e-DRIVE

Executive Report

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Application Profile

ThunderVolt Diesel Hybrid-Electric Drive Buses Reach 25,000 Mile Mark

A pair of 40-foot transit buses using ThunderVolt diesel hybrid-electric drive systems supplied by ISE Corp. (ISE) achieved a major milestone with N.J. Transit (NJT) in April, surpassing 25,000 miles of total revenue service since the buses were deployed. These Nova RTS buses, the first two of three buses "hybridized" by ISE for NJT, have also demonstrated high reliability and better in-service fuel economy than any other transit buses of this size, including competing hybrids.

Impressive results achieved over the last six months of revenue service include:

· In-service availability of 90 percent, with only three drive system-related maintenance issues over this period.

· Operating five days a week, each bus has averaged more than 700 miles per week.

· Average fuel economy has exceeded 5.75 miles per gallon, and since ISE upgraded its hybrid control system four months ago, the buses have averaged more than 6 mpg.

The diesel hybrids in N.J. feature an idle-stop feature, in which the Cummins diesel engine stops running automatically every time the vehicle stops for more than a few seconds. This contributes to the buses' high fuel economy and also reduces harmful emissions, as well as reducing noise when passengers board and disembark.

The results in N.J. are particularly impressive because the buses are operating on a relatively high-speed suburban route, whereas the ISE series hybrid drive system was designed primarily for vehicles engaged in urban stop-and-go driving.

"The performance of the ThunderVolt drive system in N.J. dispels the myth that parallel hybrid drive systems outperform series hybrid systems on higher speed routes, or any routes for that matter," according to Michael Simon, ISE Chairman and Co-CEO. Data compiled by N.J. Transit show that the ISE series hybrid has outperformed the conventional buses in its garage by an average of 22 percent over the past six months, and 29 percent over the past four months.

Another unique feature of the ISE hybrid system is that it comes equipped with either advanced nickel sodium chloride batteries or ultracapacitors. Neither of these options is offered by ISE's leading hybrid drive system competitors. The N.J. buses use the nickel sodium chloride ZEBRAÔ batteries, which store 2-3 times the energy contained in competing battery systems. The buses can be plugged into the electric power grid to derive part of the bus' operating energy, mitigating the impact of rapidly escalating fuel costs. ISE drive systems equipped with ultracapacitors can achieve even greater fuel economy than ISE's battery-based systems, based on the lighter weight and greater efficiency of the ultracapacitors. ISE offers the new ultracapacitor option through a strategic marketing partnership with Maxwell Technologies, an ultracapacitor manufacturer in the US.

ISE's ThunderVolt hybrid drive system also makes use of Siemens ELFA motors, motor controllers and generators. Having been used in more than 700 buses in Europe, these Siemens components have been used in more than 30 million miles of total revenue service, more than all other heavy-duty hybrid drive system combined. In the ThunderVolt configuration, the result is a reliable drive system that is warranted by ISE and Siemens for up to five full years.

ISE's hybrid drive system is also available in a gasoline-fueled version that uses the ultra-clean Ford Triton 6.8 liter engine. In addition, a hydrogen-fueled version of the ISE drive system, using a Ford Triton engine converted to burn gaseous hydrogen, is in development and scheduled to be demonstrated later this year.

The ISE ThunderVolt hybrid-electric drive system enters large scale production this summer, and can be used in virtually any major bus model.

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