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Customer Inquiries

Media Inquiries

Mobility Infrastructure Systems Marketing Division
Public Utility Systems Group
Mitsubishi Electric Corporation

Public Relations Division

Mitsubishi Electric Corporation

rail.webmaster@nb.MitsubishiElectric.co.jp
www.MitsubishiElectric.com/

prd.gnews@nk.MitsubishiElectric.co.jp
www.MitsubishiElectric.com/news/

Mitsubishi Electric's Italian Subsidiary Is First Japanese Affiliate to Receive Order for R290 HVAC Systems for German S-Bahn Trains

Use of naturally derived refrigerants in HVAC systems will contribute to decarbonization



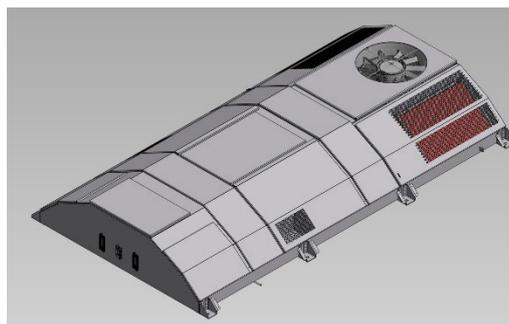
Rendition of S-Bahn train to be equipped R290 HVAC systems

TOKYO, September 19, 2024 – [Mitsubishi Electric Corporation](https://www.mitsubishielectric.com) (TOKYO: 6503) announced today that its Italian subsidiary Mitsubishi Electric Klimat Transportation Systems S.p.A. has received an order from Siemens Mobility GmbH for 1,350 Heating, Ventilation and Air Conditioning (HVAC) systems that use the natural propane refrigerant R290, which will be installed in next-generation trains of the S-Bahn rail system in Munich, Germany. The Mitsubishi Electric subsidiary, which will be the first Japanese affiliate to supply R290-refrigerant HVAC systems for use in trains,¹ will deliver 1,170 units for train cabins and 180 units for train cockpits between fiscal 2026 and 2032.

¹ According to Mitsubishi Electric research as of September 19, 2024.

Bayerische Eisenbahngesellschaft mbH, a public authority, and DB Regio AG, a subsidiary of Deutsche Bahn AG, are planning to procure the new trains to meet rising passenger expectations. The new trains will not only offer improved transportation capabilities, but also introduce next-generation technologies for purposes including reduced power consumption, lower maintenance costs as well as use of free Wi-Fi.

Non-flammable alternative freons² such as R407C and R134a, which are widely used in train HVAC systems, are problematic due to their high Global Warming Potential (GWP), which is an index that measures how much heat a greenhouse gas can absorb in the atmosphere compared to CO₂. R290 has a very low GWP, but systems using it require special design and installation safety measures due to R290's flammability. Mitsubishi Electric's new HVAC systems will offer robust safety, a key reason why Mitsubishi Electric Klimat Transportation Systems' was selected as the first Japanese affiliate to supply R290 HVAC systems for trains. The environmentally friendly R290 HVAC systems ordered by Siemens Mobility will contribute to sustainability by using the environmentally friendly R290 refrigerant.



Rendition of R290 HVAC system

Product Features

- 1) ***R290 refrigerant's low environmental impact and electricity consumption support carbon neutrality***
 - The exceptionally low GWP rating of the R290 HVAC systems (GWP: 0.02)³ is a mere 0.00001 percent of that of conventional systems using R407C (GWP: 1774)⁴ or R134a (GWP: 1430)⁴ refrigerant.
 - R290 also offers excellent cooling efficiency and a high Coefficient of Performance (COP⁵) rating as well as lower power consumption compared to standard natural CO₂ refrigerant (GWP:1) cooling, which is also an alternative of R407C or R134a for HVAC systems in trains.
 - In addition, the system's compliance with the EU's F-Gas Regulation⁶ supports decarbonization.
- 2) ***System design optimized for use of R290 refrigerant to ensure safety of cabins***
 - Multiple small-scale refrigeration cycles ensure that the refrigerant charge⁷ per circuit remains below the flammability limit specified in the EN378-1 regulation.⁸

² Industrial synthetic compound developed as an alternative to fluorocarbons that deplete the ozone layer and have greenhouse effects.

³ Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report.

⁴ Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report.

⁵ Measure of energy efficiency for cooling refrigerators and equipment.

⁶ Regulation (EU) 2024/573.

⁷ Amount of refrigerant injected into air conditioning system.

⁸ European standard for safety and environmental criteria for installation, design and maintenance of equipment and refrigerants.

- Even if R290 were to leak, seamless piping used in the indoor equipment of R290 HVAC system prevents refrigerant from leaking into the train cabin, and it also helps to keep the refrigerant at a low density for added safety.

Future Plans and Prospects

Mitsubishi Electric has positioned sustainability as the cornerstone of its business, in line with the company's motto "provide solutions to social challenges through our businesses." Beginning with the Munich S-Bahn order, Mitsubishi Electric aims to provide R290 HVAC systems for other rail systems in Europe and indeed around the world, thereby contributing to global carbon neutrality and sustainability.

Patents

Acquired one patent in Japan and one patent outside of Japan is pending.

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About Mitsubishi Electric Corporation

With more than 100 years of experience in providing reliable, high-quality products, Mitsubishi Electric Corporation (TOKYO: 6503) is a recognized world leader in the manufacture, marketing and sales of electrical and electronic equipment used in information processing and communications, space development and satellite communications, consumer electronics, industrial technology, energy, transportation and building equipment. Mitsubishi Electric enriches society with technology in the spirit of its "Changes for the Better." The company recorded a revenue of 5,257.9 billion yen (U.S.\$ 34.8 billion*) in the fiscal year ended March 31, 2024. For more information, please visit www.MitsubishiElectric.com

*U.S. dollar amounts are translated from yen at the rate of ¥151=U.S.\$1, the approximate rate on the Tokyo Foreign Exchange Market on March 31, 2024