

March 19, 2021

SOLICITATION ADDENDUM NO. 2
ITB 20-0030
International School of Beaverton Roof & HVAC
General Contractor

THE FOLLOWING CHANGES/ADDITIONS TO THE ABOVE CITED SOLICITATION ARE ANNOUNCED:

This Addendum modifies the Invitation to Bid (ITB) document(s) only to the extent indicated herein. All other areas not changed or otherwise modified by this Addendum shall remain in full force and effect. This Addendum is hereby made an integral part of the ITB document. Bidder must be responsive to any requirements of this Addendum as if the requirements were set forth in the ITB. Failure to do so may result in Bid rejection. See the ITB regarding requests for clarification or change and protests of this Addendum, and the deadlines for the foregoing.

This addendum is to be acknowledged in the space provided on the Bidder Certification form supplied in the solicitation document. Failure to acknowledge receipt of this addendum may be cause to reject your offer.

The closing date **REMAINS UNCHANGED: March 23, 2021 at 2:00 PM Pacific Time**

CLARIFICATIONS:

- Question:** For the metal downspouts, is the intent to have a fully welded assembly of schedule pipe from gutter to existing hub or a predetermined height of schedule pipe that transitions to a 24 ga. sheet metal downspout?
- Answer:** The design intent is to match the existing downspout configurations. The new downspouts will match the existing profiles (i.e., square, rectangular, circular). The new metal downspouts will extend full height from gutters to the existing below grade connection hub as noted in the bid documents. Transitions in profile, where occurs (specifically those that serve the gymnasium roof), would occur and match existing conditions, unless technically infeasible.

SUBSTITUTION REQUESTS:

- 1) Both Substitution Requests included in Substitution Request 1 (attached) are rejected.
Commentary: Products not of comparable quality to those in Specifications.
- 2) Substitution Request 2 (attached) is rejected.
Commentary: Replacements should be terminal strip control. The Greenheck model appears to have onboard controls that we are not familiar to District personnel. Not an approved network controller.

-END of Addendum
Peter Madaus
Contract Specialist

Substitution Request 1



Advancement
of Construction
Technology

ATTACHMENT L

SUBSTITUTION REQUEST

(During the Bidding Phase)

Project: BSD International School of Beaverton Re-Roof

Substitution Request Number: 002

From: Dave Havelick

To: contracts@beaverton.k12.or.us

Date: March 9, 2021

Re: Prior Substitution Request for RTU

A/E Project Number: 20Y105.01

Contract For: Beaverton School District

Specification Title: General Requirements

Description: Packaged Rooftop Units RTU-1,2,3,4,6,7,8,9,10,11,12,13,
and 14

Section: 2. Products Page: pg. 74/79

Article/Paragraph: Part 2, 2.01 A.

Proposed Substitution: ReliaCore (RTU-1,2, and 4), Pro (RTU-3) and Residential LX Series (RTU-6,7,8,9,10,11,12,13, and 14

Manufacturer: JCI Address: Commercial (Z)- Norman, OK Phone: 877-874-7378 RTU-10 PCG

Trade Name: Fraser-Johnston Residential (P)- Wichita, KS Model No.: RTU-1,2,4 ZW RTU-6,7,8,9,11,12

RTU-3 ZJ ,13,14 PCG

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted by: Dave Havelick

Signed by: *Dave Havelick*

Firm: 7412 SW Beaverton Hillsdale Hwy., Ste. 203, Portland, OR 97225

Address: _____

Telephone: 503-703-2042

A/E's REVIEW AND ACTION

- ☐ Substitution approved - Make submittals in accordance with Specification Section 01330.
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01330.
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: _____

Date: _____

Supporting Data Attached: ☒ Drawings ☒ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____



SUBMITTAL DATA

Order #: **Date:** 03/09/2021

Project: International School of Beaverton

Project #:

Submitter: David Havelick
Sustainable Mechanical Systems LLC
7412 SW Beaverton Hillsdale Hw,
Portland, Oregon 97225
503-780-5405

Date

03/09/2021

Project Name

International School of Beaverton

Project Number**Client / Purchaser**

Submittal Summary Page

Qty	Tag #	Model #	Description
2	RTU-1,4	ZW-20N40S2A2AAA3A1	20 Ton, Single Packaged R-410A Air Conditioner, Four Stage Cooling, 11.0 EER, 400 MBH Input Aluminized Steel, Two Stage Gas Heat, 208/230-3-60, Single Wall Construction <ul style="list-style-type: none"> • VFD with Bypass and Intellispeed • Includes fresh air hood with baffle that can be set for 10, 15, or 25% outside air. • 5 HP Standard Static Belt Drive Blower • 4" Pleated Filters (MERV 13) • Smart Equipment Controller including Discharge Air, Return Air, and Outdoor Air Temperature Sensors. • HACR Circuit Breaker/Disconnect • Standard Evaporator Coil • Standard Condenser Coil • Standard Access Doors • Galvanized Steel Drain Pan
2	RTU-1,4	1RC0437	Roof Curb - 14" High, Flat, Uninsulated, Full Perimeter (Shipped Knocked Down)
1	RTU-3	ZJ102N18S2B2AAA3A2	8.5 Ton, Single Packaged R-410A Air Conditioner, High Efficiency, Two Stage Cooling, 12.0 EER, 180 MBH Input Aluminized Steel, Two Stage Gas Heat, 208/230-3-60 <ul style="list-style-type: none"> • Dry Bulb Low Leak Economizer w/Barometric Relief and Hoods (Bottom or Horizontal End Return Only) with Economizer Fault Detection & Diagnostic (Meets ASHRAE 90.1-2013, IECC 2015, California Title 24, AMCA 511). • 2 HP Standard Static Belt Drive Blower • 4" Pleated Filters (MERV 13) • IntelliSpeed control of the VFD and Manual Bypass based on stages of cooling (Provides Single Zone VAV Fan Operation as defined by ASHRAE 90.1 section 6.4.3.10) • Smart Equipment Controller including Discharge Air, Return Air, and Outdoor Air Temperature Sensors. • HACR Circuit Breaker/Disconnect • Micro-Channel "all-aluminum" condenser coil, Copper tube/aluminum fin evaporator coil • Composite Drain Pan - Front Connection
1	RTU-3	1RC0471	Roof Curb - 14" High, Flat, Uninsulated, Full Perimeter (Shipped Knocked Down)
1	RTU-2	ZW-20N30S2A2AAA3A1	20 Ton, Single Packaged R-410A Air Conditioner, Four Stage Cooling, 11.0 EER, 300 MBH Input Aluminized Steel, Two Stage Gas Heat, 208/230-3-60, Single Wall Construction <ul style="list-style-type: none"> • VFD with Bypass and Intellispeed

Qty	Tag #	Model #	Description
			<ul style="list-style-type: none"> • Includes fresh air hood with baffle that can be set for 10, 15, or 25% outside air. • 5 HP Standard Static Belt Drive Blower • 4" Pleated Filters (MERV 13) • Smart Equipment Controller including Discharge Air, Return Air, and Outdoor Air Temperature Sensors. • HACR Circuit Breaker/Disconnect • Standard Evaporator Coil • Standard Condenser Coil • Standard Access Doors • Galvanized Steel Drain Pan
1	RTU-2	1RC0437	Roof Curb - 14" High, Flat, Uninsulated, Full Perimeter (Shipped Knocked Down)
8	RTU- 6,7,8,9,11,12 ,13,14	PCG4A361002X4	3 Ton Single Stage Cooling, Fraser Johnston Single Packaged R-410A Air Conditioner, 14.0 SEER / 11.8 EER, Small Cabinet (35" x 51"), Copper Tube/Aluminum Fin Condenser Coil, 100 MBH Input Single Stage Stainless Steel Natural Gas Heat, 208/230-1-60, Low NOx (40 ng/J)
8	RTU- 6,7,8,9,11,12 ,13,14	S1-1RC0502	Roof Curb 14" Small Footprint
8	RTU- 6,7,8,9,11,12 ,13,14	S1-2EE04710024	Low Leak Downflow Economizer, Small Footprint
8	RTU- 6,7,8,9,11,12 ,13,14	S1-2EC06700124	Transformer Kit
1	RTU-10	PCG4A421002X4	3.5 Ton Single Stage Cooling, Fraser Johnston Single Packaged R-410A Air Conditioner, 14.0 SEER / 11.2 EER, Small Cabinet (35" x 51"), Copper Tube/Aluminum Fin Condenser Coil, 100 MBH Input Single Stage Stainless Steel Natural Gas Heat, 208/230-1-60, Low NOx (40 ng/J)
1	RTU-10	S1-1RC0502	Roof Curb 14" Small Footprint
1	RTU-10	S1-2EC06700124	Transformer Kit
1	RTU-10	S1-2EE04710024	Low Leak Downflow Economizer, Small Footprint

Equipment start-up and commissioning by a factory trained technician is recommended.
Contact your supplying distributor or sales representative for additional information & guidance.



WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov

ReliaCore 100 15-25 Ton Package

Fraser-Johnston Single Package R-410A Air Conditioner

Project Name: **International School of Beaverton**Unit Model #: **ZW-20N40S2A2AAA3A1**Quantity: **2** Tag #: **RTU-1,4**System: **ZW-20N40S2A2AAA3A1**

Cooling Performance

Total gross capacity	231.6 MBH
Sensible gross capacity	200.9 MBH
Total net capacity	219.9 MBH
Sensible net capacity	189.2 MBH
Efficiency (at ARI)	11.00 EER
Integrated eff. (at ARI)	12.50 IEER
Ambient DB temp.	95.0 °F
Entering DB temp.	80.1 °F
Entering WB temp.	63.6 °F
Leaving DB temp.	53.5 °F
Leaving WB temp.	52.1 °F
Power input (w/o blower)	18.10 kW
Sound power	92 dB(A)

Refrigerant

Refrigerant type	R-410A
Sys1	12 lbs
Sys2	13 lbs
Sys3	12 lbs
Sys4	12 lbs

Gas Heating Performance

Entering DB temp.	60 °F
Heating output capacity (Max)	320 MBH
Supply air	7000 CFM
Heating input capacity (Max)	400 MBH
Leaving DB temp.	102.3 °F
Air temp. rise	42.3 °F
SSE	80.0 %
Stages	2

Supply Air Blower Performance

Supply air	7000 CFM
Ext. static pressure	0.5 IWG
Add. Unit Losses (Options/Accessories)	0.17 IWG
Blower speed	842 RPM
Max BHP of Motor (including service factor)	5.75 HP
Duct location	Bottom
Motor rating	5.00 HP
Actual required BHP	4.11 HP
Power input	3.44 kW
Elevation	0 ft.
Drive type	BELT

Electrical Data

Power supply	208-3-60	230-3-60
Unit min circuit ampacity	88.6 Amps	88.1 Amps
Unit max over-current protection	100 Amps	100 Amps

Dimensions & Weight

Hgt	53 in.	Len	181 in.	Wth	92 in.
Weight with factory installed options	2977 lbs.				

Clearances

Right	36 in.	Front	36 in.	Rear	24 in.
Top	72 in.	Bottom	0 in.	Left	24 in.

Note: Please refer to the tech guide for listed maximum static pressures



20 Ton

- Fraser-Johnston Units are Manufactured at an ISO 9001 Registered Facility and each Rooftop is Completely Computer-Run Tested Prior to Shipment.

Unit Features

- Four Stage Cooling
- 400 MBH Input Aluminized Steel, Two Stage Gas Heat
- Unit Cabinet Constructed of Powder Painted Steel, Certified At 750 Hours Salt Spray Test (ASTM B-117 Standards).
- Either Supply and/or Return can be Field Converted from Vertical to Horizontal Configuration without Cutting Panels
- Full Perimeter Base Rails with Built in Rigging Capabilities
- Four Independent Refrigerant Circuits for Efficient Part Load Operation with Scroll Compressors
- 5 HP Standard Static Belt Drive Blower
- 4" Pleated Filters (MERV 13)
- Solid Core Liquid Line Filter Driers
- Replacement Filters: For 2" filters 12 - (12" x 24" x 2") OR For 4" filters 2 - (20" X 24" x 4") AND 4 - (24" X 24" x 4")
- Single Point Power Connection
- Through-the-Curb and Through-The-Base Utility Connections
- HACR Circuit Breaker/Disconnect
- Short Circuit Current: 5kA RMS Symmetrical
- Standard Condenser Coil
- Standard Evaporator Coil
- Crane Required to Unload Unit
- Galvanized Steel Drain Pan
- Standard Access Doors

BAS Controller

- VFD with Bypass and Intellispeed
- Smart Equipment Controller including Discharge Air, Return Air, and Outdoor Air Temperature Sensors.

Standard Unit Controller: Smart Equipment Control Board

- Safety Monitoring - Monitors the High and Low-Pressure Switches, the Freezestats, the Gas Valve, if Applicable, and the Temperature Limit Switch on Gas and Electric Heat Units. The Unit Control Board will Alarm on Ignition Failures, Safety Lockouts and Repeated Limit Switch Trips.
- An Integrated Low-Ambient Control, Anti-Short Cycle Protection, Lead-Lag, Fan On and Fan off Delays, Low Voltage Protection, On-Board Diagnostic and Fault Code Display. Allows all units to operate in the cooling mode down to 0 °F outdoor ambient without additional components or intervention.

Warranty

- One (1) Year Limited Warranty on the Complete Unit
- Five (5) Year Warranty - Compressors and Electric Heater Elements
- Ten (10) Year Warranty - Aluminized Steel Tubular Heat Exchangers



ReliaCore 100 15-25 Ton Package

Fraser-Johnston Single Package R-410A Air Conditioner

Project Name: International School of Beaverton

Unit Model #: ZW-20N40S2A2AAA3A1

Quantity: 2 Tag #: RTU-1,4

System: ZW-20N40S2A2AAA3A1

Factory Installed Options

ZW-20N40S2A2AAA3A1

Equipment Options	Option(s) Selected	
Product Category:	ZW	Single Packaged R-410A Air Conditioner 11.0 EER
Nominal Cooling Capacity:	-20	20 Ton Four Stage Cooling
Heat Type and Nominal Heat Capacity:	N40	400 MBH Input Aluminized Steel, Two Stage Gas Heat
Blower Option:	S	VFD with Bypass and Intellispeed 5 HP Standard Static Belt Drive Blower
Voltage:	2	208/230-3-60
Outside Air Option:	A	Includes fresh air hood with baffle that can be set for 10, 15, or 25% outside air.
Service Options:	2	HACR Circuit Breaker/Disconnect
Sensor Options:	A	
Controls:	A	Smart Equipment Controller including Discharge Air, Return Air, and Outdoor Air Temperature Sensors.
Refrigeration:	A	Standard Condenser Coil Standard Evaporator Coil
Additional Options:	3	4" Pleated Filters (MERV 13)
Cabinet Options:	A	Single Wall Construction Standard Access Doors Galvanized Steel Drain Pan
Product Generation:	1	

Field Installed Accessories

- | | | |
|---|--|--|
| <ul style="list-style-type: none"> <input type="radio"/> 1BD0404 - Burglar Bars (51.0 lbs) <input type="radio"/> 1CG0421 - Coil Guard (15.0 lbs) <input type="radio"/> 1CV0407 - Concentric Diffuser, Flush Mount, 24X28 <input type="radio"/> 1CV0408 - Concentric Diffuser, Flush Mount, 24X54 <input type="radio"/> 1CV0416 - Concentric Diffuser, Side Discharge, 24X48 <input type="radio"/> 1CV0417 - Concentric Diffuser, Side Discharge, 24X54 <input type="radio"/> 1CV0421 - Concentric Diffuser, Specialty, 28X28 <input type="radio"/> 1CV0423 - Concentric Diffuser, Specialty, 36X36 <input type="radio"/> 1CV0426 - Concentric Diffuser, Specialty, 24X24 | <ul style="list-style-type: none"> <input type="radio"/> 1CV0428 - Concentric Diffuser, Specialty, 30X30 <input type="radio"/> 1CV0429 - Concentric Diffuser, Specialty, 36X36 <input type="radio"/> 1FE0410 - Flue Extension Kit (37.0 lbs) <input type="radio"/> 1GP0403 - Gas Piping Kit (11.0 lbs) <input type="radio"/> 1HG0412 - Hail Guard Kit (48.0 lbs) <input type="radio"/> 1LD0417 - High Speed Drive Kit (9.0 lbs) <input type="radio"/> 1NP0418 - Natural Gas to Propane Conversion Kit (2-Stage) (1.0 lbs) | <ul style="list-style-type: none"> <input checked="" type="radio"/> 1RC0437 - Roof Curb - 14" High, Flat, Uninsulated, Full Perimeter (Shipped Knocked Down) (185.0 lbs) <input type="radio"/> 1RC0497 - Roof Curb 14" High Full Perimeter Transition Curb with wood nailer. Allow replacement of ZF180 / J15ZF / ZS-15 / ZST15 with other Large Sunline product. (135.0 lbs) <input type="radio"/> 1RD0413 - Barometric Relief Damper with Hood Kit (Downflow Unit or Duct Mounted) (47.0 lbs) <input type="radio"/> 1WS0404 - Wood Skid - Allows unit to be handled with 90 inch forks (210.0 lbs) <input type="radio"/> 2AP0402 - Air Proving Switch (1.0 lbs) |
|---|--|--|

Project Name: **International School of Beaverton**

Unit Model #: **ZW-20N40S2A2AAA3A1**

Quantity: **2** Tag #: **RTU-1,4**

System: **ZW-20N40S2A2AAA3A1**

Consolidated Drawing

NOTES:

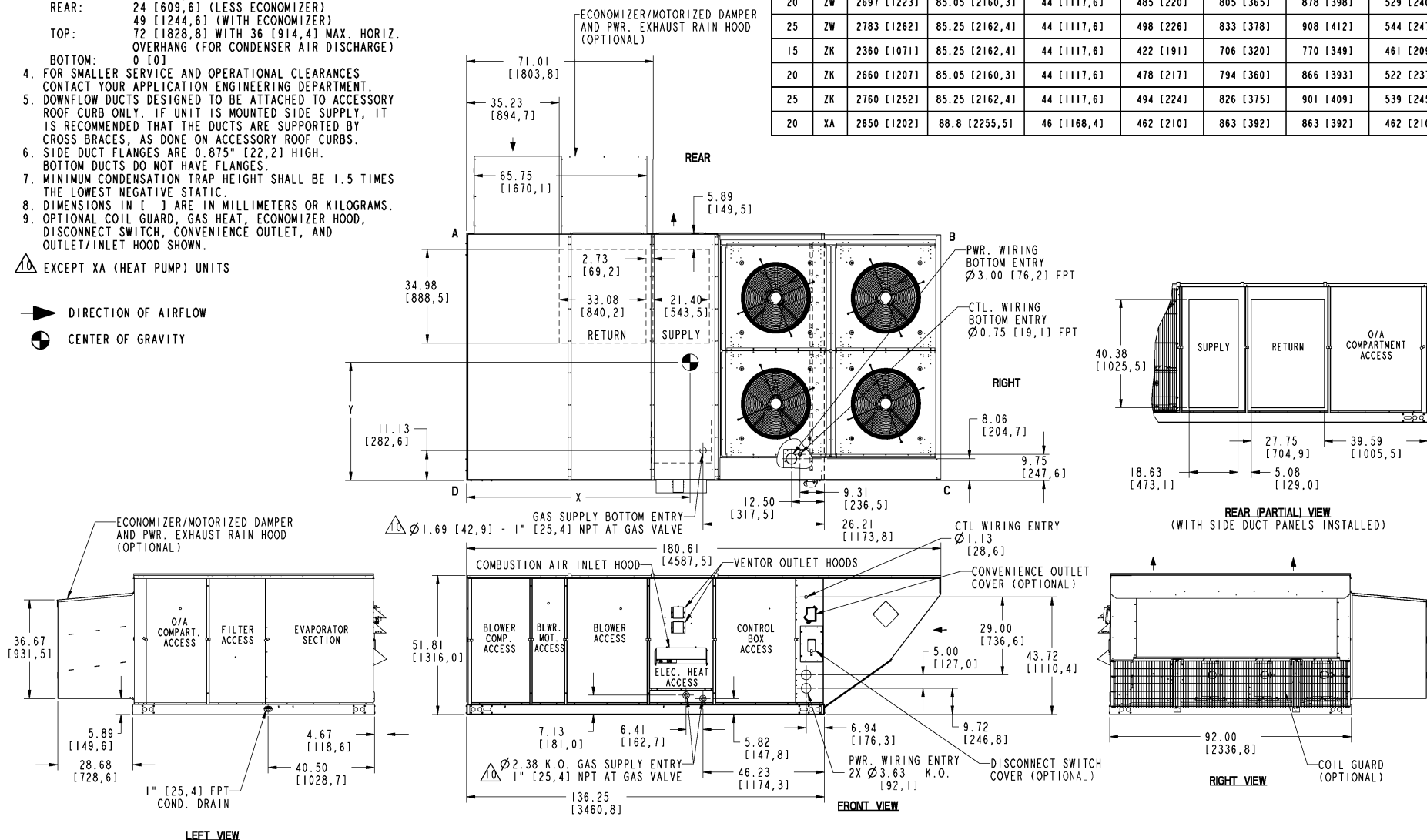
- FOR OUTDOOR USE ONLY.
- WEIGHTS SHOWN ARE FOR COOLING ONLY UNITS.
- MIN. CLEARANCES TO BE:
RIGHT SIDE: 36 [914,4]
LEFT SIDE: 24 [609,6] (LESS ECONOMIZER)
36 [914,4] (WITH ECONOMIZER)
FRONT:
36 [914,4]
REAR:
24 [609,6] (LESS ECONOMIZER)
49 [1244,6] (WITH ECONOMIZER)
TOP:
72 [1828,8] WITH 36 [914,4] MAX. HORIZ.
OVERHANG (FOR CONDENSER AIR DISCHARGE)
0 [0]
BOTTOM:
0 [0]
- FOR SMALLER SERVICE AND OPERATIONAL CLEARANCES CONTACT YOUR APPLICATION ENGINEERING DEPARTMENT.
- DOWNFLOW DUCTS DESIGNED TO BE ATTACHED TO ACCESSORY ROOF CURB ONLY. IF UNIT IS MOUNTED SIDE SUPPLY, IT IS RECOMMENDED THAT THE DUCTS ARE SUPPORTED BY CROSS BRACES, AS DONE ON ACCESSORY ROOF CURBS.
- SIDE DUCT FLANGES ARE 0.875" [22,2] HIGH. BOTTOM DUCTS DO NOT HAVE FLANGES.
- MINIMUM CONDENSATION TRAP HEIGHT SHALL BE 1.5 TIMES THE LOWEST NEGATIVE STATIC.
- DIMENSIONS IN [] ARE IN MILLIMETERS OR KILOGRAMS.
- OPTIONAL COIL GUARD, GAS HEAT, ECONOMIZER HOOD, DISCONNECT SWITCH, CONVENIENCE OUTLET, AND OUTLET/INLET HOOD SHOWN.

⚠ EXCEPT XA (HEAT PUMP) UNITS

➔ DIRECTION OF AIRFLOW

⊙ CENTER OF GRAVITY

TONNAGE	UNIT	OPERATING WEIGHT (LBS) (BASE UNIT)	CENTER OF GRAVITY LOCATION (BASE UNIT)		4 POINT CORNER LOADS (LBS) (BASE UNIT)			
			X	Y	A	B	C	D
15	ZW	2609 [1183]	85.25 [2162,4]	44 [1117,6]	467 [212]	781 [354]	852 [387]	510 [231]
17.5	ZW	2665 [1209]	85.25 [2162,4]	44 [1117,6]	477 [216]	797 [362]	870 [395]	520 [236]
20	ZW	2697 [1223]	85.05 [2160,3]	44 [1117,6]	485 [220]	805 [365]	878 [398]	529 [240]
25	ZW	2783 [1262]	85.25 [2162,4]	44 [1117,6]	498 [226]	833 [378]	908 [412]	544 [247]
15	ZK	2360 [1071]	85.25 [2162,4]	44 [1117,6]	422 [191]	706 [320]	770 [349]	461 [209]
20	ZK	2660 [1207]	85.05 [2160,3]	44 [1117,6]	478 [217]	794 [360]	866 [393]	522 [237]
25	ZK	2760 [1252]	85.25 [2162,4]	44 [1117,6]	494 [224]	826 [375]	901 [409]	539 [245]
20	XA	2650 [1202]	88.8 [2255,5]	46 [1168,4]	462 [210]	863 [392]	863 [392]	462 [210]



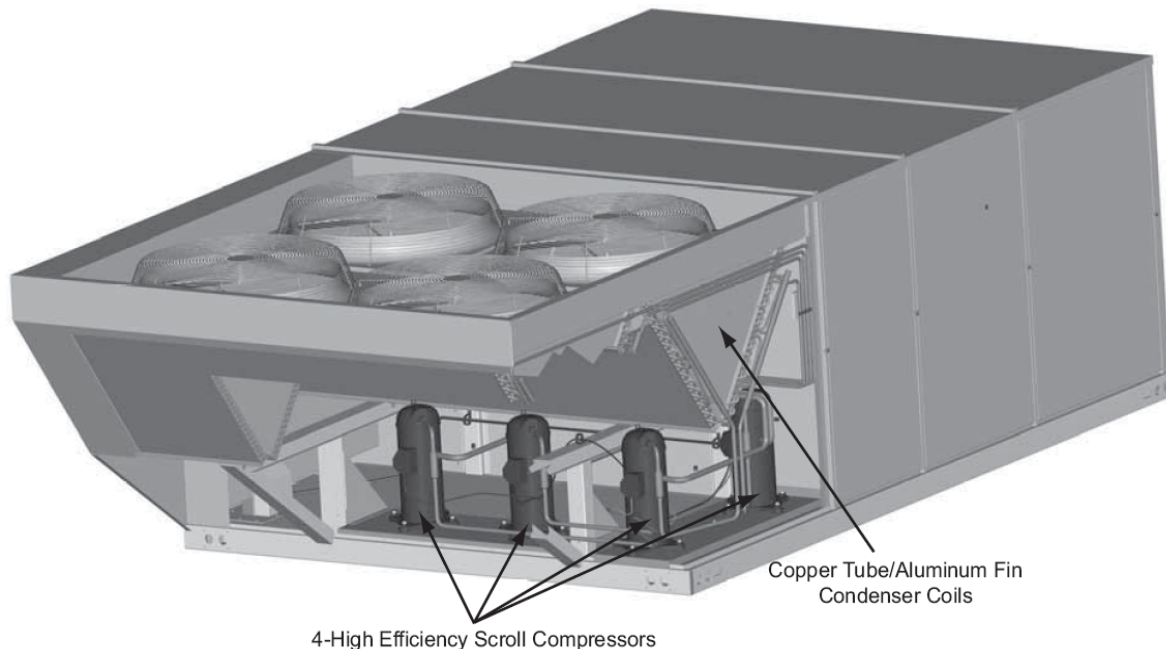
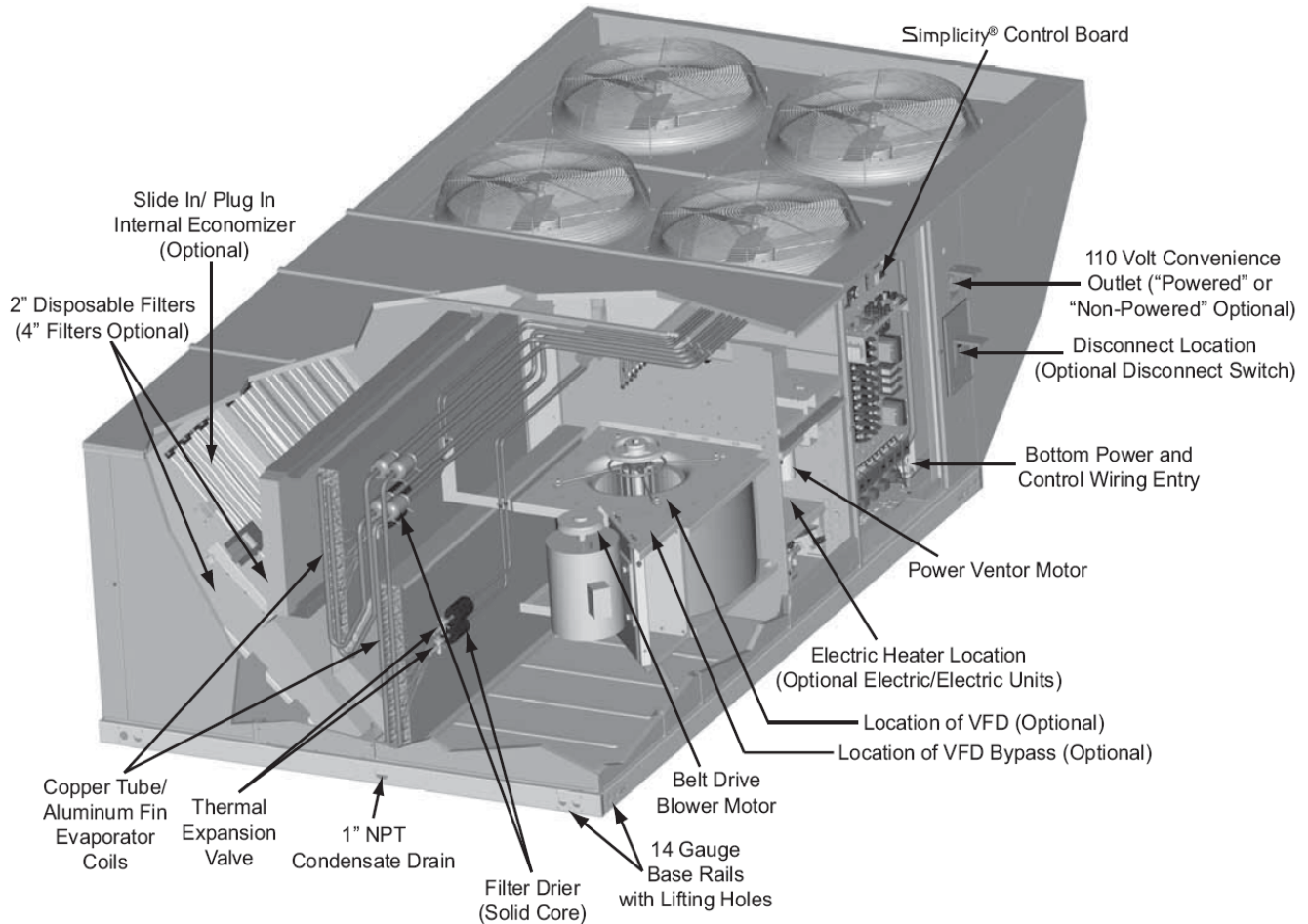
Project Name: **International School of Beaverton**

Unit Model #: **ZW-20N40S2A2AAA3A1**

Quantity: **2** Tag #: **RTU-1,4**

System: **ZW-20N40S2A2AAA3A1**

Component Locations



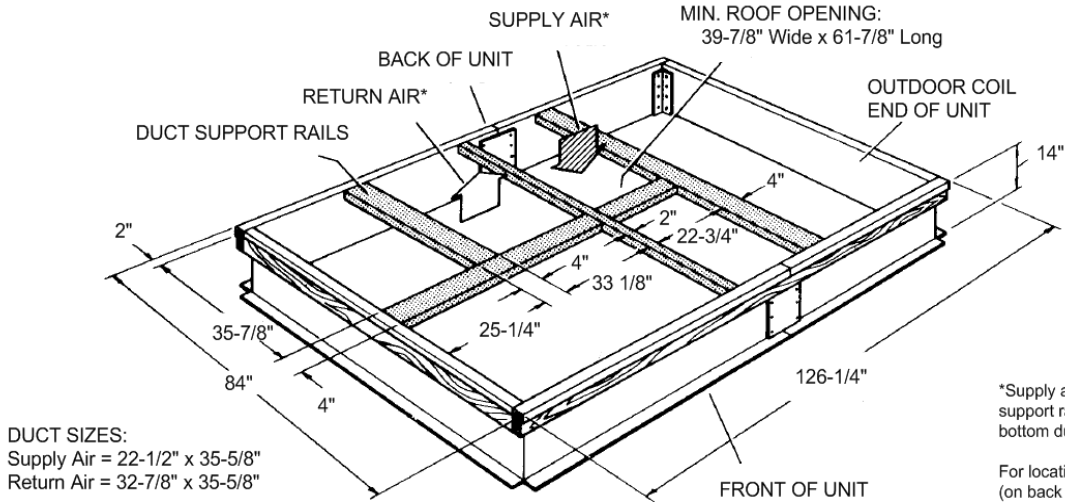
Project Name: **International School of Beaverton**

Unit Model #: **ZW-20N40S2A2AAA3A1**

Quantity: **2** Tag #: **RTU-1,4**

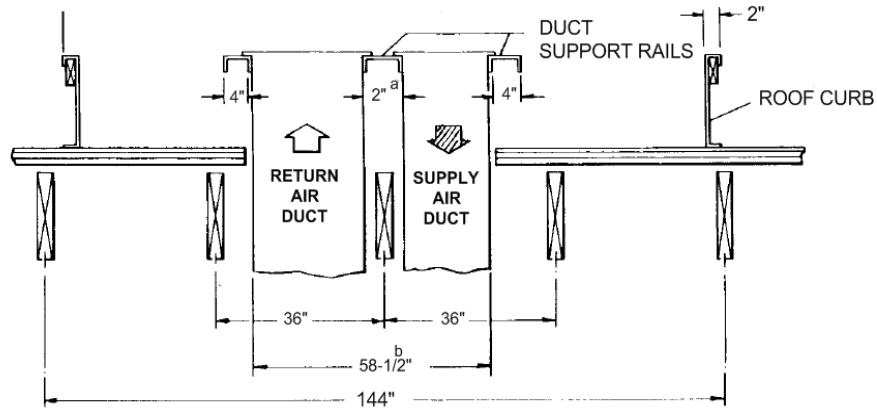
System: **ZW-20N40S2A2AAA3A1**

1RC0437 Roof Curb



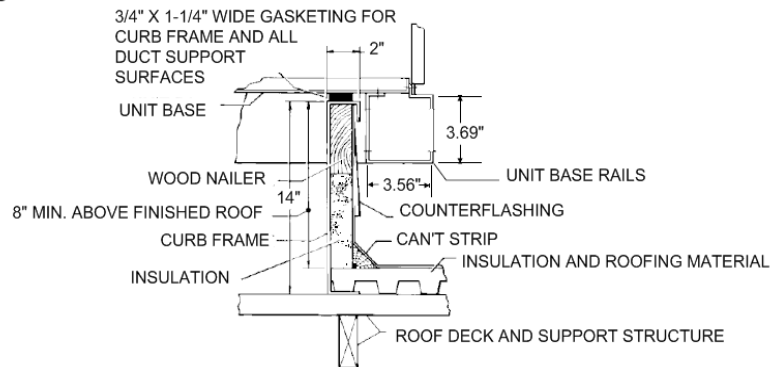
ROOF CURB DUCT OPENINGS DIMENSIONS

FRONT VIEW (JOIST SUPPORTS)



- a. The 2" space between the ducts allows for "jumping" an existing roof joist.
b. The 58-1/2" overall dimension of the ducts allows duct work penetration between roof joists that are spaced on 72" centers.
- NOTE: Ducts can be installed into the curb from the roof. All electrical and gas line connections can be made inside the curb.

CUT AWAY OF ROOF CURB



1RC0437 Roof Curb Dimensions

Project Name: **International School of Beaverton**

 Unit Model #: **ZJ102N18S2B2AAA3A2**

 Quantity: **1** Tag #: **RTU-3**

 System: **ZJ102N18S2B2AAA3A2**

Cooling Performance

Total gross capacity	103.9 MBH
Sensible gross capacity	76.1 MBH
Total net capacity	99.9 MBH
Sensible net capacity	72.1 MBH
Efficiency (at ARI)	12.00 EER
Integrated eff. (at ARI)	13.80 IEER
Ambient DB temp.	95.0 °F
Entering DB temp.	86.3 °F
Entering WB temp.	69.8 °F
Leaving DB temp.	59.7 °F
Leaving WB temp.	57.9 °F
Power input (w/o blower)	6.76 kW
Sound power	92 dB(A)

Refrigerant

Refrigerant type	R-410A
Sys1	8 lbs 2 oz
Sys2	7 lbs 14 oz

Gas Heating Performance

Entering DB temp.	60 °F
Heating output capacity (Max)	144 MBH
Supply air	2650 CFM
Heating input capacity (Max)	180 MBH
Leaving DB temp.	110.3 °F
Air temp. rise	50.3 °F
SSE	80.0 %
Stages	2

Supply Air Blower Performance

Supply air	2650 CFM
Ext. static pressure	0.4 IWG
Addl. Unit Losses (Options/Accessories)	0.35 IWG
Blower speed	870 RPM
Max BHP of Motor (including service factor)	2.30 HP
Duct location	Bottom
Motor rating	2.00 HP
Actual required BHP	1.25 HP
Power input	1.16 kW
Elevation	0 ft.
Drive type	BELT

Electrical Data

Power supply	208-3-60	230-3-60
Unit min circuit ampacity	45.5 Amps	45.5 Amps
Unit max over-current protection	60 Amps	60 Amps

Dimensions & Weight

Hgt	51 in.	Len	89 in.	Wth	59 in.
Weight with factory installed options	1245 lbs.				

Clearances

Right	12 in.	Front	36 in.	Rear	36 in.
Top	72 in.	Bottom	0 in.	Left	36 in.

Note: Please refer to the tech guide for listed maximum static pressures



8.5 Ton

- Fraser Johnston units are manufactured at an ISO 9001 registered facility and each rooftop is completely computer-run tested prior to shipment.

Unit Features

- Two Stage Cooling
- 180 MBH Input Aluminized Steel, Two Stage Gas Heat
- Full perimeter base rails with built in rigging capabilities
- Unit Cabinet Constructed of Powder Painted Steel, Certified At 750 Hours Salt Spray Test (ASTM B-117 Standards)
- Scroll Compressor[s]
- Dry Bulb Low Leak Economizer w/Barometric Relief and Hoods (Bottom or Horizontal End Return Only) with Economizer Fault Detection & Diagnostic (Meets ASHRAE 90.1-2013, IECC 2015, California Title 24, AMCA 511).
- 2 HP Standard Static Belt Drive Blower
- Unit Ships with 4" Pleated Filters (MERV 13)
- Solid Core Liquid Line Filter Driers
- Replacement Filters: 4 - (24" x 20"). Unit accepts 2" or 4" wide filters.
- Short Circuit Current: 5kA RMS Symmetrical
- Single Point Power Connection
- HACR Circuit Breaker/Disconnect
- Through-the-Curb and Through-the-Base Utility Connections
- Micro-Channel "all-aluminum" condenser coil, Copper tube/aluminum fin evaporator coil
- Composite Drain Pan - Front Connection
- Tool-free maintenance with features like hinged doors for all-access panels, slide-out blower and blower motor tray

BAS Controller

- IntelliSpeed control of the VFD and Manual Bypass based on stages of cooling. Provides Single Zone VAV Fan Operation as defined by ASHRAE 90.1 section 6.4.3.10.
- Smart Equipment Controller including Discharge Air, Return Air, and Outdoor Air Temperature Sensors.

Standard Unit Controller: Smart Equipment Control Board

- Safety Monitoring - Monitors the High and Low-Pressure Switches, the Freezestats, the Gas Valve, if Applicable, and the Temperature Limit Switch on Gas and Electric Heat Units. The Unit Control Board will Alarm on Ignition Failures, Safety Lockouts and Repeated Limit Switch Trips.

Warranty

- One (1) Year Limited Warranty on the Complete Unit
- Five (5) Year Warranty - Compressors and Electric Heater Elements
- Ten (10) Year Limited Warranty - Aluminized Steel Heat Exchanger

Project Name: **International School of Beaverton**

 Unit Model #: **ZJ102N18S2B2AAA3A2**

 Quantity: **1** Tag #: **RTU-3**

 System: **ZJ102N18S2B2AAA3A2**

Factory Installed Options

ZJ102N18S2B2AAA3A2

Equipment Options	Option(s) Selected	
Product Category:	ZJ	Single Packaged R-410A Air Conditioner, High Efficiency 12.0 EER
Nominal Cooling Capacity:	102	8.5 Ton Two Stage Cooling
Heat Type and Nominal Heat Capacity:	N18	180 MBH Input Aluminized Steel, Two Stage Gas Heat
Blower Option:	S	2 HP Standard Static Belt Drive Blower IntelliSpeed control of the VFD and Manual Bypass based on stages of cooling (Provides Single Zone VAV Fan Operation as defined by ASHRAE 90.1 section 6.4.3.10)
Voltage:	2	208/230-3-60
Outside Air Option:	B	Dry Bulb Low Leak Economizer w/Barometric Relief and Hoods (Bottom or Horizontal End Return Only) with Economizer Fault Detection & Diagnostic (Meets ASHRAE 90.1-2013, IECC 2015, California Title 24, AMCA 511).
Service Options:	2	HACR Circuit Breaker/Disconnect
Sensor Options:	A	
Controls:	A	Smart Equipment Controller including Discharge Air, Return Air, and Outdoor Air Temperature Sensors.
Refrigeration:	A	Micro-Channel "all-aluminum" condenser coil, Copper tube/aluminum fin evaporator coil
Additional Options:	3	4" Pleated Filters (MERV 13)
Cabinet Options:	A	Composite Drain Pan - Front Connection
Product Generation:	2	

Field Installed Accessories

- | | | |
|--|---|---|
| <input type="radio"/> 1BD0408 - Burglar Bars (32.0 lbs) | <input type="radio"/> 1CV0420 - Concentric Diffuser, Specialty, 24X24 | <input type="radio"/> 1GP0405 - Gas Piping Kit for Bottom Gas Supply Connection with External Shut-Off (includes: Internal gas pipe, fittings, gas cock & panel gaskets) (10.0 lbs) |
| <input type="radio"/> 1CG0420 - Coil Guard (27.0 lbs) | <input type="radio"/> 1CV0426 - Concentric Diffuser, Specialty, 24X24 | <input type="radio"/> 1HA0442 - High Altitude Kit for Natural Gas (1.0 lbs) |
| <input type="radio"/> 1CV0403 - Concentric Diffuser, Flush Mount, 20RD | <input type="radio"/> 1FE0412 - Flue Exhaust Extension Kit (14.0 lbs) | <input type="radio"/> 1HA0443 - High Altitude Kit for Propane (1.0 lbs) |
| <input type="radio"/> 1CV0404 - Concentric Diffuser, Flush Mount, 18X28 | <input type="radio"/> 1FF0414 - 2" Only Metal Filter Frame Kit (16.0 lbs) | |
| <input type="radio"/> 1CV0412 - Concentric Diffuser, Side Discharge, 20RD | | |
| <input type="radio"/> 1CV0413 - Concentric Diffuser, Side Discharge, 18X28 | | |

Project Name: **International School of Beaverton**Unit Model #: **ZJ102N18S2B2AAA3A2**Quantity: **1** Tag #: **RTU-3**System: **ZJ102N18S2B2AAA3A2**

- ☐ 1HG0411 - Hail Guard Kit-Diamond Pattern (37.0 lbs)
- ☐ 1HG0432 - Hail Guard Kit-Provent Style (25.0 lbs)
- ☐ 1NP0459 - Natural Gas to Propane Conversion Kit (2-Stage) (2.0 lbs)
- ☐ 1RC0470 - Roof Curb - 8" High, Flat, Uninsulated, Full Perimeter (Shipped Knocked Down) (135.0 lbs)
- ☒ 1RC0471 - Roof Curb - 14" High, Flat, Uninsulated, Full Perimeter (Shipped Knocked Down) (135.0 lbs)
- ☐ 1RC0472 - Roof Curb, Transition-Sunline 7.5T thru 12.5T to Pro 3.0T thru 12.5T (Shipped Assembled) (200.0 lbs)
- ☐ 1RC0476 - Roof Curb - 24" High, Flat, Uninsulated, Full Perimeter (Shipped Knocked Down) (135.0 lbs)
- ☐ 1WC0412 - Wooden Crate (445.0 lbs)
- ☐ 2AP0402 - Air Proving Switch (1.0 lbs)
- ☐ 2AQ04700524 - CO² Space Sensor - Wall Mount Accessory (5.0 lbs)
- ☐ 2AQ04700624 - CO² Unit Mount Accessory (4.6 lbs)
- ☐ 2DF0403 - Dirty Filter Switch (1.0 lbs)
- ☐ 2EC0401 - Kit, Single Enthalpy Field Installed (1.0 lbs)
- ☐ 2EC0402 - Kit, Dual Enthalpy Field Installed (Includes two humidity sensors) (1.0 lbs)
- ☐ 2LA04702412 - Low Ambient Kit (2.2 lbs)
- ☐ 2PE04704706 - Power Exhaust 230V without Baro Relief Downflow or Horizontal (19.0 lbs)
- ☐ 2SD04700824 - Smoke Detector Kit w/ Mounting Hardware for Supply Air (Horizontal/Downflow) Only (9.4 lbs)
- ☐ 2SD04700924 - Smoke Detector Kit w/ Mounting Hardware for Return Air (Downflow Only) Only (10.0 lbs)
- ☐ 2SD04701024 - Smoke Detector Kit w/ Mounting Hardware for Supply (Horizontal/Downflow) and Return Air (Downflow Only) (8.0 lbs)
- ☐ S1-03102529100 - Non-Networking Wall Sensor – Allows remote sensing and control from single or multiple zones. (0.0 lbs)
- ☐ S1-03102529104 - Non-Networking Wall Sensor with Over-ride button – Allows remote sensing and control from single or multiple zones. Override allows setpoint to be overridden for 2 hour time period. (0.2 lbs)
- ☐ S1-03102529106 - Non-Networking Wall Sensor with Setpoint Adjustment and Over-ride Button – Allows remote sensing and control from single or multiple zones. Allows setpoint to be adjusted $\pm 5^{\circ}$ F. Override allows setpoint to be overridden for 2 hour time period. (0.2 lbs)
- ☐ S1-ADDWIRE - Add-a-Wire allows 5-wire thermostats to use only 4 wires. (0.3 lbs)
- ☐ S1-CTS DTS - CTS Wired Temperature Sensor for thermostat | Duct *Also works for LX Series (0.3 lbs)
- ☐ S1-CTS HTS - CTS Hardwired Temperature Sensor for CTS Thermostats *Works with LX series as well (0.2 lbs)
- ☐ S1-CTS PLATE - Wall Plate for CTS Thermostats *Also works for new platform LX series models below (0.0 lbs)
- ☐ S1-CTS WFTS - CTS Temperature Sensor with WiFi for CTS Thermostats *Also works with LX Series (0.1 lbs)
- ☐ S1-LX LOCK - Locking Ring For LX-Series Thermostats (0.4 lbs)
- ☐ S1-LX PLATE - Wall Plate For LX-Series Thermostats (0.0 lbs)
- ☐ S1-LX WFM - For LX Series Thermostats - WiFi Communication (1.0 lbs)
- ☐ S1-MP-PRTKIT-0P - MAP (Multiple Access Portal) Gateway Kit- Replacement MAP gateway protective case, lanyard and communication cable. Use only to replace worn or damaged components. (0.3 lbs)
- ☐ S1-NSB8BHN041-0 - Wall Temperature and 3% Relative Humidity Combined Sensor, No Display, WHITE, NO JCI LOGO, NS8000 Series (0.4 lbs)
- ☐ S1-NSB8BHN043-0 - Wall Temperature and 3% Relative Humidity Combined Sensor, No Display, BLACK, NO JCI LOGO, NS8000 Series (0.4 lbs)
- ☐ S1-NSB8BHN141-0 - Wall Temperature and 3% Relative Humidity Combined Sensor, Warmer/Cooler Display, WHITE, NO JCI LOGO, NS8000 Series (0.4 lbs)
- ☐ S1-NSB8BHN143-0 - Wall Temperature and 3% Relative Humidity Combined Sensor, Warmer/Cooler Display, BLACK, NO JCI LOGO, NS8000 Series (0.4 lbs)
- ☐ S1-NSB8BHN240-0 - Wall Temperature and 3% Relative Humidity Combined Sensor, Full Display, WHITE, JCI LOGO, NS8000 Series (0.4 lbs)
- ☐ S1-NSB8BHN241-0 - Wall Temperature and 3% Relative Humidity Combined Sensor, Full Display, WHITE, NO JCI LOGO, NS8000 Series (0.4 lbs)
- ☐ S1-NSB8BHN243-0 - Wall Temperature and 3% Relative Humidity Combined Sensor, Full Display, BLACK, NO JCI LOGO, NS8000 Series (0.4 lbs)
- ☐ S1-NSB8BPN240-0 - Wall Temperature and 2% Relative Humidity Combined Sensor, Full Display, WHITE, JCI LOGO, NS8000 Series (0.4 lbs)
- ☐ S1-NSB8BPN241-0 - Wall Temperature and 2% Relative Humidity Combined Sensor, Full Display, WHITE, NO JCI LOGO, NS8000 Series (0.4 lbs)
- ☐ S1-NSB8BPN243-0 - Wall Temperature and 2% Relative Humidity Combined Sensor, Full Display, BLACK, NO JCI LOGO, NS8000 Series (0.4 lbs)
- ☐ S1-NSB8BTN041-0 - Wall Temperature Sensor, No Display, WHITE, NO JCI LOGO, NS8000 Series (0.4 lbs)
- ☐ S1-NSB8BTN043-0 - Wall Temperature Sensor, No Display, BLACK, NO JCI LOGO, NS8000 Series (0.4 lbs)

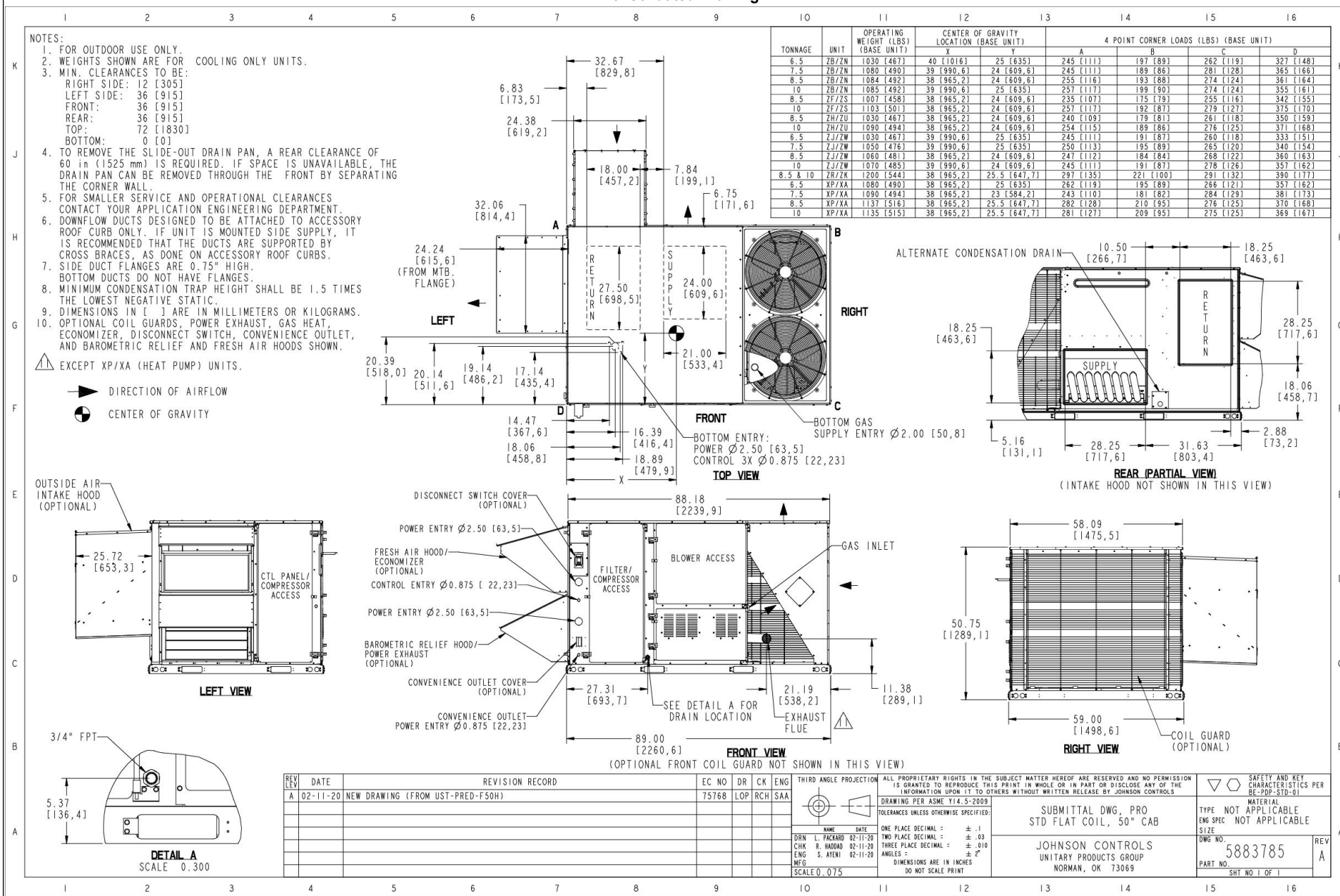
Project Name: **International School of Beaverton**

Unit Model #: **ZJ102N18S2B2AAA3A2**

Quantity: **1** Tag #: **RTU-3**

System: **ZJ102N18S2B2AAA3A2**

Consolidated Drawing



Project Name: **International School of
Beaverton**

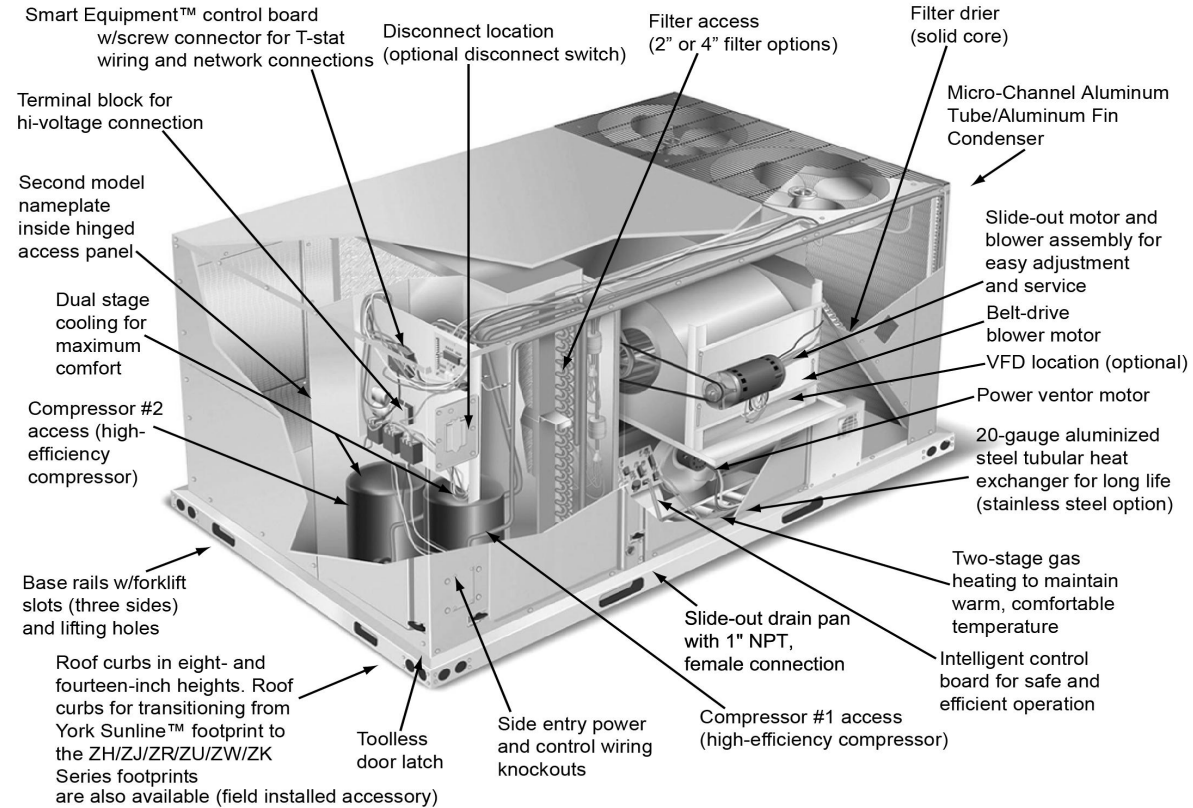
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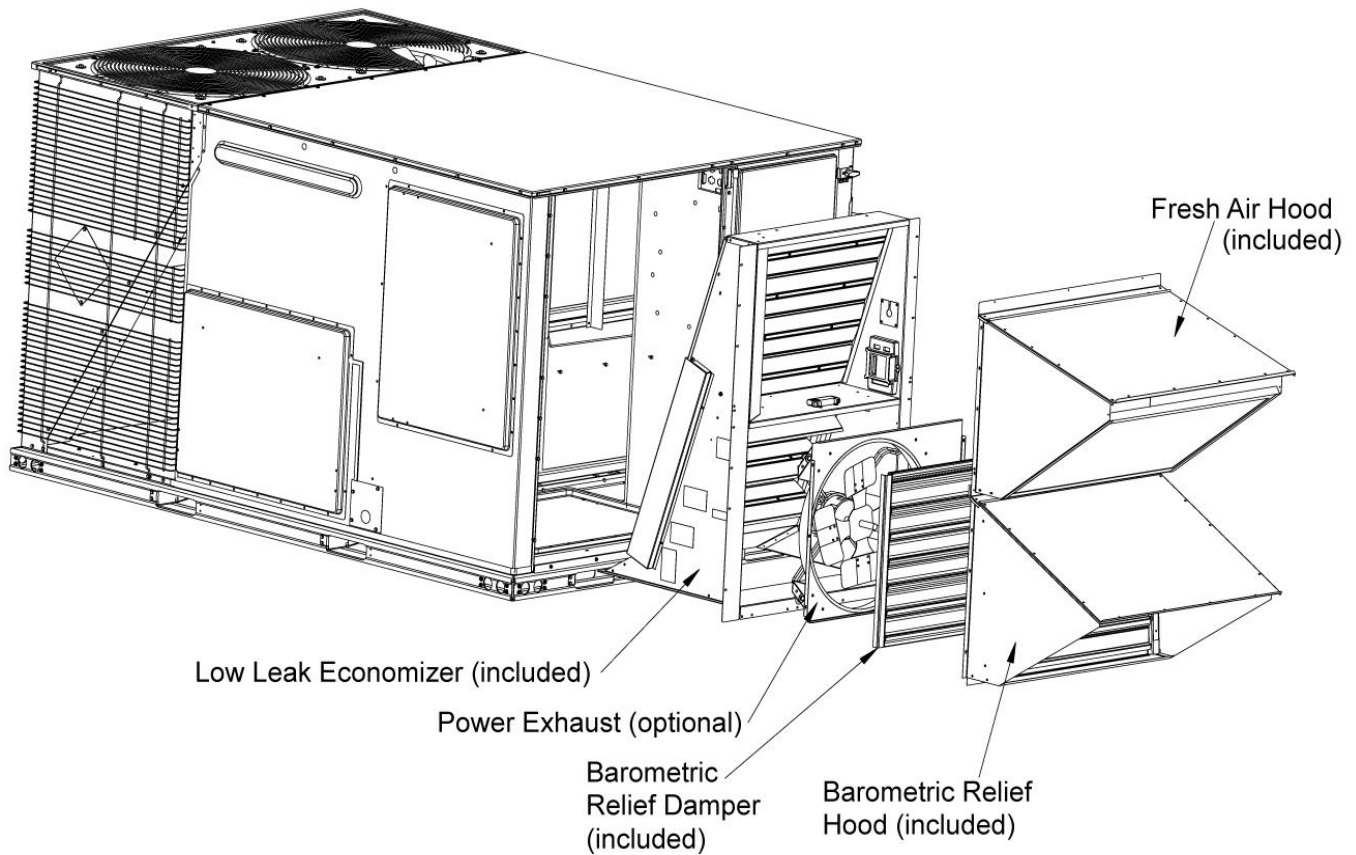
Quantity: **1** Tag #: **RTU-3**

System: **ZJ102N18S2B2AAA3A2**

Component Locations

Cooling With Gas Heat (6.5 Through 10 Tons)



Project Name: **International School of
Beaverton**Unit Model #: **ZJ102N18S2B2AAA3A2**Quantity: **1** Tag #: **RTU-3**System: **ZJ102N18S2B2AAA3A2****Low Leak Downflow Economizer****Low Leak Downflow Economizer (shown with optional Power Exhaust)**

Low leak economizers are capable achieving low leakage rates of 3 cfm/sq. ft at 1" of static pressure, meeting or exceeding the following standards:

ASHRAE 90.1-2010

ASHRAE 62

AMCA 511 (licensed as Class 1A damper)

International Energy Conservation Code (IECC)

California Title 24

The outdoor intake opening shall be covered with a rain hood that matches the exterior of the unit. Water eliminator/filters shall be provided.

Simultaneous economizer/compressor operation is also possible. Dampers shall fully close on power loss.

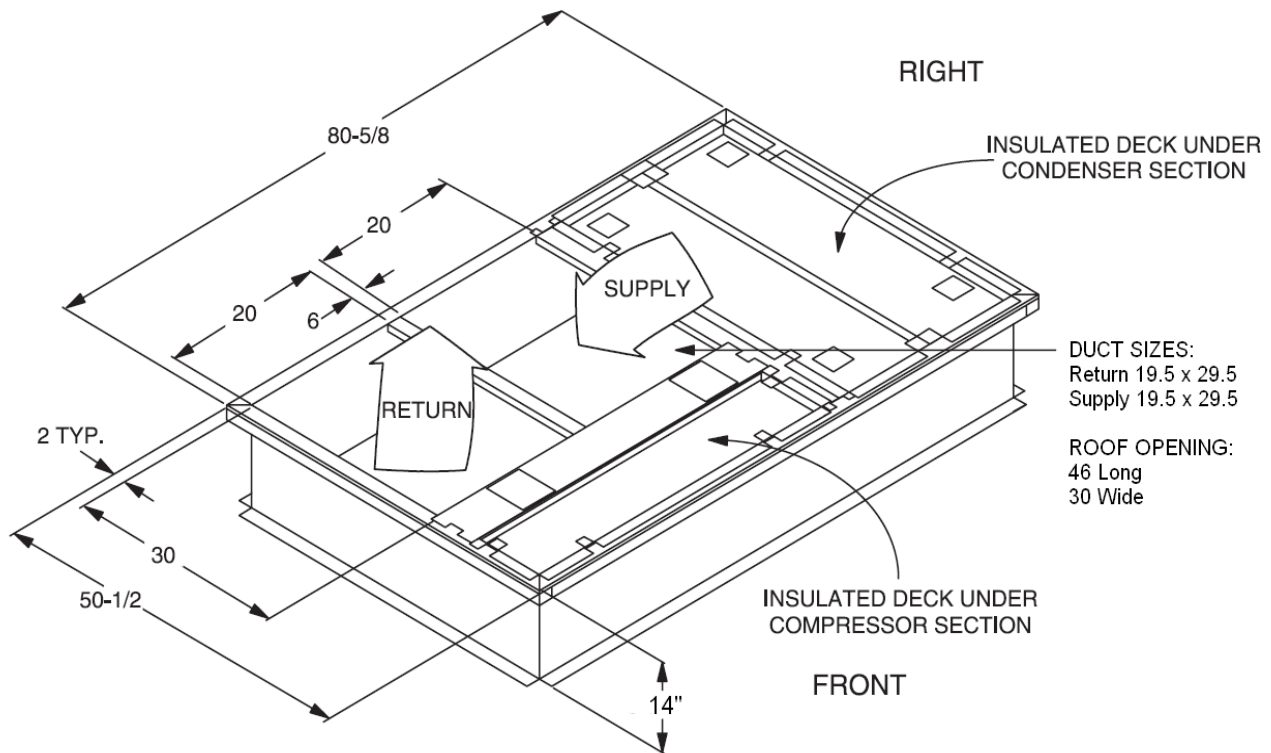
Project Name: **International School of
Beaverton**

Unit Model #: **ZJ102N18S2B2AAA3A2**

Quantity: **1** Tag #: **RTU-3**

System: **ZJ102N18S2B2AAA3A2**

1RC0471 Roof Curb



* Supply and Return Air (Including duct support rails) as shown, are typical for bottom duct applications.
For location of horizontal duct applications (On rear of unit), refer to Unit Dimensions details.

1RC0471 Roof Curb Dimensions

ReliaCore 100 15-25 Ton Package

Fraser-Johnston Single Package R-410A Air Conditioner

Project Name: **International School of Beaverton**Unit Model #: **ZW-20N30S2A2AAA3A1**Quantity: **1** Tag #: **RTU-2**System: **ZW-20N30S2A2AAA3A1**

Cooling Performance

Total gross capacity	231.6 MBH
Sensible gross capacity	200.9 MBH
Total net capacity	219.9 MBH
Sensible net capacity	189.2 MBH
Efficiency (at ARI)	11.00 EER
Integrated eff. (at ARI)	12.50 IEER
Ambient DB temp.	95.0 °F
Entering DB temp.	80.1 °F
Entering WB temp.	63.6 °F
Leaving DB temp.	53.5 °F
Leaving WB temp.	52.1 °F
Power input (w/o blower)	18.10 kW
Sound power	92 dB(A)

Refrigerant

Refrigerant type	R-410A
Sys1	12 lbs
Sys2	13 lbs
Sys3	12 lbs
Sys4	12 lbs

Gas Heating Performance

Entering DB temp.	60 °F
Heating output capacity (Max)	240 MBH
Supply air	7000 CFM
Heating input capacity (Max)	300 MBH
Leaving DB temp.	91.7 °F
Air temp. rise	31.7 °F
SSE	80.0 %
Stages	2

Supply Air Blower Performance

Supply air	7000 CFM
Ext. static pressure	0.5 IWG
Add. Unit Losses (Options/Accessories)	0.17 IWG
Blower speed	842 RPM
Max BHP of Motor (including service factor)	5.75 HP
Duct location	Bottom
Motor rating	5.00 HP
Actual required BHP	4.11 HP
Power input	3.44 kW
Elevation	0 ft.
Drive type	BELT

Electrical Data

Power supply	208-3-60	230-3-60
Unit min circuit ampacity	88.6 Amps	88.1 Amps
Unit max over-current protection	100 Amps	100 Amps

Dimensions & Weight

Hgt	53 in.	Len	181 in.	Wth	92 in.
Weight with factory installed options	2937 lbs.				

Clearances

Right	36 in.	Front	36 in.	Rear	24 in.
Top	72 in.	Bottom	0 in.	Left	24 in.

Note: Please refer to the tech guide for listed maximum static pressures



20 Ton

- Fraser-Johnston Units are Manufactured at an ISO 9001 Registered Facility and each Rooftop is Completely Computer-Run Tested Prior to Shipment.

Unit Features

- Four Stage Cooling
- 300 MBH Input Aluminized Steel, Two Stage Gas Heat
- Unit Cabinet Constructed of Powder Painted Steel, Certified At 750 Hours Salt Spray Test (ASTM B-117 Standards).
- Either Supply and/or Return can be Field Converted from Vertical to Horizontal Configuration without Cutting Panels
- Full Perimeter Base Rails with Built in Rigging Capabilities
- Four Independent Refrigerant Circuits for Efficient Part Load Operation with Scroll Compressors
- 5 HP Standard Static Belt Drive Blower
- 4" Pleated Filters (MERV 13)
- Solid Core Liquid Line Filter Driers
- Replacement Filters: For 2" filters 12 - (12" x 24" x 2") OR For 4" filters 2 - (20" X 24" x 4") AND 4 - (24" X 24" x 4")
- Single Point Power Connection
- Through-the-Curb and Through-The-Base Utility Connections
- HACR Circuit Breaker/Disconnect
- Short Circuit Current: 5kA RMS Symmetrical
- Standard Condenser Coil
- Standard Evaporator Coil
- Crane Required to Unload Unit
- Galvanized Steel Drain Pan
- Standard Access Doors

BAS Controller

- VFD with Bypass and Intellispeed
- Smart Equipment Controller including Discharge Air, Return Air, and Outdoor Air Temperature Sensors.

Standard Unit Controller: Smart Equipment Control Board

- Safety Monitoring - Monitors the High and Low-Pressure Switches, the Freezestats, the Gas Valve, if Applicable, and the Temperature Limit Switch on Gas and Electric Heat Units. The Unit Control Board will Alarm on Ignition Failures, Safety Lockouts and Repeated Limit Switch Trips.
- An Integrated Low-Ambient Control, Anti-Short Cycle Protection, Lead-Lag, Fan On and Fan off Delays, Low Voltage Protection, On-Board Diagnostic and Fault Code Display. Allows all units to operate in the cooling mode down to 0 °F outdoor ambient without additional components or intervention.

Warranty

- One (1) Year Limited Warranty on the Complete Unit
- Five (5) Year Warranty - Compressors and Electric Heater Elements
- Ten (10) Year Warranty - Aluminized Steel Tubular Heat Exchangers



ReliaCore 100 15-25 Ton Package

Fraser-Johnston Single Package R-410A Air Conditioner

Project Name: International School of Beaverton

Unit Model #: ZW-20N30S2A2AAA3A1

Quantity: 1 Tag #: RTU-2

System: ZW-20N30S2A2AAA3A1

Factory Installed Options

ZW-20N30S2A2AAA3A1

Equipment Options	Option(s) Selected	
Product Category:	ZW	Single Packaged R-410A Air Conditioner 11.0 EER
Nominal Cooling Capacity:	-20	20 Ton Four Stage Cooling
Heat Type and Nominal Heat Capacity:	N30	300 MBH Input Aluminized Steel, Two Stage Gas Heat
Blower Option:	S	VFD with Bypass and Intellispeed 5 HP Standard Static Belt Drive Blower
Voltage:	2	208/230-3-60
Outside Air Option:	A	Includes fresh air hood with baffle that can be set for 10, 15, or 25% outside air.
Service Options:	2	HACR Circuit Breaker/Disconnect
Sensor Options:	A	
Controls:	A	Smart Equipment Controller including Discharge Air, Return Air, and Outdoor Air Temperature Sensors.
Refrigeration:	A	Standard Condenser Coil Standard Evaporator Coil
Additional Options:	3	4" Pleated Filters (MERV 13)
Cabinet Options:	A	Single Wall Construction Standard Access Doors Galvanized Steel Drain Pan
Product Generation:	1	

Field Installed Accessories

- | | | |
|---|--|--|
| <ul style="list-style-type: none"> <input type="radio"/> 1BD0404 - Burglar Bars (51.0 lbs) <input type="radio"/> 1CG0421 - Coil Guard (15.0 lbs) <input type="radio"/> 1CV0407 - Concentric Diffuser, Flush Mount, 24X28 <input type="radio"/> 1CV0408 - Concentric Diffuser, Flush Mount, 24X54 <input type="radio"/> 1CV0416 - Concentric Diffuser, Side Discharge, 24X48 <input type="radio"/> 1CV0417 - Concentric Diffuser, Side Discharge, 24X54 <input type="radio"/> 1CV0421 - Concentric Diffuser, Specialty, 28X28 <input type="radio"/> 1CV0423 - Concentric Diffuser, Specialty, 36X36 <input type="radio"/> 1CV0426 - Concentric Diffuser, Specialty, 24X24 | <ul style="list-style-type: none"> <input type="radio"/> 1CV0428 - Concentric Diffuser, Specialty, 30X30 <input type="radio"/> 1CV0429 - Concentric Diffuser, Specialty, 36X36 <input type="radio"/> 1FE0410 - Flue Extension Kit (37.0 lbs) <input type="radio"/> 1GP0403 - Gas Piping Kit (11.0 lbs) <input type="radio"/> 1HG0412 - Hail Guard Kit (48.0 lbs) <input type="radio"/> 1LD0417 - High Speed Drive Kit (9.0 lbs) <input type="radio"/> 1NP0418 - Natural Gas to Propane Conversion Kit (2-Stage) (1.0 lbs) | <ul style="list-style-type: none"> <input checked="" type="radio"/> 1RC0437 - Roof Curb - 14" High, Flat, Uninsulated, Full Perimeter (Shipped Knocked Down) (185.0 lbs) <input type="radio"/> 1RC0497 - Roof Curb 14" High Full Perimeter Transition Curb with wood nailer. Allow replacement of ZF180 / J15ZF / ZS-15 / ZST15 with other Large Sunline product. (135.0 lbs) <input type="radio"/> 1RD0413 - Barometric Relief Damper with Hood Kit (Downflow Unit or Duct Mounted) (47.0 lbs) <input type="radio"/> 1WS0404 - Wood Skid - Allows unit to be handled with 90 inch forks (210.0 lbs) <input type="radio"/> 2AP0402 - Air Proving Switch (1.0 lbs) |
|---|--|--|

Project Name: **International School of Beaverton**

Unit Model #: **ZW-20N30S2A2AAA3A1**

Quantity: **1** Tag #: **RTU-2**

System: **ZW-20N30S2A2AAA3A1**

Consolidated Drawing

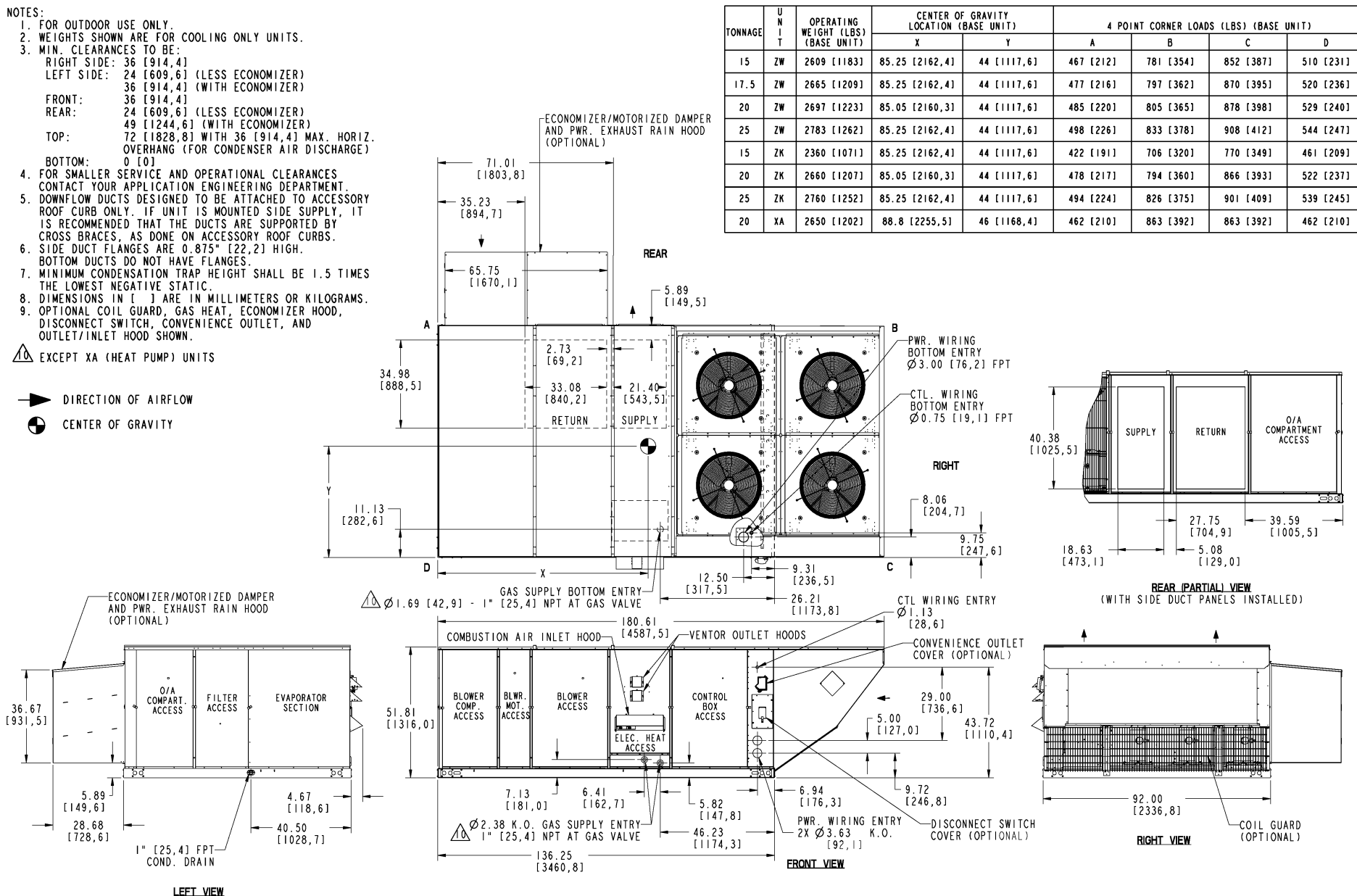
NOTES:

- FOR OUTDOOR USE ONLY.
- WEIGHTS SHOWN ARE FOR COOLING ONLY UNITS.
- MIN. CLEARANCES TO BE:
RIGHT SIDE: 36 [914,4]
LEFT SIDE: 24 [609,6] (LESS ECONOMIZER)
36 [914,4] (WITH ECONOMIZER)
FRONT:
36 [914,4]
REAR:
24 [609,6] (LESS ECONOMIZER)
49 [1244,6] (WITH ECONOMIZER)
TOP:
72 [1828,8] WITH 36 [914,4] MAX. HORIZ.
OVERHANG (FOR CONDENSER AIR DISCHARGE)
0 [0]
BOTTOM:
0 [0]
4. FOR SMALLER SERVICE AND OPERATIONAL CLEARANCES
CONTACT YOUR APPLICATION ENGINEERING DEPARTMENT.
- DOWNFLOW DUCTS DESIGNED TO BE ATTACHED TO ACCESSORY
ROOF CURB ONLY. IF UNIT IS MOUNTED SIDE SUPPLY, IT
IS RECOMMENDED THAT THE DUCTS ARE SUPPORTED BY
CROSS BRACES, AS DONE ON ACCESSORY ROOF CURBS.
- SIDE DUCT FLANGES ARE 0.875" [22,2] HIGH.
BOTTOM DUCTS DO NOT HAVE FLANGES.
- MINIMUM CONDENSATION TRAP HEIGHT SHALL BE 1.5 TIMES
THE LOWEST NEGATIVE STATIC.
- DIMENSIONS IN [] ARE IN MILLIMETERS OR KILOGRAMS.
- OPTIONAL COIL GUARD, GAS HEAT, ECONOMIZER HOOD,
DISCONNECT SWITCH, CONVENIENCE OUTLET, AND
OUTLET/INLET HOOD SHOWN.

⚠ EXCEPT XA (HEAT PUMP) UNITS

➔ DIRECTION OF AIRFLOW

⊙ CENTER OF GRAVITY



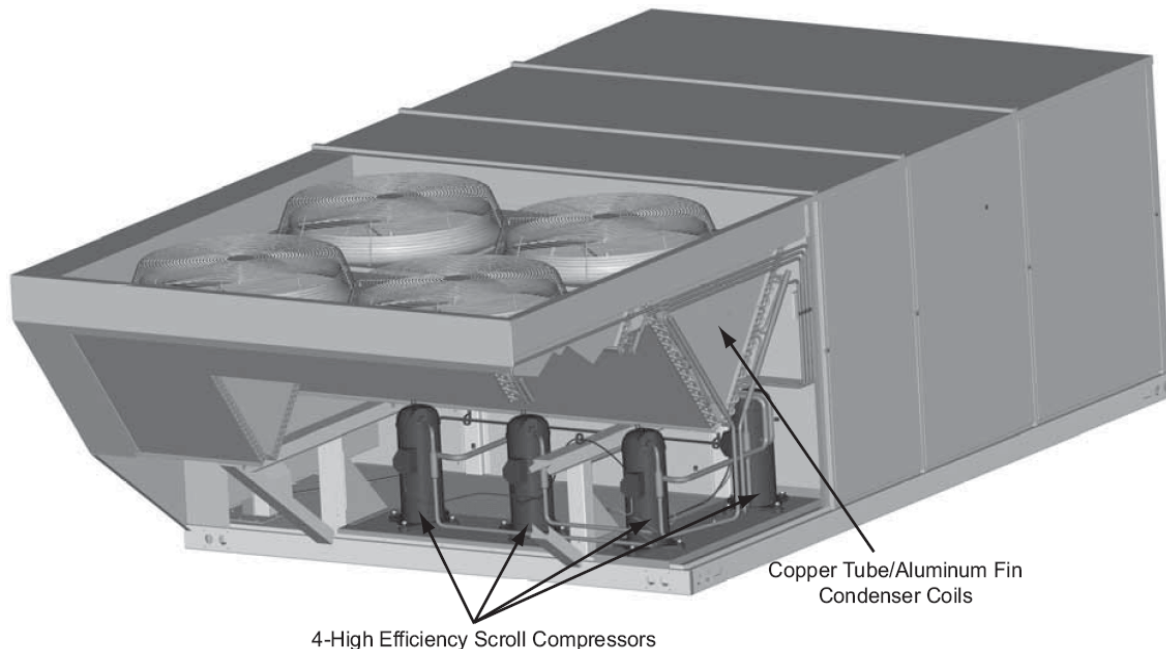
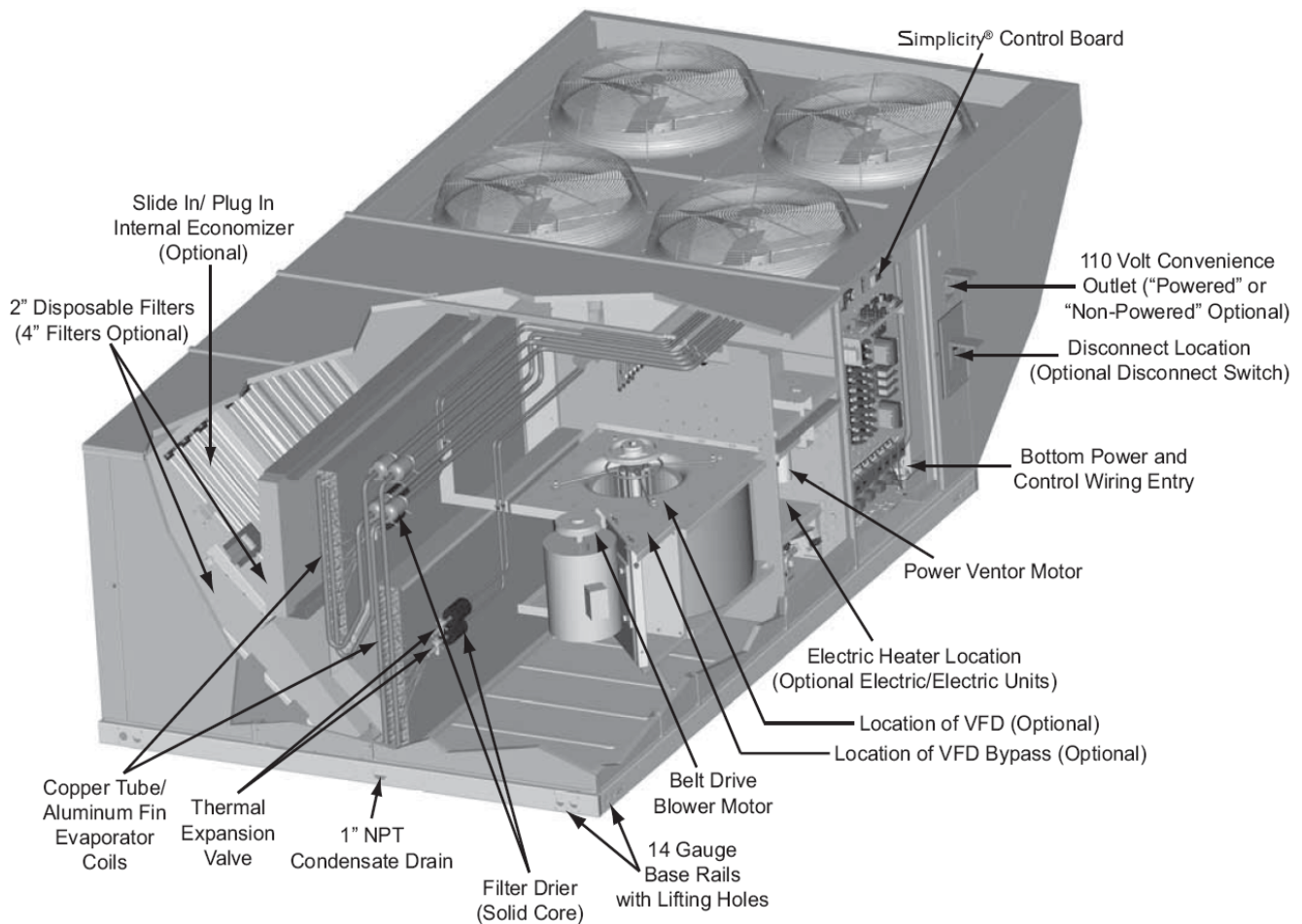
Project Name: **International School of Beaverton**

Unit Model #: **ZW-20N30S2A2AAA3A1**

Quantity: **1** Tag #: **RTU-2**

System: **ZW-20N30S2A2AAA3A1**

Component Locations



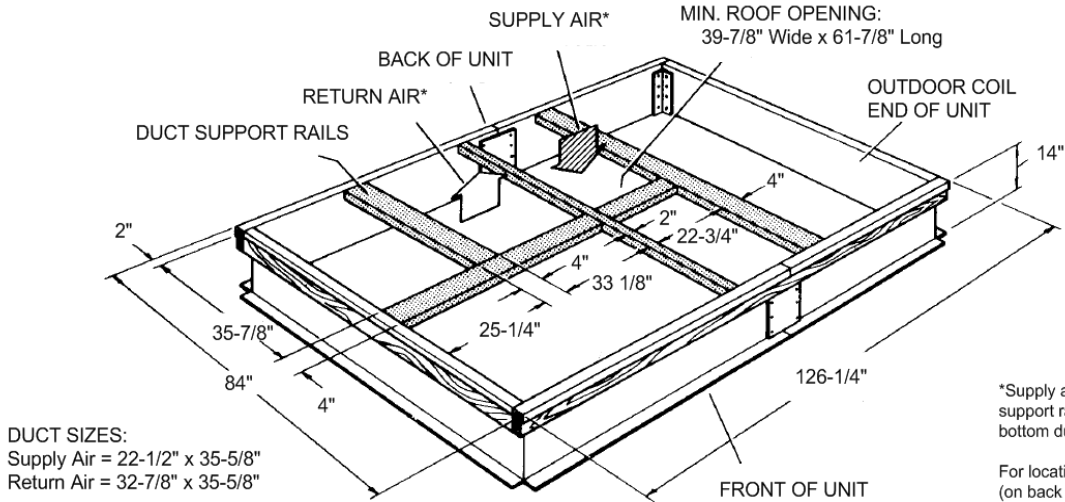
Project Name: **International School of
Beaverton**

Unit Model #: **ZW-20N30S2A2AAA3A1**

Quantity: **1** Tag #: **RTU-2**

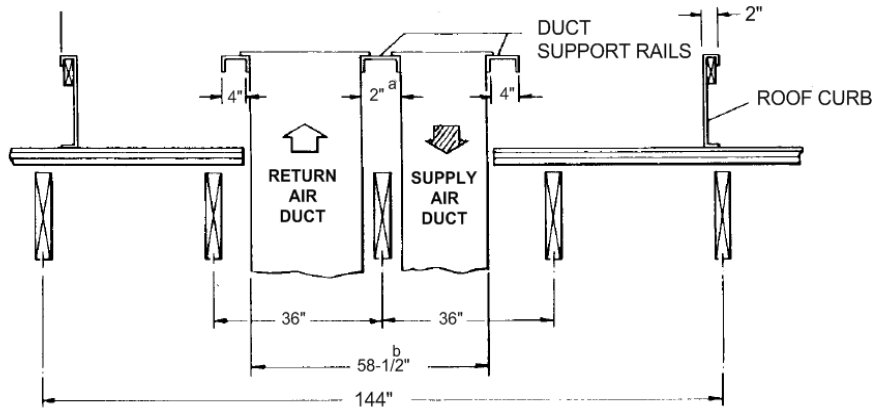
System: **ZW-20N30S2A2AAA3A1**

1RC0437 Roof Curb



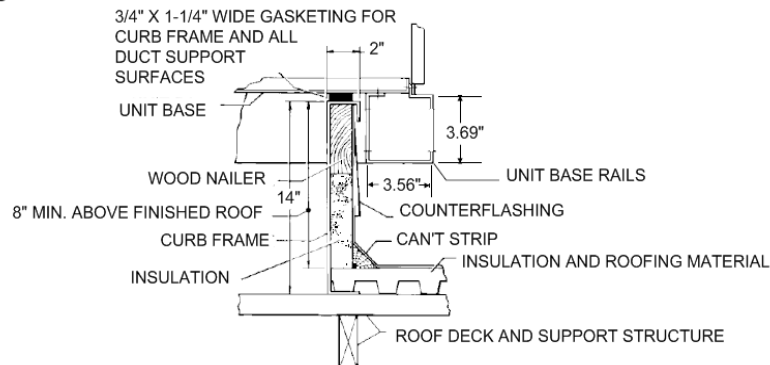
**ROOF CURB DUCT OPENINGS
DIMENSIONS**

FRONT VIEW (JOIST SUPPORTS)



- a. The 2" space between the ducts allows for "jumping" an existing roof joist.
b. The 58-1/2" overall dimension of the ducts allows duct work penetration between roof joists that are spaced on 72" centers.
- NOTE: Ducts can be installed into the curb from the roof. All electrical and gas line connections can be made inside the curb.

CUT AWAY OF ROOF CURB



1RC0437 Roof Curb Dimensions

Project Name: **International School of Beaverton**

 Unit Model #: **PCG4A361002X4**

 Quantity: **8** Tag #: **RTU-6,7,8,9,11,12,13,14**

 System: **PCG4A361002X4**
Cooling Performance

Total net capacity	37.3 MBH
Sensible net capacity	27.2 MBH
Seasonal Efficiency (at ARI)	14.00 SEER
Efficiency (at ARI)	11.80 EER
Ambient DB temp.	95.0 °F
Entering DB temp.	80.0 °F
Entering WB temp.	67.0 °F
Leaving DB temp.	59.0 °F
Leaving WB temp.	57.2 °F
Power input	2.70 kW
Sound power	76 dB(A)

Refrigerant

Refrigerant type	R-410A
Sys1	6 lbs 14 oz

Heating Performance

Entering DB temp.	60 °F
Heating output capacity (Max)	80 MBH
Supply air	1200 CFM
Heating input capacity (Max)	100 MBH
Leaving DB temp.	121.7 °F
Air temp. rise	61.7 °F
AFUE	81.0 %

Supply Air Blower Performance

Supply air	1200 CFM
Ext. static pressure	0.5 IWG
Duct location	Bottom
Motor rating	0.75 HP
Elevation	0 ft.
Drive type	DIRECT

Electrical Data

Power supply	208-1-60	230-1-60
Unit min circuit ampacity	25.5 Amps	25.5 Amps
Unit max over-current protection	40 Amps	40 Amps

Dimensions & Weight

Hgt	47 in.	Len	52 in.	Wth	36 in.
Weight with factory installed options					383 lbs.

Note: Please refer to the tech guide for listed maximum static pressures


3 Ton

- Fraser-Johnston LX® Series Units are Manufactured at an ISO 9001 Registered Facility and Each Rooftop is Completely Computer-Run Tested Prior to Shipment.

Unit Features

- All PCG4 Model Gas Units provide a Minimum AFUE of 81.0% in Heating and meet current California Low-Nox requirements of 40 ng/joule Emission Level for Air Quality Management Districts
- Unit Cabinet shall be Constructed of G-90 Galvanized, Powder-Painted Steel, Certified at 1000 hours Salt Spray Test per ASTM-B117 Standards
- Bottom and Side Electrical and Gas Utility Connections
- Easy Access to all Components
- Lower Installation Cost
- Single Piece Water-Shed Top Cover and Drip Edge
- Field Convertible Duct Connections from Horizontal to Downflow Allows Greater Flexibility
- Full Perimeter, Removable Base Rails with Built in Rigging and Access Provisions
- Non-Corrosive Condensate Pan Internally Sloped to Meet Strict Requirements of ASHRAE 62-89 Indoor Air Quality Standard
- Copper Tube/Aluminum Fin Condenser Coil
- Compressor is Internally Protected Against High Pressure and Temperature
- Standard Cooling Operation Down to 45°F
- Variable Speed Direct Drive High Static Motor and Slide out Blower Assembly

Warranty

- Extended 10-Years limited parts and compressor warranty *Requires online registration within 90 days of purchase
- Lifetime gas heat exchanger warranty with registration.

Project Name: **International School of Beaverton**

 Unit Model #: **PCG4A361002X4**

 Quantity: **8** Tag #: **RTU-6,7,8,9,11,12,13,14**

 System: **PCG4A361002X4**
Factory Installed Options
PCG4A361002X4

Equipment Options		Option(s) Selected
Model Family:	PCG	Fraser Johnston Single Packaged R-410A Air Conditioner
SEER:	4	14.0 SEER / 11.8 EER
Cabinet Options:	A	Small Cabinet (35" x 51")
Nominal Cooling Capacity:	36	3 Ton Single Stage Cooling Copper Tube/Aluminum Fin Condenser Coil
Heat Type and Nominal Heat Capacity:	100	100 MBH Input Single Stage Stainless Steel Natural Gas Heat
Voltage:	2	208/230-1-60
Options:	X	Low NOx (40 ng/J)
Generation:	4	

Field Installed Accessories

- | | | |
|---|--|---|
| <ul style="list-style-type: none"> <input type="radio"/> S1-1AK0108 - Rectangle to Round (Downflow) Transition Adapter, Small Footprint (30.0 lbs) <input type="radio"/> S1-1FA0501 - Manual Outside Air Damper with hood and screen, Small Footprint (8.0 lbs) <input type="radio"/> S1-1FE0422 - Flue Extension Kit <input type="radio"/> S1-1FF0601 - Filter/Frame Kit (Single Phase Only), Small Footprint (6.0 lbs) <input type="radio"/> S1-1HC0101 - Base Rail Hole Cover Kit (3.0 lbs) <input type="radio"/> S1-1HK0601 - Hurricane Kit (LX Series) (1.4 lbs) <input type="radio"/> S1-1NP0703 - Propane Conversion Kit (0.6 lbs) <input type="radio"/> S1-1RC0501 - Roof Curb 8" Small Footprint (45.0 lbs) <input checked="" type="radio"/> S1-1RC0502 - Roof Curb 14" Small Footprint (52.0 lbs) <input type="radio"/> S1-1TC0101 - Curb Adapter for Affinity to Small LX Series, Small Footprint (78.0 lbs) <input type="radio"/> S1-1TC0102 - Curb Adapter for Carrier 48/50ES-A 1024-036 to Small LX Series, Small Footprint (72.0 lbs) <input type="radio"/> S1-1TC0103 - Curb Adapter Goodman GPG/APG036-060 (PGC101-103 Curb) to LX Series, Small Footprint (93.0 lbs) | <ul style="list-style-type: none"> <input type="radio"/> S1-1TC0104 - Curb Adapter Trane 2/4YCC 018-036 to Small LX Series, Small Footprint (84.0 lbs) <input type="radio"/> S1-1TC0111 - Lightweight Transition Curb, Affinity to Small LX Series (81.0 lbs) <input type="radio"/> S1-1TC0112 - Lightweight Transition Curb, Trane to Small LX Series (77.0 lbs) <input type="radio"/> S1-1TC0114 - Lightweight Transition Curb, Goodman to Small LX Series (83.0 lbs) <input checked="" type="radio"/> S1-2EE04710024 - Low Leak Downflow Economizer, Small Footprint (148.0 lbs) <input type="radio"/> S1-2AQ04700924 - Duct/Unit Mount CO2 Kit (7.0 lbs) <input type="radio"/> S1-2AQ04701024 - Wall Mount CO2 Kit (2.0 lbs) <input checked="" type="radio"/> S1-2EC06700124 - Transformer Kit (2.0 lbs) <input checked="" type="radio"/> S1-2EC06700124 - Transformer Kit (2.0 lbs) <input type="radio"/> S1-HE-6863-0N00WS - Single/Dual Enthalpy Sensor (0.3 lbs) <input type="radio"/> S1-TE-63616E-2D - Supply Air Temperature Sensor Kit <input type="radio"/> S1-2LA04701024 - Advanced Low Ambient Control Kit (1.8 lbs) | <ul style="list-style-type: none"> <input type="radio"/> S1-2LC00024 - Loss of Charge Switch (1.0 lbs) <input type="radio"/> S1-2MD04705124 - Motorized Outside Air Damper with hood and screen, Small Footprint (14.0 lbs) <input type="radio"/> S1-ADDWIRE - Add-a-Wire allows 5-wire thermostats to use only 4 wires. (0.3 lbs) <input type="radio"/> S1-CTSDTS - CTS Wired Temperature Sensor for thermostat Duct *Also works for LX Series (0.3 lbs) <input type="radio"/> S1-CTSHTS - CTS Hardwired Temperature Sensor for CTS Thermostats *Works with LX series as well (0.2 lbs) <input type="radio"/> S1-CTSPLATE - Wall Plate for CTS Thermostats *Also works for new platform LX series models below (0.0 lbs) <input type="radio"/> S1-CTSWFTS - CTS Temperature Sensor with WiFi for CTS Thermostats *Also works with LX Series (0.1 lbs) <input type="radio"/> S1-LXLOCK - Locking Ring For LX-Series Thermostats (0.4 lbs) <input type="radio"/> S1-LXPLATE - Wall Plate For LX-Series Thermostats (0.0 lbs) <input type="radio"/> S1-LXWFM - For LX Series Thermostats - WiFi Communication (1.0 lbs) |
|---|--|---|

Project Name: **International School of
Beaverton**

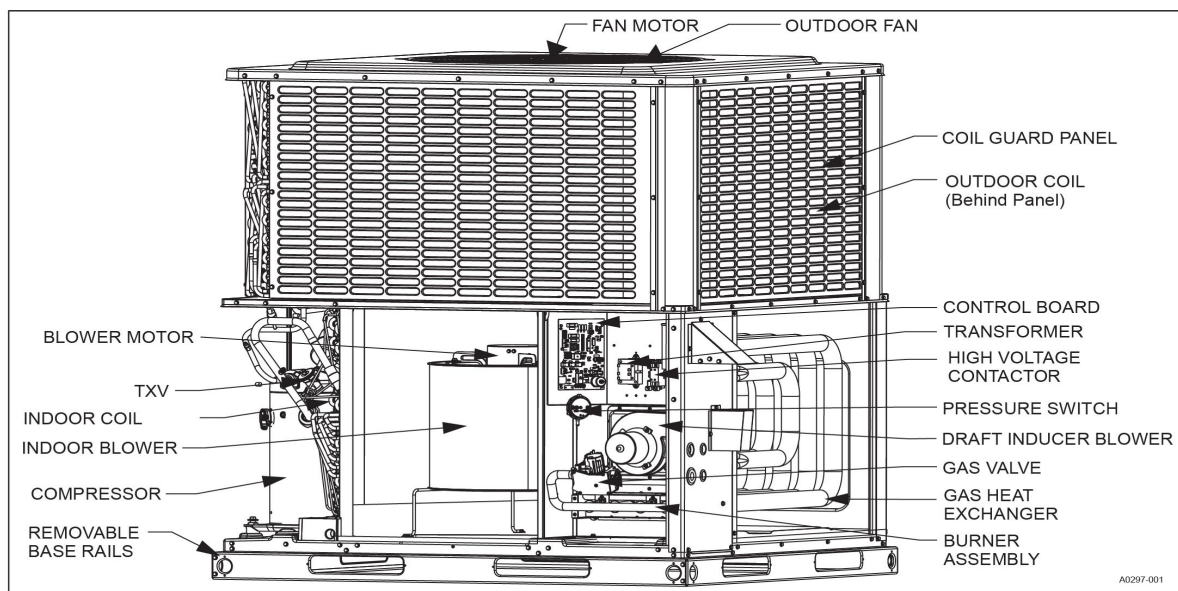
Unit Model #: **PCG4A361002X4**

Quantity: **8** Tag #: **RTU-
6,7,8,9,11,12,13,14**

System: **PCG4A361002X4**

Component Location

COMPONENT LOCATION



UNIT LIMITATIONS

Model	Unit Voltage	Unit Limitations		
		Applied Voltage		Outdoor DB Temperature
		Minimum	Maximum	Maximum (°F)
PCG4A24	208/230-1-60	187	252	125
PCG4A30	208/230-1-60	187	252	125
PCG4A36	208/230-1-60	187	252	125
PCG4A42	208/230-1-60	187	252	125
PCG4B48	208/230-1-60	187	252	125
PCG4B60	208/230-1-60	187	252	125

Project Name: **International School of
Beaverton**

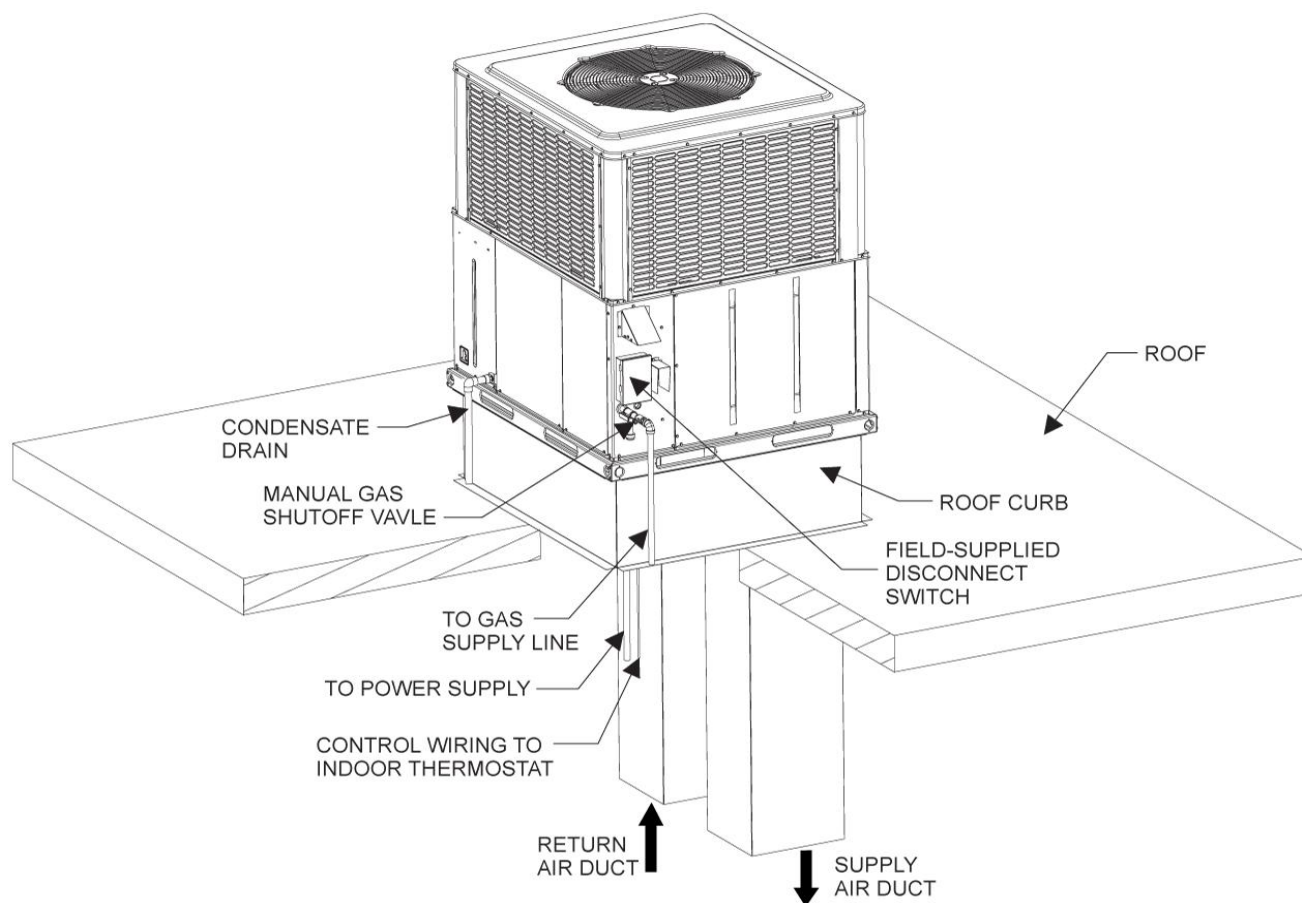
Unit Model #: **PCG4A361002X4**

Quantity: **8** Tag #: **RTU-
6,7,8,9,11,12,13,14**

System: **PCG4A361002X4**

Typical Installation Roof Curb

UNIT TYPICAL ROOF CURB INSTALLATION (Gas model shown)



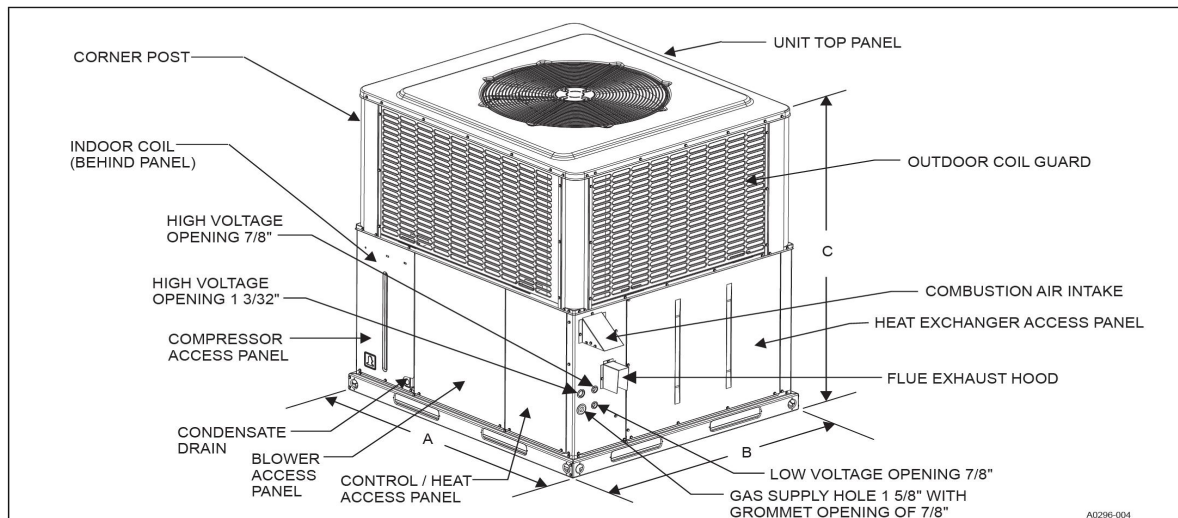
Project Name: **International School of Beaverton**

 Unit Model #: **PCG4A361002X4**

 Quantity: **8** Tag #: **RTU-6,7,8,9,11,12,13,14**

 System: **PCG4A361002X4**

Dimensions



UNIT DIMENSIONS

Model	Dimensions (in.)		
	A	B	C
PCG4A24	51 1/4	35 3/4	44
PCG4A30	51 1/4	35 3/4	45
PCG4A36	51 1/4	35 3/4	47
PCG4A42	51 1/4	35 3/4	47
PCG4B48	51 1/4	45 3/4	47
PCG4B60	51 1/4	45 3/4	50

UNIT CLEARANCES^{1,2}

Direction	Distance (in.)	Direction	Distance (in.)
Top ³	36	Power Entry (Right Side)	36
Side Opposite Ducts	36	Left Side	24
Duct Panel	0	Bottom ⁴	1

1. Provide a 1-in. clearance between any combustible material and the supply air duct work.

2. Do not allow the products of combustion to accumulate within a confined space and recirculate.

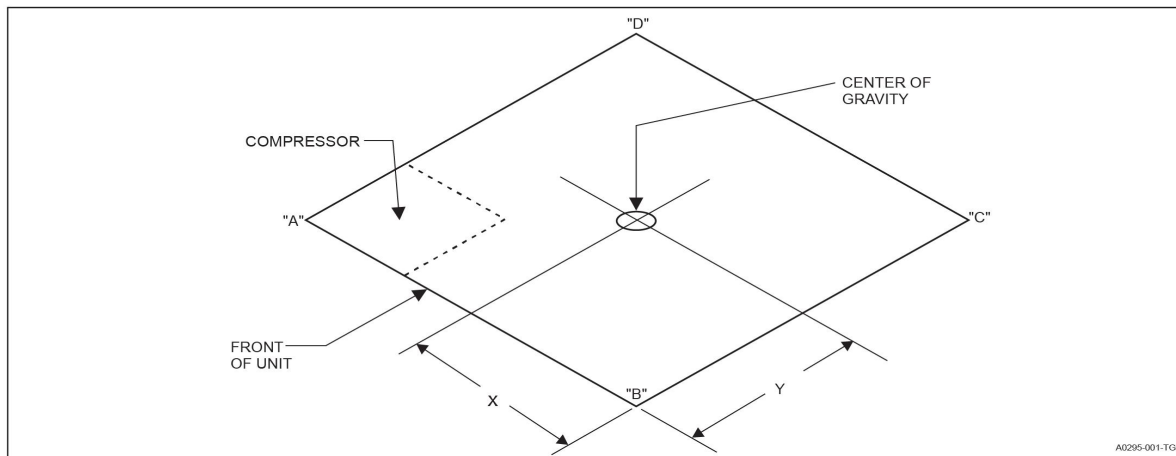
3. Install units outdoors. Make sure that overhanging structures or shrubs do not obstruct the outdoor air discharge outlet.

4. You can install units on combustible materials made from wood or class A, B, or C roof covering materials if factory base rails are left in place as shipped.

Project Name: **International School of
Beaverton**

 Unit Model #: **PCG4A361002X4**

 Quantity: **8** Tag #: **RTU-
6,7,8,9,11,12,13,14**

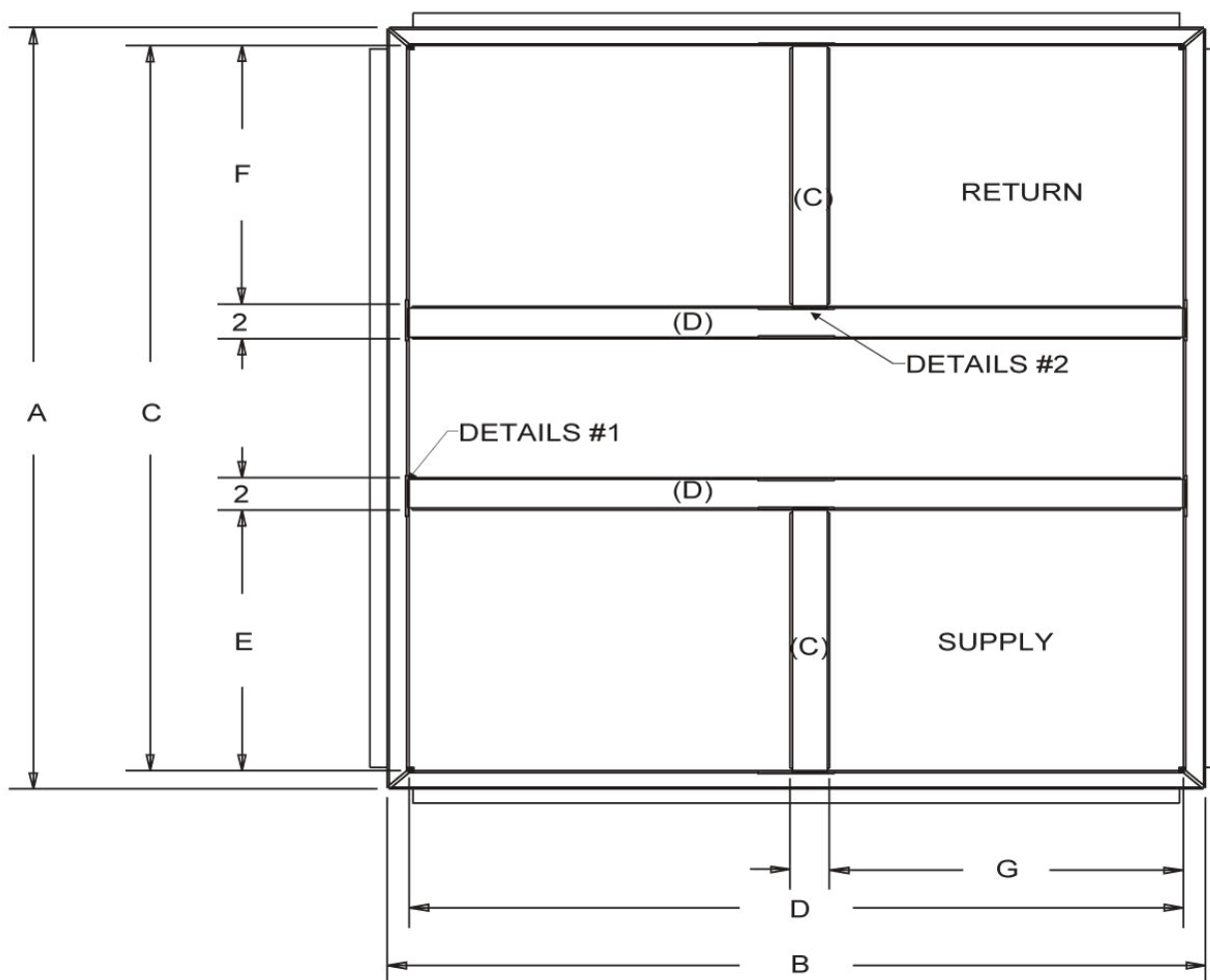
 System: **PCG4A361002X4**
Weights

WEIGHTS AND DIMENSIONS

Model	Weight (lb)		Center of Gravity		4-Point Load Location (lb)			
	Shipping	Operating	X	Y	A	B	C	D
PCG4A240502X4	321	316	29	15	118	63	76	59
PCG4A240752X4	341	336	28	15	119	79	76	62
PCG4A300502X4	357	352	28	15	119	87	76	70
PCG4A300752X4	377	372	28	15	122	89	83	78
PCG4A360502X4	364	359	28	15	123	84	79	73
PCG4A360752X4	384	379	27	16	121	92	85	81
PCG4A361002X4	388	383	27	16	120	95	87	81
PCG4A420752X4	403	398	28	15	143	93	88	74
PCG4A421002X4	407	402	28	15	137	96	90	79
PCG4B480652X4	455	450	28	18	165	107	99	79
PCG4B481002X4	461	456	28	18	163	110	99	84
PCG4B481252X4	465	460	28	18	163	112	101	84
PCG4B600652X4	474	469	27	18	167	118	102	82
PCG4B601002X4	480	475	27	18	165	121	102	87
PCG4B601252X4	484	479	27	18	165	122	104	88

Project Name: **International School of
Beaverton**

 Unit Model #: **PCG4A361002X4**

 Quantity: **8** Tag #: **RTU-
6,7,8,9,11,12,13,14**

 System: **PCG4A361002X4**
1RC0501, 1RC0502, 1RC0503, 1RC0504 Roof Curbs
Dimensions of Roof Curbs 1RC0501, 1RC0502, 1RC0503, 1RC0504
TOP VIEW


JCI Model#	RRS Model#	A	B	C	D	E	F	G	Height	Return & Supply Duct	Roof Opening
S1-1RC0501	80-201-4908	$47 \frac{9}{32}$	$31 \frac{25}{32}$	$45 \frac{1}{32}$	$29 \frac{17}{32}$	15	15	18	8	$17 \frac{1}{2} \times 14 \frac{1}{2}$	19 x 45
S1-1RC0502	80-201-4914								14		
S1-1RC0503	80-201-5008	$47 \frac{1}{8}$	$41 \frac{5}{8}$	$44 \frac{7}{8}$	$39 \frac{3}{8}$	$16 \frac{3}{16}$	$16 \frac{3}{16}$	18	8	$17 \frac{1}{2} \times 15 \frac{3}{4}$	19 x 44
S1-1RC0504	80-201-5014								14		

Project Name: **International School of Beaverton**

 Unit Model #: **PCG4A421002X4**

 Quantity: **1** Tag #: **RTU-10**

 System: **PCG4A421002X4**
Cooling Performance

Total net capacity	41.8 MBH
Sensible net capacity	30.9 MBH
Seasonal Efficiency (at ARI)	14.00 SEER
Efficiency (at ARI)	11.20 EER
Ambient DB temp.	95.0 °F
Entering DB temp.	80.0 °F
Entering WB temp.	67.0 °F
Leaving DB temp.	59.6 °F
Leaving WB temp.	57.6 °F
Power input	3.28 kW
Sound power	76 dB(A)

Refrigerant

Refrigerant type	R-410A
Sys1	7 lbs

Heating Performance

Entering DB temp.	60 °F
Heating output capacity (Max)	80 MBH
Supply air	1400 CFM
Heating input capacity (Max)	100 MBH
Leaving DB temp.	112.9 °F
Air temp. rise	52.9 °F
AFUE	81.0 %

Supply Air Blower Performance

Supply air	1400 CFM
Ext. static pressure	0.55 IWG
Duct location	Bottom
Motor rating	0.75 HP
Elevation	0 ft.
Drive type	DIRECT

Electrical Data

Power supply	208-1-60	230-1-60
Unit min circuit ampacity	27 Amps	27 Amps
Unit max over-current protection	40 Amps	40 Amps

Dimensions & Weight

Hgt	47 in.	Len	52 in.	Wth	36 in.
Weight with factory installed options					402 lbs.

Note: Please refer to the tech guide for listed maximum static pressures


3.5 Ton

- Fraser-Johnston LX® Series Units are Manufactured at an ISO 9001 Registered Facility and Each Rooftop is Completely Computer-Run Tested Prior to Shipment.

Unit Features

- All PCG4 Model Gas Units provide a Minimum AFUE of 81.0% in Heating and meet current California Low-Nox requirements of 40 ng/joule Emission Level for Air Quality Management Districts
- Unit Cabinet shall be Constructed of G-90 Galvanized, Powder-Painted Steel, Certified at 1000 hours Salt Spray Test per ASTM-B117 Standards
- Bottom and Side Electrical and Gas Utility Connections
- Easy Access to all Components
- Lower Installation Cost
- Single Piece Water-Shed Top Cover and Drip Edge
- Field Convertible Duct Connections from Horizontal to Downflow Allows Greater Flexibility
- Full Perimeter, Removable Base Rails with Built in Rigging and Access Provisions
- Non-Corrosive Condensate Pan Internally Sloped to Meet Strict Requirements of ASHRAE 62-89 Indoor Air Quality Standard
- Scroll Compressor
- Copper Tube/Aluminum Fin Condenser Coil
- Compressor is Internally Protected Against High Pressure and Temperature
- Standard Cooling Operation Down to 45°F
- Variable Speed Direct Drive High Static Motor and Slide out Blower Assembly

Warranty

- Extended 10-Years limited parts and compressor warranty *Requires online registration within 90 days of purchase
- Lifetime gas heat exchanger warranty with registration.

Project Name: **International School of Beaverton**

 Unit Model #: **PCG4A421002X4**

 Quantity: **1** Tag #: **RTU-10**

 System: **PCG4A421002X4**
Factory Installed Options
PCG4A421002X4

Equipment Options		Option(s) Selected
Model Family:	PCG	Fraser Johnston Single Packaged R-410A Air Conditioner
SEER:	4	14.0 SEER / 11.2 EER
Cabinet Options:	A	Small Cabinet (35" x 51")
Nominal Cooling Capacity:	42	3.5 Ton Single Stage Cooling Copper Tube/Aluminum Fin Condenser Coil
Heat Type and Nominal Heat Capacity:	100	100 MBH Input Single Stage Stainless Steel Natural Gas Heat
Voltage:	2	208/230-1-60
Options:	X	Low NOx (40 ng/J)
Generation:	4	

Field Installed Accessories

- | | | |
|---|--|---|
| <ul style="list-style-type: none"> <input type="radio"/> S1-1AK0108 - Rectangle to Round (Downflow) Transition Adapter, Small Footprint (30.0 lbs) <input type="radio"/> S1-1FA0501 - Manual Outside Air Damper with hood and screen, Small Footprint (8.0 lbs) <input type="radio"/> S1-1FE0422 - Flue Extension Kit <input type="radio"/> S1-1FF0601 - Filter/Frame Kit (Single Phase Only), Small Footprint (6.0 lbs) <input type="radio"/> S1-1HC0101 - Base Rail Hole Cover Kit (3.0 lbs) <input type="radio"/> S1-1HK0601 - Hurricane Kit (LX Series) (1.4 lbs) <input type="radio"/> S1-1NP0703 - Propane Conversion Kit (0.6 lbs) <input type="radio"/> S1-1RC0501 - Roof Curb 8" Small Footprint (45.0 lbs) <input checked="" type="radio"/> S1-1RC0502 - Roof Curb 14" Small Footprint (52.0 lbs) <input type="radio"/> S1-1TC0101 - Curb Adapter for Affinity to Small LX Series, Small Footprint (78.0 lbs) <input type="radio"/> S1-1TC0102 - Curb Adapter for Carrier 48/50ES-A 1024-036 to Small LX Series, Small Footprint (72.0 lbs) <input type="radio"/> S1-1TC0103 - Curb Adapter Goodman GPG/APG036-060 (PGC101-103 Curb) to LX Series, Small Footprint (93.0 lbs) | <ul style="list-style-type: none"> <input type="radio"/> S1-1TC0104 - Curb Adapter Trane 2/4YCC 018-036 to Small LX Series, Small Footprint (84.0 lbs) <input type="radio"/> S1-1TC0111 - Lightweight Transition Curb, Affinity to Small LX Series (81.0 lbs) <input type="radio"/> S1-1TC0112 - Lightweight Transition Curb, Trane to Small LX Series (77.0 lbs) <input type="radio"/> S1-1TC0114 - Lightweight Transition Curb, Goodman to Small LX Series (83.0 lbs) <input checked="" type="radio"/> S1-2EE04710024 - Low Leak Downflow Economizer, Small Footprint (148.0 lbs) <input type="radio"/> S1-2AQ04700924 - Duct/Unit Mount CO2 Kit (7.0 lbs) <input type="radio"/> S1-2AQ04701024 - Wall Mount CO2 Kit (2.0 lbs) <input checked="" type="radio"/> S1-2EC06700124 - Transformer Kit (2.0 lbs) <input checked="" type="radio"/> S1-2EC06700124 - Transformer Kit (2.0 lbs) <input type="radio"/> S1-HE-6863-0N00WS - Single/Dual Enthalpy Sensor (0.3 lbs) <input type="radio"/> S1-TE-63616E-2D - Supply Air Temperature Sensor Kit <input type="radio"/> S1-2LA04701024 - Advanced Low Ambient Control Kit (1.8 lbs) | <ul style="list-style-type: none"> <input type="radio"/> S1-2LC00024 - Loss of Charge Switch (1.0 lbs) <input type="radio"/> S1-2MD04705124 - Motorized Outside Air Damper with hood and screen, Small Footprint (14.0 lbs) <input type="radio"/> S1-ADDWIRE - Add-a-Wire allows 5-wire thermostats to use only 4 wires. (0.3 lbs) <input type="radio"/> S1-CTSDTS - CTS Wired Temperature Sensor for thermostat Duct *Also works for LX Series (0.3 lbs) <input type="radio"/> S1-CTSHTS - CTS Hardwired Temperature Sensor for CTS Thermostats *Works with LX series as well (0.2 lbs) <input type="radio"/> S1-CTSPLATE - Wall Plate for CTS Thermostats *Also works for new platform LX series models below (0.0 lbs) <input type="radio"/> S1-CTSWFTS - CTS Temperature Sensor with WiFi for CTS Thermostats *Also works with LX Series (0.1 lbs) <input type="radio"/> S1-LXLOCK - Locking Ring For LX-Series Thermostats (0.4 lbs) <input type="radio"/> S1-LXPLATE - Wall Plate For LX-Series Thermostats (0.0 lbs) <input type="radio"/> S1-LXWFM - For LX Series Thermostats - WiFi Communication (1.0 lbs) |
|---|--|---|

Project Name: **International School of Beaverton**

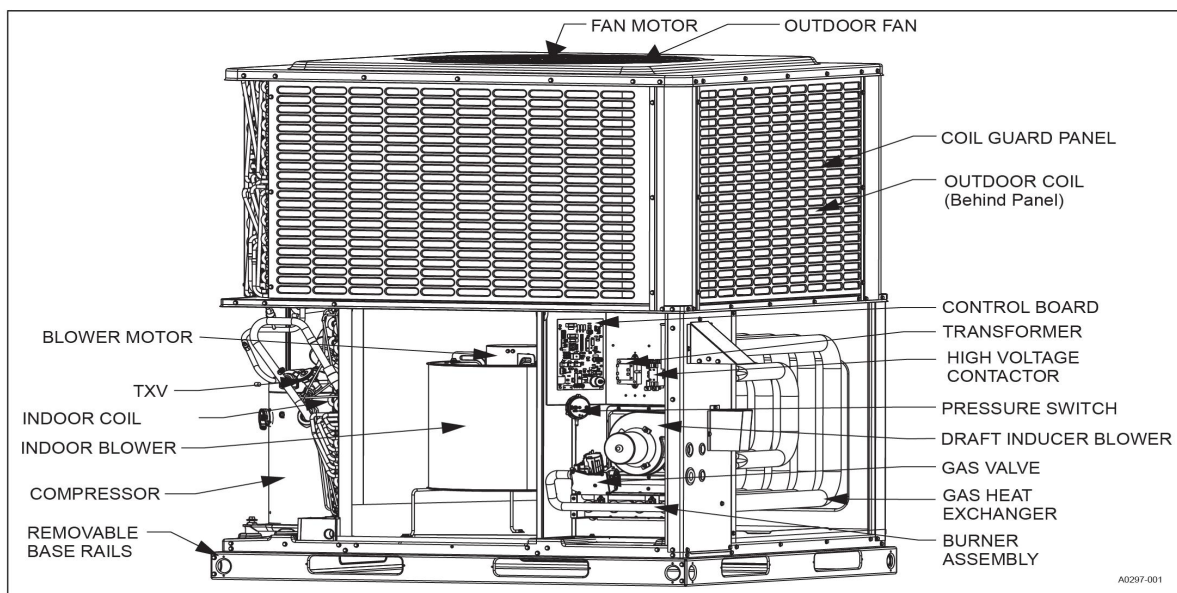
Unit Model #: **PCG4A421002X4**

Quantity: **1** Tag #: **RTU-10**

System: **PCG4A421002X4**

Component Location

COMPONENT LOCATION



UNIT LIMITATIONS

Model	Unit Voltage	Unit Limitations		
		Applied Voltage		Outdoor DB Temperature
		Minimum	Maximum	Maximum (°F)
PCG4A24	208/230-1-60	187	252	125
PCG4A30	208/230-1-60	187	252	125
PCG4A36	208/230-1-60	187	252	125
PCG4A42	208/230-1-60	187	252	125
PCG4B48	208/230-1-60	187	252	125
PCG4B60	208/230-1-60	187	252	125

Project Name: **International School of
Beaverton**

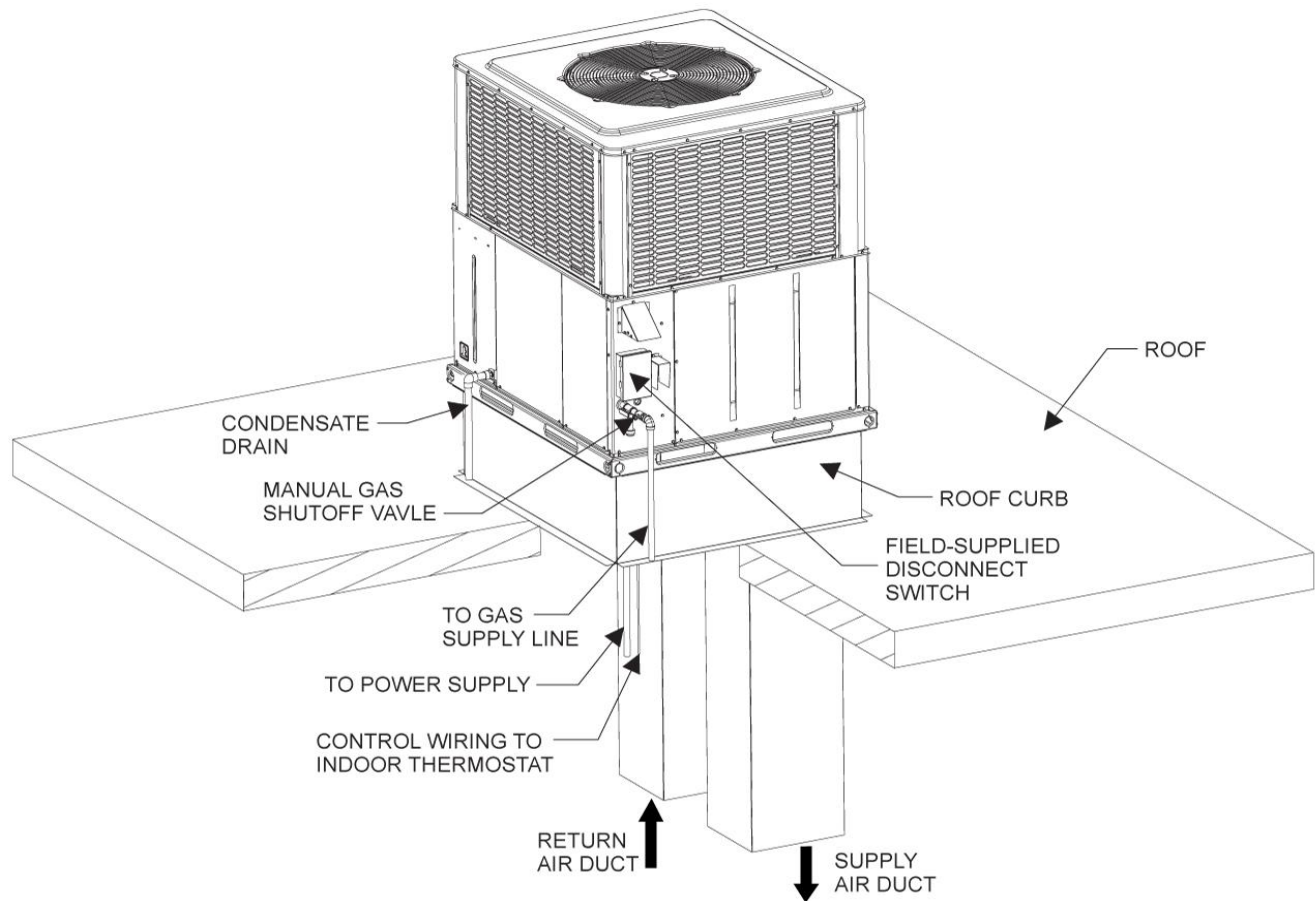
Unit Model #: **PCG4A421002X4**

Quantity: **1** Tag #: **RTU-10**

System: **PCG4A421002X4**

Typical Installation Roof Curb

UNIT TYPICAL ROOF CURB INSTALLATION (Gas model shown)



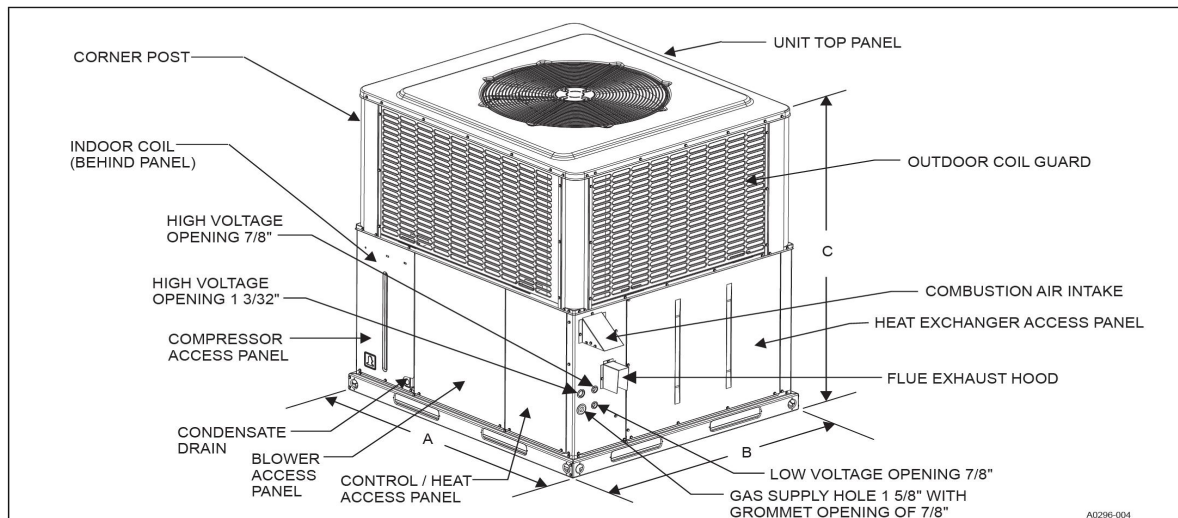
Project Name: **International School of Beaverton**

 Unit Model #: **PCG4A421002X4**

 Quantity: **1** Tag #: **RTU-10**

 System: **PCG4A421002X4**

Dimensions



UNIT DIMENSIONS

Model	Dimensions (in.)		
	A	B	C
PCG4A24	51 1/4	35 3/4	44
PCG4A30	51 1/4	35 3/4	45
PCG4A36	51 1/4	35 3/4	47
PCG4A42	51 1/4	35 3/4	47
PCG4B48	51 1/4	45 3/4	47
PCG4B60	51 1/4	45 3/4	50

UNIT CLEARANCES^{1,2}

Direction	Distance (in.)	Direction	Distance (in.)
Top ³	36	Power Entry (Right Side)	36
Side Opposite Ducts	36	Left Side	24
Duct Panel	0	Bottom ⁴	1

1. Provide a 1-in. clearance between any combustible material and the supply air duct work.
2. Do not allow the products of combustion to accumulate within a confined space and recirculate.
3. Install units outdoors. Make sure that overhanging structures or shrubs do not obstruct the outdoor air discharge outlet.
4. You can install units on combustible materials made from wood or class A, B, or C roof covering materials if factory base rails are left in place as shipped.

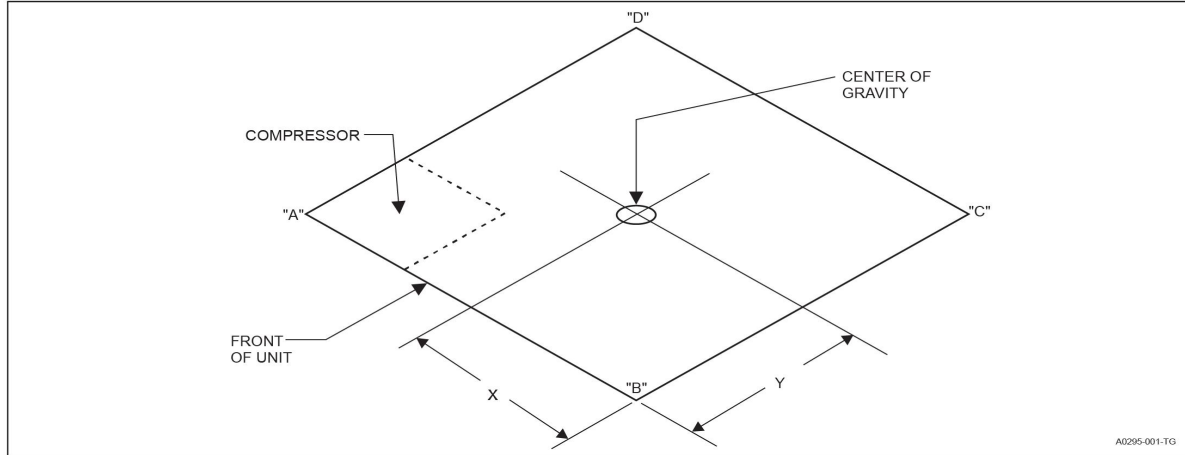
Project Name: **International School of Beaverton**

Unit Model #: **PCG4A421002X4**

Quantity: **1** Tag #: **RTU-10**

System: **PCG4A421002X4**

Weights



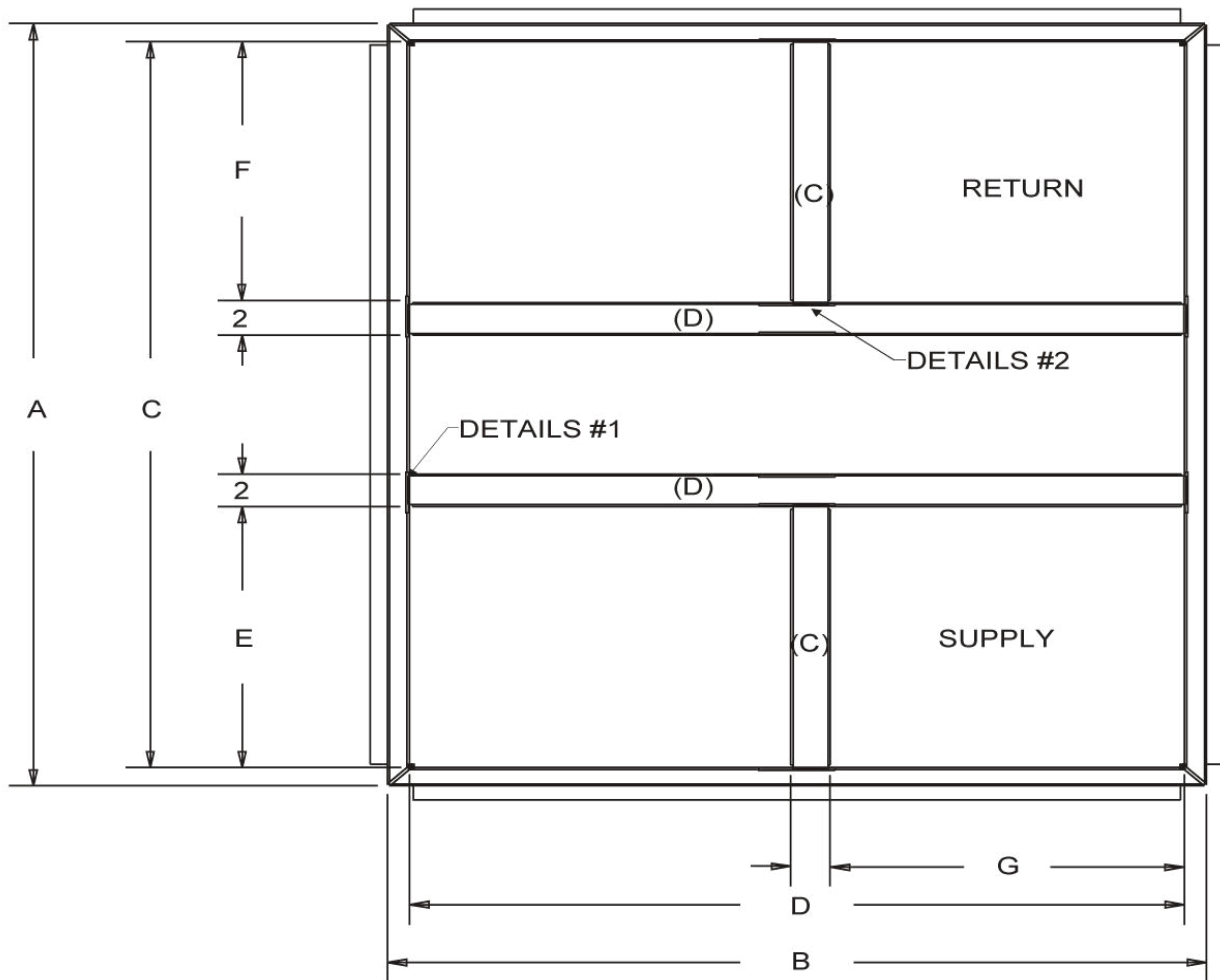
WEIGHTS AND DIMENSIONS

Model	Weight (lb)		Center of Gravity		4-Point Load Location (lb)			
	Shipping	Operating	X	Y	A	B	C	D
PCG4A240502X4	321	316	29	15	118	63	76	59
PCG4A240752X4	341	336	28	15	119	79	76	62
PCG4A300502X4	357	352	28	15	119	87	76	70
PCG4A300752X4	377	372	28	15	122	89	83	78
PCG4A360502X4	364	359	28	15	123	84	79	73
PCG4A360752X4	384	379	27	16	121	92	85	81
PCG4A361002X4	388	383	27	16	120	95	87	81
PCG4A420752X4	403	398	28	15	143	93	88	74
PCG4A421002X4	407	402	28	15	137	96	90	79
PCG4B480652X4	455	450	28	18	165	107	99	79
PCG4B481002X4	461	456	28	18	163	110	99	84
PCG4B481252X4	465	460	28	18	163	112	101	84
PCG4B600652X4	474	469	27	18	167	118	102	82
PCG4B601002X4	480	475	27	18	165	121	102	87
PCG4B601252X4	484	479	27	18	165	122	104	88

Project Name: **International School of Beaverton**

 Unit Model #: **PCG4A421002X4**

 Quantity: **1** Tag #: **RTU-10**

 System: **PCG4A421002X4**
1RC0501, 1RC0502, 1RC0503, 1RC0504 Roof Curbs
Dimensions of Roof Curbs 1RC0501, 1RC0502, 1RC0503, 1RC0504
TOP VIEW


JCI Model#	RRS Model#	A	B	C	D	E	F	G	Height	Return & Supply Duct	Roof Opening
S1-1RC0501	80-201-4908	$47 \frac{9}{32}$	$31 \frac{25}{32}$	$45 \frac{1}{32}$	$29 \frac{17}{32}$	15	15	18	8	$17 \frac{1}{2} \times 14 \frac{1}{2}$	19 x 45
S1-1RC0502	80-201-4914								14		
S1-1RC0503	80-201-5008	$47 \frac{1}{8}$	$41 \frac{5}{8}$	$44 \frac{7}{8}$	$39 \frac{3}{8}$	$16 \frac{3}{16}$	$16 \frac{3}{16}$	18	8	$17 \frac{1}{2} \times 15 \frac{3}{4}$	19 x 44
S1-1RC0504	80-201-5014								14		

Date

03/09/2021

Project Name

International School of Beaverton

Project Number**Client / Purchaser**

Guide Specification Summary Page

Product Series	Models and Unit Tags	
ReliaCore 100 15-25 Ton Package	ZW-20N40S2A2AAA3A1	RTU-1,4
	ZW-20N30S2A2AAA3A1	RTU-2
3-12.5 Fraser-Johnston® Relia™ Pro	ZJ102N18S2B2AAA3A2	RTU-3

GENERAL

Fraser Johnston 15-25 Ton package units are convertible single package units. ZW models have four independent refrigerant circuits, for efficient part load operation and maximum comfort control. Although the units are primarily designed for curb mounting on a roof, they can also be slab-mounted at ground level or set on steel beams above a finished roof. Cooling only, cooling with gas heat and cooling with electric heat models are available with a wide variety of factory-mounted options and field-installed accessories to make them suitable for almost every application. All units are self-contained and assembled on full perimeter base rails with holes in the four corners for overhead rigging. Every unit is completely piped, wired, charged and tested at the factory to simplify the field installation and to provide years of dependable operation. All models (including those with an economizer) are suitable for either bottom or horizontal duct connections. Models with power exhaust are suitable for bottom duct connections only. For bottom duct, remove the sheet metal panels from the supply and return air openings through the base of the unit. or horizontal duct, replace the supply and return air panels on the rear of the unit with a side duct flange accessory. All supply air blowers are equipped with a belt drive that can be adjusted to meet exact requirements of the job. A high static drive option is available for applications with a higher CFM and/or static pressure requirement.

ZW/ZK/XA240 models have 4 condenser fan motors. All compressors include crankcase heat and internal pressure relief. Every refrigerant circuit includes an expansion valve, a liquid line filter-drier, a discharge line high pressure switch and a suction line with a freeze-stat and low pressure/loss of charge switch. The unit control circuit includes a 75 VA transformer, a 24-volt circuit breaker and a relay board with two compressor lockout circuits, a terminal strip for thermostat wiring, plus an additional set of pin connectors to simplify the interface of additional field controls. All units have long lasting powder paint cabinets with 750 hour salt spray test approval under ASTM-B117 procedures. All models are CSA approved. All models include a 1-year limited warranty on the complete unit. Compressors and electric heater elements carry an additional 4-year warranty. Aluminumized steel tubular heat exchangers carry an additional 9-year warranty.

DESCRIPTION

ZW units shall be factory-assembled, single packaged, ZW***N Electric Cooling/Gas Heat, ZW***C/E Electric Cooling/Optional Electric Heat, designed for outdoor mounted installation. The 20 ton unit shall have a minimum EER rating of 11.0.

They shall have built-in field convertible duct connections for down discharge supply/return or horizontal discharge

supply/ return, and be available with factory installed options or field installed accessories. The units shall be factory wired, piped, charged with R-410A refrigerant and factory tested prior to shipment. All unit wiring shall be both numbered and color coded. All units shall be manufactured in a facility certified to ISO 9001 standards and the cooling performance shall be rated in accordance with DOE and AHRI test procedures. Units shall be CSA listed, classified to ANSI Z21.47 standards, UL 1995/ CAN/CSA No. 236-M90 conditions.

UNIT CABINET

Unit cabinet shall be constructed of galvanized steel, with exterior surfaces coated with a non-chalking, powdered paint finish, certified at 750 hours salt spray test per ASTM-B117 standards. Indoor blower section shall be insulated with a minimum 1/2" thick insulation, coated on the airside. Aluminum foil faced insulation shall be used in the furnace compartment and be fastened with ridged fasteners to prevent insulation from entering the air stream. Cabinet panels shall be "large" size, easily removable for servicing and maintenance. Full perimeter base rails shall be provided to assure reliable transit of equipment, overhead rigging and proper sealing on roof curb applications. Disposable 2" filters shall be furnished and be accessible through a removable access door, sealed airtight. Units filter track shall be designed to accommodate either 2" or 4" filters. Fan performance measuring ports shall be provided on the outside of the cabinet to allow accurate air measurements of evaporator fan performance without removing panels or creating air by-pass of the coils. Condensate pan shall be internally sloped and conform to ASHRAE 62-89 selfdraining standards. Condensate connection shall be a minimum of 1" I.D. female and be a ridged mount connection. Unit shall incorporate a fixed outdoor air damper with an outdoor air intake opening covered with a bird screen and a rain hood painted to match the exterior of the unit.

INDOOR (EVAPORATOR) FAN ASSEMBLY

Fan shall be a belt drive assembly and include an adjustable- pitch motor pulley. Job site selected (B.H.P.) brake horsepower shall not exceed the motors nameplate horsepower rating, plus the service factor. Units shall be designed not to operate above service factor. Fan wheel shall be double-inlet type with forward-curved blades, dynamically balanced to operate smoothly throughout the entire range of operation. Airflow design shall be constant air volume.

IntelliSpeed™ Supply Fan Control Option (ASHRAE 90.1 compliant, section 6.4.3.10) – Units configured with the IntelliSpeed™ Supply Fan Option will contain a VFD for variable volume supply fan operation. This option allows the supply fan RPM to vary based on the number of compressors or heating stages energized. The economizer's minimum position will also be configurable to vary based on the supply fan VFD frequency output.

OUTDOOR (CONDENSER) FAN ASSEMBLY

The outdoor fans shall be of the direct-driven propeller type, discharge air vertically, have aluminum blades riveted to corrosion resistant steel spider brackets and shall be dynamically balanced for smooth operation. The 4 outdoor fan motors shall be totally enclosed with permanently lubricated bearings, internally protected against overload conditions and staged independently.

REFRIGERANT COMPONENTSCompressors:

- a. Shall be Scroll compressors internally protected with internal high-pressure relief and over temperature protection.
- b. Shall have internal spring isolation and sound muffling to minimize vibration and noise, and be externally isolated on a dedicated, independent mounting.

Coils:

- a. Evaporator and condenser coils shall have aluminum plate fins mechanically bonded to seamless internally enhanced copper tubes with all joints brazed. Special Phenolic coating shall be available as a factory option
- b. Evaporator and Condenser coils shall be of the direct expansion, draw-thru, design

Refrigerant Circuit and Refrigerant Safety Components shall include:

- Balance-port thermostatic expansion valve with independent circuit feed system.
- Filter drier/strainer to eliminate any moisture or foreign matter.
- Accessible service gage connections on both suction and discharge lines to charge, evacuate, and measure refrigerant pressure during any necessary servicing or troubleshooting, without losing charge.
- The refrigeration system shall provide at least 15° F of sub-cooling at design conditions.
- All models shall have four independent circuits.

Unit Controls:

- a. Unit shall be complete with self-contained low-voltage control circuit protected by a resettable circuit breaker on the 24-volt transformer side
- b. Unit shall incorporate a lockout circuit which provides reset capability at the space thermostat or base unit, should any of the following standard safety devices trip and shut off compressor

- c. Loss-of-charge/Low-pressure switch. (1) High-pressure switch, (2) Freeze-protection thermostat, evaporator coil. If any of the above safety devices trip, a LED (light-emitting diode) indicator shall flash a diagnostic code that indicates which safety switch has tripped
- d. Unit shall incorporate "AUTO RESET" compressor over temperature, over current protection
- e. Unit shall operate with conventional thermostat designs and have a low voltage terminal strip for easy hook-up
- f. Unit control board shall have on-board diagnostics and fault code display
- g. Standard controls shall include anti-short cycle and low voltage protection, and permit cooling operation down to 0 °F
- h. Control board shall monitor each refrigerant safety switch independently
- i. Control board shall retain last 5 fault codes in non volatile memory, which will not be lost in the event of a power loss

GAS HEATING SECTION

Shall be designed with induced draft combustion with post purge logic and energy saving direct spark ignition, redundant main gas valve. Ventor wheel shall be constructed of stainless steel for corrosion resistance. The heat exchanger shall be of the tubular type, constructed of T1-40 aluminized steel for corrosion resistance and allowing minimum mixed air entering temperature of 25 °F. Burners shall be of the in-shot type, constructed of aluminum coated steel and contain air mixture adjustments. All gas piping shall enter the unit cabinet at a single location through either the side or curb, without any field modifications. An integrated control board shall provide timed control of evaporator fan functioning and burner ignition. Heating section shall be provided with the following minimum protection:

- a. Primary and auxiliary high-temperature limit switches.
- b. Induced draft motor speed sensor.
- c. Flame roll out switch (automatic reset).
- d. Flame proving controls. Unit shall have two independent stages of capacity.

UNIT OPERATING CHARACTERISTICS

Unit shall be capable of starting and running at 125° F outdoor temperature, exceeding maximum load criteria of AHRI Standard 340/360. The compressor, with standard controls, shall be capable of operation down to 25° F outdoor temperature. Accessory low ambient kit shall be available for operation to 0° F. Unit shall be provided with

fan time delay to prevent cold air delivery before heat exchanger warms up.

ELECTRICAL REQUIREMENTS

All unit power wiring shall enter unit cabinet at a single factory provided location and be capable of side or bottom entry, to minimize roof penetrations and avoid unit field modifications. Separate side and bottom openings shall be provided for the control wiring.

STANDARD LIMITED WARRANTIES

- Compressor 5 Years
- Heat Exchanger 10 Years
- Other Parts 1 Year

OPTIONAL OUTDOOR AIR

Shall be made available by either/or:

OTHER FACTORY INSTALLED OPTIONS

- **BAS Controls** - Smart Equipment with BAS communication (BACnet MS/TP, Modbus, and Johnson Controls N2) Option, CPC, HONEYWELL, NOVAR, VERASYS, FDD
- **4" Pleated Filters, MERV 13**
- **Disconnect Switch** - For gas heat units and cooling units with electric heat, a HACR breaker sized to the unit is provided.

FIELD INSTALLED OPTIONS

- **Roof Curb** – Fourteen-inch high roof curbs provide a water-tight seal between the unit and the finished roof. These full perimeter curbs meet the requirements of the National Roofing Contractors Association (NRCA) and are shipped knocked-down for field assembly. They're designed to fit inside the base rails of the unit and include both a wood nailing strip and duct hanger supports.

GENERAL

Fraser-Johnston® Relia™ Pro units are convertible single packages with a common footprint cabinet and common roof curb for all 6-1/2 through 12-1/2 ton models. All have two compressors with independent R-410A refrigeration circuits to provide 2 stages of cooling. The units were designed for light commercial applications and can be easily installed on a roof curb, slab, or frame. All units are self contained and assembled on rigid full perimeter base rails allowing for 3-way forklift access and overhead rigging. Every unit is completely charged with R-410A, wired, piped, and tested at the factory to provide a quick and easy field installation. All units are convertible between side and down airflow. Independent economizer designs are used on side and down discharge applications, as well as all tonnage sizes. Predator® units are available in the following configurations: cooling only, cooling with electric heat, cooling with gas heat, reheat only, reheat with electric heat and reheat with gas heat. Electric heaters are available as factory-installed options or field-installed accessories.

DESCRIPTION

Units shall be factory assembled, single package, (Elec/Elec, Gas/ Elec), designed for outdoor installation. They shall have built in field convertible duct connections for down discharge supply/return or horizontal discharge supply/return and be available with factory installed options or field installed accessories. The units shall be factory wired, piped and charged with R-410A refrigerant and factory tested prior to shipment. All unit wiring shall be both numbered and color coded. The cooling performance shall be rated in accordance with DOE and AHRI test procedures. Units shall be CSA certified to ANSI Z21.47 and UL 1995/CAN/CSA No. 236-M90 standards.

UNIT CABINET

Unit cabinet shall be constructed of galvanized steel with exterior surfaces coated with a non-chalking, powder paint finish, certified at a 750-hour salt spray test per ASTM-B117 standards. Indoor blower sections shall be insulated with up to 1" thick insulation coated on the airside. Either aluminum foil faced or elastomeric rubber insulation shall be used in the unit's compartments and be fastened to prevent insulation from entering the air stream. Cabinet doors shall be hinged with toolless access for easy servicing and maintenance. Full perimeter base rails shall be provided to assure reliable transit of equipment, overhead rigging, fork truck access and proper sealing on roof curb applications. Disposable 2" filters shall be furnished as standard and be accessible through hinged access door. Fan performance measuring ports shall be provided on the outside of the cabinet to allow accurate air measurements of evaporator fan performance without

removing panels or creating bypass of the coils. Condensate pan shall be slide out design, constructed of a non corrosive material, internally sloped and conforming to ASHRAE 62-B9 standards. Condensate connection shall be a minimum of 3/4" I.D. female and be rigid mount connection.

INDOOR (EVAPORATOR) FAN ASSEMBLY

Fan shall be a belt drive assembly and include an adjustable pitch motor pulley. Job site selected brake horsepower shall not exceed the motors nameplate horsepower rating plus the service factor. Units shall be designed to operate within the service factor. Fan wheel shall be double inlet type with forward curve blades, dynamically balanced to operate smoothly throughout the entire range of operation. Airflow design shall be constant volume. Bearings shall be sealed and permanently lubricated for longer life and no maintenance. Entire blower assembly and motor shall be slide out design.

OUTDOOR (CONDENSER) FAN ASSEMBLY

The outdoor fans shall be of the direct drive type, discharge air vertically, have aluminum blades riveted to corrosion resistant steel spider brackets and shall be dynamically balanced for smooth operation. The outdoor fan motors shall have permanently lubricated bearings internally protected against overload conditions and staged independently. A cleaning window shall be provided on two sides of the units for coil cleaning.

REFRIGERANT COMPONENTSCompressors:

- a. Shall be fully hermetic type, direct drive, internally protected with internal high-pressure relief and over temperature protection. The hermetic motor shall be suction gas cooled and have a voltage range of + or – 10% of the unit nameplate voltage.
- b. Shall have internal spring isolation and sound muffling to minimize vibration and noise, and be externally isolated on a dedicated, independent mounting.

Coils:

- a. Evaporator coils shall have aluminum plate fins mechanically bonded to seamless internally enhanced copper tubes with all joints brazed. Special Phenolic coating shall be available as a factory option.
- b. Evaporator coils shall be of the direct expansion, draw-thru design.
- c. Condenser coils shall have aluminum plate fins mechanically bonded to seamless internally enhanced copper tubes with all joints brazed or Micro-Channel aluminum tube, aluminum fins.
- d. Condenser coils shall be of the draw-thru design.

Refrigerant Circuit and Refrigerant Safety Components shall include:

- a. Independent fixed-orifice or thermally operated expansion devices.
- b. Solid core filter drier/strainer to eliminate any moisture or foreign matter.
- c. Accessible service gage connections on both suction and discharge lines to charge, evacuate, and measure refrigerant pressure during any necessary servicing or troubleshooting, without losing charge.
- d. The unit shall have two independent refrigerant circuits, equally split in 50% capacity increments.

Unit Controls:

- a. Unit shall be complete with self-contained low-voltage control circuit protected by a resettable circuit breaker on the 24-volt transformer side.
- b. Unit shall incorporate a lockout circuit which provides reset capability at the space thermostat or base unit should any of the following standard safety devices trip and shut off compressor:
 - Loss-of-charge/Low-pressure switch.
 - High-pressure switch.
 - Freeze condition sensor on evaporator coil. If any of these safety devices trip, the LCD screen will display the alarm message.
- c. Unit shall incorporate "AUTO RESET" compressor over temperature, over current protection.
- d. Unit shall operate with conventional thermostat designs and have a low voltage terminal strip for easy hook-up.
- e. Unit control board shall have on-board diagnostics and fault message display.
- f. Standard controls shall include anti-short cycle and low voltage protection, and permit cooling operation down to a selectable value as low as 0 °F.
- g. Control board shall monitor each refrigerant safety switch independently.

GAS HEATING SECTION

Heat exchanger and exhaust system shall be constructed of aluminized steel, and be designed with induced draft combustion with post purge logic, energy saving direct spark ignition, and redundant main gas valve. The heat exchanger shall be of the tubular type, constructed of T1-40 aluminized steel for corrosion resistance and allowing minimum mixed air entering temperature of 40 °F. Burners shall be of the in-shot type, constructed of aluminum-coated steel. All gas piping shall enter the unit cabinet at a single location, through either the side or bottom, without any field modifications. An integrated control board shall provide timed control of evaporator fan functioning and burner ignition. Heating section shall be provided with the following minimum protection:

- a. Primary and auxiliary high-temperature limit switches.
- b. Induced draft pressure sensor.
- c. Flame roll out switch (manual reset).
- d. Flame proving controls.
- e. All two stage gas units shall have two independent stages of capacity (70% or 75% 1st stage, 100% 2nd stage) 3 through 5 ton and (60% 1st stage, 100% 2nd stage) 6-1/2 through 12-1/2 ton.

UNIT OPERATING CHARACTERISTICS

Unit shall be capable of starting and running at 125 °F outdoor temperature, exceeding maximum load criteria of AHRI Standard 340/360. The compressor, with standard controls, shall be capable of operation down to 0 °F outdoor temperature. Unit shall be provided with fan time delay to prevent cold air delivery before heat exchanger warms up. (Gas heat only)

ELECTRICAL REQUIREMENTS - All unit power wiring shall enter unit cabinet at a single factory provided location and be capable of side or bottom entry to minimize roof penetrations and avoid unit field modifications. Separate side and bottom openings shall be provided for the control wiring.

STANDARD LIMITED WARRANTIES - Compressor – 5 Years, Heat Exchanger – 10 Years, Elect. Heat Elem. – 5 Years, Parts – 1 Year.

FACTORY INSTALLED OPTIONAL OUTDOOR AIR
(Shall be made available by either/or):

- **DRY BULB AUTOMATIC ECONOMIZER** – Outdoor and return air dampers that are interlocked and positioned by a fully-modulating, spring-return damper actuator. The maximum leakage rate for the outdoor air intake dampers shall be designed to meet ASHRAE 90.1, AMCA 511 Class 1A damper, and the International Energy Conservation Code (IECC) certification requirements by achieving leakage rates of 3 CFM/sq. ft. at 1" of static pressure. Changeover from compressor to economizer operation shall be provided by an integral electronic enthalpy control that feeds input into the basic module. The outdoor intake opening shall be covered with a rain hood that matches the exterior of the unit. Water eliminator/filters shall be provided.
Simultaneous economizer/compressor operation is also possible. Dampers shall fully close on power loss.

ADDITIONAL FACTORY INSTALLED OPTIONS

- **IntelliSpeed™ Supply Fan Control Option (ASHRAE 90.1 compliant, section 6.4.3.10)** – Units configured with the IntelliSpeed™ Supply Fan Option will contain a VFD for variable volume supply fan operation. This option allows the supply fan RPM to vary based on the number of compressors or heating stages energized. The economizer's minimum position will also be configurable to vary based on the supply fan VFD frequency output.
- **BAS Controls** – Include supply air sensor, return air sensor, dirty filter indicator and air proving switch.

FIELD INSTALLED OPTIONS

- **Roof Curb** – 14" high, full perimeter knockdown curb, with hinged design for quick assembly.



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ATTACHMENT L

SUBSTITUTION REQUEST (During the Bidding Phase)

Project: BSD International School of Beaverton Re-Roof Substitution Request Number: 001
From: Dave Havelick
To: contracts@beaverton.k12.or.us Date: March 9, 2021
Re: Prior Substitution Request for RTU-5 A/E Project Number: 20Y105.01
Contract For: Beaverton School District

Specification Title: General Specification Description: Packaged Rooftop Air Conditioning Units RTU-5
Section: 2. Products Page: pg. 74/79 Article/Paragraph: Part 2, 2.01 A.

Proposed Substitution: Gas Fired Heating and Ventilating Unit
Manufacturer: Nortek Address: Dyersburg, TN Phone: Sales Regional Mgr. - 503-582-1001
Trade Name: Reznor Model No.: RPBL-500

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted by: Dave Havelick
Signed by: *Dave Havelick*
Firm: Sustainable Mechanical Sytems
Address: 7412 SW Beaverton Hillsdale Hwy., Ste. 203, Portland, OR 97225
Telephone: 503-703-2042

A/E's REVIEW AND ACTION

- ☐ Substitution approved - Make submittals in accordance with Specification Section 01330.
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01330.
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by:

Date:

Supporting Data Attached: ☒ Drawings ☒ Product Data ☐ Samples ☐ Tests ☐ Reports ☐

Project Submittal Package



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RezQuote v340

REZNOR

Gas Fired Packaged Heating & Ventilating Unit Schedule

Line No.	Qty	Unit Tags	Reznor Model-Size	Type	MBH Output	EAT °F	LAT °F	Fuel Type	CFM	Mtr HP	Fan RPM	Ext. SP "WC	Total SP "WC	Voltage & Phase	Unit Notes
1	1	RTU-5	RPBL-500	Outdoor	425			NG	7000	5	927	0.50	1.08	208/3/60	

Unit Notes:

- 1)
- 2)
- 3)
- 4)
- 5)

Date: 3/9/2021

Job Name:	International School of Beaverton
Location:	Beaverton, OR
Unit Tag:	RTU-5
RPBL-500	<i>outdoor heating & ventilating unit, power vent, spark ignition, curb cap, 24v controls</i>
AA1	<i>Natural Gas</i>
AB1	<i>0 to 2000 ft Elevation</i>
AG2	<i>2 Stage Gas Valve(s)</i>
AH3	<i>Spark ignition with timed lockout</i>
AJ1	<i>Left hand controls (facing discharge)</i>
AK5	<i>208/3/60 voltage</i>
AL10	<i>5 HP ODP Motor</i>
AM11	<i>950 rpm, 7000 CFM, 0.00" ESP, 0.45" ESP</i>
AN10	<i>IEC Motor Starter</i>
AQ5	<i>Downturn Plenum</i>
AR25	<i>DDC Dampers, End O/A, Bot R/A</i>
AW11	<i>Filter Rack w/2" Pleated Filters</i>
AY2	<i>Cabinet Insulation, Single Wall</i>
BY1	<i>US Certification to ANSI Standards</i>
CJ2	<i>16" Curb for DT Plenum Shipped w/Unit</i>
CP5	<i>Outdoor 240v, 30a nonfusible disconnect</i>
DR4	<i>Adjustable Drive Blower w/Linked Belt</i>
PC12	<i>Motor Mount Vibration Isolation 1-10hp</i>
SH1	<i>Prepare Unit for Flatbed Shipment Only</i>

REZNOR®

Extended Capacity, Power Vented, Gas
Fired, Outdoor, Packaged Duct Furnace(s)
/ Blower unit Combination

Model RPBL



Description:

Reznor Model series RPBL is a factory-designed assembly of one, two, or three duct furnace(s) and a large-capacity blower cabinet and a variety of control options for heating, makeup air or a combination of these functions.

Pre-engineered design allows for single unit installation, provides unified appearance and saves customer engineering time and assembly costs.

Models are available for outdoor use in heating capacities from 400,000 through 1,200,000 BTUH gas input. Model RPBL systems are available for use with either natural or propane gas, as specified. Each unit is equipped with all required limit safety controls. Controls and wiring are accessible through lift-away side panels. Model RPBL systems are completely weather sealed. No additional protective covering is required. Each packaged unit is designed for installation on a full roof curb or field supplied supports. RPBL units feature an integral power vented system for use where environmental conditions pose a problem for gravity-vented units.

Notes:

- Regulated combination redundant gas valve consists of combination pilot solenoid valve, electric gas valve, pilot filter, pressure regulator, pilot shut-off and manual shut-off all in one body. Gas supply pressure must not exceed 0.5 PSI (8 oz. - 14" W.C.). Minimum inlet pressure for natural gas is 5" W.C. Minimum inlet pressure for propane gas is 11" W.C.
- Not certified for residential use.



Features:

- Orifices for selected gas type
- 24-volt control transformer
- Redundant gas valve on each furnace
- Intermittent spark pilot
- Fan and limit safety controls
- Reverse air flow limit
- Twin centrifugal blowers
- Adjustable belt drive
- Pre-wired to terminal blocks
- Power venter
- Weatherized, galvalume steel cabinet with interlocking joint construction for outdoor mounting
- Horizontal discharge air opening with duct flanges
- Curb cap base
- Horizontal inlet air opening
- Insulated blower cabinet
- Side access to burner(s) and controls

Included Options

AA1: Unit equipped for natural gas

Natural gas is a naturally occurring gas mixture consisting primarily of methane and includes varying volumes of alkanes, carbon dioxide, nitrogen, and hydrogen sulfide.

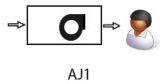
1 Therm = 100,000 BTU = 29.3 kWh

AB1: Burner orifices for elevations 0-2000 Feet

AG2: Gas controls designed for recirculating air heating application. Furnace is provided with a 24 volt, two-stage combination gas valve which provides for low fire or high fire operation controlled by a two-stage 24 volt thermostat. The first stage (low fire) is factory preset and not field adjustable. The valve includes a servo regulator which controls both high and low stages, maintaining constant gas input under wide variations in gas supply pressure. This valve also includes the safety pilot valve, and the manual shutoff valve.

AH3: Units are provided with an intermittent spark type pilot system with electronic flame supervision and lint-free feature. Spark ignitors are timed lockout style requiring manual reset by interruption of thermostat circuit if no pilot flame is sensed after 120 seconds.)

AJ1: Left side control location (facing airstream) (standard)



AK5: 208 Volt, Three Phase, 60 cycle supply voltage.

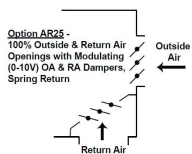
AL10: 5 HP 3450 RPM open style blower motor

AM11: Fan/drive at 901-950 RPM

AN10: Motor starter, IEC open, for single-speed motors



AQ5: Downturn plenum Supply Air cabinet with bottom discharge and no discharge dampers.



AR25: The unit intake consists of 100% outside air and 100% return air opening with motorized dampers. The outside air opening is sized to meeting rain and snow entrainment requirement per ASHRAE Std 62. The actuator spring return open to return air. See Dampper control for sequence.

Construction: The air control damper is low leak with blade and jamb seals. The damper air leakage will not exceed 10 cfm per square foot at 4" sp. The damper is constructed of 16 gage galvanized steel with reinforcement to insure structural integrity. Blade edge seals are PVC coated polyester fabric suitable for -25°F to +180°F (-32°C to +83°C) mechanically locked into the blade edge. Jamb seals are flexible stainless steel metal, compression type to prevent leakage between end of the blade and the damper frame. Bearings are corrosion resistant.

AW11: Filter rack with 2" disposable pleated filters

AY2: Single wall with insulation

BY1: Units to be supplied from factory certified by AGA and US standards of ANSI.

CJ2: 16" roof curb for unit with optional downturn plenum

CP5: 30 amp, 240 volt, non-fusible outdoor raintight disconnect switch

DR4: Easy change, Adjustable Link Belt Drive.

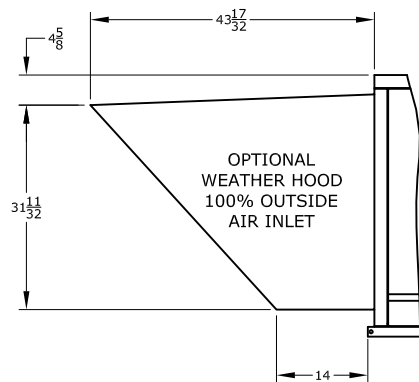
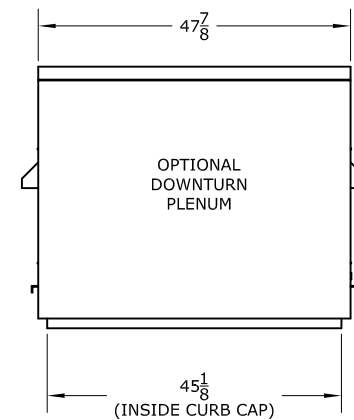
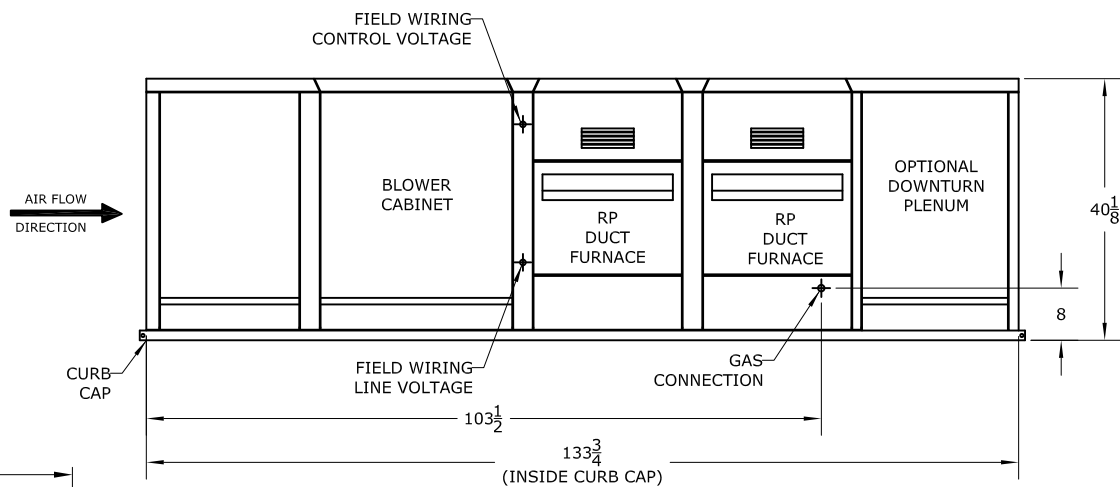
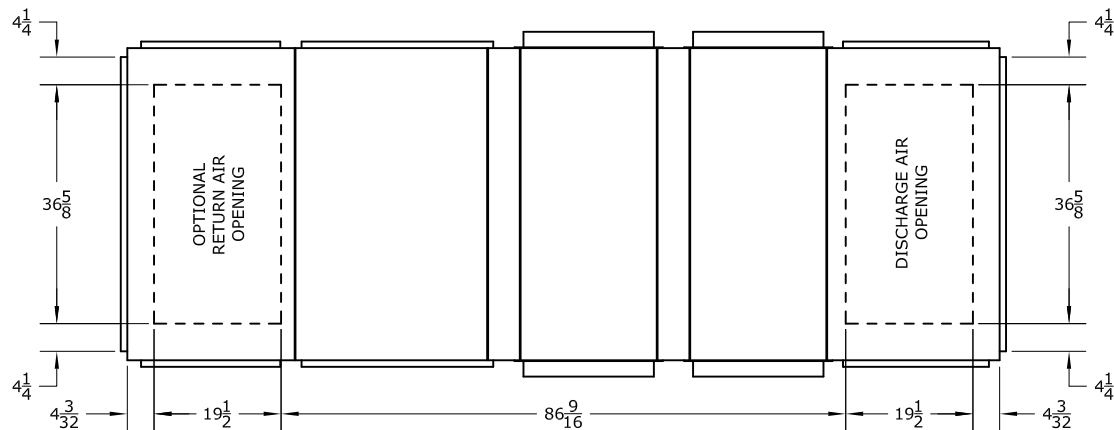
PC12: Rubber vibration isolation for blower motor

SH1: Ship Via Flatbed (no crating)

MODEL(S)

-RPBL 500
-RPBL 600

RPBL_B_DT





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**The Construction Specifications
Institute**
Northwest Region

SUBSTITUTION REQUEST

TO: WILL SCHLOTFELDT

PROJECT: International School of Beaverton (ISB) Roof and HVAC

SPECIFIED ITEM: AAON ROOFTOP UNITS

Section 2370100Page 76

Paragraph 2.02

Description PACKAGED ROOFTOP UNITS

PROPOSED SUBSTITUTION: GREENHECK ROOFTOP UNITS

Attached data includes product description, specifications, drawings, photographs, performance and test data adequate for evaluation of request identifying applicable data portions.

Attached data also includes description of changes to Contract Documents and proposed substitution required for its proper installation. Undersigned certifies following items, unless modified by attachments, are correct:

1. Proposed substitution does not affect dimensions shown on drawings.
2. Undersigned pays for changes to building design, including engineering design, detailing, and construction costs caused by proposed substitution.
3. Proposed substitution has no adverse effect on other trades, construction schedule, or specified warranty requirements.
4. Maintenance and service parts available locally or readily obtainable for proposed substitution.

Undersigned further certifies function, appearance, and quality of proposed substitution are equivalent or superior to specified item.

Undersigned agrees, if this page is reproduced, terms and conditions for substitutions found in Bidding Documents apply to this proposed substitution.

Submitted by:

Johnson Air Products

General Contractor (if after award of Contract)

STEPHEN FISK

Firm Name:	Johnson Air Products
Address:	2220 SE Ninth Ave.
City, State, Zip:	Portland, OR 97214
Date:	3 / 10 / 2021
Telephone:	(503) 234-5071 Fax: 233-0451

For use by A/E	
• Approved	• Approved as noted
• Not Approved	• Received too late
By	
Date	
Remarks	

RV-45-17.5D-M

Unit Performance

Design Conditions							
Elevation (ft)	Summer		Winter DB (F)	Supply (CFM)	Outdoor Air (CFM)	Recirc Air (CFM)	Exhaust Air (CFM)
	DB (F)	WB (F)					
108	91.2	69.4	23.9	7,000	1,860	5,140	-

Unit Specifications						
Qty	Weight (lb)	Cooling Type	Heating Type	Unit Installation	Unit ETL Listing	Furnace ETL Listing
2	3,458 (+/- 5%)	Packaged DX	Indirect Gas	Outdoor	ULcUL 1995	ANSI Z83.8 / CSA 2.6

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

ASHRAE 90.1-2016 Compliance			
	ASHRAE 90.1 Min. Efficiency	Calculated Efficiency	Compliance
EER	10.8	11	✓
IEER	12.2	12.7	✓

Cooling Specifications							
Type	Total Capacity (MBH)	Sensible Capacity (MBH)	Lead Compressor Type	Coil (DB/WB)		Reheat	
				EAT (F)	LAT (F)	Capacity (MBH)	LAT (F)
Packaged DX	221.7	189.6	Digital Scroll	79.3 / 64.4	54.6 / 53.8	-	-

Heating Specifications								
Type	Gas Type	Input (MBH)	Output (MBH)	Temperature Rise		Turndown	Performance	
				Min (F)	Max (F)		EAT (F)	LAT (F)
Indirect Gas	Natural	400.0	320.0	11.0	42.0	4:1	59.2	101.5

Air Performance							
Type	Total Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	FRPM	Fan		
					Qty	Type	Drive-Type
Supply	7,000	0.5	2.373	1628	1	Plenum	Direct

Motor Specifications						
Motor	Qty	Operating Power (hp)	Size (hp)	Enclosure	Efficiency	RPM
Supply	1	4.48	5	ODP	PE	1760

Electrical Specifications			
Power Supply	Rating (V/C/P)	MCA (A)	MOP (A)
Unit	208/60/3	87.8	110.0

Construction Features And Accessories

Unit	
Unit Installation - Outdoor	Std
Unit Construction - Double Wall	Std
Insulation - 2 inch 2.4# R13 foam	Std
Corrosion Resistant Fasteners	Std
Hinged Access	Std
Factory Wired Non-Fused Disconnect Switch	X
Direct Drive Plenum Blower & Motor Assemblies	X
Factory Wired VFDs	Std
Unit Finish - Permatector, Concrete Gray (RAL 7023)	X
Stainless Steel Condensate Drain Pan and Connection	Std
Condensate Drain Trap	Std
Short Circuit Current - 5 kA	Std
Controls	
Unit Controls - Full Control	Std
Internally Mounted Control Center with 24 VAC control transformer(s) and control circuiting fusing	Std
BMS Protocol - None	
BMS Monitoring Points	
Supply Fan Control - Constant Volume-Adj. Setpoint	X
Exhaust Fan Control	
Exhaust Fan Only Power	
Energy Wheel Rotation Sensor	
Web-Based User Interface	Std
Outd/Rec. Air Damper Ctrl - Constant Position-Adj. Setpoint	X
Economizer Control	
Furnace Control - 4:1 Modulating	X
Control Accessories	
Remote Display	
Dirty Filter Sensor(s)	
Airflow Monitor	
Room Thermostat	
Phase/Brownout Protection	Std
Economizer Fault Detection Diagnostics	

Accessories	
Recirc Air Damper - Low Leakage	X
Outdoor Air Damper - Low Leakage	X
Return Air Damper	
Roof Curb - GKD - 63.74/104.4-G14	X
Supply Air Filters - 2" Merv 13, 8-16x25x2	X
Service Outlet	
Piping Vestibule	
Vapor Tight Lights	
Condensate Overflow Switch	
Spare Filters	
Exhaust Discharge Gravity Backdraft Damper	Std
ElectroFin Coil Coating	
Power Venting	Std
Hail Guards	
Warranty Options	
Unit Warranty - 1 Yr (Standard)	Std
Compressor Warranty - 1 Yr (Standard)	Std
Furnace HX Warranty - 25 Yrs	Std

Standard Option	Std
Not Included	
Included	X

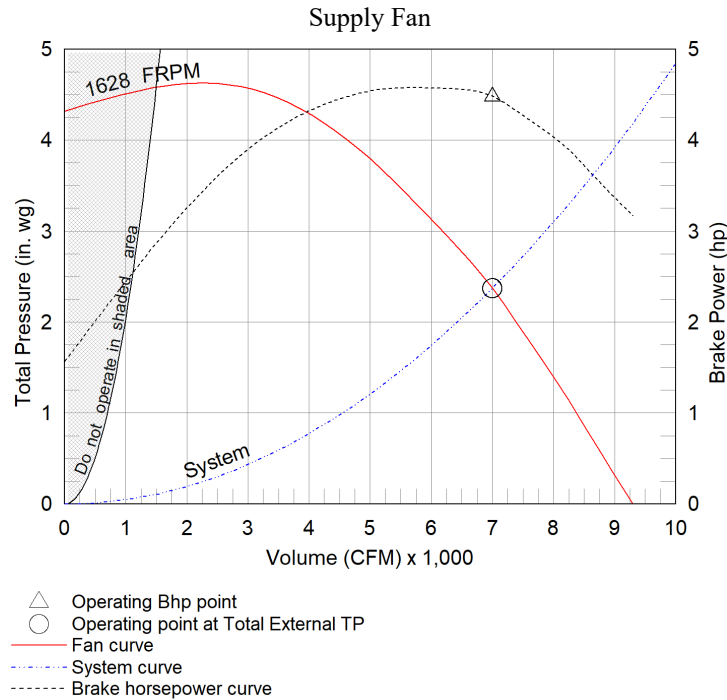
Notes
Outdoor Air Damper supplied is low leakage, motorized VCD-23 (leakage rate of 3 CFM / ft ² @ 1 in. wg), Class 1A

Supply Fan Charts And Performance

Supply Fan Performance									
Total Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	RPM	Operating Power (hp)	Motor		Fan		
					Qty	Size (hp)	Qty	Type	Drive-Type
7,000	0.5	2.373	1628	4.48	1	5	1	Plenum	Direct

Pressure Drop (in. wg)						
Weatherhood	Filter	Damper	Cooling	Heating	External	Total
0.02	0.241	0.09	0.38	0.664	0.5	2.373

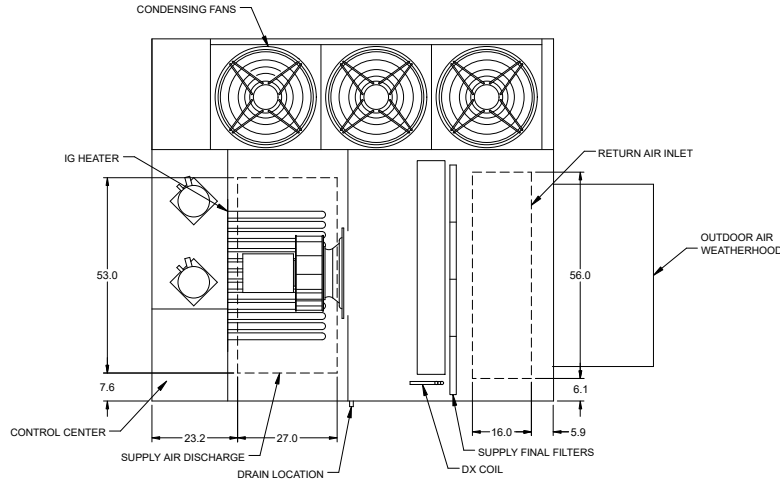
Sound Performance in Accordance with AMCA									
Sound Power by Octave Band								Lwa	dBA
62.5	125	250	500	1000	2000	4000	8000		
90	89	97	84	80	73	71	67	90	78
								Sones	
								30	



Radiated Sound

Position A

Position D



Position B

Position C

RV-45: Supply Air Flow Nominal, Largest Tonnage Condensing Section Available, PDX units only

Radiated Sound Levels										
Plane	Octave Bands (Lw)								Plane Lw	Plane LwA
	1	2	3	4	5	6	7	8		
A	78	89	83	79	78	73	68	63	91	83
B	76	83	90	78	77	72	71	61	91	84
C	77	79	79	74	73	69	64	56	84	78
D	74	83	76	73	71	65	59	54	84	76
E	93	89	86	80	78	73	68	64	96	84
Total	93	93	92	85	83	78	74	68	98	89

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/m².

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.

Cooling Performance

Cooling Specifications							
Nominal Tonnage	Entering Air (F)		Leaving Air (F)		Capacity (MBH)		Condensing Ambient Temp (F)
	DB	WB	DB	WB	Total	Sensible	
17.5	79.3	64.4	54.6	53.8	221.7	189.6	91.2

Coil Information								
PDX Coil Model	Fins Per Inch	Rows Deep	Face Vel. (ft/min)	Coil PD (in. wg)	Refrigerant	Refrig. Velocity (ft/min)	Face Area (ft2)	Suction Temp (F)
DX38S05H12-52x56-LH	12	5	346	0.382	R-410A	1,053	20.2	49.4

Compressor Details					
Lead Compressor Type	Compressor Qty	Compressor RLA (A)		Compressor LRA (A)	
		Comp. #1	Comp. #2	Comp. #1	Comp. #2
Digital Scroll	2	27.6	27.6	191	191

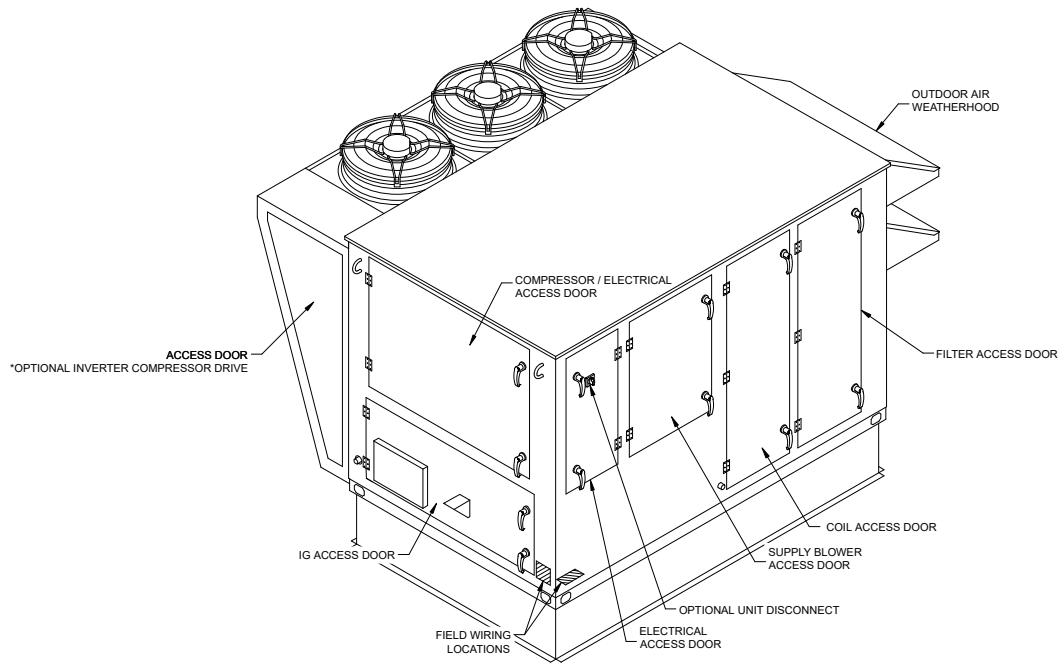
Unit Details	
Refrigerant charges provided by the factory are approximate and may require adjustment in the field	
Hermetic scroll type compressors	
Compressors mounted on neoprene vibration isolation	
Crankcase heater on compressor(s)	
Thermostatic expansion valve	
Stainless steel double sloped drain pan	
Moisture-indicating sight glass	
Service/charging valves	
Refrigerant low pressure switch (auto reset)	
Refrigerant high pressure switch (manual reset)	
Liquid-Line filter drier	
Multiple low sound condensing fans with Lead ECM condensing fan for modulating head pressure control	
Digital scroll compressor	

Heating Performance

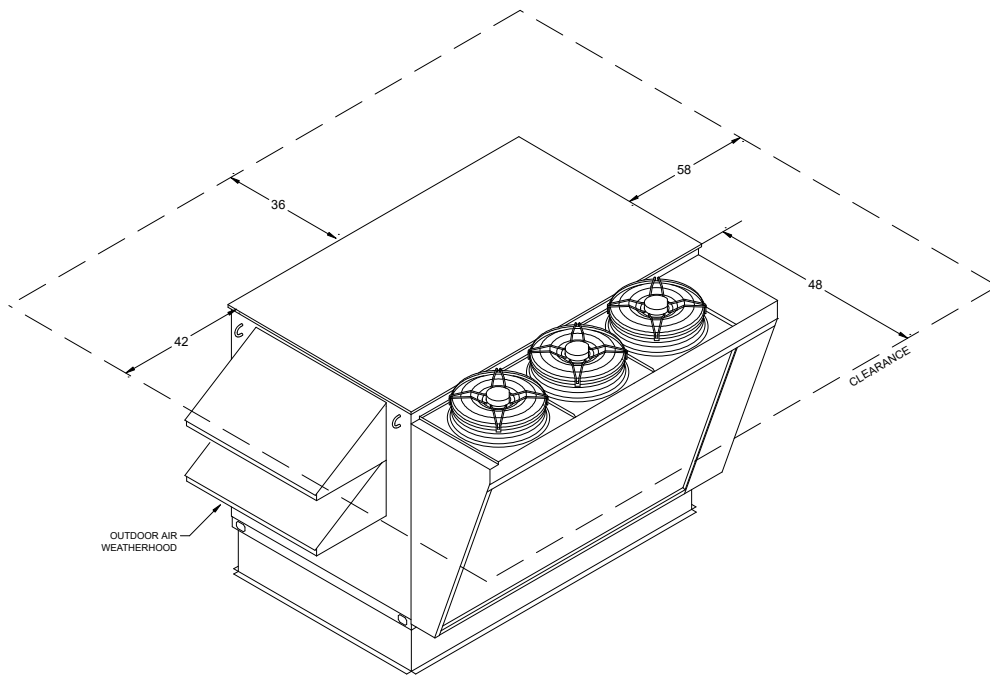
Heating Specifications								
Type	Gas Type	Input (MBH)	Output (MBH)	Temperature Rise		Turndown	Performance	
				Min (F)	Max (F)		EAT (F)	LAT (F)
Indirect Gas	Natural	400.0	320.0	11.0	42.0	4:1	59.2	101.5

Unit Details
ANSI standard Z83.8 and CSA 2.6
High Thermal efficiency
Direct spark ignition
3/4" Gas Connection
At least 6 in. wg of natural gas pressure (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

Isometric Drawings

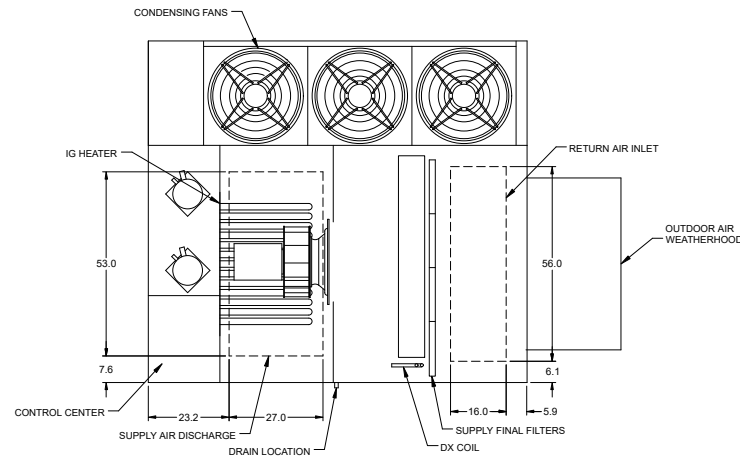


Back Right Isometric

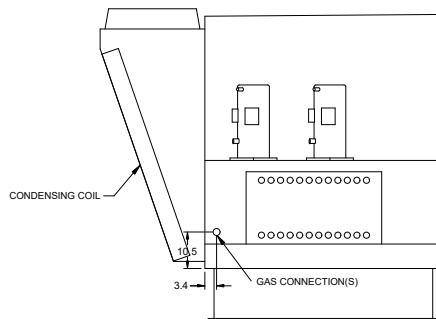


Front Left Isometric

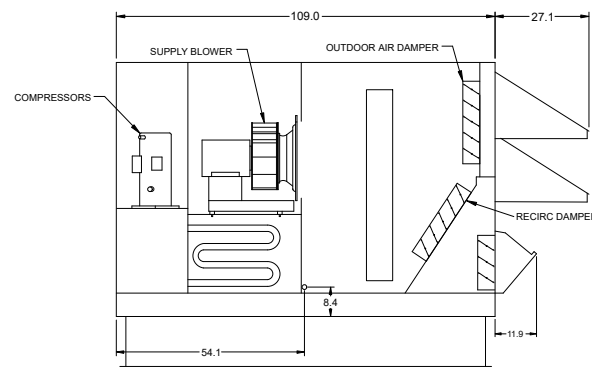
Overview Drawings



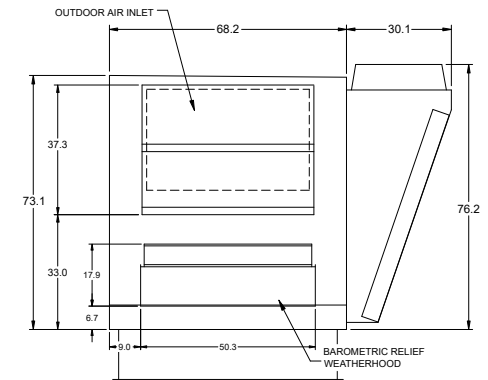
Plan



Left End

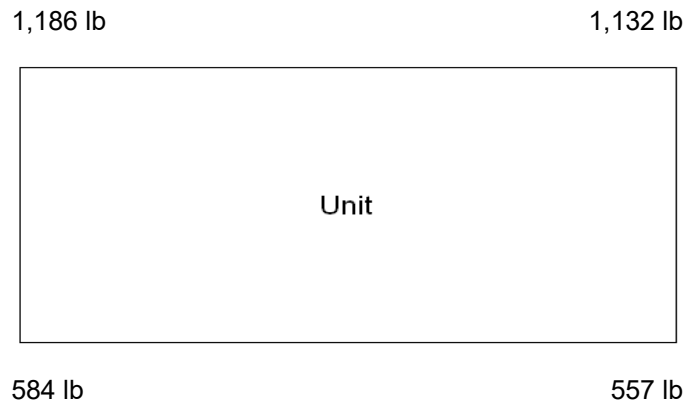


Elevation



Right End

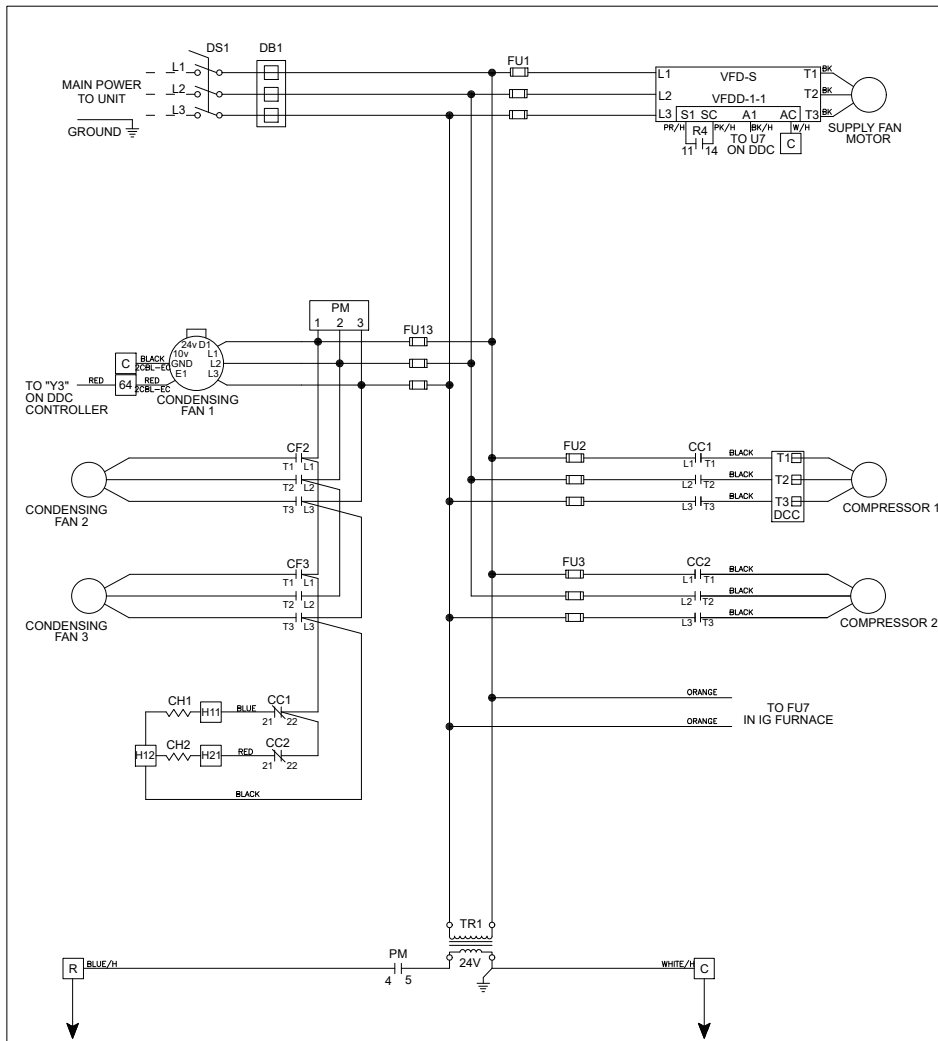
Unit Corner Weights



Note

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

Wiring Diagram



Wiring Diagram Code:

G13E2A0XK00X04X00GF20G0000XH23

CAUTION

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

NOTES

USE COPPER CONDUCTORS ONLY
60° C FOR TERMINALS RATED LESS THAN 100 AMPS.
75° C FOR TERMINALS RATED 100 AMPS OR MORE.
FIELD CONTROL WIRING RESISTANCE SHOULD
NOT EXCEED 0.75 OHM.

FIELD WIRED - - - - -
FACTORY SUPPLIED AND WIRED _____

WIRE COLOR CODE

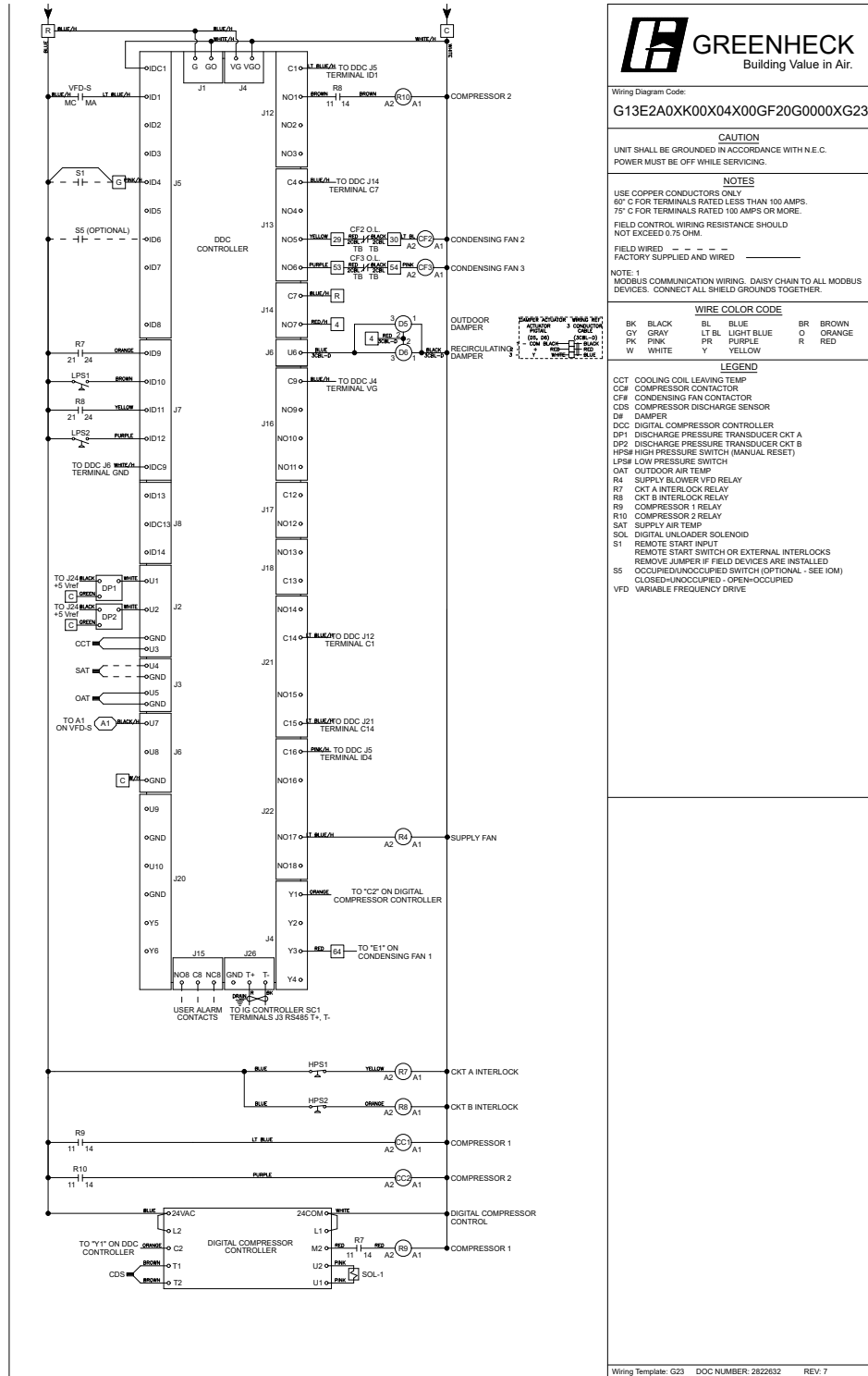
BK	BLACK	BL	BLUE	BR	BROWN
GY	GRAY	LT BL	LIGHT BLUE	O	ORANGE
PK	PINK	PR	PURPLE	R	RED
W	WHITE	Y	YELLOW		

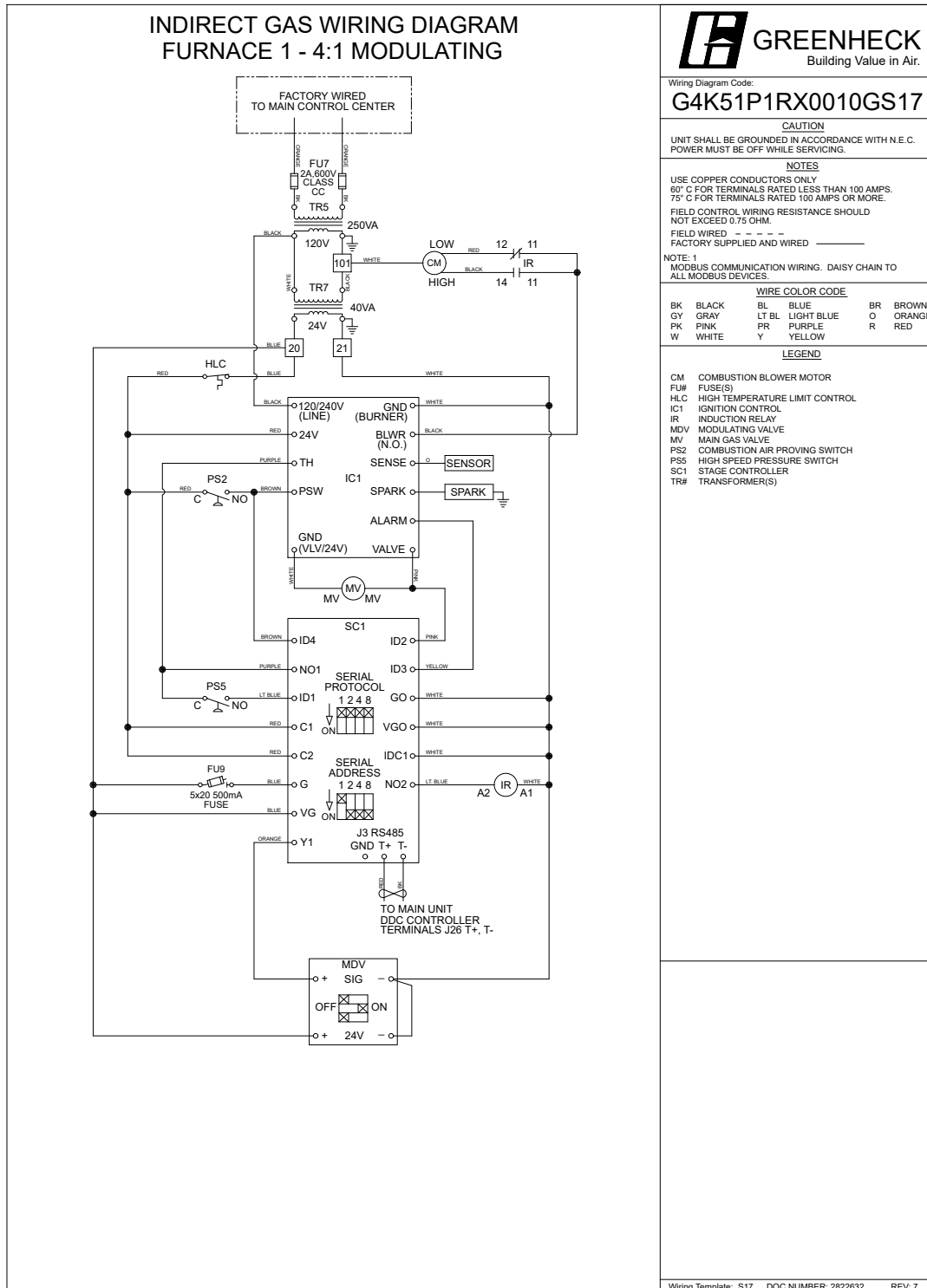
LEGEND

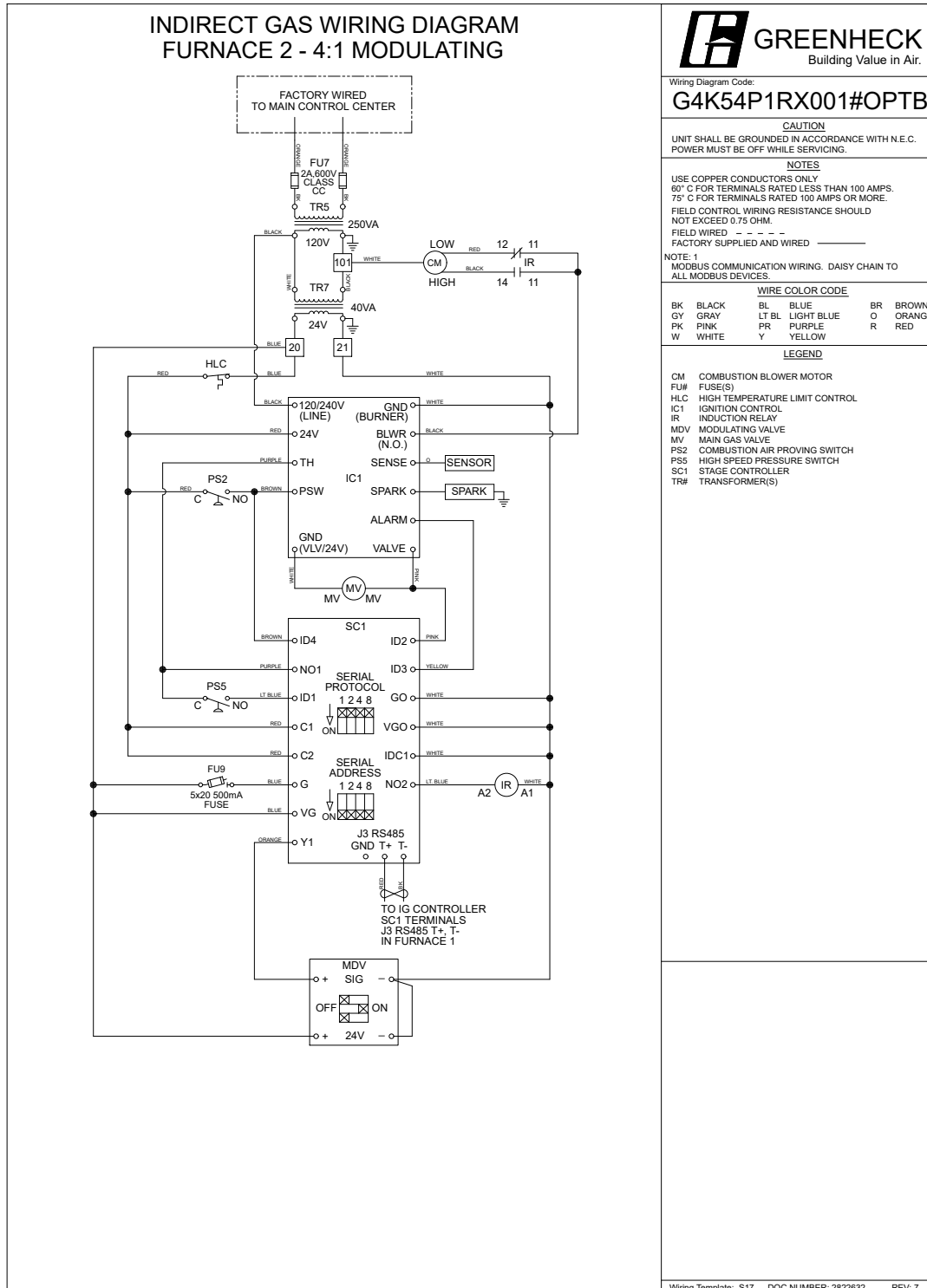
CC#	COMPRESSOR CONTACTOR
CF#	CONDENSING FAN CONTACTOR
CH#	COMPRESSOR SUMP HEATER
DB#	POWER DISTRIBUTION BLOCK
DCC	DIGITAL COMPRESSOR CONTROLLER
DS	DISCONNECT SWITCH
FU#	FUSES
PVM	PHASE VOLTAGE MONITOR
R4	SUPPLY BLOWER VFD RELAY
TR#	TRANSFORMER
VFD	VARIABLE FREQUENCY DRIVE

Wiring Template: H23 DOC NUMBER: 2822632 REV: 7

Wiring Diagram 2







Factory Controller Sequence of Operation

FACTORY CONTROLLER: Controller shall be provided with required sensors and programming for rooftop unit. Controller shall be factory programmed, mounted and tested. Controller shall have a LCD readout for changing set points and monitoring unit operation.

UNIT START COMMAND (Unit will be enabled to start once a jumper is placed between R to G):

- Factory mounted and wired outdoor air and recirculated air damper actuators are powered.
- Supply fan starts after after a (adj.) delay.
- Tempering options to function as described below.

UNIT STOP COMMAND (OR DE-ENERGIZED):

- Supply fan, exhaust fan and tempering options de-energized.
- Outdoor air damper actuator is spring return close, and the recirculated air damper actuator is spring open.

OCCUPIED/UNOCCUPIED MODES: Shall be based on a 7-day time clock internal to the controller. The schedule shall be set by the end user. When a user initiates an override input, the controller will switch from unoccupied to occupied mode. The controller will return to the scheduled occupied/unoccupied mode after the override time has expired. If internal time clock is disabled, a remote contact or a BMS can control the occupied/unoccupied mode.

Occupied Mode:

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

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

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

MORNING WARMUP/COOL DOWN: Prior to occupancy, the unit will run using the warmup or cool down sequence until the occupied set point is achieved. The heating or cooling mode must not be locked out and the space temperature is below or above set point by the unoccupied hysteresis (adj.) (This Sequence must be field configured.)

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

Constant Volume-Adj. Setpoint: The supply blower will operate at a constant speed set point (adj.) during operation.

COOLING SEQUENCE: The cooling is controlled to maintain the supply temperature set point. The mechanical cooling will be locked out when the outside air is < 55 F (adj.).

Packaged DX Cooling (Digital Scroll): The controller will provide a modulating signal for cooling. From 10-50%, the digital scroll will be controlled to maintain discharge temperature. From 50-100% the second stage will be on in combination with the digital scroll compressor to maintain the discharge temperature.

Modulating Head Pressure Control: Lead condenser fan will have an EC motor and will modulate to maintain a head pressure set point.

DEHUMIDIFICATION CONTROL SEQUENCE: The cooling is controlled to maintain the cooling-coil set point. The dehumidification sequence will be locked out when the OA is < 10 F(adj.) above the cold-coil set point (adj.).

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

HEATING SEQUENCE: The heating is controlled to maintain the supply temperature set point. The heating will be locked out when the outside air is > 80 F (adj.).

Indirect Gas Furnace: The controller will modulate the indirect gas furnace to maintain the supply temperature set point (adj.).

TEMPERATURE CONTROL SEQUENCE: The controller will adjust the supply air temperature set point between minimum (adj.) and maximum (adj) limits, to satisfy the desired space temperature setpoint. Adjustable locally or by BMS.

Supply Discharge Temperature Control: The supply set point will be a constant temperature set point from the controller (adj.). Adjustable locally or by BMS.

BUILDING FREEZE PROTECTION: If the supply air temperature drops below 35 F (adj.) for 300s (adj.), the controller will de-energize the unit and activate the alarm output.

TEMPERATURE PROTECTION (Winter Ramp): The controller will enable the outdoor air and recirc. air dampers to modulate in order to help the unit keep up with heating demand in the event of wheel failure or the unit operating outside design conditions. (This can be enabled in the controller.)

ALARMS INDICATION: The controller will display alarms and have one digital output for remote indication of an alarm condition. Possible alarms include:

Supply Air Alarm: The controller monitors the proving switch on supply blower and sends an alarm in the case of the blower proving switch not engaging for 30s (adj.).

DX Alarm: The controller monitors the refrigerant pressure. In the case of low refrigerant pressure the compressors will shut down until refrigerant pressure returns to normal values and the controller will send an alarm. In the case of high refrigerant pressure the compressors will shut down, requiring a manual reset and the controller will send a alarm.

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

ACCESSORIES: The following accessories will be included with the unit to expand the functionality or usability of the controller.

Phase and Brownout Protection: Factory mounted and wired component which monitors the main power coming into the unit. If a phase drops out, or if the incoming voltage exceeds the acceptable range, the component will turn off the unit to help protect the electrical systems.

120V/24V Photoelectric Smoke Detector: Duct smoke detector is shipped loose for field mounting and wiring in the supply air duct. Duct smoke detector contains 2 normally open and 2 normally closed contacts for alarm notification. (To disable unit based off smoke detection smoke detector contacts must be field wired between R and G)

Warranty Statement for Dedicated Outdoor Air Systems (DOAS)

Unit Warranty

Greenheck warrants the equipment to be free from defects in material and workmanship for a period of 12 months from start-up or 18 months from ship date, whichever is less. Initial startup must be completed within six months of the shipment date, and a startup report must be submitted to 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 25 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.

GKD Roof Curb

Model: GKD-63.74/104.4-G14

Curb Height (in.)	Curb Length (in.)	Curb Width (in.)	Material	Finish Type	Duct Adapter	Curb Weight (lb)
14	104.4	63.74	Galvanized	Galvanized	Yes	195

Standard Construction Features:

All dimensions shown are actual and in units of in.'s

If unit is selected with side or end discharge/return, there will not be bottom connections supplied with the curb.

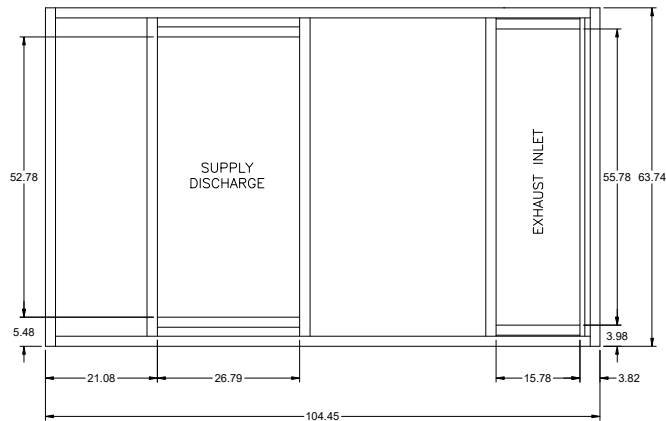
14 gauge galvanized steel (perimeter channels).

14 gauge galvanized steel (interior channels).

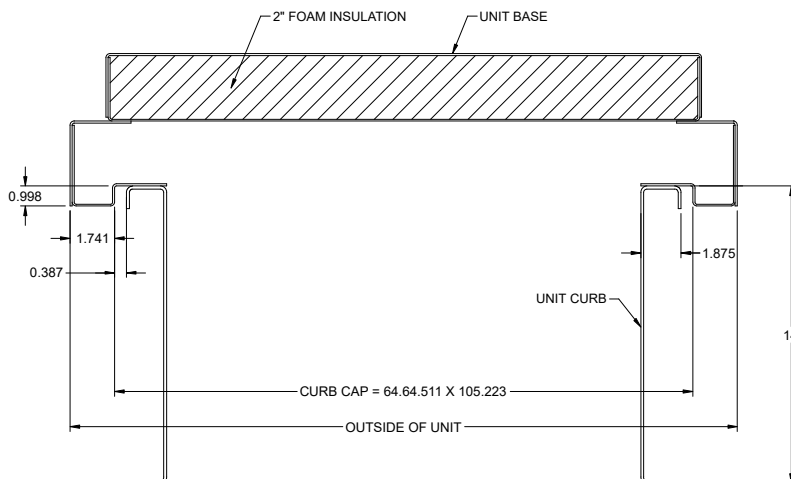
Ships knocked down for field assembly.

Curb insulation to be provided by others.

**Top View
of Curb**



**Cross-Section
View of Unit
on Curb**



RV-25-7.5D-G

Unit Performance

Design Conditions							
Elevation (ft)	Summer		Winter DB (F)	Supply (CFM)	Outdoor Air (CFM)	Recirc Air (CFM)	Exhaust Air (CFM)
	DB (F)	WB (F)					
108	91.2	69.4	23.9	2,650	530	2,120	-

Unit Specifications						
Qty	Weight (lb)	Cooling Type	Heating Type	Unit Installation	Unit ETL Listing	Furnace ETL Listing
1	2,320 (+/- 5%)	Packaged DX	Indirect Gas	Outdoor	ULcUL 1995	ANSI Z83.8 / CSA 2.6

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

ASHRAE 90.1-2016 Compliance			
	ASHRAE 90.1 Min. Efficiency	Calculated Efficiency	Compliance
EER	11	11.3	✓
IEER	12.7	12.9	✓

Cooling Specifications							
Type	Total Capacity (MBH)	Sensible Capacity (MBH)	Lead Compressor Type	Coil (DB/WB)		Reheat	
				EAT (F)	LAT (F)	Capacity (MBH)	LAT (F)
Packaged DX	100.2	78.3	Digital Scroll	78.2 / 64.0	51.3 / 50.9	-	-

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	160.0	14.0	56.0	4:1	62.4	118.3

Air Performance							
Type	Total Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	FRPM	Fan		
					Qty	Type	Drive-Type
Supply	2,650	0.5	1.59	2379	1	Plenum	Direct

Motor Specifications						
Motor	Qty	Operating Power (hp)	Size (hp)	Enclosure	Efficiency	RPM
Supply	1	1.3	2	ODP	PE	1750

Electrical Specifications			
Power Supply	Rating (V/C/P)	MCA (A)	MOP (A)
Unit	208/60/3	40.7	60.0

Construction Features And Accessories

Unit	
Unit Installation - Outdoor	Std
Unit Construction - Double Wall	Std
Insulation - 2 inch 2.4# R13 foam	Std
Corrosion Resistant Fasteners	Std
Hinged Access	Std
Factory Wired Non-Fused Disconnect Switch	X
Direct Drive Plenum Blower & Motor Assemblies	X
Factory Wired VFDs	Std
Unit Finish - Permatector, Concrete Gray (RAL 7023)	X
Stainless Steel Condensate Drain Pan and Connection	Std
Condensate Drain Trap	Std
Short Circuit Current - 5 kA	Std
Controls	
Unit Controls - Full Control	Std
Internally Mounted Control Center with 24 VAC control transformer(s)	Std
BMS Protocol - None	
BMS Monitoring Points	
Supply Fan Control - Constant Volume-Adj. Setpoint	X
Exhaust Fan Control	
Exhaust Fan Only Power	
Energy Wheel Rotation Sensor	
Web-Based User Interface	Std
Outd/Rec. Air Damper Ctrl - Constant Position-Adj. Setpoint	X
Economizer Control	
Furnace Control - 4:1 Modulating	X
Control Accessories	
Remote Display	
Dirty Filter Sensor(s)	
Airflow Monitor	
Room Thermostat	
Phase/Brownout Protection	Std
Economizer Fault Detection Diagnostics	

Accessories	
Recirc Air Damper - Low Leakage	X
Outdoor Air Damper - Low Leakage	X
Return Air Damper	
Roof Curb - GKD - 48/94.01-G14	X
Supply Air Filters - 2" Merv 13, 4-20x20x2	X
Service Outlet	
Piping Vestibule	
Vapor Tight Lights	
Condensate Overflow Switch	
Spare Filters	
Exhaust Discharge Gravity Backdraft Damper	Std
ElectroFin Coil Coating	
Power Venting	Std
Hail Guards	
Warranty Options	
Unit Warranty - 1 Yr (Standard)	Std
Compressor Warranty - 1 Yr (Standard)	Std
Furnace HX Warranty - 25 Yrs	Std

Standard Option	Std
Not Included	
Included	X

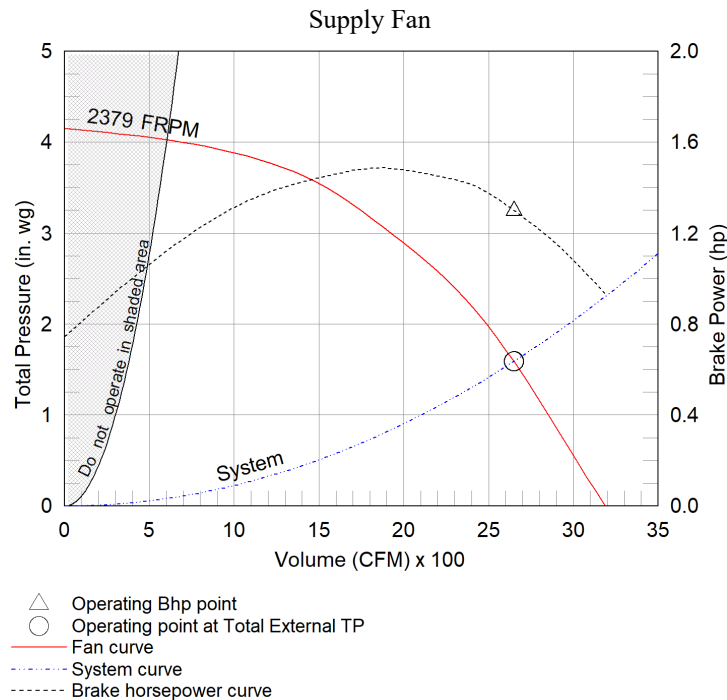
Notes
Outdoor Air Damper supplied is low leakage, motorized VCD-23 (leakage rate of 3 CFM / ft ² @ 1 in. wg), Class 1A

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
2,650	0.5	1.59	2379	1.3	1	2	1	Plenum	Direct

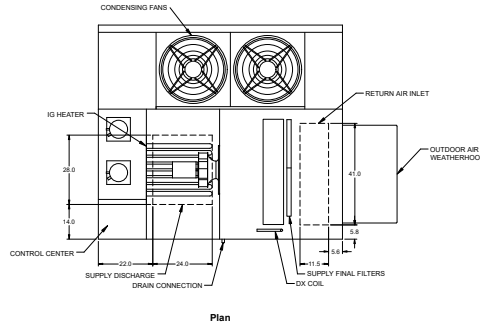
Pressure Drop (in. wg)						
Weatherhood	Filter	Damper	Cooling	Heating	External	Total
0.077	0.114	0.03	0.19	0.256	0.5	1.59

Sound Performance in Accordance with AMCA									
Sound Power by Octave Band								Lwa	dBA
62.5	125	250	500	1000	2000	4000	8000		
72	74	88	80	79	75	73	68	85	73
									21



Radiated Sound

Position A



Position D

Position B

Position C

RV-25: Supply Air Flow Nominal, Largest Tonnage Condensing Section Available, PDX units only

Radiated Sound Levels										
Plane	Octave Bands (Lw)								Plane Lw	Plane LwA
	1	2	3	4	5	6	7	8		
A	73	85	78	80	81	73	67	62	88	83
B	71	79	69	78	73	68	64	57	83	78
C	79	77	69	76	75	70	60	59	83	78
D	74	77	72	74	74	67	61	58	82	77
E	77	84	78	79	77	72	65	61	87	81
Total	83	89	82	85	84	78	71	67	93	87

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.										

Cooling Performance

Cooling Specifications							
Nominal Tonnage	Entering Air (F)		Leaving Air (F)		Capacity (MBH)		Condensing Ambient Temp (F)
	DB	WB	DB	WB	Total	Sensible	
7.5	78.2	64.0	51.3	50.9	100.2	78.3	91.2

Coil Information								
PDX Coil Model	Fins Per Inch	Rows Deep	Face Vel. (ft/min)	Coil PD (in. wg)	Refrigerant	Refrig. Velocity (ft/min)	Face Area (ft2)	Suction Temp (F)
DX38S05Q12-40x42.5-LH	12	5	224	0.19	R-410A	1,271	11.8	47.8

Compressor Details					
Lead Compressor Type	Compressor Qty	Compressor RLA (A)		Compressor LRA (A)	
		Comp. #1	Comp. #2	Comp. #1	Comp. #2
Digital Scroll	1	24	-	187	-

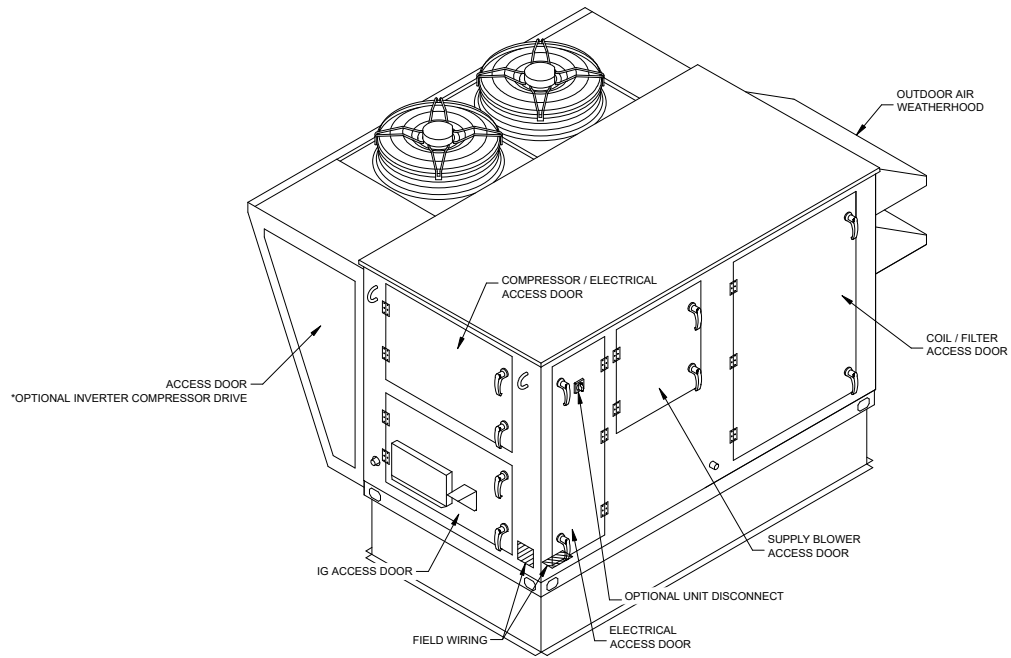
Unit Details	
Refrigerant charges provided by the factory are approximate and may require adjustment in the field	
Hermetic scroll type compressors	
Compressors mounted on neoprene vibration isolation	
Crankcase heater on compressor(s)	
Thermostatic expansion valve	
Stainless steel double sloped drain pan	
Moisture-indicating sight glass	
Service/charging valves	
Refrigerant low pressure switch (auto reset)	
Refrigerant high pressure switch (manual reset)	
Liquid-Line filter drier	
Multiple low sound condensing fans with Lead ECM condensing fan for modulating head pressure control	
Digital scroll compressor	

Heating Performance

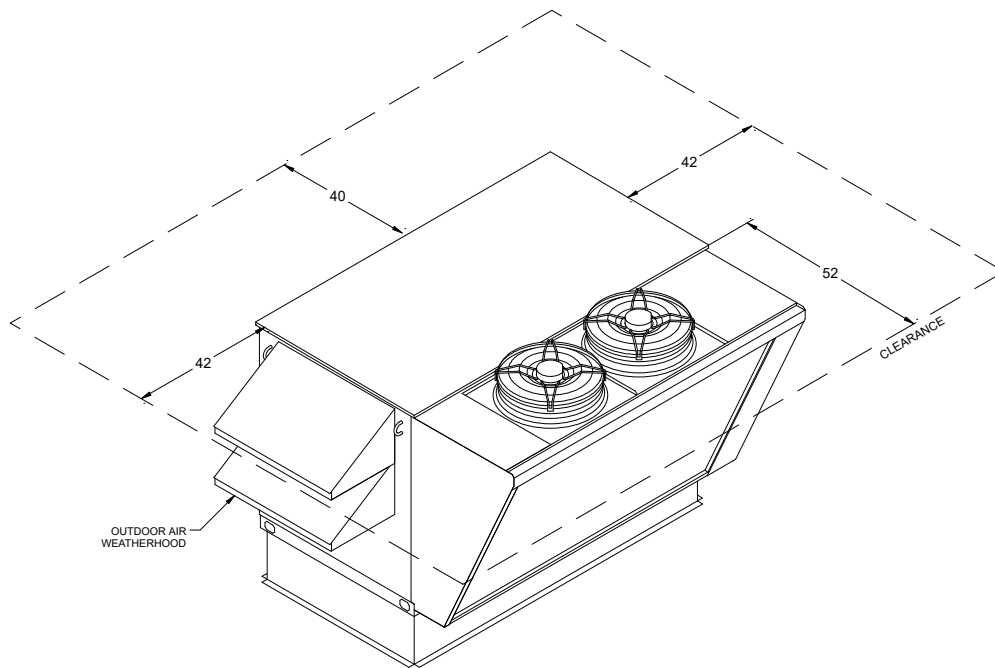
Heating Specifications								
Type	Gas Type	Input (MBH)	Output (MBH)	Temperature Rise		Turndown	Performance	
				Min (F)	Max (F)		EAT (F)	LAT (F)
Indirect Gas	Natural	200.0	160.0	14.0	56.0	4:1	62.4	118.3

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

Isometric Drawings

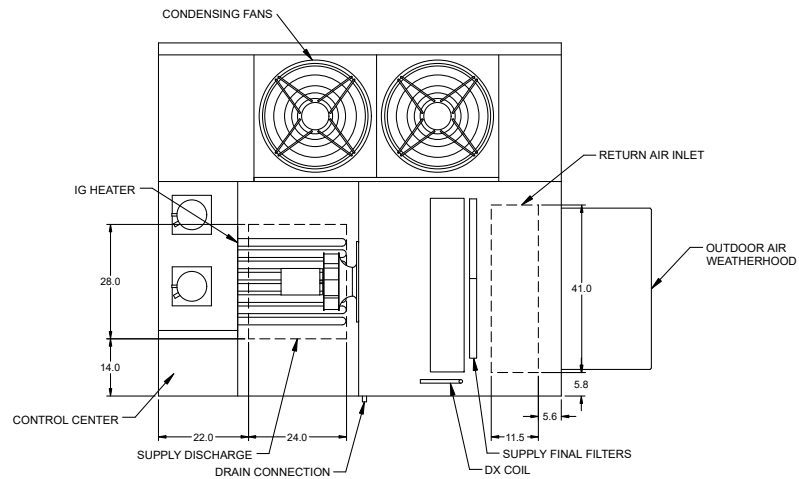


Back Right Isometric

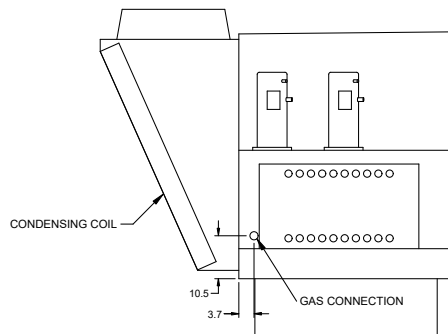


Front Left Isometric

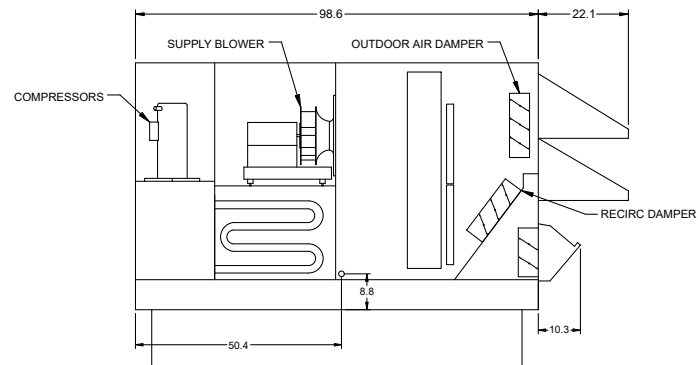
Overview Drawings



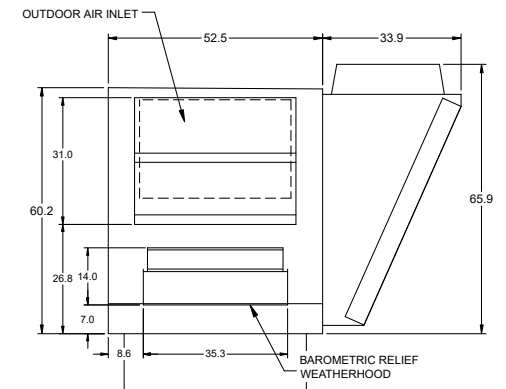
Plan



Left End

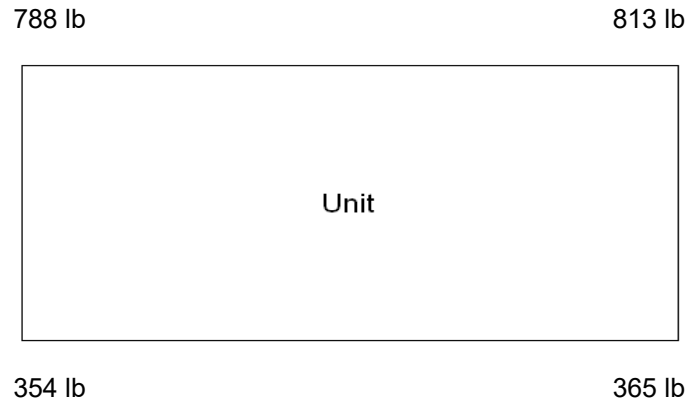


Elevation



Right End

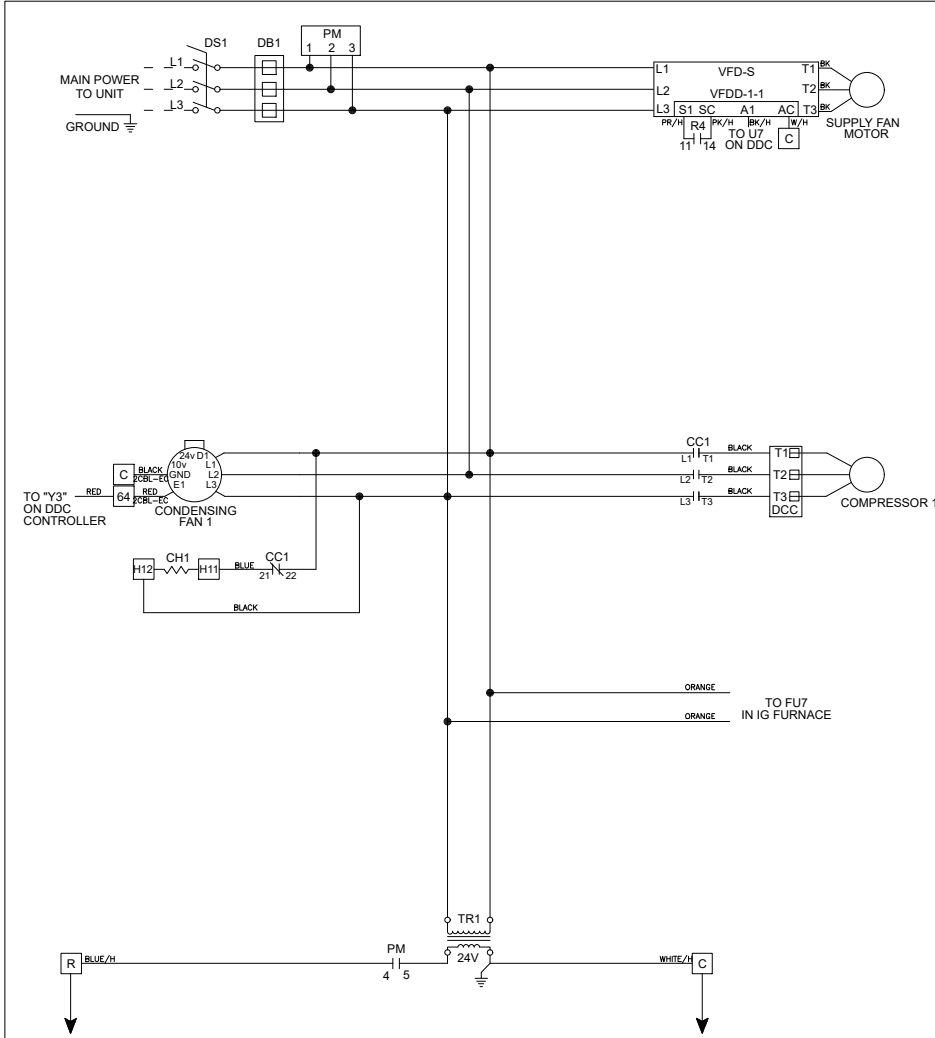
Unit Corner Weights



Note

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

Wiring Diagram



Wiring Diagram Code:

G12E1A0XK00X04X00GC20G0000XH23

CAUTION

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

NOTES

USE COPPER CONDUCTORS ONLY
60° C FOR TERMINALS RATED LESS THAN 100 AMPS.
75° C FOR TERMINALS RATED 100 AMPS OR MORE.
FIELD CONTROL WIRING RESISTANCE SHOULD
NOT EXCEED 0.75 OHM.
FIELD WIRED - - - - -
FACTORY SUPPLIED AND WIRED - - - - -

WIRE COLOR CODE

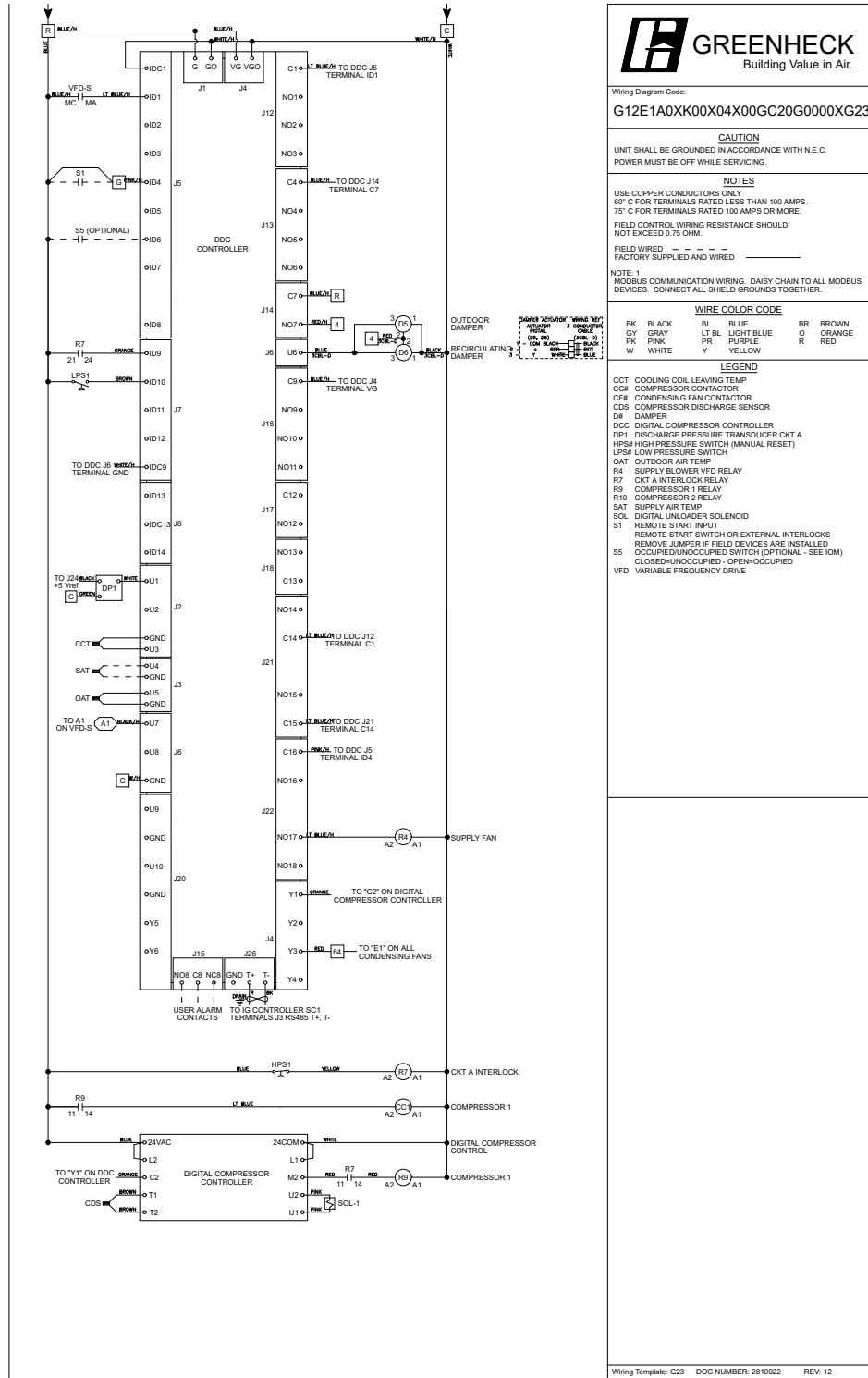
BK	BLACK	BL	BLUE	BR	BROWN
GY	GRAY	LT BL	LIGHT BLUE	O	ORANGE
PK	PINK	PR	PURPLE	R	RED
W	WHITE	Y	YELLOW		

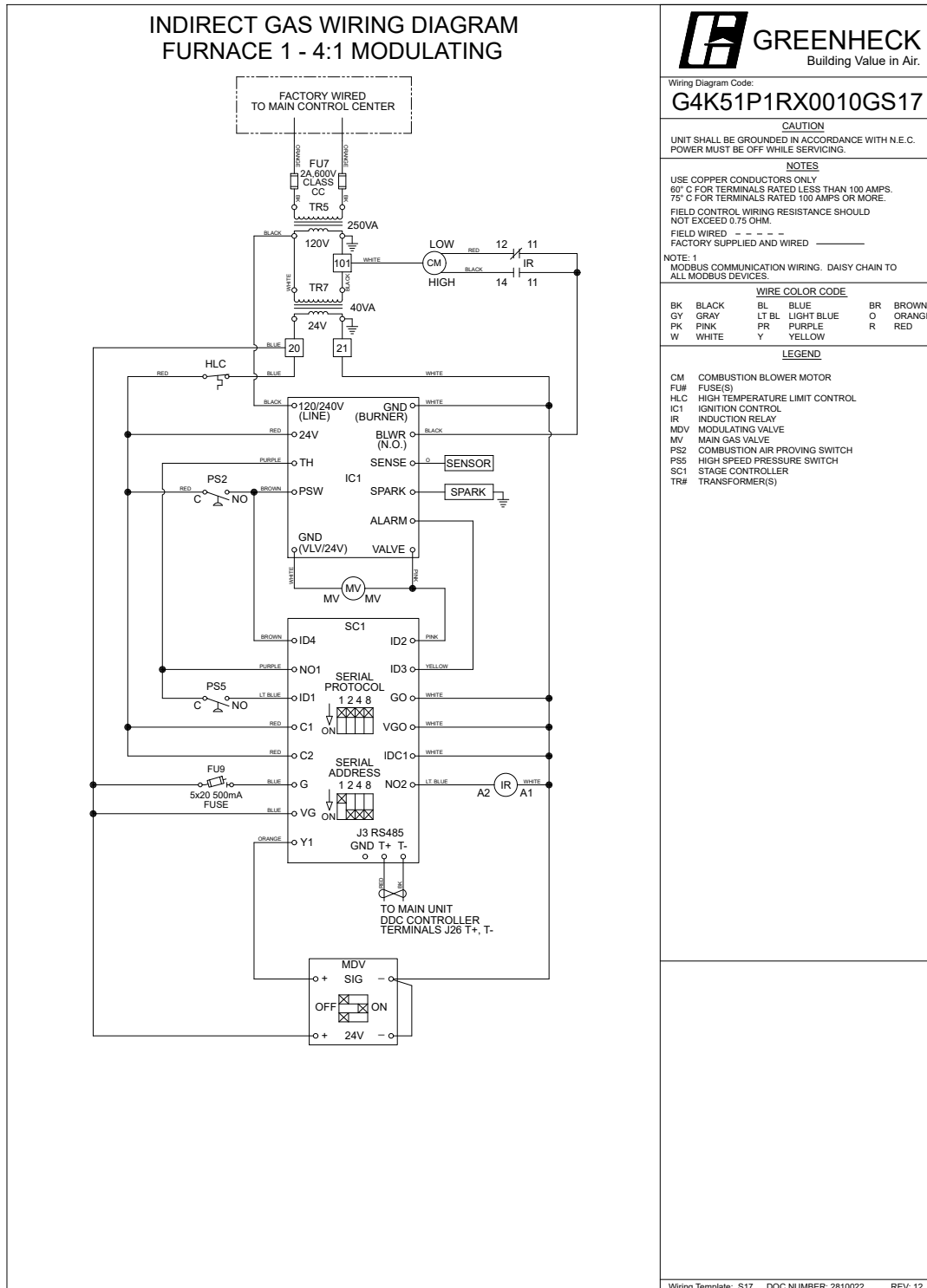
LEGEND

CC# COMPRESSOR CONTACTOR
CF# CONDENSING FAN CONTACTOR
CH# COMPRESSOR SUMP HEATER
DB# POWER DISTRIBUTION BLOCK
DCC DIGITAL COMPRESSOR CONTROLLER
DS DISCONNECT SWITCH
PVM PHASE VOLTAGE MONITOR
R4 SUPPLY BLOWER VFD RELAY
TR# TRANSFORMER
VFD VARIABLE FREQUENCY DRIVE

Wiring Template: H23 DOC NUMBER: 2810022 REV: 12

Wiring Diagram 2





Factory Controller Sequence of Operation

FACTORY CONTROLLER: Controller shall be provided with required sensors and programming for rooftop unit. Controller shall be factory programmed, mounted and tested. Controller shall have a LCD readout for changing set points and monitoring unit operation.

UNIT START COMMAND (Unit will be enabled to start once a jumper is placed between R to G):

- Factory mounted and wired outdoor air and recirculated air damper actuators are powered.
- Supply fan starts after after a (adj.) delay.
- Tempering options to function as described below.

UNIT STOP COMMAND (OR DE-ENERGIZED):

- Supply fan, exhaust fan and tempering options de-energized.
- Outdoor air damper actuator is spring return close, and the recirculated air damper actuator is spring open.

OCCUPIED/UNOCCUPIED MODES: Shall be based on a 7-day time clock internal to the controller. The schedule shall be set by the end user. When a user initiates an override input, the controller will switch from unoccupied to occupied mode. The controller will return to the scheduled occupied/unoccupied mode after the override time has expired. If internal time clock is disabled, a remote contact or a BMS can control the occupied/unoccupied mode.

Occupied Mode:

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

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

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

MORNING WARMUP/COOL DOWN: Prior to occupancy, the unit will run using the warmup or cool down sequence until the occupied set point is achieved. The heating or cooling mode must not be locked out and the space temperature is below or above set point by the unoccupied hysteresis (adj.) (This Sequence must be field configured.)

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

Constant Volume-Adj. Setpoint: The supply blower will operate at a constant speed set point (adj.) during operation.

COOLING SEQUENCE: The cooling is controlled to maintain the supply temperature set point. The mechanical cooling will be locked out when the outside air is < 55 F (adj.).

Packaged DX Cooling (Digital Scroll): The controller will provide a modulating signal for cooling. The digital scroll will be controlled to maintain discharge temperature. The second stage will be on in combination with the digital scroll compressor to maintain discharge temperature.

Modulating Head Pressure Control: Lead condenser fan will have an EC motor and will modulate to maintain a head pressure set point.

DEHUMIDIFICATION CONTROL SEQUENCE: The cooling is controlled to maintain the cooling-coil set point. The dehumidification sequence will be locked out when the OA is < 10 F(adj.) above the cold-coil set point (adj.).

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

HEATING SEQUENCE: The heating is controlled to maintain the supply temperature set point. The heating will be locked out when the outside air is > 80 F (adj.).

Indirect Gas Furnace: The controller will modulate the indirect gas furnace to maintain the supply temperature set point (adj.).

TEMPERATURE CONTROL SEQUENCE: The controller will adjust the supply air temperature set point between minimum (adj.) and maximum (adj) limits, to satisfy the desired space temperature setpoint. Adjustable locally or by BMS.

Supply Discharge Temperature Control: The supply set point will be a constant temperature set point from the controller (adj.). Adjustable locally or by BMS.

BUILDING FREEZE PROTECTION: If the supply air temperature drops below 35 F (adj.) for 300s (adj.), the controller will de-energize the unit and activate the alarm output.

TEMPERATURE PROTECTION (Winter Ramp): The controller will enable the outdoor air and recirc. air dampers to modulate in order to help the unit keep up with heating demand in the event of wheel failure or the unit operating outside design conditions. (This can be enabled in the controller.)

ALARMS INDICATION: The controller will display alarms and have one digital output for remote indication of an alarm condition. Possible alarms include:

Supply Air Alarm: The controller monitors the proving switch on supply blower and sends an alarm in the case of the blower proving switch not engaging for 30s (adj.).

DX Alarm: The controller monitors the refrigerant pressure. In the case of low refrigerant pressure the compressors will shut down until refrigerant pressure returns to normal values and the controller will send an alarm. In the case of high refrigerant pressure the compressors will shut down, requiring a manual reset and the controller will send a alarm.

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

ACCESSORIES: The following accessories will be included with the unit to expand the functionality or usability of the controller.

Phase and Brownout Protection: Factory mounted and wired component which monitors the main power coming into the unit. If a phase drops out, or if the incoming voltage exceeds the acceptable range, the component will turn off the unit to help protect the electrical systems.

120V/24V Photoelectric Smoke Detector: Duct smoke detector is shipped loose for field mounting and wiring in the supply air duct. Duct smoke detector contains 2 normally open and 2 normally closed contacts for alarm notification. (To disable unit based off smoke detection smoke detector contacts must be field wired between R and G)

Warranty Statement for Dedicated Outdoor Air Systems (DOAS)

Unit Warranty

Greenheck warrants the equipment to be free from defects in material and workmanship for a period of 12 months from start-up or 18 months from ship date, whichever is less. Initial startup must be completed within six months of the shipment date, and a startup report must be submitted to 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 25 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.

GKD Roof Curb

Model: GKD-48/94.01-G14

Curb Height (in.)	Curb Length (in.)	Curb Width (in.)	Material	Finish Type	Duct Adapter	Curb Weight (lb)
14	94.01	48	Galvanized	Galvanized	Yes	159

Standard Construction Features:

All dimensions shown are actual and in units of in.'s

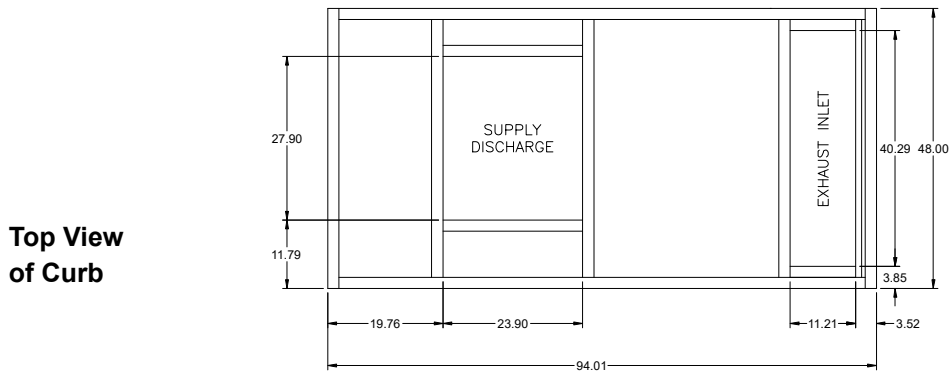
If unit is selected with side or end discharge/return, there will not be bottom connections supplied with the curb.

14 gauge galvanized steel (perimeter channels).

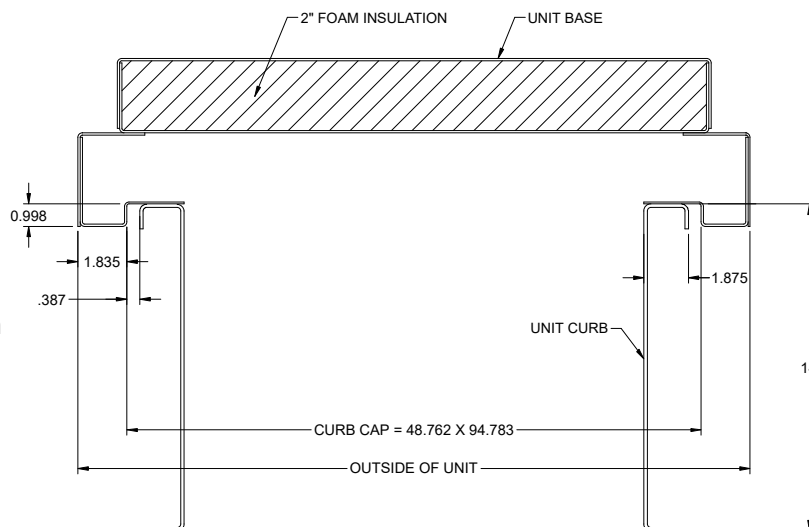
14 gauge galvanized steel (interior channels).

Ships knocked down for field assembly.

Curb insulation to be provided by others.



Top View of Curb



Cross-Section View of Unit on Curb

RV-45-25D-M

Unit Performance

Design Conditions							
Elevation (ft)	Summer		Winter DB (F)	Supply (CFM)	Outdoor Air (CFM)	Recirc Air (CFM)	Exhaust Air (CFM)
	DB (F)	WB (F)					
108	91.2	69.4	23.9	7,000	1,860	5,140	-

Unit Specifications						
Qty	Weight (lb)	Cooling Type	Heating Type	Unit Installation	Unit ETL Listing	Furnace ETL Listing
1	3,671 (+/- 5%)	Packaged DX	Indirect Gas	Outdoor	ULcUL 1995	ANSI Z83.8 / CSA 2.6

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

ASHRAE 90.1-2016 Compliance			
	ASHRAE 90.1 Min. Efficiency	Calculated Efficiency	Compliance
EER	9.8	10	✓
IEER	11.4	11.6	✓

Cooling Specifications							
Type	Total Capacity (MBH)	Sensible Capacity (MBH)	Lead Compressor Type	Coil (DB/WB)		Reheat	
				EAT (F)	LAT (F)	Capacity (MBH)	LAT (F)
Packaged DX	301.2	226.2	Digital Scroll	79.3 / 64.4	49.8 / 49.5	-	-

Heating Specifications								
Type	Gas Type	Input (MBH)	Output (MBH)	Temperature Rise		Turndown	Performance	
				Min (F)	Max (F)		EAT (F)	LAT (F)
Indirect Gas	Natural	400.0	320.0	11.0	42.0	4:1	59.2	101.5

Air Performance							
Type	Total Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	FRPM	Fan		
					Qty	Type	Drive-Type
Supply	7,000	0.5	2.46	1642	1	Plenum	Direct

Motor Specifications						
Motor	Qty	Operating Power (hp)	Size (hp)	Enclosure	Efficiency	RPM
Supply	1	4.6	5	ODP	PE	1760

Electrical Specifications			
Power Supply	Rating (V/C/P)	MCA (A)	MOP (A)
Unit	208/60/3	133.9	175.0

Construction Features And Accessories

Unit	
Unit Installation - Outdoor	Std
Unit Construction - Double Wall	Std
Insulation - 2 inch 2.4# R13 foam	Std
Corrosion Resistant Fasteners	Std
Hinged Access	Std
Factory Wired Non-Fused Disconnect Switch	X
Direct Drive Plenum Blower & Motor Assemblies	X
Factory Wired VFDs	Std
Unit Finish - Permatector, Concrete Gray (RAL 7023)	X
Stainless Steel Condensate Drain Pan and Connection	Std
Condensate Drain Trap	Std
Short Circuit Current - 5 kA	Std
Controls	
Unit Controls - Full Control	Std
Internally Mounted Control Center with 24 VAC control transformer(s) and control circuiting fusing	Std
BMS Protocol - None	
BMS Monitoring Points	
Supply Fan Control - Constant Volume-Adj. Setpoint	X
Exhaust Fan Control	
Exhaust Fan Only Power	
Energy Wheel Rotation Sensor	
Web-Based User Interface	Std
Outd/Rec. Air Damper Ctrl - Constant Position-Adj. Setpoint	X
Economizer Control	
Furnace Control - 4:1 Modulating	X
Control Accessories	
Remote Display	
Dirty Filter Sensor(s)	
Airflow Monitor	
Room Thermostat	
Phase/Brownout Protection	Std
Economizer Fault Detection Diagnostics	

Accessories	
Recirc Air Damper - Low Leakage	X
Outdoor Air Damper - Low Leakage	X
Return Air Damper	
Roof Curb - GKD - 63.74/104.4-G14	X
Supply Air Filters - 2" Merv 13, 8-16x25x2	X
Service Outlet	
Piping Vestibule	
Vapor Tight Lights	
Condensate Overflow Switch	
Spare Filters	
Exhaust Discharge Gravity Backdraft Damper	Std
ElectroFin Coil Coating	
Power Venting	Std
Hail Guards	
Warranty Options	
Unit Warranty - 1 Yr (Standard)	Std
Compressor Warranty - 1 Yr (Standard)	Std
Furnace HX Warranty - 25 Yrs	Std

Standard Option	Std
Not Included	
Included	X

Notes

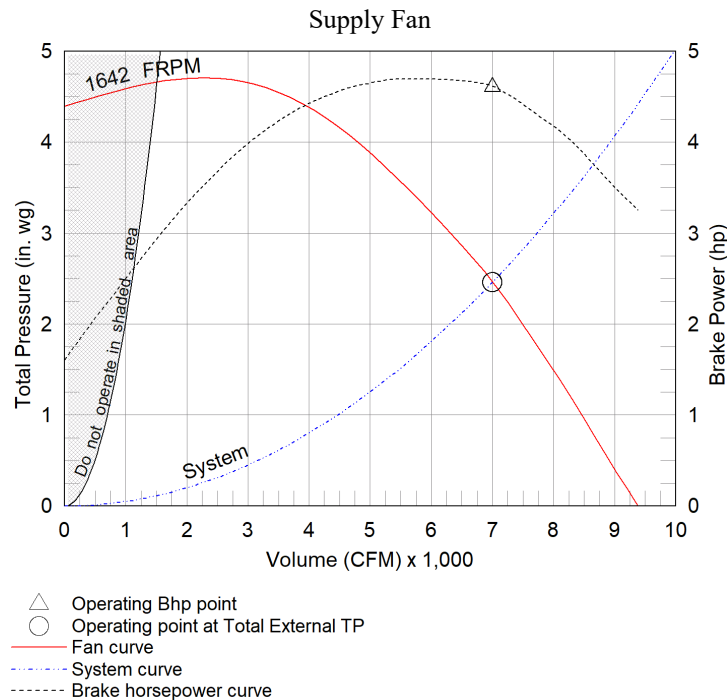
Outdoor Air Damper supplied is low leakage, motorized VCD-23 (leakage rate of 3 CFM / ft² @ 1 in. wg), Class 1A

Supply Fan Charts And Performance

Supply Fan Performance									
Total Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	RPM	Operating Power (hp)	Motor		Fan		
					Qty	Size (hp)	Qty	Type	Drive-Type
7,000	0.5	2.46	1642	4.6	1	5	1	Plenum	Direct

Pressure Drop (in. wg)						
Weatherhood	Filter	Damper	Cooling	Heating	External	Total
0.02	0.241	0.09	0.47	0.664	0.5	2.46

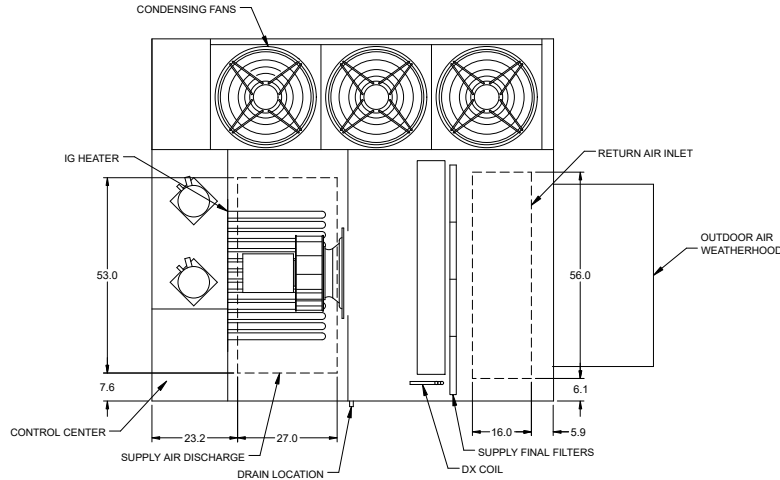
Sound Performance in Accordance with AMCA									
Sound Power by Octave Band								Lwa	dBA
62.5	125	250	500	1000	2000	4000	8000		
90	89	97	84	80	73	71	67	90	79
								Sones	
								30	



Radiated Sound

Position A

Position D



Position B

Position C

RV-45: Supply Air Flow Nominal, Largest Tonnage Condensing Section Available, PDX units only

Radiated Sound Levels										
Plane	Octave Bands (Lw)								Plane Lw	Plane LwA
	1	2	3	4	5	6	7	8		
A	78	89	83	79	78	73	68	63	91	83
B	76	83	90	78	77	72	71	61	91	84
C	77	79	79	74	73	69	64	56	84	78
D	74	83	76	73	71	65	59	54	84	76
E	93	89	86	80	78	73	68	64	96	84
Total	93	93	92	85	83	78	74	68	98	89

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/m².

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.

Cooling Performance

Cooling Specifications							
Nominal Tonnage	Entering Air (F)		Leaving Air (F)		Capacity (MBH)		Condensing Ambient Temp (F)
	DB	WB	DB	WB	Total	Sensible	
25.0	79.3	64.4	49.8	49.5	301.2	226.2	95.0

Coil Information								
PDX Coil Model	Fins Per Inch	Rows Deep	Face Vel. (ft/min)	Coil PD (in. wg)	Refrigerant	Refrig. Velocity (ft/min)	Face Area (ft2)	Suction Temp (F)
DX38S06H12-52x56-LH	12	6	346	0.469	R-410A	1,625	20.2	45.3

Compressor Details					
Lead Compressor Type	Compressor Qty	Compressor RLA (A)		Compressor LRA (A)	
		Comp. #1	Comp. #2	Comp. #1	Comp. #2
Digital Scroll	2	48.1	48.1	245	245

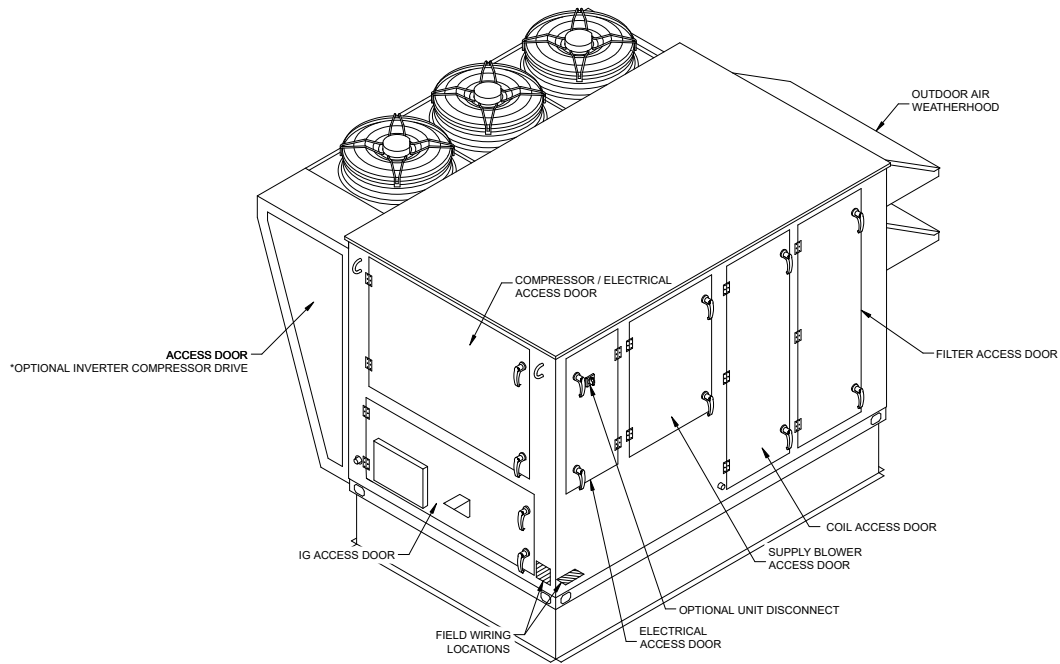
Unit Details	
Refrigerant charges provided by the factory are approximate and may require adjustment in the field	
Hermetic scroll type compressors	
Compressors mounted on neoprene vibration isolation	
Crankcase heater on compressor(s)	
Thermostatic expansion valve	
Stainless steel double sloped drain pan	
Moisture-indicating sight glass	
Service/charging valves	
Refrigerant low pressure switch (auto reset)	
Refrigerant high pressure switch (manual reset)	
Liquid-Line filter drier	
Multiple low sound condensing fans with Lead ECM condensing fan for modulating head pressure control	
Digital scroll compressor	

Heating Performance

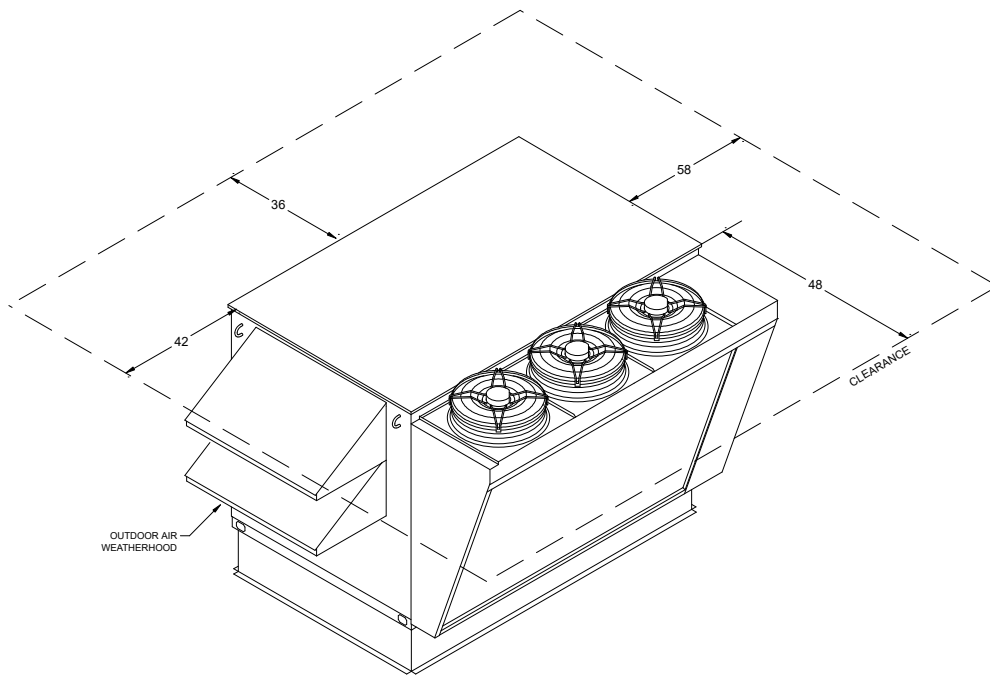
Heating Specifications								
Type	Gas Type	Input (MBH)	Output (MBH)	Temperature Rise		Turndown	Performance	
				Min (F)	Max (F)		EAT (F)	LAT (F)
Indirect Gas	Natural	400.0	320.0	11.0	42.0	4:1	59.2	101.5

Unit Details
ANSI standard Z83.8 and CSA 2.6
High Thermal efficiency
Direct spark ignition
3/4" Gas Connection
At least 6 in. wg of natural gas pressure (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

Isometric Drawings

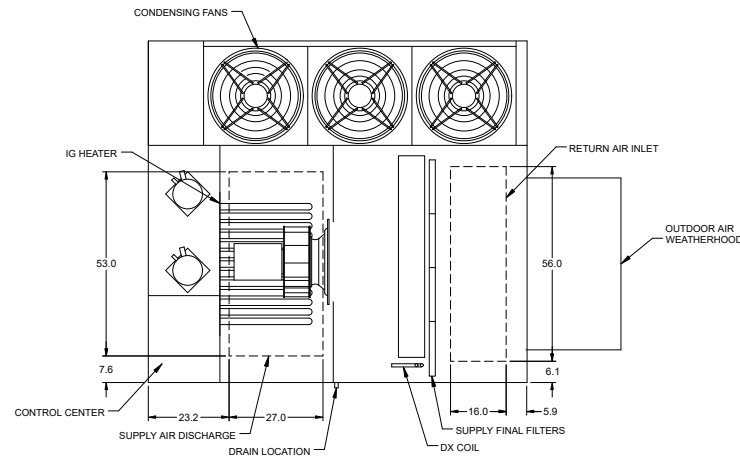


Back Right Isometric

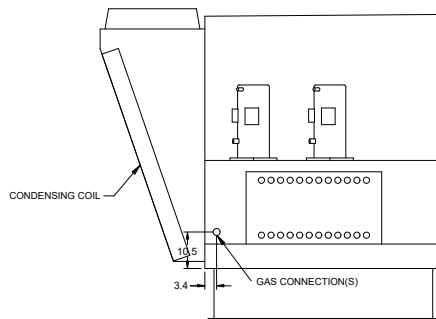


Front Left Isometric

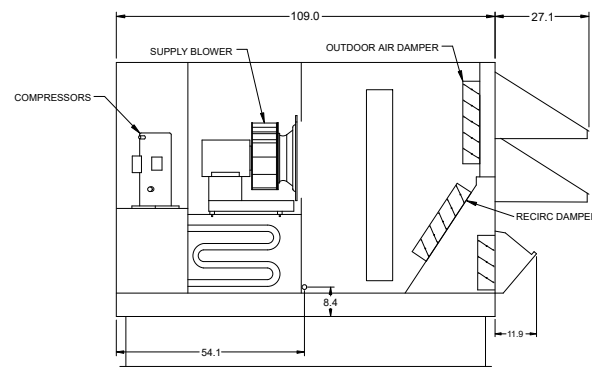
Overview Drawings



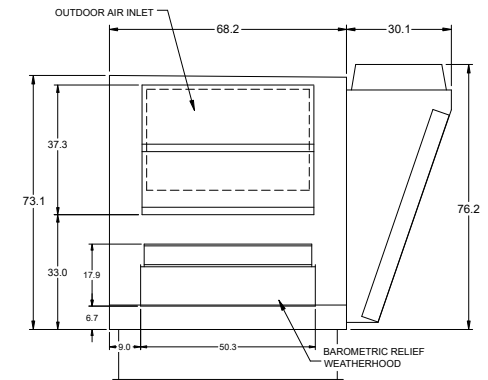
Plan



Left End

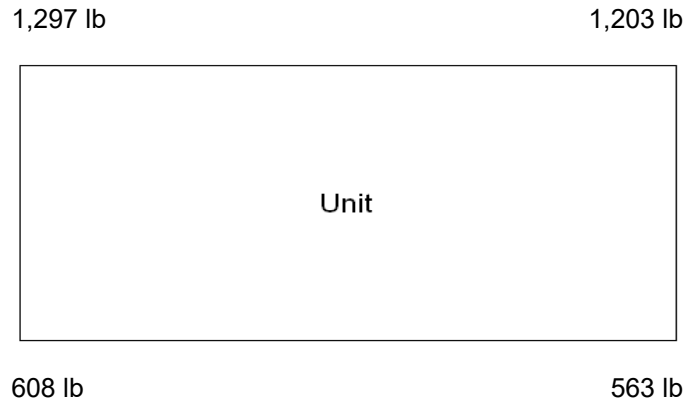


Elevation



Right End

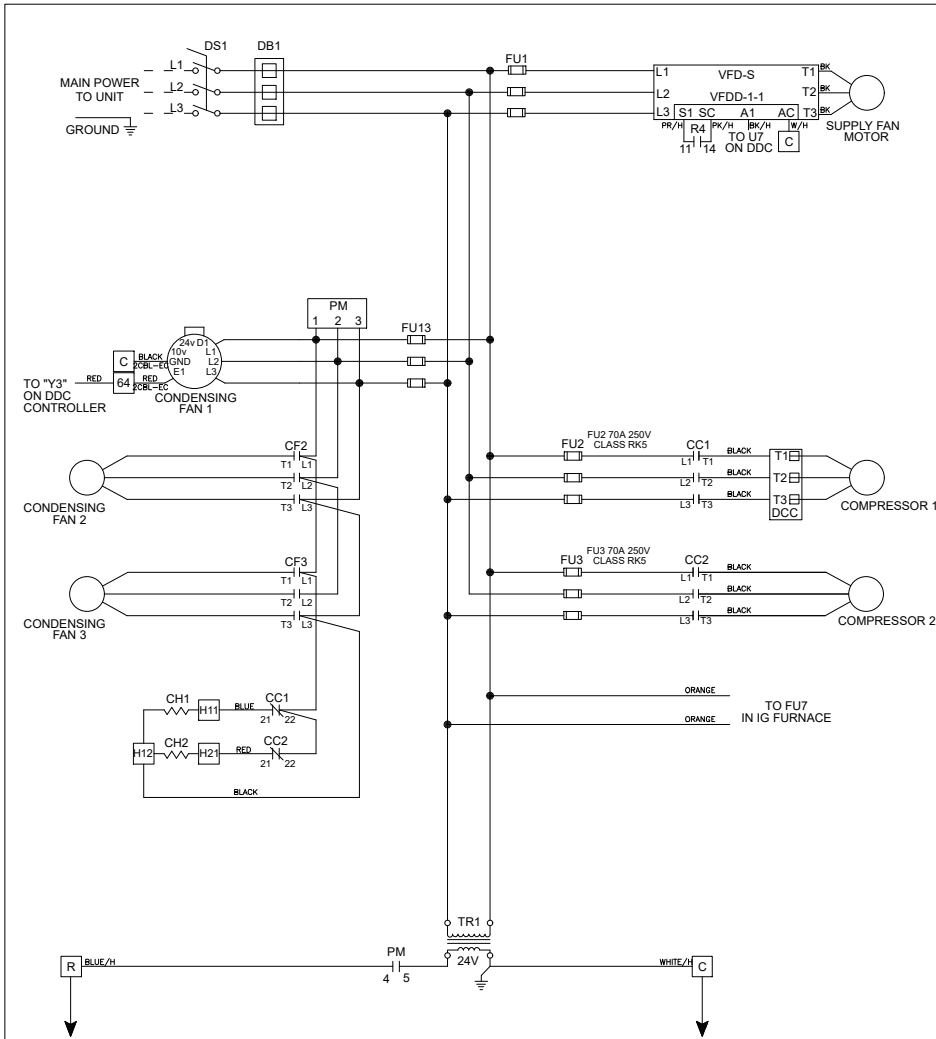
Unit Corner Weights



Note

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

Wiring Diagram



GREENHECK
Building Value in Air.

Wiring Diagram Code:

G13E2A0XK00X04X00GM20G0000XH23

CAUTION

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

NOTES

USE COPPER CONDUCTORS ONLY
60° C FOR TERMINALS RATED LESS THAN 100 AMPS.
75° C FOR TERMINALS RATED 100 AMPS OR MORE.
FIELD CONTROL WIRING RESISTANCE SHOULD NOT EXCEED 0.75 OHM.
FIELD WIRED - - - - -
FACTORY SUPPLIED AND WIRED - - - - -

WIRE COLOR CODE

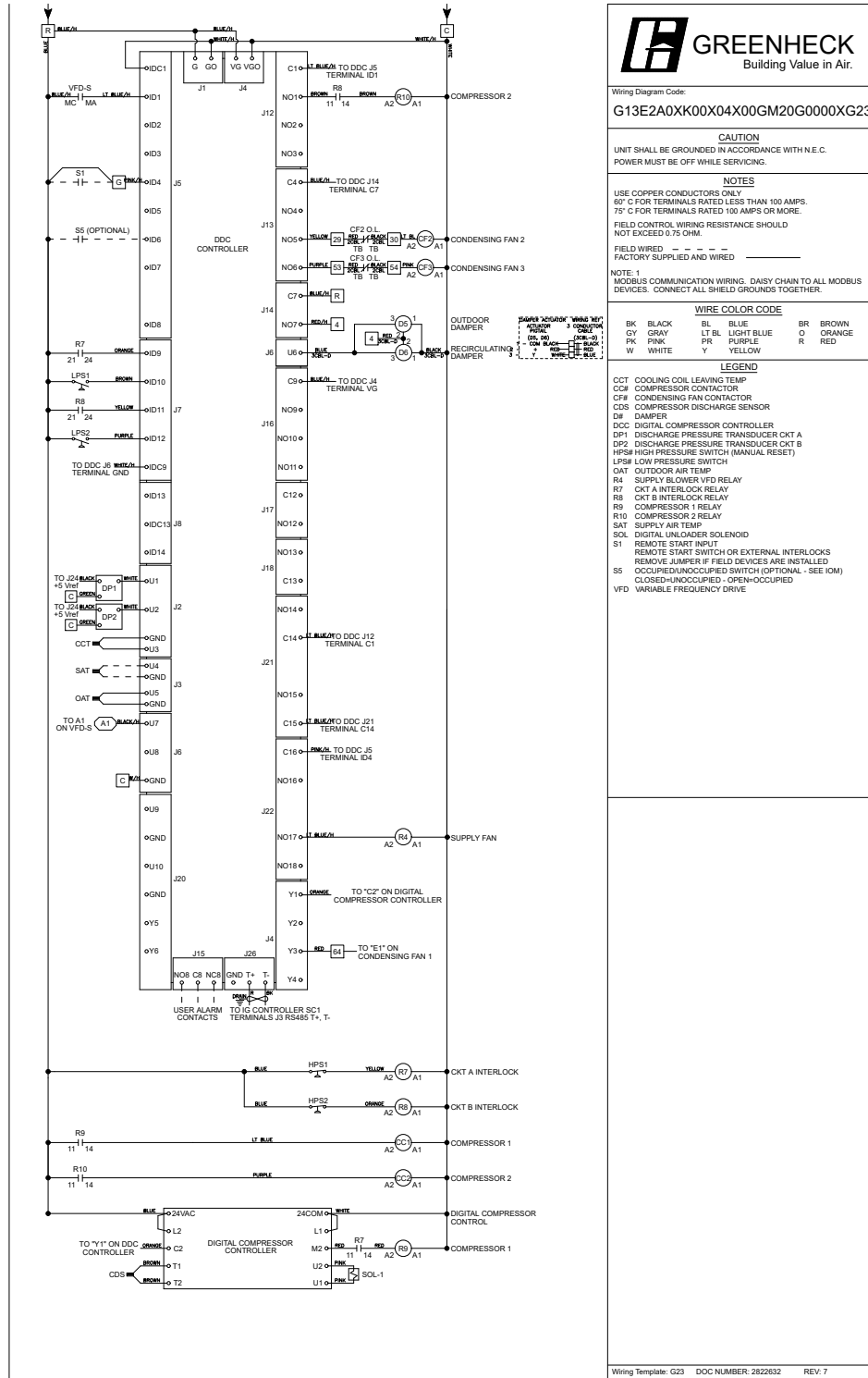
BK	BLACK	BL	BLUE	BR	BROWN
GY	GRAY	LT BL	LIGHT BLUE	O	ORANGE
PK	PINK	PR	PURPLE	R	RED
W	WHITE	Y	YELLOW		

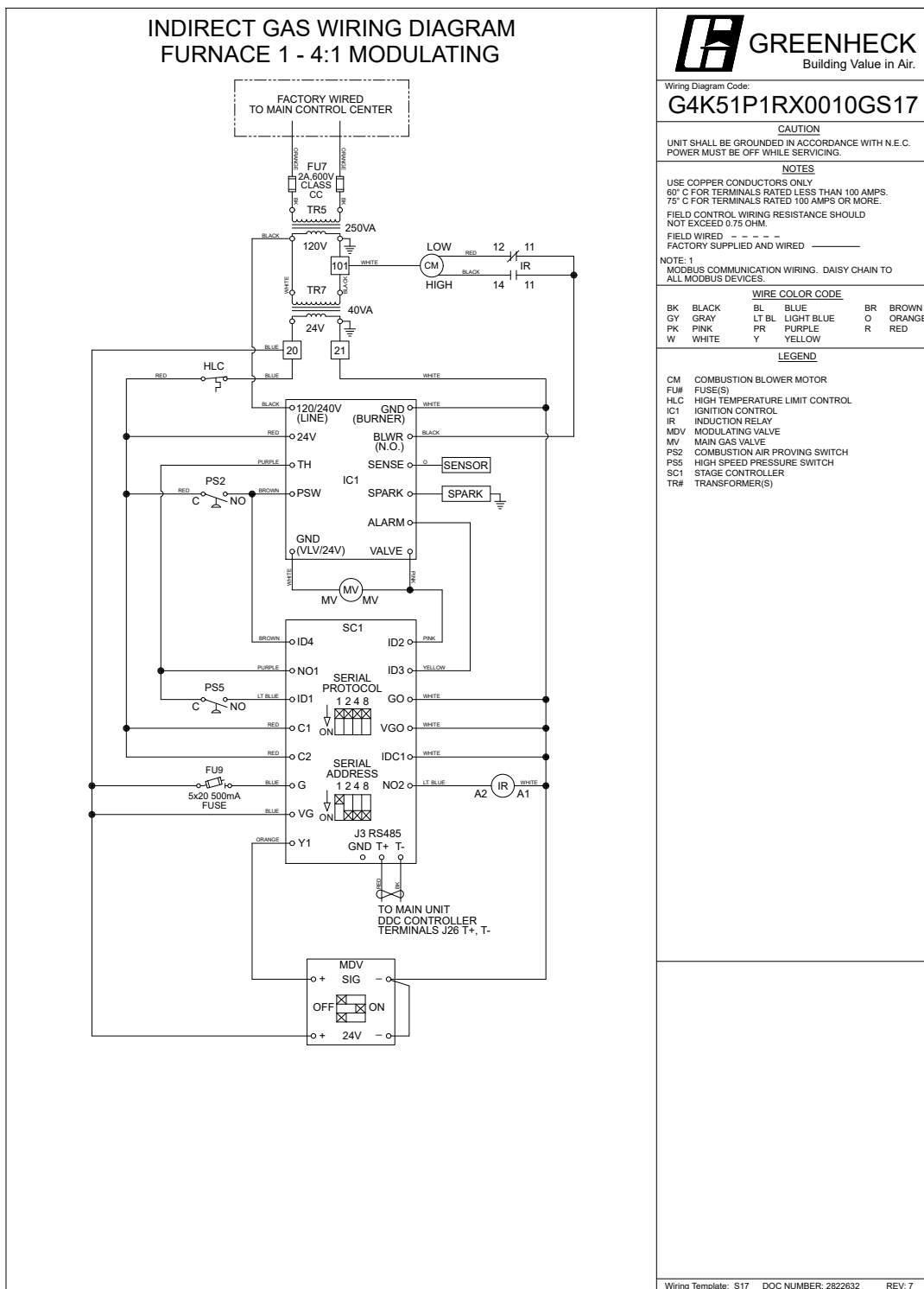
LEGEND

CC# COMPRESSOR CONTACTOR
CF# CONDENSING FAN CONTACTOR
CH# COMPRESSOR SUMP HEATER
DB# POWER DISTRIBUTION BLOCK
DCC DIGITAL COMPRESSOR CONTROLLER
DS DISCONNECT SWITCH
FU# FUSES
PVM PHASE VOLTAGE MONITOR
R4 SUPPLY BLOWER VFD RELAY
TR# TRANSFORMER
VFD VARIABLE FREQUENCY DRIVE

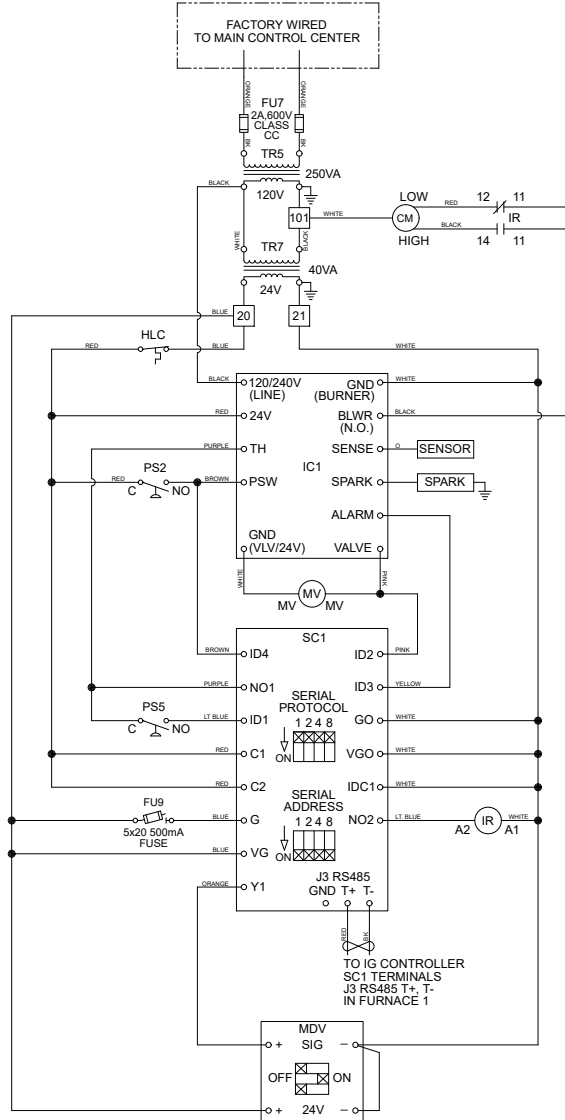
Wiring Template: H23 DOC NUMBER: 2822632 REV: 7

Wiring Diagram 2





INDIRECT GAS WIRING DIAGRAM FURNACE 2 - 4:1 MODULATING



GREENHECK
Building Value in Air.

Wiring Diagram Code:

G4K54P1RX001#OPTBGS17

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
IR	INDUCTION RELAY
MDV	MODULATING VALVE
MV	MAIN GAS VALVE
PS2	COMBUSTION AIR PROVING SWITCH
PS5	HIGH SPEED PRESSURE SWITCH
SC1	STAGE CONTROLLER
TR#	TRANSFORMER(S)

Factory Controller Sequence of Operation

FACTORY CONTROLLER: Controller shall be provided with required sensors and programming for rooftop unit. Controller shall be factory programmed, mounted and tested. Controller shall have a LCD readout for changing set points and monitoring unit operation.

UNIT START COMMAND (Unit will be enabled to start once a jumper is placed between R to G):

- Factory mounted and wired outdoor air and recirculated air damper actuators are powered.
- Supply fan starts after after a (adj.) delay.
- Tempering options to function as described below.

UNIT STOP COMMAND (OR DE-ENERGIZED):

- Supply fan, exhaust fan and tempering options de-energized.
- Outdoor air damper actuator is spring return close, and the recirculated air damper actuator is spring open.

OCCUPIED/UNOCCUPIED MODES: Shall be based on a 7-day time clock internal to the controller. The schedule shall be set by the end user. When a user initiates an override input, the controller will switch from unoccupied to occupied mode. The controller will return to the scheduled occupied/unoccupied mode after the override time has expired. If internal time clock is disabled, a remote contact or a BMS can control the occupied/unoccupied mode.

Occupied Mode:

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

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

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

MORNING WARMUP/COOL DOWN: Prior to occupancy, the unit will run using the warmup or cool down sequence until the occupied set point is achieved. The heating or cooling mode must not be locked out and the space temperature is below or above set point by the unoccupied hysteresis (adj.) (This Sequence must be field configured.)

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

Constant Volume-Adj. Setpoint: The supply blower will operate at a constant speed set point (adj.) during operation.

COOLING SEQUENCE: The cooling is controlled to maintain the supply temperature set point. The mechanical cooling will be locked out when the outside air is < 55 F (adj.).

Packaged DX Cooling (Digital Scroll): The controller will provide a modulating signal for cooling. From 10-50%, the digital scroll will be controlled to maintain discharge temperature. From 50-100% the second stage will be on in combination with the digital scroll compressor to maintain the discharge temperature.

Modulating Head Pressure Control: Lead condenser fan will have an EC motor and will modulate to maintain a head pressure set point.

DEHUMIDIFICATION CONTROL SEQUENCE: The cooling is controlled to maintain the cooling-coil set point. The dehumidification sequence will be locked out when the OA is < 10 F(adj.) above the cold-coil set point (adj.).

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

HEATING SEQUENCE: The heating is controlled to maintain the supply temperature set point. The heating will be locked out when the outside air is > 80 F (adj.).

Indirect Gas Furnace: The controller will modulate the indirect gas furnace to maintain the supply temperature set point (adj.).

TEMPERATURE CONTROL SEQUENCE: The controller will adjust the supply air temperature set point between minimum (adj.) and maximum (adj) limits, to satisfy the desired space temperature setpoint. Adjustable locally or by BMS.

Supply Discharge Temperature Control: The supply set point will be a constant temperature set point from the controller (adj.). Adjustable locally or by BMS.

BUILDING FREEZE PROTECTION: If the supply air temperature drops below 35 F (adj.) for 300s (adj.), the controller will de-energize the unit and activate the alarm output.

TEMPERATURE PROTECTION (Winter Ramp): The controller will enable the outdoor air and recirc. air dampers to modulate in order to help the unit keep up with heating demand in the event of wheel failure or the unit operating outside design conditions. (This can be enabled in the controller.)

ALARMS INDICATION: The controller will display alarms and have one digital output for remote indication of an alarm condition. Possible alarms include:

Supply Air Alarm: The controller monitors the proving switch on supply blower and sends an alarm in the case of the blower proving switch not engaging for 30s (adj.).

DX Alarm: The controller monitors the refrigerant pressure. In the case of low refrigerant pressure the compressors will shut down until refrigerant pressure returns to normal values and the controller will send an alarm. In the case of high refrigerant pressure the compressors will shut down, requiring a manual reset and the controller will send a alarm.

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

ACCESSORIES: The following accessories will be included with the unit to expand the functionality or usability of the controller.

Phase and Brownout Protection: Factory mounted and wired component which monitors the main power coming into the unit. If a phase drops out, or if the incoming voltage exceeds the acceptable range, the component will turn off the unit to help protect the electrical systems.

120V/24V Photoelectric Smoke Detector: Duct smoke detector is shipped loose for field mounting and wiring in the supply air duct. Duct smoke detector contains 2 normally open and 2 normally closed contacts for alarm notification. (To disable unit based off smoke detection smoke detector contacts must be field wired between R and G)

Warranty Statement for Dedicated Outdoor Air Systems (DOAS)

Unit Warranty

Greenheck warrants the equipment to be free from defects in material and workmanship for a period of 12 months from start-up or 18 months from ship date, whichever is less. Initial startup must be completed within six months of the shipment date, and a startup report must be submitted to 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 25 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.

GKD Roof Curb

Model: GKD-63.74/104.4-G14

Curb Height (in.)	Curb Length (in.)	Curb Width (in.)	Material	Finish Type	Duct Adapter	Curb Weight (lb)
14	104.4	63.74	Galvanized	Galvanized	Yes	195

Standard Construction Features:

All dimensions shown are actual and in units of in.'s

If unit is selected with side or end discharge/return, there will not be bottom connections supplied with the curb.

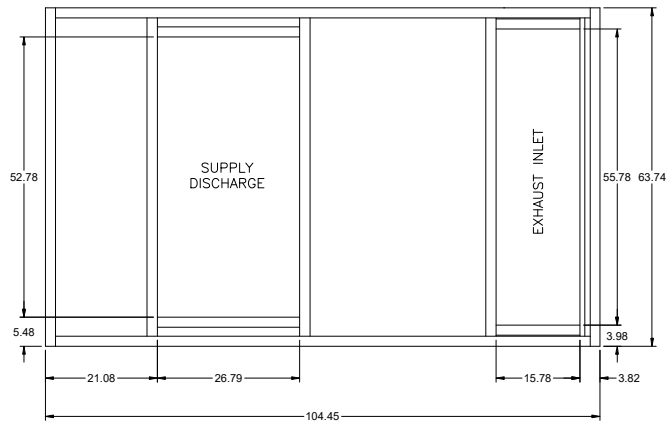
14 gauge galvanized steel (perimeter channels).

14 gauge galvanized steel (interior channels).

Ships knocked down for field assembly.

Curb insulation to be provided by others.

**Top View
of Curb**



**Cross-Section
View of Unit
on Curb**

