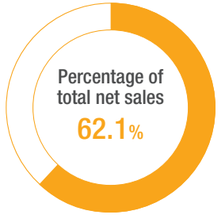
Transportation Systems Segment

BUSINESS



Support railway transportation that connects people and cities with safety and trust, through manufacturing that merges electronics technologies and mechanical technologies in a highly advanced manner

Results for fiscal 2019

Orders Received

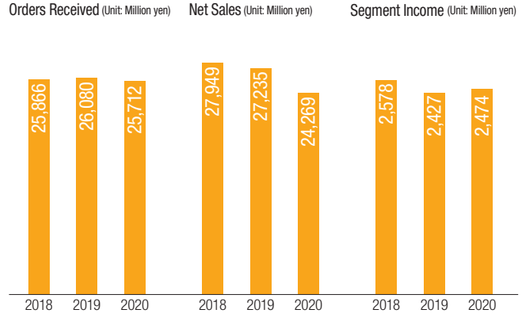
25,712 million yen (Down 1.4% year on year)

Net Sales

24,269 million yen (Down 10.9% year on year)

Segment Income

2,474 million yen (Up 1.9% year on year)



Orders received decreased 1.4% compared with the previous fiscal year to 25,712 million yen, due to a decrease in orders from private railways and overseas customers excluding those in China. Net sales totaled 24,269 million yen, a 10.9% decrease from the previous fiscal year, due to a decrease in sales for JR Group and private railways. Segment income was almost unchanged from the previous fiscal year at 2,474 million yen, as a result of efforts to step up cost control and reduce expenses.

VOICE

We will introduce new environmentally friendly products to the market and expand the overseas maintenance business.

Naoki Okuyama
General Manager of Transportation Business Unit

The Transportation Systems segment will naturally continue pursuing safety and reliability of electrical equipment for railway vehicles, which have to meet strict usage conditions, and at the same time pour our efforts on reducing environmental impact in the form of energy saving, maintenance saving, and noise reduction to provide new environmentally friendly products and services.

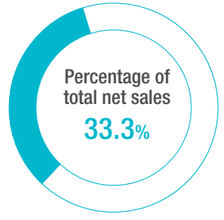
In the domestic business, there has been a growing number of customers who have chosen our new products, including driving inverters and auxiliary power supply units that realized smaller size and lighter weight as well as noise-reduced motor and driving gear units. Going forward, we anticipate more customers will choose our new products, together with pantographs and other highly reliable electrical equipment.

As for the overseas business, the maintenance business of electrical equipment for subway trains has already been launched in China, and we will strive to develop a structure and provide stable services to meet demand that will sharply increase. Particularly in North America, we are reorganizing our local subsidiaries in response to changes in the business environment and preparing to build a new maintenance business with a plan to start operations soon.

We will also work towards improving profitability of the production line at the Yokohama Plant, one of our production bases, by enhancing production capacity and efficiency.

Industrial Systems Segment

BUSINESS



Deliver technologies and gratitude to customers with highly precise, highly responding and highly efficient power electronics, for realization of an environment-friendly society

Results for fiscal 2019

Orders Received

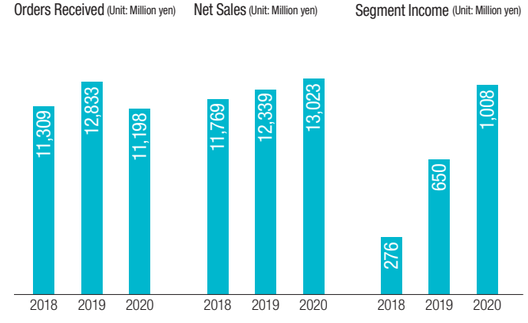
11,198 million yen (Down 12.7% year on year)

Net Sales

13,023 million yen (Up 5.5% year on year)

Segment Income

1,008 million yen (Up 55.1% year on year)



Orders received decreased 12.7% compared with the previous fiscal year to 11,198 million yen, due to a negative rebound from the previous year, when we received large-scale orders for a new business (related to power supply), as well as the stagnation of sales activities caused by the spread of COVID-19. Net sales increased 5.5% compared with the previous fiscal year to 13,023 million yen on higher sales for testing equipment and power supply. Segment income totaled 1,008 million yen, a 55.1% increase compared with the previous fiscal year, due to efforts to step up cost control and process control, as well as to reduce expenses.

VOICE

We will strengthen the domestic business foundation and push for overseas expansion, while enhancing the Shiga Ryuo Plant.

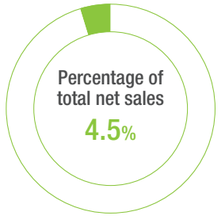
Yoshifumi Otsubo
General Manager of Industry Business Unit

In two years after the launch of the Shiga Ryuo Plant, the Industrial Systems segment has achieved a significant improvement in profitability while absorbing the increase in depreciation associated with the construction of the new plant. This is because factory productivity has increased, and we have significantly boosted the profitability of manufacturing through tighter cost control and process control, in addition to thorough cost management.

In our sales efforts, we expanded the user base with the introduction of super-high-speed rotating dynamo that can support the development of electric vehicles (EV) in the field of testing equipment for automobile development, and also offered system development and detailed services to thoroughly satisfy customer needs in the processing equipment field. With these efforts, we sought to expand sales to domestic and overseas machine manufacturers and users.

Meanwhile, 2020 has been hit by the coronavirus crisis, and we are now facing headwinds owing to customers pulling back from capital investments and restrictions on our sales activities and on-site actions. Despite the setbacks, we are steadily proceeding with steps to enhance the Shiga Ryuo Plant toward the future.

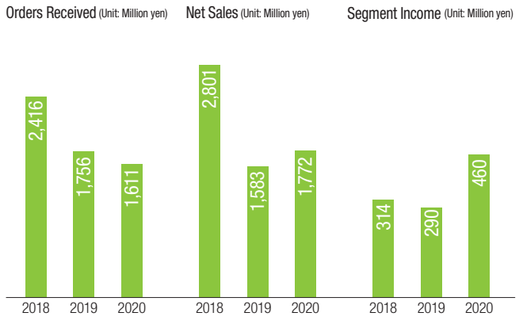
In addition to further improving product quality, we will expand the applications of in-wheel-well dynamo for testing equipment and implement actions for their full-scale production, while accelerating the development of large-capacity motor and inverter for overseas markets. Also, we will capitalize on SIAM TOYO DENKI, a Thai subsidiary established in 2019, and Chalco-Toyo Permanent Magnet Motor Co., Ltd., a Chinese motor production subsidiary that started operation this year, in order to strengthen the domestic business foundation and push for overseas expansion.



Provision of products that make the execution of operations on station premises and trains smooth and convenient and M2M solutions based on mobile phone networks and cloud servers using remote monitoring system

Results for fiscal 2019

- **Orders Received**
  1,611 million yen (Down 8.2% year on year)
- **Net Sales**
  1,772 million yen (Up 11.9% year on year)
- **Segment Income**
  460 million yen (Up 58.6% year on year)



Orders received decreased 8.2% compared with the previous fiscal year to 1,611 million yen without any major projects in the second half of the fiscal year, despite the boost from software improvement projects associated with the consumption tax hike and revisions in train timetables in the spring as well as higher orders of composite ticket vending machine in the first half. Net sales increased 11.9% year on year to 1,772 million yen, helped by software improvement projects associated with the consumption tax hike and the revisions in train timetables in the spring as well as higher sales of composite ticket vending machine. Segment income increased 58.6% compared with the previous fiscal year to 460 million yen for the same reason as net sales.

VOICE

We will work towards expanding the Information Equipment Systems segment through product development and solutions that meet customer needs, with a focus on railway station operating equipment.

To be prepared for the consumption tax hike scheduled for October 2019, the Information Equipment Systems segment updated all equipment already in use during the previous fiscal year. As part of the process, there were many functional refurbishments, creating a lot of work for us, but everything was completed without any major problems. In addition, we delivered renewal orders for commuter pass issuing machine to several customers. These machines are currently working smoothly. Commuter pass issuing machines that one of those companies ordered are exclusively for IC cards and no longer compatible with magnetic tickets. This is the first product of its kind that the Company supplied. Additionally, we received an order for and delivered software for IC card charging machines, which is a new product. We will continue to provide products that satisfy our customers by leveraging our strengths in products related to fare calculation and IC card processing.

We face extremely difficult conditions in the current fiscal year as business operators have postponed or cut back on their plans for renewal and new projects as well as functional refurbishments in light of the spread of COVID-19. We will press on with new product development with the keywords of non-contact, cashless, thin client, and competitive price in anticipation of coronavirus containment, while giving due consideration to the prevention of infection spread.

Toshihiko Akihiro
General Manager of IT Business Unit

Order received for consigned research and development of superconducting flywheel power storage system for railways

The Company received an order from East Japan Railway Company to conduct operations related to equipment manufacturing and the preparation of test reports for verification tests of a superconducting flywheel power storage system for railways.

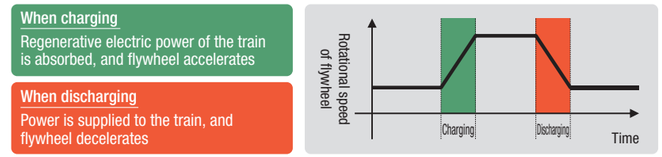
Based on the "Basic Agreement on Technology Development of Superconducting Flywheel Power Storage System for Railways" concluded on March 29, 2018 between Yamanashi Prefecture, the Railway Technical Research Institute, and East Japan Railway Company, this system is being developed for the world's first practical use in the railway field. The Company will conduct the design and manufacturing of the power conversion equipment, and will be responsible for the overall coordination of this power storage system's construction, in cooperation with MIRAPRO Co., Ltd. (Hokuto, Yamanashi Prefecture; President & CEO: Hiroyuki Tsugane).

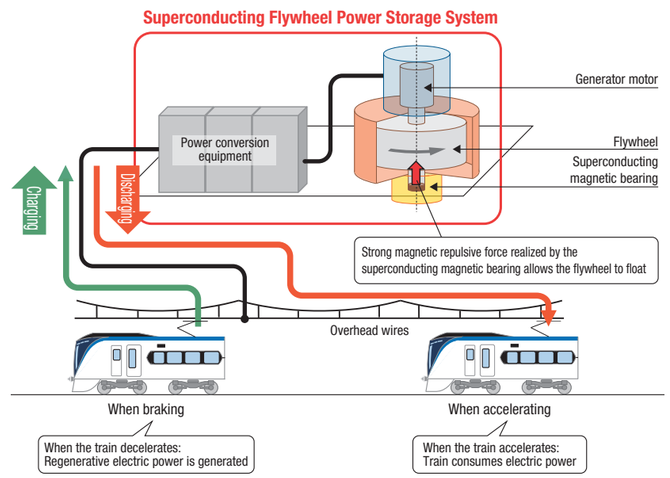
Through this business, the Company will work on the construction of a new power storage system that contributes to the improvement of energy efficiency, the stable usage of renewable energy and technology development in the railway field.

Superconducting Flywheel Power Storage System for Railways

The flywheel power storage system is a system that, by rotating a large disk (flywheel) within the device, stores regenerative electric power as kinetic energy (charging), and converts kinetic energy back to electric power (discharging) as necessary.

The bearing portion of the superconducting flywheel power storage system adopts the superconductivity technology designed by the Railway Technical Research Institute, and established through verification tests conducted in Komekurayama, Yamanashi Prefecture. The technology allows the flywheel to float, reducing rotational loss as there is no contact, and realizes a reduction in maintenance efforts.





IORemoter II: New IoT terminal for Toyo IoT/M2M solutions/remote monitoring and control systems

The Company has been developing IORemoter II, which is a further evolution of "IORemoterLTE," an IoT terminal for remote monitoring and control systems, for IoT/M2M solutions. Shipment of the first lot will start in November 2020.

IORemoter II is a high-speed IoT terminal with a built-in 4G/LTE module. IoT remote monitoring and control of various facilities, controllers, devices, and mobile entities can be conducted faster and at a larger capacity.

Furthermore, with multi-carrier and dual SIM operation enabled, we can now propose communication lines that are more suitable for each customer's applications.

The Company is considering collaboration with cloud service platforms in the future. We hope to contribute to operational efficiency by realizing the provision of faster, easier, lower-priced, and more secure IoT/M2M solutions for our customers.

R&D to support the development of social infrastructure and supporting frameworks

Research and Development

The Group's R&D activities are based on seeking to create products that fully satisfy our customers and challenging the creation and expansion of these products, and we actively promote development of technologies of our existing businesses and basic technology developments that support this development as well as development of new products that expand our businesses.

Results and topics from fiscal 2019

Segment	Project	Description
Transportation Systems	Development of high-frequency insulated auxiliary power supply (SIV)	Applying SiC elements to high-frequency insulated auxiliary power supply and taking advantage of low switching losses enabled higher frequency of the voltage applied to the transformer and the suppression of the increase in element losses, making the whole auxiliary power supply smaller and lighter.
	Development of VVVF inverters for vehicles with wheel slip stabilizing control	We introduced wheel slip stabilizing control using the slip acceleration feedforward control method. The method is aimed at keeping stable slipping and enabling self-re-adhesion without drastically reducing torque to restore adhesion during wheel spins.
Industrial Systems	Development of in-wheel-well dynamo	The name "in-wheel-well dynamo" was adopted for "flat-type dynamo" that can fit inside the automobile's wheel well and be an alternative to the conventional roller type chassis dynamo. We installed the product on real vehicles and conducted evaluation tests based on driving modes specified by the Ministry of Land, Infrastructure, Transport and Tourism and other organizations.
	Development of slender-type high-speed motor for EV/HEV system tests	We developed a slender-type high-speed motor with a maximum speed of 20,000 rpm for testing the drive systems of electric and hybrid vehicles.
Information Equipment Systems	Development of standardized data and programs for railway station operating equipment	We developed standardized fare software (data/programs) used for station operating equipment. This is expected to reduce renewal costs associated with fare revision and to improve the quality of the fare calculation processing.
Expansion of New Businesses	Function expansion of remote monitoring units	We developed and commercialized IORemoter II by evolving the remote monitoring terminal (IORemoter) currently on sale to expand and enhance functions. Its main enhanced function is support for SIM-free and dual SIM operation, making it possible to employ multiple communication carriers including overseas ones to build a monitoring system.
	Development of automotive step up/down converter	We developed a step up/down converter consisting of automotive electronic components. Adopting the interleaving method for power conversion circuit and controlling phase difference of switching achieved lower input and output ripple current, reducing the capacity of reactor and capacitor.
Research Laboratory	Reduction of motor manufacturing cost with square wire and laser welding	With the aim of reducing man-hours for the winding process by adopting square wires for ED motor coils and automating laser welding, we finished evaluation for the optimization of the number of motor poles and conductor size for medium- to large-size models.
	Improved sealability of lubrication for vehicle driving gear units	We worked on the analysis of lubrication pumping in the gearbox and the fluid analysis of the labyrinth structure, as well as the discovery of the mechanism of lubrication mist generation.

Intellectual Property

Our intellectual property is placed as a key corporate resource. Our intellectual property department is responsible for the management of intellectual property and our research laboratory and the development divisions in each business unit actively apply for patents and utility models.

In the overseas markets which we expect to further expand our businesses, we have started to actively engage in activities concerning our intellectual property in order to protect our technologies and brand.

Patent applications granted