Industrial Systems

In the industrial systems field, Toshiba acts as a pillar supporting social lifelines with the goal of realizing an environment-friendly society in which people's lives are optimally sustained. By combining cutting-edge technologies with the highest levels of reliability, we have been developing practical applications for energy-saving and environmentally conscious industrial systems and components, and supplying our products to various sectors such as industrial systems and plants, rail and road transportation systems, and elevator systems.

LF650 Flange Type Electromagnetic Flowmeter Detector

LF650 flange type electromagnetic flowmeter detector

Toshiba has developed the LF650 flange type electromagnetic flowmeter detector with the concepts of expanding sales globally, making installation possible in any location, securing the dominant position among measurement techniques, and offering easy adaptability to standards.

The main features of the LF650 are as follows:

- The design is based on the ASME pressure vessel code for operation in low-temperature environments such as Canada or northern Europe, making it possible to mount the detector in cold locations without fear of brittle destruction.
- A shorter upper straight section has been realized thanks to Toshiba's unique functional field distribution technique. This will contribute to the downsizing of piping and facilities in the water supply and sewerage systems field and the building air-conditioning systems field.

It enables structures to be designed in conformance with the requirements of standards in advance, reducing the period required for obtaining certification under standards such as the U.S. explosion-proof standards and the European Pressure Equipment Directive (PED).

ASME: American Society of Mechanical Engineers

Permanent-Magnet Motor for Hybrid Type Passenger Vehicles

Motor stator for HEVs

Hybrid electric vehicles (HEVs) have been attracting increasing attention for their better mileage and effectiveness in reducing the greenhouse gas emissions.

Toshiba Industrial Products Manufacturing Corporation has been producing motors for hybrid vehicles such as sports utility vehicles (SUVs) and commercial trucks. We have now successfully developed a new motor and generator for use in the series/parallel hybrid system for passenger cars.

This new motor generates high torque in a wide speed range by combining Toshiba's proprietary permanent-magnet torque and reluctance torque technologies. Through our continuing development efforts such as improvements to our previous motors for SUVs to enable them to handle higher voltage (improved by 20% compared with our previous products), the power density (i.e., output per volume) has been increased by 50% compared with our previous products.

Automatic Train Operation System for Subway Trains

Automatic train operation (ATO) systems to operate trains automatically in place of drivers are being introduced by many railway companies as train service schedules become heavier and the use of platform door systems increases. An ATO system ensures accurate stopping at station platforms and stable run times between stations.

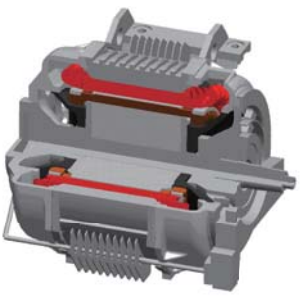
Toshiba has installed its first ATO system for the rolling stock of Tobu Railway Co., Ltd., whose services have been extended to through-operation on the Tokyo Metro Fukutoshin Line. This new ATO system operates a train according to a running plan calculated to adjust its run time to the timetable and to save energy.

ATO equipment

This system also controls braking based on a predictive technique to stop the train comfortably and accurately at the target positions even with braking in small steps.

Totally Enclosed Type Traction Motors for Shin-Keisei 8000 Series Commuter Train

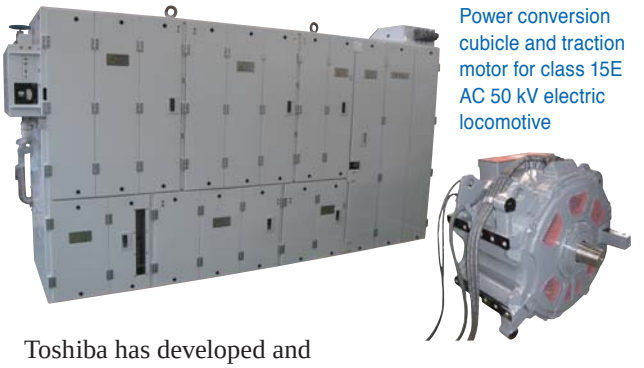

External view of totally enclosed type traction motor


Cross section of totally enclosed type traction motor

Toshiba has been developing totally enclosed type traction motors with oil-lubricated bearings aiming at the realization of environmentally conscious products by improving maintainability, achieving energy saving through high-efficiency operation, and reducing noise.

We have now developed new totally enclosed type traction motors with oil-lubricated bearings by adopting a new cooling structure that makes it possible to reduce the temperature of the bearings. This simple structure with high cooling efficiency was designed by thermal fluid analysis in conjunction with structural analysis and electromagnetic analysis. We have supplied the new traction motors to Shin-Keisei Electric Railway Co., Ltd. for the 8000 series commuter trains that have been changed to the variable voltage variable frequency (VVVF) converter system, which were put into service in March 2008 as the first commuter trains in the industry equipped with motors of this type.

Electrical Equipment for AC 50 kV Heavy-Haul Locomotives for Iron Ore Transportation in South Africa


Power conversion cubicle and traction motor for class 15E AC 50 kV electric locomotive

Toshiba has developed and manufactured the electrical equipment for a total of 44 Class 15E electric locomotives to be used on the Sishen to Saldanha line (861 km) of Transnet Freight Rail in the Republic of South Africa. This line was constructed for iron ore transportation with a 1 067 mm gauge and electrified at AC 50 kV, which is unique among the world's railway systems.

The 6-axle locomotive with a Co-Co axle arrangement can output 4 500 kW of power and haul trains of 40 000 tons or more in weight with multiple-locomotive operation. Toshiba supplied the main transformer, traction converter and inverter, traction motor, auxiliary power supply system, train control and monitoring system (TCMS), and other electrical equipment for the locomotive. The overall locomotive system integration was also carried out by Toshiba.

Both the traction inverter and converter and the auxiliary power supply system use 4 500 V-900 A insulated-gate bipolar transistor (IGBT) devices with a circulated-water cooling system to support high power outputs.

The locomotives will be ready by the middle of 2009, after which main line testing will start.

Super-High-Speed Elevators and Double-Deck Elevators Delivered to the Highest Building in the People's Republic of China

Toshiba Elevator and Building Systems Corporation has developed a super-high-speed elevator and a double-deck elevator conforming with Chinese regulations. Three of the former type and eight of the latter have been installed in the 492-meter-high Shanghai World Financial Center. The super-high-speed elevators are operated at an upward rated speed of 10 m/s, while the double-deck elevators, which are equipped with a floor height adjusting system, have a capacity of 36 passengers.

In addition, the newly developed elevators have several features including aerodynamic capsules for the elevator cars and an antivibration device for the ropes, taking full advantage of Toshiba technologies developed for our previous achievement of the world's fastest elevator. Thanks to these technologies, good riding comfort with a low level of car vibration and noise has been attained. Furthermore, safety is ensured by countermeasures against rope resonance caused by building sway in the event of an earthquake or strong wind conditions.

We are making efforts to further expand our market share in China with these top-level technologies for high-speed and large-capacity elevators.

(a) View from inside the car of a super-high-speed elevator

(b) The Shanghai World Financial Center

(photo courtesy of Mori Building Co., Ltd.)

Super-high-speed elevator for the Shanghai World Financial Center

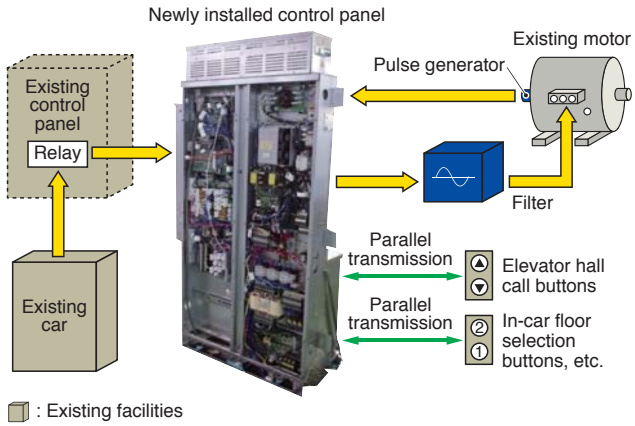
Control Panel Modernizing Technology for Improving Existing Elevators within a Short Time Frame

Providing appropriate maintenance and management of building assets is essential today. Market demand is therefore high for improvement of the safety and riding comfort of existing elevators at a low cost and within a short time frame.

To meet this market need, Toshiba Elevator and Building Systems Corporation has developed a control panel renewal technology to improve the running performance and safety of existing elevators by installing the latest control panel while leaving the existing control panel intact.

The new technology enables reuse of the existing components such as the motor and traction machine. Moreover, the split control panel allows easy installation resulting in a short work period of approximately one and a half days, achieving shorter downtime.

Additionally, maintenance service for the current model such as remote monitoring 24 hours a day, 7 days a week will continue to be offered.



Overview of elevator control panel renewal technology