



Alexandra Construction
 1234 Chestnut Street Suite 211
 Newton, Massachusetts 02464
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Project: 0523 Repair Building 51
 4930 Minuteman Way
 Charlotte, North Carolina 28208

Submittal #23 30 00-12.1 - **Make-up Air Units** Product Data 23 30 00 - HVAC AIR DISTRIBUTION

Revision	1	Submittal Manager	Michaela Murphy (Alexandra Construction)
Status	Open	Date Created	Feb 22, 2024
Issue Date	Feb 22, 2024	Spec Section	23 30 00 - HVAC AIR DISTRIBUTION
Responsible Contractor	Superior Mechanical Systems	Received From	Ben Wyke (Superior Mechanical Systems)
Received Date		Submit By	
Final Due Date	Apr 4, 2024	Lead Time	
		Cost Code	
Location		Type	Product Information
Approvers	Charlee Cowger (Mead & Hunt), James Eaton (NC ANG), Amy Daniels (NC ANG)		
Ball in Court	Charlee Cowger (Mead & Hunt)		
Distribution	Michaela Murphy (Alexandra Construction), Keith Clark (Alexandra Construction), Jim Thornton (Alexandra Construction), Hanson Pederson (NC ANG), Dan Lawsure (Alexandra Construction), Christopher Clark (Alexandra Construction)		
Description	SD-03 Product Data Make-up Air Units Even though this has been approved we deem the revisions made to be substantial.		

Submittal Workflow

Name	Sent Date	Due Date	Returned Date	R
General Information Attachments				
Charlee Cowger	Feb 22, 2024	Mar 7, 2024		P
James Eaton		Mar 21, 2024		P
Amy Daniels		Apr 4, 2024		P

SUBMITTAL REVIEW

- Approved - No Exceptions Taken
- Approved as Noted - Make Corrections Noted (Resubmittal Not Required)
- Revise and Resubmit - Exceptions Taken
- Rejected
- Accepted - Informational Submittal
- Not Accepted - Informational Submittal
- Not Reviewed

Architect's/Engineer's action on this Submittal is based solely on the information submitted and is subject to the following: Architect's/Engineer's review is limited to verifying general compatibility with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents, and for general compliance with the information given in the Contract Documents. No detailed check of quantities or dimensions was made. Approval of a specific item shall not mean approval of an assembly of which the item is a component. Disposition or notations do not constitute a contract modification and do not relieve the Contractor from compliance with Contract Documents, governing codes and regulations. Contractor shall be solely responsible for complying with the Contract Documents, as well as with Supplier's/Manufacturer's instructions consistent with the Contract Documents, Owner's directions, and Laws and Regulations. The General Contractor, Subcontractor, and/or Construction Manager is solely responsible for: obtaining, correlating, confirming, and correcting dimensions at the Site; quantities, information and choices pertaining to fabrication techniques, means, methods, sequences, procedures, and techniques of construction; coordinating work with other trades; and ensuring that work is performed in a safe and satisfactory manner. Architect/Engineer is not responsible for resubmittals or tracking progress of resubmittals.

MEAD & HUNT, INC.
 M & H ARCHITECTURE, INC.



BY Aaron Tervort

DATE 3/5/2024

Date	February 21, 2024
Hoffman & Hoffman Order #	470.476.10109
Branch Office	Charlotte, NC
Salesman	Blake Anderson



**PROJECT: NCANG - 145th AW - Hangar 51 - Repair Maintenance
Charlotte, NC**

**CONTRACTOR: Superior Mechanical
Charlotte, NC**

ENGINEER: Mead & Hunt

EQUIPMENT: Make-up Air Units by Greenheck

***Revised Units to
7.5hp motors
Verify MCA & MOP

corrected Heat-X to SS***

ALEXANDRA CONSTRUCTION
Bldg. 51 Hangar Contract #W50S8723C0002

Approved

Approved with corrections as noted on submittal data and/or attached sheet (s)

Signature: James Thornton

Title: Quality Control Manager

Date: 2/22/2024

PER LATEST DRAWINGS: 7/20/2022

General Notes:

Above per the attached data and cut sheets

- Model IGX Indirect Fired Mae-up Air Units provided with flat roof curb, 2" throw away filters, stainless steel furnace, dirty filter switch, inlet damper and weatherhood, qty (2), tags MAU-1, 2.
- Make-up air units include materials of construction, accessories and options as per the attached cut sheets.
- Motor horsepower and electrical voltage must be confirmed.
- We don't include any t'stats, VFDs, controls, motor starters, airflow monitoring or sensors, flanges, remote control, shaft grounding, seismic construction, high wind rated construction, painted finishes or coatings, pitched or metal building roof curbs, rigging, or wiring.

SIIRMITTAI

APPROVAL REQUIRED

HOFFMAN & HOFFMAN, INC.

HVAC Manufacturers Representative

Website: www.hoffman-hoffman.com

Asheville, NC (828) 252-5782	Charleston, SC (843) 884-3201
Charlotte, NC (704) 364-4700	Columbia, SC (803) 765-9360
Raleigh, NC (919) 781-8011	Greenville, SC (864) 676-1888
Wilmington, NC (910) 791-4775	Chesapeake, VA (757) 548-1700
Chattanooga, TN (423) 693-2890	Richmond, VA (804) 272-1500
Knoxville, TN (865) 450-9770	Roanoke, VA (540) 725-8701

Corporate: Greensboro, NC (336) 292-8777

We have exercised care in the preparation of this submittal. We believe it satisfies our interpretation of the designer's intent and scope. It contains the list of materials, quantities, sizes, style and the finish as we propose to furnish for this job. Please examine and check carefully that all items are exactly as required and that our interpretation of the applicable plans and/or specifications are consistent with the design. Approval by the engineer and purchaser will be required before release of this equipment for production. If any discrepancies are discovered, please notify us as soon as possible.

IGX-P127-H32-MF-O

Unit Performance

Design Conditions					
Elevation (ft)	Summer		Winter (°F)	Supply (CFM)	Outdoor Air (CFM)
	DB (°F)	WB (°F)			
768	94.1	77.1	20.5	10,400	10,400

Unit Specifications						
Qty	Weight (lb)	Cooling Type	Heating Type	Unit Installation	Unit ETL Listing	Furnace ETL Listing
2	2,058 (+/- 5%)	None	Indirect Gas Furnace	Outdoor	UL / cUL 60335-2-40	ANSI Z83.8 / CSA 2.6

Configuration				
Unit Orientation	Unit Configuration	Outdoor Air Intake	Return Air Intake	Supply Air Discharge
Horizontal	Constant Volume 100% OA	End	-	Bottom

Heating Specifications										
Type	Gas Type	Gas Pressure		Capacity (MBH)		Temperature Rise		Turndown	Performance	
		Min (in. wg)	Max (PSI)	Input	Output	Min (°F)	Max (°F)		EAT (°F)	LAT (°F)
Indirect Gas Furnace	Natural	6	0.5	600.0	486.0	1.8	43.2	24:1	21.0	63.7

Air Performance										
Type	Total Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	RPM	Operating Power (hp)	Fan				
						Qty	Type	Size (in.)	Drive-Type	
Supply	10,400	0.35	2.306	1168	6.74	1	Mixed Flow	33	Direct-Drive	

Motor Specifications					
Motor	Qty	Size (HP)	Enclosure	Efficiency	RPM
Supply Fan Motor	1	7-1/2	ODP	NEMA Premium	1180

Electrical Specifications				
Power Supply	Rating (V/C/P)	MCA (A)	MOP (A)	SCCR
Unit	460/60/3	20.2	25	5kA

Starters for External Exhaust Fans			
Starter	Exhaust Fan Mark	Motor Size (hp)	NEC Amps
Exhaust 1	EF-17	1	2.1
Exhaust 2	EF-18	1	2.1



CONSTRUCTION FEATURES AND ACCESSORIES

Unit	
Unit Installation - Indoor or Outdoor	Std
Unit Construction - Double Wall	X
Wall Insulation - 1in. fiberglass - Tempering on	X
Base Insulation - 1in. fiberglass - entire unit base pan	Std
Paneled Bottom - Sheet metal liner for base insulation	
Corrosion Resistant Fasteners	Std
Access and Connections - Right side when facing intake	X
Service Access - Hinged access doors	X
Unit Finish - Permatector ASTM B117 salt spray 2500 hours	X
Finish Color - Concrete Gray (RAL 7023)	X
Supply Fan - Direct-drive, mixed flow plenum	X
Supply Fan and Motor Vibration isolation - Neoprene	X
Controls	
Unit Controls - Microprocessor	X
Remote Panel	
BMS Communication - Monitoring and control	X
BMS Protocol - BACnet IP	X
Temperature Control - Discharge control	X
Supply Fan VFD - VFD by factory	X
Supply Fan Control - Constant Volume	X
Unoccupied Mode (Night Setback)	
Recirculation Control	
Control Accessories	
Remote display	
Heating Inlet Air Sensor	X
Cooling Inlet Air Sensor	
Dirty Filter Switch	X
Fire Stat Type III (Ships loose)	
120V/24V Smoke Detector (Ships loose)	
Inlet Damper End Switch	X
External Cooling Lockout Relay	
Freeze Protection (Supply Air Low Limit)	X
Auxiliary Supply Starter Contacts	
Auxiliary Exhaust Starter Contacts - Qty 1	X
Airflow Proving Monitoring Contact	

Accessories	
Factory Installed, Lockable, NEMA 3R Disconnect	Std
Weatherhood - Birdscreen	X
Supply Air Filters - 2" MERV 8 and 2" MERV 13, 20x25x2 - (16)	X
Outdoor Air Inlet Damper - Low leakage	X
Supply Air Outlet Damper	
Return Air Damper	
Diffuser	
Roof Curb - GPI	X
Combination Curb	
Electrofin Coil Coating	
Fan Bearing Extended Lube Lines	
Inlet Damper Module	
Spare Belts	
Spare Filters - 1 set(s)	X
Motor with Shaft Grounding	X
Service Outlet - Shipped loose	X
Service Lights	X
Gas Heating Accessories	
Furnace Venting - Outdoor	X
Venting Type - Power vented	Std
Furnace Venting Method - Standard	X
Concentric Venting Adapter	
Direct Spark Ignition	Std
Flame Sensing - Flame rod	Std
Heat Exchanger Material - Stainless steel	X
Furnace Controls - 24:1 Modulating	X
Agency Approval - ETL	Std
External Gas Pressure Regulator (Ships loose)	
DDC Assisted Furnace Commissioning	X
Warranty Options	
Unit Warranty - 1 year (ext.)	X
5 Year Compressor Warranty	
5 Year Heat Exchanger Warranty	
10 Year Heat Exchanger Warranty	X

Standard Option	Std
Not Included	
Included	X

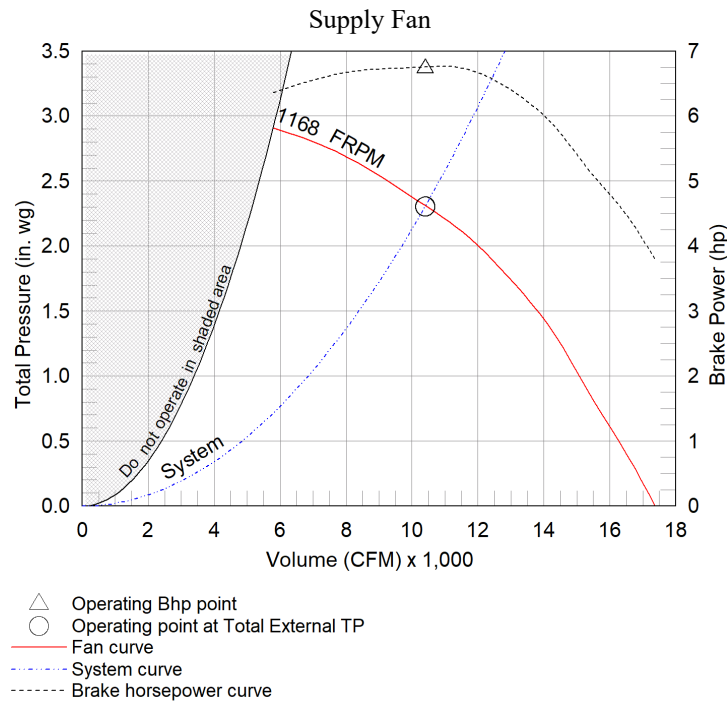
Notes
Birdscreen weatherhoods ship knocked down and require field installation.
Damper(s) supplied are low leakage, motorized VCD-23 (leakage rate of 3 CFM/ft ² @ 1 in.wg), Class 1A
Verify that the correct BMS Protocol has been selected before ordering.

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
10,400	0.35	2.306	1168	6.74	1	7-1/2	1	Mixed Flow	Direct

Pressure Drop (in. wg)							
Diffuser	Weatherhood	Filter	Damper	Cooling	Heating	External	Total
-	0.043	0.493	0.122	-	1.298	0.35	2.306

Sound Performance in Accordance with AMCA										
Sound Power by Octave Band								Lwa	dBA	Sones
62.5	125	250	500	1000	2000	4000	8000			
82	80	82	92	86	80	78	72	91	80	29



Heating Specifications

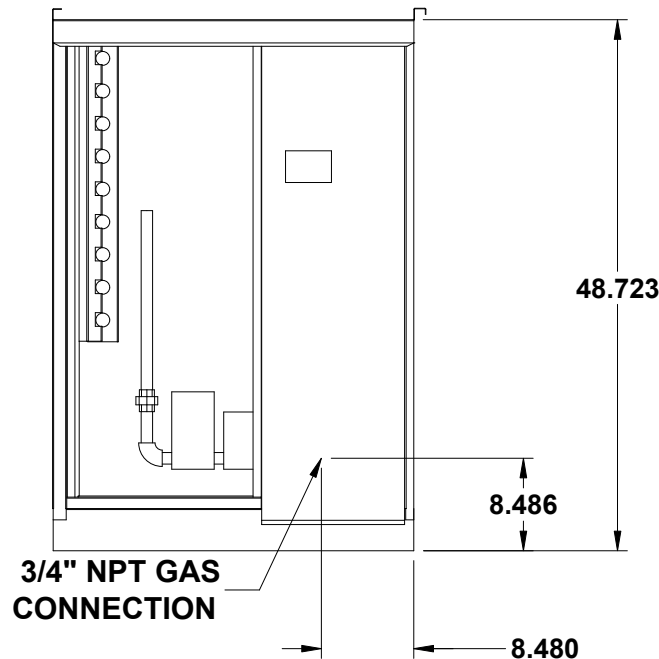
Heating Performance										
Type	Gas Type	Gas Pressure		Capacity (MBH)		Temperature Rise		Turndown	Performance	
		Min (in. wg)	Max (PSI)	Input	Output	Min (°F)	Max (°F)		EAT (°F)	LAT (°F)
Indirect Gas Furnace	Natural	6	0.5	600.0	486.0	1.8	43.2	24:1	21.0	63.7

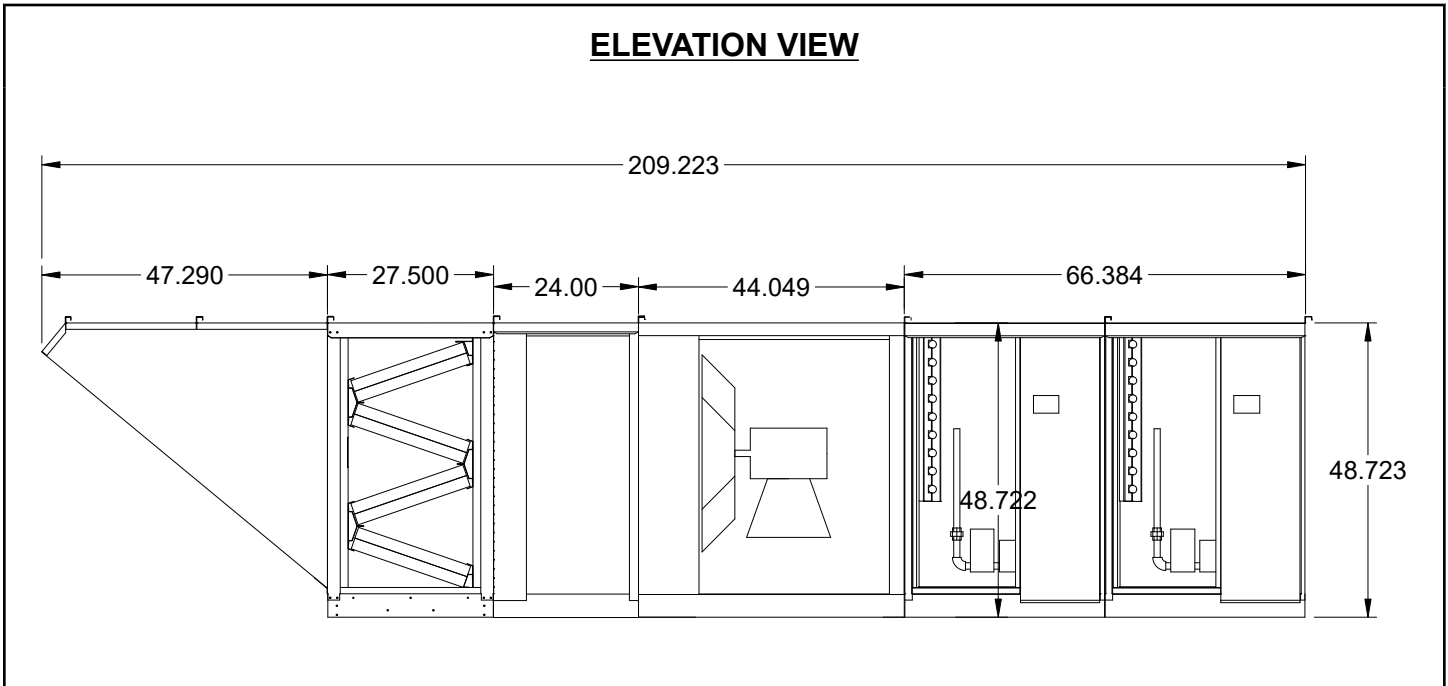
Heating Information					
Furnace Efficiency	Heat Exch. Material	Venting	Venting Method	Gas Pressure Regulators	Heat Exchanger Warranty
81%	Stainless Steel	Outdoor	Standard	-	-

Unit Details
ANSI Standard Z83.8 and CSA 2.6
Direct Spark Ignition
Stainless Steel Heat Exchanger Tubes

Power Venting
24 Volt Control Power
10 year heat exchanger warranty

Gas Connections





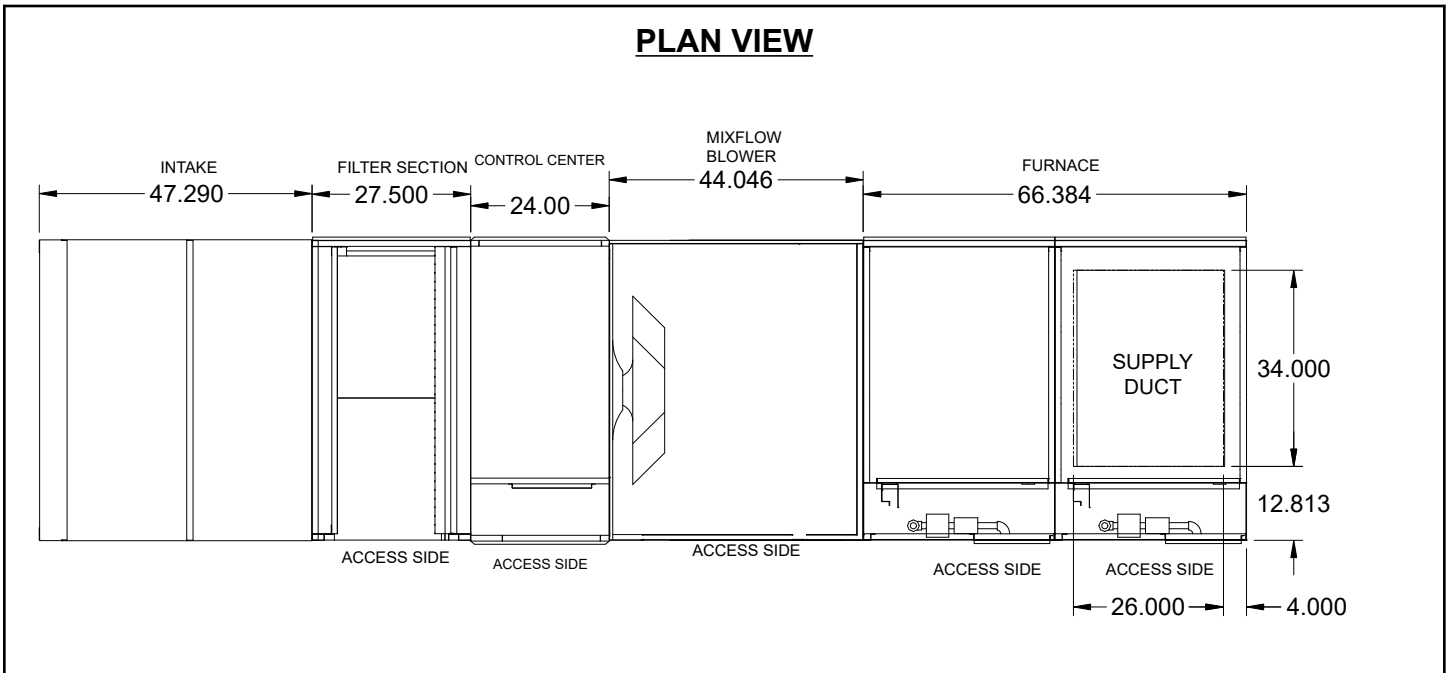
Notes - Elevation View

Standard configuration for unit access is on the right-hand side, when looking into the unit intake in the direction of airflow.

Order of unit sections is from intake of unit to discharge of unit.

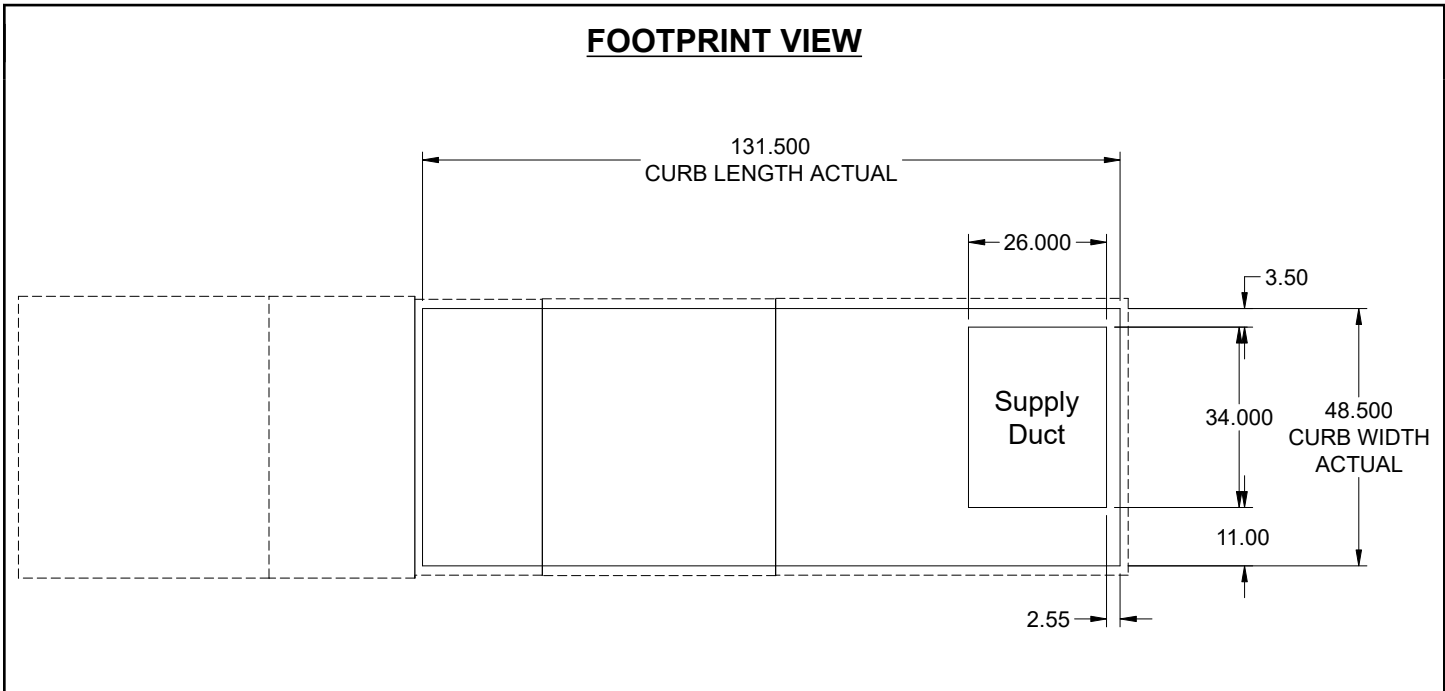
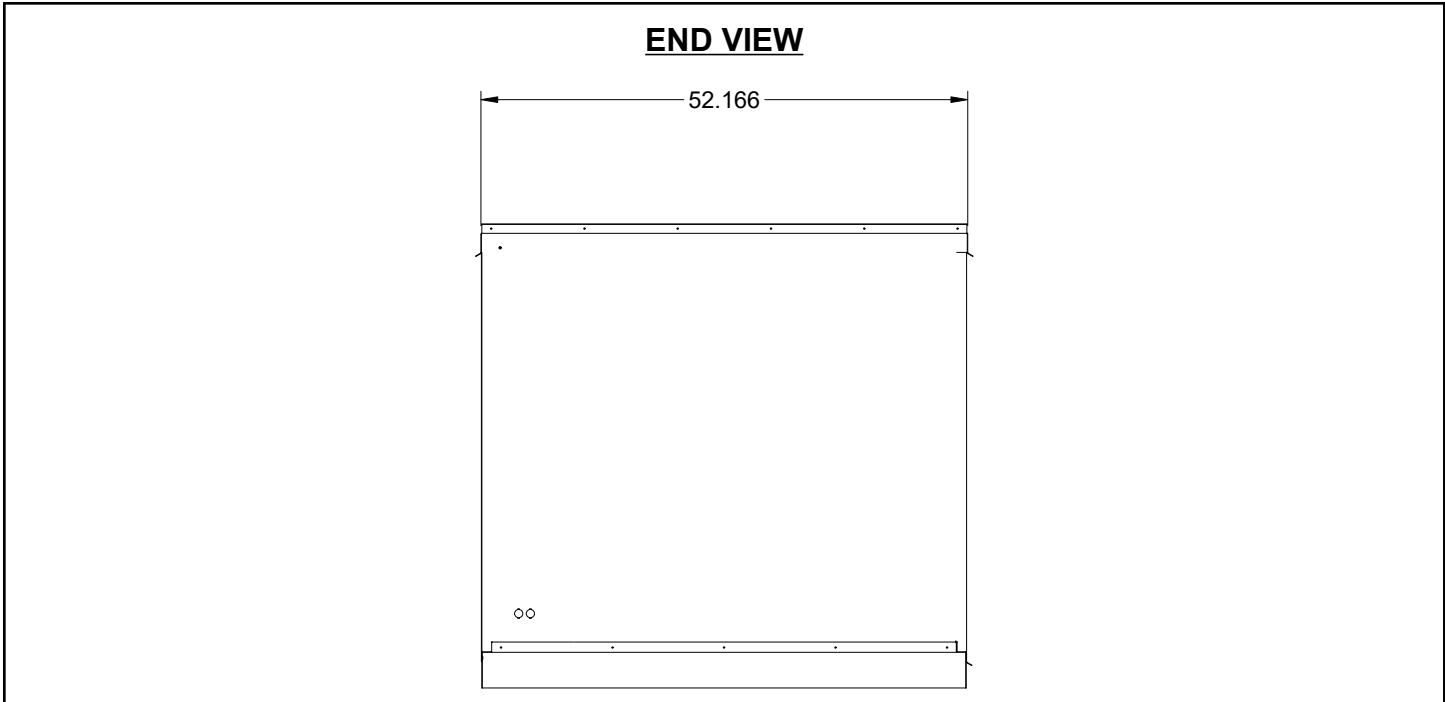
Sections included on this unit: Weatherhood Section, Filter Section, Control Center Module Section, Blower Section, Furnace 1 Section, Furnace 2 Section

Insulation: Double Wall, from Furnace Section through end of unit.



Notes - Plan View

Standard configuration for unit access is on the right-hand side, when looking into the unit intake in the direction of airflow.



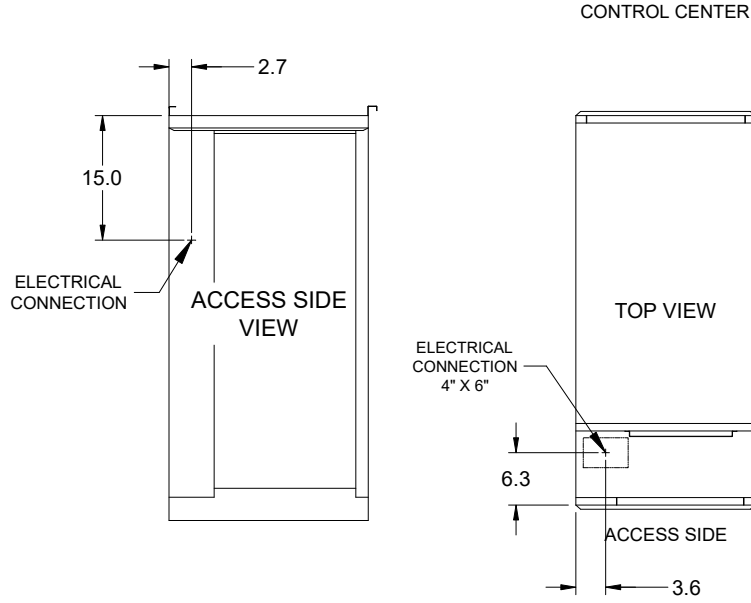
Notes - Footprint View

Minimum Roof Opening: The minimum roof opening size is the illustrated duct diameter plus 0.25 in. on all sides. For example: If the duct size is 14 x 14 in. square, the minimum roof opening size is 14.5 x 14.5 in. square.

Maximum Roof Opening: There must be a minimum perimeter of 1.75 in. between the roof opening and the roof curb. For example: If the roof curb is 75 x 30 in. square, the maximum roof opening is 71.5 x 26.5 in. inches square.

The weatherhood and filter sections of the make-up air unit extend beyond the curb. This is by design, to prevent water infiltration.

Electrical Connections



Clearance Specifications

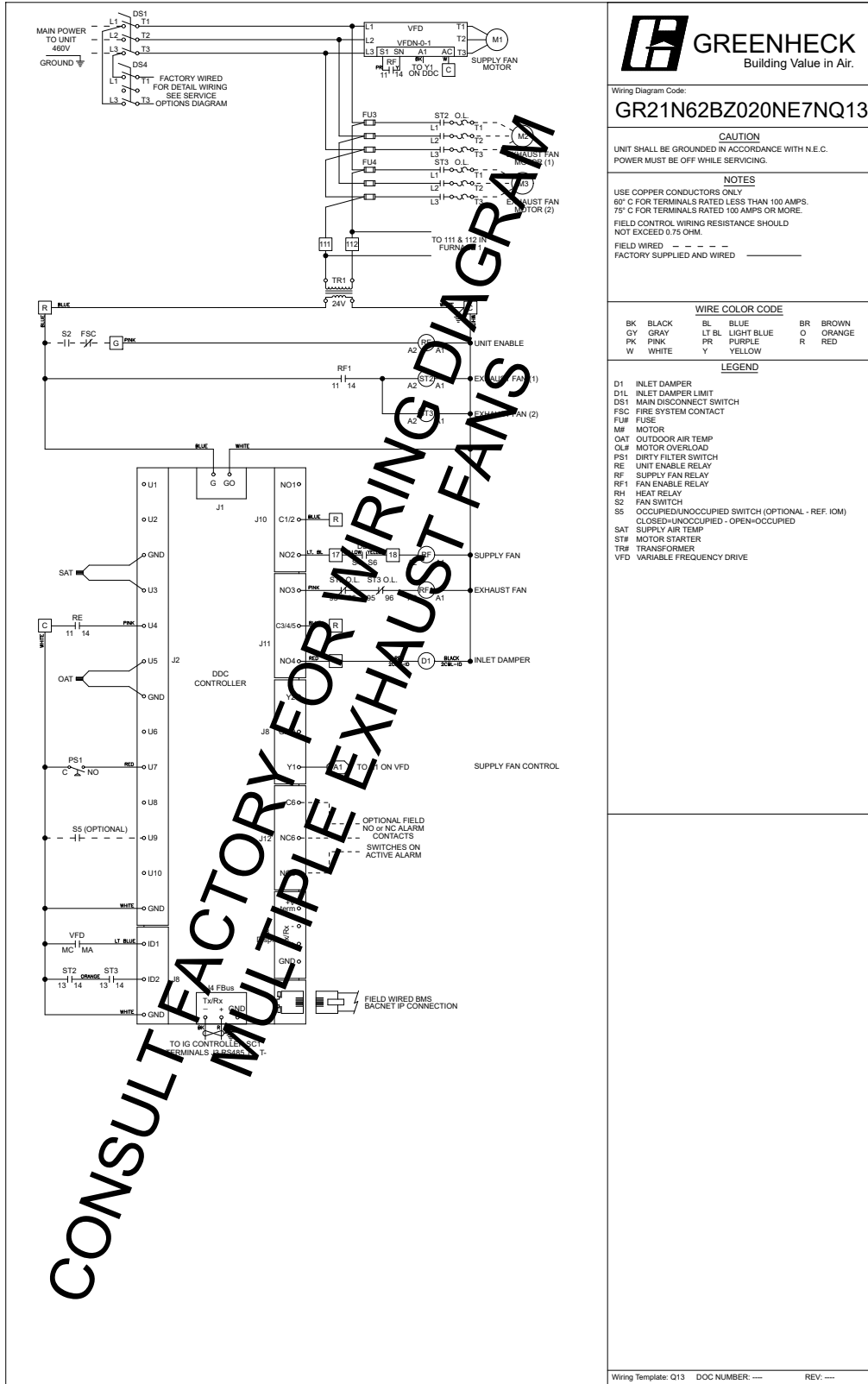
Recommended Minimum Combustible Clearances				
	Floor (in.)	Top (in.)	Sides (in.)	Ends (in.)
Indirect Fired Units	0	0	0	0

Notes - Combustible Clearances
 Clearance to combustibles is defined as the minimum distance required between the heating source and the adjacent combustible surfaces to ensure the adjacent surface's temperature does not exceed 90 F above the ambient temperature.
 Reference venting guidelines for combustion blower clearances.

Recommended Minimum Service Clearances	
Housing 32 and less (in.)	Housing 35 and higher (in.)
42 on the controls side of the unit	N/A

Notes - Service Clearances
 To ensure ample space for component removal (evaporative cooling media, coils, filters, etc.), service clearances should be 6 in. wider than the width of the module itself.

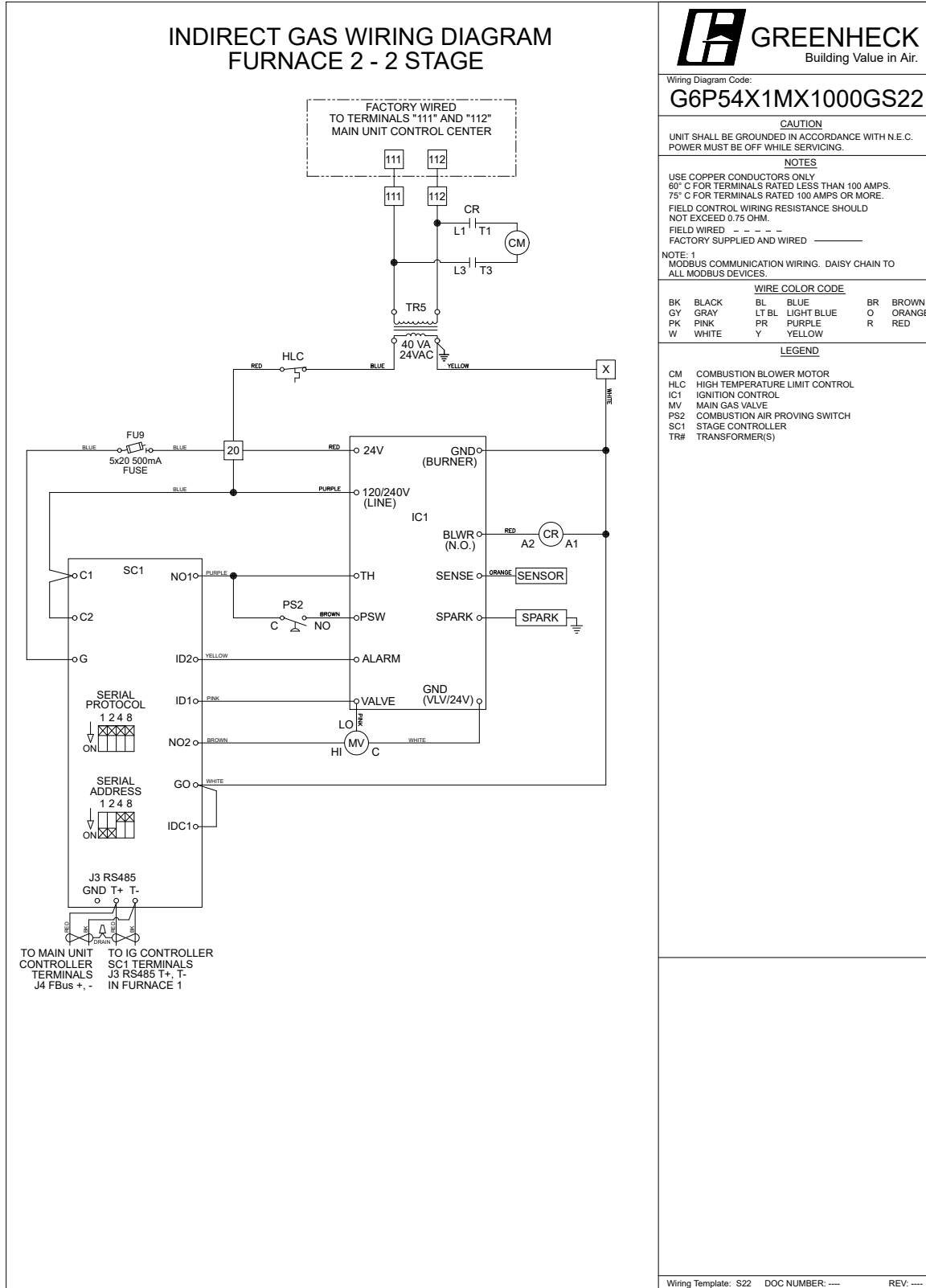
Wiring Diagram



CONSULT FACTORY FOR WIRING DIAGRAM MULTIPLE EXHAUST FANS

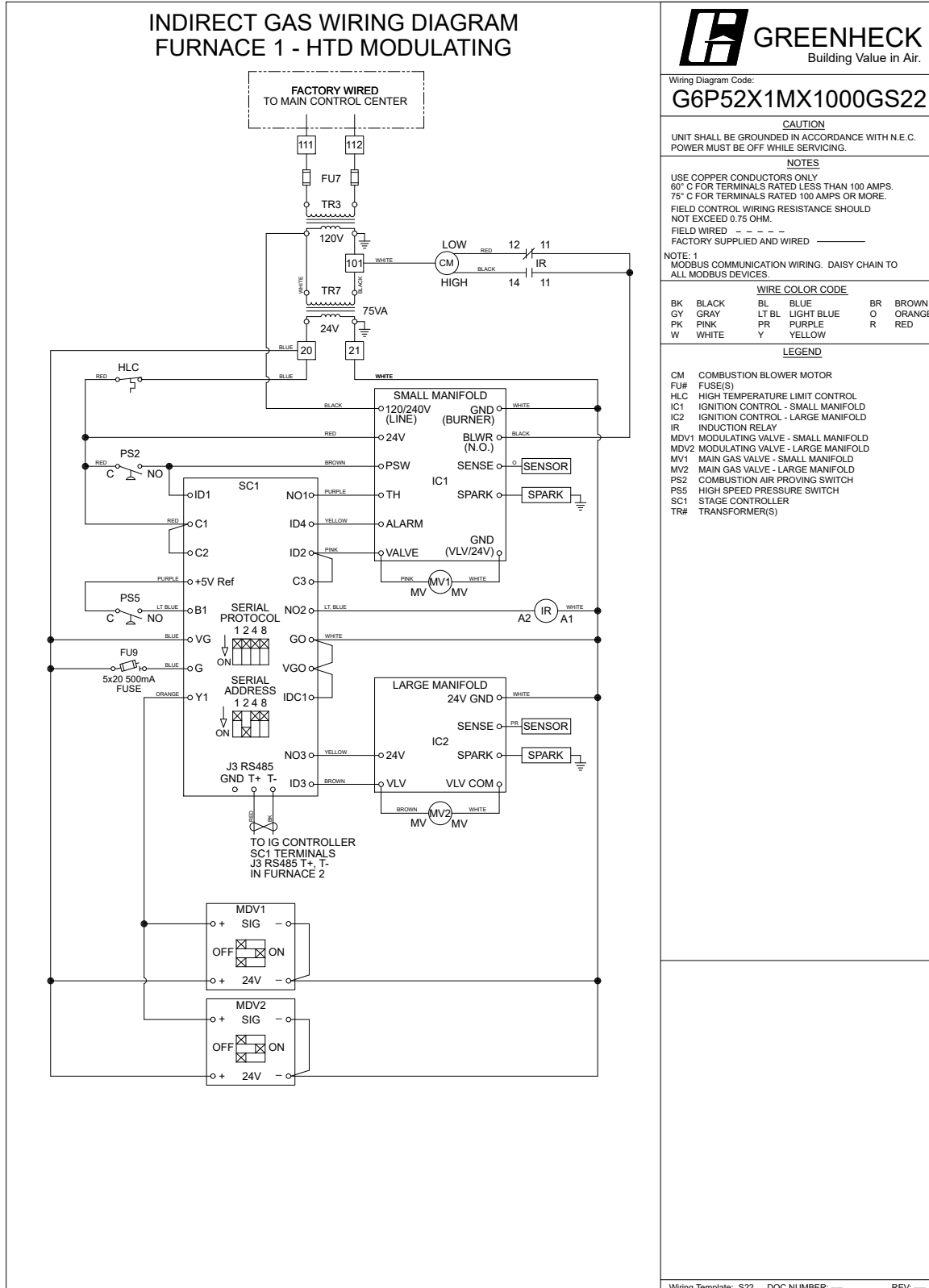
Manufacturer reserves right to change, alter, or improve this product at any time.

Furnace Wiring Diagram



Manufacturer reserves right to change, alter, or improve this product at any time.

Furnace 2 Wiring Diagram



Manufacturer reserves right to change, alter, or improve this product at any time.

BMS Protocol Points List

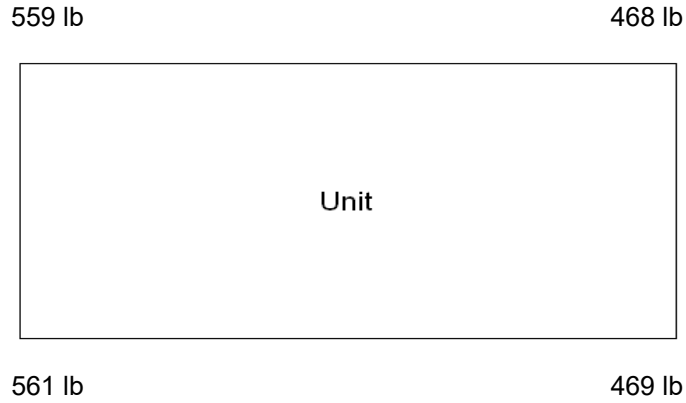
Greenheck Monitoring Interface v2.6 Modbus/BACnet Points List							
Variable	Description	BACnet	Modbus	Read or Write	Text or Unit of M		Included
		Object	Register		Active	Inactive	
Space_Temp_Analog_Input	Space Temperature	AI-1	30002	R		°F	
Supply_Temp_Analog_Input	Supply Temperature	AI-2	30004	R		°F	X
Outside_Air_Temp_Analog_Input	Outside Air Temperature	AI-3	30006	R		°F	X
Space_Static_Pressure_Analog_Input	Space Static Pressure	AI-9	30018	R		"wc	
Supply_Duct_Static_Pressure_Analog_Input	Supply Duct Static Pressure	AI-10	30020	R		"wc	
Space_CO2_1_Analog_Input	Space CO2 ppm	AI-11	30022	R		ppm	
Return_CO2_Analog_Input	Return CO2 ppm	AI-12	30024	R		ppm	
Aux_In_Customer_1	Customer defined auxiliary input	AI-22	30044	R		selectable	
Aux_In_Customer_2	Customer defined auxiliary input	AI-23	30046	R		selectable	
Aux_In_Customer_3	Customer defined auxiliary input	AI-24	30048	R		selectable	
Aux_In_Customer_4	Customer defined auxiliary input	AI-25	30050	R		selectable	
Aux_In_Customer_5	Customer defined auxiliary input	AI-26	30052	R		selectable	
Aux_In_Customer_6	Customer defined auxiliary input	AI-27	30054	R		selectable	
Aux_In_Customer_7	Customer defined auxiliary input	AI-28	30056	R		selectable	
Aux_In_Customer_8	Customer defined auxiliary input	AI-29	30058	R		selectable	
Aux_In_Customer_9	Customer defined auxiliary input	AI-30	30060	R		selectable	
Aux_In_Customer_10	Customer defined auxiliary input	AI-31	30062	R		selectable	
Temperature_Setpoint	Occupied Temperature Setpoint	AV-1	40002	R/W		°F	X
Temperature_Heat_Cool_Deadband	Occupied Spt Deadband - Space/Return Reset	AV-2	40004	R/W		°F (div 2 add/sub Setpoint)	
Temperature_Setpoint_Unoccupied	Unoccupied Temperature Setpoint	AV-3	40006	R/W		°F	
Temperature_Heat_Cool_Deadband_Unoccupied	Unoccupied Spt Deadband - Space/Return Reset	AV-4	40008	R/W		°F (div 2 add/sub Setpoint)	
Supply_Temperature_Minimum_Cooling_Setpoint	Minimum supply air temperature - Cooling	AV-5	40010	R/W		°F	
Supply_Temperature_Maximum_Cooling_Setpoint	Maximum supply air temperature - Cooling	AV-6	40012	R/W		°F	
Supply_Temperature_Minimum_Heating_Setpoint	Minimum supply air temperature - Heating	AV-7	40014	R/W		°F	X
Supply_Temperature_Maximum_Heating_Setpoint	Maximum supply air temperature - Heating	AV-8	40016	R/W		°F	X
Economizer_Temp_Enable_Setpoint	Economizer Ambient Temp Enable Setpoint	AV-9	40018	R/W		°F	
Cooling_Lockout_Setpoint	Cooling Ambient Lockout Setpoint	AV-13	40026	R/W		°F	X
Heating_Lockout_Setpoint	Heating Ambient Lockout Setpoint	AV-14	40028	R/W		°F	X
Economizer_Lockout_Setpoint	Economizer Lockout Setpoint	AV-15	40030	R/W		°F	
Space_Static_Pressure_Setpoint	Space Static Pressure Setpoint	AV-16	40032	R/W		"wc	
Supply_Duct_Static_Pressure_Setpoint	Supply Duct Static Pressure Setpoint	AV-17	40034	R/W		"wc	
Space_CO2_Setpoint	Space CO2 Setpoint	AV-18	40036	R/W		ppm	
Outside_Air_Damper_Minimum_Setpoint_Occ	Occupied Outside Air Damper Min Setpoint	AV-19	40038	R/W		%	
Outside_Air_Damper_Minimum_Setpoint_Unocc	Unoccupied Outside Air Damper Min Setpoint	AV-20	40040	R/W		%	
Heat_Vent_Changeover_Temp	Heat Vent Changeover Setpoint	AV-21	40042	R/W		°F	
Heat_Vent_Changeover_Hysteresis	Heat Vent Changeover Hysteresis (Summer Only)	AV-22	40044	R/W		°F	
HV_Summer_Damper_Setpoint_Occ	Occupied OAD Setpoint when in Summer Mode	AV-23	40046	R/W		%	
HV_Summer_Damper_Setpoint_Unocc	Unoccupied OAD Setpoint when in Summer Mode	AV-24	40048	R/W		%	
HV_Summer_Lockout	Summer Mode Ambient Lockout Setpoint	AV-25	40050	R/W		°F	
HV_Winter_Damper_Setpoint_Occ	Occupied OAD Setpoint when in Winter Mode	AV-26	40052	R/W		%	
HV_Winter_Damper_Setpoint_Unocc	Unoccupied OAD Setpoint when in Winter Mode	AV-27	40054	R/W		%	
Supply_Air_Low_Limit_Setpoint	Low Supply Temp resulting in unit shutdown	AV-28	40056	R/W		°F	X
Outside_Temp_from_BMS	Outside Temp from BMS. (Source set to BMS)	AV-30	40060	R/W		°F (Source set to BMS)	X
Space_1_CO2_from_BMS	Space CO2 from BMS. (Source set to BMS)	AV-33	40066	R/W		ppm (Source set to BMS)	
Return_CO2_from_BMS	Return CO2 from BMS. (Source set to BMS)	AV-34	40068	R/W		ppm (Source set to BMS)	
Space_Static_from_BMS	Space Static from BMS.	AV-36	40072	R/W		"wc (Source set to BMS)	
Space_Temp_from_BMS	Space Temp from BMS	AV-37	40074	R/W		°F (Source set to BMS)	
SF_Control_Signal_BMS	BMS to control signal for supply fan speed	AV-38	40076	R/W		% (Source set to BMS)	
OAD_Control_Signal_BMS	Allows the BMS to control OAD position	AV-39	40078	R/W		% (Source set to BMS)	
Aux_BMS_Analog_Output_1	BMS Commanded auxiliary analog output	AV-40	40080	R/W		selectable	
Unit_Status_Mode	Unit Status Word	AV-41	30064	R		See Unit Status Table	X

Supply_Temperature_Calculated_Setpoint	Active Supply Temperature Setpoint	AV-42	30066	R	°F		X
Cooling_1_Ramp_Capacity	Cooling Ramp 1 Status Value	AV-43	30068	R	%		
Economizer_Ramp	Economizer Ramp	AV-44	30070	R	%		
Heating_Capacity	Heating Ramp	AV-46	30074	R	%		X
OAD_CFM_BMS	OAD CFM	AV-56	30094	R	cfm		
Active_Temperature_Setpoint	Active Temperature Set point	AV-57	30096	R	°F		X
Chilled_Water_1_Valve_Analog_Output	Chilled Water 1 Valve Analog Output	AV-58	30098	R	%		
Electric_Heater_1_Analog_Output	Electric Heater 1 Analog Output	AV-59	30100	R	%		
Hot_Water_Valve_1_Analog_Output	Hot Water Valve 1 Analog Output	AV-60	30102	R	%		
Mod_Gas_Furnace_1_Analog_Output	Mod Gas Furnace 1 Analog Output	AV-61	30104	R	%		X
Outside_Air_Damper_Analog_Output	Outside Air Damper Analog Output	AV-62	30106	R	%		
Supply_Fan_Speed_Analog_Output	Supply Fan Speed Analog Output	AV-63	30108	R	%		X
Modulating_Compressor_Analog_Output_BMS	Modulating Compressor Analog Output	AV-64	30110	R	%		
Active_Cooling_Setpoint	Active Cooling Setpoint - Unoccupied	AV-69	30120	R	°F		
Active_Heating_Setpoint	Active Heating Setpoint - Unoccupied	AV-70	30122	R	°F		
Exhaust_Fan_1_Status_Digital_Input	Exhaust Fan Status	BI-1	10005	R	Active	Inactive	X
Supply_Fan_1_Status_Digital_Input	Supply Fan Status	BI-2	10006	R	Active	Inactive	X
BMS_Watchdog	BMS Watchdog command - BMS communications	BV-1	1	R/W	Active	Inactive	X
System_Enable	Master system enable/disable point.	BV-2	2	R/W	Active	Inactive	X
BMS_Occupancy_Command	Occupancy Command	BV-3	3	R/W	Unoccupied	Occupied	X
Reset_All_Alarms	Alarm Reset Command.	BV-4	4	R/W	Reset	Normal	X
Outside_Temp_Source_BMS	Outside Temp Source Selection	BV-6	6	R/W	BMS	Local	X
Space_1_CO2_Source_BMS	Space CO2 Source Selection	BV-9	9	R/W	BMS	Local	
Return_CO2_Source_BMS	Return CO2 Source Selection	BV-10	10	R/W	BMS	Local	
Space_Static_Source_BMS	Space Static Source Selection	BV-12	12	R/W	BMS	Local	
Space_Temp_Source_BMS	Space Temp Source Selection	BV-13	13	R/W	BMS	Local	
SF_Control_Source_BMS	Allows the BMS to control supply fan speed	BV-14	14	R/W	BMS	Local	
OAD_Control_Source_BMS	Allows the BMS to control OAD position	BV-15	15	R/W	BMS	Local	
Aux_BMS_Digital_Output_1	BMS Commanded auxiliary digital output	BV-16	16	R/W	Active	Inactive	
Aux_BMS_Digital_Output_2	BMS Commanded auxiliary digital output	BV-17	17	R/W	Active	Inactive	
Occupied	Occupancy	BV-18	10001	R	Occupied	Unoccupied	X
Global_Alarm	Alarm Output - Any or Shutdown Selectable	BV-19	10002	R	Alarm	Normal	X
BMS_Watchdog_Active	Status of the BMS Watchdog Ping	BV-20	10003	R	Active	Inactive	X
Temperature_Reset_Mode	Occupied Reset Mode	IV-1	40082	R	1-Supply Temp Control;2-Space;3-Return;4-Outside		X
Temperature_Reset_Mode_Unoccupied	Unoccupied Reset Mode	IV-2	40084	R			
HV_Summer_Operation_Occ	Heat Vent Summer Operation Occupied	IV-3	40086	R	1-Off; 2-Continuous;		
HV_Summer_Operation_Unocc	Heat Vent Summer Operation Unoccupied	IV-4	40088	R			
HV_Winter_Operation_Occ	Heat Vent Winter Operation Occupied	IV-5	40090	R	1-Off; 2-Continuous; 3-Cycle		
HV_Winter_Operation_Unocc	Heat Vent Winter Operation Unoccupied	IV-6	40092	R			
Active_Temperature_Reset_Mode	Active Occupied Reset Type Setpoint	IV-7	30124	R	1-Supply Temp Control;2-Space;3-Return;4-Outside		X
Active_Temperature_Reset_Mode_Unocc	Active Unoccupied Reset Type Setpoint	IV-8	30126	R			
LatestAlm	Most recent alarm	IV-9	30128	R	See Alarm Table		X
Digital_Output_Word	Digital Output Enables	IV-10	30132	R	Bitstring - See Table		X
Cooling_Alarm_Word	Cooling Device Alarms	IV-11	30136	R	Bitstring - See Table		
Device_Offline_Word	Device Communication Alarms	IV-12	30140	R	Bitstring - See Table		X
Device_Alarm_Word	Device Alarms	IV-13	30144	R	Bitstring - See Table		X
Heating_Alarm_Word	Heating Device Alarms	IV-14	30148	R	Bitstring - See Table		X
Unit_Status_Word	Unit Status Word	IV-15	30152	R	Bitstring - See Table		X

Unit Status Index											
0	System Off	4	Supply Fan Starting	8	Sys On-Heating	12	Sys On-Dehumid & Reheat	16	Unocc-Cooling	20	Remote Off
1	Initial Delay	5	System On	9	Sys On-Cooling	13	Unocc-Unit Off	17	Unocc-Dehumid	21	Alarm
2	Opening Dampers	6	Defrost Mode Active	10	Sys On-Econ & Cooling	14	Unocc-Unit On	18	Unocc-Dehumid & Reheat		
3	Exhaust Fan Starting	7	Sys On-Economizer	11	Sys On-Dehumidifying	15	Unocc-Heating	19	Manual Override		

IG Alarm (REF.IG_Alarm Point 45)				
BIT 0	BIT 1	BIT 2	BIT 3	BIT 4
No Flame	Ignition Controller	Max Retries	High Limit	IG Furnace Offline

Corner Weights



SEQUENCE OF OPERATIONS

Unit Controls

The unit shall be provided from the factory with:

- 24VAC Transformer
- Terminal Strip
- Supply Fan VFD
- Exhaust fan motor starter(s) (contactor and overload)-exhaust fans are external and field wired
- Factory mounted and wired outdoor air inlet damper with actuator

Microprocessor Controller

The microprocessor control shall be factory programmed, mounted, wired and tested. Controller shall have a lighted LCD display and keypad for changing set points and monitoring unit operation. The controller shall be equipped with the following sensors:

- Outdoor air temperature sensor
- Supply discharge temperature sensor (must be field mounted in the supply ductwork)

Building Management System (BMS) Communication

The microprocessor controller shall be capable of integrating into a Building Management System (BMS) to allow the BMS to remotely adjust set points, view unit status points and alarms. The microprocessor shall include the ability to communicate over the following protocol:

- BACnet® IP/Ethernet

Unit Start Command

A contact closure or jumper wire must be field wired between terminals R and G to enable the unit. When terminal G is energized the unit shall operate as described below. When terminal G is de-energized the unit is disabled.

Internal Time Clock (Schedule)

The microprocessor controller is equipped with an internal 7-day programmable time clock, allowing the user to add up to seven different occupancy schedules.

Occupied/Unoccupied Modes

The microprocessor controller offers the following modes for determining occupancy:

- The internal time clock
- A remote contact (see wiring diagram for details)
- The Building Management System (BMS)

The unit can be temporarily overridden to the occupied mode via a dry contact or the keypad display. After the override time has expired (1 hr, adj) the unit will return to the scheduled occupied/unoccupied mode.

Occupied Mode Unit Start-Up Sequence

- Unit enable input must be closed (contact closure between R and G).
- Initial delay, microprocessor controller initialization sequence.
- Factory mounted and wired outdoor air inlet damper actuator is powered open.
- External exhaust fan starts after adj. delay.
- Supply fan starts after adj. delay.
- Tempering operation begins (see modes below).

Supply Fan Sequence (Occupied)

The unit has been provided with a factory mounted variable frequency drive (VFD). The variable frequency drive shall control the supply fan speed as indicated by the following sequence:

Constant Volume:

The VFD shall be programmed from the factory for a constant supply fan speed. This is to be adjusted for air balancing only and is not to be modulated.

Heating Control

The heating will be locked out when the outside air is above the heating lockout set point (65 F adj.). When enabled heating will be controlled as follows:

Indirect Gas Fired Heating

The microprocessor controller will modulate the indirect gas furnace to maintain the active supply temperature set point.

Supply Temperature Set Point Control (Occupied)

The active supply temperature set point shall be adjusted (field selectable):

- Locally at the controller.
- Remotely by the BMS.

Unoccupied Mode (Disabled)

- Supply Fan Is OFF
- External exhaust fan is OFF.
- Factory mounted and wired outdoor air inlet damper actuator is de-energized and spring returns to the closed position.

Supply Air Low Limit

If the supply air temperature drops below 35 F (adj.) for 300 seconds (adj.), the controller will de-energize the unit and generate an alarm.

Alarm Management

The microprocessor controller will monitor the unit status for alarm conditions. Upon detecting an alarm, the controller will record the alarm description, time, date, available temperatures, and unit status for user review. A digital output is reserved for remote alarm indication.

Alarms are also communicated to the Building Management System (BMS).

Possible Alarms Include:

- **Global Alarm**
Indication that one or more alarms are present.
- **Outdoor Air Inlet Temperature Sensor Alarm**
Outdoor Air Inlet Temperature Sensor Alarm: Failure of the outdoor air inlet temperature sensor.
- **Supply Air Discharge Temperature Sensor Alarm**
Failure of the supply air discharge temperature sensor. Unit is shut down.
- **Supply Air Low Limit Alarm**
Supply air has fallen below 35 F (adj.) for 300 seconds (adj.). Unit is shut down.
- **Dirty Filter Alarm**
Indicates the pressure across the filters has increased above the dirty filter pressure switch setting (field adjustable)
- **Indirect Gas Furnace Alarms**
The indirect gas furnace operation is monitored for a variety of alarm conditions.
- **Supply Fan Alarm**
Indicates the supply fan failed to prove for a 30 second (adj.) period.
- **Exhaust Fan Alarm**
Indicates the exhaust fan failed to prove for a 30 second (adj.) period.
- **Building Pressure Sensor Alarm**
Failure of the building pressure sensor.

Warranty Statement for Make-Up Air

Unit Warranty

Greenheck warrants the equipment to be free from defects in material and workmanship for a period of 30 months from the date of shipment. Initial startup must be completed within six months of the shipment date, and a startup report must be submitted to Greenheck.

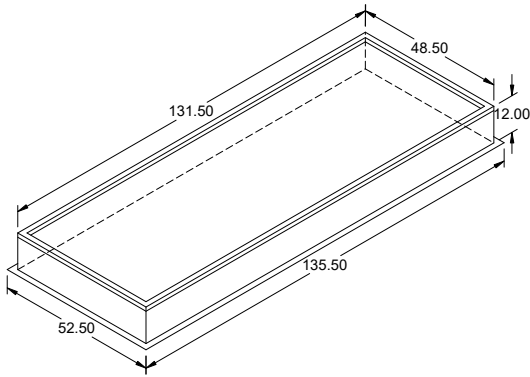
Heat Exchanger Extended Warranty

Greenheck warrants the stainless steel heat exchanger to be free from defects in material and workmanship for a period of 10 years from the shipment date.

Warranty Notes

Any component which proves defective during the warranty period will be repaired or replaced at Greenheck's sole option when returned to our factory, transportation prepaid. All warranties do not include labor costs associated with troubleshooting, removal, or installation. Greenheck will not be liable for any consequential, punitive, or incidental damages resulting from use, repair, or operation of any Greenheck 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, Greenheck reserves the right to change specifications without notice.



Model: GPI

Roof Curb

Tags:

MAU-1 MAU-2

Standard Construction Features:

- Roof Curb fits between the building roof and the fan mounted directly to the roof support structure - Constructed of either 18 ga galvanized steel or 0.064 in. aluminum - Straight Sided without a cant - 2 in. mounting flange - 3 lb density insulation - Height - Available from 12 in. to 42 in. as specified in 0.5 in. increments. Notes: - The maximum roof opening dimension should not be greater than the "Actual" top outside dimension minus 2 in.. - The minimum roof opening dimension should be at least 2.5 in. more than the damper dimension or recommended duct size. - The Roof Opening Dimension may or may not be the same as the Structural Opening Dimension. - Damper Tray is optional and must be specified. Tray size is same as damper size. - Security bars are optional and must be specified. Frames and gridwork are all 12 ga steel.

General

Tag	Qty	Model	Sizing Method	Undersizing (in.)	Weight (lb)	Shipped Assembled	Union Label
	2	GPI-50 x 133	Nominal	1.5	107	No	No Preference

Dimensions

Curb Height (in.)	Nominal Outside Width (in.)	Nominal Outside Length (in.)	Actual Outside Width (in.)	Actual Outside Length (in.)	Flange Width (in.)	Flange Length (in.)
12	50	133	48.5	131.5	52.5	135.5

Accessories

Material	Security Bars	Liner	Insulation (in.)	Insulation R Value
Galvanized	No	No	1	R4.3