

Supply Record Mobility Solutions



JR Central N700S Shinkansen (planned) 25 kVac 60Hz; 16-cars/trainset		
Total number of modules / trainset	192 modules	48 modules
Rated Voltage	750 Vdc	100 Vdc
Total Capacity	210 kWh	46 kWh
Type of use	Emergency running	100 Vdc power supply



Tokyo Metro 1000 Series 600 Vdc; 6-cars/trainset	
Total number of modules / trainset	20 modules
Rated Voltage	552 Vdc
Total Capacity	22 kWh
Type of use	Emergency running



DB Cargo HELMS BR294 (2 prototypes) Diesel hybrid; 4 axles locomotive	
Total number of modules / locomotive	84 modules
Rated Voltage	773 Vdc
Total Capacity	92 kWh
Type of use	Hybrid locomotive



JR West TWILIGHT EXPRESS MIZUKAZE Diesel hybrid; 10-cars/trainset	
Total number of modules / trainset	108 modules
Rated Voltage	497 Vdc
Total Capacity	120 kWh
Type of use	Hybrid DMU ¹ train

¹ DMU : Diesel Multiple Unit

Power Supply Solutions



Tokyo Metro – Ayase Substation Chiyoda Line - 1500 Vdc	
Rated Power	1500 kW
Rated Capacity	437 kWh
Purpose	Emergency Power Supply



Tobu Railway – Omiya-koen Battery Post Urban Park Line - 1500 Vdc	
Rated Power	1000 kW
Rated Capacity	388 kWh
Purpose	Line Voltage Stabilization / Replacement to Substation



Okinawa Urban Monorail - Sueyoshi Substation Yui Rail - 1500 Vdc	
Rated Power	500 kW
Rated Capacity	194 kWh
Purpose	Energy Saving



Hiroshima Electric Railway – Chuo Substation Hiroshima City Lines - 750 Vdc / Field Test	
Rated Power	500 kW
Rated Capacity	194 kWh
Purpose	Energy Saving & Peak Cut

Ratings and Specifications



Battery Module TypeS-20 SCiB™ Module

Nominal capacity	40 Ah
Output voltage	27.6 Vdc (nominal) (Range : 18 ~ 32.4 Vdc)
Communication Interface	CAN 2.0B-500kbps, I/O
Dimensions	W187mm × D358mm × H129.8mm
Weight	Approx. 14.5kg



SSU Safety Supervisor Unit

Input Voltage	12 Vdc
Communication Interface	I/O
Dimensions	W95mm × D88mm × H32mm (without projections)



BMU Battery Management Unit

Input Voltage	12 Vdc
Communication Interface	CAN 2.0B-500kbps, Ethernet
Dimensions	W95mm × D88mm × H32mm (without projections)

Find out more on <http://toshiba-railway.com>

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TOSHIBA

Battery Solutions for Railway Application Powerd by SCiB™



Mobility Solutions
× **SCiB™**
Power Supply Solutions



TESS
Traction Energy Storage System

Innovative Railway Systems Powered by SCiB™

Toshiba combines its experience in railway systems with its innovative SCiB™ battery technology, in designing next generation products to promote a more safe, reliable, sustainable and environment-friendly railway system.



Reduce Carbon Footprint



Improve Reliability



Improve Life cycle cost



Enhance Safety

SCiB™ is suitable for Railway Applications

Safety

Battery system consisting of TypeS-20 SCiB™ and SSU components fulfils the qualitative and quantitative safety requirements according to EN 50129 for SIL 4* applications. This confirms SCiB™'s excellent safety characteristics including low risk of fire and explosion.
* Safety Integrity Level 4



Long Life

Type test confirmed that SCiB™ cell has minimal capacity degradation even after more than 20,000 cycles* of 0%-100% charge/discharge. Its long life characteristic is ideal for railway applications.
* Measured by Toshiba using a 20Ah cell under specific test conditions.

High Input & Output

SCiB™ has high input and output characteristics making it suitable for railway application which demands high power to support various customer benefits such as hybrid rolling stock, as well as battery post for alternative power supply source.



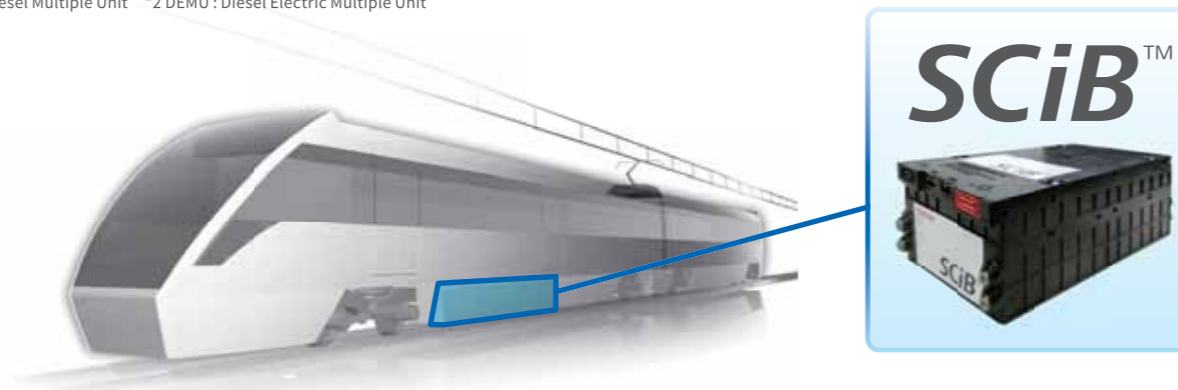
Hybrid Locomotive

TESS

Mobility Solutions Traction Battery with SCiB™

Innovative SCiB™ battery technology is used together with regular traction systems for railways. A wide range of on-board applications are possible, such as: •Emergency running •Catenary-free •Hybrid DMU¹/DEMU² •Hybrid locomotive

¹ DMU : Diesel Multiple Unit ² DEMU : Diesel Electric Multiple Unit



Key Benefits



Environment-friendly

Reduction of CO₂ emissions and noise (Use of regenerative energy and idling stop function).



Catenary-free Operation

Seamless operation with or without catenary.



Emergency Power Supply

Able to run train with on board auxiliary power, in case of power black-out.



Flexible Solutions

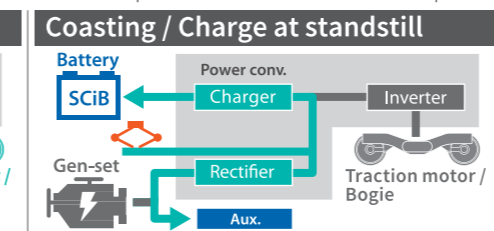
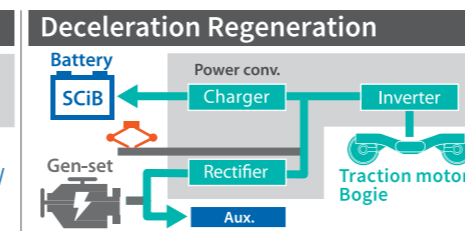
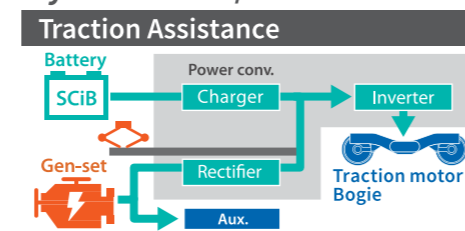
Applicable not only to new system but also to refurbishment for train/locomotive with engine.

System Line-up

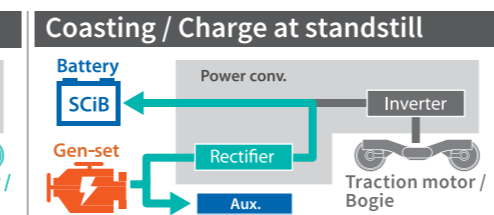
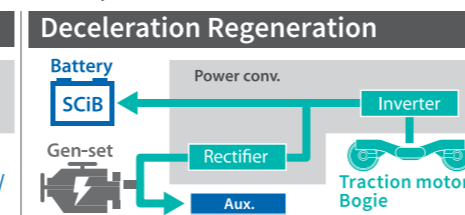
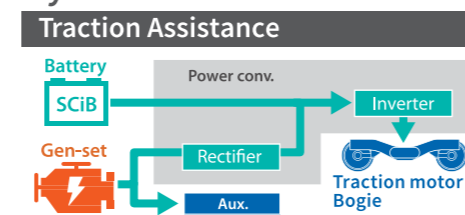
Hybrid DMU¹/ DEMU² Train

Run on non-electrified tracks

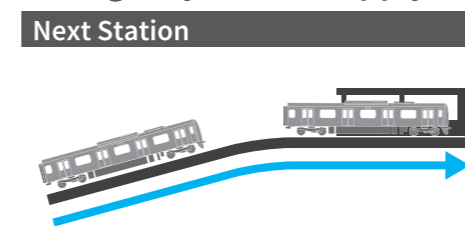
¹ DMU : Diesel Multiple Unit ² DEMU : Diesel Electric Multiple Unit



Hybrid Locomotive Reduce fuel consumption

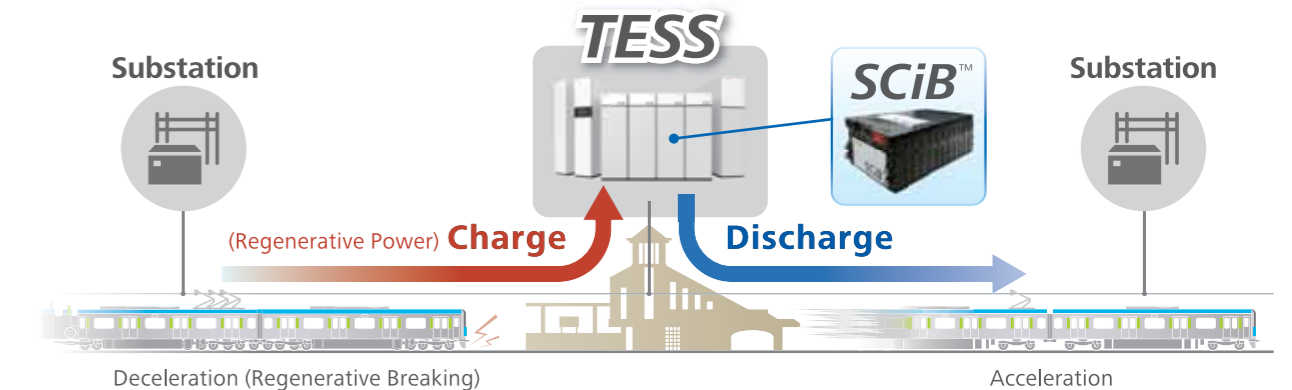


Emergency Power Supply Power train to evacuate passengers to safe location.



Power Supply Solutions Traction Energy Storage System with SCiB™

Traction Energy Storage System (TESS) efficiently stores surplus regenerative energy into the SCiB™ and discharges it to another accelerating train to achieve optimum customer benefit.



Key Benefits



Energy Saving

Efficient use of energy to prevent waste and promote power demand peak cut.



Line Voltage Stabilization

Improve traction power quality through voltage stabilization.



Emergency Power Supply

Able to power trains within a section to safely bring passengers to nearest station.



Better Regenerative Braking Operation

Surplus energy can be absorbed thus preventing regenerative brake failures.

System Outline

Control Panel

W500mm × D600mm × H2100mm × 2 Panel

Converter

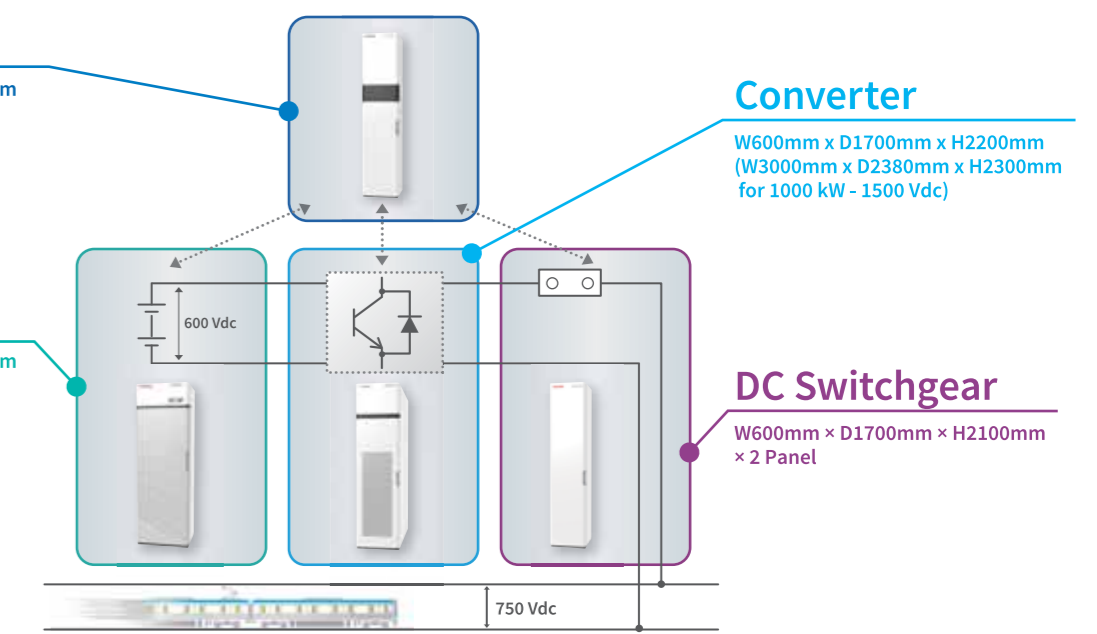
W600mm × D1700mm × H2200mm (W3000mm × D2380mm × H2300mm for 1000 kW - 1500 Vdc)

Battery Panel

W600mm × D650mm × H2100mm × 8 Panel

DC Switchgear

W600mm × D1700mm × H2100mm × 2 Panel



*Dimensions of 500 kW TESS for 750 Vdc Railway System

Ratings and Specifications

Item	Rating / Function
Rated Power	500 kW - 4000 kW
Rated Capacity	146 kWh - 777 kWh
Rated Line Voltage	600 Vdc / 750 Vdc / 825 Vdc / 1500 Vdc