



VR-400-25B-I-G0

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)					
220	95.0	75.3	26.9	9,143	1,843	7,300	-

Unit Specifications						
Qty	Weight (lb)	Cooling Type	Primary Heating Type	Secondary Heating Type	Unit Installation	Unit ETL Listing
1	3,281 (+/- 5%)	Air-Source Heat Pump	Air-Source Heat Pump	IndirectGas	Outdoor	UL 60335-2-40

Configuration			
Outdoor Air		Exhaust Air	
Intake	Discharge	Intake	Discharge
End	Bottom	-	-

ASHRAE 90.1-2022 Compliance			
	ASHRAE 90.1 Min. Efficiency	Calculated Efficiency	Compliance
EER	9.3	9.9	✓
IEER	12.3	19.5	✓
COP _H at 17 F	2.05	2.44	✓
COP _H at 47 F	3.2	3.27	✓

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	315.5	230.6	81.7 / 68.4	57.4 / 57.4	242.6	82.3

Primary Heat Specifications				
Type	Total Capacity (MBH)	Dry Bulb Temperatures		
		EAT (F)	LAT (F)	Ambient Outdoor Air (F)
Air Source Heat Pump	204.7	50.0	71.5	26.9

Secondary Heat Specifications										
Type	Gas Type	Input (MBH)	Output (MBH)	Temperature Rise		Turndown	Performance (w/ ASHP)		Performance (w/o ASHP)	
				Min (F)	Max (F)		EAT (F)	LAT (F)	EAT (F)	LAT (F)
Indirect Gas	Natural	250.0	202.5	2.0	20.5	10:1	70.5	92.0	26.9	70.5

Motor Specifications						
Motor	Qty	Operating Power (hp)	Size (hp)	Enclosure	Efficiency	RPM
Supply	2	2.9	3	OP	High	1800

Electrical Specifications				
Power Supply	Rating (V/C/P)	MCA (A)	MOP (A)	FLA (A)
Unit	208/60/3	134.1	175.0	120.2



Construction Features And Accessories

Unit	
Unit Installation - Outdoor	Std
Unit Construction - Double Wall	Std
Insulation - 1 inch R-8 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, RAL7023	Std
Stainless Steel Condensate Drain Pan and Connection	Std
Condensate Drain Trap	Std
Short Circuit Current - 5 kA	Std
Controls	
Unit Controls - Microprocessor	Std
Internally Mounted Control Center with 24 VAC control transformer(s)	Std
BMS Protocol - BACnetMSTP	X
Supply Fan Control - By BMS	X
Exhaust Fan Control	
Web-Based User Interface	Std
Damper Control - By BMS	X
Economizer Control Temperature	X
Space Interface	
Furnace Control	X
Unoccupied Recirc Mode	X
Control Accessories	
Dirty Filter Sensor(s)	
Airflow Monitor	
Room Thermostat	
Phase/Brownout Protection	Std
Economizer Fault Detection Diagnostics	

Accessories	
Recirc Air Damper - Low Leakage	Std
Outdoor Air Damper - LowLeakage	Std
Roof Curb	
Supply Air Filters - 2" Merv 13, 8-20x20x2, 4-20x16x2	X
Service Outlet - Factory Mounted and Wired	X
Condensate Overflow Switch	X
Spare Filters	
Exhaust Discharge Gravity Backdraft Damper	
ElectroFin Coil Coating - All Coils	X
Motor Shaft Grounding	
Smoke Detector(s)	
Barometric Relief Damper	
Power Venting	Std
Hail Guards	Std
Warranty Options	
Unit Warranty - 18 Months (Std.)	Std
Compressor Warranty - 5.5 Yrs. (4 Yrs. Extended)	X
Furnace HX Warranty - 25 Yrs.	Std

Standard Option	Std
Not Included	
Included	X

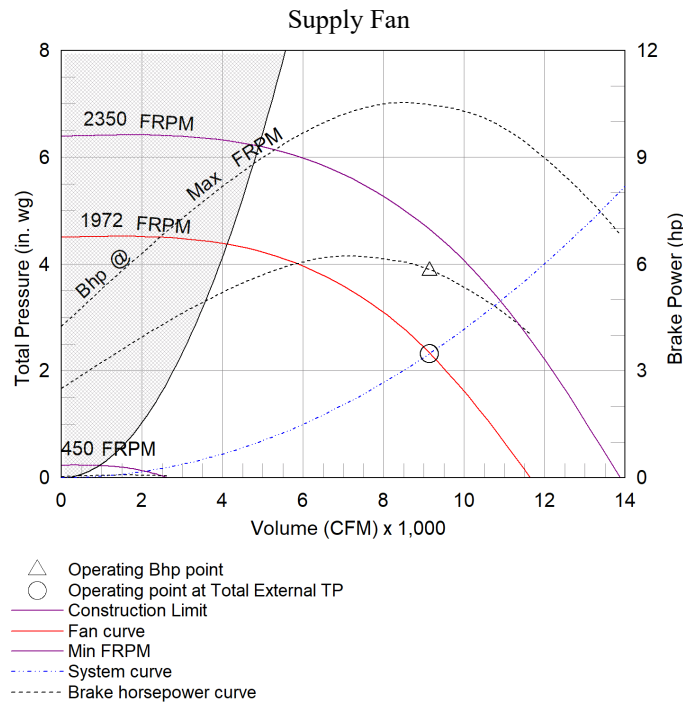
Notes
Electrofin coil coating requires monthly and quarterly coil maintenance to maintain the coil coating, failure to follow cleaning recommendations will void the coatings warranty
Verify that the correct BMS Protocol has been selected before ordering
Outdoor Air Damper supplied is low leakage, motorized VCD-23 (leakage rate of 3 CFM/ft ² @ 1 in. wg), Class 1A
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.
** The equipment you've purchased MAY include a cellular communication gateway (the "Gateway") that allows Valent Air and its affiliates to remotely monitor and log performance. The Gateway does not alter the performance of your equipment and we only use the Gateway to monitor and collect data related to the equipment's performance in the context of its operational environment. While the data we monitor and collect is specific to your equipment, we will only use that data to monitor your system; diagnose and make recommendations to you or your HVAC technicians to improve system performance; and, in the aggregate, without disclosing any personal or proprietary information, enhance the overall design and performance of our products. You may opt out of this process by calling our Service Group at 1-800-789-8550, but doing so may negatively impact our ability to enhance your product's performance.

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
9,143	1	2.325	1972	2.9	2	3	2	Plenum	Direct

Pressure Drop (in. wg)						
Weatherhood	Filter	Damper	Cooling	Heating	External	Total
-	0.211	0.413	0.398	0.216	1	2.325

Sound Performance in Accordance with AMCA										
Sound Power by Octave Band								Lwa	dBA	Sones
62.5	125	250	500	1000	2000	4000	8000			
88	87	99	92	90	84	82	76	96	84	40



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 ²)
DR38S04S16-50x75	16	4	325	0.398	R-454B	28.13

Compressor Details					
Lead Compressor Type	Compressor Qty	Compressor RLA/MRC (A)		Compressor LRA (A)	
		Comp. #1	Comp. #2	Comp. #1	Comp. #2
InverterScroll	2	55.7	28.5		225

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	315.5	230.6	81.7 / 68.4	57.4 / 57.4	242.6	82.3

Primary Heat Specifications				
Type	Total Capacity (MBH)	Dry Bulb Temperatures		
		EAT (F)	LAT (F)	Ambient Outdoor Air (F)
Air Source Heat Pump	204.7	50.0	71.5	26.9

A2L Installation Requirement - UL 60335-2-40		
Largest Circuit Charge	Minimum Circulation Airflow	Minimum Total Conditioned Room Area
80.8lb / 36.6kg	2185	1217

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
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 high pressure switch (manual reset)
Liquid-Line filter drier
Inverter scroll compressor
Unit cannot be mounted in an enclosed space.
Refrigerant low pressure switch (auto reset)

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 is locked below 0°F (-17.8°C). Above 0°F (-17.8°C), unit 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.
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	Gas Type	Input (MBH)	Output (MBH)	Temperature Rise		Turndown	Performance (w/ ASHP)		Performance (w/o ASHP)	
				Min (F)	Max (F)		EAT (F)	LAT (F)	EAT (F)	LAT (F)
Indirect Gas	Natural	250.0	202.5	2.0	20.5	10:1	70.5	92.0	26.9	70.5

Unit Details
ANSI standard Z83.8 and CSA 2.6
High Thermal efficiency
Direct spark ignition
3/4" Gas Connection
At least 6 in. wg of natural gas pressure (11 in. wg for LP) is required at the units gas connection in order to achieve maximum performance
Power Venting
24 Volt Control Power
Stainless Steel heat exchange tubes
Unit controller maximum allowable supply discharge air set point is 100F (37.8C)

AHRI Certification Performance

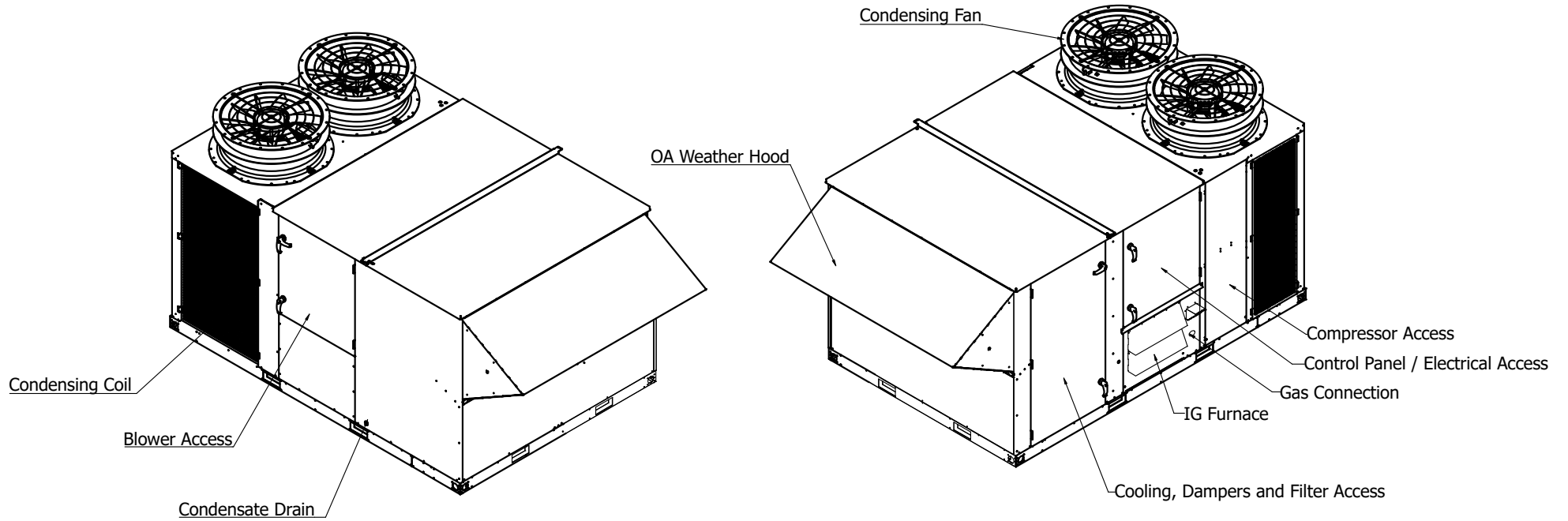
Certified Ratings for AHRI Unitary Large Equipment (ULE) in accordance with AHRI Standard 340/360						
Rated Cooling Capacity (BTU/h)	Energy Efficiency Ratio, EER ((BTU/h)/W)	Integrated Energy Efficiency Ratio, IEER ((BTU/h)/W)	Rated Heating Capacity @47F (BTU/h)	Coefficient of Performance @47F (-)	Rated Heating Capacity @17F (BTU/h)	Coefficient of Performance @17F (-)
290000	9.9	19.5	278000	3.3	172000	2.4

AHRI Certifications

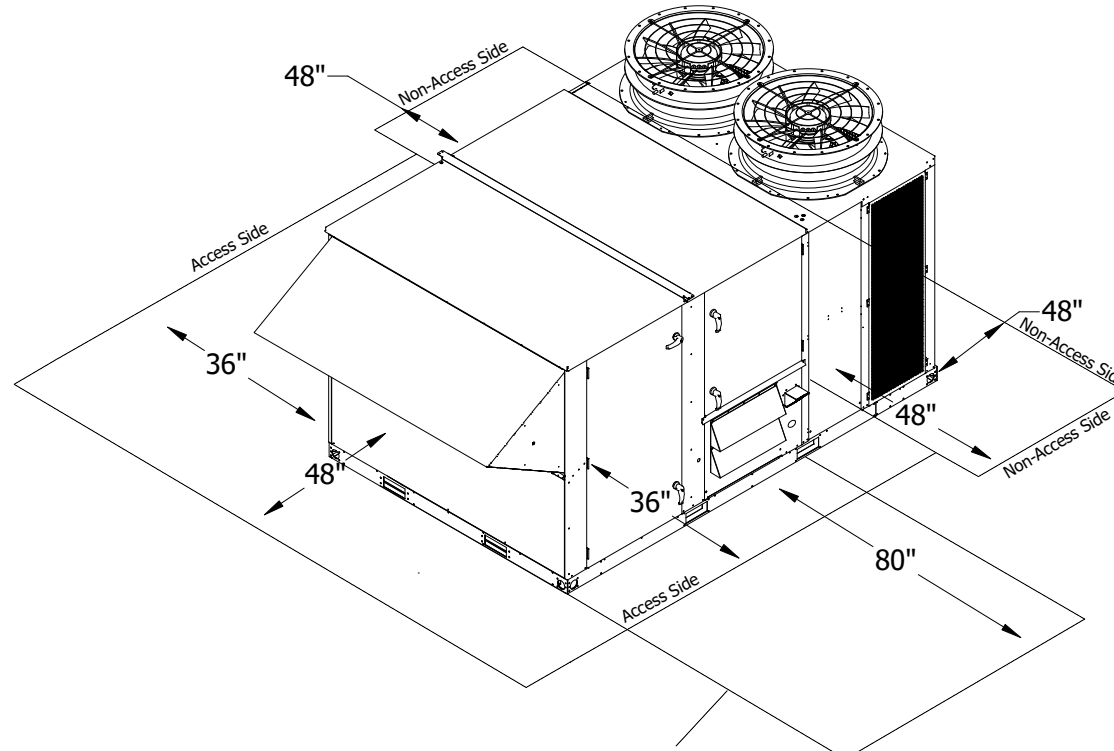


AHRI CERTIFIED®
 www.ahridirectory.org
 C
 Unitary Large HP
 AHRI Standard 340/360
 Certification applies only when the complete system is listed with AHRI.

Isometric Layout



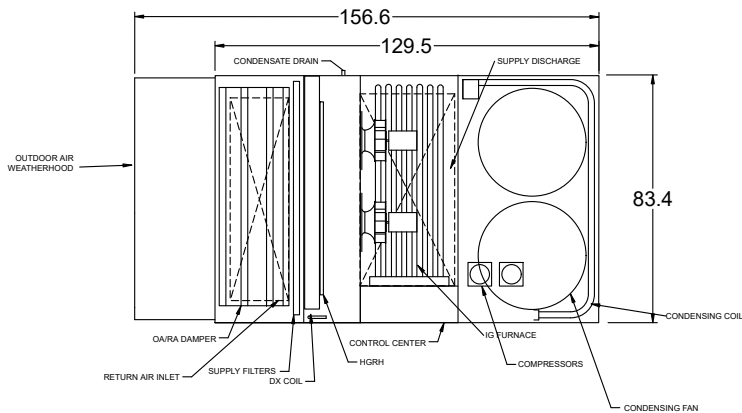
Isometric Clearances



Use if removal of Cooling Coil, Electric Heat or the IG furnace may be needed.

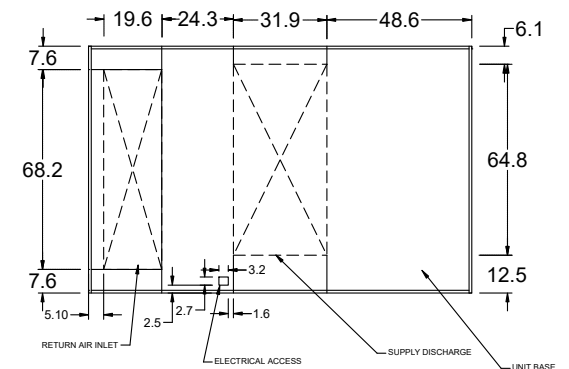
Overview

Dimensional Overview

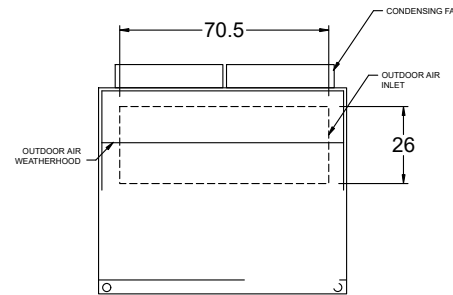


Plan

Base Dimensions

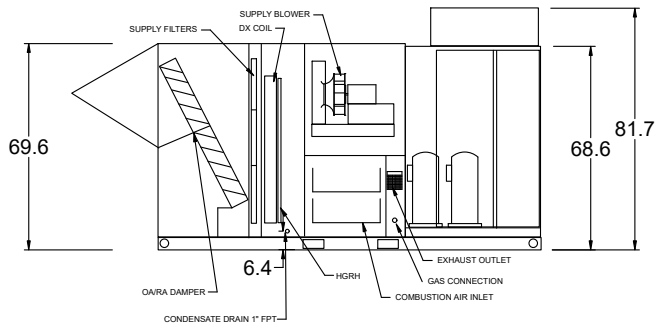


TOP

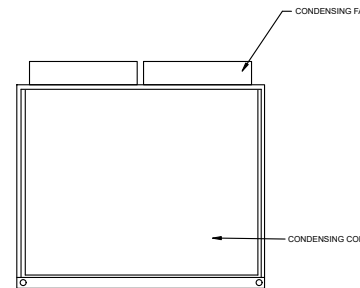


Left End

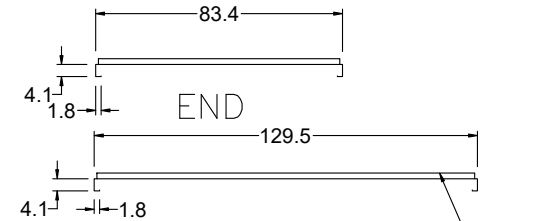
Component Layout



Elevation



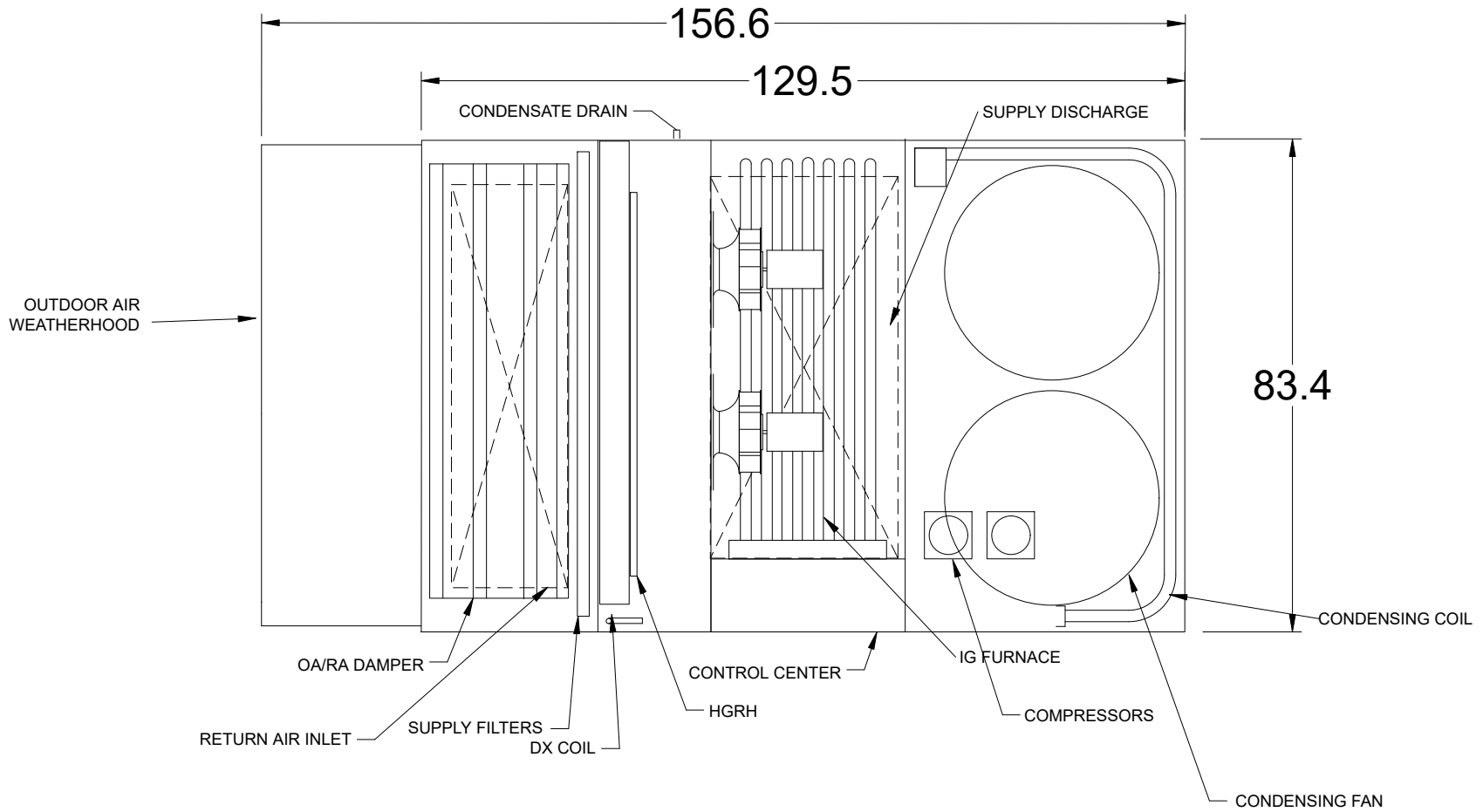
Right End



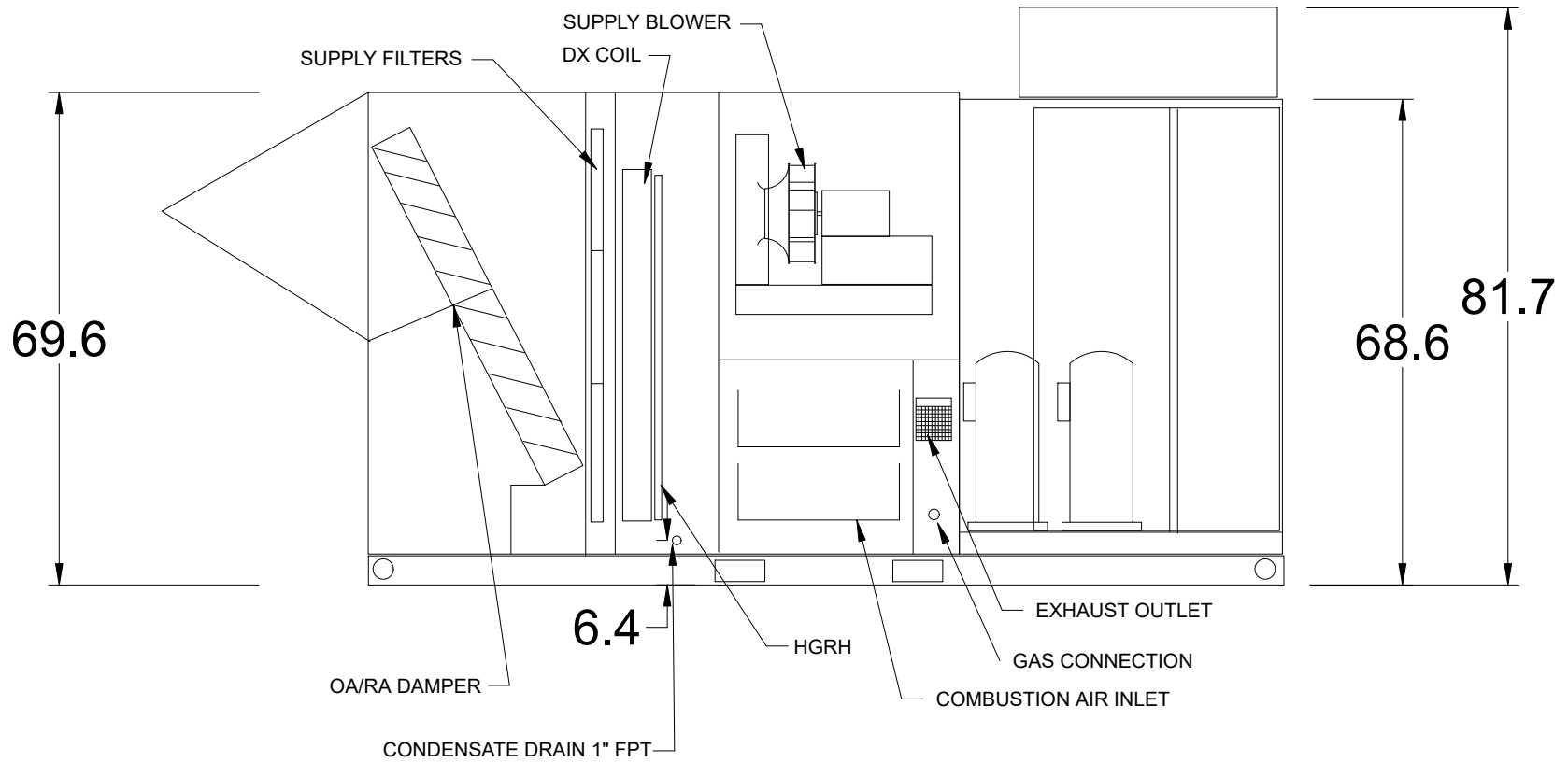
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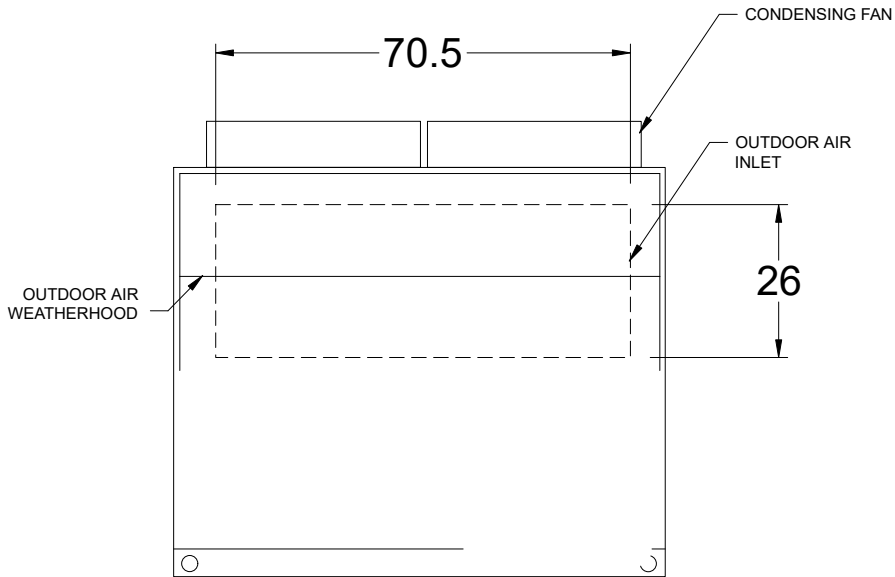
SIDE



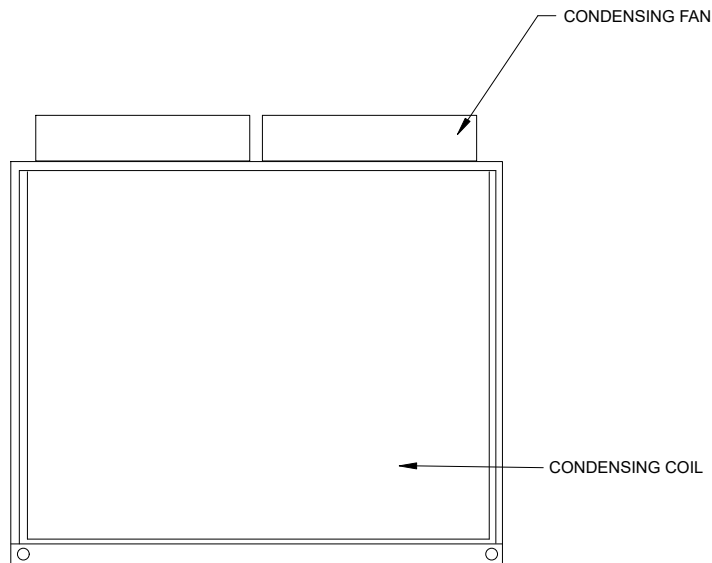
Plan



Elevation

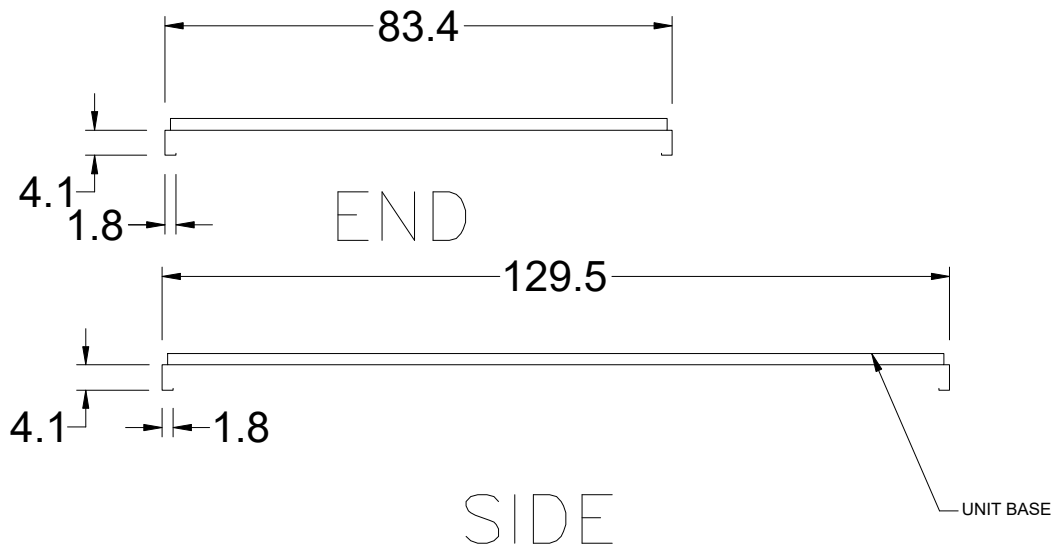
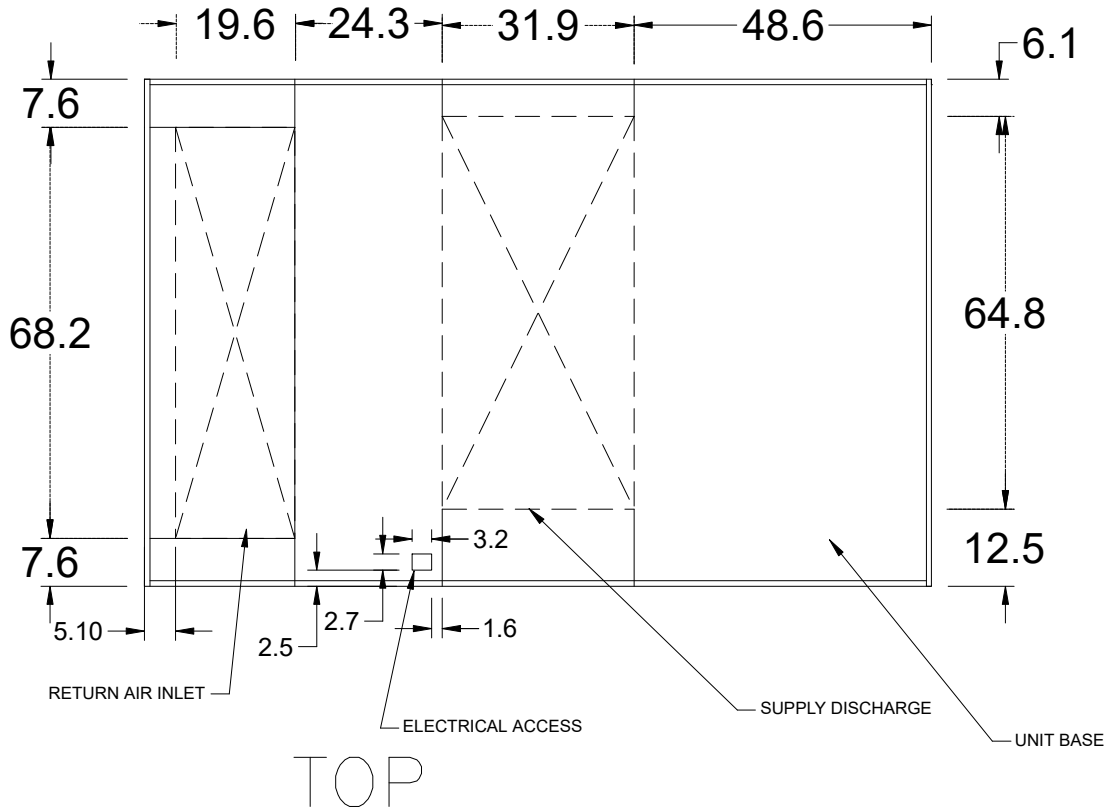


Left End

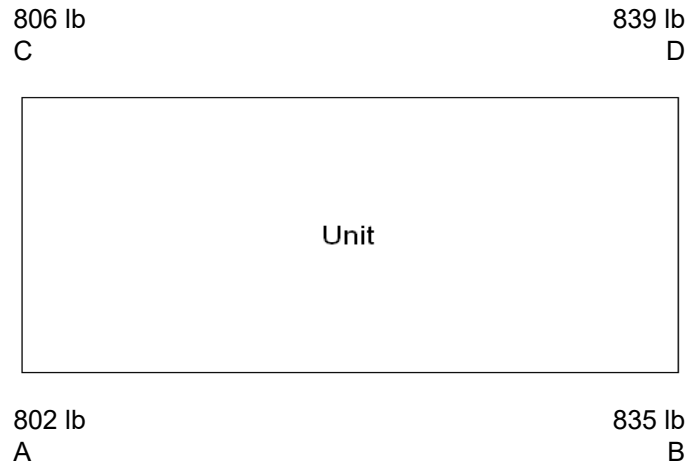


Right End

Base Dimensions



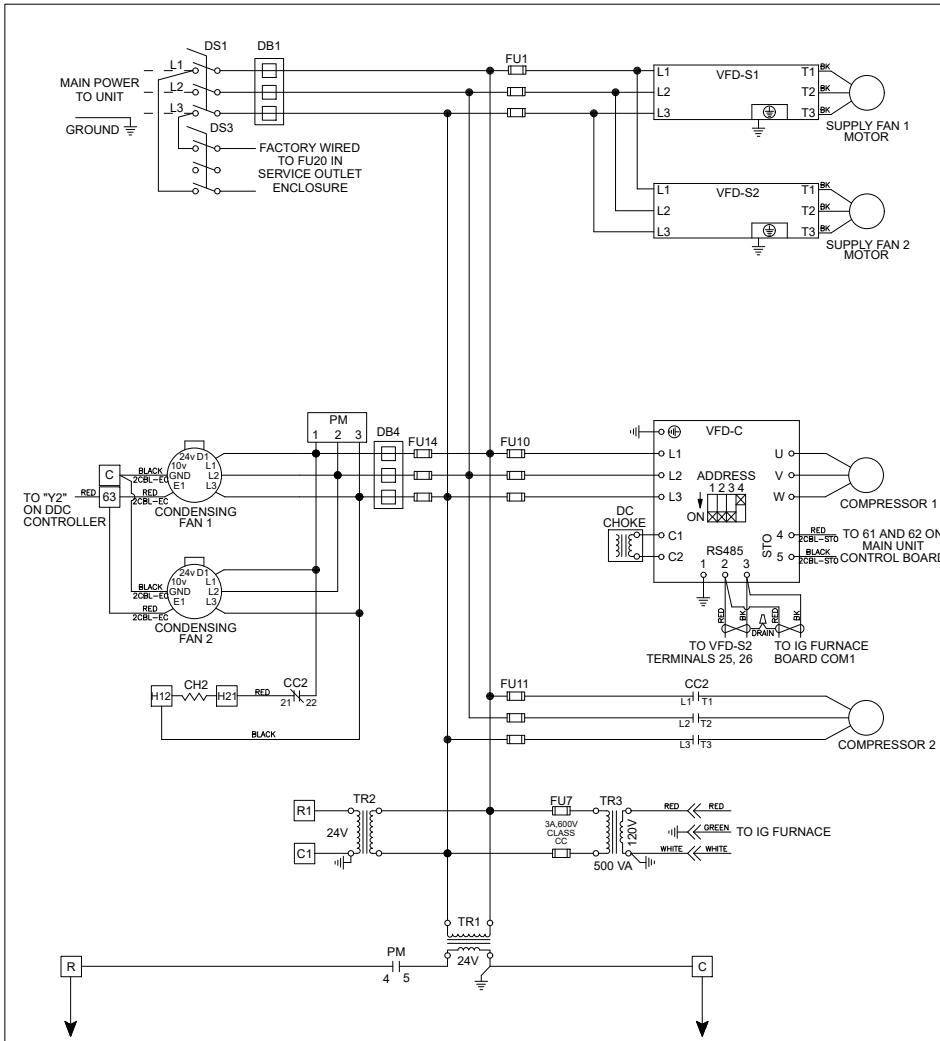
Unit Corner Weights




Note

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

Wiring Diagram





Wiring Diagram Code:
V44NBC0XA00C05X00NJ33J0000BA06

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

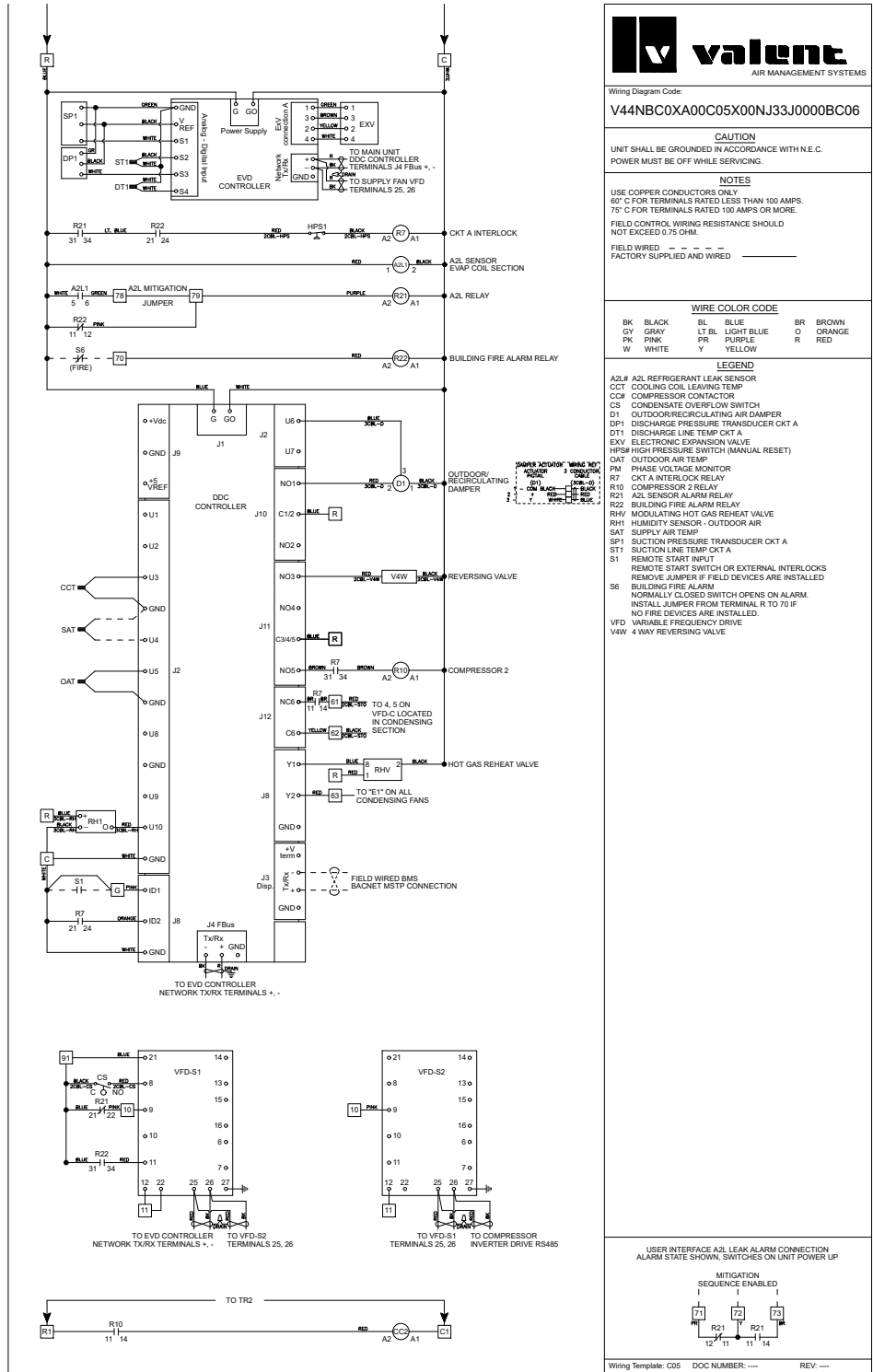
BK	BLACK	BL	BLUE	BR	BROWN
GY	GRAY	LT BL	LIGHT BLUE	O	ORANGE
PK	PINK	PR	PURPLE	R	RED
W	WHITE	Y	YELLOW		

LEGEND

- CC# COMPRESSOR CONTACTOR
- CH# COMPRESSOR SUMP HEATER
- DB# POWER DISTRIBUTION BLOCK
- DS DISCONNECT SWITCH
- FU# FUSES
- TR# TRANSFORMER
- VFD VARIABLE FREQUENCY DRIVE

Wiring Template: A06 DOC NUMBER: ---- REV: ----

Wiring Diagram 2



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	
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		%	
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	
Circuit_A_Liquid_Line_Temp_Analog_Input	Circuit A Liquid Line Temperature	AI-46	30256	R		°F	
Circuit_B_Liquid_Line_Temp_Analog_Input	Circuit B Liquid Line Temperature	AI-47	30258	R		°F	
Circuit_C_Liquid_Line_Temp_Analog_Input	Circuit C Liquid Line Temperature	AI-48	30260	R		psig	
Circuit_D_Liquid_Line_Temp_Analog_Input	Circuit D Liquid Line Temperature	AI-49	30262	R		psig	
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	
Temperature_Setpoint_Unoccupied	Main Temperature Set point Supply, Space, or Return target temperature	AV-3	40006	RW		°F	X
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	X
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	X
Economizer_Enthalpy_Enable_Setpoint	Economizer Enthalpy Enable Setpoint Allow Econ when OA Enthalpy is less than Setpoint	AV-13	40026	RW		btu/lb	
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		%	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	
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
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	%		X
Aux_BMS_Analog_Output_1	BMS Commanded auxiliary 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	%		X
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		
Total_Supply_Fan_CFM_BMS	Total Supply Fan CFM	AV-65	30142	R	CFM		
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	%		
Exhaust_Fan_Speed_Analog_Output	Exhaust Fan Speed Analog Output	AV-73	30158	R	%		
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	%		X
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 Suction Temperature	AV-86	30184	R	°F		X
Circuit_B_Sat_Suction_Temperature	Circuit B Saturated Suction Temperature	AV-87	30186	R	°F		X
Coil_Temperature_Calculated_Setpoint	Calculated Coil Leaving Set point	AV-90	30192	R	°F		X
Active_Cooling_Setpoint	Active Cooling Setpoint	AV-91	30194	R	°F		
Active_Heating_Setpoint	Active Heating Setpoint	AV-92	30196	R	°F		
LatestAlm_AV	Most recent alarm - See Alarm Table	AV-93	30230	R	Integer		X
Device_Enable_DO_Word_Real_1	Device Enable DO Word - See Table	AV-94	30232	R	Bit Pack		X
Device_Enable_DO_Word_Real_2	Device Enable DO Word - See Table	AV-95	30234	R	Bit Pack		X
Ref_Ckt_PressTemp_Alarm_Word_Real_1	Refrigeration Circuit Word - See Table	AV-96	30236	R	Bit Pack		X
Ref_Ckt_PressTemp_Alarm_Word_Real_2	Refrigeration Circuit Word - See Table	AV-97	30238	R	Bit Pack		X
Device_Offline_Word_Real_1	Device Offline Word - See Table	AV-98	30240	R	Bit Pack		X
Device_Offline_Word_Real_2	Device Offline Word - See Table	AV-99	30242	R	Bit Pack		X
Device_Alarm_Word_Real_1	Device Alarm Word - See Table	AV-100	30244	R	Bit Pack		X
Device_Alarm_Word_Real_2	Device Alarm Word - See Table	AV-101	30246	R	Bit Pack		X
System_Word_Real_1	System Word - See Table	AV-102	30248	R	Bit Pack		X
System_Word_Real_2	System Word - See Table	AV-103	30250	R	Bit Pack		X
Unit_Status_Word_Real_1	Unit Status Word - See Table	AV-104	30252	R	Bit Pack		X
Unit_Status_Word_Real_2	Unit Status Word - See Table	AV-105	30254	R	Bit Pack		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	
Circuit_A_Subcool	Circuit A Subcooling	AV-106	30264	R	°F		
Circuit_B_Subcool	Circuit B Subcooling	AV-107	30266	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		X
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		X
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	
Supply_Fan_1_Status_Digital_Input	Supply Fan Status	B-2	10010	R	Active	Inactive	X
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	Emergency Exhaust Mode Command	BV-5	6	RW	Enable	Disable	
Pressurization_Only_Mode_BMS_Cmd	Emergency 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	
OAD_Control_Source_BMS	Allows the BMS to control OAD position	BV-19	20	RW	BMS	Local	
Aux_BMS_Digital_Output_1	BMS Commanded auxiliary digital output	BV-20	21	RW	Active	Inactive	
Aux_BMS_Digital_Output_2	BMS Commanded auxiliary 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	
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/AV-102 & AV-103)		
IV-10 Bit	AV-102 Bit	Bit Description
0	0	
1	1	
2	2	Reversing Valve (Cooling (0)/Heating(1))
3	3	
4	4	OA Damper End Switch Alarm
5	5	EA Damper End Switch Alarm
6	6	Supply Temp Low Limit Alarm
7	7	Supply Temp High Limit Alarm
8	8	Supply High Duct Static Alarm
9	9	Supply Fan 1 Alarm
10	10	Exhaust Fan 1 Alarm
11	11	Drain Pan Alarm
12	12	
13	13	Filter Alarm
14	14	Space High Static Alarm
15	15	Return Low Static Alarm

IV-10 Bit	AV-103 Bit	Bit Description
16	0	Shutdown Input Alarm
17	1	
18	2	
19	3	
20	4	Heat Pump Heating Lock Out Alarm
21	5	BMS Frequent Writes - Reduce Num of Writes
22	6	BMS Offline Alarm
23	7	
24	8	
25	9	
26	10	
27	11	
28	12	Heat-Cool Only - Dehumidification Request Active
29	13	Heat-Cool Only - Heating Request Active
30	14	Heat-Cool Only - Coil Setpoint Alarm Active
31	15	Heat-Cool Only - Supply Setpoint Alarm Active

Device Enable DO Word Table (IV-6/AV-94 & AV-95)		
IV-6 Bit	AV-94 Bit	Bit Description
0	0	Compressor 1 Start
1	1	Compressor 2 Start
2	2	
3	3	
4	4	
5	5	
6	6	
7	7	
8	8	
9	9	Condenser Fan Ramp 1 Stage 1 Start
10	10	
11	11	
12	12	
13	13	
14	14	
15	15	

IV-6 Bit	AV-95 Bit	Bit Description
16	0	
17	1	
18	2	
19	3	
20	4	Supply Fan Start
21	5	Exhaust Fan Start
22	6	
23	7	
24	8	
25	9	
26	10	
27	11	
28	12	
29	13	
30	14	
31	15	

Unit Status Word Table (IV-11/AV-104 & AV-105)		
IV-11 Bit	AV-104 Bit	Bit Description
0	0	Off/Standby
1	1	Occupied Start
2	2	Unoccupied Start
3	3	Opening Dampers
4	4	Dampers Open
5	5	Fan Start Delay
6	6	Exhaust Fan On
7	7	Supply Fan On
8	8	System On
9	9	Soft Shutdown
10	10	System Disabled
11	11	Remote Off
12	12	System Shutdown Alarm
13	13	Supply Fan Only
14	14	Exhaust Fan Only
15	15	Purge Mode (Supply and Exhaust Only)

IV-11 Bit	AV-105 Bit	Bit Description
16	0	
17	1	Fans Only
18	2	Economizing
19	3	
20	4	Cooling
21	5	Heating
22	6	Dehumidifying
23	7	Hot Gas Reheat Active
24	8	HGRH Purging
25	9	Dehum w/Heat
26	10	
27	11	Heat Pump Defrost Active
28	12	Morning Warm Up/Cool Down Active
29	13	Winter Ramp Active
30	14	
31	15	Overrides Active

Ref Ckt Press temp Alarm Word Table (IV-7/AV-96 & AV-97)		
IV-7 Bit	AV-96 Bit	Bit Description
0	0	Circuit A Discharge Pressure Sensor Alarm
1	1	Circuit A Discharge Temp Sensor Alarm
2	2	Circuit A Suction Pressure Sensor Alarm
3	3	Circuit A Suction Temp Sensor Alarm
4	4	
5	5	
6	6	
7	7	
8	8	Circuit A High Pressure Switch Alarm
9	9	Circuit A Low Refrigerant Pressure Alarm
10	10	
11	11	
12	12	
13	13	Circuit A High Sat Discharge Temp Alarm
14	14	
15	15	

IV-7 Bit	AV-97 Bit	Bit Description
16	0	
17	1	
18	2	
19	3	
20	4	
21	5	
22	6	
23	7	
24	8	
25	9	
26	10	
27	11	
28	12	
29	13	
30	14	
31	15	



Device Alarm Word Table (IV-9/AV-100 & AV-101)		
IV-9 Bit	AV-100 Bit	Bit Description
0	0	Cold Coil Temperature Sensor Alarm
1	1	
2	2	Mixed Temperature Sensor Alarm
3	3	Supply Duct Static Pressure Sensor Alarm
4	4	Supply Fan AFMS Alarm
5	5	Supply Air Temp Sensor Alarm
6	6	Exhaust Fan AFMS Alarm
7	7	Exhaust Temperature Sensor Alarm
8	8	Outside Air Temp Sensor Alarm
9	9	Outside RH Sensor Alarm
10	10	OAD AMD Alarm
11	11	Greentrol OAD AFMS Alarm
12	12	Return CO2 Sensor Alarm
13	13	Return Duct Static Pressure Sensor Alarm
14	14	Return Temperature Sensor Alarm
15	15	Return RH Sensor Alarm
IV-9 Bit	AV-101 Bit	Bit Description
16	0	Space CO2 Sensor Alarm
17	1	Space RH Sensor Alarm
18	2	Space Static Pressure Sensor Alarm
19	3	Space Temperature Sensor Alarm
20	4	IG Furnace Alarm
21	5	
22	6	Inverter Scroll 1 Alarm
23	7	
24	8	EVD Valve A Alarm
25	9	
26	10	SF VFD Alarm
27	11	EF VFD Alarm
28	12	
29	13	
30	14	
31	15	

Device Offline Word Table (IV-8/AV-98 & AV-99)		
IV-8 Bit	AV-98 Bit	Bit Description
0	0	Space TStat 1 Offline
1	1	Space TStat 2 Offline
2	2	Space TStat 3 Offline
3	3	Space TStat 4 Offline
4	4	VFD Offline Supply Fan
5	5	VFD Offline Exhaust Fan
6	6	
7	7	
8	8	Expansion Board 1 Alarm
9	9	Expansion Board 2 Alarm
10	10	Expansion Board 3 Alarm
11	11	Expansion Board 4 Alarm
12	12	
13	13	
14	14	
15	15	
IV-8 Bit	AV-99 Bit	Bit Description
16	0	
17	1	
18	2	
19	3	
20	4	
21	5	
22	6	
23	7	
24	8	
25	9	
26	10	
27	11	Primary Unit Offline Alarm
28	12	Secondary Unit 1 Offline Alarm
29	13	Secondary Unit 2 Offline Alarm
30	14	Secondary Unit 3 Offline Alarm
31	15	Secondary Unit 4 Offline Alarm

UNIT STATUS MODE (AV-40)				
0		Standby	17	Fans Only Purge (Supply & Exhaust)
1		Unoccupied Start	19	Fans Only
2		Occupied Start	20	Economizing
3		Opening Dampers	21	Cooling
5		Dampers Open	22	Heating
6		Fan Start Delay	23	Dehumidifying
7		Exhaust Fan Start	25	HGRH Purging
8		Supply Fan Start	27	A2L Refrigerant Leak Alarm
9		Startup Delay	28	A2L Refrigerant Leak Alarm Fan Only Mode
10		System On	29	Dehumidifying with Heat
11		Soft Shutdown	30	Overrides
12		System Disabled	31	Expansion Offline
13		Remote Off (S1 Open)	34	Hot Gas Reheat Active
14		System Shutdown Alarm	35	Morning Sequence Active
15		Supply Fan Only	36	Heat Pump Defrost
16		Exhaust Fan Only	37	Winter Ramp Active

Alarm Table (IV-5/AV-93)			
0	Supply Fan 1 Run - Status Not Proven	87	MOP A EVD 1 - Max Operating Pressure
1	Freeze Protection - Thermostat Tripped	89	EEV A EVD 1 - Motor Alarm
2	High Supply Duct - Static Pressure	91	LowSuct A EVD 1 - Refrigerant Temp
3	Low Return Duct - Static Pressure	93	High Condensing Temp - EVD 1
4	Outside Air Temp - Sensor Value Not Valid	94	Sens S1 EVD 1 - Sensor Value Not Valid
5	Supply Air Temperature - Sensor Value Not Valid	95	Sens S2 EVD 1 - Sensor Value Not Valid
6	Cold Coil 1 Temp - Sensor Value Not Valid	96	Sens S3 EVD 1 - Sensor Value Not Valid
9	Exhaust Air Temp - Sensor Value Not Valid	97	Sens S4 EVD 1 - Sensor Value Not Valid
10	Mixed Air Temperature - Sensor Value Not Valid	98	EVD 1 EEPROM Damaged - Call Tech Support
11	Return Air Temperature - Sensor Value Not Valid	99	Incomplete Closing - EVD 1
12	Space Temperature - Sensor Value Not Valid	100	Emergency Closing - EVD 1
13	Return Air RH - Sensor Value Not Valid	101	EVD 1 Battery
14	Space RH - Sensor Value Not Valid	102	FW Incompatibility - EVD 1
15	Outside RH - Sensor Value Not Valid	103	EVD 1 Config Error
16	Low Pressure Switch - Circuit A	104	EVD 1 Comm - EVD 1 is Offline
20	High Pressure Switch - Circuit A	105	High Discharge Temp - First Inv Envelope
24	Damper End Switch Fail - Dampers are not open	106	Low Discharge Pressure - First Inv Envelope
25	Exhaust Fan 1 Run - Status Not Proven	107	High Suction Pressure - First Inv Envelope
26	Filters are Dirty - Replace Filters	108	Low Suction Pressure - First Inv Envelope
27	Cond Drain Pan Full - Check Drain	109	High Current - First Inv Envelope
28	Exp Board 1 Status - Board is Offline	110	High Pressure Ratio - First Inv Envelope
29	Exp Board 2 Status - Board is Offline	111	Low Pressure Ratio - First Inv Envelope
30	Exp Board 3 Status - Board is Offline	112	Low Delta P - First Inv Envelope
31	Exp Board 4 Status - Board is Offline	113	High Discharge Press - First Inv Envelope
32	BMS Frequent Writes - Reduce Num of Writes	114	Compressor Staging - Order Skipped
33	Space 1 CO2 - Sensor Value Not Valid	115	Heat Pump Heating - Locked Out
34	Space Static Pressure - Sensor Value Not Valid	116	EVD 1 Error - Unexpected Position
35	Supply Duct Stat Press - Sensor Value Not Valid	117	High SDT Lockout - Circuit A
36	Return Duct Stat Press - Sensor Value Not Valid	121	First Inverter Alarm - Resettable
37	Sup Fan AFMS - Sensor Value Not Valid	122	First Inverter Alarm - Serious
38	Exh Fan 1 AFMS - Sensor Value Not Valid	123	First Inverter Alarm - Irreversible
39	Outside Damper AFMS - Sensor Value Not Valid	124	First Inverter PEC - Invalid Data Set
40	Space Setpt Adj Slider - Sensor Value Not Valid	125	First Inverter STO - Safe Torque Off Open
41	Space 2 CO2 - Sensor Value Not Valid	126	First Inverter Offline - Modbus Comms Lost
42	Return CO2 - Sensor Value Not Valid	133	Space Thermostat 1 - Sensor Offline
43	Discharge Press Ckt A - Sensor Value Not Valid	134	Space Thermostat 2 - Sensor Offline
47	Suction Press Ckt A - Sensor Value Not Valid	135	Space Thermostat 3 - Sensor Offline
51	Discharge Temp Ckt A - Sensor Value Not Valid	136	Space Thermostat 4 - Sensor Offline
55	Suction Temp Ckt A - Sensor Value Not Valid	157	Outside Air Greentrol - Offline or Flow Error
59	Ckt A High Saturated - Discharge Temperature	158	Exhaust Air Greentrol - Offline or Flow Error
63	Supply Air Temperature - Low Limit Shutdown	159	Supply Air Greentrol - Offline or Flow Error
65	Secondary Unit Offline - Unit 1	170	OA Damper Fault - Not Econ and should be
66	Secondary Unit Offline - Unit 2	171	OA Damper Fault - Econ and shouldn't be
67	Secondary Unit Offline - Unit 3	172	OAD Fault - Damper not Modulating
68	Secondary Unit Offline - Unit 4	173	OAD Fault - Excess Outdoor Air
69	Primary Unit Offline	176	Supply Fan - VFD Offline
71	Multi Devices per Ch - Contact Tech Support	177	Exhaust Fan - VFD Offline
74	Shutdown Contact - In Alarm Position	180	Embedded EVD Error
75	Comp Maint Alarm - Run Hours Spt Reached	181	SF VFD Alarm - Check VFD
76	Supply Air Temperature - High Limit Shutdown	182	EF VFD Alarm - Check VFD
77	Supply Air Temperature - High Limit Shutdown	186	Compressor Refrig Leak - Furnace Locked Out
78	Internal Board Temp - Exceeds -40F or 158F	187	Airstream Refrig Leak - SF Mitigation Sequence
79	BMS Offline - Watchdog is FALSE	188	Fire Shutdown Alarm - Building Fire Alarm
80	Clg Coil Setpt Input - Value is not valid	189	EA Damper End Switch - Damper is not open
81	Sup Air Setpt Input - Value is not valid	190	Liquid Line Temp Ckt A - Sensor Value Not Valid
82	BACnet License - Not Installed	192	Liquid Line Pres Ckt A - Sensor Value Not Valid
83	Low Suction SH ExV A - EVD 1 Alarm	194	IG Furnace Offline - Modbus Comms Lost
85	A EVD 1 - Low Operating Pressure	195	Furnace Lockout - See Furnace Code

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 C to G):

- Factory mounted and wired outdoor air and recirculated air damper actuators are powered.
- Supply fan starts after 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.

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.
- Supply fan ON.
- Heating per below.
- Cooling per below.

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.

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 signal from the Building Management System.

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.

Cold Coil Set Point Control: When in dehumidification mode the controller will control the cooling to maintain a constant cold coil set point. The active set point will be set to local control (55 F, adj.) from the factory and can be field adjusted locally or by the BMS.

Dehumidification Enable: Dehumidification mode to be enabled based on the outside air dew point condition. When the outside air dew point is greater than the desired set point (adj.), the unit will operate in dehumidification mode.

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 < 0 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.

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.

Refrigerant Leak Detected In Air Tunnel: If a refrigerant leak is detected in the air tunnel, the supply fan will operate at minimum airflow requirement, recirculation damper to be fully open, outside air damper will be closed, and compressors are disabled to reduce leakage rate. This operation is required in order to move stagnant refrigerant from within the unit, duct, and space ensuring proper dilution of the refrigerant. This operation is required even if the unit is called to be off. After leak detection is cleared, the unit will go back to normal operation. Exception to this operation is when the unit is receiving an active fire alarm signal at the unit controller. If unit controller is receiving a fire alarm input, the unit will not operate the leak mitigation supply fan sequence.

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.

Refrigerant Leak Detected In Compressor Compartment: If a refrigerant leak is detected in the compressor compartment and the unit is configured with an indirect gas furnace, the furnace will be disabled while leak detection is active. After leak detection is cleared, the unit will go back to normal operation.

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.

Indirect Gas Furnace: The controller will modulate the indirect gas furnace 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.

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 (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 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.

Temperature: The economizer will be locked out when: the outside air temperature is outside of the set point ranges set within the controller (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.

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

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.

Warranty Statement for Rooftop Technology (VR)

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.

ElectroFin® E-coat Prorated Warranty

If an ElectroFin® E-coat Coil Coating was applied, this coating is warranted to be free from defects in material and workmanship for a period of 5 years (prorated) from the shipment date of the coil(s).

Heat Exchanger Extended Warranty

Valent warrants the stainless steel heat exchanger to be free from defects in material and workmanship for a period of 25 years from the shipment date.

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.