Supply Record

Mobility Solutions

JR Central

K700S Shinkansen (planned)
24,000 kW, 36 cars, 9.9% efficiency
Total number of modules/each locomotive: 332 modules
Rated Input Power: 330 kW
Total Capacity: 21.5 kWh
Type of Use: Emergency Power Supply

Tokyo Metro

C00 Series (40 cars, 45 km/h)
Total number of modules/each locomotive: 36 modules
Rated Input Power: 150 kW
Total Capacity: 8.4 kWh
Type of Use: Emergency Power Supply

DB Cargo HELMS BR241 (2 prototypes)

Swiss model electric locomotive
Total number of modules/each locomotive: 44 modules
Rated Input Power: 170 kW
Total Capacity: 12.4 kWh
Type of Use: Testing

JR West

TWILIGHT EXPRESS MIKUNIZAKE

Swiss model electric locomotive
Total number of modules/each locomotive: 44 modules
Rated Input Power: 180 kW
Total Capacity: 12 kWh
Type of Use: Testing

Power Supply Solutions

Tokyo Metro – Ayase Substation
Chiyoda Line, ±11.04 kV
Rated Power: 1506 kW
Rated Capacity: 1972 MVA
Purpose: Emergency Power Supply

Tokyu Railway – Omiya – Arakawa Substation
Urban Park Line, ±1600 kV
Rated Power: 1500 kW
Rated Capacity: 384 MVA
Purpose: Line Voltage Stabilization/Replacement for Substation

Okinawa Urban Monorail – Sueyoshi Substation
Total Power ±1000 kV
Rated Power: 506 kW
Rated Capacity: 158 MVA
Purpose: Energy Saving

Hiroshima Electric Railway – Chuo Substation
Hiroshima City Line, ±230 kV/±150 kV
Rated Power: 506 kW
Rated Capacity: 158 MVA
Purpose: Energy Saving & Peak Cut

Ratings and Specifications

Battery Module: Typa2-8 SCiB™ Module

Nominal capacity: 48Ah
Rated voltage: 216V [Nominal]
Charge / Discharge: 180 / 124.4 VDC
Communication Interface: CAN 2.0B/J1939, J1708
Dimensions: 220 mm x 157 mm x 205 mm
Weight: Approx. 24 kg

SSU Safety Supervisor Unit

Input Voltage: 12 VDC
Communication Interface: J1939
Dimensions: Width x Depth x Height (Without projections)

BMU Battery Management Unit

Input Voltage: 12 VDC
Communication Interface: CAN 2.0B/J1939, J1708
Dimensions: Width x Depth x Height (Without projections)

Toshiba Infrastructure Systems & Solutions Corporation
7-18, Ittetsu-Takamatsu, Tsuruoka, Kita-ku, Kawasaki-shi, Kanagawa 213-8585, Japan
Railway Systems Division 113-4202, Kawasaki-shi

Battery Solutions for Railway Application Powerved by SCiB™

Mobility Solutions × SCiB™
Power Supply Solutions

TOSHIBA

Hybrid Locomotive

Mobility Solutions by SCiB™

Traction Energy Storage System

TESS
**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.

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**SCiB™ is suitable for Railway Applications**

**Safety**

Battery system consisting of Toshiba’s SCiB™ and ESS components fulfills the qualitative and quantitative safety requirements according to IEC 62261 for 6th generation systems. This confirms SCiB’s excellent safety characteristics including use resistance and explosions.

**Long Life**

Features realized by the use of lithium-titanium oxides.

**High Input & Output**

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

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**Mobility Solutions**

**Traction Battery with SCiB™**

Innovation SCiB™ battery technology is coupled with regular traction systems for railways. A wide range of mechanical applications are possible, such as in the case of high-speed trains or driving trains on steep gradients.

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**Key Benefits**

- **Environment-friendly**
  - Reduction of CO2 emissions and noise (one of the core technologies of regenerative energy and sitting function).

- **Emergency Power Supply**
  - Able to restart even in case of power failure or rapid drop in battery capacity.

- **Flexible Solutions**
  - Applicable not only in new system but also to retrofit for trains/vehicles with engine.

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**System Line-up**

<table>
<thead>
<tr>
<th>System Line-up</th>
<th>Hybrid DMU 1</th>
<th>Hybrid DMU 2</th>
<th>Hybrid Locomotive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traction Assistance</td>
<td>Deceleration Regeneration</td>
<td>Control / Charge at standstill</td>
<td></td>
</tr>
<tr>
<td>Hybrid DMU 1</td>
<td>Hybrid DMU 2</td>
<td>Hybrid Locomotive</td>
<td></td>
</tr>
</tbody>
</table>

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**Emergency Power Supply**

Power trains to evacuate passengers to safe location.

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**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.

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**Key Benefits**

- **Energy Saving**
  - Efficient use of energy to prevent waste and promote power demand peak cut.

- **Line Voltage Stabilization**
  - Regenerate traction power quality through voltage stabilization.

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**System Outline**

- Control Panel
- Battery Panel
- DC Switchgear

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**Ratings and Specifications**

<table>
<thead>
<tr>
<th>Item</th>
<th>Rated Power</th>
<th>Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Power</td>
<td>360 kW - 465 kW</td>
<td></td>
</tr>
<tr>
<td>Rated Capacity</td>
<td>165 kWh - 177 kWh</td>
<td></td>
</tr>
<tr>
<td>Rated line voltage</td>
<td>600 VDC, 750 VDC, 825 VDC, 1500 VDC</td>
<td></td>
</tr>
</tbody>
</table>

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**Conversion**

- DC to AC (Converter: 900 kW / 1200 kW)