Advancing Air Conditioning Networks with Nessum

June 25, 2026

DAIKIN INDUSTRIES, LTD.

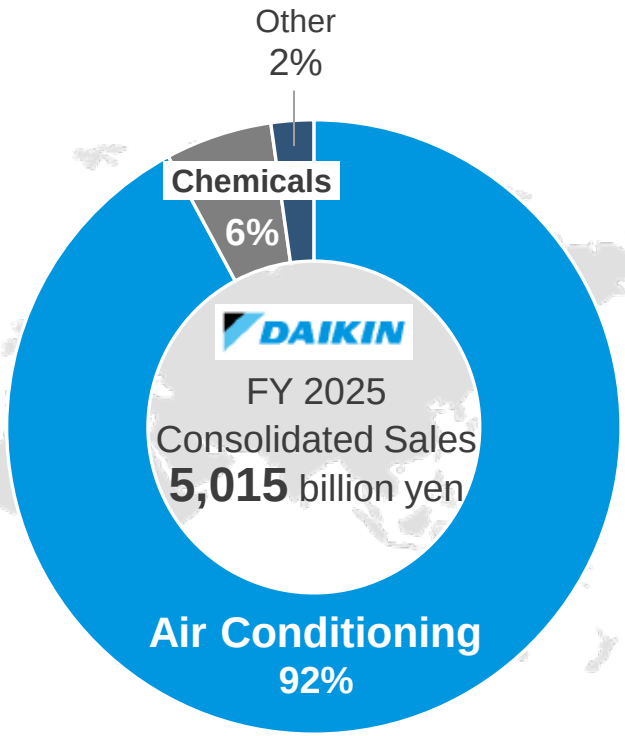
Introduction of Daikin Industries

Profile

(As of March 31, 2026)

Founded	1924
Employees	104,095 employees (consolidated)
Representatives	Chairman & CEO: Masanori Togawa President & COO: Naofumi Takenaka
Headquarters	Kita-ku, Osaka, Japan
Group Companies	324 consolidated subsidiaries (31 in Japan, 293 overseas)

Business



Overseas sales ratio
FY05 47%
FY25 **85%**

- ✓ **Air conditioning is the core**
- ✓ **Overseas sales: over 80%**
- ✓ **More than 90 production sites in 28 countries and regions**

With air conditioning at our core, we deliver products, systems, and services tailored to worldwide needs.

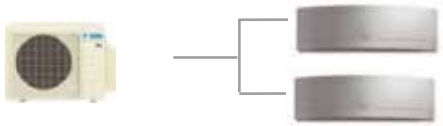
Daikin's AC Product Lineup

AC solutions are realized with an extensive lineup for all types of needs including those for energy-savings, the environment, ventilation, comfort, peace-of-mind, safety, and health.

Residential AC

Room Air Conditioners

Housing/Multi-Split Air Conditioners

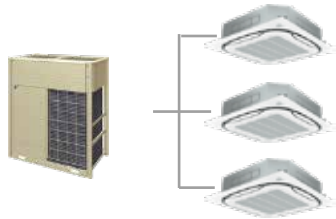


Unitary Air Conditioners

VRV Multi-Split Air Conditioning System

Control/Maintenance Systems

VRV Systems



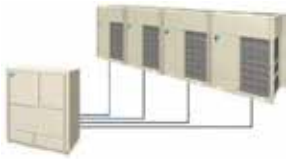
Ventilators

ACs for Facilities and Factories

Applied ACs

Centrifugal Chillers

Chillers



Air Handling Units

Fan Coil Units

Air Purifiers

Heating/ Water Heaters

ACs for Small Shops and Offices

Rooftops

Residential — Commercial — Industrial

HVAC Networks Built Around VRV Multi-Split Systems

VRV multi-split systems are installed in **buildings from small and midsize buildings to large facilities**. Depending on scale, multiple HVAC systems may be installed.

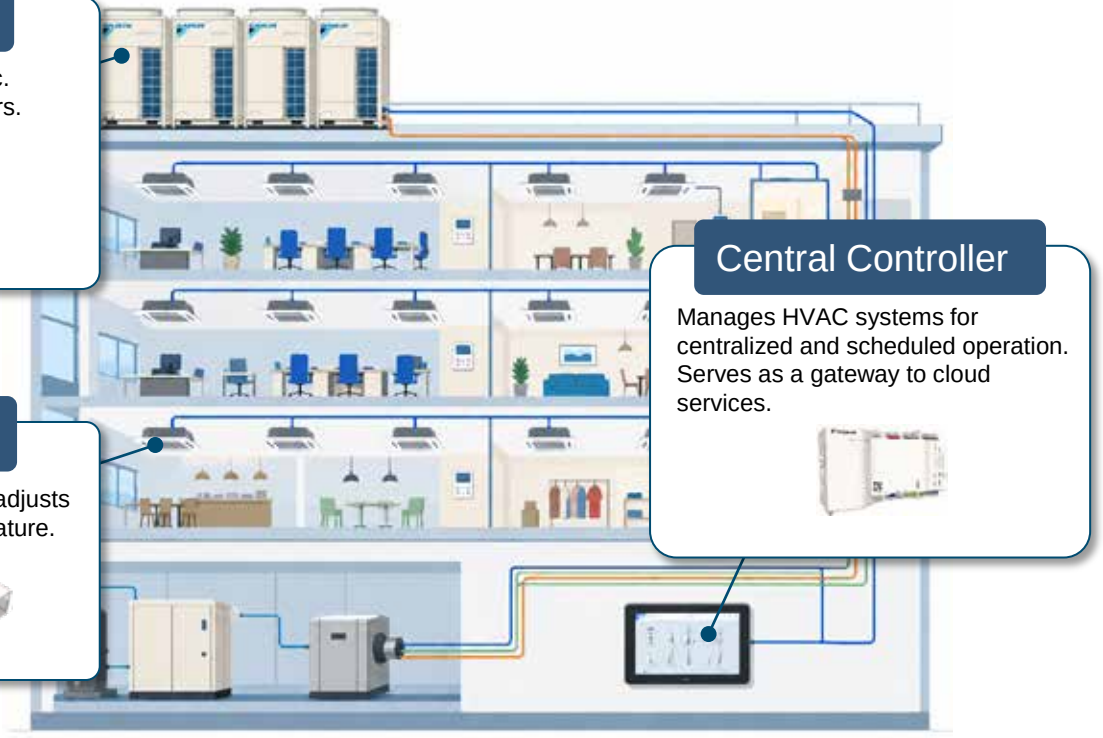
VRV Multi-Split AC System

Outdoor Unit

Installed on rooftops, etc. Discharges heat outdoors.

Indoor Unit

Collects room heat and adjusts to a comfortable temperature.



Central Controller

Manages HVAC systems for centralized and scheduled operation. Serves as a gateway to cloud services.

HVAC Network Characteristics

Many connected devices

A single network connects up to about 300 outdoor/indoor units and other HVAC devices. Central controllers can manage up to 512 indoor units and also connect third-party equipment and I/O.

Long-distance wiring

HVAC units are installed throughout a building. Communication wiring must cover the building, with a total length up to 2,000 m.

Flexible support for building-specific configurations

HVAC systems differ by building, requiring flexible support for varied configurations.

The HVAC network links many devices in a building through data communication and forms the foundation of the entire HVAC system.

Daikin's long-established HVAC network communication infrastructure

DIII-NET (Daikin proprietary communication)

DIII-NET Strengths and Expanding Network Requirements

DIII-NET has long supported Daikin HVAC systems as a communication system optimized for HVAC control. Going forward, cloud and AI use and labor shortages require **a new communication infrastructure that can make more flexible use of equipment data.**

Strengths of DIII-NET

Long track record

Used for about 30 years, mainly in building multi-split systems.

High data efficiency optimized for HVAC control

Efficient exchange of data for refrigerant control, operation commands, and monitoring.

Priority-based design for multi-device communication

Role-based priority control prevents signal collisions even when many devices communicate at once.

Supports many devices and long wiring

Stable communication for systems with many devices and long wiring.

Future Requirements

Increasing data volume

Demand will grow for sensing data such as temperature, humidity, CO2, and PM2.5, plus equipment data for advanced energy-saving control. Diverse data must be collected as needed.

Cloud and edge utilization

Collected data will be processed in the cloud or at the edge and used for advanced control. HVAC data must be easy to use in cloud and edge environments.

Labor-saving installation and setup

Rising labor costs and fewer workers require simpler, less labor-intensive on-site work for installation, maintenance, and operation.

HVAC networks must evolve from communications that support control to **a foundation that supports data utilization**.

D4-NET: A New HVAC Network Infrastructure Powered by Nessum

D4-NET integrates Nessum into HVAC communication, evolving building-wide HVAC networks into a foundation with **High-speed/High-capacity, IP-based, Reuse of existing two-wire cabling, and High noise immunity**.

1. High-speed, High-capacity communication

- Collect extensive equipment and sensor data at high speed
- Improve sampling frequency
- Support large datasets, such as diagnostics, analysis, remote settings, and software updates

Greatly expands data volume and frequency

3. Reuse of existing two-wire cabling

- Reuse of existing two-wire communication cabling is essential
- Supports long-distance, multi-branch wiring
- Maintains installation and deployment flexibility

Leverages existing wiring to reduce installation and renewal burden

DAIKIN × nessum

Integrate Nessum into HVAC communication

D4-NET

Evolution of HVAC Networks

2. IP-based communication

- A unique IP address for each device enables direct device-to-device communication
- Easy integration among HVAC, ventilation, controllers, and sensors
- Easy cloud and edge connection

Enables flexible device-to-device connectivity and expands system integration

4. High noise immunity

- Inverter-equipped HVAC units create harsh noise environments
- Branch wiring causes reflections
- Use a wide frequency band through OFDM

Stable communication even in environments with high inverter noise and reflections

With D4-NET using Nessum, HVAC networks **evolve from "communication for control" to a "communication infrastructure that creates value."**

Launch of VRV7 Building Multi-Split System with D4-NET

The VRV7 building multi-split air conditioning system, equipped with D4-NET, was launched in October 2024.

- ✓ As refrigerant regulations become stricter, the market is shifting from R410A to R32.
- ✓ D4-NET has been deployed in VRV7, a building multi-split system that uses R32 refrigerant.

Challenge: Unintended Communication Beyond Physical Wiring

Nessum high-frequency communication is effective for **higher-speed/higher-capacity and for reusing existing two-wire cabling**.
In HVAC networks, however, crosstalk and spatial propagation can allow communication with devices that are not physically wired.

In HVAC systems, physical wiring relationships matter

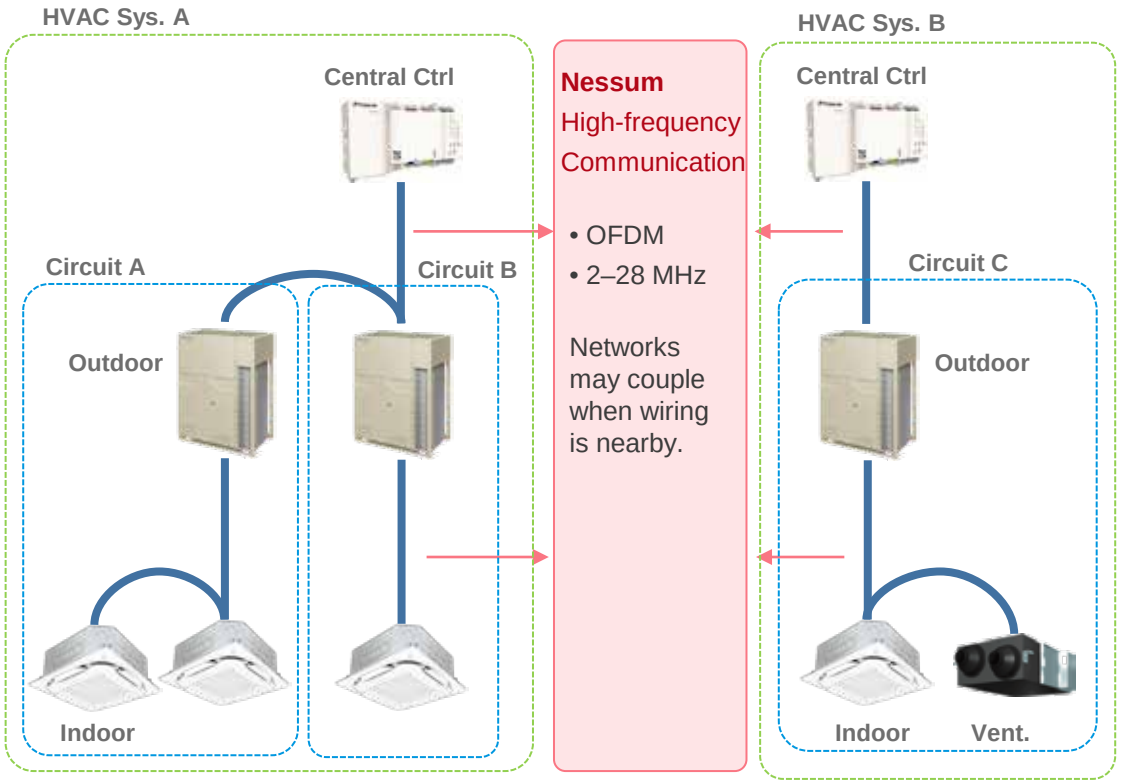
- Automatically identify which indoor units are connected to each outdoor unit

  Actual wiring defines the outdoor/indoor unit relationships and must be accurately identified.

- Automatically identify the central controller's monitoring range

- Accurately identify configurations for control/install/maintenance

  Accurate connection recognition supports control, installation checks, and device identification during maintenance.



Signals reach, but the HVAC system cannot accurately identify the system configuration

- ☒ Crosstalk leaks signals into adjacent wiring

  Networks can couple with systems that are not wired together, creating unintended configurations.

- ☒ Devices not physically wired may appear on the network

  Unintended devices may be recognized as part of the system.

- ☒ Nessum-based communication alone cannot accurately identify the system configuration

HVAC networks need not only communication, but also a way to **identify the correct devices**.
A mechanism is needed to combine high-frequency communication with the accurate identification of HVAC connections.

From “Connect Beyond Intended Wiring” to “Connect Correctly”

D4-NET uses Nessum for high-speed data communication while low-frequency signals verify actual wiring.
This combines HVAC network performance with accurate recognition of refrigerant circuits and connection configurations.

Issue:
Crosstalk

Nessum high-frequency communication
+
Actual wiring verification using a low-frequency signal

High-frequency communication: Transmits data

- High-speed/High-capacity communication
- IP communication
- Equipment, diagnostics, and settings data

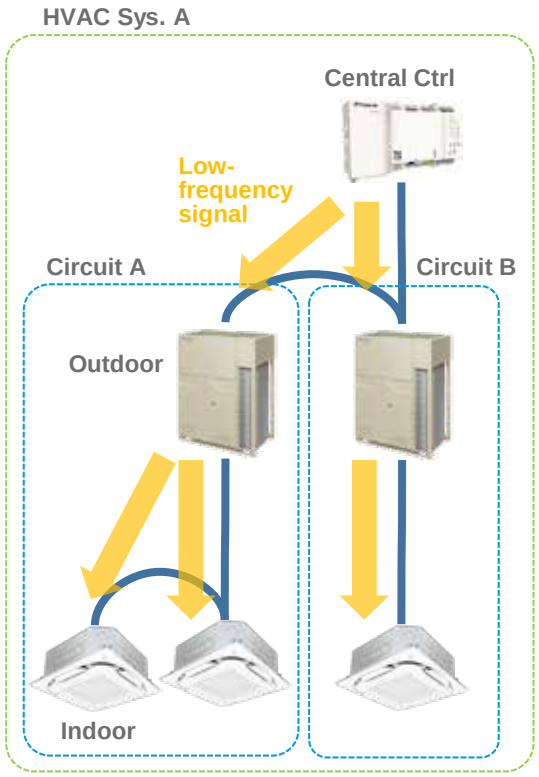
Role: Data communication

Low-frequency signal: Identifies physical wiring

- Confirms devices actually connected by wiring
- Recognizes refrigerant and communication system configurations
- Prevents misrecognition of unconnected devices
- Supports installation, maintenance, and device coordination

Role: System recognition and configuration check

Example HVAC Configuration



Identify the actual wiring configuration with low-frequency signals

- Configure devices so that only those capable of receiving the low-frequency signal can join the network
  ⇒ Prevent accidental connections to other systems
- Associate outdoor and indoor units based on transmission/reception relationships of low-frequency signals
  ⇒ Identify which indoor units should be controlled by each outdoor unit
- Determine the overall system topology
  ⇒ Identify what is connected to each wiring segment, enabling efficient control, installation, and maintenance

Implemented the required functions in collaboration with MegaChips Corporation.

D4-NET combines high-speed data communication (high frequency) with reliable connection recognition (low frequency) to optimize communications for HVAC networks.

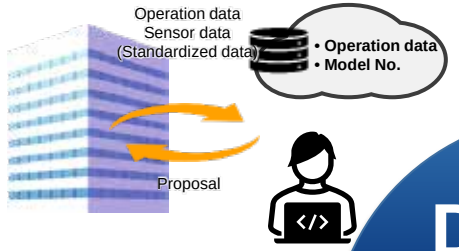
Expanding HVAC System Value with D4-NET

With D4-NET, HVAC networks evolve from communications for device control to an infrastructure that supports data utilization, device coordination, and remote operation.

Equipment Data Use

Acquire the right data, at the right frequency

- Operation data
- Sensor data
- Anomaly and diagnostic data
- Status data from HVAC, ventilation, and peripheral devices



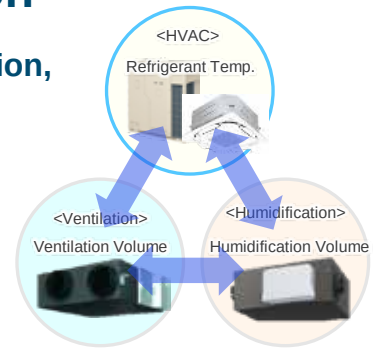
D4-NET

High-speed/High-capacity
×
IP communication
×
System recognition

Device-to-Device Coordination

Optimize systems by linking HVAC, ventilation, and sensors

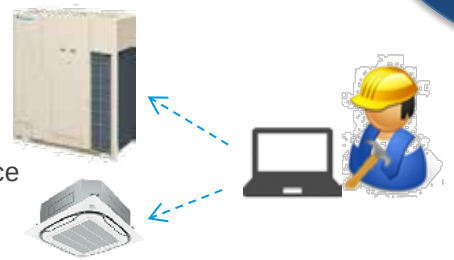
- HVAC + ventilation coordination
- Sensor coordination
- Building-wide energy saving and comfort



Remote Setup and Installation Savings

Reduce on-site work and streamline setup/commissioning

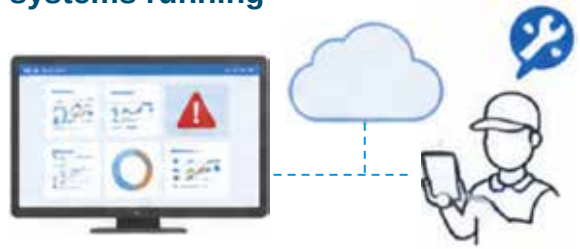
- Remote settings
- Centralized settings for multiple units
- Use of checker tools
- Labor-saving commissioning and maintenance



Advanced Maintenance/Diagnostics

Use data to keep HVAC systems running

- Remote monitoring
- Fault diagnosis and prediction
- Reduced downtime



D4-NET with Nessum will continue to increase the value of the entire HVAC system.

Through D4-NET, Daikin is expanding Nessum applications and contributing to further growth and value creation.

D4-NET × Nessum

Expanding the value of HVAC networks for future HVAC systems

Expanded HVAC adoption

Expand D4-NET-enabled products and global deployment to accelerate Nessum adoption.

New markets and applications

Create new markets and applications to expand Nessum's opportunity.

Co-creation and adoption

Expand practical use cases and grow together with partners through Nessum.


DAIKIN