DAIKIN
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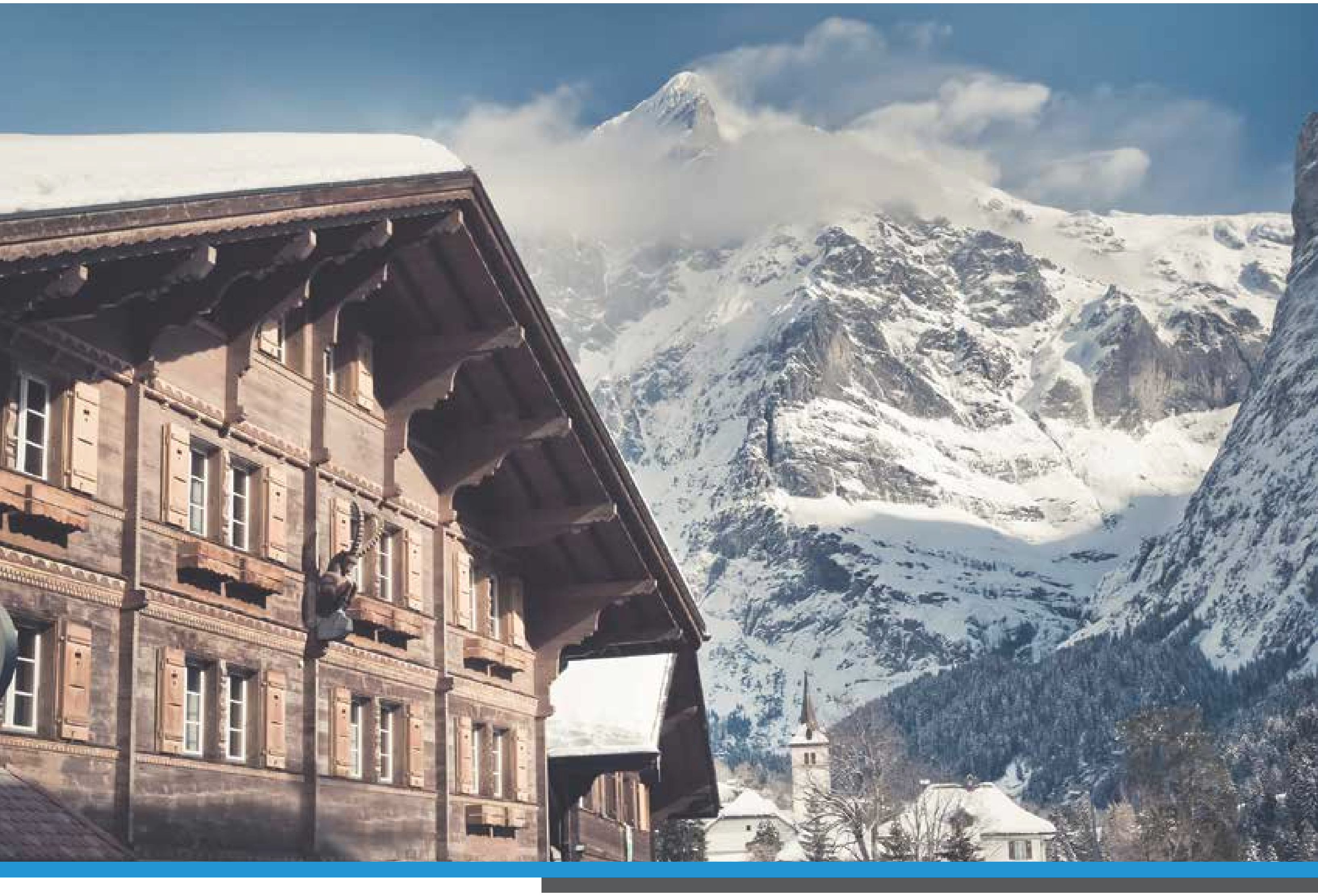

VRV
APPLICATIONS IN EXTREME CLIMATE CONDITIONS

DAIKIN
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About Daikin:

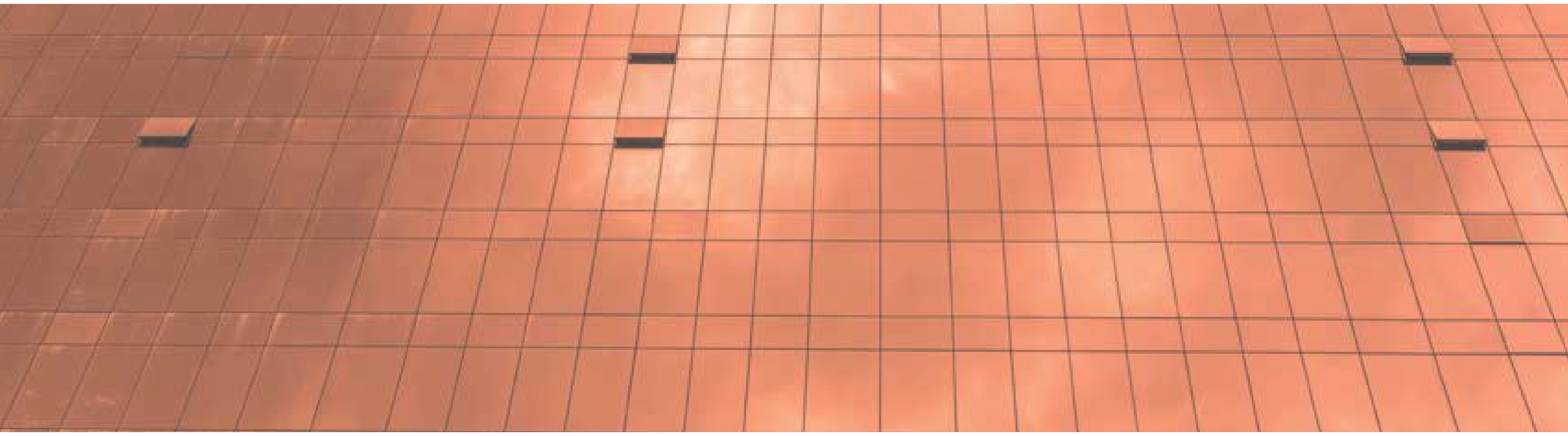
Daikin Industries, Ltd. (DIL) is a global Fortune 1000 company, which celebrated its 90th anniversary in May 2014. The company is recognized as one of the largest HVAC (Heating, Ventilation, Air Conditioning) manufacturers in the world. DIL is primarily engaged in developing indoor comfort products, and refrigeration systems for residential, commercial, and industrial applications. Its consistent success is derived, in part, from a focus on innovative, energy-efficient, and premium quality indoor climate and comfort management solutions.

A WORLD LEADING
MANUFACTURER
OF HVAC PRODUCTS

FOUNDED
IN 1924

OVER 60,0000 DAIKIN VRV SYSTEMS
OPERATING
THROUGHOUT NORTH AMERICA

RESEARCH &
DEVELOPMENT
OVER $300 MILLION



Contents

Is VRV suitable in most environments?

Yes. There are many obstacles to overcome and, like all heating and cooling systems, attention to design, capacity and application will be required, however all the reasons to use VRV in the first instance still apply.

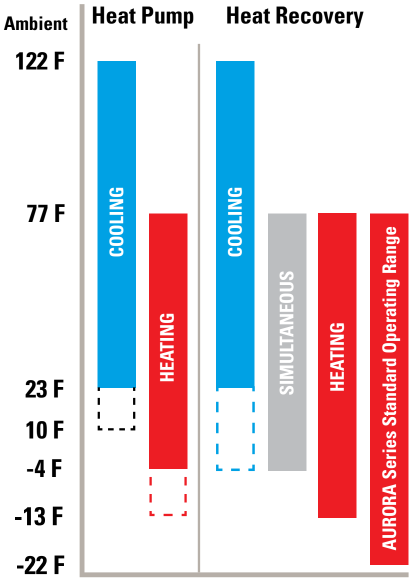
Core benefits of Daikin VRV

- Modular design
- Quick and easy to install
- High energy efficiencies even in extreme conditions
- Exceptional comfort control
- All control parameters remain

Standard operation limits — air cooled systems

VRV-IV has a wide range of operating ability and performance data covering a wide spectrum of operation range for both cooling and heating.

- The ability to provide cooling up to ambient conditions of 122°F covers ASHRAE design conditions for all regions of North America
- As standard, VRV heat recovery can operate in heating down to -13° F
- Daikin VRV AURORA™ Series Heat Recovery Systems can operate in heating down to -22° F
- Some regions require design at ambient temperatures outside this range
- This does not negate the ability to use VRV in these extreme climates
- There are several design practices that allow the use of VRV equipment and still take advantage of the system's benefits



⬚ VIA extended capacity tables

⬚ VIA technical cooling function

⬚ Cooling operation for VRV IV Heat Pump single module systems (RXYQ72/96/120/144/168T) can be extended down to 10˚F, from the standard limitation of 23˚F under defined conditions.
Contact your local Daikin manufacturer's representative or distributor for details.

Defining operation and performance

Range of operation

- Backed by performance data, Daikin VRV equipment provides continuous operation within the range indicated
- There is no factory default software based lock out of operation preventing system operation outside of these conditions

Performance data

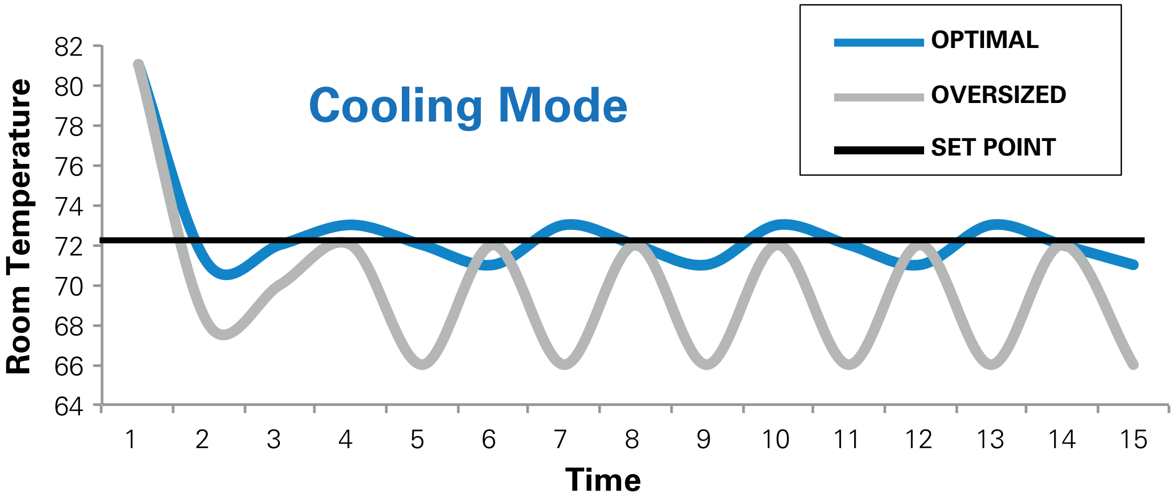
- Daikin has performance data for the entire operation range of VRV equipment
- It is possible for heat pump and heat recovery systems to operate in cooling down to 10° F and -4° F ambient, respectively (conditions apply)
- Performance data for heat pump VRV from -4° F down to -13° F is available upon request

Dangers of Oversizing

Oversized for cooling

Despite advanced control methods, oversizing of equipment, even with Variable Refrigerant Volume technology, can lead to indoor units overcooling the space and cycling on and off. This results in poor temperature control.

In addition to large temperature swings, an indoor unit that cycles on and off does not provide continuous de-humidification.

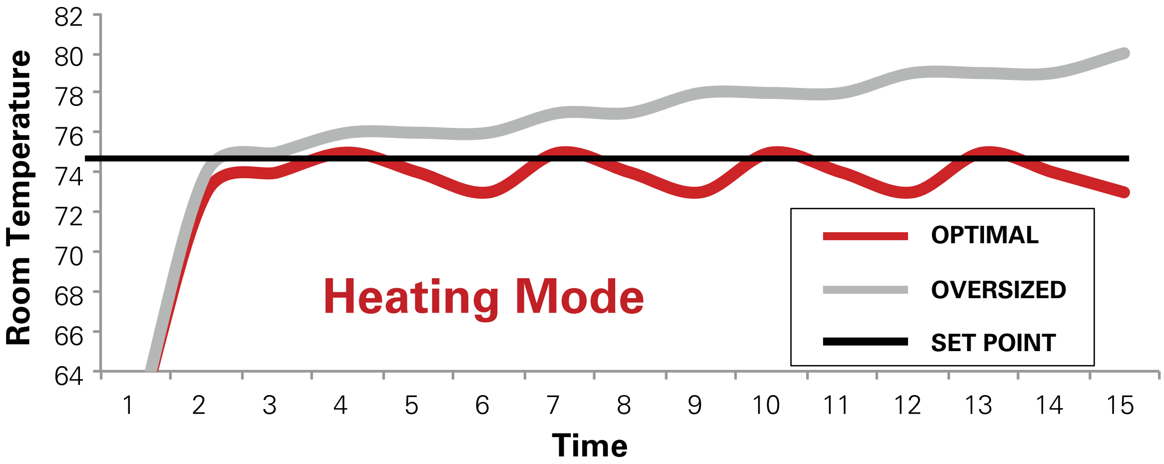


Oversized for heating

In areas of very cold climates, there is a temptation to ‘up-size’ indoor units in the belief that this ensures capacity in extreme conditions below design temperature.

The reality is correct load calculation and good design ensures the best performance.

In heating mode, the expansion device never fully closes. Therefore a unit that continuously cycles on and off will, in time, see a steady increase in temperature above set point.



Correct Sizing

Using traditional rules of thumb to size HVAC equipment can lead to oversizing of equipment as construction methods have changed from the days when the 500 ft² per ton or 400 cfm per ton was the standard one-size-fits-all solution for residential, light commercial, and commercial buildings. The latter is especially true with VRV indoor units typically operating at 320~350 cfm per ton.

Similarly, replacing like-for-like tonnage equipment in a retrofit application can lead to oversizing of equipment as the building may have improved heat gain efficiencies, been upgraded or the usage of the space has been changed.

The minimum information needed to produce accurate and optimized equipment selection on a project:

Indoor Unit

Peak Cooling and Heating Load

- Engineers will provide total and sensible loads sizing is possible when either is provided.
- Required when either heating is the dominant operation or the heating design condition is below 32°F.

Design Air Conditions

The dry and wet bulb temperatures entering the coil.

- Also known as "air-on" or "mixed air" conditions.
- Design air-on can also be given as db/RH% (eg 74°F and 50% RH).

Outdoor Unit

Ambient Conditions

The design ambient for the location of the project

- Both engineers and D&B contractors should have this information.
- ASHRAE standard design conditions for the location are easily obtained.

Pipe Length

- Longest linear length, NOT the total amount of piping.
- Both engineers and D&B contractors should be able to pin point the outdoor unit location.

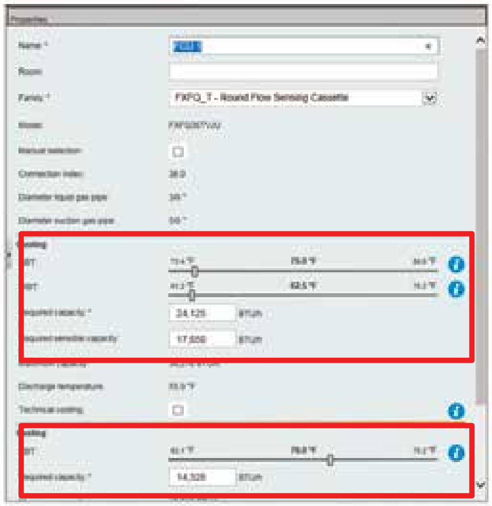
Selection Method using WEBXpress

The WEBXpress Selection Tool provides the platform to convert these design conditions to a quick and accurate selection of VRV equipment.

The Peak Cooling load demands are entered for the area to be served in addition to the correct design (mixed air) conditions.

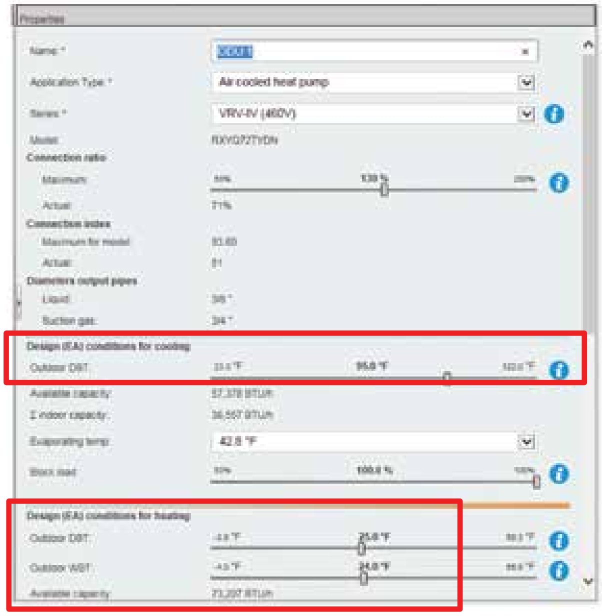
Selecting an indoor unit based on its nominal capacity will usually cause a unit to be oversized. In addition to poor performance, there is the obvious disadvantage of increased project pricing.

WEBXpress Tool Selection Panels



When sizing the VRV outdoor unit, design ambient conditions are added in the outdoor unit selection tab.

To ensure optimum accuracy of design, an indication of the expected pipe length should also be entered at this point.



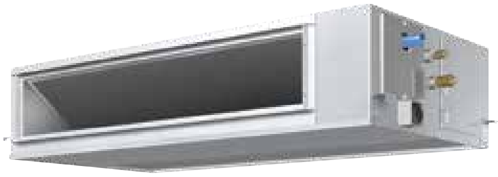
Considerations for Altitude

When using VRV in regions of high altitude, the impact of air density on total capacity should be accounted for. Daikin has produced charts for calculating the de-rate amounts that would need to be applied to the VRV equipment. There are TWO charts — One for indoor units and one for outdoor units.

Correction Factor — Indoor Units

Altitude (ft.)	0	1000	2000	3000	4000	5000
De-Rate	1.00	0.97	0.94	0.90	0.86	0.84

Altitude (ft.)	5000	6000	7000	8000	9000	10000
De-Rate	0.84	0.81	0.78	0.75	0.73	0.69



Example: The de-rate that needs to be applied to all indoor unit selections @ 4,500 ft. elevation is 0.85 by interpolation

Correction Factor Air-Source Outdoor Units

The metrics for the outdoor units differ from the indoor units because Daikin VRV outdoor units have the ability to compensate for some of the performance losses due to air pressure drops at high altitudes.

Altitude (ft.)	1000	2000	3000	4000	5000
De-Rate (%)	0.99	0.98	0.97	0.96	0.95

Altitude (ft.)	6000	7000	8000	9000	10000
De-Rate (%)	0.94	0.93	0.91	0.89	0.88

Example: the de-rate that needs to be applied all **Outdoor** unit selections @ 4,500 ft. elevation is 0.955 by interpolation

Note: Since WEBXpress does not account for air density correction automatically, indoor unit tolerances and outdoor unit loads at high altitude would need be entered manually.

Considerations for Adverse Weather

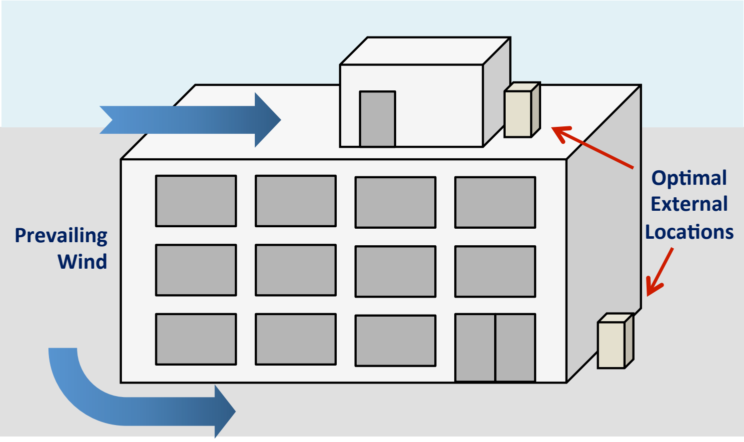
To ensure optimum capacity, performance and correct defrost in cold, snowy or high winter humidity areas, several factors should be considered in the design of your VRV system.

Outdoor Unit Locations

'Wind-chill' can have a direct effect on the performance of an outdoor unit.

Wherever possible, locate the outdoor condensing unit in a location sheltered from the prevailing wind.

If this is not possible, it is recommended to construct baffle plates to mitigate the effect (Figure 1).



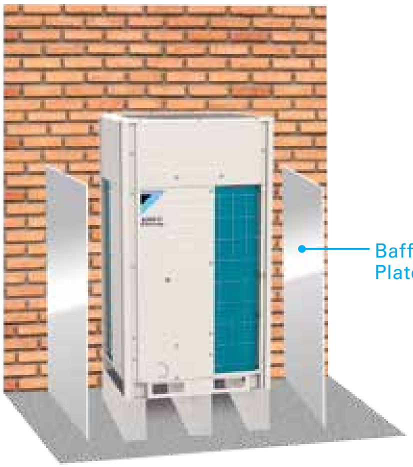
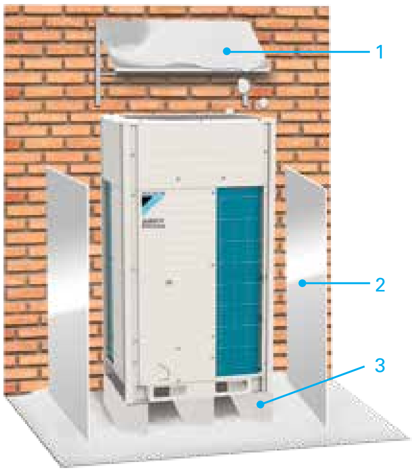


Figure 1

Condensate Drainage

- During defrost operation, condensate is generated. Ensure that condensate can adequately escape from the outdoor unit bottom plate by utilizing a mounting stand.
- This will prevent the trapping or build up of condensate in the bottom section of the unit, that could freeze in harsh climates.
- Make sure drainage water is routed away from walkways, etc. to prevent slipping or other ground hazards if it freezes.



1 Construct a large canopy
2 Add baffle plates
3 Construct a pedestal

Figure 2

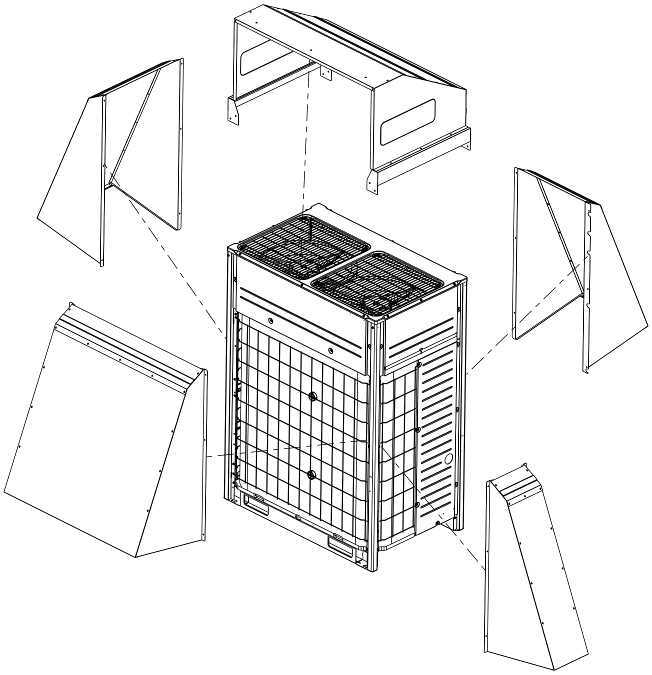
Considerations for Snow

- Install the units on a pedestal or mounting stand at a sufficient height from ground level and clearances from walls to address regional snow or drift levels.
- In areas where snow fall or drift is minimal, installation of a (field fabricated) baffle plate is recommend, in addition to a canopy placed above the outdoor unit (Figure 2).
- In situations where this is not addressed, it may be necessary to employ corrective maintenance routines after heavy snowfall to clear snow away from any affected units.

Note:

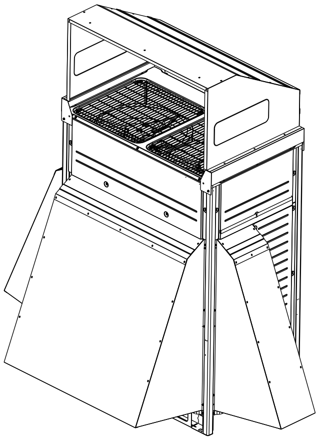
- These illustrations are for reference only. For more details contact your local Daikin representative or contractor.

Considerations for Adverse Weather



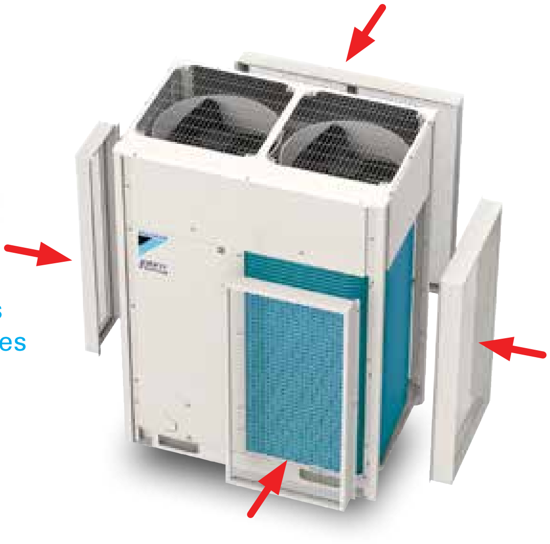
Heavy Snow Areas

- In areas where snow fall or drift is significant, field fabricated snow hoods can be added to the outdoor units.
- Daikin provides snow hood spec drawings for this purpose.
- These hoods are also suitable to protect outdoor units exposed to prevailing winds in extreme low ambient conditions.



Hail Guards

- Outdoor coil protection from hail storms is available.
- This is a factory supplied optional accessory.
- Four separate guards for each of the exposed areas of the heat exchanger are supplied.



Hail guards for all 4 sides

Note:

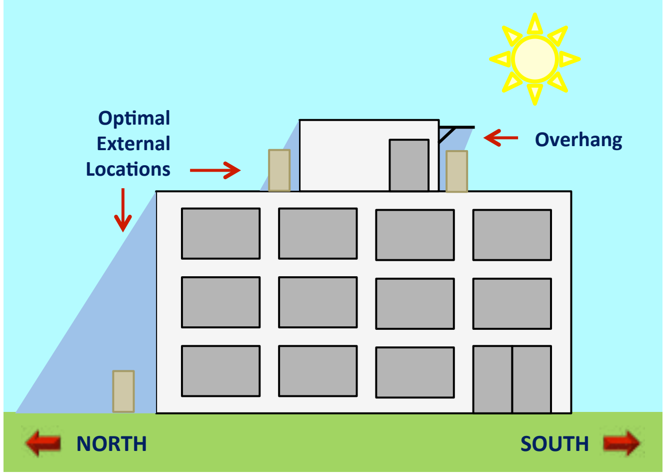
- These illustrations are for reference only. For more details contact your local Daikin representative or contractor.

Cooling in Hot and Humid Climates

Outdoor Unit Location

All comfort cooling (and most heating) design conditions in North America, per the ASHRAE Handbook, are within VRV operating limits. However outdoor unit location is still an important factor to help optimize capacity and efficiency of a VRV system, in addition to mitigating the possibility of non-performance on an exceptionally hot day.

- Shading the outdoor unit from the sun is the best way to increase the performance of a system in summer.
- When located externally, units against a north facing wall receive the least amount of direct sunlight.
- East facing walls are the next best option.
- Units exposed on west or south facing walls will sit in direct sunlight at the hottest times of day.
- If necessary, a partial overhang can benefit system performance in extreme conditions.



Note:

- Only three states (Arizona, Nevada and California) have ever recorded temperatures exceeding the stated VRV operation limit of 122° F

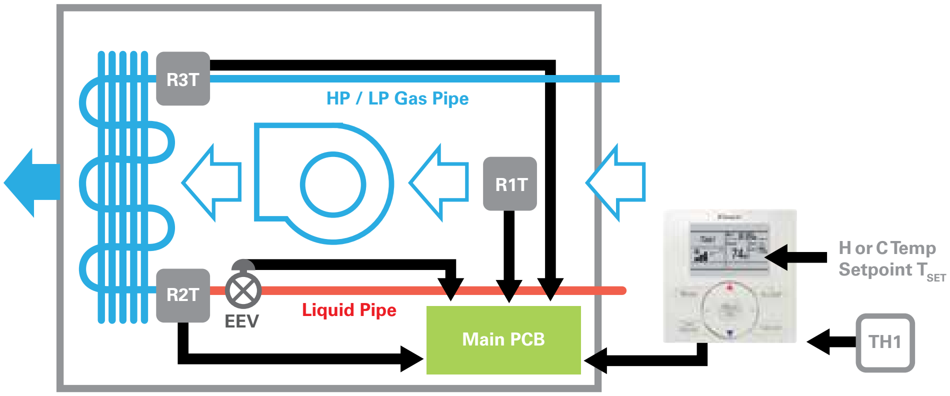
Humidity Control

The inherent design and control logic of the VRV system and indoor units help keep the humidity level within the human comfort levels of 40-60% RH without controlling to a humidity setpoint.

The three main features of the indoor units that enhance the dehumidification ability of the VRV system are:

- Relatively low airflow rates
- Indoor unit coil design
- DX coil temperatures

Indoor Fan Coil Unit



SENSOR LEGEND

R1T: Return Air
R2T: Saturated Liquid Pipe
R3T: Gas Pipe
TH1: Remote Controller Sensor
T_{SET}: Remote Controller Set Point

These features increase the latent capacity of the indoor unit and can result in a SHR of between 0.64 and 0.75 depending on the model, capacity, and design conditions. In addition to this, each VRV indoor unit has an electronic expansion valve (EEV) that modulates via refrigerant sensors and PID control to match the space load.

Cooling in Hot and Humid Climates

Areas of High Humidity

Attention to potential high humidity issues can be categorized in two forms:

» High % of Outside Air Requirement

High occupancy areas (e.g. Classrooms and Conference Areas) require high outside air volumes. A trait of this type of application is that they will often have fluctuating load demands. When there are few or no people in the space the cooling load will be greatly reduced so the cooling run time of the indoor unit would be reduced — however, the volume of OA would not unless controlled. At certain conditions this may lead to a high volume of moist OA being introduced into the room when the system is not cooling, resulting in the failure to remove adequate moisture from the air entering the space.

One solutions is to utilize CO² sensors to ensure outside air is only supplied when occupancy levels demand it.

» Indoor Unit Located in Unconditioned Space

The location of the indoor unit also has to be considered. If the space in which the unit is installed is over 82° FDB (79° FWB) and 85% RH, it should be insulated. Daikin recommends using insulation with an R value of at least 8 in these conditions. NOTE: Local or national codes may apply and always take precedence.

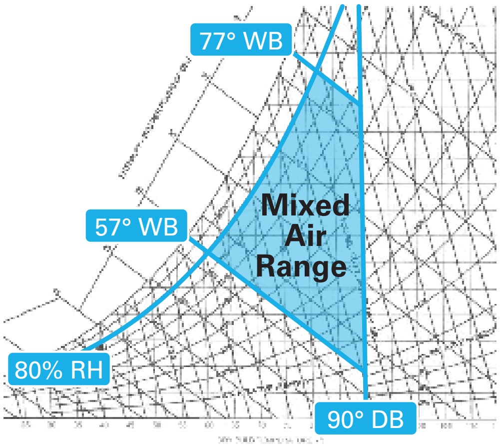
Outside Air Limitations

When choosing piping insulation thickness, consider the temperature and humidity conditions whether installing internally or externally. As always, local or national codes take precedence.

Surrounding Air	Insulation Thickness
< 86°F 75~80% RH	5/8" min.
> 86°F 80% RH	3/4" min.

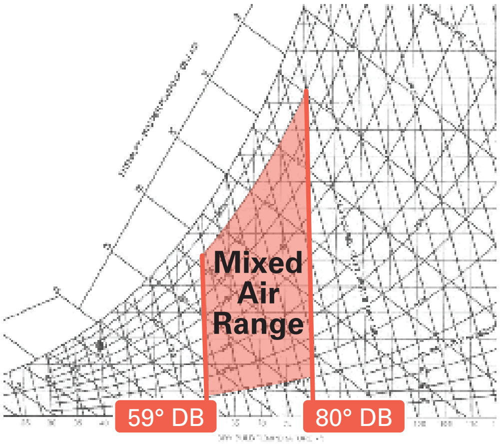
Several VRV indoor unit types allow for outside air to be incorporated directly onto the return air of the unit.

Due to the varying outside air conditions that would be supplied direct onto the indoor unit coil, there are restrictions to the amount of fresh air that can be added. The VRV reference guide provides rule of thumb percentages for each unit type. However, in order to optimize the amount of air that can be added, the criteria that needs to be met is mixed air conditions, onto the unit coil, that fall within these operating conditions:



Cooling

Mixed Air "on-coil"
55°F WB ~ 77°F WB
MAX 80% RH



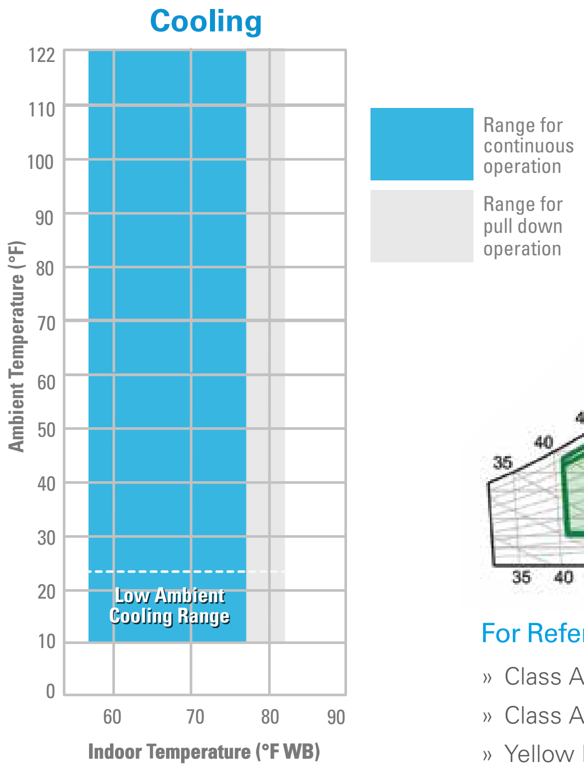
Heating

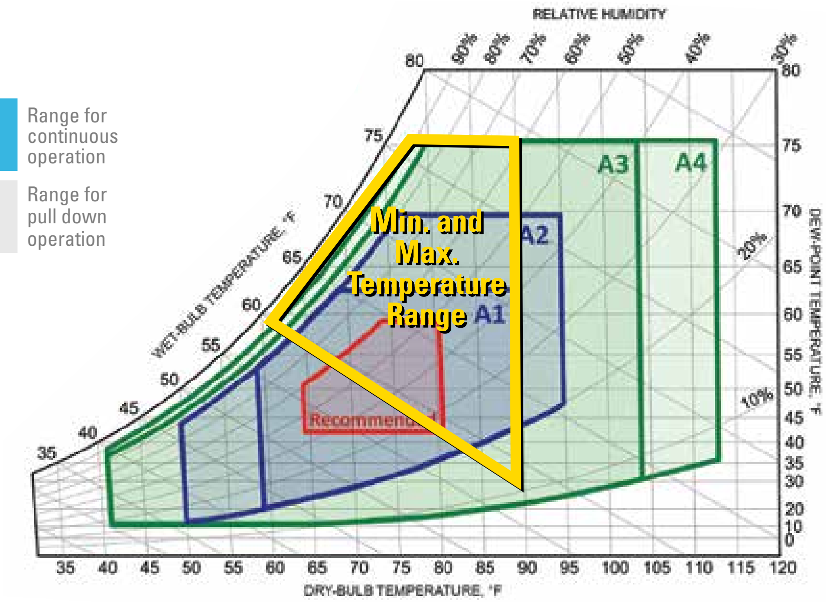
Mixed Air "on-coil"
57°F WB ~ 80°F WB
10% ~ 80% RH

VRV Heat Pump Design Limitations, Considerations, Recommendations

Daikin Air-source VRV systems can operate in cooling down to a 23° F ambient as standard. However, VRV IV Heat Pump can operate in comfort cooling down to 10°F ambient temperature according to the following rules:

- 58°F WB and 89°F DB are the minimum and maximum internal temperature, respectively





For Reference

- Class A1 Server Room Application = tight controlled dew point, temp., RH
- Class A2/3/4 Server Room Application = controlled dew point, temp., RH
- Yellow Lines = Daikin VRV "extended" comfort cooling temp. range

- Single Module VRV IV systems only
- Connected Indoor unit must have individual index ≥ 1 ton
- Minimum combined continuous cooling load must be ≥ 1.5 ton

Note:

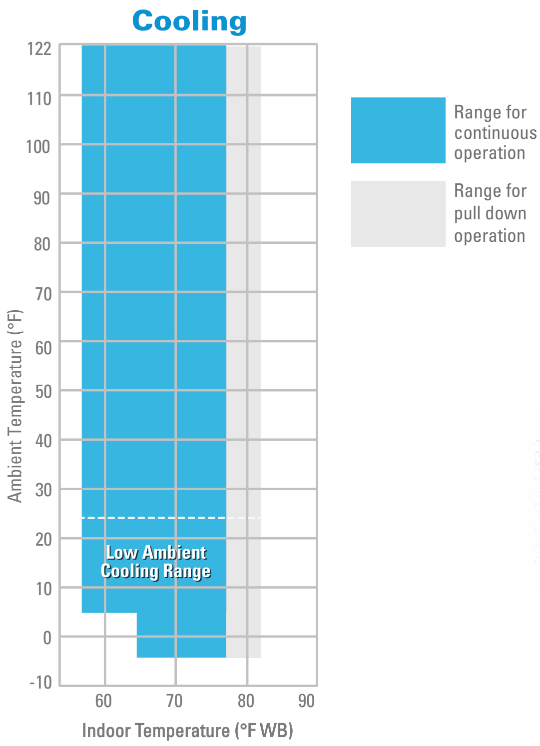
- Daikin VRV systems are designed for comfort cooling applications. Consult your supplier before using VRV in process cooling applications.

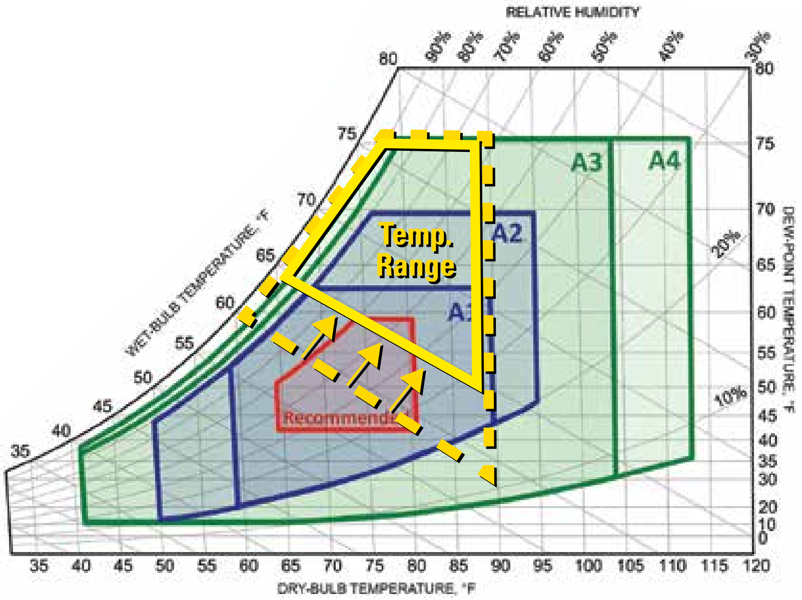
Cooling in Cold Climates

VRV Heat Recovery Design Limitations, Considerations, Recommendations

VRV IV Heat Recovery can operate in comfort cooling down to -4°F ambient temperature when the following rules are satisfied:

- 58°F WB and 89°F DB are the minimum and maximum internal temperature, respectively. However, if the ambient temperature does drop below 5°F DB, the minimum internal temperature becomes 64°F WB





For Reference

- Class A1 Server Room Application = Tight controlled dew point, temp., RH
- Class A2/3/4 Server Room Application = controlled dew point, temp., RH
- Yellow Lines = Daikin VRV "extended" comfort cooling temp. range

- Indoor units in cooling will have to be upsized based on the ambient temperature as shown in Figure 1
- One or more Indoor units must be connected to single port BS box as shown in Figure 2

Requirement (MBH)	Ambient Temperature (°F DB)		
	14	5	-4
7.5	9.5	12	15
9.5	12	15	18
12	15	18	24
15	24	24	30
18	24	30	30
24	30	48	48
30	48	48	54
36	48		
48	Outside of FXMQ PB range		
54			

Figure 1: FXMQ PB Upsize Example

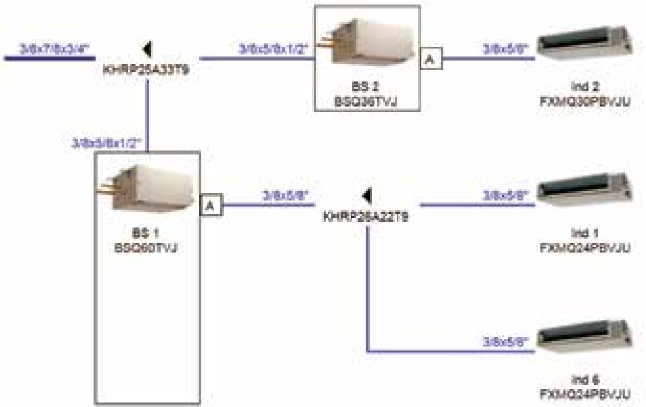


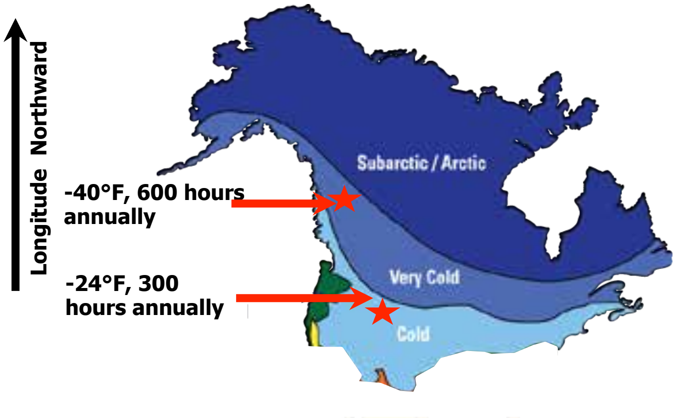
Figure 2

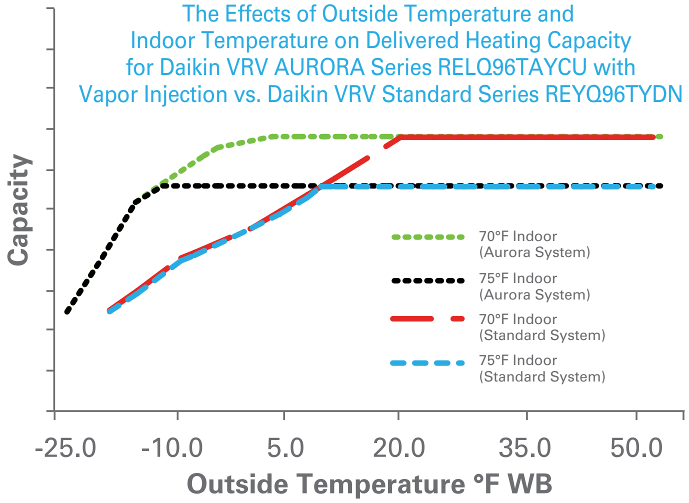
- Minimum total connection index of each system is limited 50% when the height difference between outdoor units and indoor units is ≤ 194′ and 80% when it is more than 194′.
- Maximum total connection index of each system is 130%.
- Maximum height difference between outdoor unit and indoor unit, when outdoor unit is below, is 130′.
- Function is engaged by an outdoor unit field setting and dip switch setting is necessary on all BS boxes serving indoor units not subject to low ambient cooling requirement.
- A field fabricated wind/snow hood is required for protection against the elements.

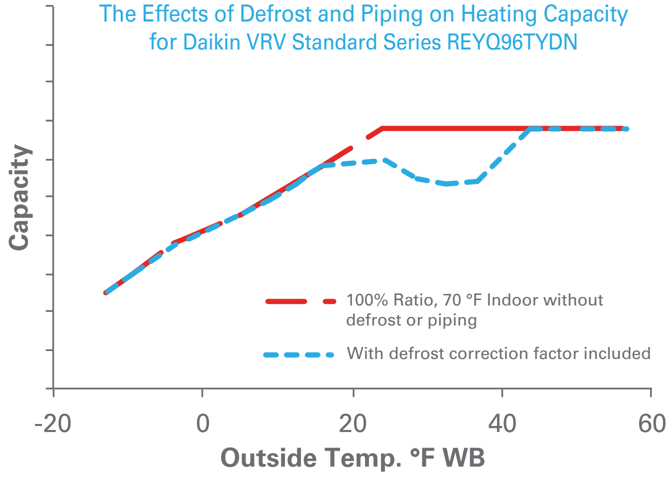
Use of Secondary Heat Source

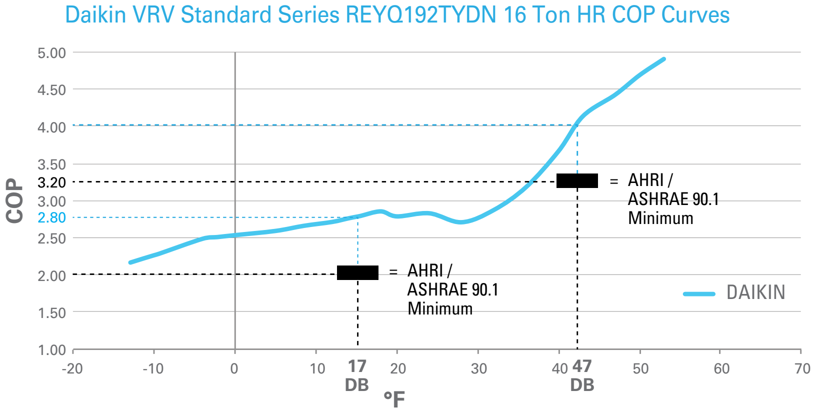
Certain parts of North America historically have long annual heating seasons with high heating requirements at low temperatures. In these geographic regions, low ambient temperatures can occur more frequently as the latitude becomes higher or northward i.e. from USA to Canada.

When using VRV systems in projects in these locations, the primary challenge is that the net delivered capacity of the VRV air-source unit will naturally diminish according to factors such as outdoor temp., capacity ratio, indoor temp., defrost, piping, and altitude.




The Effects of Outside Temperature and Indoor Temperature on Delivered Heating Capacity for Daikin VRV AURORA Series RELQ96TAYCU with Vapor Injection vs. Daikin VRV Standard Series REYQ96TYDN


The Effects of Defrost and Piping on Heating Capacity for Daikin VRV Standard Series REYQ96TYDN


Daikin VRV Standard Series REYQ192TYDN 16 Ton HR COP Curves

The delivered capacity of the VRV system is primarily impacted by 4 factors:

1. The outside temperature…
2. The indoor design condition…
3. Defrost control…
4. The altitude…

VRV Efficiency or coefficient of performance (COP) also decreases as a result of reduced heating capacity since Heating capacity / power input = COP

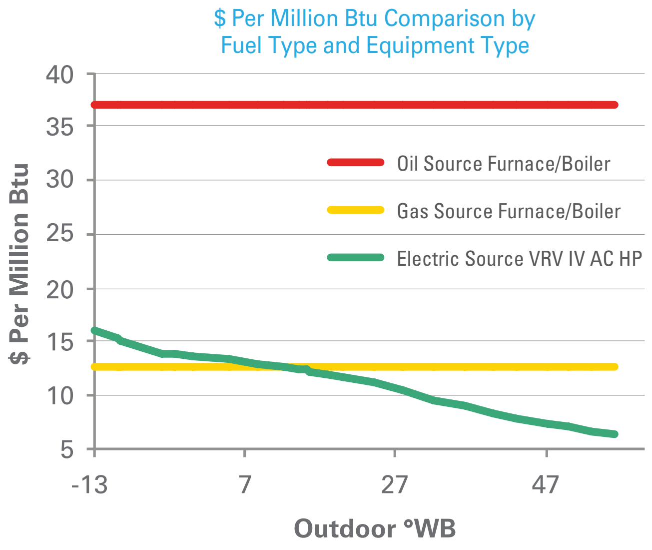
Note:

» These COP values still are significantly greater than ASHRAE 90.1 minimum values as shown

Heating in Cold Climates

Traditionally, various types of HVAC equipment and fuel sources have been used to meet the required design heating load. Since fuel cost is heavily dependent upon equipment efficiency, the most optimal fuel type/equipment efficiency combination should be considered beforehand i.e. lowest Dollar Per Million Btu as shown:

		A	B				C	
Fuel Type	Fuel Unit	Fuel Price Per Unit (Dollars)	Fuel Price Per Unit (Btu)	Fuel Heat per Million Btu (dollars)	Heating Appliance Type	Type of Efficiency Rating	Efficiency Rating	Dollars Per Million Btu
Fuel Oil (#2)	Gallon	$4	138,690	$28.84	Furnace, Boiler	AFUE	78	36.98
Electricity	KWh	$0.13	3,412	$38.10	VRV IV	COP	2.4~6	166~.3
Natural Gas	Therm.	$1	100,000	$10.02	Furnace, Boiler	AFUE	80	12.53



Note: Values shown in the above table are for demonstrative purposes only. Actual cost/unit may vary locally.

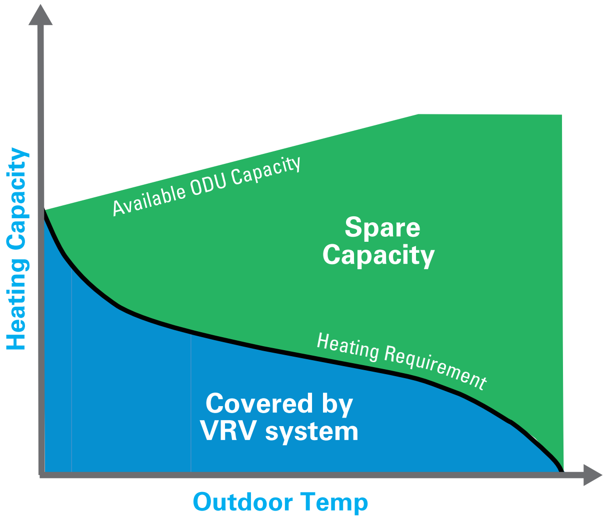
Notes:

- General Formula for calculating \$/Million Btu is (A/B)/C
- Furnace/Boiler efficiency is not affected by ambient temperature so the \$/Million Btu value remains constant.
- In this comparison, the VRV IV AC HP is an 8 Ton at 100% Connected Ratio and 70°F indoor unit Temp.
- In this comparison, the gas source furnace/boiler \$ per Million Btu value is only less than the electric source VRV IV AC HP below 14°F.

Installation Strategies

Many installation strategies for cold climate exist but three will be discussed in detail and the pros and the cons of each. These charts will show the balance point of heating load demand vs. available capacity. The available capacity as shown may be attributed to the VRV or a combination of VRV and auxiliary equipment depending on the methods used. Equipment location and the impact of climate profile on equipment size/balance point will also be discussed.

The VRV ODU may be installed outside or in an enclosure as per normal practices to deliver the required heating and cooling capacities. At higher outdoor temperature, the VRV ODU has spare heating capacity and is also efficient.

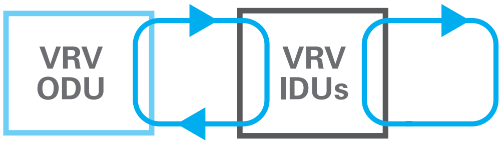


Method 1

Standalone VRV System Sized for Design Condition

The VRV outdoor unit may be installed outside or in an as per normal practices to deliver the required heating and cooling capacities. At higher outdoor temperature, the VRV Outdoor Unit has spare heating capacity and is also efficient.

Enclosed Installation



Pros

- No secondary heat to consider

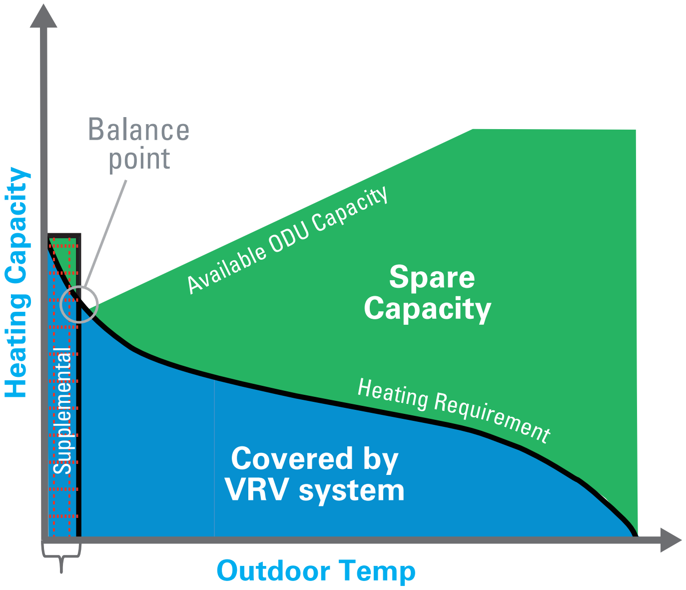
Cons

- Dependent on ambient design condition
  - Potentially larger VRV system size including larger footprint, pipe, and electrical size etc.
  - Potentially higher 1st cost such as equipment, refrigerant etc.
- Outdoor temperature limited to guaranteed range

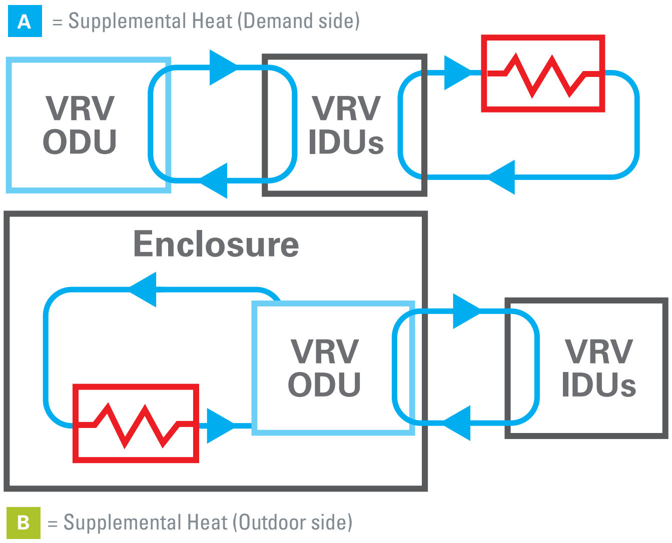
Method 2

VRV System Sized Based on Balance Point

The VRV outdoor unit may be installed outside with supplemental heat at the demand side or in an enclosure with supplemental heat. The VRV equipment may be sized to deliver the required cooling but less than the heating requirement, allowing for supplemental heat investment in the form of gas, electric, water etc. to make up for the difference. The temperature at which the capacity and demand curves intersect is the balance point. This balance point should be selected according to the optimal balance between VRV investment and heater operation, depending on the climate profile. When the outdoor temperature is below this balance point, the supplemental heat is engaged. Option A or B for supplemental heat also correlates to heater in the space or in an outdoor unit enclosure. Using both



Options for Heat Injection below balance point



A or **B**

A

Pros

- Balance VRV system investment and supplemental heat operation based on climate profile
- Multiple approaches/solutions can be used for supplemental heat (electric, hot water, gas etc.)
- Can leverage existing building infrastructure (existing baseboards etc.)

Cons

- Lowers overall energy efficiency
- Increases total life cycle cost
- Additional controls and components to install and maintain (heaters, etc.)

B

Pros

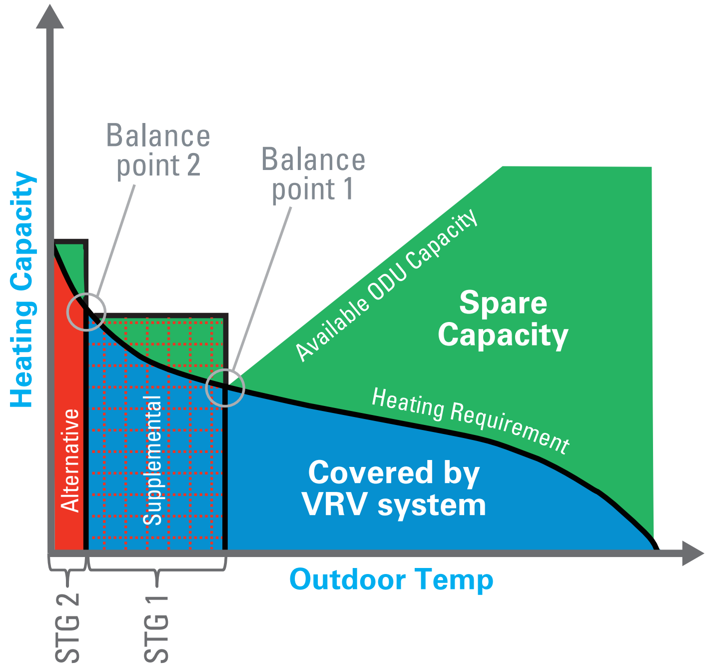
- Only heating required in the outdoor unit enclosure
- Maintains optimum outdoor unit sizing and hence overall project cost
- Less influenced by ambient fluctuations (i.e. 100 year rare occurrences etc.)

Cons

- Lowers overall energy efficiency
- Increases total life cycle cost
- Needs enclosure (internal installation only)

Method 3

This method is common for extreme cold climates. The VRV outdoor unit may be installed outside with both supplemental and alternative heat at the demand side or in an enclosure with supplemental heat with the alternative heat at the demand side. At higher temperature, the VRV has spare capacity and is efficient. As shown, the 1st and 2nd balance point are at -10°F and -15°F, respectively. When the outdoor temperature is below -10°F, the supplemental heat is engaged and below -15°F, the alternative heat is engaged. Alternative heat would be sized and utilized only during these rare occurrences of extreme ambient fluctuations.



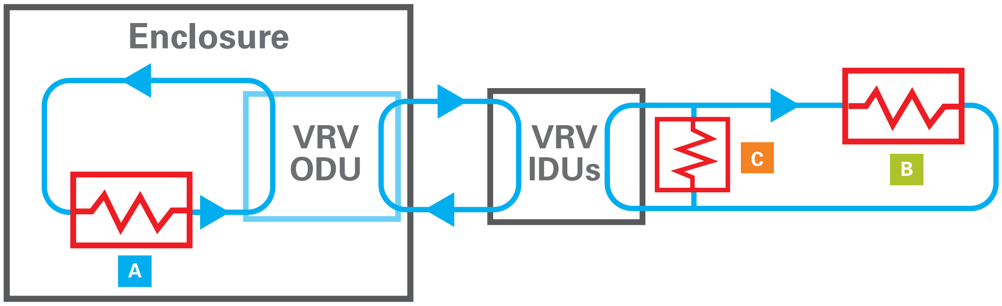
STG 1 = Supplemental Heat
(in conjunction with VRV)

A or **B**

Stage 1 heat source can be electric, baseboard hot water coil, gas furnace, etc.

STG 2 = Alternative Heat **C**
(in lieu of VRV)

Stage 2 heat source can be a boiler, existing baseboard, etc.



Pros

- Can increase overall energy efficiency
- Can lower total life cycle cost
- Balance VRV system investment and auxiliary heat operation
- Maintains optimum outdoor unit sizing and hence overall project cost
- Less influenced by ambient fluctuations (i.e. 100 year rare occurrences etc.)

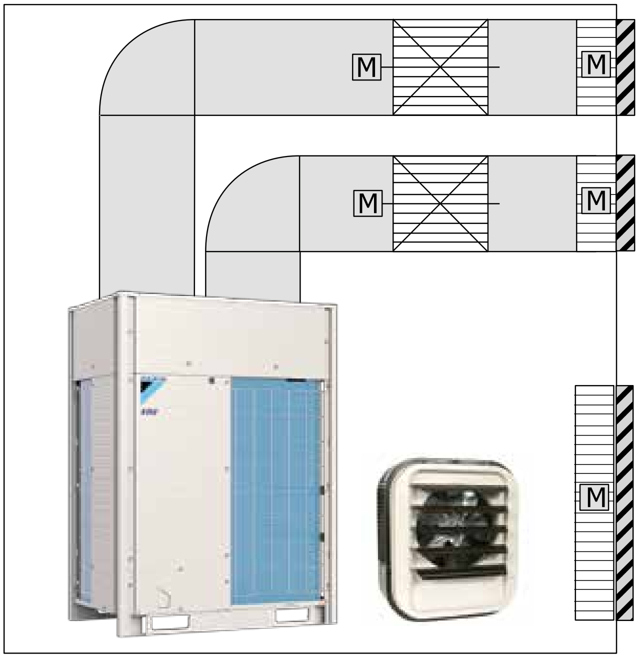
Cons

- Additional sequence of operation
- Needs enclosure (internal installation only)
- Additional controls and components to install and maintain (Heaters etc.)

When considering an internal installation for VRV outdoor units, the location is not limited to a mechanical room in the building. The possibility of utilizing or creating a remote enclosure commonly known as "dog housing".

"Dog Housing" in a remote enclosure

Air Handler Chassis



Cost consideration for an enclosure may include the following: weatherization, structural modification, motorized dampers, ductwork, heater, controller, sensors, electrical service, installation, wiring, and programming etc.

Use of the Cold Climate Analysis Tool with VRV Heat Pump Examples

The Daikin cold climate VRF analysis tool is based on the DOE energy analysis program with ASHRAE typical meteorological year (TMY2) weather data. With this tool, various cold climate approaches can be compared based on cost and performance.

Albany, NY "Cold" Region Summary		ODU sized for Cool and Heat	ODU sized for Cool, Elect. Aux. Ht. for Heat	ODU sized for Cool, Mech. Rm. @ 5°F for Heat[3]
Bldg. Size (sq. ft.)		10,000		
Peak Loads	Cooling (Tons)	15		
	Heating (kBTUH)	122		
ODU size[1]		16	14	
Annual Energy Cost[4]	$[1]	4,799	5,298	5,342
	EUI[5]	7		8
	kWh Consum.	19,192	20,570	20,558
	Therms Consum.	-		78
	kW Peak Demand	17	19	
Secondary Heat	Time (Hrs)	-	1	101
	Cap. (kBTUH)[1]	-	5	92
Unmet Heating (Hrs)[1]		0	0	

In the "Cold Region", Outdoor unit sized for Cool and Heat is the most balanced solution

Calgary, Alberta "Very Cold" Region Summary		ODU sized for Cool and Heat	ODU sized for Cool, Elect. Aux. Ht. for Heat	ODU sized for Cool, Mech. Rm. @ 45°F for Heat[3]	ODU sized for Cool, Mech. Rm. @10°F for Heat[3]
Bldg. Size (sq. ft.)		20,000			
Peak Loads	Cooling (Tons)	22			
	Heating (kBTUH)	258			
ODU size[1]		34[2]	22		Qty. 2x14
Annual Energy Cost[4]	$[1]	11,292	13,201	10,709	10,131
	EUI[5]	7		24	13
	kWh Consum.	39,652	40,302	30,513	37,109
	Therms Consum.	-		3,679	1,345
	kW Peak Demand	63	100	23	25
Secondary Heat	Time (Hrs)	-	208	4,547	1,016
	Cap. (kBTUH)[1]	-	150	199	172
Unmet Heating (Hrs)[1]		22	0		0

Red = significantly greater value vs. others

In the "Very Cold Region", outdoor unit sized for cool and heat is the most balanced solution

Important Notes:

[1] ODU size, Annual energy cost in $, Secondary Heat Capacity, and unmet heating (Hrs) are important metrics for comparison.
[2] Largest VRV HP available in range
[3] This is the minimum set point that can satisfy the heating requirement. (ODU size dependent)
[4] Comparisons are based on the following utility rates : Gas = $0.9 per therm., Electricity = $0.15 per kWh , $15 demand
[5] Energy Utilization Index (EUI) expresses a building's energy use as a function of its size

Notes

ADDITIONAL INFORMATION

Before purchasing this appliance, read important information about its estimated annual energy consumption, yearly operating cost, or energy efficiency rating that is available from your retailer.
Visit www.daikincomfort.com

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Our continuing commitment to quality products may mean a change in specifications without notice.