



VRV IV Q⁺ series

Replacement technology



The quick and qualitative way to
upgrade VRV (R-22 / R-407C / R-410A)



Replacement
technology

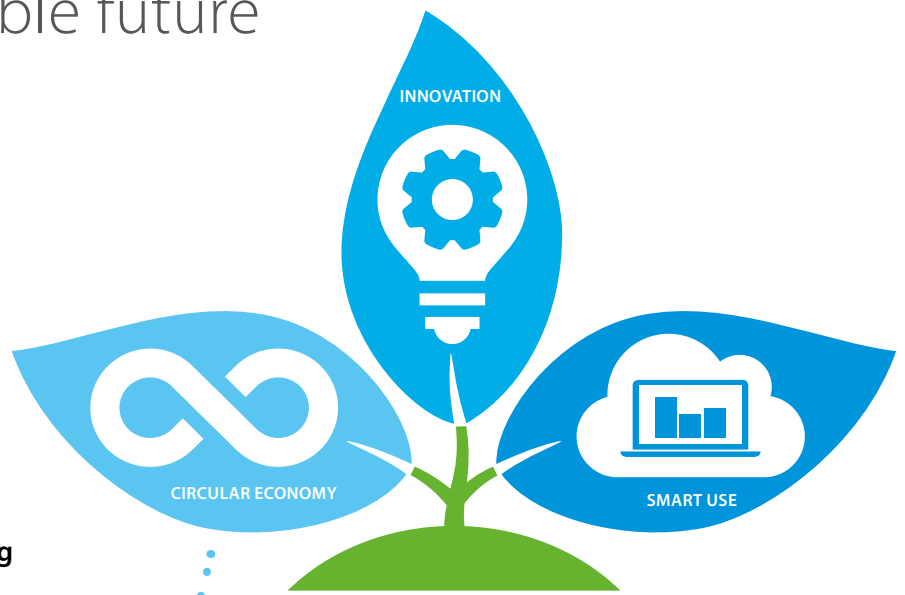


Creating a sustainable future together

Determined to reduce our environmental footprint, we aim to be CO₂-neutral by 2050.

A circular economy, innovation and smart use – these are the stepping stones on our path.

The time to act is now. Join us in creating a sustainable future for HVAC-R.



Circular economy

As Daikin we want to reduce waste. Therefore we will reuse what is already available, in a qualitative way.

- › Reusing materials
- › Reducing waste
- › Reclaiming refrigerants



Replacement technology

Reusing what is still good


Our VRV Q-series is optimised for reusing existing copper pipes and wiring. Less installation efforts means for you reduced costs, no need to replace interior decoration elements and less disruption of your daily business.

LOOP

B Y D A I K I N

Towards a circular economy of refrigerants

Make a positive choice and reuse refrigerant to avoid more than 250,000 kg of virgin gas being produced each year!



Daikin headquarters, Osaka, Japan.
Replacement with VRV Q-series in 2006–2009.
Capacity up from 1,620 to 2,322 HP while keeping
the energy consumption the same!

4 Key benefits from Daikin replacement equipment

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Watch our online seminar
on replacement VRV now!



Click or scan the code
to access all technical
information



Key benefits

from Daikin replacement equipment

02/ Lower investment and reduced running costs

- › CAPEX: Lower initial investment
- › OPEX: Lower energy consumption and maintenance costs
- › Keep your business running seamlessly

01/ No disturbance of daily operations

- › Reuse of existing pipework results in fast installation
- › Plan phases for minimal disruption
- › Replace any VRF system

03/ Lower installation costs

- › Shorter installation time
- › Use of existing piping and wiring
- › Reuse of materials



04/ Higher property value

- › Higher property value
- › Improved facilities
 - Subsidies
 - Certifications (BREEAM, LEED and WELL)



05/ Risk-free, guaranteed by Daikin

- › Automated pipe-cleaning ensures trouble-free operation



Replacement
technology



06/ Circular economy

- › Reuse of existing components
 - Piping
 - Electrical and communication wiring
 - Refrigerants
- › Part of L∞P by Daikin programme

Q⁺ series



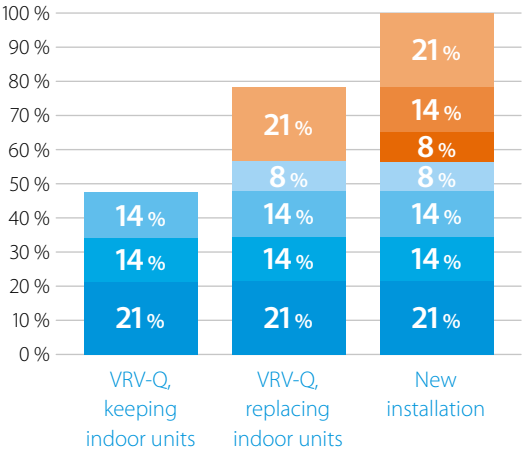
No disturbance of daily operations

- Re-use of existing pipework results in fast installation
- Plan phases for for minimal disruption
- Replace any VRF system

Quick and simple installation

There is no need to replace the existing piping and even the indoor units can be kept (depending on their design). In case you decide to keep the indoor units, for heat pump systems, you will just install a new outdoor unit, without carrying out any work or implementation inside the building. The refrigerant is automatically charged from the outdoor unit, and it cleans the pipes when it starts circulating through them. This exclusive technology from Daikin helps to reduce the impact on the building users.

Shorter installation time



	VRV-Q, keeping indoor units	VRV-Q, replacing indoor units	Completely new installation with standard VRV
Remove outdoor unit	21 %	21 %	21 %
Install new outdoor unit	14 %	14 %	14 %
Clean cooling circuit and leak test	14 %	14 %	14 %
Remove indoor units	–	8 %	8 %
Remove refrigerant pipes and other tasks	–	–	8 %
Install new refrigerant pipes	–	–	14 %
Install new indoor units and other tasks	–	21 %	21 %
Total installation time	49 %	78 %	100 %

Benefits

from our replacement solution

Perfectly planned downtimes

As this solution allows for keeping the existing refrigerant pipes, the installation is less intrusive and quicker compared to the installation of a completely new system. Moreover, it allows for detailed planning of the system replacement, minimising the time that it will be out of order.

Lower investment over time

You will be able to schedule the stages of the replacement project to be carried out progressively over a certain period of time. Normally, you will be able to keep the indoor units. These replacement air-conditioning systems can be integrated into the facilities replacement schedule and even allow for staggered investments. Besides, the installation cost can be significantly reduced by maintaining the existing refrigerant copper pipes.

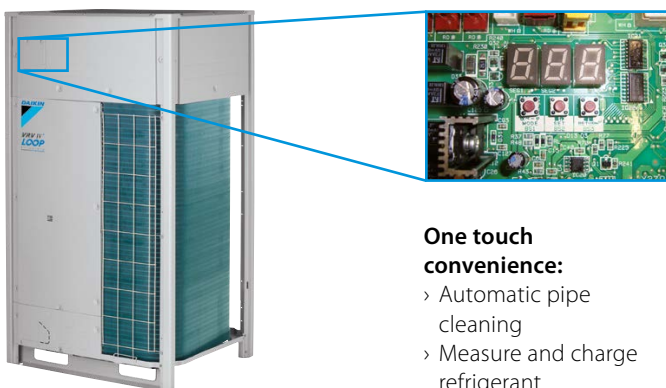
No restrictions from the older system

The automatic charge combined with the refrigerant pipes cleaning function ensure the full flushing of the cooling circuit. This way, every VRV system with R-22, R-407C and R-410A can be easily replaced.

Replace non-Daikin systems

NON DAIKIN **DAIKIN**

With VRV Q-series you can also replace non-Daikin systems with exactly the same benefits. Trouble-free and with Daikin expertise.



One touch convenience:

- › Automatic pipe cleaning
- › Measure and charge refrigerant
- › Test operation

Lower investment and reduced running costs

CAPEX: Lower installation costs
 OPEX: Lower energy consumption and maintenance costs
 Keep your business running seamlessly

What needs to be changed?

Ban on the use of R-22

1st January 2015

Replace old R-22, R-407C or R-410A installations

Using the existing piping

Outdoor units using R-22 or R-407C refrigerants have to be replaced by units with R-410A refrigerant.

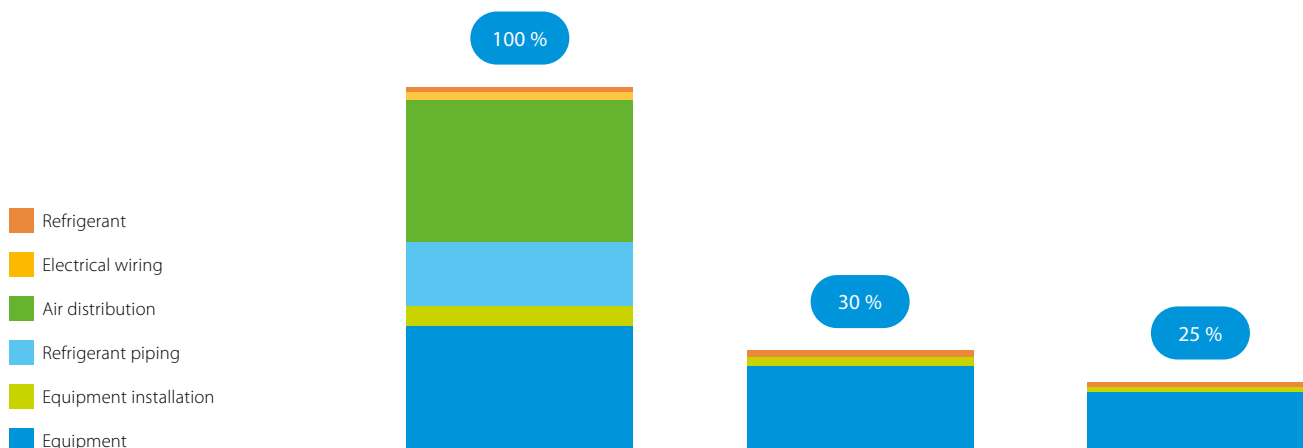
However, the refrigerant pipes can stay the same, and, in some cases, also the indoor units.

Cost estimate based on an actual project

Sale total	New installation	R-22/R-407C to R-410A	R-410A to R-410A
Outdoor	✓	✓	✓
Indoor and individual controls	✓	No cost*	No cost
Boxes	✓	✓	✓
Centralised remote controllers	✓	✓	✓
Accessories	✓	✓	No cost
Refrigerant piping	✓	No cost	No cost
Air distribution (ducts ...)	✓	No cost	No cost
Electrical wiring	✓	No cost	No cost
Refrigerant	✓	✓	✓

*Depending on the model type and condition of the indoor units

Installation cost comparison



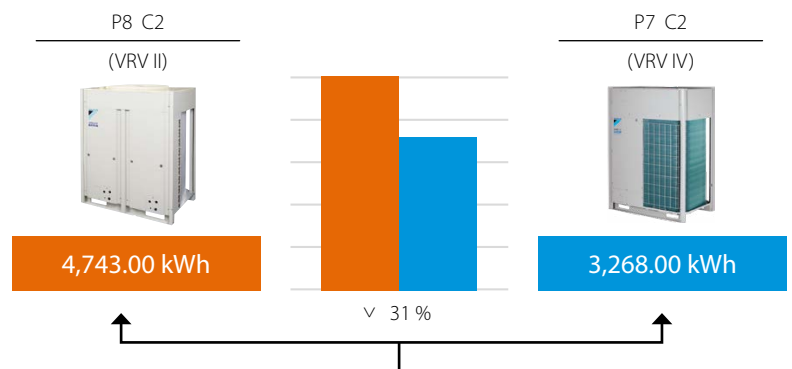


High efficiency

Upgrading an old R-22/R-407C system to a replacement VRV solution will result in an increased system efficiency. Efficiency gains of more than 40 % in cooling can be realized, by virtue of technological developments in current heat pump technology and the more efficient R-410A refrigerant. Increased energy efficiency equals lower energy consumption, subsequent lower energy costs and lower CO₂ emissions.

In a use case replacing an R-410A system from 2006 with the latest generation replacement VRV IV+ an efficiency gain of 31 % was measured!

The outcome → 31 % less energy used



These figures show the total power consumption registered during the evaluation period.

Keep you business running seamlessly

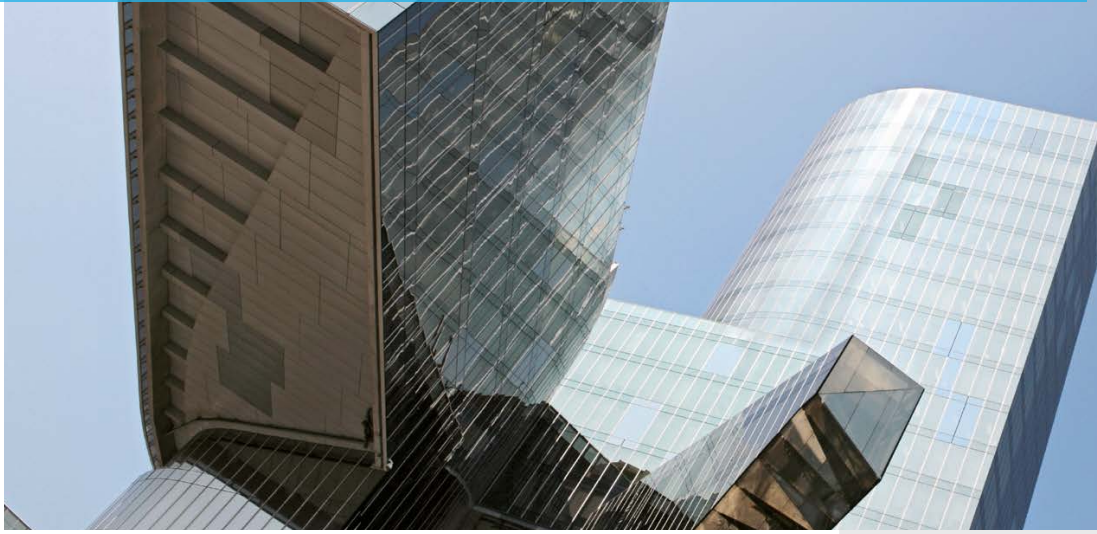
Avoid loss of business

Replacing old units prevents unplanned downtime of air conditioning systems. It also avoids loss of business for shops, complaints from guests in hotels, lower working efficiency and loss of tenants in offices.



Higher property value

Improved facilities
Upgraded CO₂ footprint



Asset value

The asset value goes up due to:

- › Providing innovation
- › Increased flexibility
- › Improved user satisfaction
- › Environmental sustainability
- › Green building certification, such as BREEAM, LEED
- › Improved efficiency
- › Lower operation costs



Refurbishments help to increase a property value. Some renovations may involve an increase of 25 % in value.



Technology insight – Variable Refrigerant Temperature

The largest leap in innovation since the introduction of the inverter compressor

As a unique Daikin technology, Variable Refrigerant Temperature (VRT) continuously adjusts both the inverter compressor speed and the refrigerant temperature to provide the necessary capacity to meet the building load resulting in up to 28 % higher seasonal efficiency. On top of that VRT keeps the evaporating temperature as high as possible, preventing cold draught.



Risk-free, guaranteed by Daikin

Automated pipe cleaning
and refrigerant charging

Thanks to extensive in-house testing and VRV-Q replacement technology already being used since 2006 we're confident about our equipment.

Also in case the original indoor units are kept the full warranty remains on the outdoor units.



Technology insight – Automatic cleaning and refrigerant charging

Automatic cleaning and refrigerant charging ensures a trouble-free operation.

Thanks to the automatic cleaning, possible contamination in the pipes is collected ensuring a trouble-free operation as with a completely new system.

The automatic charging ensures the correct amount of refrigerant is charged, so knowledge of the exact piping layout is not needed!



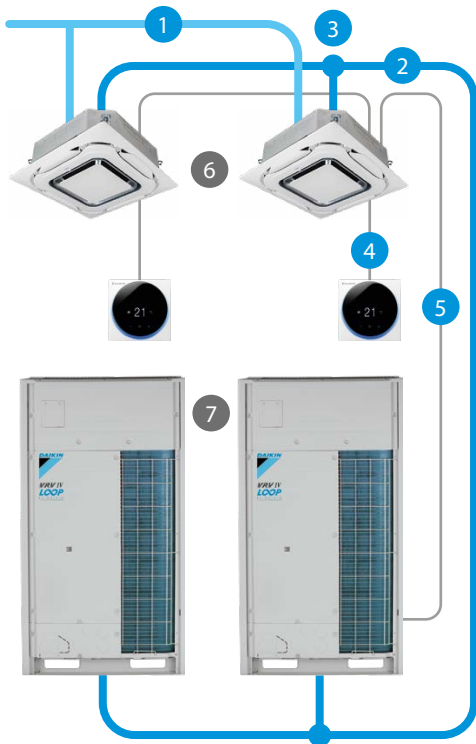
One touch convenience:

- > Automatic pipe cleaning
- > Measure and charge refrigerant
- > Test operation

Circular economy

- Reusing materials
- Reducing waste
- Reclaiming refrigerants

Keeping existing components



Daikin's solution

- 1 Reuse drain pipes**
Durable PVC pipes can be easily reused. Only flow tests are required.
- 2 Reuse refrigerant pipes**
Pipes used for R-22 /R-407C will work with VRV-Q, thanks to lower operating pressures of the system.
- 3 Reuse refrigerant branch pipes**
There are no restrictions when upgrading from a Daikin VRV system. Other VRF systems require branch pipes to withstand pressures up to 3.3 MPa.
- 4 Reuse remote control wiring**
Reuse wiring when upgrading from a Daikin VRV system. In other cases, this will depend on the cable type.
- 5 Reuse indoor-outdoor wiring**
Reuse wiring when upgrading from a Daikin VRV system. In other cases, this will depend on the cable type.

Only replace:

- 6 Indoor units**
Optional replacement. Depending on the model type and condition of the indoor units.
- 7 Outdoor units**
Need to be replaced.

Did you know?

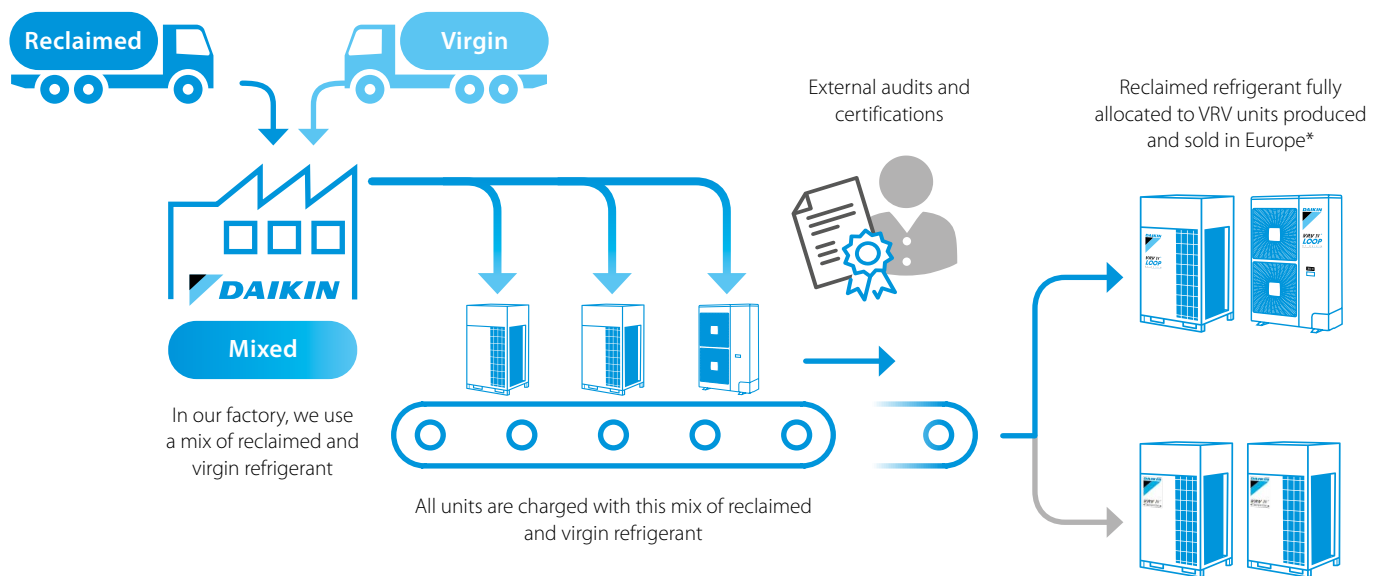
Daikin also offers retrofit solutions for VRV III series. By only upgrading the compressor to the next generation and changing the control PCB and sensors you can extend the lifetime of many Daikin systems.



L∞P by Daikin, towards a circular economy of refrigerants

Use of certified reclaimed refrigerant to avoid more than 250,000 kg of virgin gas being produced each year!

The principle



* EU member states, UK, Bosnia-Herzegovina, Serbia, Montenegro, Kosovo, Albania, North Macedonia, Iceland, Norway, Switzerland

VRV IV Q-series heat pumps are part of the L∞P by Daikin programme.

Success stories with VRV-Q



Hoteles Santos (R-410A to R-410A)

Year of installation: 2007

- › VRV II (M-series)
- › R-410A
- › 88 outdoor units
- › 458 indoor units
- › Installed capacity: 3,243 kW/3,619 kW
- › Central control with i-Manager (20 bus)
- › Installation and maintenance monitoring with Daikin Cloud Service

Thanks to the central control with Intelligent Manager and the monitoring offered by the Daikin Cloud Service, we can obtain global indicators related to the comfort and efficiency levels of your systems.



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Year of refurbishment: 2020

- › Upgrade to a VRV IV system with VRT
 - 88 outdoor units replaced
- › All 458 indoor units kept (compatible with VRV IV)
 - Addition of 27 new indoor units

Benefits obtained

- › **Fast and gradual installation** to avoid disturbing the hotel daily operations.
- › **Lower investment for this change.** Upgrade done replacing only the outdoor units and keeping both the indoor units and the wiring and piping.
- › **A higher technology solution** by adding the VRV IV latest features to the system (VRT, higher efficiency).
- › **Energy savings** with a reduction of up to **30 % of the energy used** by the air-conditioning system.
- › **Installation with lower corrective maintenance cost**, when replacing with new equipment covered by a **24-month warranty**.



Merlin Properties (R-22 to R-410A)

Year of installation: 1996

- › VRV (K-series)
- › R-22
- › 23 outdoor units
- › 371 indoor units
- › Control system D-BACS



Benefits obtained

- › **Less investment**
Upgrade replacing the outdoor and indoor units and keeping the rest of the original components (cooling circuit, electricity wiring and control wiring).
- › Work is done quicker, reducing the impact on the tenants.
- › **A better technology solution**
By adding the VRV IV latest features to the system.
 - Variable Refrigerant Temperature
 - Refrigerant pipes automatic cleaning
 - Automatic refrigerant charge
- › **Energy saving**
Upgrade to higher energy efficient equipment.
- › Installation with **lower corrective maintenance cost**, since equipment is replaced with new units covered by a **24-month warranty**.

Torre Serenissima (R-22 to R-410A)

Year of installation: 1996

- › VRV heat recovery
- › R-22
- › 39 outdoor units
- › 250 indoor units
- › 35 VAM ventilation units
- › intelligent Touch Manager

Benefits obtained

- › **Fast and gradual installation** resulted in only a half-day of missed work for employees.
- › The improved control of the air flow **significantly enhanced comfort**.
- › **Energy consumption reduction** by 25 %.



Hotel Le Pignonnet (R-22 to R-410A)

- › R-22
- › 8 outdoor units
- › 36 indoor units

- › Refurbishment of the existing VRV system of a luxury 5 star hotel, while **preserving interior decoration**.



Bloomsbury Hotel (R-22 to R-410A)

- › R-22
- › 56 outdoor units heat recovery
- › 209 indoor units

Video case study:



Benefits obtained

- › **Reduced CO₂ emissions** with over 30 %
- › **Preservation of historical interior and exterior** of the building
- › **40 % efficiency increase** in cooling
- › Floor-by-floor installation minimizing **revenue losses**





Tailor-made evaluations: VRV energy audits



The air-conditioning system is one of the main sources of energy consumption in your building, as it represents around 60–70 % of the total consumption.

The **Daikin VRV energy audits service** allows you to monitor your equipment performance, assess in detail your operating parameters and obtain global indicators related to the comfort and efficiency levels of your systems.

Case:

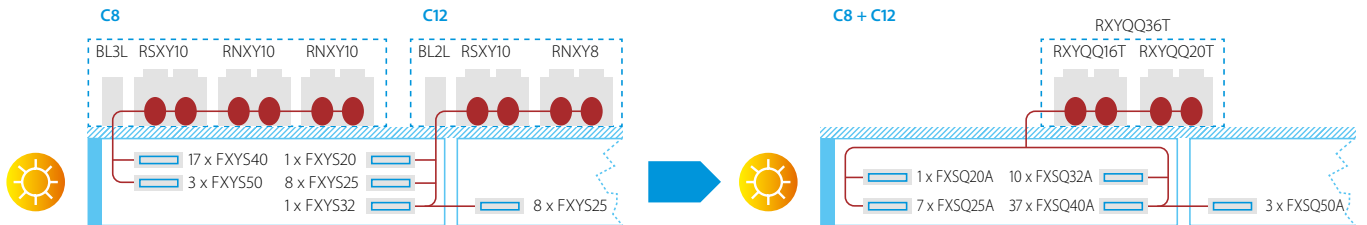
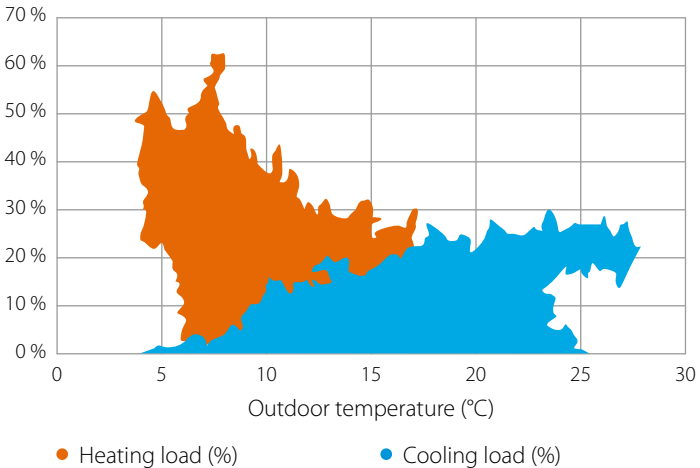
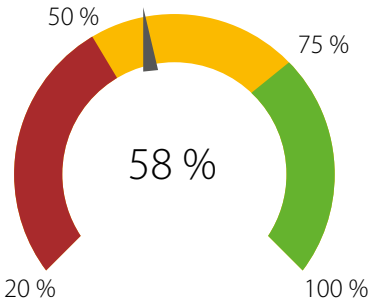
Measure

By connecting the VRV system to the Daikin Cloud Service we could visualize a **load rate of only 58 %** meaning the system was, as many, oversized.

Optimize

Based on the data from the cloud enhancement proposals were made to optimise the installation, adapting the design and capacity of the new equipment to the actual load, **realizing a saving on the needed investment**. The new installed capacity was only 36 HP vs the initial 48 HP, also the indoor unit capacity was adjusted.

Load rate





Preliminary data gathering

Measuring and monitoring

Analysis

Reporting

1 Audit summary

- › Evaluation period
- › Global operational indicators
- › Heat load indicators
- › Proposed energy-saving measures
- › Recommendations

2 Background

- › Purpose and scope
- › Building description
- › System technical data

3 Energy consumption evaluation

- › Evaluation period
- › Measurement and monitoring equipment
- › Weekly load curve
- › Power consumption
- › Analysis depending on daylight temperature
- › Average working temperature
- › System load conditions
- › Scale of production

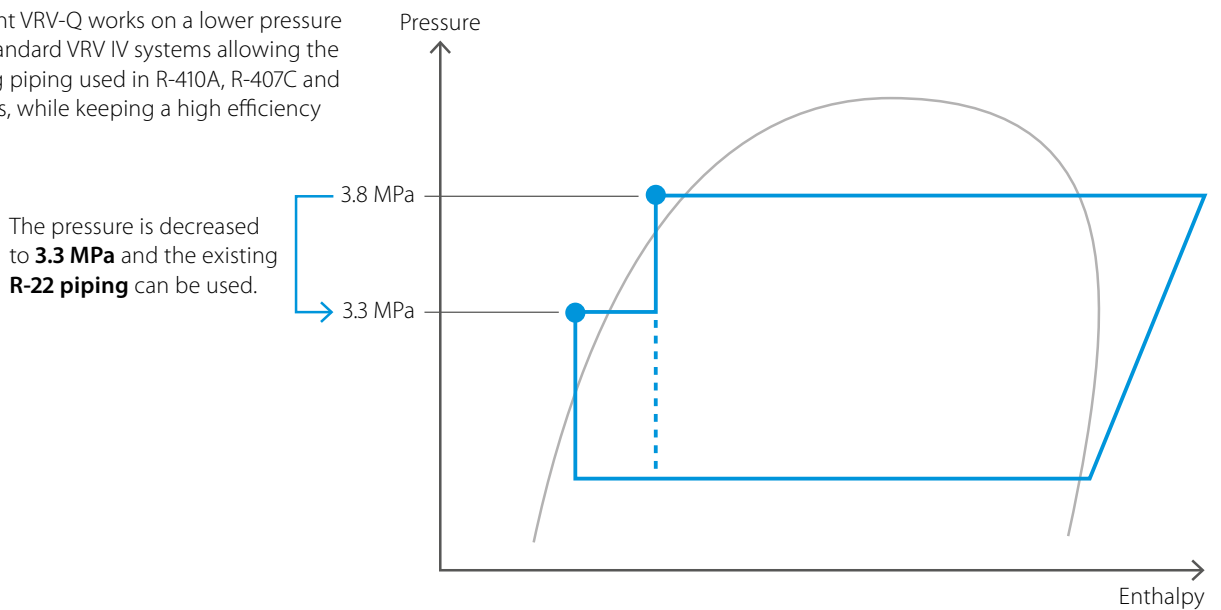
4 Improvement proposal



Key guidelines for a quality replacement with VRV-Q

The technology of reducing the R-410A pressure

The Replacement VRV-Q works on a lower pressure compared to standard VRV IV systems allowing the reuse of existing piping used in R-410A, R-407C and R-22 installations, while keeping a high efficiency level.



NON DAIKIN DAIKIN

Did you know VRV-Q can also replace non-Daikin VRF systems?

Replacing non-Daikin systems using T-joints is realised thanks to the lower pressure of VRV-Q.

Palace of Westminster (replacement of non-Daikin system)

- > R-22
- > 3 outdoor units
- > 13 indoor units

Benefits obtained

- > More than 35 % **energy savings** and over 6 tonnes less CO₂ per year.
- > Unique replacement option with the ability to **reduce operating pressures** of R-410A down to R-22 levels, keeping the R-410A performance.
- > **Replacement of non-Daikin system.**

Guidelines

Refrigerant branch pipes

Refrigerant branch pipes, including those from other manufacturers, Y-refnets, T-refnets and headers can be reused under the following conditions:

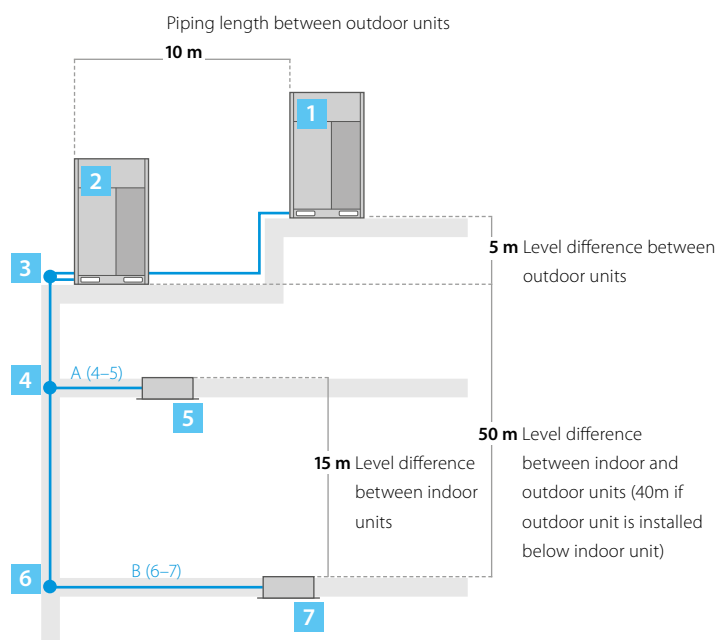
- ✓ Pipes are corrosion-free
- ✓ Pipes are insulated
- ✓ Pipes can withstand a pressure up to 3.3 MPa
- ✓ There are no special components that implement decompression (e.g. oil trap)
- ✓ Installed copper pipework is in suitable condition (piping thickness will generally meet specifications, since the unique Daikin VRV solution operates at lower pressure levels)

Refrigerant oil

Refrigerant piping can be reused if one of the following oils was used: Barrel Freeze, Ethereal, Ester, Ferreol, HAB, MS, Suniso.

Maximum piping lengths and level distances

VRV-Q can be installed for piping systems with a total length up to 300 m. See the illustration below for further requirements.



Total piping length: **300 m**
Longest piping length (1-7) actual/equivalent: **120 m / 150 m**
Maximum difference between shortest (A) and longest (B) branch: **40 m**

VRV IV Q⁺ series



Replacement
technology

Benefits:



No disturbance of daily operations

- › Combine original components with replacement technologies to receive a high-quality upgrade
- › Projects are conducted over the weekend to avoid interrupting your business



Peace of mind

- › Your equipment complies with the latest energy regulations
- › Prevention of potential breakdowns that may occur with outdated equipment
- › Keep business operations running seamlessly



Lower costs

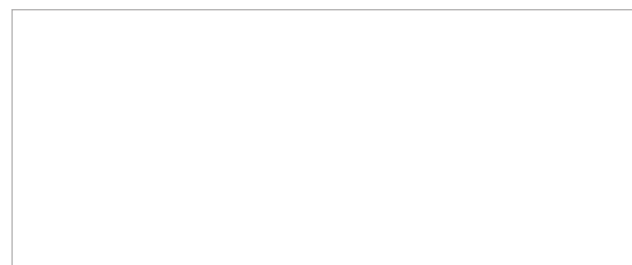
- › Simple upgrades avoid expensive and disruptive renovations
- › No interruption of business activity or costs for moving/redecorating



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ECPEN21-214

05/21



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Printed on non-chlorinated paper.