

## Frost & Sullivan Recognizes Hitachi America, Ltd. for Outstanding Contributions to Vector Control Technology

Palo Alto, Calif. — July 18, 2006 — *Frost & Sullivan* has conferred the 2006 Frost & Sullivan Award for Excellence in Technology upon Hitachi America, Ltd. in recognition of its achievement in developing a revolutionary new intelligent sensorless vector (SLV) control technology. Incorporated in the company's SJ200 iSLV drive series, this technology stands poised to transform modern vector control technology by eliminating many of its key challenges.

Sensorless vector control involves the dynamic calculation of rotor position using accurate measurements of the three-phase voltages and currents, along with those of the induction motor's electrical characteristics. The microprocessor that lies at the core of any sensorless vector drive typically takes time to perform these calculations. This is because each iteration of the drive's algorithms requires a set amount of time as the equations are repeated with updated data. This can cause a dip in performance at the applications level.

"Hitachi has exploited advances in microprocessor technology to develop a processor and algorithm that enable significantly faster calculation speeds," says Frost & Sullivan Research Analyst Rahul Nayar. "The advanced new methodology, called iSLV, makes it possible to calculate the algorithm within the time frame of the carrier frequency pulses, rather than the sine wave cycle."

Although current transformers (CTs) have traditionally been used to measure the instantaneous motor currents for each phase, the fact remains that CTs are essentially inductors and are therefore incapable of providing true instant current measurements. Instead, they provide a time-averaged current measure. CTs are also less sensitive to changes that occur at high frequencies and primarily measure the root mean square current of the lower sine wave frequencies.

It is in this context that the development of Hitachi's new iSLV methodology becomes particularly significant, because it enables the elimination of current transformers and instead introduces the method of measuring the current from the direct current (DC) bus by means of a shunt arrangement.

"With a knowledge of which output insulated gate bipolar transistors (IGBTs) within the drive are switched on at any given moment, it is possible to deduce each motor phase current directly from the DC bus current," says Nayar. "This allows an evaluation of the instantaneous current flowing in each motor phase, without the problem of delays typically caused by CTs."

Thus, the iSLV drive enables motor characteristics to be measured 'on the fly' as it were, during normal operation, rather than as a separate process. Moreover, motor characteristics can be constantly updated to reflect changing external conditions such as temperature, resulting in improved torque speed performance and stability. The iSLV technology also allows the elimination of the autotuning step, which many drive users frequently perceive as an irritant.

"Hitachi's new iSLV technology for the SJ200 drive series is therefore expected to enhance the utility of these drives, improving performance as well as ease of use and benefiting end users greatly," says Nayar. "*Frost & Sullivan* is pleased to recognize the company with the 2006 Excellence in Technology Award, acknowledging the role played by the iSLV technology in dealing with and helping alleviate the effect of key drawbacks in vector drive technology."

Every year, *Frost & Sullivan* presents this Award to a company that has shown consistent commitment to technology innovation, leading to the development and introduction of a path-breaking new technology into its particular market. The Award recognizes the potential of this technology to have significant impact across several market sectors as well as to bring about

considerable change and evolution in the industry in terms of adoption, change and competitive positioning.

*Frost & Sullivan* Best Practices Awards recognize companies in a variety of regional and global markets for demonstrating outstanding achievement and superior performance in areas such as leadership, technological innovation, customer service, and strategic product development. Industry analysts compare market participants and measure performance through in-depth interviews, analysis, and extensive secondary research in order to identify best practices in the industry.

#### **About Hitachi America Ltd.**

Hitachi America, Ltd., Industrial Systems Division, supplies a broad range of industrial products and services. The division supplies sophisticated industrial equipment, components and services for application in pharmaceutical plants, food & beverage processing, steel making, mass transit systems, chemical plants, and other manufacturing facilities.

Hitachi America, Ltd., a subsidiary of Hitachi, Ltd., markets and manufactures a broad range of electronics, computer systems and products, and consumer electronics, and provides industrial equipment and services throughout North America. For more information, visit <http://www.hitachi.us>.

Hitachi, Ltd., (NYSE: HIT / TSE: 6501), headquartered in Tokyo, Japan, is a leading global electronics company with approximately 356,000 employees worldwide. Fiscal 2005 (ended March 31, 2006) consolidated sales totaled 9,464 billion yen (\$80.9 billion). The company offers a wide range of systems, products and services in market sectors including information systems, electronic devices, power and industrial systems, consumer products, materials and financial services. For more information on Hitachi, please visit the company's website at <http://www.hitachi.com>.

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