

## R410a Data

# VK™ 3-30 Tons Vertical Comfort Cooling A/C's & Heat Pumps



**3 to 30 Tons**

*"Floor Mounted Comfort A/C's"  
(Modular for Rigging Purposes!)*



### Features & Benefits

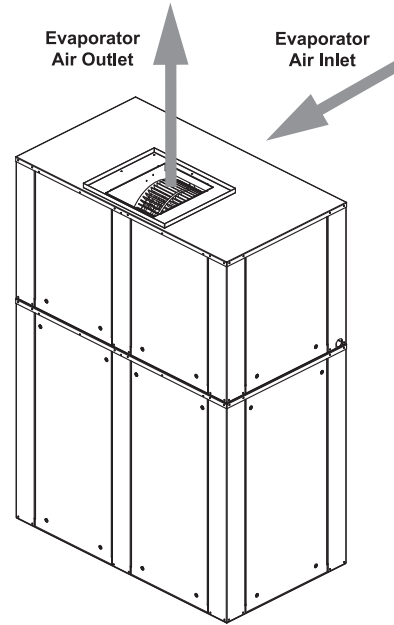
- 3 to 30 Ton Capacities
- *Comfort Applications*
  - General Office Spaces
  - Retail Stores
  - Restaurants
  - Factories & Warehouses
- Compact Vertical Floor Mounted SCAV Self-Contained & Split
- DX Air, Water & Glycol Cooled, Heat Pumps & Economizers
- Energy Saving Options
  - Variable Frequency Drives for VAV Applications
  - Air Side Economizers
  - Water Side Economizers
- Modular for Rigging Purposes & . . . More!



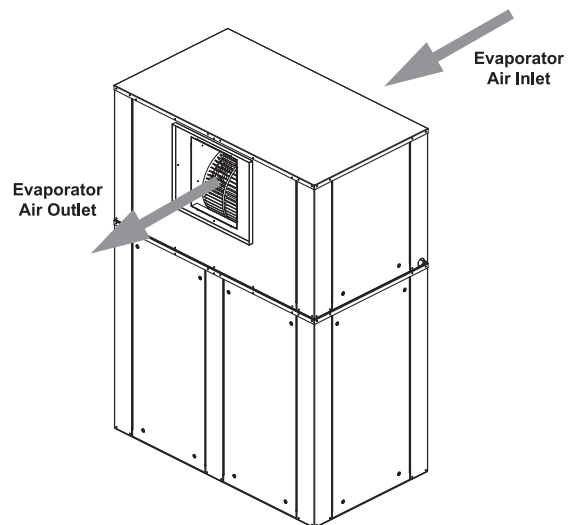
MEA229-06-E Approved

**AboveAir™** VK vertical floor mounted air conditioners are the reliable solution to your comfort cooling control needs. Available in a wide variety of cooling methods and cabinet configurations including a full range of options, **AboveAir™** A/C's are a step above!

- ☑ R410a High Efficient Refrigerant
- ☑ Modular For Rigging Purposes
- ☑ Packaged & Split Systems
- ☑ Top or Front Evap Air Discharge
- ☑ Variety of cooling methods
- ☑ Air Side and Water-Glycol Economizers
- ☑ VAV / VFD Application Option
- ☑ Flexible options and accessories
- ☑ Energy efficient operation



**Top Evaporator Air Discharge**



**Front Evaporator Air Discharge**

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*AboveAir™* VK vertical comfort cooling SCAV A/C's are designed to meet your unique application dependent requirements. Select from a wide range of options and configurations:



## 3 to 30 Tons

**Splittable For Rigging  
VAV Option Package**

**Hot Water Heat**

**Electric Heat**

**Steam Heat**

**... and more!!**



## MODULAR FOR RIGGING PURPOSES

**DX - AIR, WATER, GLYCOL COOLED plus HEAT PUMP & ECONOMIZERS**



### Standard & Optional Features:

- Scroll Compressors (R407C)
- Adjustable Belt-Drive DWDI Blowers
- High Efficiency Air Filtration
- Low Ambient Head Pressure Control
- 2 & 3-way 150 psig or 350 psig Water/ Glycol Cooled Regulating Valves
- Electric, Hot Water or Steam Heat
- Air, Water-Glycol Source Heat Pump
- Hot Gas Bypass
- Variable Frequency Drives (VFD) for VAV

### Accessories:

- Air Side Economizers w/ Enthalpy Controls
- Water-Glycol Side Economizers
- Condensate Pumps
- Main Power Electrical Disconnects
- Firestats
- Smoke Detectors
- Remote Water-Leak Detectors
- Compressor Sound Jackets
- Glycol Pump Packages & Drycoolers
- ... and more!



**MEA229-06-E**

# Performance Data (VK-Vertical) - DX 4 To 10 Tons

Nominal Size		4 Tons	5 Tons	6 Tons	8 Tons	10 Tons	
<b>Air Cooled Model</b>		<b>VKA/KE/KH-048</b>	<b>VKA/KE/KH-060</b>	<b>VKA/KE/KH-072</b>	<b>VKA/KE/KH-096</b>	<b>VKA/KE/KH-120</b>	
<b>AIR COOLED DX</b>	<b>80°F DB / 67°F WB, 50% RH</b>						
	Total	BTUH	52,100	63,500	76,200	94,200	125,000
	Sensible	BTUH	36,400	45,300	55,500	70,700	94,000
	<b>75°F DB / 62.5°F WB, 50% RH</b>						
	Total	BTUH	47,800	58,600	70,000	86,600	115,000
	Sensible	BTUH	36,200	45,100	55,400	70,500	92,000
<b>Water Cooled Model</b>		<b>VKW-048</b>	<b>VKW-060</b>	<b>VKW-072</b>	<b>VKW-096</b>	<b>VKW-120</b>	
<b>WATER COOLED DX</b>	<b>80°F DB / 67°F WB, 50% RH</b>						
	Total	BTUH	56,700	69,000	87,900	107,600	132,000
	Sensible	BTUH	39,300	48,800	62,100	77,200	97,600
	<b>75°F DB / 62.5°F WB, 50% RH</b>						
	Total	BTUH	51,400	63,800	80,100	97,700	126,800
	Sensible	BTUH	38,700	46,400	61,000	75,700	103,400
<b>Glycol Cooled Model</b>		<b>VKG-048</b>	<b>VKG-060</b>	<b>VKG-072</b>	<b>VKG-096</b>	<b>VKG-120</b>	
<b>GLYCOL COOLED DX</b>	<b>80°F DB / 67°F WB, 50% RH</b>						
	Total	BTUH	49,100	60,100	75,700	92,700	115,800
	Sensible	BTUH	36,400	45,200	57,100	71,400	85,600
	<b>75°F DB / 62.5°F WB, 50% RH</b>						
	Total	BTUH	44,500	54,800	68,400	83,900	105,300
	Sensible	BTUH	35,500	44,200	55,900	69,900	83,900

## GENERAL SHARED DATA

<b>ALL DX MODELS</b>	<b>Electric Heater (Duct Mounted, Separately Powered) - BTUH includes evaporator motor heat, (Optional)</b>						
	Capacity	BTUH	52,915	53,490	54,630	55,780	75,135
		KW	15.0	15.0	15.0	15.0	20.0
	Stages	NO	2	2	2	2	2
	<b>Evaporator Blower / Motor - Belt Drive, DWDI Centrifugal</b>						
	Airflow Rate	CFM	1,600	2,000	2,400	3,200	4,000
	E.S.P.	IN WG	0.75	0.75	0.75	0.75	0.75
	Blower Motor	HP	3/4	1	1.5	2	3
	Blower Diameter	IN	12 X 9	12 X 9	12 X 9	15 X 10	15 X 10
	<b>Evaporator Coil - Aluminum Fin, Copper Tube</b>						
	Rows	NO	4	4	4	4	4
	Face Area	FT <sup>2</sup>	5.1	5.1	5.1	8.6	8.6
	<b>Filters - 30% Dust Spot Efficient</b>						
	Nominal Size	(NO) IN	(2) 16 x 24 x 2	(2) 16 x 24 x 2	(2) 16 x 24 x 2	(3) 16 x 25 x 2	(3) 16 x 25 x 2
	<b>Compressor - Heat Pump Duty Hermetic</b>						
	Qty., Horespower	(NO) HP	(1) 4.0	(1) 5.0	(1) 6.0	(2) 4.0	(2) 5.0
	<b>Connection Sizes</b>						
	Condensate Drain	FPT IN	3/4	3/4	3/4	3/4	3/4
	<b>Approximate Unit Weights</b>						
	VKA-( )	LBS	900	925	930	1,200	1,225
VKE-( )	LBS	800	825	830	1,050	1,075	
VKH-( )	LBS	700	725	730	900	925	
VKW & VKG-( )	LBS	850	875	880	1,100	1,125	

# Performance Data (VK-Vertical) - DX 4 To 10 Tons

## Heat Rejection Data

Nominal Size	4 Tons	5 Tons	6 Tons	8 Tons	10 Tons
Model Size	048	060	072	096	120

### DX - AIR COOLED CONDENSER DATA

Packaged or Split Horizontal & Vertical Indoor (Optional Outdoor), Centrifugal Blower Air Cooled Condensing Unit Data							
AIR COOLED DX	Model	VKA-048 & XCU/VCU-048	VKA-060 & XCU/VCU-060	VKA-072 & XCU/VCU-072	VKA-096 & XCU/VCU-096	VKA-120 & XCU/VCU-120	
	Air Flow Rate	CFM	2,500	3,200	3,900	4,000	6,500
		IN ESP	1.0	1.0	1.0	1.0	1.0
	Blower Motor	HP	1	1-1/2	2	3	5
	Blower Diameter	IN	12 x 12	12 x 12	12 x 12	15 x 15	15 x 15
	Blower Type		Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal
	Coil Face Area	FT <sup>2</sup>	6.0	6.0	6.0	9.7	9.7
	Rows	NO	5	5	5	6	6

### DX - WATER COOLED CONDENSER DATA

Water Cooled Condenser Data - 0% Glycol Solution, THR & GPM at 80°F DB/67°F WB Cooling Capacity							
WATER COOLED DX	Model	VKW & VWU-048	VKW & VWU-060	VKW & VWU-072	VKW & VWU-096	VKW & VWU-120	
	Total Heat of Rej.	BTUH	68,770	84,360	111,680	131,760	162,775
	Flow @ 85°F EWT	GPM	13.8	16.9	22.3	26.4	32.6
	Water Press. Drop	FT WG	12.0	17.2	18.9	10.9	16.0
	Water Reg. Valve		2-Way, 150 psig - factory installed, (3-way & High Pressure Valves are Optional)				

### DX - GLYCOL COOLED CONDENSER DATA

Glycol Cooled Condenser Data - @ 40% Ethylene Glycol, THR & GPM at 80°F DB/67°F WB Cooling Capacity							
GLYCOL COOLED DX	Model	VKG & VGU-048	VKG & VGU-060	VKG & VGU-072	VKG & VGU-096	VKG & VGU-120	
	Total Heat of Rej.	BTUH	64,155	79,210	105,215	122,730	154,060
	Flow @ 110°F EGT	GPM	12.8	15.8	21.0	24.5	30.8
	Glycol Press. Drop	FT WG	10.3	15.0	16.8	9.5	14.3
	Glycol Reg. Valve		2-Way, 150 psig - factory installed, (3-way & High Pressure Valves are Optional)				

## Connection Data

Nominal Size	12 Tons	15 Tons	20 Tons	25 Tons
Model Size	144	180	240	300

### DX - AIR COOLED REFRIGERANT (R407C) CONNECTION DATA

AIR COOLED SPLIT	DX Air Handling Units - (VKH models)					
	Liquid Line, (Qty.)	OD IN	1/2, (2)	1/2, (2)	1/2, (2)	5/8, (2)
	Suction Line, (Qty.)	OD IN	7/8, (2)	1-1/8, (2)	1-3/8, (2)	1-5/8, (2)
	Indoor / Outdoor, Centrifugal Blower Remote Air Cooled Condensing Units - (VCU models)					
	Liquid Line, (Qty.)	OD IN	1/2, (2)	1/2, (2)	1/2, (2)	5/8, (2)
	Suction Line, (Qty.)	OD IN	7/8, (2)	1-1/8, (2)	1-3/8, (2)	1-5/8, (2)

### DX - WATER COOLED CONDENSER CONNECTION DATA

Water Cooled Condenser Data - 0% Glycol Solutions, (VKW & VWU models)					
Water IN/OUT	OD IN	1-3/8	1-5/8	2-1/8	2-1/8

### DX - GLYCOL COOLED CONDENSER CONNECTION DATA

Glycol Cooled Condenser Data - @ 40% Ethylene Glycol (VKG & VGU models)					
Glycol IN/OUT	OD IN	1-3/8	1-5/8	2-1/8	2-1/8

# Performance Data (VK-Vertical) - DX 12 To 25 Tons

Nominal Size		12 Tons	15 Tons	20 Tons	25 Tons	
<b>Air Cooled Model</b>		<b>VKA/KE/KH-144</b>	<b>VKA/KE/KH-180</b>	<b>VKA/KE/KH-240</b>	<b>VKA/KE/KH-300</b>	
<b>AIR COOLED DX</b>	<b>80°F DB / 67°F WB, 50% RH</b>					
	Total	BTUH	159,600	194,000	244,300	306,700
	Sensible	BTUH	112,000	135,900	175,100	220,800
	<b>75°F DB / 62.5°F WB, 50% RH</b>					
	Total	BTUH	145,000	175,900	221,900	278,600
	Sensible	BTUH	114,000	134,100	172,700	217,400
<b>Water Cooled Model</b>		<b>VKW-144</b>	<b>VKW-180</b>	<b>VKW-240</b>	<b>VKW-300</b>	
<b>WATER COOLED DX</b>	<b>80°F DB / 67°F WB, 50% RH</b>					
	Total	BTUH	169,200	211,400	266,200	334,300
	Sensible	BTUH	116,400	144,000	185,500	233,500
	<b>75°F DB / 62.5°F WB, 50% RH</b>					
	Total	BTUH	154,600	193,300	244,300	306,400
	Sensible	BTUH	114,000	140,800	180,100	228,600
<b>Glycol Cooled Model</b>		<b>VKG-144</b>	<b>VKG-180</b>	<b>VKG-240</b>	<b>VKG-300</b>	
<b>GLYCOL COOLED DX</b>	<b>80°F DB / 67°F WB, 50% RH</b>					
	Total	BTUH	153,000	189,400	239,000	299,300
	Sensible	BTUH	109,200	133,800	172,200	217,200
	<b>75°F DB / 62.5°F WB, 50% RH</b>					
	Total	BTUH	142,600	171,700	216,500	271,800
	Sensible	BTUH	112,600	132,100	170,100	214,200

## GENERAL SHARED DATA

<b>ALL DX MODELS</b>	<b>Electric Heater (Duct Mounted, Separately Powered) - BTUH includes evaporator motor heat, (Optional)</b>					
	Capacity	BTUH	75,135	79,720	79,720	119,580
		KW	20.0	20.0	20.0	30.0
	Stages	NO	2	2	2	2
	<b>Evaporator Blowers / Motors - Belt Drive, DWDI Centrifugal</b>					
	Airflow Rate	CFM	4,800	6,000	8,000	10,000
	E.S.P.	IN WG	0.75	0.75	0.75	0.75
	Blower Motor	HP	3	5	5	7.5
	Blower Dia., (Qty.)	IN	15 X 15, (2)	15 X 15, (2)	15 X 15, (2)	15 X 15, (2)
	<b>Evaporator Coil - Aluminum Fin, Copper Tube</b>					
	Rows	NO	4	4	4	4
	Face Area	FT <sup>2</sup>	14.4	14.4	14.4	20.0
	<b>Filters - 30% Dust Spot Efficient</b>					
	Nominal Size	(NO) IN	(4) 20 x 30 x 2	(4) 20 x 30 x 2	(4) 20 x 30 x 2	(8) 16 x 25 x 2
	<b>Compressors - Heat Pump Duty SCROLL</b>					
	Qty., Horespower	(NO) HP	(2) 6.0	(2) 7.5	(2) 10.0	(2) 12.5
	<b>Connection Sizes</b>					
	Condensate Drain	FPT IN	1	1	1	1
	<b>Approximate Unit Weights</b>					
	VKA-( )	LBS	1,850	1,900	2,100	2,500
VKH-( )	LBS	1,150	1,200	1,200	1,500	
VKW & VKG-( )	LBS	1,750	1,750	1,750	2,350	

## Heat Rejection Data

Nominal Size	12 Tons	15 Tons	20 Tons	25 Tons
Model Size	144	180	240	300

### DX - AIR COOLED CONDENSING UNIT DATA

Packaged or Split Vertical Indoor (Opt Outdoor), Centrifugal Blower Air Cooled Condensing Unit Data						
AIR COOLED DX	Model		VKA & VCU-144	VKA & VCU-180	VKA & VCU-240	VKA & VCU-300
	Air Flow Rate	CFM	7,200	9,000	13,000	15,000
		IN ESP	1.0	1.0	1.0	1.0
	Blower Motor	HP	5.0	5.0	7.5	10.0
	Blower Dia., (Qty.)	IN NO	15 x 15, (2)	15 x 15, (2)	15 x 15, (2)	15 x 15, (2)
	Blower Type		Centrifugal	Centrifugal	Centrifugal	Centrifugal
	Coil Face Area	FT <sup>2</sup>	17.5	17.5	17.5	21.3
	Rows	NO	5	5	5	5

### DX - WATER COOLED CONDENSER DATA

Water Cooled Condenser Data - 0% Glycol Solution, THR & GPM at 80°F DB/67°F WB Cooling Capacity						
WATER COOLED DX	Model		VKW & VWU-144	VKW & VWU-180	VKW & VWU-240	VKW & VWU-300
	Total Heat of Rej.	BTUH	211,800	266,680	332,450	419,960
	Flow @ 85°F EWT	GPM	42.4	53.3	66.5	84.0
	Water Press. Drop	FT WG	21.0	30.0	35.0	40.0
	Water Reg. Valve		2-Way, 150 psig - factory installed, (3-way & High Pressure Valves are Optional)			

### DX - GLYCOL COOLED CONDENSER DATA

Glycol Cooled Condenser Data - @ 40% Ethylene Glycol, THR & GPM at 80°F DB/67°F WB Cooling Capacity						
GLYCOL COOLED DX	Model		VKG & VGU-144	VKG & VGU-180	VKG & VGU-240	VKG & VGU-300
	Total Heat of Rej.	BTUH	207,650	260,175	324,625	409,275
	Flow @ 110°F EGT	GPM	45.9	57.6	71.8	90.5
	Glycol Press. Drop	FT WG	24.5	34.2	38.5	45.0
	Glycol Reg. Valve		2-Way, 150 psig - factory installed, (3-way & High Pressure Valves are Optional)			

## Connection Data

Nominal Size	12 Tons	15 Tons	20 Tons	25 Tons
Model Size	144	180	240	300

### DX - AIR COOLED REFRIGERANT (R407C) CONNECTION DATA

AIR COOLED SPLIT	DX Air Handling Units - (VKH models)					
	Liquid Line, (Qty.)	OD IN	1/2, (2)	1/2, (2)	1/2, (2)	5/8, (2)
	Suction Line, (Qty.)	OD IN	7/8, (2)	1-1/8, (2)	1-3/8, (2)	1-5/8, (2)
	Indoor / Outdoor, Centrifugal Blower Remote Air Cooled Condensing Units - (VCU models)					
	Liquid Line, (Qty.)	OD IN	1/2, (2)	1/2, (2)	1/2, (2)	5/8, (2)
	Suction Line, (Qty.)	OD IN	7/8, (2)	1-1/8, (2)	1-3/8, (2)	1-5/8, (2)

### DX - WATER COOLED CONDENSER CONNECTION DATA

WATER COOLED	Water Cooled Condenser Data - 0% Glycol Solutions, (VKW & VWU models)					
	Water IN/OUT	OD IN	1-3/8	1-5/8	2-1/8	2-1/8

### DX - GLYCOL COOLED CONDENSER CONNECTION DATA

GLYCOL COOLED	Glycol Cooled Condenser Data - @ 40% Ethylene Glycol (VKG & VGU models)					
	Glycol IN/OUT	OD IN	1-3/8	1-5/8	2-1/8	2-1/8

# Performance Data (VK-Vertical) - Free-Cooling 12-25 Tons

Nominal Unit Size	4 Tons	5 Tons	6 Tons	8 Tons	10 Tons	12 Tons	15 Tons	20 Tons	25 Tons
FE Free-Cool H2O Model:	VKW-048-FE	VKW-060-FE	VKW-072-FE	VKW-096-FE	VKW-120-FE	VKW-144-FE	VKW-180-FE	VKW-240-FE	VKW-300-FE

## Free-Cooling Coil Capacity w/ DX Water Cooled Systems - BTUH @ 45°F EWT, 0% Glycol Solution

### 80°F DB / 67°F WB, 50% RH

Total	BTUH	69,600	83,400	98,500	117,200	139,600	188,900	224,500	269,900	358,700
Sensible	BTUH	46,200	56,000	66,200	81,500	98,200	130,100	157,100	195,900	254,200

### 75°F DB / 62.5°F WB, 50% RH

Total	BTUH	54,200	65,000	76,700	91,600	109,400	148,000	176,400	214,000	282,600
Sensible	BTUH	41,400	50,300	59,500	73,900	89,300	117,800	141,200	179,900	232,000

Flow Rate	GPM	13.8	16.9	22.3	26.4	32.6	42.4	53.3	66.5	84.0
Coil Press. Drop	FT WG	11.1	15.9	25.8	5.0	7.2	3.6	5.4	7.9	11.4

FE Free-Cool Glycol Model:	VKG-048-FE	VKG-060-FE	VKG-072-FE	VKG-096-FE	VKG-120-FE	VKG-144-FE	VKG-180-FE	VKG-240-FE	VKG-300-FE
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## Free-Cooling Coil Capacity w/ DX Glycol Cooled Systems - BTUH @ 45°F EGT, 40% Ethylene Glycol Solution

### 80°F DB / 67°F WB, 50% RH

Total	BTUH	53,500	65,800	81,000	79,000	99,800	144,300	178,900	220,800	303,100
Sensible	BTUH	39,700	48,900	59,200	66,700	82,800	112,500	139,100	177,000	232,400

### 75°F DB / 62.5°F WB, 50% RH

Total	BTUH	42,600	52,400	64,300	64,600	81,500	116,100	144,000	179,700	243,400
Sensible	BTUH	36,600	45,100	54,400	62,900	78,000	104,700	129,500	166,000	215,900

Flow Rate	GPM	12.8	15.8	21.0	24.5	30.8	45.9	57.6	71.8	90.5
Coil Press. Drop	FT WG	13.5	19.6	32.3	6.1	9.1	5.7	8.6	12.6	18.1

## COMPONENT DATA: FREE-COOLING ECONOMIZER SYSTEMS

### Evaporator Blower / Motor - Belt Drive, DWDI Centrifugal

Airflow Rate	CFM	1,600	2,000	2,400	3,200	4,000	4,800	6,000	8,000	10,000
E.S.P.	IN WG	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Blower Motor	HP	1	1-1/2	2	3	5	5	7.5	7.5	7.5
Blower Dia., (Qty.)	IN	12 X 9, (1)	12 X 9, (1)	12 X 9, (1)	15 X 10, (1)	15 X 10 (1)	15 X 15, (2)	15 X 15, (2)	15 X 15, (2)	15 X 15, (2)

### FE Free-Cooling Economizer Coil - Aluminum Fin, Copper Tube

Rows	NO	4	4	5	4	4	4	4	4	4
Face Area	FT <sup>2</sup>	5.1	5.1	5.1	8.6	8.6	14.4	14.4	14.4	20

### FE Free-Cooling Control Valve - Field Installed

Standard Valve		2-Way	2-Way	2-Way	2-Way	2-Way	2-Way	2-Way	2-Way	2-Way
Valve Size, (Cv)	IN	1, (8.0)	1, (8.0)	1, (8.0)	1, (8.0)	1, (8.0)	1-1/4, (8.0)	1-1/4, (8.0)	2, (14.0)	2, (14.0)
Max Opr Press	PSIG	300	300	300	300	300	300	300	400	400

### Connection Sizes

Free-Cool Water	OD IN	1-1/8	1-1/8	1-1/8	1-3/8	1-3/8	1-5/8	1-5/8	1-5/8	2
Condensate Drain	FPT IN	3/4	3/4	3/4	3/4	3/4	1	1	1	1



# Electrical Data (VK-Vertical) - DX 4 To 25 Tons

## Electrical Data

(FLA = Full Load Amps / MCA = Min Circuit Amps / MOP = Max Overcurrent Protection)

Nominal Tons Model Size	4 Tons			5 Tons			6 Tons			8 Tons			10 Tons		
	048			060			072			096			120		
	FLA	MCA	MOP	FLA	MCA	MOP	FLA	MCA	MOP	FLA	MCA	MOP	FLA	MCA	MOP
<b>VKA, Air Cooled Packaged</b>															
208/3/60	23.6	27.7	40	29.0	34.2	50	33.3	36.2	45	47.0	51.1	60	63.9	69.1	80
460/3/60	11.5	13.4	20	14.1	16.6	25	16.5	17.9	20	22.6	24.6	30	31.0	33.5	40
<b>VKH, DX Air Handling Unit</b>															
208/3/60	3.4	4.3	15	3.8	4.8	15	4.5	5.6	15	6.0	7.5	15	8.2	10.3	15
460/3/60	1.7	2.1	15	1.9	2.4	15	2.2	2.8	15	2.9	3.6	15	4.0	5.0	15
<b>VKE, Split Air Cooled Evap</b>															
208/3/60	19.8	23.9	40	24.5	29.7	50	27.3	30.2	40	38.8	42.9	50	49.6	54.8	70
460/3/60	9.6	11.5	15	11.9	14.4	20	13.6	15.0	20	18.6	20.6	25	24.0	26.5	35
<b>VKW &amp; VKG, Water/Glycol Cooled Packaged</b>															
208/3/60	19.8	23.9	40	24.5	29.7	50	27.3	30.2	40	38.8	42.9	50	49.6	54.8	70
460/3/60	9.6	11.5	15	11.9	14.4	20	13.6	15.0	20	18.6	20.6	25	24.0	26.5	35
<b>VKW/G-FE, Water/Glycol Cooled w/ Free-Cooling</b>															
208/3/60	20.2	24.3	40	25.2	30.4	50	28.8	31.7	40	41.0	45.1	60	55.7	60.9	80
460/3/60	9.8	11.7	15	12.2	14.7	25	14.3	15.7	20	19.7	21.7	25	27.0	29.5	35

Nominal Tons Model Size	12 Tons			15 Tons			20 Tons			25 Tons		
	144			180			240			300		
	FLA	MCA	MOP	FLA	MCA	MOP	FLA	MCA	MOP	FLA	MCA	MOP
<b>VKA, Air Cooled Packaged</b>												
208/3/60	70.0	75.2	90	78.4	84.6	100	96.5	104.4	125	141.8	153.6	200
460/3/60	34.0	36.5	45	36.4	39.2	50	45.5	49.2	60	64.5	69.8	90
<b>VKH, DX Air Handling Unit</b>												
208/3/60	14.3	17.9	30	14.3	17.9	30	14.3	17.9	30	18.8	23.5	40
460/3/60	7.0	8.8	15	7.0	8.8	15	7.0	8.8	15	8.7	10.9	15
<b>VKE, Split Air Cooled Evap</b>												
208/3/60	55.7	60.9	80	64.1	70.3	90	77.7	85.6	110	112.8	124.6	150
460/3/60	27.0	29.5	35	29.4	32.2	40	36.8	40.5	50	51.1	56.4	70
<b>VKW &amp; VKG, Water/Glycol Cooled Packaged</b>												
208/3/60	55.7	60.9	80	64.1	70.3	90	77.7	85.6	110	112.8	124.6	150
460/3/60	27.0	29.5	35	29.4	32.2	40	36.8	40.5	50	51.1	56.4	70
<b>VKW/G-FE, Water/Glycol Cooled w/ Free-Cooling</b>												
208/3/60	55.7	60.9	80	64.1	70.3	90	82.2	90.1	110	112.8	124.6	150
460/3/60	27.0	29.5	35	29.4	32.2	40	38.5	42.2	50	51.1	56.4	70

## Centrifugal Blower - DX Split - Air Cooled, Remote Condensing Units

(FLA = Full Load Amps / MCA = Min Circuit Amps / MOP = Max Overcurrent Protection) \* see notes 1-3 below

**VCU - Vertical, Indoor (Outdoor)  
Centrifugal Blower  
Air Cooled Remote Condensing Units**

Power Supply	208/3/60	460/3/60
<b>VCU-048</b>		
FLA	20.2	9.8
MCA	24.3	11.7
MOP	40	15
<b>VCU-060</b>		
FLA	25.2	12.2
MCA	30.4	14.7
MOP	50	20
<b>VCU-072</b>		
FLA	28.8	14.3
MCA	31.7	15.7
MOP	40	20
<b>VCU-096</b>		
FLA	41.0	19.7
MCA	45.1	21.7
MOP	60	25
<b>VCU-120</b>		
FLA	55.7	27.0
MCA	60.9	29.5
MOP	80	35
<b>VCU-144</b>		
FLA	55.7	27.0
MCA	60.9	29.5
MOP	80	35
<b>VCU-180</b>		
FLA	64.1	29.4
MCA	70.3	32.2
MOP	90	40
<b>VCU-240</b>		
FLA	82.2	38.5
MCA	90.1	42.2
MOP	110	50
<b>VCU-300</b>		
FLA	123.0	55.8
MCA	134.8	61.1
MOP	175	80

**XCU - Horizontal, Indoor (Outdoor)  
Centrifugal Blower  
Air Cooled Remote Condensing Units**

Power Supply	208/3/60	460/3/60
<b>XCU-048</b>		
FLA	20.2	9.8
MCA	24.3	11.7
MOP	40	15
<b>XCU-060</b>		
FLA	25.2	12.2
MCA	30.4	14.7
MOP	50	20
<b>XCU-072</b>		
FLA	28.8	14.3
MCA	31.7	15.7
MOP	40	20
<b>XCU-096</b>		
FLA	41.0	19.7
MCA	45.1	21.7
MOP	60	25
<b>XCU-120</b>		
FLA	54.9	26.5
MCA	60.1	29.0
MOP	80	35
<b>XCU-144</b>		
FLA	54.9	26.5
MCA	60.1	29.0
MOP	80	35
<b>XCU-180</b>		
FLA	63.3	28.9
MCA	69.5	31.7
MOP	90	40

## Propeller Fan - Remote Air Cooled Condensers & Condensing Units

XP1 & XP2 - Single & Dual Circuit, Outdoor Propeller Fan DX Air Cooled Remote Condensers									
Power Supply	208/1/60	277/1/60	208/3/60	460/3/60	Power Supply	208/1/60	277/1/60	208/3/60	460/3/60
<b>XP1-060</b>					<b>XP2-180, 192, 240 &amp; 264</b>				
FLA	2.5	1.9	2.0	1.0	FLA	9.8	7.4	8.0	4.0
MCA	3.1	2.3	2.5	1.3	MCA	12.3	9.2	10.0	5.0
MFS	15	15	15	15	MFS	20	15	15	15
<b>XP1-096</b>					<b>XP2-300, 336, 372 &amp; 432</b>				
FLA	4.9	3.7	4.0	2.0	FLA	N/A	N/A	13.0	6.6
MCA	6.1	4.6	5.0	2.5	MCA			16.3	8.3
MFS	15	15	15	15	MFS			25	15
<b>XP2-120 &amp; 144</b>									
FLA	5.0	3.8	4.0	2.0					
MCA	6.3	4.7	5.0	2.5					
MFS	15	15	15	15					

XPU - Outdoor Propeller Fan Air Cooled Remote Condensing Units		
Power Supply	208/3/60	460/3/60
<b>XPU-036</b>		
FLA	11.6	5.8
MCA	14.2	7.1
MFS	20	15
<b>XPU-048</b>		
FLA	14.7	7.2
MCA	17.9	8.8
MFS	30	15
<b>XPU-060</b>		
FLA	20.5	8.7
MCA	25.1	10.7
MFS	40	15
<b>XPU-072</b>		
FLA	31.0	16.9
MCA	34.4	18.7
MFS	45	25
<b>XPU-096</b>		
FLA	31.0	16.9
MCA	34.4	18.7
MFS	45	25
<b>XPU-120</b>		
FLA	40.1	20.9
MCA	44.4	23.2
MFS	60	30

**Notes:**

- 1) FLA = Full Load Amps; MCA = Min Circuit Amps; MFS = Max Fuse Size
- 2) 277V provided via field installed step down transformer

**Qty. one XPU condensing unit is provided per circuit:**

- VKH-048 units are provided with qty. 1 x XPU-048 units
- VKH-060 units are provided with qty. 1 x XPU-060 units
- VKH-072 units are provided with qty. 2 x XPU-036 units
- VKH-096 units are provided with qty. 2 x XPU-048 units
- VKH-120 units are provided with qty. 2 x XPU-060 units
- VKH-144 units are provided with qty. 2 x XPU-072 units
- VKH-180 units are provided with qty. 2 x XPU-096 units
- VKH-240 units are provided with qty. 2 x XPU-120 units

## Approximate Unit Ship Weights (lbs.)

### VK™ Vertical Evaporators & Indoor Condensing Units

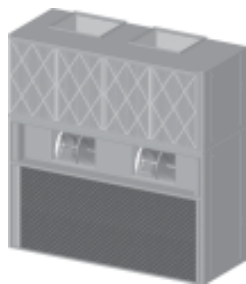
UNIT SIZE	Approximate Unit Weight (LBS)								
	VKA	VKH	VKE	VCU	XCU	XPU	VKE	VKW/VKG	VKW/G-FE
048	900	700	800	600	475	200 x 1	800	850	1,250
060	925	725	825	600	515	210 x 1	825	875	1,275
072	1,150	900	1,050	720	585	140 x 2	1,050	1,100	1,550
096	1,200	900	1,050	720	590	200 x 2	1,050	1,100	1,550
120	1,225	925	1,075	735	895	210 x 2	1,075	1,125	1,675
144	1,850	1,200	1,650	1,140	940	415 x 2	1,650	1,750	2,360
180	1,900	1,200	1,650	1,140	940	415 x 2	1,650	1,750	2,360
240	2,100	1,250	1,750	1,260	----	475 x 2	1,750	1,850	2,450
300	2,500	1,500	2300	1,500	----	----	2,300	2,350	3,000

### Remote Outdoor Air Cooled Condensers

Model	Approx. Ship Wt. (LBS.)
XP2-060	205
XP2-096	305
XP2-120	330
XP2-144	355
XP2-180	640
XP2-192	650
XP2-240	695
XP2-264	710
XP2-300	690
XP2-336	740
XP2-372	760
XP2-432	840

## 1.0 General

### ☑ 1.1 Summary



These specifications describe the requirements for a comfort cooling vertical floor mounted packaged (or split) air conditioner. The system shall be designed to control space temperature and humidity.

The air conditioning manufacturer shall design and furnish all equipment in the quantities and configurations shown on the project plans and specifications.

The system shall be provided by AboveAir Technologies in Frederick, Maryland, USA. The system shall be listed by Intertek (ETL Semko), Inc. to conform with UL Std 1995 and be certified to CAN/CSA Std C22.2 No. 236 (Control No. 3091370). The system shall be NYC MEA229-06-E and Chicago Code Approved. The system model number shall be \_\_\_\_\_.

### ☑ 1.2 Design Requirements

The system shall be an AboveAir Technologies VK-Vertical™ brand factory assembled and tested. The system shall be designed for indoor installation.

The system shall have a total cooling capacity of \_\_\_\_\_ BTU/H, and a sensible cooling capacity of \_\_\_\_\_ BTU/H, based on an entering air condition of \_\_\_\_\_ °F DB, and \_\_\_\_\_ °F WB, \_\_\_\_\_ % RH.

The evaporator section shall be designed for \_\_\_\_\_ Volt, \_\_\_\_\_ Phase, \_\_\_\_\_ Hertz main power supply. The remote condensing unit section (if applicable) shall be designed for \_\_\_\_\_ Volt, \_\_\_\_\_ Phase, \_\_\_\_\_ Hertz main power supply.

### ☑ 1.3 Submittals

Submittals shall be provided after manufacturer's receipt of a written purchase order and shall include: Detailed Performance and Electrical Data; Guide Specifications; and Dimensional Drawings.

### ☑ 1.4 Quality Assurance

The system shall be factory run tested prior to shipment. Testing shall include, but shall not be limited to: "HiPot" Test (2 times rated voltage plus 1000 volts, per UL 1995 testing requirements). The system shall be designed and manufactured according to world class quality standards.

## 2.0 Products

### ☑ 2.1 Standard Features / All Systems

#### ☑ 2.1.1 Cabinet

The cabinet chassis and access panels shall be powder-coat painted heavy gauge galvanized steel for decor matching and corrosion resistance. Cabinet access panels shall rest in recessed pockets designed for minimum air leakage. The cabinet and access panels shall be lined with 2 lb/ft<sup>2</sup> high density sound and thermal insulation and sealed with self-extinguishing gasketing conforming to NFPA 90A and 90B.

#### **Splittable for Ease of Rigging:**

The cabinet shall be modular in design to allow for easy field break-down and reassembly of top evaporator and bottom condensing unit sections for rigging purposes. As a standard, the system shall ship from the factory as a one piece unit.

*(Note: VKA-144 thru 300 system ship in two sections from the factory for field assembly after rigging.)*

#### ☑ 2.1.2 Component Access

The unit shall be serviceable through front and side access panels with quick-release quarter-turn fasteners.

#### ☑ 2.1.3 Electrical System

##### **General:**

The electrical system shall conform to National Electric Code (NEC) requirements according to UL 1995. The control circuit shall be a 24 VAC low voltage circuit.

The electrical system shall include, but not be limited to the following factory installed items: main power distribution block; grounding lug; 24 VAC control transformer; terminal connections; and motor controllers with start protection and circuit breakers for blower motors, compressors and each electric heater stage (if applicable).

### **Overflow Safety Float Switches:**

The system shall be provided with a factory installed float type condensate overflow safety switches. The circuit shall be designed to shut down all system water producing operations in the event of an overflow condition.

### ☑ 2.1.4 Air Distribution



The system air distribution shall be configured for a draw-through air pattern to provide even air distribution and maximum coil performance.

#### ☑ 2.1.4.1 Blowers / Motors

The blower shall be the belt-driven centrifugal type, double width double inlet (DWDI), and statically and dynamically balanced to a minimum vibration level. The shaft shall be heavy duty steel with self-aligning ball bearings sized for an average 100,000 hours of service life.

The blower motor shall be \_\_\_\_\_ Hp at 1725 RPM (or 3450 RPM) and mounted on an adjustable base. Belts shall be sized for 200% of the motor horsepower rating. Motors shall have overload protection and a minimum NEMA service factor of 1.15.

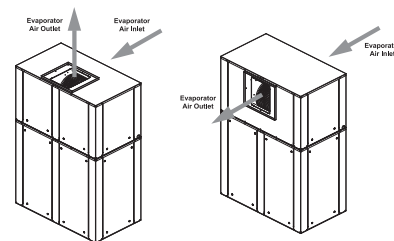
#### **Evaporator Blowers:**

The evaporator blower assembly shall be designed for \_\_\_\_\_ CFM @ \_\_\_\_\_ inches external static pressure (e.s.p.)

#### **Condenser Blowers: (DX Air Cooled)**

The evaporator blower assembly shall be designed for \_\_\_\_\_ CFM @ \_\_\_\_\_ inches external static pressure (e.s.p.)

#### ☑ 2.1.4.2 Air Patterns



Top Discharge (standard)

Front Discharge (optional)

#### **Top Evap Air Discharge: (standard)**

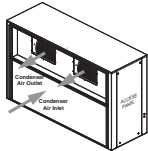
The evaporator shall be designed for free

or ducted rear-unit return air inlet and top ducted air discharge. Air inlet and outlet connections shall include factory provided turned-out duct flanges for each of field duct connection.

### Front Evap Air Discharge: (optional)

The evaporator shall be designed for free or ducted rear-unit return air inlet and front ducted air discharge. Air inlet and outlet connections shall include factory provided turned-out duct flanges for each of field duct connection.

### Packaged Air Cooled Condensers:



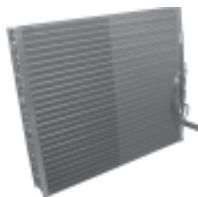
The integral air cooled condenser shall be designed for rear-unit ducted same-face air distribution. Air inlet and outlet connections shall include factory provided turned-out duct flanges for each of field duct connection.

### 2.1.4.3 Air Filtration

The filter(s) shall be 2 inch thick pleated and rated for 30% dust spot efficiency (based on ASHRAE 52.1). The filter(s) shall be serviceable through a side access without shutting down the system.

### 2.2 Direct Expansion Systems

#### 2.2.1 DX - Evaporator Coils



The DX evaporator coil shall be constructed of copper tubes and aluminum fins. The system shall be designed for a draw-through air pattern for maximum heat transfer. Coil end-plates shall be hot dipped galvanized. The evaporator coil shall be mounted in an insulated stainless steel condensate drain pan.

#### 2.2.2 Scroll Compressors



Each compressor shall be the high efficiency, low sound Scroll type mounted on vibration isolators and located in a separate compartment out of the evaporator air stream to facilitate servicing while equipment is operating. Each compressor shall be complete with reversible positive oil pump, charging and service ports, internal spring isolation, and discharge gas vibration eliminator.

#### 2.2.3 DX - Refrigeration Circuits

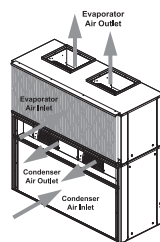


Each refrigeration circuit shall be pre-piped with type "L" refrigerant copper tubing. The refrigeration system shall include but not be limited to: expansion valve with external equalizer and rapid bleed-through capacity. Features shall include filter dryer, sight glass, pressure fittings and high pressure/low pressure safety cutouts.

### 2.3 Standard Features / Individual Systems

#### 2.3.1 DX - Air Cooled Systems

##### 2.3.1.1 DX - Air Cooled (Self-Contained Systems) Models: VKA-( )

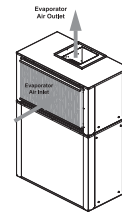


The system shall be a self-contained, vertical floor mounted air conditioner with factory mounted integral dx air cooled condensing unit with belt-driven centrifugal blower. The condensing unit shall be sized for full heat of rejection at 95°F ambient and be capable of operation to \_\_\_ °F low ambient air temperature

The system shall require only single point main power supply and ship from the factory with a full operating refrigerant charge.

*(Note-1: Low Ambient Control is Optional - see options for more detail.)*

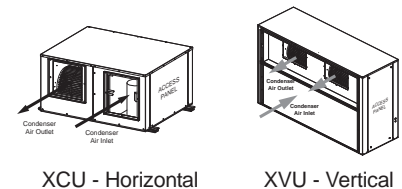
#### 2.3.1.2 DX - Air Handling Unit (Split, DX Air Handling Unit) Models: VKH-( )



The system shall be a split indoor vertical floor mounted dx air handling unit designed for field connection to the specified remote condensing unit (*air, water or glycol cooled*). The air handling unit shall include, but not be limited to: evaporator coil; centrifugal belt-driven blower and blower motor; thermal expansion valve with rapid bleed port, shraeder service valves; main power distribution block; grounding lug; 24 Vac control transformer; individual blower motor contactors; and terminal strip.

The air handling unit shall ship from the factory with a dry-nitrogen holding charge for field sweat (copper) connection and refrigerant charging.

#### 2.3.1.3 DX - Air Cooled Remote Condensing Unit (Indoor/Outdoor Centrifugal Blower Configuration)

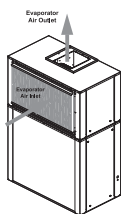


The system shall be an indoor horizontal ceiling mounted (opt. outdoor horizontal) or vertical floor mounted remote air cooled belt-driven centrifugal blower condensing unit. The remote condensing unit shall include, but not be limited to: condenser coil; centrifugal belt-driven blower and blower motor; compressor; sight glass; shraeder service valves; high & low refrigerant pressure switches; main power distribution block; grounding lug; 24 Vac control transformer; individual blower motor and compressor starters/contactors; and terminal strip.

The condensing unit shall be sized for full heat of rejection at 95°F ambient and be capable of operation to \_\_\_ °F low ambient air temperature.

The condensing unit shall ship from the factory with a dry-nitrogen holding charge for field sweat (copper) connection.

**□ 2.3.1.4 DX - Air Cooled**  
(Split Evaporator Systems)  
Models: VKE(-)



The system shall be a split dx, vertical floor mounted evaporator section for connection to a remote air cooled condenser. The compressor(s) shall be located in the evaporator section. The evaporator shall include, but not be limited to: evaporator coil; centrifugal belt-driven blower and blower motor; thermal expansion valve with rapid bleed port, shraeder service valves; compressor(s), refrigerant filter-drier and sight-glass; main power distribution block; grounding lug; 24 Vac control transformer; individual blower motor contactors; and terminal strip.

The system shall require only single point main power supply and ship from the factory with a dry-nitrogen holding charge for field sweat (copper) connection and refrigerant charging.

**□ 2.3.1.5 DX - Air Cooled Remote Condensing Unit**  
(Outdoor Propeller Fan)  
XP\_(-)



The system shall be an outdoor mounted remote air cooled direct-driven propeller fan(s) condenser. The remote condensing unit shall include, but not be limited to: condenser coil; direct drive propeller fan(s) and fan motor(s); close-meshed steel wire with vinyl coating fan guards; shraeder service valves; main power distribution block; grounding lug; dry-contact interlock for evaporator 24 Vac control signal; fan motor starters/contactors; and terminal strip.

The condenser shall be sized for full heat of rejection at 95°F ambient and be capable of operation to \_\_\_ °F low ambient air temperature.

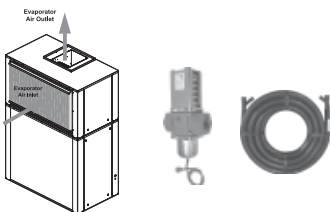
The condenser shall ship from the factory with a dry-nitrogen holding charge for field sweat (copper) connection.

**(Note-1: Select 0°F Fan Cycling or -20°F Variable Speed Fan Low Ambient head**

*pressure control as application requires - see options for more detail.)*

**□ 2.3.2 DX - Water Cooled Systems**

**□ 2.3.2.1 DX - Water Cooled**  
(Self-Contained Systems)  
Models: VKW(-)



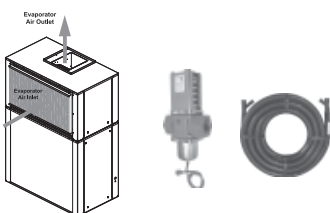
The system shall be a self-contained, vertical floor mounted air conditioner with integral dx water cooled condensing unit. The system shall include a water cooled tube-in-tube coaxial condenser and factory installed head pressure controlling 2-way water regulating valve rated for 150 psi w.w.p. The water cooled condenser shall be designed to provide the total required system heat of rejection at 85°F entering water temperature and 95°F leaving water temperature. Source water shall be provided by a remote water source (*by others*).

The system shall require only single point main power supply and ship from the factory with a full operating refrigerant charge.

**(Note: Higher pressure and 3-way valves are optionally available, see option 2.4.2.)**

**□ 2.3.3 DX - Glycol Cooled Systems**

**□ 2.3.3.1 DX - Glycol Cooled**  
(Self-Contained Systems)  
Models: VKG(-)



The system shall be a self-contained, vertical floor mounted air conditioner with integral dx glycol cooled condensing unit. The system shall include a glycol cooled tube-in-tube coaxial condenser and factory installed head pressure controlling 2-way glycol regulating valve rated for 150 psi w.w.p. The condenser shall be designed to provide the total required system heat of rejection at 110°F entering glycol temperature and 120°F leaving glycol temperature based on 40% ethylene glycol solution. Source glycol

shall be provided by a remote glycol drycooler source (*see AboveAir Technologies' FluidCool™ drycoolers*).

The system shall require only single point main power supply and ship from the factory with a full operating refrigerant charge.

**(Note: Higher pressure and 3-way valves are optionally available, see option 2.4.2.)**

**□ 2.3.3.2 Glycol Pump Packages & Drycoolers**  
FC\_(-) / PA\_(-)

Glycol condenser source shall be provided by a FluidCool™ brand remote air cooled glycol drycooler and Pump-All™ brand pump package.

The glycol drycooler shall be the outdoor mounted propeller fan type complete with factory installed aquastat fan cycling controls, motor starters with overload protection and non-fused disconnect switch.

The glycol pump package shall be a (single or dual) pump package designed for outdoor installation complete with individual pump motor starters. Dual glycol pump packages shall be provided with manual lead-lag switch and field installed flow switch for automatic switchover to backup pump upon loss of flow.

An expansion tank and AirTrol air bleed fitting shall be factory provided for field installation.

The drycooler shall provide \_\_\_\_\_ BTUH total heat rejection at a flow rate of \_\_\_\_\_ GPM with \_\_\_\_\_ °F EGT and \_\_\_\_\_ °F LGT at \_\_\_\_\_ °F ambient air temperature. Each pump shall be \_\_\_\_\_ Hp and shall be sized to provide \_\_\_\_\_ GPM @ \_\_\_\_\_ Ft. w.g. total system head. The glycol solution shall be \_\_\_\_\_ % (*ethylene or propylene*) by volume.

The drycooler and pump package shall be designed for \_\_\_\_\_ Volt, \_\_\_\_\_ Phase, \_\_\_\_\_ Hertz main power supply.

**(Note: See AboveAir Technologies' FluidCool™ indoor & outdoor glycol drycooler and PumpAll™ glycol pump packages engineering manuals for more information.)**

## 2.4 Options

**2.4.1 Air Cooled Condenser - Low Ambient Control**

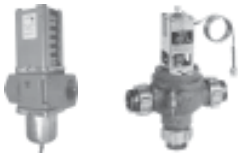
**2.4.1.1 -20°F Ambient - Variable Speed Fan (XCU, XP1/2 & XPU)**

Variable fan speed head pressure controls (JCI P266 DD or BD VFD66 / VFD) shall be factory installed to allow for low ambient operation to -20°F. Compressor cold start time delay relay and crankcase heater shall be factory installed with the -20°F low ambient control feature.

**2.4.1.2 30°F Flooded Condenser (All Condenser Models)**

A flooded condenser system shall be provided to allow for low ambient condenser operation to -30°F. The flooded system shall include a factory installed liquid refrigerant receiver and modulating head pressure control valve. Compressor cold start time delay relay and crankcase heater shall be factory installed with the -30°F low ambient control feature.

**2.4.2 DX - Water/Glycol Cooled Reg. Valves**



- 2.4.2.1 2-Way, 150 psig Reg. Valve**
- 2.4.2.2 3-Way, 150 psig Reg. Valve**
- 2.4.2.3 2-Way, 350 psig Reg. Valve**
- 2.4.2.4 3-Way, 350 psig Reg. Valve**

System head pressure shall be controlled by a factory provided \_\_\_\_ -way water / glycol regulating valve rated for \_\_\_\_ psig w.w.p.

## 2.4.2 CONTROL OPTIONS

**2.4.2.1 DT-201, 202 & 203™ - Digital H/C Thermostat (7-day programmable)**



A remote wall mounted deluxe 7-day programmable heat pump ready thermostat with digital display shall be factory provided for field installation. The thermostat shall include FAN AUTO-ON, COOL-OFF-HEAT-EM (emergency heat), SET and PROG/MAN selector switches.

*(Note: 201 = 1-Stg H/C; 202 = 2-Stg H/C; 203 = 3-Stg H/2-Stg C.)*

**2.4.2.2 MC-2000™, Advanced Microprocessor T/H Controller w/ Alarms**



The system shall be provided with a MC-2000™ advanced microprocessor based temperature and humidity controller with alarms.

**Select Features/Benefits:**

- 4x20 Character Liquid Crystal Alpha-numerical Display
- User Configurable
- Run-Time Hours
- Current Unit Mode Status
- Alarm Status
- Digital & Analog Inputs / Outputs
- Temperature Anticipation
- Remote Stop / Start Contact
- Summary Alarm Contact
- Automatic or Manual (selectable) Restart After Power Loss
- Sequential Load After Restart
- Recovery Delay
- Compressor Short Cycle Timers
- Cold Start Time Delay
- Security Password Access
- Self-Diagnostics
- Service Mode

**Unit Status Display**

The control system shall display current unit functions and room status (if applicable):

- Current Dry Bulb Temp Set Point
- Current Relative Humidity Set Point
- System ON/OFF

- Cooling
- Heating
- Humidifying
- Dehumidifying
- Reheating
- Actual Room DB Temperature
- Actual Room Relative Humidity

**Alarm Conditions:**

Alarm conditions activate an audible and visual indicator plus close a summary alarm dry contact connection. The control system shall alert to the following alarm conditions (if applicable):

- High Temperature
- Low Temperature
- High Humidity
- Low Humidity
- Sensor Failure
- Summary Failure
- Loss of Air Flow
- Dirty Filter
- High Head Press
- Smoke Detection
- Firestat
- Leak Detection
- Sensor Failure
- Loss of Power

**Digital & Analog Control Inputs / Outputs:**

The control system shall be capable of both digital (ON/OFF) and analog (proportional integral, PI) input and output control.

**Select MC-2000 Options:**

- Multi-Unit N+1 Sequencing
- BMS Communications Interface:
  - ModBus RS485 Serial Connection
  - BACnet over MS/TP (RS485 Serial)
  - BACnet Over IP (Ethernet / EIA485)
  - LonWorks FTT10 (RS485 Serial)

## 2.4.3 HEAT OPTIONS

**2.4.3.1 Electric Duct Heater**

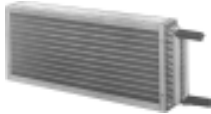


An electric duct mounted heater shall be factory provided for field installation. The duct heater shall be the open wire nichrome element type complete with individual heater stage starter/contactors, air flow switch and overheat safeties. The duct heater shall require a separate main power supply from the unit. The electric heat shall have a capacity of \_\_\_\_\_ BTU/HR and a KW rating of \_\_\_\_ KW, controlled in \_\_\_\_ stages.

**2.4.3.1.2 SCR Fired Electric Duct Heater**

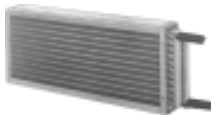
The electric heat shall be controlled through a "zero firing" silicon control rectifier (SCR) with an extruded aluminum heat sink and solid state logic system to provide close dry bulb temperature control of the leaving conditioned air temperature. The electric heat shall have a capacity of \_\_\_\_\_ BTU/HR and a KW rating of \_\_\_\_ KW.

**2.4.3.2 Steam Heat**



A Steam Heat system shall be provided complete with a factory installed aluminum fin, copper tube steam coil and field installed 2-way motorized steam control valve. Steam piping specialties shall be field provided. Steam shall be provided by a remote source at the specified temperature and pressure. The steam heat system shall have a rated capacity of \_\_\_\_\_ BTU/HR @ \_\_\_\_ psig saturated steam.

**2.4.3.3 Hot Water Heat**



A Hot Water Heat system shall be provided complete with a factory installed aluminum fin, copper tube hot water coil and field installed 2-way motorized steam control valve. Hot water shall be provided by a remote source at the specified flow rate and temperature. The hot water heat system shall have a rated capacity of \_\_\_\_\_ BTU/H @ \_\_\_\_\_ GPM, \_\_\_\_\_ °F EWT.

**2.4.3.4 Heat Pump Option**

The system shall include a factory installed heat pump heating cycle including reversing valve and automatic defrost cycle (if appl.). The heat pump mode heating capacity shall be \_\_\_\_\_ BTU/HR.

## 2.5 Accessories

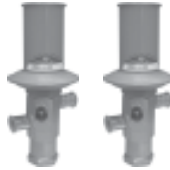
**2.5.1 Condensate Pump**



A condensate pump shall be factory provided for field installation. The condensate pump shall be provided with dual internal float switches: one for pump operation initiation and the other for pump reservoir overflow safety. The pump shall be powered through an A/C unit main power fused terminal connection.

**2.5.2 Hot Gas Bypass Systems**

**2.5.2.1 Hot Gas Bypass To Evaporator Inlet**



Each refrigerant circuit shall be provided with a factory installed hot gas (discharge) bypass valve. The hot gas bypass valve shall be designed to supply hot gas to evaporator inlet as required to provide coil freeze-protection and capacity modulation under low load conditions.

*(Note: 3<sup>rd</sup> Line - Each circuit of a Split DX system with compressor located in condensing unit shall require a field installed copper hot gas bypass refrigerant line between the evaporator and condensing unit sections.)*

**2.5.2.2 Hot Gas Bypass To Suction Line with Quench Valve**

*(3<sup>rd</sup> Line Not Required!)*



Each refrigerant circuit of the Split DX system shall be provided with a factory installed hot gas bypass system to include: hot gas (discharge) bypass; desuperheating quench; and hot gas & quench solenoid valves. The hot gas bypass system shall be designed to supply hot gas and liquid refrigerant to the suction line as required to provide coil freeze-protection and capacity modulation under low load conditions. All hot gas bypass components shall be factory installed and shall not require additional field refrigerant lines on split DX systems.

**2.5.3 Suction-Line Accumulators**



Each refrigerant circuit shall be provided with a factory installed Suction-Line Accumulator to prevent liquid slugging of the compressor and excessive refrigerant dilution of the compressor oil during low load conditions. The accumulator shall return refrigerant and oil to the compressor at a sufficient rate to maintain both system operating efficiency and proper oil level. The accumulators shall be wrapped with a 1/2" closed-cell neoprene insulation to prevent sweating.

**2.5.4 Main Power, Non-Fused Disconnect**



A main power non-fused disconnect shall be factory provided for field installation. The disconnect shall be NEMA rated for indoor or outdoor installation as required.

**2.5.5 Firestat**



A Firestat shall be factory provided for field installation in the return air duct and wired to the A/C unit electrical control panel. The Firestat shall shut-down all A/C system operations upon sensing a high return air temperature condition.

**2.5.6 Smoke Detector**



A Smoke Detector shall be factory provided for field installation in the return air duct and wired to the A/C unit electrical control panel. The Smoke Detector shall



shut-down all A/C system operations upon activation.

## □ 2.5.7 Remote Water Detector

A remote water-leak detector shall be factory provided for field installation. The remote water-leak detector shall be wired to shut down all A/C unit water producing functions upon sensing a water leak.

## □ 2.5.8 VAV Supply Air Control (VFD w/ Digital Scroll)



VFD Control

The system shall be designed for Variable Air Volume (VAV) application. A factory installed evaporator blower motor Variable Frequency Drive (VFD) with Proportional-Integral (PI) capabilities shall be provided to automatically vary system evaporator air volume based on a signal from the factory provided field installed static air pressure transducer. The A/C system shall be designed to maintain a constant leaving air temperature based on user adjustable set point temperature (eg.: 55°F DB). DX systems shall incorporate digital scroll compressor technology for capacity modulation from 10 to 100%. Chilled Water VAV Systems shall incorporate modulating (0-10Vdc) chilled water control valves. The systems shall be provided with an MC-2000V microprocessor with field installed duct mtd return air compressor(s) enable temp sensor & duct mtd supply air compressor modulating temp sensor. A supply duct mtd static air pressure transducer (0 to 5.0 IN WG Adj.) shall be factory provided for field installation.

## □ 2.5.9 DX Water/Glycol Cooled with Free Cooling Cycle VKW/G-( )-FE



The system shall include a factory installed water/glycol free cooling cycle complete with economizer cooling coil, aquastat, automatic control logic and field installed 3-way control valve. The FE

coil shall be capable of providing rated sensible capacity without compressor operation when entering water/glycol fluid temperatures are 45°F or below.

*(Note: 2-way DX/FE valve configurations are optionally available.)*

## □ 2.5.10 Air Side Economizer All Model Types



The system shall be provided with an Air-Side Economizer to include factory provided and field installed air side economizer mixing box and controls per the following sequence of control:

On a call for cooling by the indoor space thermostat, the indoor fan and the economizer shall be energized. The outdoor air control shall determine whether the outdoor air is suitable for "free/economizer-cooling". If the outdoor air is suitable, mechanical cooling shall be locked out by the outdoor enthalpy control. The motor actuator shall be energized, operating the outdoor air and the return air dampers. The motor actuator shall be regulated by the mixed air sensor to maintain proper discharge air temperature.

When outdoor air is not suitable for "free/economizer-cooling", the Economizer shall be locked out and the outdoor air damper shall maintain minimum position while the indoor fan is operating. Upon unit shutdown or power loss, the spring return motor actuator shall close the outdoor air damper.

The Economizer shall be automatically locked out during the heat mode (if applicable).

The Air Side Economizer shall include: prewired modulating spring return motor actuator, compressor lockout, minimum position potentiometer, outdoor air control (enthalpy), mixed air sensor, multi-tap transformer and damper linkage.

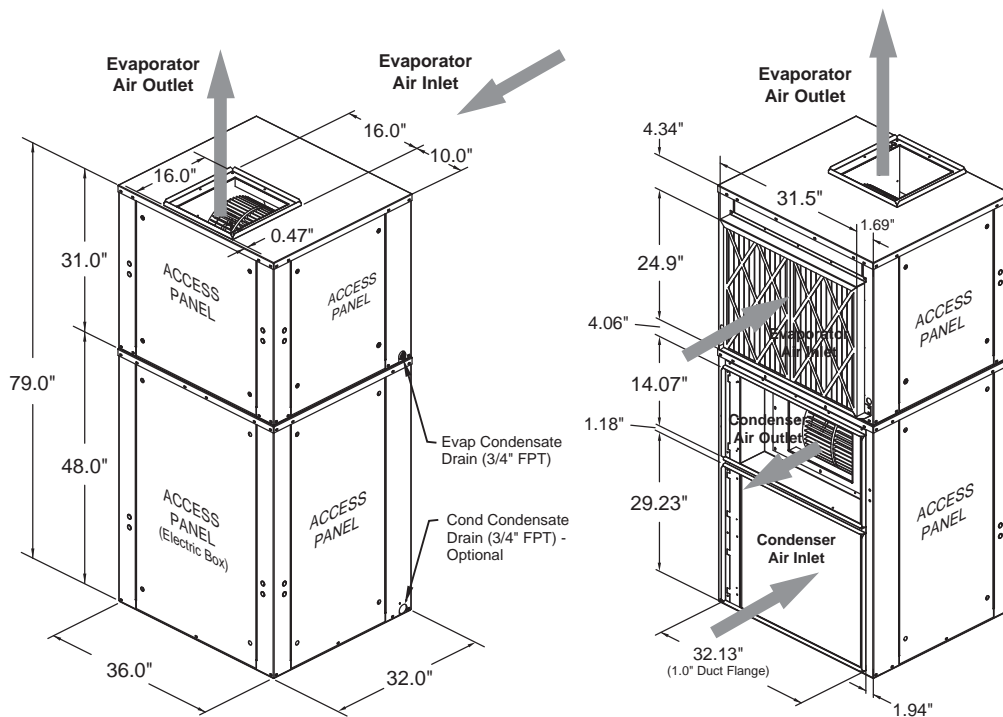
The Air-Side Economizer and Controls shall ship separately from the unit for field installation.

## □ 2.5.11 Compressor Acoustic/ Sound Jackets

Each compressor shall be provided with a factory installed compressor sound jacket with snap closure system for ease of removal and reinstallation. Sound jackets shall have a noise reduction coefficient (NRC) of 85 per ASTM and C-423 and a sound transmission lost (STC) of 11 per ASTM E-90.

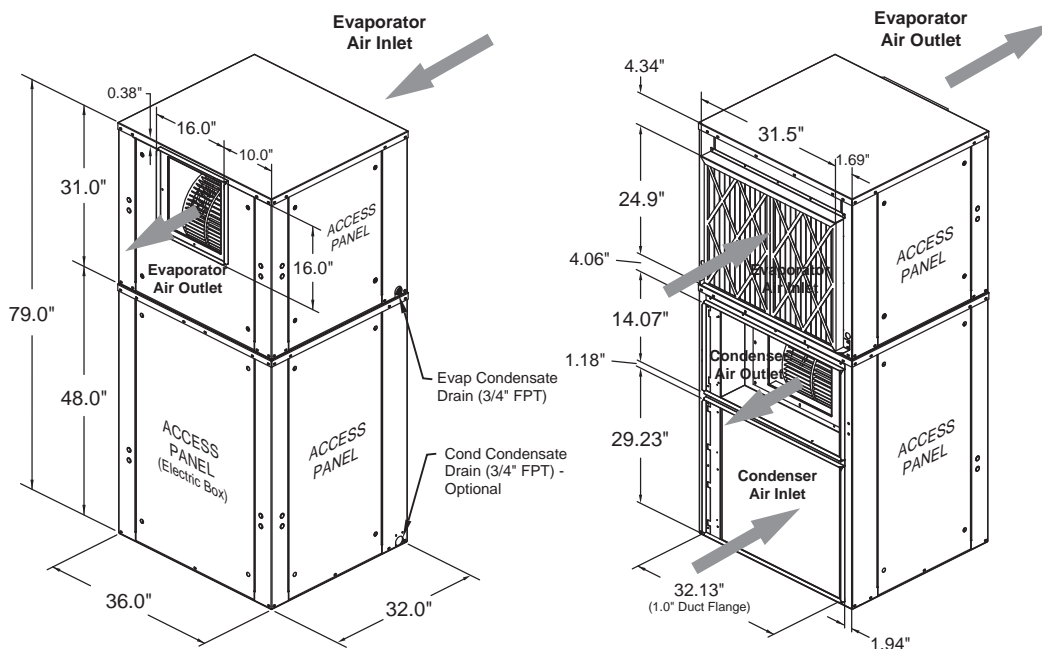
**DX - Air Cooled, Self-Contained - Top Evap Discharge**

Models: VKA-048, 060 & 072 (Single Compressor)



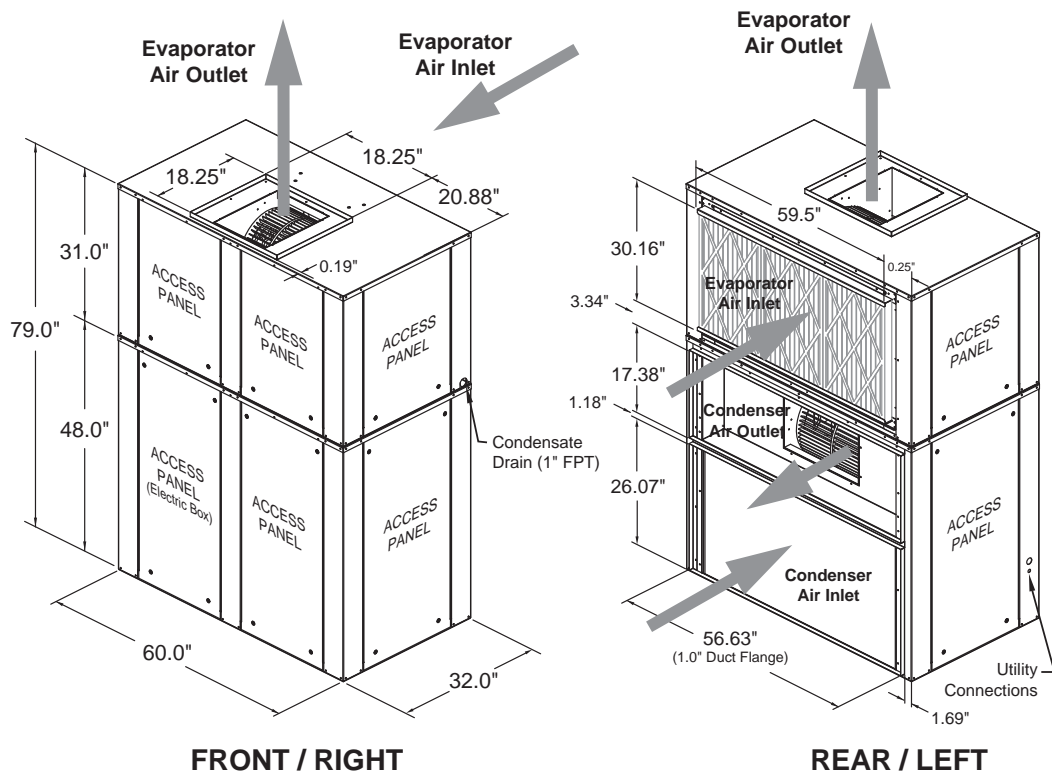
**DX - Air Cooled, Self-Contained - Front Evap Discharge**

Models: VKA-048, 060 & 072 (Single Compressor)



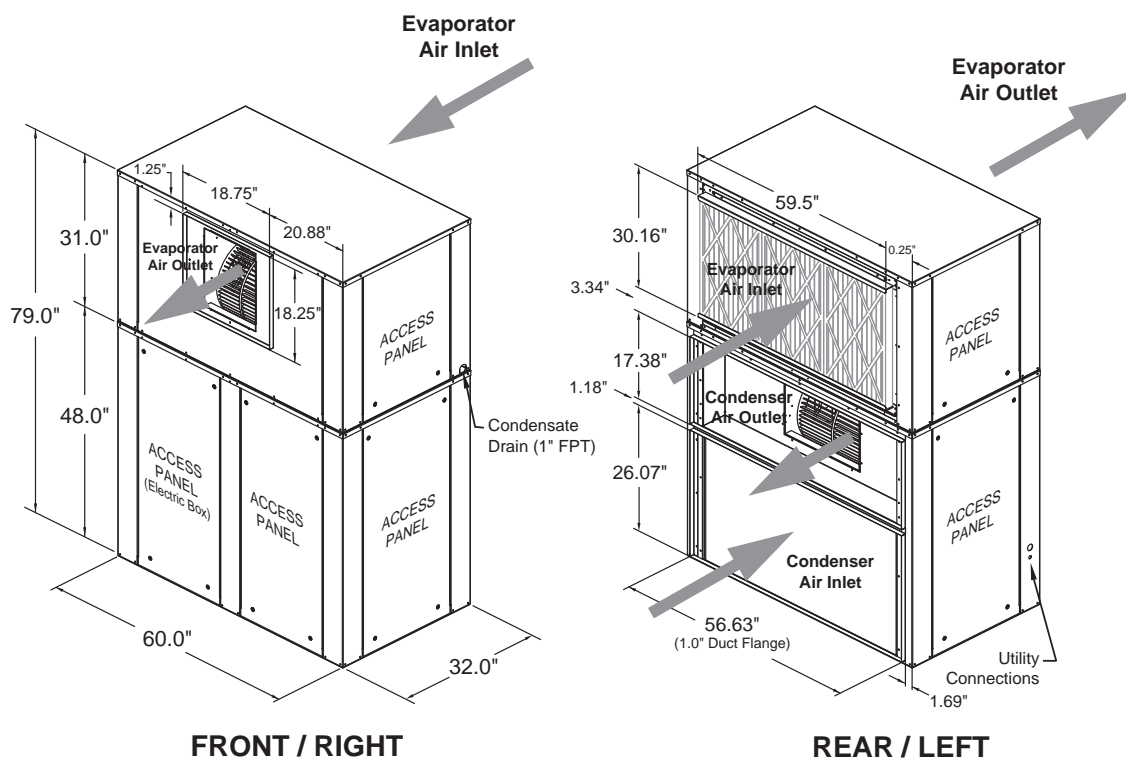
**DX - Air Cooled, Self-Contained - Top Evap Discharge**

Models: VKA-072, 096 & 120 (Dual Compressors)



**DX - Air Cooled, Self-Contained - Front Evap Discharge**

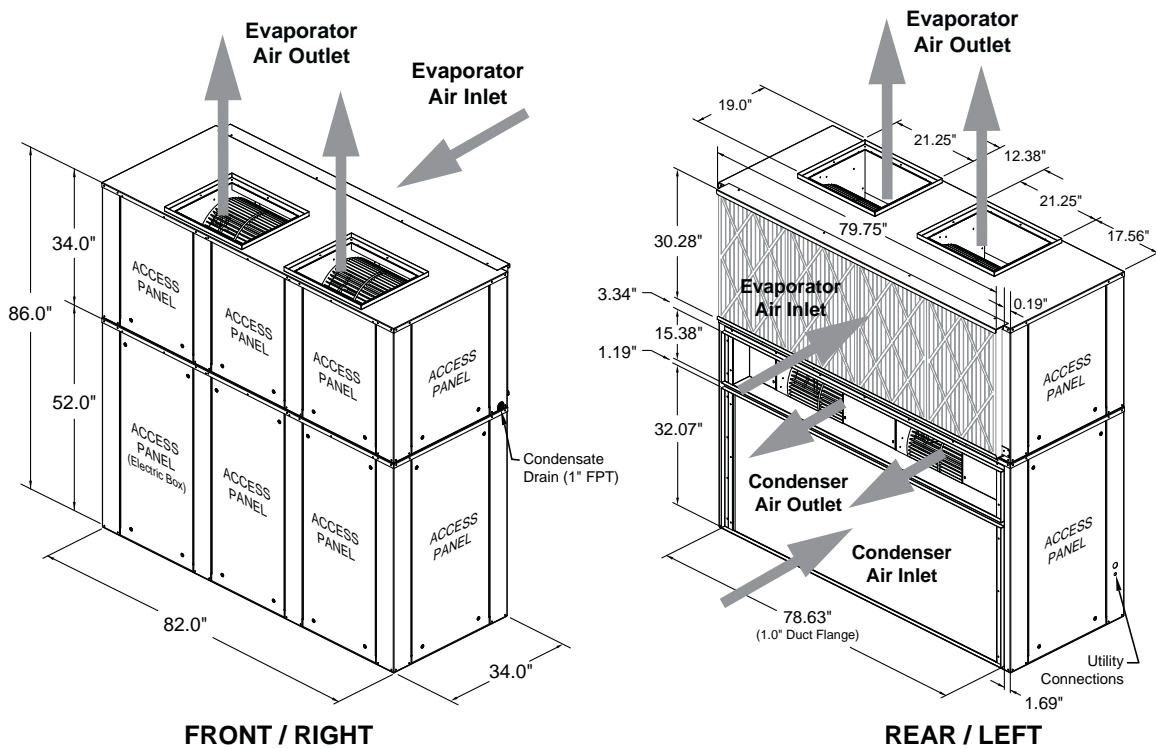
Models: VKA-072, 096 & 120 (Dual Compressors)



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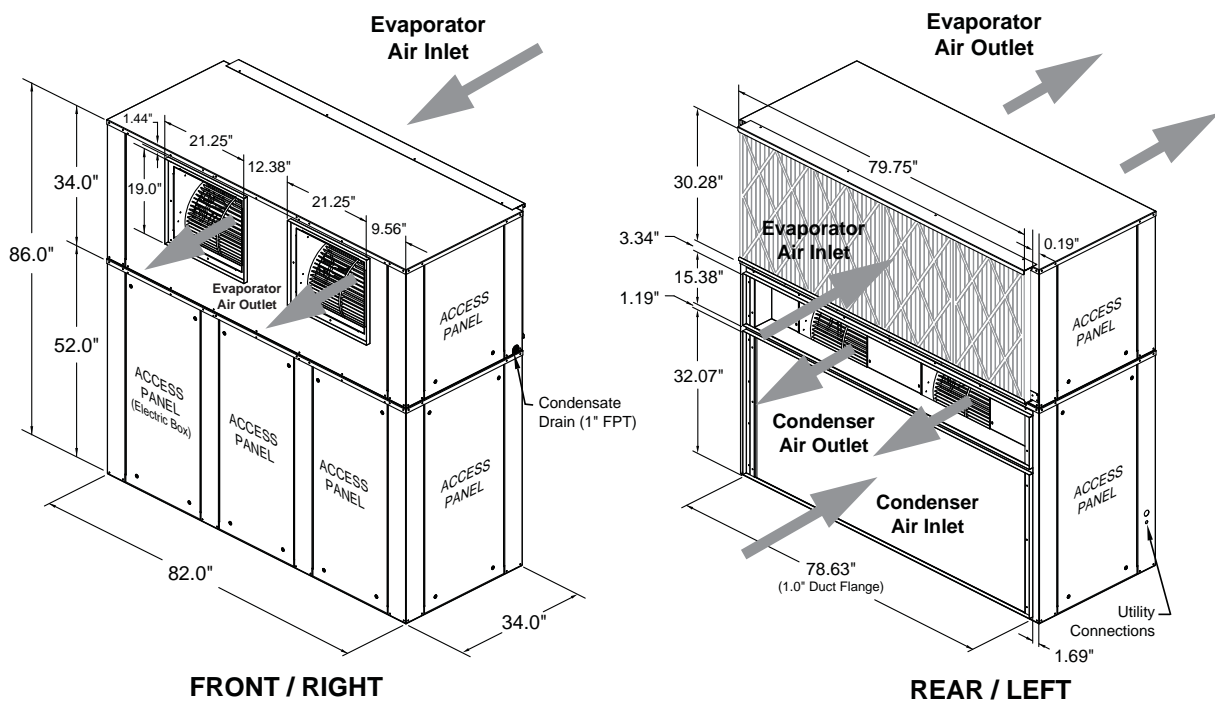
**DX - Air Cooled, Self-Contained - Top Evap Discharge**

Models: VKA-144, 180 & 240 (Dual Compressors)



**DX - Air Cooled, Self-Contained - Front Evap Discharge**

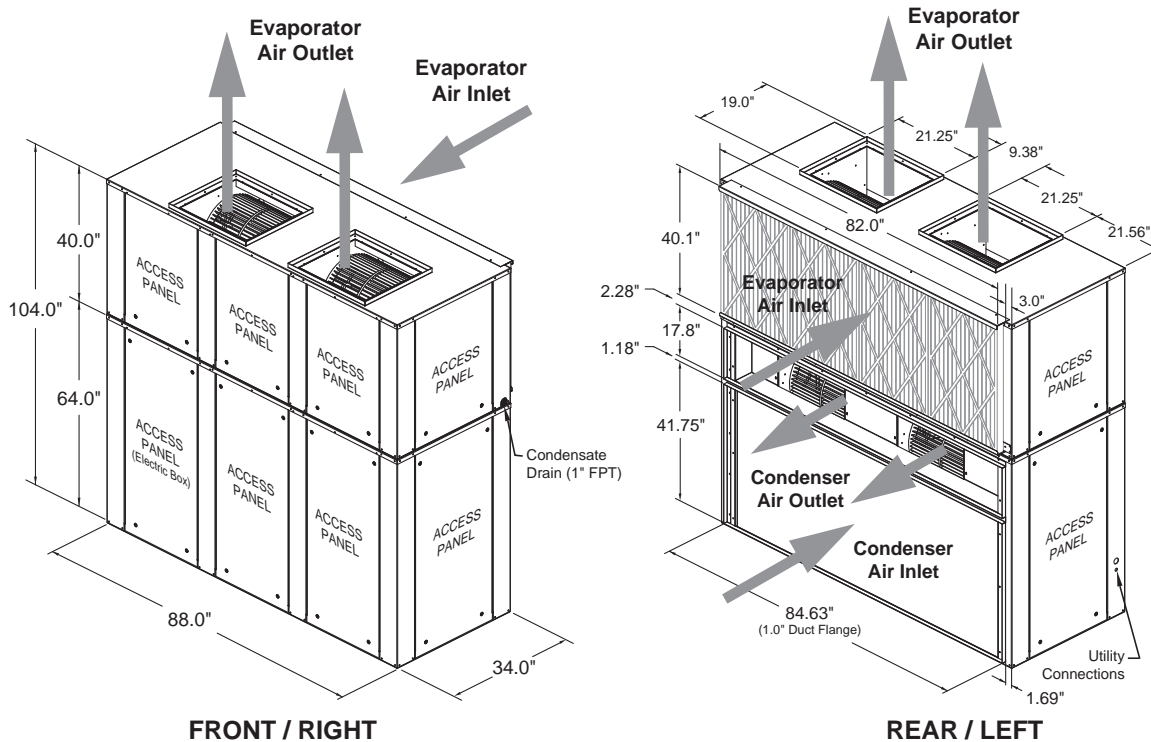
Models: VKA-144, 180 & 240 (Dual Compressors)



**DX - Air Cooled, Self-Contained - Top Evap Discharge**

*(Ships Split w/ Dry-Nitrogen Holding Charge For Rigging Purposes!)*

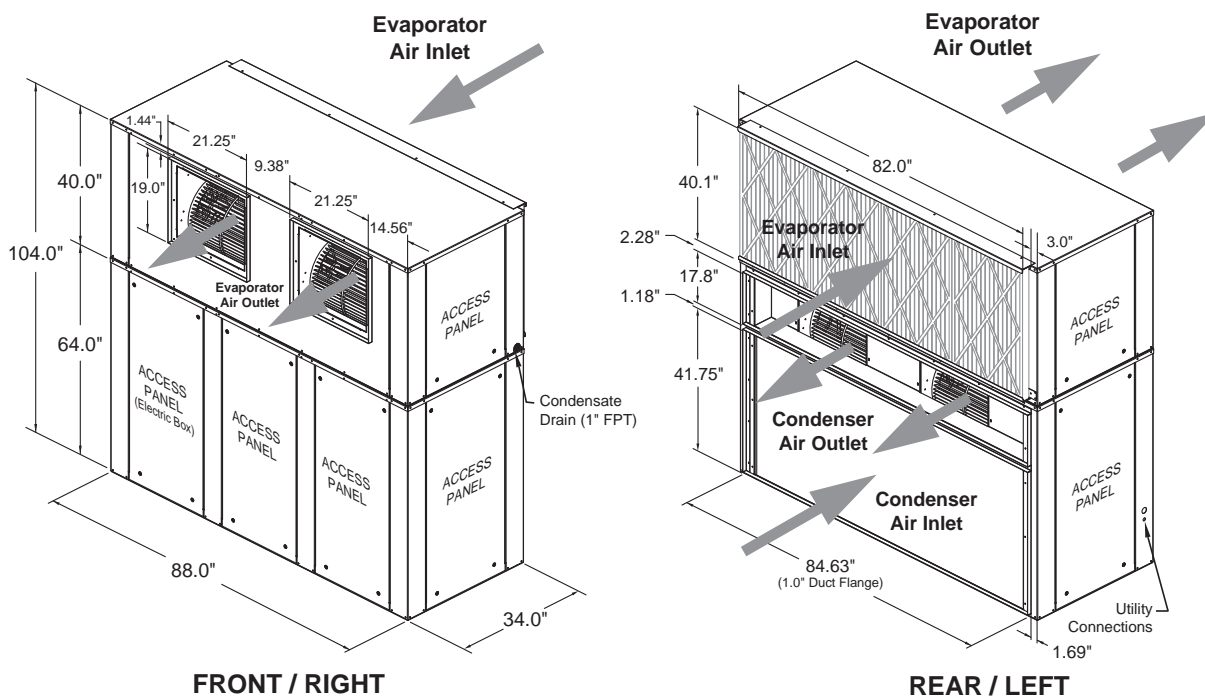
Models: VKA-300 (Dual Compressors)



**DX - Air Cooled, Self-Contained - Front Evap Discharge**

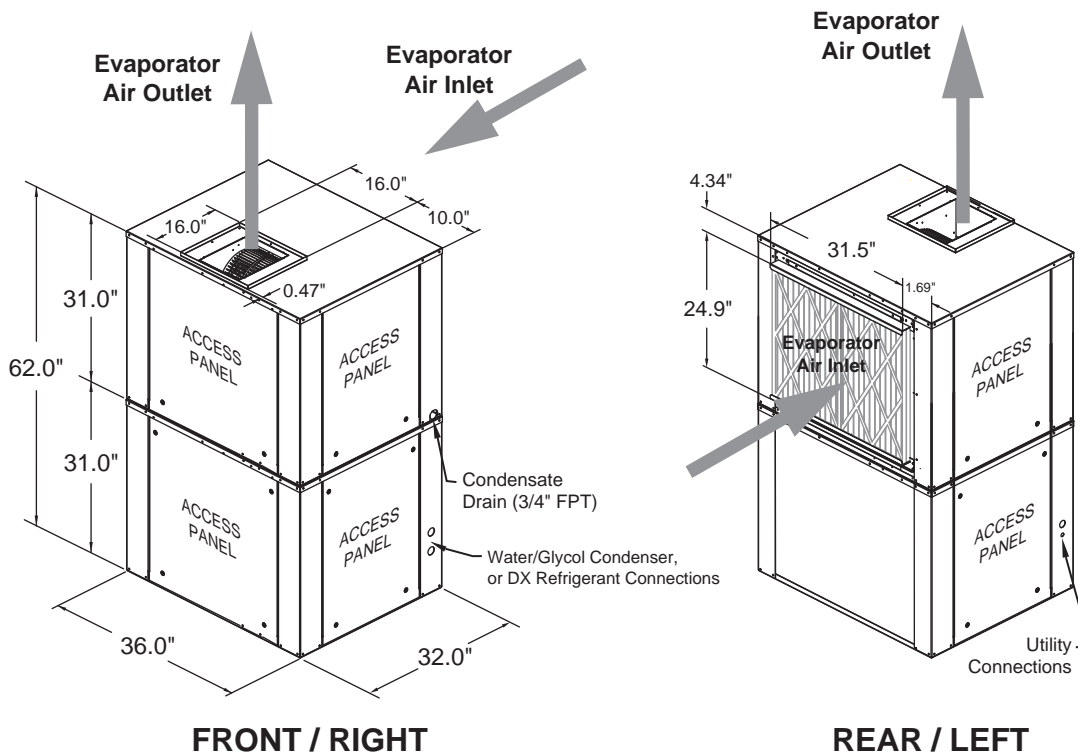
*(Ships Split w/ Dry-Nitrogen Holding Charge For Rigging Purposes!)*

Models: VKA-300 (Dual Compressors)



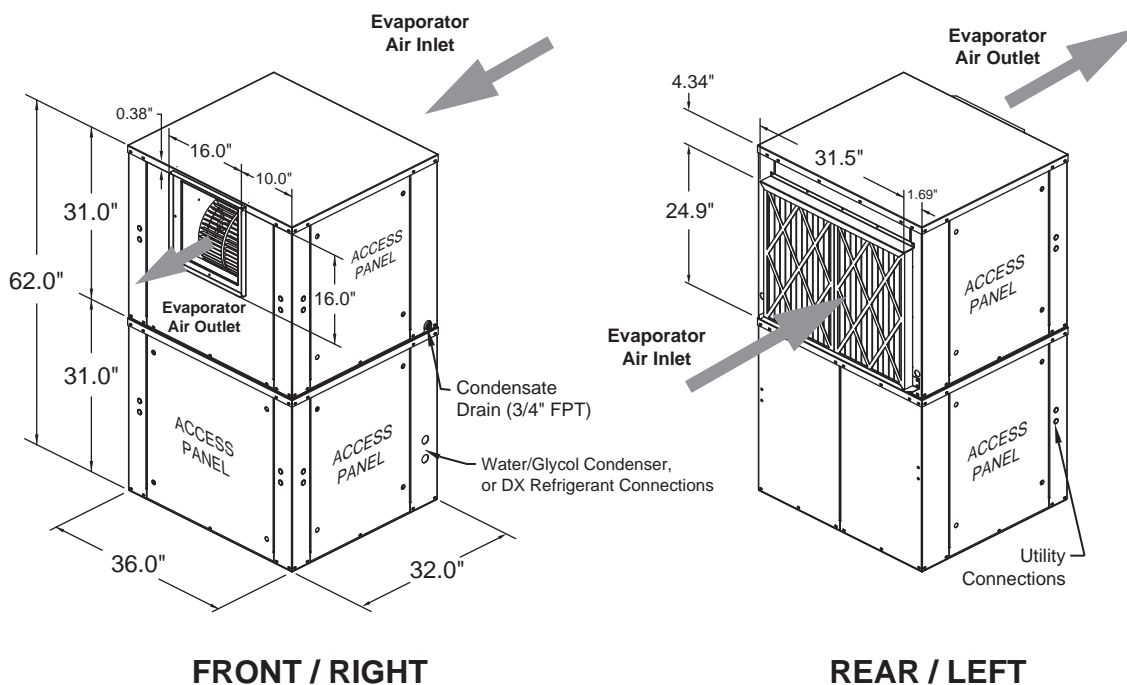
**DX - Water/Glycol Cooled & Split Air Cooled Evaps - Top Evap Discharge**

Models: VKW, VKG, VKE & VKH-048, 060 & 072 (Single Compressor)



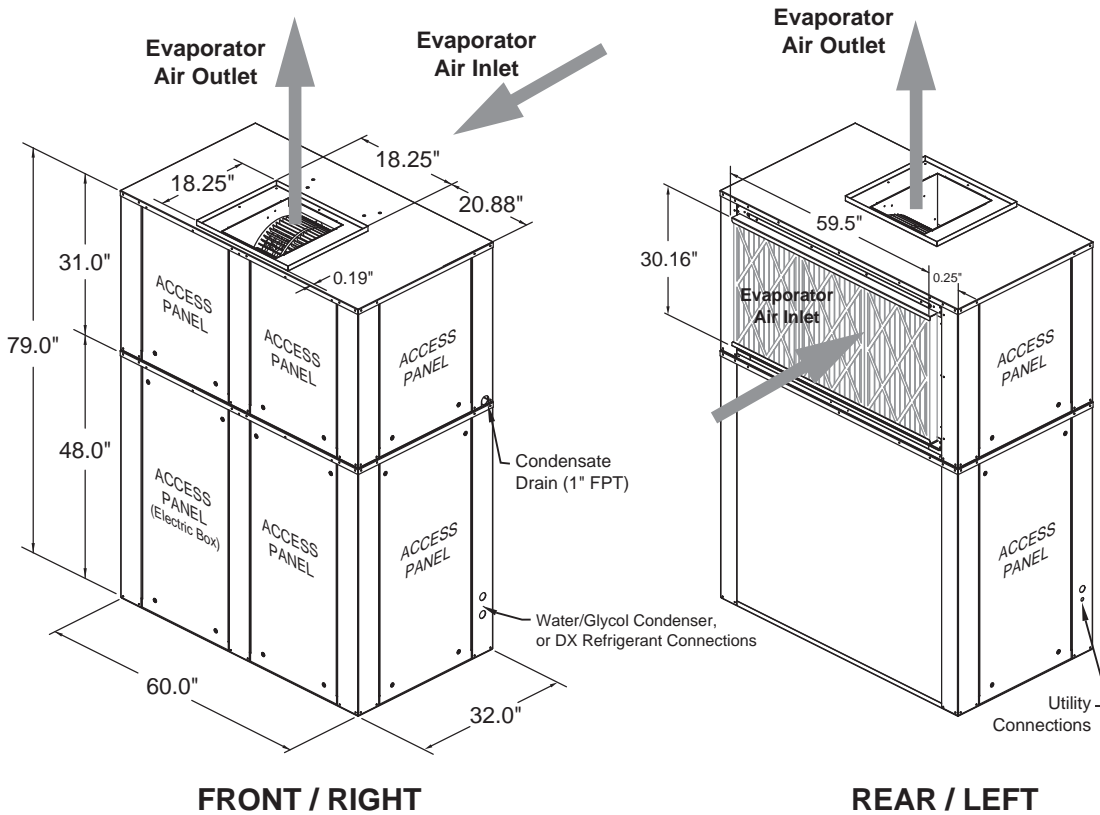
**DX - Water/Glycol Cooled & Split Air Cooled Evaps - Front Evap Discharge**

Models: VKW, VKG, VKE & VKH-048, 060 & 072 (Single Compressor)



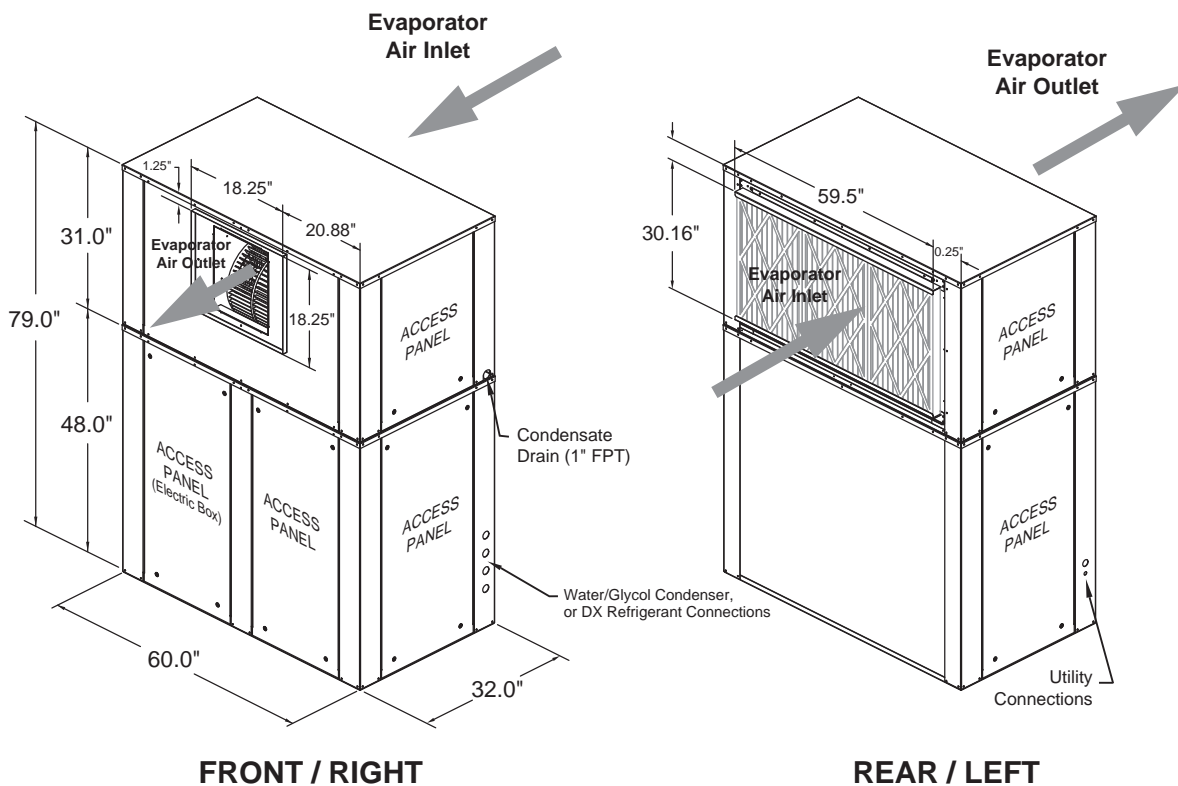
**DX - Water/Glycol Cooled & Split Air Cooled Evaps - Top Evap Discharge**

Models: VKW, VKG, VKE & VKH-072, 096 & 120 (Dual Compressors)



**DX - Water/Glycol Cooled & Split Air Cooled Evaps - Front Evap Discharge**

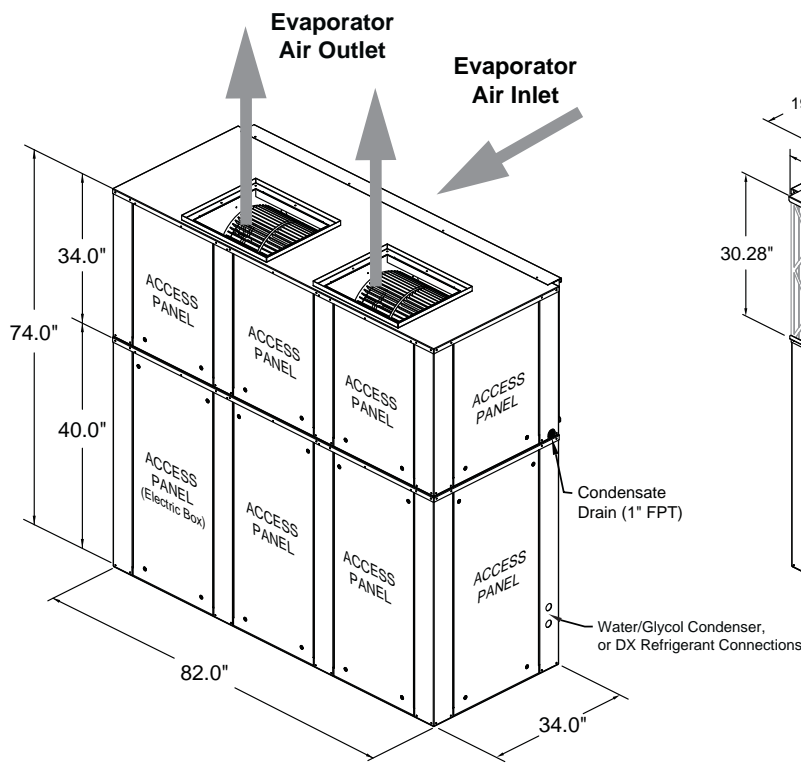
Models: VKW, VKG, VKE & VKH-072, 096 & 120 (Dual Compressors)



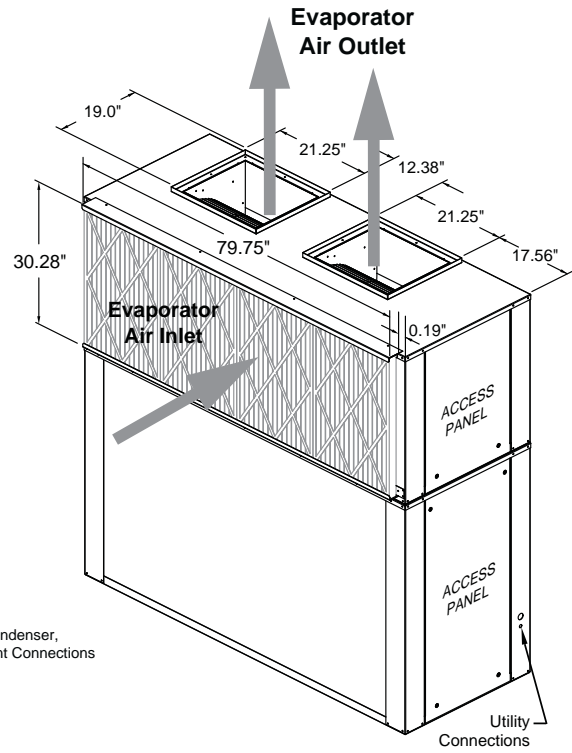


**DX - Water/Glycol Cooled & Split Air Cooled Evaps - Top Evap Discharge**

Models: VKW, VKG, VKE & VKH-144, 180 & 240 (Dual Compressors)



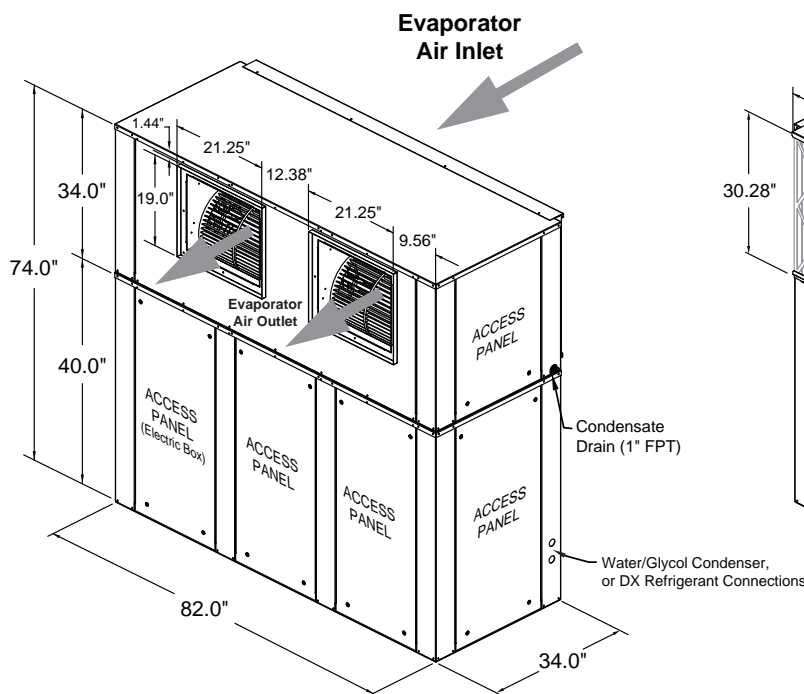
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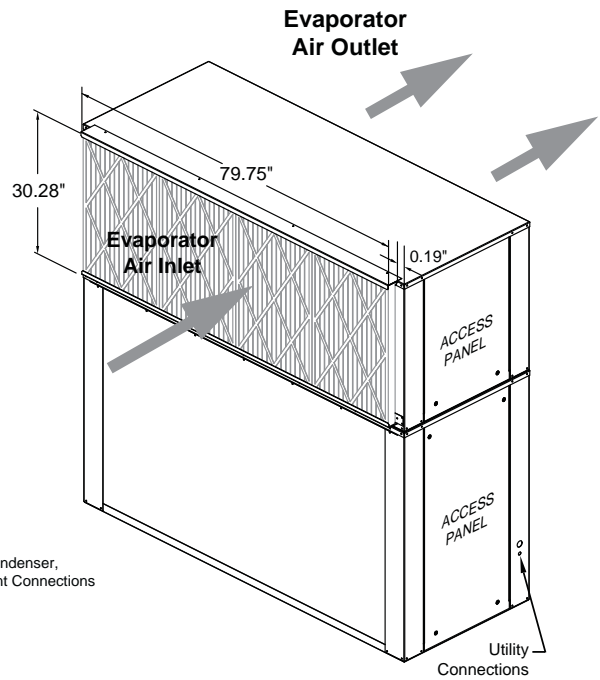
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**DX - Water/Glycol Cooled & Split Air Cooled Evaps - Front Evap Discharge**

Models: VKW, VKG, VKE & VKH-144, 180 & 240 (Dual Compressors)



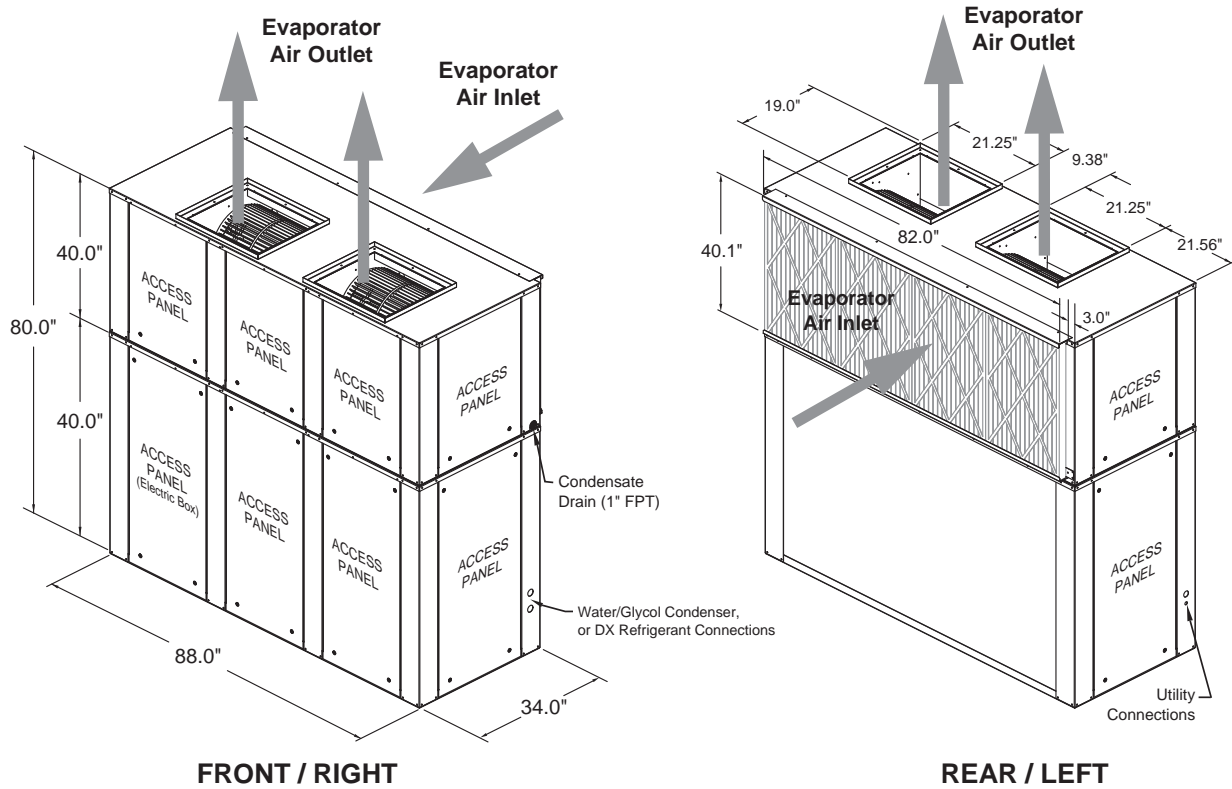
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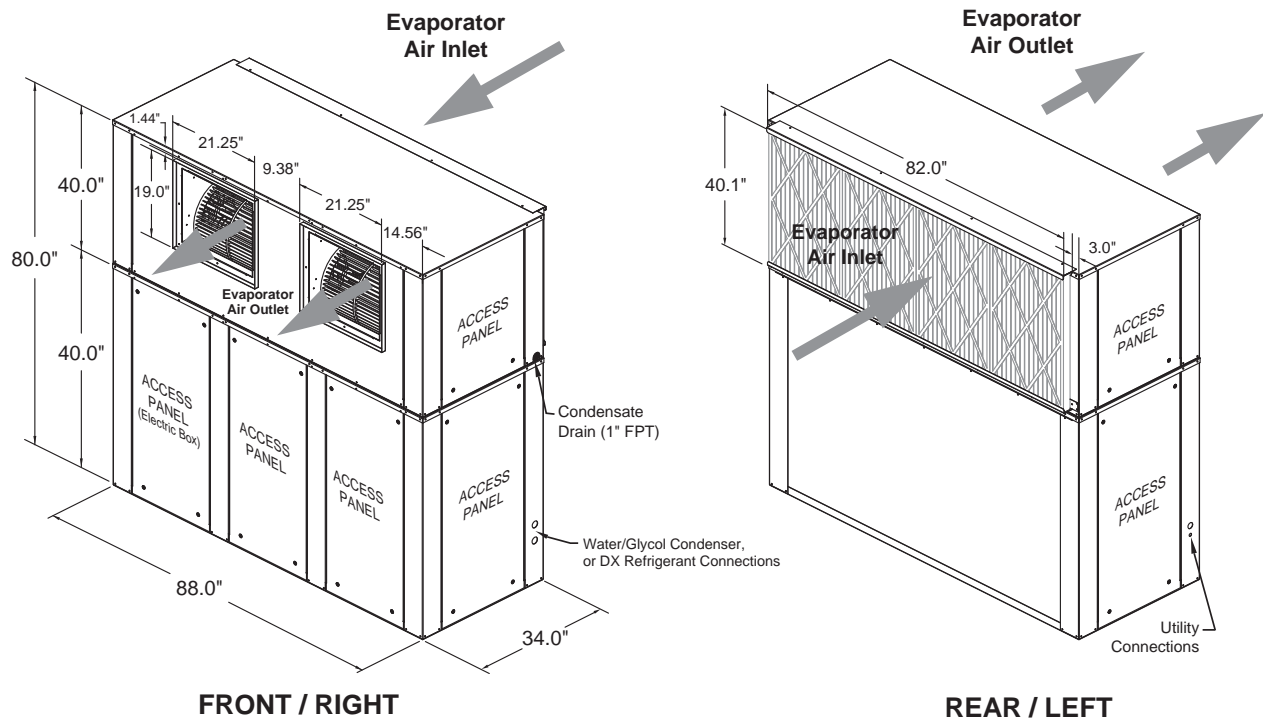
**DX - Water/Glycol Cooled & Split Air Cooled Evaps - Top Evap Discharge**

Model: VKW, VKG, VKE & VKH-300 (Dual Compressors/Circuits)



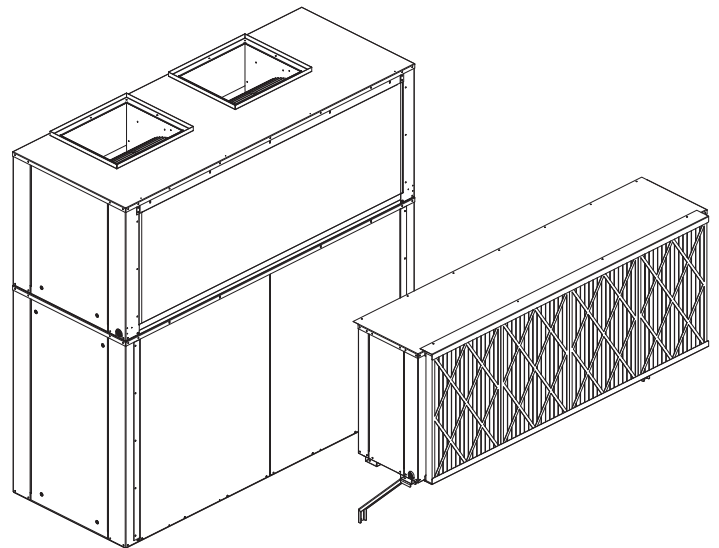
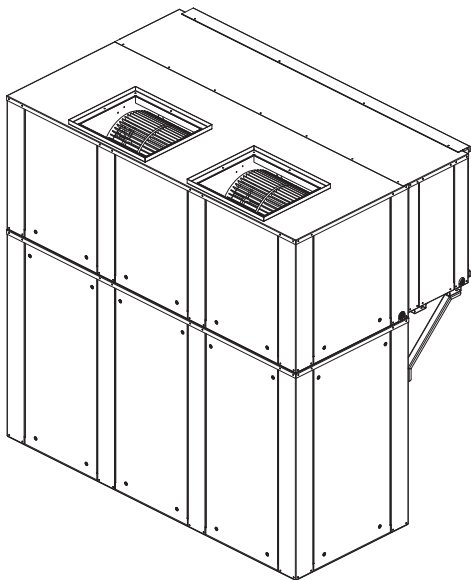
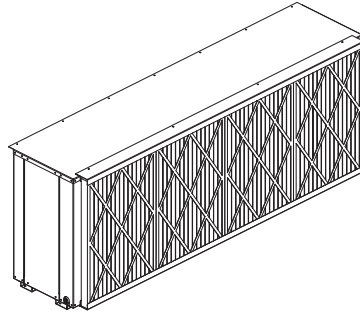
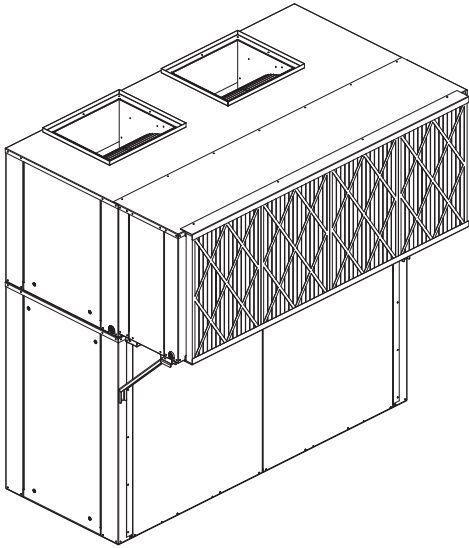
**DX - Water/Glycol Cooled & Split Air Cooled Evaps - Front Evap Discharge**

Model: VKW, VKG, VKE & VKH-300 (Dual Compressors/Circuits)



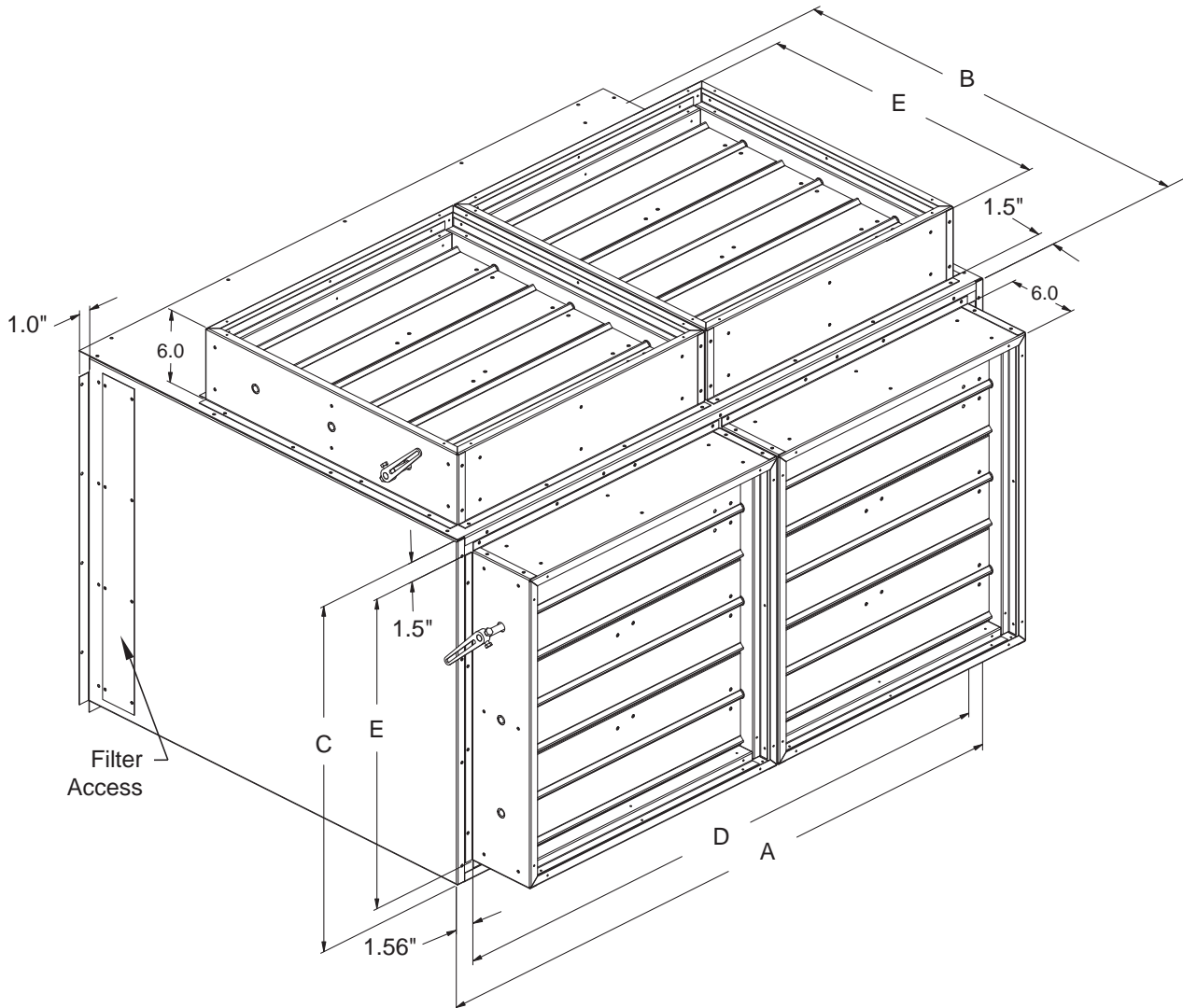
**“FE” - Free-Cooling Water/Glycol Economizer Box - 4 to 25 Tons**

Models: VKW/VKG-048 thru 300-FE



## Air Side Economizer / Mixing Box

Models: VK( )-048 thru 300-( )  
Vertical SCAV Systems



AboveAir VK™ Model Size	Air Side Economizer / Mixing Box - Dimensions				
	A	B	C	D	E
<b>VK( )-048/072</b> (Single Compressor)	30.13"	37.94"	29.0"	27.0"	26.0"
<b>VK( )-072/120</b> (Dual Compressors)	54.13"	37.94"	29.0"	51.0"	26.0"
<b>VK( )-144/180</b>	76.13"	37.94"	29.0"	73.0"	26.0"
<b>VK( )-240</b>	76.13"	40.94"	32.0"	73.0"	29.0"
<b>VK( )-300</b>	82.13"	46.94"	38.0"	79.0"	35.0"

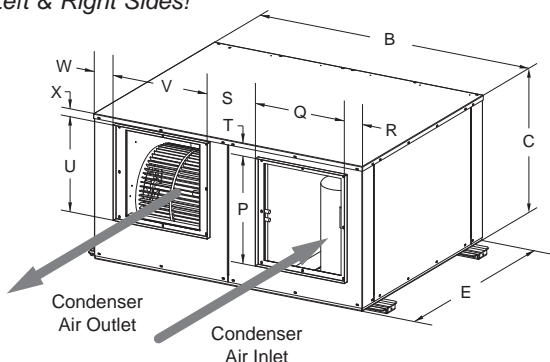
**Features:**

1. Galvanized Steel Construction
2. Fully Insulated
3. Parallel Blade Dampers with Bronze Bushings
4. Damper Linkage and Hardware
5. Access Doors on Both Sides
6. Economizer Enthalpy Control Systems - field installed

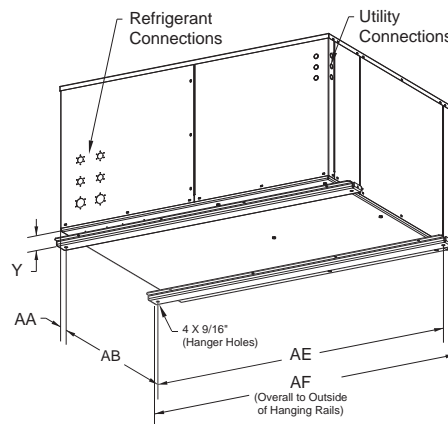
## DX - Air Cooled, Indoor Horizontal Centrifugal Blower, Remote Condensing Units

Models: XCU-048, 072, 096, 120, 144 & 180

**2-Side Access:**  
18"-24" on Left & Right Sides!



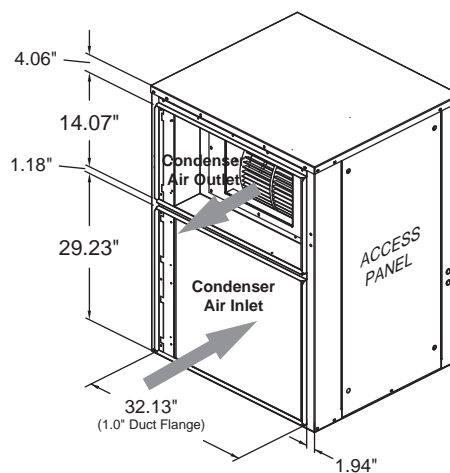
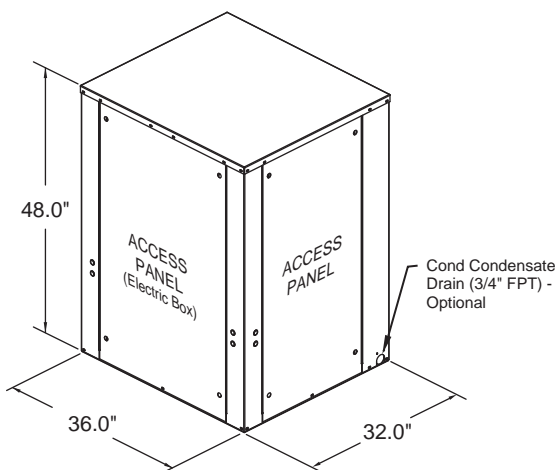
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DIMENSIONS(inches)																	
XCU-( ) Model No.	B	C	E	P	Q	R	S	T	U	V	W	X	Y	AA	AB	AE	AF
048, 060, 072 & 096	54	27	42	20	18	3	9-5/8	2	17-3/8	19	4-3/8	1-5/16	1	5	32	57-1/2	60
120, 144 & 180	74	29	58	24	30	2-3/4	14-1/8	2	18-1/4	23	4-1/8	2-7/8	1	5	48	77-1/2	80

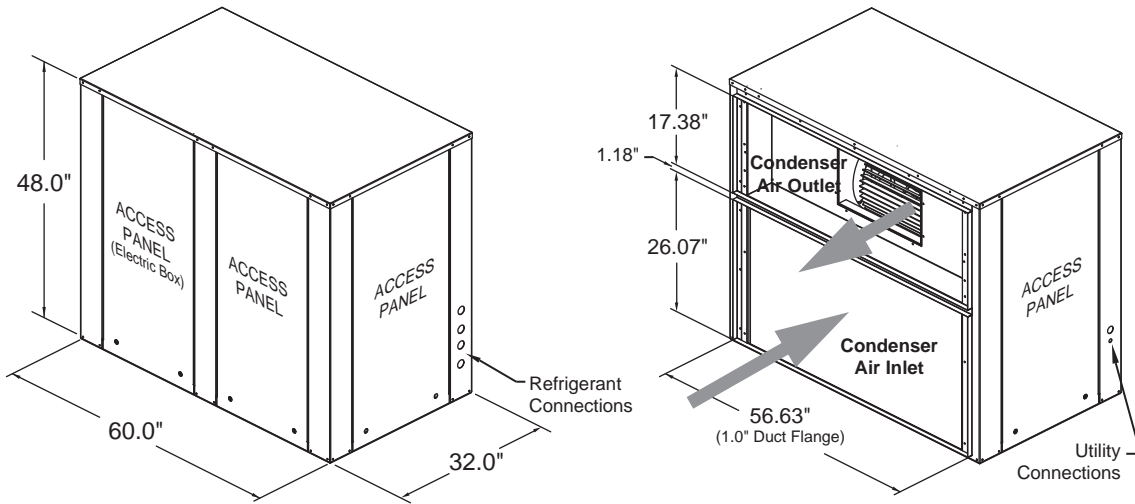
## DX - Air Cooled Remote Condensing Unit Vertical Floor Mounted, Indoor Centrifugal Blower Models: VCU-048, 060 & 072 (Single Compressor)



**DX - Air Cooled Remote Condensing Unit**

*Vertical Floor Mounted, Indoor Centrifugal Blower*

Models: VCU-072, 096, 120, 144 & 180 (Dual Compressor)



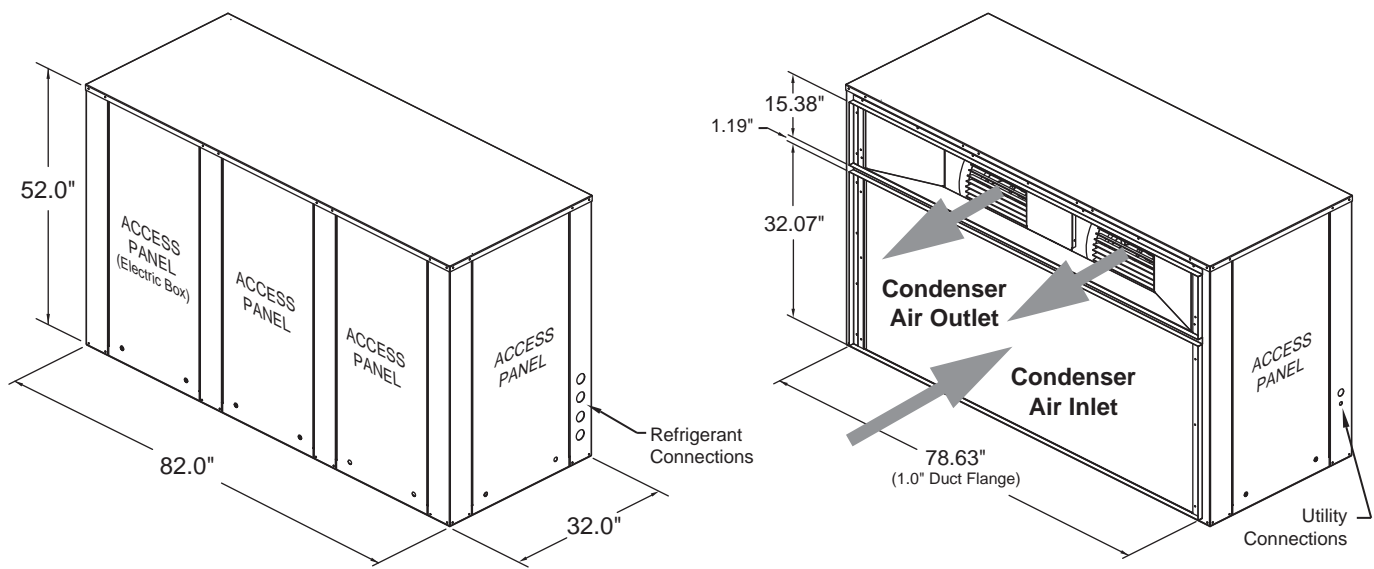
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**DX - Air Cooled Remote Condensing Unit**

*Vertical Floor Mounted, Indoor Centrifugal Blower*

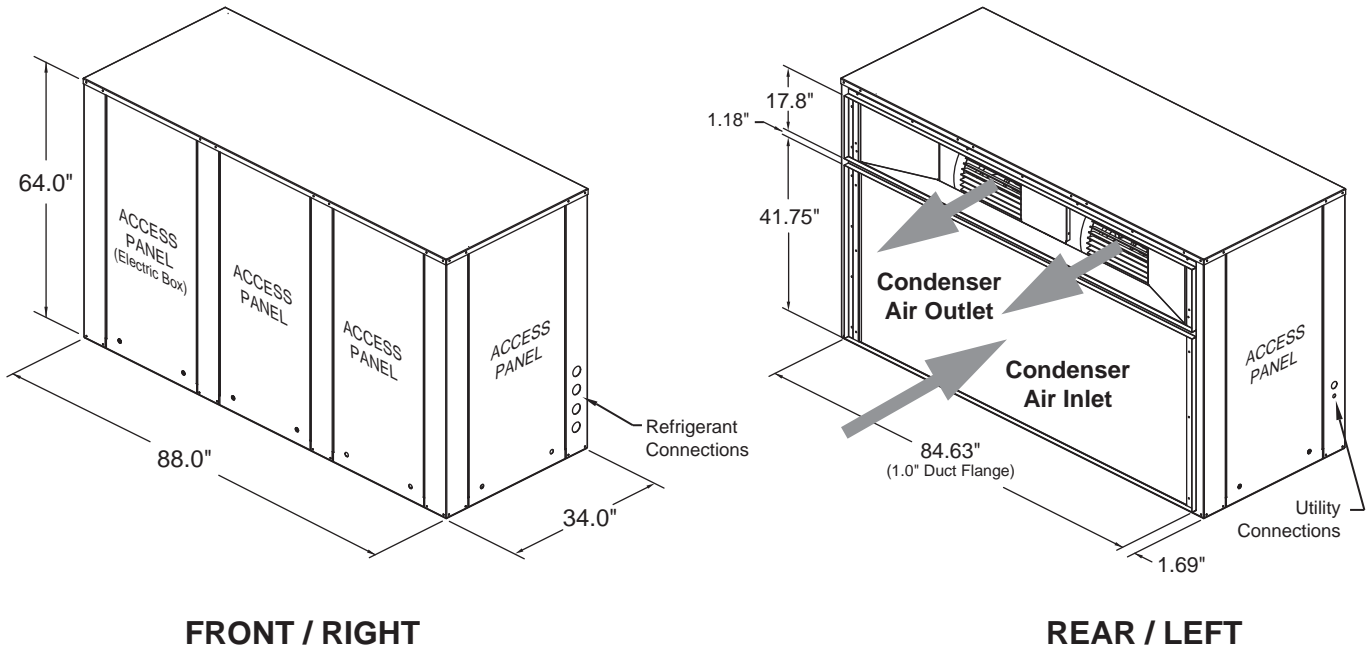
Models: VCU-144, 180 & 240



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**DX - Air Cooled Remote Condensing Unit**  
*Vertical Floor Mounted, Indoor Centrifugal Blower*  
Models: VCU-300

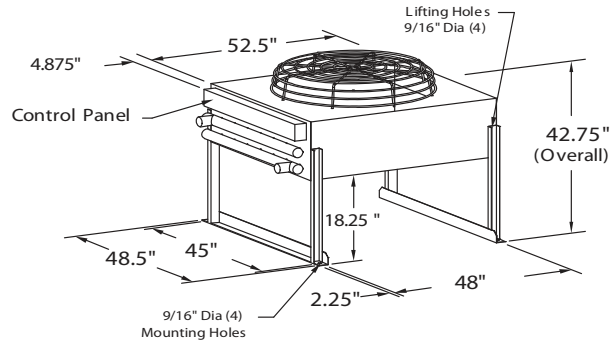


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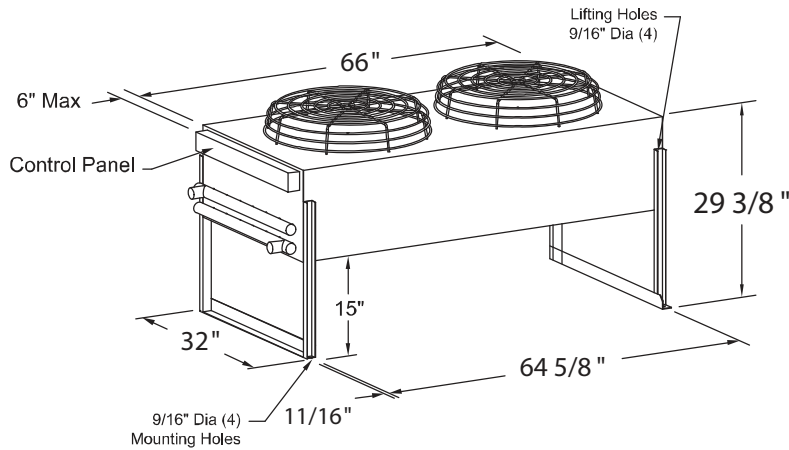
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## Remote Outdoor Propeller Fan Air Cooled Condensers

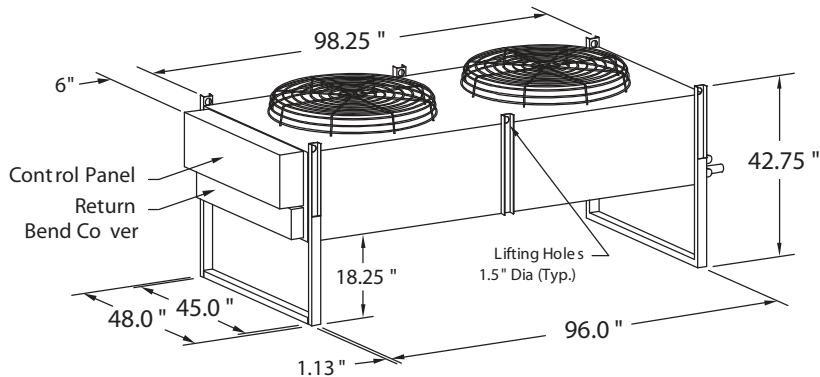
### WP1 - 108, 132 & 156



### WP2 - 084, 108 & 132

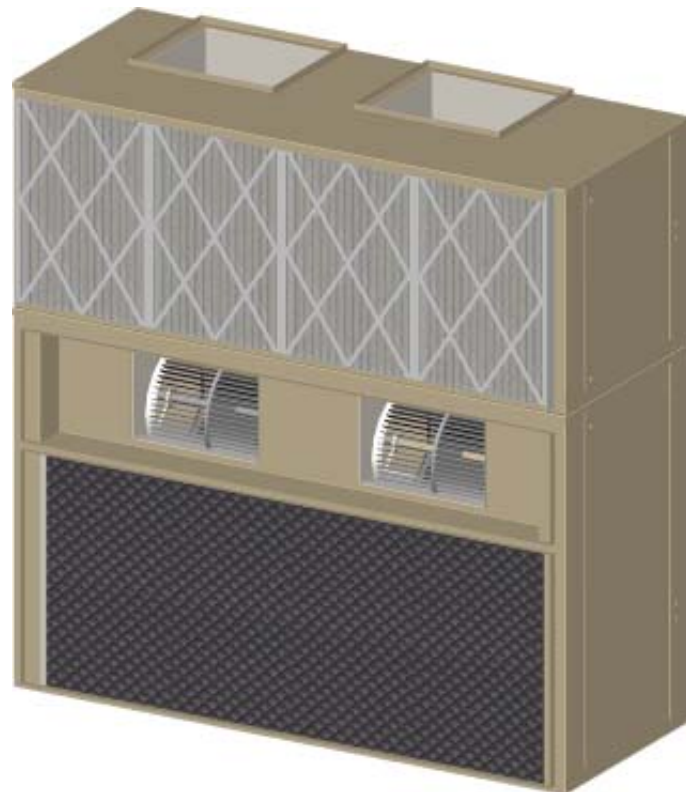


### WP2 - 204, 252, 264, 336 & 396





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## Model Nomenclature

### Packaged Systems & Split Evaporators

<b>VK</b>	<b>E - 240</b>	<b>D - 4</b>	<b>E1</b>	<b>0</b>	<b>AE - 00</b>	<b>TR</b>	<b>DW</b>	<b>D1</b>	<b>VAV</b>	<b>C</b>
<b>a</b>	<b>b - c</b>	<b>d</b>	<b>e - f</b>	<b>g</b>	<b>h - i</b>	<b>j</b>	<b>k</b>	<b>l</b>	<b>m</b>	<b>n - o</b>

- a: **VK** - VK Vertical Floor Mounted Series
- b: **A** - DX, Air Cooled - Packaged Self-Contained  
**C** - Chilled Water  
**E** - DX, Evaporator with Compressor  
**G** - DX, Glycol Cooled - Packaged Self-Contained  
**H** - DX, Air Handling Unit  
**W** - DX, Water Cooled - Packaged Self-Contained
- c: **048** = 4.0 Tons; **060** = 5.0 Tons; **072** = 6.0 Tons; **096** = 8.0 Tons;  
**120** = 10.0 Tons; **144** = 12.0 Tons; **180** = 15.0 Tons; **240** = 20.0 Tons  
**300** = 25.0 Tons; **360** = 30.0 Tons
- d: **D** - Dual DX Circuited Systems  
**Null** - Single DX Circuited System (or Chilled Water System)
- e: **1** - 208-230V / 1 Ph / 60 Hz  
**3** - 208-230V / 3 Ph / 60 Hz  
**4** - 460-480V / 3 Ph / 60 Hz  
**5** - 575V / 3 Ph / 60 Hz  
**7** - 277V / 1 Ph / 60 Hz
- f: **00** - No Heat  
**E1** - Electric Heat 1-Stage (Factory Unit Mtd)  
**E2** - Electric Heat 2-Stages (Factory Unit Mtd)  
**ES** - SCR Fired Electric Heat (Factory Unit Mtd)  
**HE** - Heat Pump with Internal Auxiliary Electric Heat  
**HG** - Hot Gas Reheat  
**HP** - Heat Pump w/o Internal Auxiliary Electric Heat  
**HW** - Hot Water Heating Coil  
**ST** - Steam Heating Coil
- g: **0** - No Humidifier  
**H** - Electrode Canister Humidifier
- h: **00** - No Economizer  
**AE** - Air Side Economizer Mixing Box  
**DC** - Dual Cool / Alternate Water Source Coil  
**FE** - Water/Glycol Side Free Cooling Economizer Coil
- i: **00** - None  
**OA** - High Percentage Outside-Air (HPOA) System
- j: **TR** - Rear Ducted (or Free) Return w/ Top Ducted Evap Disch  
**FR** - Rear Ducted (or Free) Return w/ Front Ducted Evap Disch  
**TF** - Flip / Reverse Top Evap: Front Ducted (or Free) Return w/ Top Ducted Evap Air Discharge  
**FF** - Flip / Reverse Top Evap: Front Ducted (or Free) Return w/ Rear Ducted Evap Air Discharge
- k: **Null** - Single Wall Cabinet Construction  
**DW** - Double Wall Cabinet Construction
- l: **00** - None / Not Applicable  
**Null** - Standard Constant Speed Scroll Compressors (Cir-1 & 2)  
**D1** - Digital Scroll Compressor (Circuit-1 Only) Option  
**D2** - Digital Scroll Compressors (Both Circuits-1 & 2) Option
- m: **Null** - Constant Air Volume System (can also use CAV)  
**DCV** - Demand Control Variable Air Volume System Option  
**EVF** - Evap Motor VFD for Balancing Purposes Option  
**VAV** - Variable Air Volume (Multi-Zone) System Option  
**SZV** - Single Zone Variable Air Volume System Option
- n: **Null** - Not Applicable  
**CVF** - Low Ambient Condenser Blower VFD Option
- o: **A, B ...** - VK Cabinet Frame Size (see VK Dimensional Drawings)

### Remote Condensers & Condensing Units

<b>V</b>	<b>C</b>	<b>X - 240</b>	<b>D - 4</b>	<b>00</b>	<b>00</b>	<b>SF</b>	<b>DW</b>	<b>00</b>	<b>CVF</b>	<b>C</b>
<b>a</b>	<b>b</b>	<b>c - d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l - m</b>

- a: **V** - VK Vertical Floor Mounted  
**X** - Remote Condenser or Condensing Unit  
**W** - Witt HTPG Manufactured Remote Condenser
- b: **C** - DX, Air Cooled, Centrifugal Blower Type  
**G** - DX, Glycol Cooled  
**P** - DX, Air Cooled, Propeller Fan Type  
**W** - DX, Water Cooled
- c: **1, 2 ...** - Witt Condenser Number of Fans  
**U** - DX Condensing Unit  
**X** - DX Indoor Condenser
- d: Nominal Condenser/Cond Unit Capacity in MBH
- e: **D** - Dual DX Circuited Systems  
**Null** - Single DX Circuited System (or Chilled Water System)
- f: **1** - 208-230V / 1 Ph / 60 Hz  
**3** - 208-230V / 3 Ph / 60 Hz  
**4** - 460-480V / 3 Ph / 60 Hz  
**5** - 575V / 3 Ph / 60 Hz  
**7** - 277V / 1 Ph / 60 Hz
- g: **00** - None  
**HP** - Heat Pump Option
- h: **00** - None  
**OA** - High Percentage Outside-Air (HPOA) System
- i: **SF** - Ducted Std "Same-Face" Cond Air Pattern  
**MI** - Ducted "Mirror-Image Same-Face" Cond Air Pattern  
**ZST** - Ducted "Z" Straight-Thru Cond Air Pattern  
**TT** - Ducted "Top Inlet & Top Outlet" Cond Air Pattern  
**FT** - Ducted "Front Inlet & Top Outlet" Cond Air Pattern
- j: **Null** - Single Wall Cabinet Construction  
**DW** - Double Wall Cabinet Construction
- k: **00** - None / Not Applicable  
**Null** - Standard Constant Speed Scroll Compressors (Cir-1 & 2)  
**D1** - Digital Scroll Compressor (Circuit-1 Only) Option  
**D2** - Digital Scroll Compressors (Both Circuits-1 & 2) Option
- l: **Null** - Not Applicable  
**CVF** - Low Ambient Condenser VFD Option  
**FCS** - Low Ambient Fan Cycling Option  
**FLD** - Low Ambient Flooded Condenser Option  
**P66** - Low Ambient Variable Speed Fan via JCI p266 Option
- m: **Null** - Not Applicable  
**A, B ...** - VK or HK Cabinet Frame Size (see Eng Manuals)



## Ceiling Air Conditioners

**SpotCool™** - 2x4 T-Bar "Spot-Cool & Ducted" Comfort & Precision Ceiling Mounted A/C's

**HK™ Horizontal** - Hi-Static Ducted Comfort & Precision Ceiling Mounted A/C's

**HK-OA™** - Horizontal Up to 100% DOAS High-Percentage Outside Air Ceiling Mounted A/C's

## Floor Air Conditioners

**MissionCritical™** - Precision Vertical Floor Mounted Computer Room A/C's

**VK™ Vertical** - SCAV, Vertical Floor Mounted Self-Contained & Split Comfort Constant Air Volume and Variable Air Volume (VAV) A/C's & Heat Pumps

**VK-OA™** - Vertical Up to 100% DOAS High-Percentage Outside Air Vertical Floor Mounted A/C's

**VK™ Console** - Vertical Floor Console Mounted Self-Contained & Split A/C's & Heat Pumps

## Remote Heat Rejection

**FluidCool™** - Indoor & Outdoor Remote Glycol Drycoolers

**PumpAll™** - Single, Dual & Triplex Standard & Variable (VFD) Speed Glycol Pump Packages



2x4 "Spot-Cool & Ducted" Ceiling Mounted A/C's  
(1 to 3 Tons)



High-Static BD "Ducted" Ceiling Mounted A/C's  
(1 to 30 Tons)



Comfort - Packaged & Split Vertical Floor Mounted Air Conditioners  
(1 to 45 Tons)



Precision - Vertical Floor Console Mounted Air Conditioners  
(1 to 30 Tons)

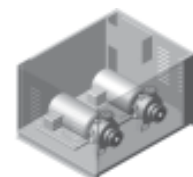


**VK-MissionCritical™** - Up-Flow & Down-Flow Vertical Floor Mounted Computer Room Air Conditioners  
(1 to 30 Tons)



Remote Air Cooled Condensers, Condensing Units & Glycol Drycoolers  
(1 to 180 Tons of THR)

Single, Dual & Triplex Glycol Pump Packages  
(1/2 to 50 HP)



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