archall
architects

☐ REVIEWED	☐ REVISE AND RESUBMIT
☐ NOT REVIEWED	☒ FURNISH AS CORRECTED

Corrections of comments made on the shop drawings during this review do not relieve the contractor from compliance with the requirements of the drawing specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given on the contract documents. The contractor is responsible for confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordination of his/her work with that of all other trades; and performing that work in a safe and satisfactory manner.

Date: 4-4-2023 By: TYLER YOUNG

SEE MECHANICAL ENGINEER'S COMMENTS

COORDINATE FINAL PLACEMENT WITH LIGHTING AND VEHICLE LIFT LOCATION TO ENSURE PROPER CLEARANCES.

TP Mechanical
CONTRACTORS | SERVICE | FABRICATION

SUBMITTAL DATA

Project:	**Performance Honda Fairfield R-3362**
Bid Category :	**HVAC**
Project No.:	**A1000983**
Construction Manager:	**Renier Construction**
Architect/Engineer:	**Archall / EM Engineering Group, LTD**
Submittal For:	**Make-Up Air Unit**
PreCon TAB #:	**309**
Manufacturer:	**Greenheck**

The attached submittal data has been reviewed by TP Mechanical Contractors for compliance with the Architect/Engineer's specifications and plan schedule for this project.

In order to maintain the project schedule, we request that this submittal be returned to TP Mechanical Contractors **within 7 days**.

NOTE: Material cannot be released without Architect/Engineer's approval of submittal.

(Please place stamp of approval here)

_____ PRODUCT DATA
_____ DRAWINGS
03/29/23 DATE SUBMITTED
_____ DATE RESUBMITTED

T. P. MECHANICAL CONTRACTORS

BY Jeff Rullman – HG

This drawing or brochure has been checked to quality or proper components only. Approval of this drawing or brochure shall not relieve the supplier of responsibility for accuracy or dimensions of full compliance with plans and specifications and purchase order.

1500 Kemper Meadow Drive ♦ Cincinnati, OH 45240 ♦ 513-851-8881 ♦ FAX 513-851-0612

SUBMITTAL

Job Name: **Performance Honda Fairfield**

Architect: archall architects
Engineer: EM Engineering
Contractor: TP Mechanical
Elevation: (ft) 499
Date: 3/27/2023
Submitted By: Kyle Dullaghan

EAP INC
3930 VIRGINIA AVE
CINCINNATI, OH 45227
US
Phone: (513)489-9494
Fax: (513)489-6448
Email Address: kdullaghan@eapnet.com

SUBMITTAL NOTES:
Make-Up Air Unit

- Night setback unavailable with Remote Panel
- As submitted, microprocessor has compatible remote display for field mounting in the space. Remote display gives access to programmable schedule and any unit alarms and provides added transparency to the unit operation.
- Contactor – configured for EF-4 (schedule note 4)

-Coordinate all equipment and accessories prior to installation to make a fully functional system.

SHOP DRAWING REVIEW

This shop drawing review is for general compliance with design concept. No responsibility is assumed by Engineer for correctness of details, dimensions or compliance with contract documents.

No substitutions or deviations may be made from Contract Documents without prior written approval by Owner. No approval for substitution/deviation is given or implied by Engineer's shop drawing review. Items other than those specified are installed at Contractor's risk and are subject to removal and replacement at Contractor's own expense regardless of comments made during this review.

	Approved
X	Approved as Noted
	Furnish Specified Item
	Rejected - See Remarks
	Revise & Resubmit
	Reviewed

Corrections or comments made on the shop drawings during this review do not relieve Contractor from compliance with requirements of the Drawings and Specifications. This check is only for review of general conformance with the design concept of the project. The Contractor is responsible for confirming and correlating all quantities and dimensions: selecting fabrication processes and techniques of construction: coordinating this work with that of other trades: and performing this work in a safe and satisfactory manner.

By Cory Allen Date 4.3.23

GREENHECK
Building Value in Air.

P.O. Box 410 Schofield, WI 54476 (715) 359-6171 FAX (715) 355-2399 www.greenheck.com

DGX-120-H32

Unit Performance

Design Conditions

Elevation (ft)	Summer		Winter (°F)	Supply (CFM)	Outdoor Air (CFM)
	DB (°F)	WB (°F)			
499	92.8	77.9	0.0	14,150	14,150

Unit Specifications

Qty	Weight (lb)	Cooling Type	Heating Type	Unit Installation	Unit ETL Listing
1	1,943 (+/- 5%)	None	Direct Gas-Fired	Outdoor/Indoor	ANSI Z83.4 / CSA 3.7

Configuration

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

Heating Specifications

Type	Gas Type	Gas Pressure		Capacity (MBH)		Temperature Rise (°F)	Performance	
		Min (in. wg)	Max (Psi)	Input	Output		EAT (°F)	LAT (°F)
Direct Gas	Natural	14	5	1,328.9	1,222.6	80.0	0.0	80.0

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	14,150	0.5	1.569	843	11.62	1	Forward Curve	20	Belt-Drive

Motor Specifications

Motor	Qty	Size (HP)	Enclosure	Efficiency	RPM
Supply Fan Motor	1	15	ODP	NEMA Premium	1725

Electrical Specifications

Power Supply	Rating (V/C/P)	MCA (A)	MOP (A)	SCCR
Unit	460/60/3	31.4	50	5kA

Starters for External Exhaust Fans

Starter	Exhaust Fan Mark	Motor Size (hp)	NEC Amps
Exhaust 1	EF-4	2	3.4

CONSTRUCTION FEATURES AND ACCESSORIES

Unit	
Unit Installation - Indoor or Outdoor	Std
Unit Construction - Double Wall	X
Wall Insulation - 1in. fiberglass - Entire unit	X
Base Insulation - 1in. fiberglass - entire unit base pan	Std
Paneled Bottom - Sheet metal liner for base insulation	X
Corrosion Resistant Fasteners	Std
Access and Connections - Right side when facing intake	X
Service Access - Hinged access doors	X
Unit Finish - G90 Galvanized	X
Finish Color	
Supply Fan - Belt-drive, forward-curved	X
Supply Fan and Motor Vibration isolation - Neoprene	X
Controls	
Unit Controls - Microprocessor	X
Remote Panel	
BMS Communication - Monitoring and control	
BMS Protocol	
Temperature Control - Room control	X
Supply Fan VFD - VFD by factory	X
Supply Fan Control - Constant Volume	X
Unoccupied Mode (Night Setback)	
Control Accessories	
Remote display - 75 ft cord	X
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	
Airflow Proving Monitoring Contact	X

Accessories	
Factory Installed, Lockable, NEMA 3R Disconnect	Std
Weatherhood	
Supply Air Filters - 2" MERV 8, 20x25x2 - (10)	X
Outdoor Air Inlet Damper - Low leakage	X
Supply Air Outlet Damper	
Return Air Damper	
Diffuser - 3-way supply air diffuser	X
Roof Curb	
Combination Curb	
Electrofin Coil Coating	
Fan Bearing Extended Lube Lines	
Inlet Damper Module	
Spare Belts	
Spare Filters	
Motor with Shaft Grounding	
Service Outlet	
Service Lights	
Gas Heating Accessories	
Pilot Ignition	Std
Flame Sensing - Flame rod	X
Flame Safeguard Display	
Agency Approval - ETL	Std
FM Compliant	X
High Gas Pressure Switch	X
Low Gas Pressure Switch	X
Visual Indication Valves	
Proof of Closure Valve	
External Gas Pressure Regulator (Ships loose)	
Carbon Dioxide Sensor (Ships loose)	
Warranty Options	
Unit Warranty - 18 months (std.)	X
5 Year Compressor Warranty	
5 Year Burner Warranty	
10 Year Burner Warranty	

Standard Option	Std
Not Included	
Included	X

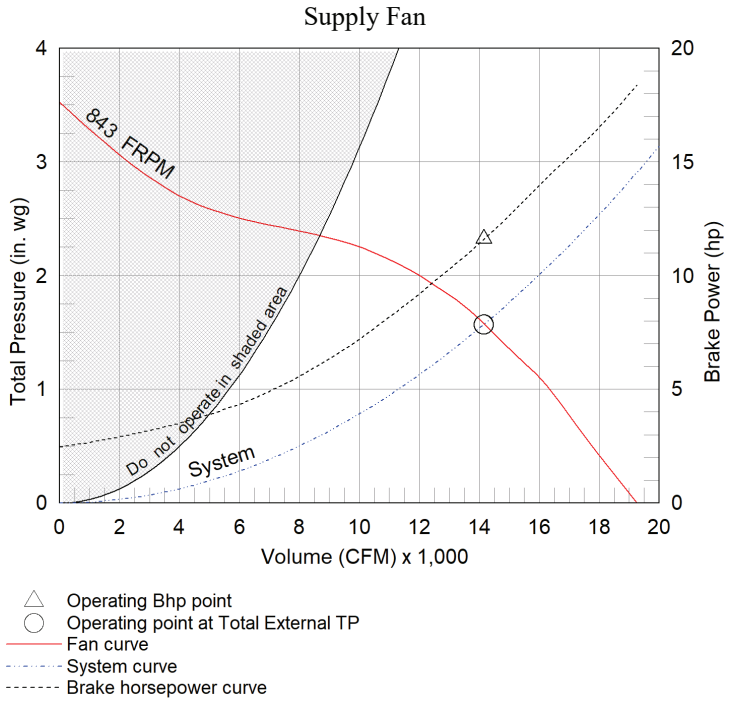
Notes
Damper(s) supplied are low leakage, motorized VCD-23 (leakage rate of 3 CFM/ft^2 @ 1 in.wg), Class 1A

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
14,150	0.5	1.569	843	11.62	1	15	1	Forward Curve	Belt

Pressure Drop (in. wg)							
Diffuser	Weatherhood	Filter	Damper	Cooling	Heating	External	Total
-	-	0.217	0.226	-	0.625	0.5	1.569

Sound Performance in Accordance with AMCA										
Sound Power by Octave Band								Lwa	dBA	Sones
62.5	125	250	500	1000	2000	4000	8000			
103	92	89	88	86	86	82	77	92	81	40



Heating Specifications

Heating Performance

Type	Gas Type	Gas Pressure		Capacity (MBH)		Temperature Rise (°F)	Performance	
		Min (in. wg)	Max (Psi)	Input	Output		EAT (°F)	LAT (°F)
Direct Gas	Natural	14	5	1,328.9	1,222.6	80.0	0.0	80.0

Gas Train Details

Redundant Main Valves	Electronic Modulating Valve	Pilot Valve	Internal Regulator	Visual Indication Valve	Proof of Closure Valve	Gas Pressure Switch(es)	External Regulator
Std	Std	Std	Std	-	-	High & Low	-

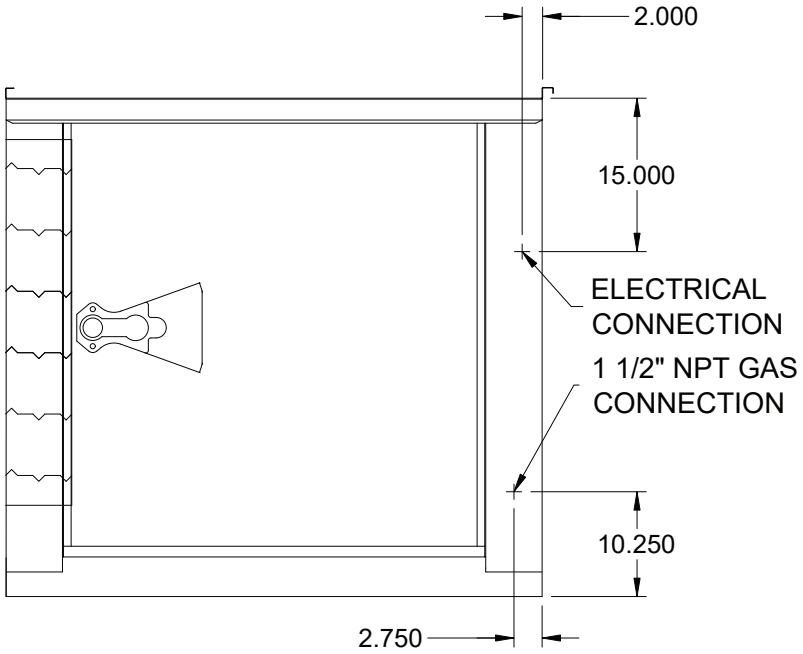
Additional Heating Information

ETL Approved	FM Compliant	Temperature Control	Flame Sensing	Ignition Control	CO2 Sensor	Flame Safeguard Display
Std	Yes	Room	Flame Rod	Pilot	-	-

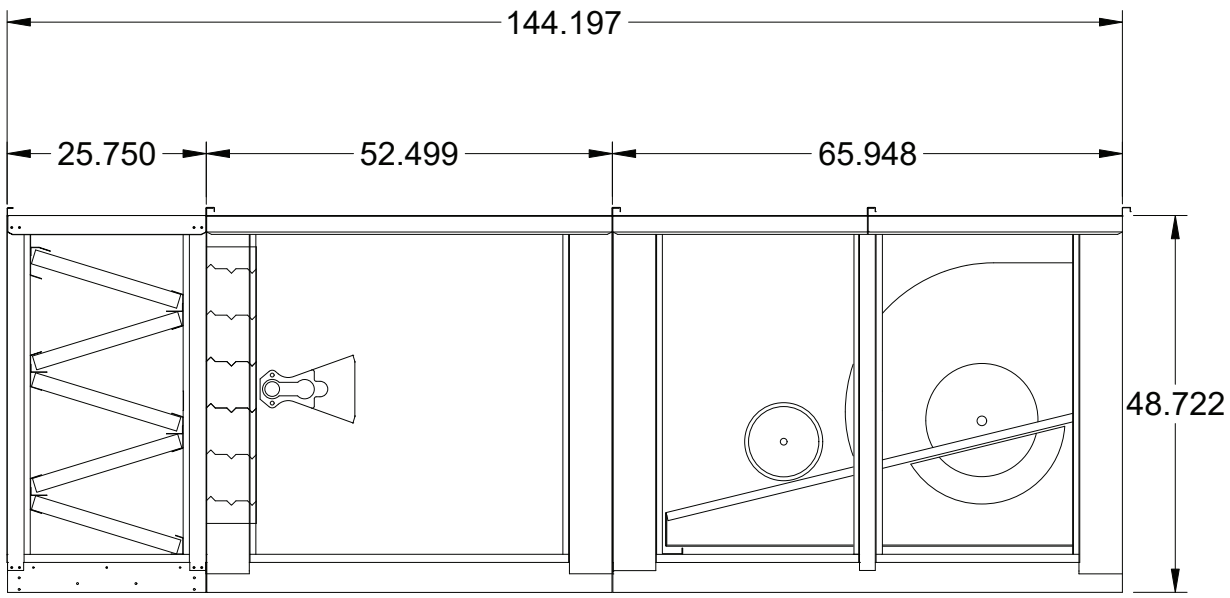
Unit Details
92% thermal efficiency
Cast aluminum burner manifold with stainless steel mixing plates
Electronic modulation burner control

10 second pre-purge sequence
Low fire start

Gas Connections

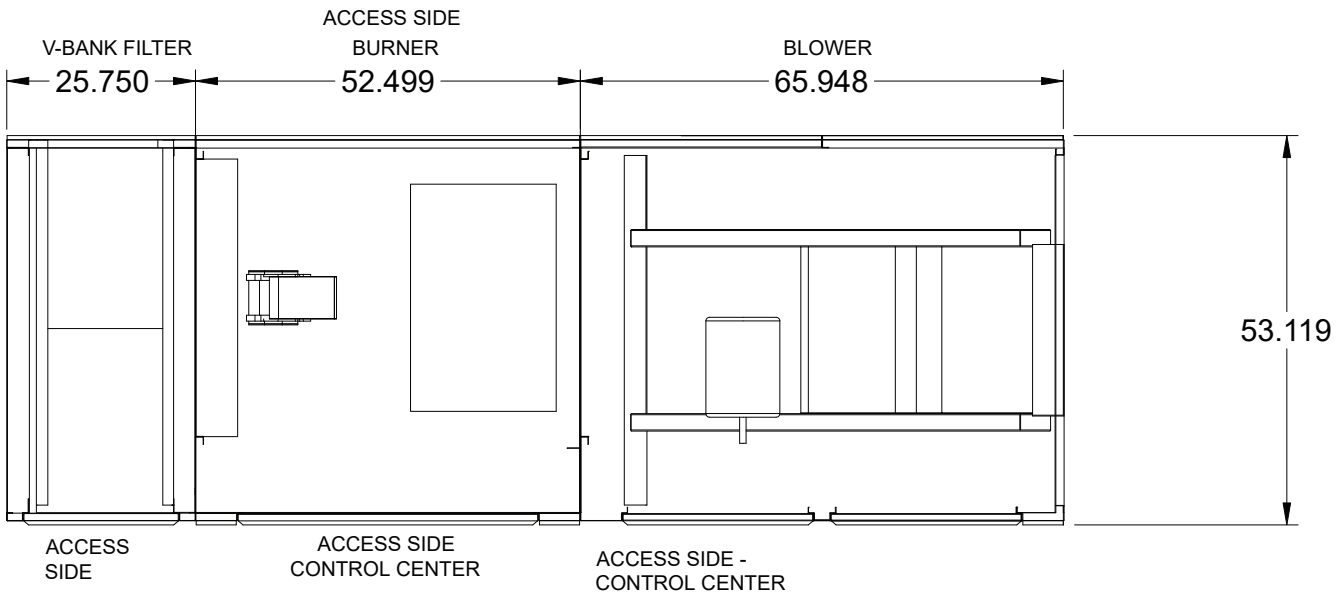


ELEVATION VIEW



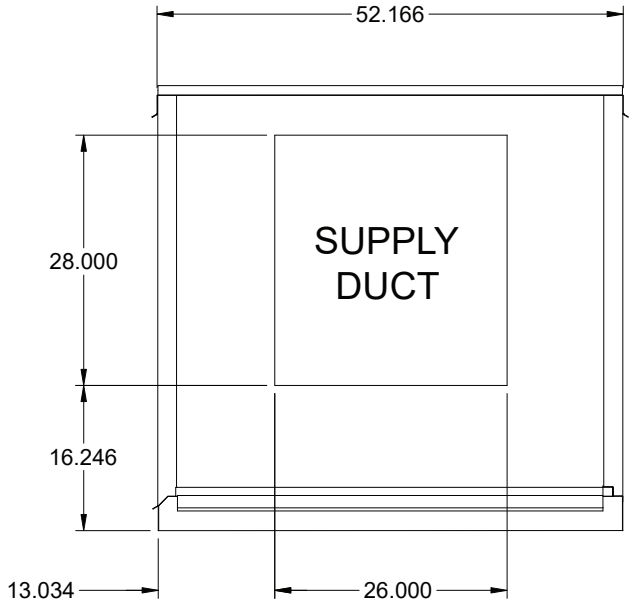
Notes - Elevation View
Standard configuration for unit access is on the right-hand side, when looking into the unit intake in the direction of airflow.
Order of unit sections is from intake of unit to discharge of unit.
Sections included on this unit: Filter Section, Heating Section, Blower Section
Insulation: Double Wall, Entire Unit Insulated.

PLAN VIEW

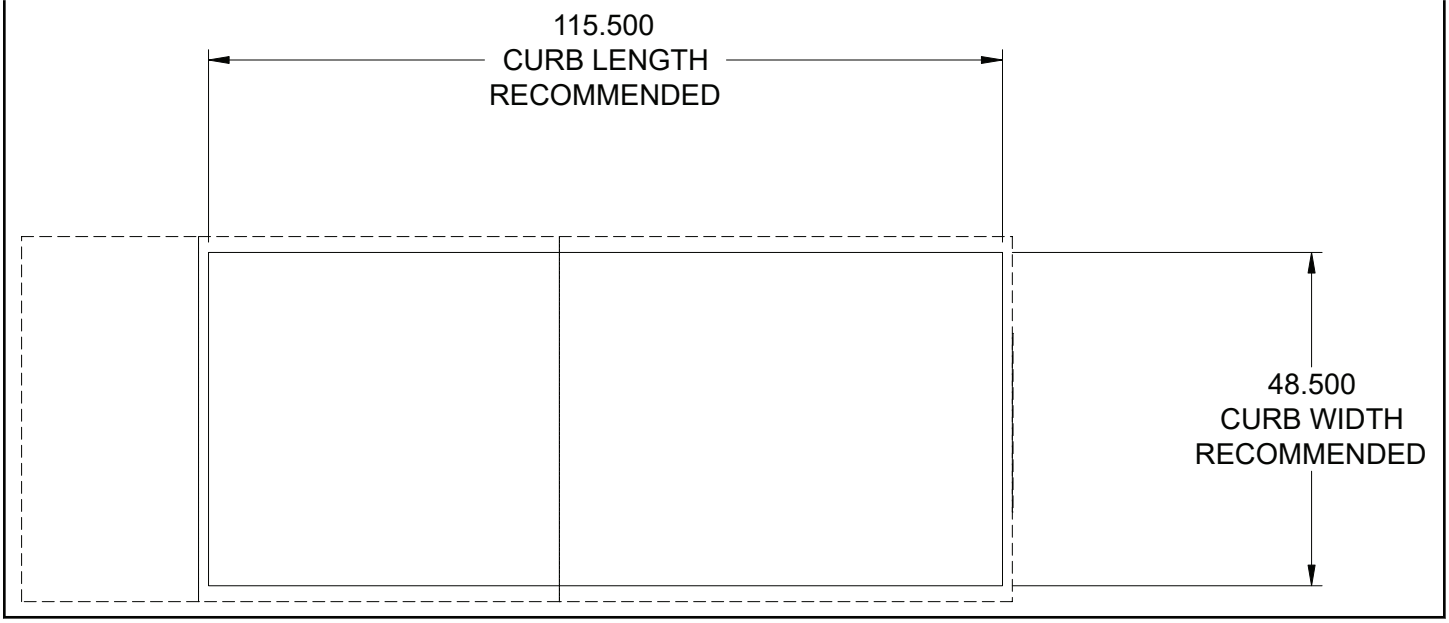


Notes - Plan View
Standard configuration for unit access is on the right-hand side, when looking into the unit intake in the direction of airflow.

END VIEW

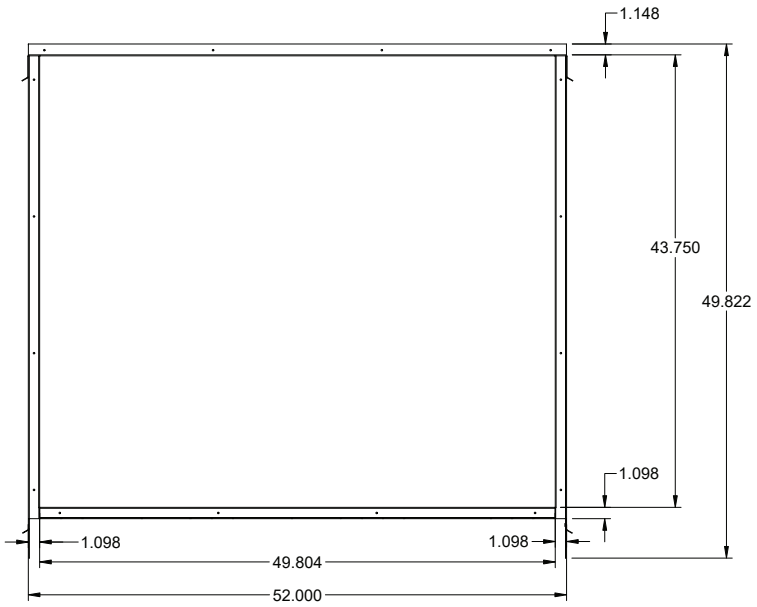


FOOTPRINT VIEW



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.

INTAKE VIEW



Clearance Specifications

Recommended Minimum Combustible Clearances				
	Floor (in.)	**Top (in.)**	**Sides (in.)**	**Ends (in.)**
Insulated Units	0	0	0	0
Non-Insulated Units	0	6	6	6

Notes - Combustible Clearances

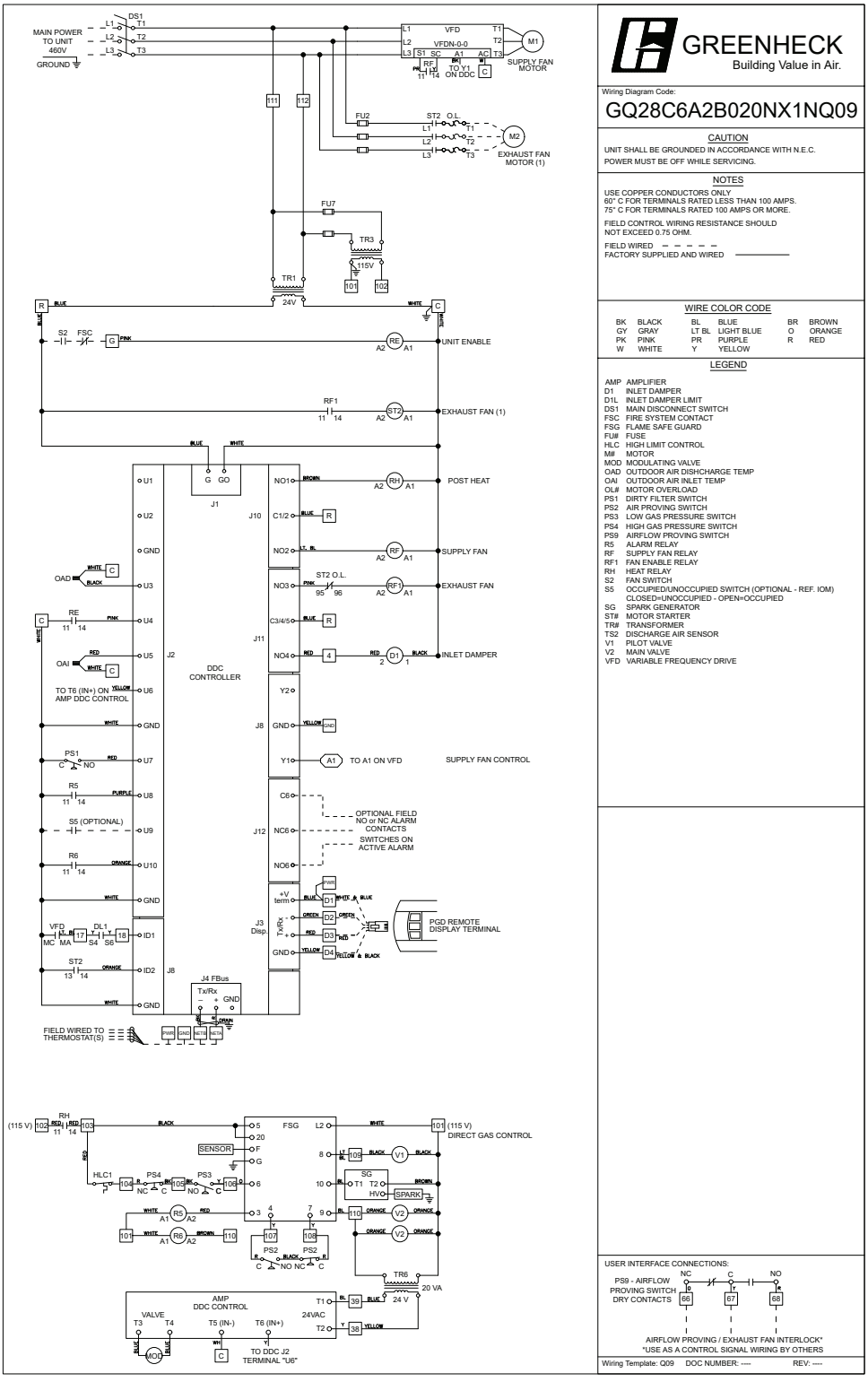
Clearance to combustibles is defined as the minimum distance required between the heating source and the adjacent combustible surfaces to ensure the adjacent surface's temperature does not exceed 90 F above the ambient temperature.

Recommended Minimum Service Clearances	
Housing 32 and less (in.)	**Housing 35 and higher (in.)**
42 on the controls side of the unit	48 on the controls side of the unit

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.

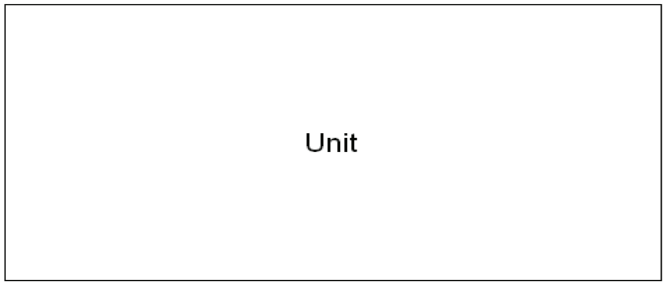
Wiring Diagram



Manufacturer reserves the right to change, modify, or improve this product at anytime

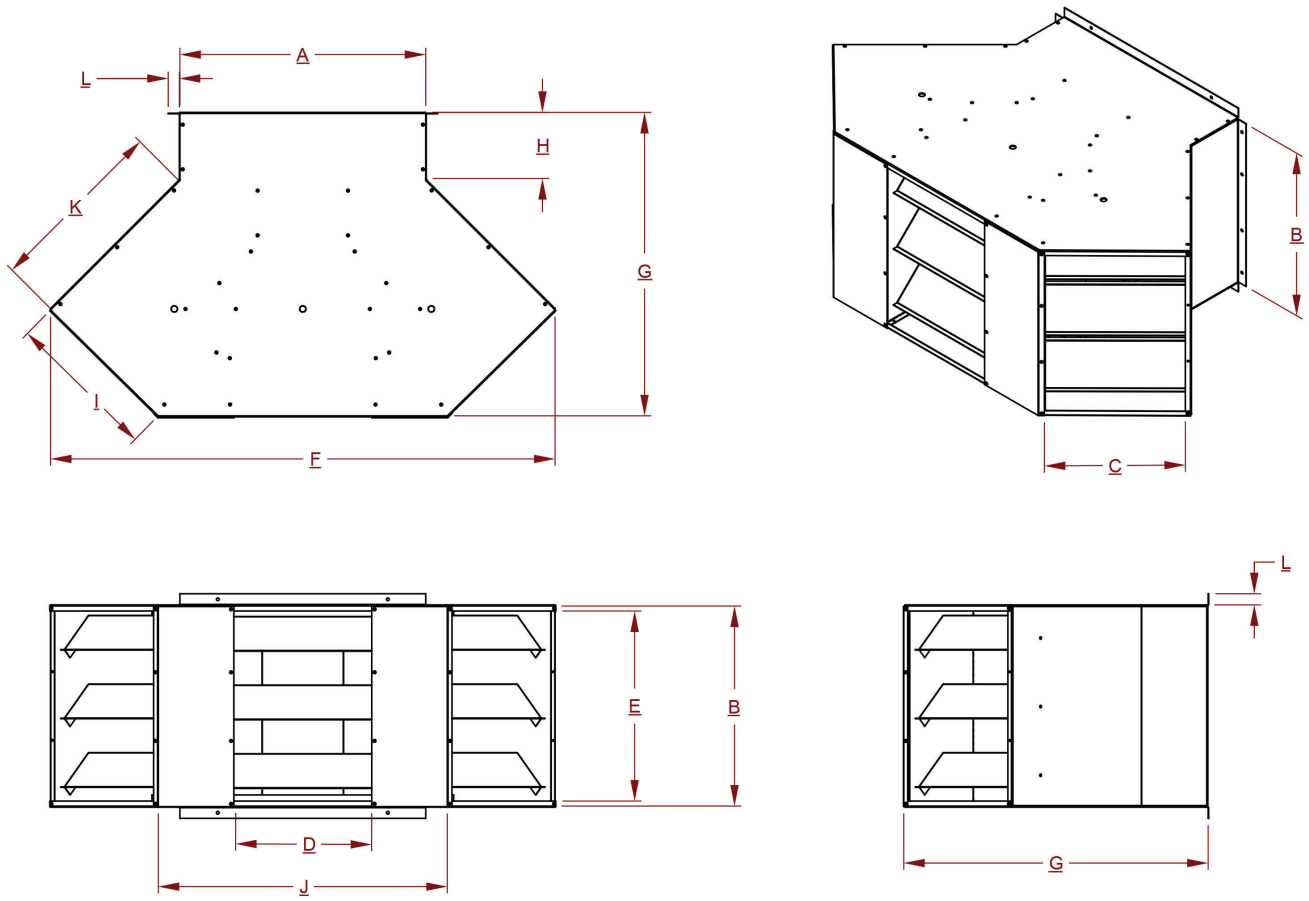
Corner Weights

430 lb 527 lb



443 lb 543 lb

Diffuser



Diffuser Dimensions													
Housing Size	Blower Qty	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F (in.)	G (in.)	H (in.)	I (in.)	J (in.)	K (in.)	L (in.)	Weight (lb)
H32	1	26	28	45.3	16	27	53.5	32	6	17.25	29.5	20	0.998	110

Construction Features and Notes
All Dimensions shown represent actual sizing.
3-Way Diffuser with housing constructed of G90 galvanized steel with mounting flanges and lifting holes. Grilles are single deflection with individually adjustable blades.

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
- Room temperature sensor (shipped loose for field mounting and wiring)

Microprocessor Remote Display
The microprocessor remote display shall have a lighted LCD display and keypad that allows the user remote access to all menus within the microprocessor. Any parameter that can be adjusted locally at the controller can be accessed and modified with the remote display.

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 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:

Direct Gas Fired Heating
The microprocessor controller will modulate the direct gas burner to maintain the active supply temperature set point.

Supply Temperature Set Point Control (Occupied)
The active supply temperature set point shall be reset by the controller between the minimum (adj.) and maximum (adj.) reset limits to maintain a room temperature set point. The room temperature sensor is shipped loose for field mounting and wiring. The room temperature set point can be adjusted:

- Locally at the controller.

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.

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.
- **Room Temperature Sensor Alarm**
  Failure of the room temperature sensor failure.
- **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)
- **Direct Gas Burner Alarm**
  Indicates an ignition controller flame failure alarm. Requires manual reset at the unit.
- **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 18 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.

DG Burner Extended Warranty

The warranty does not include items deemed as consumable components, including, but not limited to: Igniters, Spark rods, Spark generator, Flame rods,Flame wires, UV eye components, and associated components.

Note: Rust, discoloration of the burner material and cracks or holes smaller than .75 in. is not qualification for a defective burner.

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.