Printed Date: 03/12/2025
Job: RedHat RTU
Mark: RTU-1
Model: VXE-112-41D-5A-1-D2

VXE-112-41D-5A-1-D2

Unit Performance

Design Conditions

Elevation (ft)	Summer		Winter DB (F)	Supply (CFM)	Outdoor Air (CFM)	Exhaust Air (CFM)
	DB (F)	WB (F)				
30	91.0	73.0	0.0	1,500	1,500	1,275

Unit Specifications

Qty	Weight (lb)	Cooling Type	Primary Heating Type	Secondary Heating Type	Unit Installation	Unit ETL Listing
1	3,501 (+/- 5%)	Air-Source Heat Pump	Air-Source Heat Pump	Electric	Outdoor	UL\cUL 1995/ 60335-2-40

Configuration

Outdoor Air		Exhaust Air	
Intake	Discharge	Intake	Discharge
End	Side	Side	Side

ASHRAE 90.1 Compliance

	ASHRAE 90.1 Min. Efficiency	Calculated Efficiency	Compliance
ISMRE2 (ASHRAE 90.1-2022)	5	8.5	✓
ISCOP2 (ASHRAE 90.1-2022)	3.2	3.91	✓
Enthalpy Recovery Ratio (%)	50	70.74	✓

Energy Recovery Performance

Design Condition	Temperature (F)							
	Outdoor Air		Supply Air		Return Air		Exhaust Air	
	DB	WB	DB	WB	DB	WB/RH	DB	WB
Summer	91.0	73.0	79.5	65.9	75.0	62.5/50	88.2	71.3
Winter	0.0	-1.7	47.8	39.3	70.0	52.9/30	12.0	11.3

Cooling Specifications

Type	Total Capacity (MBH)	Sensible Capacity (MBH)	Coil (DB/WB)		Reheat	
			EAT (F)	LAT (F)	Capacity (MBH)	LAT (F)
Air-Source Heat Pump	66.6	45.7	79.5 / 65.9	50.5 / 50.5	49.9	81.6

Primary Heat Specifications

Type	Total Capacity (MBH)	Dry Bulb Temperatures		
		EAT (F)	LAT (F)	Ambient Outdoor Air (F)
Air-Source Heat Pump	34.6	47.8	69.5	0.0

Secondary Heat Specifications

Type	Capacity (kW)	Full Load Amps (FLA)	Capacity Control	Performance (w/ASHP)		Performance (w/o ASHP)	
				EAT (F)	LAT (F)	EAT (F)	LAT (F)
Electric	15.0	18.8	Modulating (SCR)	69.5	101.1	47.8	79.4

Motor Specifications

Motor	Qty	Operating Power (hp)	Size (hp)	Enclosure	Efficiency	RPM
Supply	1	1.23	1 1/2	ODP	NEMA Premium	1170
Exhaust	1	0.81	1	ODP	NEMA Premium	1150

Electrical Specifications

Power Supply	Rating (V/C/P)	MCA (A)	MOP (A)	FLA (A)	Fan Power (W/CFM)*
Unit	460/60/3	42.3	45.0	35.2	1.011

*Fan Power (W/CFM) = (Supply BHP + Exhaust BHP) / Supply CFM

Construction Features And Accessories

Unit	
Unit Installation - Outdoor	Std
Unit Construction - Double Wall	Std
Insulation - 2 inch 2.4# R13 foam	Std
Corrosion Resistant Fasteners	Std
Hinged Access	Std
Factory Wired Non-Fused Disconnect Switch	Std
Direct Drive Plenum Blower & Motor Assemblies	Std
Factory Wired VFDs	Std
Unit Finish - Permatector, Concrete Gray (RAL 7023)	X
Stainless Steel Condensate Drain Pan and Connection	Std
Condensate Drain Trap	Std
Short Circuit Current - 5 kA	Std
Energy Recovery Device - Polymer Wheel w/ Silica Gel Desiccant	Std
Controls	
Unit Controls - Full Factory Control	Std
Internally Mounted Control Center with 24 VAC control transformer(s)	Std
BMS Protocol - BACnet MSTP	X
BMS Monitoring Points	
Supply Fan Control - Constant Volume - Adj. Setpoint	X
Exhaust Fan Control - Constant Volume - Adj. Setpoint	X
Economizer Control - Temp./Enthalpy	X
Exhaust Fan Only Power	
Web-Based User Interface	Std
Energy Wheel Economizer Control - Modulating Wheel	X
Energy Wheel Rotation Sensor	Std
Damper Control - 100% OA-Unocc. Recirculation	X
Unoccupied Recirc Mode	X
Control Accessories	
Remote Display	
Dirty Filter Sensor(s) - None	
Airflow Monitor	
Room Thermostat - Space Temperature	X
Phase/Brownout Protection	Std
Economizer Fault Detection Diagnostics	

Accessories	
Frost Control - None	
Outdoor Air Damper - Low Leakage	X
Return Air Damper - Low Leakage	X
Roof Curb	
Supply Air Filters - 2" Merv 13, 2-20x20x2, 2-20x24x2	X
Service Outlet	
Piping Vestibule	
Service Lights	
Condensate Overflow Switch	X
Spare Filters	
Exhaust Discharge Motorized Damper	X
ElectroFin Coil Coating	
Motor Shaft Grounding	
Bipolar Ionization	
Smoke Detector(s)	
Barometric Relief Damper	
UV Lights	
Return Air Filters - 2" Merv 8, 3-16x25x2	Std
Outdoor Air Filters - 2" Merv 8, 3-16x25x2	Std
Furnace Control	
Spare Energy Wheel Belt	
Spare Energy Wheel Segments	
Energy Wheel Bypass Damper	
Hail Guards	
Warranty Options	
Unit Warranty - 18 Months (Std.)	Std
Energy Wheel Warranty - 5 Yrs Less Motor	Std
Compressor Warranty - 5.5 Yrs. (4 Yrs. Extended)	X

Standard Option	Std
Not Included	
Included	X

Notes
Verify that the correct BMS Protocol has been selected before ordering
Outdoor Air Damper supplied is low leakage, motorized VCD-23 (leakage rate of 3 CFM/ft^2 @ 1 in. wg), Class 1A
Return Air Damper supplied is low leakage, motorized VCD-23 (leakage rate of 3 CFM/ft^2 @ 1 in. wg), Class 1A
Frosting of the energy recovery device is possible. Please contact the factory to assess frost control options.
Frosting of the energy recovery device is possible. Please contact the factory to assess frost control options.
Leak detection sensors
Air-Source Heat Pump heating may go into defrost or extended lock out (until weather pattern changes) during high humidity or precipitation events. Without supplemental heat, supply discharge temperature may be extremely low during defrost. To avoid this, consider selecting supplemental heat.

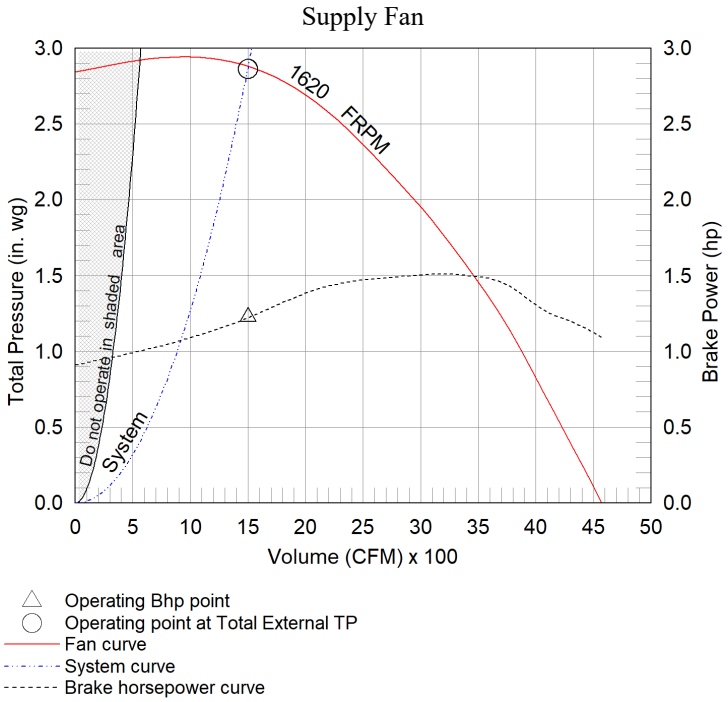
Supply Fan Charts And Performance

Supply Fan Performance									
Total Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	RPM	Operating Power (hp)	Motor		Fan		
					Qty	Size (hp)	Qty	Type	Drive-Type
1,500	2	2.864	1620	1.23	1	1 1/2	1	Plenum	Direct

Pressure Drop (in. wg)							
Weatherhood	Filter	Damper	Cooling	Heating	External	Energy Wheel	Total
0.017	0.051	0.008	0.077	0.067	2	0.636	2.864

Sound Performance in Accordance with AMCA										
Sound Power by Octave Band								Lwa	dBA	Sones
62.5	125	250	500	1000	2000	4000	8000			
73.1	81.8	81.1	72.9	66.7	63.5	72.1	60.7	77.9	66.4	15.5

*Energy Wheel pressure drop shown in above table also accounts for pressure drop across MERV8 OA filter



Exhaust Fan Charts And Performance

Exhaust Fan Performance

Mode	Total Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	RPM	Operating Power (hp)	Motor		Fan		
						Qty	Size (hp)	Qty	Type	Drive-Type
Normal	1,275	1.5	2.083	1420	0.81	1	1	1	Plenum	Direct

Pressure Drop (in. wg)

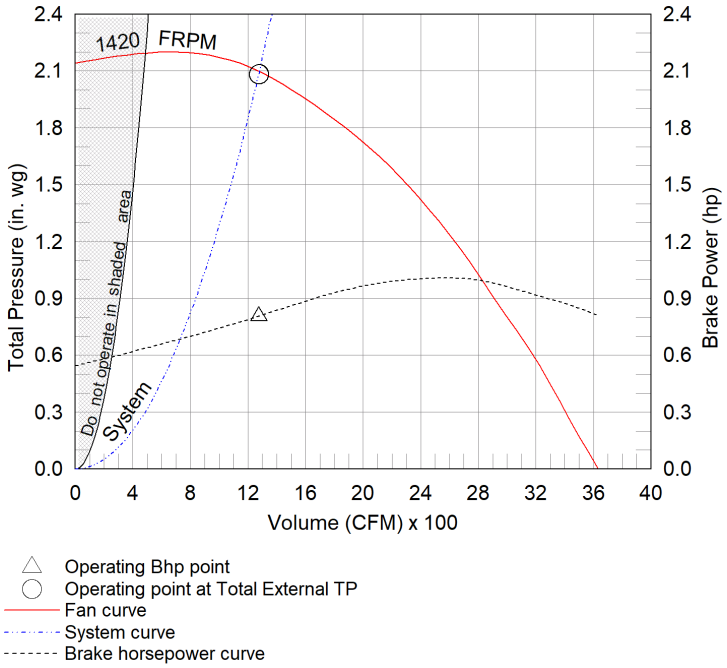
Mode	Weatherhood	Filter	Damper	Cooling	Heating	External	Energy Wheel	Total
Normal	0.021	-	-	-	-	1.5	0.562	2.083

Sound Performance in Accordance with AMCA

Mode	Sound Power by Octave Band								Lwa	dBA	Sones
	62.5	125	250	500	1000	2000	4000	8000			
Normal	78.7	68.9	71.6	62.5	59.1	57.6	62.6	54.2	68.7	57.2	9.4

*Energy Wheel pressure drop shown in above table also accounts for pressure drop across MERV8 return air filter

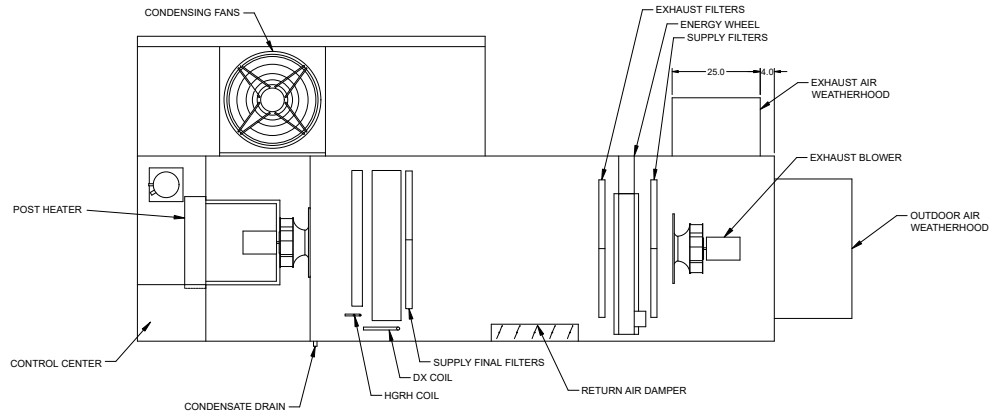
Exhaust Fan



Radiated Sound

Position A

Dimensional Overview



Plan

Position D **Position B**

Position C

"E" is the Top Plane

Supply Air Flow Nominal, Largest Tonnage Condensing Section Available, PDX units only

Radiated Sound Levels										
Plane	Octave Bands (Lw)								Plane Lw	Plane LwA
	1	2	3	4	5	6	7	8		
A	73	86	81	79	77	73	69	63	89	82
B	71	79	77	71	69	64	63	55	82	75
C	79	76	69	66	64	59	53	46	81	69
D	74	77	72	72	69	62	58	51	81	74
E	77	84	80	76	76	70	66	60	87	80
Total	83	89	85	82	81	76	72	65	92	85

AMCA 320-07 - Laboratory Methods of Sound Testing of Fans Using Sound Intensity
Tests conducted in accordance with this standard.
Free field measurement plane created 1 foot from unit on all sides and top.
Sound Intensity measured in Watts/m^2.
Sound data converted to Sound Power (Lw) for the chart above.
A-Weighted Sound Power was determined using AMCA Standard 301-90 Clause 9.1.
Plane E sound data was measured above the top plane of the unit.

Air-Source Heat Pump Performance

Coil Information						
Indoor Coil Model	**Fins Per Inch**	**Rows Deep**	**Face Vel. (ft/min)**	**Coil PD (in. wg)**	**Refrigerant**	**Face Area (ft2)**
DR516L04S16-42X42.5-LH	16	4	121	0.077	R-454B	11.81

Compressor Details					
Lead Compressor Type	**Compressor Qty**	**Compressor RLA/MRC (A)**		**Compressor LRA (A)**	
		Comp. #1	**Comp. #2**	**Comp. #1**	**Comp. #2**
Inverter Scroll	1	9.4	-	NA	-

Cooling Specifications						
Type	**Total Capacity (MBH)**	**Sensible Capacity (MBH)**	**Coil (DB/WB)**		**Reheat**	
			EAT (F)	**LAT (F)**	**Capacity (MBH)**	**LAT (F)**
Air-Source Heat Pump	66.6	45.7	79.5 / 65.9	50.5 / 50.5	49.9	81.6

Primary Heat Specifications				
Type	**Total Capacity (MBH)**	**Dry Bulb Temperatures**		
		EAT (F)	**LAT (F)**	**Ambient Outdoor Air (F)**
Air-Source Heat Pump	34.6	47.8	69.5	0.0

A2L Installation Requirement - UL 60335-2-40		
Largest Circuit Charge	**Minimum Circulation Airflow**	**Minimum Total Conditioned Room Area**
21.25lb / 9.64kg	577 CFM	319 ft2

Local codes and standards may have requirements regarding the installation of A2L refrigerants in addition to manufacturing instructions provided for listed and labeled equipment.

Unit Details
Refrigerant charges provided by the factory are approximate and may require adjustment in the field
Hermetic scroll type compressors
Compressors mounted on neoprene vibration isolation
Stainless steel double sloped drain pan
Moisture-indicating sight glass
Service/charging valves
Refrigerant high pressure switch (manual reset)
Liquid-Line filter drier
Inverter scroll compressor
Unit cannot be mounted in an enclosed space.
Leak detection sensors
Low sound ECM outdoor fan for modulating head pressure control
Electronic expansion valve

Important Notes:
Capacity is based on incoming voltage selected. If incoming power varies it may affect the capacity of your selection.
Air-Source Heat Pump heating may go into defrost or extended lock out (until weather pattern changes) during high humidity or precipitation events. Without supplemental heat, supply discharge temperature may be extremely low during defrost. To avoid this, consider selecting supplemental heat.

Secondary Heat Performance

Secondary Heat Specifications							
Type	Capacity (kW)	Full Load Amps (FLA)	Capacity Control	Performance (w/ASHP)		Performance (w/o ASHP)	
				EAT (F)	LAT (F)	EAT (F)	LAT (F)
Electric	15.0	18.8	Modulating (SCR)	69.5	101.1	47.8	79.4

Unit Details
Open coil heating elements
High grade Nickel-Chrome alloy coils
SCR controller
Unit controller maximum allowable supply discharge air set point is 100F (37.8C)
Heat pump and electric heater can operate simultaneously. Unit MCA/MOP will be sized for concurrent operation of all loads

Energy Recovery Summer Performance

Outdoor Air		Supply Air	
Dry Bulb (F)	91.0	Dry Bulb (F)	79.5
Wet Bulb (F)	73.0	Wet Bulb (F)	65.9
Specific Humidity (gr/lb)	94	Specific Humidity (gr/lb)	74
Enthalpy (BTU/lb)	36.6	Enthalpy (BTU/lb)	30.6
Exhaust Air		**Return Air**	
Dry Bulb (F)	88.2	Dry Bulb (F)	75.0
Wet Bulb (F)	71.3	Rel. Humidity (%)	50
Specific Humidity (gr/lb)	87	Specific Humidity (gr/lb)	65
Enthalpy (BTU/lb)	34.8	Enthalpy (BTU/lb)	28.2

ENERGY WHEEL

Design Air Flow Conditions			
OA Volume (CFM)	**ASHRAE 90.1 OA Enthalpy Recovery Ratio**	**EA Volume (CFM)**	**EA Wheel Effectiveness**
1,500	70.74	1,275	79.169

Summer Conditions

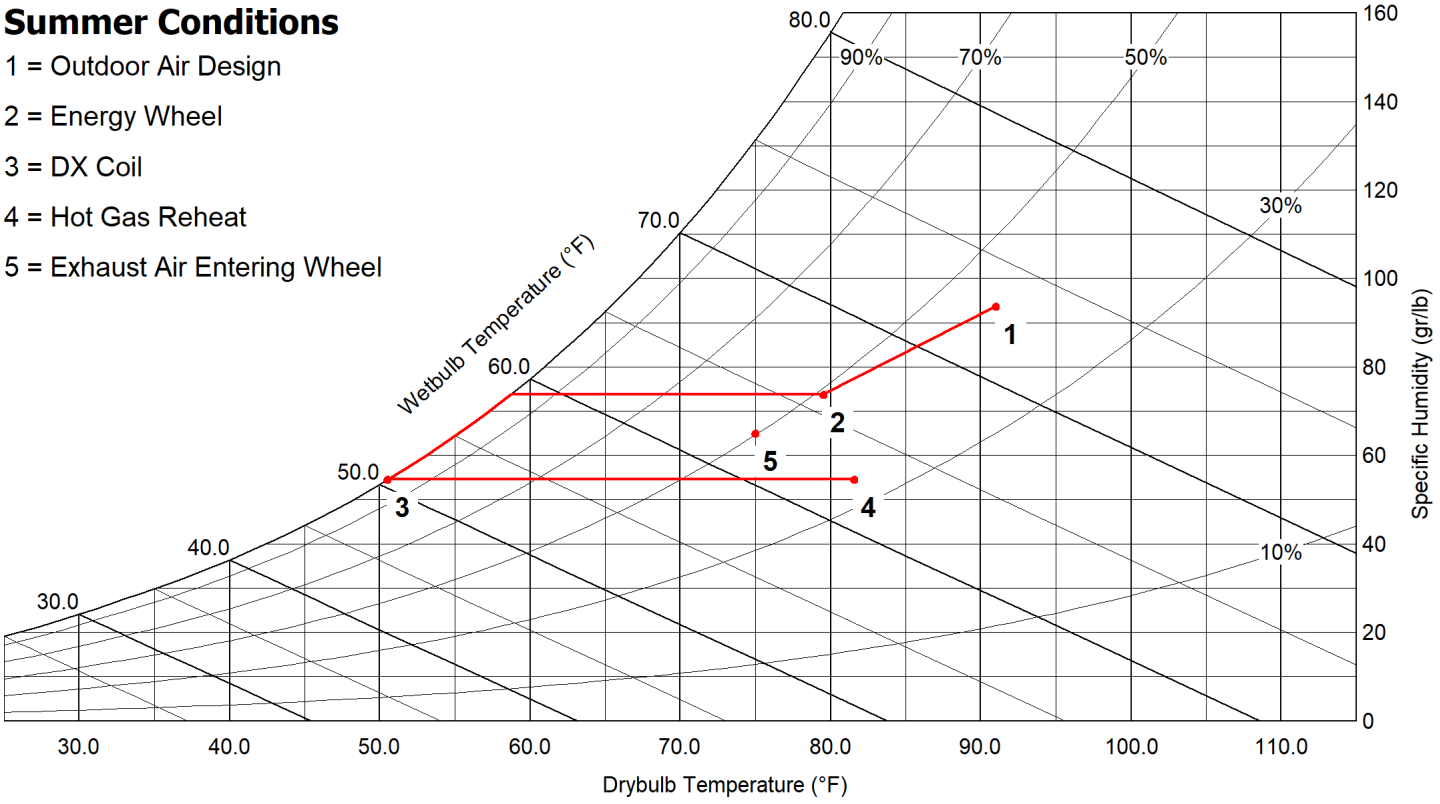
1 = Outdoor Air Design

2 = Energy Wheel

3 = DX Coil

4 = Hot Gas Reheat

5 = Exhaust Air Entering Wheel



Energy Recovery Winter Performance w/out Preheater

Outdoor Air		Supply Air	
Dry Bulb (F)	0.0	Dry Bulb (F)	47.8
Wet Bulb (F)	-1.7	Wet Bulb (F)	39.3
Specific Humidity (gr/lb)	3	Specific Humidity (gr/lb)	22
Enthalpy (BTU/lb)	0.4	Enthalpy (BTU/lb)	14.9
Exhaust Air		**Return Air**	
Dry Bulb (F)	12.0	Dry Bulb (F)	70.0
Wet Bulb (F)	11.3	Rel. Humidity (%)	30
Specific Humidity (gr/lb)	9	Specific Humidity (gr/lb)	33
Enthalpy (BTU/lb)	4.2	Enthalpy (BTU/lb)	21.9

ENERGY WHEEL

Design Air Flow Conditions			
OA Volume (CFM)	**ASHRAE 90.1 OA Enthalpy Recovery Ratio**	**EA Volume (CFM)**	**EA Wheel Effectiveness**
1,500	67.35	1,275	80.58

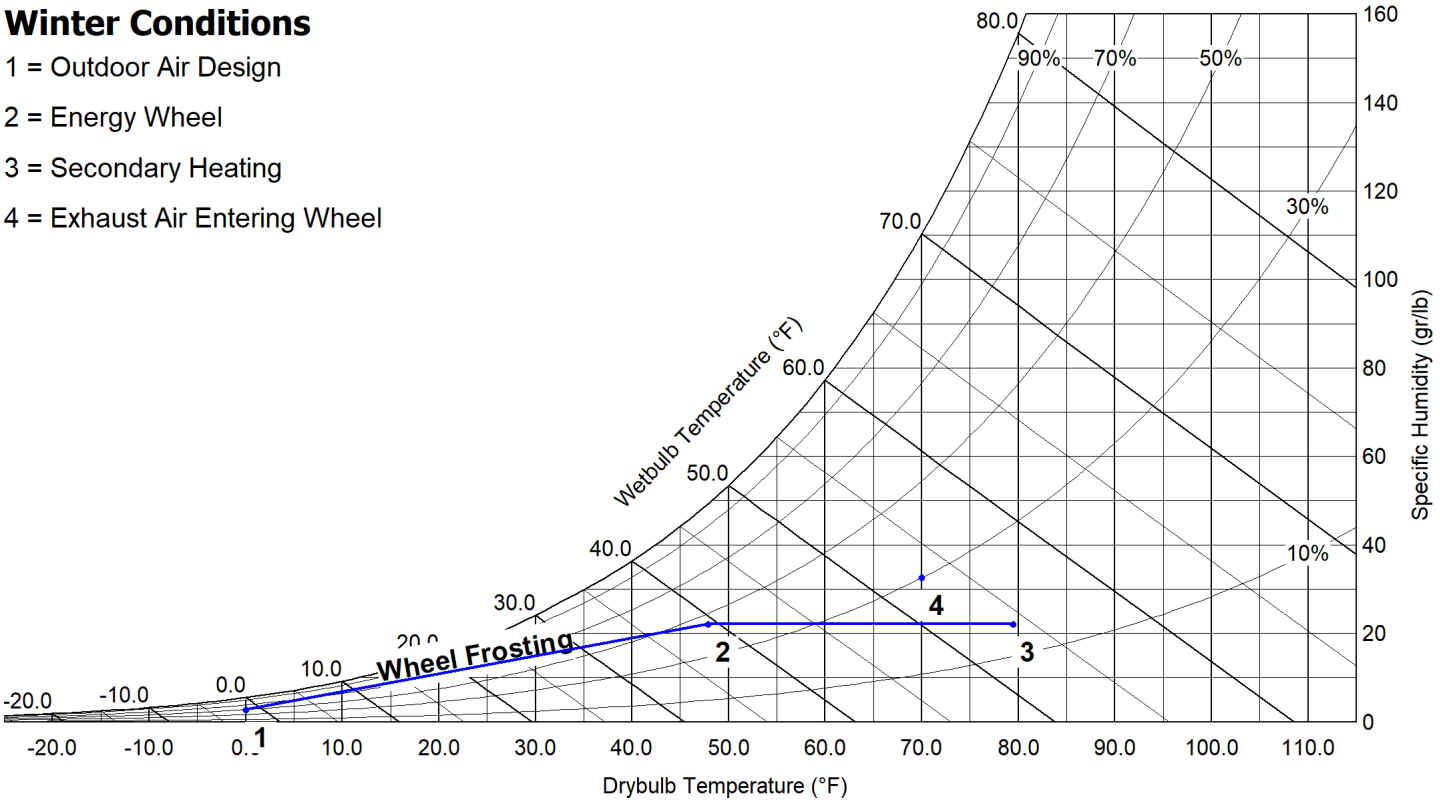
Winter Conditions

1 = Outdoor Air Design

2 = Energy Wheel

3 = Secondary Heating

4 = Exhaust Air Entering Wheel



AHRI Performance Ratings

Energy Recovery Performance Rating in accordance with AHRI Standard 1060 (I-P)							
Rated Airflow (SCFM)		Net Supply Airflow (SCFM)	EATR (%)	OACF	Pressure Drop (in. wg)		Purge Angle (degrees)
Leaving Supply	Entering Exhaust				Supply	Exhaust	
1,281	1,371	1,596	6.0	1.06	0.41	0.35	0

Thermal Effectiveness Ratings							
Enthalpy Recovery		Sensible Effectiveness		Latent Effectiveness		Total Effectiveness	
Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
70.7	67.3	81.6	81.4	77.0	77.4	79.2	80.6

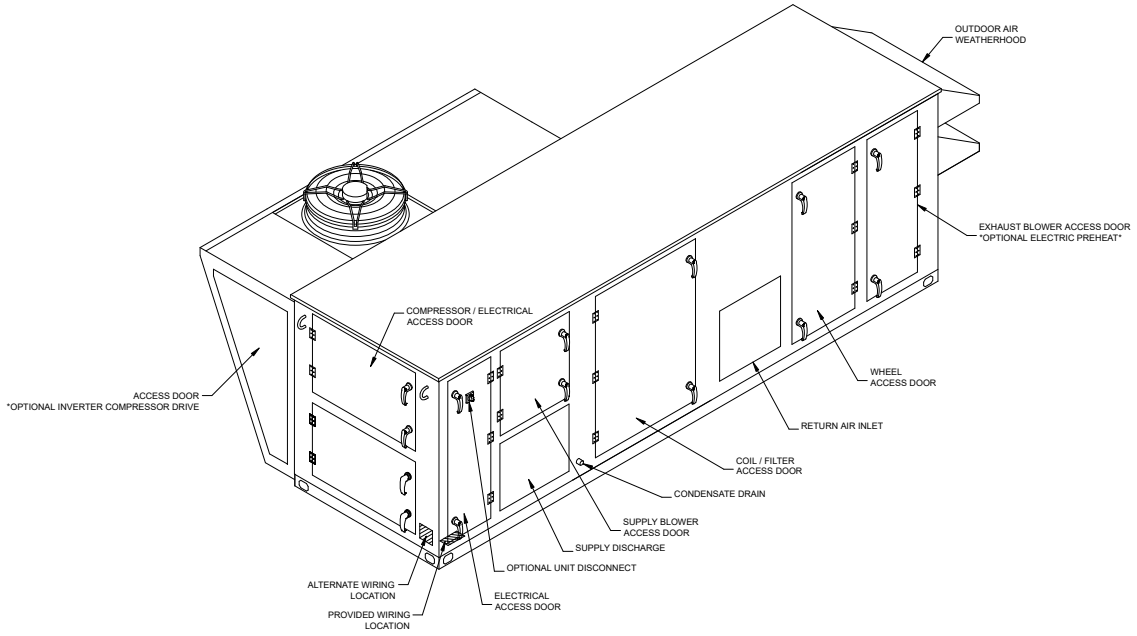
Note(s)

Summer Design Conditions:
Certified in accordance with the AHRI ERV Certification Program, which is based on AHRI Standard 1060. Certified units may be found in the AHRI Directory at www.ahridirectory.org.

Winter Design Conditions:
Application Rating is outside the scope of the AHRI ERV certification Program but is rated in accordance with AHRI Standard 1060.

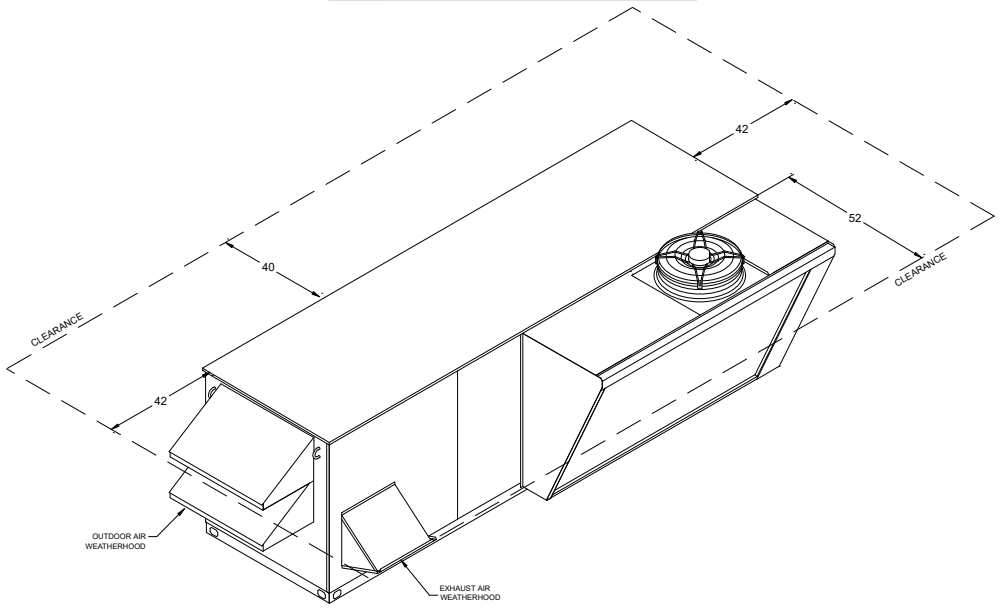
Isometric Drawings

Component Layout



Back Right Isometric

Service Clearances

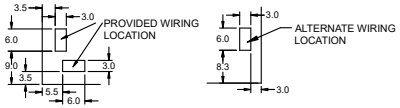


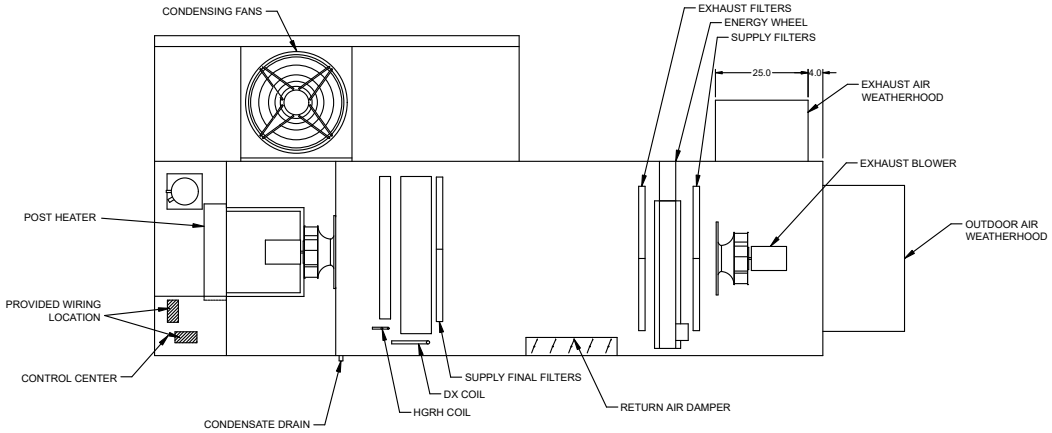
Front Left Isometric

Overview Drawings

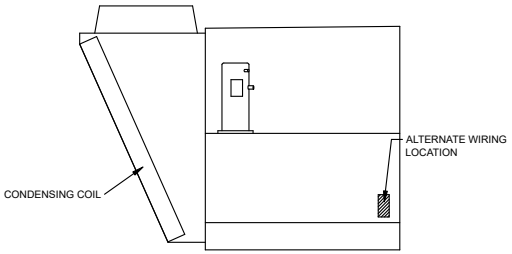
Dimensional Overview

Electrical Connections

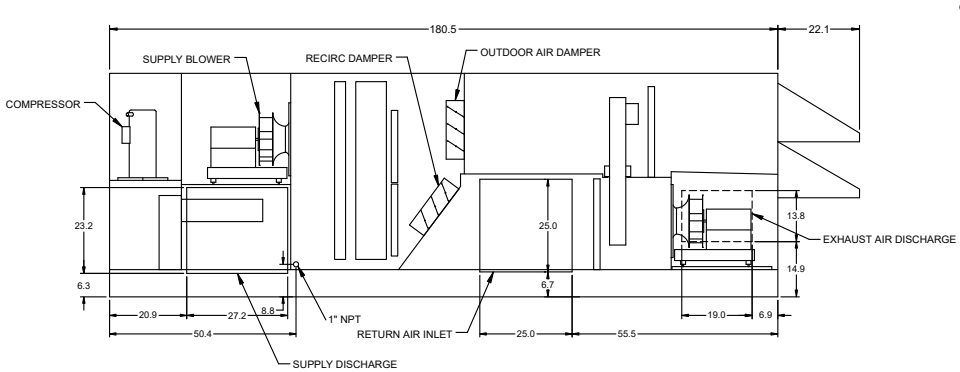




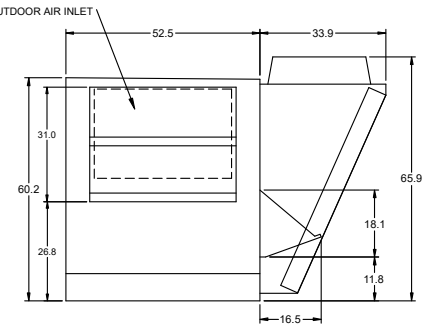
Plan



Left End



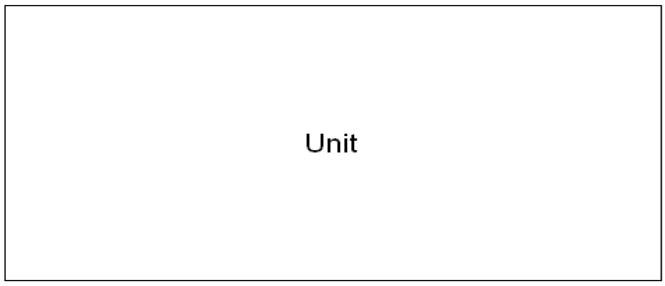
Elevation



Right End

Unit Corner Weights

1,214 lb 1,048 lb

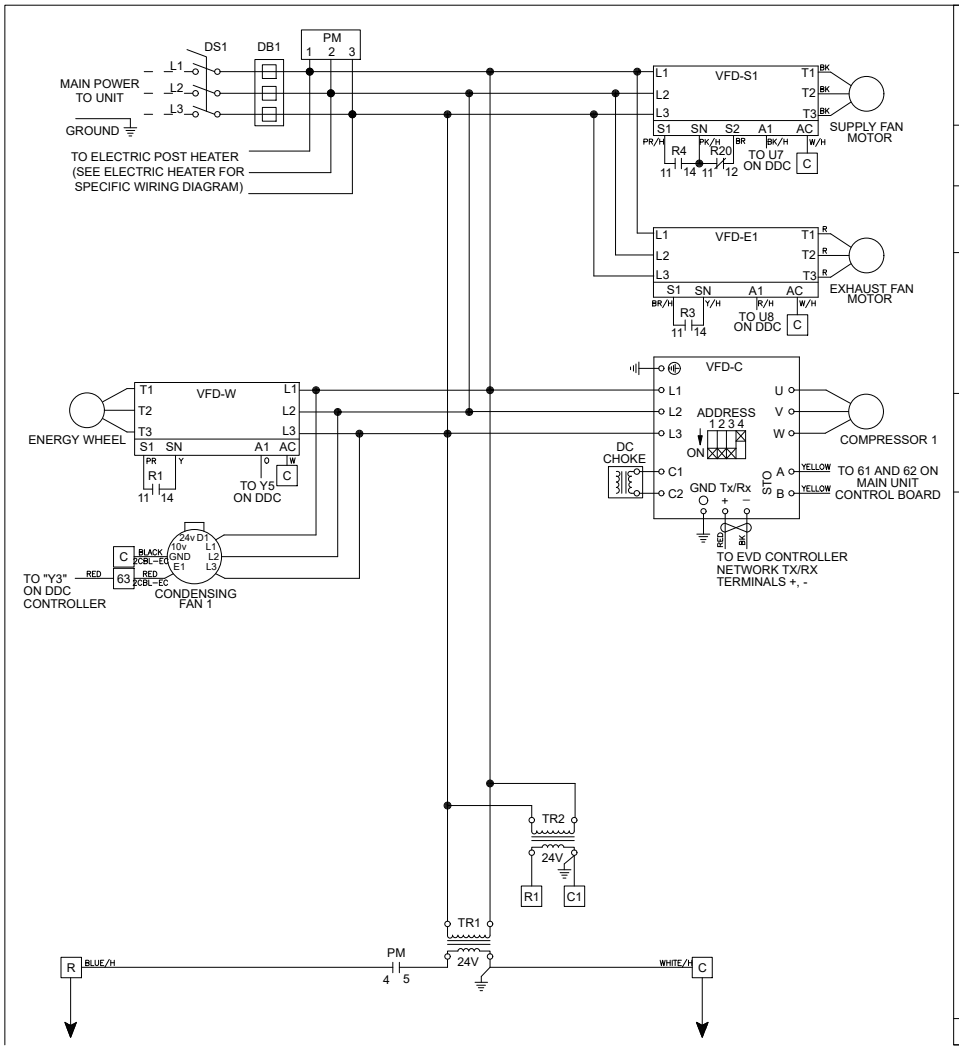


665 lb 574 lb

Note

Estimated corner weights are shown looking down on unit and the outside air intake will be on the right. Weights are applied at the base of the unit. Images not drawn to scale.

Wiring Diagram



AIR MANAGEMENT SYSTEMS

Wiring Diagram Code:

V22Q1A1AM00G64X00NA23F0300BH31

CAUTION

UNIT SHALL BE GROUNDED IN ACCORDANCE WITH N.E.C.
POWER MUST BE OFF WHILE SERVICING.

NOTES

USE COPPER CONDUCTORS ONLY
60° C FOR TERMINALS RATED LESS THAN 100 AMPS.
75° C FOR TERMINALS RATED 100 AMPS OR MORE.

FIELD CONTROL WIRING RESISTANCE SHOULD NOT EXCEED 0.75 OHM.

FIELD WIRED – – – – –
FACTORY SUPPLIED AND WIRED ————

WIRE COLOR CODE

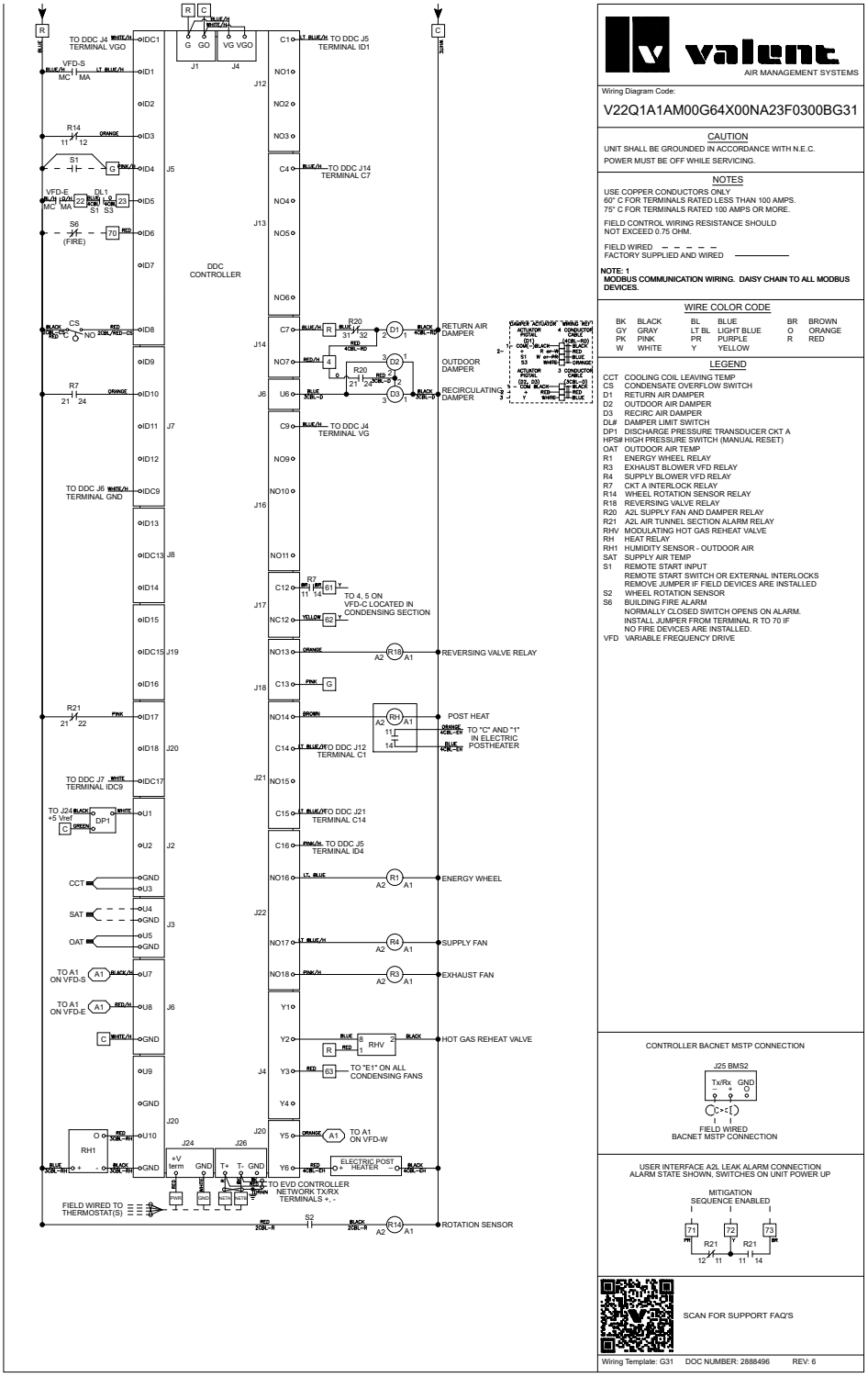
BK	BLACK	BL	BLUE	BR	BROWN
GY	GRAY	LT BL	LIGHT BLUE	O	ORANGE
PK	PINK	PR	PURPLE	R	RED
W	WHITE	Y	YELLOW		

LEGEND

DB#	POWER DISTRIBUTION BLOCK
DS	DISCONNECT SWITCH
PM	PHASE VOLTAGE MONITOR
R1	ENERGY WHEEL RELAY
R3	EXHAUST BLOWER VFD RELAY
R4	SUPPLY BLOWER VFD RELAY
R20	A2L SUPPLY FAN AND DAMPER RELAY
TR#	TRANSFORMER
VFD	VARIABLE FREQUENCY DRIVE

Wiring Template: H31 DOC NUMBER: 2888496 REV: 6

Wiring Diagram 2



AIR MANAGEMENT SYSTEMS

Wiring Diagram Code:

V22Q1A1AM00G64X00NA23F0300BG31

CAUTION

UNIT SHALL BE GROUNDED IN ACCORDANCE WITH N.E.C.

POWER MUST BE OFF WHILE SERVICING.

NOTES

USE COPPER CONDUCTORS ONLY
60° C FOR TERMINALS RATED LESS THAN 100 AMPS.
75° C FOR TERMINALS RATED 100 AMPS OR MORE.

FIELD CONTROL WIRING RESISTANCE SHOULD NOT EXCEED 0.75 OHM.

FIELD WIRED – – – – –
FACTORY SUPPLIED AND WIRED ————

NOTE: 1
MODBUS COMMUNICATION WIRING. DAISY CHAIN TO ALL MODBUS DEVICES.

WIRE COLOR CODE

BK	BLACK	BL	BLUE	BR	BROWN
GY	GRAY	LT BL	LIGHT BLUE	O	ORANGE
PK	PINK	PR	PURPLE	R	RED
W	WHITE	Y	YELLOW		

LEGEND

CCT	COOLING COIL LEAVING TEMP
CS	CONDENSATE OVERFLOW SWITCH
D1	RETURN AIR DAMPER
D2	OUTDOOR AIR DAMPER
D3	RECIRC AIR DAMPER
DLM	DAMPER LIMIT SWITCH
DP1	DISCHARGE PRESSURE TRANSDUCER CKT A
HPS#	HIGH PRESSURE SWITCH (MANUAL RESET)
OAT	OUTDOOR AIR TEMP
R1	ENERGY WHEEL RELAY
R3	EXHAUST BLOWER VFD RELAY
R4	SUPPLY BLOWER VFD RELAY
R7	CKT A INTERLOCK RELAY
R14	WHEEL ROTATION SENSOR RELAY
R18	REVERSING VALVE RELAY
R20	A2L SUPPLY FAN AND DAMPER RELAY
R21	A2L AIR TUNNEL SECTION ALARM RELAY
RHV	MODULATING HOT GAS REHEAT VALVE
RH	HEAT RELAY
RH1	HUMIDITY SENSOR - OUTDOOR AIR
SAT	SUPPLY AIR TEMP
S1	REMOTE START INPUT REMOTE START SWITCH OR EXTERNAL INTERLOCKS REMOVE JUMPER IF FIELD DEVICES ARE INSTALLED
S2	WHEEL ROTATION SENSOR
S6	BUILDING FIRE ALARM NORMALLY CLOSED SWITCH OPENS ON ALARM. INSTALL JUMPER FROM TERMINAL R TO 70 IF NO FIRE DEVICES ARE INSTALLED.
VFD	VARIABLE FREQUENCY DRIVE

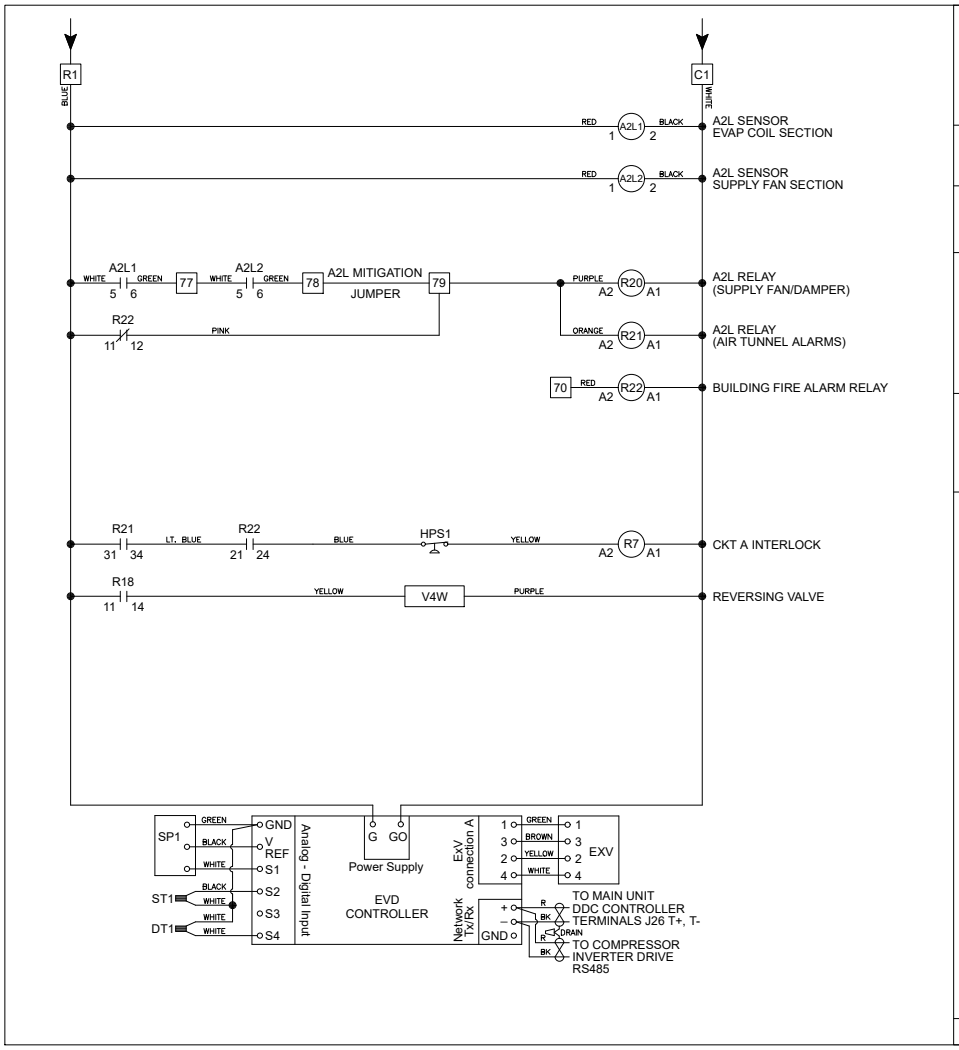
CONTROLLER BACNET MSTP CONNECTION

USER INTERFACE A2L LEAK ALARM CONNECTION
ALARM STATE SHOWN, SWITCHES ON UNIT POWER UP

SCAN FOR SUPPORT FAQ'S

Wiring Template: G31 DOC NUMBER: 2888496 REV: 6

Wiring Diagram 3



AIR MANAGEMENT SYSTEMS

Wiring Diagram Code:

V22Q1A1AM00G64X00NA23F0300BL31

CAUTION

UNIT SHALL BE GROUNDED IN ACCORDANCE WITH N.E.C.
POWER MUST BE OFF WHILE SERVICING.

NOTES

USE COPPER CONDUCTORS ONLY
60° C FOR TERMINALS RATED LESS THAN 100 AMPS.
75° C FOR TERMINALS RATED 100 AMPS OR MORE.

FIELD CONTROL WIRING RESISTANCE SHOULD NOT EXCEED 0.75 OHM.

FIELD WIRED – – – – –
FACTORY SUPPLIED AND WIRED ————

WIRE COLOR CODE

BK	BLACK	BL	BLUE	BR	BROWN
GY	GRAY	LT BL	LIGHT BLUE	O	ORANGE
PK	PINK	PR	PURPLE	R	RED
W	WHITE	Y	YELLOW		

LEGEND

A2L#	A2L REFRIGERANT LEAK SENSOR
EXV	ELECTRONIC EXPANSION VALVE
R7	CKT A INTERLOCK RELAY
R18	REVERSING VALVE RELAY
R20	A2L SUPPLY FAN AND DAMPER RELAY
R21	A2L AIR TUNNEL SECTION ALARM RELAY
R22	BUILDING FIRE ALARM RELAY
RH	HEAT RELAY
SP1	SUCTION PRESSURE TRANSDUCER CKT A
ST1	SUCTION LINE TEMP CKT A
VFD	VARIABLE FREQUENCY DRIVE
V4W	4 WAY REVERSING VALVE

Wiring Template: L31 DOC NUMBER: 2888496 REV: 6

Valent Network Interface v10.001 Modbus/BACnet Points List

Variable	Description	BACnet Object	ModBus Object	Read or Write	Text or Unit of M		Included
					Active	Inactive	
Space_Temp_Analog_Input	Space Temperature	AI-1	30002	R	°F		X
Supply_Temp_Analog_Input	Supply Temperature	AI-2	30004	R	°F		X
Outside_Air_Temp_Analog_Input	Outside Air Temperature	AI-3	30006	R	°F		X
Mixed_Temp_Analog_Input	Mixed Temperature	AI-4	30008	R	°F		
Cold_Coil_1_Temp_Analog_Input	Cold Coil 1 Temperature	AI-5	30010	R	°F		X
Return_Temp_Analog_Input	Return Temperature	AI-7	30014	R	°F		
Exhaust_Temp_Analog_Input	Exhaust Temperature	AI-8	30016	R	°F		
Space_RH_Analog_Input	Space % Relative Humidity	AI-9	30018	R	%		
Outside_RH_Analog_Input	Outside % Relative Humidity	AI-10	30020	R	%		X
Return_RH_Analog_Input	Return % Relative Humidity	AI-11	30022	R	%		
Return_Duct_Static_Pressure_Analog_Input	Return Duct Static Pressure	AI-12	30024	R	"wc		
Space_Static_Pressure_Analog_Input	Space Static Pressure	AI-13	30026	R	"wc		
Supply_Duct_Static_Pressure_Analog_Input	Supply Duct Static Pressure	AI-14	30028	R	"wc		
Space_CO2_1_Analog_Input	Space 1 CO2 ppm	AI-15	30030	R	ppm		
Return_CO2_Analog_Input	Return CO2 ppm	AI-17	30034	R	ppm		
Circuit_A_Discharge_Temp_Analog_Input	Circuit A Discharge Temperature	AI-20	30040	R	°F		X
Circuit_A_Suction_Temp_Analog_Input	Circuit A Suction Temperature	AI-21	30042	R	°F		X
Circuit_B_Discharge_Temp_Analog_Input	Circuit B Discharge Temperature	AI-22	30044	R	°F		X
Circuit_B_Suction_Temp_Analog_Input	Circuit B Suction Temperature	AI-23	30046	R	°F		X
Circuit_A_Discharge_Pressure_Analog_Input	Circuit A Discharge Pressure	AI-28	30056	R	psig		X
Circuit_A_Suction_Pressure_Analog_Input	Circuit A Suction Pressure	AI-29	30058	R	psig		X
Circuit_B_Discharge_Pressure_Analog_Input	Circuit B Discharge Pressure	AI-30	30060	R	psig		X
Circuit_B_Suction_Pressure_Analog_Input	Circuit B Suction Pressure	AI-31	30062	R	psig		X
Aux_In_Customer_1	Customer defined auxiliary input	AI-36	30072	R	selectable		
Aux_In_Customer_2	Customer defined auxiliary input	AI-37	30074	R	selectable		
Aux_In_Customer_3	Customer defined auxiliary input	AI-38	30076	R	selectable		
Aux_In_Customer_4	Customer defined auxiliary input	AI-39	30078	R	selectable		
Aux_In_Customer_5	Customer defined auxiliary input	AI-40	30080	R	selectable		
Aux_In_Customer_6	Customer defined auxiliary input	AI-41	30082	R	selectable		
Aux_In_Customer_7	Customer defined auxiliary input	AI-42	30084	R	selectable		
Aux_In_Customer_8	Customer defined auxiliary input	AI-43	30086	R	selectable		
Aux_In_Customer_9	Customer defined auxiliary input	AI-44	30088	R	selectable		
Aux_In_Customer_10	Customer defined auxiliary input	AI-45	30090	R	selectable		
Temperature_Setpoint	Main Temperature Set point Supply, Space, or Return target temperature	AV-1	40002	RW	°F		X
Temperature_Heat_Cool_Deadband	Heat/Cool Spt Deadband when Room or Return control is active Clg Spt = Deadband /2 + Temp Spt Htg Spt = Deadband /2 - Temp Spt	AV-2	40004	RW	Delta in °F		X
Temperature_Setpoint_Unoccupied	Main Temperature Set point Supply, Space, or Return target temperature	AV-3	40006	RW	°F		
Temperature_Heat_Cool_Deadband_Unoccupied	Heat/Cool Spt Deadband when Room or Return control is active Clg Spt = Deadband /2 + Temp Spt Htg Spt = Deadband /2 - Temp Spt	AV-4	40008	RW	Delta in °F		
Cooling_Coil_Setpoint_Min	Cooling Coil Leaving Air Setpoint	AV-5	40010	RW	°F		X
Cooling_Coil_Setpoint_Max	Maximum Coil Leaving Setpoint	AV-6	40012	RW	°F		X
Dehumidification_Setpoint	Dehumidification Setpoint %RH for Space or Return control	AV-7	40014	RW	%		
Outside_Dewpoint_Setpoint	Outside Dewpoint Dehumidification Trigger	AV-8	40016	RW	°F		X
Indoor_Dewpoint_Setpoint	Indoor Dewpoint Dehumidification Trigger	AV-9	40018	RW	°F		
Unocc_Indoor_Dewpoint_Setpoint	Unoccupied Indoor Dewpoint Dehumidification Trigger	AV-10	40020	RW	°F		
Unoccupied_Dehumidification_Setpoint	Unoccupied Dehumidification %RH Setpoint	AV-11	40022	RW	°F		
Economizer_Temp_Enable_Setpoint	Economizer Ambient Temp Enable Setpoint Allow Econ when OAT is less than Setpoint	AV-12	40024	RW	°F		
Economizer_Enthalpy_Enable_Setpoint	Economizer Enthalpy Enable Setpoint Allow Econ when OA Enthalpy is less than Setpoint	AV-13	40026	RW	btu/lb		X
Cooling_Lockout_Setpoint	Cooling Ambient Lockout Setpoint	AV-17	40034	RW	°F		X
Heating_Lockout_Setpoint	Heating Ambient Lockout Setpoint	AV-18	40036	RW	°F		X
Preheat_Lockout_Setpoint	Preheat Ambient Lockout Setpoint	AV-19	40038	RW	°F		
Economizer_Lockout_Setpoint	Economizer Ambient Lockout Setpoint	AV-20	40040	RW	°F		X
Return_Duct_Static_Pressure_Setpoint	Return Duct Static Pressure Setpoint	AV-21	40042	R	"wc		
Space_Static_Pressure_Setpoint	Space Static Pressure Setpoint	AV-22	40044	RW	"wc		
Supply_Duct_Static_Pressure_Setpoint	Supply Duct Static Pressure Setpoint	AV-23	40046	RW	"wc		
Space_CO2_Setpoint	Space_CO2_Setpoint	AV-24	40048	RW	ppm		
Outside_Air_Damper_Minimum_Setpoint_Occ	Outside Air Damper Minimum Setpoint	AV-24	40050	RW	%		
Outside_RH_from_BMS	Outside RH from BMS Used when source selection is set to BMS	AV-26	40052	RW	%		X
Outside_Temp_from_BMS	Outside Temp from BMS Used when source selection is set to BMS	AV-27	40054	RW	°F		X
Return_RH_from_BMS	Return RH from BMS Used when source selection is set to BMS	AV-28	40056	RW	%		X
Return_Temp_from_BMS	Return Temp from BMS Used when source selection is set to BMS	AV-29	40058	RW	°F		X

Valent Network Interface v8 Modbus/BACnet Points List

Variable	Description	BACnet Object	ModBus Object	Read or Write	Text or Unit of M		Included
					Active	Inactive	
Space_1_CO2_from_BMS	Space 1 CO2 from BMS Used when source selection is set to BMS	AV-30	40060	RW	ppm		X
Return_CO2_from_BMS	Return CO2 from BMS Used when source selection is set to BMS	AV-32	40062	RW	ppm		X
Space_RH_from_BMS	Space RH from BMS Used when source selection is set to BMS	AV-33	40066	RW	%		X
Space_Static_from_BMS	Space Static from BMS Used when source selection is set to BMS	AV-34	40068	RW	"wc		X
Space_Temp_from_BMS	Space Temp from BMS Used when source selection is set to BMS	AV-35	40070	RW	°F		X
SF_Control_Signal_BMS	BMS to control signal for supply fan speed	AV-36	40072	RW	%		X
EF_Control_Signal_BMS	BMS to control signal for exhaust fan speed	AV-37	40074	RW	%		X
OAD_Control_Signal_BMS	Allows the BMS to control OAD position	AV-38	40076	RW	%		
Aux_BMS_Analog_Output_1	BMS Commanded auxilary analog output	AV-39	40078	RW	selectable		X
Unit_Status_Mode	Unit Status Mode - See Table	AV-40	30092	R	Real		X
Supply_Temperature_Calculated_Setpoint	Active Supply Temperature Setpoint	AV-41	30094	R	°F		X
Cooling_1_Ramp_Capacity	Cooling Ramp 1 Status Value	AV-42	30096	R	%		X
Defrost_Ramp	Defrost Ramp	AV-44	30100	R	%		X
Economizer_Ramp	Economizer Ramp	AV-45	30102	R	%		X
Head_Pressure_Control_Ramp_1_Ramp	Head Pressure Control Ramp 1	AV-46	30104	R	%		X
Head_Pressure_Control_Ramp_2_Ramp	Head Pressure Control Ramp 2	AV-47	30106	R	%		
HP_Ramp_Capacity	Heat Pump Heating Ramp	AV-50	30112	R	%		X
Heating_Capacity	Heating Ramp	AV-51	30114	R	%		X
Case_Heat_Control_Ramp	Case Heat Ramp	AV-52	30116	R	%		
Hot_Gas_Reheat_Ramp	Hot Gas Reheat Ramp	AV-53	30118	R	%		
Outside_Dewpoint	Outside Dewpoint	AV-54	30120	R	°F		X
Outside_Enthalpy	Outside Enthalpy	AV-55	30122	R	btu/lb		X
Return_Dewpoint	Return Dewpoint	AV-56	30124	R	°F		
Return_Enthalpy	Return Enthalpy	AV-57	30126	R	btu/lb		
Space_Dewpoint	Space Dewpoint	AV-58	30128	R	°F		
Space_Enthalpy	Space Enthalpy	AV-59	30130	R	btu/lb		
Circuit_A_Superheat	Circuit A Superheat	AV-60	30132	R	°F		X
Circuit_B_Superheat	Circuit B Superheat	AV-61	30134	R	°F		X
Total_Exhaust_Fan_CFM_BMS	Total Exhaust Fan CFM	AV-64	30140	R	CFM		X
Total_Supply_Fan_CFM_BMS	Total Supply Fan CFM	AV-65	30142	R	CFM		X
OAD_CFM_BMS	OAD CFM	AV-66	30144	R	CFM		
Active_Temperature_Setpoint	Active_Temperature_Setpoint	AV-67	30146	R	°F		X
Chilled_Water_1_Valve_Analog_Output	Chilled Water 1 Valve Analog Output	AV-68	30148	R	%		
Electric_Heater_1_Analog_Output	Electric Heater 1 Analog Output	AV-70	30152	R	%		
Energy_Recovery_Analog_Output	Energy Recovery Analog Output	AV-72	30156	R	%		X
Exhaust_Fan_Speed_Analog_Output	Exhaust Fan Speed Analog Output	AV-73	30158	R	%		X
Hot_Water_Valve_1_Analog_Output	Hot Water Valve 1 Analog Output	AV-74	30160	R	%		
Mod_Gas_Furnace_1_Analog_Output	Mod Gas Furnace 1 Analog Output	AV-76	30164	R	%		
Outside_Air_Damper_Analog_Output	Outside Air Damper Analog Output	AV-78	30168	R	%		
Supply_Fan_Speed_Analog_Output	Supply Fan Speed Analog Output	AV-79	30170	R	%		X
Modulating_Compressor_Analog_Output_BMS	First Modulating Compressor Analog Output - BMS	AV-80	30172	R	%		X
Circuit_A_Sat_Discharge_Temperature	Circuit A Saturated Discharge Temperature	AV-82	30176	R	°F		X
Circuit_B_Sat_Discharge_Temperature	Circuit B Saturated Discharge Temperature	AV-83	30178	R	°F		X
Circuit_A_Sat_Suction_Temperature	Circuit A Saturated Suciton Temperature	AV-86	30184	R	°F		X
Circuit_B_Sat_Suction_Temperature	Circuit B Saturated Suciton Temperature	AV-87	30186	R	°F		X
Coil_Temperature_Calculated_Setpoint	Calculated Coil Leaving Set point	AV-90	30192	R	°F		X
Unoccupied_Cooling_Setpoint	Active Cooling Setpoint - Unoccupied	AV-91	30194	R	°F		
Unoccupied_Heating_Setpoint	Active Heating Setpoint - Unoccupied	AV-92	30196	R	°F		
Temperature_Reset_Mode	Occupied Reset Type Setpoint 1-No Reset(Supply Temp Control) 2-Space 3-Return 4-Outside	IV-1	40080	RW	Integer		X
Temperature_Reset_Mode_Unoccupied	Unoccupied Reset Type Setpoint 1-No Reset(Supply Temp Control) 2-Space 3-Return 4-Outside	IV-2	40082	RW	Integer		
Active_Temperature_Reset_Mode	Active Occupied Reset Type Setpoint 1-No Reset(Supply Temp Control) 2-Space 3-Return 4-Outside	IV-3	30198	R	Integer		X
Active_Temperature_Reset_Mode_Unocc	Active Unoccupied Reset Type Setpoint 1-No Reset(Supply Temp Control) 2-Space 3-Return 4-Outside	IV-4	30200	R	Integer		
LatestAlm	Most recent alarm - See Alarm Table	IV-5	30202	R	Integer		X
Device_Enable_DO_Word	Device Enable DO Word - See Table	IV-6	30206	R	Bit Pack		X
Ref_Ckt_PressTemp_Alarm_Word	Refrigeration Circuit Word - See Table	IV-7	30210	R	Bit Pack		X
Device_Offline_Word	Device Offline Word - See Table	IV-8	30214	R	Bit Pack		X
Device_Alarm_Word	Device Alarm Word - See Table	IV-9	30218	R	Bit Pack		X
System_Word	System Word - See Table	IV-10	30222	R	Bit Pack		X
Unit_Status_Word	Unit Status Word - See Table	IV-11	30226	R	Bit Pack		X
Exhaust_Fan_1_Status_Digital_Input	Exhaust Fan Status	BI-1	10009	R	Active	Inactive	X
Supply_Fan_1_Status_Digital_Input	Supply Fan Status	B-2	10010	R	Active	Inactive	X

Valent Network Interface v8 Modbus/BACnet Points List

Variable	Description	BACnet Object	ModBus Object	Read or Write	Text or Unit of M		Included
					Active	Inactive	
BMS_Watchdog	BMS Watchdog command Used to determine BMS comm status Must heartbeat within the watch dog timeout delay to detect comm status	BV-1	2	RW	Active	Inactive	X
System_Enable	Master system enable/disable point	BV-2	3	RW	Enable	Disable	X
BMS_Occupancy_Command	Occupancy Command	BV-3	4	RW	Unoccupied	Occupied	X
Reset_All_Alarms	Alarm Reset Command	BV-4	5	RW	Reset	Normal	X
Exhaust_Only_Mode_BMS_Cmd	Emergancy Exhaust Mode Command	BV-5	6	RW	Enable	Disable	
Pressurization_Only_Mode_BMS_Cmd	Emergancy Pressurization Mode Command	BV-6	7	RW	Enable	Disable	
Outside_RH_Source_BMS	Outside RH Source Selection	BV-7	8	RW	BMS	Local	X
Outside_Temp_Source_BMS	Outside Temp Source Selection	BV-8	9	RW	BMS	Local	X
Return_RH_Source_BMS	Return RH Source Selection	BV-9	10	RW	BMS	Local	X
Return_Temp_Source_BMS	Return Temp Source Selection	BV-10	11	RW	BMS	Local	X
Space_1_CO2_Source_BMS	Space 1 CO2 Source Selection	BV-11	12	RW	BMS	Local	X
Space_2_CO2_Source_BMS	Space 2 CO2 Source Selection	BV-12	13	RW	BMS	Local	X
Return_CO2_Source_BMS	Return CO2 Source Selection	BV-13	14	RW	BMS	Local	X
Space_RH_Source_BMS	Space RH Source Selection	BV-14	15	RW	BMS	Local	X
Space_Static_Source_BMS	Space Static Source Selection	BV-15	16	RW	BMS	Local	
Space_Temp_Source_BMS	Space Temp Source Selection	BV-16	17	RW	BMS	Local	X
SF_Control_Source_BMS	Allows the BMS to control supply fan speed	BV-17	18	RW	BMS	Local	X
EF_Control_Source_BMS	Allows the BMS to control exhaust fan speed	BV-18	19	RW	BMS	Local	X
OAD_Control_Source_BMS	Allows the BMS to control OAD position	BV-19	20	RW	BMS	Local	
Aux_BMS_Digital_Output_1	BMS Commanded auxilary digital output	BV-20	21	RW	Active	Inactive	
Aux_BMS_Digital_Output_2	BMS Commanded auxilary digital output	BV-21	22	RW	Active	Inactive	
Occupied	Occupancy	BV-22	10002	R	Occupied	Unoccupied	X
Global_Alarm	General alarm point Optionally set to indicate any alarm is active, or a shutdown alarm is active	BV-23	10003	R	Alarm	Normal	X
BMS_Watchdog_Active	Status of the BMS watchdog heartbeat	BV-24	10004	R	Active	Inactive	X
OAD_Feedback_Error_Not_Economizing.Active	Feedback indicates OAD is not opening during economizer	BV-25	10005	R	Alarm	Normal	
OAD_Feedback_Error_Economizing.Active	Feedback indicates OAD is open	BV-26	10006	R	Alarm	Normal	
OAD_Feedback_Error_OAD_Not_Modulating.Active	Feedback indicates the OAD is not modulating	BV-27	10007	R	Alarm	Normal	
OAD_Feedback_Error_Excess_OA.Active	Feedback indicates the OAD is not closing	BV-28	10008	R	Alarm	Normal	
Supply_Fan_1_Alarm.Active	Supply Fan Alarm Active	BV-29	10011	R	Alarm	Normal	X
Exhaust_Fan_1_Alarm.Active	Exhaust Fan Alarm Active	BV-30	10012	R	Alarm	Normal	X
Drain_Pan_Alarm.Active	Condensate Drain Pan Alarm Active	BV-31	10013	R	Alarm	Normal	X
Fire_Safety_Shutdown_Alarm.Active	Fire Safety Shutdown Alarm Active	BV-32	10014	R	Alarm	Normal	X
Refrigerant_Leak_Compressor_Alarm.Active	Refrigerant Leak Compressor Alarm Active	BV-33	10015	R	Alarm	Normal	X
Refrigerant_Leak_Airstream_Alarm.Active	Refrigerant Leak Airstream Alarm Active	BV-34	10015	R	Alarm	Normal	X

System_Word (IV-10)
System_Word

Bit	Bit Description
0	Heat Wheel Enable
1	Preheat Enable
2	Reversing Valve (Cooling (0)/Heating(1))
3	
4	OA Damper End Switch Alarm
5	EA Damper End Switch Alarm
6	Supply Temp Low Limit Alarm
7	Supply Temp High Limit Alarm
8	Supply High Duct Static Alarm
9	Supply Fan 1 Alarm
10	Exhaust Fan 1 Alarm
11	Drain Pan Alarm
12	Freeze Stat Alarm
13	Filter Alarm
14	Space High Static Alarm
15	Return Low Static Alarm
16	Shutdown Input Alarm
17	Energy Recovery Wheel High Diff Pressure
18	Energy Recovery Wheel Rotation Alarm
19	
20	Heat Pump Heating Lock Out Alarm
21	BMS Frequent Writes - Reduce Num of Writes
22	BMS Offline Alarm
23	
24	
25	
26	
27	
28	Heat-Cool Only - Dehumidification Request Active
29	Heat-Cool Only - Heating Request Active
30	Heat-Cool Only - Coil Setpoint Alarm Active
31	Heat-Cool Only - Supply Setpoint Alarm Active

Unit_Status_Word Table (IV-11)
Unit_Status_Word

Bit	Bit Description
0	Standby
1	Occupied Start
2	Unoccupied Start
3	Opening Dampers
4	Dampers Open
5	Fan Start Delay
6	Exhaust Fan On
7	Supply Fan On
8	System On
9	Soft Shutdown
10	System Disabled
11	Remote Off
12	System Shutdown Alarm
13	Supply Fan Only
14	Exhaust Fan Only
15	Purge Mode (Supply and Exhaust Only)
16	Case Heat Active
17	Fans Only
18	Economizing
19	Energy Recovery Active
20	Cooling
21	Heating
22	Dehumidifying
23	Hot Gas Reheat Active
24	HGRH Purging
25	Dehum w/Heat
26	Energy Recovery Defrost Active
27	Heat Pump Defrost Active
28	Morning Warm Up/Cool Down Active
29	Winter Ramp Active
30	
31	Overrides Active

Device Enable DO Word Table (IV-6)
Device_Enable_DO_Word

Bit	Bit Description
0	Compressor 1 Start
1	Compressor 2 Start
2	Compressor 3 Start
3	Compressor 4 Start
4	
5	
6	
7	
8	Condenser Fan Ramp 1 Stage 1 Start
9	Condenser Fan Ramp 1 Stage 2 Start
10	Condenser Fan Ramp 1 Stage 3 Start
11	
12	Condenser Fan Ramp 2 Stage 1 Start
13	Condenser Fan Ramp 2 Stage 2 Start
14	Condenser Fan Ramp 2 Stage 3 Start
15	
16	Furnace 1 Start (External Furnace Controller Only)
17	Furnace 2 Start (External Furnace Controller Only)
18	
19	
20	Supply Fan Start
21	Exhaust Fan Start
22	
23	
24	
25	
26	
27	
28	
29	
30	
31	

Refrigeration Circuit Word Table (IV-7)
Ref_Ckt_PressTemp_Alarm_Word

Bit	Bit Description
0	Circuit A Discharge Pressure Sensor Alarm
1	Circuit A Discharge Temp Sensor Alarm
2	Circuit A Suction Pressure Sensor Alarm
3	Circuit A Suction Temp Sensor Alarm
4	Circuit B Discharge Pressure Sensor Alarm
5	Circuit B Discharge Temp Sensor Alarm
6	Circuit B Suction Pressure Sensor Alarm
7	Circuit B Suction Temp Sensor Alarm
8	Circuit A High Pressure Switch Alarm
9	Circuit A Low Refrigerant Pressure Alarm
10	Circuit B High Pressure Switch Alarm
11	Circuit B Low Refrigerant Pressure Alarm
12	Circuit A High Sat Discharge Temp Alarm
13	Circuit B High Sat Discharge Temp Alarm
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	
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29	
30	
31	

Device_Alarm_Word Table (IV-9) Device_Enable_DO_Word	
Bit	Bit Description
0	Cold Coil Temperature Sensor Alarm
1	
2	Mixed Temperature Sensor Alarm
3	Supply Duct Static Pressure Sensor Alarm
4	Supply Fan AFMS Alarm
5	Supply Air Temp Sensor Alarm
6	Exhaust Fan AFMS Alarm
7	Exhaust Temperature Sensor Alarm
8	Outside Air Temp Sensor Alarm
9	Outside RH Sensor Alarm
10	OAD AMD Alarm
11	Greentrol OAD AFMS Alarm
12	Return CO2 Sensor Alarm
13	Return Duct Static Pressure Sensor Alarm
14	Return Temperature Sensor Alarm
15	Return RH Sensor Alarm
16	Space CO2 Sensor Alarm
17	Space RH Sensor Alarm
18	Space Static Pressure Sensor Alarm
19	Space Temperature Sensor Alarm
20	IG Furnace Alarm
21	
22	Inverter Scroll 1 Alarm
23	
24	EVD Valve A Alarm
25	
26	SF VFD Alarm
27	EF VFD Alarm
28	
29	
30	
31	

Device_Offline_Word Table (IV-8) Device_Enable_DO_Word	
Bit	Bit Description
0	Space TStat 1 Offline
1	Space TStat 2 Offline
2	Space TStat 3 Offline
3	Space TStat 4 Offline
4	VFD Offline Supply Fan
5	VFD Offline Exhaust Fan
6	
7	
8	Expansion Board 1 Alarm
9	Expansion Board 2 Alarm
10	Expansion Board 3 Alarm
11	Expansion Board 4 Alarm
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	Primary Unit Offline Alarm
28	Secondary Unit 1 Offline Alarm
29	Secondary Unit 2 Offline Alarm
30	Secondary Unit 3 Offline Alarm
31	Secondary Unit 4 Offline Alarm

UNIT STATUS MODE TABLE (AV-40)			
0	Standby	20	Economizing
1	Unoccupied Start	21	Cooling
2	Occupied Start	22	Heating
3	Opening Dampers	23	Dehumidifying
5	Dampers Open	24	
6	Fan Start Delay	25	HGRH Purging
7	Exhaust Fan Start	26	Energy Recovery Defrost Active
8	Supply Fan Start	27	A2L Refrigerant Leak Alarm
9	Startup Delay	28	A2L Refrigerant Leak Alarm Fan Only Mode
10	System On	29	Dehumifying w/Heat
11	Soft Shutdown	30	Overrides
12	System Disabled	31	Expansion Offline
13	Remote Off	32	
14	System Shutdown Alarm	33	Energy Recovery Active
15	Pressurization Only	34	Hot Gas Reheat Active
16	Exhaust Only	35	Morning Sequence Active
17	Fans Only Purge	36	Heat Pump Defrost
18	Case Heat Active	37	Winter Ramp Active
19	Fans Only		

Alarm Table (Latest Alarm IV-5)					
0	Supply Fan 1 Run - Status Not Proven	64	Heat Wheel Rotation - Not Detected	122	First Inverter Alarm - Serious
1	Freeze Protection - Thermostat Tripped	65	Secondary Unit Offline - Unit 1	123	First Inverter Alarm - Irreversible
2	High Supply Duct - Static Pressure	66	Secondary Unit Offline - Unit 2	124	First Inverter PEC - Invalid Data Set
3	Low Return Duct - Static Pressure	67	Secondary Unit Offline - Unit 3	125	First Inverter STO - Safe Torque Off Open
4	Outside Air Temp - Sensor Value Not Valid	68	Secondary Unit Offline - Unit 4	126	First Inverter Offline - Modbus Comms Lost
5	Supply Air Temperature - Sensor Value Not Valid	69	Primary Unit Offline -	133	Space Thermostat 1 - Sensor Offline
6	Cold Coil 1 Temp - Sensor Value Not Valid	71	Multi Devices per Ch - Contact Tech Support	134	Space Thermostat 2 - Sensor Offline
7	Cold Coil 2 Temp - Sensor Value Not Valid	74	Shutdown Contact - In Alarm Position	135	Space Thermostat 3 - Sensor Offline
9	Exhaust Air Temp - Sensor Value Not Valid	75	Comp Maint Alarm - Run Hours Spt Reached	136	Space Thermostat 4 - Sensor Offline
10	Mixed Air Temperature - Sensor Value Not Valid	76	Supply Air Temperature - High Limit Shutdown	137	IG Furnace 1 - No flame after 3 tries
11	Return Air Temperature - Sensor Value Not Valid	77	Space High Static Pres - Shutdown	138	IG Furnace 1 - Large - No flame after 3 tries
12	Space Temperature - Sensor Value Not Valid	78	Internal Board Temp - Exceeds -40F or 158F	139	IG Furnace 1 Combust - Fan High Pressure Sw
13	Return Air RH - Sensor Value Not Valid	79	BMS Offline - Watchdog is FALSE	140	IG Furnace 1 Ignition - Controller Alarm
14	Space RH - Sensor Value Not Valid	78	Internal Board Temp - Exceeds -40F or 158F	138	IG Furnace 1 Large - no flame after 3 tries
15	Outside RH - Sensor Value Not Valid	80	Clg Coil Setpt Input - Value is not valid	141	IG Furnace 1 Pressure - Switch Fault Alarm
16	Low Pressure Switch - Circuit A	81	Sup Air Setpt Input - Value is not valid	142	IG Furnace 1 Combust - Fan Proving Alarm
17	Low Pressure Switch - Circuit B	82	BACnet License - Not Installed	143	IG Furnace 1 - Max Retries
20	High Pressure Switch - Circuit A	83	Low Suction SH ExV A - EVD 1 Alarm	144	IG Furnace 1 - High Limit Trip
21	High Pressure Switch - Circuit B	85	LOP A EVD 1 - Low Operating Pressure	145	IG Furnace - pCOe 1 Offline
24	Damper End Switch Fail - Dampers are not open	87	MOP A EVD 1 - Max Operating Pressure	146	IG Furnace 1 IC Fault - Check Furnace Wiring
25	Exhaust Fan 1 Run - Status Not Proven	89	EEV A EVD 1 - Motor Alarm	147	IG Furnace 2 - No flame after 3 tries
26	Filters are Dirty - Replace Filters	91	LowSuct A EVD 1 - Refrigerant Temp	148	IG Furnace 2 - Large - No flame after 3 tries
27	Cond Drain Pan Full - Check Drain	93	High Condensing Temp - EVD 1	149	IG Furnace 2 Combust - Fan High Pressure Sw
28	Exp Board 1 Status - Board is Offline	94	Sens S1 EVD 1 - Sensor Value Not Valid	150	IG Furnace 2 Ignition - Controller Alarm
29	Exp Board 2 Status - Board is Offline	95	Sens S2 EVD 1 - Sensor Value Not Valid	151	IG Furnace 2 Pressure - Switch Fault Alarm
30	Exp Board 3 Status - Board is Offline	96	Sens S3 EVD 1 - Sensor Value Not Valid	152	IG Furnace 2 Combust - Fan Proving Alarm
31	Exp Board 4 Status - Board is Offline	97	Sens S4 EVD 1 - Sensor Value Not Valid	153	IG Furnace 2 - Max Retries
32	BMS Frequent Writes - Reduce Num of Writes	98	EVD 1 EEPROM Damaged - Call Tech Support	154	IG Furnace 2 - High Limit Trip
33	Space 1 CO2 - Sensor Value Not Valid	99	Incomplete Closing - EVD 1	155	IG Furnace - pCOe 2 Offline
34	Space Static Pressure - Sensor Value Not Valid	100	Emergency Closing - EVD 1	156	IG Furnace 2 IC fault - Check Furnace Wiring
35	Supply Duct Stat Press - Sensor Value Not Valid	101	EVD 1 Battery	157	Outside Air Greentrol - Offline or Flow Error
36	Return Duct Stat Press - Sensor Value Not Valid	102	FW Incompatibility - EVD 1	158	Exhaust Air Greentrol - Offline or Flow Error
37	Sup Fan AFMS - Sensor Value Not Valid	103	EVD 1 Config Error	159	Supply Air Greentrol - Offline or Flow Error
38	Exh Fan 1 AFMS - Sensor Value Not Valid	104	EVD 1 Comm - EVD 1 is Offline	169	ER Wheel High - Differential Pressure
39	Outside Damper AFMS - Sensor Value Not Valid	105	High Discharge Temp - First Inv Envelope	170	OA Damper Fault - Not Econ and should be
40	Space Setpt Adj Slider - Sensor Value Not Valid	106	Low Discharge Pressure - First Inv Envelope	171	OA Damper Fault - Econ and shouldn't be
41	Space 2 CO2 - Sensor Value Not Valid	107	High Suction Pressure - First Inv Envelope	172	OAD Fault - Damper not Modulating
42	Return CO2 - Sensor Value Not Valid	108	Low Suction Pressure - First Inv Envelope	173	OAD Fault - Excess Outdoor Air
43	Discharge Press Ckt A - Sensor Value Not Valid	109	High Current - First Inv Envelope	174	IG Furnace 1 - Combustion Fan Alarm
44	Discharge Press Ckt B - Sensor Value Not Valid	110	High Pressure Ratio - First Inv Envelope	175	IG Furnace 2 - Combustion Fan Alarm
47	Suction Press Ckt A - Sensor Value Not Valid	111	Low Pressure Ratio - First Inv Envelope	176	Supply Fan - VFD Offline
48	Suction Press Ckt B - Sensor Value Not Valid	112	Low Delta P - First Inv Envelope	177	Exhasut Fan - VFD Offline
51	Discharge Temp Ckt A - Sensor Value Not Valid	113	High Discharge Press - First Inv Envelope	180	Embedded EVD Error
52	Discharge Temp Ckt B - Sensor Value Not Valid	114	Compressor Staging - Order Skipped	181	SF VFD Alarm - Check VFD
55	Suction Temp Ckt A - Sensor Value Not Valid	115	Heat Pump Heating - Locked Out	182	EF VFD Alarm - Check VFD
56	Suction Temp Ckt B - Sensor Value Not Valid	116	EVD 1 Error - Unexpected Position	186	Compressor Refrig Leak - Furnace Locked Out
59	Ckt A High Saturated - Discharge Temperature	117	High SDT Lockout - Circuit A	187	Airstream Refrig Leak - SF Mitigation Sequence
60	Ckt B High Saturated - Discharge Temperature	118	High SDT Lockout - Circuit B	188	Fire Shutdown Alarm - Building Fire Alarm
63		121	First Inverter Alarm - Resettable	189	EA Damper End Switch - Damper is not open

VXE-112

Factory Controller Sequence of Operation

FACTORY CONTROLLER: Controller shall be provided with required sensors and programming for rooftop unit. Controller shall be factory programmed, mounted and tested. Controller shall have a LCD readout for changing set points and monitoring unit operation.

UNIT START COMMAND (Unit will be enabled to start once a jumper is placed between R to G):

- Factory mounted and wired outdoor air and recirculated air damper actuators are powered.
- Return/Exhaust air damper actuator is powered.
- Exhaust fan starts after a (adj.) delay.
- Supply fan starts after a (adj.) delay.
- Tempering options and energy wheel option to function as described below.

UNIT STOP COMMAND (OR DE-ENERGIZED):

- Supply fan, exhaust fan, energy wheel and tempering options de-energized.
- Outdoor air damper actuator is spring return close, and the recirculated air damper actuator is spring open.
- Return air damper is spring return close.

OCCUPIED/UNOCCUPIED MODES: Shall be based on a 7-day time clock internal to the controller. The schedule shall be set by the end user. When a user initiates an override input, the controller will switch from unoccupied to occupied mode. The controller will return to the scheduled occupied/unoccupied mode after the override time has expired. If internal time clock is disabled, a remote contact or a BMS can control the occupied/unoccupied mode.

Occupied Mode:

- Damper control per below.
- Energy wheel control per below.
- Exhaust fan ON.
- Supply fan ON.
- Heating per below.
- Cooling per below.

Unoccupied mode (Cycle on Room Temp): The unit will cycle to maintain unoccupied room set points if there is a call for unoccupied heating, cooling or dehumidification.

- Supply fan OFF
- Exhaust fan OFF
- Recirculation air damper open.
- Outdoor air damper closed.
- On a call for heating (room temp set point – differential) supply fan cycles ON, and the heating increases the room temperature. Unit cycles off when room temperature reaches the unoccupied set point (adj.).
- On a call for cooling (room temp set point + differential) supply fan cycles ON, and the cooling decreases the room temperature. Unit cycles off when room temperature reaches the unoccupied set point (adj.)

MORNING WARMUP/COOL DOWN: Prior to occupancy, the unit will run using the warmup or cool down sequence until the occupied set point is achieved. The heating or cooling mode must not be locked out and the space temperature is below or above set point by the unoccupied hysteresis (adj.) (This Sequence must be field configured.)

SUPPLY BLOWER SEQUENCE: The supply blower is provided with a factory mounted variable frequency drive. The supply blower speed will be controlled with the following sequence. Minimum supply fan turndown is 50% of the design maximum operation.

Constant Volume-Adj. Setpoint: The supply blower will operate at a constant speed set point (adj.) during operation.

EXHAUST BLOWER SEQUENCE: The exhaust blower will operate at a constant speed set point (adj.) during operation.

Constant Volume-Adj. Setpoint: The exhaust blower will operate at a constant speed set point (adj.) during operation.

COOLING SEQUENCE: The cooling is controlled to maintain the supply temperature set point. The mechanical cooling will be locked out when the outside air is < 55 F (adj.).

Air-Source Heat Pump: The controller will provide a modulating signal for cooling. From 0-100%, the inverter scroll will be controlled to maintain discharge temperature. The electronic expansion valve will modulate to maintain 10 F of superheat.

Modulating Hot Gas Reheat Sequence: During dehumidification the modulating HGRH is controlled to maintain the supply temperature set point.

Modulating Hot Gas Reheat: The controller will modulate the hot gas reheat reheat valve with a 0-10 V signal to maintain the supply temperature set point (adj.).

PRIMARY HEATING SEQUENCE: The air-source heat pump is controlled to maintain the supply temperature set point. Heating will be locked out when the outside air is > 80 F (adj.). The air-source heat pump will be locked out when outside temperatures are < 0 F.

Air-Source Heat Pump: The controller will provide a modulating signal for heating. From 0-100%, the inverter scroll will be controlled to maintain discharge temperature. The electronic expansion valve will modulate to maintain 10 F of superheat.

SECONDARY HEATING SEQUENCE: If the air-source heat pump cannot meet the supply temperature set point, the secondary heating source will activate and work in conjunction with the air-source heat pump.

Electric Heater: The controller will modulate an electric heater to maintain the supply temperature set point (adj.).

TEMPERATURE CONTROL SEQUENCE: The unit will maintain the supply air discharge setpoint per the following. Adjustable locally or by BMS.

Room Reset: The controller will reset the supply air temperature set point to maintain the room temperature set point (adj.).

Supply Discharge Temperature Control: The supply setpoint will be a constant temperature setpoint from the controller (adj.). Adjustable locally or by BMS.

BUILDING FREEZE PROTECTION: If the supply air temperature drops below 35 F (adj.) for 300s (adj.), the controller will de-energize the unit and activate the alarm output.

TEMPERATURE PROTECTION: The controller will enable the supply fan to modulate down to help the unit keep up with heating demand in the event of wheel failure or the unit operating outside design conditions. (This can be enabled under the manufacturer menu in the controller)

UNIT LEAK DETECTION AND MITIGATION: The unit will be equipped with refrigerant leak detection sensors. These sensors along with the following sequence of operation are required per UL60335-2-40.

Dry alarm contacts available to allow the building (by others) to perform external mitigation actions when necessary. These by other external actions include opening of zone dampers in the ductwork, disabling duct mounted electric resistance heaters, and/or enabling additional mechanical ventilation if required per ASHRAE 15.

ECONOMIZER SEQUENCE: When the application requires cooling, and the outdoor air conditions are suitable for free cooling, the controller will modulate the energy wheel speed to maintain the discharge temperature set point. If the energy wheel speed modulates to the economizer set point and the supply air temperature is not met, the controller will increase the call for cooling to meet the supply air temperature and could engage mechanical cooling.

Temp./Enthalpy: The economizer will be locked out when: the outdoor air is < 40 F DB (adj.) or > 75 F DB (adj.) or > 55 F dew point (adj.) ; the unit is operating in dehumidification mode; or there is a call for heating.

ALARMS INDICATION: The controller will display alarms and have one digital output for remote indication of an alarm condition. Possible alarms include:

Building Management System: The controller will send all alarms to the BMS.

Wheel Rotation Alarm: The controller monitors wheel rotation, if the wheel does not rotate for a set period of time (adj.) an alarm will generate.

Supply and Exhaust Air Alarm: The controller monitors the proving switch on each blower and sends an alarm in the case of either blower proving switch not engaging.

Temperature Sensor Alarm: The controller sends an alarm in the case of a failed air temperature sensor.

Humidity Sensor Alarm: The controller sends an alarm in the case of a failed humidity sensor.

ACCESSORIES: The following accessories will be included with the unit to expand the functionality or usability of the controller.

BMS Interfacing: A BMS port or serial card is provided with the controller for field interfacing with a building management system. Each card is sent out with the default parameters, and the controls contractor must change the appropriate addresses to match the BMS settings.

Phase and Brownout Protection: Factory mounted and wired component which monitors the main power coming into the unit. If a phase drops out, or if the incoming voltage exceeds the acceptable range, the component will turn off the unit to help protect the electrical systems.

Condensate Overflow Unit Shutdown: Factory mounted condensate overflow switch wired to the unit controller. The controller monitors the condensate overflow switch. If the water level in the drain pan reaches a certain level, the unit will shutdown and send an alarm.

Damper End Switch: Damper end switched will be provided to ensure the supply and exhaust fans do not enable until the dampers are proven open.

Warranty Statement for Dedicated Outdoor Air Systems (DOAS)

Unit Warranty

Valent warrants the equipment to be free from defects in material and workmanship for a period of 18 months from ship date. Initial startup must be completed within six months of the shipment date, and a startup report must be submitted to Valent.

Energy Wheel Warranty

The energy recovery wheel is warranted to be free from defects in material and workmanship for a period of 5 years from the shipment date. This warranty applies to all parts and components in the energy recovery cassettes with the exception of the motor.

Compressor Extended Warranty

Valent warrants the refrigerant compressor(s) to be free from defects in material and workmanship for a period of 5.5 years from the shipment date.

Warranty Notes

Any component which proves defective during the warranty period will be repaired or replaced at Valent's sole option when returned to our factory, transportation prepaid. All warranties do not include labor costs associated with troubleshooting, removal, or installation. Valent will not be liable for any consequential, punitive, or incidental damages resulting from use, repair, or operation of any Valent product. These warranties are exclusive and are in lieu of all other warranties, whether written, oral, or implied, including the warranty of merchantability and the warranty of fitness for a particular purpose. No person (including any agent or salesperson) has authority to expand Seller's obligation beyond the terms of this warranty, or to state that the performance of the product is other than that published by Seller.

As a result of our commitment to continuous improvement, Valent reserves the right to change specifications without notice.