ADDENDUM #2

Date: March 19, 2024

Oliver Ellsworth Humidity Mitigation
730 Kennedy Rd, Windsor, CT 06095

1. Mandatory Pre-Bid Meeting held on site. Attached is Bidder Sign-In Sheet. Only Firms, whom attended Pre-Bid Meeting, bid proposals will be acknowledged.
2. Building Permit fees from the Town of Windsor will be waived although State of CT Education fee ($.26/$1,000) shall be payable to the Owner. All License Trades are required to apply and obtain Building Permits.
3. All RFI's shall be directed to Engineer:

   Jon Peterson
   Project Manager, AIA Assoc.
   van Zelm, Heywood & Shadford, Inc.
   10 Talcott Notch Road
   Farmington, CT 06032
   jonpetersen@sbcglobal.net
   T: 860-788-3548
   www.vanzelm.com

4. The last day for RFI's will be extended to Thursday, March 21, 2024 at 5:00pm.
5. Responses shall be posted to Advanced Reprographics' Plan Room:

   https://www.advancedplanroom.com/jobs/public

6. Related to Schedule of Workable Hours on Site, Prior to June 12th, Tradesman are allowed on site from 4 PM until 10:30 PM. From June 13th until August 19th, Normal Working Hours on site from 7 AM till 4 PM.
7. It is the intent to obtain Substantial Completion on August 19th, the date that Staff returns to the School Complex.
8. A CPM Schedule shall be presented with the Bid Proposals. Additionally, an updated CPM Schedule shall be attached to each Monthly Application for Payment.
9. Awarded General Contractor shall maintain a Supervisor (Person of Authority) on Site during progress of Construction Phase.
10. The Town of Windsor will reimburse the Awarded General Contractor for material stored offsite with confirmation of equipment and certificate of insurance.

ADDENDUM #2

Date: March 19, 2024

11. All modifications to the existing Roof System shall be undertaken by a Firm which is qualified to the maintain the existing Roof Warranty. Town of Windsor's roofing material manufacturer's representative is:

    Greg Rose
    S R Products
    6 Strongs Ave, Portland, CT 06480
    860-559-5175
    Grose@simonroofingproducts.com

12. See Attachments of Submittals on all Pre-Purchased Equipment.
13. The new roof curbs for DOAS #1 through 5 require assembly per submittal. These roof curbs also require insulation of Pipe Cabinet.
14. The RTU schedule on the drawings indicate that the unit was pre-purchased. RTU serving office will be purchased by contractor. **Pricing and lead time for RTU to be listed separately and included in base bid.**
15. The main exhaust and intake louver in the mezzanine mechanical room has some air gaps. All air gaps in to mezzanine mechanical to be seal to alleviate infiltration.
16. Some DOAS unit's Roof curb size may be changed from 14" to 18" due to roof insulation thickness.
17. There is a small ceiling mounted 110v exhaust fan in classroom 27 that is no longer used. Remove fan, electrical power and cap ductwork as required. Replace ceiling tile.
18. Unit ventilators with outside air duct shall be capped and sealed at ceiling level. The unit ventilator's outside air damper shall be removed and the return air damper locked to fully open. Actuator shall be removed and returned to owner. All unused wire shall be removed or capped.
19. Unit ventilators with sleaved outside air intake shall have sleave capped, insulated, and sealed. The unit ventilator's outside air damper shall be removed and the return air damper locked to fully open. Actuator shall be removed and returned to owner. All unused wire shall be removed or capped.
20.
21. On Electrical Drawing ED201, rename new panel in mezzanine mechanical room to HHM. All units are to be fed from the HHM panel in the mezzanine mechanical room per motor circuit schedule on drawing E001.
22. On Mechanical Drawing M401, detail 1 (DOAS Curb Detail), add (2) layers of 5/8" sheetrock on roof deck below unit for sound attenuation.

Attachments: Pre-Bid Sign-In Sheet, Pre Purchased Equipment

OLIVER ELLSWORTH HUMIDITY MITIGATION
Walkthrough - Sign-In Sheet
3/14/24 3:00 PM

Name	Company Name & Address	Phone/Email
Joe Roberge	Air Temp Mechanical Services 63 Fuller Way Berlin CT 06037	Phone: Email: jroberge@ctairtemp.com
Mike Sullo	CT Temperature Controls 500 Corporate Row Cromwell CT 06416	Phone: 800 890 2028 Email: msullo@CTTempControls.com
Greg Rosa	SR Products 6 Strong Ave Portland, CT 06480	Phone: 860-559-5175 Email: GregRosa420@yahoo.com
DAVE BONVOULOIR	D-BON IRONWORKS	Phone: 860 836 6236 e-mail: DBONIRON@HOTMAIL.COM
Troy Karwowski	SAV-MOR Southington, Ct	Phone: 860-621-9959 Email: troy@savmorct.com
John Gallagher	HIGHLINE CRANE	Phone: 203 565 5131 Email: john@highlinecrane.com
		Phone: e-mail:
		Phone: e-mail:

OLIVER ELLSWORTH HUMIDITY MITIGATION
Walkthrough - Sign-In Sheet
3/14/24 3:00 PM

Name	Company Name & Address	Phone/Email
JOHN PRZYBYLSKI	AIR TEMP MECHANICAL 63 FULLER WAY BERLIN, CT. 06037	Phone: 860-306-2801 Email: JOHN.P@CTAIRTEMP.COM
Erik Holton	AirTemp Mech't. 63 Fuller Way Berlin CT. 06037	Phone: 860 502 5392 Email: e.holton@ctairtemp.com
Jim Kinsler	CTC 500 Corporate Row Cromwell CT 06416	Phone: 8608912583 Email: JKinsler@CTTempControls.com
Mike Cagle	Action Air Systems 131 Adams ST Manchester, CT	Phone: 959-216-1161 e-mail: Michael@actionairsystems.com
		Phone: Email:
		Phone: Email:
		Phone: e-mail:
		Phone: e-mail:

NORRIS & FERRARIS

Submittal

Project:	**OliverEllsworth School**
Engineer:	vanZelm
Contractor:	TBD
Salesman:	Scott W Puzzo
Date:	1.31.2024

Approval	X	Record	Resubmittal

Tag	Quantity	Equipment/Description
DOAS-1 thru 5	5	Valent Packaged Rooftop Units Notes to Submittal: 1. Units are 460 V / 3 phase. 2. Units are chilled / hot water dual temp coil with natural gas burner for dehumidification control. 3. Controls by others. 4. 2” double wall construction with R-13 foam injected panels 5. 5-year compressor warranty (parts ONLY) 6. Fans are plenum style with direct drive motors and accompanying VFD. 7. Unit powered GFCI included 8. Motor shaft grounding rings included. 9. 2” MERV 8 filters + 2” MERV 13 filters with spare set. 10. Side duct connections on all units. 11. Single point power with disconnect. 12. Curbs to be 24” tall structural rated. Separate submittal to be provided.

240 chapel road, south windsor, ct 06074 ☎ 860.651.1986

VXE-112-41D-CW-G-D1

Unit Performance

Design Conditions

Elevation (ft)	Summer		Winter DB (F)	Supply (CFM)	Outdoor Air (CFM)	Exhaust Air (CFM)
	DB (F)	WB (F)				
180	91.0	73.0	0.0	3,600	3,600	3,600

Unit Specifications

Qty	Weight (lb)	Cooling Type	Heating Type	Unit Installation	Unit ETL Listing	Furnace ETL Listing
1	2,868 (+/- 5%)	Chilled Water	Indirect Gas	Outdoor	UL\cUL 1995/ 60335-2-40	ANSI Z83.8 / CSA 2.6

Configuration

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

Energy Recovery Performance

Design Condition	Temperature (F)								Capacity Reduction (BTU/h)
	Outdoor Air		Supply Air		Return Air		Exhaust Air		
	DB	WB	DB	WB	DB	WB/RH	DB	WB	
Summer	91.0	73.0	80.7	66.8	75.0	62.5/50	85.2	69.3	85,860.0
Winter	0.0	-1.5	43.1	37.0	72.0	55.8/35	26.3	25.8	167,573.0

Cooling Specifications

Type	Fluid Type		Flow Rate (GPM)	Fluid PD (ft wg)	Capacity (MBH)		Fluid Conditions		Performance (DB/WB)	
	Type	%			Total	Sensible	EWT (F)	LWT (F)	EAT (F)	LAT (F)
Chilled Water	Water	100	32.8	5.7	164.7	114.8	45.0	55.0	80.7 / 66.8	51.7 / 51.6

Heating Specifications

Type	Gas Type	Input (MBH)	Output (MBH)	Temperature Rise		Turndown	Performance	
				Min (F)	Max (F)		EAT (F)	LAT (F)
Indirect Gas	Natural	200.0	162.0	3.0	42.0	16:1	43.1	84.7

Motor Specifications

Motor	Qty	Operating Power (hp)	Size (hp)	Enclosure	Efficiency	RPM
Supply	1	4.08	5	ODP	PE	1750
Exhaust	1	3.43	5	ODP	PE	1750

Electrical Specifications

Power Supply	Rating (V/C/P)	MCA (A)	MOP (A)	FLA (A)	Fan Power (W/CFM)*
Unit	460/60/3	18.4	20.0	14.7	1.554

*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	Std
Factory Wired VFDs	Std
Unit Finish - Permatector, Concrete Gray (RAL 7023)	X
Stainless Steel Condensate Drain Pan and Connection	Std
Condensate Drain Trap	Std
Short Circuit Current - 5 kA	Std
Energy Recovery Device - Polymer Wheel w/ Silica Gel Desiccant	Std
Controls	
Unit Controls - Heat-Cool Only Control	Std
Internally Mounted Control Center with 24 VAC control transformer(s)	Std
BMS Protocol - BACNetMSTP	X
BMS Monitoring Points	
Supply Fan Control - 0-10VDC By Others	X
Exhaust Fan Control - 0-10VDC By Others	X
Economizer Control	
Exhaust Fan Only Power	
Web-Based User Interface	
Energy Wheel Economizer Control - VFD Signal By Others	X
Energy Wheel Rotation Sensor	Std
Damper Control - 100% OA-No Recirculation	X
Unoccupied Recirc Mode	
Control Accessories	
Remote Display	
Dirty Filter Sensor(s) - All	X
Airflow Monitor	
Room Thermostat	
Phase/Brownout Protection	X
Economizer Fault Detection Diagnostics	

Accessories	
Frost Control ModulatingWheel - Modulating Wheel	X
Outdoor Air Damper - Low Leakage	X
Return Air Damper - Low Leakage	X
Roof Curb - GKD - 45.9/173.9-G14	X
Supply Air Filters - 2" Merv 8 And 2" Merv 13, 8-20x20x2	X
Service Outlet - Shipped loose and powered by others	X
Piping Vestibule	X
Service Lights	
Condensate Overflow Switch	X
Spare Filters - Both, Qty: 1 set(s)	X
Exhaust Discharge Gravity Backdraft Damper	X
ElectroFin Coil Coating	
Motor Shaft Grounding	X
Bipolar Ionization	
Smoke Detector(s)	
Barometric Relief Damper	
UV Lights	
Return Air Filters - 2" Merv 8, 3-16x25x2	Std
Outdoor Air Filters - 2" Merv 8, 3-16x25x2	Std
Furnace Control - 16:1 Modulating	X
Spare Energy Wheel Belt	
Spare Energy Wheel Segments	
Energy Wheel Bypass Damper	
Power Venting	Std
Warranty Options	
Unit Warranty - 18 Months (Std.)	Std
Energy Wheel Warranty - 5 Yrs Less Motor	Std
Furnace HX Warranty - 25 Yrs.	Std

Standard Option	Std
Not Included	
Included	X

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

Supply Fan Charts And Performance

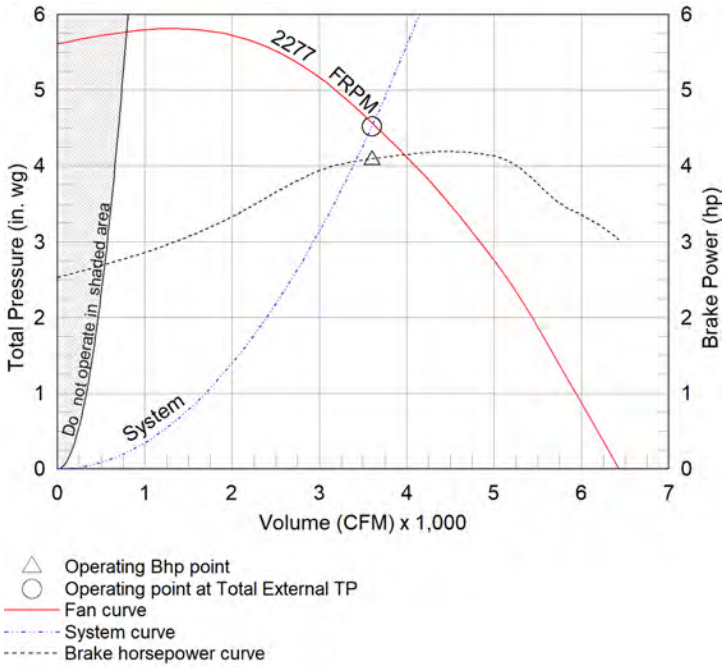
Supply Fan Performance									
Total Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	RPM	Operating Power (hp)	Motor		Fan		
					Qty	Size (hp)	Qty	Type	Drive-Type
3,600	1.5	4.523	2277	4.08	1	5	1	Plenum	Direct

Pressure Drop (in. wg)							
Weatherhood	Filter	Damper	Cooling	Heating	External	Energy Wheel	Total
0.1	0.384	0.05	0.521	0.447	1.5	1.53	4.523

Sound Performance in Accordance with AMCA										
Sound Power by Octave Band								Lwa	dBA	Sones
62.5	125	250	500	1000	2000	4000	8000			
78	82	86	78	73	68	74	65	82	70	19

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

Supply Fan



Exhaust Fan Charts And Performance

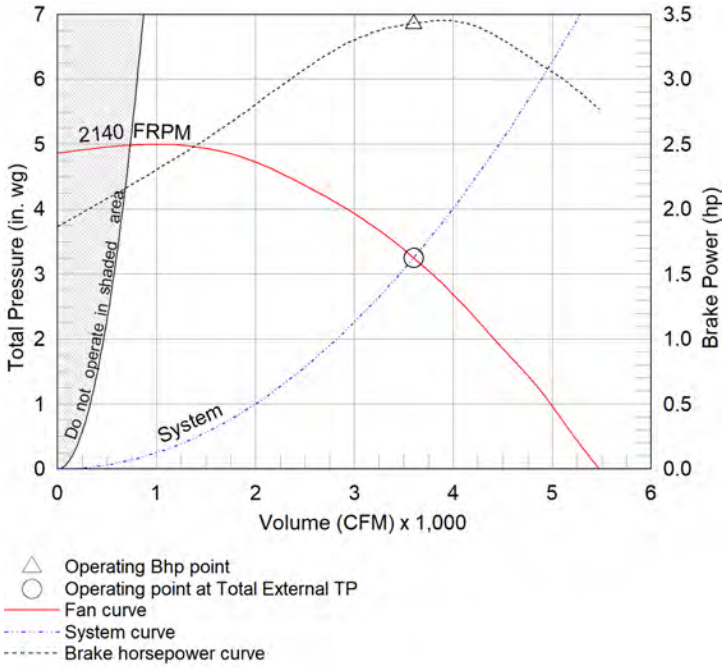
Exhaust Fan Performance									
Total Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	RPM	Operating Power (hp)	Motor		Fan		
					Qty	Size (hp)	Qty	Type	Drive-Type
3,600	1.5	3.254	2140	3.43	1	5	1	Plenum	Direct

Pressure Drop (in. wg)							
Weatherhood	Filter	Damper	Cooling	Heating	External	Energy Wheel	Total
0.17	-	-	-	-	1.5	1.59	3.254

Sound Performance in Accordance with AMCA										
Sound Power by Octave Band								Lwa	dBA	Sones
62.5	125	250	500	1000	2000	4000	8000			
83	73	81	75	71	68	68	62	78	66	15

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

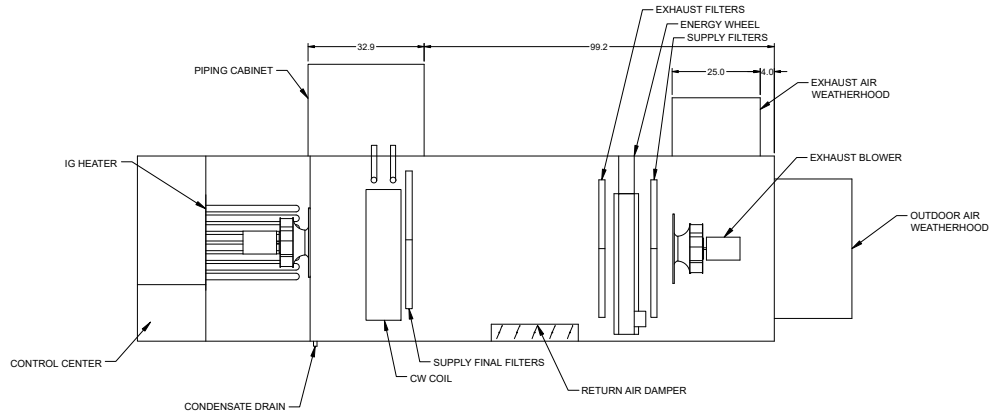
Exhaust Fan



Radiated Sound

Position C

Dimensional Overview



Plan

Position D

Position B

Position A

Supply Air Flow Nominal

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

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

Cooling Performance

Cooling Specifications										
Type	Fluid Type		Flow Rate (GPM)	Fluid PD (ft wg)	Capacity (MBH)		Fluid Conditions		Performance (DB/WB)	
	Type	%			Total	Sensible	EWT (F)	LWT (F)	EAT (F)	LAT (F)
Chilled Water	Water	100	32.8	5.7	164.7	114.8	45.0	55.0	80.7 / 66.8	51.7 / 51.6

Coil Information					
CW Coil Model	Fins Per Inch	Rows Deep	Face Vel. (ft/min)	Coil PD (in. wg)	Connection Size (in.)
CW58S06H10-42x37-RH	10	6	334	0.521	1.5

Unit Details
Coil control valves must be field provided by others
Copper tube, aluminum fin coil construction
Coil freeze protection is to be provided by others
Stainless steel double sloped drain pan

Heating Performance

Heating Specifications								
Type	Gas Type	Input (MBH)	Output (MBH)	Temperature Rise		Turndown	Performance	
				Min (F)	Max (F)		EAT (F)	LAT (F)
Indirect Gas	Natural	200.0	162.0	3.0	42.0	16:1	43.1	84.7

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 (14 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)
Discharge temperature assumes proper energy wheel operation and maintenance.

Energy Recovery Summer Performance

Outdoor Air		Supply Air	
Dry Bulb (F)	91.0	Dry Bulb (F)	80.7
Wet Bulb (F)	73.0	Wet Bulb (F)	66.8
Specific Humidity (gr/lb)	94	Specific Humidity (gr/lb)	77
Enthalpy (BTU/lb)	36.7	Enthalpy (BTU/lb)	31.4
Exhaust Air		**Return Air**	
Dry Bulb (F)	85.2	Dry Bulb (F)	75.0
Wet Bulb (F)	69.3	Rel. Humidity (%)	50
Specific Humidity (gr/lb)	82	Specific Humidity (gr/lb)	65
Enthalpy (BTU/lb)	33.3	Enthalpy (BTU/lb)	28.2

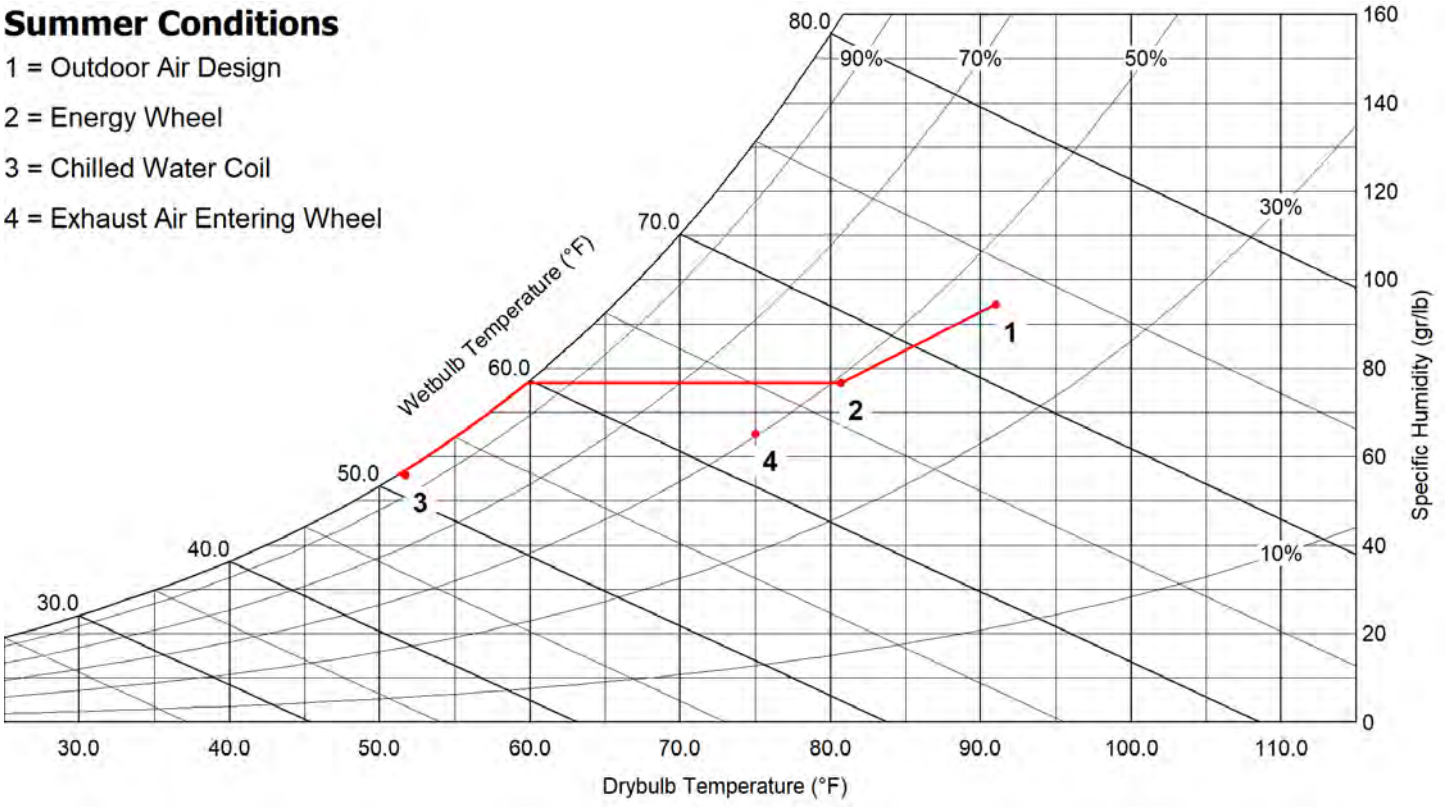
ENERGY WHEEL

Design Air Flow Conditions

OA Volume (CFM)	ASHRAE 90.1 OA Enthalpy Recovery Ratio	EA Volume (CFM)	EA Wheel Effectiveness
3,600	62.5	3,600	60.9

Outdoor Air Cooling Reduction

OA Load w/o Energy Recovery		OA Load with Energy Recovery		Equipment Reduction (tons)
(BTU/h)	(tons)	(BTU/h)	(tons)	
137,700.0	11.48	51,840.0	4.32	7.16



Energy Recovery Winter Performance w/out Preheater

Outdoor Air		Supply Air	
Dry Bulb (F)	0.0	Dry Bulb (F)	43.1
Wet Bulb (F)	-1.5	Wet Bulb (F)	37.0
Specific Humidity (gr/lb)	3	Specific Humidity (gr/lb)	23
Enthalpy (BTU/lb)	0.4	Enthalpy (BTU/lb)	13.9
Exhaust Air		**Return Air**	
Dry Bulb (F)	26.3	Dry Bulb (F)	72.0
Wet Bulb (F)	25.8	Rel. Humidity (%)	35
Specific Humidity (gr/lb)	19	Specific Humidity (gr/lb)	41
Enthalpy (BTU/lb)	9.3	Enthalpy (BTU/lb)	23.7

ENERGY WHEEL

Design Air Flow Conditions

OA Volume (CFM)	ASHRAE 90.1 OA Enthalpy Recovery Ratio	EA Volume (CFM)	EA Wheel Effectiveness
3,600	58	3,600	60.9

Outdoor Air Heating Reduction

OA Load w/o Energy Recovery (BTU/h)	OA Load with Energy Recovery (BTU/h)	Equipment Reduction (BTU/h)	Sensible Effectiveness (%)
279,936.0	112,363.0	167,573.0	62.9

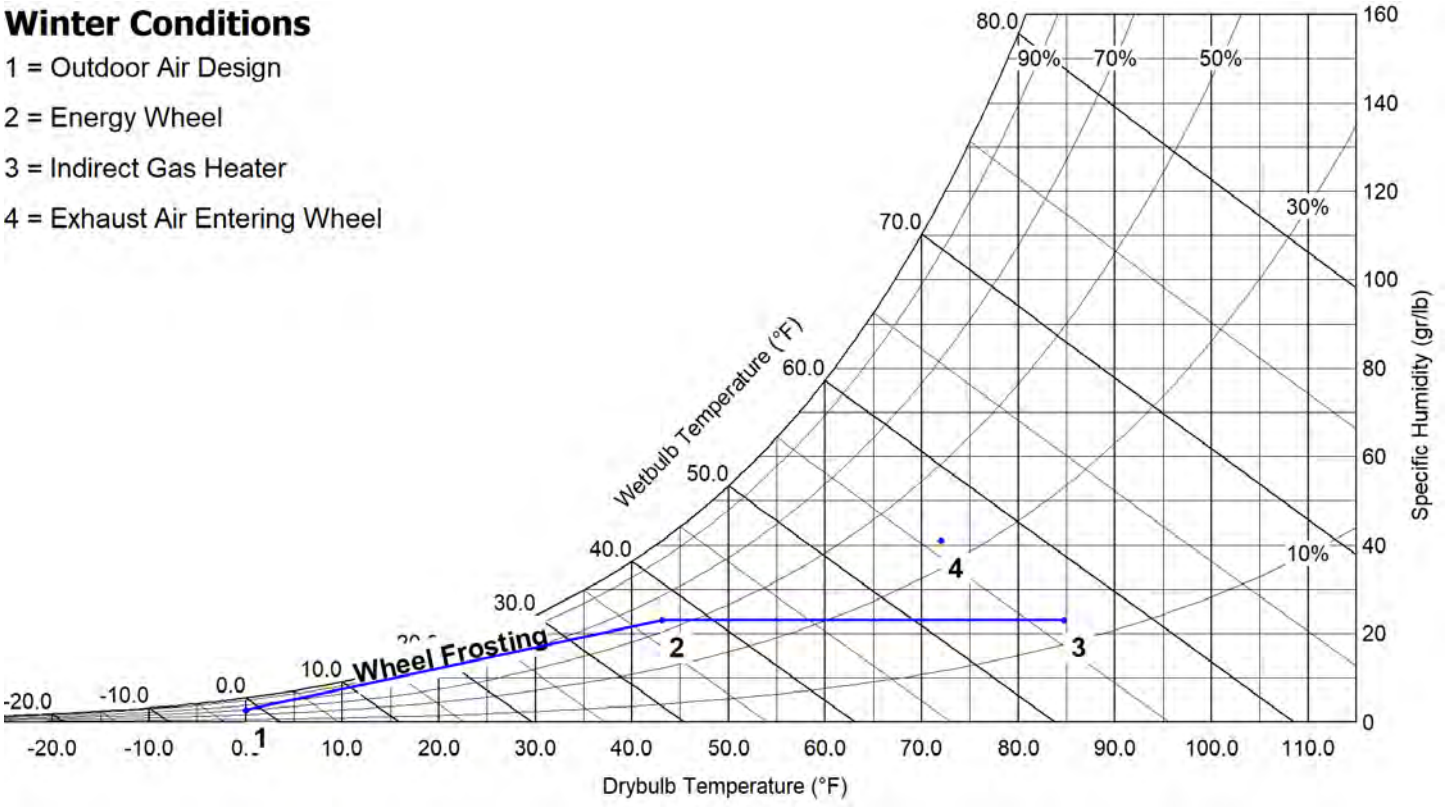
Winter Conditions

1 = Outdoor Air Design

2 = Energy Wheel

3 = Indirect Gas Heater

4 = Exhaust Air Entering Wheel



AHRI Performance Ratings

Energy Recovery Performance Rating in accordance with AHRI Standard 1060 (I-P)							
Rated Airflow (SCFM)		Net Supply Airflow (SCFM)	EATR (%)	OACF	Pressure Drop (in. wg)		Purge Angle (degrees)
Leaving Supply	Entering Exhaust				Supply	Exhaust	
3699	3699	3600	2.7	1.03	0.95	0.94	0

Thermal Effectiveness Ratings							
Enthalpy Recovery		Sensible Effectiveness		Latent Effectiveness		Total Effectiveness	
Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
62.5	58	63.4	62.9	58.6	55.8	60.9	60.9

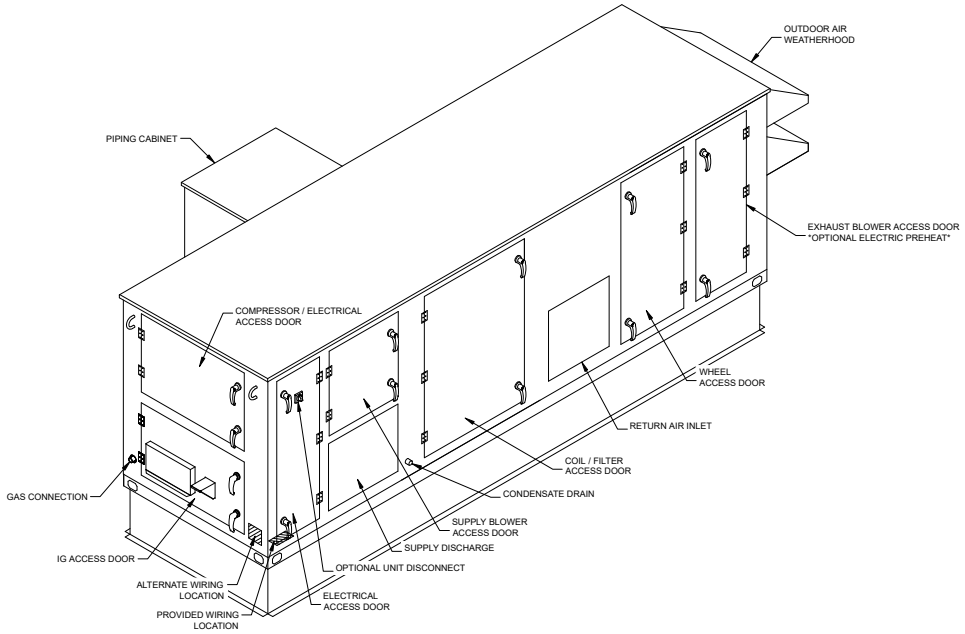
Note(s)

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

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

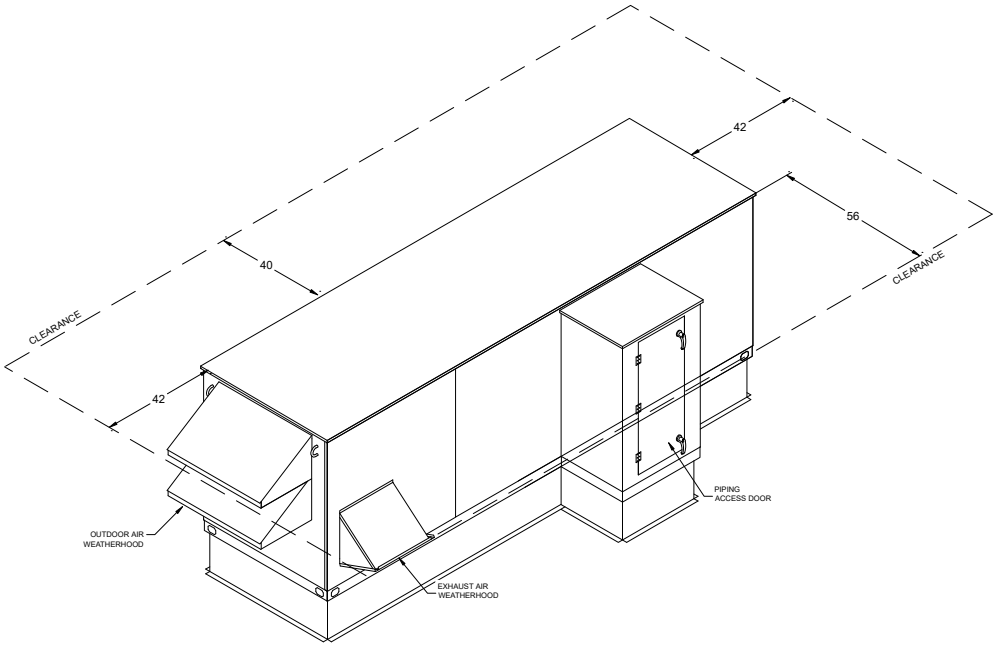
Isometric Drawings

Component Layout



Back Right Isometric

Service Clearances

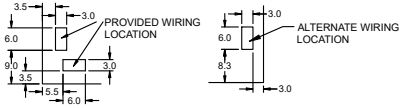


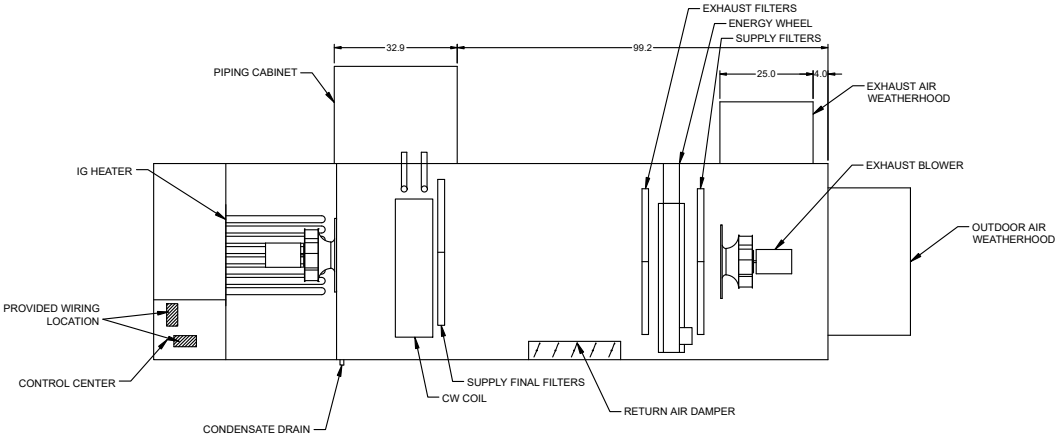
Front Left Isometric

Overview Drawings

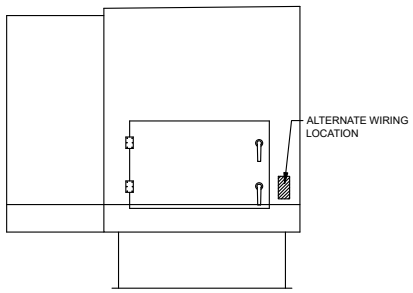
Dimensional Overview

Electrical Connections

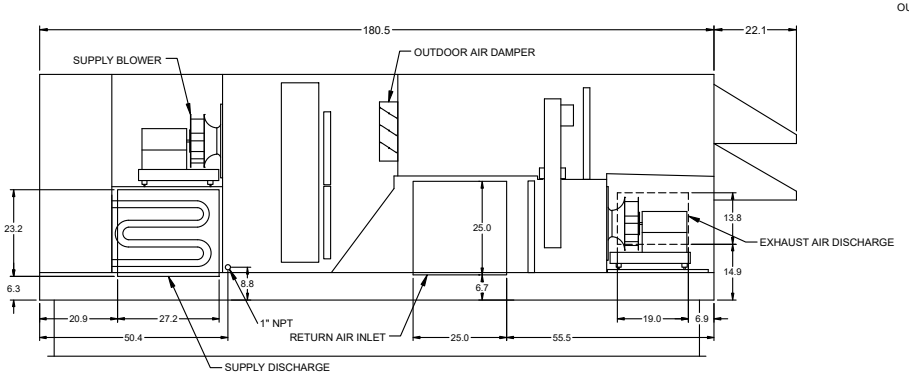




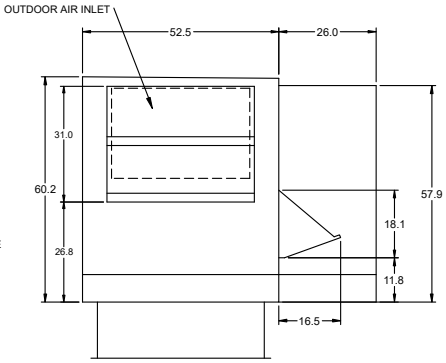
Plan



Left End



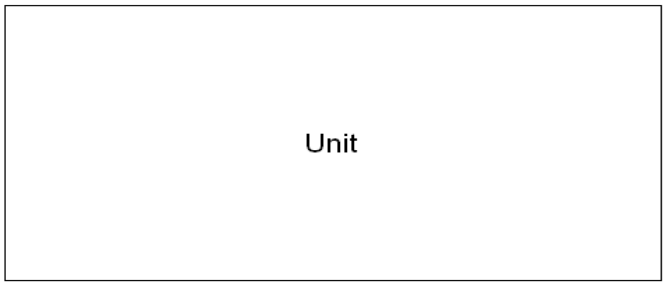
Elevation



Right End

Unit Corner Weights

689 lb 727 lb



707 lb 746 lb

Note

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

VXE-112-36D-CW-G-D1

Unit Performance

Design Conditions

Elevation (ft)	Summer		Winter DB (F)	Supply (CFM)	Outdoor Air (CFM)	Exhaust Air (CFM)
	DB (F)	WB (F)				
180	91.0	73.0	0.0	3,250	3,250	3,250

Unit Specifications

Qty	Weight (lb)	Cooling Type	Heating Type	Unit Installation	Unit ETL Listing	Furnace ETL Listing
1	2,849 (+/- 5%)	Chilled Water	Indirect Gas	Outdoor	UL\cUL 1995/ 60335-2-40	ANSI Z83.8 / CSA 2.6

Configuration

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

Energy Recovery Performance

Design Condition	Temperature (F)								Capacity Reduction (BTU/h)
	Outdoor Air		Supply Air		Return Air		Exhaust Air		
	DB	WB	DB	WB	DB	WB/RH	DB	WB	
Summer	91.0	73.0	81.1	67.0	75.0	62.5/50	84.9	69.1	74,588.0
Winter	0.0	-1.5	41.3	35.6	72.0	55.8/35	27.7	27.0	144,963.0

Cooling Specifications

Type	Fluid Type		Flow Rate (GPM)	Fluid PD (ft wg)	Capacity (MBH)		Fluid Conditions		Performance (DB/WB)	
	Type	%			Total	Sensible	EWT (F)	LWT (F)	EAT (F)	LAT (F)
Chilled Water	Water	100	31	5.1	155.5	106.7	45.0	55.0	81.1 / 67.0	51.2 / 51.1

Heating Specifications

Type	Gas Type	Input (MBH)	Output (MBH)	Temperature Rise		Turndown	Performance	
				Min (F)	Max (F)		EAT (F)	LAT (F)
Indirect Gas	Natural	200.0	162.0	3.0	46.0	16:1	41.3	87.4

Motor Specifications

Motor	Qty	Operating Power (hp)	Size (hp)	Enclosure	Efficiency	RPM
Supply	1	3.3	5	ODP	PE	1750
Exhaust	1	3.11	5	ODP	PE	1750

Electrical Specifications

Power Supply	Rating (V/C/P)	MCA (A)	MOP (A)	FLA (A)	Fan Power (W/CFM)*
Unit	460/60/3	18.4	20.0	14.7	1.471

*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	Std
Factory Wired VFDs	Std
Unit Finish - Permatector, Concrete Gray (RAL 7023)	X
Stainless Steel Condensate Drain Pan and Connection	Std
Condensate Drain Trap	Std
Short Circuit Current - 5 kA	Std
Energy Recovery Device - Polymer Wheel w/ Silica Gel Desiccant	Std
Controls	
Unit Controls - Heat-Cool Only Control	Std
Internally Mounted Control Center with 24 VAC control transformer(s)	Std
BMS Protocol - BACNetMSTP	X
BMS Monitoring Points	
Supply Fan Control - 0-10VDC By Others	X
Exhaust Fan Control - 0-10VDC By Others	X
Economizer Control	
Exhaust Fan Only Power	
Web-Based User Interface	
Energy Wheel Economizer Control - VFD Signal By Others	X
Energy Wheel Rotation Sensor	Std
Damper Control - 100% OA-No Recirculation	X
Unoccupied Recirc Mode	
Control Accessories	
Remote Display	
Dirty Filter Sensor(s) - All	X
Airflow Monitor	
Room Thermostat	
Phase/Brownout Protection	X
Economizer Fault Detection Diagnostics	

Accessories	
Frost Control ModulatingWheel - Modulating Wheel	X
Outdoor Air Damper - Low Leakage	X
Return Air Damper - Low Leakage	X
Roof Curb - GKD - 45.9/173.9-G14	X
Supply Air Filters - 2" Merv 8 And 2" Merv 13, 8-20x20x2	X
Service Outlet - Shipped loose and powered by others	X
Piping Vestibule	X
Service Lights	
Condensate Overflow Switch	X
Spare Filters - Both, Qty: 1 set(s)	X
Exhaust Discharge Gravity Backdraft Damper	X
ElectroFin Coil Coating	
Motor Shaft Grounding	X
Bipolar Ionization	
Smoke Detector(s)	
Barometric Relief Damper	
UV Lights	
Return Air Filters - 2" Merv 8, 2-20x25x2	Std
Outdoor Air Filters - 2" Merv 8, 2-20x25x2	Std
Furnace Control - 16:1 Modulating	X
Spare Energy Wheel Belt	
Spare Energy Wheel Segments	
Energy Wheel Bypass Damper	
Power Venting	Std
Warranty Options	
Unit Warranty - 18 Months (Std.)	Std
Energy Wheel Warranty - 5 Yrs Less Motor	Std
Furnace HX Warranty - 25 Yrs.	Std

Standard Option	Std
Not Included	
Included	X

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

Supply Fan Charts And Performance

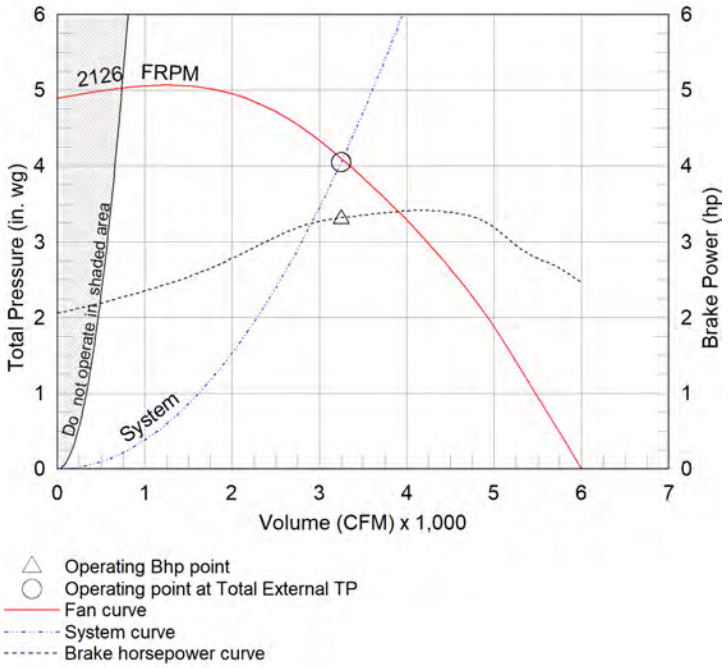
Supply Fan Performance									
Total Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	RPM	Operating Power (hp)	Motor		Fan		
					Qty	Size (hp)	Qty	Type	Drive-Type
3,250	1.5	4.052	2126	3.3	1	5	1	Plenum	Direct

Pressure Drop (in. wg)							
Weatherhood	Filter	Damper	Cooling	Heating	External	Energy Wheel	Total
0.08	0.313	0.04	0.454	0.365	1.5	1.3	4.052

Sound Performance in Accordance with AMCA										
Sound Power by Octave Band								Lwa	dBA	Sones
62.5	125	250	500	1000	2000	4000	8000			
77	82	85	77	71	67	74	64	81	69	18

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

Supply Fan



Exhaust Fan Charts And Performance

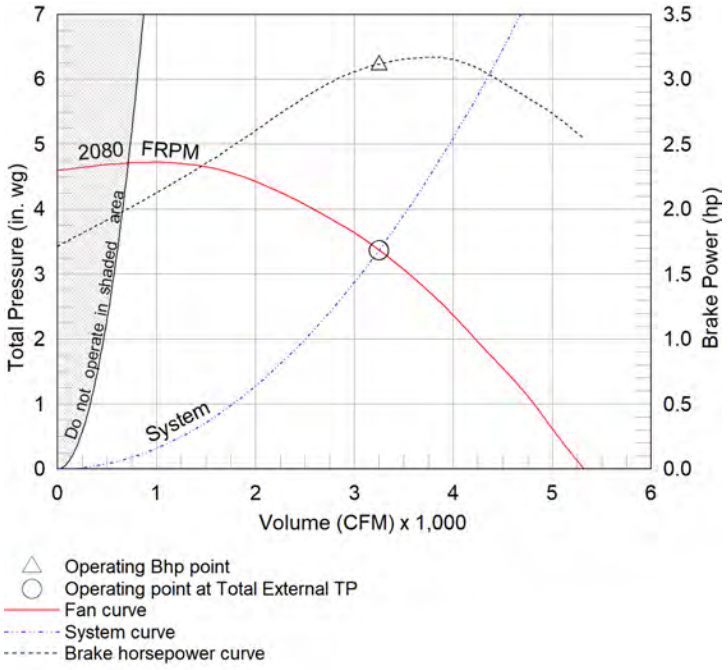
Exhaust Fan Performance									
Total Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	RPM	Operating Power (hp)	Motor		Fan		
					Qty	Size (hp)	Qty	Type	Drive-Type
3,250	1.5	3.371	2080	3.11	1	5	1	Plenum	Direct

Pressure Drop (in. wg)							
Weatherhood	Filter	Damper	Cooling	Heating	External	Energy Wheel	Total
0.14	-	-	-	-	1.5	1.74	3.371

Sound Performance in Accordance with AMCA										
Sound Power by Octave Band								Lwa	dBA	Sones
62.5	125	250	500	1000	2000	4000	8000			
81	72	80	74	70	68	68	62	77	66	14

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

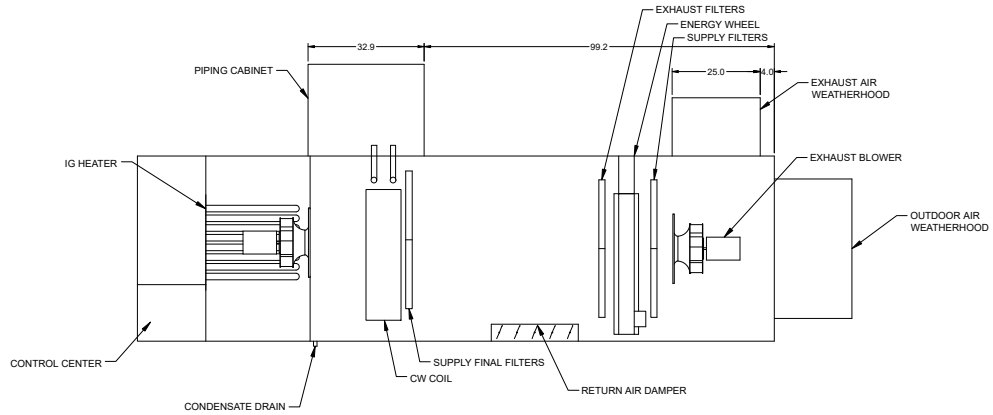
Exhaust Fan



Radiated Sound

Position C

Dimensional Overview



Plan

Position D

Position B

Position A

Supply Air Flow Nominal

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

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

Cooling Performance

Cooling Specifications										
Type	Fluid Type		Flow Rate (GPM)	Fluid PD (ft wg)	Capacity (MBH)		Fluid Conditions		Performance (DB/WB)	
	Type	%			Total	Sensible	EWT (F)	LWT (F)	EAT (F)	LAT (F)
Chilled Water	Water	100	31	5.1	155.5	106.7	45.0	55.0	81.1 / 67.0	51.2 / 51.1

Coil Information					
CW Coil Model	Fins Per Inch	Rows Deep	Face Vel. (ft/min)	Coil PD (in. wg)	Connection Size (in.)
CW58S06H10-42x37-RH	10	6	301	0.454	1.5

Unit Details
Coil control valves must be field provided by others
Copper tube, aluminum fin coil construction
Coil freeze protection is to be provided by others
Stainless steel double sloped drain pan

Heating Performance

Heating Specifications								
Type	Gas Type	Input (MBH)	Output (MBH)	Temperature Rise		Turndown	Performance	
				Min (F)	Max (F)		EAT (F)	LAT (F)
Indirect Gas	Natural	200.0	162.0	3.0	46.0	16:1	41.3	87.4

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 (14 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)
Discharge temperature assumes proper energy wheel operation and maintenance.

Energy Recovery Summer Performance

Outdoor Air		Supply Air	
Dry Bulb (F)	91.0	Dry Bulb (F)	81.1
Wet Bulb (F)	73.0	Wet Bulb (F)	67.0
Specific Humidity (gr/lb)	94	Specific Humidity (gr/lb)	78
Enthalpy (BTU/lb)	36.7	Enthalpy (BTU/lb)	31.6
Exhaust Air		**Return Air**	
Dry Bulb (F)	84.9	Dry Bulb (F)	75.0
Wet Bulb (F)	69.1	Rel. Humidity (%)	50
Specific Humidity (gr/lb)	81	Specific Humidity (gr/lb)	65
Enthalpy (BTU/lb)	33.1	Enthalpy (BTU/lb)	28.2

ENERGY WHEEL

Design Air Flow Conditions

OA Volume (CFM)	ASHRAE 90.1 OA Enthalpy Recovery Ratio	EA Volume (CFM)	EA Wheel Effectiveness
3,250	59.9	3,250	58.7

Outdoor Air Cooling Reduction

OA Load w/o Energy Recovery		OA Load with Energy Recovery		Equipment Reduction (tons)
(BTU/h)	(tons)	(BTU/h)	(tons)	
124,313.0	10.36	49,725.0	4.14	6.22

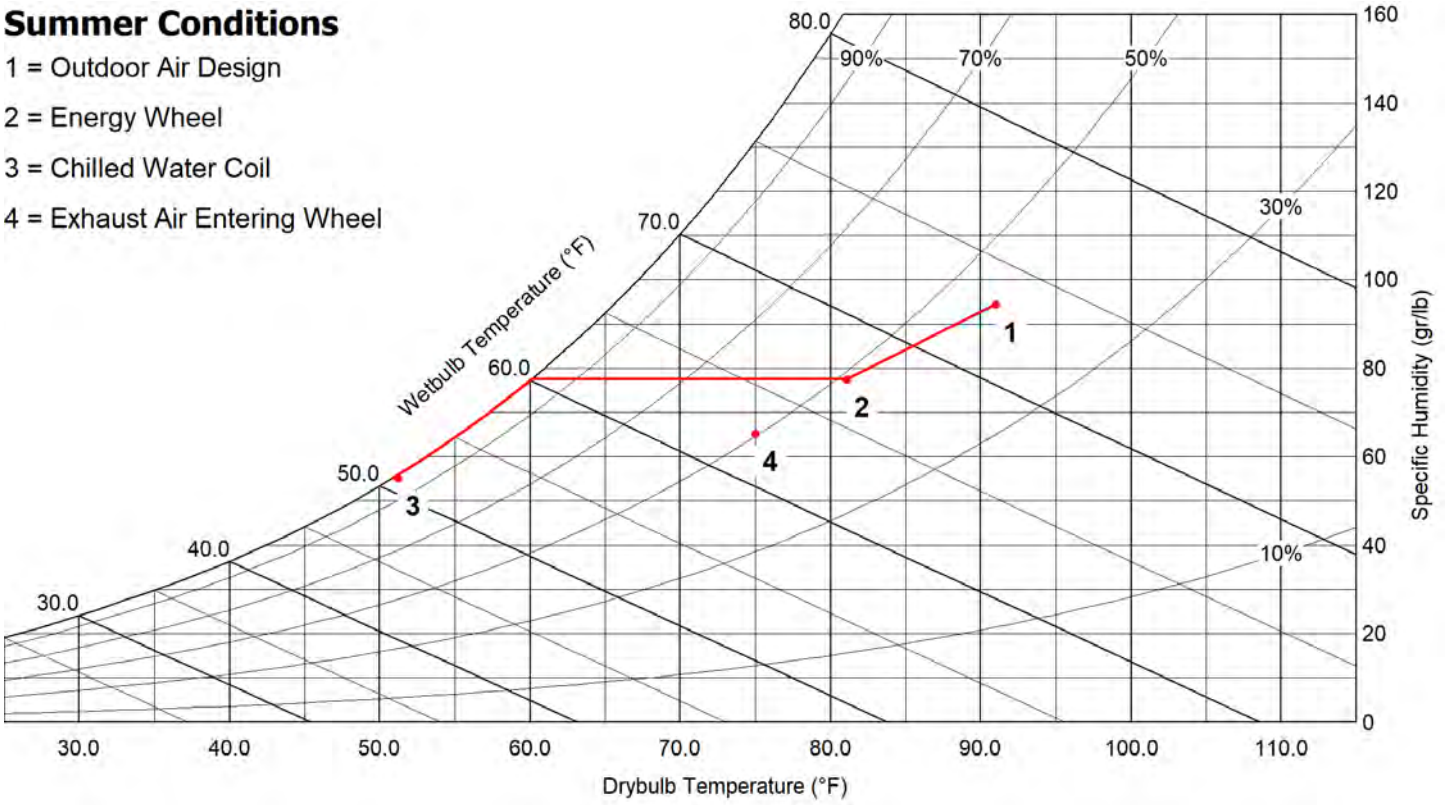
Summer Conditions

1 = Outdoor Air Design

2 = Energy Wheel

3 = Chilled Water Coil

4 = Exhaust Air Entering Wheel



Energy Recovery Winter Performance w/out Preheater

Outdoor Air		Supply Air	
Dry Bulb (F)	0.0	Dry Bulb (F)	41.3
Wet Bulb (F)	-1.5	Wet Bulb (F)	35.6
Specific Humidity (gr/lb)	3	Specific Humidity (gr/lb)	22
Enthalpy (BTU/lb)	0.4	Enthalpy (BTU/lb)	13.3
Exhaust Air		**Return Air**	
Dry Bulb (F)	27.7	Dry Bulb (F)	72.0
Wet Bulb (F)	27.0	Rel. Humidity (%)	35
Specific Humidity (gr/lb)	20	Specific Humidity (gr/lb)	41
Enthalpy (BTU/lb)	9.8	Enthalpy (BTU/lb)	23.7

ENERGY WHEEL

Design Air Flow Conditions

OA Volume (CFM)	ASHRAE 90.1 OA Enthalpy Recovery Ratio	EA Volume (CFM)	EA Wheel Effectiveness
3,250	55.3	3,250	58.9

Outdoor Air Heating Reduction

OA Load w/o Energy Recovery (BTU/h)	OA Load with Energy Recovery (BTU/h)	Equipment Reduction (BTU/h)	Sensible Effectiveness (%)
252,720.0	107,757.0	144,963.0	61

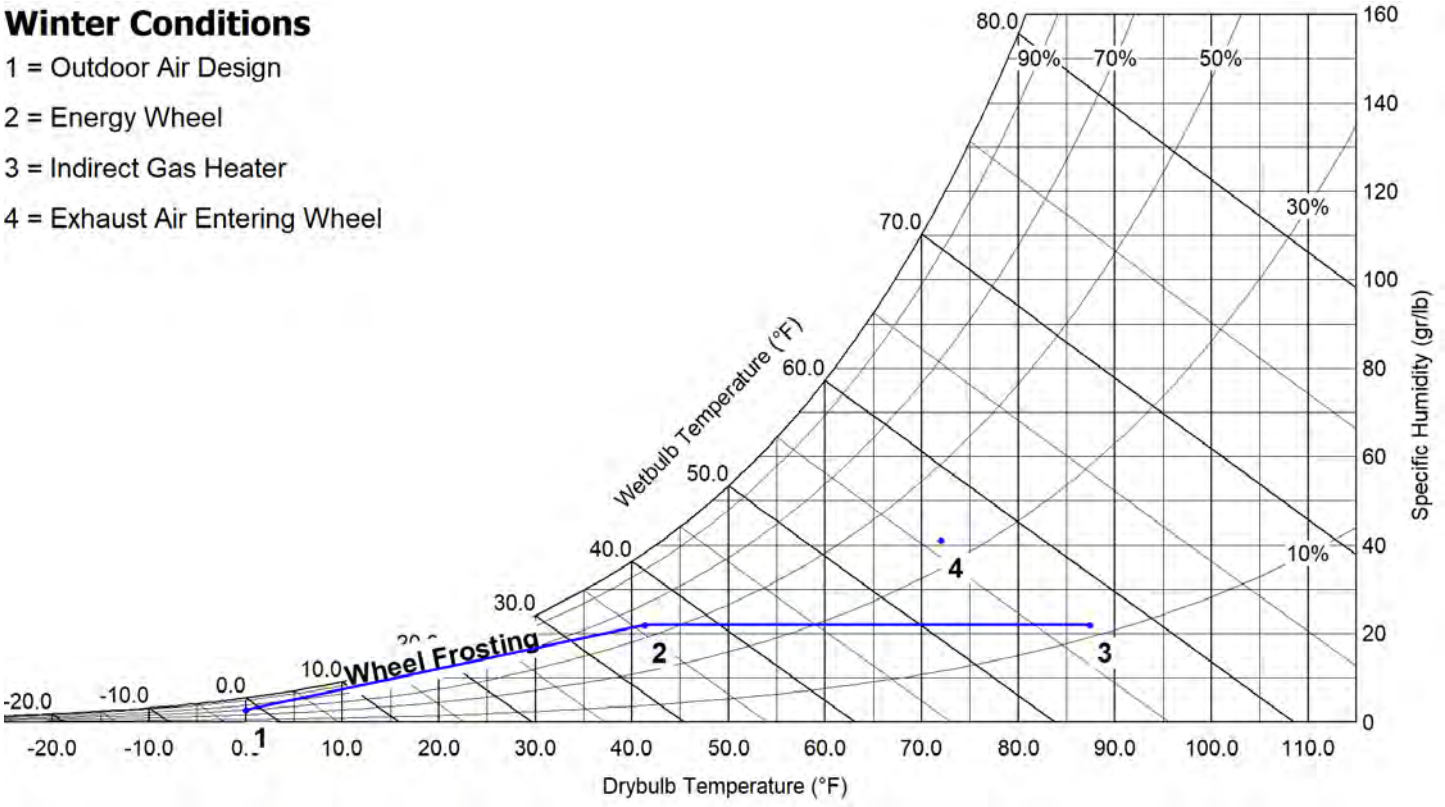
Winter Conditions

1 = Outdoor Air Design

2 = Energy Wheel

3 = Indirect Gas Heater

4 = Exhaust Air Entering Wheel



AHRI Performance Ratings

Energy Recovery Performance Rating in accordance with AHRI Standard 1060 (I-P)							
Rated Airflow (SCFM)		Net Supply Airflow (SCFM)	EATR (%)	OACF	Pressure Drop (in. wg)		Purge Angle (degrees)
Leaving Supply	Entering Exhaust				Supply	Exhaust	
3296	3296	3250	1.4	1.05	1.02	1.01	0

Thermal Effectiveness Ratings							
Enthalpy Recovery		Sensible Effectiveness		Latent Effectiveness		Total Effectiveness	
Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
59.9	55.3	61.4	61	56.3	53.4	58.7	58.9

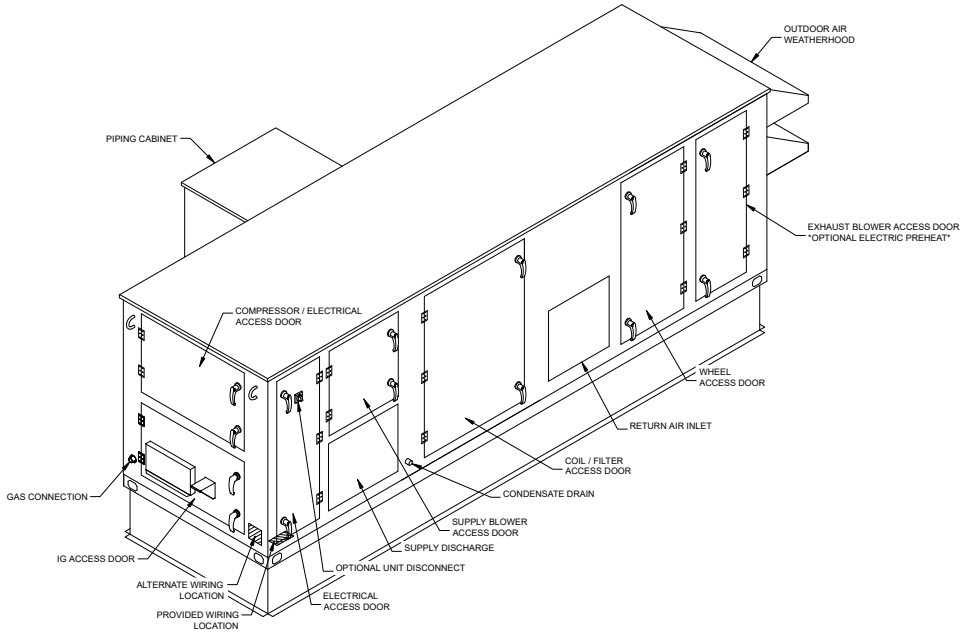
Note(s)

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

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

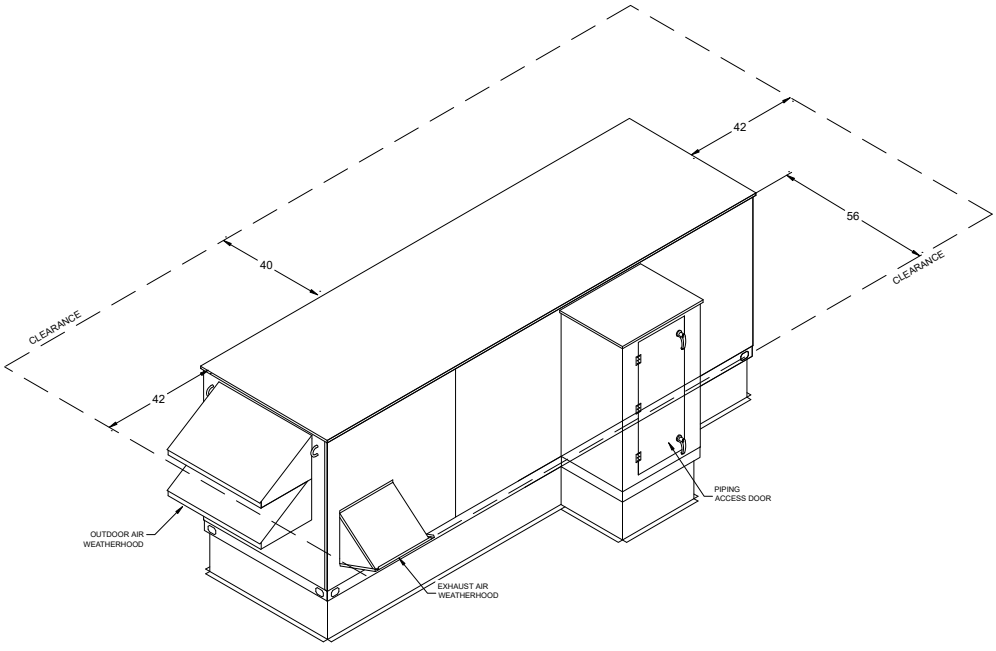
Isometric Drawings

Component Layout



Back Right Isometric

Service Clearances

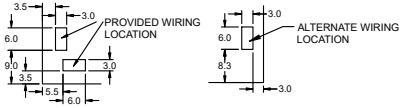


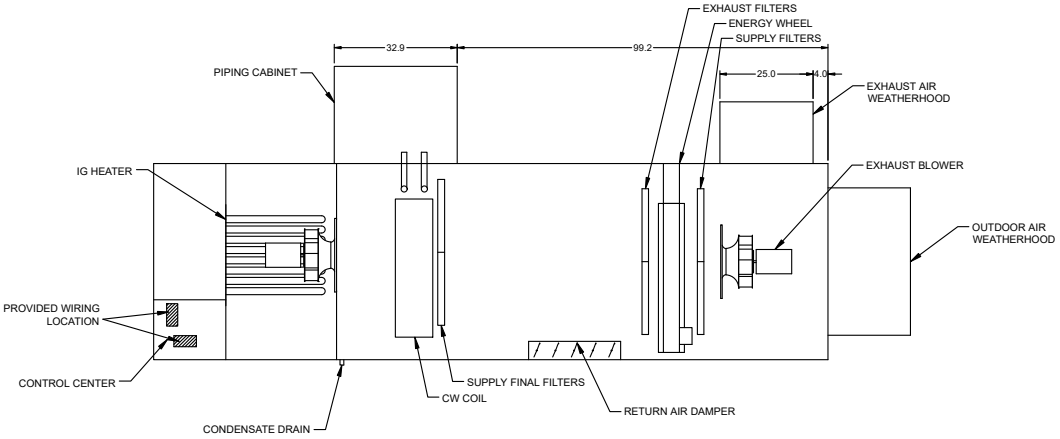
Front Left Isometric

Overview Drawings

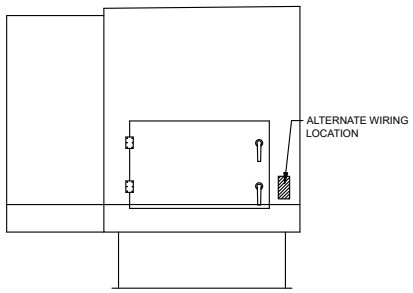
Dimensional Overview

Electrical Connections

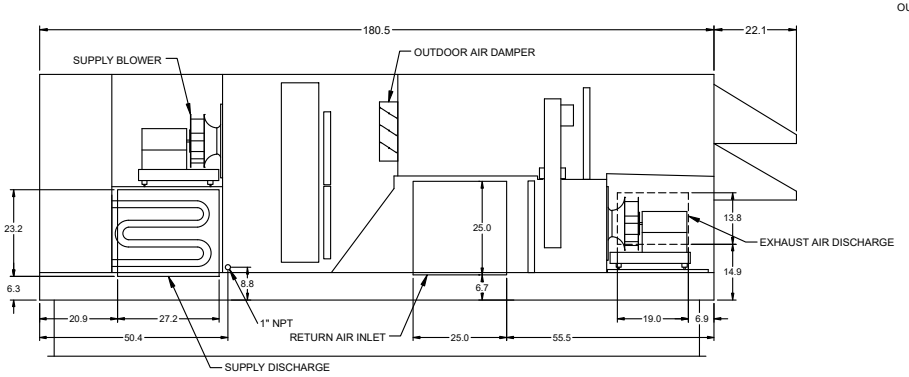




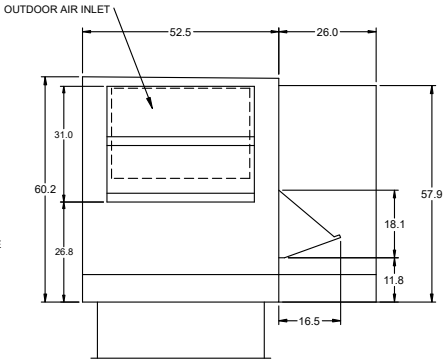
Plan



Left End



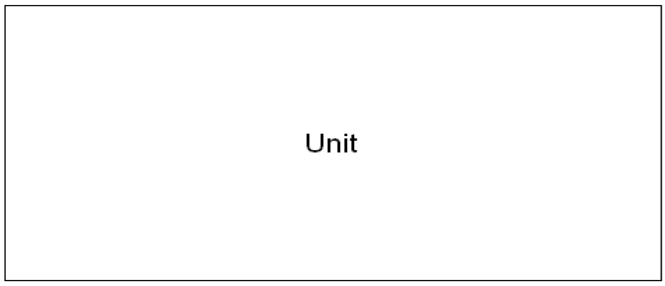
Elevation



Right End

Unit Corner Weights

688 lb 720 lb



704 lb 738 lb

Note

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

VXE-112-36D-CW-C-D1

Unit Performance

Design Conditions

Elevation (ft)	Summer		Winter DB (F)	Supply (CFM)	Outdoor Air (CFM)	Exhaust Air (CFM)
	DB (F)	WB (F)				
180	91.0	73.0	0.0	2,700	2,700	2,700

Unit Specifications

Qty	Weight (lb)	Cooling Type	Heating Type	Unit Installation	Unit ETL Listing	Furnace ETL Listing
1	2,812 (+/- 5%)	Chilled Water	Indirect Gas	Outdoor	UL\cUL 1995/ 60335-2-40	ANSI Z83.8 / CSA 2.6

Configuration

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

Energy Recovery Performance

Design Condition	Temperature (F)								Capacity Reduction (BTU/h)
	Outdoor Air		Supply Air		Return Air		Exhaust Air		
	DB	WB	DB	WB	DB	WB/RH	DB	WB	
Summer	91.0	73.0	80.4	66.5	75.0	62.5/50	85.6	69.6	66,825.0
Winter	0.0	-1.5	44.7	38.2	72.0	55.8/35	24.4	24.1	130,345.0

Cooling Specifications

Type	Fluid Type		Flow Rate (GPM)	Fluid PD (ft wg)	Capacity (MBH)		Fluid Conditions		Performance (DB/WB)	
	Type	%			Total	Sensible	EWT (F)	LWT (F)	EAT (F)	LAT (F)
Chilled Water	Water	100	25.8	3.6	129.3	88.8	45.0	55.0	80.4 / 66.5	50.4 / 50.4

Heating Specifications

Type	Gas Type	Input (MBH)	Output (MBH)	Temperature Rise		Turndown	Performance	
				Min (F)	Max (F)		EAT (F)	LAT (F)
Indirect Gas	Natural	100.0	81.0	2.0	28.0	16:1	44.7	72.4

Motor Specifications

Motor	Qty	Operating Power (hp)	Size (hp)	Enclosure	Efficiency	RPM
Supply	1	2.54	5	ODP	PE	1750
Exhaust	1	2.29	5	ODP	PE	1750

Electrical Specifications

Power Supply	Rating (V/C/P)	MCA (A)	MOP (A)	FLA (A)	Fan Power (W/CFM)*
Unit	460/60/3	18.4	20.0	14.7	1.335

*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	Std
Factory Wired VFDs	Std
Unit Finish - Permatector, Concrete Gray (RAL 7023)	X
Stainless Steel Condensate Drain Pan and Connection	Std
Condensate Drain Trap	Std
Short Circuit Current - 5 kA	Std
Energy Recovery Device - Polymer Wheel w/ Silica Gel Desiccant	Std
Controls	
Unit Controls - Heat-Cool Only Control	Std
Internally Mounted Control Center with 24 VAC control transformer(s)	Std
BMS Protocol - BACNetMSTP	X
BMS Monitoring Points	
Supply Fan Control - 0-10VDC By Others	X
Exhaust Fan Control - 0-10VDC By Others	X
Economizer Control	
Exhaust Fan Only Power	
Web-Based User Interface	
Energy Wheel Economizer Control - VFD Signal By Others	X
Energy Wheel Rotation Sensor	Std
Damper Control - 100% OA-No Recirculation	X
Unoccupied Recirc Mode	
Control Accessories	
Remote Display	
Dirty Filter Sensor(s) - All	X
Airflow Monitor	
Room Thermostat	
Phase/Brownout Protection	X
Economizer Fault Detection Diagnostics	

Accessories	
Frost Control ModulatingWheel - Modulating Wheel	X
Outdoor Air Damper - Low Leakage	X
Return Air Damper - Low Leakage	X
Roof Curb - GKD - 45.9/173.9-G14	X
Supply Air Filters - 2" Merv 8 And 2" Merv 13, 8-20x20x2	X
Service Outlet - Shipped loose and powered by others	X
Piping Vestibule	X
Service Lights	
Condensate Overflow Switch	X
Spare Filters - Both, Qty: 1 set(s)	X
Exhaust Discharge Gravity Backdraft Damper	X
ElectroFin Coil Coating	
Motor Shaft Grounding	X
Bipolar Ionization	
Smoke Detector(s)	
Barometric Relief Damper	
UV Lights	
Return Air Filters - 2" Merv 8, 2-20x25x2	Std
Outdoor Air Filters - 2" Merv 8, 2-20x25x2	Std
Furnace Control - 16:1 Modulating	X
Spare Energy Wheel Belt	
Spare Energy Wheel Segments	
Energy Wheel Bypass Damper	
Power Venting	Std
Warranty Options	
Unit Warranty - 18 Months (Std.)	Std
Energy Wheel Warranty - 5 Yrs Less Motor	Std
Furnace HX Warranty - 25 Yrs.	Std

Standard Option	Std
Not Included	
Included	X

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

Supply Fan Charts And Performance

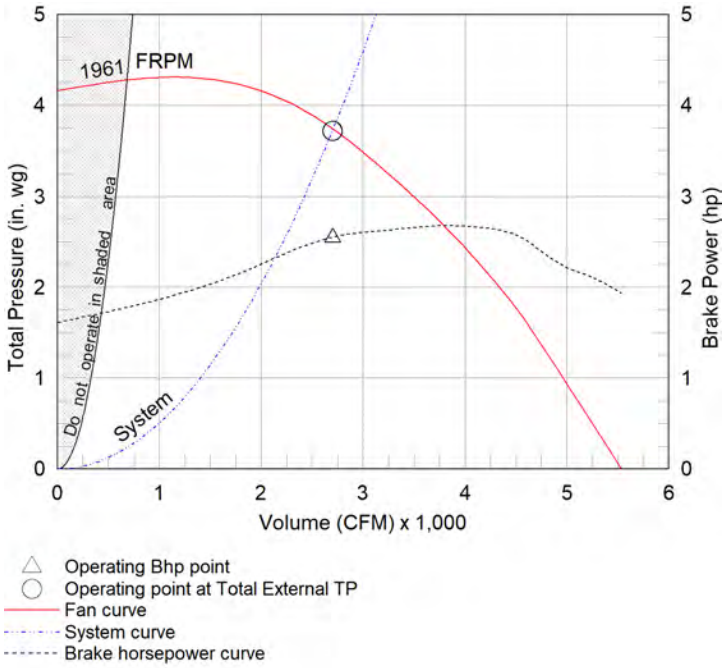
Supply Fan Performance									
Total Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	RPM	Operating Power (hp)	Motor		Fan		
					Qty	Size (hp)	Qty	Type	Drive-Type
2,700	1.5	3.717	1961	2.54	1	5	1	Plenum	Direct

Pressure Drop (in. wg)							
Weatherhood	Filter	Damper	Cooling	Heating	External	Energy Wheel	Total
0.06	0.216	0.03	0.353	0.484	1.5	1.08	3.717

Sound Performance in Accordance with AMCA										
Sound Power by Octave Band								Lwa	dBA	Sones
62.5	125	250	500	1000	2000	4000	8000			
75	82	84	75	70	66	73	63	80	68	17

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

Supply Fan



Exhaust Fan Charts And Performance

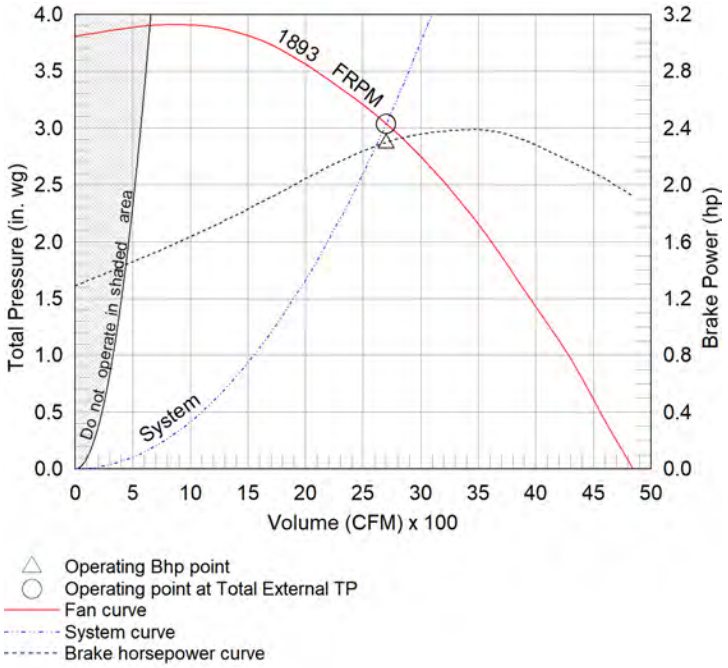
Exhaust Fan Performance									
Total Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	RPM	Operating Power (hp)	Motor		Fan		
					Qty	Size (hp)	Qty	Type	Drive-Type
2,700	1.5	3.035	1893	2.29	1	5	1	Plenum	Direct

Pressure Drop (in. wg)							
Weatherhood	Filter	Damper	Cooling	Heating	External	Energy Wheel	Total
0.09	-	-	-	-	1.5	1.44	3.035

Sound Performance in Accordance with AMCA										
Sound Power by Octave Band								Lwa	dBA	Sones
62.5	125	250	500	1000	2000	4000	8000			
80	72	80	71	68	66	66	61	76	64	13

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

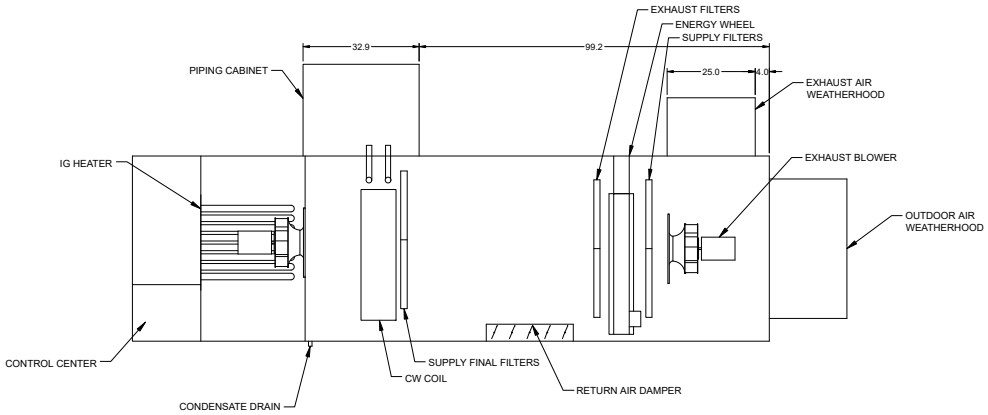
Exhaust Fan



Radiated Sound

Position C

Dimensional Overview



Plan

Position D

Position B

Position A

Supply Air Flow Nominal

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

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

Cooling Performance

Cooling Specifications										
Type	Fluid Type		Flow Rate (GPM)	Fluid PD (ft wg)	Capacity (MBH)		Fluid Conditions		Performance (DB/WB)	
	Type	%			Total	Sensible	EWT (F)	LWT (F)	EAT (F)	LAT (F)
Chilled Water	Water	100	25.8	3.6	129.3	88.8	45.0	55.0	80.4 / 66.5	50.4 / 50.4

Coil Information					
CW Coil Model	Fins Per Inch	Rows Deep	Face Vel. (ft/min)	Coil PD (in. wg)	Connection Size (in.)
CW58S06H10-42x37-RH	10	6	250	0.353	1.5

Unit Details
Coil control valves must be field provided by others
Copper tube, aluminum fin coil construction
Coil freeze protection is to be provided by others
Stainless steel double sloped drain pan

Heating Performance

Heating Specifications								
Type	Gas Type	Input (MBH)	Output (MBH)	Temperature Rise		Turndown	Performance	
				Min (F)	Max (F)		EAT (F)	LAT (F)
Indirect Gas	Natural	100.0	81.0	2.0	28.0	16:1	44.7	72.4

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 (14 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)
Discharge temperature assumes proper energy wheel operation and maintenance.

Energy Recovery Summer Performance

Outdoor Air		Supply Air	
Dry Bulb (F)	91.0	Dry Bulb (F)	80.4
Wet Bulb (F)	73.0	Wet Bulb (F)	66.5
Specific Humidity (gr/lb)	94	Specific Humidity (gr/lb)	76
Enthalpy (BTU/lb)	36.7	Enthalpy (BTU/lb)	31.2
Exhaust Air		**Return Air**	
Dry Bulb (F)	85.6	Dry Bulb (F)	75.0
Wet Bulb (F)	69.6	Rel. Humidity (%)	50
Specific Humidity (gr/lb)	83	Specific Humidity (gr/lb)	65
Enthalpy (BTU/lb)	33.6	Enthalpy (BTU/lb)	28.2

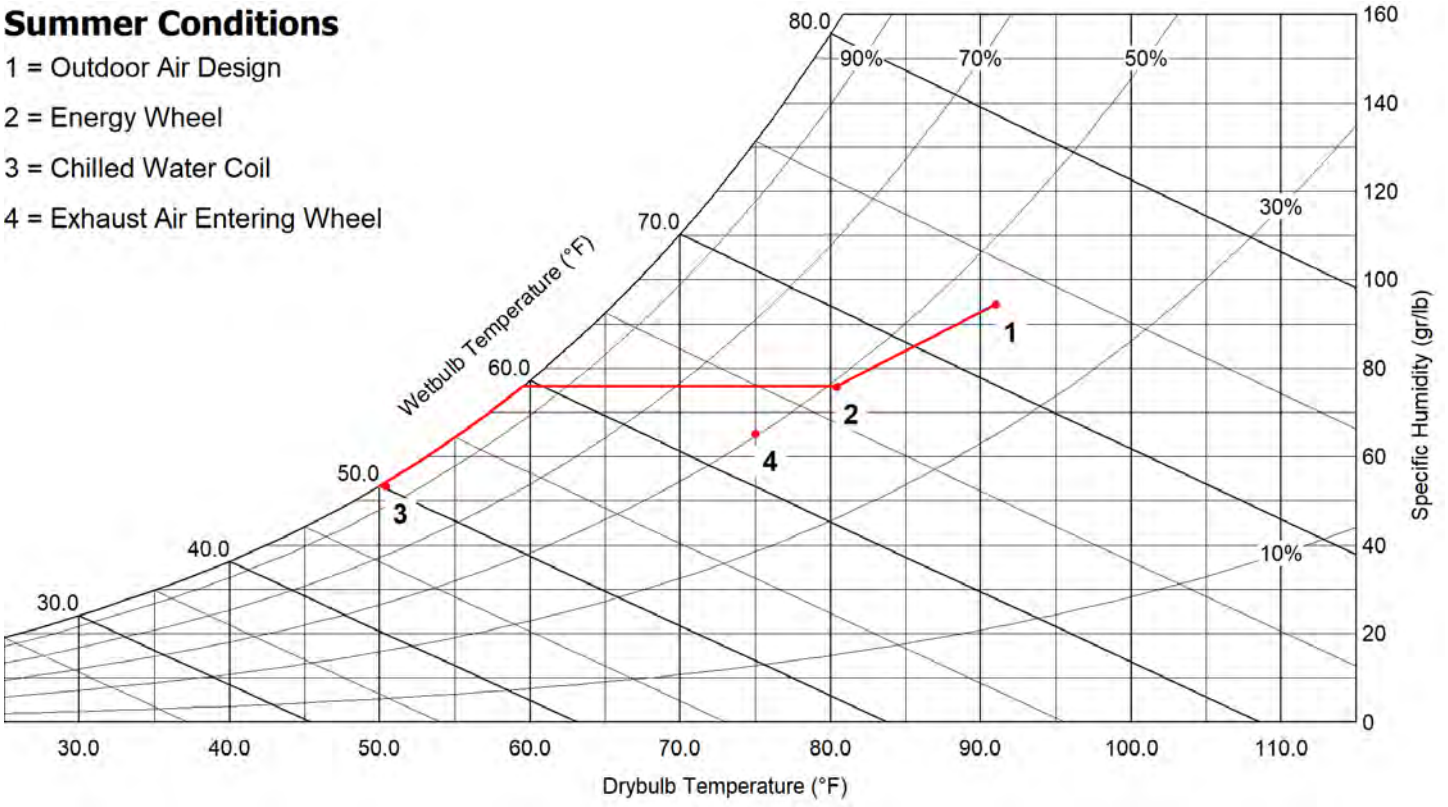
ENERGY WHEEL

Design Air Flow Conditions

OA Volume (CFM)	ASHRAE 90.1 OA Enthalpy Recovery Ratio	EA Volume (CFM)	EA Wheel Effectiveness
2,700	64.8	2,700	63.8

Outdoor Air Cooling Reduction

OA Load w/o Energy Recovery		OA Load with Energy Recovery		Equipment Reduction (tons)
(BTU/h)	(tons)	(BTU/h)	(tons)	
103,275.0	8.61	36,450.0	3.04	5.57



Energy Recovery Winter Performance w/out Preheater

Outdoor Air		Supply Air	
Dry Bulb (F)	0.0	Dry Bulb (F)	44.7
Wet Bulb (F)	-1.5	Wet Bulb (F)	38.2
Specific Humidity (gr/lb)	3	Specific Humidity (gr/lb)	24
Enthalpy (BTU/lb)	0.4	Enthalpy (BTU/lb)	14.4
Exhaust Air		**Return Air**	
Dry Bulb (F)	24.4	Dry Bulb (F)	72.0
Wet Bulb (F)	24.1	Rel. Humidity (%)	35
Specific Humidity (gr/lb)	18	Specific Humidity (gr/lb)	41
Enthalpy (BTU/lb)	8.6	Enthalpy (BTU/lb)	23.7

ENERGY WHEEL

Design Air Flow Conditions

OA Volume (CFM)	ASHRAE 90.1 OA Enthalpy Recovery Ratio	EA Volume (CFM)	EA Wheel Effectiveness
2,700	60.2	2,700	63.8

Outdoor Air Heating Reduction

OA Load w/o Energy Recovery (BTU/h)	OA Load with Energy Recovery (BTU/h)	Equipment Reduction (BTU/h)	Sensible Effectiveness (%)
209,952.0	79,607.0	130,345.0	65.6

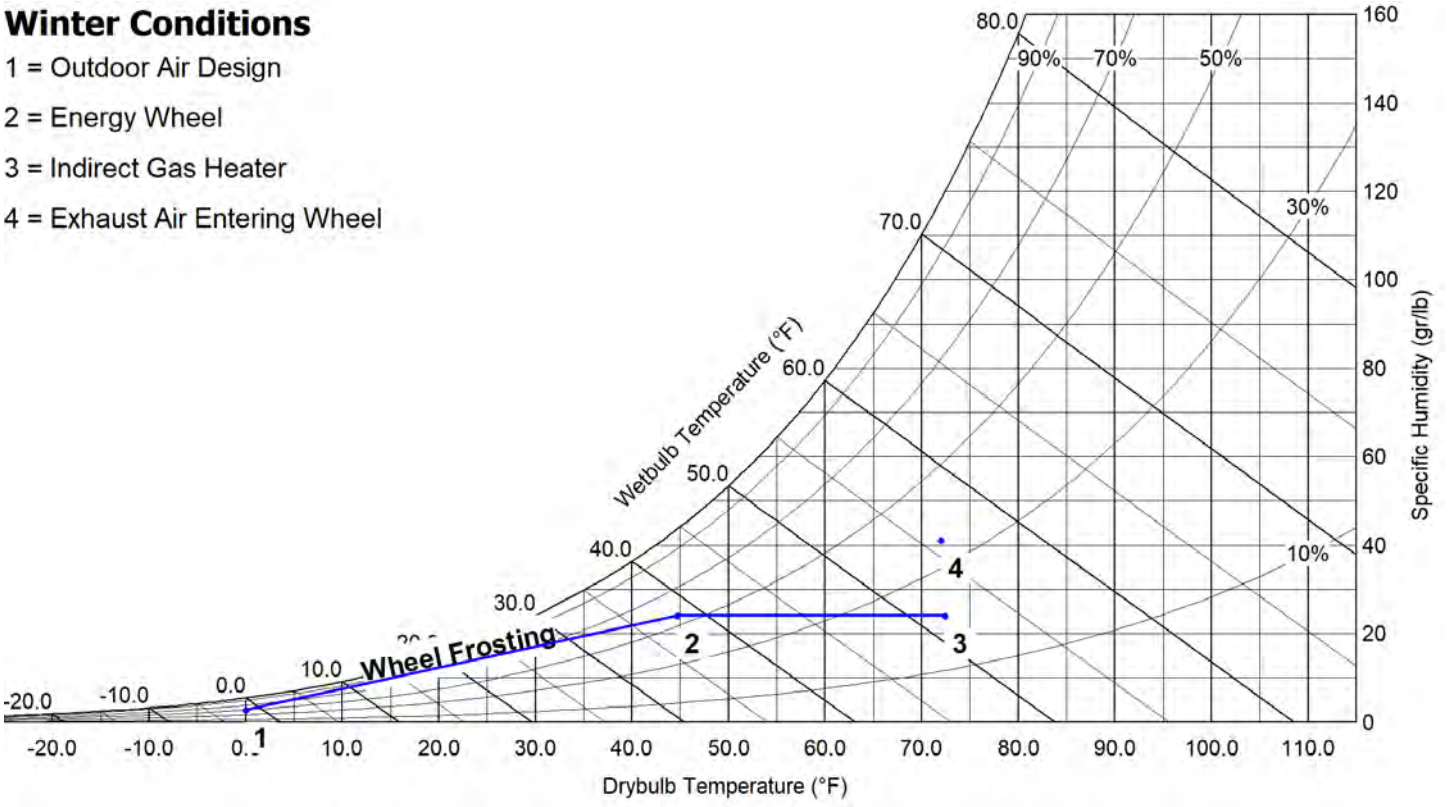
Winter Conditions

1 = Outdoor Air Design

2 = Energy Wheel

3 = Indirect Gas Heater

4 = Exhaust Air Entering Wheel



AHRI Performance Ratings

Energy Recovery Performance Rating in accordance with AHRI Standard 1060 (I-P)							
Rated Airflow (SCFM)		Net Supply Airflow (SCFM)	EATR (%)	OACF	Pressure Drop (in. wg)		Purge Angle (degrees)
Leaving Supply	Entering Exhaust				Supply	Exhaust	
2735	2735	2700	1.3	1.06	0.85	0.84	0

Thermal Effectiveness Ratings							
Enthalpy Recovery		Sensible Effectiveness		Latent Effectiveness		Total Effectiveness	
Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
64.8	60.2	66.1	65.6	61.6	59.1	63.8	63.8

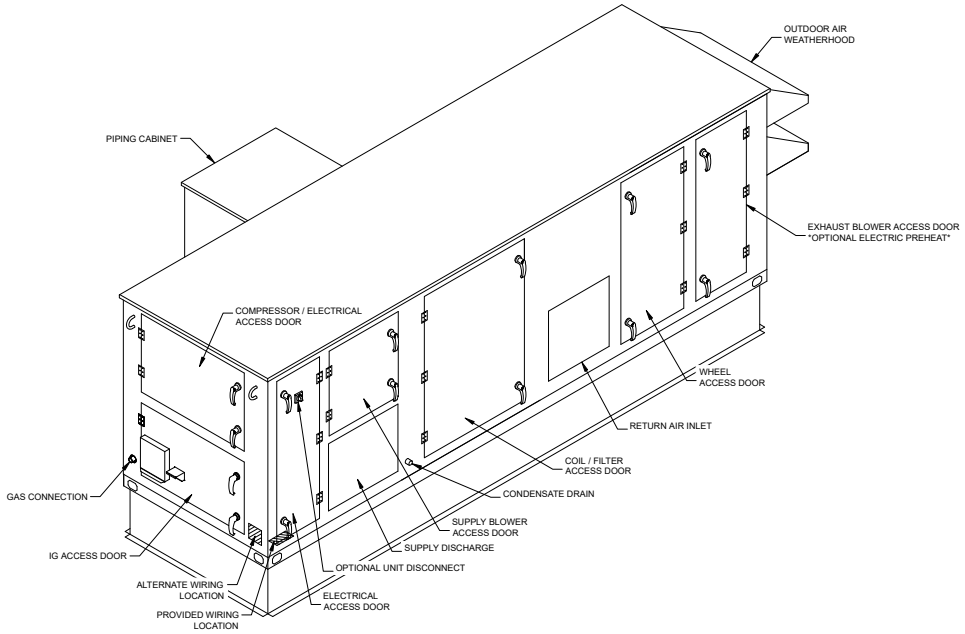
Note(s)

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

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

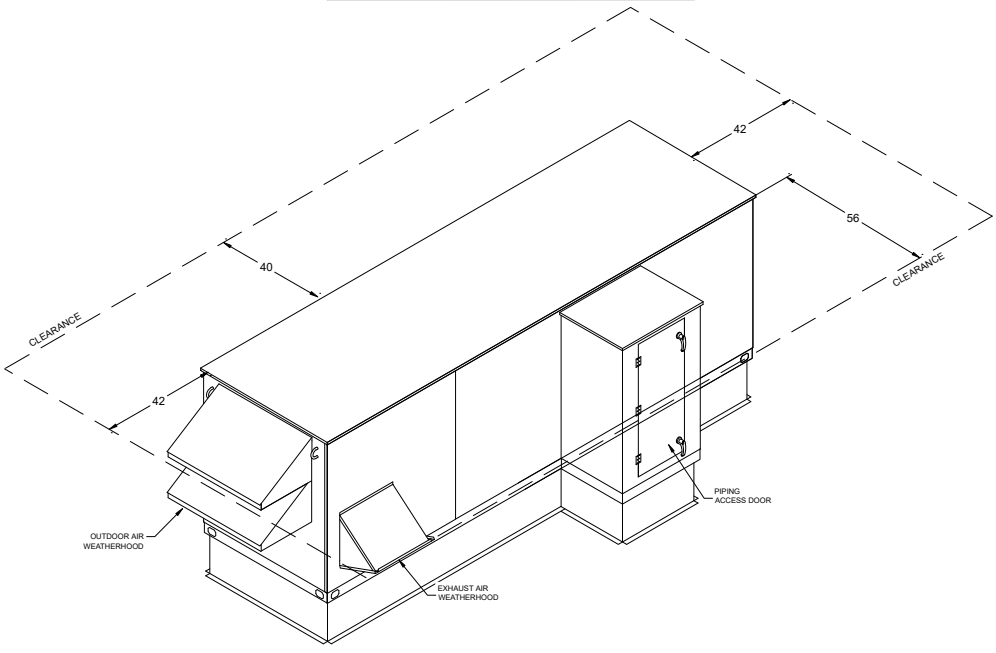
Isometric Drawings

Component Layout



Back Right Isometric

Service Clearances

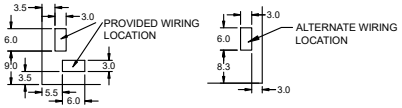


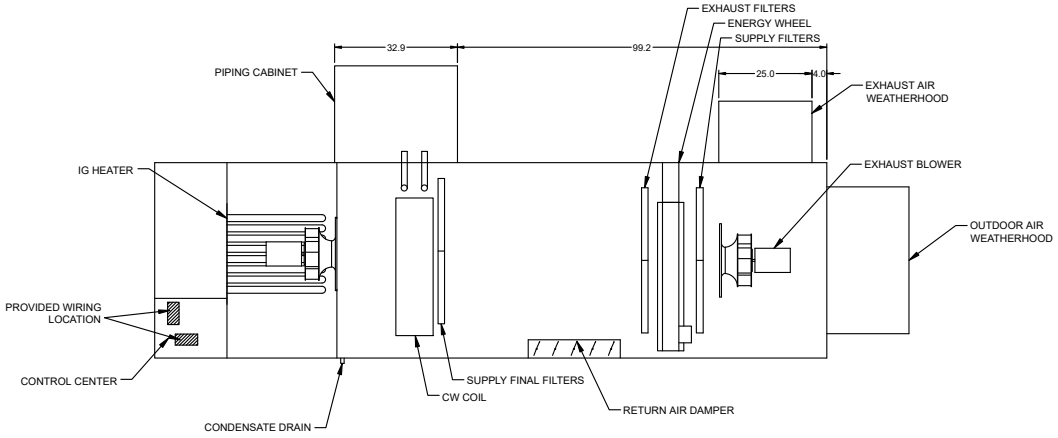
Front Left Isometric

Overview Drawings

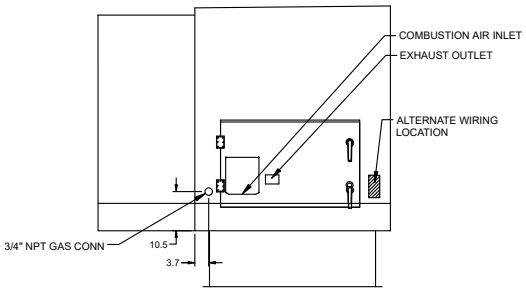
Dimensional Overview

Electrical Connections

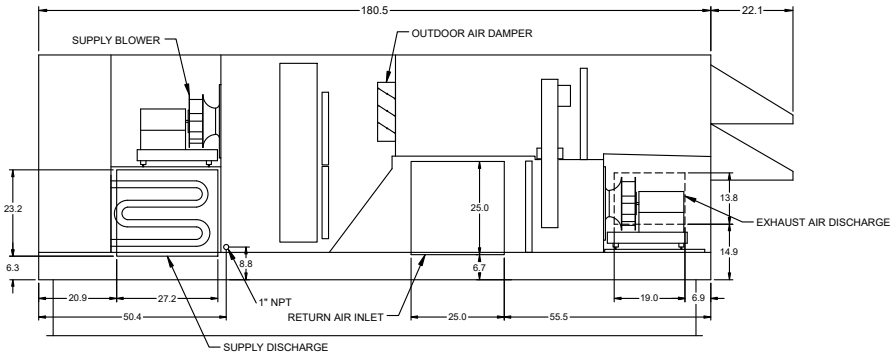




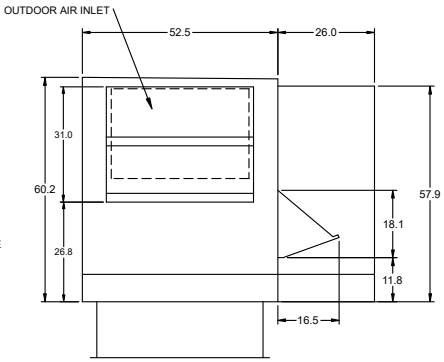
Plan



Left End



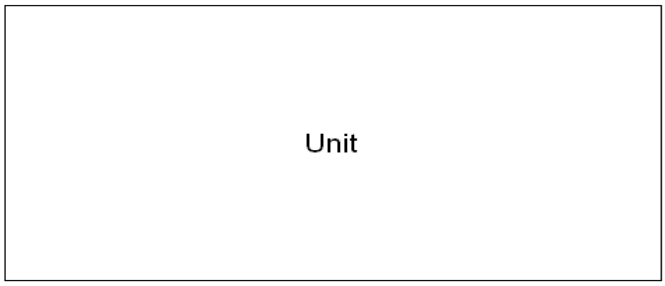
Elevation



Right End

Unit Corner Weights

671 lb 717 lb



688 lb 736 lb

Note

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

VXE-112-36D-CW-C-D1

Unit Performance

Design Conditions

Elevation (ft)	Summer		Winter DB (F)	Supply (CFM)	Outdoor Air (CFM)	Exhaust Air (CFM)
	DB (F)	WB (F)				
180	91.0	73.0	0.0	2,600	2,600	2,600

Unit Specifications

Qty	Weight (lb)	Cooling Type	Heating Type	Unit Installation	Unit ETL Listing	Furnace ETL Listing
1	2,812 (+/- 5%)	Chilled Water	Indirect Gas	Outdoor	UL\cUL 1995/ 60335-2-40	ANSI Z83.8 / CSA 2.6

Configuration

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

Energy Recovery Performance

Design Condition	Temperature (F)								Capacity Reduction (BTU/h)
	Outdoor Air		Supply Air		Return Air		Exhaust Air		
	DB	WB	DB	WB	DB	WB/RH	DB	WB	
Summer	91.0	73.0	80.2	66.4	75.0	62.5/50	85.8	69.7	65,520.0
Winter	0.0	-1.5	45.3	38.7	72.0	55.8/35	23.8	23.6	127,202.0

Cooling Specifications

Type	Fluid Type		Flow Rate (GPM)	Fluid PD (ft wg)	Capacity (MBH)		Fluid Conditions		Performance (DB/WB)	
	Type	%			Total	Sensible	EWT (F)	LWT (F)	EAT (F)	LAT (F)
Chilled Water	Water	100	24.8	3.3	124.4	85.5	45.0	55.0	80.2 / 66.4	50.3 / 50.3

Heating Specifications

Type	Gas Type	Input (MBH)	Output (MBH)	Temperature Rise		Turndown	Performance	
				Min (F)	Max (F)		EAT (F)	LAT (F)
Indirect Gas	Natural	100.0	81.0	2.0	29.0	16:1	45.3	74.1

Motor Specifications

Motor	Qty	Operating Power (hp)	Size (hp)	Enclosure	Efficiency	RPM
Supply	1	2.38	5	ODP	PE	1750
Exhaust	1	2.16	5	ODP	PE	1750

Electrical Specifications

Power Supply	Rating (V/C/P)	MCA (A)	MOP (A)	FLA (A)	Fan Power (W/CFM)*
Unit	460/60/3	18.4	20.0	14.7	1.303

*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	Std
Factory Wired VFDs	Std
Unit Finish - Permatector, Concrete Gray (RAL 7023)	X
Stainless Steel Condensate Drain Pan and Connection	Std
Condensate Drain Trap	Std
Short Circuit Current - 5 kA	Std
Energy Recovery Device - Polymer Wheel w/ Silica Gel Desiccant	Std
Controls	
Unit Controls - Heat-Cool Only Control	Std
Internally Mounted Control Center with 24 VAC control transformer(s)	Std
BMS Protocol - BACNetMSTP	X
BMS Monitoring Points	
Supply Fan Control - 0-10VDC By Others	X
Exhaust Fan Control - 0-10VDC By Others	X
Economizer Control	
Exhaust Fan Only Power	
Web-Based User Interface	
Energy Wheel Economizer Control - VFD Signal By Others	X
Energy Wheel Rotation Sensor	Std
Damper Control - 100% OA-No Recirculation	X
Unoccupied Recirc Mode	
Control Accessories	
Remote Display	
Dirty Filter Sensor(s) - All	X
Airflow Monitor	
Room Thermostat	
Phase/Brownout Protection	X
Economizer Fault Detection Diagnostics	

Accessories	
Frost Control ModulatingWheel - Modulating Wheel	X
Outdoor Air Damper - Low Leakage	X
Return Air Damper - Low Leakage	X
Roof Curb - GKD - 45.9/173.9-G14	X
Supply Air Filters - 2" Merv 8 And 2" Merv 13, 8-20x20x2	X
Service Outlet - Shipped loose and powered by others	X
Piping Vestibule	X
Service Lights	
Condensate Overflow Switch	X
Spare Filters - Both, Qty: 1 set(s)	X
Exhaust Discharge Gravity Backdraft Damper	X
ElectroFin Coil Coating	
Motor Shaft Grounding	X
Bipolar Ionization	
Smoke Detector(s)	
Barometric Relief Damper	
UV Lights	
Return Air Filters - 2" Merv 8, 2-20x25x2	Std
Outdoor Air Filters - 2" Merv 8, 2-20x25x2	Std
Furnace Control - 16:1 Modulating	X
Spare Energy Wheel Belt	
Spare Energy Wheel Segments	
Energy Wheel Bypass Damper	
Power Venting	Std
Warranty Options	
Unit Warranty - 18 Months (Std.)	Std
Energy Wheel Warranty - 5 Yrs Less Motor	Std
Furnace HX Warranty - 25 Yrs.	Std

Standard Option	Std
Not Included	
Included	X

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

Supply Fan Charts And Performance

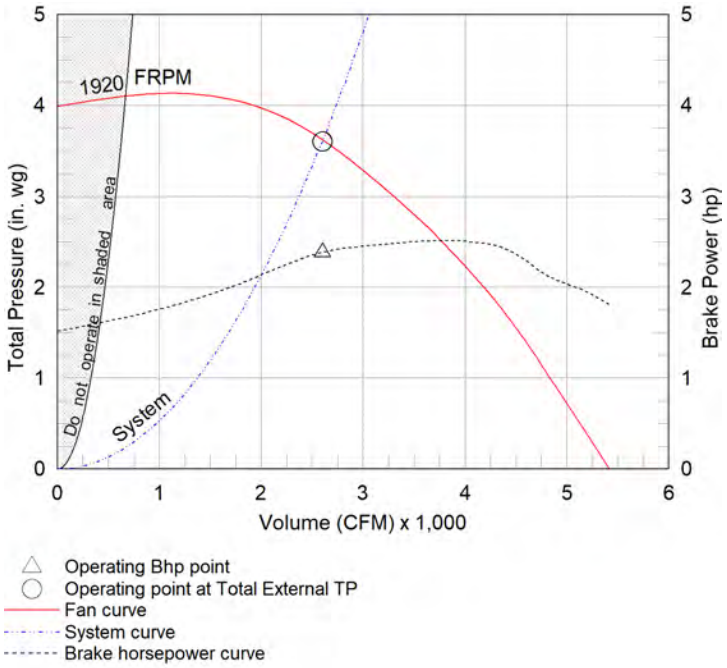
Supply Fan Performance									
Total Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	RPM	Operating Power (hp)	Motor		Fan		
					Qty	Size (hp)	Qty	Type	Drive-Type
2,600	1.5	3.603	1920	2.38	1	5	1	Plenum	Direct

Pressure Drop (in. wg)							
Weatherhood	Filter	Damper	Cooling	Heating	External	Energy Wheel	Total
0.05	0.2	0.02	0.336	0.449	1.5	1.04	3.603

Sound Performance in Accordance with AMCA										
Sound Power by Octave Band								Lwa	dBA	Sones
62.5	125	250	500	1000	2000	4000	8000			
75	82	84	75	69	66	73	63	80	68	17

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

Supply Fan



Exhaust Fan Charts And Performance

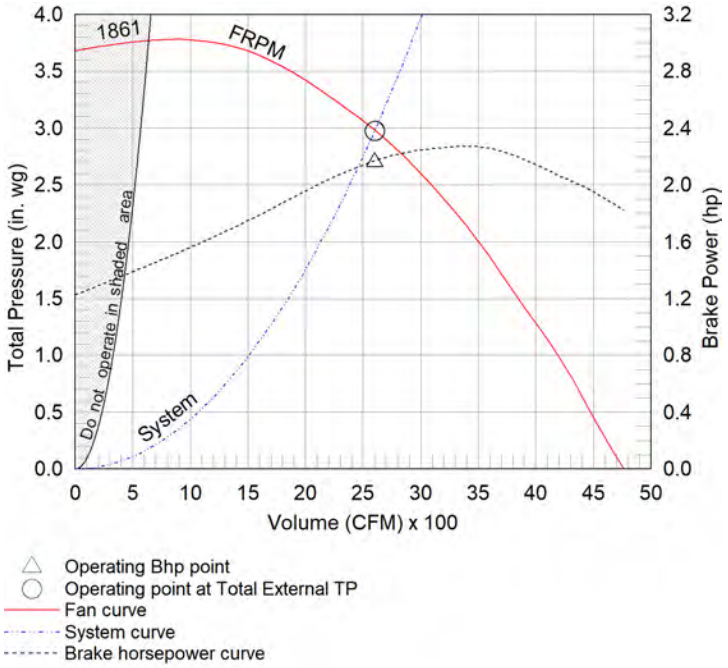
Exhaust Fan Performance									
Total Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	RPM	Operating Power (hp)	Motor		Fan		
					Qty	Size (hp)	Qty	Type	Drive-Type
2,600	1.5	2.975	1861	2.16	1	5	1	Plenum	Direct

Pressure Drop (in. wg)							
Weatherhood	Filter	Damper	Cooling	Heating	External	Energy Wheel	Total
0.09	-	-	-	-	1.5	1.39	2.975

Sound Performance in Accordance with AMCA										
Sound Power by Octave Band								Lwa	dBA	Sones
62.5	125	250	500	1000	2000	4000	8000			
81	72	80	71	67	66	66	60	76	64	13

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

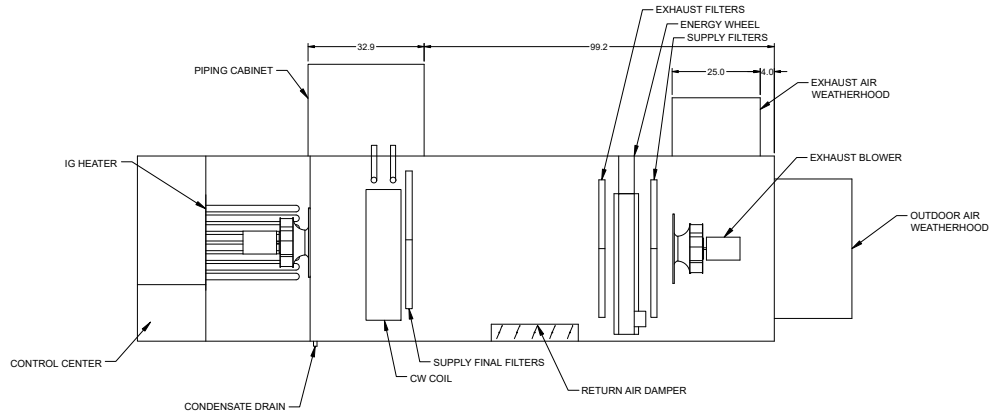
Exhaust Fan



Radiated Sound

Position C

Dimensional Overview



Plan

Position D

Position B

Position A

Supply Air Flow Nominal

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

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

Cooling Performance

Cooling Specifications										
Type	Fluid Type		Flow Rate (GPM)	Fluid PD (ft wg)	Capacity (MBH)		Fluid Conditions		Performance (DB/WB)	
	Type	%			Total	Sensible	EWT (F)	LWT (F)	EAT (F)	LAT (F)
Chilled Water	Water	100	24.8	3.3	124.4	85.5	45.0	55.0	80.2 / 66.4	50.3 / 50.3

Coil Information					
CW Coil Model	Fins Per Inch	Rows Deep	Face Vel. (ft/min)	Coil PD (in. wg)	Connection Size (in.)
CW58S06H10-42x37-RH	10	6	241	0.336	1.5

Unit Details
Coil control valves must be field provided by others
Copper tube, aluminum fin coil construction
Coil freeze protection is to be provided by others
Stainless steel double sloped drain pan

Heating Performance

Heating Specifications								
Type	Gas Type	Input (MBH)	Output (MBH)	Temperature Rise		Turndown	Performance	
				Min (F)	Max (F)		EAT (F)	LAT (F)
Indirect Gas	Natural	100.0	81.0	2.0	29.0	16:1	45.3	74.1

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 (14 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)
Discharge temperature assumes proper energy wheel operation and maintenance.

Energy Recovery Summer Performance

Outdoor Air		Supply Air	
Dry Bulb (F)	91.0	Dry Bulb (F)	80.2
Wet Bulb (F)	73.0	Wet Bulb (F)	66.4
Specific Humidity (gr/lb)	94	Specific Humidity (gr/lb)	76
Enthalpy (BTU/lb)	36.7	Enthalpy (BTU/lb)	31.1
Exhaust Air		**Return Air**	
Dry Bulb (F)	85.8	Dry Bulb (F)	75.0
Wet Bulb (F)	69.7	Rel. Humidity (%)	50
Specific Humidity (gr/lb)	83	Specific Humidity (gr/lb)	65
Enthalpy (BTU/lb)	33.6	Enthalpy (BTU/lb)	28.2

ENERGY WHEEL

Design Air Flow Conditions

OA Volume (CFM)	ASHRAE 90.1 OA Enthalpy Recovery Ratio	EA Volume (CFM)	EA Wheel Effectiveness
2,600	65.7	2,600	64.7

Outdoor Air Cooling Reduction

OA Load w/o Energy Recovery		OA Load with Energy Recovery		Equipment Reduction (tons)
(BTU/h)	(tons)	(BTU/h)	(tons)	
99,450.0	8.29	33,930.0	2.83	5.46

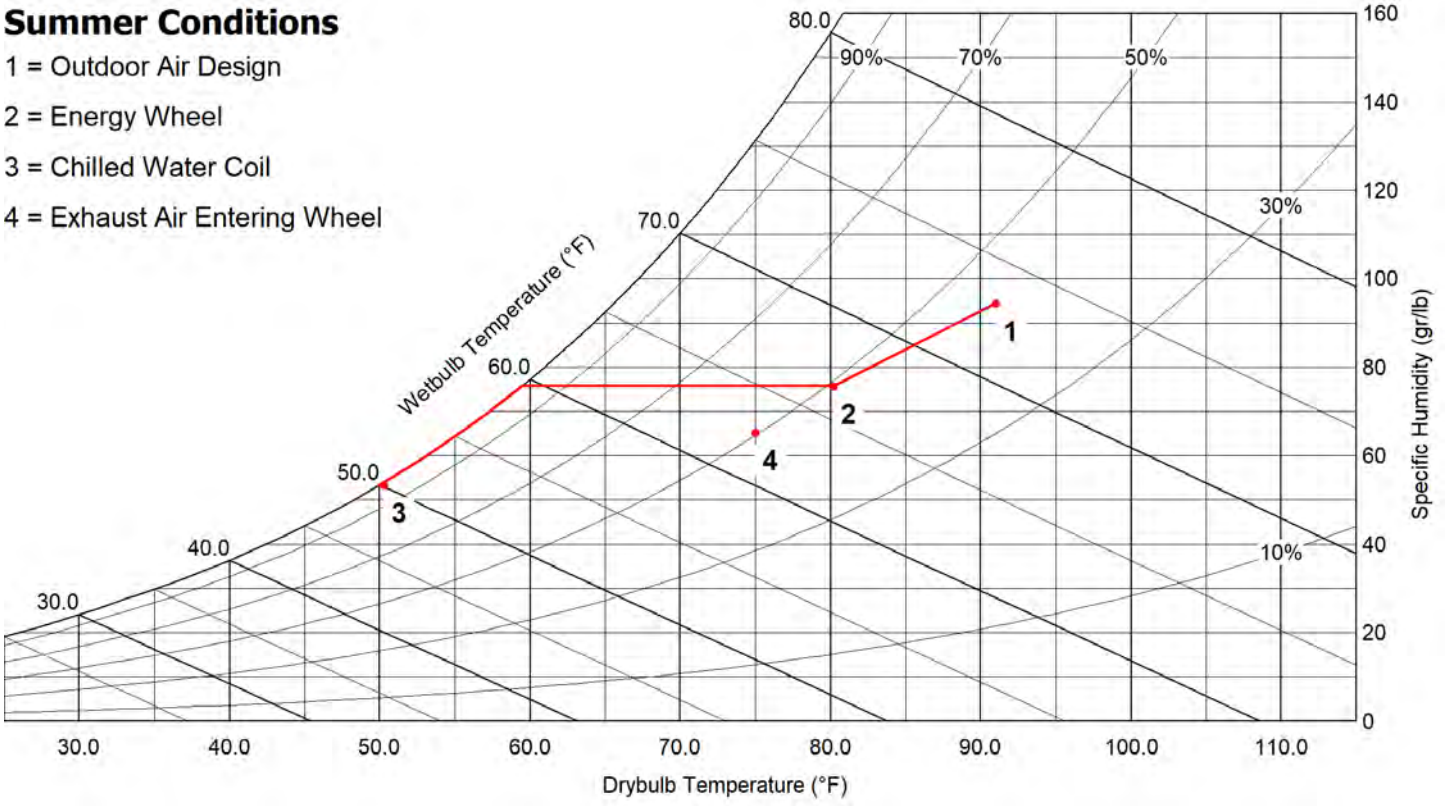
Summer Conditions

1 = Outdoor Air Design

2 = Energy Wheel

3 = Chilled Water Coil

4 = Exhaust Air Entering Wheel



Energy Recovery Winter Performance w/out Preheater

Outdoor Air		Supply Air	
Dry Bulb (F)	0.0	Dry Bulb (F)	45.3
Wet Bulb (F)	-1.5	Wet Bulb (F)	38.7
Specific Humidity (gr/lb)	3	Specific Humidity (gr/lb)	25
Enthalpy (BTU/lb)	0.4	Enthalpy (BTU/lb)	14.6
Exhaust Air		**Return Air**	
Dry Bulb (F)	23.8	Dry Bulb (F)	72.0
Wet Bulb (F)	23.6	Rel. Humidity (%)	35
Specific Humidity (gr/lb)	18	Specific Humidity (gr/lb)	41
Enthalpy (BTU/lb)	8.4	Enthalpy (BTU/lb)	23.7

ENERGY WHEEL

Design Air Flow Conditions

OA Volume (CFM)	ASHRAE 90.1 OA Enthalpy Recovery Ratio	EA Volume (CFM)	EA Wheel Effectiveness
2,600	61.1	2,600	64.7

Outdoor Air Heating Reduction

OA Load w/o Energy Recovery (BTU/h)	OA Load with Energy Recovery (BTU/h)	Equipment Reduction (BTU/h)	Sensible Effectiveness (%)
202,176.0	74,974.0	127,202.0	66.5

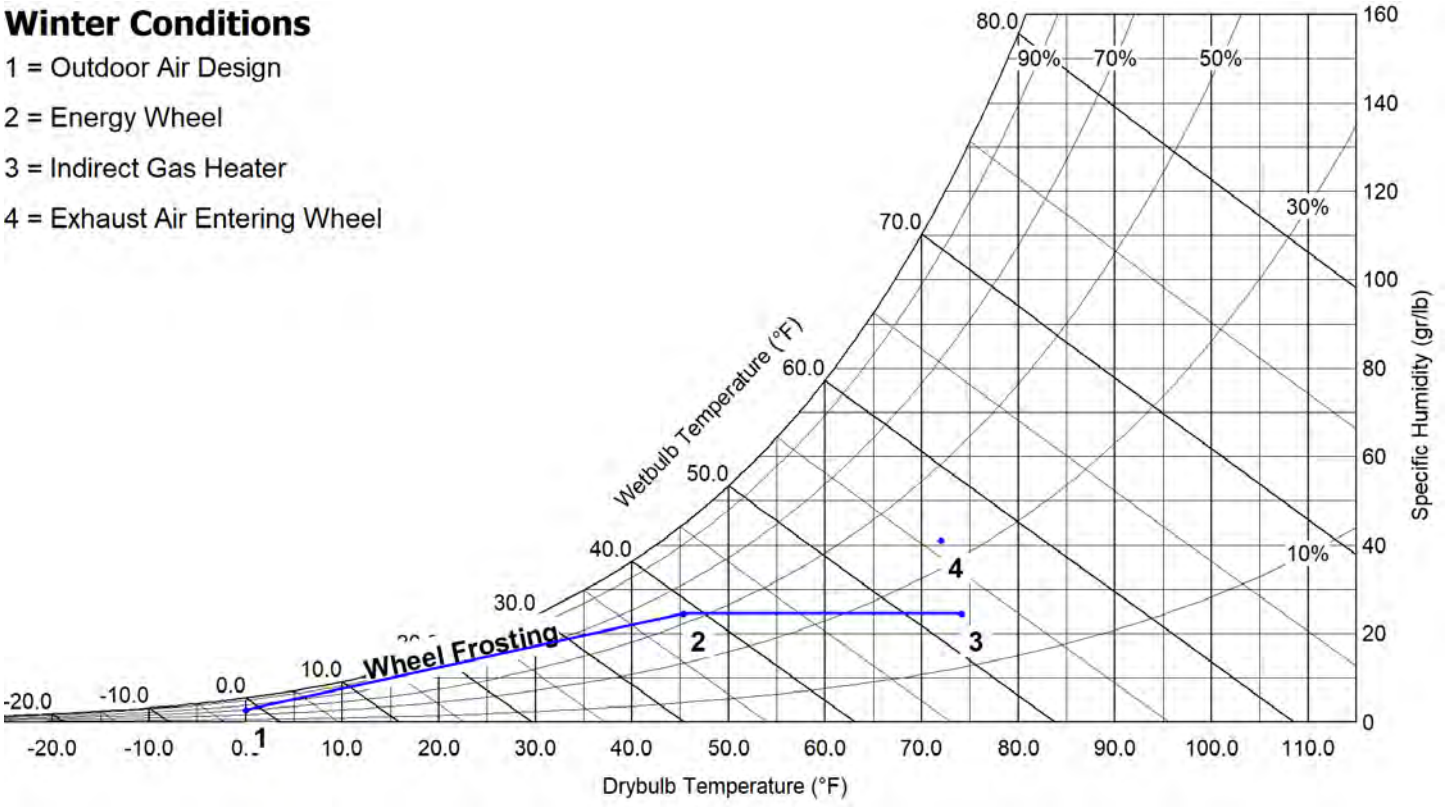
Winter Conditions

1 = Outdoor Air Design

2 = Energy Wheel

3 = Indirect Gas Heater

4 = Exhaust Air Entering Wheel



AHRI Performance Ratings

Energy Recovery Performance Rating in accordance with AHRI Standard 1060 (I-P)							
Rated Airflow (SCFM)		Net Supply Airflow (SCFM)	EATR (%)	OACF	Pressure Drop (in. wg)		Purge Angle (degrees)
Leaving Supply	Entering Exhaust				Supply	Exhaust	
2633	2633	2600	1.2	1.06	0.82	0.81	0

Thermal Effectiveness Ratings							
Enthalpy Recovery		Sensible Effectiveness		Latent Effectiveness		Total Effectiveness	
Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
65.7	61.1	66.9	66.5	62.6	60.1	64.7	64.7

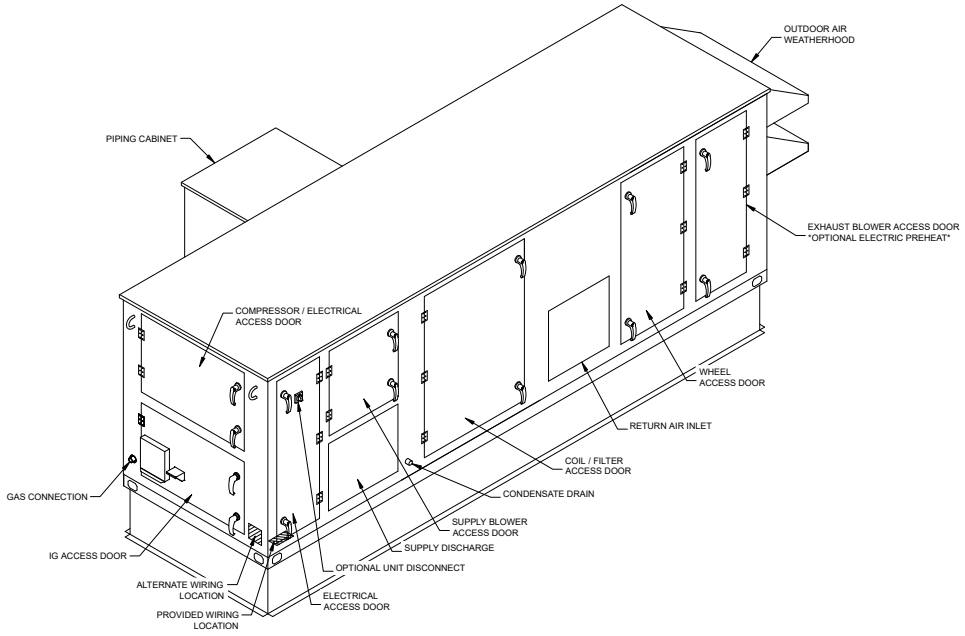
Note(s)

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

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

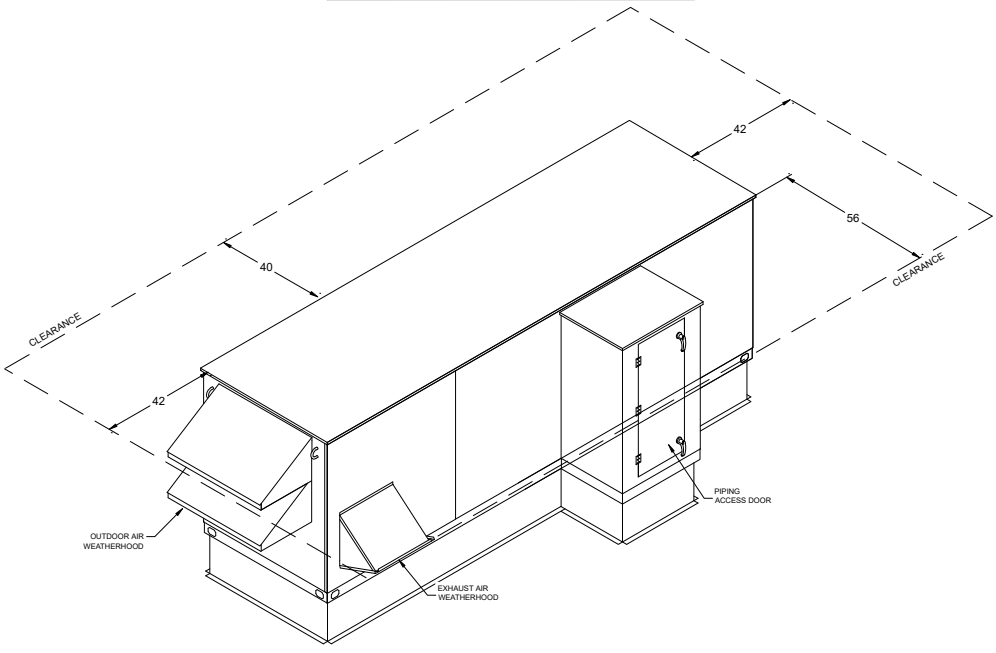
Isometric Drawings

Component Layout



Back Right Isometric

Service Clearances

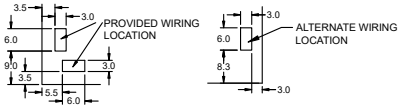


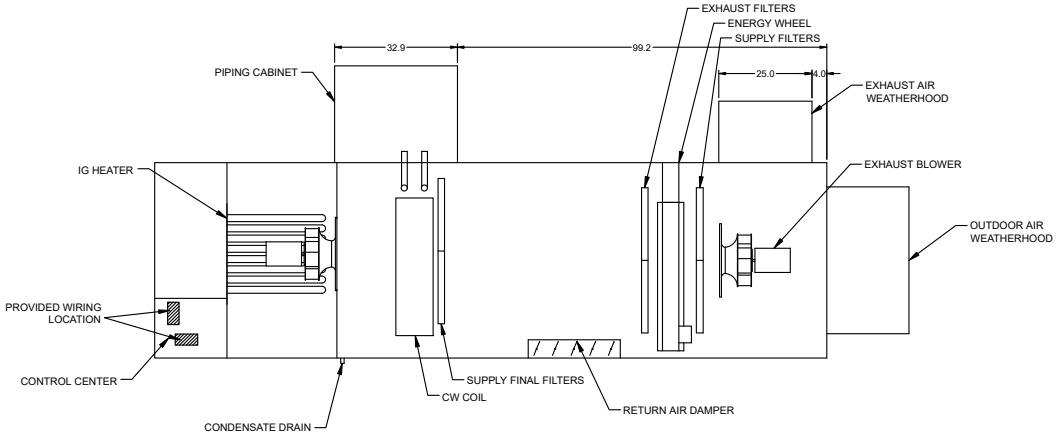
Front Left Isometric

Overview Drawings

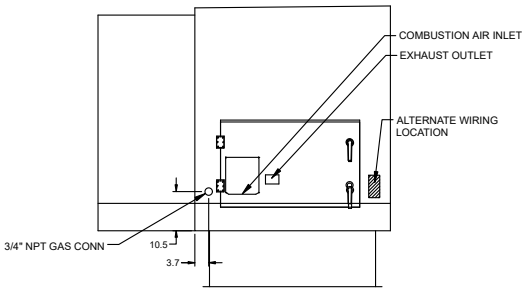
Dimensional Overview

Electrical Connections

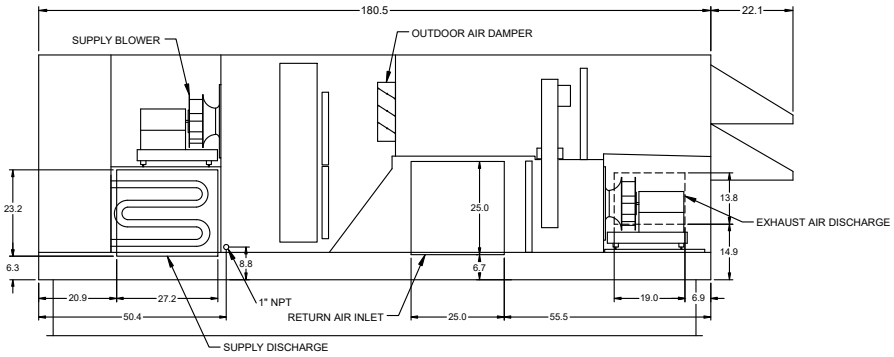




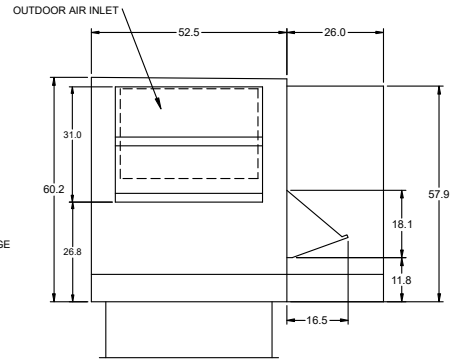
Plan



Left End



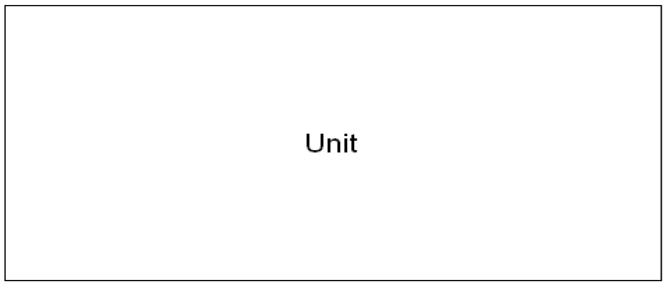
Elevation



Right End

Unit Corner Weights

671 lb 717 lb



688 lb 736 lb

Note

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

VXE-112-36D-CW-C-D1

Unit Performance

Design Conditions

Elevation (ft)	Summer		Winter DB (F)	Supply (CFM)	Outdoor Air (CFM)	Exhaust Air (CFM)
	DB (F)	WB (F)				
180	91.0	73.0	0.0	2,500	2,500	2,500

Unit Specifications

Qty	Weight (lb)	Cooling Type	Heating Type	Unit Installation	Unit ETL Listing	Furnace ETL Listing
1	2,812 (+/- 5%)	Chilled Water	Indirect Gas	Outdoor	UL\cUL 1995/ 60335-2-40	ANSI Z83.8 / CSA 2.6

Configuration

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

Energy Recovery Performance

Design Condition	Temperature (F)								Capacity Reduction (BTU/h)
	Outdoor Air		Supply Air		Return Air		Exhaust Air		
	DB	WB	DB	WB	DB	WB/RH	DB	WB	
Summer	91.0	73.0	80.1	66.3	75.0	62.5/50	85.9	69.8	64,125.0
Winter	0.0	-1.5	45.9	39.2	72.0	55.8/35	23.2	23.0	123,930.0

Cooling Specifications

Type	Fluid Type		Flow Rate (GPM)	Fluid PD (ft wg)	Capacity (MBH)		Fluid Conditions		Performance (DB/WB)	
	Type	%			Total	Sensible	EWT (F)	LWT (F)	EAT (F)	LAT (F)
Chilled Water	Water	100	23.8	3.1	119.6	82.2	45.0	55.0	80.1 / 66.3	50.2 / 50.1

Heating Specifications

Type	Gas Type	Input (MBH)	Output (MBH)	Temperature Rise		Turndown	Performance	
				Min (F)	Max (F)		EAT (F)	LAT (F)
Indirect Gas	Natural	100.0	81.0	2.0	30.0	16:1	45.9	75.9

Motor Specifications

Motor	Qty	Operating Power (hp)	Size (hp)	Enclosure	Efficiency	RPM
Supply	1	2.19	5	ODP	PE	1750
Exhaust	1	2.03	5	ODP	PE	1750

Electrical Specifications

Power Supply	Rating (V/C/P)	MCA (A)	MOP (A)	FLA (A)	Fan Power (W/CFM)*
Unit	460/60/3	18.4	20.0	14.7	1.259

*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	Std
Factory Wired VFDs	Std
Unit Finish - Permatector, Concrete Gray (RAL 7023)	X
Stainless Steel Condensate Drain Pan and Connection	Std
Condensate Drain Trap	Std
Short Circuit Current - 5 kA	Std
Energy Recovery Device - Polymer Wheel w/ Silica Gel Desiccant	Std
Controls	
Unit Controls - Heat-Cool Only Control	Std
Internally Mounted Control Center with 24 VAC control transformer(s)	Std
BMS Protocol - BACNetMSTP	X
BMS Monitoring Points	
Supply Fan Control - 0-10VDC By Others	X
Exhaust Fan Control - 0-10VDC By Others	X
Economizer Control	
Exhaust Fan Only Power	
Web-Based User Interface	
Energy Wheel Economizer Control - VFD Signal By Others	X
Energy Wheel Rotation Sensor	Std
Damper Control - 100% OA-No Recirculation	X
Unoccupied Recirc Mode	
Control Accessories	
Remote Display	
Dirty Filter Sensor(s) - All	X
Airflow Monitor	
Room Thermostat	
Phase/Brownout Protection	X
Economizer Fault Detection Diagnostics	

Accessories	
Frost Control ModulatingWheel - Modulating Wheel	X
Outdoor Air Damper - Low Leakage	X
Return Air Damper - Low Leakage	X
Roof Curb - GKD - 45.9/173.9-G14	X
Supply Air Filters - 2" Merv 8 And 2" Merv 13, 8-20x20x2	X
Service Outlet - Shipped loose and powered by others	X
Piping Vestibule	X
Service Lights	
Condensate Overflow Switch	X
Spare Filters - Both, Qty: 1 set(s)	X
Exhaust Discharge Gravity Backdraft Damper	X
ElectroFin Coil Coating	
Motor Shaft Grounding	X
Bipolar Ionization	
Smoke Detector(s)	
Barometric Relief Damper	
UV Lights	
Return Air Filters - 2" Merv 8, 2-20x25x2	Std
Outdoor Air Filters - 2" Merv 8, 2-20x25x2	Std
Furnace Control - 16:1 Modulating	X
Spare Energy Wheel Belt	
Spare Energy Wheel Segments	
Energy Wheel Bypass Damper	
Power Venting	Std
Warranty Options	
Unit Warranty - 18 Months (Std.)	Std
Energy Wheel Warranty - 5 Yrs Less Motor	Std
Furnace HX Warranty - 25 Yrs.	Std

Standard Option	Std
Not Included	
Included	X

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

Supply Fan Charts And Performance

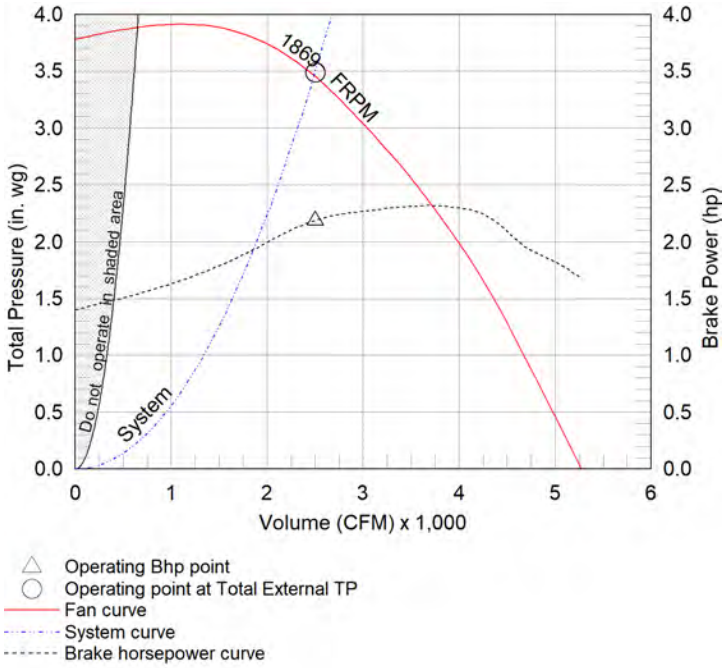
Supply Fan Performance									
Total Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	RPM	Operating Power (hp)	Motor		Fan		
					Qty	Size (hp)	Qty	Type	Drive-Type
2,500	1.5	3.491	1869	2.19	1	5	1	Plenum	Direct

Pressure Drop (in. wg)							
Weatherhood	Filter	Damper	Cooling	Heating	External	Energy Wheel	Total
0.05	0.185	0.02	0.319	0.415	1.5	1	3.491

Sound Performance in Accordance with AMCA										
Sound Power by Octave Band								Lwa	dBA	Sones
62.5	125	250	500	1000	2000	4000	8000			
75	82	83	75	69	66	73	62	79	68	17

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

Supply Fan



Exhaust Fan Charts And Performance

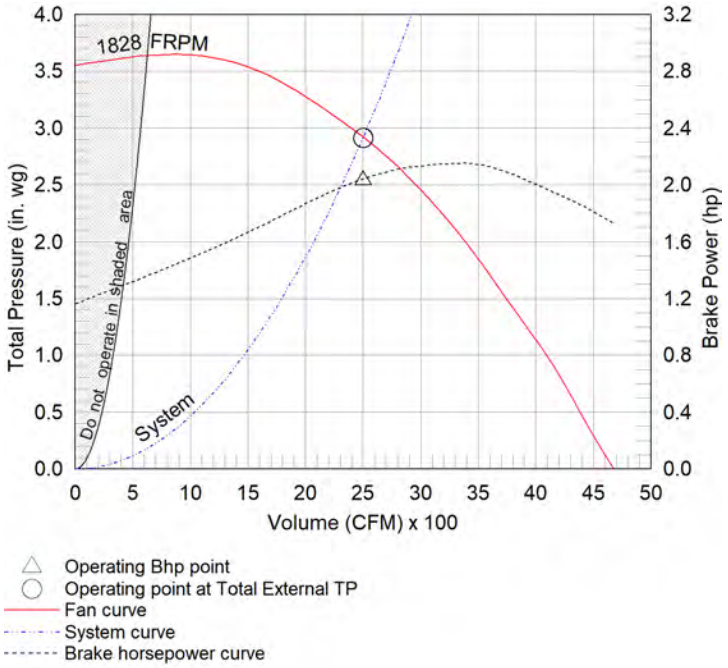
Exhaust Fan Performance									
Total Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	RPM	Operating Power (hp)	Motor		Fan		
					Qty	Size (hp)	Qty	Type	Drive-Type
2,500	1.5	2.915	1828	2.03	1	5	1	Plenum	Direct

Pressure Drop (in. wg)							
Weatherhood	Filter	Damper	Cooling	Heating	External	Energy Wheel	Total
0.08	-	-	-	-	1.5	1.34	2.915

Sound Performance in Accordance with AMCA										
Sound Power by Octave Band								Lwa	dBA	Sones
62.5	125	250	500	1000	2000	4000	8000			
81	72	80	70	67	65	66	60	75	64	13

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

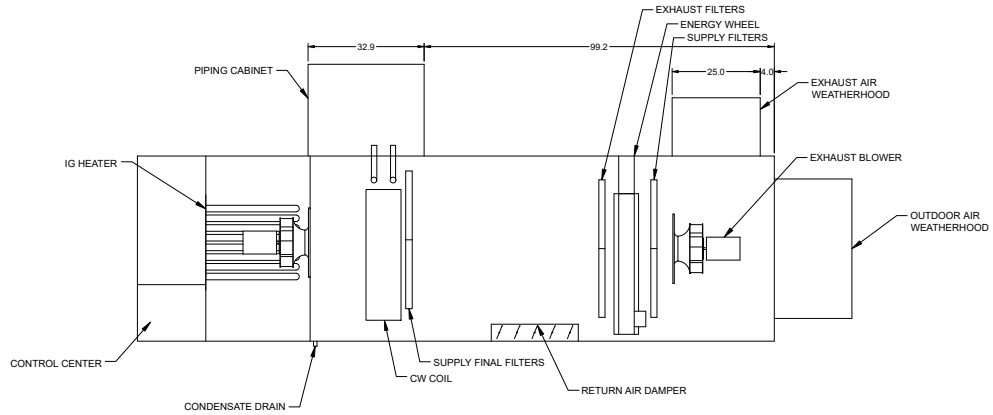
Exhaust Fan



Radiated Sound

Position C

Dimensional Overview



Plan

Position D

Position B

Position A

Supply Air Flow Nominal

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

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

Cooling Performance

Cooling Specifications										
Type	Fluid Type		Flow Rate (GPM)	Fluid PD (ft wg)	Capacity (MBH)		Fluid Conditions		Performance (DB/WB)	
	Type	%			Total	Sensible	EWT (F)	LWT (F)	EAT (F)	LAT (F)
Chilled Water	Water	100	23.8	3.1	119.6	82.2	45.0	55.0	80.1 / 66.3	50.2 / 50.1

Coil Information					
CW Coil Model	Fins Per Inch	Rows Deep	Face Vel. (ft/min)	Coil PD (in. wg)	Connection Size (in.)
CW58S06H10-42x37-RH	10	6	232	0.319	1.5

Unit Details
Coil control valves must be field provided by others
Copper tube, aluminum fin coil construction
Coil freeze protection is to be provided by others
Stainless steel double sloped drain pan

Heating Performance

Heating Specifications								
Type	Gas Type	Input (MBH)	Output (MBH)	Temperature Rise		Turndown	Performance	
				Min (F)	Max (F)		EAT (F)	LAT (F)
Indirect Gas	Natural	100.0	81.0	2.0	30.0	16:1	45.9	75.9

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 (14 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)
Discharge temperature assumes proper energy wheel operation and maintenance.

Printed Date: 03/18/2024
Job: Oliver Ellsworth MS
Mark: DOA-5 @ 2500cfm
Model: VXE-112-36D-CW-C-D1

Energy Recovery Summer Performance

Outdoor Air		Supply Air	
Dry Bulb (F)	91.0	Dry Bulb (F)	80.1
Wet Bulb (F)	73.0	Wet Bulb (F)	66.3
Specific Humidity (gr/lb)	94	Specific Humidity (gr/lb)	75
Enthalpy (BTU/lb)	36.7	Enthalpy (BTU/lb)	31.0
Exhaust Air		**Return Air**	
Dry Bulb (F)	85.9	Dry Bulb (F)	75.0
Wet Bulb (F)	69.8	Rel. Humidity (%)	50
Specific Humidity (gr/lb)	84	Specific Humidity (gr/lb)	65
Enthalpy (BTU/lb)	33.7	Enthalpy (BTU/lb)	28.2

ENERGY WHEEL

Design Air Flow Conditions

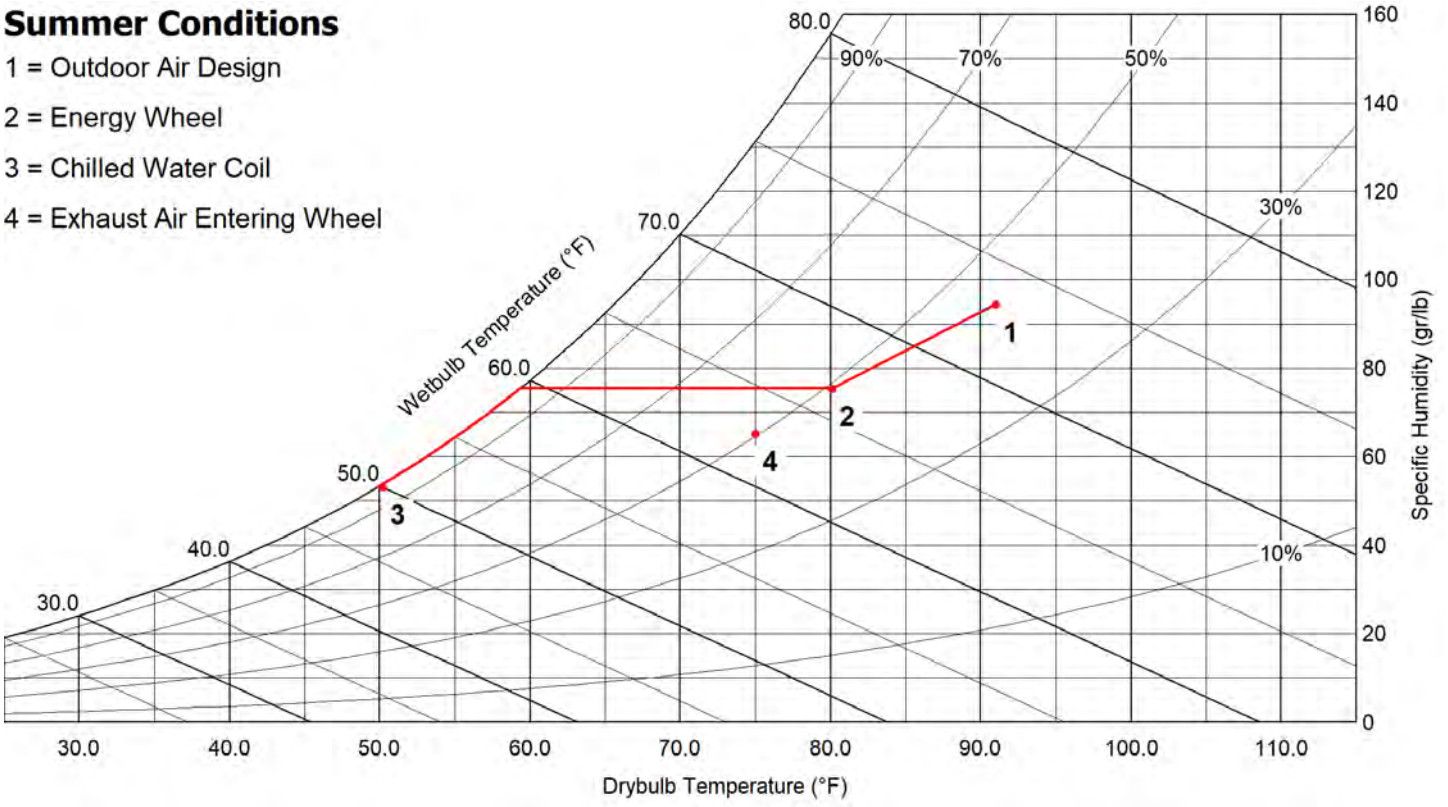
OA Volume (CFM)	ASHRAE 90.1 OA Enthalpy Recovery Ratio	EA Volume (CFM)	EA Wheel Effectiveness
2,500	66.7	2,500	65.6

Outdoor Air Cooling Reduction

OA Load w/o Energy Recovery		OA Load with Energy Recovery		Equipment Reduction (tons)
(BTU/h)	(tons)	(BTU/h)	(tons)	
95,625.0	7.97	31,500.0	2.63	5.34

Summer Conditions

1 = Outdoor Air Design
2 = Energy Wheel
3 = Chilled Water Coil
4 = Exhaust Air Entering Wheel



Energy Recovery Winter Performance w/out Preheater

Outdoor Air		Supply Air	
Dry Bulb (F)	0.0	Dry Bulb (F)	45.9
Wet Bulb (F)	-1.5	Wet Bulb (F)	39.2
Specific Humidity (gr/lb)	3	Specific Humidity (gr/lb)	25
Enthalpy (BTU/lb)	0.4	Enthalpy (BTU/lb)	14.9
Exhaust Air		**Return Air**	
Dry Bulb (F)	23.2	Dry Bulb (F)	72.0
Wet Bulb (F)	23.0	Rel. Humidity (%)	35
Specific Humidity (gr/lb)	17	Specific Humidity (gr/lb)	41
Enthalpy (BTU/lb)	8.2	Enthalpy (BTU/lb)	23.7

ENERGY WHEEL

Design Air Flow Conditions

OA Volume (CFM)	ASHRAE 90.1 OA Enthalpy Recovery Ratio	EA Volume (CFM)	EA Wheel Effectiveness
2,500	62.1	2,500	65.6

Outdoor Air Heating Reduction

OA Load w/o Energy Recovery (BTU/h)	OA Load with Energy Recovery (BTU/h)	Equipment Reduction (BTU/h)	Sensible Effectiveness (%)
194,400.0	70,470.0	123,930.0	67.3

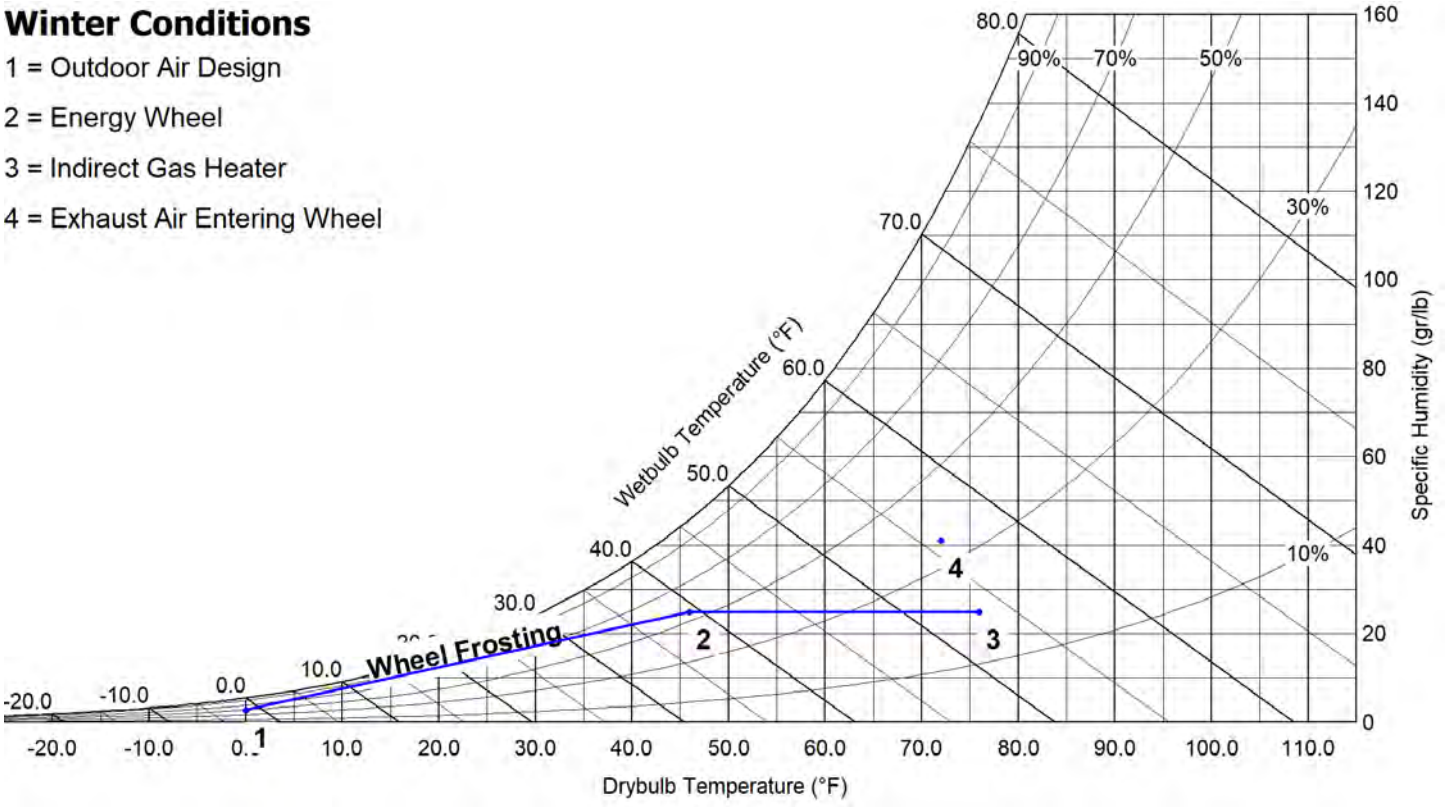
Winter Conditions

1 = Outdoor Air Design

2 = Energy Wheel

3 = Indirect Gas Heater

4 = Exhaust Air Entering Wheel



AHRI Performance Ratings

Energy Recovery Performance Rating in accordance with AHRI Standard 1060 (I-P)							
Rated Airflow (SCFM)		Net Supply Airflow (SCFM)	EATR (%)	OACF	Pressure Drop (in. wg)		Purge Angle (degrees)
Leaving Supply	Entering Exhaust				Supply	Exhaust	
2533	2533	2500	1.3	1.06	0.79	0.78	0

Thermal Effectiveness Ratings							
Enthalpy Recovery		Sensible Effectiveness		Latent Effectiveness		Total Effectiveness	
Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
66.7	62.1	67.8	67.3	63.6	61.2	65.6	65.6

Note(s)

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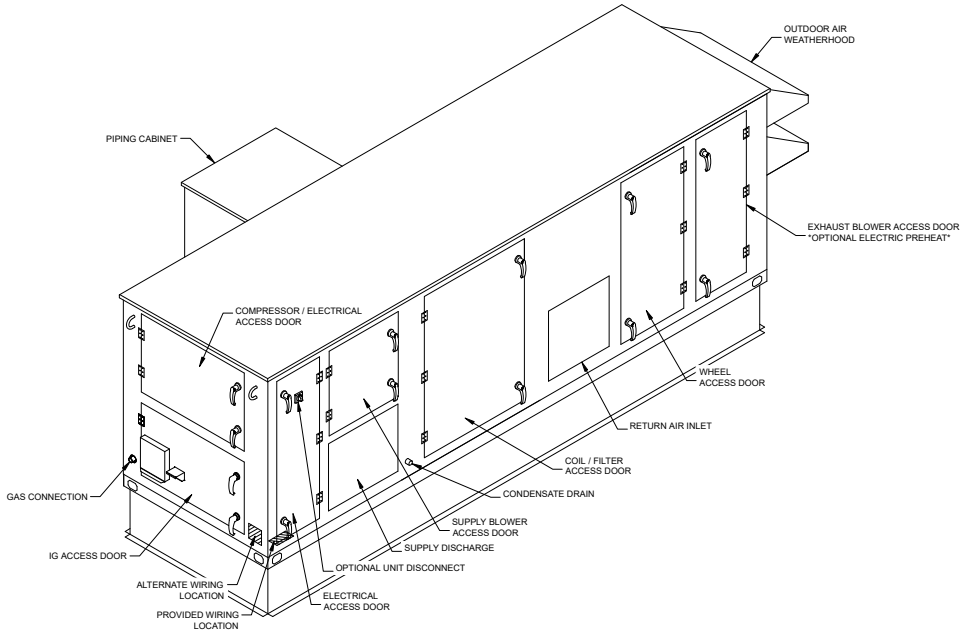
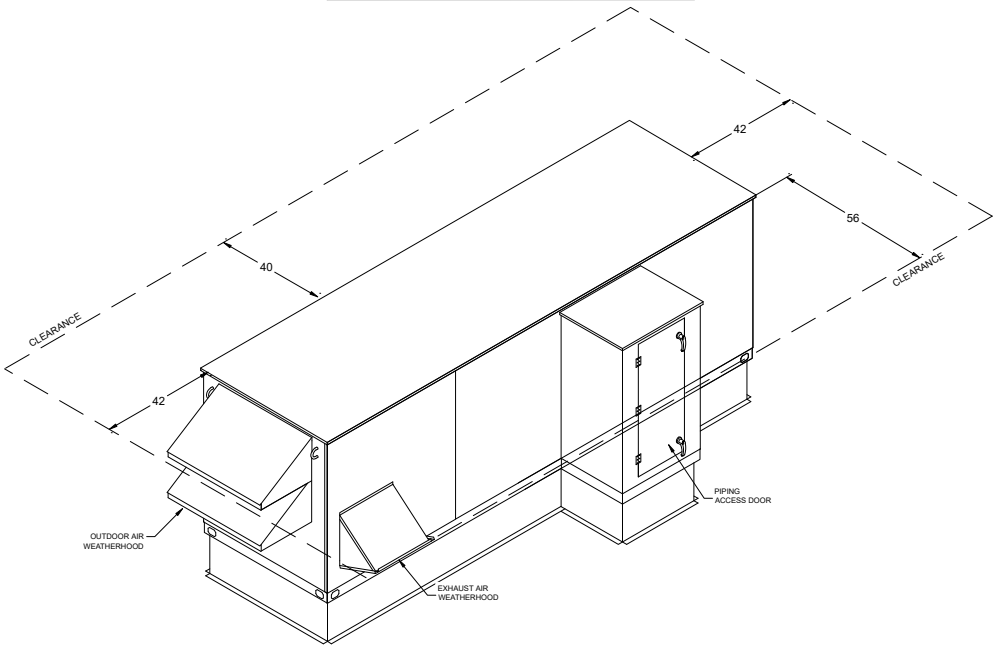
Component Layout



Back Right Isometric

Service Clearances

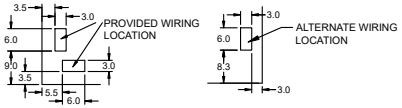


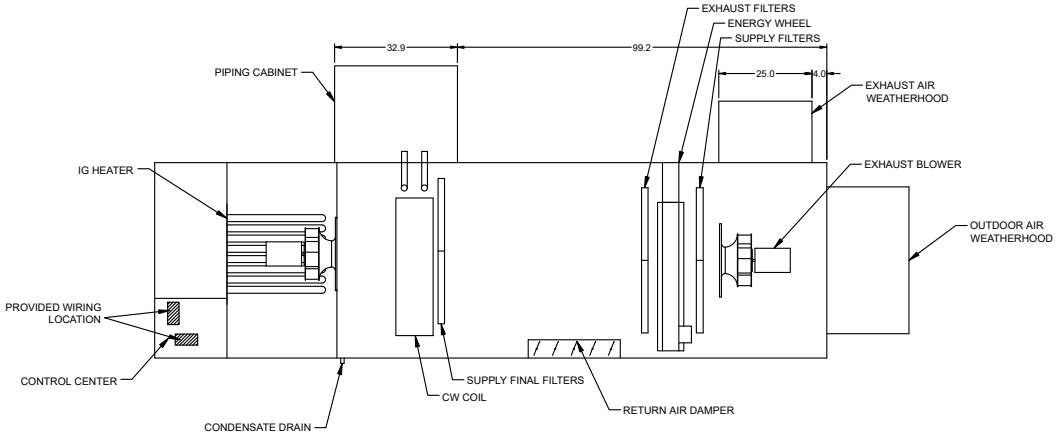
Front Left Isometric

Overview Drawings

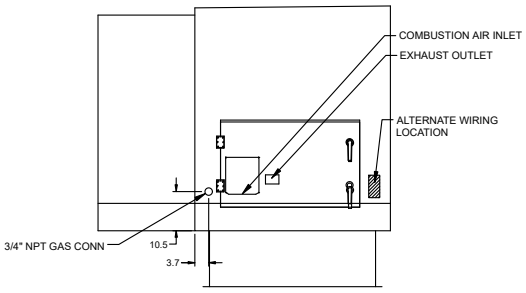
Dimensional Overview

Electrical Connections

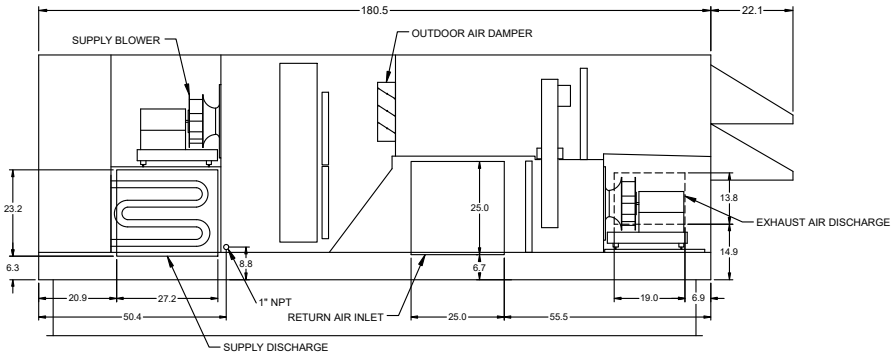




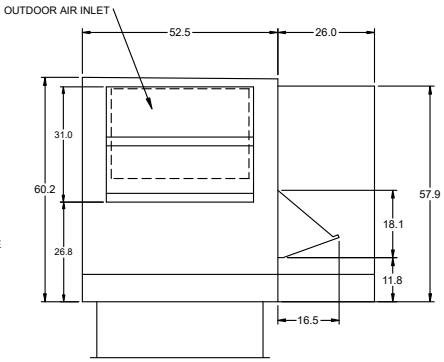
Plan



Left End



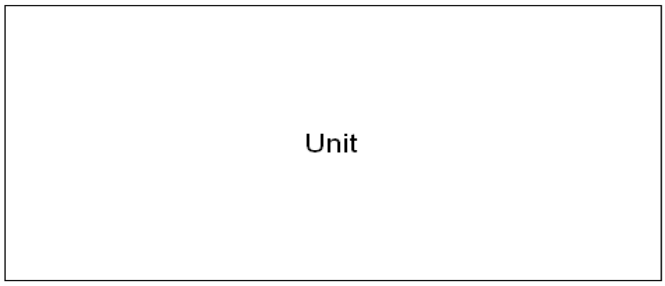
Elevation



Right End

Unit Corner Weights

671 lb 717 lb



688 lb 736 lb

Note

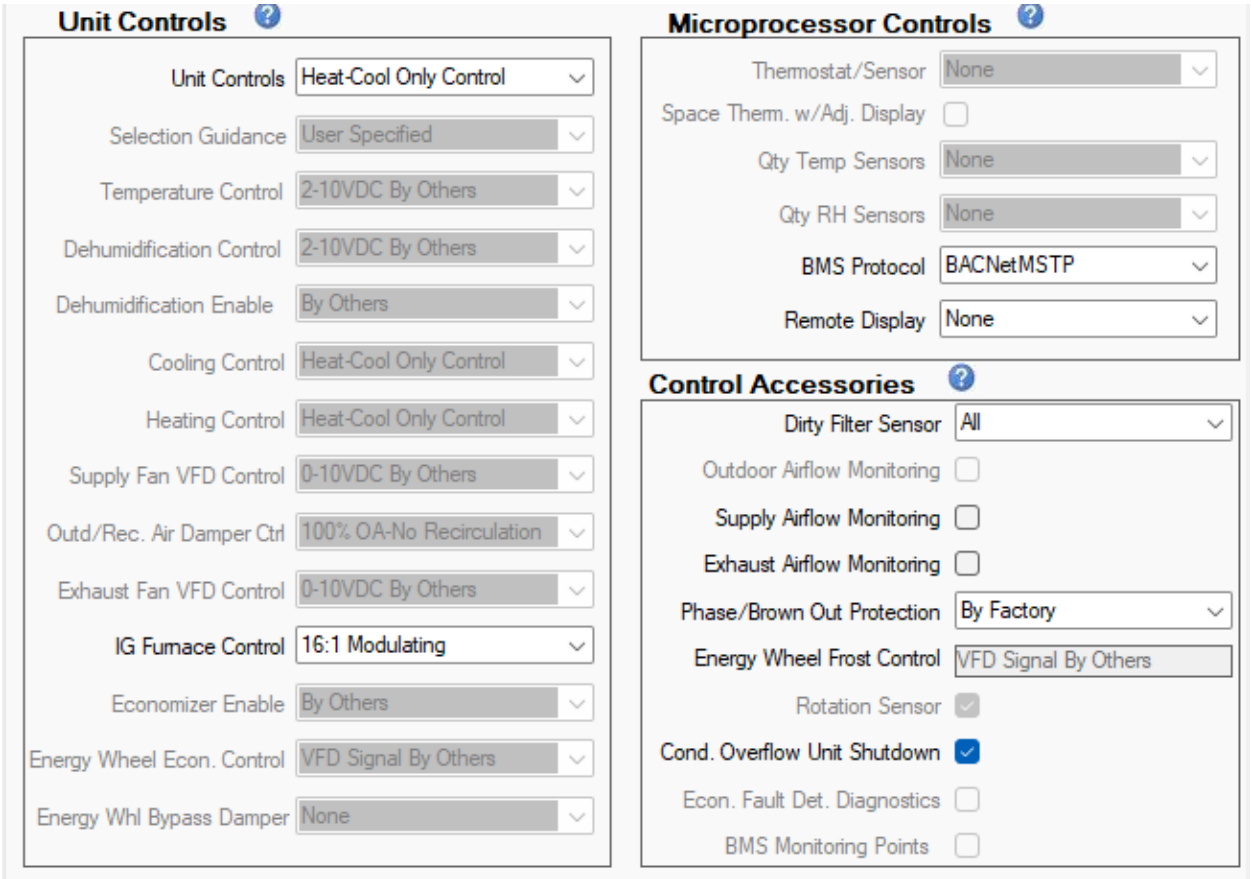
Estimated corner weights are shown looking down on unit and the outside air intake will be on the right. Weights are applied at the base of the unit. Images not drawn to scale.

Oliver Ellsworth Middle School

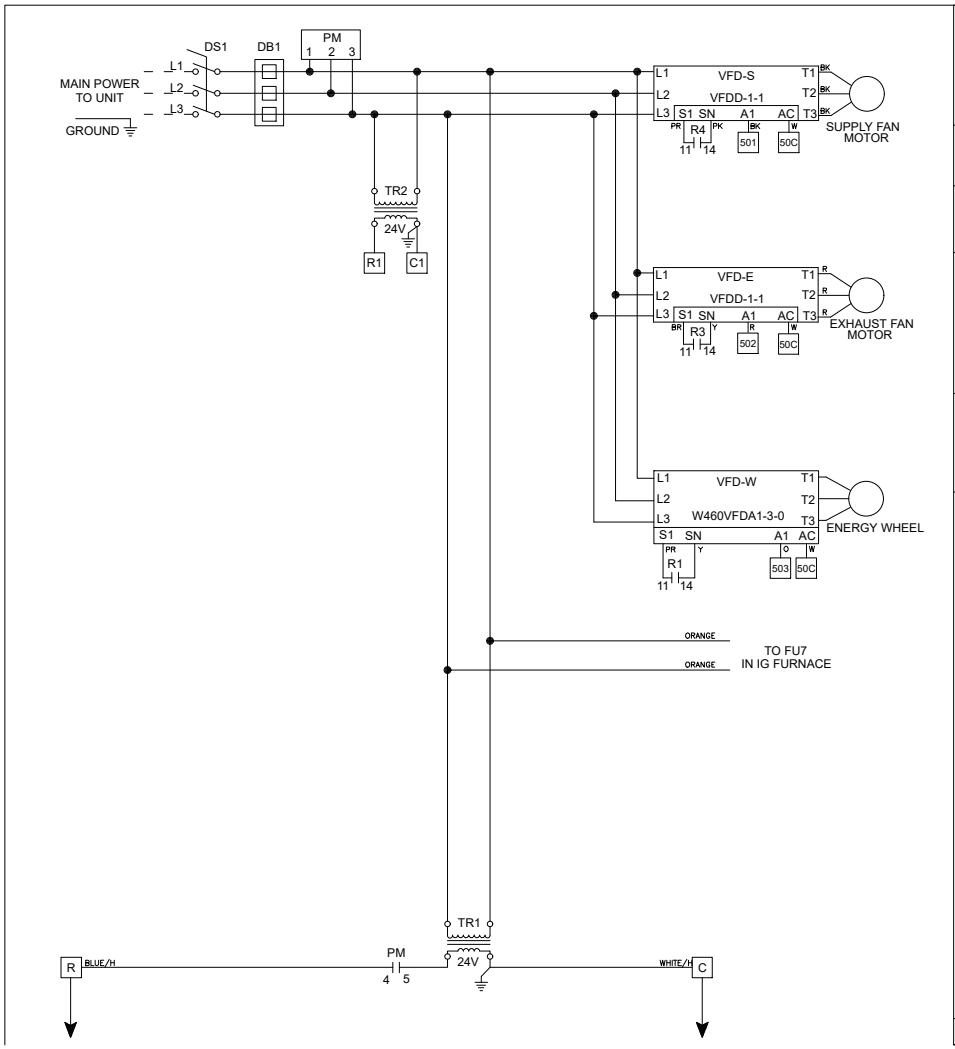
Windsor CT

Control & Wiring

Information



Wiring Diagram



AIR MANAGEMENT SYSTEMS

Wiring Diagram Code:

~~V2~~2Q1G1GF52A44X00CX02H0000BH30

CAUTION

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

NOTES

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

FIELD CONTROL WIRING RESISTANCE SHOULD NOT EXCEED 0.75 OHM.

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

WIRE COLOR CODE

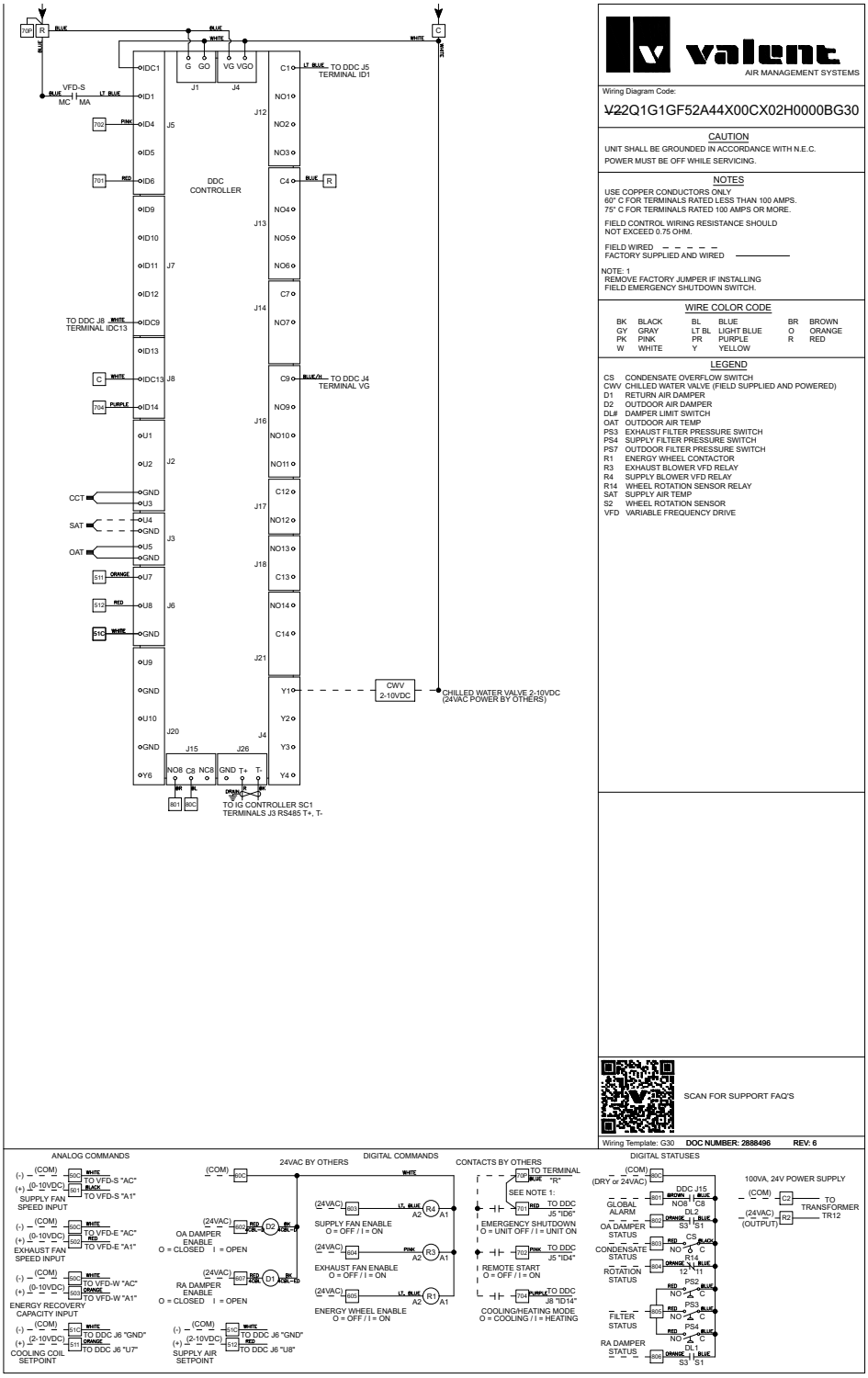
BK	BLACK	BL	BLUE	BR	BROWN
GY	GRAY	LT BL	LIGHT BLUE	O	ORANGE
PK	PINK	PR	PURPLE	R	RED
W	WHITE	Y	YELLOW		

LEGEND

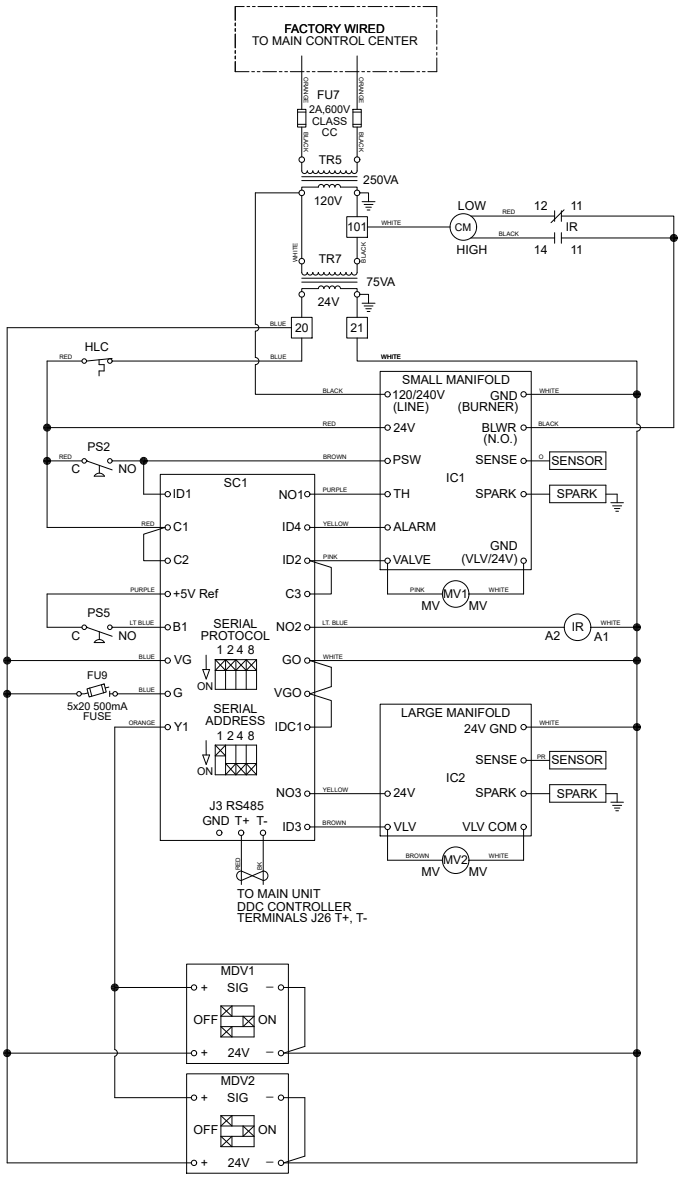
DB#	POWER DISTRIBUTION BLOCK
DS	DISCONNECT SWITCH
PM	PHASE VOLTAGE MONITOR
R1	ENERGY WHEEL CONTACTOR
R3	EXHAUST BLOWER VFD RELAY
R4	SUPPLY BLOWER VFD RELAY
TR#	TRANSFORMER
VFD	VARIABLE FREQUENCY DRIVE

Wiring Template: H30 DOC NUMBER: 2888496 REV: 6

Wiring Diagram 2



INDIRECT GAS WIRING DIAGRAM
FURNACE 1 - HTD MODULATING



valent
AIR MANAGEMENT SYSTEMS

Wiring Diagram Code:

V6N51X1RX0010GS22

CAUTION

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

NOTES

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

FIELD CONTROL WIRING RESISTANCE SHOULD NOT EXCEED 0.75 OHM.

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

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

WIRE COLOR CODE

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

LEGEND

CM	COMBUSTION BLOWER MOTOR
FU#	FUSE(S)
HLC	HIGH TEMPERATURE LIMIT CONTROL
IC1	IGNITION CONTROL - SMALL MANIFOLD
IC2	IGNITION CONTROL - LARGE MANIFOLD
IR	INDUCTION RELAY
MDV1	MODULATING VALVE - SMALL MANIFOLD
MDV2	MODULATING VALVE - LARGE MANIFOLD
MV1	MAIN GAS VALVE - SMALL MANIFOLD
MV2	MAIN GAS VALVE - LARGE MANIFOLD
PS2	COMBUSTION AIR PROVING SWITCH
PS5	HIGH SPEED PRESSURE SWITCH
SC1	STAGE CONTROLLER
TR#	TRANSFORMER(S)

Wiring Template: S22 DOC NUMBER: 2888496 REV: 6

Heat-Cool Only Controls - Sequence of Operation

1. Third-Party Controls Responsibilities and Limitations

The following information in this section are guidelines for the third-party controls contractor to follow when controlling a unit with Heat-Cool Only controls:

1.1 Airflow

Maintaining the proper airflow through the unit is the responsibility of the third-party.

A. Dampers
Ensure damper end switch, when installed, proves the damper position for airflow through the unit prior to starting the supply fan. (100% OA units)

i. Outside Air Damper
ii. Return Air Damper

B. Supply Fan Modulation
Proper fan modulation is the responsibility of the third-party. Enable and modulation of the supply fan within the following guidelines:

i. Compressor Operation
- Fan turn down limited to 50% of the designed airflow.

ii. Electric Heat
- Fan turndown limited to the requirements from the electric heater manufacturer.

iii. Gas Furnace Heat
- All gas furnaces must be limited to the greater of the following:
  - o minimum airflow in CFM; OR
  - o 50% of design airflow.

C. Exhaust Fan Modulation
Enable and modulation of the exhaust fan necessary to achieve the building requirements.

1.2 Energy Recovery

Controlling the energy recovery equipment is the responsibility of the third-party.

A. Enable of Energy recovery device and modulation signal, if installed.

B. Defrost of device located in the outside air stream.
All units with energy recovery options must provide a defrost sequence for the energy recovery section.

i. Energy Wheel
- Provide a difference pressure switch or transducer installed across the energy wheel; AND
- Maintain less than 1.5”wc when Outside Air Temp less than 10 F.

ii. Energy Core
- Provide an exhaust air temperature sensor; AND
- Maintain the exhaust air temperature >= 30 F.

i. Energy Wheel
- Provide an exhaust air temperature sensor; AND
- Maintain the exhaust air temperature >= 25 F.

iii. Pre-heat device, when installed, for energy recovery defrost.
- Outside Air Damper >= 30% open; AND
- Supply Fan enabled; AND
- Outdoor Air Temp less than 10 F.

Note: Please see manufacturer’s information for suggested minimum cfm for pre-heat.

1.3 Supply Air Temperature Control

Supply Air Temperature must be monitored and maintained by the third-party.

A. Supply Air Temperature Setpoint

i. A 2-10VDC analog input will be utilized by the third-party for setpoint control.

ii. Setpoint range between 50.0°F and 95.0°F for all modes of operation.
Note: A minimum setpoint of 60.0°F is advised in heating mode of a heat pump.

B. Supply Air Temperature Limits

The third-party must follow the supply air temp limits below.

i. Minimum Low Supply Temp Limit
- Supply Air Temperature less than 35 F.
- Cooling will shutdown and the unit will be disabled.

ii. Maximum High Supply Temp Limit
- Supply Air Temperature > 120 F.
- Heating will shutdown and the unit will be disabled.

1.4 Cooling and Dehumidification

Refrigeration control is requested by the third-party via two 2-10VDC inputs:

A. Cooling Mode

- Remote Enable Input: Closed
- Cooling/Dehumidification Input: Open
- Cooling/Heating Input: Open
- Cooling Coil Setpoint Request: 50 F - 75 F scaled from 2-10VDC (Compressor Staging)

B. Dehumidification Mode

- Remote Enable Input: Closed
- Cooling/Dehumidification Input: Closed
- Cooling/Heating Input: Open
- Supply Air Setpoint Request: 50 F - 95 F scaled from 2-10VDC (HGRH Valve Modulation)
- Cooling Coil Setpoint Request: 50 F - 75 F scaled from 2-10VDC (Compressor Staging)

1.5 Heating

Heating device control is requested by the third-party via a single 2-10VDC input. This input will control any heating devices installed in the unit.

A. Heating Mode
(IG Furnace, Electric Heat, Hot Water, Heat Pump Heating)

- Remote Enable Input: Closed
- Cooling/Dehumidification Input: Open
- Cooling/Heating Input: Closed
- Supply Air Setpoint Request: 50 F - 95 F scaled from 2-10VDC

Note: A minimum setpoint of 60.0 F is advised in heating mode of a heat pump.

2. Controls Availability

The following sequence is logic in the Heat-Cool Only Controller installed in the unit.

2.1 Unit Availability

The unit is available for operation when the following conditions are met:

A. Heat-Cool Only system alarms are not active.
B. Shutdown Input is closed.
C. Remote Start Input is closed.
D. Supply fan status indicates that the fan is running.
E. Outside Air Temperature sensor is reading a normal temperature.
F. Coil Leaving Air Temperature sensor is reading a normal temperature.
G. Supply Air Temperature sensor is reading a normal temperature.

2.2 Cooling Availability

The unit is available to operate in cooling mode when all the Unit Availability conditions, and the following conditions are met:

A. Outside Air Temp > Cooling Ambient Lockout.

B. Coil Leaving Air Temp > Cold Coil Low Limit Setpoint.
- If the coil leaving temp falls below 42.0 F, the compressors are not available to stage on until the cooling coil temp reaches 46.0 F.

C. Cooling/Heating Control Mode is open for cooling mode (third-party input).

D. Refrigeration alarms are not active.

2.3 Heating Availability

The unit is available to operate in heating mode when all the Unit Availability conditions, and the following conditions are met:

A. Outside Air Temp less than Heating Ambient Lockout.
B. Cooling/Heating Control Mode is closed for Heating Mode (third-party input).
C. Heat device alarms are not active.
D. Heat Pump Heating – Outside Air Temp > ASHP Low Ambient Lockout for ASHP.

3. Cooling Sequence

3.1 Cooling Control

The heat-cool only controller performs the following functions for compressor control.

A. The compressors stage and modulate to maintain the cooling coil temperature setpoint.

B. Modulating Inverter Scroll Compressor
If the unit is equipped with an inverter scroll compressor, the following control will also apply:

- Envelope Control: The Hear-Cool Only controller will monitor temperatures and pressures in the circuit and compare them to the compressor's operating envelope to ensure that the compressor is within safe operating conditions.
- Superheat Control: An Electronic Expansion Valve (ExV) and Electronic Valve Driver (EVD) will be utilized in the modulating circuit. The EVD will control the position of the ExV based on the Suction Superheat to maintain a setpoint of 10 F.

3.2 Dehumidification Control

Dehumidification mode is possible on units equipped with Hot Gas Reheat.

A. Enable Dehumidification
The Cooling/Dehumidification input is closed to initiate dehumidification mode, the following will occur:

- The hot gas reheat valve will modulate to maintain the supply air temperature setpoint.

- The compressors stage and modulate to maintain the cooling coil temperature setpoint.

B. Disable Dehumidification
The Cooling/Dehumidification input is open to initiate cooling mode, the following will occur:

- The HGRH valve modulates to the closed position when a compressor in the HGRH circuit is operating.
- The compressors stage and modulate to maintain the cooling coil temperature setpoint.

3.3 Pressure Control

Pressure control maintains a consistent condensing temperature in cooling and dehumidification modes by modulating coil fans to meet the pressure control setpoint.

4. Heating Sequence

4.1 Heat Control

The heat-cool only controller performs the following functions for control of gas furnaces, electric heat, or hot water devices installed in the unit.

A. Modulates the heating device to maintain the supply air temperature setpoint.

4.2 Heat Pump Heating

A. The compressors stage and modulate to maintain the supply air temperature setpoint.

B. Modulating Inverter Scroll Compressor

If the unit is equipped with an inverter scroll compressor, the following control will also apply:

- Envelope Control: The main controller will monitor temperatures and pressures in the circuit and compare them to the compressor's operating envelope to ensure that the compressor is within safe operating conditions.

- Superheat Control: An Electronic Expansion Valve (ExV) and Electronic Valve Driver (EVD) will be utilized in the modulating circuit. The EVD will control the position of the ExV based on the Suction Superheat to maintain a setpoint of 10 F.

C. Pressure Control

Pressure control maintains a consistent coil temperature in heating mode by modulating coil fans to meet the pressure control setpoint.

D. Secondary Heat

A secondary heating device may be installed in the unit. This device may be electric heat, gas furnace, or a hot water coil.

- Backup
  Secondary heat only operates when heat pump heating is not available.

- Supplemental
  Secondary heat will operate simultaneously with heat pump heating when the compressors are not producing enough heat to stay within 2 F of setpoint.

E. Outside Coil Defrost - ASHP

An Air-Source Heat Pump (ASHP) periodically initiates a defrost cycle of the outside coil to remove the accumulation of frost build-up when operating in heating mode.

- Supplemental Heat

If supplemental heat is installed in the unit, that heating device will maintain the Supply Air Temperature Setpoint.

- Backup Heat
  If backup heat is installed in the unit, that heating device will NOT start during defrost operation.

5. Switching Modes of Operation

The unit switches modes of operation based on an external input from a third-party device.

5.1 Switch from Cooling to Heating

When the Cooling/Heating contact is closed and all heating availability conditions are met, heating mode will initiate, and the following will occur:

A. All currently operating compressors are shut down.

B. The mode switch timer starts before completely switching to heating mode.

C. The reversing valve moves to the heating position, if the unit is a heat pump.

5.2 Switch from Heating to Cooling

When the Cooling/Heating contact is open and all cooling availability conditions are met, cooling mode will initiate, and the following will occur:

A. All heating devices are shut down.

B. The mode switch timer starts before completely switching to cooling mode.

C. The reversing valve moves to the cooling position, if the unit is a heat pump.

6. Digital Statuses

The Heat-Cool Only terminal strip provides the third-party controller with information from devices installed in the unit. The following information is available through those digital statuses.

6.1 Outside Air Damper Actuator End Switch

When installed, this status provides an indication that the outside air damper actuator has reached a specific open position.

6.2 Condensate Overflow Switch

This device, when installed, indicates when the condensate drain pan is full and further operation of the refrigeration system could cause an overflow of water in the pan.

6.3 Energy Recovery Status

When installed, the energy recovery device may have an indication back to the terminal strip that the device is rotating, or the bypass is open.

6.4 Filter Pressure Switch

If a filter pressure switch or switches are installed, an indication back to the third-party indicates that the filters are dirty.

6.5 Global Alarm Output

The global alarm output is available on all Heat-Cool Only units. This status indicates that there is an alarm condition in the Heat-Cool Only controller.

Warranty Statement for Dedicated Outdoor Air Systems (DOAS)

Unit Warranty

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

Energy Wheel Warranty

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

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.

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.

Connecticut Headquarters
330 Main Street, STE 24
Manchester, CT 06040
Ph: (860) 730-4974
Email: seismiccontrolproducts@gmail.com

February 28, 2024

Submittal

Wind Certified Roof Curbs

Project: Oliver Elsworth Middle School
Windsor, CT

Customer: Swan Associates, Inc.
49 Holly Drive
Newington, CT 06111
Phone: 860-666-6923
Fax: 860-666-2861

Engineer: van Zelm Engineers
10 Talcott Notch
Farmington, CT 06032
Phone: 860-529-8882
Fax: 860-529-3991

Notes: Structural Steel Base to Span Perpendicular Beams

NOVIA CORPORATION

Salem, NH
Tel: (603)-898-8600
www.noviacorp.com

Submittal Data

Project:	Oliver Ellsworth School		
Location:	Windsor, CT		
Customer:	Seismic Control Products, LLC	P.O. No.:	24005

Submittal		Date	Description
→	Rev 0	02/27/24	DOAS-1, 2, 3, 4, 5 Roof Curb Submittal

Code/Spec.:	IBC 2015
Our Job No.:	N240060
Prepared By:	Chris Schall

Vibration Isolation
In stock
Hangers – All types
Floor mounts – All types
Restrained Mounts
Floating Floors
Resilient Ceilings

Seismic Restraints
Materials – In Stock

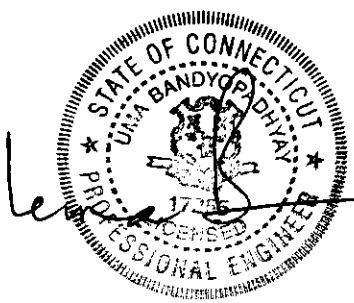
Custom Metal Fabrication
Spring Curbs
Seismic Curbs
Flashable Rails
Inertia Bases
Cooling Tower Rails
I-Beams
Custom Stands & Bases

Representing
Unisource
Flex Connectors
Expansion Joints & Compensators
V – Loops

Engineering
Seismic & Wind Loading
Pipe Thermal Expansion
Pipe Stress Analysis
Finite Element Analysis
PE Certifications

Summary of Calculations

Drawing	Date	Description
240060EC1	02/27/24	Curb Calc



2/27/24

CERTIFICATE OF LIABILITY INSURANCE

1/1/2025

DATE (MM/DD/YYYY) 1/10/2024

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Lockton Companies 1185 Avenue of the Americas, Suite 2010 New York NY 10036 646-572-7300	CONTACT NAME:	
	PHONE (A/C, No, Ext):	FAX (A/C, No):
	E-MAIL ADDRESS:	
	INSURER(S) AFFORDING COVERAGE	NAIC #
	INSURER A : Travelers Property Casualty Company of America	25674
INSURED 1529598 Novia Corporation 1 NORTHWESTERN DR SALEM NH 03079-4809	INSURER B : Westchester Surplus Lines Insurance Co	10172
	INSURER C : Lloyds of London	
	INSURER D : Travelers Casualty and Surety Company	19038
	INSURER E : Steadfast Insurance Company	26387
	INSURER F : --- SEE ATTACHMENT ---	

COVERAGES **CERTIFICATE NUMBER:** 20194088 **REVISION NUMBER:** XXXXXXX

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
C	X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE X OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: X POLICY PRO-JECT LOC OTHER:	N	N	B1881S230354	1/1/2024	1/1/2025	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$ 1,000,000 $ 50,000 $ 5,000 $ 1,000,000 $ 2,000,000 $ 2,000,000
A	AUTOMOBILE LIABILITY X ANY AUTO OWNED AUTOS ONLY SCHEDULED AUTOS HIRED AUTOS ONLY NON-OWNED AUTOS ONLY X Comp/Coll DED: $100K	N	N	TC2JCAP-1R571266-TIL-24	1/1/2024	1/1/2025	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 1,000,000 $ XXXXXXX $ XXXXXXX $ XXXXXXX $ XXXXXXX
B	X UMBRELLA LIAB X OCCUR X EXCESS LIAB CLAIMS-MADE DED RETENTION $	N	N	G74376009 001	1/1/2024	1/1/2025	EACH OCCURRENCE AGGREGATE	$ 2,000,000 $ 2,000,000 $ XXXXXXX
A D	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y / N: N (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	N / A	N	UB-6X230049-24-51-K UB-6X229143-24-51-R (MA)	1/1/2024 1/1/2024	1/1/2025 1/1/2025	X PER STATUTE OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ 1,000,000 $ 1,000,000 $ 1,000,000
F F E	Excess $3M X $2M Excess $5M X $5M Mfg E&O	N	N	See Attached See Attached EOC 7921869-00	1/1/2024 1/1/2024 1/1/2024	1/1/2025 1/1/2025 1/1/2025	Each occ/agg: $3M Each Occ/agg: $5M $2,000,000 Ret: 50K	

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

CERTIFICATE HOLDER

20194088
Evidence of Insurance

CANCELLATION See Attachments

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

NOVIA CORPORATION
1 Northwestern Dr. Salem, NH 03079
P:(603)-898-8600
email: sales@noviacorp.com

Curbs & Roof Rail Schedule

PROJECT: OLIVER ELLSWORTH SCHOOL
CUSTOMER: SEISMIC CONTROL PRODUCTS, LLC **P.O.#:** 24005
PM: TOM COLLETTI
ENGINEER:
LAST FOLLOW-UP:

NAI # : N240060
DRAWING # : N240060SC
THIS UPDATE : 02/27/24
LAST UPDATE : NONE

STATUS (SEE NOTE)	TAG	QTY	EQUIP SUBM RCV'D	CURBS & ROOF RAILS				
				DEFLECTION	MODEL	DWG. NO.	DATE	RELEASED
EQUIPMENT								
IFA	**DOAS-1, 2, 3, 4, 5**	**5**	**YES**	**N/A**	**SeisCurb**	**240060-1**	**02/27/24**	

STATUS:
IFA= IN FOR APPROVAL, APRVD= APPROVED, RLSD= RELEASED, RD= REQUESTED EQUIPMENT DRAWINGS, IP = IN PROCESS
NOTE: ONLY ITEMS IN BOLD ARE CURRENTLY BEING SUBMITTED.

C
A
L
C
S

WIND LOAD AND/OR SEISMIC RESTRAINT CALCULATIONS

NOVIA ***CORPORATION***

1 NORTHWESTERN DRIVE SALEM, NH 03079
PH 603-898-8600 FAX 603-898-2755
sales@noviacorp.com

PROJECT: OLIVER ELLSWORTH SCHOOL
CUSTOMER: SEISMIC CONTROL PRODUCTS, LLC
CUST. PO. NO.: 24005
DRAWING NO.: 240060WG DATE: 02/27/24
SOURCE FOR FORCES: Assumed Site Class D, Exposure C
PROJECT ADDRESS: Windsor, CT

WIND LOAD AND "g" FORCE CALCULATOR

WIND LOAD CALCULATION - LRFD DESIGN

C	EXPOSURE CATEGORY B, C or D	**BASED ON UPWIND TOPOGRAPHICAL FEATURES**
15	HEIGHT OF EQUIPMENT'S ATTACHMENT TO STRUCTURE	
131	BASIC WIND SPEED (MPH) - BASED ON LOCATION AND OCCUPANCY CATEGORY	
33.608	qz = 0.00256 (Kz)(Kzt)(Kd)(V Squared)	
63.9	HORIZONTAL DESIGN WIND LOAD (PSF)	
50.4	VERTICAL DESIGN WIND LOAD (PSF)	

SEISMIC "g" FORCE CALCULATOR

IBC2012/15	CODE	**SDC = B, SEISMIC RESTRAINTS ARE NOT REQUIRED PER CODE.**
N/A	Sds OR Ss	**Sds = DESIGN , 5% DAMPED, SPECTRAL RESPONSE ACCELERATION AT SHORT PERIODS**
N/A	DESIGN Sds	**Ss = MAPPED MCE, 5% DAMPED, SPECTRAL RESPONSE ACCELERATION AT SHORT PERIODS**
N/A	Ip (ENTER 1.5 OR 1.0)	**COMPONENT IMPORTANCE FACTOR**
N/A	ap (ENTER 2.5 OR 1.0)	**COMPONENT AMPLIFICATION FACTOR**
N/A	Rp	**COMPONENT RESPONSE MODIFICATION FACTOR**
N/A	Z	**COMPONENT HEIGHT**
N/A	H	**TOTAL BUILDING HEIGHT**
	(NOTE: IF COMPONENT HEIGHT EQUALS BLDG HEIGHT SET Z=H=1: WORST CASE)	
N/A	DESIGN "g" FORCE	

NOVIA *A Division of Carpenter and Paterson*

1 NORTHWESTERN DRIVE SALEM, NH 03079
PH 603-898-8600 FAX 603-898-2755
sales@cp-novia.com

PROJECT: OLIVER ELLSWORTH SCHOOL
CUSTOMER: SEISMIC CONTROL PRODUCTS, LLC
CUST. PO. NO.: 24005
DRAWING NO.: 240060EC1 DATE: 02/27/24

WIND RESTRAINT CALCULATIONS

FOR ROOF CURBS - BOLTED, WELDED TO STRUCTURE

TAG: DOAS-1, 2, 3, 4, 5
MFGR: Valent
MODEL: VXE-112

INPUT DATA						
					50.4	Fv, Vertical design wind load (PSF)
0	%We		g	Design "g" force	63.9	Fh, Horizontal design wind load (PSF)
0.00	% g		Sds	0.2 Second Spectral Response Acceleration		
1.00	Ω			Omega Overstrength Factor		

INPUT DATA - RTU & curb						
2,868	lbs.		We	Weight of unit - Maximum		
436	lbs.		Wb	Weight curb		
14.00	in.		Bh	Curb operating height		
173.90	in.		El	Curb overall length		
45.90	in.		Ew	Curb overall width		
180.50	in.		Ela	RTU overall length		
52.50	in.		Elb	RTU overall width		
60.20	in.		HH	RTU overall height above curb		
72.20	in.		H	Curb & RTU overall height (1)		
30.10	in.		Ce	RTU center of gravity - Vertical		
7.00	in.		Cc	Curb center of gravity - Vertical		
39.21	in.		A	Combined RTU & curb center of gravity - Vertical		
44.00	in.		B	Shortest - Center line between extreme curb anchors		
158.10	in.		Bl	Longest - Center line between extreme curb anchors		
22.00	in.		SSC	Short side of curb - RTU Center of gravity - Horizontal		
N	Y/N		SEISMIC	Seismic Application Y/N	1.00	SDRF: Seismic De-Rate Factor
N	Y/N		HKP	Housekeeping pad Y/N		

ATTACHMENT TO STRUCTURE BOLTS				
0.5	in.		Hm	Steel Through Bolts
6	in.		Bq	Quantity of bolts

A307 STEEL BOLTS				
0.50	in.		Bd	Diameter
3,528	lbs.		Ashear	Allowable shear force on each anchor (100% capacity)
6,624	lbs.		Atension	Allowable tensile force on each anchor (100% capacity)

NOVIA *A Division of Carpenter and Paterson*

1 NORTHWESTERN DRIVE SALEM, NH 03079
PH 603-898-8600 FAX 603-898-2755
sales@cp-novia.com

PROJECT: OLIVER ELLSWORTH SCHOOL
CUSTOMER: SEISMIC CONTROL PRODUCTS, LLC
CUST. PO. NO.: 24005
DRAWING NO.: 240060EC1 DATE: 02/27/24

DERIVED FORCES FOR UNIT ONLY				
3,987	lbs.	YES	Foo	Total overturning force on unit alone (Maximum of wind or seismic when applicable)
YES	lbs.		check	Positive attachment of unit to curb required
DERIVED FORCES FOR CURB AND UNIT				
0	lbs.		Fhs	Total seismic shear force
5,902	lbs.		Fhw	Total wind load shear force (When applicable)
5,902			Fh	Maximum shear force
0	lbs.	NONE	OTS	Overturning force due to seismic
5,335	lbs.	YES	OTW	Overturning force due to wind
5,335			FO	Maximum overturning force
984	lbs.	OK	Fvb	Maximum shear force per Steel Bolt
1,778	lbs.	OK	Ftb	Maximum tensile force per Steel Bolt
0.55		OK	CST	Combined shear & tensile forces per steel bolt (CST < 1.0)
3,528		OK	SFVA	Carbon steel anchor shear capacity check
6,624		OK	SFTA	Carbon steel anchor tensile capacity check

SUMMARY INFORMATION - ATTACHMENT OPTIONS - ALL DIMENSIONS ARE IN INCHES

A-307 Steel Bolts	**QTY:** 6	**DIAM.:** 0.500	**EMBEDM.:** 0.000
1/16 IN FILLET WELD	**INCHES:** 4	***INSIDE & OUT AT EACH ANCHOR LOCATION***	

ATTACHMENT OF UNIT TO CURB ****

1/4 IN. TEK SCREWS	**TOTAL QTY:** 12	**QTY PER LONG SIDE:** 6

>>>>>NO GAP BETWEEN UNIT AND CURB AT TEK SCREW LOCATIONS - SHIM AS REQUIRED<<<<<

SEE SSD-8000A FOR CERTIFICATION OF THIS CALCULATION

****** CHECK WITH UNIT MFGR PRIOR TO DRILLING THROUGH UNIT**

(1) 2" Allowance for roof insulation has been deducted from Curb & Unit Height (H))

NOVIA
CORPORATION
Salem, NH
603-898-8600

SSD-8000A LRFD

WIND LOAD AND/OR SEISMIC ANALYSIS OF ROOF MOUNTED CURBS

NOVIA
CORPORATION
Salem, NH
603-898-8600

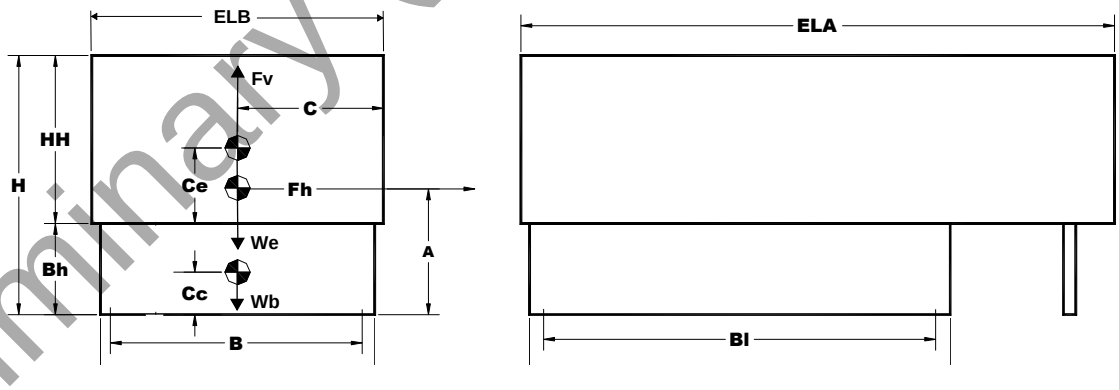
SSD-8000A
LRFD

1. INPUT DATA

The design "g" force will be determined from the specifications. Wind load is based on the horizontal value of PSF applied to the largest surface vertical surface area and the vertical value of PSF applied to the unit roof area.

2. DERIVED FORCES

Foo = Worst case overturning force based on seismic or wind load with appropriate combined loading correction factors on unit by itself.
Fh = Worst shear force based on seismic or wind loading (if applicable).
FO = Worst case overturning force based on seismic or wind load with appropriate combined loading correction factors. See Figure 1.
Shear Force per Hilti Concrete Attachment (Fvb) = Fh / Quantity of bolts.
Tensile Force per Hilti Concrete Attachment (Ftb) = FO / Quantity of bolts in tensile plane.
Combined Shear & Tensile Forces per Hilti Attachment = Fvb / Fva + Ftb / Fta < 1.3.
Carbon steel anchor shear capacity check = Fvb < SFVA.
Carbon steel anchor shear capacity check = Ftb < SFTA.



Combined Loading Factors (LRFD): 1.0 W + 0.9 D
1.0 E + 0.7 D (Good to Sds=1.0, Ev=-0.2D)

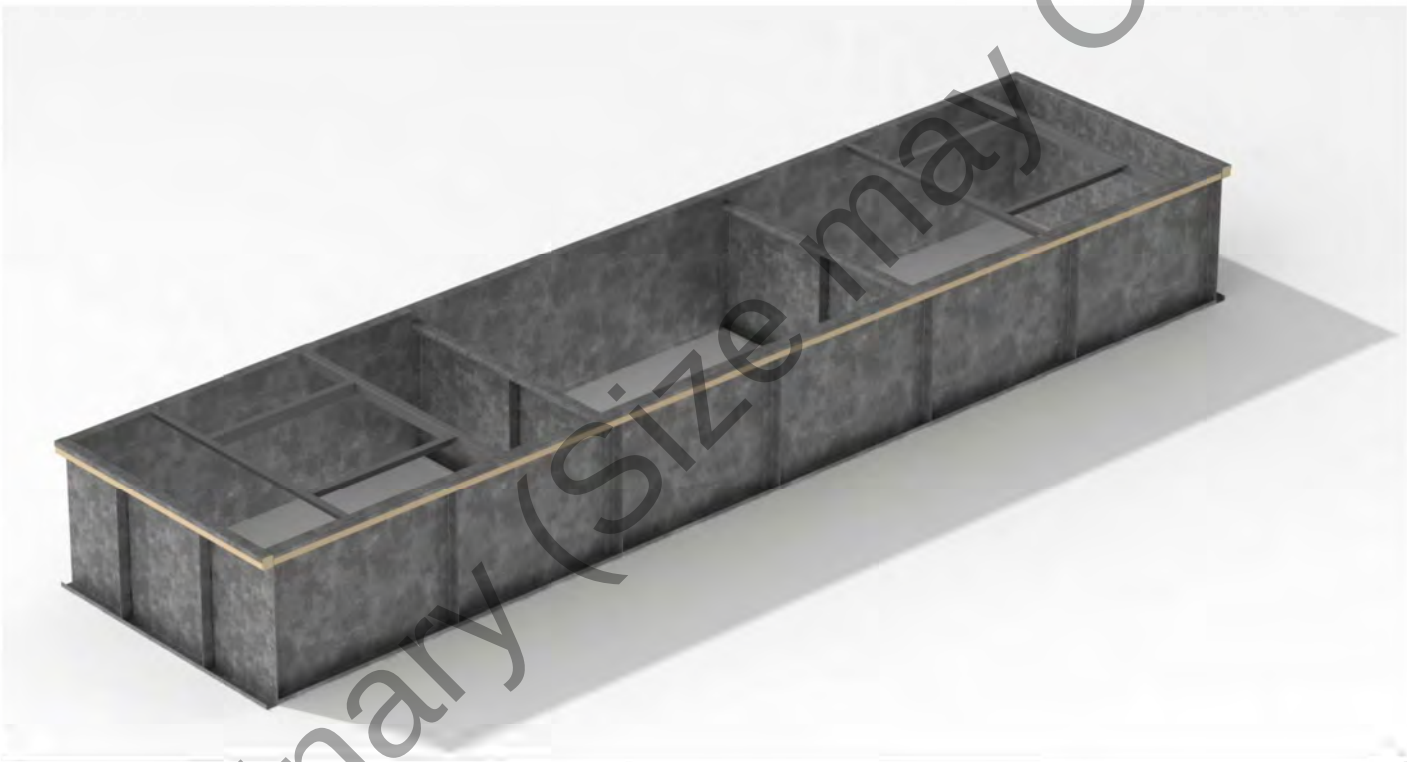
INSTALLATION INSTRUCTIONS

INSTALLATION INSTRUCTIONS

NOVIA
CORPORATION

SeisCurb Installation Instructions

Date: 12/05/17
Supersedes: 6/15/17



SEISMIC ROOF CURB

Novia Corporation
1 Northwestern Drive Salem, NH 03079
Ph: 603-898-8600 Fax: 603-898-2755 Email: Sales@noviacorp.com

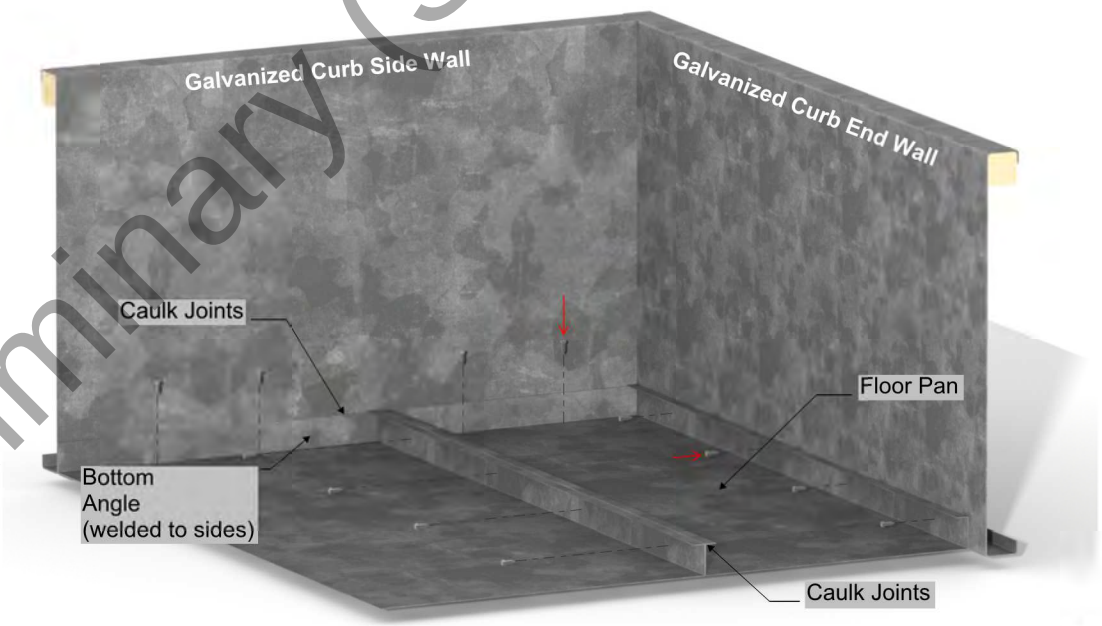
NOVIA
CORPORATION
Salem, NH
603-898-8600

1*

SECURE CURB ENDS TO SIDES WITH SELF TAPPING SCREWS OR BOLTS PROVIDED.

NOTE: SIDES WILL BE MARKED WITH EITHER *COND. END* (CONDENSING UNIT) OR *S.A.* (SUPPLY AIR). BE SURE TO ORIENTATE THE CURB PROPERLY.

2*



PLACE FLOOR PANS (IF SUPPLIED) ON BOTTOM ANGLES AND USE SELF TAPPING SCREWS PROVIDED TO ATTACH TOGETHER AND AT ENDS. SCREW 6" FROM SIDES AND 12" ON CENTER.

NOTE: START AT CURB END FITTING ONE PAN AT A TIME AND FINISH AT PLENUM DIVIDER OR OTHER CURB END WALL. CAULK ALL JOINTS IN PLENUM SECTIONS.

*** ONLY FOR KNOCKED DOWN CURBS.**

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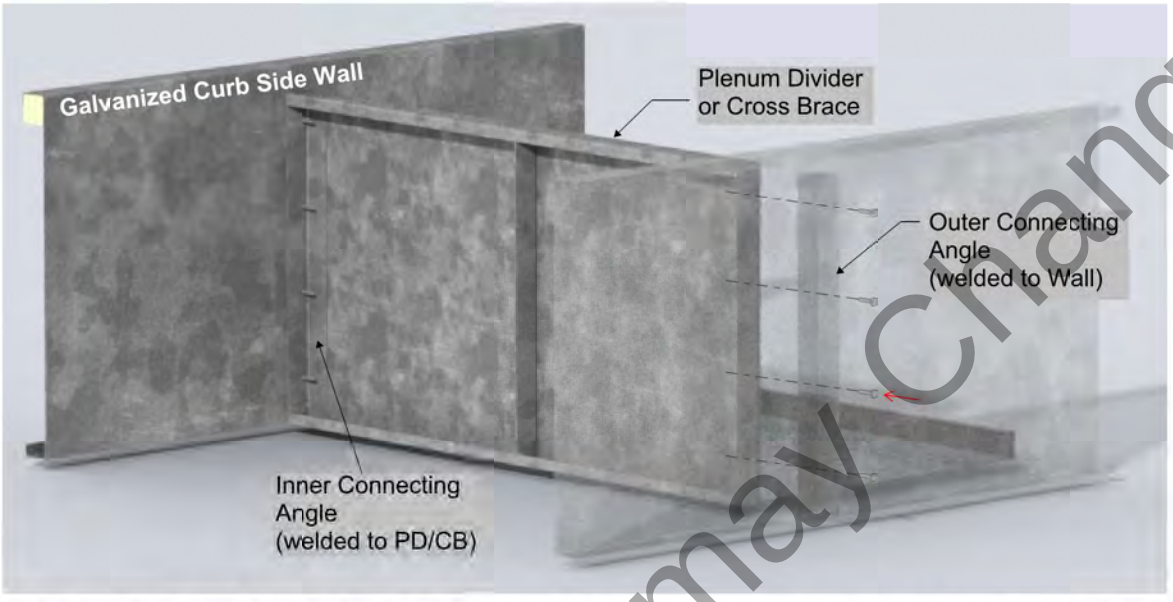
CORPORATION
Salem, NH
603-898-8600

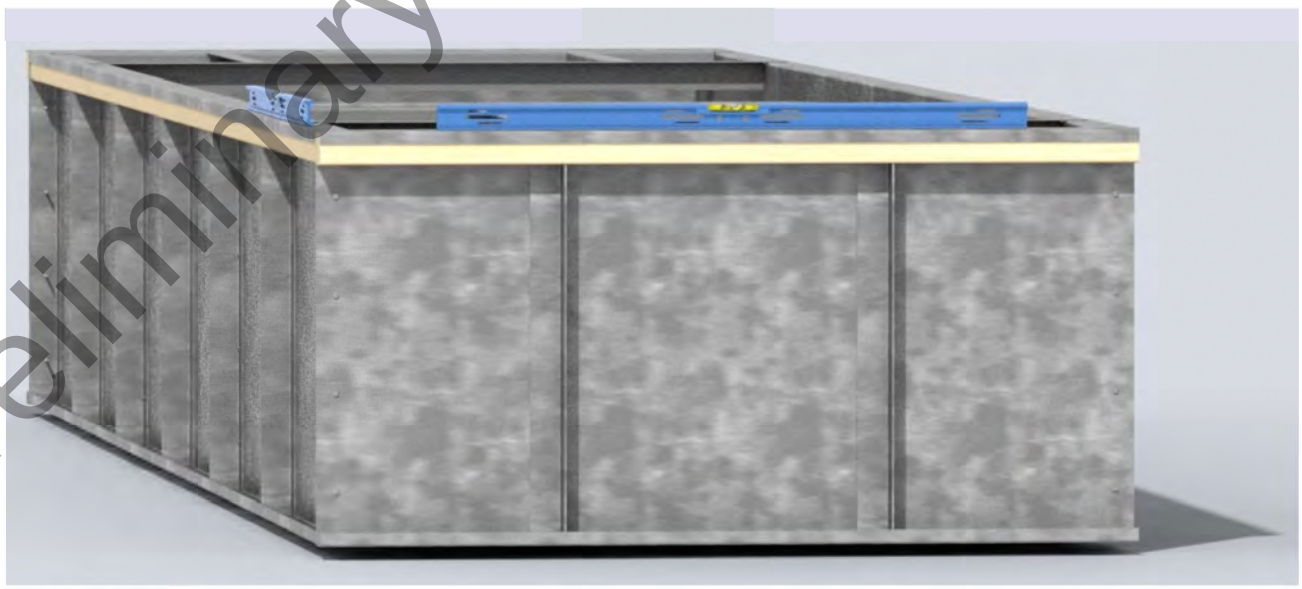
3*



INSTALL PLENUM DIVIDER OR CROSS BRACES AT LOCATIONS INDICATED ON SUBMITTAL WITH SELF TAPPING SCREWS OR BOLTS PROVIDED.

NOTE: DO NOT TIGHTEN UNTIL CURB IS SQUARED & LEVELED.

4



LEVEL CURB.
SEE RTU MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR MAXIMUM TOLERANCE.

*** ONLY FOR KNOCKED DOWN CURBS.**

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Salem, NH
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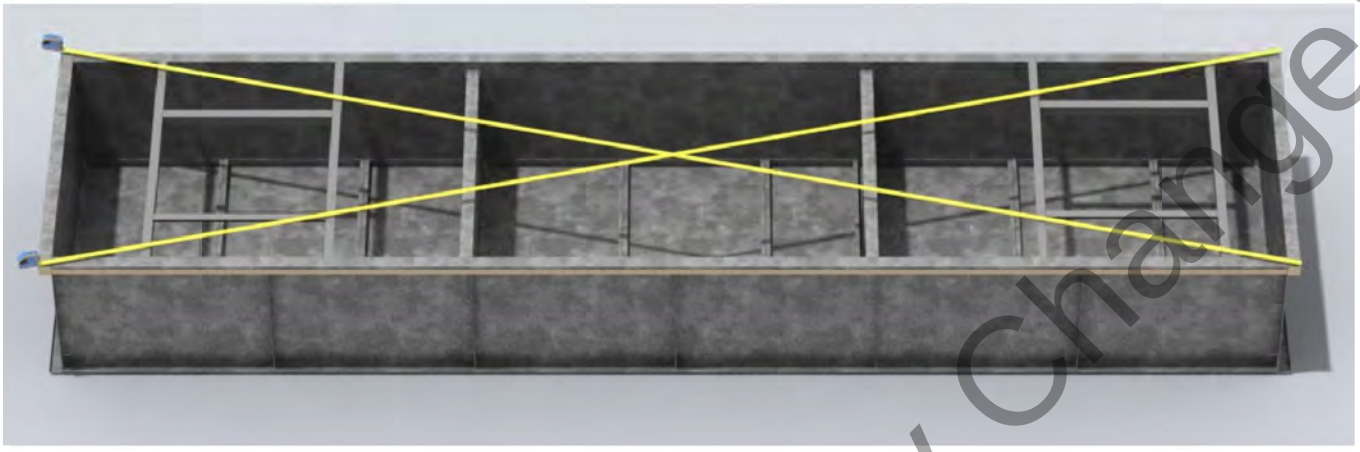
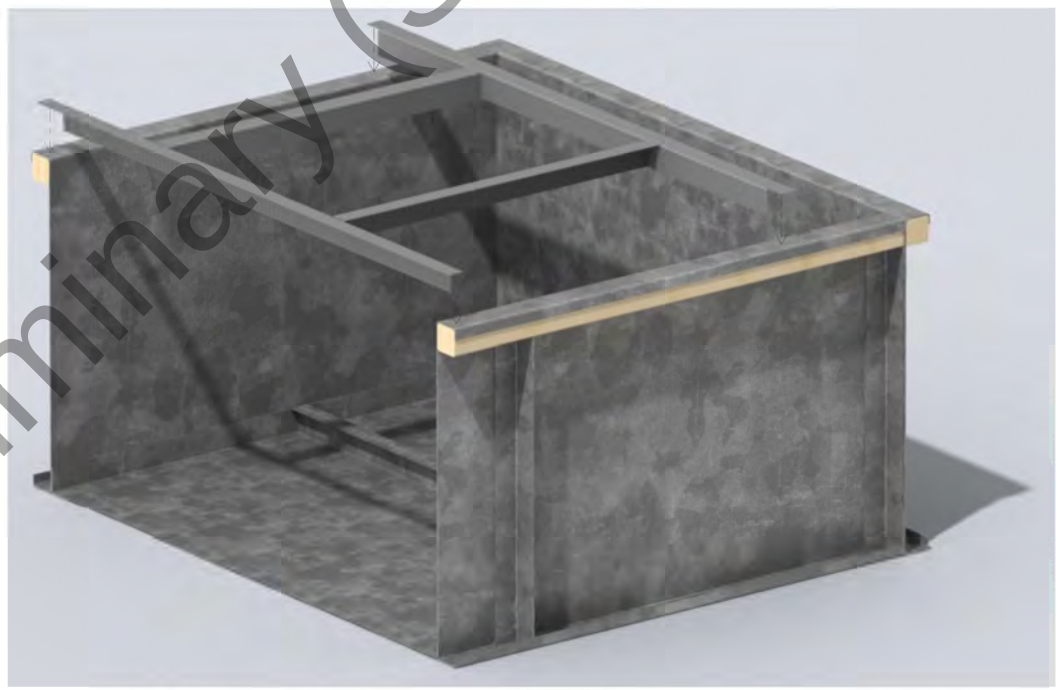
5



SQUARE UP CURB BY CHECKING DIAGONALS. TIGHTEN PLENUM DIVIDER OR CROSS BRACES TO KEEP SIDES STRAIGHT.

NOTE: CURB MAY NOW BE ATTACHED TO THE STRUCTURE.
SEE SUBMITTAL FOR TIE DOWN OPTIONS. IF WOOD BLOCKING IS USED, THE MINIMUM BLOCKING WIDTH MUST BE EQUAL TO OR GREATER THAN THE MAXIMUM BLOCKING HEIGHT OR ADDITIONAL ANCHORS MAY BE REQUIRED. IF THIS CONDITION CANNOT BE MET, CONTACT NOVIA WITH MAXIMUM BLOCKING HEIGHT AND MINIMUM WIDTH PRIOR TO INSTALLATION.

6*



IF SUPPLIED, SLIP PRE-ASSEMBLED DUCT SUPPORTS OVER TOP FLANGE OF CURB. ALIGN AS NOTED ON SUBMITTAL DRAWING.

*** ONLY FOR KNOCKED DOWN CURBS.**

NOVIA
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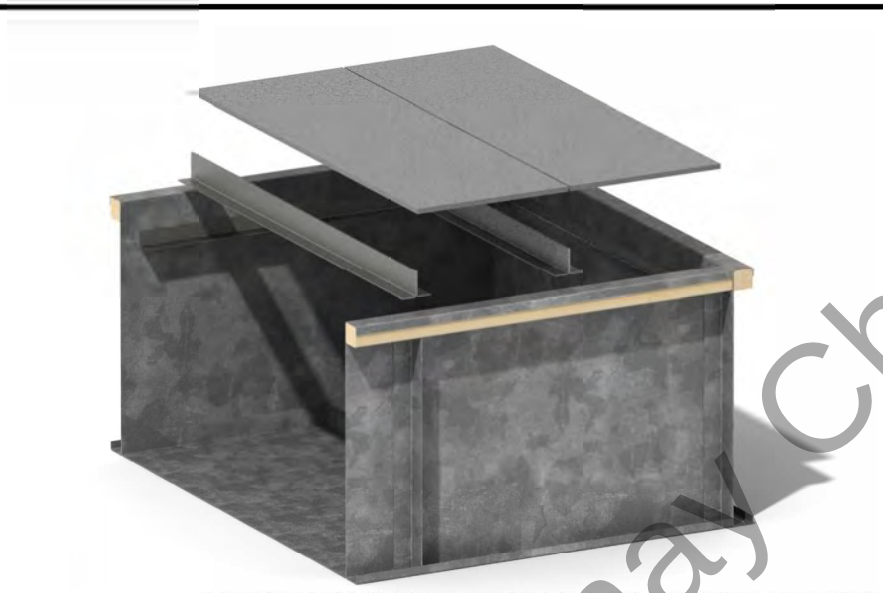
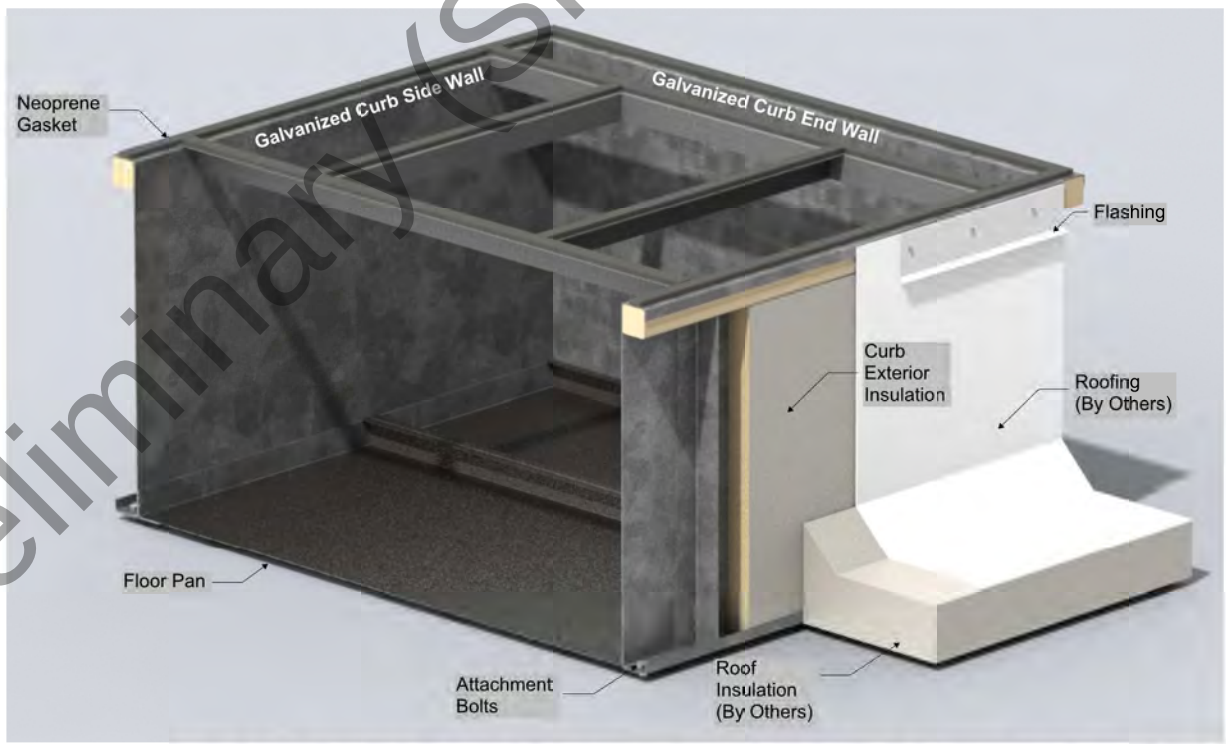
Salem, NH
603-898-8600

7



IF SUPPLIED INSTALL SOUND BARRIER PACKAGE ANGLES AND BOARD MATERIAL(BY OTHERS) IN CURB. ALIGN AS NOTED ON SUBMITTAL DRAWING. FOR PLENUM CURBS, SBP MUST BE ATTACHED TO SUPPORT ANGLES WITH ZIP SCREWS AND SEALED WITH CAULKING.

8



INSULATE CURB AND APPLY ROOFING MEMBRANE. INSTALL 3" FLASHING OVER ROOFING. ATTACH FLASHING TO WOOD NAILER WITH ZIP SCREWS. INSTALL 3/8" NEOPRENE GASKET AROUND PERIMETER OF CURB TOP FLANGE AND AT DUCT SUPPORTS IF SUPPLIED.

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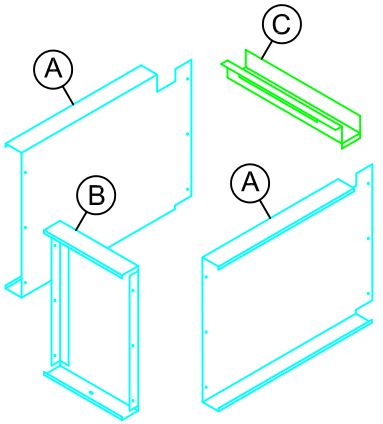
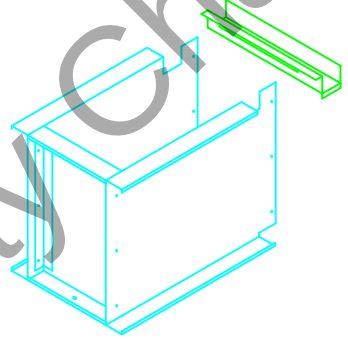
Installation Instructions Non-Isolated Pipe Enclosures



Step #1

Verify Components

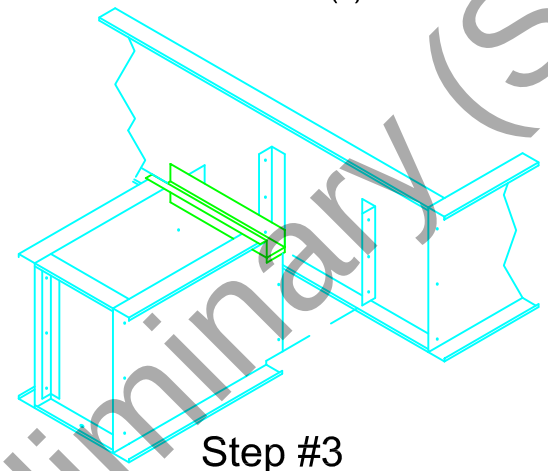
A - Ends (2)
B - Side (1)
C - Gutter (1)



Step #2

Assembly

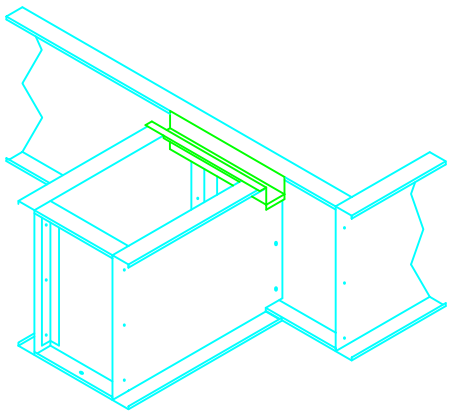
1) Fasten Ends to Side
2) Secure Gutter



Step #3

Assembly

1) Align Enclosure w/ angles on side of curb
2) Slide Enclosure into place
3) Fasten thru angles



Step #4

Assembly

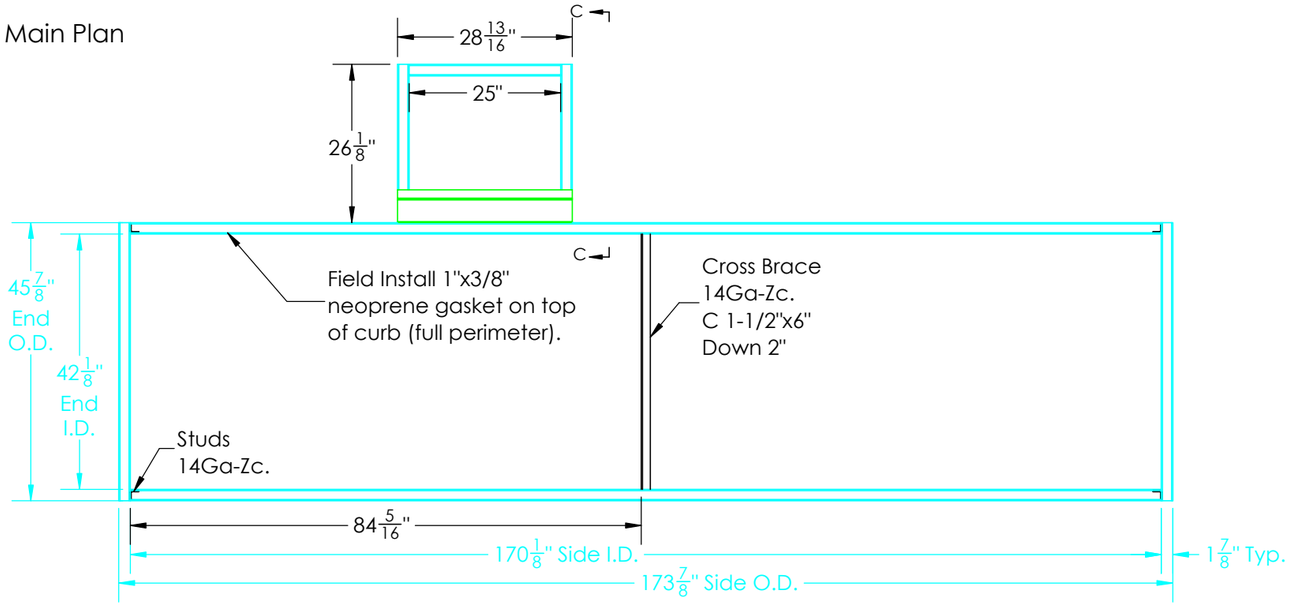
1) Fasten Enclosure to Deck thru factory drilled hole
2) Assembly is now ready for insulation and roofing

BY: RN DATE: 05/04/11 DWG#: Pipe Enclosure - Installation Details

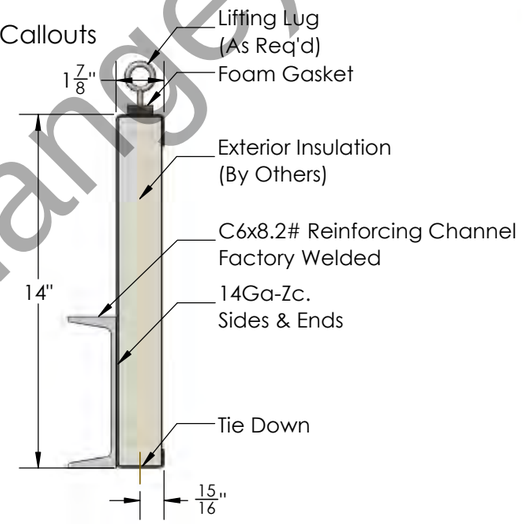
DRAWINGS

DRAWINGS

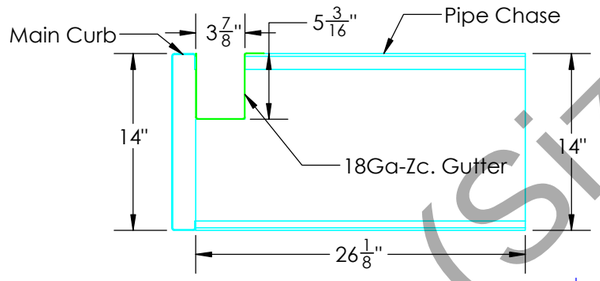
Main Plan



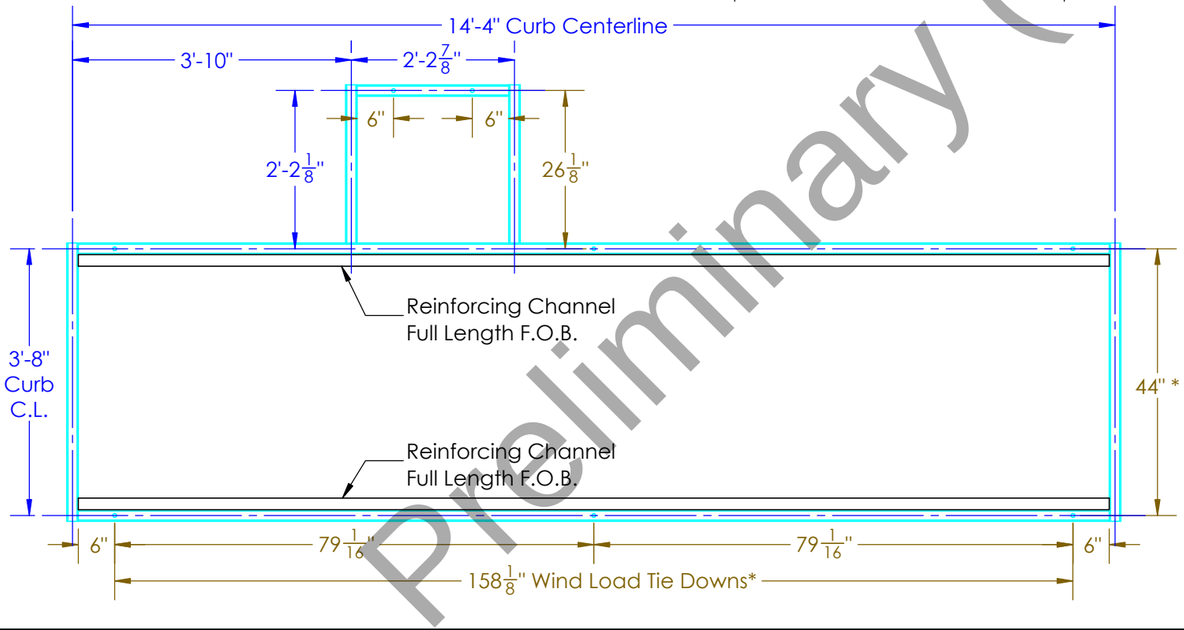
Material Callouts



Pipe Chase Section C-C



Tie Downs & Curb Centerlines



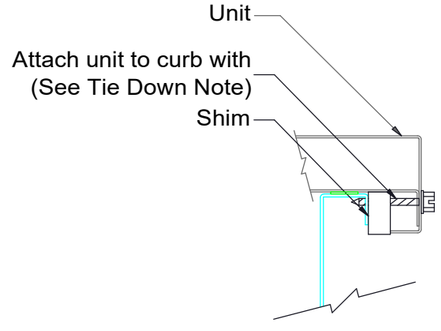
*** Wind Load Tie Down Options**
Contractor may use whichever attachment technique is appropriate for this unit's installation.

Curb to Structure:
1) 8 - 1/2" Through bolts with fish plates.
2) 4" Of 1/16" fillet weld inside & out, at each anchor location.

Notes:
1) If Option 1 is used, provide 12" long solid blocking under the anchor location to transfer the load to the structural steel and to prevent the metal deck from crushing. If decking high point happens to run parallel to the long side of the curb, directly on top of the structural steel, then cut out the decking to insert the blocking.

Attachment of Unit to Top Rail:
Pre-drill (12) holes (6) Per long side of curb top rail through unit base channel and install 1/4" Teks screws. The void between the base channel and the curb top rail must be shimmed tight. See Section Detail for approximate location of screws. Field verify that there are no unforeseen obstructions. Silicone caulk all screws air tight.

Confirm with unit manufacturer that nothing inside of base rail(s) will be damaged, such as wiring or piping, etc.



NOVIA CORPORATION
Salem, NH
603-898-8600

SeisCurb
Seismic Curbs

Prepared For:
Oliver Ellsworth School

Tag:
DOAS-1, 2, 3, 4, 5
(5 Units)

Valent
VXE-112
(01/18/24)

Customer:
Seismic Control Products, LLC

Shipping: K.D.

Weights:
Curb = 436#
Unit = 2,868# Max.

Revisions:

Dwg. No.: 240060-1
Orig. Date: 02/27/24
By: Chris Schall

VAN ZELM ENGINEERS
VAN ZELM HEYWOOD & SHADFORD, INC.
10 TALCOTT NOTCH FARMINGTON, CT 06032-1800
P: 860.284.5064 F: 860.284.5098
Connecticut | Massachusetts | North Carolina

SHOP DRAWING TRANSMITTAL

Issue Date:	February 23, 2024
Project Name:	Oliver Elsworth School Heat Pipe Retrofit
Project Number:	2023127.01
File:	232283
Submittal Number:	232283-15-00
From:	Craig Boman
To:	Marco Aglieco
Company Name:	Town of Windsor
E-Mail Address:	aglieco@townofwindsorct.com
cc:	vZHS File

Attached are copies of shop drawings, stamped as checked in their respective Action categories below. Our office has retained one (1) copy of each item listed herewith:

# of Copies	Description	ACTION				
		Furnish As Submitted	Furnish As Corrected	Revise And Resubmit	Rejected	Submit Specified Item
1	Heat Pipe Retrofit Submittal	X				

CORRECTIONS / REMARKS / INSTRUCTIONS:

2023127.01
CRB

VANZELM ENGINEERS
RECEIVED
2/23/24
DDT #001

Heat Pipe Technology

Energy Recovery Heat Pipes

SUBMITTAL FOR:
APPROVAL

PROJECT: Oliver Elsworth School Heat Pipe Retrofit
Windsor, CT

ENGINEER: Van Zelm Heywood & Shadford, Inc.
Farmington, CT

SUBMITTED BY: Eric Cormier

Flow Tech®
10 Bidwell Road
South Windsor, CT 06074
860-291-8886

FLOW TECH #: 232283-15-00

SUBMITTAL DATE: 2/22/2024

VANZELM ENGINEERS

- [x] FURNISHED AS SUBMITTED
- [ ] REVISE AND RESUBMIT
- [ ] SUBMIT SPECIFIED ITEM
- [ ] REJECTED
- [ ] FURNISH AS CORRECTED

Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with requirements of the drawings and specifications. The contractor is responsible for confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his/her work with that of all other trades; and performing his/her work in a safe and satisfactory manner.
van Zelm Heywood & Shadford, Inc.

BY CRB **DATE** 2/23/24

SelectPlus™ Design Software

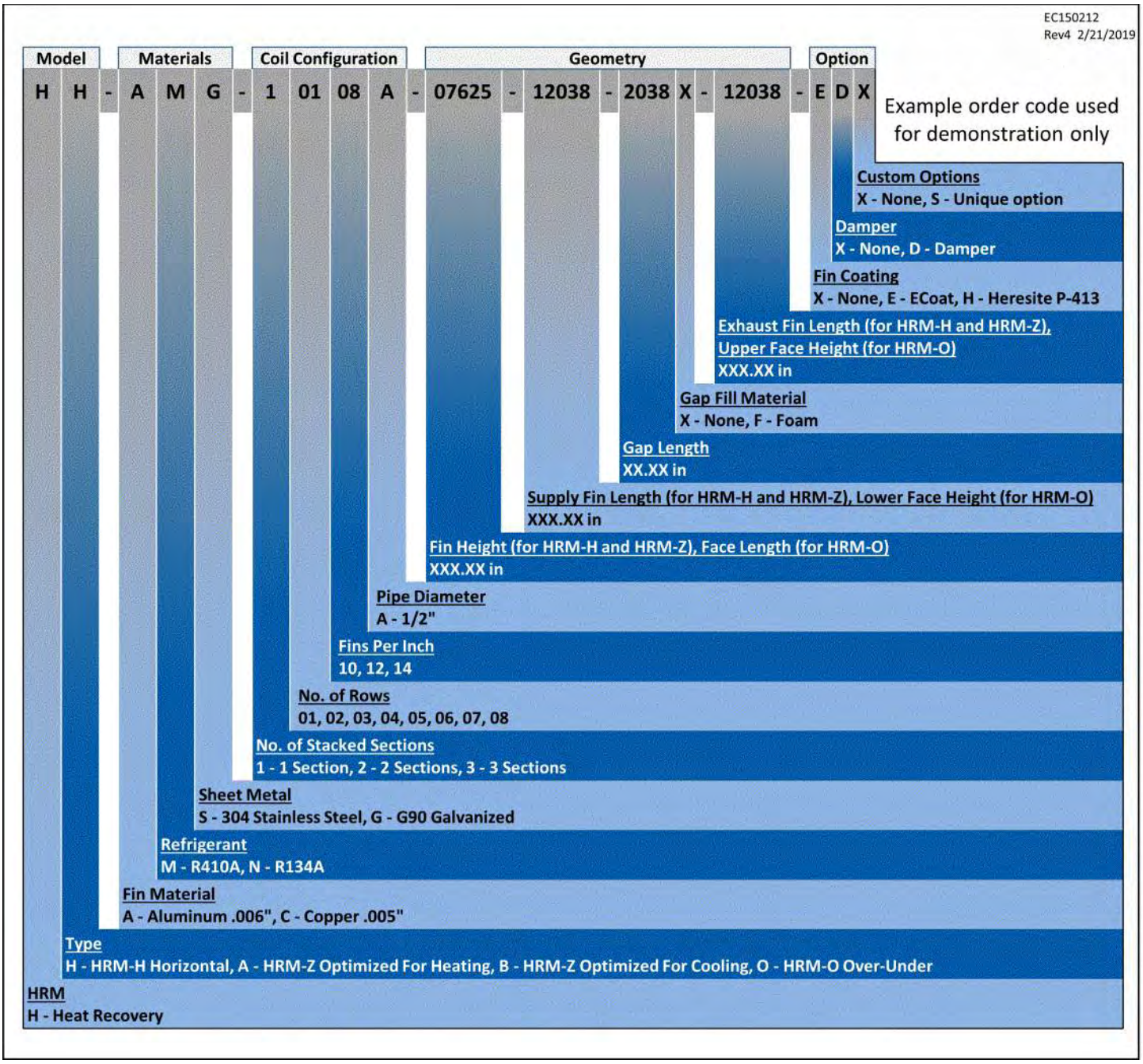
Project Submittal

Prepared For:	Jon Peterson	Prepared By:	Eric Cormier (ecormier)
			Flow Tech Inc.
Project:	Windsor Public Schools	Date:	12/20/2023 7:28 AM
		HPT Project:	223626
	Windsor Connecticut		

Qty:	Model:	Tag:	Order Code:
1	HRM	Cafeteria 80x40 2 sections	HO-AMG-20812A-08000-04000-0600F-04000-XBX

The attached information describes the equipment we propose to furnish for this project and is submitted for your approval

HRM Order Code



SelectPlus™ Design Software

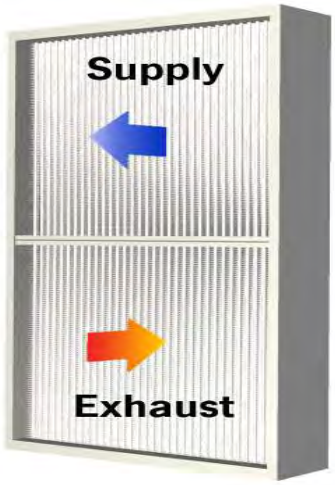
Project Name: Windsor Public Schools
Prepared For: Jon Peterson
Prepared By: Eric Cormier (ecormier)
Flow Tech Inc.
Date: 12/20/2023 7:28 AM HPT Project: 223626

Qty:	Model:	Tag:	Order Code:
1	HRM	Cafeteria 80x40 2 sections	HO-AMG-20812A-08000-04000-0600F-04000-XBX

HRM Design Performance

Elevation: 0 ft.

Air Type: Standard



	Supply	Exhaust
	OACF 1.00	EATR % 0.0
	11,250 SCFM	
	55.00 ÁF DB	63.74 ÁF DB
	45.11 ÁF WB	58.47 ÁF WB
	45.0 %RH	73.5 %RH
	66.37 ÁF DB	11,250 SCFM
	50.34 ÁF WB	75.00 ÁF DB
	30.0 %RH	62.54 ÁF WB
		50.0 %RH

SCFM1=SCFM2=Net Supply Airflow

Coil Performance

Pressure Drop (in. H2O)	0.83	1.03
Face Velocity (SFPM)	506.30	506.30
Temperature Gain/Loss(ÁF)	11.40	11.30
Sensible Effectiveness %	56.8	
Latent Effectiveness %	0.0	
Total Effectiveness %	26.2	
Heat Transferred (BTU/h)	139,175	
Condensation (lbs/hr)	0.0	0

Coil Design

Face Height (in.)	40.00	40.00
Face Length (in.)	80.00	80.00
Face Area (SF)	22.22	22.22
No. of Rows	8	8
Tube OD (in.)	1/2	1/2
Fins per inch	12	12
Fin Type	Standard	Standard
Fin Material	Aluminum	Aluminum
Tilt Angle degree	90	

Final 2.1

Refrigerant: R410a

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

Performance is based on counterflow conditions.

Performance is single season based on airflow orientation

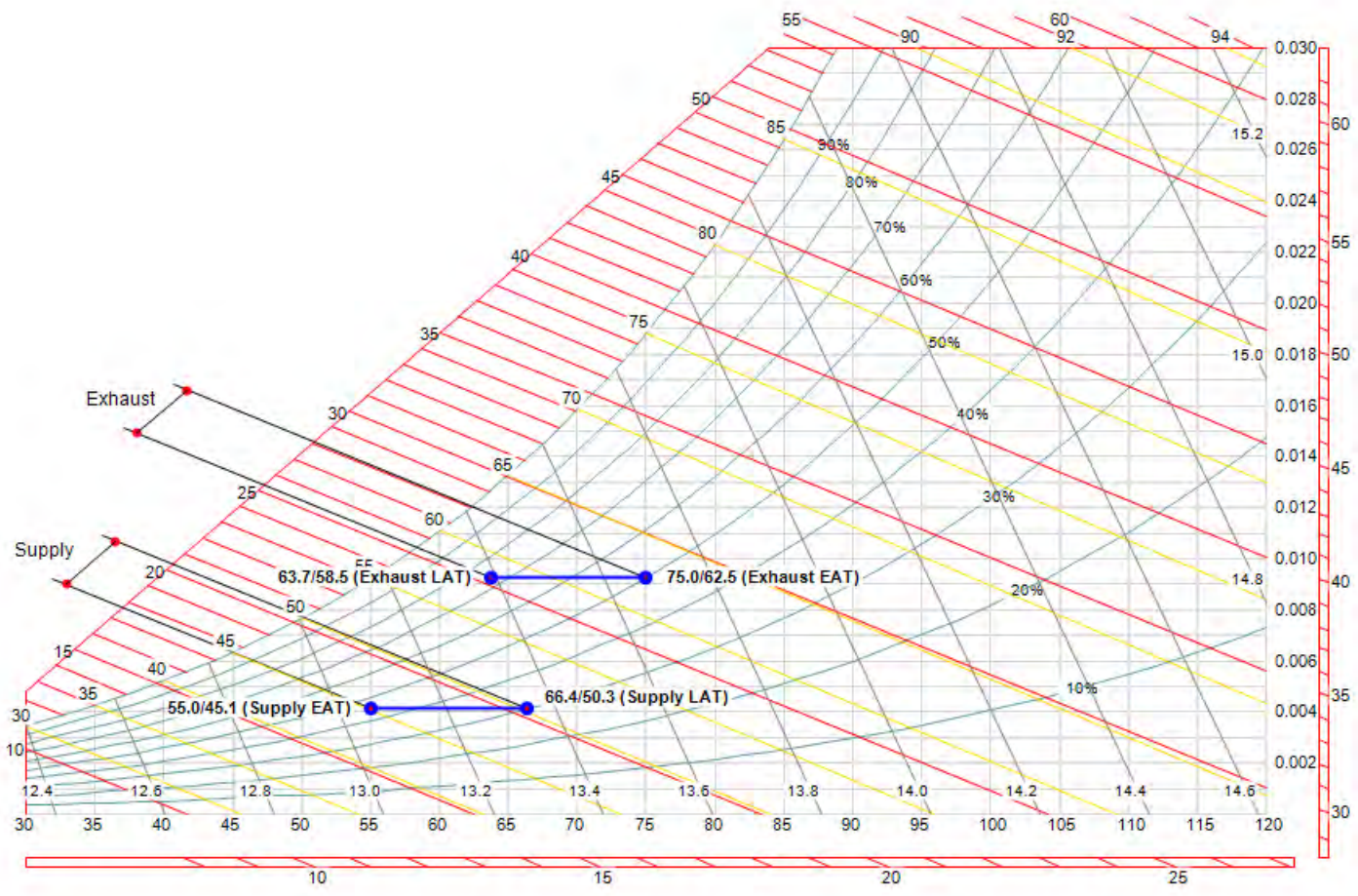
SelectPlus™ Design Software

Project Name:	Windsor Public Schools
Prepared For:	Jon Peterson
Prepared By:	Eric Cormier (ecormier)
	Flow Tech Inc.
Date:	12/20/2023 7:28 AM HPT Project: 223626

Qty:	Model:	Tag:	Order Code:
1	HRM	Cafeteria 80x40 2 sections	HO-AMG-20812A-08000-04000-0600F-04000-XBX

Psychrometric Analysis

Supply Airflow:	11250 CFM	Exhaust Airflow:	11250 CFM
Supply Entering:	55.0/45.1 ÜF DB/ ÜF WB	Exhaust Entering:	75.0/62.5 ÜF DB/ ÜF WB
Supply Leaving:	66.4/50.3 ÜF DB/ ÜF WB	Exhaust Leaving:	63.7/58.5 ÜF DB/ ÜF WB



SelectPlus™ Design Software

Project Name: Windsor Public Schools
Prepared For: Jon Peterson
Prepared By: Eric Cormier (ecormier)
Flow Tech Inc.
Date: 12/20/2023 7:28 AM HPT Project: 223626

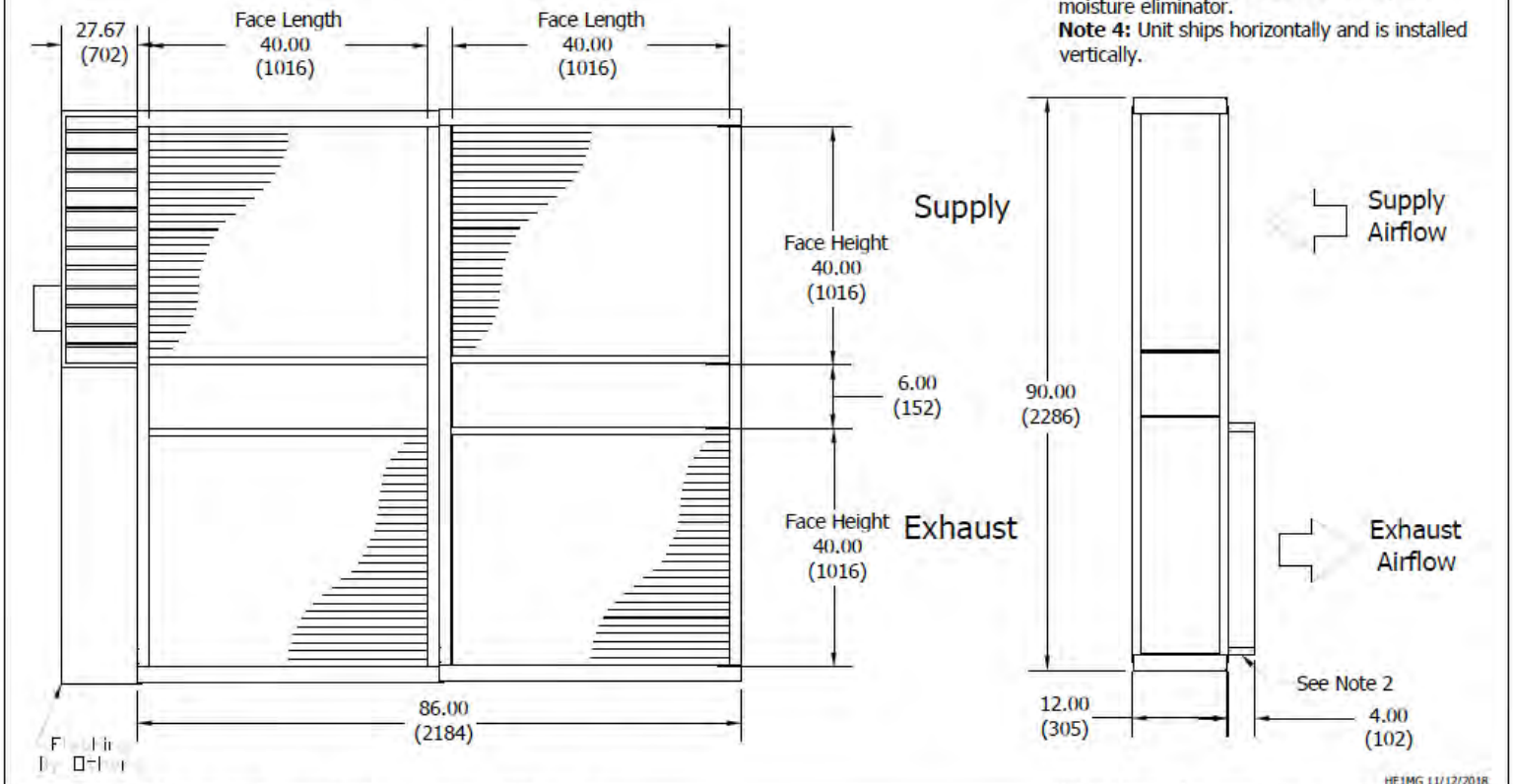
Qty:	Model:	Tag:	Order Code:
1	HRM	Cafeteria 80x40 2 sections	HO-AMG-20812A-08000-04000-0600F-04000-XBX

Drawing

Tubes	Material: Copper	Fins	Coating: None	Unit:	Rows: 8	Refrigerant: R410a	FPI: 12	Approval	Name:	Date:
Diameter: 1/2	Surface: Rifled	Material: Aluminum	Geometry: Sine Wave	Sheet Metal: 16 GA G90 Galvanized Steel		Weight: 1340		Company:		Signature:

Order Code: HO-AMG-20812A-08000-04000-0600F-04000-XBX

Note 1: Heat Pipes used in this orientation have horizontal fins.
Note 2: Drain pans are required. They are not provided by the factory.
Note 3: Drain pan shall extend 2" beyond moisture eliminator.
Note 4: Unit ships horizontally and is installed vertically.



HEIMG 11/12/2018

Tolerances: Unless specified
Fin Area: ±1/8 (3mm)
Sheet: ±3/16 (5mm)
Weight: ±10%
Length: inches (mm)
Weight: lbs

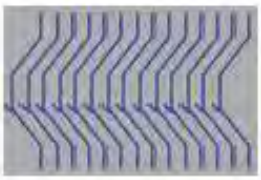
Project Name:	Project No: 209637
Unit Tag:	Created By: hpt-andrew
Drawing No: XX22MAR0039	Date: 03/01/2022 12:10
	Scale: Not To Scale

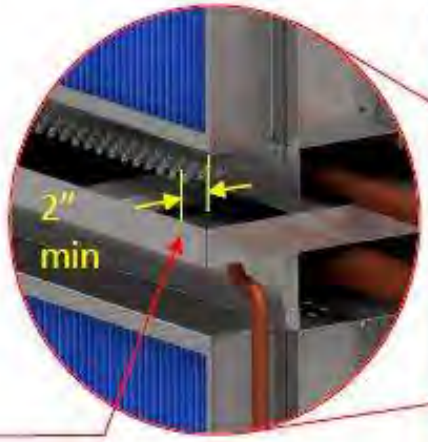
SelectPlus™ Design Software
6904 Parke East Blvd, Tampa FL 33610
P: (813) 470-4250 www.heatpipe.com

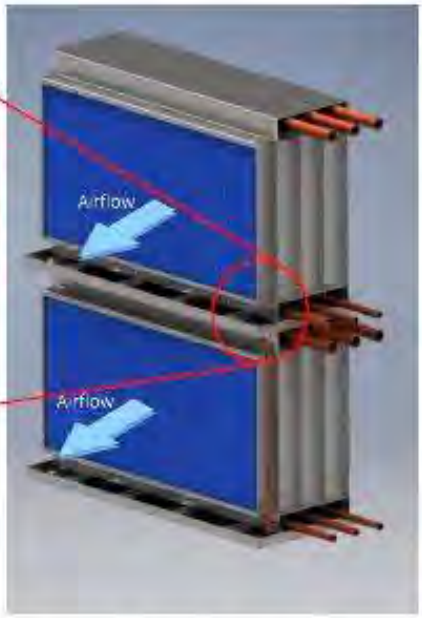
Moisture Eliminator

Description

Blades are designed to capture condensate that forms on, and spits from, horizontal coil fins. The moisture eliminator will sit over a drain pan and captured condensate will drain out of the bottom of the moisture eliminator into the pan.







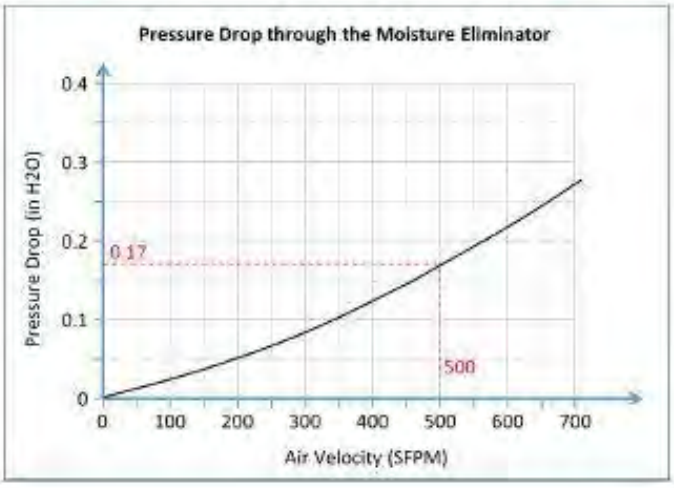
- Intermediate drain pans are required when multiple heat pipe sections are stacked vertically
- All drain pans to extend a minimum of 2" past the moisture eliminator casing

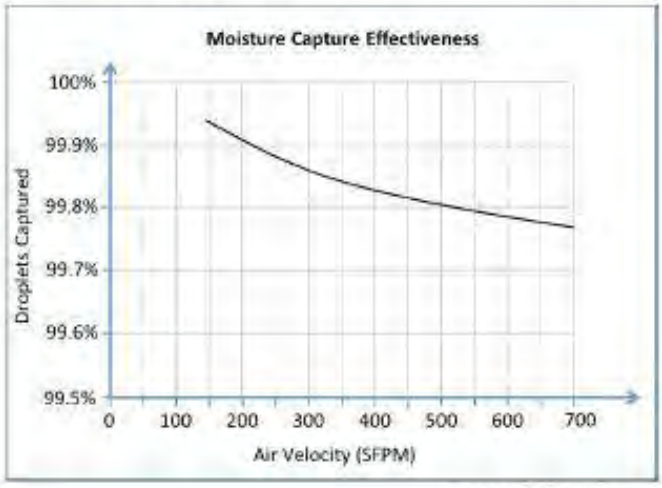
Materials of Construction

Moisture Eliminator Casing is either 16ga G90 Galvanized or 16ga 304 Stainless Steel. Moisture Eliminator Blades are made from extruded ABS plastic. Blade material is enhanced with UV resilient and anti-fungal additives. Blade material meets UL 94 V-0 Flammability requirements.

Performance

At least 99.75% of condensate will be captured by the moisture eliminator, when the coil is producing condensate at a rate of 0 to 15 lbs_{water} /sqft/hour and coil airflow is ≤ 700 SFPM





HRM warranty

Energy Recovery Heat Pipes (Module Only)
Five Year Limited Warranty

Subject to the following conditions, Heat Pipe Technology, Inc. (HPT), warrants this product to be free from defects in material and workmanship for a period of FIVE YEARS for the heat exchanger only from the date of installation not to exceed 60 days from date of shipment. Dampers and HPT provided controls carry a 12 month warranty. This warranty is in lieu of all other warranty not expressly set forth herein, whether expressed or implied by operation of law or otherwise. In the event this product fails under normal use and service within the applicable period, HPT will correct, repair or, at its sole discretion, replace the defective product or refund the purchase price of products which are returned freight prepaid to HPT for inspection, when accompanied by proof of purchase and written claims of defect, and which upon inspection by HPT, do comply with the terms of this warranty.

This warranty applies to the first retail buyer and extends to any subsequent owners of the systems.

The cost of replacement parts or components shall be determined by the price schedule in effect at the time of submission of warranty claim.

Repair or replacement parts will be furnished F.O.B. factory in all cases.

If HPT elects to replace or provide a refund, the defective product must be returned to HPT free and clear of liens or other encumbrances.

Limitations on Liability

This warranty does not cover and no warranty is made with respect to:

A. Failures not reported to HPT within the period specified above;
B. Failures or damage due to misapplication, misuse, abuse, improper storage or handling, abnormal conditions of temperature, water, dirt, corrosive substances or other contaminants;
C. Products which have been repaired with parts or materials not furnished or approved by HPT or by its authorized dealers or representatives, or products which have been in any way tampered with or altered;
D. Products damaged in shipment or storage or otherwise without fault of HPT;
E. Normal maintenance as outlined in the installation and servicing instructions or owners manual including coil cleaning, filter cleaning and periodic flushing of systems;
F. Damage or repairs required as a consequence of faulty installation or application by others;
G. Damage or repairs required as a consequence of any misapplication, abuse, improper servicing, unauthorized alteration or improper operation;
H. Damage as a result of floods, winds, fires, lightning, accidents, corrosive atmosphere or other conditions beyond the control of HPT;
I. Damage resulting from freezing of domestic water or condensate, inadequate or interrupted water supply, use of corrosive water, fouling or restriction of the water circuit by foreign material or like causes;
J. Damage resulting from operation with an inadequate supply of air or water;
K. Dampers or other mechanical options.

HPT total responsibility for any claims, damages, losses or liabilities related to the product covered hereunder shall not exceed the purchase price of such product. In no event shall HPT be liable for any special, indirect, incidental or consequential damages of any character, including but not limited to loss of use of productive facilities or equipment, lost profits, property damage, transportation, installation or removal, lost production, or personal injury whether suffered by Purchaser or any third party. HPT disclaims all liability for any and all costs, claims, demands, charges, expenses or other damages, either direct or indirect, incident to personal injury or property damage arising out of any cause of action based on strict liability.

Some states do not allow the exclusion or limitation of incidental or consequential damages or limitations on how long an implied warranty lasts, so the exclusion or limitation above of consequential damages or the limitation of time above on implied warranties may not apply to you.

This warranty gives you specific legal rights and you may have other rights which may vary from state to state.