SUBMITTAL DATA

Order #: **Date:** 12/06/2024

Project: BCF 885 Liverpool, NY

Project #:

Submitter: Billy Prater
UPG National Accounts-York
5005 York Dr.,
Norman, Oklahoma 73069
405 419 6498

Date
12/06/2024
Project Name
BCF 885 Liverpool, NY
Project Number
Client / Purchaser

Submittal Summary Page

Qty	Tag #	Model # / Material #	Description
1	RTU 1	KV30N3DR4S1CAS41G1	30 Ton, York Single Packaged R-454B Air Conditioner, Refrigerant Detection System (RDS) is factory installed, Standard Efficiency / Bottom Supply / Bottom Return, Natural Gas, Staged Heat, High Heat, 620 MBH Input, 460-3-60, 15 HP High Static Belt Drive Blower • Two stages of cooling • VFD with Bypass and Intellispeed • Dual Enthalpy Economizer w/ Power Exhaust and Economizer Fault Detection & Diagnostic (Meets ASHRAE 90.1-2013, IECC 2015, California Title 24, AMCA 511) • 2" Throwaway Filter • Smart Equipment Controller including Discharge Air, Return Air, and Outdoor Air Temperature Sensors. BACNet MS/TP, Modbus and N2 Communication Card. • Non Powered Convenience Outlet (110 VAC) • Circuit Disconnect • Phase Monitor • Microchannel condenser coils • Copper tube/Aluminum fin evaporator coils • Modulating Hot Gas Reheat • Hinged Access Panel • Galvanized Steel Drain Pan • Condensate Overflow(COF)
1	RTU 4	KV30N3CY4S1CAS11G1	30 Ton, York Single Packaged R-454B Air Conditioner, Refrigerant Detection System (RDS) is factory installed, Standard Efficiency / Bottom Supply / Bottom Return, Natural Gas, Staged Heat, High Heat, 620 MBH Input, 460-3-60, 10 HP Medium Static Belt Drive Blower • Four Stages of Cooling • VFD with Bypass and Intellispeed • Dual Enthalpy Economizer w/ Power Exhaust and Economizer Fault Detection & Diagnostic (Meets ASHRAE 90.1-2013, IECC 2015, California Title 24, AMCA 511) • 2" Throwaway Filter • Smart Equipment Controller including Discharge Air, Return Air, and Outdoor Air Temperature Sensors. BACNet MS/TP, Modbus and N2 Communication Card. • Non Powered Convenience Outlet (110 VAC) • Circuit Disconnect • Phase Monitor • Microchannel condenser coils • Copper tube/Aluminum fin evaporator coils • Hinged Access Panel

Qty	Tag #	Model # / Material #	Description
			• Galvanized Steel Drain Pan • Condensate Overflow(COF)
1	RTU 5	KJ061N16B4BEACA1A1	5 Ton, Single Packaged R-454B Air Conditioner, High Efficiency, Single Stage Cooling, 14.7 SEER2 / 12.5 EER2, 160 MBH Input Aluminized Steel, Two Stage Gas Heat, 460-3-60 • Refrigerant Detection System • Dry Bulb Low Leak Economizer w/Barometric Relief and Hoods (Bottom or Horizontal End Return Only) with Economizer Fault Detection & Diagnostic (Meets ASHRAE 90.1-2013, IECC 2015, California Title 24, AMCA 511). • 1.5 HP Standard Static Belt Drive Blower • Standard 2" Throwaway Filters • Smart Equipment Controller including Discharge Air, Return Air, and Outdoor Air Temperature Sensors. BACNet MS/TP, Modbus and N2 Communication Card. • Non-Powered Convenience Outlet • HACR Circuit Breaker/Disconnect • Micro-Channel "all-aluminum" condenser coil, Copper tube/aluminum fin evaporator coil • Composite Drain Pan - Front Connection • Tool-free maintenance with features like hinged doors for all-access panels, slide-out blower and blower motor tray
1	RTU 5	2EC0401	Kit, Single Enthalpy Field Installed
3		S1-NSB8BHN041-0	Wall Temperature and 3% Relative Humidity Combined Sensor, No Display, WHITE, NO JCI LOGO, NS8000 Series
1		S1-AG3180E	SENSOR,CONDS OVERFLOW,PLNM RATED,W/

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

27.5 – 50 Ton Sun™ Select

Project Name: **BCF 885 Liverpool, NY** Unit Model #: **KV30N3DR4S1CAS41G1**

Quantity: **1** Tag #: **RTU 1** System: **KV30N3DR4S1CAS41G1**

Cooling Performance		
Total gross capacity	351.3	MBH
Sensible gross capacity	266.3	MBH
Total net capacity	327.4	MBH
Sensible net capacity	242.4	MBH
Efficiency (at ARI)	10.50	EER
Integrated eff. (at ARI)	14.30	IEER
Ambient DB temp.	95.0	°F
Entering DB temp.	80.0	°F
Entering WB temp.	67.0	°F
Evap Coil Leaving DB temp.	59.5	°F
Evap Coil Leaving WB temp.	57.8	°F
Unit Leaving DB temp.	61.3	°F
Unit Leaving WB temp.	58.5	°F
Leaving air temp dew point	56.70	°F
Power input (w/o blower)	33.20	kW
Sound power	89	dB(a)

Refrigerant		
Refrigerant type	R-454B	
Sys1	14 lb	4 oz
Sys2	13 lb	4 oz

Reheat Performance		
Total capacity	165.7	MBH
Sensible capacity	101.1	MBH
Ambient DB temp.	85	°F
Entering DB temp.	75	°F
Entering WB temp.	67	°F
Leaving DB temp.	67.2	°F
Leaving WB temp.	62.9	°F
Power input (w/o blower)	29.50	kW
Gallons of water per hour	7.37	gal/hr

Gas Heating Performance		
Entering DB temp.	60	°F
Heating output capacity (Max)	502.2	MBH
Supply air	12000	cfm
Heating input capacity (Max)	620	MBH
Leaving DB temp.	98.8	°F
Air temp. rise	38.8	°F
SSE	81.0	%
Stages	2	

Supply Air Blower Performance		
Supply air	12000	cfm
Ext. static pressure	1.0	IWG
Addl. Unit Losses (Options/Accessories)	0.48	IWG
Blower speed	901	rpm
Max BHP of Motor (including service factor)	16.13	HP
Duct location	Bottom	
Motor rating	15.00	HP
Actual required BHP	7.53	HP
Power input	7.02	kW
Elevation	0	ft
Drive type	BELT	

Electrical Data		
Power supply	460-3-60	
Unit min circuit ampacity	86.7	A
Unit max over-current protection	110	A

Dimensions & Weight					
Hgt 76 in		Len 218 in		Wth 90 in	
Weight with factory installed options				4872	lb

Clearances					
Right	96 in	Front	90 in	Rear	96 in
Top	120 in	Bottom	0 in	Left	72 in

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

30 Ton

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

Product Features

- Refrigerant Detection System (RDS) is factory installed
- ASHRAE 90.1 Energy Efficiency compliant
- Two independent refrigerant circuits
- Airflow options for each tonnage available with IntelliSpeed, or VAV
- Two stages of cooling - 2-stage IntelliSpeed
- Footprint design allows for direct replacement of a competitive model family (Trane) without a transition curb
- Reliability designed into all products and tested at the component and system level at the Advanced Technology Lab in Norman, Oklahoma
- Single shaft, dual blower design for improved efficiency
- AMCA 511 certified low leak dampers
- Modulating Hot Gas Reheat

Standard Unit Controller: Smart Equipment Control Board

- Smart Equipment™ Controls: streamlines commissioning, integration, and service
- Smart Equipment Controller including Discharge Air, Return Air, and Outdoor Air Temperature Sensors.

Warranty

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

Project Name: **BCF 885 Liverpool, NY** Unit Model #: **KV30N3DR4S1CAS41G1**

Quantity: **1** Tag #: **RTU 1** System: **KV30N3DR4S1CAS41G1**

Additional Electrical Data		
Power supply	460-3-60	
Unit min circuit ampacity	86.7	A
Unit max over-current protection	110	A
Min Voltage	416	V
Max Voltage	508	V
Comp #1 RLA	23.6	
Comp #1 LRA	158	
Comp #2 RLA	23.6	
Comp #2 LRA	158	
Indoor Mtr Voltage	460-3-60	
Indoor Mtr FLA	21	
Outdoor Mtr Qty	4	
Outdoor Fan Voltage	460-3-60	
OD Fan Mtr FLA (ea.)	2.1	
Power Ex Mtr Qty (if applicable)	2	
Powered Ex Voltage(if applicable)	460-3-60	
Power Ex Mtr FLA (ea) (if applicable)	2.1	
Combustion Mtr Qty	2	
Combustion Motor Voltage	208/230-1-60	
Combustion Mtr FLA (ea)	1.6	

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Quantity: **1** Tag #: **RTU 1** System: **KV30N3DR4S1CAS41G1**

RDS SUMMARY (Lowest Elevation Floor Being Served)

Refrigerant Detection System (RDS) Not Required.

Room with the Lowest Discharge Height	0	ft
Smallest RDS Required Room Area on the Lowest Floor	N/A	ft²
Min. Allowed Smallest Room Area without an RDS	N/A	ft²
Total Applied Area	0	ft²
Min. Allowed Total Applied Area	N/A	ft²
Min. CFM when RDS is enabled	N/A	cfm
Min. System Exhaust (External to Unit)	N/A	cfm
Total Largest Circuit Refrigerant Charge	0	lb

JOBSITE INPUTS

R454B is a mildly flammable refrigerant. Unit installation must be in compliance with UL 60335-2-40 and installation and operations manual available on Solution Navigator, DS Solutions app and shipped with the unit.

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Quantity: **1** Tag #: **RTU 1** System: **KV30N3DR4S1CAS41G1**

Factory Installed Options

KV30N3DR4S1CAS41G1

Equipment Options		Option(s) Selected
Product Category:	**K**	York Single Packaged R-454B Air Conditioner, Refrigerant Detection System (RDS) is factory installed
Efficiency:	**V**	Standard Efficiency / Bottom Supply / Bottom Return
Nominal Cooling Capacity:	**30**	30 Ton
Heat Type:	**N**	Natural Gas, Staged Heat
Heat Size:	**3**	High Heat, 620 MBH Input
Blower Option:	**D**	15 HP High Static Belt Drive Blower
Air Volume:	**R**	Two stages of cooling VFD with Bypass and Intellispeed
Voltage:	**4**	460-3-60
Outside Air Option:	**S**	Dual Enthalpy Economizer w/ Power Exhaust and 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:	**S**	Non Powered Convenience Outlet (110 VAC) Circuit Disconnect Phase Monitor
Refrigeration:	**4**	Modulating Hot Gas Reheat
Additional Options:	**1**	2" Throwaway Filter
Cabinet Options:	**G**	Hinged Access Panel Galvanized Steel Drain Pan Condensate Overflow(COF)
Product Generation:	**1**	

Field Installed Accessories

Project Name: **BCF 885 Liverpool, NY** Unit Model #: **KV30N3DR4S1CAS41G1**

Quantity: **1** Tag #: **RTU 1** System: **KV30N3DR4S1CAS41G1**

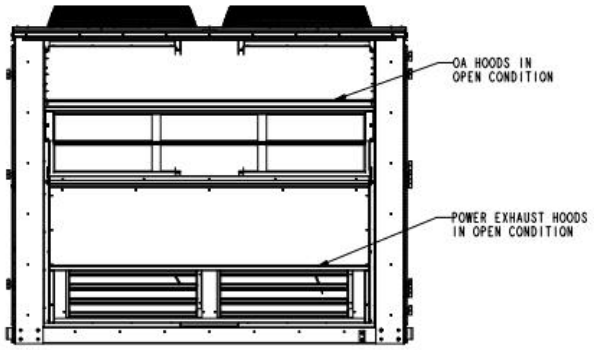
- ○ 1BD0412 - Burglar Bars, 27.5 - 35 ton models
- ○ 1BP0405 - Roof Curb Blockoff Plate. for replacement of 27.5 - 35 ton Trane Voyager III models with high heat gas heat (75.0 lbs)
- ○ 1FE0421 - High Gas Heat Flue Exhaust (54.0 lbs)
- ○ 1HA0403 - Natural Gas High Altitude Conversion Kit - For applications between 2000 and 10,000 feet altitude
- ○ 1HA0404 - Propane High Altitude Conversion Kit - For applications between 2000 and 10,000 feet altitude (11.0 lbs)
- ○ 1HG0450 - Hail Guard, 27.5 - 35 ton models (10.0 lbs)
- ○ 1NP0402 - Propane Conversion Kit (4.0 lbs)
- ○ 1RB0401 - Roof Curb Bracket, for replacement of Trane Voyager III models (18.0 lbs)
- ○ 1RC0450 - 14" Roof Curb, 27.5 - 35 ton models (130.0 lbs)
- ○ 2AP0404 - Air Proving Switch (3.0 lbs)
- ○ 2DF0405 - Dirty Filter Switch (3.0 lbs)
- ○ 2SD04703324 - Horizontal and Vertical Supply Air Smoke Detector
- ○ 2SD04703624 - Vertical Return Air Smoke Detector
- ○ 2SD04703724 - Vertical Supply and Return Air Smoke Detector
- ○ 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-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 - Zone Temperature Sensor. +3% RH, LCD DISPLAY, LOCAL SETPOINT CONTROL , WHITE, WITH JCI LOGO (0.4 lbs)
- ○ S1-NSB8BHN241-0 - Zone Temperature Sensor. +3% RH, LCD DISPLAY, LOCAL SETPOINT CONTROL , WHITE, NO LOGO (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 - Zone Temerature Sensor Only, NO DISPLAY, NO SETPOINT CONTROL , WHITE, NO LOGO (0.4 lbs)
- ○ S1-NSB8BTN141-0 - Zone Temerature Sensor Only, NO DISPLAY, WARMER/COOLER TEMP. ADJUSTMENT , WHITE, NO LOGO (0.4 lbs)
- ○ S1-NSB8BTN143-0 - Wall Temperature Sensor, Warmer/Cooler Display, BLACK, NO JCI LOGO, NS8000 Series (0.4 lbs)
- ○ S1-NSB8BTN240-0 - Zone Temerature Sensor Only, LCD DISPLAY, LOCAL SETPOINT CONTROL , WHITE, WITH JCI LOGO (0.4 lbs)
- ○ S1-NSB8BTN241-0 - Zone Temerature Sensor Only, LCD DISPLAY, LOCAL SETPOINT CONTROL , WHITE, NO LOGO (0.4 lbs)
- ○ S1-NSB8BTN243-0 - Wall Temperature Sensor, Full Display, BLACK, NO JCI LOGO, NS8000 Series (0.4 lbs)
- ○ S1-SE-COM2001-0 - Field Installed Communication Card for Simplicity SE control. Can be field configurable for BACnet, N2 or ModBUS MSTP (1.0 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-TEC3030-16-000 - 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-TEC3130-14-000 - 7 DAY PROGRAMMABLE THERMOSTAT, ZIGBEE PRO WIRELESS COMMUNICATION, RTU/HEAT PUMP WITH ECON,FULL COLOR, WHITE, JCI 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-ZFR-CBLEXT-1 - 10 FT Network Cable w/male RJ12 connections. Use to connect TMR to SSE 5.0 or SBH (1.0 lbs)
- ○ YCCP300COMP060 - 30 TON 2nd-5th Year Compressor Warranty
- ○ YCCP300PK012LO - One Year Labor Only AC PKG 30T
- ○ YCCP300PK012PL - One Year Renewable Parts & Labor AC PKG 30T
- ○ YCCP300PK060PL - 5 Year Parts and Labor AC PKG 30T
- ○ YCCP300PK060PO - 5 Year Parts Only (No Compressor Coverage) AC PKG 30T

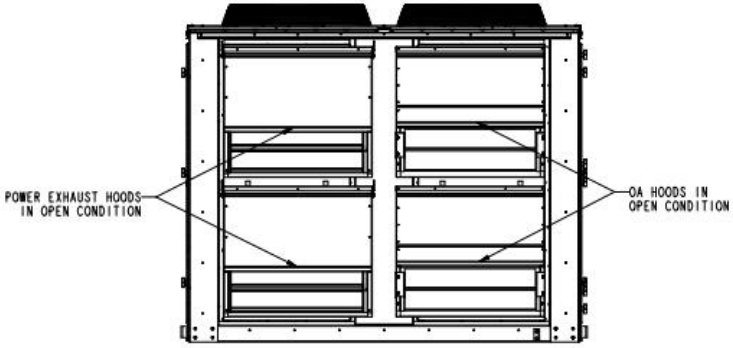
Project Name: **BCF 885 Liverpool, NY** Unit Model #: **KV30N3DR4S1CAS41G1**

Quantity: **1** Tag #: **RTU 1**

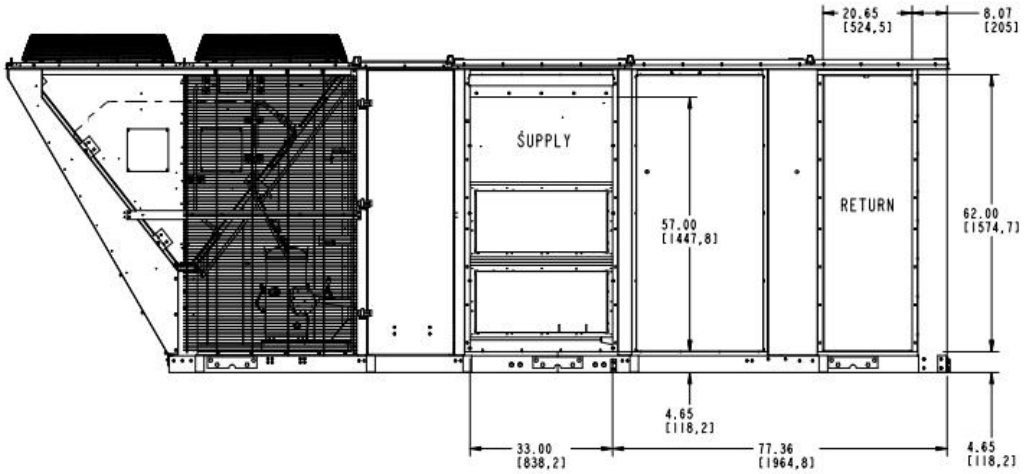
Consolidated Drawing 27.5-35 Tons



BOTTOM DISCHARGE LEFT VIEW WITH OPTIONAL ECONOMIZER
SCALE 0.075



SIDE DISCHARGE LEFT VIEW WITH OPTIONAL ECONOMIZER
SCALE 0.075



SIDE DISCHARGE OPENINGS
SCALE 0.075

REV LEV	DATE	REVISION RECORD	EC NO	DR	CK	ENG
1	10-11-19	NEW DRAWING	-	SM		
2	07-07-20	ADDED SHEET 2 FOR SIDE DISCHARGE OPENINGS	-	PA		
3	09-10-20	ADDED LEFT VIEWS FOR SIDE AND BOTTOM DISCHARGE	-	PA		
4	05-08-23	ADDED SHEET 3 & 4 CROSS FLOW SUPPLY	-	JN		

THIRD ANGLE PROJECTION

	NAME	DATE
DRN	SM	10-10-19
CHK	SM	10-10-19
ENG		
MFG		
SCALE		

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

28-35T - BTM & SIDE SUPPLY
SUBMITTAL DRAWING

JOHNSON CONTROLS
UNITARY PRODUCTS GROUP
NORMAN, OK 73069

SAFETY AND KEY CHARACTERISTICS PER BE-PDP-STD-01
MATERIAL
TYPE
ENG SPEC
SIZE
DWG NO. L545_SUBMITTAL_SMALL_BTM
REV 3
PART NO.
SHT NO 2 OF 4

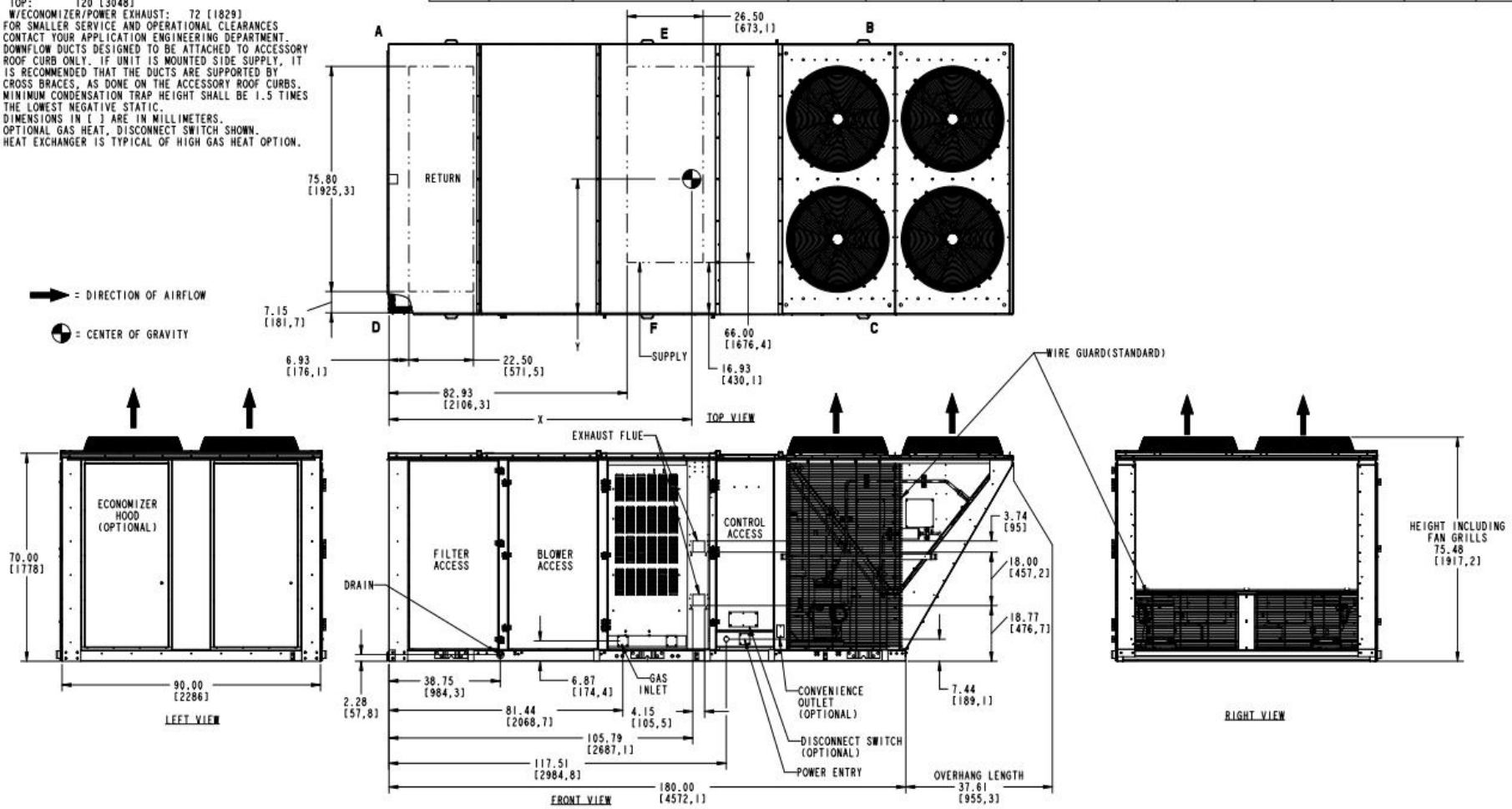
Project Name: **BCF 885 Liverpool, NY** Unit Model #: **KV30N3DR4S1CAS41G1**

Quantity: **1** Tag #: **RTU 1**

Consolidated Drawing 27.5-35 Tons

NOTES:
1. FOR OUTDOOR USE ONLY.
2. WEIGHTS SHOWN ARE FOR COOLING ONLY UNITS.
3. RECOMMENDED MIN. CLEARANCES:
   RIGHT SIDE: 96 [2438]
   LEFT SIDE: 60 [1524]
   FRONT: 90 [2286]
   REAR: 96 [2438]
   TOP: 120 [3048]
   W/ECONOMIZER/POWER EXHAUST: 72 [1829]
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.
8. OPTIONAL GAS HEAT, DISCONNECT SWITCH SHOWN.
9. HEAT EXCHANGER IS TYPICAL OF HIGH GAS HEAT OPTION.

TONNAGE	OPERATING WEIGHT LBS [KG] (BASE UNIT)	CENTER OF GRAVITY LOCATION IN [MM] (BASE UNIT)		4 POINT LOAD LOCATION LBS [KG] (BASE UNIT)				6 POINT CORNER LOADS LBS [KG] (BASE UNIT)					
		X	Y	A	B	C	D	A	B	C	D	E	F
27.5	4078 [1849]	100.1 [2543.3]	43.2 [1097.8]	869 [394]	1089 [494]	1179 [535]	940 [426]	558 [253]	755 [342]	817 [370]	604 [274]	645 [293]	698 [317]
30	4105 [1862]	100.6 [2555.0]	43.2 [1098.0]	870 [394]	1102 [500]	1192 [541]	941 [427]	558 [253]	765 [347]	827 [375]	604 [274]	649 [294]	702 [319]
35	4191 [1900]	99.8 [2535.1]	43.2 [1098.2]	897 [407]	1116 [506]	1207 [548]	970 [440]	577 [262]	772 [350]	835 [379]	624 [283]	664 [301]	718 [326]



REV LEV	DATE	REVISION RECORD	EC NO	DR	CK	ENG
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THIRD ANGLE PROJECTION

	NAME	DATE
DRN	SM	10-10-19
CHK	SM	10-10-19
ENG		
MFG		
SCALE		

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

28-35T - BTM & SIDE SUPPLY SUBMITTAL DRAWING

JOHNSON CONTROLS
UNITARY PRODUCTS GROUP
NORMAN, OK 73069

SAFETY AND KEY CHARACTERISTICS PER BE-PDP-STD-01
MATERIAL
TYPE
ENG SPEC
SIZE
DWG NO. L545_SUBMITTAL_SMALL_BTM
REV 3
PART NO.
SHT NO 1 OF 4

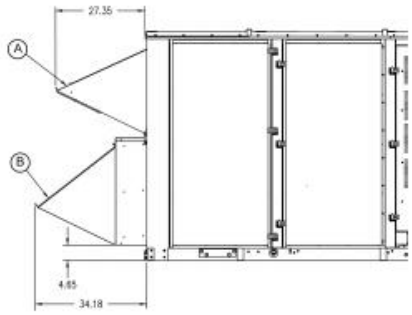
Project Name: **BCF 885 Liverpool, NY** Unit Model #: **KV30N3DR4S1CAS41G1**

Quantity: **1** Tag #: **RTU 1**

Rain Hood Dimensions

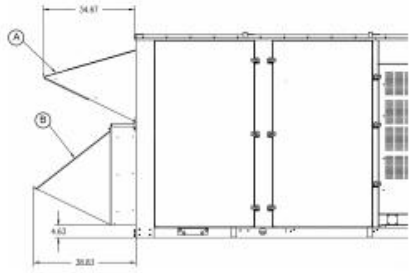
Rain hood dimensions

Figure 27: 27.5 ton to 35 ton rain hood dimensions



Item	Description
A	Economizer and manual damper rain hood
B	Power exhaust rain hood

Figure 28: 40 ton to 50 ton rain hood dimensions



Item	Description
A	Economizer and manual damper rain hood
B	Power exhaust rain hood

27.5 – 50 Ton Sun™ Select

Project Name: **BCF 885 Liverpool, NY** Unit Model #: **KV30N3CY4S1CAS11G1**

Quantity: **1** Tag #: **RTU 4** System: **KV30N3CY4S1CAS11G1**

Cooling Performance		
Total gross capacity	351.3	MBH
Sensible gross capacity	266.3	MBH
Total net capacity	328.6	MBH
Sensible net capacity	243.6	MBH
Efficiency (at ARI)	10.50	EER
Integrated eff. (at ARI)	14.30	IEER
Ambient DB temp.	95.0	°F
Entering DB temp.	80.0	°F
Entering WB temp.	67.0	°F
Evap Coil Leaving DB temp.	59.5	°F
Evap Coil Leaving WB temp.	57.8	°F
Unit Leaving DB temp.	61.2	°F
Unit Leaving WB temp.	58.4	°F
Leaving air temp dew point	56.70	°F
Power input (w/o blower)	33.20	kW
Sound power	89	dB(a)

Refrigerant		
Refrigerant type	R-454B	
Sys1	13 lb	8 oz
Sys2	13 lb	

Gas Heating Performance		
Entering DB temp.	60	°F
Heating output capacity (Max)	502.2	MBH
Supply air	12000	cfm
Heating input capacity (Max)	620	MBH
Leaving DB temp.	98.8	°F
Air temp. rise	38.8	°F
SSE	81.0	%
Stages	2	

Supply Air Blower Performance		
Supply air	12000	cfm
Ext. static pressure	1.0	IWG
Addl. Unit Losses (Options/Accessories)	0.33	IWG
Blower speed	873	rpm
Max BHP of Motor (including service factor)	10.90	HP
Duct location	Bottom	
Motor rating	10.00	HP
Actual required BHP	7.14	HP
Power input	6.66	kW
Elevation	0	ft
Drive type	BELT	

Electrical Data		
Power supply	460-3-60	
Unit min circuit ampacity	79.9	A
Unit max over-current protection	100	A

Dimensions & Weight					
Hgt 76 in		Len 218 in		Wth 90 in	
Weight with factory installed options				4780	lb

Clearances					
Right	96 in	Front	90 in	Rear	96 in
Top	120 in	Bottom	0 in	Left	72 in

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

30 Ton

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

Product Features

- Refrigerant Detection System (RDS) is factory installed
- ASHRAE 90.1 Energy Efficiency compliant
- Two independent refrigerant circuits
- Airflow options for each tonnage available with IntelliSpeed, or VAV
- Up to four stages of cooling (VAV) to meet advanced building code requirements
- Footprint design allows for direct replacement of a competitive model family (Trane) without a transition curb
- Reliability designed into all products and tested at the component and system level at the Advanced Technology Lab in Norman, Oklahoma
- Single shaft, dual blower design for improved efficiency
- AMCA 511 certified low leak dampers

Standard Unit Controller: Smart Equipment Control Board

- Smart Equipment™ Controls: streamlines commissioning, integration, and service
- Smart Equipment Controller including Discharge Air, Return Air, and Outdoor Air Temperature Sensors.

Warranty

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

Project Name: **BCF 885 Liverpool, NY** Unit Model #: **KV30N3CY4S1CAS11G1**

Quantity: **1** Tag #: **RTU 4** System: **KV30N3CY4S1CAS11G1**

Additional Electrical Data		
Power supply	460-3-60	
Unit min circuit ampacity	79.9	A
Unit max over-current protection	100	A
Min Voltage	416	V
Max Voltage	508	V
Comp #1 RLA	23.6	
Comp #1 LRA	158	
Comp #2 RLA	11.9	
Comp #2 LRA	103	
Comp #3 RLA	11.9	
Comp #3 LRA	103	
Indoor Mtr Voltage	460-3-60	
Indoor Mtr FLA	14	
Outdoor Mtr Qty	4	
Outdoor Fan Voltage	460-3-60	
OD Fan Mtr FLA (ea.)	2.1	
Power Ex Mtr Qty (if applicable)	2	
Powered Ex Voltage(if applicable)	460-3-60	
Power Ex Mtr FLA (ea) (if applicable)	2.1	
Combustion Mtr Qty	2	
Combustion Motor Voltage	208/230-1-60	
Combustion Mtr FLA (ea)	1.6	

Project Name: **BCF 885 Liverpool, NY** Unit Model #: **KV30N3CY4S1CAS11G1**

Quantity: **1** Tag #: **RTU 4** System: **KV30N3CY4S1CAS11G1**

RDS SUMMARY (Lowest Elevation Floor Being Served)

Refrigerant Detection System (RDS) Not Required.

Room with the Lowest Discharge Height	0	ft
Smallest RDS Required Room Area on the Lowest Floor	N/A	ft²
Min. Allowed Smallest Room Area without an RDS	N/A	ft²
Total Applied Area	0	ft²
Min. Allowed Total Applied Area	N/A	ft²
Min. CFM when RDS is enabled	N/A	cfm
Min. System Exhaust (External to Unit)	N/A	cfm
Total Largest Circuit Refrigerant Charge	0	lb

JOBSITE INPUTS

R454B is a mildly flammable refrigerant. Unit installation must be in compliance with UL 60335-2-40 and installation and operations manual available on Solution Navigator, DS Solutions app and shipped with the unit.

Project Name: **BCF 885 Liverpool, NY** Unit Model #: **KV30N3CY4S1CAS11G1**

Quantity: **1** Tag #: **RTU 4** System: **KV30N3CY4S1CAS11G1**

Factory Installed Options

KV30N3CY4S1CAS11G1

Equipment Options		Option(s) Selected
Product Category:	**K**	York Single Packaged R-454B Air Conditioner, Refrigerant Detection System (RDS) is factory installed
Efficiency:	**V**	Standard Efficiency / Bottom Supply / Bottom Return
Nominal Cooling Capacity:	**30**	30 Ton
Heat Type:	**N**	Natural Gas, Staged Heat
Heat Size:	**3**	High Heat, 620 MBH Input
Blower Option:	**C**	10 HP Medium Static Belt Drive Blower
Air Volume:	**Y**	Four Stages of Cooling VFD with Bypass and Intellispeed
Voltage:	**4**	460-3-60
Outside Air Option:	**S**	Dual Enthalpy Economizer w/ Power Exhaust and 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:	**S**	Non Powered Convenience Outlet (110 VAC) Circuit Disconnect Phase Monitor
Refrigeration:	**1**	
Additional Options:	**1**	2" Throwaway Filter
Cabinet Options:	**G**	Hinged Access Panel Galvanized Steel Drain Pan Condensate Overflow(COF)
Product Generation:	**1**	

Field Installed Accessories

○ 1BD0412 - Burglar Bars, 27.5 - 35 ton models

Project Name: **BCF 885 Liverpool, NY** Unit Model #: **KV30N3CY4S1CAS11G1**

Quantity: **1** Tag #: **RTU 4** System: **KV30N3CY4S1CAS11G1**

- ○ 1BP0405 - Roof Curb Blockoff Plate. for replacement of 27.5 - 35 ton Trane Voyager III models with high heat gas heat (75.0 lbs)
- ○ 1FE0421 - High Gas Heat Flue Exhaust (54.0 lbs)
- ○ 1HA0403 - Natural Gas High Altitude Conversion Kit - For applications between 2000 and 10,000 feet altitude
- ○ 1HA0404 - Propane High Altitude Conversion Kit - For applications between 2000 and 10,000 feet altitude (11.0 lbs)
- ○ 1HG0450 - Hail Guard, 27.5 - 35 ton models (10.0 lbs)
- ○ 1NP0402 - Propane Conversion Kit (4.0 lbs)
- ○ 1RB0401 - Roof Curb Bracket, for replacement of Trane Voyager III models (18.0 lbs)
- ○ 1RC0450 - 14" Roof Curb, 27.5 - 35 ton models (130.0 lbs)
- ○ 2AP0404 - Air Proving Switch (3.0 lbs)
- ○ 2DF0405 - Dirty Filter Switch (3.0 lbs)
- ○ 2SD04703324 - Horizontal and Vertical Supply Air Smoke Detector
- ○ 2SD04703624 - Vertical Return Air Smoke Detector
- ○ 2SD04703724 - Vertical Supply and Return Air Smoke Detector
- ○ 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-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 - Zone Temperature Sensor. +3% RH, LCD DISPLAY, LOCAL SETPOINT CONTROL , WHITE, WITH JCI LOGO (0.4 lbs)
- ○ S1-NSB8BHN241-0 - Zone Temperature Sensor. +3% RH, LCD DISPLAY, LOCAL SETPOINT CONTROL , WHITE, NO LOGO (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 - Zone Temerature Sensor Only, NO DISPLAY, NO SETPOINT CONTROL , WHITE, NO LOGO (0.4 lbs)
- ○ S1-NSB8BTN141-0 - Zone Temerature Sensor Only, NO DISPLAY, WARMER/COOLER TEMP. ADJUSTMENT , WHITE, NO LOGO (0.4 lbs)
- ○ S1-NSB8BTN143-0 - Wall Temperature Sensor, Warmer/Cooler Display, BLACK, NO JCI LOGO, NS8000 Series (0.4 lbs)
- ○ S1-NSB8BTN240-0 - Zone Temerature Sensor Only, LCD DISPLAY, LOCAL SETPOINT CONTROL , WHITE, WITH JCI LOGO (0.4 lbs)
- ○ S1-NSB8BTN241-0 - Zone Temerature Sensor Only, LCD DISPLAY, LOCAL SETPOINT CONTROL , WHITE, NO LOGO (0.4 lbs)
- ○ S1-NSB8BTN243-0 - Wall Temperature Sensor, Full Display, BLACK, NO JCI LOGO, NS8000 Series (0.4 lbs)
- ○ S1-SE-COM2001-0 - Field Installed Communication Card for Simplicity SE control. Can be field configurable for BACnet, N2 or ModBUS MSTP (1.0 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-TEC3030-16-000 - 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-TEC3130-14-000 - 7 DAY PROGRAMMABLE THERMOSTAT, ZIGBEE PRO WIRELESS COMMUNICATION, RTU/HEAT PUMP WITH ECON,FULL COLOR, WHITE, JCI LOGO (0.8 lbs)

Project Name: **BCF 885 Liverpool, NY** Unit Model #: **KV30N3CY4S1CAS11G1**

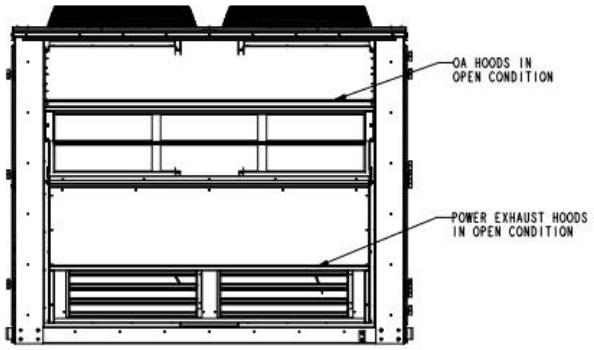
Quantity: **1** Tag #: **RTU 4** System: **KV30N3CY4S1CAS11G1**

- ○ 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-ZFR-CBLEXT-1 - 10 FT Network Cable w/male RJ12 connections. Use to connect TMR to SSE 5.0 or SBH (1.0 lbs)
- ○ YCCP300COMP060 - 30 TON 2nd-5th Year Compressor Warranty
- ○ YCCP300PK012LO - One Year Labor Only AC PKG 30T
- ○ YCCP300PK012PL - One Year Renewable Parts & Labor AC PKG 30T
- ○ YCCP300PK060PL - 5 Year Parts and Labor AC PKG 30T
- ○ YCCP300PK060PO - 5 Year Parts Only (No Compressor Coverage) AC PKG 30T

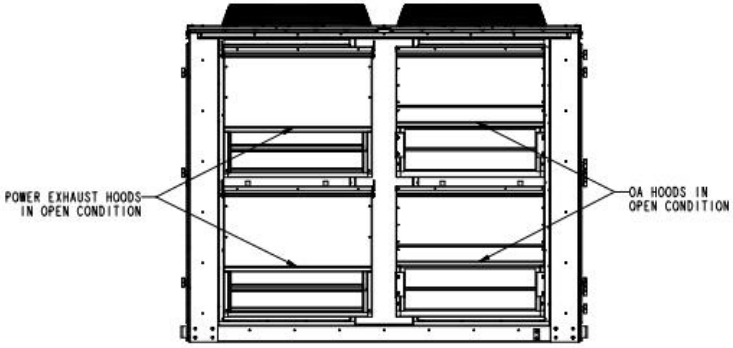
Project Name: **BCF 885 Liverpool, NY** Unit Model #: **KV30N3CY4S1CAS11G1**

Quantity: **1** Tag #: **RTU 4**

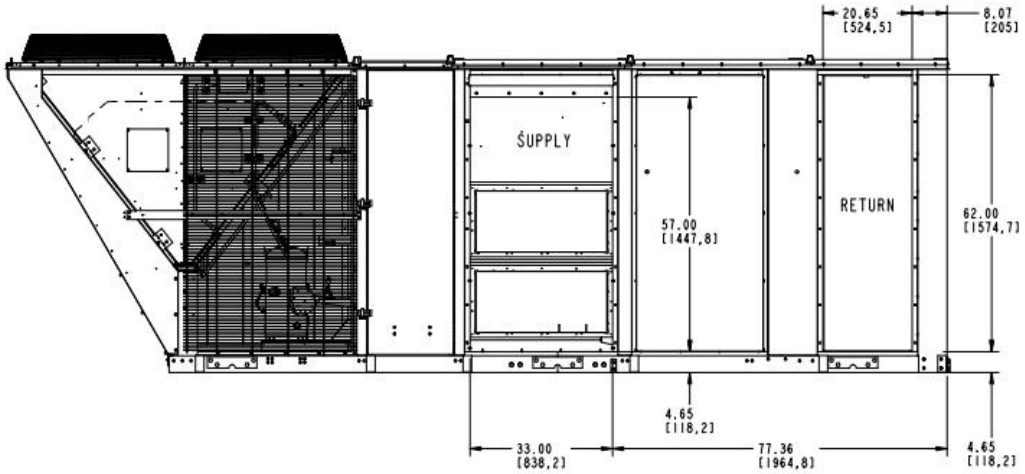
Consolidated Drawing 27.5-35 Tons



BOTTOM DISCHARGE LEFT VIEW WITH OPTIONAL ECONOMIZER
SCALE 0.075



SIDE DISCHARGE LEFT VIEW WITH OPTIONAL ECONOMIZER
SCALE 0.075



SIDE DISCHARGE OPENINGS
SCALE 0.075

REV LEV	DATE	REVISION RECORD	EC NO	DR	CK	ENG
1	10-11-19	NEW DRAWING	-	SM		
2	07-07-20	ADDED SHEET 2 FOR SIDE DISCHARGE OPENINGS	-	PA		
3	09-10-20	ADDED LEFT VIEWS FOR SIDE AND BOTTOM DISCHARGE	-	PA		
4	05-08-23	ADDED SHEET 3 & 4 CROSS FLOW SUPPLY	-	JN		

THIRD ANGLE PROJECTION

	NAME	DATE
DRN	SM	10-10-19
CHK	SM	10-10-19
ENG		
MFG		
SCALE		

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

28-35T - BTM & SIDE SUPPLY
SUBMITTAL DRAWING

JOHNSON CONTROLS
UNITARY PRODUCTS GROUP
NORMAN, OK 73069

SAFETY AND KEY CHARACTERISTICS PER BE-PDP-STD-01
MATERIAL
TYPE
ENG SPEC
SIZE
DWG NO. L545_SUBMITTAL_SMALL_BTM
REV 3
PART NO.
SHT NO 2 OF 4

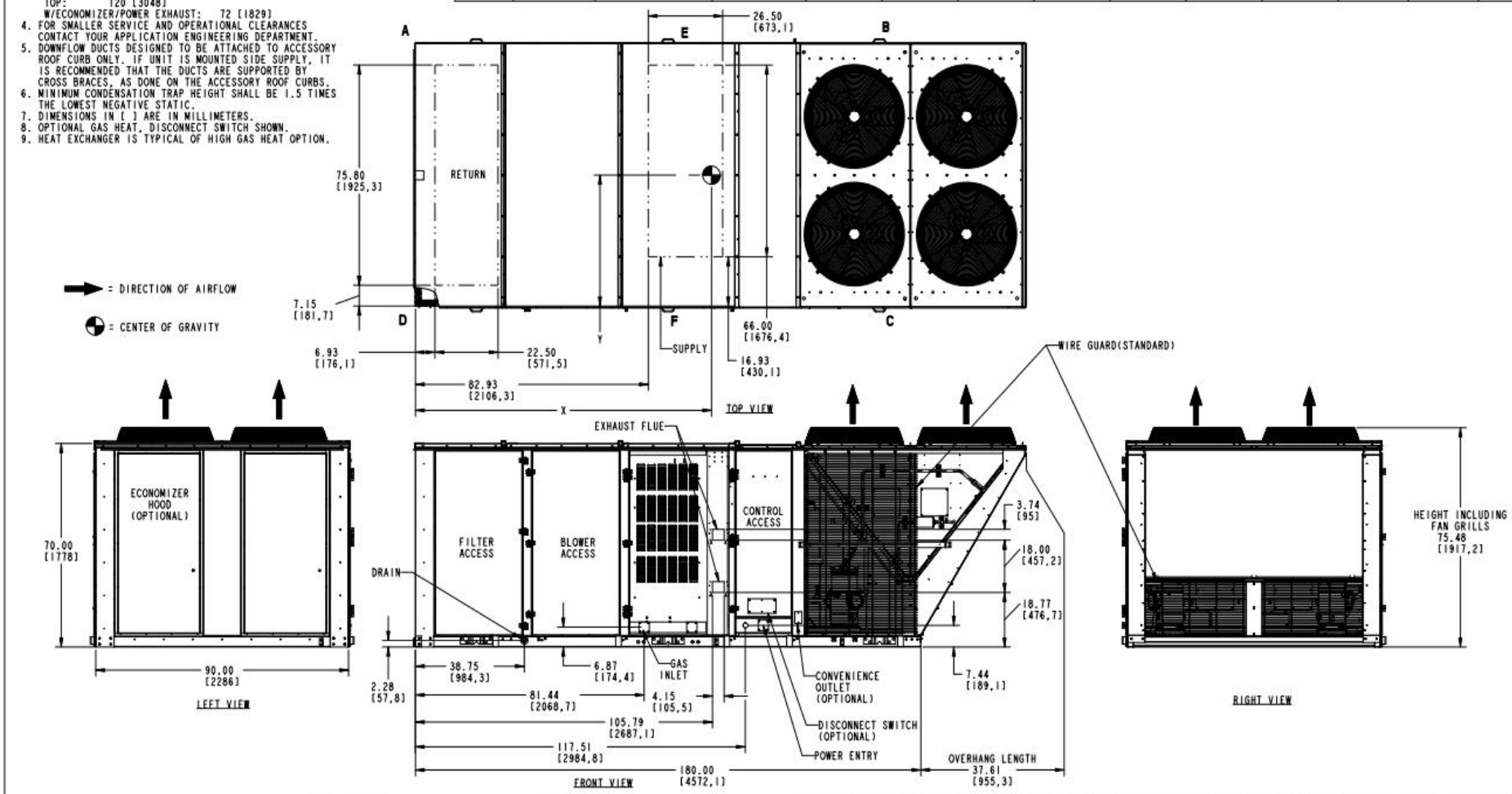
Project Name: **BCF 885 Liverpool, NY** Unit Model #: **KV30N3CY4S1CAS11G1**

Quantity: **1** Tag #: **RTU 4**

Consolidated Drawing 27.5-35 Tons

NOTES:
1. FOR OUTDOOR USE ONLY.
2. WEIGHTS SHOWN ARE FOR COOLING ONLY UNITS.
3. RECOMMENDED MIN. CLEARANCES:
   RIGHT SIDE: 96 [2438]
   LEFT SIDE: 60 [1524]
   FRONT: 90 [2286]
   REAR: 96 [2438]
   TOP: 120 [3048]
   W/ECONOMIZER/POWER EXHAUST: 72 [1829]
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.
8. OPTIONAL GAS HEAT, DISCONNECT SWITCH SHOWN.
9. HEAT EXCHANGER IS TYPICAL OF HIGH GAS HEAT OPTION.

TONNAGE	OPERATING WEIGHT LBS [KG] (BASE UNIT)	CENTER OF GRAVITY LOCATION IN [MM] (BASE UNIT)		4 POINT LOAD LOCATION LBS [KG] (BASE UNIT)				6 POINT CORNER LOADS LBS [KG] (BASE UNIT)					
		X	Y	A	B	C	D	A	B	C	D	E	F
27.5	4078 [1849]	100.1 [2543.3]	43.2 [1097.8]	869 [394]	1089 [494]	1179 [535]	940 [426]	558 [253]	755 [342]	817 [370]	604 [274]	645 [293]	698 [317]
30	4105 [1862]	100.6 [2555.0]	43.2 [1098.0]	870 [394]	1102 [500]	1192 [541]	941 [427]	558 [253]	765 [347]	827 [375]	604 [274]	649 [294]	702 [319]
35	4191 [1900]	99.8 [2535.1]	43.2 [1098.2]	897 [407]	1116 [506]	1207 [548]	970 [440]	577 [262]	772 [350]	835 [379]	624 [283]	664 [301]	718 [326]



REV LEV	DATE	REVISION RECORD	EC NO	DR	CK	ENG
1	10-11-19	NEW DRAWING	-	SM		
2	07-07-20	ADDED SHEET 2 FOR SIDE DISCHARGE OPENINGS	-	PA		
3	09-10-20	ADDED LEFT VIEWS FOR SIDE AND BOTTOM DISCHARGE	-	PA		
4	05-08-23	ADDED SHEET 3 & 4 CROSS FLOW SUPPLY	-	JN		

THIRD ANGLE PROJECTION

	NAME	DATE
DRN	SM	10-10-19
CHK	SM	10-10-19
ENG		
MFG		
SCALE		

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

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

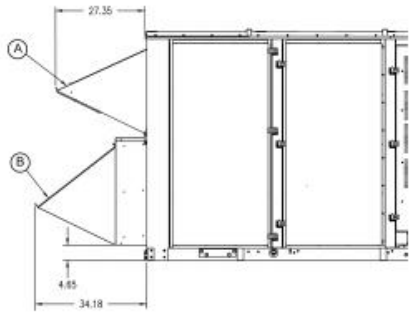
MATERIAL
TYPE
ENG SPEC
SIZE
DWG NO. L545_SUBMITTAL_SMALL_BTM
REV 3
PART NO.
SHT NO 1 OF 4

28-35T - BTM & SIDE SUPPLY SUBMITTAL DRAWING

JOHNSON CONTROLS
UNITARY PRODUCTS GROUP
NORMAN, OK 73069

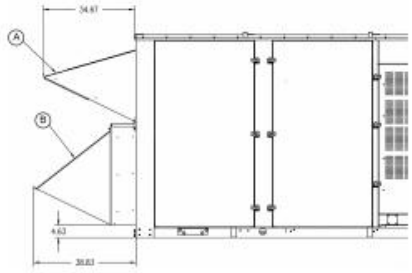
Rain hood dimensions

Figure 27: 27.5 ton to 35 ton rain hood dimensions



Item	Description
A	Economizer and manual damper rain hood
B	Power exhaust rain hood

Figure 28: 40 ton to 50 ton rain hood dimensions



Item	Description
A	Economizer and manual damper rain hood
B	Power exhaust rain hood

3-12.5 York® Sun™ Pro

Project Name: **BCF 885 Liverpool, NY** Unit Model #: **KJ061N16B4BEACA1A1**

Quantity: **1** Tag #: **RTU 5** System: **KJ061N16B4BEACA1A1**

Cooling Performance		
Total gross capacity	61.7	MBH
Sensible gross capacity	44.6	MBH
Total net capacity	58.7	MBH
Sensible net capacity	41.6	MBH
Seasonal Efficiency (at ARI)	14.70	SEER2
Efficiency (at ARI)		EER
Efficiency (at ARI)	12.50	EER2
Ambient DB temp.	105.0	°F
Entering DB temp.	80.0	°F
Entering WB temp.	67.0	°F
Evap Coil Leaving DB temp.	59.4	°F
Evap Coil Leaving WB temp.	57.3	°F
Unit Leaving DB temp.	60.7	°F
Unit Leaving WB temp.	57.8	°F
Leaving air temp dew point	56.00	°F
Power input (w/o blower)	4.50	kW
Sound power	77	dB(a)

Refrigerant		
Refrigerant type	R-454B	
Sys1	7 lb	2 oz

Gas Heating Performance		
Entering DB temp.	60	°F
Heating output capacity (Max)	130.0	MBH
Supply air	2000	cfm
Heating input capacity (Max)	160	MBH
Leaving DB temp.	120.2	°F
Air temp. rise	60.2	°F
SSE	81.0	%
Stages	2	

Supply Air Blower Performance		
Supply air	2000	cfm
Ext. static pressure	0.6	IWG
Addl. Unit Losses (Options/Accessories)	0.18	IWG
Blower speed	952	rpm
Max BHP of Motor (including service factor)	1.73	HP
Duct location	Bottom	
Motor rating	1.50	HP
Actual required BHP	0.93	HP
Power input	0.87	kW
Elevation	0	ft
Drive type	BELT	

Electrical Data		
Power supply	460-3-60	
Unit min circuit ampacity	14.3	A
Unit max over-current protection	20	A

Dimensions & Weight					
Hgt	42 in	Len	89 in	Wth	59 in
Weight with factory installed options				975	lb

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

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

Unit Features

- Refrigerant Detection System (RDS) is Factory Installed
- Single Stage Cooling
- 160 MBH Input Aluminized Steel, Two Stage Gas Heat
- Full perimeter base rails with built in rigging capabilities
- Unit Cabinet Constructed of Powder Painted Steel, Certified At 750 Hours Salt Spray Test (ASTM B-117 Standards)
- Scroll Compressor[s]
- Dry Bulb Low Leak Economizer w/Barometric Relief and Hoods (Bottom or Horizontal End Return Only) with Economizer Fault Detection & Diagnostic (Meets ASHRAE 90.1-2013, IECC 2015, California Title 24, AMCA 511).
- Solid Core Liquid Line Filter Driers
- Unit Ships with 2" Throwaway Filters
- Replacement Filters: 4 - (24" x 16").
- Non-Powered Convenience Outlet
- HACR Circuit Breaker/Disconnect
- Single Point Power Connection
- Through-the-Curb and Through-the-Base Utility Connections
- Short Circuit Current: 5kA RMS Symmetrical
- Micro-Channel "all-aluminum" condenser coil, Copper tube/aluminum fin evaporator coil
- Composite Drain Pan - Front Connection
- Tool-free maintenance with features like hinged doors for all-access panels, slide-out blower and blower motor tray

5 Ton

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

Product Features

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

Standard Unit Controller: Smart Equipment Control Board

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

Warranty

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

Project Name: **BCF 885 Liverpool, NY**

Unit Model #: **KJ061N16B4BEACA1A1**

Quantity: **1** Tag #: **RTU 5**

System: **KJ061N16B4BEACA1A1**

Additional Electrical Data		
Power supply	460-3-60	
Unit min circuit ampacity	14.3	A
Unit max over-current protection	20	A
Min Voltage	432	V
Max Voltage	504	V
Comp #1 RLA	7.7	
Comp #1 LRA	69.0	
Indoor Mtr Voltage	460-3-60	
Indoor Mtr FLA	2.5	
Outdoor Mtr Qty	2	
Outdoor Fan Voltage	460-1-60	
OD Fan Mtr FLA (ea.)	1.1	
Power Ex Mtr Qty (if applicable)	1	
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)	0.5	

Project Name: **BCF 885 Liverpool, NY** Unit Model #: **KJ061N16B4BEACA1A1**

Quantity: **1** Tag #: **RTU 5** System: **KJ061N16B4BEACA1A1**

RDS SUMMARY (Lowest Elevation Floor Being Served)

Refrigerant Detection System (RDS) Not Required.
Refrigerant Detection System is factory installed.

Room with the Lowest Discharge Height	0	ft
Smallest RDS Required Room Area on the Lowest Floor	N/A	ft²
Min. Allowed Smallest Room Area without an RDS	N/A	ft²
Total Applied Area	0	ft²
Min. Allowed Total Applied Area	N/A	ft²
Min. CFM when RDS is enabled	N/A	cfm
Min. System Exhaust (External to Unit)	N/A	cfm
Total Largest Circuit Refrigerant Charge	0	lb

JOBSITE INPUTS

R454B is a mildly flammable refrigerant. Unit installation must be in compliance with UL 60335-2-40 and installation and operations manual available on Solution Navigator, DS Solutions app and shipped with the unit.

Project Name: **BCF 885 Liverpool, NY** Unit Model #: **KJ061N16B4BEACA1A1**

Quantity: **1** Tag #: **RTU 5** System: **KJ061N16B4BEACA1A1**

Factory Installed Options

KJ061N16B4BEACA1A1

Equipment Options		Option(s) Selected
Product Category:	**KJ**	Single Packaged R-454B Air Conditioner, High Efficiency 14.7 SEER2 / 12.5 EER2
Nominal Cooling Capacity:	**061**	5 Ton Single Stage Cooling
Heat Type and Nominal Heat Capacity:	**N16**	160 MBH Input Aluminized Steel, Two Stage Gas Heat
Blower Option:	**B**	1.5 HP Standard Static Belt Drive Blower
Voltage:	**4**	460-3-60
Outside Air Option:	**B**	Dry Bulb Low Leak Economizer w/Barometric Relief and Hoods (Bottom or Horizontal End Return Only) with Economizer Fault Detection & Diagnostic (Meets ASHRAE 90.1-2013, IECC 2015, California Title 24, AMCA 511).
Service Options:	**E**	Refrigerant Detection System Non-Powered Convenience Outlet HACR Circuit Breaker/Disconnect
Sensor Options:	**A**	
Controls:	**C**	Smart Equipment Controller including Discharge Air, Return Air, and Outdoor Air Temperature Sensors. BACNet MS/TP, Modbus and N2 Communication Card.
Refrigeration:	**A**	Micro-Channel "all-aluminum" condenser coil, Copper tube/aluminum fin evaporator coil
Additional Options:	**1**	Standard 2" Throwaway Filters
Cabinet Options:	**A**	Composite Drain Pan - Front Connection Tool-free maintenance with features like hinged doors for all-access panels, slide-out blower and blower motor tray
Product Generation:	**1**	

Field Installed Accessories

- ○ 1BD0408 - Burglar Bars (32.0 lbs)
- ○ 1CG0428 - Coil Guard (20.0 lbs)
- ○ 1CV0402 - Concentric Diffuser,Flush Mount,18RD
- ○ 1CV0411 - Concentric Diffuser,Side Discharge,18RD (55.0 lbs)
- ○ 1CV0419 - Concentric Diffuser,Specialty,18X18
- ○ 1FE0412 - Flue Exhaust Extension Kit (14.0 lbs)
- ○ 1FF0415 - 2" Only metal Filter Frame Kit (16.0 lbs)
- ○ 1HA0424 - High Altitude Kit with Propane Conversion - For applications between 2000 and 6000 feet altitude (1.0 lbs)

Project Name: **BCF 885 Liverpool, NY** Unit Model #: **KJ061N16B4BEACA1A1**

Quantity: **1** Tag #: **RTU 5** System: **KJ061N16B4BEACA1A1**

- ○ 1HA0447 - High Altitude Kit for Natural Gas - For applications between 2000 and 6000 feet altitude (1.0 lbs)
- ○ 1HG0415 - Hail Guard Kit-Diamond Pattern (50.0 lbs)
- ○ 1HG0431 - Hail Guard Kit-Provent Style (20.0 lbs)
- ○ 1NP0462 - Natural Gas to Propane Conversion Kit
- ○ 1RC0470 - Roof Curb - 8" High, Flat, Uninsulated, Full Perimeter (Shipped Knocked Down) (135.0 lbs)
- ○ 1RC0471 - Roof Curb - 14" High, Flat, Uninsulated, Full Perimeter (Shipped Knocked Down) (135.0 lbs)
- ○ 1RC0476 - Roof Curb - 24" High, Flat, Uninsulated, Full Perimeter (Shipped Knocked Down) (135.0 lbs)
- ○ 1WC0412 - Wooden Crate (445.0 lbs)
- ○ 2AP0402 - Air Proving Switch (1.0 lbs)
- ○ 2AQ04700524 - CO^2 Space Sensor - Wall Mount Accessory (5.0 lbs)
- ○ 2AQ04700624 - CO^2 Unit Mount Accessory (4.6 lbs)
- ● 2EC0401 - Kit, Single Enthalpy Field Installed (1.0 lbs)
- ○ 2EC0402 - Kit, Dual Enthalpy Field Installed (Includes two humidity sensors) (1.0 lbs)
- ○ 2LA04702412 - Low Ambient Kit - ICM 333 (2.2 lbs)
- ○ 2PE04704746 - Power Exhaust 460V without Baro Relief Downflow or Horizontal (19.0 lbs)
- ○ 2SD04700824 - Smoke Detector Kit w/ Mounting Hardware for Supply Air (Horizontal/Downflow) Only (9.4 lbs)
- ○ 2SD04700924 - Smoke Detector Kit w/ Mounting Hardware for Return Air (Downflow Only) Only (10.0 lbs)
- ○ 2SD04701024 - Smoke Detector Kit w/ Mounting Hardware for Supply (Horizontal/Downflow) and Return Air (Downflow Only) (8.0 lbs)
- ○ S1-02812496000 - Blower Sheave AK79 Field Installed Drive (4.0 lbs)
- ○ 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-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-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 - Zone Temperature Sensor. +3% RH, LCD DISPLAY, LOCAL SETPOINT CONTROL , WHITE, WITH JCI LOGO (0.4 lbs)
- ○ S1-NSB8BHN241-0 - Zone Temperature Sensor. +3% RH, LCD DISPLAY, LOCAL SETPOINT CONTROL , WHITE, NO LOGO (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 - Zone Temerature Sensor Only, NO DISPLAY, NO SETPOINT CONTROL , WHITE, NO LOGO (0.4 lbs)
- ○ S1-NSB8BTN141-0 - Zone Temerature Sensor Only, NO DISPLAY, WARMER/COOLER TEMP. ADJUSTMENT , WHITE, NO LOGO (0.4 lbs)
- ○ S1-NSB8BTN143-0 - Wall Temperature Sensor, Warmer/Cooler Display, BLACK, NO JCI LOGO, NS8000 Series (0.4 lbs)

Project Name: **BCF 885 Liverpool, NY** Unit Model #: **KJ061N16B4BEACA1A1**

Quantity: **1** Tag #: **RTU 5** System: **KJ061N16B4BEACA1A1**

- ○ S1-NSB8BTN240-0 - Zone Temerature Sensor Only, LCD DISPLAY, LOCAL SETPOINT CONTROL , WHITE, WITH JCI LOGO (0.4 lbs)
- ○ S1-NSB8BTN241-0 - Zone Temerature Sensor Only, LCD DISPLAY, LOCAL SETPOINT CONTROL , WHITE, NO LOGO (0.4 lbs)
- ○ S1-NSB8BTN243-0 - Wall Temperature Sensor, Full Display, BLACK, NO JCI LOGO, NS8000 Series (0.4 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-TEC3130-14-000 - 7 DAY PROGRAMMABLE THERMOSTAT, ZIGBEE PRO WIRELESS COMMUNICATION, RTU/HEAT PUMP WITH ECON,FULL COLOR, WHITE, JCI 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-TL-CWCVT-0 - CWCVT (Connected Workflow Converter) (1.0 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)
- ○ YCCP050PK012LO - One Year Labor Only AC/HP PKG 1 to 5T
- ○ YCCP050PK012PL - One Year Renewable Parts & Labor AC/HP PKG 1 to 5T
- ○ YCCP050PK060PL - 5 Year Parts and Labor AC/HP PKG 1 to 5T
- ○ YCCP050PK060PO - 5 Year Parts Only (No Compressor Coverage) AC/HP PKG 1 to 5T

Project Name: **BCF 885 Liverpool, NY**

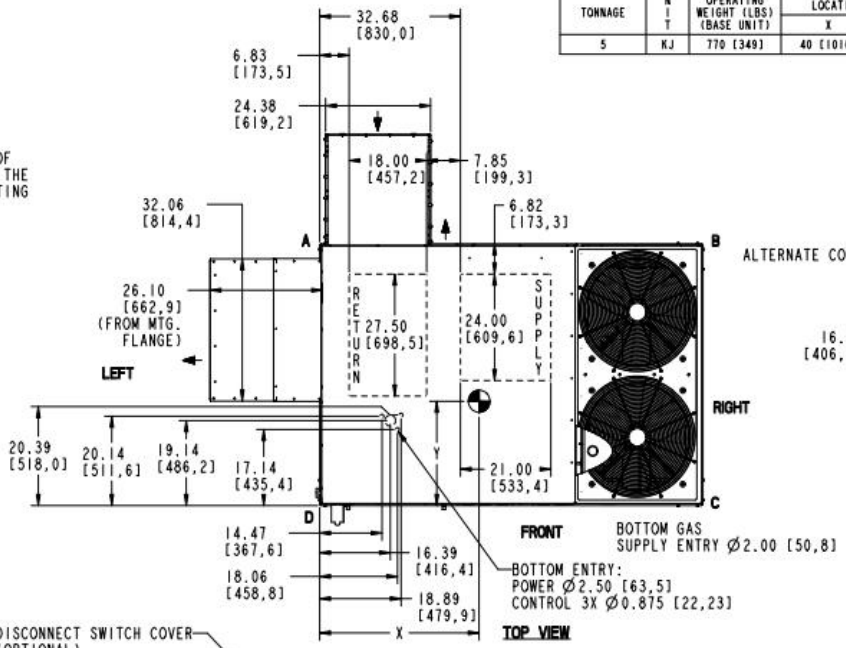
Unit Model #: **KJ061N16B4BEACA1A1**

Quantity: **1** Tag #: **RTU 5**

Submittal

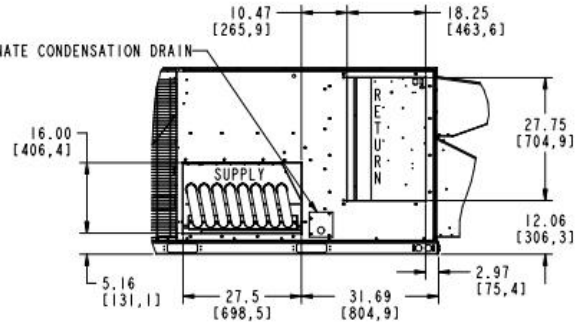
NOTES:
1. FOR OUTDOOR USE ONLY.
2. WEIGHTS SHOWN ARE FOR COOLING ONLY UNITS.
3. MIN. CLEARANCES TO BE:
   RIGHT SIDE: 12 [305]
   LEFT SIDE: 36 [915]
   FRONT: 36 [915]
   REAR: 36 [915]
   TOP: 72 [1830]
   BOTTOM: 0 [0]
4. TO REMOVE THE SLIDE-OUT DRAIN PAIN, A REAR CLEARANCE OF 60 in (1525 mm) IS REQUIRED. IF SPACE IS UNAVAILABLE, THE DRAIN PAN CAN BE REMOVED THROUGH THE FRONT BY SEPARATING THE CORNER WALL.
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. SIDE DUCT FLANGES ARE 0.75" HIGH. BOTTOM DUCTS DO NOT HAVE FLANGES.
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, POWER EXHAUST, GAS HEAT, ECONOMIZER, DISCONNECT SWITCH, CONVENIENCE OUTLET, AND BAROMETRIC RELIEF & FRESH AIR HOODS SHOWN.
11. 8 TUBE HEAT EXCHANGER IS NOT AVAILABLE FOR 3 & 4 TON UNITS.

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
5	KJ	770 [349]	40 [1016]	24 [609,6]	172 [78]	141 [64]	205 [93]	251 [114]

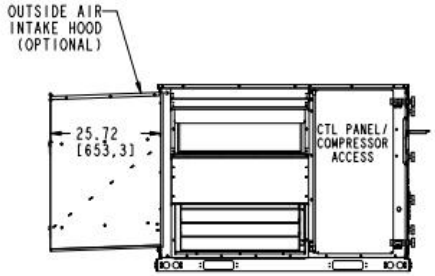


DIRECTION OF AIRFLOW

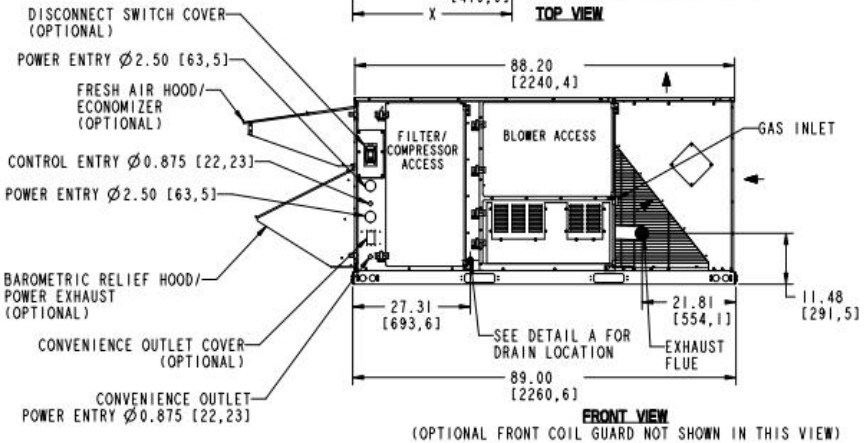
CENTER OF GRAVITY



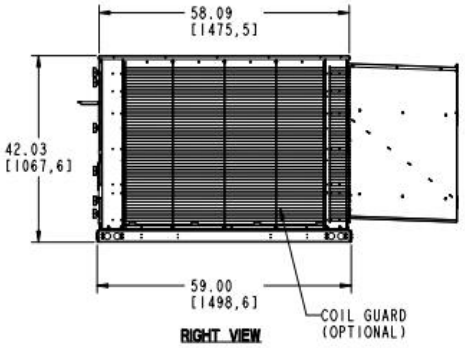
REAR (PARTIAL VIEW)
(INTAKE HOOD NOT SHOWN IN THIS VIEW)



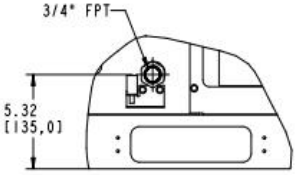
LEFT VIEW



FRONT VIEW
(OPTIONAL FRONT COIL GUARD NOT SHOWN IN THIS VIEW)



RIGHT VIEW



DETAIL A
SCALE 0.300

REV LEV	DATE	REVISION RECORD	EC NO	DR	CK	ENG
A	10-31-23	NEW DRAWING	100725	LOP	RCH	BV

THIRD ANGLE PROJECTION

	NAME	DATE
DRN	L. PACKARD	10-31-23
CHK	R. HADDAD	10-31-23
ENG	B. VARVA	10-31-23
MFG		

SCALE 0.075

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 DATA DWG, PRO STD FLAT,2 ODF,42"

JOHNSON CONTROLS
UNITARY PRODUCTS GROUP
NORMAN, OK 73069

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

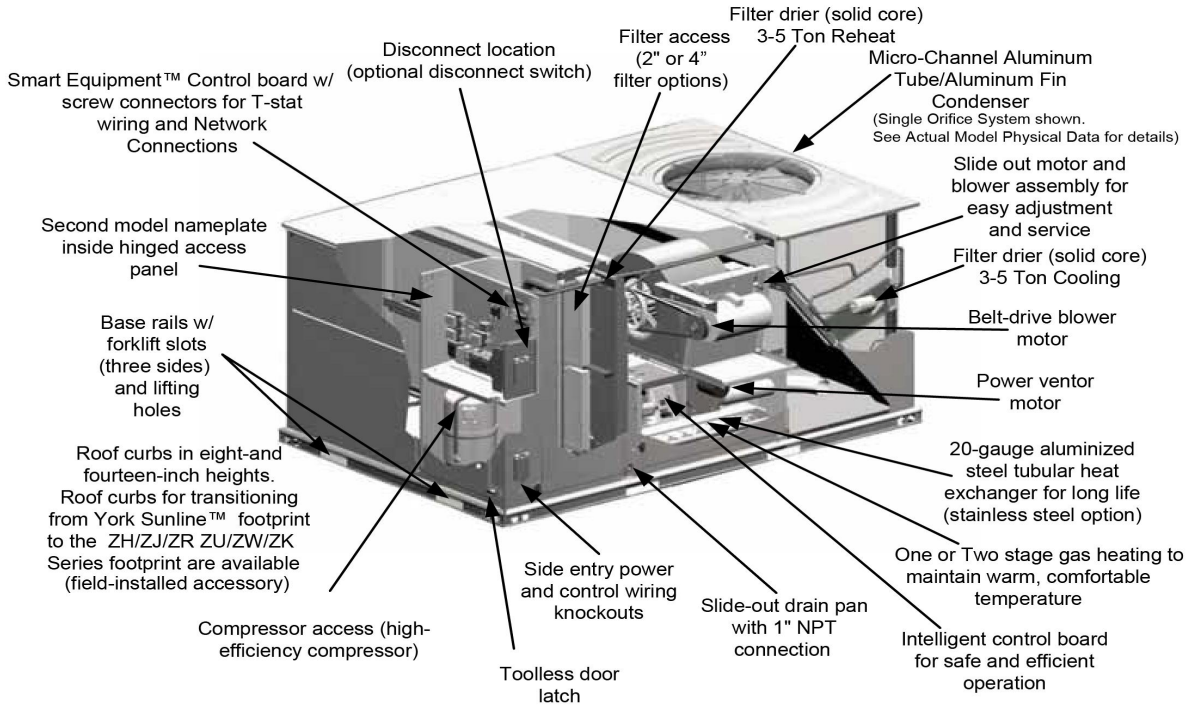
MATERIAL
TYPE NOT APPLICABLE
ENG SPEC NOT APPLICABLE
SIZE

DWG NO. 6454068 REV A
PART NO.
SHT NO 1 OF 1

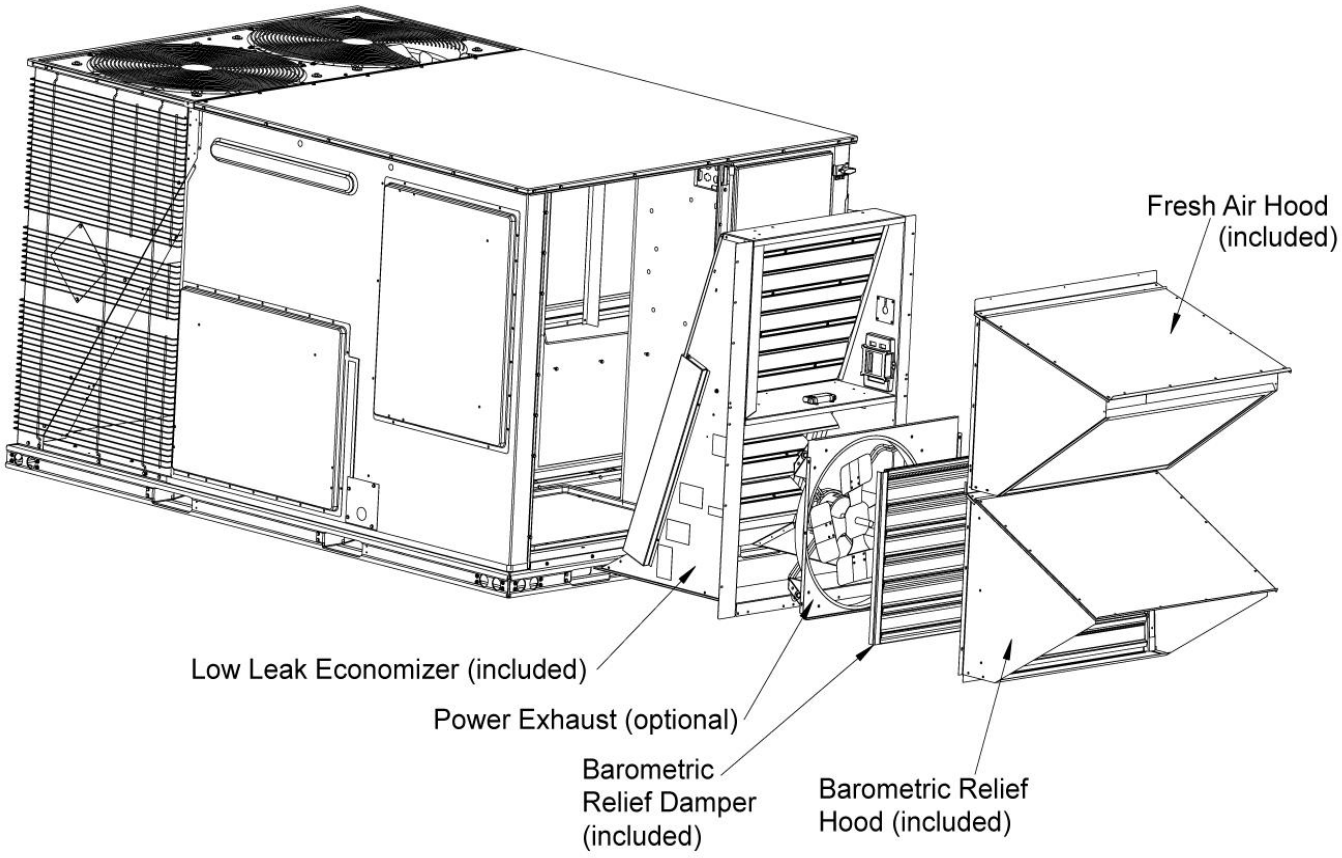
Component Locations

Component Location

Cooling With Gas Heat (3 Through 5 Ton)



Low Leak Downflow Economizer (shown with optional Power Exhaust)



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

ASHRAE 90.1-2010
ASHRAE 62
AMCA 511 (licensed as Class 1A damper)
International Energy Conservation Code (IECC)
California Title 24

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

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

Date
12/06/2024
Project Name
BCF 885 Liverpool, NY
Project Number
Client / Purchaser

Guide Specification Summary Page

Product Series	Models and Unit Tags	
27.5 – 50 Ton Sun™ Select	KV30N3DR4S1CAS41G1	RTU 1
	KV30N3CY4S1CAS11G1	RTU 4
3-12.5 York® Sun™ Pro	KJ061N16B4BEACA1A1	RTU 5

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, foil-faced fiber glass insulation with thermal conductivity of 0.24 or better, adhered with acrylate polymer 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, foil-faced fiber glass insulation with thermal conductivity of 0.24 or better, adhered with acrylate polymer 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. Interior cabinet surfaces shall be insulated with a minimum 0.5 in. thick, foil-faced fiber glass insulation with thermal conductivity of 0.24 or better, adhered with acrylate polymer 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, foil-faced fiber glass insulation with thermal conductivity of 0.24 or better, adhered with acrylate polymer 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 0.24 or better, adhered with acrylate polymer 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 have capability to energize 4 different stages of cooling and 2 different stages of heating.
   d. 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 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 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. Heating section shall be provided with the following minimum protections:
    a. High temperature limit switches.
    b. Induced draft pressure sensor.
    c. Flame rollout switch.

d. Flame proving controls.

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 “no- tool” removal option is available as described in the 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 UL- 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, including tested to withstand rain.
10. Unit shall be constructed to prevent intrusion of snow and tested to prevent snow intrusion into the control box.
11. Unit 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 (46°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 and electric utility knockouts in the side of the unit and in the unit underside.
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 12 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 1” NPT female drain connection through the side of the drain pan. Connection shall be made per manufacturer’s recommendations.
6. Top panel:
   a. Shall be a multi 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. Through- the- base capability.
      1) Standard unit shall have a through- the- base gas- line location using a raised, embossed portion of the unit base-pan.
      2) Optional, factory approved, water- tight connection method must be used for through- the- base gas connections.
      3) No base-pan penetration, other than those authorized by the manufacturer, is permitted.
8. Electrical Connections
   a. All unit power wiring shall enter unit cabinet at a factory prepared opening or knockout location.
   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) Optional, factory approved, water- tight connection method must be used for through- the- base electrical connections.
      3) 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. Staged heat units shall have two stages of heating capacity with first stage capacity 75% of total capacity.
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. Unit Control 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 cycle on unit flame rollout switch or 3 short cycles on the high temperature limit switch. Fault indication shall be made using an LED.
3. Staged gas heat
   a. Shall have two stages of heating capacity.
4. Aluminized Steel Heat Exchanger construction

a. Heat exchanger shall be of the tubular- section type constructed of a minimum of 20- gauge steel coated with a T1-40 aluminum-silicon 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.

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.

e. Shall have an 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. Shall be leak tested to 150 psig, pressure tested to 250 psig, and qualified to CSA C22.2 No. 236-11(UL 1995) 4th edition burst test at 1775 psig.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 to 650 psig, and qualified to UL 1995 burst test at 1980 psig.

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

23 81 19. 13.J. Refrigerant Circuits

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

2. 4 speed IntelliSpeed and Variable Air Volume airflow options shall have 2 independent refrigerant circuits with 4 stages of cooling.

3. 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.

b. Refrigerant filter drier - Solid core design.

c. Service gauge connections on suction and discharge lines.

4. Compressors

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

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

c. Four stage models shall use a tandem compressor set on circuit one and a fixed speed compressor on circuit two.

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

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

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

g. Compressor shall be factory mounted on rubber grommets.

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

i. 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. Shall use sealed, permanently lubricated ball-bearing type.
   c. Shall use dual blower design consisting of two balanced blower fans on a single shaft.
   d. Blower fan shall be double- inlet type with forward- curved blades.
   e. 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. 5% swinging chokes for harmonic reduction and improved power factor.
   h. All printed circuit boards shall be conformal coated.
3. Low Leak Economizer:
   a. Integrated, linkage driven opposing modulating blade design type capable of simultaneous economizer and compressor operation.
   b. Damper blades shall be galvanized steel with metal gears. 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 gear 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. Enthalpy sensor is available as a factory or field installed sensing option. 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. Actuator shall be direct coupled to economizer gear. No linkage arms or control rods shall be acceptable.

r. Economizer controller shall provide indications when in free cooling mode, in the DCV mode, or the exhaust fan contact is closed.

4. 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.
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 solenoids to alter the refrigerant flow from being directed through the condenser circuit to the hot gas reheat circuit.
      4) Changeover from cooling mode to reheat mode shall be accomplished in 30 seconds or less.
6. 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.
7. 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.

8. Non-Powered convenience outlet:
   a. Outlet shall be powered from a separate 115/120v power source.
   b. A transformer shall not be included.
   c. Outlet shall be factory installed and internally mounted with easily accessible 115- v female receptacle.
   d. Outlet shall include 15 amp GFI receptacles with independent fuse protection.
   e. Outlet shall be accessible from outside the unit.
9. Constant Volume Power Exhaust:
   a. Power exhaust shall be used in conjunction with an integrated economizer.
   b. Exhaust fans shall be of centrifugal blower design with dual exhaust fans.
   c. Shall be controlled by economizer controller operation. Exhaust fans shall be energized when dampers open past the 0- 100% adjustable set point on the economizer control.
   d. Exhaust shall have built in fold out rain hood design to reduce installation time.
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. Condensate Overflow Switch:
    a. Shall utilize float switch to monitor water level in condensate drain pan and 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.

GENERAL

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

DESCRIPTION

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

UNIT CABINET

Unit cabinet shall be constructed of galvanized steel with exterior surfaces coated with a non-chalking, powder paint finish, certified at a 750-hour salt spray test per ASTM-B117 standards. Indoor blower sections shall be insulated with up to 1” thick insulation coated on the airside. Either aluminum foil faced or elastometric rubber insulation shall be used in the unit’s compartments and be fastened to prevent insulation from entering the air stream. Cabinet doors shall be hinged with toolless access for easy servicing and maintenance. Full perimeter base rails shall be provided to assure reliable transit of equipment, overhead rigging, fork truck access and proper sealing on roof curb applications. Disposable 2” filters shall be furnished as standard and be accessible through hinged access door. Fan performance measuring ports shall be provided on the outside of the cabinet to allow accurate air measurements of evaporator fan performance without removing panels or creating bypass of the coils. Condensate pan shall be slide out design, constructed of a non corrosive material, internally sloped and conforming to ASHRAE 62-B9 standards. Condensate connection shall be a minimum of ¾” I.D. female and be rigid mount connection.

INDOOR (EVAPORATOR) FAN ASSEMBLY

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

OUTDOOR (CONDENSER) FAN ASSEMBLY

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

REFRIGERANT COMPONENTS

Compressors:

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

Coils:

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

Refrigerant Circuit and Refrigerant Safety Components shall include:

a. Independent fixed-orifice or thermally operated expansion devices.
b. Solid core filter drier/strainer to eliminate any moisture or foreign matter.
c. Accessible service gage connections on both suction and discharge lines to charge, evacuate, and measure refrigerant pressure during any necessary servicing or troubleshooting, without losing charge.
d. The 6-1/2 through 12-1/2 ton unit shall have two independent refrigerant circuits, equally split in 50% capacity increments.

Unit Controls:

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

GAS HEATING SECTION

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

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

UNIT OPERATING CHARACTERISTICS

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

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

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

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

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

ADDITIONAL FACTORY INSTALLED OPTIONS

- **Non-Powered Convenience Outlet** – Unit is provided with a non-powered 120VAC GFCI outlet with cover on the corner of the unit housing the compressors.
- **BAS Controls** – Include supply air sensor, return air sensor, dirty filter indicator and air proving switch.

FIELD INSTALLED OPTIONS

Date
12/06/2024
Project Name
BCF 885 Liverpool, NY
Project Number
Client / Purchaser

Control Summary Page

Control	Models and Unit Tags	
BACnet MSTP,Mdbs,N2 COM Card	KV30N3DR4S1CAS41G1	RTU 1
	KV30N3CY4S1CAS11G1	RTU 4
	KJ061N16B4BEACA1A1	RTU 5

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: