



## Engineering Data

## ED 19086-1

Group: **UV**

Part Number: **ED 19086-1**

Date: **August 2020**

# Daikin VRV-Compatible Unit Ventilator Configuration and Ordering Guidelines

Daikin can now offer a Unit Ventilator configured for use with a Daikin VRV system. This solution utilizes the VRV AHU Integration Kit to control the VRV operation. A 3rd party DDC controller is required to control all other unit operation. Daikin will provide and install a VRV-compatible DX coil, and mount the AHU Integration kit components as detailed below.

### VRV AHU Integration Kit Application Considerations:

- VRV heating operation is limited to a minimum of 50°F dry-bulb air temperature entering the coil. A secondary heat source such as hot water, steam or electric heat must be used if heating operation will be required with an entering air condition below this range.
- Cooling operation is limited to a 57°F–77°F wet-bulb air temperature entering the coil.
- Each unit ventilator must have its own dedicated EKEQMCAV3-US (Z-control) control box, (internally mounted on UAV\*; externally mounted on UAH\*), EKEXV Valve kit and BRC1E73 Navigation Remote Controller.
- Refer to the Daikin North America AHU Integration Kit Selection Guide for all VRV application requirements.
- This system will require a 3rd party, unit-level DDC control to enable/disable the VRV controls, and to control other unit components such as fan, outdoor/return air dampers, face and bypass damper and other heat source. The BAS/DDC system will need to access the VRV system from the system level using the BACnet Gateway (DMS502B71) or iTM Server/Gateway (DCM014A51) for setpoint and mode changes. The system control interfaces and logic should be coordinated with the BAS/DDC provider in detail before ordering equipment. See “Suggested Sequence of Operation” on page 3.

- Product support and warranty coverage for the standard unit ventilator components and installation of EKEXV kits and its control box will be provided by Daikin Applied.
- Product support and standard warranty coverage for the AHU Integration Kit components (i.e. EKEXV and EKEQMCAV3-US) and VRV system will be provided by Daikin North America.
- All BAS/DDC controls, wiring, programming, piping and installation are provided and supported by others.

### DST Unit Ventilator Configuration:

The Daikin Model AV or AH unit ventilator will be equipped with a special DX coil that complies with the requirements of the AHU Integration kit and provides the following performance:

VRV Unit Ventilator DX Coil Performance					
UV Model	07	10	13	15	20
EXV Kit Size	2-Ton	2.5-Ton	3-Ton	4-Ton	5-Ton
Airflow (CFM)	750	1,000	1,250	1,500	2,000
Cooling Capacity @ 80/67 EAT					
Total (btuh)	25,371	33,879	40,679	50,787	60,000
Sensible (btuh)	17,686	23,118	27,101	33,382	40,190
LAT-DB (F)	58.0	59.0	56.9	55.8	58.2
LAT-WB (F)	55.9	56.6	54.0	53.9	55.6
Heating Capacity @ 65 EAT					
Sensible (btuh)	26,888	36,155	44,035	54,175	63,296
LAT-DB (F)	99.2	100.0	98.0	98.8	94.6

- All units must be configured with a DX coil and with the Field Mounted Controls option.
- You may select any AV/AH unit type, size, voltage, fan motor type, heating coil type or any other standard factory option, except as noted above. See code sheets on page 4 and page 5 for allowable options.
- Daikin can also include factory installation of the 3rd party DDC controller, sensors, damper actuators and valve packages as part of the special.

### **What You Will Need To Do:**

- Contact Application Engineering for a FPA. The FPA will include supplying and installing the DX coil, mounting and piping of the EXV kit, and mounting and wiring of AHU Integration kit controls. For unit voltages other than 208/230/1 the factory will provide a transformer for the Z-Control power requirement.
- It is recommended that the Navigation Remote Controller accessory also be factory mounted in the unit. It may be field mounted in the space if required.
- The EXV kit and Z-Control kit and Navigation controller must be purchased by a Daikin VRV rep office and shipped to San Luis Potosi, Mexico, by way of Laredo, TX, at your cost.
  - Each unit will require (1) EKEQMCAV3-US Z-Control kit
  - Each unit will require one of the following:
    - For AV/AH size 07 provide (1) EKEXV63-US
    - For AV/AH size 10 provide (1) EKEXV80-US
    - For AV/AH size 13 provide (1) EKEXV100-US
    - For AV/AH size 15 provide (1) EKEXV125-US
    - For AH size 20 provide (1) EKEXV140-US
  - If the Remote Controller is to be unit mounted each unit will require (1) BRC1E73 Navigation Remote Controller.

### **System Control Interface Using 3rd Party BAS/DDC And Unit-Mounted DDC Controllers**

#### **Unit-mounted DDC controller to Z-Control interface required for the following functions:**

- Control signal from unit DDC controller to Z-Control
  - T1-T2: dry contact closure to enable/disable VRV operation
- Control signal from Z-Control to unit DDC controller
  - C1-C2: dry contact closure indicates call for fan during VRV operation

#### **BAS to DIII-NET interface required for the following functions:**

- Copy BAS zone setpoints to each UV's Z-control
  - DDC controller zone setpoints will be used to enable/disable VRV operation based on zone demand
  - VRV zone setpoints will be used by the Z-Control when during VRV cooling or heating operation
- Set VRV system mode to cooling or heating (if VRV heating is used)
  - The BAS should be able to command the DX operation mode using the VRV BMS interface provided.
  - For a Heat pump, the mode change command should be sent to the master indoor unit or UV. When UV's are connected a single heat pump outdoor unit, all UV's will operate in the same mode as the master indoor unit or UV.
  - For a Heat recovery system, the mode change command is sent directly to UV's mode change BACnet point.
- Read system alarms
  - During an Alarm event the DX coil may not provide heating or cooling.
- During VRV outdoor unit defrost or oil return, the DX coil may not be able to provide the required heating or cooling capacity.
- During the DX coil operation, the return air temperature of the EKEXV kit should be used for control.
  - When enabled, the DX coil will provide heating or cooling if the room temperature sensed is greater (cooling) or lower (heating) than 1 Deg F from setpoint of the EKEXV kit.
  - The DX coil's active heating or cooling status can be monitored using thermo status point via the VRV BMS interface.

## Suggested Sequence of Operation

### Heat/cool (2-coil) units using VRV for cooling only:

- When the zone DDC controller determines there is a demand for cooling it shall close the T1-T2 contact to enable the zone VRV operation.
  - VRV system mode must be set to cooling through the BAS.
  - Supply fan should be on high speed.
  - Face & bypass damper (if present) should be positioned for full airflow across the DX coil.
- Hot water, steam or electric coil shall be used for all heating demand. T1-T2 to remain open during heating operation.
- The DDC controller should operate all other unit functions (unit dampers, fan speed and heating valve) per typical UV sequence of operation.

### Heat/cool (2-coil) units using VRV for heating and cooling duty:

VRV heating operation is limited based on entering air temperature as described above. Based on outdoor air temperature or time of year the system should switch between VRV heating and the secondary heating source.

- When the zone DDC controller determines there is a demand for cooling it shall close the T1-T2 contact to enable the zone VRV operation.
  - VRV system mode must be set to cooling through the BAS.
  - Supply fan should be on high speed.
  - Face & bypass damper (if present) should be positioned for full airflow across the DX coil.
- When VRV heating is enabled by the BAS and the zone DDC controller determines there is a demand for heating it shall close the T1-T2 contact to enable the zone VRV operation.
  - VRV system mode must be set to heating through the BAS.
  - Supply fan should be on high speed.
  - Face & bypass damper (if present) should be positioned for full airflow across the DX coil.
- When VRV heating is disabled by the BAS the hot water, steam or electric coil shall be used for all heating demand. T1-T2 to remain open during heating operation.
- The DDC controller should operate all other unit functions (unit dampers, fan speed and heating valve) per typical UV sequence of operation.

### Units using VRV for all heating and cooling duty:

This method should only be used in climates where the heating and cooling entering air limits will not be exceeded. This option may not be used with Face & Bypass units.

- When the zone DDC controller determines there is a demand for cooling it shall close the T1-T2 contact to enable the zone VRV operation.
  - VRV system mode must be set to cooling through the BAS.
  - Supply fan should be on high speed.
- When the zone DDC controller determines there is a demand for heating it shall close the T1-T2 contact to enable the zone VRV operation.
  - VRV system mode must be set to heating through the BAS.
  - Supply fan should be on high speed.
- The DDC controller should operate all other unit functions (unit dampers and fan speed) per typical UV sequence of operation.

### Capacity Setting Adaptor:

The Z-Control kit will ship with a plastic bag containing 10 “jumpers”, each associated with a different size EKEXV kit. It is the responsibility of the Rep/Contractor to identify the correct capacity adaptor that matches their EKEXV kit and install this in the field.

EX EXV Kit	Capacity Setting Adaptor Label (Indication)	EX EXV Kit	Capacity Setting (Indication)
50	J56	140	J160
63	J71	200	J224
80	J90	250	J280
100	J112	400	J22
125	J140	500	J28

## Model Nomenclature – AVS, AVB, AVV, AVR

**U AVV 9 H10 C G 65 A 23 AL 22 G I B 1**  
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Category	Code Item	Code Option	Code Designation & Description			
Product Category	1	1	U	Unit Ventilators		
Model Type	2	2-4	AVS	Floor, Face & Bypass <i>Note: May only be used on units utilizing a hot water or steam coil for heating.</i>	AVV	Floor, Valve Control
			AVB	Floor, Face & Bypass, Reheat <i>Note: May only be used on units utilizing a hot water or steam coil for heating.</i>	AVR	Floor, Valve Control, Reheat
Design Series	3	5	9	Design J		
Motor Type	4	6	H	EC Motor, 3-Speed	V	EC Motor, Variable Airflow
Nominal Capacity		7-8	07	750 CFM	13	1250 CFM
			10	1000 CFM	15	1500 CFM
Voltage	5	9	A	115/60/1*	D	208/60/3
			C	208/60/1	H	230/60/3
			G	230/60/1	K	460/60/3*
			J	265-277/60/1*		
Coil Options	6	10	G [9]	DX (Required)		
	Numerical codes [#] include optional stainless steel drain pan.					
Heating Options	7	11-12	12	3 Element Low Cap. Electric Heat	68	Steam Low Cap.
			13	6 Element Low Cap. Electric Heat	69	Steam High Cap.
			65	1 Row HW	78	Opposite End Steam Low Cap.
			66	2 Row HW	79	Opposite End Steam High Cap.
			67	3 Row HW	00	None
Hand Orientation	8	13	E	LH Heating/RH Cooling	S	Single Coil Right Hand
Controls	9	14-15	23	Field Mounted Controls (By Others)		
Discharge	10	16-17	AL	16-5/8" Top Bar Grille		
			AK	21-7/8" Top Bar Grille Partial Adapter Back, Open Tunnel		
			AN	21-7/8" Top Bar Grille Full Adapter Back, Closed Tunnel		
			AP	21-7/8" Top Bar Grille Full Adapter Back, Cold Pipe Tunnel, Top Duct In		
			AM	21-7/8" Top Bar Grille 2" Step, Full Adapter Back, Closed Tunnel		
			AB	21-7/8" Top Bar Grille Full Adapter Back, Closed Pipe Tunnel w/ Solid Back		
Return Air/Outside Air	11	18-19	22	Return Air Bottom Front/ Outdoor Air Rear		
			24	Recirculation Only/ No OA or RA Dampers		
			30	Return Air Bottom with Draft Stop/ OA Rear		
Power Connection	12	20	G	Box With Switch		
Color	13	21	I	Antique Ivory	G	Soft Gray
			W	Off White	C	Cupola White
			B	Putty Beige		
SKU Type	14	22	B	Standard Delivery		
Product Style	15	23	1	1st Style Change		

\* Selection of non-208/230V unit will incur cost to supply additional transformer

## Model Nomenclature – AHB, AHF, AHR, AHV

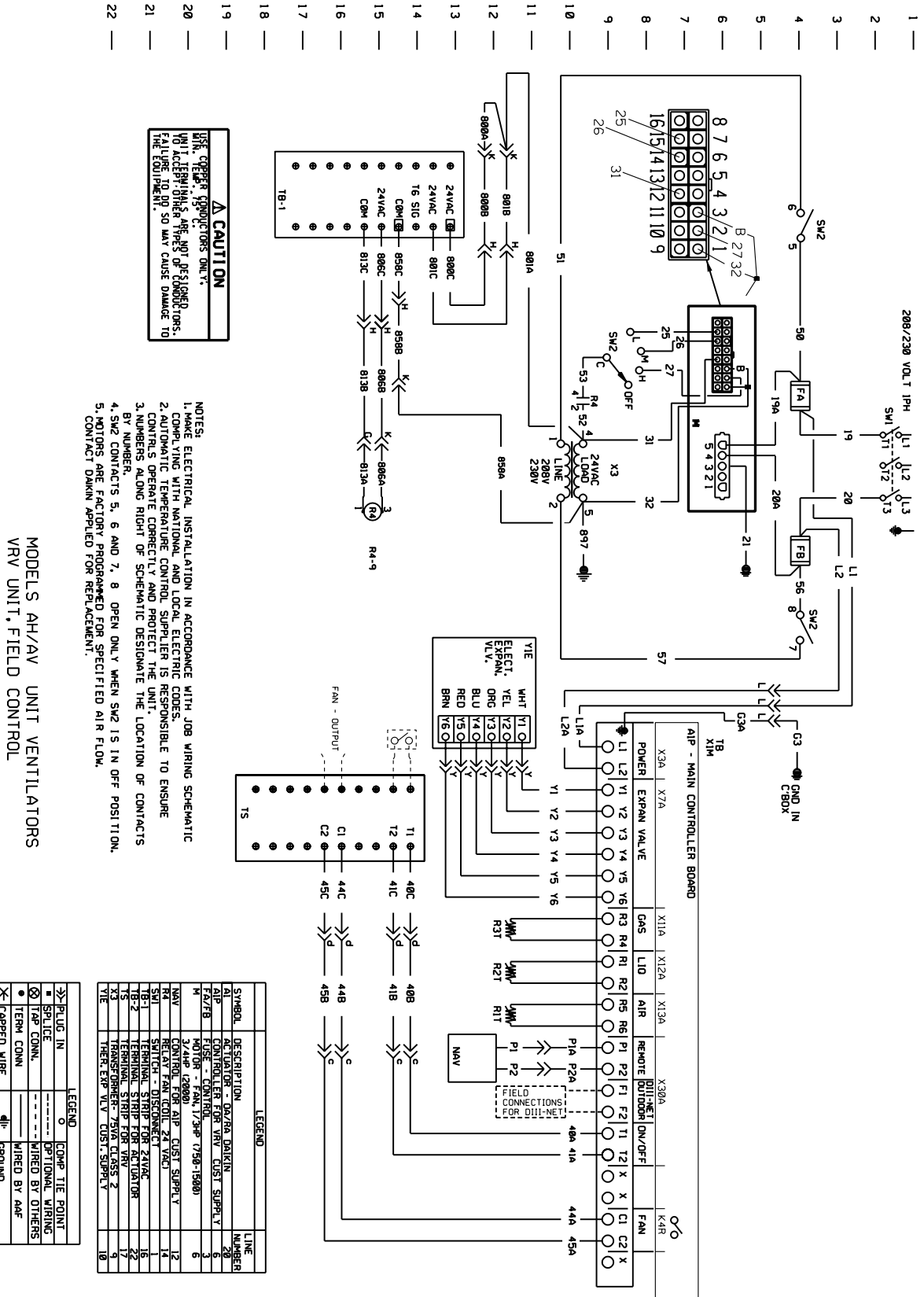
**U AHF 9 H10 C G 65 A 23 AT 26 G Y B 1**  
**1 2 3 4 5 6 7 8 9 10 11 12 13 14 15**

Category	Code Item	Code Option	Code Designation & Description			
<b>Product Category</b>	1	1	U	Unit Ventilators		
<b>Model Type</b>	2	2-4	AHB	Ceiling- Face & Bypass w/ Reheat <i>Note: May only be used on units utilizing a hot water or steam coil for heating.</i>	AHR	Ceiling- Valve Control w/ Reheat
			AHF	Ceiling- Face & Bypass <i>Note: May only be used on units utilizing a hot water or steam coil for heating.</i>	AHV	Ceiling- Valve Control
<b>Design Series</b>	3	5	9	Design J		
<b>Nominal Capacity</b>	4	6-8	H07	High Static 750 CFM	V07	EC Motor, Variable Airflow 750 CFM
			H10	High Static 1000 CFM	V10	EC Motor, Variable Airflow 1000 CFM
			H13	High Static 1250 CFM	V13	EC Motor, Variable Airflow 1250 CFM
			H15	High Static 1500 CFM	V15	EC Motor, Variable Airflow 1500 CFM
			H20	High Static 2000 CFM	V20	EC Motor, Variable Airflow 2000 CFM
<b>Voltage</b>	5	9	A	115/60/1*	D	208/60/3
			C	208/60/1	H	230/60/3
			G	230/60/1	K	460/60/3*
			J	265-277/60/1*		
<b>Coil Options</b>	6	10	G [9]	DX ( <b>Required</b> )		
	Numerical codes [#] include optional stainless steel drain pan.					
<b>Heating Options</b>	7	11-12	12	3 Element Low Cap. Electric Heat	67	3 Row HW
			13	6 Element Low Cap. Electric Heat	68	Steam Low Cap.
			65	1 Row HW	69	Steam High Cap.
			66	2 Row HW	00	None
<b>Hand Orientation</b>	8	13	E	LH Heating/RH Cooling	S	Single Coil Right Hand
<b>Controls</b>	9	14-15	23	Field Mounted Controls (By Others)		
<b>Discharge</b>	10	16-17	AH	Front Discharge Duct Collar- 36" Length Unit		
			AT	Front Disch. Double Deflection Grille- 36" Length		
			BD	Down Disch. Double Deflection Grille- 40" Length		
			FD	Front Discharge Duct Collar- 40" Length Unit		
			FG	Front Disch. Double Deflection Grille- 40" Length		
<b>Return Air/Outside Air</b>	11	18-19	25	Recirculation RA Bottom Grille- No RA/OA Dampers		
			26	RA Bottom Grille & OA Top Duct Collar		
			27	RA Bottom Grille & OA Rear Duct Collar		
			28	RA Rear Duct Grille & OA Top Duct Collar		
			29	RA Rear Duct Grille & OA Rear Duct Collar		
<b>Power Connection</b>	12	20	G	Box With Switch		
<b>Color</b>	13	21	Y	Off White		
<b>SKU Type</b>	14	22	B	Standard Delivery		
<b>Product Style</b>	15	23	1	1st Style Change		

\* Selection of non-208/230V unit will incur cost to supply additional transformer

**Figure 1: VRV Unit, Field Control**

**Note:** The schematic below is an example of a VRV Unit Vent with pre-wired connections to the terminal blocks. Line voltage, fan motor type and terminal block connections will vary depending on unit configuration and other modifications made per customer FPA-request. Always refer to the wiring schematic provided with the unit, located on the inside of the front-right access panel.







### ***Daikin Applied Training and Development***

Now that you have made an investment in modern, efficient Daikin equipment, its care should be a high priority. For training information on all Daikin HVAC products, please visit us at [www.DaikinApplied.com](http://www.DaikinApplied.com) and click on Training, or call 540-248-9646 and ask for the Training Department.

### ***Warranty***

All Daikin equipment is sold pursuant to its standard terms and conditions of sale, including Limited Product Warranty. Consult your local Daikin Applied representative for warranty details. Refer to Form 933-430285Y. To find your local Daikin Applied representative, go to [www.DaikinApplied.com](http://www.DaikinApplied.com).

### ***Aftermarket Services***

To find your local parts office, visit [www.DaikinApplied.com](http://www.DaikinApplied.com) or call 800-37PARTS (800-377-2787). To find your local service office, visit [www.DaikinApplied.com](http://www.DaikinApplied.com) or call 800-432-1342.

This document contains the most current product information as of this printing. For the most up-to-date product information, please go to [www.DaikinApplied.com](http://www.DaikinApplied.com).

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