“We have found a system (Daikin VRV) that is price competitive with PTAC’s that gives us better attributes than a 4 pipe system.”

– Drury Hotels
Hotel Application Requirements

100’s of New users every day!

- Simple Occupant Control
- Efficient and Reliable Operation
- Comfortable Environment (Sound & Temperature Swings)
- Simple and Quick Maintenance
- Discrete System
- Happy Customers (No Complaints, Repeat Business)
Attributes Behind VRV Success In Hotels

Support
- Tools to assist with all project phases from design to start-up and commissioning

Design
- Revenue generating space maximized
- Variety of indoor units & models to meet every space requirement and aesthetic

Reduced Costs
- Cost effective
- Reliable

Energy Efficiency
- Occupancy sensors
- DC fan motors in ducted units
- Set-point range limitation

Controls
- Integration with INNCOM
- Room control solutions can integrate with occupancy sensors, key card controller and centrally controlled to coincide with booked or un-booked.

Comfort
- Tight temperature control without temperature swings
- Excellent humidity control
- Quiet operation so guests sleep soundly

At Daikin we’re proud of our commitment to providing the best in guest comfort
Variable Refrigerant Volume Vs. Chiller Overview

- Compressor + pump + cooling tower + boiler + controls/AHU + ducts or FCUs + water pipe
- Uses water as heat transfer medium
- 2 pipe chiller & 4 pipe system for simultaneous heating and cooling
- Complicated operation requires management

- Outdoor unit + piping + branch selector box (for Heat Recovery only) + indoor unit + controls
- Uses refrigerant as heat transfer medium
- 2 pipe chiller = Heat pump.
- 4 pipe system = 3 pipe Heat recovery (simultaneous heat/cool)
- Up to 64 indoor units to one outdoor unit
- Simple energy efficient operation

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A Closer Look At VRV Systems In Offices...

Simple building blocks:
- Less components
- More leasable square feet or save on construction
- Less maintenance and repairs to disrupt productivity

- Simultaneous Heat/Cool ability with 3 Refrigerant pipes
- Has both Cooling source and Heating Source built into Condenser
- Only outdoor space required for Condenser in most cases
- Refrigerant as the Heat-Transfer Medium.
Design: Technology & Innovation

Daikin focuses on 3 cutting edge technologies

**Heat Pump**
*Energy saving* technology transferring available ambient heat yielding energy savings.

**Inverter**
Contributes to greater energy efficiency and *comfort* by eliminating unnecessary operation.

**Refrigerant Control**
Enhanced energy savings and *comfort* delivered through Daikin’s Variable Refrigerant Temperature (VRT) technology.

As an innovative leader Daikin paves the way for next generation technologies, uniquely integrated to provide optimal energy efficiency for you and comfort for your guests.
Design benefits to hotel owners

- Central controls allow groups of indoor units on certain floors or wings to be turned off during times of low occupancy.
- Units are controlled in each individual zone; local malfunctions do not cause system shut down.
- Multiple types of indoor units and sizes provides design flexibility for each space.
- Operates over a broad temperature range.
- Meet the comfort demands of each guest room using simultaneous heating and cooling with Daikin VRV Heat Recovery.
Design: Small Guest Room Solutions

- Experience a restful nights sleep with sound levels as low as 29dB(A).
- Can be installed into limited ceiling void, bulkhead, or soffit space.
- Reduced maintenance costs with washable filter included.

- Alternative to Slim Ducted unit
- Limited install space required
- Easy maintenance

These solutions are ideal for guest rooms up to 400ft² in need of a low profile unit with low sound levels.
Design: Large Guest Room Solutions

Vertical Air Handling Unit

- Minimized equipment and installation cost with plug-in electric heat control.

- Energy efficiency with ECM (Electronically Commutated Motor) fan motor.

- Reduced piping cost with smaller piping diameters.

- Can be used in new construction and replacement projects.

- Ability to mix and match with other Daikin VRV indoor units on the same system as room sizes may vary.
### Design: Ducted Indoor Unit Types

<table>
<thead>
<tr>
<th>Type</th>
<th>Model</th>
<th>Capacity Sizes</th>
<th>Description</th>
</tr>
</thead>
</table>
| Slim Duct built-in concealed low static |                                            | 7.5 MBH to 24 MBH       | - Low profile and low sound levels  
- Ductless soffit or adapt to minimal ductwork  
- Installation for supply and return  
- Condensate lift pump  
- Rear or bottom return |
| Medium static ducted unit   |                                            | 72 MBH & 96 MBH         | - 6 and 8 ton capacity models  
- Standard blower motors  
- Gravity condensate drain  
- Front discharge – rear return |
| Floor standing unit (concealed) |                                            | 7.5 MBH to 24 MBH       | - Top discharge/bottom return  
- Space saving free-standing or wall mounted  
- Optional condensate pump  
- Factory long-life filter |

Designed for absolute comfort and versatility with zoning flexibility and control for every room and space.
Design: Common Area Solutions

-round flow sensing cassette-

- 360° Airflow and occupancy sensors enable optimized comfort and efficiency
- Optional self-cleaning filter panel to further increase efficiency and reduce maintenance time and costs
- LEED ready - MERV 13 filter options

Ideal for common areas, meeting rooms, cafes and restaurants within the hotel.
## Other Ductless Indoor Unit Types

<table>
<thead>
<tr>
<th>Type</th>
<th>Model</th>
<th>Capacity Sizes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2’ x 2’ 4-way</td>
<td>2,3 or 4 way configured air flow</td>
<td>7.5 MBH</td>
<td>- Condensate lift pump</td>
</tr>
<tr>
<td>ceiling cassette</td>
<td></td>
<td>to 18 MBH</td>
<td>- Outside air integration possible</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Factory long life filter</td>
</tr>
<tr>
<td>Under ceiling</td>
<td>Innovative under ceiling 4-way cassette</td>
<td>18 MBH</td>
<td>- 2,3 or 4 way configured air flow</td>
</tr>
<tr>
<td>4-way cassette</td>
<td></td>
<td>to 36 MBH</td>
<td>- Optional floor and presence sensor kit</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wall-mounted unit</td>
<td>Quiet operation</td>
<td>7.5 MBH</td>
<td>- Powered louvers – programmable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>to 24 MBH</td>
<td>- Optional condensate pump kit</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Factory long-life filters</td>
</tr>
<tr>
<td>Ceiling suspended</td>
<td>Wide air discharge with long throw</td>
<td>12 MBH</td>
<td>- Powered louver – programmable</td>
</tr>
<tr>
<td>unit</td>
<td></td>
<td>to 36 MBH</td>
<td>- Less than 8” high</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Factory long-life filters</td>
</tr>
<tr>
<td>Floor standing unit</td>
<td>Top discharge/bottom return</td>
<td>7.5 MBH</td>
<td>- Space saving free-standing or wall mounted</td>
</tr>
<tr>
<td>(exposed)</td>
<td></td>
<td>to 24 MBH</td>
<td>- Optional condensate pump</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Factory long-life filter</td>
</tr>
</tbody>
</table>

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Energy efficiency by design: attributes and features

- Variable-speed inverter compressor eliminates unnecessary operation
- Sophisticated zone controls
- Indoor unit features such as occupancy sensors
- VRT (Variable Refrigerant Temperature) climate tuning capability
- Easy to model using energy simulation tools
- Systems are AHRI certified

Daikin VRV far exceeds minimum efficiency requirements
VRT: Where Comfort And Efficiency Intersect

The system adjusts intelligently to weather variations and real life situations.

Evaporating and condensing temperatures can be tailored precisely to achieve the optimum balance.

VRT delivers a perfectly controlled interior climate with maximum energy savings.

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Comfort: Optimal Room Temperature

Always the right temperature with VRT technology

- Improved temperature control
- Reduced temperature swings
- Improved humidity control in every season

A commitment to providing a comfortable stay for every guest
Comfort: Low Sound Emissions

Low sound emissions from both indoor and outdoor units

Requirements for hotel noise criterion (NC)
Individual rooms 25-35 NC → 35-45 dB(A)
Halls, corridors & lobby: 35-40 NC → 50-55 dB(A)

- Quiet Library ≈ 29 dB (A)*
- Vaccum Cleaner ≈ 70 dB (A)
- Chain Saw ≈ 110 dB (A)

- Daikin VRV Unit ≈ 29 dB (A)*
- Typical Conversation ≈ 60 dB (A)
- Subway ≈ 90 dB (A)

* Based on the 0.6 - 1 ton Slim-Duct, Built-In Concealed Ceiling unit (FXDQ-MVJU) on low fan speed

Average PTAC runs at ~53 dB(A) with compressor running at High Cool

Quiet operation so your guests sleep undisturbed.
Comfort: Night Time Operation

Night Quiet Function

Peak in outdoor temperature

Capacity

Load

8 hours (Initial Setting)

10 hours (Initial Setting)

Night Mode

Step1 max. - 3dB

Step2 max. - 8dB

Step3 max. - 13dB

Step1: 55dB

Step2: 50dB

Step3: 45dB

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Controls: Simple And Intuitive Room Options

Simple to use intuitive control for guest rooms and common areas

- Interchangeable face plates allow for only the necessary and required level of guest control
- Programmable max/min and setback points maximize guest comfort and system efficiency

Simplified controls for guests

Detailed menu options for staff to control zones and floors

- Complete compatibility with INNCOMM; provides the guest with familiar and easy to use controls

Plug and play integration with INNCOM

Flexible, guest friendly and highly customizable controls.

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Controls: Hotel Building Management

Comprehensive control for hotel management with iTouch Manager

- Advanced Multi-zone controller with the ability to control up to 1024 indoor units
- Zone-based scheduling, ex: 5+1+1 ‘field set’
- Web monitoring via Internet & Intranet & email alerts for potential system errors
- Auxiliary control of other equipment such as DOAS, lighting, fire alarms and pumps capability
- Seamless integration with other building controls via LonWorks, BACnet® and Modbus

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Daikin VRV IV Optimized Life Cycle Costs

Delivering lower total cost of ownership...

- Repair Cost Savings
- Upfront Savings
- Simple Maintenance
- Reduced Running Costs

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Upfront Savings: Installation Phase

Upfront cost-reduction potential

- Reduced overall power supply
- Reduced back-up generator capacity – generator surge loads are greatly reduced or eliminated
- Additional auxiliary equipment may not be needed for install
- Minimal landscaping around compact outdoor unit by strategically placing out of sight
- Sophisticated controls are part of the VRV package, no separate purchase

With Daikin VRV there are many cost reduction opportunities to realize to lower first costs during the installation phase.
Reduced Energy Usage & Costs: Operational

Based on 60,000 ft² hotel, 4 floors, 12,000 ft² common area

Average cost Savings with VRV-IV

<table>
<thead>
<tr>
<th>Component</th>
<th>Average Cost Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chiller + AHU</td>
<td>69%</td>
</tr>
<tr>
<td>DX + PTAC</td>
<td>63%</td>
</tr>
<tr>
<td>DX + PTHP</td>
<td>73%</td>
</tr>
<tr>
<td>PTAC</td>
<td>72%</td>
</tr>
<tr>
<td>WSHP</td>
<td>59%</td>
</tr>
<tr>
<td>VRV WIII184</td>
<td>34%</td>
</tr>
</tbody>
</table>

Average cost Savings with VRV-IV

<table>
<thead>
<tr>
<th>Component</th>
<th>Average Cost Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chiller + AHU</td>
<td>48%</td>
</tr>
<tr>
<td>DX + PTAC</td>
<td>40%</td>
</tr>
<tr>
<td>DX + PTHP</td>
<td>51%</td>
</tr>
<tr>
<td>PTAC</td>
<td>56%</td>
</tr>
<tr>
<td>WSHP</td>
<td>35%</td>
</tr>
<tr>
<td>VRV WIII184</td>
<td>5%</td>
</tr>
</tbody>
</table>

Average cost Savings with VRV-IV

<table>
<thead>
<tr>
<th>Component</th>
<th>Average Cost Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chiller + AHU</td>
<td>66%</td>
</tr>
<tr>
<td>DX + PTAC</td>
<td>71%</td>
</tr>
<tr>
<td>DX + PTHP</td>
<td>78%</td>
</tr>
<tr>
<td>PTAC</td>
<td>73%</td>
</tr>
<tr>
<td>WSHP</td>
<td>70%</td>
</tr>
<tr>
<td>VRV WIII184</td>
<td>51%</td>
</tr>
</tbody>
</table>

Average cost Savings with VRV-IV

<table>
<thead>
<tr>
<th>Component</th>
<th>Average Cost Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chiller + AHU</td>
<td>46%</td>
</tr>
<tr>
<td>DX + PTAC</td>
<td>46%</td>
</tr>
<tr>
<td>DX + PTHP</td>
<td>31%</td>
</tr>
<tr>
<td>PTAC</td>
<td>26%</td>
</tr>
<tr>
<td>WSHP</td>
<td>-15%</td>
</tr>
<tr>
<td>VRV WIII184</td>
<td>0%</td>
</tr>
</tbody>
</table>

Average cost Savings with VRV-IV

<table>
<thead>
<tr>
<th>Component</th>
<th>Average Cost Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chiller + AHU</td>
<td>52%</td>
</tr>
<tr>
<td>DX + PTAC</td>
<td>45%</td>
</tr>
<tr>
<td>DX + PTHP</td>
<td>56%</td>
</tr>
<tr>
<td>PTAC</td>
<td>51%</td>
</tr>
<tr>
<td>WSHP</td>
<td>39%</td>
</tr>
<tr>
<td>VRV WIII184</td>
<td>3%</td>
</tr>
</tbody>
</table>

IES-VE modeling software

Usage modeled by PhD in-house Energy Engineer

Using 2014 state commercial energy prices

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Reduced Costs: Simple Maintenance

Round Flow Sensing Cassette

Indoor units that include life long washable filters

- Slim-Duct, Built-in Concealed Ceiling Unit
- Concealed Floor-standing unit
- 2’ x 2’ 4-Way Ceiling Mounted Cassette
- Ceiling-Suspended Unit
- Floor-standing unit

Maintenance costs reduced both for guest rooms and open areas.
Reduced Costs: Repair Expenses

Best in-class 10 year warranty reduces repair costs

- Industry leading warranty and experience provides long term reliability & peace of mind
- 10yr Parts and Compressor Warranty for all VRV products
- Indoor fan coil features such as long life filters reduce replacement costs
- PTAC units need to be replaced every 7-10 years whereas Daikin VRV’s lifespan is 15-20 years

Complete warranty details available from your local dealer or at www.daikincomfort.com.

A commitment to serve and lower costs for the lifetime of your system.

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Leading Investment, Tools And Support

Local Development and Manufacturing

ASSEMBLED IN THE U.S.

Extensive local inventory and short lead times

98% of replacement parts shipped in 48hrs

Electronic Tools to assist with:

- Design (CAD & REVIT)
- Equipment selection
- Energy Screening
- Submittal
- Start Up and Commissioning
Mike.Youngs@DaikinComfort.com
781-315-5753