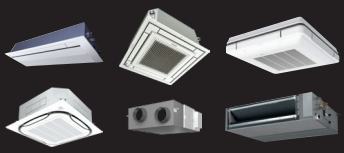
DAIKIN

VRV



VRV DESIGN AND APPLICATION GUIDE

WARNING

Only personnel that have been trained to install, adjust, service or repair (hereinafter, "service") the equipment specified in this manual should service the equipment. The manufacturer will not be responsible for any injury or property damage arising from improper service or service procedures. If you service this unit, you assume responsibility for any injury or property damage which may result. In addition, in jurisdictions that require one or more licenses to service the equipment specified in this manual, only licensed personnel should service the equipment. Improper installation, adjustment, servicing or repair of the equipment specified in this manual, or attempting to install, adjust, service or repair the equipment specified in this manual without proper training may result in product damage, property damage, personal injury or death.

This *VRV* Design and Application Guide is intended for qualified and trained technicians only.

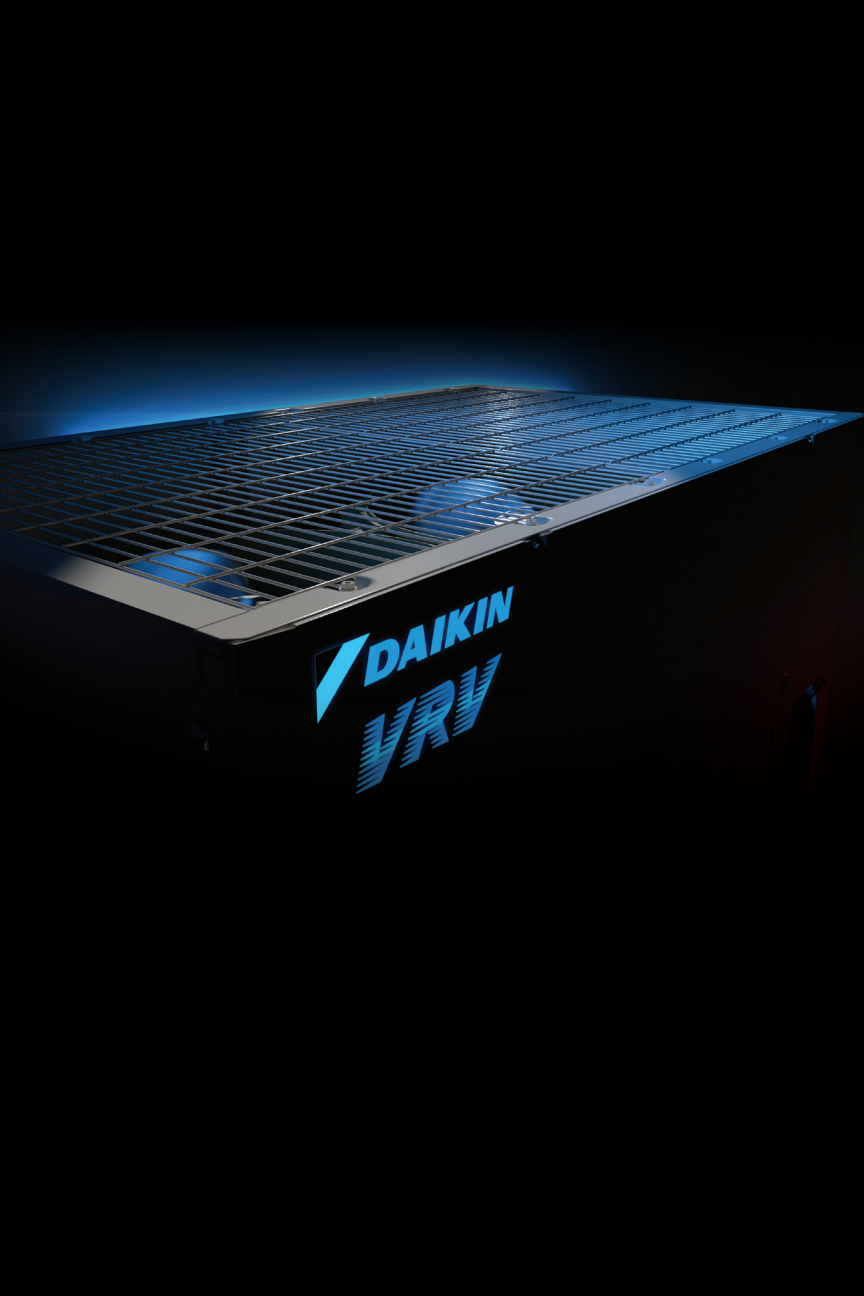
TABLE OF CONTENTS

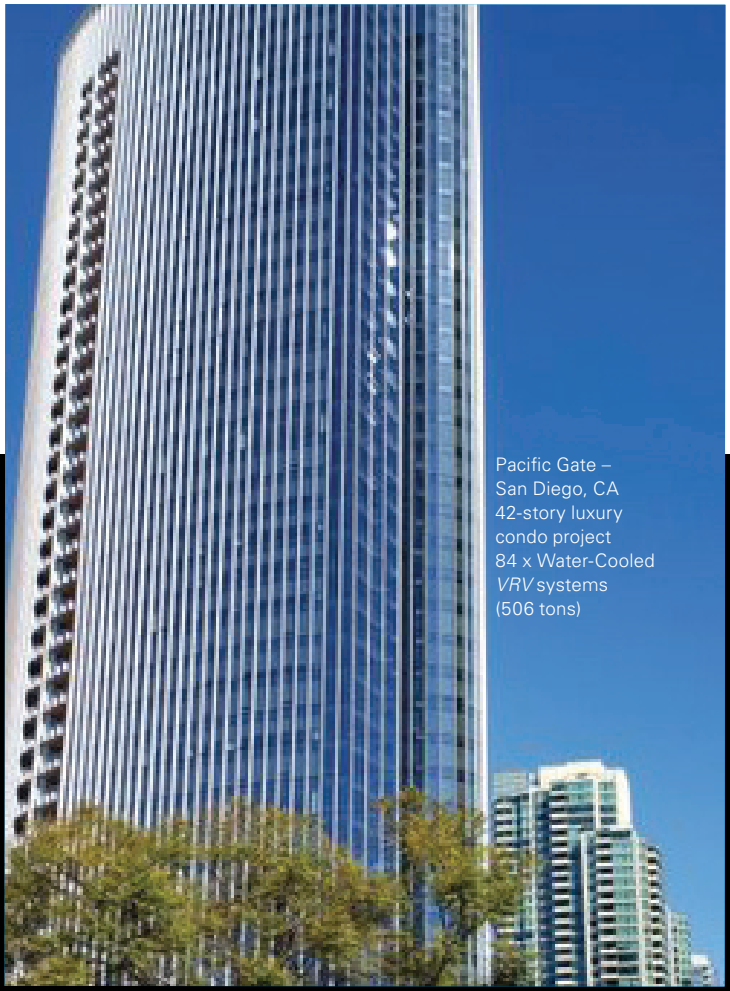
SYSTEM OVERVIEW

SYSTEM SELECTION

DESIGN OPTIMIZATION

CONTROLS & STANDARDS


DAIKIN
VRV



Pacific Gate –
San Diego, CA
42-story luxury
condo project
84 x Water-Cooled
VRV systems
(506 tons)

SYSTEM OVERVIEW

The Features and Benefits of *VRV*

The benefits of *VRV* equipment can be categorized by three core features:

Simple Modular Design

Outdoor Unit

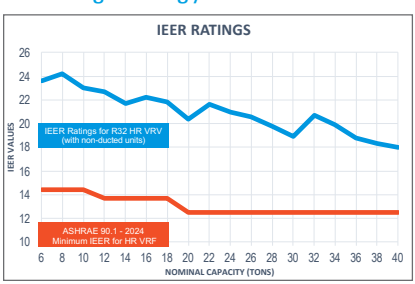
Indoor Units

Piping

Controls

The ease of both design and installation has been a major factor in the success of *VRV*. Simple methodology sees *VRV* regularly utilized in all project sizes from 2 ton to several 1,000 ton.

Ultra-High Energy Efficiencies



Direct expansion systems (those that use refrigerant to directly condition the space) provide an efficient method of heat exchange.

Inverter controlled compressors also ensure optimized system performance.

Optimum refrigerant & system control sees Daikin *VRV* far exceed industry energy efficiency requirements.

Exceptional Comfort control

Simplified Room Controller

Room or Group Controller

Central Controller

BMS Interface

Cloud-based monitoring

Cloud-based monitoring and control

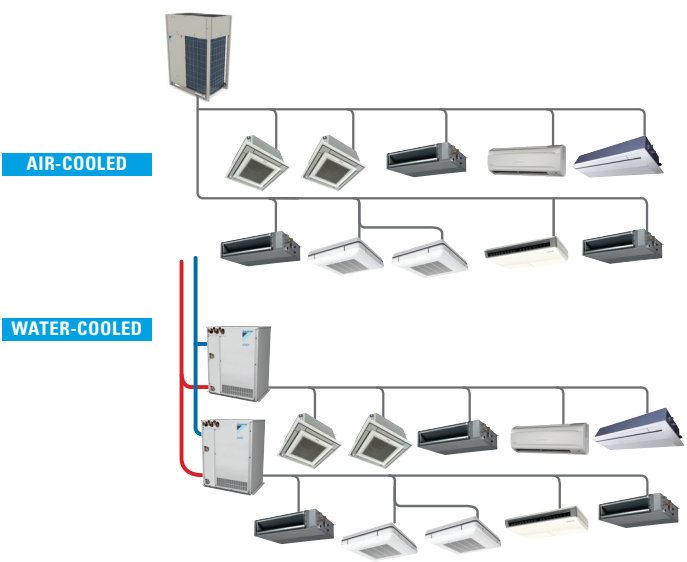
From controlling temperature in individual areas to the remote monitoring and control of multiple sites, the Daikin *VRV* system has a wealth of proprietary control options to cover all end user requirements and ensure exceptional levels of comfort control.

What is *VRV*?

- **V**ariable *System capacity varies with load*
- **R**efrigerant *R-32 Direct Expansion (DX) System*
- **V**olume *Refrigerant Volume regulated by EEVs & variable-speed compressors*

VRV **= Daikin registered trademark**
VRF = Industry term

- **Invented by Daikin in 1982** World's first VRF system
- VRF introduced to North America in the early 2000's
- Multiple **indoor units connected** to a single refrigerant circuit
- Up to 64 independently controlled units served by the same circuit
- Available in either **air-cooled** or **water-cooled**



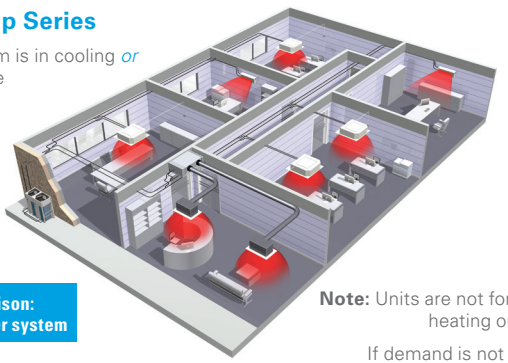
What is *VRV*?

Heat Pump and Heat Recovery

Both air-cooled & water-cooled *VRV* can be installed as HEAT PUMP or HEAT RECOVERY systems

Heat Pump Series

Whole system is in cooling *or* heating mode



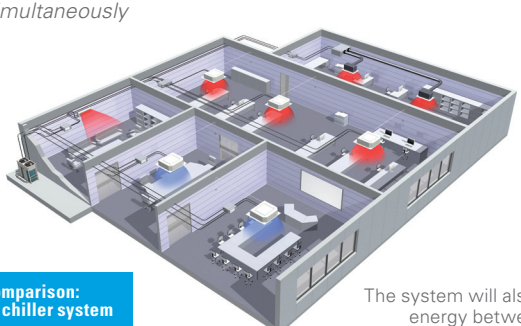
Comparison: 2-pipe chiller system

Note: Units are not forced into heating or cooling

If demand is not required a FCU will go onto fan only

Heat Recovery Series

The system can cool *and* heat *simultaneously*

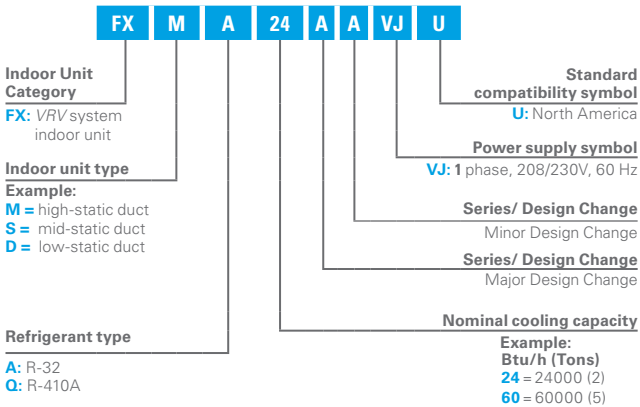


Comparison: 4-pipe chiller system

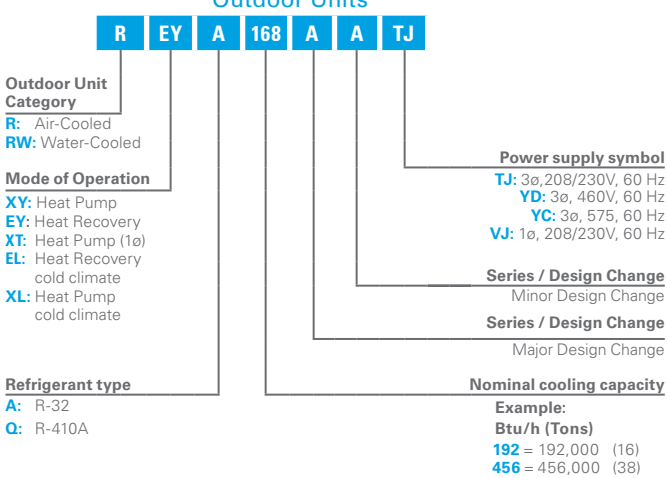
The system will also exchange energy between zones in different modes, hence the term 'Heat Recovery'

Nomenclature

Indoor Units



Outdoor Units



Product Portfolio

Outdoor Unit (ODU) Range

	HEAT PUMP	HEAT RECOVERY
Air-Cooled 3-phase	 ***VRV EMERION*** **6-40 tons** ***VRV AURORA R-32*** **6-24 tons**	 ***VRV EMERION*** **6-40 tons** ***VRV AURORA R-32*** **6-24 tons**
Air-Cooled 1-phase	 ***VRV-S*** **2-5 ton** ***VRV-S AURORA*** **3-4 tons**	
Water-Cooled 3-phase	 ***W-VRV T-Series*** **6-36 tons**	 ***W-VRV T-Series*** **6-36 tons**

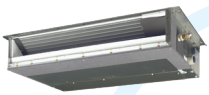
REFRIGERANT TYPES : AIR-COOLED R-32
WATER-COOLED R-410A

NOTE: Water-cooled systems will change to R-32 by end of 2026

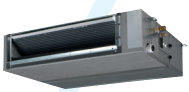
Product Portfolio

Indoor Unit (IDU) Range

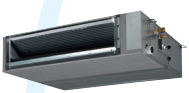
Ducted Units



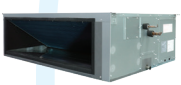
Slim Low-static *



Medium Static Ducted



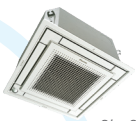
High-Static Ducted



Large Capacity High-Static

Multi-Position AHU

Duct-free Units



2' x 2' *VISTA* Cassette

3' x 3' Round-Flow Cassette

Wall-Mounted

1-Way Cassette *

4-Way Cassette (under ceiling) *

Ventilation Units

Energy Recovery Ventilator
300-1200 CFM

3rd party
AHU
Integration

* R-32 models available by mid 2027.

Product Portfolio

Voltages and Maximum IDU Connections

VRV-EMERION

HEAT PUMP & HEAT RECOVERY

Capacity MBH (Tn)	Voltage	Number of Modules	Number of Compressors	Maximum Number of IDUs
72 (6)	3 Phase: 208/230V ~ 460V ~ 575V	1	1	12
96 (8)		1	2	16
120 (10)				20
144 (12)				25
168 (14)				29
192 (16)				33
216 (18)				37
240 (20)				41
264 (22)		2	4	45
288 (24)				49
312 (26)				54
336 (28)				58
360 (30)				62
384 (32)				64
408 (34)				64
432 (36)				64
456 (38)				64
480 (40)				64

Note: Some 575V models to be released at a later date

VRV AURORA

HEAT PUMP & HEAT RECOVERY

Capacity MBH (Tn)	Voltage	Number of Modules	Number of Compressors	Maximum Number of IDUs
72 (6)	3 Phase: 208/230V ~ 460V ~ 575V	1	1	12
96 (8)		1	2	16
120 (10)				20
144 (12)				25
168 (14)		2	4	29
192 (16)				33
216 (18)				37
240 (20)				41
264 (22)				45
288 (24)				49

VRV-S

HEAT PUMP

Capacity MBH (Tn)	Voltage	Number of Modules	Number of Compressors	Maximum Number of IDUs
24 (2)	1 Phase: 208/230V	1	1	4
36 (3)				6
48 (4)				8
60 (5)				9

VRV-S AURORA

HEAT PUMP

Capacity MBH (Tn)	Voltage	Number of Modules	Number of Compressors	Maximum Number of IDUs
36 (3)	1 Phase: 208/230V	1	1	6
48 (4)				8

Product Portfolio

Capacity Range

WATER-COOLED HEAT PUMP & HEAT RECOVERY				
Capacity MBH (Tn)	Voltage	Number of Modules	Number of Compressors	Maximum Number of IDUs
72 (6)*	3 Phase: 208-230V ~ 460V ~ 575V	1	1	12
84 (7)*				14
96 (8)				20
120 (10)				25
144 (12)				30
168 (14)*		2	2	29
192 (16)				41
216 (18)				46
240 (20)				51
264 (22)				56
288 (24)				61
312 (26)		3	3	64
336 (28)				64
360 (30)				64
384 (32)				64
408 (34)				64
432 (36)				64

*PC Series

Key Points for Selection

Connection Ratio Limits

SYSTEM TYPE		Minimum Connection Ratio	*VRV EMERION* & *AURORA* (3ph) Maximum Connection Ratio		
UNIT TYPE			When using only: FXAA (07-24), FXSA (07)	When using at least one: FXFA (07-09) FXAA-05, FXZA-05, FXSA-05, FXTA-12	All other indoor unit models
Single Module	6-14 ton	*EMERION*: 50% *AURORA*: 70%-75%*	200%	180%	200%
	16-20 ton				180%
Dual Module				160%	160%

SYSTEM TYPE	Minimum Connection Ratio	*VRV -S* & *VRV-S AURORA* (1ph) Maximum Connection Ratio
UNIT TYPE		All indoor unit models
Single Module	50%	130%

SYSTEM TYPE	Minimum Connection Ratio	WATER COOLED T-SERIES (R-410A) Maximum Connection Ratio	
INDOOR UNIT TYPE		All FXDQ	All FXTQ
		All FXMQ	FXZQ-05T
		All FXAQ	FXFQ-07 & 09
Single Module	50%	150%	130%
Dual Module			
Triple Module 24-34 ton			
Triple Module 36 ton			120%

* Minimum rises to 75% for sizes 96 & 168~216.

Refer to the engineering manual for full *AURORA* and *EMERION* rules and conditions.

Note

1. If the operational capacity of indoor units is more than 130%, low airflow operation is enforced in all the indoor units. This limitation can be deactivated through field setting.
2. Cooling only units installed on a heat recovery system (i.e. when not connected to a BS Box), must not exceed 50% of the total capacity index of all IDU's on the system.

Generally, IDU capacity indexes correspond to IDU unit sizes.
The exception to this rule are the 3 smallest units in the range:

Capacity Index Table

Indoor Unit Size														
5	*7*	*9*	*12*	*15*	*18*	*24*	*30*	*36*	*42*	*48*	*54*	*60*	*72*	*96*
Indoor Unit Capacity Index														
5.8	**7.5**	**9.5**	**12**	**15**	**18**	**24**	**30**	**36**	**42**	**48**	**54**	**60**	**72**	**96**

Note: These values are automatically adjusted in the WEBXpress *VRV* selection tool.

Key Points for Selection

System Diversity vs Connection Ratio

Optimizing *VRV* System Selection

- The most successful users of *VRV* equipment understand the importance of a fully optimized design
- A key factor that ensures optimized *VRV* equipment selection is to understand the correlation between SYSTEM DIVERSITY & CONNECTION RATIO

A fully optimized design can realize a number of benefits:

- Equipment & installations costs
- Optimum outdoor unit footprint
- Energy efficient system

Peak Loads & Block Loads

The first step to optimization is to understand the different load demands of the equipment to be selected:

Unit Type	Selection Scope	Selection Approach
	Peak Load (Indoor Unit Sizing)	Each Indoor unit should be sized to deliver the PEAK load (total and/or sensible) of the area it is to serve, at the entering air design conditions, determined by the building load calculations
	Block Load (Outdoor Unit Sizing)	Outdoor units should be selected to meet the BLOCK Cooling & Heating capacities (The maximum simultaneous load demand of all attached indoor units at a given time of day) determined by the same load calculations

Key Points for Selection

System Diversity & Connection Ratio – What's the Difference?

Connection Ratio:

Indicates how much indoor capacity is connected to the system

» Both indoor & outdoor units have a Capacity Index number (e.g. FXMA30AAVJU indoor unit & RXYA192AATJA outdoor unit)

Total sum of IDU index numbers ÷ ODU index number = CONNECTION RATIO

» This ratio is defined as a percentage:

Example: 8 x FXMA30 connected to 1 x RXYA192 = 240 / 192 = 1.25

– Therefore the Connection Ratio = 125%

System Diversity:

System DIVERSITY is the difference between the Maximum System Load demand and the Maximum Capacity of the outdoor unit, at design conditions

» The *VRV WebXpress* tool can define diversity - also as a percentage

Example: 8 x FXMA30 connected to 1 x RXYA168

– Maximum Load required at any given time: 170,269 btu
– Maximum Capacity of the ODU at design conditions: 166,315 btu
– *VRV* defines the DIVERSITY of the system at: -2%

» In this example, if the maximum load is called for, the outdoor unit will fall short of demand by 3,954btu – This *VRV* design has a 2% system diversity

In Summary:

Connection Ratio does NOT indicate the diversity of a *VRV* system. Use of the *VRV Xpress* selection tool will indicate clearly if selected *VRV* equipment has a system diversity or not.

Key Points for Selection

Project Design Criteria

Before selection of any *VRV* system, a minimum amount of information is required for accurate equipment selection and to apply an optimized design.

For an accurate selection of indoor units the following information is required:

PEAK Cooling Loads	PEAK Heating Loads	DESIGN AIR Conditions
» Engineers will usually provide both Total & Sensible loads which should be entered » However it is possible to select equipment using only Total or Sensible load	» Required when either Heating is the dominant operation or the heating design condition is below 32°F	» The dry & wet bulb temperature entering the coil » Also known as "air-on" or "mixed air" conditions » Nominal conditions are typically 80°F db & 67°F wb but rarely reflect actual conditions » Design air-on can also be given as db/RH% (e.g. 74°F & 50% RH)

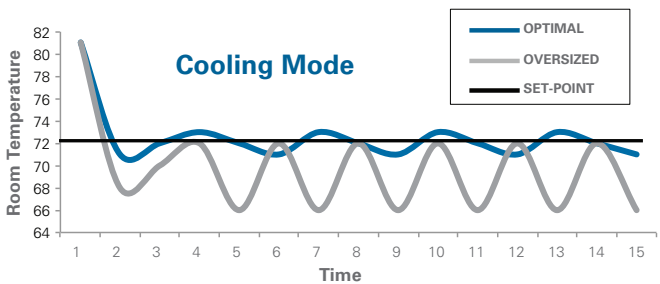
For an accurate selection of outdoor units the following information is required:

AMBIENT Conditions	PIPE LENGTH
» The design ambient temperature for the location of the project » Both engineers and D&B contractors should have this information » If this information is not at hand then use ASHRAE standard design conditions for the location	» The estimated distance between the outdoor unit and the furthest indoor unit » This is the linear length from one point to another NOT the total amount of piping » Both engineers and D&B contractors should be able to pinpoint the outdoor unit location » Be sure to calculate and include the vertical height between outdoor & furthest indoor unit

Key Points for Selection

Despite advanced control methods, oversizing of equipment, even with Variable Refrigerant Volume technology, can lead to indoor units over cooling 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. This can lead to higher humidity levels than desired.

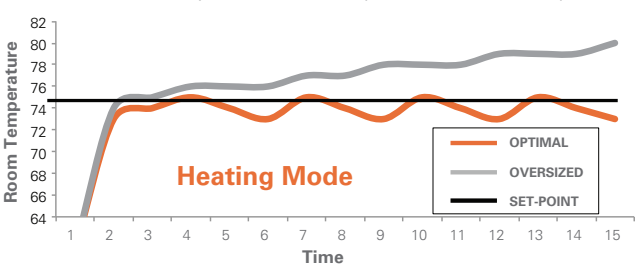


Oversized for heating

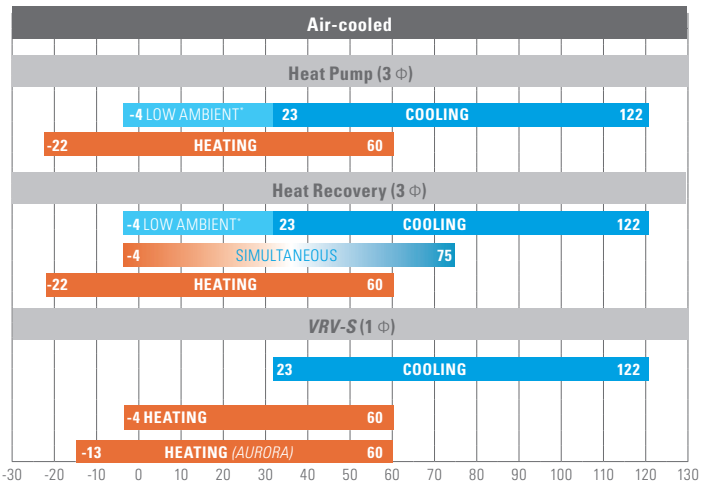
In areas of very cold climates, there is a temptation to 'upsize' indoor units in the belief that this ensures capacity in extreme conditions below design temperature

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

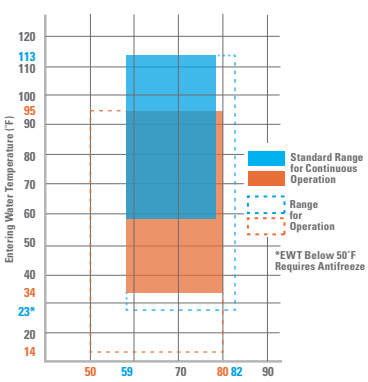


Operation Range



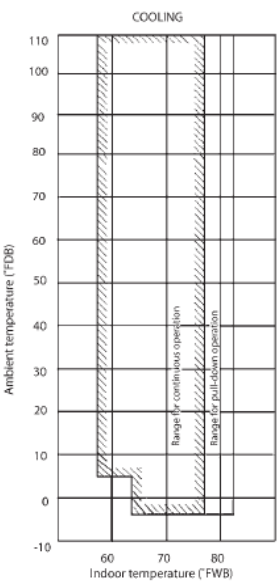
*R-32 models with safety shut-off valve only.

WATER-COOLED (R-410A)



Low Ambient Cooling

Air-cooled 3ph *VRV* (both HP & HR) have an enhanced feature that allows low ambient cooling from that standard limit of 23°F DB down to -4°F DB



Application Rules

- Total connection index of each system is limited to 50-130% when height difference is 0-164 ft. (0-50 m), 80-130% when higher than 164 ft. (50 m).
- Function is engaged by a field setting on the outdoor unit to enable low ambient cooling.
- During operation below 23°F DB (–5°CDB), the available cooling capacity decreases as follows:
  - 14°F DB (–10°C DB) - Reduces to 80% of nominal
  - 5°F DB (–15°C DB) - Reduces to 65% of nominal
  - –4°F DB (–20°C DB) - Reduces to 60% of nominal
- Refrigerant noise from the Safety Shut-Off Valve unit will become louder, so be sure to install where noise will not be a problem
- If sound reduction is required, soundproof connection piping by wrapping them in soundproofing material, etc.
- The maximum vertical height limit is 164 ft. when ODU is above IDUs and 130 ft. when ODU is below indoor unit
- If ambient temperature is less than the setting of Heat pump lockout temp, indoor units connected to the system cannot operate in cooling mode. In this case the system can operate only in heating mode via an auxiliary heat or secondary heat source

Low Ambient Cooling

SVA60AAVJ, SVA96AAVJ SSOV Box

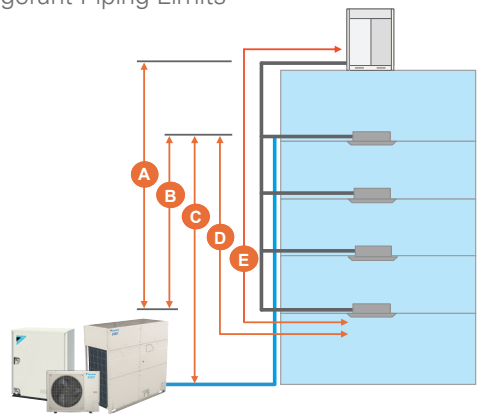
Any indoor unit requiring this feature must be connected downstream of a BS Box or a Safety Shut-off Valve. This means:

HEAT RECOVERY: Cooling only units (i.e. IDUs not connected to a BS Box) are not possible to achieve this feature

HEAT PUMP: SSOV boxes are typically only required when refrigerant charge limits are not met. In this case, SSOV box is required for this separate function

Application Limits

Refrigerant Piping Limits



PIPING LIMITATIONS Max (ft)		AIR-COOLED (R-32)				WATER-COOLED
		VRV EMERION	*VRV AURORA*	*VRV-S*	*VRV-S AURORA*	*VRV T-Series* (R-410A)
A	Vertical Drop	165 361[1]	165 361[1]	165	165	165
B	Height Between IDU	100 (50)[2]	100 (50)[2]	50	50	100
C	Vertical Rise	130 361[1]	130 361[1]	130	130	130
D	From 1st Branch	130 (295)[3]	130 (295)[3]	130	130	295
E	Linear Length	540	540	394	394	540
	Total Network	3280	3280	984	984	984

1 Setting adjustment on condensing unit required.
NOTE: there are specific, restrictive conditions that may allow longer vertical runs up to 361 ft if required (refer to install manual for details)

2 When linear length exceeds 390 ft, height differential should be restricted to 50ft to avoid possible refrigerant noise

3 When linear length exceeds 295 ft, height differential must be restricted to 100ft

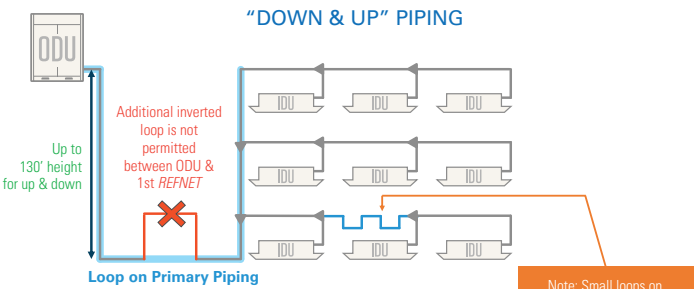
4 A pipe distance differential of 130 ft or less from nearest to furthest IDU must be met (see install manual for details)

NOTE: If the first branch is a multi-port BS Box, 130 ft distance to any one unit cannot be exceeded, even if the differentials above are met

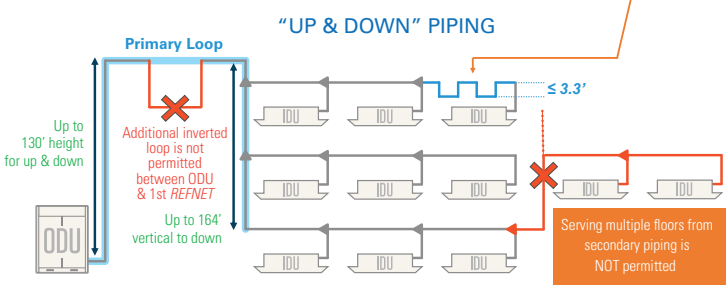
What constitutes an oil trap?

Most limitations applied to *VRV* piping are needed to ensure adequate oil return to the compressor. Minimizing potential oil traps is a key component of a good install. To understand what constitutes an oil trap, different rules apply to PRIMARY & SECONDARY piping. Primary piping runs from the ODU to the furthest branch (or multiport box). All other piping is considered SECONDARY.

If an application demands, it is possible to run Primary piping vertically up & down (or down & up) within the maximum standard vertical limitations:



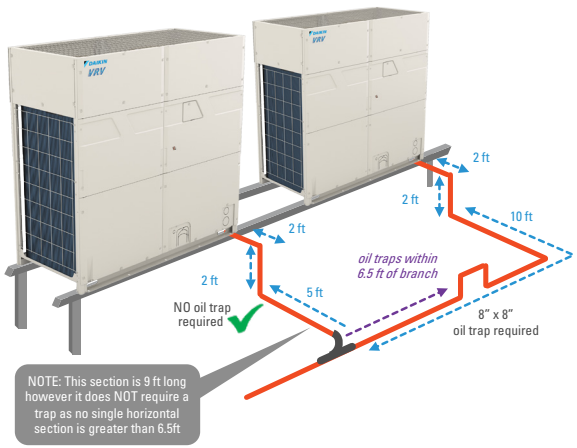
With Secondary piping, it is permitted to allow loops within 3.3ft (1 meter)



Once Secondary piping branches horizontally from the Primary piping, it is NOT permitted to serve IDU's on multiple levels, from that Secondary piping. As shown in the diagram above, vertical piping configurations must meet height and oil return requirements.

Oil Trap Requirements

When outdoor units are linked together on a single refrigerant circuit, oil equalization is an important consideration. This diagram illustrates when and where oil traps are required



- Oil traps are required on gas pipe (plus hi/lo pipe on HR) when a single horizontal pipe length from branch to branch, or branch to unit, exceeds 6.5 ft
- Oil traps must be 8" loop minimum
- Any oil trap must be positioned within 6.5 ft upstream from branch to unit

Multi-module pipe lengths

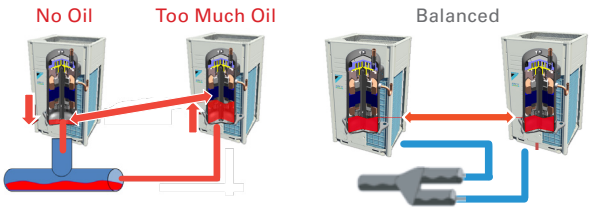
Allowable length after branch (to each unit) **33 ft**

Allowable height difference (between each unit) **16 ft**

Piping Guide

Multi Connection Kits

The outdoor multi connection kit is a branch set, designed to promote proper oil distribution between *VRV* ODU modules piped together as a single system (both air & water-cooled)



Branch Orientation

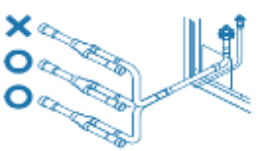
Unlike *REFNET* joints on the main piping, multi connectors cannot be installed vertically. Ensure the caution label (attached to the joint) is facing up

BHFP26P100U dual module multi-connection kit

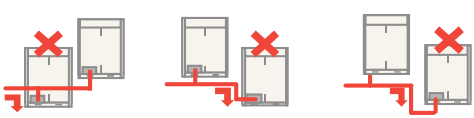
Unlike *REFNET* joints on the main piping, multi connectors cannot be installed in a vertical position. Tolerance from horizontal plane is limited to 15 degrees

Branch position to Outdoor Units

- Any branch must be installed below, or at the level of all connected ODUs
- Where this is not possible, an 8" oil trap must be added



Incorrect Configuration
Oil Collects to the Outermost OD Units



Correct Configuration
Oil Collects to the Outermost OD Units

Piping Guide

Multi Connection Kits

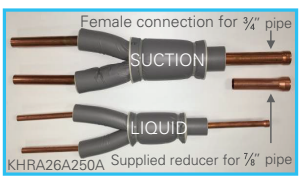
Multi-port Junction Pipe Kit

- Each port on a multi-port BS box has a maximum capacity index of 54 (i.e., a maximum of 4.5 Tons connected downstream of each port)
- When a unit exceeds this capacity there are two options open to the designer:
  1. Put the unit (or units) on a larger capacity single port box
  2. Utilize TWO ports on the multi-port box

Multi-port Junction Pipe Kit

- When choosing option 2, a junction pipe kit (twinning joint) is required to join the two ports
- Connected ports are limited to adjoining ports:

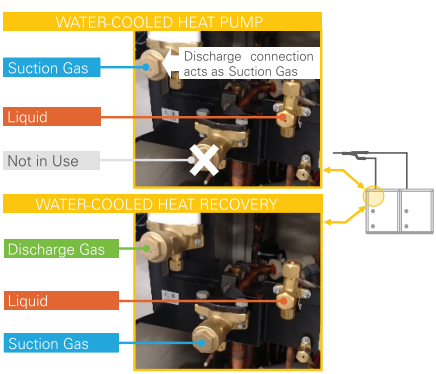
  A & B (all multi-port boxes)
  C & D (all multi-port boxes)
  E & F (6 & 8 port option only)



NOTE: When using a junction pipe kit, the maximum pipe distance from BS Box to indoor units is HALVED from 131 ft to 65.5 ft

Water-Cooled Piping Connections

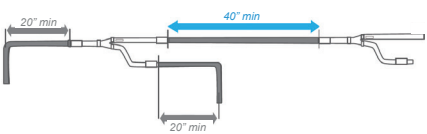
- Water-Cooled (*VRV T-Series*) Heat Pump & Recovery systems use the SAME condensing unit models
- When installed as a Heat Pump system, the Discharge Gas (HI/LO) piping connection becomes



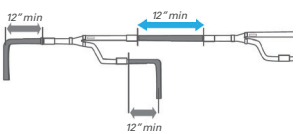
NOTE: Water-cooled "outdoor" units are, in fact, internally mounted. They are typically installed in a mechanical room on a floor-by-floor basis and link up to an existing water loop running through the building.
Piping limitations do allow some flexibility to their location but MUST be protected from external ambient conditions

Minimum Piping Lengths

As is standard, all fixings (*REFNETs*, boxes, fan coils, etc.) require minimum lengths of straight pipe from pipe bends and from each other (e.g. *REFNET* to *REFNET*). These distances ensure a laminar flow of refrigerant through the system.



However, a minimum length of 12" straight pipe from pipe bends AND from each terminal is acceptable, if the possibility of increased refrigerant noise is not critical.



REFNET Branch Pipe Kits

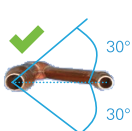
All Daikin *VRV* systems are supplied with *REFNET* branch kits which must be used in installation.

Each branch has varying diameters for the different pipe sizes that need to connect to it. Cut the pipe accordingly.

Vertical installation of *REFNETs* is acceptable on vertical pipe runs

On horizontal runs, ensure all *REFNET* lie flat in the horizontal plane

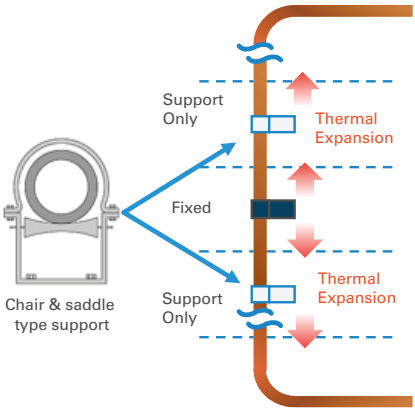
Install the *REFNET* no more than 30° from the horizontal plane

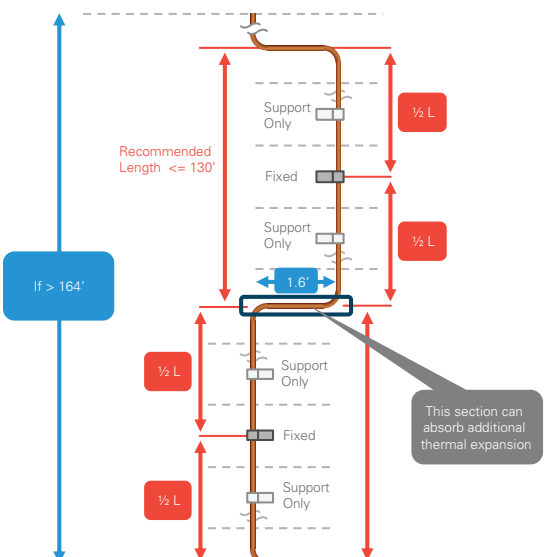


Piping Guide

Vertical Piping

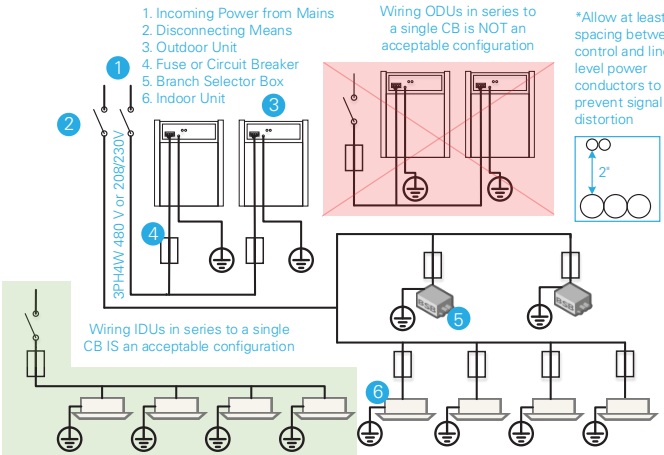
- The ability to provide long piping runs brings its own set of challenges
- Inadequate support of piping can lead to buckling and/or fracture due to its own weight
- If a vertical (or horizontal) pipework is greater than 164', allow a section along with flexible pipe supports to mitigate thermal expansion
- To account for any residual thermal expansion, supports should allow for movements in two directions as shown





Wiring

Electrical Wiring

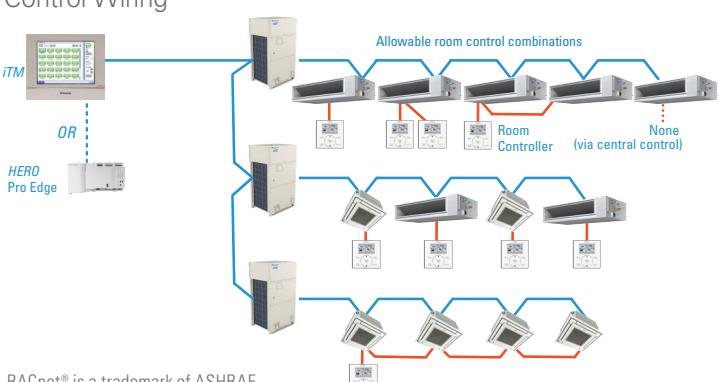


- 2 core daisy chain communication
- 18-16 2AWG stranded wire
- Non shielded
- Non polarized

Control wiring length limits:

- Up to 656 ft single length (connection to connection)
- Up to 2296 ft linear length (ODU to IDU)
- Up to 6560 ft of total system wiring

Control Wiring



BACnet® is a trademark of ASHRAE.

SYSTEM SELECTION

Indoor Unit Range

IDU tonnages & main features available

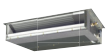
TYPE	MODEL	BUILT-IN / OPTION
ROUNDFLOW (3' x 3') CASSETTE 7 9 12 15 18 24	FXFA  30 36 48 54	
VISTA (2' X 2') CASSETTE 5 7 9 12 15 18	FXZA 	
1 WAY FLOW CASSETTE 5 7 9 12 15 18 24	FXKA 	
4 WAY FLOW UNDER CEILING 18 24 30 36	FXUA 	
WALL-MOUNTED 5 7 9 12 18 24	FXAA  30* 36*	
FLOOR-MOUNTED 7 9 12 18 24	FXLA 	
CONCEALED FLOOR-MOUNTED 7 9 12 18 24	FXNA 	

R-32 models to return in 2027. Details TBC

*** 30 & 36 wall mount unit sizes available by end of 2026**

Indoor Unit Range

IDU tonnages & main features available

TYPE	MODEL	BUILT-IN / ADD ON
MULTI POSITION AHU	FXTA 	OSA
9 12 18 24	30 36 42 48 54	60
LOW STATIC DUCTED	FXDA 	OSA
7 9 12 18 24	NOTE: FXDA range is due to return in mid-2027	
MID STATIC DUCTED	FXSA 	OSA
5 7 9 12 15 18 24	30 36 48 54	
HIGH STATIC DUCTED	FXMA 	OSA
15 18 24	30 36 48 54	
LARGE CAPACITY DUCTED	FXMA 	OSA
72 96		

= Filter Included
= Filter Options
=Pump Included
=Pump Options
=OA Connection
=OA Kit Option
36 =IDU size available

Indoor Unit Considerations

DUCTLESS UNITS provide a great combination of economic installation with a good level of flexible project design. Fresh air supply is possible but limited.

Considerations:

- Is there a ceiling void space?
- What is the height of the void space?
- What type of ceiling (grid or hardboard)?*
- Is there a requirement to introduce fresh air?

Note: In hard-board ceilings, service hatches are required

Ductless Units		Model Size	In-Ceiling Height	Approx. Air Throw	Maximum Outside Air
	FXFA	07 ~ 30	10"	16 ft. (per outlet)	20% of unit air flow rate*
		36-48	11¾"		
	FXZA	All	11¾"	12 ft. (per outlet)	3% of unit air flow rate
	FXUA	All	0 ~ 2¼" (sits below ceiling)	17 ft. (per outlet)	N/A
	FXKA	All	10"	15ft	15% of unit air flow rate
	FXAA	All	13'	N/A	NONE

*requires outdoor air kit (or else only 3% maximum)

Note: Air throws are subjective. The data provided here is for guideline purposes only.

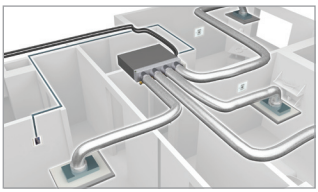
Indoor Unit Considerations

Ducted Range		Model Size	In-Ceiling Height		ESP		Maximum Outside Air
					Standard	Max	
	FXDA	07 ~ 12	8"		0.04"	0.12"	20% of units air flow rate
		18 ~ 24			0.06"	0.17"	
	FXSA	05 ~ 48	10"		0.20"	0.60"	
		54				0.56"	
	FXMA-T	15 ~ 48	10"		0.40"	0.80"	
		54			0.40"	0.56"	
	FXMA-M	72 ~ 96	$18^{1}/_{8}$"		0.96"		
					1.03"		
	FXTA	09 - 36	17.7" [1]	45" [2]	0.9"		20% air flow rate*
		42 - 48	21.2" [1]	53" [2]			
		54 - 60	24.7" [1]	58" [2]			

Application Examples		
	FXSA FXMA-T	Most applications – Multiple room zoning
	FXMA-M	Large open plan areas – High ESP requirements
	FXDA	Bulkheads – Hotels – Assisted Living
	FXTA	Single & Multi Family Residential – Closet spaces – Retrofits

Zoning *VRV* Systems with DZK

VRV Meets VAV - Features & Benefits



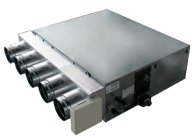
DZK - Daikin Zoning Kit

The DZK solution increases the flexibility of *VRV* applications by allowing multiple zones to be served by one indoor unit fan coil while still providing individual temperature control.

Up to 6 separate dampers supply variable air flow to the zones in response to individual zone thermostats.

Zoning Box

The zoning box is a plenum with motorized dampers that constantly modulate the conditioned air flow into each zone through standard ductwork, in response to the demand from the individual zone thermostat.



Wired Thermostat

The main thermostat is a wired color touch display master unit used to configure the DZK system. It can also be used as the thermostat for one or all of the zones.

Wireless Thermostat

The Wireless thermostat is a battery powered, touch display unit that is used for one zone. Each zone thermostat monitors and allows the user to select a comfortable room temperature, and program or adjust the control functions for the room.

Wireless Lite Thermostat

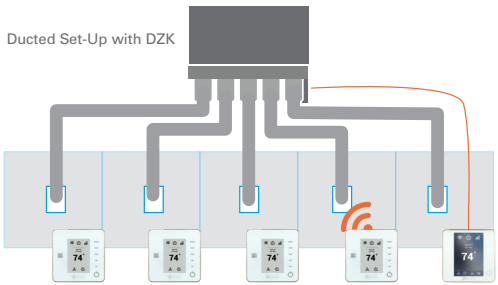
This is a simplified wireless controller that allows a 3 degree differential (higher and lower) from a default temperature Set-point interface

DZK BACnet® Hub

The DZK BACnet® Hub allows individual room control via Wi-Fi, BACnet® IP or BACnet® MSTP

BACnet® is a trademark of ASHRAE.

Zoning *VRV* Systems with DZK



Benefits

- Manage system hardware cost — few indoor units required
- Provides comfort by allowing individual zone control
- Manage installation expense and maintenance costs
- Manage the amount of refrigerant required in the installation
- Enjoy flexibility of the *VRV* application design

	DZKS Zoning Box Range for FXSA Units					
Product Reference	DZKS015E-5	DZKS015E-5	DZKS030E-5	DZKS030E-5	DZKS048E-5	DZKS048E-5
Compatible Ducted Unit	FXSA15AA		FXSA18 ~ 30AA		FXSA36 ~ 48AA	
No. of Air Duct Outlets	3 x ø8"	4 x ø6"	4 x ø8"	5 x ø6"	4 x ø8"	6 x ø6"
Number of Zones	2 to 3	2 to 4	2 to 4	2 to 5	2 to 4	2 to 6

	DZK Zoning Box Range for FXMA Units			
Product Reference	DZK030E-5	DZK030E-5	DZK048E-5	DZK048E-5
Compatible Ducted Unit	FXMA15AA ~ FXMA24AA		FXMA30AA ~ FXMA54AA	
No. of Air Duct Outlets	4 x ø8"	5 x ø6"	4 x ø8"	6 x ø6"
Number of Zones	2 to 4	2 to 5	2 to 4	2 to 6

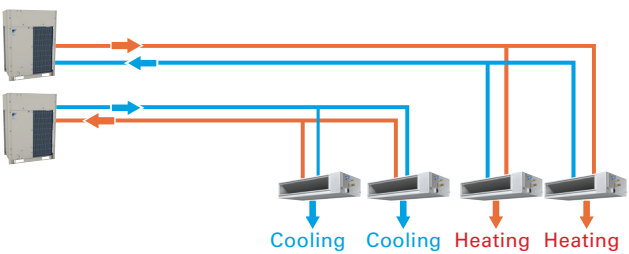
Note: BRC1NRV71 controller is required for indoor unit commissioning

Heat Pump or Heat Recovery

The Various Heat/Cool Changeover Options

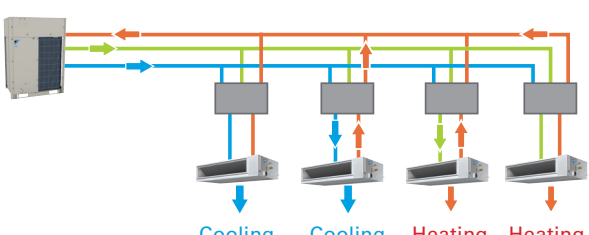
Heat Pump (HP)

- The 2-pipe Heat Pump system is the equivalent of a 2-pipe chilled water system
- A Heat Pump system provides the means of heating OR cooling at any given time
- Multiple Heat Pump systems can be zoned and will work independently of each other
- When demand is met by an indoor unit the unit will work on fan only or the fan will cycle on/off until demand returns or mode change occurs



Heat Recovery (HR)

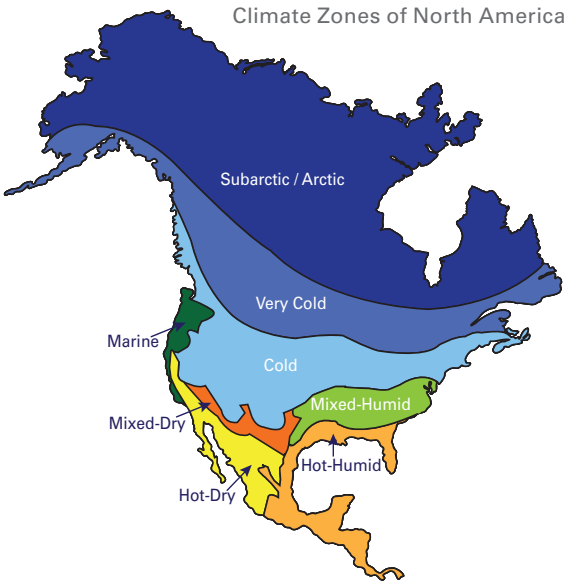
- The 3-pipe Heat Recovery system is the equivalent of a 4-pipe chilled water system
- A Heat Recovery system has the ability to provide simultaneous heating AND cooling
- When both heating and cooling occur simultaneously, system and building energy can be better utilized
- When demand is met by an indoor unit the unit will work on fan only or the fan will cycle on/off until demand returns



Heat Pump or Heat Recovery?

Should I Use Heat Pump or Heat Recovery?

There are three main factors that dictate whether a HP or HR system should be selected. All these factors should be considered in each case to determine an appropriate selection:



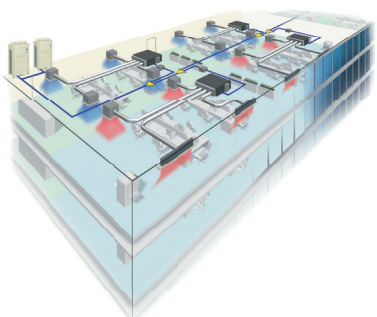
GEOGRAPHY

The location or the project will often dictate what type of system will be required. Projects in temperate climates tend to use Heat Recovery due to the changeable load demands that can occur through the course of a day. However areas with defined seasons or little demand for simultaneous heating or cooling throughout the year will usually utilize Heat Pump.

Heat Pump or Heat Recovery?

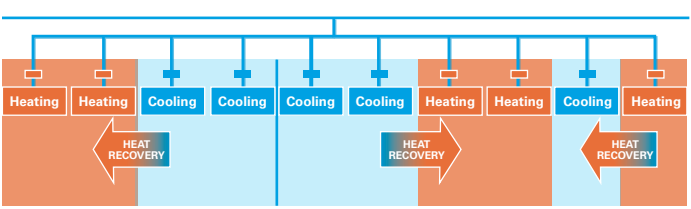
BUILDING LAYOUT

Sites with open plan areas and/or similar orientation will often be satisfied by a Heat Pump system, irrespective of geography. On the other hand, if the site has many aspects, individual rooms and/or heat loads, this may define the client requirement toward Heat Recovery. Differing internal room load demands may see the need for cooling for longer periods of the year.



OCCUPANCY

The type of end user will often trump any other consideration. Typically a multi-tenanted site will require a heat recovery system as the ability for individual mode control is paramount. Typical examples of this include hotels, assisted living, condos as well as offices. It is always important to establish from the outset if an office application is to have multiple tenants.



Ultimately there are many applications where the answer will be **both Heat Pump AND Heat Recovery**

Water-Cooled *VRV* – Geothermal

Air to air *VRV* systems make up the majority of *VRV* installations This is due to the following:

- Ease of installation (no water system required)
- Low initial capital costs

However Water-Cooled *VRV* can have certain advantages:

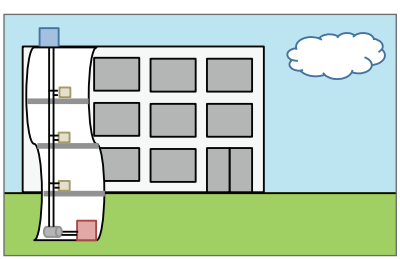
- Energy efficiencies
- Localized CU installation (limit pipe runs)

These advantages come in to play when the following are present:

- An existing condenser water loop
- Extreme ambient conditions
- An ability & desire to utilize a local geothermal source

Internal Plate Heat Exchanger

Water-Cooled *VRV* - Existing Water Loop



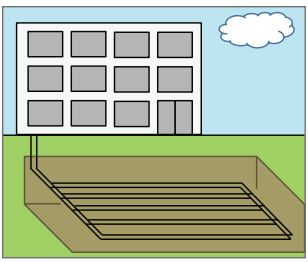
Boiler ~ Tower Water Loop

By utilizing an existing water loop in the building, Energy efficiency can be promoted without having to offset capital costs. In addition *VRV* Water-Cooled Series CUs are usually located locally to the area they are serving and will typically attach to the water loop already running through the building. This negates the need to run copper piping through risers to a remote plant space (be aware that *VRV* Water-Cooled Series CUs are internal mounting units).

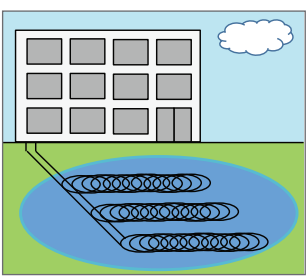
Water-Cooled *VRV* – Geothermal

A ground-source *VRV* heat pump system combines the advantages of both technologies into one system, making it an efficient HVAC system designed for energy savings. The constant ambient conditions below ground help provide this energy efficiency year-round.

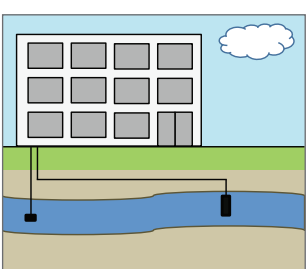
There are two main types of systems: closed loop and open loop. Closed loops bury water pipes either in solid ground or in a water source (like a pond or lake). An open loop draws from groundwater, like a well, and returns it back to source.



Closed Loop Buried in Ground



Closed Loop in Surface Water



Open Loop using Ground Water

Water-Cooled *VRV* – Design Criteria

Design Criteria:

Water loop design is the responsibility of the engineer. However, two facts are needed from Daikin:

The minimum & maximum entering water temperatures:

- 50°F - 113°F for Cooling
- 23°F - 113°F for Cooling on a Geothermal System*
- 50°F - 113°F for Heating
- 14°F - 95°F for Heating on a Geothermal System*

A suitable water flow rate:

- 13.2 gpm to 39 gpm per module Boiler & Tower System
- 21 gpm to 39 gpm per module with glycol use

* (Be aware that conditions need to be met when EWT for heating is required below 50°F – seek assistance for these applications)

Other consideration:

- When *VRV* is to be applied with an open loop system, a 3rd party heat exchanger is required to ensure the plate heat exchanger of the *VRV* condensing unit operates in a closed loop system.
- The *VRV* condensing units have a heat output into the adjacent mechanical room (see table). Where multiple units are placed in an enclosed area, any potential heat buildup must be addressed (either with adequate ventilation or even a fan coil unit). RWEQ_TA series units have the ability to configure the unit to reject this heat to the refrigerant circuit. See Installation manual for further details.
- From the CU pipe connection to the fan coils, the equipment, controls & selection process is identical to Air-Cooled *VRV*.

Module Model	Ventilation Load (BTU/hr)
RWEYQ72PC	2,200
RWEYQ84PC	2,450
RWEQ96TA	2,730
RWEQ120TA	3,412
RWEQ144TA	4,436

Water-cooled condensing units located in a mechanical room. Internal installation is required for W-*VRV* condensing units

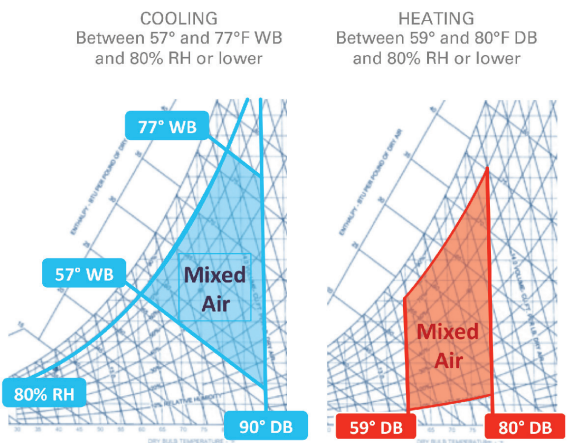
Solutions for Ventilation

Allowable Ventilation Air %

Typically Daikin equipment has been applied using a standard rule of thumb that a maximum of 20% OA can be incorporated into a ducted fan coil unit (FXMA, FXSA, FXDA, FXTA and FXNA). However, this practice is not always applicable as this rule of thumb is based upon introducing OA at nominal conditions.

Basic Rules

1. COOLING: Any percentage of OA can be used as long as the resulting mixed air is between 57 and 77˚F WB and 80% RH or lower.
2. HEATING: Any percentage of OA can be used as long as the resulting mixed air is between 59 and 80˚F DB and 80% RH or lower.



Note: Space temperature sensing should be done via the room zone controller or remote sensor kit if a "mixed air" approach is taken.

VRV Ventilation Methods

Direct Method

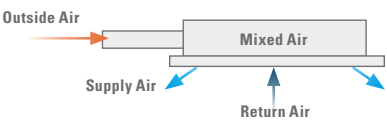
Untreated outside air is mixed with return air either in the return air ductwork or enters the *VRV* IDU directly

Application Consideration

- IDU must be sized for both space and ventilation loads
- IDU fan speed varies with the different modes, affecting the amount of entering OA. A fixed speed is available through a field setting.
- OA should always be pre-filtered

Ducted IDUs *Mixed Air conditions must be within acceptable range*

Ductless IDUs *Defined max % of OA (3% to 20%)*



Pros	Cons
» Lowest cost	» Indoor fans must operate continuously to provide ventilation during scheduled occupancy » Limited OA (Mixed air limitation) » Indoor unit must be sized to handle the entire ventilation and internal load

	Scope	Options	Entering Air Limits	Connection Ratio Limits
Direct Method	1. Untreated ventilation is supplied directly to the indoor unit 2. Small projects where low CFM volumes are low CFM volumes are required 3. Projects with budget constraints 4. Suitable for mild climates	FXMA FXDA FXNA FXTA FXFA* FXZA* FXSA FXKA*	Cooling 57°–77°F WB Heating 59° F – 80°F DB	Follow the standard *VRV* CU to IDU connection ratio limitation (See table on page 11)

*Consider Booster Fan and OA% Scope

VRV Ventilation Methods

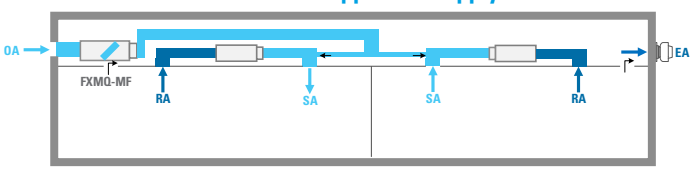
Integrated Method

The OA is conditioned by mechanical means before being supplied to the *VRV* indoor unit for distribution.

Application Consideration

» Allows the ventilation air unit (100% OA Unit, DOAS, HRV or ERV) to handle all or part of the OA load. The IDU is sized for the internal space load, and possibly part of the OA load.

Conditioned Outside air supplied to supply side of IDU



Pros

» Less ductwork and diffuser

» Opportunity for plenum condensation is reduced since OA is not introduced into IDU mix air plenum

» IDU capacity is not de-rated since they are handling only warm return air

Cons

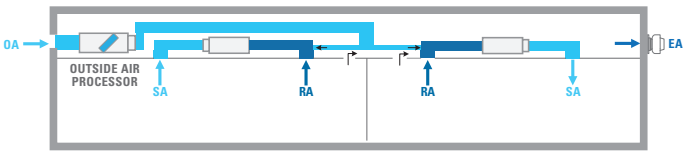
» IDU fan must run constant

» Difficult to balance

VRV Ventilation Methods

Integrated Method

Conditioned Outside air supplied to return side of IDU



Pros

- Less ductwork and diffusers

Cons

- IDU Fan must run constant
- Risk for condensation in the mixing plenum
- Indoor Unit capacity de-rate due to cool mix air temp

Integrated Method

Scope	Options	Entering Air Limits		Connection Ratio Limits	
1. Pretreated ventilation is supplied directly to the indoor unit 2. Small to medium applications 3. Suitable for all climates 4. Allows for sharing load between ventilation system and *VRV* system	VAM	Cooling	122°F DB	Standard Connection Ratio Limits	
		Heating	5°F DB		
	FXMA-MF	Cooling	Std Config: 90°F WB	Dedicated**	Std Config: 50-100%
			Enhanced Config: 78 (82*)°F WB		Enhanced Config: 50-130%
		Heating	Std Config: 23°F DB	Combined***	Std Config: 50-100% (FXMA-MF <=30%)
			Enhanced Config: 59 (50*)°F DB		Enhanced Config: 50-130% (FXMA-MF <=50%)
	AHU Integration Kit	Cooling	122°F DB / 89°F WB		90-110%
		Heating	23°F DB		

* Warm Up/Pull Down Operation
** Dedicated FXMA-MF unit(s) and *VRV* CU
*** FXMA-MF unit(s) combined with other Daikin IDU on a *VRV* CU system

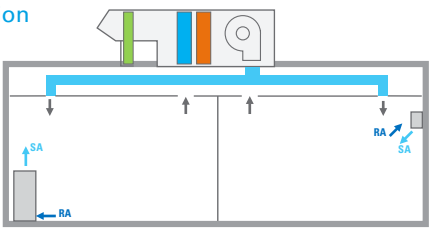
VRV Ventilation Methods

Separate Method (Decoupled)

OA is supplied directly to the space being conditioned. A separate ventilation system using conventional technology and a Daikin *VRV* system can both be installed where the *VRV* system function is to maintain comfort.

Application Consideration

» Allows the DOAS to handle the entire OA oad. IDUs sized only for the internal space load.



Pros

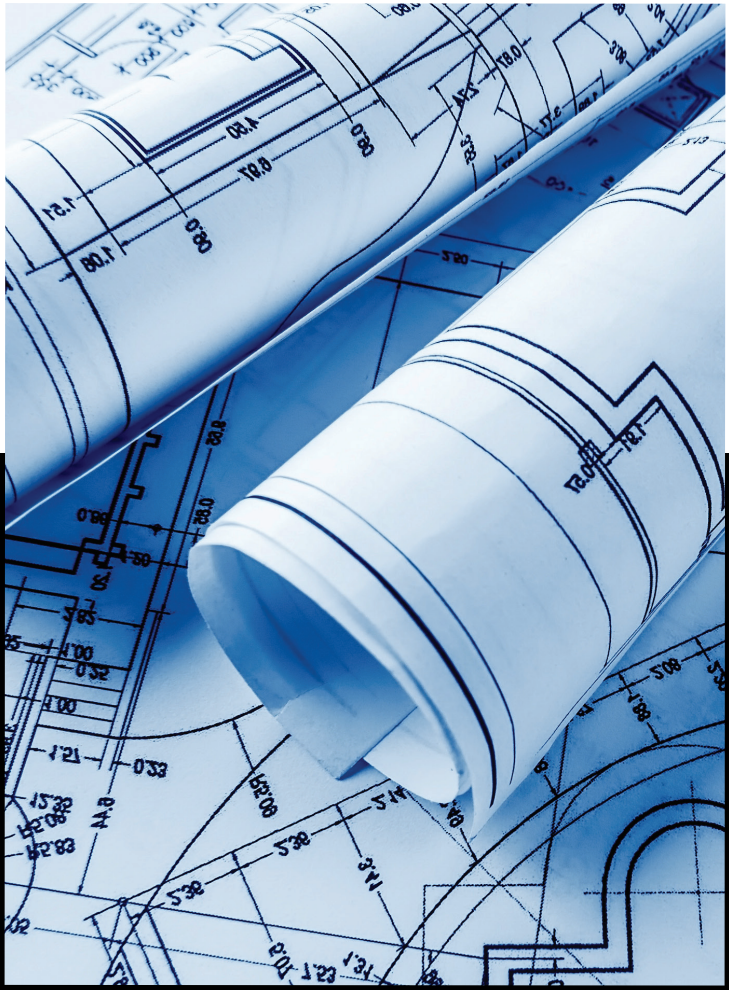
- Opportunity to cycle off the local IDU fan
- Allows the OA unit to operate during unoccupied periods (for after hours humidity control or pre-occupancy purge)
- Flexible layout
- Can meet strict filtration requirement
- Larger OA volume

Cons

- Requires installation of additional ductwork and separated diffuser
- Many require multiple diffusers to ensure that OA is adequately dispersed through-out the zone

Separate (de-coupled) Method	Scope	Options	Entering Air Limits		Connection Ratio Limits
	1. Pretreated ventilation directly to the space 2. Suitable for all applications and climates 3. Allows for sharing load between ventilation system and *VRV* system 4. Most flexible layout	AHU Integration Kit	Cooling	122°F DB / 89°F WB	Total DX: 50-105% DX+ RH: 50- X%****
			Heating	16°F DB	
		DVS	Cooling	115°F DB	50 – 120% (100%)***
			Heating	23°F DB**	
		Destiny Vision Rebel Maverick	Select options based on manufacturer guidelines. Integrate controls where it makes sense.		

** -20°F with gas heat
*** Triple Module
**** X = 150% (single module), 140% (dual module), 130% (Triple module)



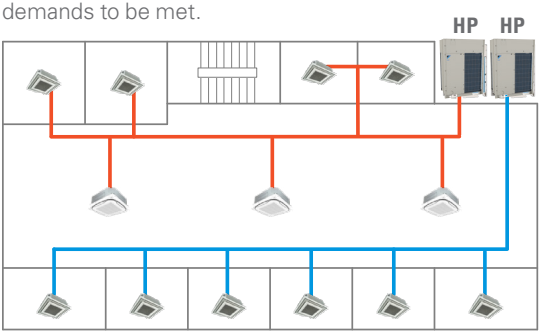
DESIGN OPTIMIZATION

System Zoning

Guideline to Optimized Zoning of Systems

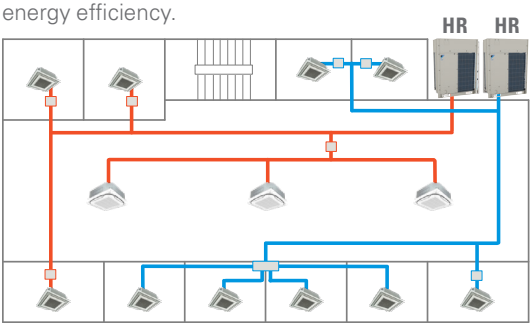
Typical Zoning of Heat Pump

When more than one system is required, it is good practice to zone units that are positioned on the same orientation or are subject to common load profiles. This maximizes the scope for correct heating/cooling demands to be met.



Typical Zoning of Heat Recovery

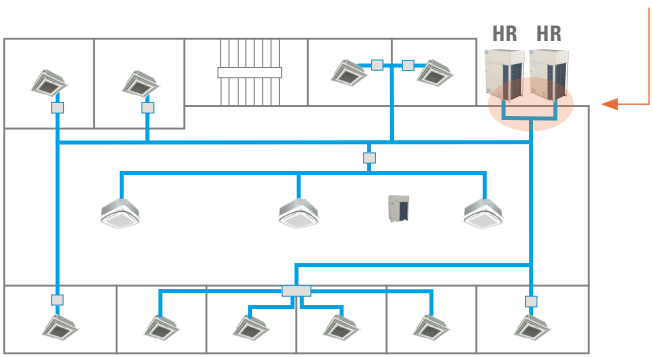
Conversely, with heat recovery it is better to ensure that units on different orientations are matched together. This is designed to ensure more potential for heat recovery to occur at any given time for energy efficiency.



Note: Changing systems from HR to HP through the design process is not uncommon It does NOT affect initial indoor unit selection however re-zoning of fan coil units is may be required.

MULTIPLE MODULE Design

There are some advantages to linking *VRV* condensing units together: Less piping & total refrigerant needs and a greater likelihood of heat recovery to occur (on 3-pipe) due to increase in varying zones on the systems.

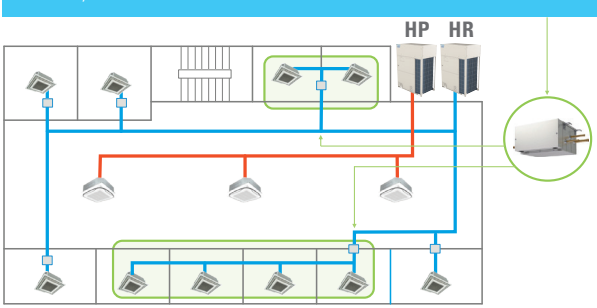


Note: This design option can be pushed back at design stage due to refrigerant limitations in small spaces, set by ASRAE Std 15.

The OPTIMIZED Design

It is important to avoid defining a project as a 'heat recovery job' or 'heat pump job'. There are often applications where a mixture of both types is the best design practice — and can manage costs for the the client.

In addition, Heat recovery does not always mean a branch selector PORT for each unit — even when those units are serving different rooms. The benefits of Heat Recovery can still be realized at a low cost



Branch Selector Box

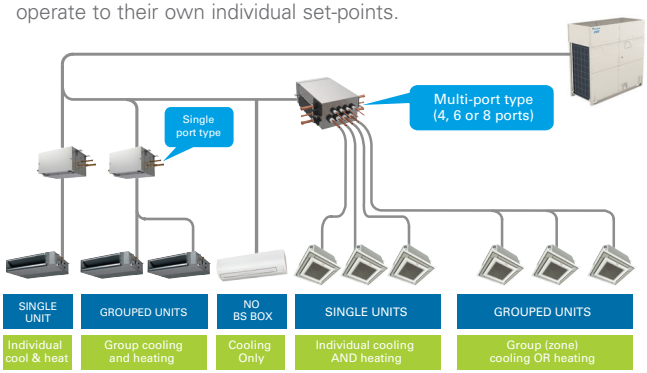
Range of Boxes & Connection Limits

- Heat Recovery (HR) systems require branch selector boxes to provide simultaneous heating and cooling zones
- Daikin HR gives the project designer the option of both single and multi-port boxes (1, 4, 6 & 8 port boxes)

Single-port

Multi –port

- On every type of box, each port performs the same function: To provide heating or cooling independent of every other unit linked to other other ports on the system
- Any indoor units grouped together on a single port will operate in the same MODE (i.e., either heating OR cooling). However, each indoor unit will still operate independent of each other.
- In the case of units on a single room controller this means each unit working to achieve set-point on based on their own return air sensor
- Where units are on their own room controller, they will be able to operate to their own individual set-points.



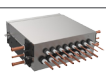
Cooling Only Function

When a unit is linked to just the liquid & suction line (i.e., not connected to a port) it will operate as a cooling only unit. This feature is seen as an opportunity to use *VRV* to serve equipment/server rooms.

Note: This is NOT a recommended application and advise the use of individual splits systems to perform this function. Contact your Daikin representative if you require further clarification on this recommendation.

Branch Selector Box

Range of Boxes & Connection Limits

Connection Limitations	Model	Max Units per PORT	Max Capacity per PORT	Max Capacity per BOX
Single Port Box				
	BSA36(AAVJ)	4	36 MBH	36 MBH
	BSA60(AAVJ)	8	60 MBH	60 MBH
	BSA96(AAVJ)	8	96 MBH	96 MBH
Multi Port Box				
	BSF4A54(AAVJ)	5	54 MBH	144 MBH
	BSF6A54(AAVJ)	5	54 MBH	216 MBH (162)*
	BSF8A54(AAVJ)	5	54 MBH	290 MBH (162)*

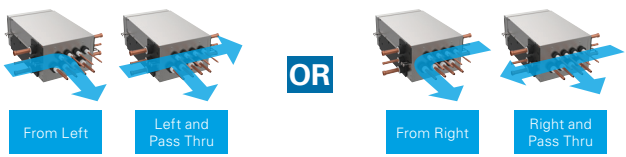
* Maximum capacity per box when multi-port boxes are installed in series

Branch Selector Boxes

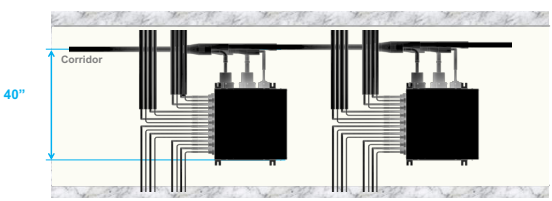
Multi-port Box Features

The multi port box (available as 4, 6 or 8 port) has several features:

- Flexible piping – piping can enter from left or right of box
- Boxes are either terminal (last in line) or in series (pass-thru)
- Compact height of less than 10 inches
- Side access for servicing
- No service space requirements above the unit
- Allows low ambient cooling down to -4°F

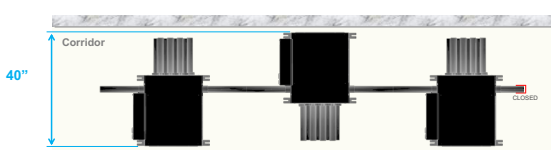


Multi-port branched install



- Up to 12[1] ports can be connected in series. So for example, you can connect three 4-port boxes together, or have an 8-port and 4-port in series. You can have up 230 Mbh[1] of capacity for BS Boxes connected in series.

Multi-port **Boxes**

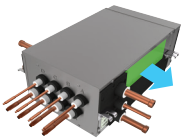


[1] Refer to engineering manuals for design rules

Multi-Port Boxes

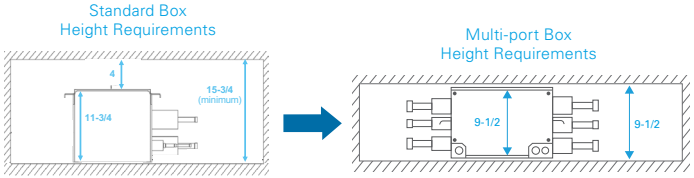
Multi-port Box Features

The new Multi-port boxes are equipped with side access panels to offer quick access to the EEVs for ease of maintenance and service.

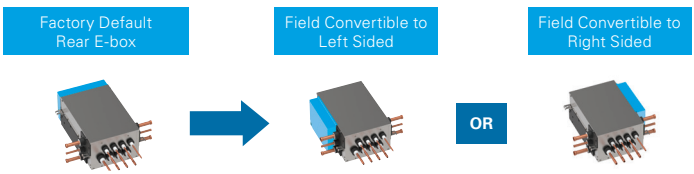


Multi-port box height requirements

Side access allows the unit to sit flush to the ceiling without the need for service space above the unit.



If any void space is restricted it is possible to detach the electrical box and locate it up to 2ft distance. The electrical box on the 4-Port unit can customized to fit on either side of the unit.



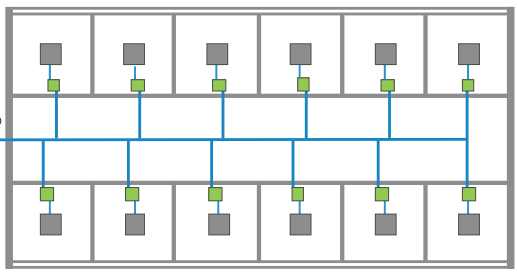
Branch Selector Boxes

Single vs Multi-port: Optimizing Design

» HEAT RECOVERY systems using single BS boxes generally require much less piping & refrigerant than a multi-port box application.

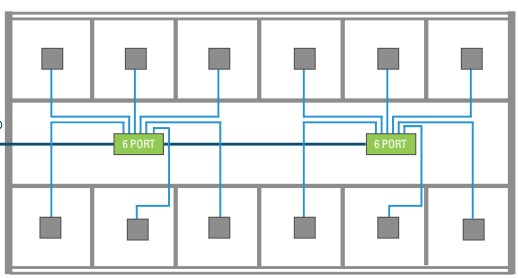
» In addition to their compact size, 3-Ton BS boxes have low operation noise compared to previous BS boxes. Both these factors allow flexibility of location.

SINGLE PORT BOXES	
TOTAL PIPING REQUIRED	729 ft
REFRIGERANT CHARGE	38.2 lbs
REFNET JOINT SETS	11
BRAZED CONNECTIONS	186
BS BOX HANGING RODS	48



PROS: LESS PIPING • LESS REFRIGERANT • LOCATION FLEXIBILITY: Smaller size allow more localized BS box positioning (e.g., bedrooms)

MULTIPORT BOXES	
TOTAL PIPING REQUIRED	937 ft
REFRIGERANT CHARGE	40.2 lbs
REFNET JOINT SETS	0
BRAZED CONNECTIONS	60
BS BOX HANGING RODS	8



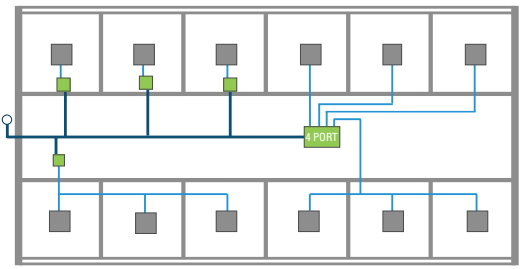
PROS: REDUCED NEED FOR *REFNETS* • LESS BRAZING • LESS BOXES TO INSTALL

= BS Box | = Indoor Unit

Branch Selector Box Layout

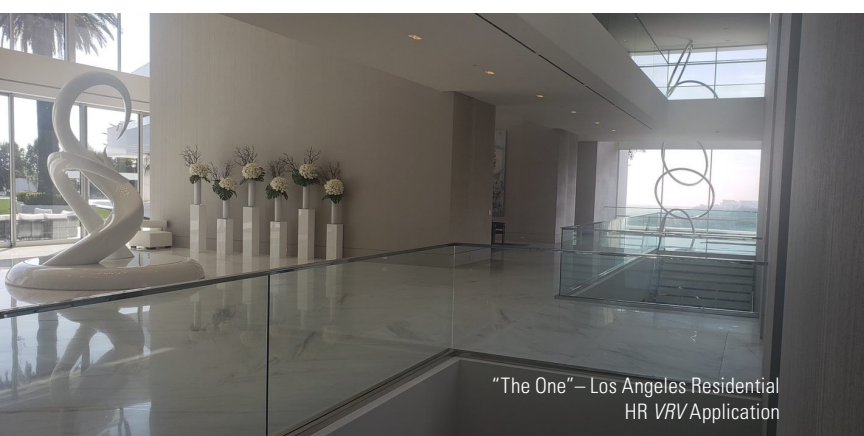
Single vs Multi-port: Optimizing Design

SINGLE AND MULTI-PORT BOXES	
TOTAL PIPING REQUIRED	727 ft
REFRIGERANT CHARGE	37.9 lbs
REFNET JOINT SETS	8
BRAZED CONNECTIONS	102
BS BOX HANGING RODS	20



The ability to select both single AND multi-port boxes (PLUS the ability to zone multiple units on a single port, when practical) provides outstanding flexibility

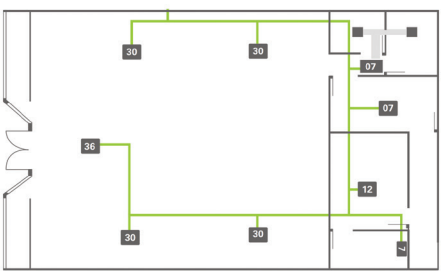
= BS Boxes | = Indoor Unit



"The One"– Los Angeles Residential HR *VRV* Application

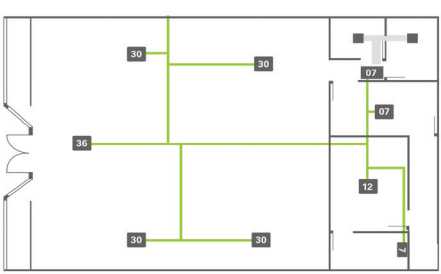
Optimized Pipe Routes

- Establish an optimum piping route for each system, as early as possible in the design stage. This is especially important in the era of low GWP refrigerants and the need to consider refrigerant charge.
- It is possible to manage piping diameters (and *REFNET* sizes) by ensuring pipe routes follow a direct path that "branches" as soon as possible rather than, for example, following the perimeter of a floor-plan in a "linear" pattern.
- *VRV* piping (and *REFNET*) size is dictated by the tonnage downstream of the piping section. The quicker the piping branches, the quicker the whole diameter drops
- Low total piping and refrigerant charge demands are also often realized



Example 1 – LINEAR PIPE ROUTE

LINEAR PIPING ROUTE	
Piping Diameter	**Total Feet**
1-1/8"	51
7/8"	31
3/4"	17
5/8"	38
1/2"	103
3/8"	55
1/4"	21
Total Piping:	316
Refrigerant Charge:	43.7 lbs
Large *REFNET*	x 4
Medium *REFNET*	x 1
Small *REFNET*	x 3



Example 2 - BRANCHING PIPE ROUTE

LINEAR PIPING ROUTE	
Piping Diameter	**Total Feet**
1-1/8"	31
7/8"	2
3/4"	51
5/8"	39
1/2"	58
3/8"	92
1/4"	27
Total Piping:	300
Refrigerant Charge:	41.7 lbs
Large *REFNET*	x 1
Medium *REFNET*	x 2
Small *REFNET*	x 5

Outdoor Unit Installation

Minimum Space Requirements

At concept stage one of the most common requirements, especially in built up areas, is to establish that there is space to fit the outdoor equipment. The 'decentralized' nature of *VRV* provides flexibility however the multitude of service space combinations in the engineering book still do not cover fully the bespoke nature of project application. Therefore it is important to have a grasp of minimum space requirements.

The 3 criteria to overcome are:

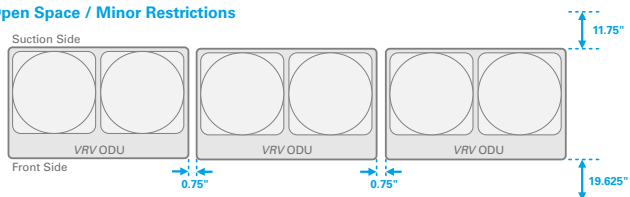
AIR STARVATION • SHORT CIRCUITING • SERVICE SPACE

There are two constants regardless of the application, system type or series:

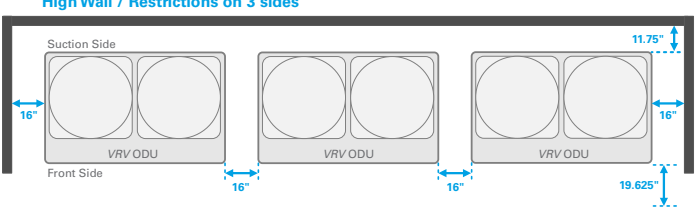
- *VRV* ODU's require a minimum of **11.75"** (300mm) **at the Rear** (or air side) of the unit
- *VRV* ODU's require a minimum of **19.625"** (500mm) **at the Front** (or service side) of the unit

*Note: Local code may require a greater distance

Open Space / Minor Restrictions



High Wall / Restrictions on 3 sides



Outdoor Unit Installation

Minimum Space Requirements

The complexity of design comes in to play when multiple units are to be installed into a restrictive area. The space between units in scenario 1 above are minimal and is only required to avoid any possible issues of vibration.

However when wall heights exceed those shown in the data book (as they usually do) rather than move units away from the wall, the preferred practice (if the space allows) is to move the units further apart from each other. The distance can vary according to a number of factors however 16" between units will cover most all scenario's.

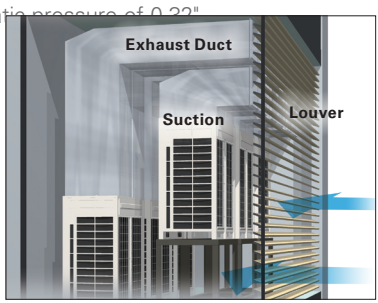
Therefore, a great rule of thumb to ensure that a space is suitable for *VRV* equipment is: 12" x 16" x 20"

Think of the service engineer!

- The minimum service space (20") allows for the removal of a compressor however if rows of units are to be located in one area then place the units front to front and allow 40" between each row (24" air side to air side).
- The minimum space between units of 0.75" can make removing the top plate awkward. If space allows, always leave at least 4" between units (although this is not a necessity).

Mechanical Rooms & Acoustic Enclosures

- The same space rules apply in enclosed areas however the air side of a unit can be positioned closer than 12" to a louvered wall. Each unit has a maximum static pressure of 0.22".
- Short circuiting and air starvation must also be addressed. This is specially so when units are to be situated behind acoustic louvers and when multiple units are to be positioned together in a single enclosure.



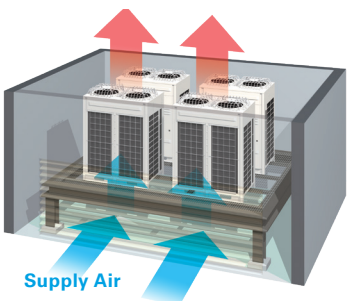
Outdoor Unit Installation

Exhaust air in an open enclosure

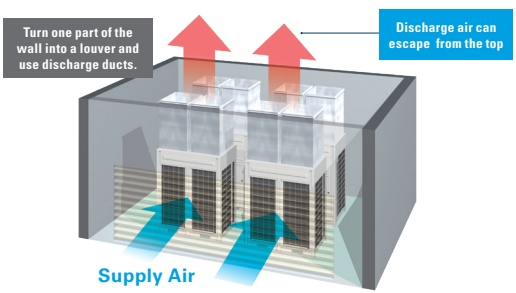
There are times when outdoor units are required to be installed in an open enclosure. Usually for aesthetic purposes, or to limit noise. When this is required:

- Ensure the discharge level is equal to or higher than the wall, either by:
  - elevating the units
  - installing discharge ducts
  - a combination of both

Units Elevated on Platform



Units Sitting on Floor

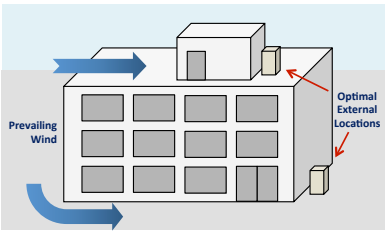


Note:

- Open enclosures are usually louvered. However, some applications can see a combination of solid AND louvered.
- Ensure at least ONE part of the wall is louvered.
- Units that are placed in a pit (i.e. four walls with no means of air intake) are in danger of cutting out in heating mode due to pooling of cold air exhaust from the units, irrespective of discharge ducting. Avoid this application method.

Outdoor Unit Installation

Outdoor Unit Positioning & Protection

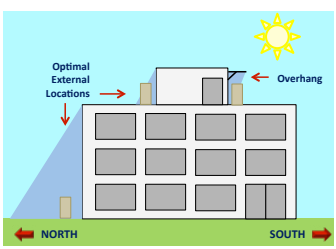


Cold Climates

- ODU location is an important factor to help optimize capacity and efficiency of a *VRV* system
- Wind can have a direct effect on the performance of an outdoor unit: most notably, fan performance
- On days of extreme ambient conditions, this is particularly important to help mitigate stress and even the possibility of compressor failure on days of extreme ambient conditions
- Wherever possible, locate the ODU in a location sheltered from the prevailing wind
- If an ODU is exposed to prevailing winds, baffle plates or snow hoods are strongly recommended

NOTE: When a project has a demands cooling in ambient conditions below 23°F (also known as technical cooling), protection of the outdoor units, as per above, is mandatory

Hot Climates



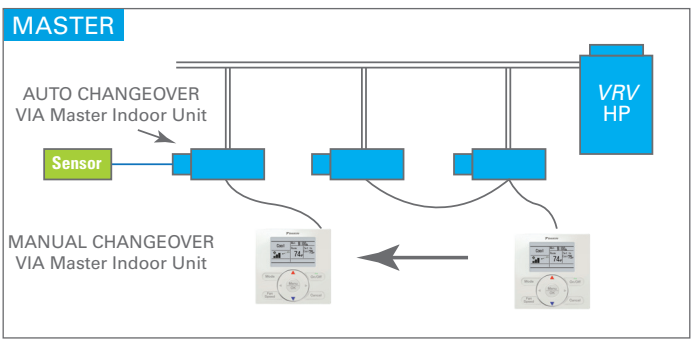
- Shading the outdoor unit from the sun is a great way to increase the performance of a system in summer
- When located externally, units against a north facing wall receive the least amount of direct sunlight
- East facing walls are the next best option
- Units exposed on west or south facing walls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

NOTE: Only three states (Arizona, Nevada and California) have ever recorded temperatures exceeding the stated *VRV* continuous operation limit of 122°F (50°C)

Heat Pump Changeover

The Various Heat/Cool Changeover Options

There are no less than six ways to provide heat/cool changeover on a heat pump system. Most of these also apply to heat recovery FCU's grouped on a single port of a BS Box (think of the BS box as a mini heat pump system).



Master Indoor Unit:

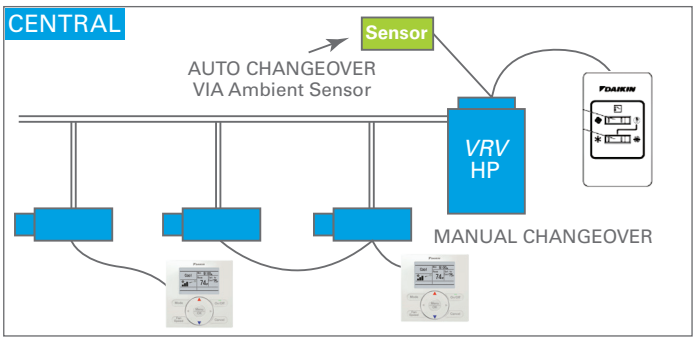
The simplest way to address heat / cool changeover **automatically** is to nominate a master unit. When the unit's return air sensor (or external temperature sensor) measures the space temperature outside the temperature Set-point for the current mode, it switches the ODU mode to the opposite mode and all other connected IDUs follow.

Similar to the option above except mode selection is made **manually** by via a designated master indoor unit. Again, all other units on the system then switch mode in unison.

Note: A common pitfall is to elect an area that is not in constant use or has no easy access (e.g. managers office). If the unit isn't running then mode change is not possible without the intervention of some form of central control.

Heat Pump Changeover

The Various Heat/Cool Changeover Options

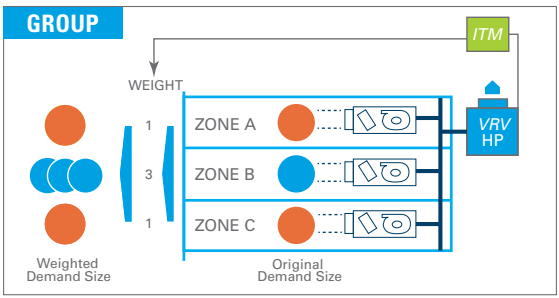


Summer / Winter Switch:

A Daikin supplied switch is attached to the "ABC" terminals on the condensor unit to allow **manual** changeover from a central location. This is commonly found on sites with facilities managers or multi-tenant sites such as hotels where heat pump was installed in an exclusively cooling region. The ABC terminals on the ODU can be use to control the system operation mode. Add in a 3rd party ambient sensor the cool/heat selector switch that tied the ABC terminal of the ODU will allow control of the system mod based upon ambient conditions.

Note: Both the central mode control options above are only utilized on heat pump systems.

Heat Pump Changeover



Averaging Changeover:

Takes an average of the room temperature and set-point of all connected indoor units. Uses the averaged values to determine the system operation mode.

Voting Changeover:

The most flexible auto change over is the voting changeover. Changeover operates by continually calculating the demand load of each room by measuring the temperature differential of the Set-point against the room temperature. Modes are regularly changed accordingly.

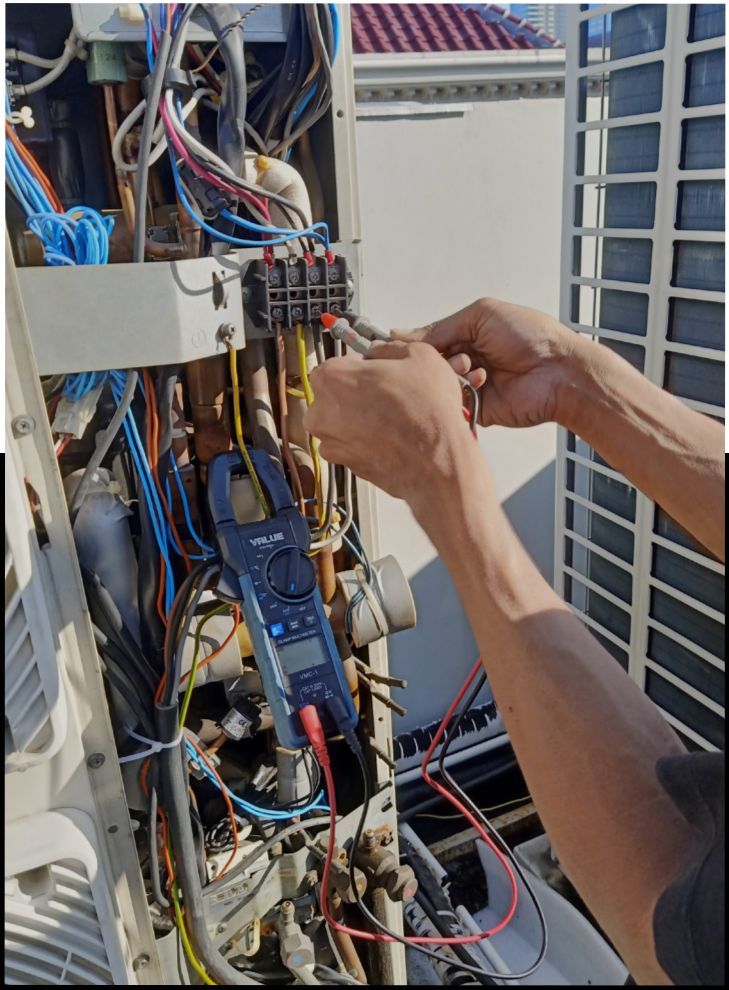
This method can be tailored on each application by 'weighting' the demand of a room based on it's importance. Note that this method can be used for units grouped together on a single port of a heat recovery system.

Note: Both "Fixed", "Averaging", and "Vote" changeover methods require a Daikin *i-Touch Manager* to operate.

In Summary:

With ALL changeover options, when a system mode is changed, the indoor units on the system are not forced into heating or cooling. If there is no demand in the room for the mode that has been selected, the unit(s) will be in thermo-off and the fan may or may not be running based upon the indoor unit configuration.

22 Floor Air- Cooled *VRV* / California

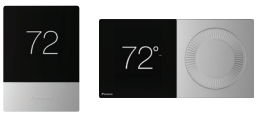


CONTROLS AND STANDARDS

Controls Portfolio

Individual Zone Controls

BRC1NRV71
Navigation
Remote Controller



DTST-TOU-A
Daikin *ONE* Touch Smart Thermostat

DTST-CWBSA-NI-B
Daikin *ONE+* Smart Thermostat

BRC1H71W
Daikin *Madoka*
Room Controller

Proprietary Multi-Zone Controls

DSE401B71
HERO Simple Edge

DGE601A71/B71
HERO Pro Edge

DCM601B71
intelligent Touch Manager

Open Protocol Interfaces

DMS502B71
BACnet®
Interface

DMS504C71
LonWorks
Interface

DTA116A51
Modbus Adaptor

DCM601B71+
DCM014A51
BACnet®
Server Option

DGE601A71/B71
+ DGE014A71
HERO Pro Edge
BACnet®
Server Option

Adaptor PCBs

KRP1C
Adaptor

BRP2A81/82
(ABC Adaptor)

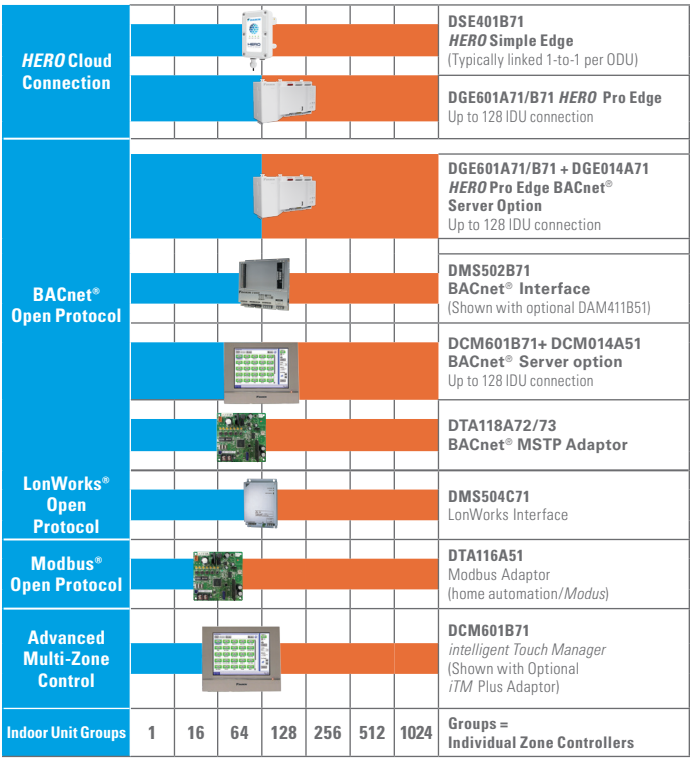
BRP9A71/72/73
(Alarm /Vent Adaptor)

BRD72A-L
(D3/D4 Adaptor)

Controls Portfolio

Range of Zone and Centralized Controllers

Scalable controls offering to match a building's requirement

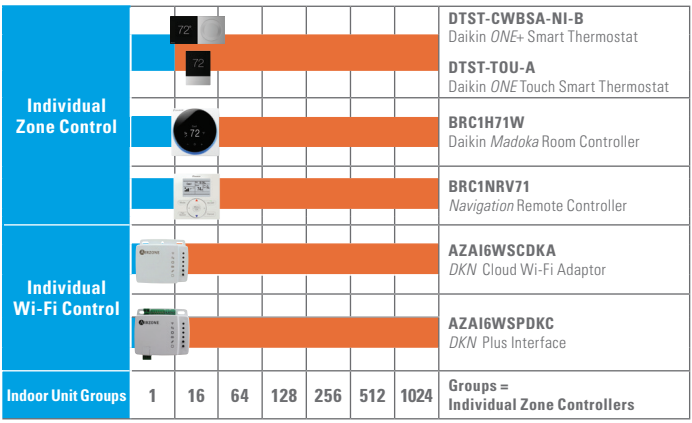


= Indicates that requirements can be met with the application of multiple devices

Controls Portfolio

Range of Zone and Centralized Controllers

Scalable controls offering to match a building's requirement



= Indicates that requirements can be met with the application of multiple devices

Project requirements drive the controls selection process

Project Requirements		Daikin *VRV* Controls				
		 *Navigation* Remote Controller	 BRC1H71W Daikin *Madoka* Room Controller	 Daikin *ONE+* & Touch Smart Thermostat	 AZAI6WSCDKA *DKN* Cloud Wi-Fi Adaptor	 AZAI6WSPDKC *DKN* Plus Interface
Basic indoor unit control		●	●	●	●	●
Advanced Control	Auto changeover with guard timer	●	●	●	●	●
	Set-point range limitation	●	●	●		
	Independent Heating and Cooling Set-point	●	●	●	●	●
	Unoccupied Set-point (Setback control)	●	●	●		
	Minimum Set-point differential	●	●	●		
	Individual fan speed for cooling and heating	●	●	●		
	Programmable schedule	●		●	●	●
	Humidity control with humidity Set-point			●[2]		
	CO_2 control with Set-point					
	Configurable occupancy sensor logic					
Auxiliary Heater Control	Secondary heater control	●[1]	●[1]	●	●[1]	●
	Primary heater control			●		
	Emergency heater control			●	●	●
	Priority cooling logic					
Integration Option	Cloud API				●	●
	BACnet® MS/TP					●
	Modbus®				●	●
	Third-party thermostat					●
Connectivity	Bluetooth® configuration app		●		●	●
	Smartphone control through Wi-Fi			●	●	●
	Voice Control by *Amazon Alexa and Google Assistant*			●	●	●
	Dealer Web portal			●		
	Geo-fencing			●		
	Over-the-air (OTA) Software update			●	●	●

1. With KRP1C74/75/76/77 adaptor only
2. Dehumidification with overcooling function
3. Depends on controller model or external sensor connection

Project requirements drive the controls selection process

Project Requirements	Daikin *VRV* Controls							
	intelligent Touch Manager 			WAGO® I/O 	*HERO* Simple Edge 	*HERO* Pro Edge 		
	Basic	BACnet® Client Option	BACnet® Server Option			Basic	BACnet® Client Option	BACnet® Server Option
Independent Cool and Heat set-points	●		●			●		●
Individual zone control with weekly programmable scheduling	●		●			●		
Basic central point on/off control of all air handling units	●		●			●		●
Advanced multi-zone control of small to medium size projects	●	●	●	●		●	●	●
Advanced multi-zone control of large commercial projects	●	●	●	●		●	●	●
Advanced multi-zone control with scheduling logic and calendar	●		●			●		●
Automatic cooling/heating changeover for heat pump systems	●		●			●		●
Single input batch shutdown of all connected air handlers	●	●	●			●	●	●
Web browser control and monitoring via Intranet and Internet	●		●		●	●	●	
E-mail notification of system alarms and equipment malfunctions	●		●		●	●	●	
Multiple tenant power billing for shared condenser applications	●	●	●			●	●	●
Temperature set-point range restrictions	●		●			●		●
Trend and plot (Current and past data)	●				●	●	●	
Adjust outdoor unit field settings remotely					●	●		
Multi-site monitoring	●				●	●	●	

● Native application or feature for this device. ● Dependent upon controller programming

BACnet® is a trademark of ASHRAE.

Project requirements drive the controls selection process

Project Requirements	Daikin *VRV* Controls							
	intelligent Touch Manager 			WAGO® I/O 	*HERO* Simple Edge 	*HERO* Pro Edge 		
	Basic	BACnet® Client Option	BACnet® Server Option			Basic	BACnet® Client Option	BACnet® Server Option
Graphical user interface with floor plan layout	●	●				●	●	
Start/Stop control of external equipment	●	●		●		●	●	●
Modulating control of External equipment		●					●	
Interlock programming for external equipment control		●					●	
Indoor and outdoor unit service data monitoring	●	●	●		●	●	●	●
Outdoor units demand limit schedule					●	●		
Automated reports					●	●		

● Native application or feature for this device. ● Dependent upon controller programming

BACnet® is a trademark of ASHRAE.

Project requirements drive the controls selection process

Project Requirements	Daikin *VRV* Controls						
	BACnet® Interface		LonWorks® Interface	Modbus® Adaptor	BACnet® MSTP Adaptor	ITM BACnet® Server	*HERO* Pro Edge BACnet® Server
	Basic	With BMS Plug-in					
Independent Cool and Heat set-points		●			●	●	●
Individual zone control with weekly programmable scheduling					●	●	●
Basic central point on/off control of all air handling units	●	●	●	●	●	●	●
Advanced multi-zone control of small to medium size projects	●	●	●	●	●	●	●
Advanced multi-zone control of large commercial projects	●	●	●			●	●
Advanced multi-zone control with scheduling logic and calendar	●	●	●	●	●	●	●
Automatic cooling/heating changeover for heat pump systems	●	●	●	●	●	●	●
Single input batch shutdown of all connected air handlers	●		●			●	●
Web browser control and monitoring via Intranet and Internet	●		●	●	●	●	●
E-mail notification of system alarms and equipment malfunctions	●		●	●		●	●
Multiple tenant power billing for shared condenser applications						●	●
Temperature set-point range restrictions	●	●	●	●	●	●	●
Graphical user interface with floor plan layout	●	●	●	●	●	●	●

● Native application or feature for this device. ● Dependent upon controller programming

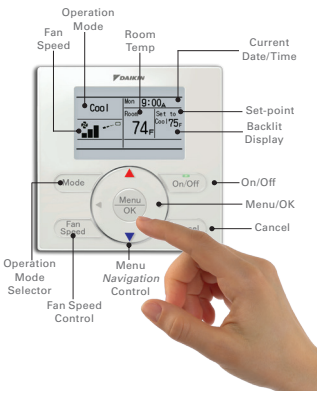
BACnet® is a trademark of ASHRAE.

Local Control Options

Features & Benefits of the Room Controller

BRC1NRV71 – *Navigation* Room Controller

Daikin room controllers offer a vast array of features that provide flexibility and benefits.



The controllers operate on the basis of last command priority.

In addition to the basic functions that meet the zone control requirement of all *VRV* indoor units, the *Navigation* Remote Controller will provide advanced control functions that historically require a central controller to administer:

- 7 day Schedule
- Temperature Limiting
- Control Lockout
- Dual set-points
- Auto cool/heat changeover
- Automatic adjustment for Daylight Saving Time (DST)
- Temperature sensor with configurable offset

AZAI6WSCDKA – *DKN* Cloud Wi-Fi Adaptor

The *DKN* Cloud Wi-Fi Adaptor enables the control of the P1P2 indoor units through a smartphone app. The adaptor is used as a main or sub controller on the P1P2 bus, thus a BRC1NRV71 controller is not required to be used together with the Wi-Fi adaptor. The listed functions seen at right are available on the smartphone app for this adaptor

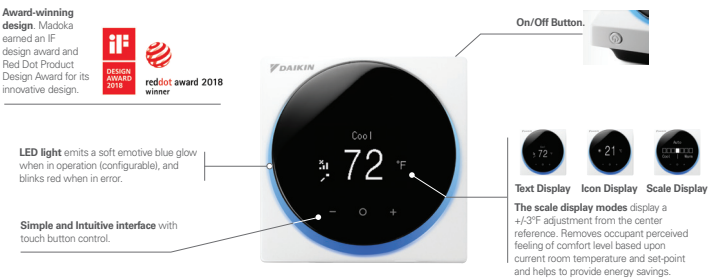
- On/Off
- Mode
- Set-point
- Fan speed
- Room temperature
- Error alert
- Schedule
- Leveled user authority
- Louver control
- Modbus integration

Local Control Options

Features & Benefits of the Room Controller

BRC1H71W – *Madoka* Room Controller

Daikin is pleased to introduce the *Madoka* remote controller for the North American *VRV, SkyAir,* and Single and Multi-zone systems. The *Madoka* features a sleek and stylish design with an intuitive interface including touch button control. It retains advanced functions for indoor unit control. It can be commissioned and managed with ease through a Bluetooth® configuration app or via the onboard menus. The *Madoka* provides 3 configurable display modes: Text (default), Icon, and Scale to help meet project and occupant needs.



- Easy commissioning and management with Bluetooth® app
  - Leveled user authority for owner/administrator and installer
  - QR code (stored locally) required to access the installer menu to prevent unauthorized access
  - Settings can be saved and sent to multiple controllers
  - Set up multiple settings at once
- Sleek and stylish design
- Simple and intuitive interface with advanced function options
- Selectable display mode:
  - Text mode, icon mode, and scale mode

BACnet® is a trademark of ASHRAE.

Local Control Options

Features & Benefits of the Room Controller

The Daikin *ONE+* smart thermostat is an intelligent home air controller from a world leading heating, ventilating, and air conditioning (HVAC) manufacturer. It is a cloud-connected hub of sophistication, integrated for controlling temperature, humidity, and indoor air quality.

Designed with quality components

1. The high-resolution color touch screen display is protected by the same toughened glass used in smart phones.

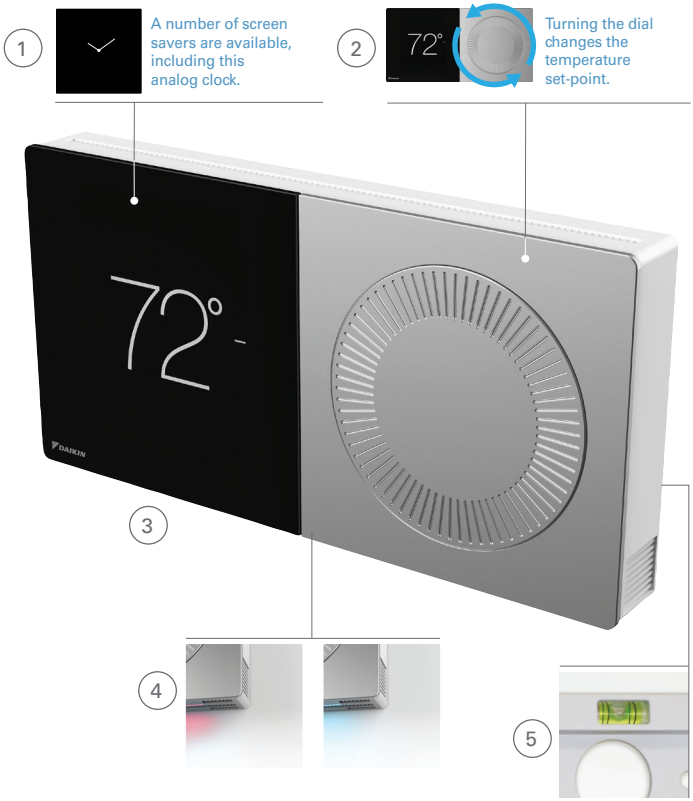
2. The anodized aluminum bezel and dial are precision manufactured. The surfaces have a fine bead blast with a warm hued anodized finish. The dial rotation is extraordinarily smooth because it rests on a bearing assembly typically found in precision instruments. A switch behind the dial enables users to return to the home screen from any menu with a single tap.

3. An integrated Wi-Fi radio connects to the internet (via a home router) to the cloud and onto the homeowner mobile application. The Daikin cloud will also seamlessly integrate with open smart home architectures, including Amazon Alexa and Google Assistant, enabling consumers to effortlessly use features such as voice control.

4. A thin LED light bar sits flush within the bottom surface and runs from edge to edge, delicately illuminating the wall beneath. Emitting a soft emotive glow, the light bar indicates the current system mode: red for heating, blue for cooling.

5. Built-in bubble level aids professional installation

Designed with quality components: Daikin *ONE+* Smart Thermostat



Designed with quality components: Daikin *ONE* Touch Smart Thermostat

1 **The high-resolution color touch screen display** is protected by the same toughened glass used in smart phones.

A number of screen savers are available, including this analog clock.

2 **Simple, elegant industrial design, capacitive touchscreen user interface,** multi-language support: English, Spanish, French. Add Programmable 4-event schedule with adjustable hold function.

5 **Built-in bubble level** aids in a professional installation.

3 **An integrated Wi-Fi radio** connects to the internet (via a home router) to the cloud and onto the homeowner's mobile application. The *Skyport* cloud will also seamlessly integrate with open smart home architectures, including Amazon Alexa and Google Assistant, enabling consumers to effortlessly use features such as voice control.

4 **Wi-Fi enabled smart thermostat** with smartphone app control. Voice control by Amazon Alexa and Google Assistant Control and comfort functions: Away mode, geo-fencing. Outdoor environment monitoring: outdoor temperature, outdoor humidity, and weather forecast when connected to Wi-Fi. Compatible with Daikin *ONE* home air monitor for IAQ visualization

Local Control Options

Features & Benefits of the Room Controller

AZAIGWSPDKC – *DKN* Plus Interface

The *DKN* Plus Interface (AZAI6WSPDKC) enables the energy-efficient control of Daikin air conditioners by a third-party thermostat or an automation system. With this interface, third-party devices or systems can control the *VRV, SkyAir*, and Daikin Single/Multi-Zone indoor units through Cloud API, Modbus®, BACnet® MS/TP, or thermostat relay contacts. This interface can be commissioned with ease through the *DKN* Cloud North America (NA) app via Bluetooth® Low Energy (BLE).

NORTH AMERICA

» Versatile interface adaptor that can integrate with a third-party thermostat/BMS through multiple approaches:
  — Cloud API
  — Modbus
  — BACnet® MS/TP
  — Backup thermostat G/Y/W (Fan/Cool/Heat) relay control through thermostat wire:
    – Automatically disables thermostat relay logic when cloud API connection detected
    – Advanced control logic to maximize indoor unit efficiency
» Easy commissioning with the BLE configuration app (*DKN* Cloud NA app)

» Indoor unit control and monitoring points*
  — On/Off
  — Set-point
  — Room temperature
  — Mode (Auto, Cool, Heat, Fan, Dry)
  — Fan speed
  — Louver position
  — Error code
  — Interlock control with indoor unit On/Off
» Auxiliary Heater Control
  — Auxiliary heater controlled as a secondary heat source

* Availability depends on indoor unit model

BACnet® is a trademark of ASHRAE.

Featured Controllers

Daikin *HERO* Pro Edge

The Daikin *HERO* Pro Edge is a cloud-enabled *VRV* central controller that provides real-time remote monitoring and control, advanced analytics, and centralized management of connected building systems. It supports Daikin *VRV* systems, Mini and Multi-Split units, Daikin Applied Rooftop Units, and ancillary equipment, enabling users to monitor and manage equipment across single or multiple sites.

- Remote monitoring and control of *VRV* indoor and outdoor unit operation across multiple sites through a single login
- Secure web and mobile access from anywhere
- Advanced control strategies, including:
  - Independent occupied and unoccupied heating/cooling set-points
  - Setback control and optimum start
  - Auto changeover with configurable methods (Fixed, Individual, Average, or Vote)
  - Weekly scheduling with timed override functionality
- Dashboard views with system status, alarms, warnings, trends, and predictive insights
- Animated piping diagrams showing real-time system operation
- Historical data storage at 1-minute intervals for up to 5 years with CSV export capability
- Advanced alarm management with detailed diagnostics, timestamps, and automatic email notifications
- Predictive analytics to identify potential equipment issues before failures occur
- Floor plan visualization for equipment layout and navigation
- Automatic discovery and registration of R-410A *VRV* Systems
- Remote addressing, commissioning, and registration for R-410A *VRV* systems
- Continuous commissioning through remote configuration of outdoor and indoor unit field settings and system parameters
- BACnet® Server Option enabling direct BACnet®/IP BMS integration without additional gateways (BTL certified)

Featured Controllers

Daikin *HERO* Pro Edge

Integration to BMS (DGE014A71)

» BACnet® Server Option (BTL certified*) enabling direct BACnet®/IP BMS integration without additional gateways

» Exposure of *VRV* system data points as BACnet® objects for seamless *VRV* monitoring and control by the BMS

Mini BMS Solution (DGE009A71/A72)

» BACnet® Client Option for monitoring and controlling third-party BACnet® devices (up to 10 or 50 devices, depending on license)

» Integration with third-party equipment/sensors via WAGO® I/O (DI, DO, AI, AO points)

» Mini-BMS functionality with integrated scheduling, interlock control, floor plan, and emergency stop

Power Proportional Distribution (PPD) and Tenant Billing (DGE002A71)

» Energy consumption of the *VRV* system is proportionally calculated for each indoor unit

» Automated distribution for the PPD site and tenant reports by email

» Customized site and tenant reports for company logo, cost per kWh, admin fees, heating usage, and report file format output

Tenant app option (HGPFETEN-01)

» Direct indoor unit control by tenants (with configurable permissions) through the Daikin *HERO* Cloud, which eliminates the need for smart local thermostats

» Two user levels:

  – Primary User – Full access to assigned indoor units and ability to invite secondary users

  – Secondary User – Limited access defined by the Primary User

* The BTL® mark is a registered certification mark of BACnet International, Inc.

Featured Controllers

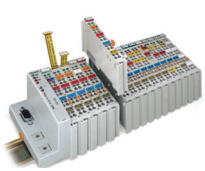
Daikin *HERO* Simple Edge

The Daikin *HERO* Simple Edge provides a connection of a Daikin *VRV* system to the *HERO* Cloud Services network for remote monitoring. The *HERO* Simple Edge is mounted onto the outdoor unit, and the built-in SIM card provides wireless connectivity. When integrated, data visualization of connected indoor and outdoor unit data and animated piping diagrams displaying operation status is provided. Daikin *HERO* Cloud Services also includes failure prediction for the compressors and sensors and refrigerant leak detection in the *VRV* system. In addition, *HERO* Cloud Services can help optimize the equipment operation based on outdoor ambient temperatures.

DCM601B71 – *intelligent Touch Manager*

The *intelligent Touch Manger* (*iTM*) is an advanced multi-zone controller that controls and monitors Daikin *VRV* system.

intelligent Touch Manager



- » Easy operation and configuration with LCD touch screen
- » Advanced control functions includes dual set-point, setback control, auto-changeover, set-point range limitation, weekly schedule with optimum start and etc.
- » Indoor unit, outdoor unit, connected BACnet® Client points, and WAGO® I/O operation data is stored in the *iTM* every minute for the previous 5 days. The operation data can be accessed and downloaded through the *iTM* web access or USB output
- » Web Access and Alert Emails
- » Tenant Billing with PPD Option
- » Monitor and controls DI, DO, AI, AO signals of external equipment with WAGO® I/O kit

DCM002A71 – *iTM* Power Proportional Distribution (PPD) Option

With the PPD Option, energy consumption of the *VRV* system is proportionally calculated for each indoor unit.

BACnet® is a trademark of ASHRAE.

Featured Controllers

DCM009A51 – *iTM* BACnet® Client Option

The *iTM* BACnet® Client Option enable the *iTM* to monitor and control external equipment through the BACnet®/IP protocol.

» Object Types: AI, AO, AV, DI, DO, DV, MSI, MSO, MSV
» The operation data for indoor and outdoor unit BACnet® Client points are available in the *iTM* every minute for the previous 5 days.
» Applications: Integrate the *iTM* with sensors, lighting, pumps, fan, DOAS, and etc.

DCM014A51 – *iTM* BACnet® Server Gateway Option

With *iTM* BACnet® Server Gateway Option, Building Management Systems (BMS) can monitor and/or control *VRV* indoor and outdoor units units via the BACnet®/IP protocol. This option provides seamless control logic integration between *iTM* and BMS.

» BACnet® virtual router function implemented to enable individual BACnet® device ID for each indoor unit
» Indoor unit and outdoor unit service data points are available to be monitored by BMS
» *iTM*'s advanced control functions including dual set-points, setback control, auto-changeover, set-point range limitation, and schedule can be accessed by the BMS
» Supports Change of Value (COV) and foreign device registration

DMS502B71 – Interface for use in BACnet®

Interface for use in BACnet® is a hardware gateway solution that enables the BMS to monitor and control the *VRV* indoor units through BACnet®/IP protocol.

To resolve the challenges of integrating the *VRV* systems, Daikin provides BMS Plug-ins to the integrators for easy integration with the *VRV* system. BMS Plug-ins are pre-programmed objects and graphics built for Niagara AX® specifically for Daikin *VRV*. By the use of BMS Plug-ins, the integrators work load could be reduced to as little as point linking.

Featured Controllers

DTA118A73 D3-Net/BACnet® MS/TP Adaptor

The DTA118A73 operates as a BACnet® router/gateway for *VRV* systems. Using this adaptor, third-party Building Management Systems (BMS) can monitor both *VRV* indoor and outdoor units, as well as control indoor units via the BACnet® MS/TP protocol. The adaptor has been updated for compatibility with the D3/D4 interface (BRD72A-L), allowing R-31 *VRV* systems (D4-Net protocol) to connect seamlessly to BACnet® MS/TP networks.

DTA116A51 – D3-Net/Modbus® Communication Adaptor

The D3-Net/Modbus Communication adaptor can be used for Home automation system integration. With the adaptor, up to 16 indoor units can be controlled through Modbus/RTU.

DMS504C71 – Interface for use in LonWorks®

Interface for use in LonWorks is a hardware gateway solution that enables the BMS to monitor and control the *VRV* indoor units through LonWorks communication.

Where to find Official Information?

Product Detail		Design Guide	Eng. Data	IOM	Submittal	Option Handbook	SVM	Sales Bulletin
Features	**Summary**	◆	◆					◆
Specification	Summary Table		◆	◆			◆	◆
	Electrical		◆	◆	◆		◆	
Drawings	Dimension		◆		◆		◆	
	Piping		◆		◆		◆	
	Wiring		◆				◆	
Performance	Capacity Correction		◆		◆			
	Piping		◆		◆			
	Airflow / ESP		◆		◆			
	Sound Level		◆		◆			
Installation	Piping		◆	◆				
	Wiring		◆	◆				
	Fundamentals		◆	◆				
	Sizing & Charging		◆	◆				
Operation	How to use			◆				
	Controls	◆	◆	◆				◆
Accessories	Specification		◆			◆		◆
	Installation					◆		◆
Characteristics	Functions	◆					◆	
Set-up, Commissioning & Service	Test Operation			◆			◆	
	Troubleshooting						◆	
	Flow Charts						◆	
	Replace Procedure						◆	

Application Guides – Document Portfolio

Applications Engineering has developed a portfolio of Design and Application Guides for Daikin DX equipment. Hard copies are available to order and can also be obtained online via DaikinCity.com

Design and Application Guides

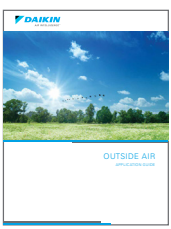
Outdoor Unit Layout Guide
BPG-VRV4OD

Daikin Zoning Kit
BPG-DZKAPP

Building Automation
BPG-BAS

VRV Extreme Climates
BPG-EXTAMB

Water-Cooled *VRV*
BPG-WTVR



OA Integration
BPG-OAGUIDE

Daikin *HERO* Cloud Services
CB-HEROCS

Reference Guides

Single and Multi-Zone Systems Reference Guide
PM-DCRG

Daikin *ALTHERMA* Design and Application Guide
PM-ALTHERMA

Daikin *FIT* Design and Application Guide
PM-DKFIT

DAIKIN

APPLICATIONS
ENGINEERING TRAINING

DESIGN WORKSHOPS

Regional Training Offered By
Daikin Applications Engineering

Understanding the components and methods that create an optimized project design is the key to success in the application of any Daikin system. Applications engineering have developed a portfolio of design workshops to support a wide range of products, topics and levels of experience.

What specific courses are available?

All courses listed below are currently available on request. Most are half day courses (unless indicated):

DAIKIN VRV DESIGN WORKSHOP
A comprehensive foundation level 1.5-day course essential for anyone new to VRV design.

DAIKIN VRV DESIGN AND WEBXpress SELECTION TOOL
A one day version of the above course covering optimized design practices and how to use the WEBXpress selection tool.

DAIKIN VRV T-SERIES WATER COOLED SYSTEMS
Design and selection of VRV-T series design and water loop integration.

AHU KIT INTEGRATION
Selection and application of the Daikin EEV kits developed to allow 3rd party AHU integration.

LIGHT COMMERCIAL (RTU) DESIGN WORKSHOP
Provides a comprehensive look at the product range, accessories and LCXpress selection tool.

WEBXpress 2D FLOORPLAN for AutoCAD
This class teaches the advanced WEBXpress selection process allowing AutoCAD integration.

DAIKIN MEGA-Q DESIGN WORKSHOP
Design and selection of Daikin's hot water generation system for commercial applications.

DAIKIN ALTHERMA DESIGN WORKSHOP
Design and selection of Daikin's air-to-water heat pump system.

DAIKIN FIT AND SIDE DISCHARGE UNITARY WORKSHOP
Best practices for optimized side discharge design, and the use of our system configurator.

Who is eligible to attend?

The target audience is anyone involved in project design. This includes Daikin manufacturer representatives, distributors, dealers, consulting engineers and installers.

What is the method of training?

TELL – SHOW – DO

TELL: Formal presentations covering the best practices for optimized application of equipment.

SHOW: Provide live demonstration of the digital selection tools and how best to use them.

DO: Get participants to create a project selection based on what has been taught in class.

These "in-house" courses are available regionally and run by Daikin application engineers. We will come to you! Consult your Daikin representative for availability or contact our team directly at applications.engineering@daikincomfort.com

AT-WORKSHOPS_07-26


DAIKIN
VRV

For more information:

Sales and Technical Support: 1-855-DAIKIN1

www.daikincomfort.com

USGBC® and the related logo are trademarks owned by the U.S. Green Building Council® and are used with permission.

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.

Download on the App Store

GET IT ON Google Play

Android, Google, Google Assistant, and all related logos are trademarks of Google LLC or its affiliates.

Amazon, Alexa and all related logos are trademarks of Amazon.com, Inc. or its affiliates.

App Store® is a registered trademark of Apple Inc.

The Bluetooth® word mark and logos are registered trademarks owned by Bluetooth SIG, Inc., and any use of such marks are under license.

BACnet® is a trademark of ASHRAE.

All trademarks are the property of their respective owners.

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

Houston, Texas · USA · www.daikincomfort.com

PM-DVRV_08-26