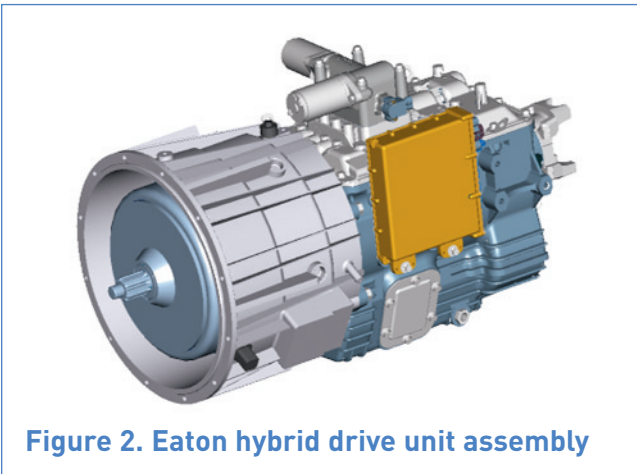
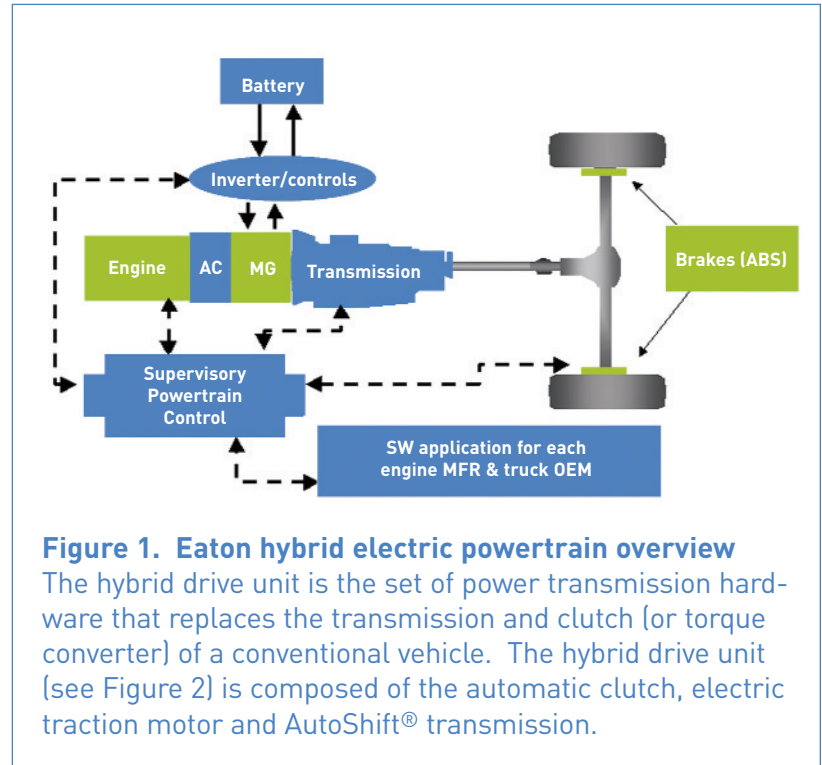


Figure 2. Eaton hybrid drive unit assembly



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