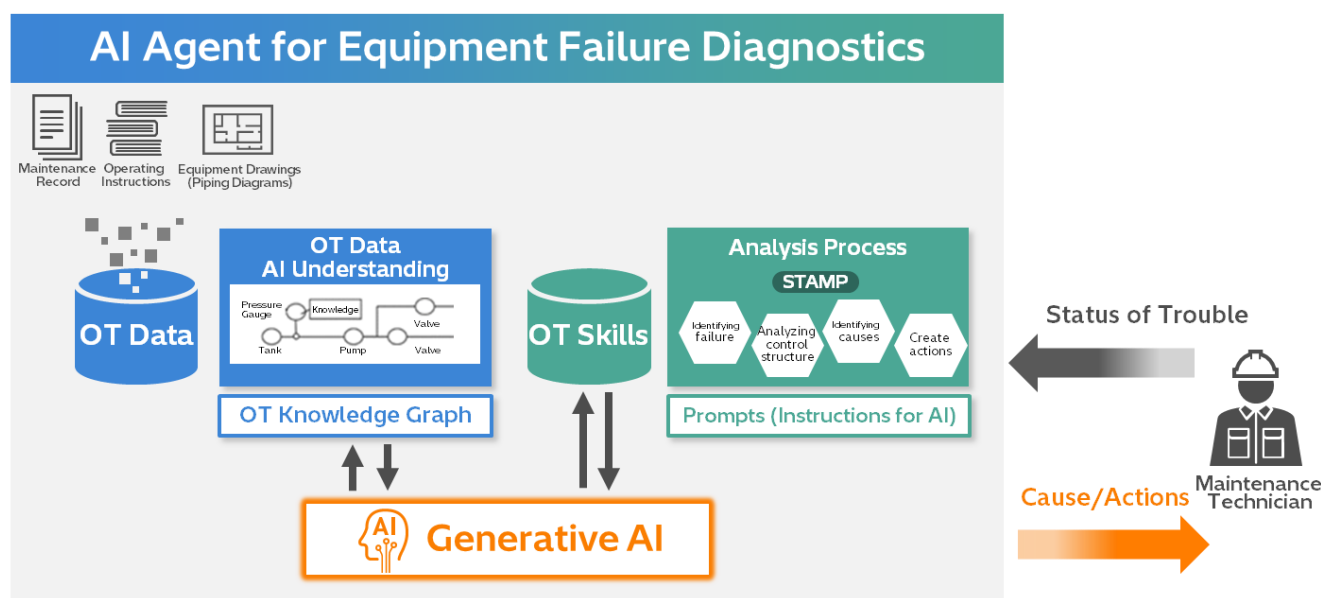


News Release

For Immediate Release

Through Collaborative Creation, Daikin and Hitachi Begin Trial Operation of AI Agent Supporting Equipment Failure Diagnostics in Factories

Contributing to global quality assurance by integrating generative AI and OT knowledge for response time under 10 seconds and accuracy exceeding 90%



Conceptual diagram of AI agent supporting equipment failure diagnostics in factories

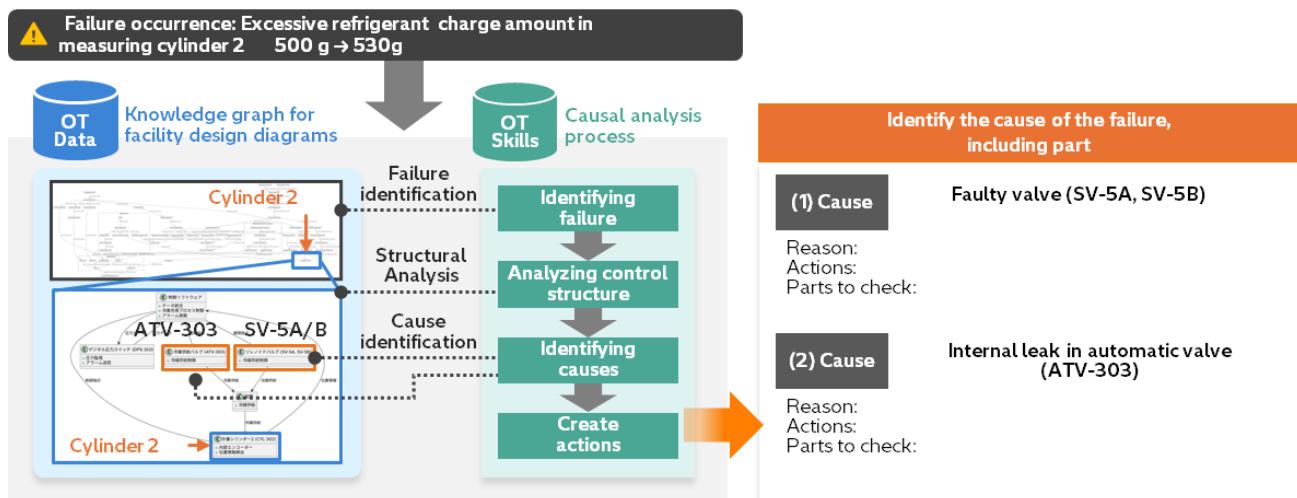
Tokyo and Osaka, Japan, April 22, 2025- Daikin Industries, Ltd. (TSE:6367, “Daikin”) and Hitachi, Ltd. (TSE:6501, “Hitachi”) are working through collaborative creation to begin a trial operation in April 2025 at the Sakai Plant-Rinkai Factory (Sakai City, Osaka Prefecture) where Daikin manufactures commercial air conditioning equipment. Their aim is to commercialize an AI agent that supports equipment failure diagnostics in factories (AI Agent for Equipment Failure Diagnostics).

This initiative takes the OT^{*1} knowledge cultivated by Daikin and Hitachi at their respective worksites over many years and unites it with Hitachi’s advanced IT. When a maintenance technician armed with a tablet device discovers a failure in a pump or valve while inspecting production equipment, the “AI Agent for Equipment Failure Diagnostics” will indicate the cause and needed corrective actions to the technician. The system works by first converting the factory equipment drawings that Daikin has accumulated, such as various production and utility equipment, into knowledge graphs^{*2} that the generative AI can read. Then, the generative AI learns the “OT data,” which includes knowledge graphs, maintenance records, and “OT skills,” Hitachi’s unique equipment failure cause analysis process^{*3} based on STAMP^{*4} and others. This achieves the failure diagnostics that is on par with or exceeds the capabilities of Daikin’s standard maintenance technicians. A preliminary demonstration test confirmed that the “AI Agent for Equipment Failure Diagnostics” could identify the cause of equipment failure and recommend corrective actions within 10 seconds at an accuracy of over 90%.^{*5}

Daikin and Hitachi plan to complete the trial operation by September 2025 before beginning practical application of the AI agent. By developing it to Daikin’s manufacturing bases both in Japan and overseas, the company intends to share its tacit knowledge of equipment

maintenance as organizational knowledge in order to ensure global quality, the transfer of skills, and improved productivity of frontline workers.

For its part, Hitachi will adopt the “AI Agent for Equipment Failure Diagnostics” as a Lumada^{*6} solution throughout the manufacturing industry and provide applications combining OT knowledge and IT into fields other than equipment maintenance. Hitachi will also help frontline workers improve work efficiency by including services such as the “AI Agent Development, Operation, and Environment Provision Service,”^{*7} which rapidly develops and generates AI agents that utilize OT knowledge.



Example of presenting causes and corrective actions for equipment failure using AI Agent for Equipment Failure Diagnostics

*1 OT: Operational technology

*2 Knowledge graph: A data model that expresses knowledge in the form of a graph. In equipment drawings, equipment components, such as parts, are expressed as nodes, and the relationships between the components are expressed as edges.

*3 Patent pending at Hitachi. Descriptions of the patent application listed here indicate the status at the time of announcement. Please note that patent status, etc., may differ from the status at the time of writing due to patent invalidation trials requested by third parties, the status of rights procedures for granting rights, and similar factors.

*4 System Theoretic Accident Model and Processes (STAMP): STAMP is an accident causality model based on systems theory. It enhances traditional Fault Tree Analysis (FTA) by considering interactions between system elements, allowing for the identification of new failure causes.

*5 The causes and corrective actions of five failure situations for five types of equipment are estimated, and the accuracy of the estimations are evaluated on a five-point scale by two experienced maintenance technicians.

*6 **Lumada**: A collective term for solutions, services and technologies based on Hitachi's advanced digital technologies for creating value from customers' data accelerating digital innovation.

*7 On March 26, 2025, Hitachi issued the press release “Hitachi Launches AI Agent Development Service to Support Frontline Workforce” <https://www.hitachi.co.jp/New/cnews/month/2025/03/0326.html> (Japanese)

Background

In addition to a decrease in the working-age population in the manufacturing industry, a drop has been seen in the number of skilled technicians. Similarly, globalization and the expansion of manufacturing bases has increased the number of technicians needed, leading to a worsening of the labor shortage.

Daikin manufactures air conditioners at over 90 production sites in 28 countries around the world and is accelerating its expansion into various regions around the world. However, some overseas factories have been unable to hire maintenance technicians and keep pace with the training of high-level technicians as equipment becomes increasingly more sophisticated. This has resulted in such issues as longer lead times for maintenance and inconsistent maintenance quality. Additionally, even though data such as equipment logs and maintenance records have been collected, they have yet to be effectively incorporated to increase business efficiency.

As the working-age population continues to decline and social issues become more multifaceted, reducing the burden on frontline workers at manufacturing sites and improving

productivity have become urgent issues. In response to this, Hitachi established the Generative AI Center in May 2023 to promote the safe and effective use of generative AI both internally and externally and will accelerate its growth by maximizing the value provided to customers and improving productivity through Lumada solutions. In addition, Hitachi is working to solve problems by leveraging its strengths in IT, OT, and products, as well as the wealth of knowledge and know-how (domain knowledge) that it has gained through collaborative creation with a wide range of manufacturing customers.

Until now, Daikin and Hitachi have been engaged in collaborative creation aimed at establishing a next-generation production model leveraging their respective technologies and know-how, including the digitalization of brazing work,^{*8} the digitalization of fluorochemical reaction processes,^{*9} and support for the creation and execution of optimal production and sales plans in the chemicals business.^{*10} Now, the two companies are beginning to further deepen their co-creation initiatives for realization of a factory with zero equipment breakdowns that is continuously evolving and never stops.

^{*8} On September 26, 2017, Daikin and Hitachi issued the press release “Daikin and Hitachi Embark on Collaborative Creation Aiming to Establish a Next-Generation Production Model Utilizing IoT to Support Skill Transfer from Expert Workers.”

<https://www.hitachi.com/New/cnews/month/2017/09/170926a.html>

^{*9} On October 12, 2018, Daikin and Hitachi issued the press release “Daikin and Hitachi Start Joint Demonstration Aiming to Digitalize Quality Control Know-How in Reaction Process of Chemical Manufacturing.”

<https://www.hitachi.com/New/cnews/month/2018/10/181012a.html>

^{*10} On July 14, 2020, Daikin and Hitachi issued the press release “Through collaborative creation, Daikin and Hitachi have commercialized and begun operation of a solution to support the creation and execution of optimal production and sales plans that quickly respond to fluctuations in demand in the chemicals business.”

<https://www.hitachi.co.jp/New/cnews/month/2020/07/0714.html> (Japanese)

About Daikin

Daikin is a leading HVAC&R company with over 100 manufacturing bases worldwide and operations in over 170 countries and regions. In the fiscal year ending March 31, 2024, the company recorded sales of 4,395.3 billion yen and employment of approximately 100,000 people worldwide. Through the sale of air conditioning equipment, which has become an essential social infrastructure for daily life, Daikin improves indoor air quality in various climates, contributing to the creation of comfortable spaces and human health. With the number of air conditioners in the world currently predicted to triple by 2050, the increase in electricity demand associated with the use of air conditioners has developed into a major issue. In response to this, Daikin believes its mission is to mitigate the effects of global warming to the greatest extent possible while providing air environments that are safe, secure, comfortable, and healthy. With its aim of “Perfecting the Air,” Daikin offers products and services worldwide that meet diverse needs and cultures. For more information, please visit Daikin's website (<https://www.daikin.com/>)

About Hitachi, Ltd.

Hitachi drives Social Innovation Business, creating a sustainable society through the use of data and technology. We solve customers' and society's challenges with Lumada solutions leveraging IT, OT (Operational Technology) and products. Hitachi operates under the 3 business sectors of “Digital Systems & Services” - supporting our customers' digital transformation; “Green Energy & Mobility” - contributing to a decarbonized society through energy and railway systems, and “Connective Industries” - connecting products through digital technology to provide solutions in various industries. Driven by Digital, Green, and Innovation, we aim for growth through co-creation with our customers. The company's revenues as 3 sectors for fiscal year 2023 (ended March 31, 2024) totaled 8,564.3 billion yen, with 573 consolidated subsidiaries and approximately 270,000 employees worldwide. For more information on Hitachi, please visit the company's website at <https://www.hitachi.com>.

General Inquiries

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Information contained in this news release is current as of the date of the press announcement, but may be subject to change without prior notice.
