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Modeling Guide for Daikin VRV in TRACE 700



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Introduction

This modeling guide contains step-by-step instructions for modeling Daikin VRV IV, III and WIV systems in TRACE 700. To purchase and learn more about TRACE 700, please visit http://www.trane.com/commercial/north-america/us/en/products-systems/design-and-analysis-tools/trace-700.html.

Please visit Daikin AC website: <u>http://www.daikinac.com/content/resources/software-tools/</u>, or Daikin city website <u>https://www.daikincity.com/</u> following the path: Library Home > 07 VRV/LC Sales Partners > Sales Tools & Applications Resources > Sales and Applications Tools > Energy Simulation for new products information update.

The Daikin VRV library file includes cooling and heating performance curves for Daikin VRV IV air-cooled (RXYQ and REYQ series), VRV III air-cooled (RXYQ and REYQ series) and VRV WIV water-cooled (RWEYQ series) products. The cooling/heating curves are:

- Total Capacity; *f(t evaporator entering wet bulb, t condenser entering dry bulb)* These curves model equipment capacity at 100% load based on
 - o For air-cooled products, ambient and indoor air temperature.
 - For water-cooled products, entering water and indoor air temperature.
- Electric Input Ratio; *f(t evaporator entering wet bulb, t condenser entering dry bulb)* These curves model equipment power input at 100% load based on
 - o For air-cooled products, ambient and indoor air temperature.
 - For water-cooled products, entering water and indoor air temperature.
- Part Load Ratio; f(part load ratio)

This curve adjusts system power input based on the part load ratio of the condensing unit.

This document and its associate library file are intended to provide necessary data to help designers optimize the design of Daikin VRV systems based on building energy cost. This guide should be used as a guideline only. The modeling accuracy is highly dependent on the user input data and it is the users' responsibility to understand how the input data will affect the program output.



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Program Installation

Please purchase the software first and then follow the instructions provided by the sales.



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Importing Daikin VRV Library File

This session demonstrates how to import the Daikin VRV library file into TRACE 700.

1. Download the library file (Daikin VRV LIB. EXP) from Daikin website:

http://www.daikinac.com/content/resources/software-tools/.

or Daikin City https://www.daikincity.com following the path: Library Home > 07 VRV/LC Sales Partners >

Sales Tools & Applications Resources > Sales and Applications Tools > Energy Simulation>TRACE

	LIBRARY HOME	01 MINI-SPLIT	02 ALTHERMA	03 MULTI-SPLIT	04 SKY-AIR	05 VRV	06 CONTROLS & ACCESSORIES	07 VRV/LC SALES PARTNERS
Lib	ary Home > 07 VRV/LC	Sales Partners > Sales Tools 8	Applications Resources > Sale	es and Applications Tools > En	argy Simulation > Trace			
Т	RACE							
	1 Rems	ODELS	DAIKIN VRV LIB.EXP	Modeling G Modeling G MODELING G DAIKIN VRV 700.P	IN ALES Idea for IN TRACE DF OO	•		
	SAMPLE BUILDING M	ODELS						

2. Double click the TRACE 700 icon 2 on your desktop to launch TRACE 700. The TRACE 700 startup options dialog box appears:

TRACE® 700 for exclusive use by #SYP		
File Actions Libraries Help		
D 😂 🛃 ?		TRANE®
	Startup	
For Help, press F1		



- Select Create a New Project to create a new project or Open an Existing Project, if this is not the first time opening TRACE 700. Or click the Close button, if the intention is only to add the Daikin VRV library file.
- When you click the Close button, the main window of TRACE 700 appears. Choose Library > Equipment > Cooling to open the library.

👼 TRACE® 700 f	for exclusive use by #SYP		
File Actions	Libraries Help		
D 🖨 📴	Base Utilities Calendars Contruction Types		TRANE®
	Contruction Types Equipment ↓ Glass Types Internal and Airflow Loads Materials Rate Structures Schedules Shading Unloading Curves Weather	Cogeneration Cooling Heating Heat Rejection 4 Fan Misc. Accessories Thermal Storage Ground Source Heat Exchanger	
			NUM /

5. Go to File > Import Custom Library and choose the library file (Daikin VRV LIB. EXP) from the path this library file was copied to. *Note: During the library file import, if shown an option to overwrite an existing duplicate library data for Daikin products from the import file, set to 'Yes' will allow to overwrite an existing database.



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Library / Template Editors -							
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Libraries	I Y	1 3 1 & r	त क ाल हे	5 🕊 Gy 🖽 🗠 🖂 🗌			TDAME®
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clobal relipiates .						- • •	
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Import Custom Library		 Com 	ments >190 to	ins with heat recovery <105 deg.		Save	
Heat I	Rec 105 H	W -	HW. EU	INTE		Close	
Export Custom Library							
Exit		•					
						New	
Operating Mode	Cap	pacity	0.010	Energy Rate		Сору	
Cooling	to	ons	0.812	kW/ton			
Tank Charging	10	ons	0.875	KW/ton		Delete	
Tank Charging & beat recovery						TOPCO	
Tank charging cheat locovery						Import	
Pumps			Туре				
Primary chilled water		Cnst vol chill wate	r pump			Packaged	
Condenser water		Enst vol end wate	er pump - Low E	H		Energy	
Heat recovery or aux condenser		INONE				Breakout	
Unloading Curves				A 1		Owne 1	
	Primary			Secondary		Curves	
Curve type Power consumed	EQ101	1L	-	j jeq1011L	-		
Standard Ambient modification	on EQ101	1L - Amb Mod		None	•		
C DOF C N	-						
Capacity	1			11			
Main	L		<u>Options</u>		Graph		
						/	

- The air-cooled units can be found in the Equipment Type under the Cooling category of 'Aircooled unitary', while the water-cooled units can be found under the Cooling category of 'Water source heat pump'.
- 7. Click **File > Exit** to close the library.

7 Fi	Library / Template le View Options	Editors - Window Help	1 7 3 1 .	\$. 57 5 12 3	성 위 G x 🖽 🛞 G	<u>× </u>	
	Cooling Equipment Cooling category Equipment type Cooling type Deratin Cooling Heat Recovery Tank Charging Tank Charging & Primary chilled w Condenser wate Heat recovery on Unloading Curt Curve type Standard	At Main Air-cooled unitary Id4 Min AC SS/SP Ele CV Liebert DX 22 ton Liebert DX 32 tons Light Commercial Rooftop Packaged Terminal Heat Self Contained Air Cooled Small Rooftop - Recip Cool Split System-RAUC-20+ T Trane VRF Heat Pump 14 Trane VRF Heat Recover Trane VRF Heat Recover Trane VRF Heat Recover Trane VRF Heat Recover VRV III Daikin AC Heat R VRV III Daikin AC Heat P VRV II Daikin AC Heat R VRV IV Daikin AC Heat P VRV IV Daikin AC Heat P		Comments AC Air 135-2 9.7 9.7 Type	Cooled, Electric heat, SS 40 MBh Energy Rate Packaged EER kW/ton kW/ton kW/ton kW/ton kW/ton secondary 90.1 Min SS and SP None	or SP,	Save Save Close New Copy Delete TOPSS Import Packaged Energy Breakout Cyrves
	C DOE	<u>M</u> ain	6	<u>O</u> ptions		<u> </u>	



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Library / Template Editors -	
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Cooling Equipment Main	
Cooling category Water source heat pump Comments Electrically Operated, 59 Entering water temp	Save
90.1-04 Min WSHP 17-65 MBh Cooling type 90.1-04 Min WSHP 65-135 MBh 90.1-07 Min Ground Source 59EW < 135	<u>U</u> ew
Operatin 901-107 Min Ground Source 77EW < 13:	
S0.1-10 Min WSHP Enriet-0-Water (135) 90.1-10 Min WSHP (17 MB) 90.1-10 Min WSHP 17 55 MBh Condenser water 90.1-10 Min W-W 59EWT <135 MBh Heat recovery or 90.1-10 Min W-W 59EWT <13	Packaged Energy Breakout
Unloading Curve Sciound Source HP - High Effic Unloading Curve Sciound Source HP - High Effic VRV WIII Daikin WC 72 series Curve type VRV WIII Daikin WC 84 series 6	C <u>u</u> rves
Standard Water Source HP - High Effic Water Source HP - Reg Effic Water Source HP - Variable Speed C DDE Water Source HP - Variable Speed ✓	
Main Options Graph	



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System Modeling

This session demonstrates how to model the VRV system in TRACE 700. It is the users' responsibility to evaluate the calculation methodology of the various system types within TRACE 700 and select the most proper one for their buildings. Also, this session only provides the necessary steps to set up the VRV system in TRACE 700. Users should make their own choices and inputs on the other variables that are not mentioned in this guide.

Modeling air-cooled outdoor units

TRACE 700 provides step by step project navigator to properly set up the building model. This process starts with Create Systems, followed with Assign Rooms to Systems, Create Plants and Assign Systems to Plants. The rest steps are defined based on users' needs.

Project Navigator	
Alternative 1	Create Systems - Selection
Enter Project Information Test hotel	Alternative 1
Select Weather Information Houston, Texas	System category
Create Templates 21 Templates	All Variable Volume <u>Nor-mixing</u> <u>New</u>
Create Rooms 11 Rooms	Costant Volarie Hoting Heating Only Induction Underflor Air Distribution Delete
Create Systems 1 Systems	Displacement Ventilation Childe Beams ASHRAE 90.1 Baseline Systems
Assign Rooms to Systems ^{11 Assigned Rooms} 5	System type
Create Plants 2 Plants 6	Twie Fan Oudle Duet VAV UFAD VAV w/ Baseboard Heating
Assign Systems to Plants	Underlicor Az Distribution CV Underlicor Az Distribution FSPVAV Underlicor Az Distribution FSPVAV
Define Economics A sample with all utilities 0(\$)	Variable Refrigerant Volume 3
Calculate and View Results 10/09/2014 - 11:49 AM	Selection Options Dedicated OA Temp/Humidity Fans Coils Schematic

Create Systems

- 1. After setting up the project building, double click the box under Alternative 1 and Create Systems.
- 2. Select **Variable Refrigerant Volume** under System type for system-001. Click the **Apply** button.
- 3. Click the **Fans** button on the bottom toolbox to define the indoor unit fan power.



- a. Only 1 system is defined in this example. For multiple systems, make sure the defined fan power is corresponding to the right system.
- b. Select VRV Indoor Fan as the Primary Fan and enter the static pressure and the full load energy rate. *Appendix A* lists the nominal External Static Pressure (ESP) and the full load energy rate for all the Daikin indoor units. For duct free units (FXFQ-T, FXZQ-M, FXHQ-M, FXAQ-P, FXLQ-M and FXNQ-M series), the static pressure input should be zero. Make sure the Full Load Energy Rate Units is kW/cfm to use the values in *Appendix A*.
- c. TRACE 700 currently does not apply library files for zone level air side equipment. Only a single fan definition exists for the entire system, so an average assumed fan power density must be used for the system if different indoor units are used within the system. For example, the indoor units used for one system is 2 x FXDQ07MVJU, 3 x FXDQ09MVJU and 4 x FXDQ12MVJU. For 07 and 09, the capacity is 7500 and 9500 Btu/h. The total capacity/1000 of the system is 2 x 7.5 + 3 x 9.5 + 4 x 12 = 91.5.

The average full load energy rate is (2 x 7.5 x 0.0002946 + 3 x 9.5 x 0.0002946 + 4 x 12 x 0.0003054)/91.5 = 0.00030027.

reate Systems - F	Fan Overrides						
Alternative 1		3a					
System descriptio	n System - 001		✓ Variable	Refrigerant Volume		3d	Apply
Fan cycling sche	dule Cycle with occupan	су	-		3b		Cancel
	Туре	Static Pressure (in, wg)	Full Load Energy Rate	Full Load Energy Rate Units		Schedule	<u>O</u> verrides
Primary	VRV Indoor Fan	0.03	0.0002946	kW/Cfm	Available (10	0%)	Adjustments
Secondary	None	0	0	kW	Available (10	0%)	
Return	None	0	0	kW	Available (10	0%)	
System exhaust	None	0	0	kW	Available (10		
Room exhaust	None	0	0	kW	Available (10	0%)	
Optional vent	None	0	0	kW	Available (10	0%)	
Auxiliary	None	0	0	kW	Available (10	0%)	
Selection	Options	Dedicated 0A	Temp/H	umiditu	ang	Coils	Schematic

d. Click the **Apply** button.



4. Click the **Close** button to close the Create Systems panel.

Assign Rooms to Systems

 Double click the box under Alternative 1 and Assign Rooms to Systems. Drag the rooms under Unassigned Rooms to the wanted systems on the right column, until all the rooms are assigned to a system. Click the **Close** button.



Create Plants

 Double click the box under Alternative 1 and Create Plants. Drag the Air-cooled unitary to the Cooling Plant - 001 and select Electric resistance as the Heating Plant - 002.

Create Plants			
Alternative 1			
Equipment Category	Config	guration	
		Cooling plants de Cooling plant - 001	Close
Air-cooled Air-cooled Wa chiller unitary	ater-cooled Water-cooled E	Air-cooled unitary - 001	Plant <u>W</u> izard
🔥 🚊	5 🚳 🗖	Heating plants Heating plant - 002 Flashis Desistence - 001	New Clg Plant
Water source Boiler E heat pump re	Electric Gas-fired heat		New <u>H</u> tg Plant
	P 💿		Edjt
Air-cooled Cooling tower I condenser	Pumps Thermal storage		<u>D</u> elete
			<u>P</u> lant Ctrl
			Energy Mgmt
			Sequencing
To assig	n equipment, drag the desired equipment	t category to the configuration tree.	
<u>C</u> onfiguration	Cooling Equipment	Heating Equipment	Base Utility / Misc. Accessory



- 7. Click the **Cooling Equipment** on the bottom tool box.
 - a. Choose the desired VRV series and model types in the Equipment type for Cooling plant 001. The entry with 'VRT' in the equipment name will enable the program to account for the VRT benefits for VRV IV series. If multiple cooling plants exist, choose the wanted Equipment type for each plant.
 - b. The default COP value in the library file is an average value based on Daikin RXYQ and REYQ series correspondingly. If a product model is known for the plant, users can input the COP value for that model type based on the values listed in *Appendix B*. The heat recovery columns here are actually the 'heating mode'.
 - c. The cooling capacity is left blank in the initial library entry for all the VRV units. The reason is if the system is not sized properly and the building load exceeds the capacity defined here, the maximum capacity the unit can provide is the value defined here and the exceeding load will be rolled over to the calculation of next hour, which will result in abnormal results and a lot of unmet load hours.

TRACE™ 700 - C:\Users\	lisx\Docume	nts\Software comparison\Ho	tel runs\HO	EL.TRC		
File Edit Actions View	w Options	Libraries Templates Alte	ernatives Setu	ip Window Help		
D 🚅 🖪 🎒 X 🖻	B 🖉 🖉	े 🌾 🚖 न्द 😭 🦉 📷	🦻 🖩 🤅	t 🖪 ?		TRA
Create Plants						
Cooling Equipment - Alter	rnative 1 ——		Heat Re	jection		9
Cooling plant	Cooling plant -	001 🗨	Туре	Included In Compress	or Power 📃 💌	
Equipment tag	Water source	heat pump - 001 🛛 🗨	Hourly	ambient wet bulb offset	۴F	<u>C</u> ancel
Category	Air-cooled uni	ary 💌	_ 7a			
Equipment type	VRV IV Daikir	AC Heat Recovery VRT 💌	_ Thermal	Storage		<u>N</u> ew Equip
Sequencing type	Single	•	Туре	None	•	Copy Equip
Backup heat source	Heating plant	• 002 🔹	Capacit	y 12	gal/ton 💌	Delete Equip
Reject condenser heat	Heating plant	•	Schedu	le Heatpump	~	
Reject heat to plant	Heating plant	• 002 💌			7b	C <u>o</u> ntrols
0	7c	C>		Г		Packaged
Casting III0	ue	tana		2 7254 Deal	riale	Energy
Heat recoveru		tons		1 1 396 Pack	aged COP	Breakout
Tank charging		tons		1 don		
Tank charging & heat reco	overy	tons		kW/	ton	
Pumps		Туре		Full load cor	nsumption	
Primary chilled water		None		U ft wa	ter	
Londenser water		None		U It wa	iter	
Ineactecovery of aux cond	uensei	INORE		lu lit wa		
<u>C</u> onfiguration		Cooling Equipment		Heating Equipment	<u>B</u> ase Utility	y / Misc. Accessory



8. Select 'Change your entered values to the library values for this equipment type' in the popped out window and then click the **OK** button.

You have selected "VRV III Daikin AC" as your cooling equipment type. Do you wish to:
Change your entered values to the library values for this equipment type.
U Just change the equipment type.
Always use this setting when selecting an equipment type from the library.
OK Help

9. Click the **Apply** button and then close the window.

Assign systems to plants

10. Double click the box under Alternative 1 and Assign systems to plants. Drag the Cooling system under the cooling plant while heating system to the heating plant. Then close the window.



Modeling water-cooled outdoor units

To modeling water-cooled units, a water source heat pump loop should be chosen. The major different steps from modeling air-cooled units are Create Systems and Create Plants. For the rest steps please follow the guide for modeling air-cooled outdoor units.



Create Systems

1. Pick the **Water Source Heat Pump** as the system type. Click the **Apply** button.

Create Systems - Selection	n				
Alternative 1 System description System	· 001	Water Source Heat Pump			Apply
System category					Cancel
All Variable Volume Constant Volume - Non-mixin Constant Volume - Mixing Heating Drly Induction Underfloor Air Distribution Displacement Ventilation Chilled Beams	g				New Cgpy Delete
ASHRAE 90.1 Baseline System System type Underfloor Air Distribution SFI	ems PVAV				Advanced
Unit Heaters Unit Ventilator Variable Refrigerant Volume Variable Temperature Consta Variable Volume Reheat (302 VAV. w/P packeard Meating	int Volume ≋ Min Flow Default)	<u> </u>		200	
VAV w/Baseboard Skin Heal VAV w/Baseboard Skin Heal VAV w/Forced Flow Skin He Ventilation and Heating Water Source Heat Pump	ting 1 ating		2		
Selection [ptions <u>D</u> edicated OA		<u>F</u> ans	Coils	Schematic

2. Click the Fans tab and define the fan power following the step 3 on page 6-7.

Create Plants

3. Select **Water Source Heat Pump** as the Cooling plant and select either Boiler or Electric resistance as the Heating plants, whichever fits the performance better.

💭 Create Plants					
Alternative 1 Equipment Category Air-cooled Air-cooled Air-cooled Air-cooled Water source Heat pump Boiler El Air-cooled Cooled Air-cooled Cooling tower P	Cor Cor Cor Cor Cor Cor Cor Cor	nfguration Cooling plants If Cooling plant - 001 Cooling plant - 001 Cooling tower Cooling tower Cooling tower Partice cooling tower Heating plant - 002 Cooling boilt - 001 Cooling tower Hot water pump	3 Plant <u>Wi</u> zard New Clg Plant New <u>H</u> tg Plant Edit <u>D</u> elete Plant Ctrl <u>Energy Mgmt</u>		
			<u>S</u> equencing		
To assign equipment, drag the desired equipment category to the configuration tree.					
<u>C</u> onfiguration	Cooling Equipment	<u>H</u> eating Equipment	Base Utility / Misc. Accessory		

4. Click the **Cooling Equipment** tab. Select VRV WIV Daikin WC 72 series or 84 series as the Equipment type.



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💭 Create Plants						
Cooling Equipment - Alternativ		Theat Rejection 7				
Cooling plant Coo	Cooling plant - 001		Туре	WSHP - Cooling tower	_	Apply
Equipment tag Wat	ater source heat pump - I	001 💌	Hourly a	mbient wet bulb offset	*F	<u>C</u> ancel
Category 1	ater source heat pump	_			5	
Equipment type	V WIII Daikin WC 72 se	ries 🔽	Thermal 3	Storage		<u>N</u> ew Equip
Sequencing type Sing	gle	-	Туре	Heat pump loop no storage	•	Copy Equip
Backup heat source Hea	ating plant - 002	•	Capacity	, 12 gal/ton	-	Delete Equip
Reject condenser heat Hea	at Heat rejection equipment			Schedule Heatpump		
Reject heat to plant		–		6		Controls
				0		
Operating mode		Capacity		Energy rate		Packaged
Cooling		tons		5.0241 Packaged	COP	Energy
Heat recovery	13.5	Mbh/ton		5.9347 Packaged	COP	Dieakout
Tank charging						
I ank charging & heat recovery	y					
Pumps		Туре		Full load consumpt	ion	
Primary chilled water 90.1-10 Min Var Vol Chilled Wat		Var Vol Chilled Water F	ump	0 ft water		
Condenser water None				0 ft water		
Heat recovery or aux condense	er None			0 ft water		
Configuration	Coolir	ng Equipment		Heating Equipment	<u>B</u> ase Utility /	Misc. Accessory

- 5. Select **Heat pump loop no storage** as the Thermal Storage type. *Note: do not remove thermal storage as the water loop is modeled as a special thermal storage type in TRACE 700.
- The input energy rate in the library file has an average COP value based on RWEYQ series.
 Appendix C gives the COP values for each model.
- 7. Click the **Apply** button. Then close the panel.



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Appendix A Fan Power for Indoor Units

Non-ducted

Model	Design	Model	Design	Model	Design
wouer	(kW/cfm)	Woder	(kW/cfm)	Woder	(kW/cfm)
FXAQ07PVJU	0.00007308	FXFQ07TVJU	0.00006667	FXL(N)Q07MVJU9	0.00019184
FXAQ09PVJU	0.00010000	FXFQ09TVJU	0.00007029	FXL(N)Q09MVJU9	0.00019184
FXAQ12PVJU	0.00010345	FXFQ12TVJU	0.00007029	FXL(N)Q12MVJU9	0.00028214
FXAQ18PVJU	0.00006600	FXFQ15TVJU	0.00008008	FXL(N)Q18MVJU9	0.00021429
FXAQ24PVJU	0.00007874	FXFQ18TVJU	0.00010270	FXL(N)Q24MVJU9	0.00019286
FXEQ07PVJU	0.00013613	FXFQ24TVJU	0.00010296	FXUQ18PVJU	0.00011321
FXEQ09PVJU	0.00011947	FXFQ30TVJU	0.00015198	FXUQ24PVJU	0.00011321
FXEQ12PVJU	0.00012830	FXFQ36TVJU	0.00016652	FXUQ30PVJU	0.00018265
FXEQ15PVJU	0.00014791	FXHQ12MVJU	0.00021951	FXUQ36PVJU	0.00018265
FXEQ18PVJU	0.00011911	FXHQ24MVJU	0.00017887	FXZQ07MVJU9	0.00025000
FXEQ24PVJU	0.00013929	FXHQ36MVJU	0.00019398	FXZQ09MVJU9	0.00025000
		·	•	FXZQ12MVJU9	0.00023881
				FXZQ15MVJU9	0.00025773
				FXZQ18MVJU9	0.00026263



Ducted

Model	ESP	Design (kW/cfm)	Model	ESP	Design (kW/cfm)
FXDQ07MVJU	0.03	0.00032857	FXMQ07PA(PB)VJU	0.2	0.00025237
FXDQ09MVJU	0.03	0.00032857	FXMQ09PA(PB)VJU	0.2	0.00025237
FXDQ12MVJU	0.04	0.00033929	FXMQ12PA(PB)VJU	0.2	0.00042222
FXDQ18MVJU	0.06	0.00042045	FXMQ15PA(PB)VJU	0.4	0.00035714
FXDQ24MVJU	0.06	0.00033103	FXMQ18PA(PB)VJU	0.4	0.00033071
FXTQ12PAVJU	0.3	0.00024750	FXMQ24PA(PB)VJU	0.4	0.00033430
FXTQ18PAVJU	0.3	0.00025500	FXMQ30PA(PB)VJU	0.4	0.00032907
FXTQ24PAVJU	0.3	0.00020250	FXMQ36PA(PB)VJU	0.4	0.00033628
FXTQ30PAVJU	0.3	0.00024900	FXMQ48PA(PB)VJU	0.4	0.00033406
FXTQ36PAVJU	0.3	0.00028000	FXMQ54PA(PB)VJU	0.4	0.00028325
FXTQ42PAVJU	0.3	0.00032000	FXMQ48MFVJU	0.88	0.00056693
FXTQ48PAVJU	0.3	0.00041313	FXMQ72MFVJU	0.96	0.00055668
FXTQ54PAVJU	0.3	0.00049167	FXMQ96MFVJU	1.03	0.00051780
			FXMQ72MVJU	0.95	0.00072789
			FXMQ96MVJU	0.95	0.00066116



Appendix B1 Cooling and Heating COP for VRV III Products

VRV III Model	Cooling COP	Heating COP	VRV III Model	Cooling COP	Heating COP
RXYQ72PBTJ/PBYD	4.566	4.016	REYQ72PBTJ/PBYD	4.673	4.237
RXYQ96PBTJ/PBYD	4.049	4.000	REYQ96PBTJ/PBYD	3.831	3.817
RXYQ120PBTJ/PBYD	3.876	3.704	REYQ120PBTJ/PBYD	3.731	3.774
RXYQ144PBTJ/PBYD	4.167	3.831	REYQ144PBTJ/PBYD	4.065	3.861
RXYQ168PBTJ/PBYD	4.255	4.016	REYQ168PBTJ/PBYD	3.876	3.984
RXYQ192PBTJPBYD	4.115	3.984	REYQ192PBTJ/PBYD	3.610	3.817
RXYQ216PBTJ/PBYD	3.953	3.953	REYQ216PBTJ/PBYD	3.390	3.731
RXYQ240PBTJ/PBYD	3.876	3.953	REYQ240PBTJ/PBYD	3.226	3.650
RXYQ264PBTJ/PBYD	4.065	3.922	REYQ264PBTJ/PBYD	3.436	3.597
RXYQ288PBTJ/PBYD	4.082	4.000	REYQ288PBTJ/PBYD	3.571	3.788
RXYQ312PBTJ/PBYD	4.016	3.968	REYQ312PBTJ/PBYD	3.425	3.731
RXYQ336PBTJ/PBYD	3.922	3.937	REYQ336PBTJ/PBYD	3.322	3.676
RXYQ360PBTJ/PBYD	3.876	3.937			



Appendix B2 Cooling and Heating COP for VRV IV Products

VRV IV Model	Cooling COP w/o VRT	Heating COP without VRT	Heating COP with VRT	VRV IV Model	Cooling COP w/o VRT	Heating COP without VRT	Heating COP with VRT
RXYQ72TTJU/TYDN	4.566	4.348	4.545	REYQ72TTJU/TYDN	5.102	4.348	4.545
RXYQ96TTJU/TYDN	4.608	4.785	5.000	REYQ96TTJU/TYDN	5.025	4.831	5.051
RXYQ120TTJU/TYDN	3.906	4.167	4.367	REYQ120TTJU/TYDN	4.292	4.149	4.348
RXYQ144TTJU/TYDN	3.571	4.274	4.484	REYQ144TTJU/TYDN	3.906	4.132	4.348
RXYQ168TTJU/TYDN	3.040	4.149	4.310	REYQ168TTJU/TYDN	3.546	3.876	4.065
RXYQ192TTJU/TYDN	4.132	4.115	4.405	REYQ192TTJU/TYDN	4.049	4.132	4.329
RXYQ216TTJU/TYDN	4.184	4.425	4.608	REYQ216TTJU/TYDN	3.937	4.310	4.525
RXYQ240TTJU/TYDN	3.906	4.167	4.367	REYQ240TTJU/TYDN	3.861	4.115	4.292
RXYQ264TTJU/TYDN	3.717	4.219	4.405	REYQ264TTJU/TYDN	3.663	4.000	4.149
RXYQ288TTJU/TYDN	3.597	4.274	4.484	REYQ288TTJU/TYDN	3.597	3.861	4.016
RXYQ312TTJU/TYDN	3.279	4.219	4.405	REYQ312TTJU/TYDN	3.425	3.759	3.937
RXYQ336TTJU/TYDN	3.049	4.167	4.348	REYQ336TTJU/TYDN	3.165	3.584	3.759
RXYQ360TTJU/TYDN	3.906	4.167	4.367	REYQ360TTJU/TYDN	3.584	4.082	4.274
RXYQ384TTJU/TYDN	3.597	4.310	4.484	REYQ384TTJU/TYDN	3.268	3.774	3.953
RXYQ408TTJU/TYDN	3.521	4.329	4.525	REYQ408TTJU/TYDN	3.155	3.546	3.717
				REYQ432TTJU/TYDN	3.012	3.460	3.610
				REYQ456TTJU/TYDN	2.732	3.322	3.460



Appendix C Cooling and Heating COP for VRV WIV Products

Model	Cooling COP	Heating COP
RWEYQ72PCYD/PCTJ	5.025	5.935
RWEYQ84PCYD/PCTJ	4.396	5.128
RWEYQ144PCYD/PCTJ	5.025	5.935
RWEYQ168PCYD/PCTJ	4.396	5.128
RWEYQ216PCYD/PCTJ	5.025	5.935
RWEYQ252PCYD/PCTJ	4.396	5.120