



2000 cfm max/ 500 cfm min  
 with CO2 control

6700 cfm

2000 cfm up to 7200 during  
 full economizer

# VX-212-17.5A

## Unit Performance

Design Conditions							
Elevation (ft)	Summer		Winter DB (F)	Supply (CFM)	Outdoor Air (CFM)	Recirc Air (CFM)	Exhaust Air (CFM)
	DB (F)	WB (F)					
1,329	90.0	68.0	20.0	7,200	6,700	500	2,000

Unit Specifications						
Qty	Weight (lb)	Cooling Type	Primary Heating Type	Secondary Heating Type	Unit Installation	Unit ETL Listing
1	4,362 (+/- 5%)	Air-Source Heat Pump	Air-Source Heat Pump	Electric	Outdoor	UL\cUL 1995

Configuration			
Outdoor Air		Exhaust Air	
Intake	Discharge	Intake	Discharge
End	Side	Access Side	Side

ASHRAE 90.1-2016 Compliance			
	ASHRAE 90.1 Min. Efficiency	Calculated Efficiency	Compliance
EER	10.6	10.8	✓
IEER	11.6	14.6	✓
COP <sub>H</sub> at 17 F	2.05	2.16	✓
COP <sub>H</sub> at 47 F	3.2	3.25	✓

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	243.7	243.7	89.0 / 67.6	57.9 / 57.2	107.0	72.5

Primary Heat Specifications				
Type	Total Capacity (MBH)	Dry Bulb Temperatures		
		EAT (F)	LAT (F)	Ambient Outdoor Air (F)
Air-Source Heat Pump	145.5	23.5	42.2	20.0

Secondary Heat Specifications				
Type	Capacity (kW)	Capacity Control	Performance	
			EAT (F)	LAT (F)
Electric	41.0	Modulating (SCR)	23.5	41.5

Air Performance							
Type	Total Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	FRPM	Fan		
					Qty	Type	Drive-Type
Supply	7,200	1.5	4.463	2020	1	Plenum	Direct
Exhaust	2,000	0.75	0.76	728	1	Plenum	Direct
Economizer	7,200	0.75	0.75	1494	1	Plenum	Direct

Motor Specifications						
Motor	Qty	Operating Power (hp)	Size (hp)	Enclosure	Efficiency	RPM
Supply	1	8.81	10	ODP	PE	1770
Exhaust	1	0.4	7-1/2	ODP	PE	1770

Electrical Specifications				
Power Supply	Rating (V/C/P)	MCA (A)	MOP (A)	Fan Power (W/CFM)*
Unit	208/60/3	127.0	150.0	0.817



**Printed Date:** 06/30/2021  
**Job:** ODOC - MFIA Design 17.5T VAV Unit  
**Mark:** 17.5T VAV HP Unit  
**Model:** VX-212-17.5A

\*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	X
Direct Drive Plenum Blower & Motor Assemblies	X
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
Controls	
Unit Controls - Full Control	Std
Internally Mounted Control Center with 24 VAC control transformer(s) and control circuiting fusing	Std
BMS Protocol - BACNetMSTP	X
BMS Monitoring Points - RAI, ACC	X
Supply Fan Control - By BMS	X
Exhaust Fan Control - By BMS	X
Exhaust Fan Only Power	
Energy Wheel Rotation Sensor	
Web-Based User Interface	Std
Outd/Rec. Air Damper Ctrl - By BMS	X
Economizer ControlTemp./Enthalpy	X
Control Accessories	
Remote Display	
Dirty Filter Sensor(s) - Supply	X
Airflow Monitor	
Room Thermostat	
Phase/Brownout Protection	Std
Economizer Fault Detection Diagnostics	X

Accessories	
Recirc Air Damper - Low Leakage	X
Outdoor Air Damper - Low Leakage	X
Return Air Damper - Low Leakage	X
Roof Curb	
Supply Air Filters - 2" Merv 13, 8-16x25x2	X
Service Outlet - Factory mounted and wired	X
Piping Vestibule	
Vapor Tight Lights	
Condensate Overflow Switch	
Spare Filters	
Exhaust Discharge Gravity Backdraft Damper	Std
ElectroFin Coil Coating	
Motor Shaft Grounding	X
UV Lights	X
Bipolar Ionization	X
Hail Guards	
Warranty Options	
Unit Warranty - 1 Yr (Standard)	Std
Compressor Warranty - 5 Yrs (4 Yrs Extended)	X

Standard Option	Std
Not Included	
Included	X

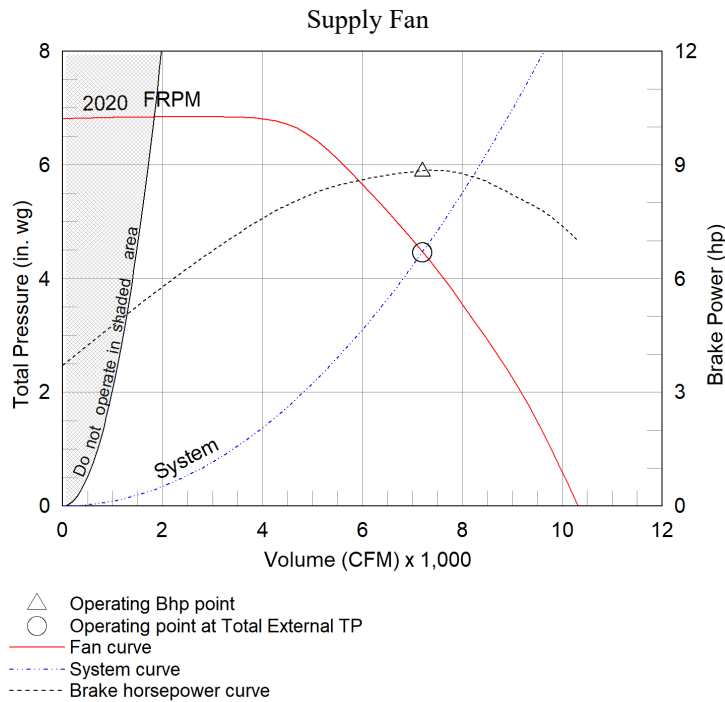
Notes
Outdoor Air Damper supplied is low leakage, motorized VCD-23 (leakage rate of 3 CFM / ft <sup>2</sup> @ 1 in. wg), Class 1A
Return Air Damper supplied is low leakage, motorized VCD-23 (leakage rate of 3 CFM / ft <sup>2</sup> @ 1 in. wg), Class 1A

### 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
7,200	1.5	4.463	2020	8.81	1	10	1	Plenum	Direct

Pressure Drop (in. wg)						
Weatherhood	Filter	Damper	Cooling	Heating	External	Total
0.25	0.255	0.09	0.291	1.499	1.5	4.463

Sound Performance in Accordance with AMCA										
Sound Power by Octave Band								Lwa	dBA	Sones
62.5	125	250	500	1000	2000	4000	8000			
87	85	95	85	81	75	73	70	89	77	28



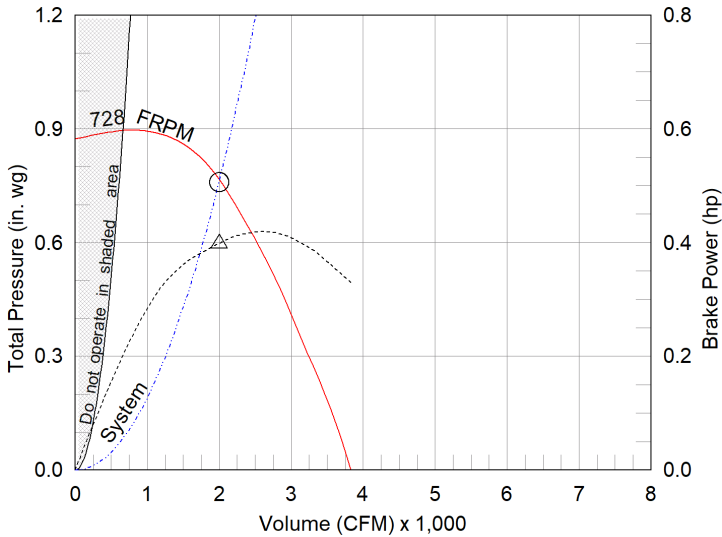
### Exhaust Fan Charts And Performance

Exhaust 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
2,000	0.75	0.76	728	0.4	1	7-1/2	1	Plenum	Direct
7,200	0.75	0.75	1494	3.16	1	7-1/2	1	Plenum	Direct

Pressure Drop (in. wg)						
Weatherhood	Filter	Damper	Cooling	Heating	External	Total
0.01	-	-0.007	-	-	0.75	0.76

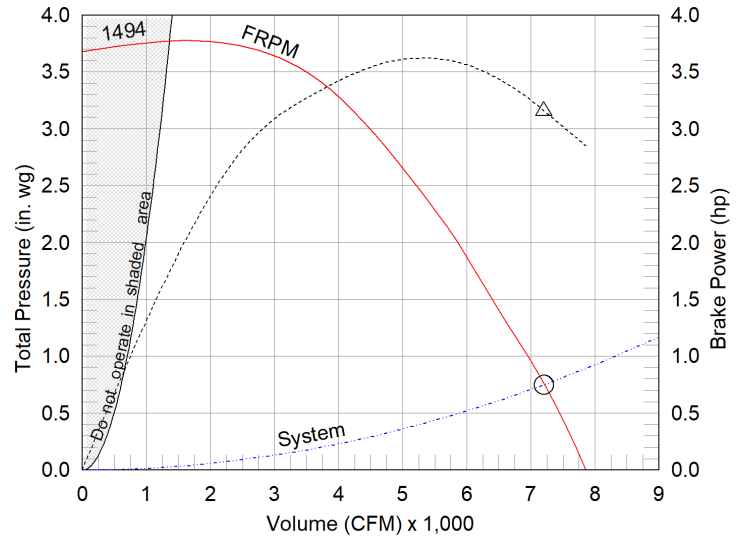
Sound Performance in Accordance with AMCA										
Sound Power by Octave Band								Lwa	dBA	Sones
62.5	125	250	500	1000	2000	4000	8000			
98	75	66	63	56	56	53	59	74	62	15

Exhaust Fan



- △ Operating Bhp point
- Operating point at Total External TP
- Fan curve
- - - System curve
- - - Brake horsepower curve

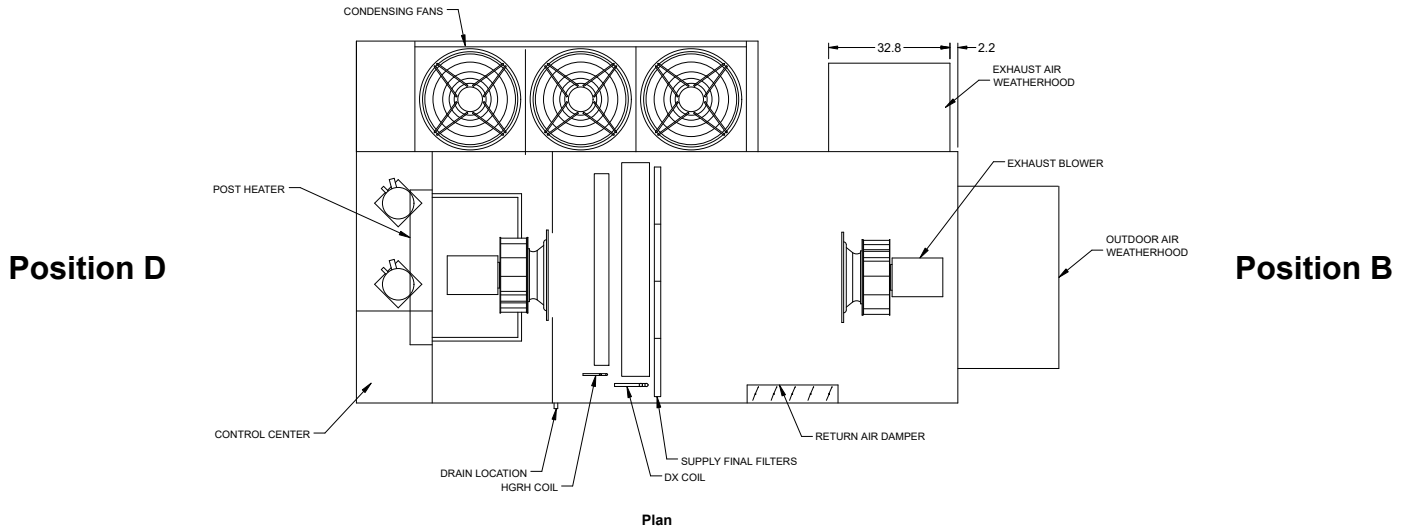
Exhaust Fan - Economizer



- △ Operating Bhp point
- Operating point at Total External TP
- Fan curve
- - - System curve
- - - Brake horsepower curve

### Radiated Sound

#### Position A



Plan

#### 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	84	88	90	85	85	81	80	79	95	90
B	79	81	88	78	77	75	74	71	90	84
C	81	78	80	74	72	69	64	61	85	78
D	74	79	79	73	70	66	64	61	83	77
E	79	87	87	84	81	77	76	73	92	87
<b>Total</b>	88	91	94	88	87	84	82	80	98	93

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 <sup>2</sup> .
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 (ft <sup>2</sup> )
DX38S06H12-52x56-LH	12	6	356	0.291	R-410A	37

Compressor Details					
Lead Compressor Type	Compressor Qty	Compressor RLA/MRC (A)		Compressor LRA (A)	
		Comp. #1	Comp. #2	Comp. #1	Comp. #2
Inverter Scroll	2	32.3	27.6	NA	191

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	243.7	243.7	89.0 / 67.6	57.9 / 57.2	107.0	72.5

Primary Heat Specifications				
Type	Total Capacity (MBH)	Dry Bulb Temperatures		
		EAT (F)	LAT (F)	Ambient Outdoor Air (F)
Air-Source Heat Pump	145.5	23.5	42.2	20.0

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
Crankcase heater on staged compressor
Electronic expansion valve on lead circuit, thermostatic expansion valve on staged circuit
Stainless steel double sloped drain pan
Moisture-indicating sight glass
Service/charging valves
Refrigerant low pressure switch (auto reset)
Refrigerant high pressure switch (manual reset)
Liquid-Line filter drier
Multiple low sound outdoor fans with Lead ECM outdoor fan for modulating head pressure control
Inverter scroll compressor



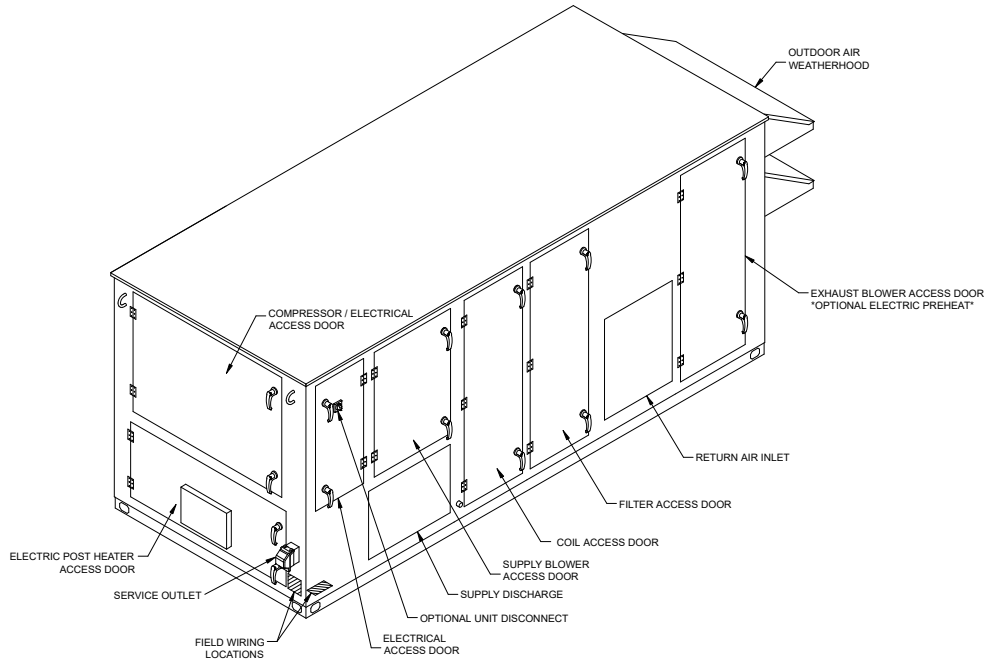
### Secondary Heat Performance

Secondary Heat Specifications				
Type	Capacity (kW)	Capacity Control	Performance	
			EAT (F)	LAT (F)
Electric	41.0	Modulating (SCR)	23.5	41.5

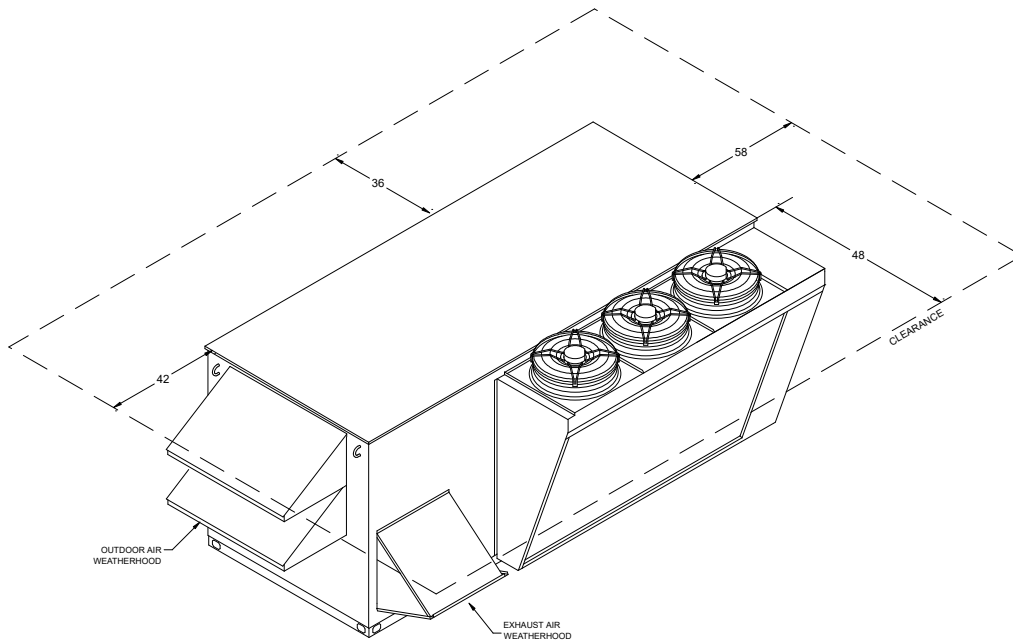
Unit Details
Open coil heating elements
High grade Nickel-Chrome alloy coils
SCR controller
Electric heat requires separate power supply. Unit MCA/MOP data does not include electric heater amp draws
Heat pump and electric heater can operate simultaneously



### Isometric Drawings

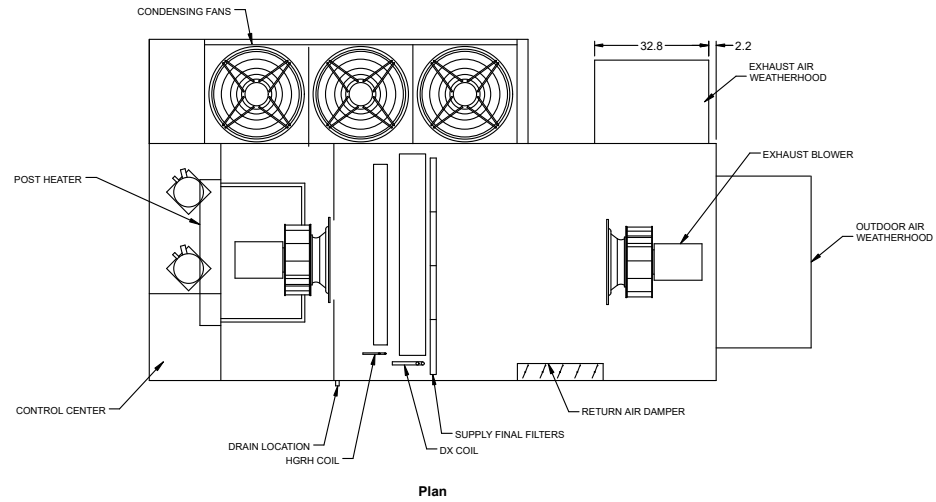


Back Right Isometric

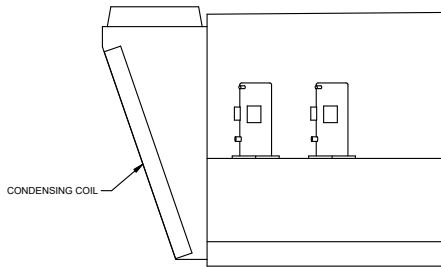


Front Left Isometric

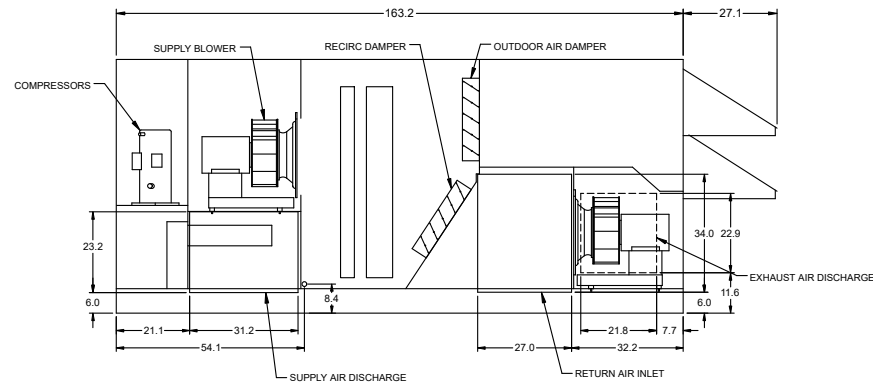
### Overview Drawings



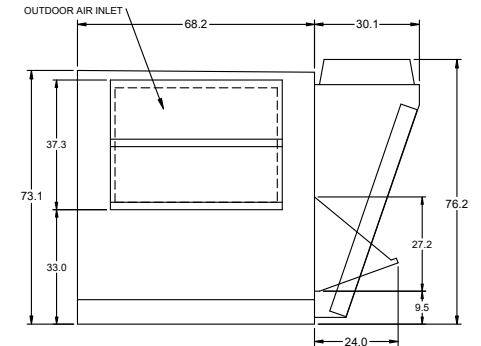
Plan



Left End

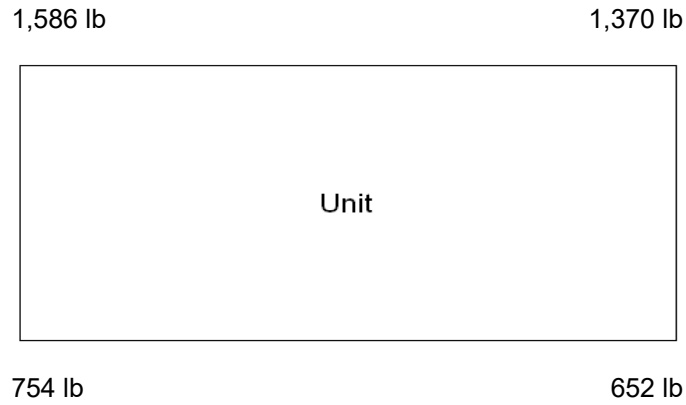


Elevation



Right End

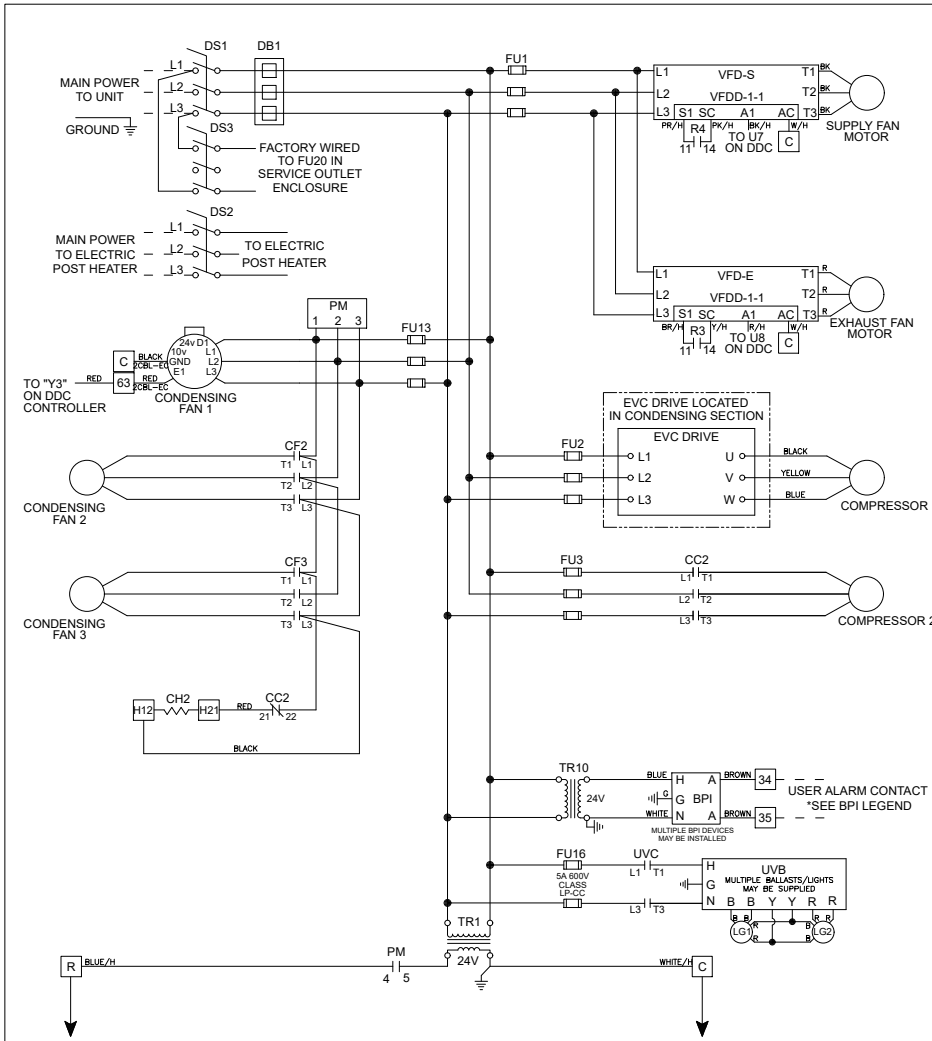
### Unit Corner Weights




#### 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:  
**V13E2C1CR40C05C00NF21B0030BH24**

**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		

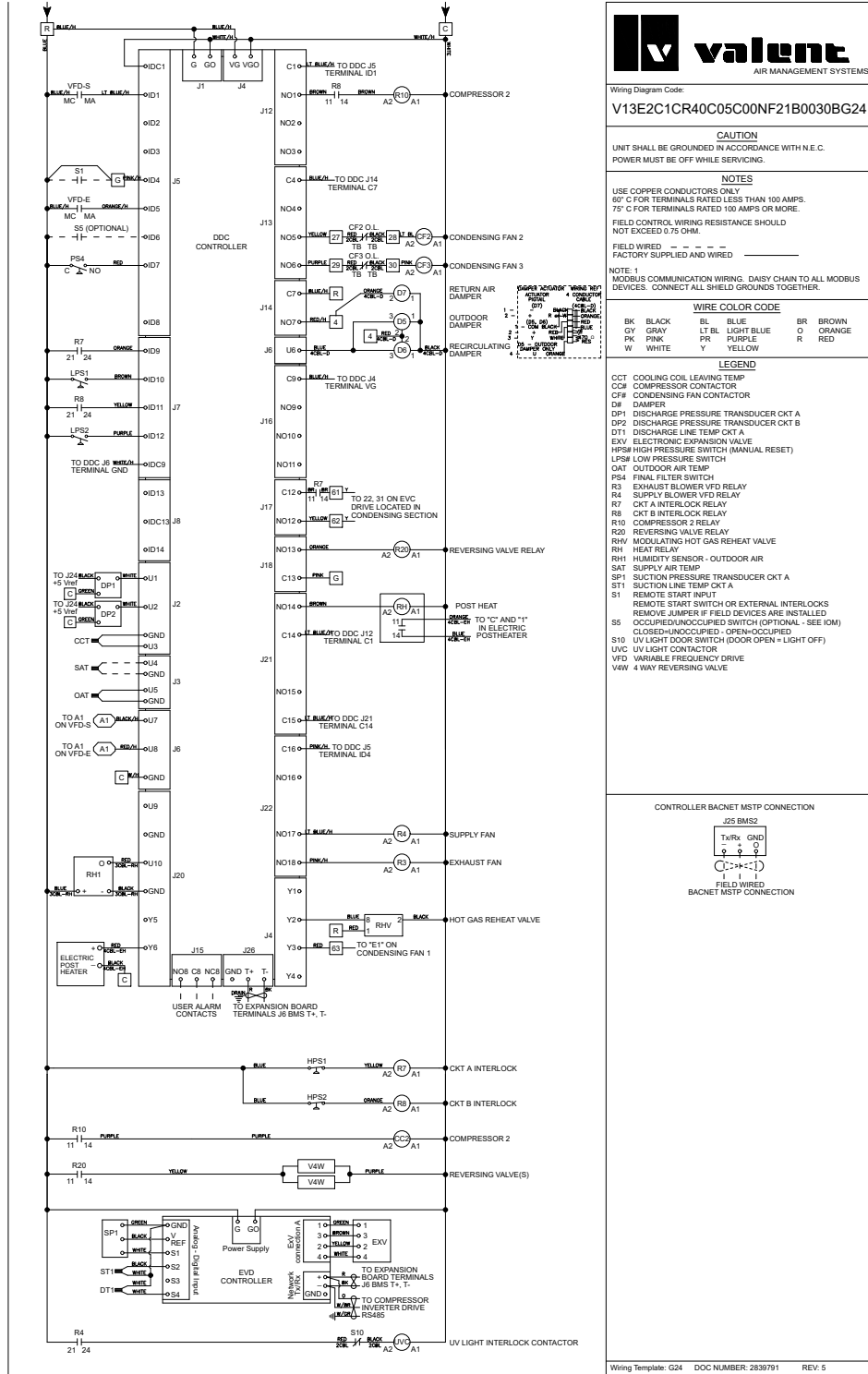
**LEGEND**

BPI BIPOLAR IONIZATION UNIT  
 NORMALLY OPEN ALARM CONTACT CLOSSES  
 WHEN POWERED WITH NO FAULTS  
 250V 1A MAX

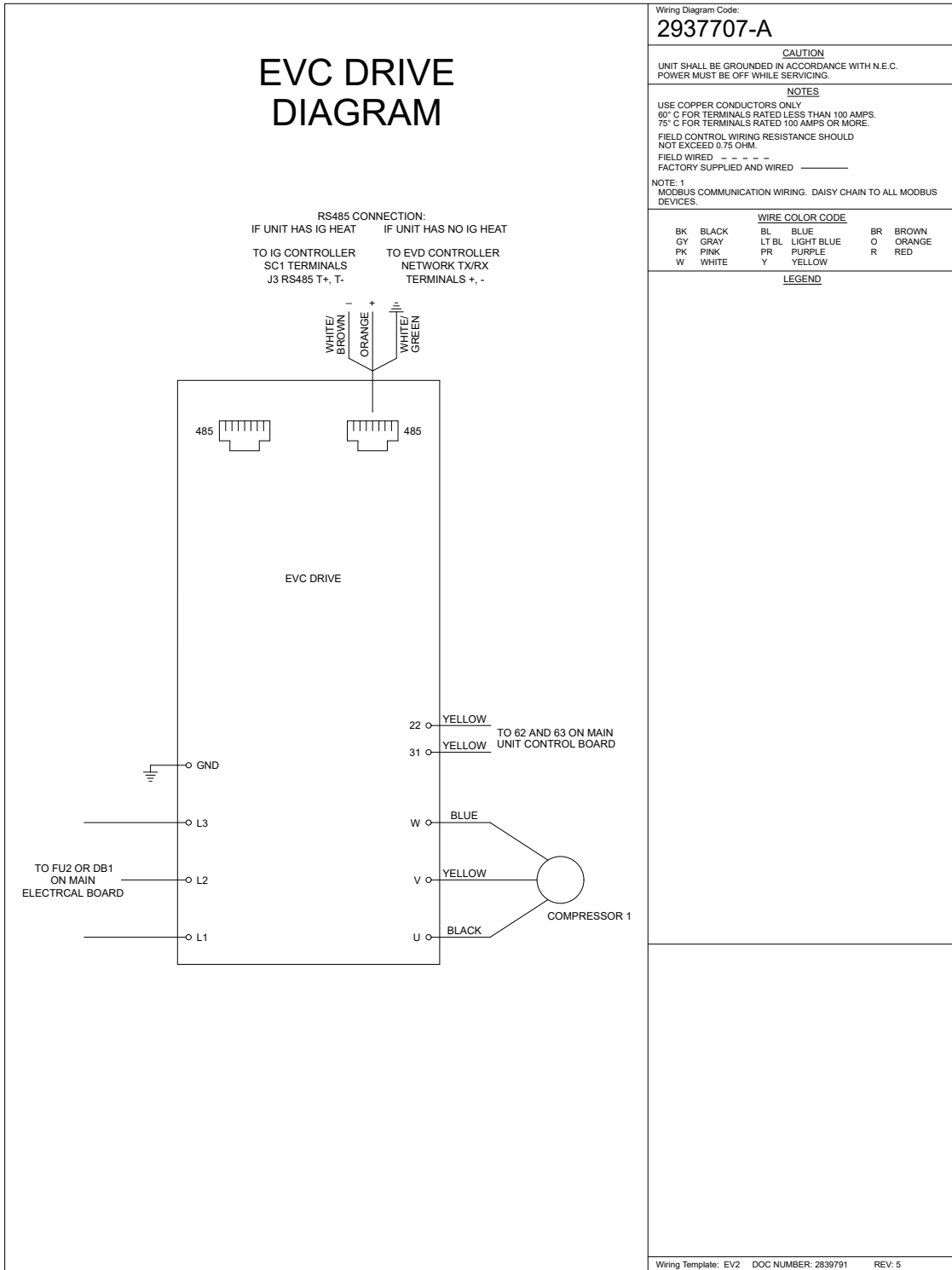
CC# COMPRESSOR CONTACTOR  
 CF# CONDENSING FAN CONTACTOR  
 CH# COMPRESSOR SUMP HEATER  
 DB# POWER DISTRIBUTION BLOCK  
 DS DISCONNECT SWITCH  
 FU# FUSES  
 LG# GERMICIDAL UV LAMP  
 PM PHASE VOLTAGE MONITOR  
 R3 EXHAUST BLOWER VFD RELAY  
 TR# TRANSFORMER  
 UVB UV LIGHT BALLAST  
 UVC UV LIGHT CONTACTOR  
 VFD VARIABLE FREQUENCY DRIVE

Wiring Template: H24 DOC NUMBER: 2839791 REV: 5

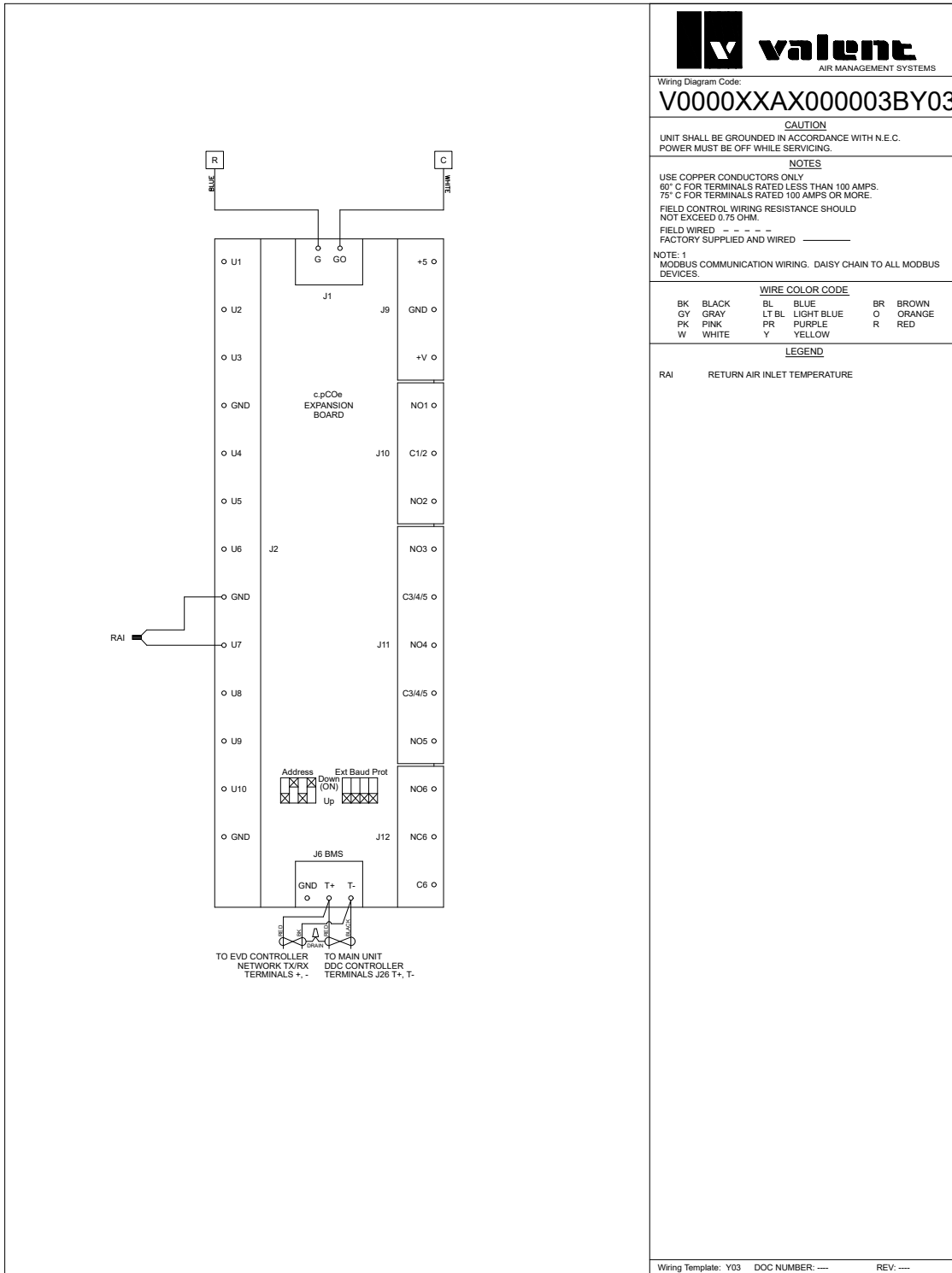
### Wiring Diagram 2



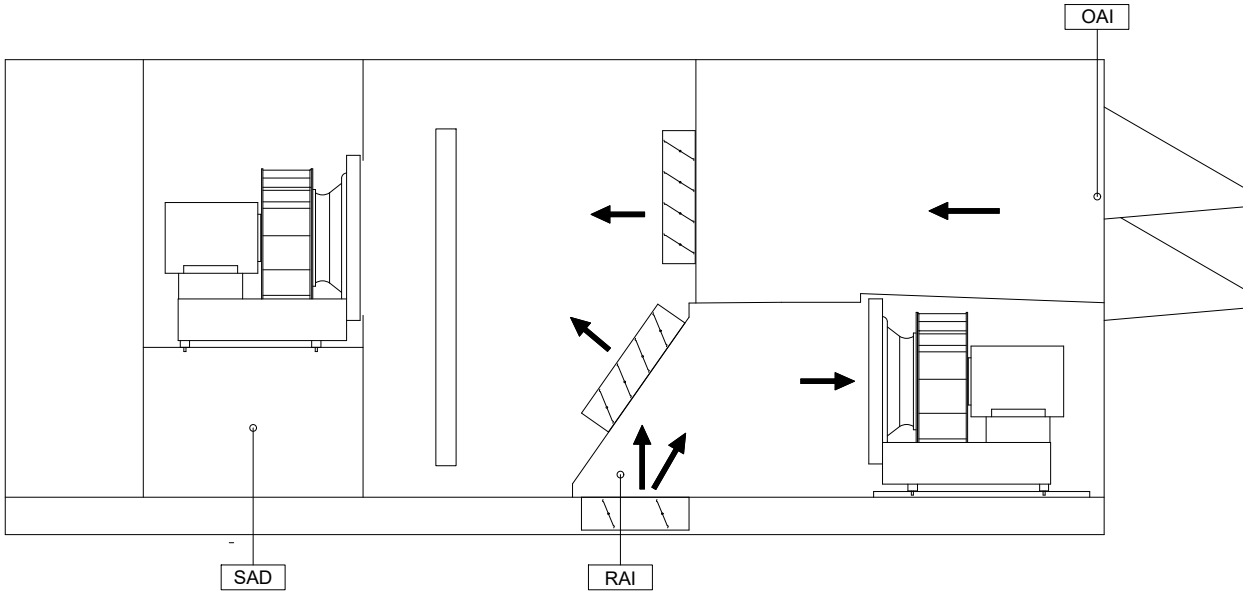
### Wiring Diagram 3



### Monitoring Points Wiring Diagram



### BMS Monitoring Points



Item	Description	Type
OAI	Outdoor Air Intake Temperature Sensor	10K Ohm NTC (Carel)
SAD	Supply Air Discharge Temperature Sensor	10K Ohm NTC (Carel)
RAI	Return Air Intake Temperature Sensor	10K Ohm NTC (Carel)

\*Shipped loose sensor.





**Valent Network Interface v5.002 Modbus/BACnet Points List**

Variable	Description	Units	BACNET		Read (R) Write (W)	MODBUS		Included
			Object Instance	Object Type		Index	Register Type	
Circuit_A_Discharge_Temp_Analog_Input	Circuit A Discharge Temp		1	AI	R	30196	Input	X
Circuit_A_Suction_Temp_Analog_Input	Circuit A Suction Temp		3	AI	R	30200	Input	X
Circuit_B_Discharge_Temp_Analog_Input	Circuit B Discharge Temp		4	AI	R	30202	Input	X
Cold_Coil_1_Temp_Analog_Input	Cold Coil 1 Temperature		25	AI	R/W	30243	Input	X
CL_Coil_Spt_Temp	Cold Coil Setpoint Temp		31	AI	R	30256	Input	X
CL_Supply_Spt_Temp	Cooling Supply Setpoint Temp		32	AI	R	30258	Input	X
Outside_Air_Temp_Analog_Input	Outside Air Temperature		37	AI	R	30267	Input	X
Space_Temp_Analog_Input	Space Temperature		44	AI	R	30281	Input	
Supply_Temp_Analog_Input	Supply Temperature		45	AI	R	30283	Input	X
Outside_RH_Analog_Input	Outside % Relative Humidity		86	AI	R	30349	Input	X
Return_RH_Analog_Input	Return Air Relative Humidity		88	AI	R	30354	Input	
Space_RH_Analog_Input	Space % Relative Humidity		89	AI	R	30355	Input	
Return_Duct_Static_Pressure_Analog_Input	Return Duct Pressure		93	AI	R	30364	Input	
Space_Static_Pressure_Analog_Input	Space Static Pressure		94	AI	R	30365	Input	
Supply_Duct_Static_Pressure_Analog_Input	Supply Duct Static Pressure		95	AI	R	30367	Input	
Space_CO2_1_Analog_Input	Space 1 CO2 ppm		116	AI	R	30401	Input	
Circuit_A_Discharge_Pressure_Analog_Input	Circuit A Discharge Pressure Analog Input		119	AI	R	30407	Input	X
Circuit_A_Suction_Pressure_Analog_Input	Circuit A Suction Pressure Analog Input		120	AI	R	30410	Input	X
Circuit_B_Discharge_Pressure_Analog_Input	Circuit B Discharge Pressure Analog Input		121	AI	R	30411	Input	X
Aux_In_Customer_1	Aux Input Customer 1		640	AI	R	30640	Input	X
Aux_In_Customer_2	Aux Input Customer 2		642	AI	R	30642	Input	X
Aux_In_Customer_3	Aux Input Customer 3		644	AI	R	30644	Input	X
Aux_In_Customer_4	Aux Input Customer 4		646	AI	R	30646	Input	X
Aux_In_Customer_5	Aux Input Customer 5		648	AI	R	30648	Input	X
Aux_In_Customer_6	Aux Input Customer 6		650	AI	R	30650	Input	X
Temperature_Setpoint	Main Temperature Setpoint Supply, Space, or Return Target Temperature		1	AV	R/W	40001	Holding	X
Temperature_Heat_Cool_Deadband	Heat/Cool Spt Deadband when Space or Return control is active Clg Spt = Offset/2 + Temp Spt Htg Spt = Offset/2 - Temp Spt		2	AV	R/W	40003	Holding	X
Cooling_Coil_Setpoint	Cooling Coil Leaving Air Setpoint		3	AV	R/W	40005	Holding	X
Dehumidification_Setpoint	Dehumidification Setpoint % RH for Space or Return control		5	AV	R/W	40009	Holding	X
Outside_Dewpoint_Setpoint	Outside Dewpoint Dehumidification Trigger Setpoint		6	AV	R/W	40011	Holding	X
Inside_Dewpoint_Setpoint	Inside Dewpoint Dehumidification Trigger Setpoint		7	AV	R/W	40013	Holding	
Unocc_Inside_Dewpoint_Setpoint	Unoccupied Inside Dewpoint Dehumidification Trigger Setpoint		9	AV	R/W	40017	Holding	
Unoccupied_Cooling_Setpoint	Unoccupied Cooling Setpoint		10	AV	R/W	40019	Holding	
Unoccupied_Dehumidification_Setpoint	Unoccupied Dehumidification % RH Setpoint		11	AV	R/W	40005	Holding	
Unoccupied_Heating_Setpoint	Unoccupied Heating Setpoint		12	AV	R/W	40023	Holding	
Economizer_Temp_Enable_Setpoint	Economizer Ambient Temp Enable Setpoint Allow Econ when OAT < Spt		16	AV	R/W	40031	Holding	X
Economizer_Enthalpy_Enable_Setpoint	Economizer Enthalpy Enable Setpoint Allow Econ when OA Enthalpy < Spt		17	AV	R/W	40033	Holding	X
Outside_RH_from_BMS	Outside RH from BMS Used when source selection is set to BMS		21	AV	R/W	40041	Holding	X
Outside_Temp_from_BMS	Outside Temp from BMS Used when source selection is set to BMS		22	AV	R/W	40043	Holding	X
Return_RH_from_BMS	Return RH from BMS Used when source selection is set to BMS		23	AV	R/W	40045	Holding	X
Return_Temp_from_BMS	Return Temp from BMS Used when source selection is set to BMS	-	24	AV	R/W	40047	Holding	X
Space_1_CO2_from_BMS	Space 1 CO2 from BMS Used when source selection is set to BMS		25	AV	R/W	40049	Holding	X
Space_RH_from_BMS	Space RH from BMS Used when source selection is set to BMS		28	AV	R/W	40055	Holding	X
Space_Static_from_BMS	Space Static from BMS Used when source selection is set to BMS		29	AV	R/W	40057	Holding	X
Space_Temp_from_BMS	Space Temp from BMS Used when source selection is set to BMS		30	AV	R/W	40059	Holding	X
Cooling_Lockout_Setpoint	Cooling Ambient Lockout Setpoint		31	AV	R/W	40061	Holding	X
Heating_Lockout_Setpoint	Heating Ambient Lockout Setpoint		32	AV	R/W	40063	Holding	X
Preheat_Lockout_Setpoint	Preheat Lockout Setpoint		33	AV	R/W	40066	Holding	
Return_Duct_Static_Pressure_Setpoint	Return Duct Static Pressure Setpoint		36	AV	R/W	40072	Holding	
Space_Static_Pressure_Setpoint	Space Static Pressure Setpoint		37	AV	R/W	40073	Holding	
Supply_Duct_Static_Pressure_Setpoint	Supply Duct Static Pressure Setpoint		38	AV	R/W	40075	Holding	
Space_CO2_Setpoint	Space CO2 Setpoint		39	AV	R/W	40077	Holding	
SF_Control_Signal_BMS	BMS to control signal for supply fan speed		133	AV	R/W	40083	Holding	X
EF_Control_Signal_BMS	BMS to control signal for exhaust fan speed		134	AV	R/W	40085	Holding	X
OAD_Control_Signal_BMS	Allows the BMS to control OAD position		136	AV	R/W	40089	Holding	X
Outside_Air_Damper_Minimum_Setpoint	Outside Air Damper Minimum Setpoint		137	AV	R/W	40091	Holding	X



**Valent Network Interface v5.002 Modbus/BACnet Points List**

Variable	Description	Units		BACNET		Read (R) Write (W)	MODBUS		Included
				Object Instance	Object Type		Index	Register Type	
Aux_BMS_Analog_Output_1	Aux BMS Analog Output 1			138	AV	R/W	40094	Holding	X
Aux_BMS_Analog_Output_2	Aux BMS Analog Output 2			139	AV	R/W	40096	Holding	X
Aux_BMS_Analog_Output_3	Aux BMS Analog Output 3			140	AV	R/W	40098	Holding	X
Aux_BMS_Analog_Output_4	Aux BMS Analog Output 4			141	AV	R/W	40104	Holding	X
Unit_Status_Mode	See Table 13: Unit status mode			40	AV	R	30001	Input	X
Supply_Temperature_Calculated_Setpoint	Active Supply Temperature Setpoint			41	AV	R	30003	Input	X
Cooling_1_Ramp_Capacity	Cooling Ramp 1 Compressor Capacity			43	AV	R	30007	Input	X
Economizer_Ramp	Economizer Ramp			48	AV	R	30017	Input	X
Exhaust_Fan_Space_Static_Pressure_Ramp	Exhaust Fan Space Static Pressure Ramp			49	AV	R	30019	Input	
Exhaust_Fan_Supply_Tracking_Ramp	Exhaust Fan Supply Tracking Ramp			50	AV	R	30021	Input	
Head_Pressure_Control_Ramp_1_Ramp	Head Pressure Control Ramp 1			51	AV	R	30023	Input	X
Heating_Ramp	Heating Ramp			60	AV	R	30041	Input	X
Hot_Gas_Reheat_Ramp	Hot Gas Reheat Ramp			61	AV	R	30043	Input	X
Space_CO2_Control_Ramp	Space CO2 Control Ramp			71	AV	R	30063	Input	
Supply_Duct_Static_Pressure_Ramp	Supply Duct Static Pressure Ramp			72	AV	R	30065	Input	
Supply_Fan_Space_Static_Pressure_Ramp	Supply Fan Space Static Pressure Ramp			74	AV	R	30069	Input	
Winter_Ramp_Output	Winter Ramp Output			75	AV	R	30071	Input	
Outside_Dewpoint	Outside Dewpoint			82	AV	R	30085	Input	X
Outside_Enthalpy	Outside Enthalpy			83	AV	R	30087	Input	X
Return_Dewpoint	Return Air Dewpoint			86	AV	R	30094	Input	
Return_Enthalpy	Return Air Enthalpy			87	AV	R	30096	Input	
Space_Dewpoint	Space Dewpoint			88	AV	R	30097	Input	
Space_Enthalpy	Space Enthalpy			89	AV	R	30099	Input	
Circuit_A_Superheat	Circuit A Air Superheat			93	AV	R	30108	Input	X
Circuit_B_Superheat	Circuit B Air Superheat			95	AV	R	30112	Input	X
Total_Supply_Fan_CFM_BMS	Total Supply Fan CFM			110	AV	R	30140	Input	
Total_Exhaust_Fan_CFM_BMS	Total Exhaust Fan CFM			107	AV	R	30135	Input	
OAD_CFM_BMS	OAD CFM			129	AV	R	30173	Input	
Active_Temperature_Setpoint	Active Temperature Setpoint			132	AV	R	30179	Input	X
SF_Control_Source_BMS	Allows the BMS to control supply fan speed	BMS	Local	56	BV	R/W	19	Coil	X
EF_Control_Source_BMS	Allows the BMS to control exhaust fan speed	BMS	Local	57	BV	R/W	20	Coil	X
OAD_Control_Source_BMS	Allows the BMS to control OAD position	BMS	Local	59	BV	R/W	22	Coil	X
Chilled_Water_1_Valve_Analog_Output	Chilled Water 1 Valve Analog Output			201	AV	R	30473	Input	
Condenser_1_Analog_Output	Condenser 1 Analog Output			205	AV	R	30481	Input	X
Electric_Heater_1_Analog_Output	Electric Heater 1 Analog Output			221	AV	R	30513	Input	
Energy_Recovery_Analog_Output	Energy Recovery Analog Output			229	AV	R	30517	Input	
Exhaust_Fan_Speed_Analog_Output	Exhaust Fan Speed Analog Output			231	AV	R	30521	Input	X
Hot_Gas_Reheat_Analog_Output	Hot Gas Reheat Analog Output			235	AV	R	30523	Input	X
Hot_Water_Valve_1_Analog_Output	Hot Water Valve 1 Analog Output			236	AV	R	30525	Input	
Mod_Gas_Furnace_1_Analog_Output	Mod Gas Furnace 1 Analog Output			242	AV	R	30537	Input	
Outside_Air_Damper_Analog_Output	Outside Air Damper Analog Output			250	AV	R	30541	Input	X
Supply_Fan_Speed_Analog_Output	Supply Fan Speed Analog Output			264	AV	R	30557	Input	X
Modulating_Compressor_Analog_Output_BMS	Modulating Compressor Analog Output			285	AV	R	30585	Input	X
Circuit_A_Sat_Discharge_Temperature	Circuit A Saturated Discharge Temperature			286	AV	R	30587	Input	X
Circuit_B_Sat_Discharge_Temperature	Circuit B Saturated Discharge Temperature			287	AV	R	30589	Input	X
Circuit_A_Sat_Suction_Temperature	Circuit A Saturated Suction Temperature			294	AV	R	30604	Input	X
Coil_Temperature_Calculated_Setpoint	Coil Temperature Calculated Active Setpoint			312	AV	R	30654	Input	X
Cooling_Coil_Setpoint_Max	Cooling Coil Max Setpoint			313	AV	R/W	40102	Holding	X
		<b>ACTIVE TEXT</b>	<b>INACTIVE TEXT</b>						
Exhaust_Fan_1_Status_Digital_Input	Exhaust Fan 1 Status	On	Off	23	BI	30587	10072	Discrete	X
Occupancy_Digital_Input	Occupancy Digital Input Status	Occupied	Unoccupied	53	BI	R	10102	Discrete	
Outside_Filter_Alarm_Digital_Input	Outside Filter Alarm Digital Input Status	Alarm	Normal	54	BI	R	10103	Discrete	X
Shutdown_Alarm_Digital_Input	Shutdown Alarm Digital Input Status	Alarm	Normal	75	BI	R	10124	Discrete	X
Supply_Fan_1_Status_Digital_Input	Supply Fan 1 Status	On	Off	78	BI	R	10127	Discrete	X
Unit_Enable_Digital_Input	Remote Unit Enable Digital Input Status	Enabled	Disabled	82	BI	R	10131	Discrete	X
Wheel_Status_Digital_Input	Heat Wheel Status	Enabled	Disabled	83	BI	R	10132	Discrete	
BMS_Watchdog	BMS Watchdog command Used to determine comm status Must heartbeat within the watch dog timeout delay to detect comm status	Active	Inactive	1	BV	R/W	2	Coil	X
System_Enable	Master system enable	Enabled	Disabled	2	BV	R/W	3	Coil	X
BMS_Occupancy_Command	Occupancy Command	Unoccupied	Occupied	3	BV	R/W	4	Coil	X
Reset_All_Alarms	Alarm Reset Command	Reset	Normal	4	BV	R/W	5	Coil	X
Outside_RH_Source_BMS	Outside RH Source Selection	BMS	Local	5	BV	R/W	6	Coil	X
Outside_Temp_Source_BMS	Outside Temp Source Selection	BMS	Local	6	BV	R/W	7	Coil	X
Return_Temp_Source_BMS	Return Temp Source Selection	BMS	Local	8	BV	R/W	9	Coil	X
Space_1_CO2_Source_BMS	Space 1 CO2 Source Selection	BMS	Local	9	BV	R/W	10	Coil	
Return_CO2_Source_BMS	Return CO2 Source Selection	BMS	Local	11	BV	R/W	11	Coil	X
Return_CO2_from_BMS	Return CO2 Source From BMS	BMS	Local	27	AV	R/W	40054	Holding	X



**Valent Network Interface v5.002 Modbus/BACnet Points List**

Variable	Description	ACTIVE TEXT	INACTIVE TEXT	BACNET		Read (R) Write (W)	MODBUS		Included
				Object Instance	Object Type		Index	Register Type	
Space_RH_Source_BMS	Space RH Source Selection	BMS	Local	12	BV	R/W	13	Coil	X
Space_Static_Source_BMS	Space Static Source Selection	BMS	Local	13	BV	R/W	14	Coil	
Space_Temp_Source_BMS	Space Temp Source Selection	BMS	Local	14	BV	R/W	15	Coil	X
Occupied	Occupied Status	Occupied	Unoccupied	16	BV	R	10002	Discrete	
Unoccupied	Unoccupied Status	Unoccupied	Occupied	17	BV	R	10003	Discrete	
Unoccupied_Cooling_Call	Unoccupied Cooling Call Status	On	Off	18	BV	R	10004	Discrete	
Unoccupied_Dehumidification_Call	Unoccupied Dehumidification Call Status	On	Off	19	BV	R	10005	Discrete	
Unoccupied_Heating_Call	Unoccupied Heating Call Status	On	Off	20	BV	R	10006	Discrete	
Occupied_Start	Occupied Start Command Status	Start	Stop	21	BV	R	10007	Discrete	
Unoccupied_Start	Unoccupied Start Command Status	Start	Stop	22	BV	R	10008	Discrete	
Enable_Controls	Status to indicate startup is complete and the unit is ready	Yes	No	23	BV	R	10009	Discrete	X
Global_Alarm	General alarm point Optionally set to indicate any alarm is active, or a shutdown alarm is active	Alarm	Normal	24	BV	R	10010	Discrete	X
System_Shutdown_Alarm	Shutdown alarm status When true, System Enable will be set to false and the unit will remain off	Alarm	Normal	25	BV	R	10011	Discrete	X
Damper_Open	Indicates there is an open air path and the supply fan can run	Open	Closed	26	BV	R	10012	Discrete	X
Cooling_is_On	Indicates that the unit is cooling	Yes	No	27	BV	R	10013	Discrete	X
Economizer_is_On	Indicates that the unit is economizing	Yes	No	28	BV	R	10014	Discrete	X
Heating_is_On	Indicates that the unit is heating	Yes	No	29	BV	R	10015	Discrete	X
Dehumidification_Mode_Enabled	Indicates the unit is dehumidifying	Yes	No	31	BV	R	10017	Discrete	X
Manual_Override_Active	Indicates that manual overrides are active	Active	Inactive	32	BV	R	10018	Discrete	X
Cooling_Not_Locked_Out	Indicates that cooling is allowed	Allowed	Locked Out	33	BV	R	10019	Discrete	X
Heating_Not_Locked_Out	Indicates that heating is allowed	Allowed	Locked Out	34	BV	R	10020	Discrete	X
Preheat_Not_Locked_Out	Indicates that preheat is allowed	Allowed	Locked Out	36	BV	R	10022	Discrete	
HGRH_Purging	Indicates the hot gas reheat value is purging	Yes	No	37	BV	R	10023	Discrete	X
Allow_Dampers	Startup sequence command to open dampers	Yes	No	43	BV	R	10029	Discrete	X
Allow_Exhaust_Fans	Startup sequence command to trigger exhaust fans to start	Yes	No	44	BV	R	10030	Discrete	X
Allow_Supply_Fans	Startup sequence command to trigger supply fans to start	Yes	No	48	BV	R	10034	Discrete	X
BMS_Watchdog_Active	Status of the BMS watchdog ping	Active	Inactive	49	BV	R	10035	Discrete	X
BMS_Occupancy_Status	Status of the BMS occupancy command	Unoccupied	Occupied	50	BV	R	10036	Discrete	X
Damper_Actuator_Power_1_Digital_Output	Damper Actuator Power 1 Digital Output	Active	Inactive	100	BV	R	10153	Discrete	X
Compressor_1_Enable_Digital_Output	Compressor 1 Enable	On	Off	111	BV	R	10164	Discrete	
Compressor_2_Enable_Digital_Output	Compressor 2 Enable	On	Off	112	BV	R	10165	Discrete	
Compressor_3_Enable_Digital_Output	Compressor 3 Enable	On	Off	113	BV	R	10166	Discrete	
Compressor_4_Enable_Digital_Output	Compressor 4 Enable	On	Off	114	BV	R	10167	Discrete	
Condenser_Fan_1_Digital_Output	Condenser Fan Stage 1	On	Off	119	BV	R	10171	Discrete	
Condenser_Fan_2_Digital_Output	Condenser Fan Stage 2	On	Off	120	BV	R	10172	Discrete	
Condenser_Fan_3_Digital_Output	Condenser Fan Stage 3	On	Off	121	BV	R	10173	Discrete	
Condenser_Fan_4_Digital_Output	Condenser Fan Stage 4	On	Off	122	BV	R	10174	Discrete	
Condenser_Fan_5_Digital_Output	Condenser Fan Stage 5	On	Off	123	BV	R	10175	Discrete	
Condenser_Fan_6_Digital_Output	Condenser Fan Stage 6	On	Off	124	BV	R	10176	Discrete	
Condenser_Fan_7_Digital_Output	Condenser Fan Stage 7	On	Off	125	BV	R	10177	Discrete	
Condenser_Fan_8_Digital_Output	Condenser Fan Stage 8	On	Off	126	BV	R	10178	Discrete	
Exhaust_Fan_1_Start_Stop_Digital_Output	Exhaust Fan 1 Start Stop	On	Off	127	BV	R	10180	Discrete	X
Furnace_1_Stage_1_Digital_Output	Furnace 1 Stage 1	On	Off	131	BV	R	10184	Discrete	
Furnace_2_Stage_1_Digital_Output	Furnace 2 Stage 1	On	Off	133	BV	R	10186	Discrete	
Heat_Wheel_Enable_Digital_Output	Heat Wheel Enable	On	Off	163	BV	R	10208	Discrete	
PreHeat_Enable_Digital_Output	PreHeat Enable Digital Output	On	Off	166	BV	R	10211	Discrete	
Reversing_Valve_Digital_Output	Reversing Valve Digital Output HP	On	Off	175	BV	R	10219	Discrete	X
Supply_Fan_1_Start_Stop_Digital_Output	Supply Fan 1 Start	Start	Stop	186	BV	R	10231	Discrete	X
Aux_BMS_Digital_Output_1	Aux BMS Digital Output	BMS	Local	207	BV	R/W	23	Coil	X
Aux_BMS_Digital_Output_2	Aux BMS Digital Output	BMS	Local	208	BV	R/W	24	Coil	X
Aux_BMS_Digital_Output_3	Aux BMS Digital Output	BMS	Local	209	BV	R/W	25	Coil	X
Aux_BMS_Digital_Output_4	Aux BMS Digital Output	BMS	Local	210	BV	R/W	26	Coil	X
Aux_BMS_Digital_Output_5	Aux BMS Digital Output	BMS	Local	211	BV	R/W	27	Coil	X
Aux_BMS_Digital_Output_6	Aux BMS Digital Output	BMS	Local	212	BV	R/W	28	Coil	X
BMS_Offline_Alarm_Active	BMS Offline Alarm	Alarm	Normal	313	BV	R	10264	Discrete	X
Cold_Coil_1_Temperature_Sensor_Alarm_Active	Cold Coil 1 Temperature Sensor Alarm	Alarm	Normal	387	BV	R	10338	Discrete	X
Comp_Circ_A_High_Pressure_Alarm.Active	Comp Circ A High Pressure Alarm	Alarm	Normal	395	BV	R	10345	Discrete	
Comp_Circ_A_Low_Pressure_Alarm.Active	Comp Circ A Low Pressure Alarm	Alarm	Normal	396	BV	R	10346	Discrete	
Comp_Circ_B_High_Pressure_Alarm.Active	Comp Circ B High Pressure Alarm	Alarm	Normal	397	BV	R	10347	Discrete	
Comp_Circ_B_Low_Pressure_Alarm.Active	Comp Circ B Low Pressure Alarm	Alarm	Normal	398	BV	R	10348	Discrete	
Comp_Maintenance_Alarm_Active	Comp Maintenance Alarm	Alarm	Normal	411	BV	R	10362	Discrete	
Drain_Pan_Alarm.Active	Condensate Drain Pan Alarm	Alarm	Normal	422	BV	R	10371	Discrete	



**Valent Network Interface v5.002 Modbus/BACnet Points List**

Variable	Description	ACTIVE TEXT	INACTIVE TEXT	BACNET		Read (R) Write (W)	MODBUS		Included
				Object Instance	Object Type		Index	Register Type	
Exhaust_Fan_1_Alarm_Active	Exhaust Fan 1 Alarm	Alarm	Normal	423	BV	R	10372	Discrete	X
Exhaust_Fan_1_AMD_analog_input_Alarm.Active	Exhaust AMD Analog Input Alarm	Alarm	Normal	424	BV	R	10373	Discrete	
Expansion_Board_1_Alarm_Active	Expansion Board 1 Alarm	Alarm	Normal	434	BV	R	10384	Discrete	
Expansion_Board_2_Alarm_Active	Expansion Board 2 Alarm	Alarm	Normal	435	BV	R	10385	Discrete	
Expansion_Board_3_Alarm_Active	Expansion Board 3 Alarm	Alarm	Normal	436	BV	R	10386	Discrete	
Internal_Board_Temp_Alarm_Active	Internal Board Temp Alarm	Alarm	Normal	498	BV	R	10448	Discrete	X
Multi_Channel_Conf_Alarm_Active	Multi Channel Conf Alarm	Alarm	Normal	503	BV	R	10453	Discrete	X
Outside_Air_Temperature_Sensor_Alarm_Active	Outside Air Temperature Sensor Alarm	Alarm	Normal	507	BV	R	10457	Discrete	X
Outside_Filter_Alarm_Active	Outside Filter Alarm	Alarm	Normal	508	BV	R	10458	Discrete	X
Outside_RH_Sensor_Alarm_Active	Outside RH Sensor Alarm	Alarm	Normal	509	BV	R	10459	Discrete	X
Return_Duct_Static_Pressure_Analog_Input_Alarm.Active	Return Duct Static Pressure Analog Input Alarm	Alarm	Normal	521	BV	R	10470	Discrete	
Return_Low_Static_Alarm.Active	Return Low Static Pressure Alarm	Alarm	Normal	531	BV	R	10480	Discrete	
Return_RH_Sensor_Alarm.Active	Return RH Sensor Alarm	Alarm	Normal	532	BV	R	10481	Discrete	
Return_Temperature_Sensor_Alarm.Active	Return Temp Sensor Alarm	Alarm	Normal	533	BV	R	10482	Discrete	
Space_CO2_1_Analog_Input_Alarm_Active	Space CO2 1 Analog Input Alarm	Alarm	Normal	535	BV	R	10485	Discrete	
Space_High_Static_Alarm_Active	Space High Static Alarm	Alarm	Normal	537	BV	R	10487	Discrete	
Space_RH_Sensor_Alarm_Active	Space RH Sensor Alarm	Alarm	Normal	538	BV	R	10488	Discrete	
Space_Static_Pressure_Analog_Input_Alarm_Active	Space Static Pressure Analog Input Alarm	Alarm	Normal	540	BV	R	10490	Discrete	
Space_Temperature_Sensor_Alarm_Active	Space Temperature Sensor Alarm	Alarm	Normal	541	BV	R	10491	Discrete	
Shutdown_Input_Alarm_Active	Shutdown Input Alarm	Alarm	Normal	546	BV	R	10496	Discrete	
Supply_Air_Temp_Low_Limit_Active	Supply Air Temp Low Limit Alarm	Alarm	Normal	551	BV	R	10501	Discrete	X
Supply_Air_Temperature_Sensor_Alarm_Active	Supply Air Temperature Sensor Alarm	Alarm	Normal	552	BV	R	10502	Discrete	X
Supply_Duct_Static_Pressure_Analog_Input_Alarm_Active	Supply Duct Static Pressure Analog Input Alarm	Alarm	Normal	553	BV	R	10503	Discrete	
Supply_Fan_1_Alarm_Active	Supply Fan 1 Alarm	Alarm	Normal	554	BV	R	10504	Discrete	X
Supply_High_Duct_Static_Alarm_Active	Supply High Duct Static Alarm	Alarm	Normal	563	BV	R	10513	Discrete	
Supply_Temp_High_Limit_Alarm_Active	Supply Temp High Limit Alarm	Alarm	Normal	565	BV	R	10515	Discrete	X
TMem_Error_Active	TMem Error Alarm	Alarm	Normal	567	BV	R	10517	Discrete	X
Wheel_Rotation_Alarm_Active	Wheel Rotation Alarm	Alarm	Normal	576	BV	R	10526	Discrete	
AI_Batt_EVD_1_Active	EVD Battery Alarm	Alarm	Normal	589	BV	R	10539	Discrete	X
AI_ConfigErr_EVD_1_Active	EVD Configuration Alarm	Alarm	Normal	590	BV	R	10540	Discrete	X
AI_DscgHiP_COMP_Active	Compressor Envelope-High Discharge Pressure Alarm	Alarm	Normal	591	BV	R	10541	Discrete	X
AI_DscgHiTemp_COMP_Active	Compressor Envelope-High Discharge Temperature Alarm	Alarm	Normal	592	BV	R	10542	Discrete	X
AI_DscgLowP_COMP_Active	EVD Low Discharge Pressure Alarm	Alarm	Normal	593	BV	R	10543	Discrete	X
AI_EEPROM_EVD_1_Active	EVD EEPROM Alarm	Alarm	Normal	594	BV	R	10544	Discrete	X
AI_EEV_A_EVD_1_Active	ExV Motor Alarm - Valve A	Alarm	Normal	595	BV	R	10545	Discrete	X
AI_EmergencyClosing_EVD_1_Active	EVD Emergency Closing Alarm	Alarm	Normal	597	BV	R	10547	Discrete	X
AI_EVD_Offline_EVD_1_Active	EVD Offline Communication Alarm	Alarm	Normal	598	BV	R	10548	Discrete	X
AI_FW_CompatibErr_EVD_1_Active	EVD Firmware Compatibility Alarm	Alarm	Normal	599	BV	R	10549	Discrete	X
AI_HiCurr_COMP_Active	Compressor Envelope-High Current Alarm	Alarm	Normal	600	BV	R	10550	Discrete	X
AI_HiRatioP_COMP_Active	Compressor Envelope-High Pressure Ratio Alarm	Alarm	Normal	601	BV	R	10551	Discrete	X
AI_HiT_Cond_EVD_1_Active	AI HiT Cond EVD 1	Alarm	Normal	602	BV	R	10552	Discrete	X
AI_IncompleteClosing_EVD_1_Active	EVD Incomplete Closing Alarm	Alarm	Normal	603	BV	R	10553	Discrete	X
AI_LOP_A_EVD_1_Active	EVD Low Operating Pressure Alarm - Valve A	Alarm	Normal	604	BV	R	10554	Discrete	X
AI_Low_SH_A_EVD_1_Active	EVD Low Super Heat Alarm - Circuit A	Alarm	Normal	606	BV	R	10556	Discrete	X
AI_LowDeltaP_COMP_Active	Compressor Envelope-Low Pressure Delta Alarm	Alarm	Normal	608	BV	R	10558	Discrete	X
AI_LowRatioP_COMP_Active	Compressor Envelope-Low Pressure Ratio Alarm	Alarm	Normal	609	BV	R	10559	Discrete	X
AI_LowSuct_A_EVD_1_Active	Low Suction Refrigerant Temperature - Circuit A	Alarm	Normal	610	BV	R	10560	Discrete	X
AI_MOP_A_EVD_1_Active	EVD Max Operating Pressure Alarm - Valve A	Alarm	Normal	612	BV	R	10562	Discrete	X
AI_S1_EVD_1_Active	EVD-S1 Suction Pressure Sensor Alarm	Alarm	Normal	614	BV	R	10564	Discrete	X
AI_S2_EVD_1_Active	EVD-S2 Suction Temperature Sensor Alarm	Alarm	Normal	615	BV	R	10565	Discrete	X
AI_S4_EVD_1_Active	EVD-S4 Discharge Temperature Sensor Alarm	Alarm	Normal	617	BV	R	10567	Discrete	X
AI_SuctHiP_COMP_Active	Compressor Envelope - SuctHiP_COMP	Alarm	Normal	618	BV	R	10568	Discrete	X
AI_SuctLowP_COMP_Active	Compressor Envelope - SuctLowP_COMP	Alarm	Normal	619	BV	R	10569	Discrete	X
Comp_Staging_Order_Skipped_Active	Compressor Staging Order is Skipped Warning	Alarm	Normal	632	BV	R	10579	Discrete	X
Heat_Pump_Heating_Lock_Out_Alarm.Active	Heat Pump Heating Lockout	Alarm	Normal	633	BV	R	10580	Discrete	X
EVD_PrePosition_Alarm_Active	Unexpected EEV Position	Alarm	Normal	634	BV	R	10582	Discrete	X
ER_Wheel_High_DP.Active	ER Wheel High DP.Active	Alarm	Normal	731	BV	R	10679	Discrete	
High_Low_Press_Circ_A_Alarm.Active	High Low Press Circ A Alarm.Active	Alarm	Normal	733	BV	R	10682	Discrete	
High_Low_Press_Circ_B_Alarm.Active	MHigh Low Press Circ B Alarm.Active	Alarm	Normal	734	BV	R	10683	Discrete	
High_Low_Press_Circ_C_Alarm.Active	MHigh Low Press Circ C Alarm.Active	Alarm	Normal	735	BV	R	10684	Discrete	
High_Low_Press_Circ_D_Alarm.Active	MHigh Low Press Circ D Alarm.Active	Alarm	Normal	736	BV	R	10685	Discrete	
Greentrol_1_Alarm.Active	Greentrol 1 Alarm.Active	Alarm	Normal	737	BV	R	10686	Discrete	



**Valent Network Interface v5.002 Modbus/BACnet Points List**

Variable	Description	ACTIVE TEXT	INACTIVE TEXT	BACNET		Read (R) Write (W)	MODBUS		Included
				Object Instance	Object Type		Index	Register Type	
OAD_Feedback_Error_Not_Economizing.Active	OAD Feedback Error Not Economizing	Alarm	Normal	741	BV	R	10689	Discrete	X
OAD_Feedback_Error_Economizing.Active	OAD Feedback Error Economizing	Alarm	Normal	742	BV	R	10691	Discrete	X
OAD_Feedback_Error_OAD_Not_Modulating.Active	OAD Feedback Error OAD Not Modulating	Alarm	Normal	743	BV	R	10693	Discrete	X
OAD_Feedback_Error_Excess_OA.Active	OAD Feedback Error Excess OA	Alarm	Normal	744	BV	R	10695	Discrete	X
Space_TStat_1_Offline.Active	Space Thermostat 1 Offline	Alarm	Normal	745	BV	R	10699	Discrete	
Space_TStat_2_Offline.Active	Space Thermostat 2 Offline	Alarm	Normal	746	BV	R	10701	Discrete	
Space_TStat_3_Offline.Active	Space Thermostat 3 Offline	Alarm	Normal	747	BV	R	10703	Discrete	
Space_TStat_4_Offline.Active	Space Thermostat 4 Offline	Alarm	Normal	748	BV	R	10705	Discrete	
Inverter_Scroll_1_Alarm	Inverter Scroll Alarm	Alarm	Normal	749	BV	R	10707	Discrete	X
IG_Furnace_Alarm	IG Furnace Alarm	Alarm	Normal	753	BV	R	10715	Discrete	
Supply_Fan_Delay_Remaining	Supply Fan startup sequence Time before starting supply fan			2	IV	R	30183	Input	X
Exhaust_Fan_Delay_Remaining	Exhaust Fan startup sequence Time before starting exhaust fan			3	IV	R	30185	Input	X
LatestAlm	Most recent alarm See alarm table			7	IV	R	30193	Input	X

**UNIT STATUS MODE**

TABLE 13: UNIT STATUS MODE

0	Off/Standby	14	Shutdown Alarm
1	Unoccupied Start	18	Unassigned
2	Occupied Start	19	Fans Only
3	Opening Dampers	20	Economizing
4	End Switch	21	Cooling
5	Dampers Open	22	Heating
6	Fan Start Delay	23	Dehumidifying
7	Fans Starting	25	HGRH Purging
9	Heat/Cool Delay	26	Defrost Active
10	System On	28	Cooling & Heating
11	Soft Shutdown	29	Dehum w/Heat
12	System Disabled	30	Overrides Active
13	Remote Off	31	Expansion Offline

## 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 air damper actuator is powered.
- Exhaust fan starts after a (adj.) delay.
- Supply fan starts after a (adj.) delay.
- Tempering options to function as described below.

**UNIT STOP COMMAND (OR DE-ENERGIZED):**

- Supply fan, exhaust fan 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.
- Exhaust fan ON.
- Supply fan ON.
- Heating per below.
- Cooling per below.

**Unoccupied Mode (Unit Off):** Unit remains off when in unoccupied mode.

- Supply fan OFF
- Exhaust fan OFF
- Tempering OFF
- Outdoor air damper closed.
- Return damper closed.
- Recirculation damper open.

**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.

**BMS Control:** The supply blower is modulated based upon a command from the Building Management System. (This Sequence must be field configured.)

**OUTDOOR AIR AND RE-CIRCULATED (RECIRC) AIR DAMPER CONTROL:** The outdoor and recirculated air dampers are factory mounted and wired. Outside air damper and recirculation damper will be inverse positions of

each other. Example, when the outside air damper is set to 35% opening, the recirculation damper will be at 65% opening. The modulating actuator will be controlled to dictate position by the following sequence.

**BMS Control:** The damper position is modulated based upon a command from the Building Management System. (This sequence must be field configured.)

**EXHAUST BLOWER SEQUENCE:** The exhaust blower is provided with a factory mounted variable frequency drive. The exhaust blower speed will be controlled with the following sequence.

**BMS Control:** The exhaust blower is modulated based upon a command from the Building Management System. (This sequence must be field configured.)

**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 0-50%, the inverter scroll will be controlled to maintain discharge temperature. From 50-100% the second stage will be on in combination with the inverter scroll compressor to maintain the 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 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 < 10 F.

**Air-Source Heat Pump:** The controller will provide a modulating signal for heating. From 0-50%, the inverter scroll will be controlled to maintain discharge temperature. From 50-100% the second stage will be on in combination with the inverter scroll compressor to maintain the 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 controller will adjust the supply air temperature set point between minimum (adj.) and maximum (adj) limits, to satisfy the desired space temperature setpoint. Adjustable locally or by BMS.

**Supply Discharge Temperature Control:** The supply set point will be a constant temperature set point 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 (Winter Ramp):** The controller will enable the outdoor air and recirc. air dampers to modulate in order 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 in the controller.)

**ECONOMIZER SEQUENCE:** When the application requires cooling, and the outdoor air conditions are suitable for free cooling, the controller will modulate the outdoor air and recirculated air dampers to maintain the discharge temperature set point. If the outdoor air damper modulates to the maximum economizer set point and the discharge temperature is not met, the controller will increase the call for cooling to meet the discharge 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.

**Dirty Filter Alarm:** A digital signal is sent to the controller indicating an increased pressure drop across the supply air filter (Must be adjusted in field during start up). The controller will then provide a dirty filter alarm.

**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.

**UV Lights:** UV-C lights are mounted in the supply blower cabinet and provide air disinfection. The lights are factory-powered and are on when the supply blower is running. A kill switch on the supply blower access door turns the lights off when that door is open.

**Bipolar Ionization:** Needlepoint bipolar ionizers are mounted on the fan inlet cone(s) and provide air disinfection. The ionizers are factory-powered and are on when there is power to the unit disconnect.

**Economizer Fault Detection Diagnostic:** Provides the status and faults of the air economizer to indicate proper economizer sequence operation. This assures the benefits of free cooling when outdoor conditions are suitable for economizer functions. The FDD system will indicate when free cooling is available and if the outside air damper and recirculation damper are reacting properly. If the dampers are not functioning correctly an alarm will be generated.





## 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 12 months from start-up or 18 months from ship date, whichever is less. Initial startup must be completed within six months of the shipment date, and a startup report must be submitted to Valent.

### Compressor Extended Warranty

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