

## **Japan-Led International Standard on Lithium-Ion Batteries for Auxiliary Power Supply Systems Used on Rolling Stock Issued**

The Railway Technical Research Institute established the Railway International Standards Center (RISC) and has been promoting development of international standards for railway technologies together with member organizations of RISC.

The International Electrotechnical Commission (IEC) has issued JP-Led international standards on “IEC 62973-5 applied to lithium-ion batteries for auxiliary power supply systems used on rolling stock”. RISC will continue making efforts to develop international standards for the technologies in which Japan has an advantage.

### **1. Background**

To run rolling stock on electric power, two circuit systems are required: the main circuit and the auxiliary circuit (auxiliary power supply system). The main circuit supplies electric power to the traction motors (motors), and the auxiliary power supply system operates the equipment that controls the main circuit, and lighting and door systems. For the auxiliary circuit, a battery is used to supply the power taken from the vehicle to the equipment, and nickel-cadmium and lead-acid batteries have been used so far.

Meanwhile, in the main circuit, lithium-ion batteries with compact and high-capacity features are used as running batteries, instead of nickel-cadmium batteries. In hybrid vehicles that run on electricity incorporated into the vehicle and battery power, lithium-ion batteries have been introduced in recent years. As for a lithium-ion batteries used in the main circuit, the international standard “IEC 62928 applied to onboard lithium-ion batteries” was published in 2017, which was initiated by Japan and reflects Japanese technology.

The batteries used for the auxiliary power supply system were also expected to be lithium-ion. However, since no international standards existed for the batteries, it was hoped that an international standard would be issued that reflected Japanese technology.

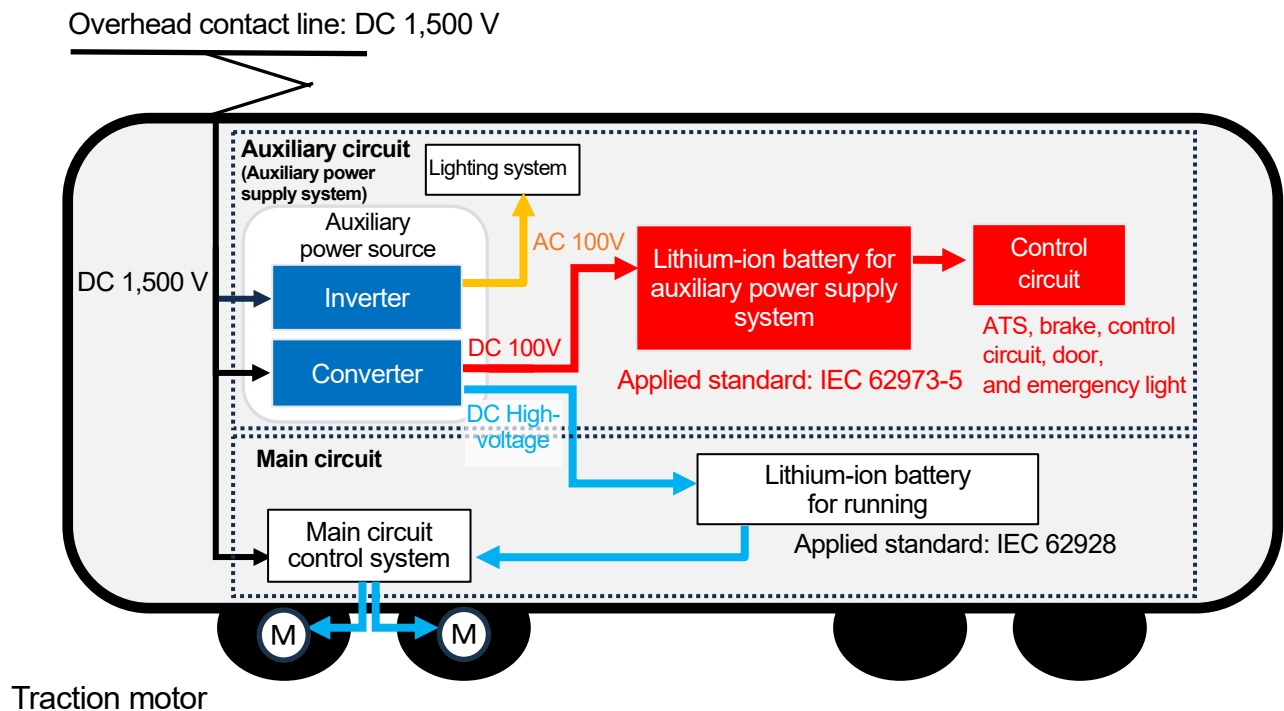
### **2. History**

(1) In October 2018, Germany proposed the international standardization of IEC 62973-5 in the 58th IEC TC 9 Plenary Meeting. Under the initiative of Japan as the project leader, the Ad Hoc Group 25 (AHG 25) was organized to discuss standardization themes.

(2) In October 2019, the 59th IEC TC 9 Plenary Meeting decided on starting votes for the New Work Item Proposal (NP).

(3) In March 2020, the voting result for the NP was approved, and PT 62973-5 was launched.

(4) In August 2023, “IEC 62973-5: railway applications—rolling stock—batteries for auxiliary power supply systems—part 5: lithium-ion batteries” was issued (on August 30).



Reference: Example of how lithium-ion batteries work in rolling stock (Example of a DC hybrid vehicle).

### 3. Short description of international standard IEC 62973-5:

#### “Railway applications—rolling stock— batteries for auxiliary power supply systems—part 5: lithium-ion batteries”

This standard defines the following provisions specific to lithium-ion batteries:

- Terms and definitions

Among terms specific to lithium-ion batteries, “lithium-ion battery cell” and “rated battery capacity of lithium-ion batteries” are defined.

- Management systems of battery chargers

Specified battery management systems for lithium-ion batteries, including overcharge and over-discharge protection and temperature management systems, are defined.

- Handling regulations (for transport and storage)

Specified requirements for charging conditions during transport and storage of lithium-ion batteries are defined.

- Testing methods

As lithium-ion batteries have a specific (flammable) electrolytic solution, in addition to common electrical

performance testing, shock-and-vibration-resistance tests are also defined.

The establishment of this international standard will be helpful to create an environment where economic benefit due to compact, high-capacity lithium batteries is expected, and developed in Japan.