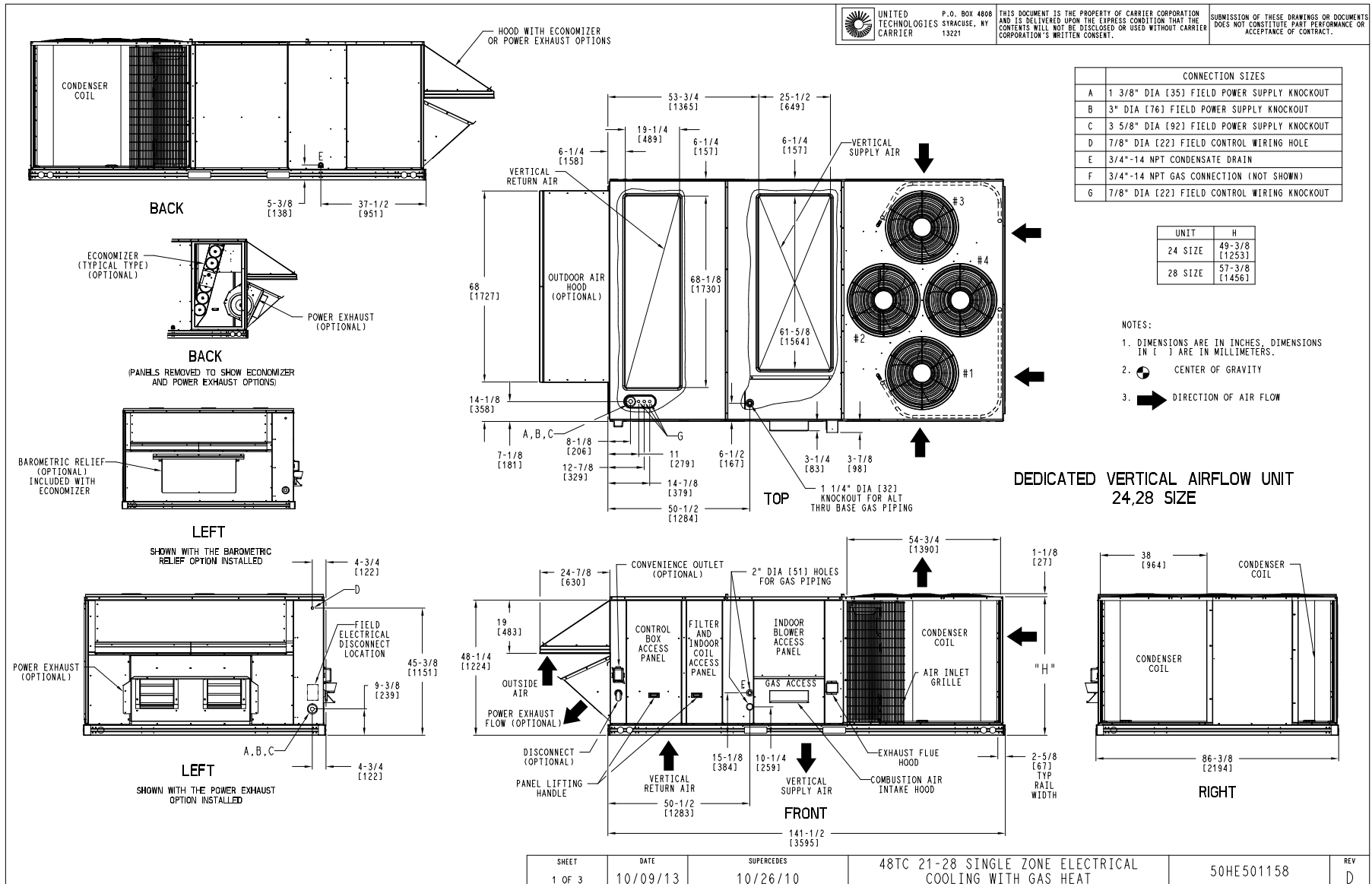


Certified Drawing for 48TCFD24A2A6-6F0G0_SUBMITTAL

Project: 1.0 RTU Submittals for Website - Page 8
 Prepared By:

11/25/2019
 11:05AM



Certified Drawing for 48TCFD24A2A6-6F0G0_SUBMITTAL

Project: 1.0 RTU Submittals for Website - Page 8
 Prepared By:

11/25/2019
 11:05AM

UNIT	OUTDOOR COIL TYPE	STD UNIT WEIGHT *		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.					
		LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z			
48TC24	MCHX	1989	904	383	174	540	245	623	283	442	201	46 1/8	[1172]	82 7/8	[2105]	16 1/2	[419]
48TC28	MCHX	2118	963	408	186	575	261	664	302	471	214	46 1/8	[1172]	82 7/8	[2105]	19	[483]
48TC21	RTPF	2102	956	474	215	390	177	593	269	582	265	47 1/2	[1207]	71 1/4	[1810]	16 1/2	[419]
48TC24	RTPF	2072	942	558	254	548	249	479	217	487	221	40 5/32	[1020]	70	[1778]	16 1/2	[419]
48TC25	RTPF	2247	1021	540	246	556	253	598	272	581	264	44 5/8	[1133]	71 5/8	[1819]	19	[483]
48TC28	RTPF	2197	999	571	259	564	256	528	240	534	243	41 21/32	[1058]	70 1/4	[1784]	19	[483]

RTPF - ROUND TUBE, PLATE FIN (COPPER/ALUM)
 MCHX - NOVATION (ALUM/ALUM)

* STANDARD UNIT WEIGHT IS WITH LOW GAS HEAT AND WITHOUT PACKAGING.
 FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.

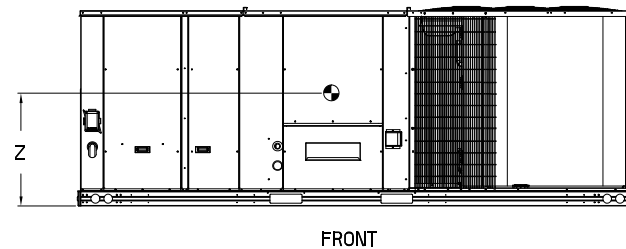
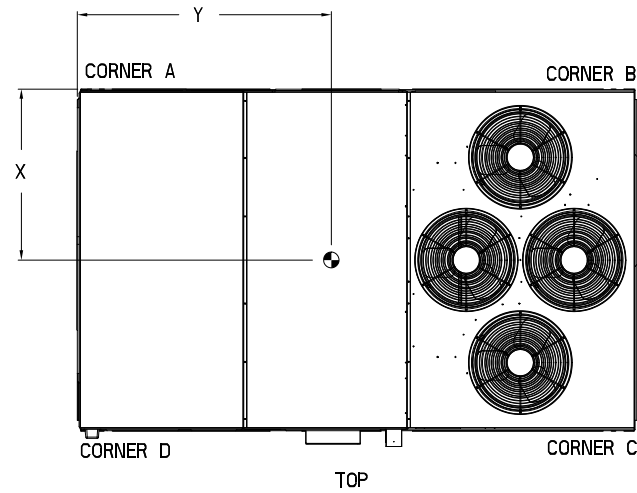


UNITED TECHNOLOGIES SYRACUSE, NY
 CARRIER 13221

P.O. BOX 4808
 13221

THIS DOCUMENT IS THE PROPERTY OF CARRIER CORPORATION AND IS DELIVERED UPON THE EXPRESS CONDITION THAT THE CONTENTS WILL NOT BE DISCLOSED OR USED WITHOUT CARRIER CORPORATION'S WRITTEN CONSENT.

SUBMISSION OF THESE DRAWINGS OR DOCUMENTS DOES NOT CONSTITUTE PART PERFORMANCE OR ACCEPTANCE OF CONTRACT.



SHEET 3 OF 3	DATE 10/09/13	SUPERCEDES 10/26/10	48TC 21-28 SINGLE ZONE ELECTRICAL COOLING WITH GAS HEAT	50HE501158	REV D
-----------------	------------------	------------------------	--	------------	----------

Certified Drawing for 48TCFD24A2A6-6F0G0_SUBMITTAL

Project: 1.0 RTU Submittals for Website - Page 8
 Prepared By:

11/25/2019
 11:05AM

Service Clearance

C12392

LOCATION	DIMENSION	CONDITION
A	36--in (914 mm)	<ul style="list-style-type: none"> • Recommended clearance for air flow and service
B	42--in (1067 mm)	<ul style="list-style-type: none"> • Recommended clearance for air flow and service
C	18--in (457 mm)	<ul style="list-style-type: none"> • No Convenience Outlet • No Economizer • No field installed disconnect on economizer hood side (Factory-- installed disconnect installed)
	36--in (914 mm)	<ul style="list-style-type: none"> • Convenience Outlet installed • Vertical surface behind servicer is electrically non--conductive (e.g.: wood, fiberglass)
	42--in (1067 mm)	<ul style="list-style-type: none"> • Convenience Outlet installed • Vertical surface behind servicer is electrically conductive (e.g.: metal, masonry)
	96--in (2438 mm)	<ul style="list-style-type: none"> • Economizer and/or Power Exhaust installed • Check for sources of flue products with 10 feet (3 meters) of economizer fresh air intake
D	42--in (1067 mm)	<ul style="list-style-type: none"> • Recommended clearance for service

NOTE: Unit not designed to have overhead obstruction. Contact Application Engineering for guidance on any application planning overhead obstruction or vertical clearances.

Chassis 6-9

Performance Summary For 48TCFD24A2A6-6F0G0_SUBMITTAL

Project: 1.0 RTU Submittals for Website - Page 8
Prepared By:

11/25/2019
11:05AM

Part Number:48TCFD24A2A6-6F0G0

ARI EER:..... **9.80**
Application EER (Rooftop Unit only):..... **10.06**
IEER:..... **11.7**

Base Unit Dimensions

Unit Length:..... **141.5** in
Unit Width:..... **86.6** in
Unit Height:..... **49.4** in

Operating Weight

Base Unit Weight:..... **2072** lb
High Heat:..... **113** lb
Medium Static Option - Vertical Models:..... **6** lb
Enthalpy Economizer w/ Barometric Relief (Vertical Air Flow Only):..... **246** lb
2 Speed Fan Controller (VFD):..... **20** lb

Total Operating Weight:..... **2457** lb

Unit

Unit Voltage-Phase-Hertz:..... **460-3-60**
Air Discharge:..... **Vertical**
Fan Drive Type:..... **Belt**
Actual Airflow:..... **8000** CFM
Site Altitude:..... **0** ft

Cooling Performance

Condenser Entering Air DB:..... **95.0** F
Evaporator Entering Air DB:..... **80.0** F
Evaporator Entering Air WB:..... **67.0** F
Entering Air Enthalpy:..... **31.44** BTU/lb
Evaporator Leaving Air DB:..... **57.7** F
Evaporator Leaving Air WB:..... **56.9** F
Evaporator Leaving Air Enthalpy:..... **24.32** BTU/lb
Unit Discharge Air DB:..... **59.4** F
Unit Discharge Air WB:..... **57.5** F
Unit Discharge Air Enthalpy:..... **24.73** BTU/lb
Gross Cooling Capacity:..... **256.10** MBH
Net Cooling Capacity:..... **241.65** MBH
Gross Sensible Capacity:..... **192.60** MBH
Net Sensible Capacity:..... **178.15** MBH
Compressor Power Input:..... **19.80** kW
Coil Bypass Factor:..... **0.081**

Heating Performance

Heating Airflow:..... **8000** CFM
Entering Air Temp:..... **70.0** F
Leaving Air Temp:..... **107.5** F
Gas Heating Input Capacity:..... **320.0 / 400.0** MBH
Gas Heating Output Capacity:..... **260.0 / 324.0** MBH
Temperature Rise:..... **37.5** F
Thermal Efficiency (%):..... **81.0**

Supply Fan

External Static Pressure:..... **1.00** in wg
Options / Accessories Static Pressure
Economizer:..... **0.08** in wg
Total Application Static (ESP + Unit Opts/Acc.):..... **1.08** in wg
Fan RPM:..... **987**
Fan Power:..... **4.96** BHP

Performance Summary For 48TCFD24A2A6-6F0G0_SUBMITTAL

Project: 1.0 RTU Submittals for Website - Page 8
 Prepared By:

11/25/2019
 11:05AM

NOTE:.....Selected IFM RPM Range: 835 - 1021

Electrical Data

Voltage Range:.....	414 - 506
Compressor #1 RLA:.....	18.6
Compressor #1 LRA:.....	125
Compressor #2 RLA:.....	14.7
Compressor #2 LRA:.....	95
Indoor Fan Motor Type:.....	MED
Indoor Fan Motor FLA:.....	8.6
Combustion Fan Motor FLA (ea):.....	0.3
Power Supply MCA:.....	50.2
Power Supply MOCP (Fuse or HACR):.....	60
Disconnect Size FLA:.....	52
Disconnect Size LRA:.....	270
Electrical Convenience Outlet:.....	None
Outdoor Fan [Qty / FLA (ea)]:.....	4 / 0.9

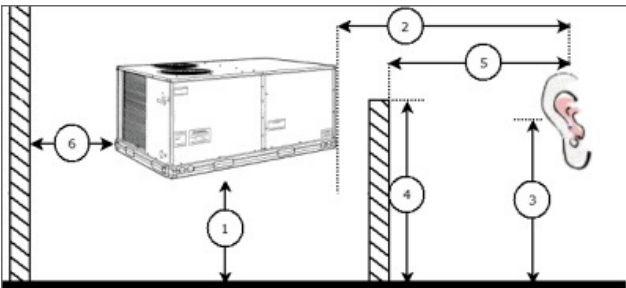
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Rating:.....**87.0** db
 Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	94.2	94.4	95.6
125 Hz	88.5	77.6	87.5
250 Hz	81.2	71.3	84.2
500 Hz	80.6	63.6	84.2
1000 Hz	75.1	58.3	81.7
2000 Hz	73.4	54.2	77.9
4000 Hz	73.1	47.7	73.2
8000 Hz	65.0	36.2	66.3
A- Weighted	82.7	70.8	86.5

Advanced Acoustics



Advanced Accoustics Parameters

- 1. Unit height above ground:.....**30.0** ft
- 2. Horizontal distance from unit to receiver:.....**50.0** ft
- 3. Receiver height above ground:.....**5.7** ft
- 4. Height of obstruction:.....**0.0** ft
- 5. Horizontal distance from obstruction to receiver:**0.0** ft
- 6. Horizontal distance from unit to obstruction:....**0.0** ft

Performance Summary For 48TCFD24A2A6-6F0G0_SUBMITTAL

Project: 1.0 RTU Submittals for Website - Page 8
 Prepared By:

11/25/2019
 11:05AM

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	95.6	87.5	84.0	88.0	81.7	77.9	73.2	66.3	96.9 Lw
B	69.4	77.1	75.6	81.0	81.7	79.1	74.2	65.2	86.5 LwA
C	63.2	55.1	55.8	55.1	49.3	45.5	40.8	32.9	64.5 Lp
D	70.0	73.9	74.3	78.6	79.3	76.6	71.1	62.8	54.1 LpA

Legend

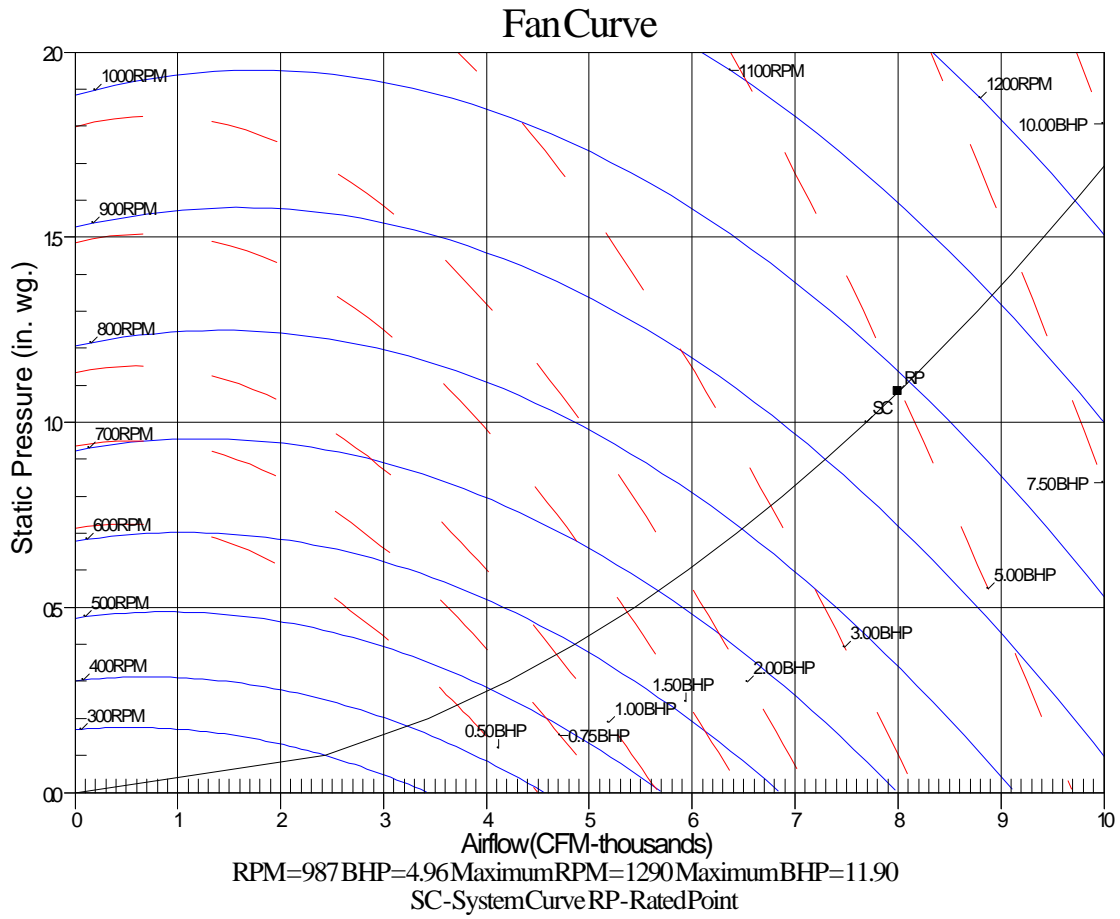
- A Sound Power Levels at Unit's Acoustic Center, Lw
- B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
- C Sound Pressure Levels at Specific Distance from Unit, Lp
- D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.

Performance Summary For 48TCFD24A2A6-6F0G0_SUBMITTAL

Project: 1.0 RTU Submittals for Website - Page 8
Prepared By:

11/25/2019
11:05AM





GUIDE SPECIFICATIONS – 48TCFD24A2A6-6F0G0

Gas Heat/Electric Cooling Packaged Rooftop HVAC Guide Specifications

Size: 024

Part 1: Schedules for Decentralized HVAC Equipment

Decentralized Unitary HVAC Equipment Schedule

1.01. Rooftop unit schedule

- A. Schedule is per the project specification requirements.

Part 2: HVAC Equipment Insulation

Decentralized, Rooftop Units:

2.01. Evaporator fan compartment:

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

2.02. Gas heat compartment:

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

Part 3: Electric and Electronic Control System for HVAC

Decentralized, Rooftop Units:

3.01. General:

- A. Shall be complete with self-contained low-voltage control circuit protected by a resettable circuit breaker on the 24-v transformer side. Transformer shall have 75VA capability.
- B. Shall utilize color-coded wiring.
- C. 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.
- D. The heat exchanger shall be controlled by an integrated gas controller (IGC) microprocessor. See heat exchanger section of this specification.
- E. Unit shall include a minimum of one 8-pin screw terminal connection board for connection of control wiring.

3.02. Safeties:

- A. Compressor over-temperature, over-current. High internal pressure differential.
- B. Low-pressure switch.
 - 1. Units shall have different sized connectors for the circuit 1 and circuit 2 low and high pressure switches. They shall physically prevent the cross-wiring of the safety switches between circuits 1 and 2.
 - 2. 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.

Guide Specification for 48TCFD24A2A6-6F0G0_SUBMITTAL

Project: 1.0 RTU Submittals for Website - Page 8
Prepared By:

11/25/2019
11:05AM

- C. High-pressure switch.
 - 1. Units shall have different sized connectors for the circuit 1 and circuit 2 low and high pressure switches. They shall physically prevent the cross-wiring of the safety switches between circuits 1 and 2.
 - 2. High pressure switch shall use different color wire than the low pressure switch. The purpose is to assist the installer and service technician to correctly wire and or troubleshoot the rooftop unit.
- D. Automatic reset, motor thermal overload protector.
- E. Heating section shall be provided with the following minimum protections:
 - 1. High-temperature limit switches.
 - 2. Induced draft motor speed sensor.
 - 3. Flame rollout switch.
 - 4. Flame proving controls.

Part 4: Sequence of Operations for HVAC Controls

Decentralized, Rooftop Units:

4.01. INSERT SEQUENCE OF OPERATION

Part 5: Panel Air Filters

Decentralized, Rooftop Units:

5.01. Standard filter section

- A. Shall consist of factory-installed, low velocity, disposable 2-in. thick fiberglass filters of commercially available sizes.
- B. Unit shall use only one filter size. Multiple sizes are not acceptable.
- C. Filters shall be accessible through a dedicated, weather tight access panel.
- D. 4-in filter capabilities shall be capable with pre-engineered and approved Carrier filter track field installed accessory. This kit requires field furnished filters.

Part 6: Self-Contained Air Conditioners

Medium-Capacity Self-Contained Air Conditioners

6.01. General

- A. Outdoor, rooftop mounted, electrically controlled, heating and cooling unit utilizing a fully hermetic scroll compressor(s) for cooling duty and gas combustion for heating duty.
- B. 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.
- C. Unit shall use environmentally sound, Puron refrigerant.
- D. Unit shall be installed in accordance with the manufacturer's instructions.
- E. Unit must be selected and installed in compliance with local, state, and federal codes.

6.02. Quality Assurance

- A. Unit meets ASHRAE 90.1 minimum efficiency requirements.
- B. Units are Energy Star certified where sizes are required.
- C. Unit shall be rated in accordance with AHRI Standard 340/360.
- D. Unit shall be designed to conform to ASHRAE 15.
- E. Unit shall be ETL-tested and certified in accordance with ANSI Z21.47 Standards and ETL-listed and certified under Canadian standards as a total package for safety requirements.
- F. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
- G. Unit casing shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).
- H. Unit casing shall be capable of withstanding Federal Test Method Standard No. 141 (Method 6061) 5000-hour salt spray.
- I. Unit shall be designed and manufactured in accordance with ISO 9001.
- J. Roof curb shall be designed to conform to NRCA Standards.
- K. 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.
- L. Unit shall be designed in accordance with UL Standard 1995, including tested to withstand rain.
- M. Unit shall be constructed to prevent intrusion of snow and tested to prevent snow intrusion into the control box up to 40

Guide Specification for 48TCFD24A2A6-6F0G0_SUBMITTAL

Project: 1.0 RTU Submittals for Website - Page 8
Prepared By:

11/25/2019
11:05AM

mph.

- N. Unit shake tested to assurance level 1, ASTM D4169 to ensure shipping reliability.
 - O. High Efficient Motors listed shall meet section 313 of the Energy Independence and Security Act of 2007 (EISA 2007).
- 6.03. Delivery, Storage, and Handling
- A. Unit shall be stored and handled per manufacturer's recommendations.
 - B. Lifted by crane requires either shipping top panel or spreader bars.
 - C. Unit shall only be stored or positioned in the upright position.
- 6.04. Project Conditions
- A. As specified in the contract.
- 6.05. Operating Characteristics
- A. Unit shall be capable of starting and running at 115_F (46_C) ambient outdoor temperature, meeting maximum load criteria of AHRI Standard 340/360 at $\pm 10\%$ voltage.
 - B. Compressor with standard controls shall be capable of operation down to 30_F (-1_C), ambient outdoor temperatures. Accessory winter start kit is necessary if mechanically cooling at ambient temperatures below 30_F (-1_C).
 - C. Unit shall discharge supply air vertically or horizontally as shown on contract drawings.
 - D. Unit shall be factory configured and ordered for vertical supply & return configurations.
 - E. Unit shall be factory furnished for either vertical or horizontal configuration without the use of special conversion kits. No field conversion is possible.
- 6.06. Electrical Requirements
- A. Main power supply voltage, phase, and frequency must match those required by the manufacturer.
- 6.07. Unit Cabinet
- A. Unit cabinet shall be constructed of galvanized steel, and shall be bonderized and coated with a pre-painted baked enamel finish on all externally exposed surfaces.
 - B. Unit cabinet exterior paint shall be: film thickness, (dry) 0.003 inches minimum, gloss (per ASTM D523, 60_F / 16_C): 60, Hardness: H-2H Pencil hardness.
 - C. Evaporator fan compartment interior cabinet insulation shall conform to AHRI Standard 340/360 minimum exterior sweat criteria. Interior surfaces shall be insulated with a minimum 1/2-in. thick, 1 lb density, flexible fiberglass insulation, neoprene coated on the air side. Aluminum foil-faced fiberglass insulation shall be used in the gas heat compartment.
 - D. Base of unit shall have a minimum of four locations for thru-the-base gas and electrical connections standard. Both gas and electric connections shall be internal to the cabinet to protect from environmental issues.
 - E. Base Rail
 - 1. Unit shall have base rails on a minimum of 2 sides.
 - 2. Holes shall be provided in the base rails for rigging shackles to facilitate maneuvering and overhead rigging.
 - 3. Holes shall be provided in the base rail for moving the rooftop by fork truck.
 - 4. Base rail shall be a minimum of 16 gauge thickness.
 - F. Condensate pan and connections:
 - 1. Shall be a sloped condensate drain pan made of a non-corrosive material.
 - 2. Shall comply with ASHRAE Standard 62.
 - 3. Shall use a 3/4-in -14 NPT drain connection, through the side of the drain pan. Connection shall be made per manufacturer's recommendations.
 - G. Top panel:
 - 1. Shall be a multi-piece top panel linked with water tight flanges and locking systems.
 - H. Gas Connections:
 - 1. All gas piping connecting to unit gas valve shall enter the unit cabinet at a single location on side of unit (horizontal plane).
 - 2. Thru-the-base capability
 - a. Standard unit shall have a thru-the-base gas-line location using a raised, embossed portion of the unit basepan.
 - b. Thru-the-base provisions/connections are available as standard with every unit. When bottom connections are

Guide Specification for 48TCFD24A2A6-6F0G0_SUBMITTAL

Project: 1.0 RTU Submittals for Website - Page 8
Prepared By:

11/25/2019
11:05AM

required, field furnished couplings are required.

c. No basepan penetration, other than those authorized by the manufacturer, is permitted.

I. Electrical Connections

1. All unit power wiring shall enter unit cabinet at a single, factory-prepared, knockout location.

2. Thru-the-base capability.

a. Thru-the-base provisions/connections are available as standard with every unit. When bottom connections are required, field furnished couplings are required.

b. No basepan penetration, other than those authorized by the manufacturer, is permitted.

J. Component access panels (standard)

1. Cabinet panels shall be easily removable for servicing.

2. Unit shall have one factory installed, tool-less, removable, filter access panel.

3. Panels covering control box and filter shall have molded composite handles while the blower access door shall have an integrated flange for easy removal.

4. Handles shall be UV modified, composite. They shall be permanently attached, and recessed into the panel.

5. Screws on the vertical portion of all removable access panel shall engage into heat resistant, molded composite collars.

6. Collars shall be removable and easily replaceable using manufacturer recommended parts.

6.08. GasHeat

A. General

1. Heat exchanger shall be an induced draft design. Positive pressure heat exchanger designs shall not be allowed.

2. Shall incorporate a direct-spark ignition system and redundant main gas valve.

3. Gas supply pressure at the inlet to the rooftop unit gas valve must match that required by the manufacturer.

B. The heat exchanger shall be controlled by an integrated gas controller (IGC) microprocessor.

1. IGC board shall notify users of fault using an LED (light-emitting diode).

2. The LED shall be visible without removing the control box access panel.

3. IGC board shall contain algorithms that modify evaporator-fan operation to prevent future cycling on high temperature limit switch.

4. Unit shall be equipped with anti-cycle protection with one short cycle on unit flame rollout switch or 4 continuous short cycles on the high temperature limit switch. Fault indication shall be made using an LED.

C. Standard Heat Exchanger construction

1. Heat exchanger shall be of the tubular-section type constructed of a minimum of 20-gauge steel coated with a nominal 1.2 mil aluminum-silicone alloy for corrosion resistance.

2. Burners shall be of the in-shot type constructed of aluminum-coated steel.

3. 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.

4. Each heat exchanger tube shall contain multiple dimples for increased heating effectiveness.

D. Induced draft combustion motor and blower

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

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

3. Shall have permanently lubricated sealed bearings.

4. Shall have inherent thermal overload protection.

5. Shall have an automatic reset feature.

6.09. Coils

A. Standard Aluminum Fin - Copper Tube Coils:

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

2. Evaporator coils shall be leak tested to 150 psig, pressure tested to 450 psig, and qualified to UL 1995 burst test at 1775 psig.

3. Condenser coils shall be leak tested to 150 psig, pressure tested to 650 psig, and qualified to UL 1995 burst test at

Guide Specification for 48TCFD24A2A6-6F0G0_SUBMITTAL

Project: 1.0 RTU Submittals for Website - Page 8
Prepared By:

11/25/2019
11:05AM

1980 psig.

6.10. Refrigerant Components

- A. Refrigerant circuit shall include the following control, safety, and maintenance features:
 - 1. Fixed orifice metering system shall prevent mal-distribution of two-phase refrigerant by including multiple fixed orifice devices in each refrigeration circuit. Each orifice is to be optimized to the coil circuit it serves.
 - 2. Refrigerant filter drier - Solid core design.
 - 3. Service gauge connections on suction and discharge lines.
 - 4. Pressure gauge access through a specially designed access screen on the side of the unit.
- B. Compressors
 - 1. Unit shall use fully hermetic, scroll compressor for each independent refrigeration circuit.
 - 2. Models shall be available with 2 compressor/2-stage cooling.
 - 3. Compressor motors shall be cooled by refrigerant gas passing through motor windings.
 - 4. Compressors shall be internally protected from high discharge temperature conditions.
 - 5. Compressors shall be protected from an over-temperature and over-ampereage conditions by an internal, motor overload device.
 - 6. Compressor shall be factory mounted on rubber grommets.
 - 7. Compressor motors shall have internal line break thermal, current overload and high pressure differential protection.
 - 8. Crankcase heaters shall not be required for normal operating range, unless provided by the factory.

6.11. Filter Section

- A. Filters access is specified in the unit cabinet section of this specification.
- B. Filters shall be held in place by a preformed, slide-out filter tray, facilitating easy removal and installation.
- C. Shall consist of factory-installed, low velocity, throw-away 2-in. thick fiberglass filters.
- D. Filters shall be standard, commercially available sizes.
- E. Only one size filter per unit is allowed.
- F. 4-in filter capability is possible with a field installed pre engineered slide out filter track accessory. 4-in filters are field furnished.

6.12. Evaporator Fan and Motor

- A. Evaporator fan motor:
 - 1. Shall have inherent automatic-reset thermal overload protection or circuit breaker.
 - 2. Shall have a maximum continuous bhp rating for continuous duty operation; no safety factors above that rating shall be required.
- B. Belt-driven Evaporator Fan:
 - 1. Belt drive shall include an adjustable-pitch motor pulley and belt break protection system.
 - 2. Shall use rigid pillow block bearing system with lubricant fittings at accessible bearing or lubrication line.
 - 3. Blower fan shall be double-inlet type with forward-curved blades.
 - 4. Shall be constructed from steel with a corrosion resistant finish and dynamically balanced.

6.13. Condenser Fans and Motors

- A. Condenser fan motors:
 - 1. Shall be a totally enclosed motor.
 - 2. Shall use permanently lubricated bearings.
 - 3. Shall have inherent thermal overload protection with an automatic reset feature.
 - 4. Shall use a shaft-down design.
- B. Condenser Fans:
 - 1. Shall be a direct-driven propeller type fan.
 - 2. Shall have galvalum blades riveted to corrosion-resistant steel spiders and shall be dynamically balanced.

6.14. Special Features Options and Accessories

- A. Staged Air Volume System (SAV) for 2-stage cooling models only:
 - 1. Evaporator fan motor:

Guide Specification for 48TCFD24A2A6-6F0G0_SUBMITTAL

Project: 1.0 RTU Submittals for Website - Page 8
Prepared By:

11/25/2019
11:05AM

- a. Shall have permanently lubricated bearings.
 - b. Shall have a maximum continuous bhp rating for continuous duty operation; no safety factors above that rating.
 - c. Shall be Variable Frequency duty and 2-speed control.
 - d. Shall contain motor shaft grounding ring to prevent electrical bearing fluting damage by safely diverting harmful shaft voltages and bearing currents to ground.
- B. Variable Frequency Drive (VFD). Only available on 2-speed indoor fan motor option (SAV):
1. Shall be installed inside the unit cabinet, mounted, wired and tested.
 2. Shall contain Electromagnetic Interference (EMI) frequency protection.
 3. Insulated Gate Bi-Polar Transistors (IGBT) used to produce the output pulse width modulated (PWM) waveform, allowing for quiet motor operation.
 4. Self diagnostics with fault and power code LED indicator. Field accessory Display Kit available for further diagnostics and special setup applications.
 5. RS485 capability standard.
 6. Electronic thermal overload protection.
 7. 5% swinging chokes for harmonic reduction and improved power factor.
 8. All printed circuit boards shall be conformal coated.
- C. Standard Integrated Economizers (Factory installed on 3 Phase Models Only. Field installed on all 3 and 1 Phase Models):
1. Integrated, gear-driven opposing blade design type capable of simultaneous economizer and compressor operation.
 2. Independent modules for vertical or horizontal return configurations shall be available. Vertical and horizontal return modules shall be available as a factory installed option.
 3. Damper blades shall be galvanized steel with composite gears. Plastic or composite blades on intake or return shall not be acceptable.
 4. Shall include all hardware and controls to provide free cooling with outdoor air when temperature and/or humidity are below setpoints.
 5. Shall be equipped with gear driven dampers for both the outdoor ventilation air and the return air for positive air stream control.
 6. Standard models shall be equipped with low-leakage dampers, not to exceed 2% leakage at 1 in. wg pressure differential. Economizer controller on electromechanical units shall be Honeywell W7212 that provides:
 - a. Combined minimum and DCV maximum damper position potentiometers with compressor staging relay.
 - b. Functions with solid state analog enthalpy or dry bulb changeover control sensing.
 - c. Contain LED indicates for:
 - I) When free cooling is available
 - II) When module is in DCV mode
 - III) When exhaust fan contact is closed
 7. Shall be capable of introducing up to 100% outdoor air.
 8. Shall be equipped with a barometric relief damper capable of relieving up to 100% return air.
 9. Shall be designed to close damper(s) during loss-of-power situations with spring return built into motor.
 10. Dry bulb outdoor air temperature sensor shall be provided as standard. Outdoor air sensor setpoint shall be adjustable and shall range from 40 to 100_F / 4 to 38_C. Additional sensor options shall be available as accessories.
 11. 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%.
 12. The economizer shall maintain minimum airflow into the building during occupied period and provide design ventilation rate for full occupancy. A remote potentiometer may be used to override the damper setpoint.
 13. Dampers shall be completely closed when the unit is in the unoccupied mode.
 14. 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.
 15. Compressor lockout sensor shall open at 35_F (2_C) and close closes at 50_F (10_C).
 16. Actuator shall be direct coupled to economizer gear. No linkage arms or control rods shall be acceptable.

Guide Specification for 48TCFD24A2A6-6F0G0_SUBMITTAL

Project: 1.0 RTU Submittals for Website - Page 8

11/25/2019

Prepared By:

11:05AM

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