Quality People. Building Solutions.

Comfort Systems USA (Arkansas), Inc.
P.O. Box 16620
Little Rock, AR 72231
Phone 501-834-3320
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Date: 5/2/2024
Return Request: 5/12/2024
Project: Little Rock West High School
Supplier: Airetech
Manufacturer: JCI
Submittal: Pkgd. RTU A/C Units
Submittal Number: 23 74 16-01
Drawing # and Installation: Mechanical Drawings

ARCHITECT
Lewis Architects Engineers
11225 Huron Lane, Suite 104
Little Rock, AR 72211
501-223-9302

ENGINEER
Lewis Architects Engineers
11225 Huron Lane, Suite 104
Little Rock, AR 72211
501-223-9302

GENERAL CONTRACTOR
Baldwin & Shell
1000 W. Capitol Ave.
Little Rock, AR 72201
501-374-8677

MECHANICAL SUBCONTRACTOR
Comfort Systems USA (Arkansas), Inc.
9924 Landers Rd.
N. Little Rock, AR 72117
501-834-3320

Notes:

chowell@comfortar.com

SUBMITTAL DATA

EQUIPMENT: JCI Packaged Units

SPEC SECTION:

TAGS: RTUG-3, C-1, W-1

PROJECT: Little Rock West High School

LOCATION: Little Rock, AR

ENGINEER: LEWIS ARCHITECTS ENGINEERS

CONTRACTOR: COMFORT SYSTEMS USA ARKANSAS

DATE: 4/15/2024

SUBMITTED BY: Nick Moore
nick.moore@airetechcorp.com

SUBMITTAL DATA

Order #: **Date:** 04/12/2024

Project: Little Rock West High School Packaged Units

Project #:

Date
04/12/2024
Project Name
Little Rock West High School Packaged Units
Project Number
Client / Purchaser

Submittal Summary Page

Qty	Tag #	Model # / Material #	Description
1	RTU-G3	AD25S3CP4S1CAH46F3	25 Ton, Johnson Controls Choice Single Packaged R-410A Air Conditioner, Two Stage Compressor Operation, Standard Efficiency, Bottom Duct, Natural Gas, Stainless Steel, Staged Heat, High Heat, 400 MBH Input, 460-3-60, 7.5 HP Medium Static Belt Drive Blower • IntelliSpeed control of the VFD based on stages of cooling. Provides Single Zone VAV Fan Operation as defined by ASHRAE 90.1 section 6.4.3.10. • Dual Enthalpy Economizer w/Barometric Relief with Economizer Fault Detection & Diagnostic (Meets ASHRAE 90.1-2013, IECC 2015, California Title 24, AMCA 511) • 2" Pleated Filters (MERV 8) • Smart Equipment Controller including Discharge Air, Return Air, and Outdoor Air Temperature Sensors. BACNet MS/TP, Modbus and N2 Communication Card. • HACR Circuit Disconnect • Phase Monitor • Microchannel condenser coils • Copper tube/Aluminum fin evaporator coils • Modulating Hot Gas Reheat • Hinged Access Panel • Louvered Hail Guard • Polyester SMC Drain Pan • Condensate Overflow(COF)
1	RTU-G3	S1-NSB8BPN241-0	Wall Temperature and 2% Relative Humidity Combined Sensor, Full Display, WHITE, NO JCI LOGO, NS8000 Series
1	RTU-G3	2AQ04700524	CO^2 Space Sensor - Wall Mount Accessory
1	RTU-C1	ZYG12S4B3EB1A124A3	10 Ton, Two Stage Cooling, MagnaDRY Reheat, Johnson Controls Core Single Packaged R-410A Air Conditioner, 220 MBH Two Stage Input Medium Heat Stainless Steel, Gas Heat, 460-3-60 • VFD IntelliSpeed • Medium Static Belt Drive Blower • Smart Equipment Controller including Discharge Air, Return Air, and Outdoor Air Temperature Sensors. BACNet MS/TP, Modbus and N2 Communication Card. • Non-fused Disconnect (60 Amp) • Microchannel All Aluminum Condenser Coil, Copper tube/Aluminum fin Evaporator Coil • Louvered Hail Guards & Hinged Cabinet Doors
1	RTU-C1	S1-NSB8BPN240-0	Wall Temperature and 2% Relative Humidity Combined Sensor, Full Display, WHITE, JCI LOGO, NS8000 Series

Qty	Tag #	Model # / Material #	Description
1	RTU-C1	2PM04700224	Phase Monitor Kit
1	RTU-C1	2EE04707324	Economizer, DB, Horizontal Flow, Large Footprint, Tall Cabinet (with Barometric Relief)
1	RTU-C1	2AQ04700524	CO^2 Space Sensor - Wall Mount Accessory
1	RTU-C1	1RC0457	Curb Rigid 14" (356 mm) Large Footprint
1	RTU-W1	ZYG08S4B3EB1A124A4	7.5 Ton, Two Stage Cooling, MagnaDRY Reheat, Johnson Controls Core Single Packaged R-410A Air Conditioner, 12.0 EER, 180 MBH Two Stage Input Medium Heat Stainless Steel, Gas Heat, 460-3-60 • VFD IntelliSpeed • Medium Static Belt Drive Blower • Smart Equipment Controller including Discharge Air, Return Air, and Outdoor Air Temperature Sensors. BACNet MS/TP, Modbus and N2 Communication Card. • Non-fused Disconnect (60 Amp) • Microchannel All Aluminum Condenser Coil, Copper tube/Aluminum fin Evaporator Coil • Louvered Hail Guards & Hinged Cabinet Doors
1	RTU-W1	S1-NSB8BPN240-0	Wall Temperature and 2% Relative Humidity Combined Sensor, Full Display, WHITE, JCI LOGO, NS8000 Series
1	RTU-W1	2EE04707324	Economizer, DB, Horizontal Flow, Large Footprint, Tall Cabinet (with Barometric Relief)
1	RTU-W1	2AQ04700524	CO^2 Space Sensor - Wall Mount Accessory
1	RTU-W1	1RC0457	Curb Rigid 14" (356 mm) Large Footprint

*RTU-G3 will be provided with a 36" tall plenum curb for horizontal discharge in order to have economizer and barometric relief. Unit can be provided with motorized damper and field installed barometric damper in lieu of economizer for horizontal discharge out of unit and factory curb if approved.

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

Choice 15-27.5 Ton Package

Johnson Controls Single Package R-410A Air Conditioner

Project Name: **Little Rock West High School Packaged Units** Unit Model #: **AD25S3CP4S1CAH46F3**

Quantity: **1** Tag #: **RTU-G3** System: **AD25S3CP4S1CAH46F3**

Cooling Performance		
Total gross capacity	303.3	MBH
Sensible gross capacity	221.9	MBH
Total net capacity	285.8	MBH
Sensible net capacity	204.4	MBH
Efficiency (at ARI)	10.00	EER
Integrated eff. (at ARI)	13.80	IEER
Ambient DB temp.	95.0	°F
Entering DB temp.	80.0	°F
Entering WB temp.	67.0	°F
Evap Coil Leaving DB temp.	57.2	°F
Evap Coil Leaving WB temp.	56.2	°F
Unit Leaving DB temp.	59.0	°F
Unit Leaving WB temp.	56.9	°F
Leaving air temp dew point	55.50	°F
Sound power	84	dB(a)

Refrigerant		
Refrigerant type	R-410A	
Sys1	14 lb	12 oz
Sys2	15 lb	4 oz

Reheat Performance		
Total capacity	160.1	MBH
Sensible capacity	24.2	MBH
Ambient DB temp.	85	°F
Entering DB temp.	75	°F
Entering WB temp.	67	°F
Leaving DB temp.	72.5	°F
Leaving WB temp.	61.7	°F
Power input (w/o blower)	21.36	kW
Gallons of water per hour	15.51	GPM

Gas Heating Performance		
Entering DB temp.	60	°F
Heating output capacity (Max)	324.0	MBH
Supply air	9000	cfm
Heating input capacity (Max)	400	MBH
Leaving DB temp.	93.3	°F
Air temp. rise	33.3	°F
SSE	81.0	%
Stages	2	

Supply Air Blower Performance		
Supply air	9000	cfm
Ext. static pressure	0.8	IWG
Addl. Unit Losses (Options/Accessories)	0.2	IWG
Blower speed	1074	rpm
Max BHP of Motor (including service factor)	8.63	HP
Duct location	Bottom	
Motor rating	7.50	HP
Actual required BHP	5.50	HP
Power input	5.13	kW
Elevation	0	ft
Drive type	BELT	

Outside/Mixed Air		
Outside Air cfm	1000	cfm

Electrical Data		
Power supply	460-3-60	
Unit min circuit ampacity	62.7	A
Unit max over-current protection	80	A

Dimensions & Weight					
Hgt 57 in		Len 144 in		Wth 89 in	
Weight with factory installed options				2480	lb

Clearances							
Right	42	in	Front	80	in	Rear	36 in
Top	120	in	Bottom	0	in	Left	96 in

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

25 Ton

- Manufactured at an ISO 9001 Registered Facility and Each Rooftop is Completely Computer-Run Tested Prior to Shipment.

Unit Features

- Two Stage Compressor Operation
- Two independent refrigerant circuits
- Full Perimeter Base Rails with Built in Rigging Capabilities
- Dual Enthalpy Economizer w/Barometric Relief with Economizer Fault Detection & Diagnostic (Meets ASHRAE 90.1-2013, IECC 2015, California Title 24, AMCA 511)
- 7.5 HP Medium Static Belt Drive Blower
- 2" Pleated Filters (MERV 8)
- Replacement Filters: 9 (16" x 25" x 2" or 4"). Unit accepts 2" or 4" wide filters.
- Units are provided with the selected 2-inch or 4-inch filter and can easily be converted in the field to accept either size in the standard filter rack
- Utility Connections - Gas and electrical utility locations are supplied in the unit underside as well as the side of the unit. Utility connections can be made quickly and with a minimum amount of field labor
- Copper tube/Aluminum fin evaporator coils
- Microchannel condenser coils

Standard Unit Controller: Smart Equipment Control Board

- 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.
- 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.

BAS Controller

- Smart Equipment Controller including Discharge Air, Return Air, and Outdoor Air Temperature Sensors. BACNet MS/TP, Modbus and N2 Communication Card.

Warranty

- One (1) Year Limited Warranty on the Complete Unit
- Five (5) Year Warranty - Compressors and Electric Heater Elements
- Fifteen (15) Year Warranty - Stainless Steel Tubular Heat Exchangers

Choice 15-27.5 Ton Package

Johnson Controls Single Package R-410A Air Conditioner

Project Name: **Little Rock West High School Packaged Units** Unit Model #: **AD25S3CP4S1CAH46F3**

Quantity: **1** Tag #: **RTU-G3** System: **AD25S3CP4S1CAH46F3**

Additional Electrical Data		
Power supply	460-3-60	
Unit min circuit ampacity	62.7	A
Unit max over-current protection	80	A
Min Voltage	416	V
Max Voltage	508	V
Comp #1 RLA	19.2	
Comp #1 LRA	147	
Comp #2 RLA	19.2	
Comp #2 LRA	147	
Indoor Mtr Voltage	460-3-60	
Indoor Mtr FLA	14.3	
Outdoor Mtr Qty	4	
Outdoor Fan Voltage	460-1-60	
OD Fan Mtr FLA (ea.)	1.3	
Power Ex Mtr Qty (if applicable)	2	
Powered Ex Voltage(if applicable)	460-1-60	
Power Ex Mtr FLA (ea) (if applicable)	2.2	
Combustion Mtr Qty	1	
Combustion Motor Voltage	208/230-1-60	
Combustion Mtr FLA (ea)	0.8	

Choice 15-27.5 Ton Package

Johnson Controls Single Package R-410A Air Conditioner

Project Name: **Little Rock West High School Packaged Units** Unit Model #: **AD25S3CP4S1CAH46F3**

Quantity: **1** Tag #: **RTU-G3** System: **AD25S3CP4S1CAH46F3**

REFRIGERANT DETECTION SYSTEM

RDS SUMMARY (Lowest Elevation Floor Being Served)

*See condition requirements below

		Unit of Measure
Lowest Zone Discharge Height	0	ft
Smallest Zone Area on the Lowest Floor	0	ft²
Min. Allowed Smallest Zone Area	0	ft²
Total Applied Area	0	ft²
Min. Allowed Total Applied Area	0	ft²
Min. Remediation Air Flow	0	cfm
Min. System Exhaust (External to Unit)	0	cfm

JOBSITE INPUTS

Unit of Measure

REFRIGERANT DATA

Refrigerant type	R-410A
Sys1	14 lb 12 oz
Sys2	15 lb 4 oz
Largest Circuit Refrigerant Charge	0 lb

*RDS RULES AND REQUIREMENTS

(Only applies for single refrigerant charge between 4 lb and 169 lb.)

1. RDS is NOT required if all the following conditions are met:

- The largest circuit refrigerant charge < 34 lb.
- Lowest Zone discharge height is ≥ 2 ft.
- The smallest zone area on the lowest floor is ≥ the min. allowed smallest zone area.

2. RDS is required if any of the following conditions are met and the Total Applied Area is ≥ the minimum Allowed Total Applied Area:

- The largest circuit refrigerant charge is ≥ 34 lb.
- The lowest zone discharge height is < 2 ft.
- The smallest zone area on the lowest floor is < the min. allowed smallest zone area.

3. RDS and an additional System Exhaust is required if any of the conditions are met for the RDS and the Total Applied Area is < the minimum Allowed Total Applied Area.

4. RDS is required for Cooling only units. Johnson Controls is requiring the RDS due to the potential installation of an ignition source..

R454B is mildly flammable A2L refrigerant. Unit installation must comply with UL/CSA 60335-2-40 and the installation and operations manual (IOM). The IOM is shipped with the unit and available on Solution Navigator and DS Solutions App.

Choice 15-27.5 Ton Package

Johnson Controls Single Package R-410A Air Conditioner

Project Name: **Little Rock West High School Packaged Units** Unit Model #: **AD25S3CP4S1CAH46F3**

Quantity: **1** Tag #: **RTU-G3** System: **AD25S3CP4S1CAH46F3**

Factory Installed Options

AD25S3CP4S1CAH46F3

Equipment Options		Option(s) Selected
Product Category:	**A**	Johnson Controls Choice Single Packaged R-410A Air Conditioner
Efficiency:	**D**	Standard Efficiency, Bottom Duct
Nominal Cooling Capacity:	**25**	25 Ton
Heat Type:	**S**	Natural Gas, Stainless Steel, Staged Heat
Heat Size:	**3**	High Heat, 400 MBH Input
Blower Option:	**C**	7.5 HP Medium Static Belt Drive Blower
Air Volume:	**P**	Two Stage Compressor Operation IntelliSpeed control of the VFD based on stages of cooling. Provides Single Zone VAV Fan Operation as defined by ASHRAE 90.1 section 6.4.3.10.
Voltage:	**4**	460-3-60
Outside Air Option:	**S**	Dual Enthalpy Economizer w/Barometric Relief with Economizer Fault Detection & Diagnostic (Meets ASHRAE 90.1-2013, IECC 2015, California Title 24, AMCA 511)
Coil Options:	**1**	Microchannel condenser coils Copper tube/Aluminum fin evaporator coils
Controls:	**C**	Smart Equipment Controller including Discharge Air, Return Air, and Outdoor Air Temperature Sensors. BACNet MS/TP, Modbus and N2 Communication Card.
Sensor Options:	**A**	
Service Options:	**H**	HACR Circuit Disconnect Phase Monitor
Refrigeration:	**4**	Modulating Hot Gas Reheat
Additional Options:	**6**	2" Pleated Filters (MERV 8) Louvered Hail Guard
Cabinet Options:	**F**	Hinged Access Panel Polyester SMC Drain Pan Condensate Overflow(COF)
Product Generation:	**3**	

Field Installed Accessories

- ○ 1BD0411 - Burglar Bars (85.0 lbs)
- ○ 1CV0408 - Concentric Diffuser,Flush Mount,24X54
- ○ 1CV0409 - Concentric Diffuser,Flush Mount,28X60

Choice 15-27.5 Ton Package

Johnson Controls Single Package R-410A Air Conditioner

Project Name: **Little Rock West High School Packaged Units** Unit Model #: **AD25S3CP4S1CAH46F3**

Quantity: **1** Tag #: **RTU-G3** System: **AD25S3CP4S1CAH46F3**

- ○ 1CV0417 - Concentric Diffuser,Side Discharge,24X54
- ○ 1CV0418 - Concentric Diffuser,Side Discharge,28X60
- ○ 1CV0424 - Concentric Diffuser,Specialty,42X42
- ○ 1CV0425 - Concentric Diffuser,Specialty,44X44
- ○ 1CV0428 - Concentric Diffuser,Specialty,30X30
- ○ 1CV0430 - Concentric Diffuser,Specialty,42X42
- ○ 1CV0431 - Concentric Diffuser,Specialty,44X44
- ○ 1FE0418 - Flue Exhaust Kit (30.0 lbs)
- ○ 1HA0401 - Natural Gas High Altitude Conversion Kit - For applications between 2000 and 10,000 feet altitude
- ○ 1HA0402 - Propane High Altitude Conversion Kit - For applications between 2000 and 10,000 feet altitude (3.0 lbs)
- ○ 1NP0401 - Propane Conversion Kit (4.0 lbs)
- ○ 1RC0444 - 14" Roof Curb (188.0 lbs)
- ○ 1RC0447 - 24" Roof Curb (260.0 lbs)
- ○ 2AP0402 - Air Proving Switch (1.0 lbs)
- ● 2AQ04700524 - CO^2 Space Sensor - Wall Mount Accessory (5.0 lbs)
- ○ 2AQ04700624 - CO^2 Unit Mount Accessory (4.6 lbs)
- ○ 2DF0403 - Dirty Filter Switch (1.0 lbs)
- ○ 2EC0406 - Single Enthalpy / Reheat Humidity Sensor (3.0 lbs)
- ○ 2EC0407 - Dual Enthalpy Sensing (3.0 lbs)
- ○ 2NC0401 - Non-powered Convenience Outlet (5.0 lbs)
- ○ 2SD04702024 - Supply Air Smoke Detector (8.0 lbs)
- ○ 2SD04703024 - Return Air Smoke Detector (8.0 lbs)
- ○ 2SD04703124 - Supply & Return Air Smoke Detector (12.0 lbs)
- ○ PCCP250PK012LO - One Year Labor Only AC PKG 25T
- ○ PCCP250PK012PL - One Year Renewable Parts & Labor AC PKG 25T
- ○ PCCP250PK060PL - 5 Year Parts and Labor AC PKG 25T
- ○ PCCP250PK060PO - 5 Year Parts Only (No Compressor Coverage) AC PKG 25T
- ○ S1-03102529000 - Non-Networking Wall Sensor – Allows remote sensing and control from single or multiple zones. (0.2 lbs)
- ○ S1-03102529004 - 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)
- ○ S1-03102529006 - 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 ± 5º F. Override allows setpoint to be overridden for 2 hour time period. (0.2 lbs)
- ○ S1-03103489000 - Temp sensor, 80mm x 80mm, LCD display, screw terminals, adjustable setpoint, JCI logo (0.1 lbs)
- ○ S1-03103490000 - Temp sensor w/Economizer FDD, 120mm x 80mm, LCD display, screw terminals, adjustable setpoint, no logo (0.0 lbs)
- ○ S1-03103516000 - Temp & humidity sensor, 120mm x 80mm, LCD display, screw terminals, warmer/cooler dial, JCI logo (0.4 lbs)
- ○ S1-03103517000 - Temp sensor, 120mm x 80mm, no display, no dial, screw terminals, no logo (0.4 lbs)
- ○ S1-03103518000 - Temp & humidity sensor, 120mm x 80mm, no display, modular jack, warmer/cooler dial, JCI logo (0.4 lbs)
- ○ S1-03103519000 - Network Sensor ,CO2, No Display (0.2 lbs)
- ○ S1-LC-TMR100-0 - Transparent Wireless MS/TP Router, Coordinator, or Repeater. Wireless mesh network up 1,000 ft. line-of-sight (250 ft. recommended) (55.1 lbs)
- ○ S1-LC-TMRKIT-0 - NEMA 3R panel with liquid-tight conduit for mounting TMR outdoors. TMR sold separately. (0.3 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)

Choice 15-27.5 Ton Package

Johnson Controls Single Package R-410A Air Conditioner

Project Name: **Little Rock West High School Packaged Units** Unit Model #: **AD25S3CP4S1CAH46F3**

Quantity: **1** Tag #: **RTU-G3** System: **AD25S3CP4S1CAH46F3**

- ○ 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)
- ○ S1-NSB8BTN141-0 - Wall Temperature Sensor, Warmer/Cooler Display, WHITE, NO JCI LOGO, NS8000 Series (0.4 lbs)
- ○ S1-NSB8BTN143-0 - Wall Temperature Sensor, Warmer/Cooler Display, BLACK, NO JCI LOGO, NS8000 Series (0.4 lbs)
- ○ S1-NSB8BTN240-0 - Wall Temperature Sensor, Full Display, WHITE, JCI LOGO, NS8000 Series (0.4 lbs)
- ○ S1-NSB8BTN241-0 - Wall Temperature Sensor, Full Display, WHITE, NO JCI LOGO, NS8000 Series (0.4 lbs)
- ○ S1-NSB8BTN243-0 - Wall Temperature Sensor, Full Display, BLACK, NO JCI LOGO, NS8000 Series (0.4 lbs)
- ○ S1-SE-COM1001-0 - Field Installed Communication Card for Simplicity SE control. Can be field configurable for BACnet, N2 or ModBUS MSTP (0.0 lbs)
- ○ S1-TBSU309-Y - York Branded, 2 Heating 4 Cooling stages, 7-Day Programmable, Humidity and IAQ sensors, Title 24 OpenADR compliant. (0.6 lbs)
- ○ S1-TC500A-N - Honeywell TC500A, 5 Heat 3 Cool Heat Pump, 3 Heat 4 Cool conventional utiizing Aux output , Auto/Man Changeover, Electronic 7 Day Programmable, Networkable with BACnet MS/TP, BACnet IP over Wi-Fi, Wi-Fi 802.11 b/g/n (2.0 lbs)
- ○ S1-TEC3030-14-000 - 7 DAY PROGRAMMABLE THERMOSTAT, ZIGBEE PRO WIRELESS COMMUNICATION, RTU/HEAT PUMP WITH ECON,FULL COLOR, WHITE, JCI LOGO (0.8 lbs)
- ○ S1-TEC3030-16-000 - 7 DAY PROGRAMMABLE THERMOSTAT, ZIGBEE PRO WIRELESS COMMUNICATION, RTU/HEAT PUMP WITH ECON, AND FULL COLOR, WHITE, NO LOGO (0.8 lbs)
- ○ S1-TEC3031-14-000 - 7 DAY PROGRAMMABLE THERMOSTAT, ZIGBEE PRO WIRELESS COMMUNICATION, RTU/HEAT PUMP WITH ECON, OCC SENSOR, FULL COLOR, WHITE, JCI LOGO (0.8 lbs)
- ○ S1-TEC3031-16-000 - 7 DAY PROGRAMMABLE THERMOSTAT, ZIGBEE PRO WIRELESS COMMUNICATION, RTU/HEAT PUMP WITH ECON, OCC SENSOR, FULL COLOR, WHITE, NO LOGO (0.8 lbs)
- ○ S1-TEC3630-14-000 - 7 DAY PROGRAMMABLE THERMOSTAT, OPTIONAL MSTP OR N2 COMMUNICATION, RTU/HEAT PUMP WITH ECON,FULL COLOR, WHITE, JCI LOGO (0.8 lbs)
- ○ S1-TEC3631-14-000 - 7 DAY PROGRAMMABLE THERMOSTAT, OPTIONAL MSTP OR N2 COMMUNICATION, RTU/HEAT PUMP WITH ECON, OCC SENSOR, FULL COLOR, WHITE, JCI LOGO (0.8 lbs)
- ○ S1-TEC3631-16-000 - 7 DAY PROGRAMMABLE THERMOSTAT, OPTIONAL MSTP OR N2 COMMUNICATION, RTU/HEAT PUMP WITH ECON, OCC SENSOR, FULL COLOR, WHITE, NO LOGO (0.8 lbs)
- ○ S1-YK-MAP1810-0P - MAP (Multiple Access Portal) Gateway- For use with SimplicitySE Control. (0.2 lbs)
- ○ S1-YK-MAP1810-0S - Stationary MAP Gateway (Includes MAP Gateway, Field Bus Adapter, Mounting Bracket and 100 to 240 VAC Power Supply). US-compatible counties. (1.9 lbs)
- ○ S1-ZFR-CBLEXT-1 - 10 FT Network Cable w/male RJ12 connections. Use to connect TMR to SSE 5.0 or SBH (1.0 lbs)

Choice 15-27.5 Ton Package

Johnson Controls Single Package R-410A Air Conditioner

Project Name: **Little Rock West High School Packaged Units**

Unit Model #: **AD25S3CP4S1CAH46F3**

Quantity: **1** Tag #: **RTU-G3**

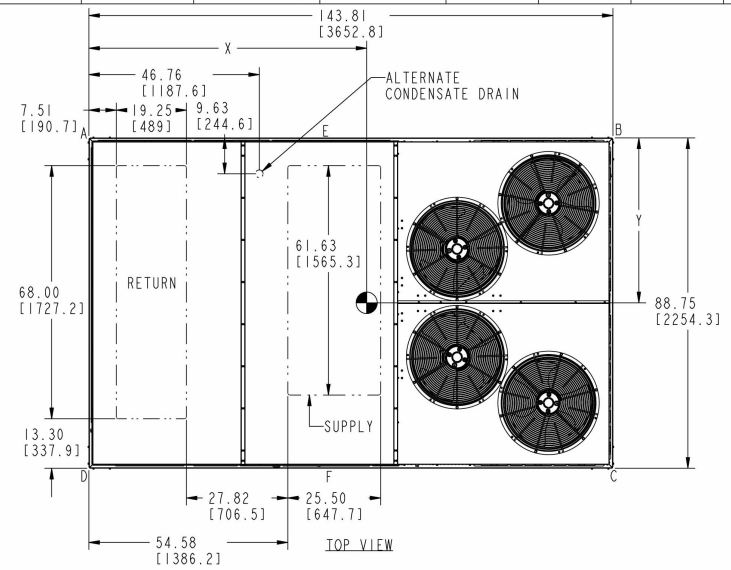
25 Ton Consolidated Drawing

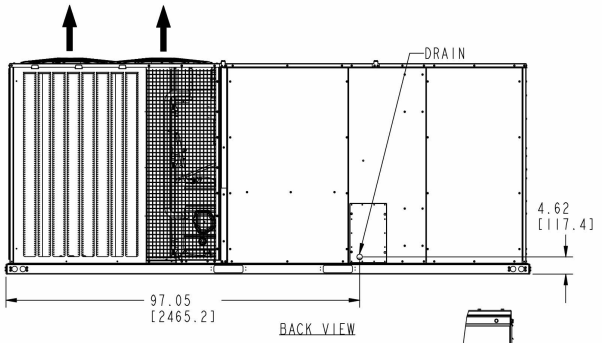
NOTES:
1. FOR OUTDOOR USE ONLY.
2. WEIGHTS SHOWN ARE FOR COOLING ONLY UNITS.
3. RECOMMENDED MIN. CLEARANCES:
   RIGHT SIDE: 42 [1067]
   LEFT SIDE: 18 [457]
   FRONT: 80 [2032]
   REAR: 36 [914]
   TOP: 120 [3048]
   W/ECONOMIZER/POWER EXHAUST: 96 [2438]
4. FOR SMALLER SERVICE AND OPERATIONAL CLEARANCES CONTACT YOUR APPLICATION ENGINEERING DEPARTMENT.
5. 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 THE ACCESSORY ROOF CURBS.
6. MINIMUM CONDENSATION TRAP HEIGHT SHALL BE 1.5 TIMES THE LOWEST NEGATIVE STATIC.
7. DIMENSIONS IN [ ] ARE IN MILLIMETERS OR KILOGRAMS.
8. OPTIONAL COIL GAURDS, GAS HEAT, DISCONNECT SWITCH SHOWN.
9. HEAT EXCHANGER IS TYPICAL OF HIGH GAS HEAT OPTION.

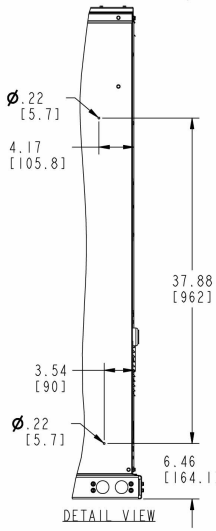
= DIRECTION OF AIRFLOW

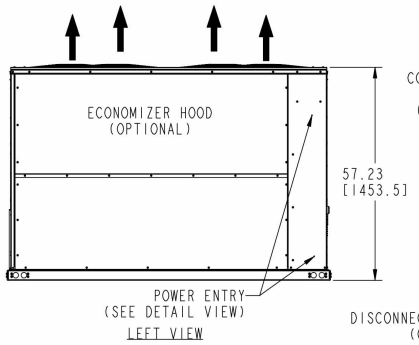
= CENTER OF GRAVITY

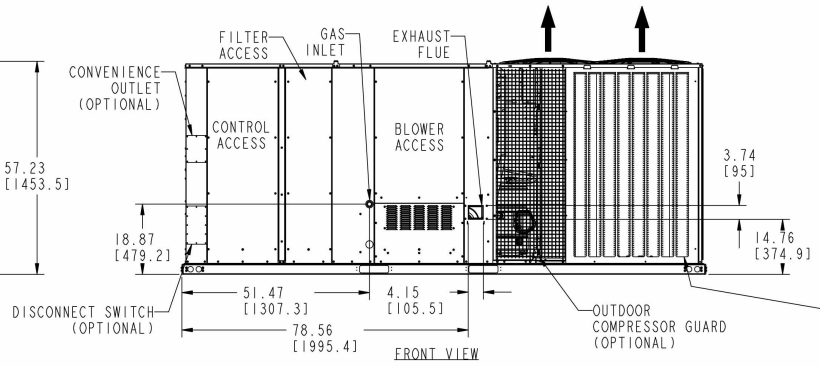
TONNAGE	OPERATING WEIGHT (LBS) (BASE UNIT)	CENTER OF GRAVITY LOCATION (BASE UNIT)		4 POINT CORNER LOADS (LBS) (BASE UNIT)				6 POINT CORNER LOADS (LBS) (BASE UNIT)					
		X	Y	A	B	C	D	A	B	C	D	E	F
25	2090 [948]	70.6 [1793.2]	48.7 [1236.9]	481 [218]	464 [210]	562 [255]	583 [264]	322 [146]	307 [139]	373 [169]	391 [177]	315 [143]	382 [173]

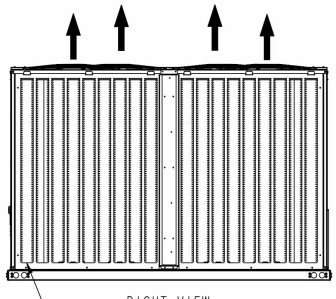






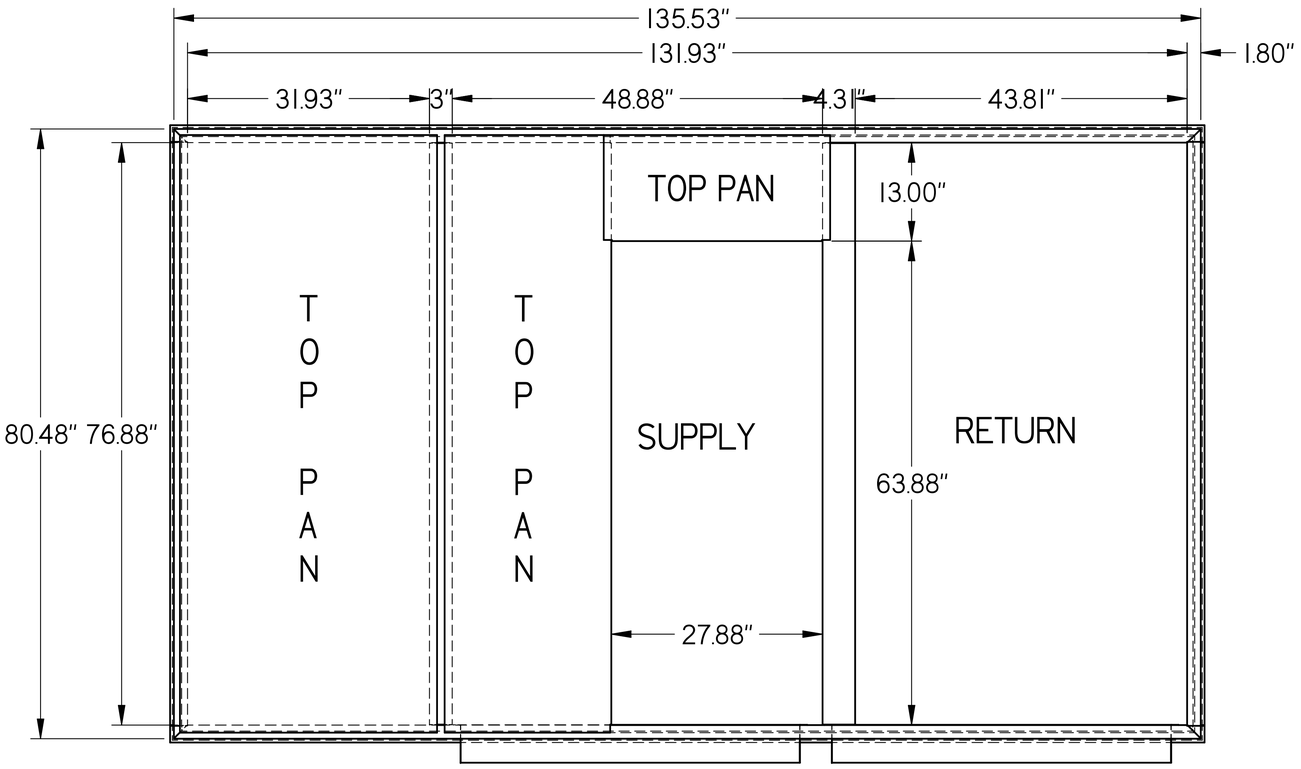


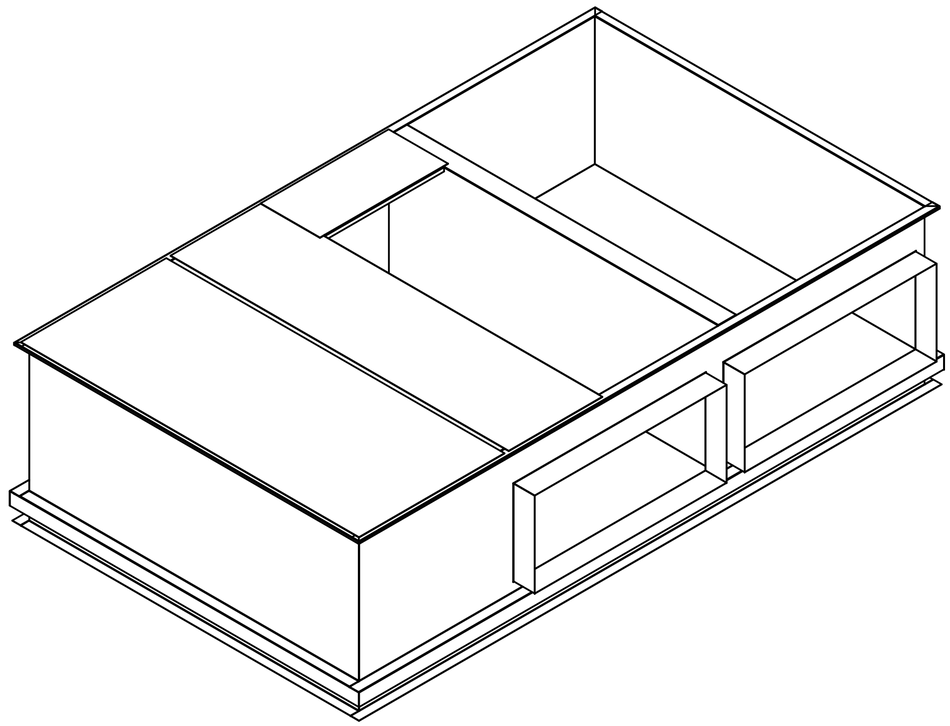


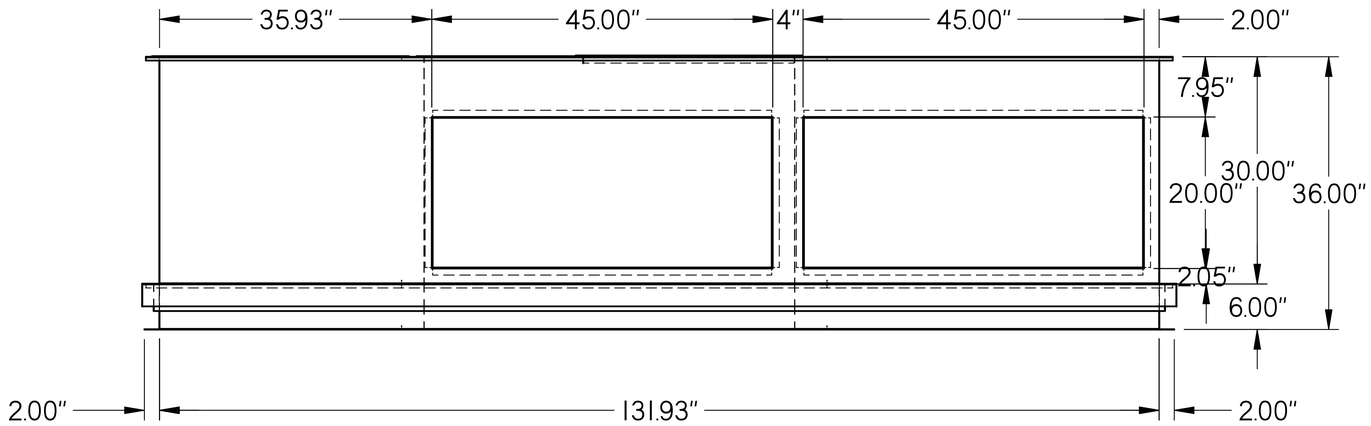


JOB NAME:	LITTLE ROCK WEST HS		
TAG:	RTU-G3	APPROVED BY:	DATE:
	APPROXIMATE WEIGHT:	*"IN THE ABSENCE OF A SIGNED DRAWING, MGM PRODUCTS ACCEPTS THE P.O AS CONFIRMATION OF WHAT IS TO BE BUILT"*	

REVISION HISTORY			
REV	DESCRIPTION	DATE	ENGINEER
1	INITIAL DRAWING	04/15/24	A.B.







MGM PRODUCTS, INC.

1080 CULPEPPER DRIVE CONYERS, GA 30094
PHONE: (770) 483-0055; (800) 341-3536 FAX: (770) 483-0130
WWW.MGMPRODUCTS.COM

NOTES:

1. 14GA G90 CONSTRUCTION
2. EACH CURB IS FULLY WELDED
3. TOP CURB = 1" BLACK DUCT LINER INSULATION
4. BASE CURB = 1" FOIL FACED INSULATION; SOLID BOTTOM; 1X4 WOOD NAILER

TITLE	AD25S 36" TALL TWO-PIECE HORIZ FRC		
	NAME	DATE	Q# 61308
DRAWN	A.B.	4/15/2024	
WEIGHT			
SHEET	SHEET 1 OF 1		
FILE NAME	[ADS25]-[36" TALL]-[TWO-PIECE HORIZ FRC]-[RTU-G3].DFT		

Choice 15-27.5 Ton Package

Johnson Controls Single Package R-410A Air Conditioner

Project Name: **Little Rock West High School Packaged Units**

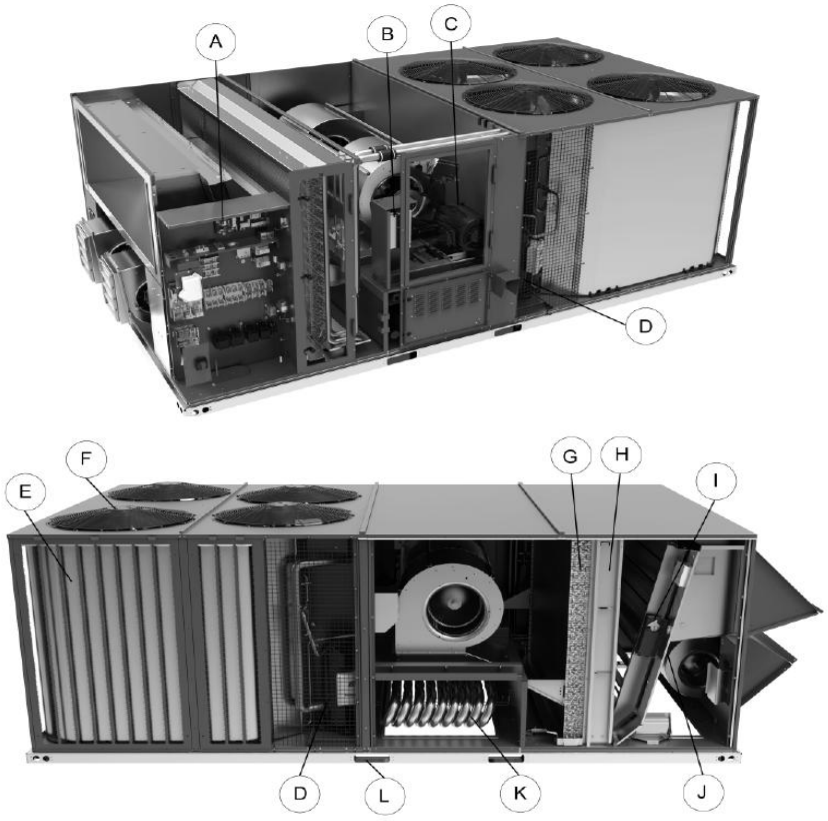
Unit Model #: **AD25S3CP4S1CAH46F3**

Quantity: **1** Tag #: **RTU-G3**

Component Location

Unit components

Figure 1: Component location



The previous figure shows the AVXX model. The following table lists the components of the unit.

Table 1: Component location table

Item	Description	Item	Description
A	Smart Equipment ™ controls	G	Copper tube/aluminum fin evaporator coil
B	Optional variable frequency drive	H	Filter access, 2-inch or 4-inch filter options
C	Belt drive blower motor with dual centrifugal fan design	I	Optional economizer. Optional manual or motorized outside air dampers not shown.
D	Scroll compressors in various arrangements to produce 2 or 4 stages of cooling depending on the selected model	J	Optional powered exhaust. Optional barometric relief not shown.
E	MicroChannel condenser coils	K	Optional staged or modulating gas heat with aluminized or stainless steel heat exchanger
F	Condenser fans	L	Full perimeter base rails with holes for overhead rigging

Project Name: **Little Rock West High School Packaged Units**

Unit Model #: **AD25S3CP4S1CAH46F3**

Quantity: **1** Tag #: **RTU-G3**

Typical Installation

Typical installation

The following figures show the typical installations for the unit.

Figure 14: Roof jack installation

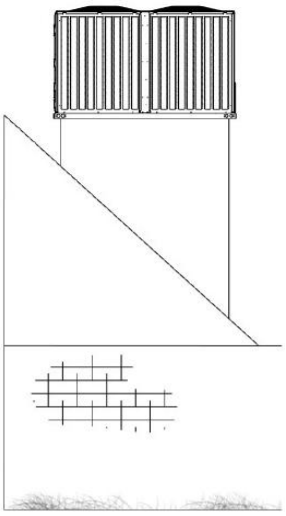
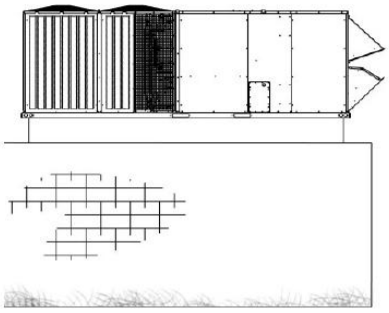


Figure 15: Roof curb installation



Project Name: **Little Rock West High School Packaged Units**

Unit Model #: **AD25S3CP4S1CAH46F3**

Quantity: **1** Tag #: **RTU-G3**

Economizer Drawing

Economizer options

Figure 13: Economizer options

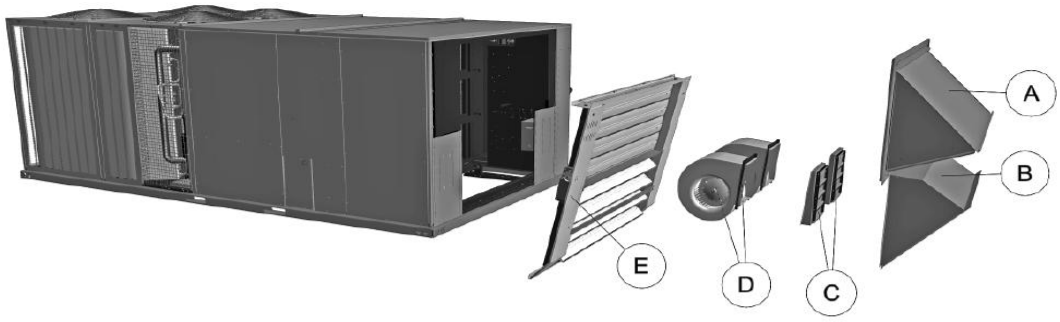


Table 38: Economizer components

Item	Description
A	Fresh air hood
B	Power exhaust hood
C	Power exhaust damper
D	Power exhaust
E	Low leak economizer

Project Name: **Little Rock West High School Packaged Units**

Unit Model #: **AD25S3CP4S1CAH46F3**

Quantity: **1** Tag #: **RTU-G3**

Rainhood Drawing

Rain hood dimensions

Figure 8: Rain hood dimensions

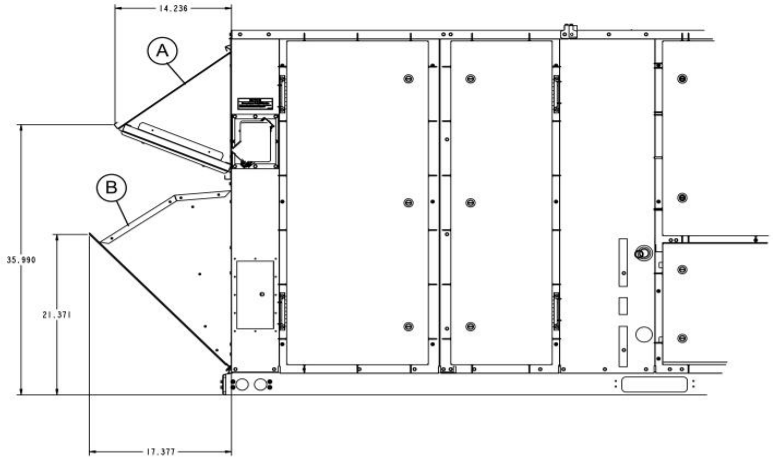


Table 32: Rain hood components

Item	Description
A	Economizer/motorized damper and power exhaust rain hood
B	Air intake hood

Johnson-Controls® Core 3-12.5 Ton Package

Single Package R-410A Air Conditioner

Project Name: **Little Rock West High School Packaged Units** Unit Model #: **ZYG12S4B3EB1A124A3**

Quantity: **1** Tag #: **RTU-C1** System: **ZYG12S4B3EB1A124A3**

Cooling Performance		
Total gross capacity	122.4	MBH
Sensible gross capacity	85.1	MBH
Total net capacity	114.6	MBH
Sensible net capacity	77.3	MBH
Efficiency (at ARI)	12.00	EER
Integrated eff. (at ARI)	14.60	IEER
Ambient DB temp.	95.2	°F
Entering DB temp.	80.0	°F
Entering WB temp.	67.0	°F
Evap Coil Leaving DB temp.	56.5	°F
Evap Coil Leaving WB temp.	55.3	°F
Unit Leaving DB temp.	58.7	°F
Unit Leaving WB temp.	56.1	°F
Leaving air temp dew point	54.50	°F
Power input (w/o blower)	8.51	kW
Sound power	87	dB(a)

Refrigerant		
Refrigerant type	R-410A	
Sys1	6 lb	12 oz
Sys2	6 lb	10 oz

Reheat Performance		
Total capacity	52.9	MBH
Sensible capacity	7.6	MBH
Ambient DB temp.	85	°F
Entering DB temp.	75	°F
Entering WB temp.	67	°F
Leaving DB temp.	72.9	°F
Leaving WB temp.	62.4	°F
Power input (w/o blower)	3.72	kW
Gallons of water per hour	5.17	GPM

Gas Heating Performance		
Entering DB temp.	60	°F
Heating output capacity (Max)	176.0	MBH
Supply air	3400	cfm
Heating input capacity (Max)	220	MBH
Leaving DB temp.	108.6	°F
Air temp. rise	48.6	°F
SSE	80.0	%
Stages	2	

Supply Air Blower Performance		
Supply air	3400	cfm
Ext. static pressure	0.8	IWG
Addl. Unit Losses (Options/Accessories)	0.55	IWG
Blower speed	972	rpm
Max BHP of Motor (including service factor)	3.70	HP
Duct location	Side	
Motor rating	3.70	HP
Actual required BHP	2.44	HP
Power input	2.28	kW
Elevation	1152	ft
Drive type	BELT	

Electrical Data		
Power supply	460-3-60	
Unit min circuit ampacity	23.6	A
Unit min over-current protection	25	A
Unit max over-current protection	30	A

Dimensions & Weight					
Hgt	55 in	Len	87 in	Wth	62 in
Weight with factory installed options				1062	lb

Clearances					
Right	18 in	Front	48 in	Rear	36 in
Top	72 in	Bottom	1 in	Left	12 in

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

10 Ton

- All 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
- 220 MBH Two Stage Input Medium Heat Stainless Steel
- 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
- Scroll Compressors
- Medium Static Belt Drive Blower
- Solid Core Liquid Line Filter Driers
- Unit Ships with 2" Throwaway Filters
- Replacement Filters: 4 - (20" x 20"). Unit accepts 2" or 4" wide filters.
- Single Point Power Connection
- Short Circuit Current: 5kA RMS Symmetrical
- Non-fused Disconnect (60 Amp)
- Microchannel All Aluminum Condenser Coil, Copper tube/Aluminum fin Evaporator Coil
- MagnaDRY Reheat

Standard Unit Controller

- 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, Allows all units to operate in the cooling mode down to 0 °F outdoor ambient without additional components or intervention.
- Smart Equipment Control Board
- On-Board Diagnostic and Fault Code display

BAS Controller

- Smart Equipment Controller including Discharge Air, Return Air, and Outdoor Air Temperature Sensors. BACNet MS/TP, Modbus and N2 communication card.

Warranty

- One (1) Year Limited Warranty on the Complete Unit
- Five (5) Year Warranty - Compressors
- Fifteen (15) Year Warranty - Stainless Steel Tubular Heat Exchangers

Johnson-Controls® Core 3-12.5 Ton Package

Single Package R-410A Air Conditioner

Project Name: **Little Rock West High School Packaged Units** Unit Model #: **ZYG12S4B3EB1A124A3**

Quantity: **1** Tag #: **RTU-C1** System: **ZYG12S4B3EB1A124A3**

Additional Electrical Data		
Power supply	460-3-60	
Unit min circuit ampacity	23.6	A
Unit max over-current protection	30	A
Min Voltage	432	V
Max Voltage	504	V
Comp #1 RLA	7.1	
Comp #1 LRA	62.0	
Comp #2 RLA	7.1	
Comp #2 LRA	62.0	
Indoor Mtr Voltage	460-3-60	
Indoor Mtr FLA	4.7	
Outdoor Mtr Qty	1	
Outdoor Fan Voltage	460-3-60	
OD Fan Mtr FLA (ea.)	2.9	
Power Ex Mtr Qty (if applicable)	2	
Powered Ex Voltage(if applicable)	460-3-60	
Power Ex Mtr FLA (ea) (if applicable)	0.5	
Combustion Mtr Qty	1	
Combustion Motor Voltage	208/230-1-60	
Combustion Mtr FLA (ea)	0.08	

Johnson-Controls® Core 3- 12.5 Ton Package

Single Package R-410A Air Conditioner

Project Name: **Little Rock West High School Packaged Units** Unit Model #: **ZYG12S4B3EB1A124A3**

Quantity: **1** Tag #: **RTU-C1** System: **ZYG12S4B3EB1A124A3**

REFRIGERANT DETECTION SYSTEM

RDS SUMMARY (Lowest Elevation Floor Being Served)

*See condition requirements below

		Unit of Measure
Lowest Zone Discharge Height		ft
Smallest Zone Area on the Lowest Floor		ft²
Min. Allowed Smallest Zone Area		ft²
Total Applied Area		ft²
Min. Allowed Total Applied Area	0	ft²
Min. Remediation Air Flow	0	cfm
Min. System Exhaust (External to Unit)	0	cfm

JOBSITE INPUTS

Unit of Measure

REFRIGERANT DATA

Refrigerant type	R-410A
Sys1	6 lb 12 oz
Sys2	6 lb 10 oz
Largest Circuit Refrigerant Charge	0 lb

*RDS RULES AND REQUIREMENTS

(Only applies for single refrigerant charge between 4 lb and 169 lb.)

1. RDS is NOT required if all the following conditions are met:

- The largest circuit refrigerant charge < 34 lb.
- Lowest Zone discharge height is ≥ 2 ft.
- The smallest zone area on the lowest floor is ≥ the min. allowed smallest zone area.

2. RDS is required if any of the following conditions are met and the Total Applied Area is ≥ the minimum Allowed Total Applied Area:

- The largest circuit refrigerant charge is ≥ 34 lb.
- The lowest zone discharge height is < 2 ft.
- The smallest zone area on the lowest floor is < the min. allowed smallest zone area.

3. RDS and an additional System Exhaust is required if any of the conditions are met for the RDS and the Total Applied Area is < the minimum Allowed Total Applied Area.

4. RDS is required for Cooling only units. Johnson Controls is requiring the RDS due to the potential installation of an ignition source..

R454B is mildly flammable A2L refrigerant. Unit installation must comply with UL/CSA 60335-2-40 and the installation and operations manual (IOM). The IOM is shipped with the unit and available on Solution Navigator and DS Solutions App.

Johnson-Controls® Core 3-12.5 Ton Package

Single Package R-410A Air Conditioner

Project Name: **Little Rock West High School Packaged Units** Unit Model #: **ZYG12S4B3EB1A124A3**

Quantity: **1** Tag #: **RTU-C1** System: **ZYG12S4B3EB1A124A3**

Factory Installed Options

ZYG12S4B3EB1A124A3

Equipment Options		Option(s) Selected
Product Category:	**ZY**	Johnson Controls Core Single Packaged R-410A Air Conditioner
Heat Type:	**G**	Gas Heat
Nominal Cooling Capacity:	**12**	10 Ton Two Stage Cooling
Heat Size:	**S**	220 MBH Two Stage Input Medium Heat Stainless Steel
Voltage:	**4**	460-3-60
Airflow:	**B**	Medium Static Belt Drive Blower
Airflow Options:	**3**	VFD IntelliSpeed
Coil Options:	**E**	Microchannel All Aluminum Condenser Coil, Copper tube/Aluminum fin Evaporator Coil
Controls:	**B**	Smart Equipment Controller including Discharge Air, Return Air, and Outdoor Air Temperature Sensors. BACNet MS/TP, Modbus and N2 Communication Card.
Economizer / Damper:	**A**	
Convenience Outlet:	**1**	
Electrical Options:	**2**	Non-fused Disconnect (60 Amp)
Cabinet Options:	**4**	Louvered Hail Guards & Hinged Cabinet Doors
Special Options:	**A**	
Product Generation:	**3**	

Field Installed Accessories

- ○ 1BD0410 - Burglar Bars (Large Footprint) (32.0 lbs)
- ○ 1CV0404 - Concentric Diffuser,Flush Mount,18X28
- ○ 1CV0405 - Concentric Diffuser,Flush Mount,18X32
- ○ 1CV0413 - Concentric Diffuser,Side Discharge,18X28
- ○ 1CV0414 - Concentric Diffuser,Side Discharge,18X32
- ○ 1CV0420 - Concentric Diffuser,Specialty,24X24
- ○ 1CV0426 - Concentric Diffuser,Specialty,24X24
- ○ 1FE0416 - Flue Extension Kit (18.1 lbs)
- ○ 1HA0455 - High Altitude Kit for Natural Gas - For applications between 2000 and 10,000 feet altitude (1.5 lbs)
- ○ 1HA0459 - High Altitude Kit for Propane - For applications between 2000 and 10,000 feet altitude (1.9 lbs)
- ○ 1HG0424 - Hail Guard Kit (Large Footprint Tall Cabinet) (50.0 lbs)
- ○ 1HS0401 - Heat Shield (0.6 lbs)
- ○ 1NP0457 - Propane Conversion Kit
- ● 1RC0457 - Curb Rigid 14" (356 mm) Large Footprint (135.0 lbs)
- ○ 1RC0459 - Curb Rigid 24" (610 mm) Large Footprint (135.0 lbs)
- ○ 1TB0402 - Large Footprint Thru The Base Electrical & Thru The Curb Gas (1.0 lbs)
- ○ 1TB0404 - Large Footprint Thru The Base Electrical & Gas (1.0 lbs)
- ○ 1WS0416 - Stacking Bracket (230.0 lbs)
- ○ 2EC0401 - Kit, Single Enthalpy Field Installed (1.0 lbs)

Johnson-Controls® Core 3-12.5 Ton Package

Single Package R-410A Air Conditioner

Project Name: **Little Rock West High School Packaged Units** Unit Model #: **ZYG12S4B3EB1A124A3**

Quantity: **1** Tag #: **RTU-C1** System: **ZYG12S4B3EB1A124A3**

- ● 2EE04707324 - Economizer, DB, Horizontal Flow, Large Footprint, Tall Cabinet (with Barometric Relief) (102.0 lbs)
- ● 2AQ04700524 - CO² Space Sensor - Wall Mount Accessory (5.0 lbs)
- ● 2AQ04700524 - CO² Space Sensor - Wall Mount Accessory (5.0 lbs)
- ○ 2AQ04700624 - CO² Unit Mount Accessory (4.6 lbs)
- ○ 2PE04704546 - Power Exhaust Horiz Flow Large Footprint 460V 3-ph (38.8 lbs)
- ● 2PM04700224 - Phase Monitor Kit (1.0 lbs)
- ○ PCCP100PK012LO - One Year Labor Only AC/HP PKG 8.5 to 10T
- ○ PCCP100PK012PL - One Year Renewable Parts & Labor AC/HP PKG 8.5 to 10T
- ○ PCCP100PK060PL - 5 Year Parts and Labor AC/HP PKG 8.5 to 10T
- ○ PCCP100PK060PO - 5 Year Parts Only (No Compressor Coverage) AC/HP PKG 8.5 to 10T
- ○ S1-03102529000 - Non-Networking Wall Sensor – Allows remote sensing and control from single or multiple zones. (0.2 lbs)
- ○ S1-03102529004 - 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)
- ○ S1-03102529100 - 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 ± 5º 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-CTSDTS - CTS Wired Temperature Sensor for thermostat | Duct *Also works for LX Series (0.3 lbs)
- ○ S1-CTSHTS - CTS Hardwired Temperature Sensor for CTS Thermostats *Works with LX series as well (0.2 lbs)
- ○ S1-CTSPLATE - Wall Plate for CTS Thermostats *Also works for new platform LX series models below (0.0 lbs)
- ○ S1-CTSWFTS - CTS Temperature Sensor with WiFi for CTS Thermostats *Also works with LX Series (0.1 lbs)
- ○ S1-LC-TMR100-0 - Transparent Wireless MS/TP Router, Coordinator, or Repeater. Wireless mesh network up 1,000 ft. line-of-sight (250 ft. recommended) (55.1 lbs)
- ○ S1-LC-TMRKIT-0 - NEMA 3R panel with liquid-tight conduit for mounting TMR outdoors. TMR sold separately. (0.3 lbs)
- ○ S1-LXLOCK - Locking Ring For LX-Series Thermostats (0.4 lbs)
- ○ S1-LXPLATE - Wall Plate For LX-Series Thermostats (0.0 lbs)
- ○ S1-LXWFM - For LX Series Thermostats - WiFi Communication (0.1 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-MP-STAFBA-0 - Field Bus Adapter (Includes RJ-12 to 4-position Terminal Block Adapter. Used for interfacing directly to MS/TP Field Bus) (1.0 lbs)
- ○ S1-MP-STAKIT-0 - Stationary Cradle Only (Includes mounting bracket and field bus adapter) (0.1 lbs)
- ○ S1-MP-STAKIT-0H - Stationary Cradle Kit (Includes mounting bracket, field bus adapter, and 100-240 VAC line voltage power supply) (1.0 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)
- ○ S1-NSB8BTN141-0 - Wall Temperature Sensor, Warmer/Cooler Display, WHITE, NO JCI LOGO, NS8000 Series (0.4 lbs)
- ○ S1-NSB8BTN143-0 - Wall Temperature Sensor, Warmer/Cooler Display, BLACK, NO JCI LOGO, NS8000 Series (0.4 lbs)
- ○ S1-NSB8BTN240-0 - Wall Temperature Sensor, Full Display, WHITE, JCI LOGO, NS8000 Series (0.4 lbs)
- ○ S1-NSB8BTN241-0 - Wall Temperature Sensor, Full Display, WHITE, NO JCI LOGO, NS8000 Series (0.4 lbs)
- ○ S1-NSB8BTN243-0 - Wall Temperature Sensor, Full Display, BLACK, NO JCI LOGO, NS8000 Series (0.4 lbs)
- ○ S1-SE-COM1001-0 - Field Installed Communication Card for Simplicity SE control. Can be field configurable for BACnet, N2 or ModBUS MSTP (0.0 lbs)
- ○ S1-TBPU435-S - Source 1 Branded CTS Series | 4.3" Display | 3/4 Stage Heating | 2 Stage Cooling | (5+1+1) 7-day Programmable | WiFi On-Board (0.7 lbs)
- ○ S1-TBPU436-S - Source 1 Branded CTS Series | 3/4 Stage Heating | 2 Stage Cooling | (5+1+1) 7-day Programmable | WiFi and Humidity On-Board (0.7 lbs)
- ○ S1-TBSU232-S - Source 1 Branded LX Series | 2.3" Display | 2 Stage Heating | 2 Stage Cooling | 7-day Programmable (0.2 lbs)
- ○ S1-TBSU304-S - Source 1 Branded LX Series | 3" Display | 2 Stage Heating | 2 Stage Cooling | Non-Programmable | Humidity On-Board (1.0 lbs)
- ○ S1-TBSU306-S - Source 1 Branded LX Series | 3" Display | 3/4 Stage Heating | 2 Stage Cooling | (5+1+1) 7-day Programmable | Humidity On-Board (1.0 lbs)
- ○ S1-TEC3630-16-000 - 7 DAY PROGRAMMABLE THERMOSTAT, OPTIONAL MSTP OR N2 COMMUNICATION, RTU/HEAT PUMP WITH ECON,FULL COLOR, WHITE, NO LOGO (0.8 lbs)
- ○ S1-YK/AN-RSO-ACI - Non-Networking Wall Sensor with Setpoint Adjustment and Over-ride Button – Allows remote sensing and control from single or multiple zones. (1.0 lbs)
- ○ S1-YK-MAP1810-0P - MAP (Multiple Access Portal) Gateway- For use with SimplicitySE Control. (0.2 lbs)
- ○ S1-YK-MAP1810-0S - Stationary MAP Gateway (Includes MAP Gateway, Field Bus Adapter, Mounting Bracket and 100 to 240 VAC Power Supply). US-compatible counties. (1.9 lbs)
- ○ S1-ZFR-CBLEXT-1 - 10 FT Network Cable w/male RJ12 connections. Use to connect TMR to SSE 5.0 or SBH (1.0 lbs)

Johnson-Controls® Core 3-12.5 Ton Package

Single Package R-410A Air Conditioner

Project Name: **Little Rock West High School Packaged Units**

Unit Model #: **ZYG12S4B3EB1A124A3**

Quantity: **1** Tag #: **RTU-C1**

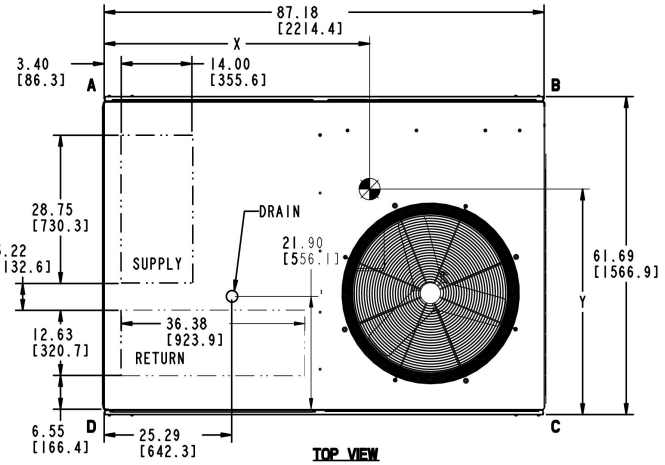
Consolidated Drawing

NOTES:
1. FOR OUTDOOR USE ONLY.
2. WEIGHTS SHOWN ARE FOR COOLING ONLY UNITS.
3. RECOMMENDED MIN. CLEARANCES:
   RIGHT SIDE: 18 [450] W/SIDE CONDENSATE DRAIN: 24 [600]
   LEFT SIDE: 12 [300] W/PIGTAIL: 18 [450]
   FRONT: 48 [1200]
   REAR: 18 [450] W/ECONOMIZER/POWER EXHAUST: 36 [900]
   TOP: 72 [1800]
   BOTTOM: 1 [25]
4. REMOVED.
5. FOR SMALLER SERVICE AND OPERATIONAL CLEARANCES CONTACT YOUR APPLICATION ENGINEERING DEPARTMENT.
6. 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.
7. REMOVED.
8. MINIMUM CONDENSATION TRAP HEIGHT SHALL BE 1.5 TIMES THE LOWEST NEGATIVE STATIC.
9. DIMENSIONS IN [ ] ARE IN MILLIMETERS OR KILOGRAMS.
10. OPTIONAL COIL GUARDS, GAS HEAT, DISCONNECT SWITCH SHOWN.
11. TOP PANEL EMBOSSMENTS NOT SHOWN FOR DIMENSION CLARITY.
12. HEAT EXCHANGER IS TYPICAL OF HIGH GAS HEAT OPTION.

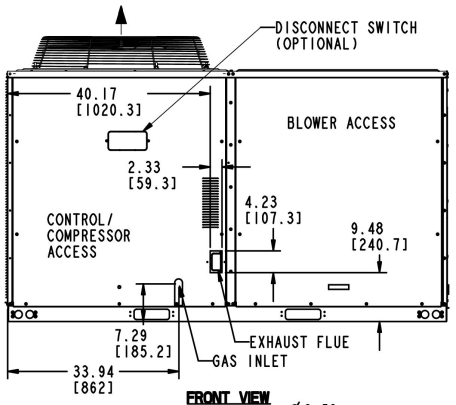
TONNAGE	UNIT	OPERATING WEIGHT (LBS) (BASE UNIT)	CENTER OF GRAVITY LOCATION (BASE UNIT)		4 POINT CORNER LOADS (LBS) (BASE UNIT)			
			X	Y	A	B	C	D
10	ZL	955 [433.2]	45.8 [1163.3]	35.4 [899.2]	258.2 [117.1]	287.1 [130.2]	215.7 [97.8]	194.0 [88.0]
12.5	ZL	980 [444.5]	44 [1117.6]	35.4 [899.2]	276.6 [125.5]	283.0 [128.4]	212.6 [96.4]	207.8 [94.3]
12.5	ZX	941 [426.8]	45 [1143]	36.2 [919]	265.2 [120.3]	284.1 [128.9]	202.5 [91.9]	189 [85.7]
10	ZY	902 [409.1]	46.8 [1189]	35.5 [902]	238.6 [108.2]	277.8 [126]	207.3 [94.1]	178.1 [80.8]

DIRECTION OF AIRFLOW

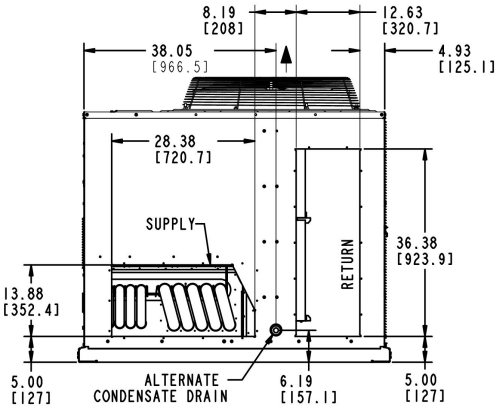
CENTER OF GRAVITY



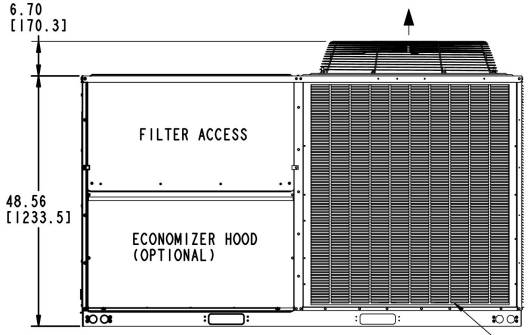
TOP VIEW



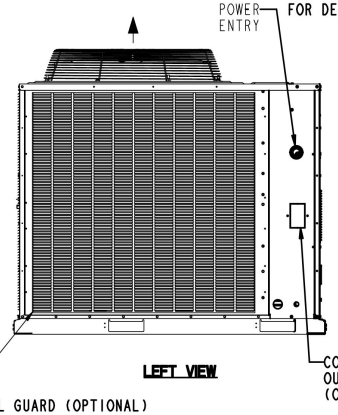
FRONT VIEW



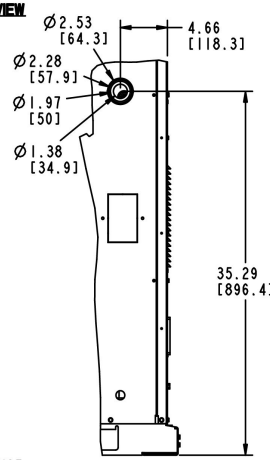
RIGHT VIEW



REAR VIEW



LEFT VIEW



VIEW A
SCALE 0.180

REV LEV	DATE	REVISION RECORD	EC NO	DR	CK	ENG
A	09-13-13	NEW DRAWING	27375	RGG	JC	DW
B	12-03-14	REVISE CLEARANCES (NOTE 3), REMOVE EXTRA DIMS FROM VIEW A	37128	RGG	TPS	AJR
C	10-24-16	CORRECTED 4 POINT CORNER LOAD TABLE, CORRECTED CORNER CALL OUTS ON PRINT		ZAW	TR	TR
D	09-13-19	ADDED "ZL" MODELS	70864	LOP	RCH	AB

THIRD ANGLE PROJECTION

	NAME	DATE
DRN	R. GRAJALES	01-13-16
CHK	S. DOBBS	01-13-16
ENG	C. BOYCE	01-13-16
MFG		

SCALE 0.090

DRAWING PER ASME Y14.5-2009

TOLERANCES UNLESS OTHERWISE SPECIFIED:

ONE PLACE DECIMAL = ± .1
TWO PLACE DECIMAL = ± .03
THREE PLACE DECIMAL = ± .010
ANGLES = ± 2°
DIMENSIONS ARE IN INCHES
DO NOT SCALE PRINT

SUBMITTAL DWG, CDR, 1 ODF, 48.5" CAB

JOHNSON CONTROLS
UNITARY PRODUCTS GROUP
NORMAN, OK 73069

SAFETY AND KEY CHARACTERISTICS PER BE-PDP-STD-01

MATERIAL
TYPE NOT APPLICABLE
ENG SPEC NOT APPLICABLE
SIZE

DWG NO. UST-CDR-10DFLT REV D
PART NO.
SHT NO 1 OF 1

Project Name: **Little Rock West High School Packaged Units**

Unit Model #: **ZYG12S4B3EB1A124A3**

Quantity: **1** Tag #: **RTU-C1**

Field Installed Accessory Weights

Unit Accessory Weights

Unit Accessory	Weights (lbs.)
Vertical Flow Dry Bulb Economizer Small Footprint	63
Horizontal Flow Dry Bulb Economizer Small Footprint Short	96
Horizontal Flow Dry Bulb Economizer Small Footprint Short	75
Horizontal Flow Dry Bulb Economizer Small Footprint Tall	81
Horizontal Flow Dry Bulb Economizer Large Footprint Short	105
Horizontal Flow Dry Bulb Economizer Large Footprint Tall	102
Power Exhaust Vert Flow Small Footprint	38
Power Exhaust Vert Flow Large Footprint	38
Power Exhaust Horiz Flow Small Footprint	38
Power Exhaust Horiz Flow Large Footprint	38
Hail Guard Kit Small Short Factory Installed	19
Hail Guard Kit Small Tall Factory Installed	24
Hail Guard Kit Large Short Factory Installed	50
Hail Guard Kit Large Tall Factory Installed	50
Curb Rigid 14" Small Footprint	145
Curb Rigid 24" Small Footprint	135
Curb Rigid 14" Large Footprint	135
Curb Rigid 24" Large Footprint	135

Johnson-Controls® Core 3-12.5 Ton Package

Single Package R-410A Air Conditioner

Project Name: **Little Rock West High School Packaged Units**

Unit Model #: **ZYG12S4B3EB1A124A3**

Quantity: **1** Tag #: **RTU-C1**

Seismic Certification

036-21805-001-0120

THE VMC GROUP
The Power of Together™

Johnson Controls

CERTIFICATE OF COMPLIANCE

SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

IBC CERTIFIED — THE VMC GROUP

Certification No.

VMA -51410 -01 C (Revision 0)

Expiration Date: 04/30/2021

Certification Parameters:

The nonstructural products (mechanical and/or electrical components) listed on this certificate are CERTIFIED[1] FOR SEISMIC APPLICATIONS in accordance with the following building code[2] releases.

IBC 2006, 2009, 2012, 2015

The following model designations, options, and accessories are included in this certification. Reference report number **VMA-51410-01** as issued by The VMC Group for a complete list of certified models, included accessories/options, and certified installation methods.

Johnson Controls, Incorporated: Rooftop Units
3-12.5 Ton Competitive Direct Replacement: 3 – 12.5 Ton Cooling Capacity

The above referenced equipment is **APPROVED** for seismic application when properly installed[3], used as intended, and contains a Seismic Certification Label referencing this Certificate of Compliance[4]. As limited by the tabulated values, below grade, grade, and roof-level installations, installations in essential facilities, for life safety applications, and/or of equipment containing hazardous contents are permitted and included in this certification with an Equipment Importance Factor assigned as I_P=1.5. The equipment is qualified by successful seismic shake table testing at the nationally recognized Dynamic Certification Laboratory under the witness of the ISO Accredited Product Certification Agency, The VMC Group.

Certified Seismic Design Levels

Certified **IBC**	**Importance I_P** ≤ 1.5 Soil Classes A-E Risk Categories I-IV Design Categories A-F	**S_{DS} ≤ 2.500 g** **z/h = 0.0**	**S_{DS} ≤ 2.000 g** **z/h ≤ 1.0**
		Horizontal Design —	—(–) **4.500 g**
Test Datum **AC156**	ISO 17025 Laboratory Pre/Post-Shake Functionality Tri-axial, 5% Damping SRS	**A_{FLEX-H} ≤ 3.200 g** **A_{RIG-H} ≤ 2.400 g** **ZPA_H ≤ 2.160 g**	**A_{FLEX-V} ≤ 1.667 g** **A_{RIG-V} ≤ 0.667 g** **ZPA_V ≤ 0.600 g**

Certified Seismic Installation Methods

Directly to seismically tested curb/rail	Directly to seismically tested curb/rail with external isolation

Johnson-Controls® Core 3-12.5 Ton Package

Single Package R-410A Air Conditioner

Project Name: **Little Rock West High School Packaged Units**

Unit Model #: **ZYG12S4B3EB1A124A3**

Quantity: **1** Tag #: **RTU-C1**

Seismic Certification

036-21805-001-0120

THE VMC GROUP
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CERTIFICATE OF COMPLIANCE

SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

Certified Product Table:

Model	Unit Type	Efficiency Rating	Nominal Cooling Capacity (Tons)	Length (in.)	Width (in.)	Height (in.)	Max. Operating Weight (lbs.)
Z*G04	Gas AC Unit	Standard / Mid / 14 SEER	3	74.1	48.9	32.5	527
Z*G05			4	74.1	48.9	32.5	618
Z*G06			5	74.1	48.9	40.6	636
Z*G07		Standard / Mid	6	74.1	48.9	40.6	804
Z*GA7			6	74.1	48.9	40.6	804
Z*G08			7.5	87.1	61.7	40.6	980
Z*G09			8.5	87.2	61.7	48.6	980
Z*G12			10	87.2	61.7	48.6	1008
ZXG14		Standard	12.5	87.2	61.7	55.3	1047
Z*E04	Electric AC Unit	Standard / Mid / 14 SEER	3	74.1	48.9	32.5	481
Z*E05			4	74.1	48.9	40.6	564
Z*E06			5	74.1	48.9	40.6	582
Z*E07		Mid / Standard	6	87.1	61.7	40.6	734
Z*EA7			6	87.1	61.7	40.6	734
Z*E08			7.5	87.2	61.7	48.6	878
Z*E09			8.5	87.2	61.7	48.6	878
Z*E12			10	87.2	61.7	55.3	902
ZXE14		Standard	12.5	87.2	61.7	55.3	941
X*E04	Heat Pump	Mid / 14 SEER	3	74.1	48.9	32.5	535
X*E05			4	74.1	48.9	40.6	614
X*E06			5	74.1	48.9	40.6	653
X*EA7			6	87.1	61.7	40.6	861
XYE07		Mid	6	87.1	61.7	40.6	861
X*E08		Mid / Standard	7.5	87.2	61.7	55.3	1060
X*E09			8.5	87.2	61.7	55.3	1061
XXE12		Standard	10	87.2	61.7	55.3	1060

* Denotes Q, X, Y which represent 14 SEER, Standard, and Mid Efficiency Rating, respectively

This certification **includes** rooftop unit modules as detailed in the above charts. The rooftop unit configuration and options shall be a catalogue design and factory supplied. The rooftop unit shall be installed and attached to the building structure per the manufacturer's supplied seismic installation instructions. For a list of certified configurations and options please directly contact the manufacturer. This certification **excludes** all non-factory supplied accessories, all connections for electrical, fuel, heating or cooling fluid, or other pipe/conduit connections and all non-catalogued, standard options and/or configurations not detailed in the above charts. Flexibility in the connections must be maintained as to not transmit load into the equipment. Design specials are outside the scope of this certification.

IBC CERTIFIED THE VMC GROUP

VMA-51410-01C (Revision 0)
Issue Date: April 23, 2018
Revision Date: April 23, 2018
Expiration Date: April 30 , 2021

Johnson-Controls® Core 3-12.5 Ton Package

Single Package R-410A Air Conditioner

Project Name: **Little Rock West High School Packaged Units**

Unit Model #: **ZYG12S4B3EB1A124A3**

Quantity: **1** Tag #: **RTU-C1**

Seismic Certification

036-21805-001-0120

THE VMC GROUP
The Power of Together™

Johnson Controls

CERTIFICATE OF COMPLIANCE

SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

Notes and Comments:

1. All equipment listed herein successfully passed the seismic acceptance criteria for shake testing non-structural components and systems as set forth in the ICC AC-156. The Test Response Spectrum (TRS) enveloped the Required Response Spectrum (RRS) for all units tested. The units cited in this certification were representative sample(s) of a contingent of models and all remained captive and structurally sound after the seismic shake simulation. The units also remained functionally operational after the simulation testing as functional testing was completed by the equipment manufacturer before and after the seismic simulations. Although a seismic qualified unit inherently contains some wind resisting capacity, that capacity is undetermined and is excluded from this certification. Snow/Ice loads have been neglected and thus limit the unit to be installed both indoors (covered by an independent protective structure) and out of doors (exposed to accumulating snow/ice) for ground snow loads no greater than 30 psf for all applications.
2. The following building codes are addressed under this certification:
   IBC 2006 – referencing ASCE7-05 and ICC AC-156
   IBC 2009 – referencing ASCE7-05 and ICC AC-156
   IBC 2012 – referencing ASCE7-10 and ICC AC-156
   IBC 2015 – referencing ASCE7-10 and ICC AC-156
3. Refer to the manufacturer supplied installation drawings for anchor requirements and mounting considerations for seismic applications. Required anchor locations, size, style, and load capacities (tension and shear) may be specified on the installation drawings or specified by a 3rd party. Mounting requirement details such as anchor brand, type, embedment depth, edge spacing, anchor-to-anchor spacing, concrete strength, special inspection, wall design, and attachment to non-building structures must be outlined and approved by the Engineer of Record for the project or building. Structural walls, structural floors, and housekeeping pads must also be seismically designed and approved by the project or building Structural Engineer of Record to withstand the seismic anchor loads as defined on the installation drawings. The installing contractor is responsible for observing the installation detailed in the seismic installation drawings and the proper installation of all anchors and mounting hardware.
4. For this certificate and certification to remain valid, this certificate must correspond to the "Seismic Certification Label" found affixed to the unit per Section 1703.5 of the International Building Code. The label ensures the manufacturer built the unit in conformance to the IBC seismic design criteria set forth by the Certified Seismic Qualification Agency, The VMC Group, and meets the seismic design levels claimed by this certificate.
5. Mechanical, Electrical, and Plumbing connections to the equipment must be flexibly attached as to not transfer load through the connection. The structural integrity of any conduit, cable trays, piping, ductwork and/or flexible connections is the responsibility of others. This certification does not guarantee the equipment will remain compliant to NEMA, IP, UL, or CSA standards after a seismic event.
6. This certificate applies to units manufactured at:
   5005 York Drive, Norman, OK. 73069
7. This project follows The VMC Group's ISO -17065 Scheme for Product Certification of Nonstructural Components.

John P. Giuliano, PE
President, The VMC Group

VMA-51410-01C (Revision 0)
Issue Date: April 23, 2018
Revision Date: April 23, 2018
Expiration Date : April 30 , 2021

IBC CERTIFIED THE VMC GROUP

The VMC Group • 113 Main Street, Bloomingdale, NJ 07403 • Tel: 973-838-1780 • Fax: 973-492-8430 • www.thevmcgroup.com

102S-103387 Rev 9

Johnson-Controls® Core 3-12.5 Ton Package

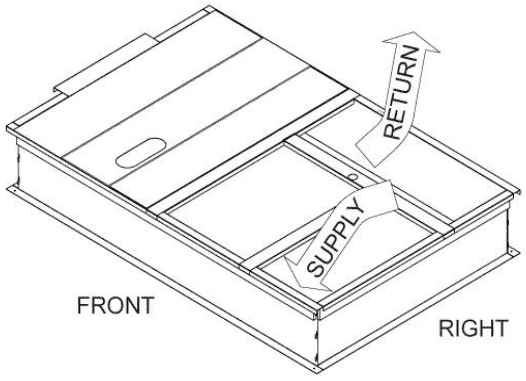
Single Package R-410A Air Conditioner

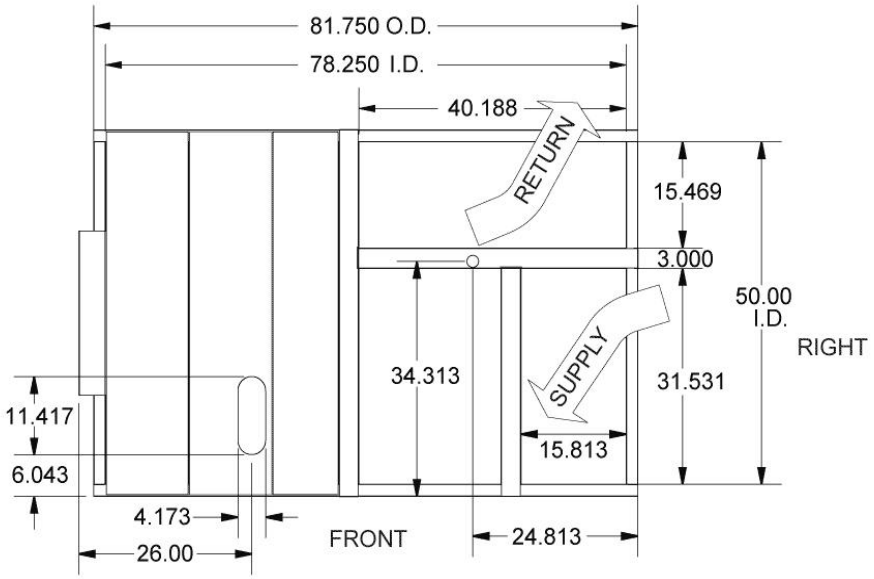
Project Name: **Little Rock West High School Packaged Units**

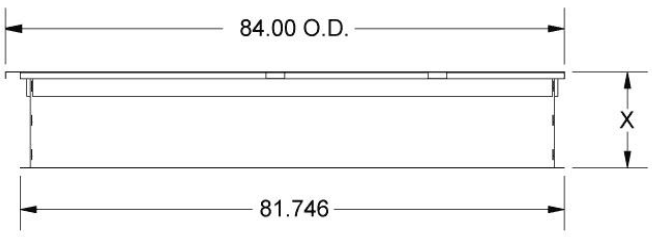
Unit Model #: **ZYG12S4B3EB1A124A3**

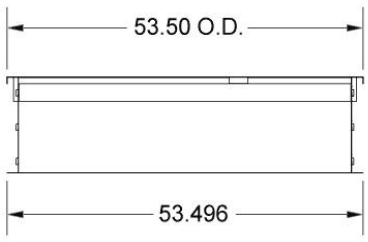
Quantity: **1** Tag #: **RTU-C1**

1RC0457 Roof Curb









1RC0457 X= 14" Height

1RC0459 X= 24" Height

Notes:
1. Sides, ends, unit locator and cross support are 18-G90. Deck pans, R/A & S/A supports are 20-G90.
2. Full perimeter wood nailer.
3. Insulated deck pans.

Unit Models used with 1RC0457, 1RC0459 Roof Curb

ZX08	ZY07
ZX09	ZY08
ZX12	ZY09
ZX14	ZY12

Johnson-Controls® Core 3-12.5 Ton Package

Single Package R-410A Air Conditioner

Project Name: **Little Rock West High School Packaged Units** Unit Model #: **ZYG08S4B3EB1A124A4**

Quantity: **1** Tag #: **RTU-W1** System: **ZYG08S4B3EB1A124A4**

Cooling Performance		
Total gross capacity	93.7	MBH
Sensible gross capacity	67.1	MBH
Total net capacity	88.1	MBH
Sensible net capacity	61.5	MBH
Efficiency (at ARI)	12.00	EER
Integrated eff. (at ARI)	14.60	IEER
Ambient DB temp.	95.2	°F
Entering DB temp.	80.0	°F
Entering WB temp.	67.0	°F
Evap Coil Leaving DB temp.	57.5	°F
Evap Coil Leaving WB temp.	56.3	°F
Unit Leaving DB temp.	59.4	°F
Unit Leaving WB temp.	57.0	°F
Leaving air temp dew point	55.50	°F
Power input (w/o blower)	6.17	kW
Sound power	83	dB(a)

Refrigerant		
Refrigerant type	R-410A	
Sys1	6 lb	4 oz
Sys2	6 lb	

Reheat Performance		
Total capacity	42.6	MBH
Sensible capacity	10.6	MBH
Ambient DB temp.	85	°F
Entering DB temp.	75	°F
Entering WB temp.	67	°F
Leaving DB temp.	71.4	°F
Leaving WB temp.	62.5	°F
Power input (w/o blower)	3.11	kW
Gallons of water per hour	3.65	GPM

Gas Heating Performance		
Entering DB temp.	60	°F
Heating output capacity (Max)	144.0	MBH
Supply air	2800	cfm
Heating input capacity (Max)	180	MBH
Leaving DB temp.	108.3	°F
Air temp. rise	48.3	°F
SSE	80.0	%
Stages	2	

Supply Air Blower Performance		
Supply air	2800	cfm
Ext. static pressure	0.8	IWG
Addl. Unit Losses (Options/Accessories)	0.42	IWG
Blower speed	876	rpm
Max BHP of Motor (including service factor)	2.40	HP
Duct location	Side	
Motor rating	2.40	HP
Actual required BHP	1.77	HP
Power input	1.65	kW
Elevation	1152	ft
Drive type	BELT	

Electrical Data		
Power supply	460-3-60	
Unit min circuit ampacity	20.6	A
Unit min over-current protection	25	A
Unit max over-current protection	25	A

Dimensions & Weight					
Hgt	49 in	Len	87 in	Wth	62 in
Weight with factory installed options				1034	lb

Clearances					
Right	18 in	Front	48 in	Rear	36 in
Top	72 in	Bottom	1 in	Left	12 in

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

7.5 Ton

- All 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 Two Stage Input Medium Heat Stainless Steel
- 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
- Scroll Compressors
- Medium Static Belt Drive Blower
- Solid Core Liquid Line Filter Driers
- Unit Ships with 2" Throwaway Filters
- Replacement Filters: 4 - (20" x 20"). Unit accepts 2" or 4" wide filters.
- Single Point Power Connection
- Short Circuit Current: 5kA RMS Symmetrical
- Non-fused Disconnect (60 Amp)
- Microchannel All Aluminum Condenser Coil, Copper tube/Aluminum fin Evaporator Coil
- MagnaDRY Reheat

Standard Unit Controller

- 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, Allows all units to operate in the cooling mode down to 0 °F outdoor ambient without additional components or intervention.
- Smart Equipment Control Board
- On-Board Diagnostic and Fault Code display

BAS Controller

- Smart Equipment Controller including Discharge Air, Return Air, and Outdoor Air Temperature Sensors. BACNet MS/TP, Modbus and N2 communication card.

Warranty

- One (1) Year Limited Warranty on the Complete Unit
- Five (5) Year Warranty - Compressors
- Fifteen (15) Year Warranty - Stainless Steel Tubular Heat Exchangers

Johnson-Controls® Core 3- 12.5 Ton Package

Single Package R-410A Air Conditioner

Project Name: **Little Rock West High School Packaged Units** Unit Model #: **ZYG08S4B3EB1A124A4**

Quantity: **1** Tag #: **RTU-W1** System: **ZYG08S4B3EB1A124A4**

Additional Electrical Data		
Power supply	460-3-60	
Unit min circuit ampacity	20.6	A
Unit max over-current protection	25	A
Min Voltage	432	V
Max Voltage	504	V
Comp #1 RLA	6.4	
Comp #1 LRA	55.1	
Comp #2 RLA	6.4	
Comp #2 LRA	55.1	
Indoor Mtr Voltage	460-3-60	
Indoor Mtr FLA	3.6	
Outdoor Mtr Qty	2	
Outdoor Fan Voltage	460-1-60	
OD Fan Mtr FLA (ea.)	1.3	
Power Ex Mtr Qty (if applicable)	2	
Powered Ex Voltage(if applicable)	460-3-60	
Power Ex Mtr FLA (ea) (if applicable)	0.5	
Combustion Mtr Qty	1	
Combustion Motor Voltage	208/230-1-60	
Combustion Mtr FLA (ea)	0.08	

REFRIGERANT DETECTION SYSTEM

RDS SUMMARY (Lowest Elevation Floor Being Served)

*See condition requirements below

		Unit of Measure
Lowest Zone Discharge Height		ft
Smallest Zone Area on the Lowest Floor		ft²
Min. Allowed Smallest Zone Area		ft²
Total Applied Area		ft²
Min. Allowed Total Applied Area	0	ft²
Min. Remediation Air Flow	0	cfm
Min. System Exhaust (External to Unit)	0	cfm

JOBSITE INPUTS

Unit of Measure

REFRIGERANT DATA

Refrigerant type	R-410A		
Sys1	6	lb	4 oz
Sys2	6	lb	
Largest Circuit Refrigerant Charge	0	lb	

*RDS RULES AND REQUIREMENTS

(Only applies for single refrigerant charge between 4 lb and 169 lb.)

1. RDS is NOT required if all the following conditions are met:

- The largest circuit refrigerant charge < 34 lb.
- Lowest Zone discharge height is ≥ 2 ft.
- The smallest zone area on the lowest floor is ≥ the min. allowed smallest zone area.

2. RDS is required if any of the following conditions are met and the Total Applied Area is ≥ the minimum Allowed Total Applied Area:

- The largest circuit refrigerant charge is ≥ 34 lb.
- The lowest zone discharge height is < 2 ft.
- The smallest zone area on the lowest floor is < the min. allowed smallest zone area.

3. RDS and an additional System Exhaust is required if any of the conditions are met for the RDS and the Total Applied Area is < the minimum Allowed Total Applied Area.

4. RDS is required for Cooling only units. Johnson Controls is requiring the RDS due to the potential installation of an ignition source..

R454B is mildly flammable A2L refrigerant. Unit installation must comply with UL/CSA 60335-2-40 and the installation and operations manual (IOM). The IOM is shipped with the unit and available on Solution Navigator and DS Solutions App.

Johnson-Controls® Core 3-12.5 Ton Package

Single Package R-410A Air Conditioner

Project Name: **Little Rock West High School Packaged Units** Unit Model #: **ZYG08S4B3EB1A124A4**

Quantity: **1** Tag #: **RTU-W1** System: **ZYG08S4B3EB1A124A4**

Factory Installed Options

ZYG08S4B3EB1A124A4

Equipment Options		Option(s) Selected
Product Category:	**ZY**	Johnson Controls Core Single Packaged R-410A Air Conditioner
Heat Type:	**G**	Gas Heat
Nominal Cooling Capacity:	**08**	7.5 Ton Two Stage Cooling 12.0 EER
Heat Size:	**S**	180 MBH Two Stage Input Medium Heat Stainless Steel
Voltage:	**4**	460-3-60
Airflow:	**B**	Medium Static Belt Drive Blower
Airflow Options:	**3**	VFD IntelliSpeed
Coil Options:	**E**	Microchannel All Aluminum Condenser Coil, Copper tube/Aluminum fin Evaporator Coil
Controls:	**B**	Smart Equipment Controller including Discharge Air, Return Air, and Outdoor Air Temperature Sensors. BACNet MS/TP, Modbus and N2 Communication Card.
Economizer / Damper:	**A**	
Convenience Outlet:	**1**	
Electrical Options:	**2**	Non-fused Disconnect (60 Amp)
Cabinet Options:	**4**	Louvered Hail Guards & Hinged Cabinet Doors
Special Options:	**A**	
Product Generation:	**4**	

Field Installed Accessories

- ○ 1BD0410 - Burglar Bars (Large Footprint) (32.0 lbs)
- ○ 1CV0403 - Concentric Diffuser,Flush Mount,20RD
- ○ 1CV0404 - Concentric Diffuser,Flush Mount,18X28
- ○ 1CV0412 - Concentric Diffuser,Side Discharge,20RD
- ○ 1CV0413 - Concentric Diffuser,Side Discharge,18X28
- ○ 1CV0420 - Concentric Diffuser,Specialty,24X24
- ○ 1FE0416 - Flue Extension Kit (18.1 lbs)
- ○ 1HA0455 - High Altitude Kit for Natural Gas - For applications between 2000 and 10,000 feet altitude (1.5 lbs)
- ○ 1HA0459 - High Altitude Kit for Propane - For applications between 2000 and 10,000 feet altitude (1.9 lbs)
- ○ 1HG0424 - Hail Guard Kit (Large Footprint Tall Cabinet) (50.0 lbs)
- ○ 1HS0401 - Heat Shield (0.6 lbs)
- ○ 1NP0457 - Propane Conversion Kit
- ● 1RC0457 - Curb Rigid 14" (356 mm) Large Footprint (135.0 lbs)
- ○ 1RC0459 - Curb Rigid 24" (610 mm) Large Footprint (135.0 lbs)
- ○ 1TB0402 - Large Footprint Thru The Base Electrical & Thru The Curb Gas (1.0 lbs)
- ○ 1TB0404 - Large Footprint Thru The Base Electrical & Gas (1.0 lbs)
- ○ 2EC0401 - Kit, Single Enthalpy Field Installed (1.0 lbs)

Johnson-Controls® Core 3-12.5 Ton Package

Single Package R-410A Air Conditioner

Project Name: **Little Rock West High School Packaged Units** Unit Model #: **ZYG08S4B3EB1A124A4**

Quantity: **1** Tag #: **RTU-W1** System: **ZYG08S4B3EB1A124A4**

- ● 2EE04707324 - Economizer, DB, Horizontal Flow, Large Footprint, Tall Cabinet (with Barometric Relief) (102.0 lbs)
- ● 2AQ04700524 - CO² Space Sensor - Wall Mount Accessory (5.0 lbs)
- ● 2AQ04700524 - CO² Space Sensor - Wall Mount Accessory (5.0 lbs)
- ○ 2AQ04700624 - CO² Unit Mount Accessory (4.6 lbs)
- ○ 2PE04704546 - Power Exhaust Horiz Flow Large Footprint 460V 3-ph (38.8 lbs)
- ○ 2LA04704846 - Low Ambient for 2 system Units with 1 phase condenser fans (for 460V units) (4.0 lbs)
- ○ 2PM04700224 - Phase Monitor Kit (1.0 lbs)
- ○ PCCP075PK012LO - One Year Labor Only AC/HP PKG 6 to 7.5T
- ○ PCCP075PK012PL - One Year Renewable Parts & Labor AC/HP PKG 6 to 7.5T
- ○ PCCP075PK060PL - 5 Year Parts and Labor AC/HP PKG 6 to 7.5T
- ○ PCCP075PK060PO - 5 Year Parts Only (No Compressor Coverage) AC/HP PKG 6 to 7.5T
- ○ S1-03102529000 - Non-Networking Wall Sensor – Allows remote sensing and control from single or multiple zones. (0.2 lbs)
- ○ S1-03102529004 - 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)
- ○ S1-03102529100 - 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 ± 5º 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-CTSDTS - CTS Wired Temperature Sensor for thermostat | Duct *Also works for LX Series (0.3 lbs)
- ○ S1-CTSHTS - CTS Hardwired Temperature Sensor for CTS Thermostats *Works with LX series as well (0.2 lbs)
- ○ S1-CTSPLATE - Wall Plate for CTS Thermostats *Also works for new platform LX series models below (0.0 lbs)
- ○ S1-CTSWFTS - CTS Temperature Sensor with WiFi for CTS Thermostats *Also works with LX Series (0.1 lbs)
- ○ S1-LC-TMR100-0 - Transparent Wireless MS/TP Router, Coordinator, or Repeater. Wireless mesh network up 1,000 ft. line-of-sight (250 ft. recommended) (55.1 lbs)
- ○ S1-LC-TMRKIT-0 - NEMA 3R panel with liquid-tight conduit for mounting TMR outdoors. TMR sold separately. (0.3 lbs)
- ○ S1-LXLOCK - Locking Ring For LX-Series Thermostats (0.4 lbs)
- ○ S1-LXPLATE - Wall Plate For LX-Series Thermostats (0.0 lbs)
- ○ S1-LXWFM - For LX Series Thermostats - WiFi Communication (0.1 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-MP-STAFBA-0 - Field Bus Adapter (Includes RJ-12 to 4-position Terminal Block Adapter. Used for interfacing directly to MS/TP Field Bus) (1.0 lbs)
- ○ S1-MP-STAKIT-0 - Stationary Cradle Only (Includes mounting bracket and field bus adapter) (0.1 lbs)
- ○ S1-MP-STAKIT-0H - Stationary Cradle Kit (Includes mounting bracket, field bus adapter, and 100-240 VAC line voltage power supply) (1.0 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)
- ○ S1-NSB8BTN141-0 - Wall Temperature Sensor, Warmer/Cooler Display, WHITE, NO JCI LOGO, NS8000 Series (0.4 lbs)
- ○ S1-NSB8BTN143-0 - Wall Temperature Sensor, Warmer/Cooler Display, BLACK, NO JCI LOGO, NS8000 Series (0.4 lbs)
- ○ S1-NSB8BTN240-0 - Wall Temperature Sensor, Full Display, WHITE, JCI LOGO, NS8000 Series (0.4 lbs)
- ○ S1-NSB8BTN241-0 - Wall Temperature Sensor, Full Display, WHITE, NO JCI LOGO, NS8000 Series (0.4 lbs)
- ○ S1-NSB8BTN243-0 - Wall Temperature Sensor, Full Display, BLACK, NO JCI LOGO, NS8000 Series (0.4 lbs)
- ○ S1-SE-COM1001-0 - Field Installed Communication Card for Simplicity SE control. Can be field configurable for BACnet, N2 or ModBUS MSTP (0.0 lbs)
- ○ S1-TBPU435-S - Source 1 Branded CTS Series | 4.3" Display | 3/4 Stage Heating | 2 Stage Cooling | (5+1+1) 7-day Programmable | WiFi On-Board (0.7 lbs)
- ○ S1-TBPU436-S - Source 1 Branded CTS Series | 3/4 Stage Heating | 2 Stage Cooling | (5+1+1) 7-day Programmable | WiFi and Humidity On-Board (0.7 lbs)
- ○ S1-TBSU232-S - Source 1 Branded LX Series | 2.3" Display | 2 Stage Heating | 2 Stage Cooling | 7-day Programmable (0.2 lbs)
- ○ S1-TBSU304-S - Source 1 Branded LX Series | 3" Display | 2 Stage Heating | 2 Stage Cooling | Non-Programmable | Humidity On-Board (1.0 lbs)
- ○ S1-TBSU306-S - Source 1 Branded LX Series | 3" Display | 3/4 Stage Heating | 2 Stage Cooling | (5+1+1) 7-day Programmable | Humidity On-Board (1.0 lbs)
- ○ S1-TEC3630-16-000 - 7 DAY PROGRAMMABLE THERMOSTAT, OPTIONAL MSTP OR N2 COMMUNICATION, RTU/HEAT PUMP WITH ECON,FULL COLOR, WHITE, NO LOGO (0.8 lbs)
- ○ S1-YK/AN-RSO-ACI - Non-Networking Wall Sensor with Setpoint Adjustment and Over-ride Button – Allows remote sensing and control from single or multiple zones. (1.0 lbs)
- ○ S1-YK-MAP1810-0P - MAP (Multiple Access Portal) Gateway-For use with SimplicitySE Control. (0.2 lbs)
- ○ S1-YK-MAP1810-0S - Stationary MAP Gateway (Includes MAP Gateway, Field Bus Adapter, Mounting Bracket and 100 to 240 VAC Power Supply). US-compatible counties. (1.9 lbs)
- ○ S1-ZFR-CBLEXT-1 - 10 FT Network Cable w/male RJ12 connections. Use to connect TMR to SSE 5.0 or SBH (1.0 lbs)

Johnson-Controls® Core 3-12.5 Ton Package

Single Package R-410A Air Conditioner

Project Name: **Little Rock West High School Packaged Units**

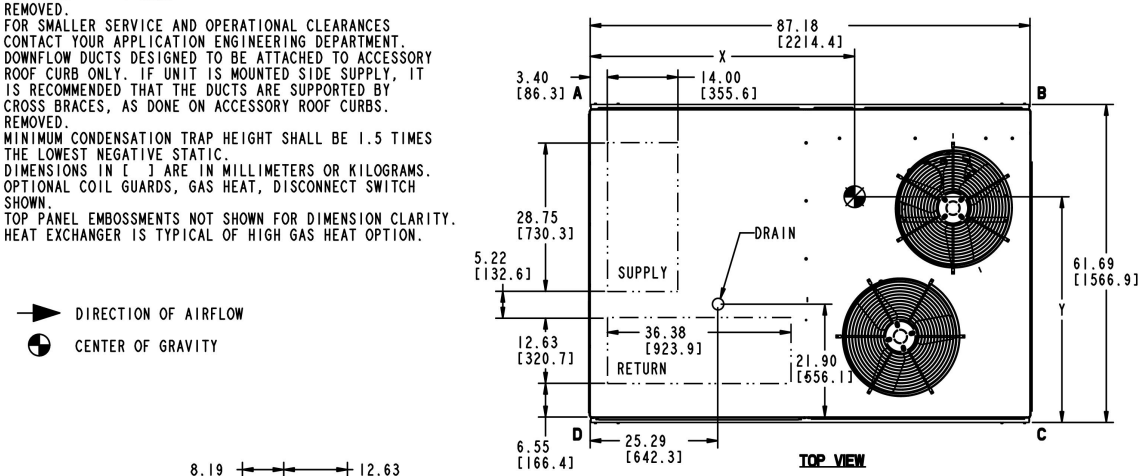
Unit Model #: **ZYG08S4B3EB1A124A4**

Quantity: **1** Tag #: **RTU-W1**

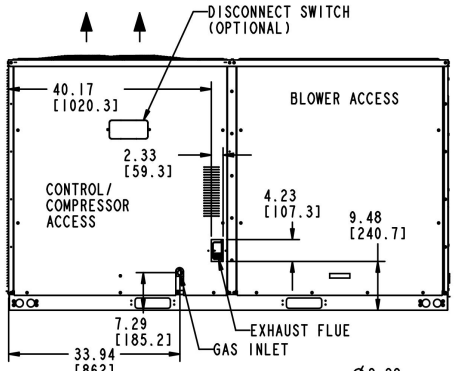
Consolidated Drawing

NOTES:
1. FOR OUTDOOR USE ONLY.
2. WEIGHTS SHOWN ARE FOR COOLING ONLY UNITS.
3. RECOMMENDED MIN. CLEARANCES:
   RIGHT SIDE: 18 [450] W/SIDE CONDENSATE DRAIN: 24 [600]
   LEFT SIDE: 12 [300] W/PIGTAIL: 18 [450]
   FRONT: 48 [1200]
   REAR: 18 [450] W/ECONOMIZER/POWER EXHAUST: 36 [900]
   TOP: 72 [1800]
   BOTTOM: 1 [25]
4. REMOVED.
5. FOR SMALLER SERVICE AND OPERATIONAL CLEARANCES CONTACT YOUR APPLICATION ENGINEERING DEPARTMENT.
6. 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.
7. REMOVED.
8. MINIMUM CONDENSATION TRAP HEIGHT SHALL BE 1.5 TIMES THE LOWEST NEGATIVE STATIC.
9. DIMENSIONS IN [ ] ARE IN MILLIMETERS OR KILOGRAMS.
10. OPTIONAL COIL GUARDS, GAS HEAT, DISCONNECT SWITCH SHOWN.
11. TOP PANEL EMBOSSMENTS NOT SHOWN FOR DIMENSION CLARITY.
12. HEAT EXCHANGER IS TYPICAL OF HIGH GAS HEAT OPTION.

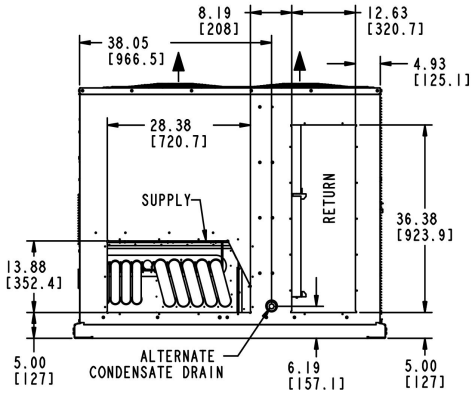
TONNAGE	UNIT	OPERATING WEIGHT (LBS) (BASE UNIT)	CENTER OF GRAVITY LOCATION (BASE UNIT)		4 POINT CORNER LOADS (LBS) (BASE UNIT)			
			X	Y	A	B	C	D
7.5	ZL	920 [417.3]	45.1 [1145.5]	36.7 [932.2]	262.3 [119]	282.3 [128.1]	194.6 [91.2]	180.8 [82]
8.5	ZL	925 [419.6]	45.6 [1158.2]	36.3 [922]	257.7 [117]	283.9 [128.8]	201.0 [99.3]	182.5 [82.8]
8.5	ZX	852 [386.5]	46.3 [1176]	35.8 [909]	230.1 [104.4]	261.8 [118.8]	191.6 [86.9]	168.4 [76.4]
10	ZX	879 [398.7]	46 [1168]	36.2 [919]	241.8 [109.7]	271.3 [123.1]	193.3 [87.7]	172.3 [78.2]
7.5	ZY	878 [398.3]	46.2 [1173]	36 [914]	239 [108.4]	270.7 [122.8]	195.5 [88.7]	172.6 [78.3]
8.5	ZY	878 [398.3]	45.6 [1158]	35.7 [907]	240.5 [109.1]	264.9 [120.2]	195.2 [88.5]	177.2 [80.4]



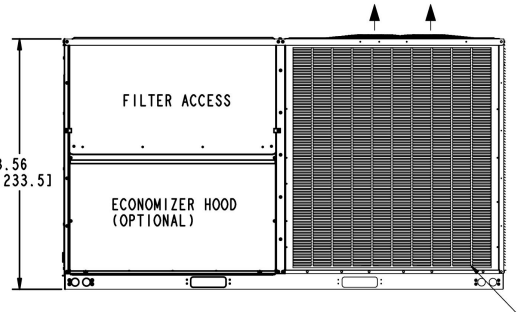
TOP VIEW



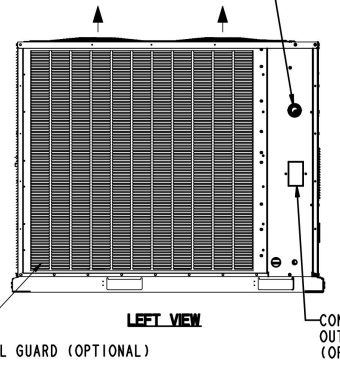
FRONT VIEW



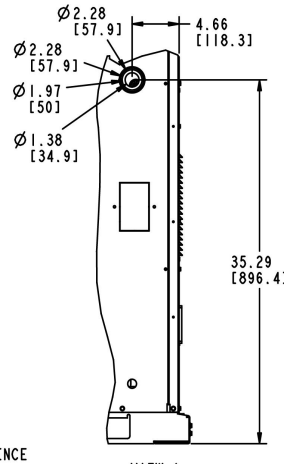
RIGHT VIEW



REAR VIEW



LEFT VIEW



VIEW A
SCALE 0.180

REV LEV	DATE	REVISION RECORD	EC NO	DR	CK	ENG
A	09-13-13	NEW DRAWING	27375	RGG	JC	DW
B	12-03-14	REVISE CLEARANCES (NOTE 3), REMOVE EXTRA DIMS FROM VIEW A	37128	RGG	TPS	AJR
C	10-25-16	CORRECTED 4 POINT CORNER LOAD TABLE, CORRECTED CORNER CALL OUTS ON PRINT		ZAW	TR	TR
D	09-13-19	ADDED "ZL" MODELS	70864	LOP	RCH	AB

THIRD ANGLE PROJECTION

	NAME	DATE
DRN	R.GUAJARDO	09-13-13
CHK	J.CARTER	09-13-13
ENG	D.WOODWARD	09-13-13
MFG		

SCALE 0.090

DRAWING PER ASME Y14.5-2009

TOLERANCES UNLESS OTHERWISE SPECIFIED:

ONE PLACE DECIMAL = ± .1
TWO PLACE DECIMAL = ± .03
THREE PLACE DECIMAL = ± .010
ANGLES = ± 2°
DIMENSIONS ARE IN INCHES
DO NOT SCALE PRINT

SUBMITTAL DWG, CDR, 2 ODF, 48.5" CAB

JOHNSON CONTROLS
UNITARY PRODUCTS GROUP
NORMAN, OK 73069

SAFETY AND KEY CHARACTERISTICS PER BE-PDP-STD-01

MATERIAL
TYPE NOT APPLICABLE
ENG SPEC NOT APPLICABLE
SIZE

DWG NO. UST-CDR-20DFLT REV D
PART NO.
SHT NO 1 OF 1

Project Name: **Little Rock West High School Packaged Units**

Unit Model #: **ZYG08S4B3EB1A124A4**

Quantity: **1** Tag #: **RTU-W1**

Field Installed Accessory Weights

Unit Accessory Weights

Unit Accessory	Weights (lbs.)
Vertical Flow Dry Bulb Economizer Small Footprint	63
Horizontal Flow Dry Bulb Economizer Small Footprint Short	96
Horizontal Flow Dry Bulb Economizer Small Footprint Short	75
Horizontal Flow Dry Bulb Economizer Small Footprint Tall	81
Horizontal Flow Dry Bulb Economizer Large Footprint Short	105
Horizontal Flow Dry Bulb Economizer Large Footprint Tall	102
Power Exhaust Vert Flow Small Footprint	38
Power Exhaust Vert Flow Large Footprint	38
Power Exhaust Horiz Flow Small Footprint	38
Power Exhaust Horiz Flow Large Footprint	38
Hail Guard Kit Small Short Factory Installed	19
Hail Guard Kit Small Tall Factory Installed	24
Hail Guard Kit Large Short Factory Installed	50
Hail Guard Kit Large Tall Factory Installed	50
Curb Rigid 14" Small Footprint	145
Curb Rigid 24" Small Footprint	135
Curb Rigid 14" Large Footprint	135
Curb Rigid 24" Large Footprint	135

Johnson-Controls® Core 3-12.5 Ton Package

Single Package R-410A Air Conditioner

Project Name: **Little Rock West High School Packaged Units**

Unit Model #: **ZYG08S4B3EB1A124A4**

Quantity: **1** Tag #: **RTU-W1**

Seismic Certification

036-21805-001-0120

THE VMC GROUP
The Power of Together™

Johnson Controls

CERTIFICATE OF COMPLIANCE

SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

IBC CERTIFIED — THE VMC GROUP

Certification No.

VMA -51410 -01 C (Revision 0)

Expiration Date: 04/30/2021

Certification Parameters:

The nonstructural products (mechanical and/or electrical components) listed on this certificate are CERTIFIED[1] FOR SEISMIC APPLICATIONS in accordance with the following building code[2] releases.

IBC 2006, 2009, 2012, 2015

The following model designations, options, and accessories are included in this certification. Reference report number **VMA-51410-01** as issued by The VMC Group for a complete list of certified models, included accessories/options, and certified installation methods.

Johnson Controls, Incorporated: Rooftop Units
3-12.5 Ton Competitive Direct Replacement: 3 – 12.5 Ton Cooling Capacity

The above referenced equipment is **APPROVED** for seismic application when properly installed[3], used as intended, and contains a Seismic Certification Label referencing this Certificate of Compliance[4]. As limited by the tabulated values, below grade, grade, and roof-level installations, installations in essential facilities, for life safety applications, and/or of equipment containing hazardous contents are permitted and included in this certification with an Equipment Importance Factor assigned as I_P=1.5. The equipment is qualified by successful seismic shake table testing at the nationally recognized Dynamic Certification Laboratory under the witness of the ISO Accredited Product Certification Agency, The VMC Group.

Certified Seismic Design Levels

Certified **IBC**	**Importance $I_P \le 1.5$** Soil Classes A-E Risk Categories I-IV Design Categories A-F	**$S_{DS} \le 2.500$ g** **z/h = 0.0**	**$S_{DS} \le 2.000$ g** **z/h ≤ 1.0**
		Horizontal Design — —(–) **4.500 g**	
Test Datum **AC156**	ISO 17025 Laboratory Pre/Post-Shake Functionality Tri-axial, 5% Damping SRS	**$A_{FLEX-H} \le 3.200$ g** **$A_{RIG-H} \le 2.400$ g** **$ZPA_H \le 2.160$ g**	**$A_{FLEX-V} \le 1.667$ g** **$A_{RIG-V} \le 0.667$ g** **$ZPA_V \le 0.600$ g**

Certified Seismic Installation Methods

Directly to seismically tested curb/rail	Directly to seismically tested curb/rail with external isolation

Johnson-Controls® Core 3-12.5 Ton Package

Single Package R-410A Air Conditioner

Project Name: **Little Rock West High School Packaged Units**

Unit Model #: **ZYG08S4B3EB1A124A4**

Quantity: **1** Tag #: **RTU-W1**

Seismic Certification

036-21805-001-0120

THE VMC GROUP
The Power of Together™

Johnson Controls

CERTIFICATE OF COMPLIANCE

SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

Certified Product Table:

Model	Unit Type	Efficiency Rating	Nominal Cooling Capacity (Tons)	Length (in.)	Width (in.)	Height (in.)	Max. Operating Weight (lbs.)
Z*G04	Gas AC Unit	Standard / Mid / 14 SEER	3	74.1	48.9	32.5	527
Z*G05			4	74.1	48.9	32.5	618
Z*G06			5	74.1	48.9	40.6	636
Z*G07		Standard / Mid	6	74.1	48.9	40.6	804
Z*GA7			6	74.1	48.9	40.6	804
Z*G08			7.5	87.1	61.7	40.6	980
Z*G09			8.5	87.2	61.7	48.6	980
Z*G12			10	87.2	61.7	48.6	1008
ZXG14		Standard	12.5	87.2	61.7	55.3	1047
Z*E04	Electric AC Unit	Standard / Mid / 14 SEER	3	74.1	48.9	32.5	481
Z*E05			4	74.1	48.9	40.6	564
Z*E06			5	74.1	48.9	40.6	582
Z*E07		Mid / Standard	6	87.1	61.7	40.6	734
Z*EA7			6	87.1	61.7	40.6	734
Z*E08			7.5	87.2	61.7	48.6	878
Z*E09			8.5	87.2	61.7	48.6	878
Z*E12			10	87.2	61.7	55.3	902
ZXE14		Standard	12.5	87.2	61.7	55.3	941
X*E04	Heat Pump	Mid / 14 SEER	3	74.1	48.9	32.5	535
X*E05			4	74.1	48.9	40.6	614
X*E06			5	74.1	48.9	40.6	653
X*EA7			6	87.1	61.7	40.6	861
XYE07		Mid	6	87.1	61.7	40.6	861
X*E08		Mid / Standard	7.5	87.2	61.7	55.3	1060
X*E09			8.5	87.2	61.7	55.3	1061
XXE12		Standard	10	87.2	61.7	55.3	1060

* Denotes Q, X, Y which represent 14 SEER, Standard, and Mid Efficiency Rating, respectively

This certification **includes** rooftop unit modules as detailed in the above charts. The rooftop unit configuration and options shall be a catalogue design and factory supplied. The rooftop unit shall be installed and attached to the building structure per the manufacturer's supplied seismic installation instructions. For a list of certified configurations and options please directly contact the manufacturer. This certification **excludes** all non-factory supplied accessories, all connections for electrical, fuel, heating or cooling fluid, or other pipe/conduit connections and all non-catalogued, standard options and/or configurations not detailed in the above charts. Flexibility in the connections must be maintained as to not transmit load into the equipment. Design specials are outside the scope of this certification.

IBC CERTIFIED THE VMC GROUP

VMA-51410-01C (Revision 0)
Issue Date: April 23, 2018
Revision Date: April 23, 2018
Expiration Date: April 30 , 2021

Project Name: **Little Rock West High School Packaged Units**

Unit Model #: **ZYG08S4B3EB1A124A4**

Quantity: **1** Tag #: **RTU-W1**

Seismic Certification

036-21805-001-0120

THE VMC GROUP
The Power of Together™

Johnson Controls

CERTIFICATE OF COMPLIANCE

SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

Notes and Comments:

1. All equipment listed herein successfully passed the seismic acceptance criteria for shake testing non-structural components and systems as set forth in the ICC AC-156. The Test Response Spectrum (TRS) enveloped the Required Response Spectrum (RRS) for all units tested. The units cited in this certification were representative sample(s) of a contingent of models and all remained captive and structurally sound after the seismic shake simulation. The units also remained functionally operational after the simulation testing as functional testing was completed by the equipment manufacturer before and after the seismic simulations. Although a seismic qualified unit inherently contains some wind resisting capacity, that capacity is undetermined and is excluded from this certification. Snow/Ice loads have been neglected and thus limit the unit to be installed both indoors (covered by an independent protective structure) and out of doors (exposed to accumulating snow/ice) for ground snow loads no greater than 30 psf for all applications.
2. The following building codes are addressed under this certification:
   IBC 2006 – referencing ASCE7-05 and ICC AC-156
   IBC 2009 – referencing ASCE7-05 and ICC AC-156
   IBC 2012 – referencing ASCE7-10 and ICC AC-156
   IBC 2015 – referencing ASCE7-10 and ICC AC-156
3. Refer to the manufacturer supplied installation drawings for anchor requirements and mounting considerations for seismic applications. Required anchor locations, size, style, and load capacities (tension and shear) may be specified on the installation drawings or specified by a 3rd party. Mounting requirement details such as anchor brand, type, embedment depth, edge spacing, anchor-to-anchor spacing, concrete strength, special inspection, wall design, and attachment to non-building structures must be outlined and approved by the Engineer of Record for the project or building. Structural walls, structural floors, and housekeeping pads must also be seismically designed and approved by the project or building Structural Engineer of Record to withstand the seismic anchor loads as defined on the installation drawings. The installing contractor is responsible for observing the installation detailed in the seismic installation drawings and the proper installation of all anchors and mounting hardware.
4. For this certificate and certification to remain valid, this certificate must correspond to the "Seismic Certification Label" found affixed to the unit per Section 1703.5 of the International Building Code. The label ensures the manufacturer built the unit in conformance to the IBC seismic design criteria set forth by the Certified Seismic Qualification Agency, The VMC Group, and meets the seismic design levels claimed by this certificate.
5. Mechanical, Electrical, and Plumbing connections to the equipment must be flexibly attached as to not transfer load through the connection. The structural integrity of any conduit, cable trays, piping, ductwork and/or flexible connections is the responsibility of others. This certification does not guarantee the equipment will remain compliant to NEMA, IP, UL, or CSA standards after a seismic event.
6. This certificate applies to units manufactured at:
   5005 York Drive, Norman, OK. 73069
7. This project follows The VMC Group's ISO -17065 Scheme for Product Certification of Nonstructural Components.

John P. Giuliano, PE
President, The VMC Group

VMA-51410-01C (Revision 0)
Issue Date: April 23, 2018
Revision Date: April 23, 2018
Expiration Date : April 30 , 2021

IBC CERTIFIED THE VMC GROUP

The VMC Group • 113 Main Street, Bloomingdale, NJ 07403 • Tel: 973-838-1780 • Fax: 973-492-8430 • www.thevmcgroup.com

Johnson-Controls® Core 3-12.5 Ton Package

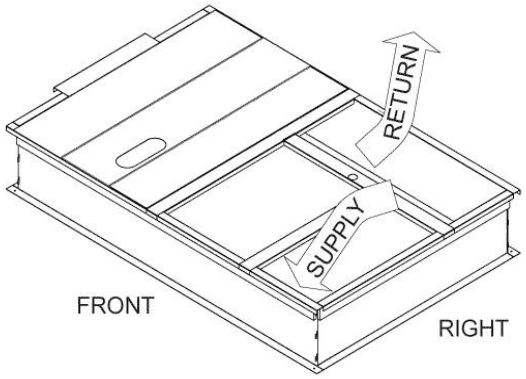
Single Package R-410A Air Conditioner

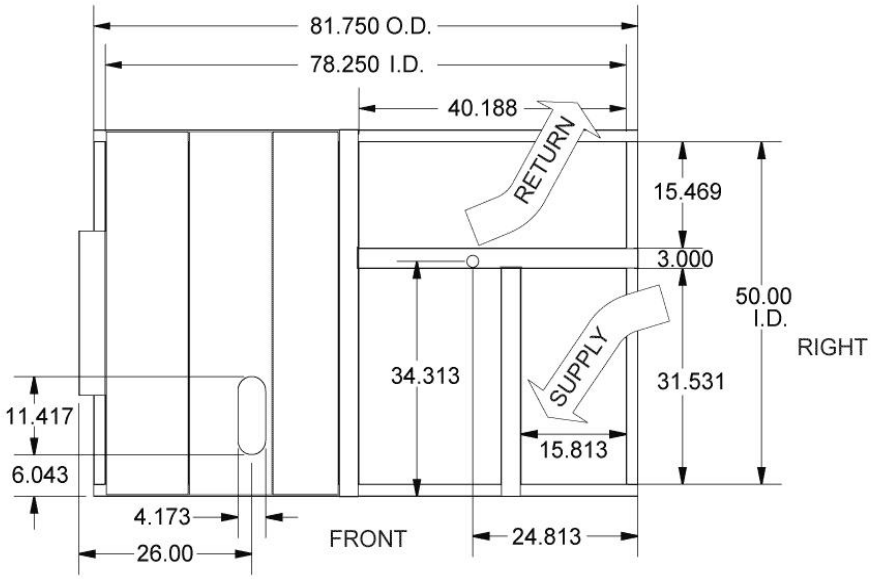
Project Name: **Little Rock West High School Packaged Units**

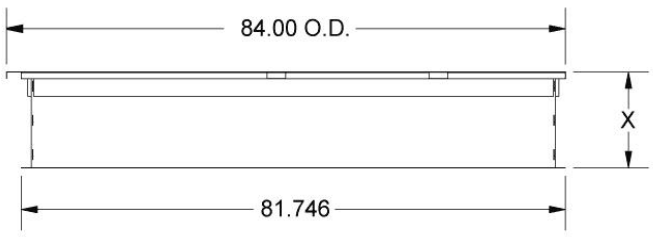
Unit Model #: **ZYG08S4B3EB1A124A4**

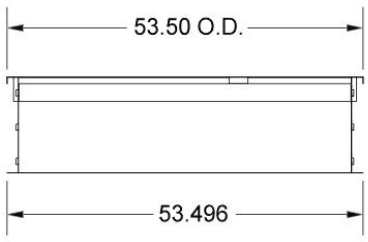
Quantity: **1** Tag #: **RTU-W1**

1RC0457 Roof Curb









1RC0457 X= 14" Height

1RC0459 X= 24" Height

Notes:
1. Sides, ends, unit locator and cross support are 18-G90. Deck pans, R/A & S/A supports are 20-G90.
2. Full perimeter wood nailer.
3. Insulated deck pans.

Unit Models used with 1RC0457, 1RC0459 Roof Curb

ZX08	ZY07
ZX09	ZY08
ZX12	ZY09
ZX14	ZY12

Date
04/12/2024
Project Name
Little Rock West High School Packaged Units
Project Number
Client / Purchaser

Guide Specification Summary Page

Product Series	Models and Unit Tags	
Choice 15-27.5 Ton Package	AD25S3CP4S1CAH46F3	RTU-G3
Johnson-Controls® Core 3-12.5 Ton Package	ZYG12S4B3EB1A124A3	RTU-C1
	ZYG08S4B3EB1A124A4	RTU-W1

15 to 27.5 Tons Nominal Cooling

178,000 to 324,000 BTUH Nominal Gas Heating Output

25 to 75 kW Electric Heating

23 06 80 Schedules for Decentralized HVAC Equipment

23 06 80. 13 Decentralized Unitary HVAC Equipment Schedule

23 06 80. 13.A. Rooftop unit schedule

1. Schedule is per the project specification requirements.

23 07 16. HVAC Equipment Insulation

23 07 16. 13 Decentralized, Rooftop Units:

23 07 16. 13.A. Evaporator fan compartment:.

1. Interior cabinet surfaces shall be insulated with a minimum 0.5 in. thick, fiber glass insulation with thermal conductivity of 0.23 or better, adhered with water based adhesive.
2. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

23 07 16. 13.B. Gas heat compartment:

1. Interior cabinet surfaces shall be insulated with a minimum 0.5 in. thick, fiber glass insulation with thermal conductivity of 0.23 or better, adhered with water based adhesive.
2. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

23 07 16. 13.C. Economizer and Control compartment:

1. Shall be Interior cabinet surfaces shall be insulated with a minimum 0.5 in. thick, fiber glass insulation with thermal conductivity of 0.23 or better, adhered with water based adhesive.
2. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

23 07 16. 13.D. Partition and Duct Panel:

1. Interior cabinet surfaces shall be insulated with a minimum 0.5 in. thick, fiber glass insulation with thermal conductivity of 0.23 or better, adhered with water based adhesive.
2. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

23 07 16. 13.E. Base Pan and Blower Back:

1. Interior cabinet surfaces shall be insulated with a minimum 0.5 in. thick, foil faced fiber glass insulation with thermal conductivity of 0.23 or better, adhered with water based adhesive.
2. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

23 09 13 Instrumentation and Control Devices for HVAC

23 09 13. 23 Sensors and Transmitters

23 09 13. 23.A. Thermostats

1. Thermostat must
   a. Energize “Y” when calling for cooling and “W” when calling for heating.
   b. Shall have capability to energize 2 different stages of cooling, and 2 different stages of heating.
   c. Shall include capability for occupancy scheduling.

23 09 23 Direct- digital Control system for HVAC

23 09 23. 13 Decentralized, Rooftop Units:

23 09 23. 13.A. Simplicity SMART Equipment Control

1. Shall be ASHRAE 62 compliant.
2. Shall accept 20-30 VAC input power, 50/60Hz. 24 VAC nominal.
3. Shall have an operating temperature range from -40°F to 158°F; 10-90% RH (non-condensing UI), and -4°F to 158°F; 10-90% RH (non-condensing), with a storage temperature range from -40°F to 194°F; 5-95% RH (non-condensing).
4. Shall include an option of an Economizer microprocessor controller which communicates directly with the Unit Control Board and has 8 Analog outputs, 2 Analog inputs, 2 Binary outputs, 3 Binary inputs.
5. Controller shall accept the following inputs: space temperature, return air temperature sensor, set point adjustment, outdoor air temperature, indoor air quality, outdoor air quality, indoor relative humidity, compressor lock- out, fire/smoke

shutdown, single and dual enthalpy, fan status, remote time clock, Sensor Actuator (SA) Bus communicated temperature/humidity/CO2 values from Network sensors, Field Controller (FC) Bus Network Overrides for space temperature, outdoor air temperature, space humidity, outdoor air quality, Indoor air quality, System purge.

6. Shall accept a CO2 sensor or multiple CO2 sensors networked together in the conditioned space, and be Demand Control Ventilation (DCV) ready.
7. Shall provide compressor short-cycle protection with minimum compressor runtime set at 3 minutes standard and adjustable from 2 to 7 minutes.
8. Unit shall provide surge protection for the controller through a circuit breaker.
9. Shall have open communication protocols with all required points exposed. Protocols supported include: BACnet®, MS/TP, Modbus®, and N2 communication.
10. Shall have an LCD display on the Unit Control Board to display fault messages as well as navigate the menu structure to review and change set points.
11. Shall utilize a USB connection to allow for uploading and downloading of data.
    a. USB shall allow for downloading of “trending data” for analysis of inputs and values on other device such as a PC.
    b. USB shall allow for uploading of new firmware to the UCB.
    c. USB shall allow for backing up controller set points and parameters and for uploading of these same parameters to the UCB.
12. Shall include an RJ-12 port to be used with a Wi-Fi signal transmitting device and allow unit(s) access via any non-proprietary smart device.
    a. Unit access shall include ability to view and change all adjustable parameters and set points using the same characteristics and values available directly through the UCB joystick and LCD display.
    b. Unit access shall be configurable at 3 different levels to allow control over parameter and set point changes.
    c. Wi-Fi transmitting device can be connected by 3 means.
        1) RJ-12 port connected directly to UCB.
        2) Optional connection port mounted in operating space.
        3) Optional connection to building network allowing unit access from any internet browser worldwide.
13. Shall have the capability to integrate with Verasys zoning controls system.
14. Shall not require any proprietary software or contractor tool to start-up, commission and troubleshoot unit operation.
15. Software upgrades will be accomplished by local download via USB port on main Unit Control Board.
16. Shall be UL Recognized, File E107041, UL 916, Energy management Equipment, UL 60335-2-40, Heating and Cooling Equipment; FCC Compliant to CFR47, Part 15, Subpart B, Class B, CSA 22.2 No. 236, Signal Equipment Industry Canada, ICES-003 Recognized, and BTL certified.

23 09 33 Electric and Electronic Control System for HVAC

23 09 33. 13 Decentralized, Rooftop Units:

23 09 33. 13.A. General

1. Shall be complete with self- contained low- voltage control circuit protected by a resettable circuit breaker on the 24- v transformer side. Transformer shall have minimum 75VA capability.
2. Shall utilize color- coded wiring.
3. Shall include a central control terminal board to conveniently and safely provide connection points for vital control functions such as: smoke detectors, phase monitor, gas controller, economizer, thermostat, DDC control options, and low and high pressure switches.
4. The gas furnace shall be controlled by an integrated gas controller (IGC) microprocessor. See heat exchanger section of this specification.

23 09 33. 23.B. Safeties:

1. Compressor over- temperature and over- current.
2. Low pressure switch and high pressure switch.
    a. Low pressure switch shall use different color wire than the high pressure switch. The purpose is to assist the installer and service technician to correctly wire and or troubleshoot the rooftop unit.
3. Automatic reset, motor thermal overload protector.
4. Gas heating section shall be provided with the following minimum protections.
    a. Primary and auxiliary high temperature limit switches

b. Induced draft pressure sensor

c. Flame rollout switch

d. Flame proving controls

5. Electric heat section shall be provided with the following minimum protections:

a. Primary, backup and auxiliary high temperature limit switches

23 40 13 Panel Air Filters

23 40 13 13. Decentralized, Rooftop Units:

23 40 13. 13.A. Standard filter section

1. Shall consist of factory installed, low velocity, disposable 2- in. thick fiberglass filters of commercially available sizes.
2. Units can accept 2” or 4” filters and have a field convertible transition.
3. Filters shall be accessible through an access panel; hinged panel with toolless access is available as described in the Special Features Options and Special Features Options and Accessories section of this specification.

23 81 19 Self- Contained Air Conditioners

23 81 19 13 Small- Capacity Self- Contained Air Conditioners

23 81 19. 13.A. General

1. Outdoor, rooftop mounted, electrically controlled, heating and cooling unit utilizing a fully hermetic, suction gas cooled, direct drive compressor(s) for cooling duty and gas combustion or nickel chromium elements for heating duty.
2. Factory assembled, single- piece heating and cooling rooftop unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, and special features required prior to field start- up.
3. Unit shall use environmentally sound, R-410A refrigerant.
4. Unit shall be installed in accordance with the manufacturer’s instructions.
5. Unit must be selected and installed in compliance with local, state, and federal codes.

23 81 19. 13.B. Quality Assurance

1. Unit meets ASHRAE 90.1 minimum efficiency requirements.
2. Unit shall be rated in accordance with AHRI Standards 210/240 or 340/360.
3. Unit shall be designed to conform to ASHRAE 15.
4. Unit shall be CSA tested and certified in accordance with ANSI Z21.47 -2016/CSA 2.3-2016, and CSA C22.2 No. 60335-2-40.
5. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
6. Unit casing shall be capable of withstanding 750- hour salt spray exposure per ASTM B117 (scribed specimen).
7. Roof curb shall be designed to conform to NRCA Standards.
8. Unit shall be subjected to a completely automated run test on the assembly line. The data for each unit will be stored at the factory, and must be available upon request.
9. Unit shall be designed in accordance with CSA C.22.2 NO.60335-2-40, including tested to withstand rain.
10. Unit shall be constructed to prevent intrusion of snow into the control box.
11. 15 – 25 ton units shall be shake tested to Truck 2, ASTM D4169 to ensure shipping reliability.

23 81 19. 13.C. Delivery, Storage, and Handling

1. Unit shall be stored and handled per manufacturer’s recommendations.
2. Overhead crane can be used to place the units on a roof using rigging holes built into the unit base rails without any additions to the unit.
3. Unit shall only be stored or positioned in the upright position.

23 81 19. 13.D. Project Conditions

1. As specified in the contract.

23 81 19. 13.E. Operating Characteristics

1. Unit shall be capable of starting and running at 115°F (52°C) ambient outdoor temperature, meeting maximum load criteria of AHRI Standard 210/240 or 340/360 at ±10% voltage.
2. Compressor with standard controls shall be capable of operation down to 45°F (7°C), ambient outdoor temperatures. Intermittent cooling shall be operational down 0° F (-17° C). Low ambient kit is necessary if mechanically cooling at ambient temperatures below 40°F (4°C).

3. Unit shall be factory configured for vertical supply & return configurations.

23 81 19. 13.F. Electrical Requirements

1. Main power supply voltage, phase, and frequency must match those required by the manufacturer.

23 81 19. 13.G. Unit Cabinet

1. Unit cabinet shall be constructed of galvanized steel with exterior surfaces coated with a non-chalking, powder paint finish, certified at 750 hour salt spray test per ASTM-B117 standards.
2. Unit cabinet exterior paint shall be: film thickness, (dry) 3.0 MILS minimum, gloss (per ASTM D523, 60°F / 16°C): 80+/- 5, Hardness: H- 2H Pencil hardness.
3. Unit cabinet shall have gas utility entry holes in the side of the unit and in the unit underside. Entry holes shall not require field setup and shall be capped from the factory to prevent water intrusion when not in use.
4. Unit cabinet shall have electric utility entry locations marked from the factory with a dimple for accuracy of field drilling. Entry locations shall be available for entry through the side of the unit or from the unit underside.
5. Base Rail
   a. Unit shall have base rails on all 4 sides.
   b. Holes shall be provided in the base rails for rigging shackles to facilitate maneuvering and overhead rigging.
   c. Holes shall be provided in the base rail for moving the unit by fork truck.
   d. Base rail shall be a minimum of 15 gauge thickness.
6. Condensate pan and connections:
   a. Shall be a multidirectional internally sloped condensate drain pan made of a non- corrosive material.
   b. Shall comply with ASHRAE Standard 62.
   c. Shall use a 1” NPT female drain connection through the side of the drain pan. Connection shall be made per manufacturer’s recommendations.
   d. Shall include intentional “overflow notch” and water containment path to guide flow of water where desired in the event of a drain pan overflow.
7. Top panel:
   a. Shall be a multi piece top panel.
8. Electrical Connections
   a. All unit power wiring shall enter unit cabinet through a field drilled hole located by a factory provided dimple.
   b. Through- the- base capability.
      1) Standard unit shall have a through- the- base electrical location(s) using a raised, embossed portion of the unit base-pan.
      2) No base-pan penetration, other than those authorized by the manufacturer, is permitted.

23 81 19. 13.H. Gas Heat

1. General
   a. Heat exchanger shall be an induced draft design. Positive pressure heat exchanger designs shall not be allowed.
   b. Shall incorporate a direct- spark ignition system and redundant main gas valve.
   c. Gas supply pressure at the inlet to the rooftop unit gas valve must match that required by the manufacturer.
   d. Burners shall be of the in- shot type constructed of aluminum- coated steel.
   e. Burners shall incorporate orifices for rated heat output up to 2000 ft. (610m) elevation. Additional accessory kits may be required for applications above 2000 ft. (610m) elevation, depending on local gas supply conditions.
   f. Each heat exchanger tube shall contain multiple dimples for increased heating effectiveness.
2. The gas furnace shall be controlled by an integrated gas controller (IGC) microprocessor.
   a. IGC board shall notify users of fault using an LED (light- emitting diode).
   b. Unit shall be equipped with anti- cycle protection with one cycle on the unit flame rollout switch, 3 short cycles on the high temperature limit switch, one cycle on the auxiliary limit switch, and one cycle on indoor blower fault detection. Fault indication shall be made using an LED.
3. Staged gas heat
   a. Shall have two stages of heating capacity with first stage capacity 75% of total capacity.
4. Stainless Steel Heat Exchanger construction

a. The optional stainless steel heat exchanger shall be of the tubular- section type, constructed of a minimum of 20-gauge type 409 stainless steel.

b. Type 409 stainless steel shall be used in heat exchanger tubes and vestibule plate.

5. Induced draft combustion motor and blower

a. Shall be a direct- drive, single inlet, forward- curved centrifugal type.

b. Shall be made from steel with a corrosion- resistant finish.

c. Shall have permanently lubricated sealed bearings.

d. Shall have inherent thermal overload protection with automatic reset feature.

23 81 19. 13.I. Coils

1. Evaporator Coils, Aluminum Fin - Copper Tube:

a. Standard evaporator coils shall have aluminum plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.

b. b. Shall be leak tested to 150 psig, pressure tested to 250 psig, and burst qualified to CSA C22.2 No. 60335-2-40.th edition burst test at 1775 psig.

c. Assembled unit shall be pressure tested to 450 psig.

2. Condenser Coils, All Aluminum Microchannel:

a. Condenser coils shall have all aluminum microchannel design consisting of aluminum multiport flat tube design and aluminum fin. Coils shall be a furnace brazed design and contain epoxy lined shrink wrap on all aluminum to copper connections.

b. Microchannel condenser coils shall be leak tested to 150 psig, pressure tested by supplier to 600 psig, and burst qualified to CSA C22.2 No. 60335-2-40.

c. Assembled unit shall be pressure tested to 450 psig.

23 81 19. 13.J. Refrigerant Circuits

1. 2 stage IntelliSpeed airflow options shall have 2 refrigerant circuits with 2 stages of cooling.

2. Refrigerant circuit shall include the following control, safety, and maintenance features:

a. Thermostatic Expansion Valve (TXV) shall help provide optimum performance across the entire operating range.

b. Refrigerant filter drier - Solid core design.

c. Service gauge connections on suction and discharge lines.

3. Compressors

a. Unit shall use fully hermetic scroll compressors for each independent refrigeration circuit.

b. Two stage models shall use a single stage compressor on each refrigeration circuit.

c. Compressor motors shall be cooled by refrigerant gas passing through motor windings.

d. Compressors shall be internally protected from high discharge temperature conditions.

e. Compressors shall be protected from an over- temperature and over- amperage conditions by an internal, motor overload device.

f. Compressor shall be factory mounted on rubber grommets.

g. Crankcase heaters shall be installed in the factory as needed on tandem compressor sets.

23 81 19. 13.K. Filter Section

1. Filters access is specified in the unit cabinet section of this specification.

23 81 19. 13.L. Evaporator Fan and Motor

1. Evaporator fan motor:

a. Shall have permanently lubricated ball-bearings.

b. Shall have inherent automatic- reset thermal overload protection.

c. The job site selected brake horsepower shall be required to not exceed the motor’s nameplate horsepower rating plus the service factor.

2. Evaporator Fan:

a. Fan shall be a belt drive assembly with an adjustable pitch motor pulley.

b. Blower bearings shall have an L10 life of 100,000 hrs

c. Shall use sealed, permanently lubricated ball-bearing type.

d. Shall use dual blower design consisting of two balanced blower fans on a single shaft.

e. Blower fan shall be double- inlet type with forward- curved blades.

f. Shall be constructed from steel with a corrosion resistant finish and dynamically balanced.

23 81 19. 13.M. Condenser Fans and Motors

1. Condenser fan motors:
   a. Shall be a totally enclosed motor.
   b. Shall use permanently lubricated ball-bearings.
   c. Shall have inherent thermal overload protection with an automatic reset feature.
   d. Shall use a shaft- down design.
2. Condenser Fans:
   a. Shall be a direct- driven propeller type fan.

23 81 19. 13.N. Special Features Options and Accessories

1. IntelliSpeed staged air volume system:
   a. Evaporator fan motor:
      1) Shall have permanently lubricated bearings.
      2) Shall have a maximum continuous bhp rating for continuous duty operation; no safety factors above that rating.
      3) Shall be Variable Frequency duty and multi-speed control.
2. Variable Frequency Drive (VFD). Available on multi-speed (IntelliSpeed) and VAV indoor fan motor options:
   a. Shall be installed inside the unit cabinet, mounted, wired and tested.
   b. Shall contain Electromagnetic Interference (EMI) frequency protection.
   c. Insulated Gate Bi- Polar Transistors (IGBT) used to produce the output pulse width modulated (PWM) waveform.
   d. Built in LED display and controls. Does not require additional kit or options.
   e. RS485 capability standard.
   f. Electronic thermal overload protection.
   g. All printed circuit boards shall be conformal coated.
3. Low Leak Economizer:
   a. Integrated, tie-bar driven parallel modulating blade design type capable of simultaneous economizer and compressor operation.
   b. Damper blades shall be galvanized steel with tie-bar metal linkages. Plastic or composite blades on intake or return shall not be acceptable.
   c. Damper blades shall be class 1A dampers.
   d. Shall include all hardware and controls to provide free cooling with outdoor air when temperature and/or humidity are below set points.
   e. Shall be equipped with tie-bar driven dampers for both the outdoor ventilation air and the return air for positive air stream control.
   f. Economizer shall comply with, and be certified to, the AMCA 511 standard.
   g. Standard leak rate shall be equipped with dampers not to exceed 3 cfm/ft2 leakage at 1 in. wg pressure differential.
   h. Economizer controller shall be the Johnson Controls SE Economizer Controller
      1) On- board Fault Detection and Diagnostics (FDD) that senses and alerts when the economizer is not operating properly, meets the requirements for California Title 24, IECC 2015, and ASHRAE 90.1.
      2) Display alarms if the following occur
         i. Economizer is economizing when conditions do not support
         ii. Economizer is not economizing when conditions do support
         iii. Damper Stuck
         iv. Excess Outdoor Air
         v. Failed Sensor
      3) Automatic sensor detection

4) Capabilities for use with multiple-speed indoor fan systems
5) Utilize digital sensors: Dry bulb and Enthalpy
6) UL, CSA, and ICES-003 recognized and FCC compliant to CFR47

i. Shall be capable of introducing up to 100% outdoor air.
j. Shall be equipped with a barometric relief damper capable of relieving up to 100% return air and contain seals that meet ASHRAE 90.1 requirements. Barometric relief can be replaced by optional power exhaust.
k. Shall be designed to close damper(s) during loss- of- power situations with spring return built into motor.
l. Dry bulb outdoor air temperature sensor shall be provided as standard. Single or dual enthalpy sensing is available as a factory or field installed sensing option.fg Outdoor air sensor set point shall be adjustable and shall range from 40° to 80°F / 4° to 27°C. Additional sensor options shall be available as accessories.
m. The economizer controller shall also provide control of an accessory power exhaust unit function. Factory set at 100%, with a range of 0% to 100%.
n. The economizer shall maintain minimum airflow into the building during occupied period and provide design ventilation rate for full occupancy.
o. Dampers shall be completely closed when the unit is in the unoccupied mode.
p. Economizer controller shall accept a 2- 10 Vdc CO2 sensor input for IAQ/DCV control. In this mode, dampers shall modulate the outdoor air damper to provide ventilation based on the sensor input.
q. Economizer controller shall provide indications when in free cooling mode, in the DCV mode, or the exhaust fan contact is closed.

4. Barometric Relief Damper:
   a. Shall contain all materials necessary to field install a barometric relief damper capable of relieving up to 100% return air and contain seals that meet ASHRAE 90.1 requirements.
5. MagnaDry Dehumidification System:
   a. The MagnaDry Dehumidification system is factory installed and provides dehumidification of an occupied space while maintaining temperature control utilizing a hot gas reheat coil.
      1) Determination of unit functionality in straight cooling, straight heating, or reheat mode shall come from standard SSE control board.
      2) Reheat mode shall utilize a specific reheat coil placed after the evaporator coil to heat the conditioned air back to a neutral temperature when the occupied space requires dehumidification, but the temperature requirements are satisfied.
      3) The reheat circuit shall utilize a 3-way electronic controlled valve to modulate the refrigerant between the condenser circuit and reheat circuit.
      4) Changeover from cooling mode to reheat mode shall be accomplished in 30 seconds or less.
6. Phase Monitor:
   a. Shall provide protection against phase reversal, phase loss, and phase unbalance.
   b. Switch shall automatically shut off unit control circuit if any of the above conditions is detected.
   c. Shall have visual LED indication of operational status.
7. Hinged and tool less access panels:
   a. Cabinet panels shall be hinged.
   b. Shall provide easy access with toolless latching mechanism.
   c. Shall be on major panels of: filter, control box, fan motor, and gas or electric heat controls.
8. Louvered Hail/Coil Guard:
   a. Shall cover all external sides of unit condenser coil to prevent damage or tampering.
   b. Field kit shall contain all materials necessary to field install a coil guard.
   c. Shall provide protection for the coil and header on the entire exposed surfaces of the outdoor coil.
9. Unit-Mounted, Non-Fused Disconnect Switch:
   a. Switch shall be factory installed, internally mounted.
   b. National Electric Code (NEC) and UL approved non- fused switch shall provide unit power shutoff.
   c. Shall be accessible from outside the unit.
   d. Shall provide local shutdown and lockout capability.

10. Dual Enthalpy Sensor:
    a. The dual enthalpy sensor option or kit shall provide 2 relative humidity sensors to be mounted in the return and outdoor air streams to provide dual enthalpy economizer control.
    b. This kit contains all components required for dual enthalpy control and does not need to be used in conjunction with the Single Enthalpy Sensor Kit.
11. CO2 Sensor:
    a. Shall be able to provide demand ventilation control for indoor air quality (IAQ).
    b. The CO2 sensor shall be available in duct mount or wall mount with LED display.
    c. The set-points for IAQ and OAQ shall have adjustment capability between 0 and 5000 ppm in the Simplicity Smart Equipment controls.
12. Condensate Overflow Switch:
    a. Shall utilize float switch in condensate drain pan to signal if water level rises above acceptable threshold.
    b. Switch shall detect a 0.25 inch rise above mounted location to determine need to send shutoff signal.
    c. Shall send 24V signal to unit controller when tripped to shut down cooling operation and prevent additional buildup of water in condensate drain pan.

DIVISION 23 – HEATING, VENTILATING, AND AIR-CONDITIONING(HVAC)

Number Title

23 00 00 HEATING VENTILATING, AND AIR-CONDITIONING(HVAC)

23 06 00 Schedules for HVAC

23 06 80 Schedules for Decentralized HVAC Equipment

23 06 80. 13 Decentralized Unitary HVAC Equipment Schedule

23 06 80. 13.A Rooftop unit schedule

23 07 00 HVAC Insulation

23 07 16 HVAC Equipment Insulation

23 07 16. 13 Decentralized, Rooftop Units

23 07 16. 13.A Evaporator fan compartment

1. Interior cabinet surfaces shall be insulated with a minimum 1/2- in. thick, minimum 1 1/2 lb density, flexible fiberglass insulation coated on the air side.
2. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

23 07 16. 13.B Gas heat compartment

1. Aluminum foil-faced fiberglass insulation shall be used.
2. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

23 09 00 Instrumentation and Control for HVAC

23 09 13 Instrumentation and Control Devices for HVAC

23 09 13. 23 Sensors and Transmitters

23 09 13. 23.A Thermostats

1. Thermostat must:
   a. energize “G” when calling for fan only or continuous fan.
   b. have capability to energize 2 different stages of cooling, and 2 different stages of heating.
   c. include capability for occupancy scheduling.

23 09 23 Direct-digital Control system for HVAC

23 09 23. 13 Decentralized, Rooftop Units

23 09 23. 13.A Smart Equipment (Unit based microprocessor control)

1. Shall be ASHRAE 62-2001 compliant.
2. Shall include an integrated economizer controller to support an economizer with 2 to 10 v DC actuator input.
3. Controller shall accept the following inputs: space temperature, setpoint adjustment, outdoor air temperature, indoor air quality, outdoor air quality, indoor relative humidity, compressor lockout, fire shutdown, enthalpy, fan status, remote time clock/door switch.
4. Shall accept a CO_2 sensor in the conditioned space, and be Demand Control Ventilation ready.
5. Unit shall provide surge protection for the controller through a circuit breaker.
6. Shall have an LED display independently showing the status of activity on the communication bus, and processor operation.
7. Software upgrades will be accomplished by local download. Software upgrades through chip replacements are not allowed.

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-pressureswitch.

D. High-pressure switch.

E. Freeze-protection thermostat, evaporator coil. If any of the above safety devices trip, an LED (light-emitting diode) indicator shall flash a diagnostic code that indicates which safety switch has tripped.

F. Unit shall incorporate “AUTO RESET” compressor over temperature, over current protection.

G. Unit shall operate with conventional thermostat designs and have a low voltage terminal strip for easy hook-up.

H. Unit control board shall have on-board diagnostics and fault code display.

I. Standard controls shall include anti-short cycle and low voltage protection, and permit cooling operation down to 0 ºF.

J. Control board shall monitor each refrigerant safety switch independently.

K. Control board shall retain last 5 fault codes in non-volatile memory, which will not be lost in the event of a power loss.

23 09 23. 13.B RTU Open-multi-protocol, direct digital controller

1. Shall be ASHRAE 62-2001 compliant.
2. Shall include built-in protocol for BACNET , Modbus , and Johnson N2.
3. Shall allow access of up to 62 network variables (SNVT). Shall be compatible with all open controllers
4. Baud rate Controller shall be selectable using a dip switch.
5. Shall have an LED display independently showing the status of serial communication,running, errors, power, all digital outputs, and all analog inputs.
6. Shall accept the following inputs: space temperature, setpoint adjustment, outdoor air temperature, indoor air quality, outdoor air quality, compressor lock- out, fire shutdown, enthalpy switch, and fan status/filter status/ humidity/ remote occupancy.
7. Software upgrades will be accomplished by either local or remote download. No software upgrades through chip replacements are allowed.

23 09 33 Electric and Electronic Control System for HVAC

23 09 33. 13 Decentralized, Rooftop Units

23 09 33. 13.A General

1. Shall be complete with self- contained low- voltage control circuit protected by a resettable circuit breaker on the 24-v transformer side. Transformer shall have 75VA capability.
2. Shall utilize color-coded wiring.
3. Shall include a central control terminal board to conveniently and safely provide connection points for vital control functions such as: smoke detectors, phase monitor, gas controller, economizer, thermostat, DDC control options, and low and high pressure switches.
4. The heat exchanger shall be controlled by an integrated gas controller (IGC) microprocessor. See heat exchanger section of this specification.

23 09 33. 23.B Safeties

1. Compressor over-temperature, over-current. High internal pressure differential.
2. Low-pressure switch.
   a. Units with 2 compressors shall have different sized connectors for the circuit 1 and circuit 2 low **and high** pressure switches. They shall physically prevent the cross- wiring of the safety switches between circuits 1 and 2.
   b. Low pressure switch shall use different color wire than the high pressure switch. The purpose is to assist the installer and service technician to correctly wire and or troubleshoot the rooftop unit.
3. High pressure switch.
   a. Units with 2 compressors shall have different sized connectors for the circuit 1 and circuit 2 **low and** high pressure switches. They shall physically prevent the cross-wiring of the safety switches between circuits 1 and 2.

b. High pressure switch shall use different color wire than the low pressure switch. The purpose is to assist the installer and service technician to correctly wire and or troubleshoot the rooftop unit.

4. Automatic reset,/motor thermal overload protector.
5. Heating section shall be provided with the following minimum protections:
   a. High-temperature limit switches.
   b. Induced draft motor speed sensor.
   c. Flame rollout switch.
   d. Flame proving controls

23 09 93 Sequence of Operations for HVAC Controls

23 09 93. 13 Decentralized, Rooftop Units

23 09 93. 13 INSERT SEQUENCE OF OPERATION

23 40 13 Panel Air Filters

23 40 13. 13 Decentralized, Rooftop Units

23 40 13. 13.A Standard filter section

1. Shall consist of factory-installed, low velocity, disposable 2" or 4" thick fiberglass filters of commercially available sizes.
2. Units can accept 2” or 4” filters and have a field convertible toolless
3. Filters shall be accessible through an access panel with toolless removal as described in the unit cabinet section of this specification (23 81 19.13.H).

23 81 19 Self-Contained Air Conditioners

23 81 19. 13 Small-Capacity Self-Contained Air Conditioners

23 81 19. 13.A General

1. Outdoor, rooftop mounted, electrically controlled, heating and cooling unit utilizing a fully hermetic scroll compressor(s) for cooling duty and gas combustion for heating duty.
2. Factory assembled, single-piece heating and cooling rooftop unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, and special features required prior to field start-up.
3. Unit shall use environmentally sound, R-410A refrigerant.
4. Unit shall be installed in accordance with the manufacturer’s instructions.
5. Unit must be selected and installed in compliance with local, state, and federal codes.

23 81 19. 13.B Quality Assurance

1. Unit meets ASHRAE 90.1 minimum efficiency requirements.
2. ZY units are Energy Star certified.
3. Unit shall be rated in accordance with AHRI Standards 210/240 and 340/360.
4. Unit shall be designed to conform to ASHRAE 15, 2001.
5. Unit shall be UL- tested and certified in accordance with ANSI Z21.47 -2012/CSA 2.3-2012, CSA C22.2 No. 236-11 (UL 1995) 4th edition and CSA C22.2 No. 3 - M 1988
6. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
7. Unit casing shall be capable of withstanding 750-hour salt spray exposure per ASTM B117 (scribed specimen).
8. Unit shall be designed in accordance with ISO 9001, and shall be manufactured in a facility registered by; ISO 9001.
9. Roof curb shall be designed to conform to NRCA Standards.
10. Unit shall be subjected to a completely automated run test on the assembly line. The data for each unit; will be stored at the factory, and must be available upon request.
11. Unit shall be designed in accordance with UL Standard 1995, including tested to withstand rain.
12. Unit shake tested to assurance level 1, ASTM D4169 to ensure shipping reliability.

13. High Efficient Motors listed shall meet section 313 of the Energy Independence and Security Act of 2007; (EISA 2007).

23 81 19. 13.B Delivery, Storage, and Handling

1. Unit shall be stored and handled per manufacturer's recommendations.

23 81 19. 13.E Project Conditions

1. As specified in the contract.

23 81 19. 13.F Operating Characteristics

1. Unit shall be capable of starting and running at 125°F (52°C)ambient outdoor temperature, meeting maximum load criteria of AHRI Standard 210/240 or 340/360 at ± 10% voltage.
2. Compressor with standard controls shall be capable of operation down to 0°F (2°C), ambient outdoor temperatures.See below for head pressure control package or winter start kit.
3. Unit shall discharge supply air vertically or horizontally as shown on contract drawings.
4. Unit shall be factory configured for vertical supply & return configurations.
5. Unit shall be field convertible from vertical to horizontal airflow on all models.
6. Unit shall be capable of mixed operation: vertical supply with horizontal return or horizontal supply with vertical return.

23 81 19. 13.G Electrical Requirements

1. Main power supply voltage, phase, and frequency must match those required by the manufacturer.

23 81 19. 13.H Unit Cabinet

1. **Unit cabinet shall be constructed of galvanized steel with exterior surfaces coated with a non-chalking, powder paint finish, certified at 750 hour salt spray test per ASTM-B117 standards.**
2. Evaporator fan compartment interior cabinet insulation shall conform to AHRI Standards 210/240 or 340/360 minimum exterior sweat criteria. Interior surfaces shall be insulated with a minimum 1/2- in. thick, 1 1/2 lb density, flexible fiberglass insulation, neoprene coated on the air side. Aluminum foil- faced fiberglass insulation shall be used in the gas heat compartment. 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 (Only premium efficiency motors have hp rating on the nameplate). 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.

   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.
3. Base of unit shall have a minimum of four locations for thru-the-base gas and electrical connections (factory installed or field installed), standard.
4. Base Rail
   a. Unit shall have base rails on a minimum of 4 sides.
   b. Holes shall be provided in the base rails for rigging shackles to facilitate maneuvering and overhead rigging.
   c. Holes shall be provided in the base rail for moving the rooftop by fork truck..
   d. Base rail shall be a minimum of 16 gauge thickness.
5. Condensate pan and connections
   a. Shall be an internally sloped condensate drain pan made of a non-corrosive material.
   b. Shall comply with ASHRAE Standard 62.
   c. Shall use a 3/4" - 14 NPT drain connection, possible either through the bottom or side of the drain pan. Connection shall be made per manufacturer's recommendations.
6. Top panel
   a. Shall be a single piece top panel.
7. Gas Connections
   a. All gas piping connecting to unit gas valve shall enter the unit cabinet at a single location on side of unit
   b. Thru-the-base capability
      (1.) Standard unit shall have a thru-the-base gas- line location using a raised, embossed portion of the unit basepan.

(2.) Optional, factory- approved, water- tight connection method must be used for thru-the-base gas connections.

(3.) No basepan penetration, other than those authorized by the manufacturer, is permitted.

8. Electrical Connections
   a. All unit power wiring shall enter unit cabinet at a single, factory-prepared, knockout location.
   b. Thru-the-base capability.
      (1.) Standard unit shall have a thru-the-base electrical location(s) using a raised, embossed portion of the unit basepan.
      (2.) Optional, factory- approved, water-tight connection method must be used for thru-the-base electrical connections.
      (3.) No basepan penetration, other than those authorized by the manufacturer, is permitted.
9. Component access panels (standard)
   a. Cabinet panels shall be easily removable for servicing.
   b. Unit shall have one factory installed, toolless, removable, filter access panel.
   c. Panels covering control box, indoor fan, indoor fan motor, gas components(where applicable), and compressors shall have a molded composite handles.
   d. Handles shall be UV modified, composite. They shall be permanently attached, and recessed into the panel.
   e. Screws on the vertical portion of all removable access panel shall engage into heat resistant, molded composite collars.
   f. Collars shall be removable and easily replaceable using manufacturer recommended parts.

23 81 19. 13.I Gas Heat

1. General
   a. Heat exchanger shall be an induced draft design. Positive pressure heat exchanger designs shall not be allowed.
   b. Shall incorporate a direct- spark ignition system and redundant main gas valve.
   c. Gas supply pressure at the inlet to the rooftop unit gas valve must match that required by the manufacturer.
2. The heat exchanger shall be controlled by an integrated gas controller (IGC) microprocessor.
   a. IGC board shall notify users of fault using an LED (light-emitting diode).
   b. The LED shall be visible without removing the control box access panel.
   c. IGC board shall contain algorithms that modify evaporator-fan operation to prevent future cycling on high temperature limit switch.
   d. Unit shall be equipped with anti-cycle protection with one short cycle on unit flame rollout switch or 4 continuous short cycles on the high temperature limit switch. Fault indication shall be made using an LED.
3. Standard Heat Exchanger construction
   a. Heat exchanger shall be of the tubular-section type constructed of a minimum of 20-gauge steel coated with a nominal 1.2 mil aluminum-silicone alloy for corrosion resistance.
   b. Burners shall be of the in-shot type constructed of aluminum-coated steel.
   c. Burners shall incorporate orifices for rated heat output up to 2000 ft (610m) elevation. Additional accessory kits may be required for applications above 2000 ft (610m) elevation, depending on local gas supply conditions.
   d. Each heat exchanger tube shall contain multiple dimples for increased heating effectiveness.
4. Optional Stainless Steel Heat Exchanger construction
   a. Use energy saving, direct-spark ignition system.
   b. Use a redundant main gas valve.
   c. Burners shall be of the in-shot type constructed of aluminum-coated steel.
   d. All gas piping shall enter the unit cabinet at a single location on side of unit (horizontal plane).
   e. The optional stainless steel heat exchanger shall be of the tubular-section type, constructed of a minimum of 20-gauge type 409 stainless steel.
   f. Type 409 stainless steel shall be used in heat exchanger tubes and vestibule plate.
   g. Complete stainless steel heat exchanger allows for greater application flexibility.
6. Induced draft combustion motor and blower
   a. Shall be a direct-drive, single inlet, forward-curved centrifugal type.

b. Shall be made from steel with a corrosion-resistant finish.

c. Shall have permanently lubricated sealed bearings.

d. Shall have inherent thermal overload protection.

e. Shall have an automatic reset feature.

23 81 19. 13.J Coils

1. Standard Aluminum Fin/Copper Tube Coils

a. Standard evaporator and condenser coils shall have aluminum lanced plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.

b. Evaporator coils shall be leak tested to 150 psig, pressure tested to 450 psig, and qualified to CSA C22.2 No. 236-11 (UL 1995) 4th edition burst test at 1775 psig.

c. Condenser coils shall be leak tested to 150 psig, pressure tested to 650 psig, and qualified to CSA C22.2 No. 236-11 (UL 1995) 4th edition burst test at 1980 psig.

23 81 19. 13.K Refrigerant Components

1. Refrigerant circuit shall include the following control, safety, and maintenance features

a. Thermostatic Expansion Valve (TXV) shall help provide optimum performance across the entire operating range. Shall contain removable power element to allow change out of power element and bulb without removing the valve body.(Orifice on ZX08, ZX09, ZX12, ZQ04, ZQ05 & ZQ06)

b. Refrigerant filter drier - Solid core design.

c. Service gauge connections on suction and discharge lines.

d. Pressure gauge access through a specially designed access port in the top panel of the unit.

2. There shall be gauge line access port in the skin of the rooftop, covered by a black, removable plug.

a. The plug shall be easy to remove and replace.

b. When the plug is removed, the gauge access port shall enable maintenance personnel to route their pressure gauge lines.

c. This gauge access port shall facilitate correct and accurate condenser pressure readings by enabling the reading with the compressor access panel on.

d. The plug shall be made of a leak proof, UV- resistant, composite material.

3. Compressors

a. Unit shall use fully hermetic, scroll compressor for each independent refrigeration circuit.

b. Compressor motors shall be cooled by refrigerant gas passing through motor windings.

c. Compressors shall be internally protected from high discharge temperature conditions.

d. Compressors shall be protected from an over-temperature and over-amperage conditions by an internal, motor overload device.

e. Compressor shall be factory mounted on rubber grommets.

f. Compressor motors shall have internal line break thermal, current overload and high pressure differential protection.

g. Crankcase heaters shall not be required for normal operating range, unless provided by the factory.

23 81 19. 13.L Filter Section

1. Filters access is specified in the unit cabinet section of this specification.

2. Shall consist of factory-installed, low velocity, throw-away 2” or 4” thick fiberglass filters.

3. Units can accept 2” or 4” filters and have a field convertible toolless

23 81 19. 13.M Evaporator Fan and Motor

1. Evaporator fan motor

a. Shall have permanently lubricated bearings.

b. Shall have inherent automatic reset thermal protection (Only on single-phase, belt-drive motors, three - phase, belt-drive motors have internal thermostat used for external line-break control.).

3. Belt-driven Evaporator Fan

a. Belt drive shall include an adjustable-pitch motor pulley.

b. Shall use sealed, permanently lubricated ball-bearing type.

c. Blower fan shall be double-inlet type with forward-curved blades.

d. Shall be constructed from steel with a corrosion resistant finish and dynamically balanced.

23 81 19. 13.N Condenser Fans and Motors

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 60°C ball bearings internally protected against overload conditions and staged independently. A cleaning window shall be provided on two sides of the units for coil cleaning.

1. Condenser fan motors
   a. Shall be a totally enclosed motor.
   b. Shall use permanently lubricated bearings.
   c. Shall have inherent thermal overload protection with an automatic reset feature.
   d. All models shall use a shaft-down design except shaft-up on ZX14 & ZY12 size with rain shield.
2. Condenser Fans
   a. Shall be a direct-driven propeller type fan.
   b. Shall have aluminum blades riveted to corrosion-resistant steel spiders and shall be dynamically balanced.

23 81 19. 13.O Special Features Options and Accessories

1. IntelliSpeed-Staged Air Volume System (ZX08-14 & ZY08-12)
   a. Evaporator fan motor:
      (1.) Shall have permanently lubricated bearings.
      (2.) Shall have a maximum continuous bhp rating for continuous duty operation; no safety factors above that rating.
      (3.) Shall be Variable Frequency duty and 2-speed control.
      (4.) Shall contain motor shaft grounding ring to prevent electrical bearing fluting damage by safely diverting harmful shaft voltages and bearing currents to ground.
2. Variable Frequency Drive (VFD). Only available on 2-speed indoor fan motor option (IntelliSpeed)

   INSERT MITSUBISHI DRIVE SPECIFICATIONS

8. Unit- Mounted, Non-Fused Disconnect Switch: (Verify on the unit nameplate that the disconnect is properly sized for the application. Units with field installed electric heat may exceed the factory installed disconnect amperage rating.)
   a. Switch shall be factory- installed, internally mounted.
   b. National Electric Code (NEC) and UL approved non- fused switch shall provide unit power shutoff.
   c. Shall be accessible from outside the unit.
   d. Shall provide local shutdown and lockout capability.
11. Roof Curbs (Vertical):
   a. Full perimeter roof curb with exhaust capability providing separate air streams for energy recovery from the exhaust air without supply air contamination.
   b. Formed galvanized steel with wood nailer strip and shall be capable of supporting entire unit weight.
   c. Permits installation and securing of ductwork to curb prior to mounting unit on the curb.

Date
04/12/2024
Project Name
Little Rock West High School Packaged Units
Project Number
Client / Purchaser

Johnson Controls

Control Summary Page

Control	Models and Unit Tags	
BACnet MSTP,Mdbs,N2 COM Card	AD25S3CP4S1CAH46F3	RTU-G3
BACnet MSTP,Mdbs,N2 COM Card	ZYG12S4B3EB1A124A3	RTU-C1
	ZYG08S4B3EB1A124A4	RTU-W1

23 09 23 Direct- digital Control system for HVAC

23 09 23. 13 Decentralized, Rooftop Units:

23 09 23. 13.A. Unit Control Board

1. ASHRAE 62- 2001compliant. BTL certified.
2. Shall accept 20-30 VAC input power, 50/60Hz. 24 VAC nominal.
3. Operating temperature range from -40F to 158F; 10-90% RH (non-condensing UI), and -4F to 158F; 10-90% Rh (non-condensing), with a storage temperature range from -40F to 194F; 5-95% RH (non-condensing).
4. Shall include an option of and Economizer microprocessor controller which communicates directly with the Unit Control Board and has 8 Analog outputs, 2 Analog inputs, 2 Binary outputs, 3 Binary outputs.
5. Controller shall accept the followinginputs: space temperature, return air temperature sensor, setpointadjustment, outdoor air temperature, indoor air quality, outdoor air quality, indoor relative humidity, compressor lock- out, fire/smoke shutdown, single and dual enthalpy,fan status, remote time clock, SA Bus communicated temperature/humidity/CO2 values from Network sensors, FC Bus Network Overrides for space temperature, outdoor air temperature, space humidity, outdoor air quality, Indoor air quality, System purge.
6. Shall accept a single CO_2 sensor or multiple CO_2 sensors networked together via communication bus in the conditioned space, and be Demand Control Ventilation (DCV) ready.
7. Shall provide the following outputs: economizer, fan, cooling stage 1, cooling stage 2, heat stage 1, heat stage 2, heat stage 3/ exhaust/ reversing valve/ dehumidify/occupied.
8. Unit shall provide surge protection for the controller through a circuit breaker.
9. Shall be Internet capable, and communicate at a Baud rate of 38.4K or faster.
10. Shall have an LED display independently showingthe status of activity on the communication bus, and processor operation.
11. 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. If any of these safety devices trip, the LCD screen will display alarm message indicating the specific safety device that caused the lockout.
    a. Loss of charge/Low-pressure switch.
    b. High-pressure switch.
    c. Freeze condition sensor on evaporator coil.
12. Unit control board must support each usage case:
    a. Conventional thermostat with low voltage input terminals for easy installation
    b. Communicating network sensors in the occupied space to provide feedback on space conditions for unit control board to compare with associated setpoints
    c. Communication via BACnet MS/TP, Modbus RTU, N2 protocols for integration into a building automation/management system
13. Anti-short cycle and low voltage protection features included.
14. Internal occupied/unoccupied scheduling
15. Unit control board shall permit cooling operation down to a selectable value as low as 0 degrees F.
16. Shall allow for start-up, commissioning, troubleshooting, parameter adjustment, setpoint adjustment via onboard display and navigable menu with no additional interface tool or controls technician required.
17. The unit control board shall run a self-test diagnostics algorithm at startup that operated the cooling cycle, heating cycle, fan operation. A status report shall be provided upon completion of the diagnostic self-test.
18. Utilize any wi-fi enabled smart device to access the HVAC or multiple HVAC units if communication wiring between them is present (FC Bus or SA Bus). Remote access shall allow complete ability to perform start-up, commissioning, troubleshooting, parameter adjustment, setpoint adjustment.
19. Local embedded trending and scheduling. Trending data and occupancy scheduling predefined from the factory. Occupancy schedule to be modified via control board joystick menu navigation and remotely using a smart device (cellular phone, laptop, tablet)
20. A menu on the onboard screen shall display the unit status and allow changing parameters where applicable. These include but are not limited to:
    a. Demand Ventilation Mode – enable or disable
    b. Operational Setpoint – display current value
    c. Supply Air Temperature (SAT) – display current value
    d. Return Air Temperature (RAT) – display current value

e. Operational Supply Humidity (OprSH) – display current value as provided by a 0-10VDS input, SA Bus Network Sensor, or FC Bus communicated value
f. Return Air Humidity (RAH) – display current value
g. Operational outdoor Air Temperature (OprOAT) – enthalpy calculated from OAH 0-10VDC input to Economizer board and OprOAT only if economizer is present
h. Operational Outdoor Air Humidity (OprOAH) – the buffered outdoor air humidity. May be from economizer boards OAH 0-10VDC input or FC Bus communicated value
i. Operational outdoor Air Quality (OprOAQ) – the buffered outdoor air quality in use. May be from economizer boards OAQ 0-10VDC input or FC Bus communicated value
j Operational Indoor Air Quality (OprIAQ) – the buffered indoor air quality in use. May be from economizer board IAQ 0-10VDC input, SA Bus Network Sensor, or FC Bus communicated value

21. A menu shall display and allow modification to the following operations and settings:
    a. HVAC Zone Fan
    b. Cooling
    c. Heating
    d. Economizer
    e. Demand Ventilation
    f. Power Exhaust
    g. Sensors
    h. Network
22. A menu shall display and allow modification to the following operations and settings:
    a. HVAC Zone – Occupied status
    b. Indoor Fan status
    c. Cooling status
    d. Heating status
    e. Economizer indication whether free-cooling is available or not
    f. Enabling or disabling of Demand Ventilation
    g. Power Exhaust
        1) Enable/disable hot-gas reheat if available
        2) Warmup/Cooldown
        3) Title 24 Load Shed
        4) Defrost
23. A menu shall display and allow modification to the following operations and settings:
    a. Firmware version (of UCB, Economizer, other peripheral boards)
    b. Setting time zone
    c. Network information
        1) Device name that will appear on the FC Bus
        2) Selection of communication protocol
        3) Operational Baud Rate
        4) Device ID
24. A menu shall display and allow modification to the following operations and settings:
    a. Version of firmware
    b. Ability to Load new firmware
    c. Create a backup file of the firmware and parameter setting via USB port
    d. Restore factory default parameter values and setup
    e. Full and Partial Cloning of parameter setpoints from or to other units
    f. Data trend exporting
25. A menu shall display and allow modification to the following operations and settings:

a. Unit serial number, model number and name
b. Ability to reset Lockouts
c. Controller name
d. Displays the current values of all setpoints in use
e. Displays all current values for the indoor and outdoor zones
f. Displays current values related to:
    1) Indoor Fan
    2) Cooling
    3) Heating
    4) Heat Pump operation
    5) Economizer operation
    6) Power Exhaust
    7) Demand Ventilation
    8) Air monitoring station
    9) Hot Gas Reheat
    10) Smoke Control
g. Current information for inputs; including
    1) Sensors
    2) Coil Sensors
    3) Thermostat
    4) Binary Inputs
    5) Unit Protection
    6) Network Inputs
    7) All outputs (relay and binary)
h. Self-Test
    1) A patented self-test system that runs through a series of algorithms to provide a report of all functioning characteristics of the system at time of startup and commissioning.

23 09 23. 13.B. Auxiliary Control Boards

1. ASHRAE 62- 2001 compliant. BTL certified.
2. Economizer controller CEC Title 24 Compliant
    a. Display alarms if the following occur
        1) Economizer is economizing when conditions do not support
        2) Economizer is not economizing when conditions do support
        3) Damper Stuck
        4) Excess Outdoor Air
        5) Failed Sensor
3. Refrigeration Fault Detection & Diagnostics
    a. There is insufficient refrigerant in any circuit
    b. There is excessive refrigerant in any circuit
    c. There is excessive refrigerant flow
    d. There is insufficient refrigerant flow (restriction)
    e. Inefficient compressor
    f. Insufficient High-side heat transfer
    g. Excessive High-side heat transfer (low ambient control problem, low ΔP)
    h. Insufficient Low-side heat transfer
    i. Excessive Low-side heat transfer

j. Sensor fault- The liquid temperature is greater than the condenser temperature (Could also be triggered if refrigerant level is very low in the system)
k. Sensor fault- Sensor data is not available
l. The unit is off
m. The ambient temperature is too low
n. The ambient temperature is too high
o. The return air wet-bulb temperature is too low
p. The return air wet-bulb temperature is too high
q. Sensor fault- The condensing temperature is lower than the ambient temperature (Could also be triggered when the condenser is wet)
r. The suction line temperature is less than the evaporator temperature
s. The evaporator temperature is greater than the ambient temperature
t. The liquid temperature is lower than the ambient temperature
u. Sensor fault- Suction temperature or ambient temperature is invalid
v. Sensor fault- The return air dry-bulb or wet-bulb temperature is invalid
w. Sensor fault- The liquid pressure or suction pressure is invalid
x. Sensor fault- The suction line temperature is invalid
y. The return air dry-bulb temperature is too low
z. The return air dry-bulb temperature is too high
aa. The Efficiency Index is below 75% of ideal
bb. The Capacity Index is below 75% of ideal

23 09 23. 13.C Remote Accessibility:

1. ASHRAE 62- 2001 compliant. BTL certified.
2. Provide the ability to adjust parameter values, setpoints, limits remotely
3. Connectivity to an Ethernet network via static IP address or Dynamic Name Server (DNS)
4. Allow a maximum of 100 devices on the same FC bus trunk and accessed by one remote device

Start-up sheet

START-UP & SERVICE DATA INSTRUCTION

COMMERCIAL PACKAGE UNITS

3.0 To 50.0 TONS

START-UP CHECKLIST

Date: _____

Job Name: _____

Customer Name: _____

Address: _____

City: _____ State: _____ Zip: _____

Model Number: _____ Serial Number: _____

Qualified Start-up Technician: _____ Signature: _____

HVAC Contractor: _____ Phone: _____

Address: _____

Contractor's E-mail Address: _____

Electrical Contractor: _____ Phone: _____

Distributor Name: _____ Phone: _____

WARRANTY STATEMENT

Johnson Controls/Ducted Systems is confident that this equipment will operate to the owner's satisfaction if the proper procedures are followed and checks are made at initial start-up. This confidence is supported by the 30 day dealer protection coverage portion of our standard warranty policy which states that Johnson Controls/ Ducted Systems will cover parts and labor on new equipment start-up failures that are caused by a defect in factory workmanship or material, for a period of 30 days from installation. Refer to the current standard warranty policy and warranty manual for details.

In the event that communication with Johnson Controls/Ducted Systems is required regarding technical and/or warranty concerns, all parties to the discussion should have a copy of the equipment start-up sheet for reference. A copy of the original start-up sheet should be filed with the Technical Services Department.

The packaged unit is available in constant or variable air volume versions with a large variety of custom options and accessories available. Therefore, some variation in the startup procedure will exist depending upon the products capacity, control system, options and accessories installed.

This start-up sheet covers all startup check points common to all package equipment. In addition it covers essential startup check points for a number of common installation options. Depending upon the particular unit being started not all sections of this startup sheet will apply. Complete those sections applicable and use the notes section to record any additional information pertinent to your particular installation.

Warranty claims are to be made through the distributor from whom the equipment was purchased.

EQUIPMENT STARTUP

Use the local LCD or Mobile Access Portal (MAP) Gateway to complete the start-up.

A copy of the completed start-up sheet should be kept on file by the distributor providing the equipment and a copy sent to:

Johnson Controls/Ducted Systems
Technical Services Department
5005 York Drive
Norman, OK 73069

SAFETY WARNINGS

The inspections and recording of data outlined in this procedure are required for start-up of Johnson Controls/Ducted Systems' packaged products. Industry recognized safety standards and practices must be observed at all times. General industry knowledge and experience are required to assure technician safety. It is the responsibility of the technician to assess all potential dangers and take all steps warranted to perform the work in a safe manner. By addressing those potential dangers, prior to beginning any work, the technician can perform the work in a safe manner with minimal risk of injury.

⚠WARNING

Lethal voltages are present during some start-up checks. Extreme caution must be used at all times.

⚠WARNING

Moving parts may be exposed during some startup checks. Extreme caution must be used at all times.

NOTE: Read and review this entire document before beginning any of the startup procedures.

DESIGN APPLICATION INFORMATION

This information will be available from the specifying engineer who selected the equipment. If the system is a VAV system the CFM will be the airflow when the remote VAV boxes are in the full open position and the frequency drive is operating at 60 HZ. **Do not proceed with the equipment start-up without the design CFM information.**

Design Supply Air CFM: _____ Design Return Air CFM: _____

Design Outdoor Air CFM At Minimum Position: _____

Total External Static Pressure: _____

Supply Static Pressure: _____

Return Static Pressure: _____

Design Building Static Pressure: _____

Outside Air Dilution: Economizer Position Percentage: _____ CFM: _____

Supply Gas Pressure After Regulator W/o Heat Active _____ Inches _____

ADDITIONAL APPLICATION NOTES FROM SPECIFYING ENGINEER:

REFERENCE

General Inspection	Completed	See Notes
Unit inspected for shipping, storage, or rigging damage	☐	☐
Unit installed with proper clearances	☐	☐
Unit installed within slope limitations	☐	☐
Refrigeration system checked for gross leaks (presence of oil)	☐	☐
Terminal screws and wiring connections checked for tightness	☐	☐
Filters installed correctly and clean	☐	☐
Economizer hoods installed in operating position	☐	☐
Condensate drain trapped properly, refer to Installation Manual	☐	☐
Economizer damper linkage tight	☐	☐
Gas Heat vent hood installed	☐	☐
All field wiring (power and control) complete	☐	☐

Air Moving Inspection	Completed	See Notes
Alignment of drive components	☐	☐
Belt tension adjusted properly	☐	☐
Blower pulleys tight on shaft, bearing set screws tight, wheel tight to shaft	☐	☐
Pressure switch or transducer tubing installed properly	☐	☐

Exhaust Inspection Powered ☐ Barometric Relief ☐	Completed	See Notes
Check hub for tightness	☐	☐
Check fan blade for clearance	☐	☐
Check for proper rotation	☐	☐
Check for proper mounting (screen faces towards unit)	☐	☐
Prove operation by increasing minimum setting on economizer	☐	☐

Economizer Inspection Standard ☐ BAS ☐	Completed	See Notes
CO_2 sensor installed Yes ☐ No ☐	☐	☐
Check economizer setting (Reference Smart Equipment™ Control Board LCD menu location)	☐	☐
Prove economizer open/close through Smart Equipment™ Board Setting	☐	☐

Reheat Mode Normal ☐ or Alternate ☐ Not Applicable ☐
Humidity Sensor (2SH0401) _____

Operating Measurements - Air Flow

Fan operates with proper rotation (All VFD equipped units with the optional Manual Bypass must be phased for correct blower rotation with the Bypass switch set in the LINE position) ID Fans ☐ Exh. Fans ☐ Cond. Fans ☐	
Pressure drop across dry evaporator coil (At maximum design CFM) [1]	IWC
External Static Pressure	IWC
Return Static Pressure	IWC
Supply Static Pressure	IWC
Supply Air CFM Using Dry Coil Chart	CFM
Final Adjusted Supply Air CFM[2]	CFM

1. Consult the proper airflow to pressure drop table to obtain the actual airflow at the measured pressure differential.
2. Was a motor pulley adjustment or change required to obtain the correct airflow?
   Was it necessary to increase of decrease the airflow to meet the design conditions?
   If the motor pulley size was changed, measure the outside diameters of the motor and blower pulleys and record those diameters here;

Blower Motor HP _____ FLA_____ RPM_____

Pulley Pitch Diameter _____ Turns Out_____ Final Turns Out_____

Blower Pulley Pitch Diameter _____ Fixed Sheave_____

ELECTRICAL DATA

T1 - T2 _____ Volts T2 - T3 _____ Volts

Control Voltage _____ Volts T1 - T3 _____ Volts

Device	Nameplate	Measured List All Three Amperages
Supply Fan Motor[1, 2]	AMPS	AMPS
Exhaust Motor (Dampers 100%)	AMPS	AMPS
Condenser Fan #1	AMPS	AMPS
Condenser Fan #2 (if equipped)	AMPS	AMPS
Condenser Fan #3 (if equipped)	AMPS	AMPS
Condenser Fan #4 (if equipped)	AMPS	AMPS
Compressor #1	AMPS	AMPS
Compressor #2 (if equipped)	AMPS	AMPS
Compressor #3 (if equipped)	AMPS	AMPS
Compressor #4 (if equipped)	AMPS	AMPS

1. VAV units with heat section - simulate heat call to drive VAV boxes and VFD/IGV to maximum design airflow position.
2. VAV units without heat section - VAV boxes must be set to maximum design airflow position.

OPERATING MEASUREMENTS - COOLING

Stage	Discharge Pressure	Discharge Temp.	Liquid Line Temp.[1]	Subcooling[2]	Suction Pressure	Suction Temp.	Superheat
First	#	°	°	°	#	°	°
Second (if equipped)	#	°	°	°	#	°	°
Third (if equipped)	#	°	°	°	#	°	°
Fourth (if equipped)	#	°	°	°	#	°	°
Reheat 1st Stage	#	°	°	°	#	°	°

1. Liquid temperature should be taken before filter/drier.
2. Subtract 10 psi from discharge pressure for estimated liquid line pressure

Outside air temperature	_____	°F db	_____	°F wb	_____ %RH
Return Air Temperature	_____	°F db	_____	°F wb	_____ %RH
Mixed Air Temperature	_____	°F db	_____	°F wb	_____ %RH
Supply Air Temperature	_____	°F db	_____	°F wb	_____ %RH

REFRIGERANT SAFETIES

Action	Completed	See Notes
Prove Compressor Rotation (3 phase only) by gauge pressure	☐	☐
Prove High Pressure Safety, All Systems	☐	☐
Prove Low Pressure Safety, All Systems	☐	☐

OPERATING MEASUREMENTS - GAS HEATING

Fuel Type: ☐ Natural Gas ☐ LP Gas

Action		Completed	See Notes
Check for gas leaks		☐	☐
Prove Ventor Motor Operation		☐	☐
Prove Primary Safety Operation		☐	☐
Prove Auxiliary Safety Operation		☐	☐
Prove Rollout Switch Operation		☐	☐
Prove Smoke Detector Operation		☐	☐
Manifold Pressure	Stage 1	IWC	☐
	Stage 2 (If Equipped)	IWC	☐
	Stage 3 (If Equipped)	IWC	☐
Supply gas pressure at full fire		IWC	☐
Check temperature rise[1]	☐ measured at full fire	°F	☐

1. $\frac{\text{Input X Eff. (BTU output)}}{1.08 \text{ X Temp. Rise}}$

OPERATIONAL MEASUREMENTS - STAGING CONTROLS

Verify Proper Operation of Heating/Cooling Staging Controls	
Create a cooling demand at the Thermostat, BAS System or Smart Equipment™ Verify that cooling/economizer stages are energized.	☐
Create a heating demand at the Thermostat, BAS System or Smart Equipment™ Verify that heating stages are energized.	☐
Verify Proper Operation of the Variable Frequency Drive (If Required)	
Verify that motor speed modulates with duct pressure change.	☐

FINAL - INSPECTION

Verify that all operational control set points have been set to desired value Scroll through all setpoints and change as may be necessary to suit the occupant requirements.	☐
Verify that all option parameters are correct Scroll through all option parameters and ensure that all installed options are enabled in the software and all others are disabled in the software. (Factory software settings should match the installed options)	☐
Verify that all access panels have been closed and secured	☐
Save a backup file from the unit control board onto a USB flash drive.	☐

OBSERVED PRODUCT DEFICIENCIES & CONCERNS: