

Japan-Led International Standard on AC Power Compensator Issued

RTRI established the Railway International Standards Center, RISC, and has been promoting development of international standards for railway technologies together with the other member organizations of the RISC. The International Electrotechnical Commission, IEC, issued Japan-led international standards on AC power compensators. RISC will continue making efforts to develop international standards for the technologies in which Japan has many years of experience.

1. Background

Since high-speed trains such as the Shinkansen trains consume a large amount of electric power, the AC power supply system suitable for high power feeding has been used. In Japanese AC power supply systems, three-phase AC power supplied by power companies is converted at substations into two systems of single-phase AC suitable for train driving and supplied to line sections in both directions. If a proper balance in the power supply corresponding to train positions and driving conditions is not attained, imbalance might be caused in the three-phase AC side as well and have an impact on power companies' grids and other consumers in case of weak power grid.

Japanese manufacturers and railway operators have been developing and implementing AC power compensators capable of reducing imbalance at the interface to the 3AC power network. Currently, foreign manufacturers are also developing similar devices, but international standards for AC power compensators are not yet to be developed. In order to improve Japan's strength in taking on overseas railway project contracts including construction of high-speed rails, it is necessary to develop international standards reflecting Japanese technologies.

2. History

May 2017	RISC launched an internal study. Railway operators and manufacturers began preparing an early draft as an input for international standards.
October 2017	Development of international standards was proposed to IEC/TC9 (Electrical equipment and systems for railways)
January 2019	Each country agreed upon starting review of international standards. Since then, Japan led the review of the draft for 3 years.
July 22 2022	The final draft was approved at IEC/TC 9.
August 12 2022	IEC 62590-3-1 "Electronic power compensators" was issued.

3. Outline of IEC 62590-3-1 "Electronic power compensators"

This standard reflects Shinkansen technologies.

- Basic requirement for AC power compensator based on railways' power consumption patterns
Describes basic requirements to mitigate voltage fluctuation.
Sets out a guideline to choose specifications according to functions necessary for railway devices such

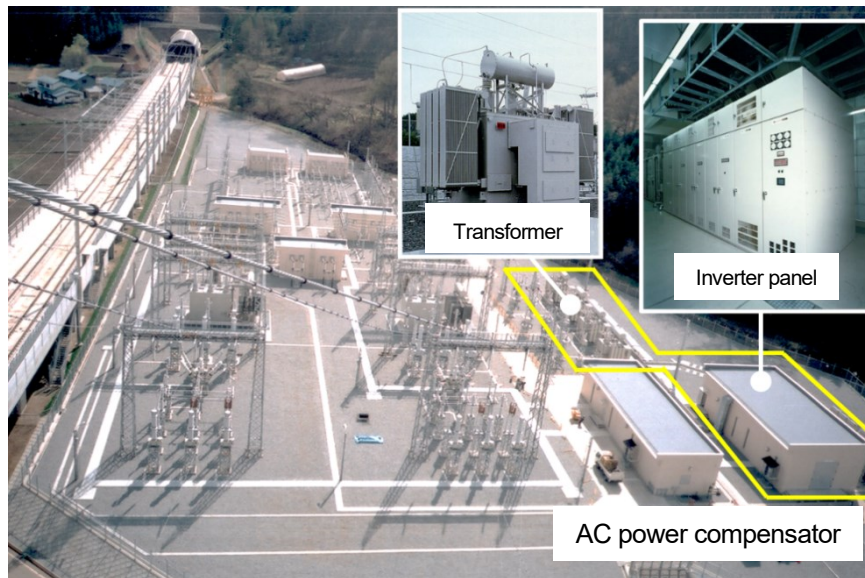
as stabilizing voltage.

- Assessment method to introduce AC power compensator

Describes the process to assess the effects of introducing AC power compensator and a guideline to determine specifications including locations of the devices, methods and scales (capacity, numbers of devices)

- Methods of testing at factories and construction sites

The AC power compensator consists of devices including transformer and inverter panel (semiconductor assembly for power supply, controlling device). Individual devices and the entire system are tested. This standard specifies test methods and points to be checked.



Railway substation

(Provided by the Japan Railway Construction, Transport and Technology Agency)