

Commencement of Sales of Electricity Generated by Biogas Cogeneration Plant at Ginowan Sewage Treatment Center

In recent years, a number of private enterprises in Japan have constructed biogas power generation plants at sewage treatment centers in order to sell the generated electricity to an electric power company under the feed-in tariff (FIT) scheme. The FIT scheme allows private enterprises to construct solar, wind, hydroelectric, geothermal, biogas, and other renewable power plants and sell the generated electricity to an electric power company at a fixed price for a fixed period of time. Biogas is purchased from municipal sewage treatment centers.

Toshiba was awarded a contract to serve as a representative of a privately built and privately operated enterprise for FIT-based biogas cogeneration at the Ginowan Sewage Treatment Center, Okinawa. The biogas cogeneration plant started selling electricity on October 1, 2016, and plans to purchase 2 966 803 Nm³(*) of biogas per year from the Ginowan Sewage Treatment Center and sell 7 069 150 kW of electricity per year to The Okinawa Electric Power Company, Inc. for 20 years.

There are four sets of power generators in the plant. The plant has a control function that allows the number of active generators to be changed in order to fully utilize the intermittent biogas supply. In addition, the exhaust heat is used to warm the digestion tank.

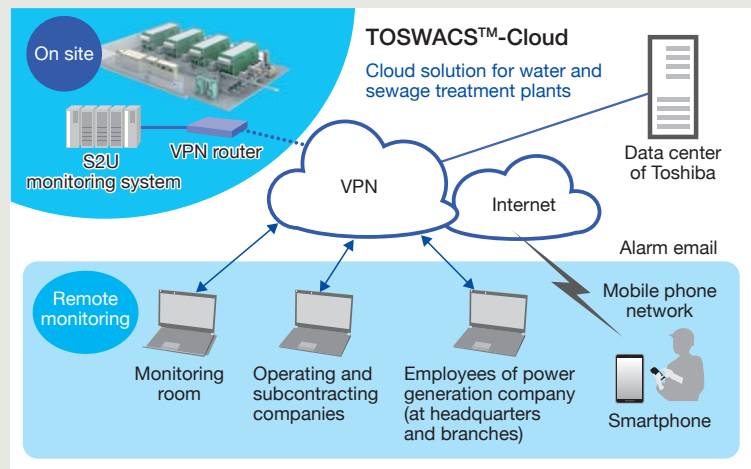
The efficiency of the power generators is 34.3% and that of the exhaust heat recovery is 49.3%. Therefore, the total energy efficiency of the plant is 83.6%. In the event of a commercial power failure due to an earthquake, tsunami, or other natural disaster, the biogas power generators can provide 100 kW of electricity.

Operators can monitor the plant's operating data via the Internet using the TOSWACS™-Cloud remote monitoring system. In the event of an abnormality at the plant, an alarm email is sent to the mobile phones of the operators as well as the engineers who designed the plant so that they can consult each other to solve the problem and maintain the stable operation of the plant.

(*) Nm³: normal cubic meter, defined here as one cubic meter of gas at 0°C and 1 atm



Biogas cogeneration plant at Ginowan Sewage Treatment Center



VPN: virtual private network

Overview of remote monitoring system

Membrane Bioreactor for Emerging Markets

Toshiba has developed a membrane bioreactor (MBR) for wastewater treatment targeted at emerging markets.

Since conventional MBRs use a concrete structure for the water tank, they require a long period of time for installation and therefore high initial costs. In contrast, the use of a panel tank shortens the installation period to roughly one-third.

In order to further shorten the installation period, Toshiba adopted a liner sheet with sufficient waterproofness. We verified its waterproof performance and ruggedness and reinforced its design, eliminating the need for the foundation and bottom panels.

Furthermore, we developed an easy-to-install partition to make it possible to denitrify wastewater with different dissolved oxygen (DO) concentrations in the same tank.

As a result of these innovations, the installation period has been shortened from the conventional 72 days to 15 days, and the initial cost has been halved.



MBR system for wastewater treatment facilities targeted at emerging markets

High-Efficiency Liquid-Cooled Wideband TV Transmitter for Overseas Markets

There is strong demand for reduction of the large power consumption of television transmitters. To meet this demand, Toshiba has developed a high-efficiency liquid-cooled wideband TV transmitter for overseas markets. The newly developed TV transmitter achieves significant power savings due to increased efficiency through the use of a gallium nitride (GaN) power device together with Doherty amplifier and memory compensation technologies.

In comparison with our conventional model, the new TV transmitter provides an efficiency improvement of more than 20 percentage points, contributing to the reduction of both running costs and carbon dioxide (CO₂) emissions.

In order to expand our sales of this product in overseas markets, we will continue to work on increasing its output power, expanding the product lineup, and reducing costs.



High-efficiency liquid-cooled wideband TV transmitter for overseas markets

Depalletizer for Logistics Facilities



With the increase in the volume of parcel deliveries and same-day deliveries accompanying the expansion of the e-commerce market, it is becoming difficult to secure sufficient personnel in the logistics industry.

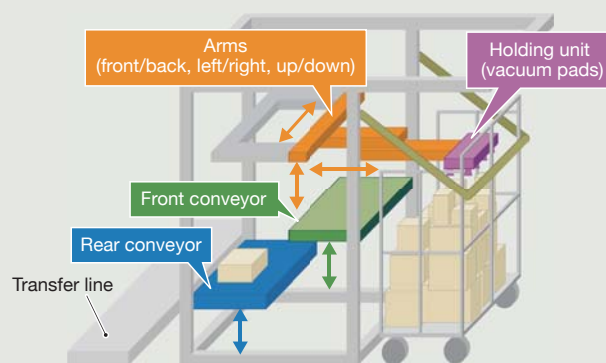
Leveraging robot control and image recognition technologies, Toshiba has been promoting the overall automation of logistics facilities. As part of these efforts, we have developed a depalletizer that automatically unloads parcels from roll box pallets and containers.

Our depalletizer can handle a wide variety of box parcels and unload as many parcels as a human worker (500 parcels or more per hour). It is an orthogonal robot with a simple mechanism specialized for unloading work and is equipped with an arm structure that moves linearly front and back, left and right, up and down, and in the longitudinal direction. The depalletizer has a holding unit with multiple vacuum pads to speedily and stably unload heavy parcels of up to 30 kg without damaging them. We have also developed a unique algorithm based on distance and luminance images that makes it possible to recognize the sizes and positions of various box parcels that are randomly stacked on containers and to automatically determine the order in which to unload them.

We are planning to commercialize this depalletizer in the second half of fiscal 2017, and develop a palletizer and an order picking system in the future.

Item	Target specification
Picking directions	Top and side
Capacity	500 parcels or more per hour
Parcel handling size	Maximum: 600 (W) × 600 (D) × 500 (H) mm Minimum: 200 (W) × 100 (D) × 100 (H) mm
Parcel weight	30 kg or less
Supported equipment	Roll box pallets, pallets

Rendering of depalletizer for physical distribution field and its target specifications



Structure of prototype

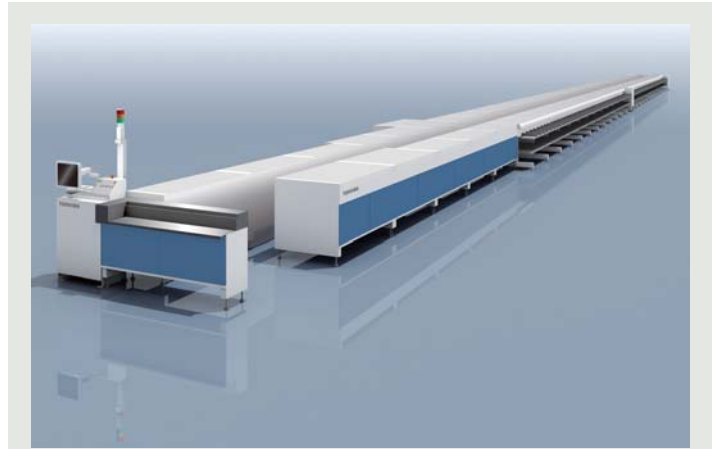
Commencement of Operation of Moscow Logistics Centre of Russian Post

The Moscow Logistics Centre of Russian Post is located near the Vnukovo International Airport. It distributes incoming international letters, parcels, and other mail items throughout the entire Russian Federation.

In 2014, Toshiba was awarded a package contract for postal automation systems that would fulfill the requirements of this facility. The contract includes several types of sorting machines that can handle a wide assortment of mail items coming in a variety of shapes and sizes.

Three types of parcel sorting machines are already in operation. For the processing of other mail items, we developed a new letter and flat sorting machine that can handle both small letters and large C4-size flats. The first machine of this type commenced operation in November 2016.

To support these sorting machines, we have also been supplying several subsystems including a customs clearance system that receives incoming international mail items, a material handling system that conveys mail items throughout the facility, and an information technology (IT) system that provides database and monitoring functions for all systems and interfaces with the IT systems of Russian Post. All systems are scheduled to commence operation at the end of September 2017.

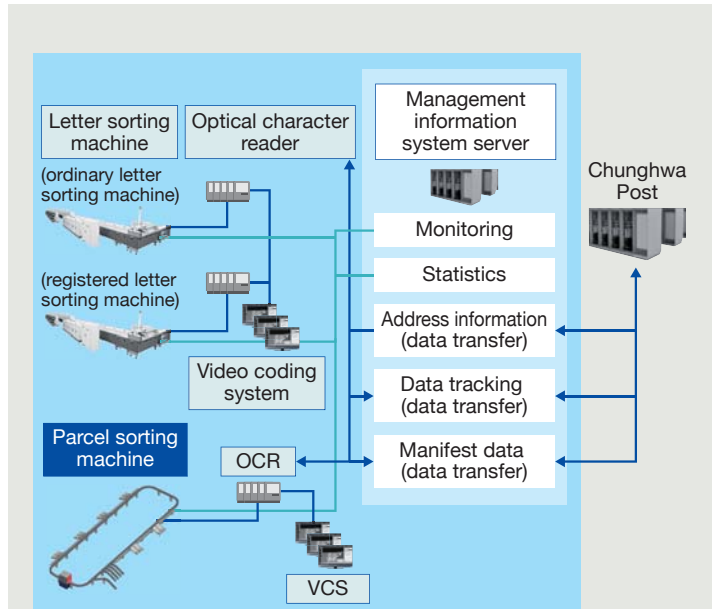


TT-2000 letter and flat sorting machine

Postal Automation System for Chunghwa Post, Taiwan

Toshiba has delivered a postal automation system consisting of four letter sorting machines (LSMs), three parcel sorting machines (PSMs), three optical character reader (OCR)/video coding systems (VCS), and four management information systems (MIS) to Chunghwa Post, Taiwan. This postal automation system reads postal codes and addresses on mail items and parcels, and sorts them by destination.

The main feature of our postal automation system is its high processing capacity: the LSMs can process a total of 42 500 letters per hour while the PSMs can process 8 500 parcels per hour in total. In addition, whereas the conventional LSMs in Taiwan can read only postal codes, our postal automation system reads both postal codes and addresses written in traditional Chinese characters to improve character recognition accuracy. As a result, our postal automation system speeds up the processing of postal items and parcels, contributing to enhancement of the work efficiency of our customer.



Postal automation system for Chunghwa Post, Taiwan

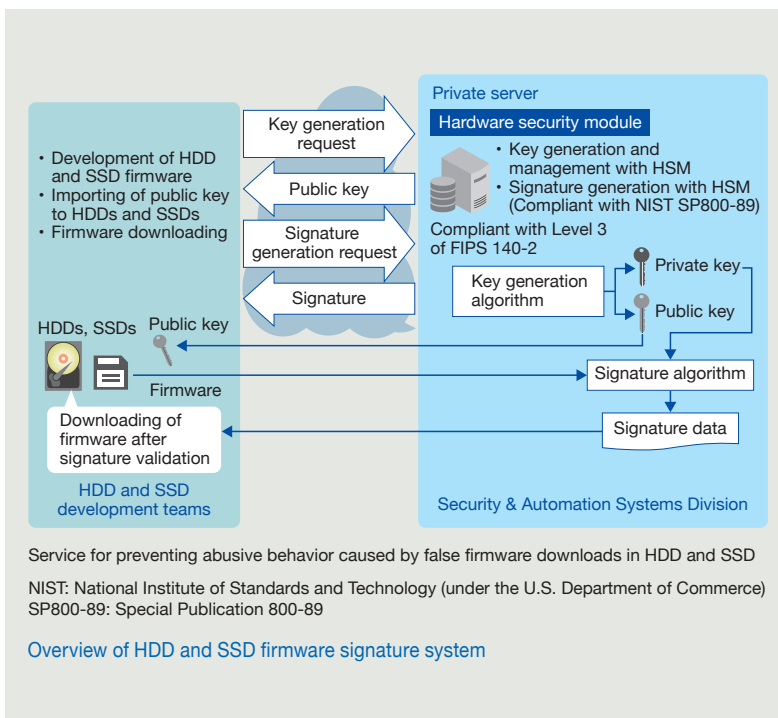
Application of Smartcard Security Technology to IoT

Toshiba is working on the application of smartcard security technologies to enhance the security of the Internet of Things (IoT), which is gradually becoming pervasive. For example, in collaboration with the hard disk drive (HDD) and solid-state drive (SSD) development teams, we have developed a firmware signature system that ensures the integrity of firmware of HDDs and SSDs.

A hardware security module (HSM) is commonly used in the smartcard issuance process to enable secure key management and signature generation. In response to customer requests, an HSM was incorporated into the firmware signature system. Compliant with FIPS 140-2, this HSM is highly tamper-resistant.

Key deployment and management is important for IoT security. We will continue to develop systems and services in this field.

FIPS: Federal Information Processing Standard



Generator for Vehicles Equipped with New Electric Powertrain

Toshiba has commenced the mass production of generators for Nissan Motor Co., Ltd. The generator is a key component of a new electric powertrain mounted on certain Nissan vehicle models, which was commercialized in November 2016.

This powertrain drives vehicles with an electric traction motor as in electric vehicles (EVs). However, the generator is driven by the engine to supply electric power to a high-voltage battery or to the traction motor when the remaining battery level is low. Our generator helps to achieve low fuel consumption because the engine is constantly controlled at an efficient operating speed during electricity generation.

We were able to reduce the generator development period by roughly one year compared with the typical development time. This was realized by using proven parts and existing facilities as much as possible to minimize investments. In addition, in order to meet the dimensional requirements, we developed a space-efficient low-pressure cast aluminum casing with an integrated water-cooling channel.

We will continue to develop innovative products that meet the needs of customers.



Item	Specification
Max. torque	108 Nm
Max. electric power output	55 kW
Max. speed	10 000 rpm
External dimensions	Diameter: 210 mm, Length: 240 mm

Generator for vehicles and its main specifications

Emergency-Running Battery System for Tokyo Metro 1000 Series Trains

Toshiba has delivered emergency-running systems to Tokyo Metro Co., Ltd. for its 1000 series trains. Safety and stable operations are crucial for railway systems. Normally, electric power generated by utility power plants is transmitted to substations and then supplied to train cars via power lines. In the event that the power supply from the substations is cut off, an emergency battery system supplies electric power to the trains so that they can continue running to the nearest station.

Our emergency battery system consists of an emergency-running battery and a charging device. During normal operation, the emergency-running battery is charged by electricity from the charging device that is received via the power lines. In the event of a power failure, the stored electric power is supplied, via the charging device, to a variable-voltage variable-frequency (VVVF) traction inverter and an auxiliary power supply unit (APU). The emergency-running system allows the 1000 series trains operating on Tokyo Metro's Ginza Line to safely carry passengers to the nearest station in the event of a total power loss.

In 2013, pilot battery systems were installed on 1000 series trains to perform field tests in the train yard and on the main line. In November 2015, an emergency battery system was installed on one train set to test its endurance in service operations. The emergency battery system was then adapted to begin installation on 1000 series trains in April 2016. Installation on 40 trains will be completed in March 2018.

The emergency-running battery system significantly contributes to the safety and stable operations of the railway system during power failures.



Emergency-running battery



Charging device

Emergency-running system consisting of emergency-running battery and charging device for 1000 series trains of Tokyo Metro Co., Ltd.

Field Test of Rapid Wireless Charger on Electric Buses

Toshiba has developed an 85 kHz-band 44 kW rapid wireless charger for electric buses. The charger is easy to operate: it is cable-free, and charging starts once the driver presses a button on the bus dashboard.

The transmitting pads placed on the ground can be up to 13 cm away from the receiving pads mounted on the bus. This is made possible by the application of a magnetic resonance technology that allows long-distance power transfer. The charger also takes interference with peripheral systems into consideration by reducing magnetic radiation through the application of two parallel transmitting pads with opposite-phase current feeding.

The rapid wireless charger and two electric buses carrying Toshiba's long-life SCiB™ lithium-ion rechargeable batteries were used for regular services between the facilities of All Nippon Airways Co., Ltd. near Tokyo Haneda Airport. This joint evaluation in collaboration with Waseda University was implemented by the Ministry of the Environment under Low Carbon Technology Research and Development Program.

We will continue to contribute to the reduction of the load on the environment while improving the quality of urban transportation.



Transmitting equipment of 44 kW rapid wireless charging system



Medium-sized electric bus with wireless power-receiving equipment

SCiB™ Lithium-Ion Rechargeable Battery for Electric Tricycles in the Philippines

Motorized tricycles are one of the major modes of transportation in the Philippines. However, they are also one of the leading causes of noise and pollution. To mitigate these adverse effects, the Department of Energy of the Philippines, with the support of the Asian Development Bank, has launched the E-Trike (Electric Tricycle) Project. Toshiba was selected as a battery manufacturer and began supplying its 20 Ah-cell 2P12S SCiB™ lithium-ion rechargeable battery module to vehicle maker Uzushio Electric Co., Ltd. in February 2016.

Due to the use of a lithium titanium oxide (LTO) anode, the SCiB™ battery provides excellent safety and long life even at high temperatures. Since the Philippines is a tropical country, the high-temperature performance of the SCiB™ has been highly evaluated. Furthermore, the high input and output power characteristics of the SCiB™ allow effective regenerative braking, quick charging, and the ability to climb steep slopes.

There are also plans for the electrification of other vehicles in neighboring countries to further reduce carbon emissions. We will continue to support these efforts with our SCiB™ battery technology.



68 VM E-Trike manufactured by Uzushio Electric Co., Ltd. incorporating SCiB™ battery



Item	Specification
Nominal voltage	27.6 V
Nominal capacity	40 Ah
Dimensions	360 (W) × 190 (D) × 125 (H) mm
Weight	Approx. 14 kg

20 Ah 2P12S SCiB™ module for automotive applications composed of two parallel strings of 20 Ah cells connected in a 12-series configuration, and its main specifications

SIP24-23 and SIP48-23 Battery Modules Equipped with BMU

Toshiba released new 24 V and 48 V industrial battery modules, the SIP24-23 and SIP48-23, in April 2017. These battery modules incorporate 23 Ah SCiB™ lithium-ion rechargeable battery cells featuring a large charging current, good low-temperature performance, long life, and high safety.

The built-in battery management unit (BMU) provides self-contained protection by means of a power line shutdown function and a fuse. The BMU can also acquire battery information via a controller area network (CAN) interface and output a contact signal.

The SIP24-23 is physically smaller than a typical lead-acid battery and its weight is approximately one-quarter that of the lead-acid type.

These new battery modules are expected to be used in various industrial applications, including drive systems and battery energy storage systems.



Item		Specification
Type name		SIP24-23
Cell configuration		1 parallel 11 series
Rated voltage		25.3 VDC
Operating voltage range		16.5 to 29.7 VDC
Rated capacity		22 Ah
Maximum allowable current		125 A-200 s ^{(*)1}
Dimensions		247 (W) × 188 (D) × 165 (H) mm
Weight		Approx. 8 kg
Ambient conditions	Operating temperature	-30 to 45°C
	Storage temperature	-30 to 55°C (Lower than 35°C is recommended.)
	Humidity	Lower than 85%RH (no condensation)
	Dust/water prevention	Equivalent to IP53 ^{(*)2}

(*)1 At 25°C (Cell temperature must not exceed 55°C.)

(*)2 An ingress protection code rating of 53 for electrical machinery and instruments as specified by Japanese Industrial Standard (JIS) C 9020

Main specifications of SIP24-23 24 V battery module equipped with BMU

FS20000S Industrial Servers with Latest CPU Architecture

Toshiba has developed the FS20000S model 200/100 industrial servers as successors to the FS5000S and FS10000S.

The FS20000S inherits the characteristics of the previous models cultivated through our experience in the development of industrial servers, including robustness; ease of maintenance; reliability, availability, and serviceability (RAS); and long-term supply and support.

The new models feature Intel's latest central processing unit (CPU) architecture to achieve higher performance than the previous models and are capable of handling double the number of storage devices compared with the FS5000S models of the same size.

The new models also provide an interface for remote monitoring and management functions compliant with the Intelligent Platform Management Interface (IPMI) standards for commercial servers.

The FS20000S is not only suitable for traditional applications such as monitoring systems, broadcast systems, and semiconductor production devices, but also meets the growing demand for new applications including edge computing for the processing of data from large volumes of IoT devices, as well as server virtualization.



FS20000S model 200/100 industrial server

Specifications of processor, memory, and storage devices

Item		Model 200		Model 100	
Processor	Main processor	Intel® Xeon® Processor E5-2658 v4, 2.3 GHz		Intel® Xeon® Processor E5-2609 v4, 1.7 GHz	
	Number of CPU sockets	1	2	1	2
	Number of cores	14	28	8	16
Main Memory	Capacity	4 GB min 512 GB max			
	Type	DDR4 SDRAM			
	Applicable standard	DDR4-2133 (PC4-17000)		DDR4-1866 (PC4-14900)	
Number of storages		8 units			

DDR4 SDRAM: double data rate fourth-generation synchronous dynamic random-access memory

Intel and Xenon are trademarks of Intel Corporation in the United States and/or other countries.

TOSGAGE-HS High-Speed Type X-Ray Thickness Gauge

The X-ray thickness gauge is an indispensable tool on rolling lines to measure the thickness of metal sheets and assure their quality.

Recently, the response time required by rolling lines has been becoming much shorter than before. This has led to the need for sensing devices such as X-ray thickness gauges to perform high-speed measurements.

In response to this trend, Toshiba has developed the TOSGAGE-HS high-speed type X-ray thickness gauge with a calculation time of 1 ms and a data transmission cycle time of 1 ms.

Our previous thickness gauge had a transmission cycle time of 5 ms and therefore a calculation time of 5 ms. In order to increase the data transmission speed, we used Real-Time Ethernet (RTE) for data transmission between the devices of TOSGAGE-HS.

Ethernet is a trademark of Fuji Xerox Co., Ltd.



TOSGAGE-HS high-speed type X-ray thickness gauge

Performance specifications

Item	Specification
Calculation period	1 ms
Transmission cycle	1 ms
Measurement range	0.1 to 8.0 mm
Radiometric noise (2 σ , time constant 10 ms)	0.05% of the measured thickness (measuring range: 1.0 to 8.0 mm) 0.06% of the measured thickness or 0.12 μm , whichever is larger (measuring range: 0.1 to 0.999 mm)

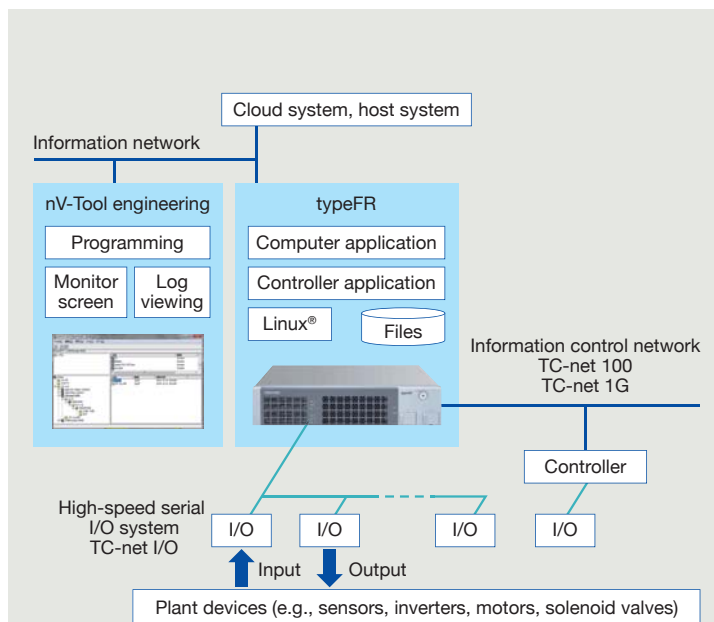
New "typeFR" Industrial Controller

Industrial controllers provide instrumentation and electrical control to support the stable long-term operation of plants and social infrastructure systems.

Toshiba has developed the Unified Controller nv-pack series "typeFR" as a new industrial controller product.

The typeFR integrates high-speed controllers and computers, which were previously separate, into one unit in order to save installation space and wiring. In addition, the typeFR has a high-speed remote input/output (I/O) that periodically collects data from a large number of sensors. The collected data can be used by numerical analysis software for visualization or sent to a host system using a gateway server application. Furthermore, the program editor and optional add-ons of the nV-Tool integrated engineering tool can be used to improve productivity and support the programming of application software.

Linux is a registered trademark of Linus Torvalds in the United States and other countries.



Example of application of Unified Controller nv-pack series typeFR

e-STUDIO2500AC/5005AC/7506AC Full-Color and e-STUDIO5008A/8508A Black-and-White MFP Series



e-STUDIO2500AC/5005AC/5008A series medium-speed and e-STUDIO7506AC/8508A series high-speed MFPs

Toshiba TEC Corporation has developed five new medium- and high-speed models in the e-STUDIO series of color and black-and-white multifunctional peripherals (MFPs).

The newly developed models provide 1 200 dots-per-inch (dpi) printing and simultaneous two-sided scanning at speeds of up to 240 pages per minute^{(*)1}. Their main body, control panel, and user interface designs were renewed to enhance the appeal of these products to users. In addition, we upgraded the system software and incorporated applications into the new models that make it possible to connect to various cloud applications from the main body for the first time.

Furthermore, the new e-STUDIO series has achieved the industry's top-level environmental performance^{(*)2} by reducing the standby power consumption^{(*)3} of the medium-speed models by about 40% and that of the high-speed models by about 90% as well as the active power consumption by about 20% and 60%, respectively, compared with existing models. We also improved the serviceability of the new models by using long-life consumables (with double the lifetime of the existing models) and by reducing the time required for setting up options.

(*)1 Two-sided A4 landscape scanning at 200 and 300 dpi

(*)2 As of May 2016 (as researched by Toshiba TEC Corporation)

(*)3 Typical Electricity Consumption (TEC) values (typical amount of energy consumed in one week based on the measurement method of the International Energy Star Program)

CT-5100 Card Settlement Terminals with PADCT-5100 PIN Pad

Toshiba TEC Corporation has released compact versatile payment terminals with robust security. The CT-5100 comes in two models that support payments through INFOX[®](*)1 and JET-S^{(*)2}, respectively. Both models incorporate all of the functions available with the conventional models as well as new functions for China UnionPay and multiple-currency payments. The CT-5100 is more compact and provides significantly higher performance than the conventional models. In addition, the CT-5100 can be extended to support new devices such as SD cards, universal serial bus (USB) memory sticks, and Bluetooth[®] devices.

The PADCT-5100 personal identification number (PIN) pad is certified as conforming with the latest Payment Card Industry PIN Transaction Security (PCI PTS) 4.1 standard.

(*)1 Connected to INFOX-NET[®] operated by NTT DATA Corporation

(*)2 Connected to Cardnet operated by Japan Card Network Co., Ltd.

INFOX is a registered trademark of NTT DATA Corporation in Japan.

The Bluetooth[®] word mark and logo are registered trademarks owned by Bluetooth SIG, Inc.



CT-5100 JET-S

PADCT-5100

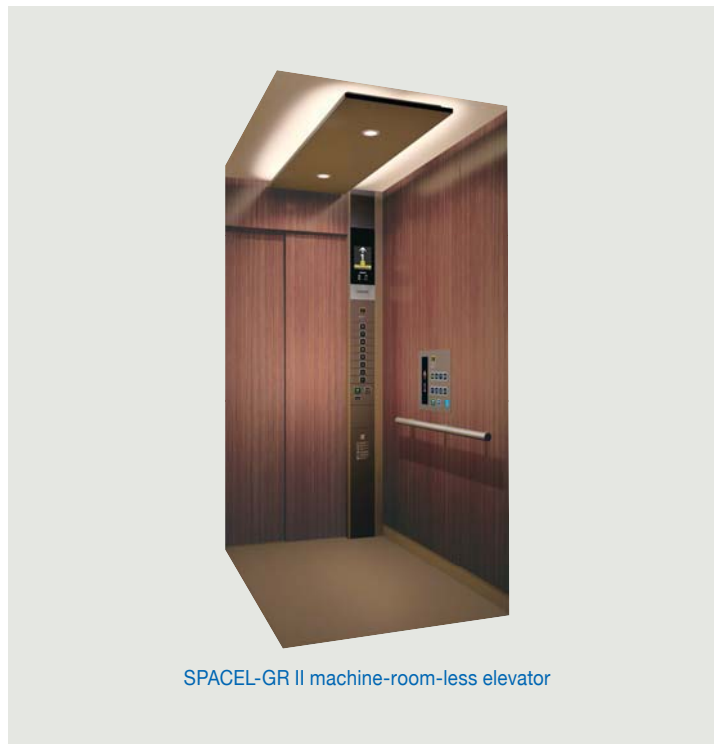
CT5100 JET-S card settlement terminal with PADCT-5100 PIN pad

SPACEL-GR II Machine-Room-Less Elevator for Japanese Market with Improved Safety and Comfort

Toshiba Elevator and Building Systems Corporation has released the SPACEL-GR II elevator offering enhanced safety. The SPACEL-GR II features the industry's first gapless doorsill^(*), which reduces the risk of dropping an object through the door threshold. This elevator also has a wide-angle mirror that allows passengers to see the inside and outside areas of the car. Moreover, the "Smart Door" automatically recognizes and predicts the actions of people approaching the elevator car to prevent accidents around the door.

The design of the car interior is further enhanced through the installation of a mirror on the rear wall that provides innovative mirror signage features. In addition, the universal guidance feature of the SPACEL-GR II shows the operating status on a liquid-crystal display panel in several languages and provides guidance using pictograms and voice announcements.

(*) As of January 2016 (as researched by Toshiba Elevator and Building Systems Corporation)



ELCOSMO-TJ Standard Elevator for Indian Market

The ELCOSMO-TJ elevator is a strategic product for the Indian market designed based on the popular ELCOSMO-E global model.

We adapted the car size to the shaft dimensions prevalent in the Indian market and reviewed various items to conform with local regulations. The fire-resistant door was locally manufactured. In the event of a fire or other emergency on a given floor, the ELCOSMO-TJ automatically skips that floor and travels to a safe floor.

We also reviewed quality standards in order to realize a cost-competitive elevator while maintaining both safety and energy efficiency, with the aim of increasing our market share for volume-zone products.

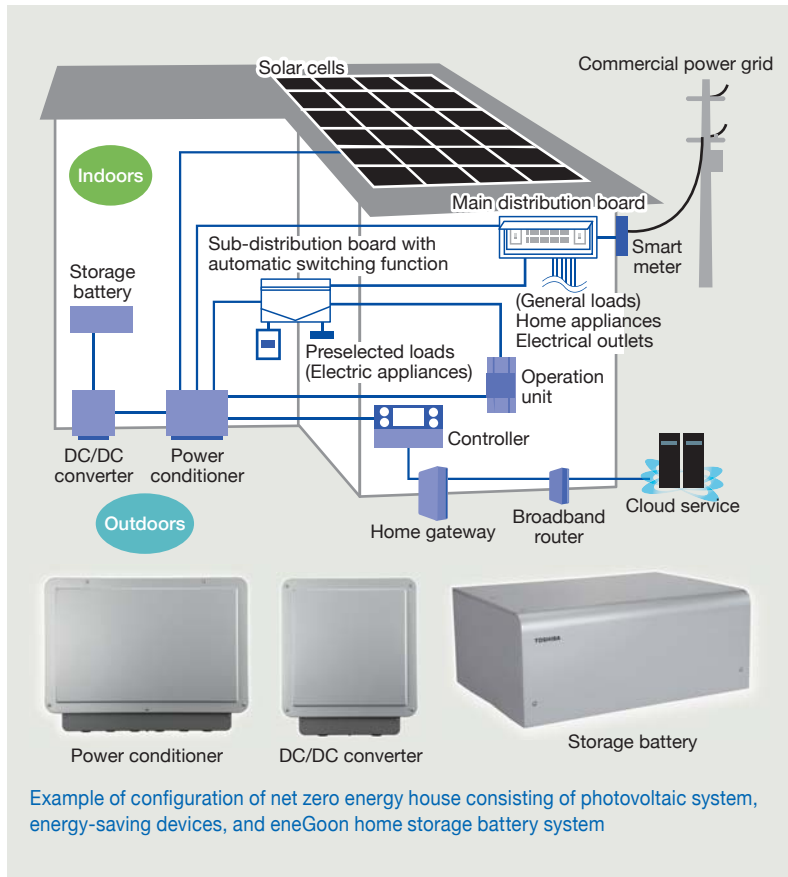


“eneGoon” Series Home Storage Battery System

A net zero energy house (ZEH) is a house with an annual net energy consumption roughly equal to zero. In order to realize a net ZEH, it is necessary to achieve integrated system control encompassing a photovoltaic (PV) power generation system, energy-saving equipment, and a power storage system.

Toshiba Lighting & Technology Corporation has developed a new hybrid 5.0 kWh model of the “eneGoon” series home storage battery system. The hybrid model is equipped with a hybrid power conditioner that can charge the storage battery with DC power from a PV generation system.

As a result, the efficiency of charging of the storage battery by a PV power generator is improved by roughly 5% compared with a conventional AC-charged storage battery system. In addition, the new hybrid storage battery system uses the 23 Ah SCiB™ lithium-ion rechargeable battery cell, enabling it to handle both nighttime charging and daytime PV charging over a long period. It can also be linked to a home energy management system (HEMS).



Socket Type Red LED Lamp for Vehicles

Toshiba Lighting & Technology Corporation has developed a socket type red light-emitting diode (LED) lamp for automotive brake light/tail light applications that is as easy to attach and detach as conventional miniature incandescent lamps. This LED lamp integrates a light-emitting part, an electronic circuit, and a socket.

We employed a chip-on-board technology to reduce the size of the light-emitting part. For the socket, we used a high-thermal-conductivity resin containing conductive fillers in order to improve heat dissipation and thereby reduce its size and weight. The electric current flowing through the LED is adjusted by laser-trimming a printed resistor on a ceramic printed circuit board (PCB). This helps to dramatically reduce the luminous flux variation among LED lamps.

The power consumption of the new LED lamp is approximately 90% lower than that of conventional incandescent lamps. This LED lamp is therefore expected to find widespread use in the near future.



8 hp/10 hp Super Power Eco Gold Air Conditioners

In April 2016, Toshiba Carrier Corporation released its new Super Power Eco Gold compact and energy-efficient air-conditioning systems in the Japanese market for use in stores and offices, with 8 and 10 horsepower (hp) models. Due to their unique compact and lightweight design, the new air conditioners weigh only 141 kg, 65 kg lighter than the previous model, and have a 50% smaller footprint than the previous model.

Furthermore, due to the use of a new DC twin-rotary compressor and a high-efficiency inverter incorporating a new voltage boosting technology (A-SRB™), the 8 hp model achieved the industry's highest APF^(*1) of 6.0^(*2) in 2015 for its class. In addition, these new technologies have made it possible to reduce the minimum cooling and heating capacity to 4.6 kW (from 6.0 kW in the previous model) and save energy loss during operation in extreme conditions (when the compressor is intermittently turned on and off).

(*1) APF: annual performance factor, an energy efficiency level stipulated in the Japanese Industrial Standards (JIS)

(*2) As of September 2016 (as researched by Toshiba Carrier Corporation)



8 hp/10 hp outdoor unit of Super Power Eco Gold air-conditioning system for stores and offices

Compact and Lightweight Side-Blow Type MiNi-SMMS Multiple Air-Conditioner System for Chinese Market

Toshiba Carrier Corporation has commercialized a highly energy-efficient, compact, and lightweight 5 hp/6 hp side-blow type outdoor unit for the MiNi-SMMS multiple air-conditioner system for the Chinese market.

This outdoor unit is designed for use in small offices, apartments, and condominiums, where an outdoor unit must often be installed in a narrow space at the customer's request. In order to reduce the size of the heat exchanger, we developed a high-performance propeller fan and reduced the diameter of the heat exchanger tubes to increase the tube density. The height of the new outdoor unit is 26% lower than that of the previous model. To facilitate installation and transportation of the outdoor unit, we simplified and reduced the weight of its internal parts such as metal plates and copper tubes. The new outdoor unit weighs roughly 15% less than the previous model.

We also employed a new torque control method to control the compressor's drive in order to reduce its vibration. This helps to decrease noise and vibration transmitted to the casing even when the compressor is running at a low rotation speed.

Additionally, the new outdoor unit incorporates an efficient twin rotary compressor and inverter drive to meet the growing demand for energy efficiency. As a result, this unit achieved an Integrated Part Load Value (IPLV) of 6.20, the industry's top-class IPLV in the Chinese market^(*).

(*) As of November 2016 (as researched by Toshiba Carrier Corporation)



5 hp/6 hp side-blow type outdoor unit of MiNi-SMMS multiple air-conditioner system for Chinese market