

Voyager Gas/Electric Packaged Rooftop

Unit Overview - YSH240G3RHC**000000000000000000000000

Application	Unit Size	Supply Fan		External Dimensions (in.)			Operating Weight		EER	IEER/SEER	Elevation
		Airflow	External Static Pressure	Height	Width	Length	Minimum	Maximum			
Gas/Electric	20 Ton	8000 cfm	0.500 in H2O	4.68 ft	7.02 ft	10.14 ft	1977.0 lb	2572.0 lb	10.0 EER	11.40	804.00 ft

Unit Features

Unit Electrical

Voltage/phase/hertz	208-230/60/3
MCA	107.00 A
MOP	150.00 A



Controls

Unit Controls Reliabel

Cooling Section

		Capacity
Entering Dry Bulb	80.00 F	Gross Total 255.72 MBh
Entering Wet Bulb	67.00 F	Gross Sensible 199.93 MBh
Ambient Temp	95.00 F	Net Total 241.23 MBh
Leaving Coil Dry Bulb	56.86 F	Net Sensible 185.44 MBh
Leaving Coil Wet Bulb	56.85 F	Fan Motor Heat 14.49 MBh
Leaving Unit Dry Bulb	58.39 F	Refrig Charge-circuit 1 12.4 lb
Leaving Unit Wet Bulb	57.43 F	Refrig Charge-circuit 2 7.2 lb
Refrigeration System Options		
Leaving Dew Point	56.84 F	

Heating Section

Heat Type	Gas
Heating Stages	2
Output Heating Capacity	320.00 MBh
Heating EAT	70.00 F
Heating LAT	106.87 F
Heating Temp Rise	36.87 F

Fan Section

Indoor Fan Data		Outdoor Fan Data	
Type	FC Centrifugal	Type	Propeller
Drive Type	Belt	Fan Quantity	2
Evap Fan FLA	16.70 A	Drive Type	Direct
Indoor Fan Performance		Outdoor Fan Performance	
Airflow	8000 cfm	Outdoor Motor Power	1.73 kW
Design ESP	0.500 in H2O	Condenser Fan FLA	4.80 A
Component SP	0.000 in H2O		
Total SP	0.500 in H2O		
Supply Motor Horsepower	5.000 hp		
Indoor Motor Operating Power	4.60 bhp		
Indoor Motor Power	3.43 kW		
Indoor RPM	756 rpm		

Compressor Section

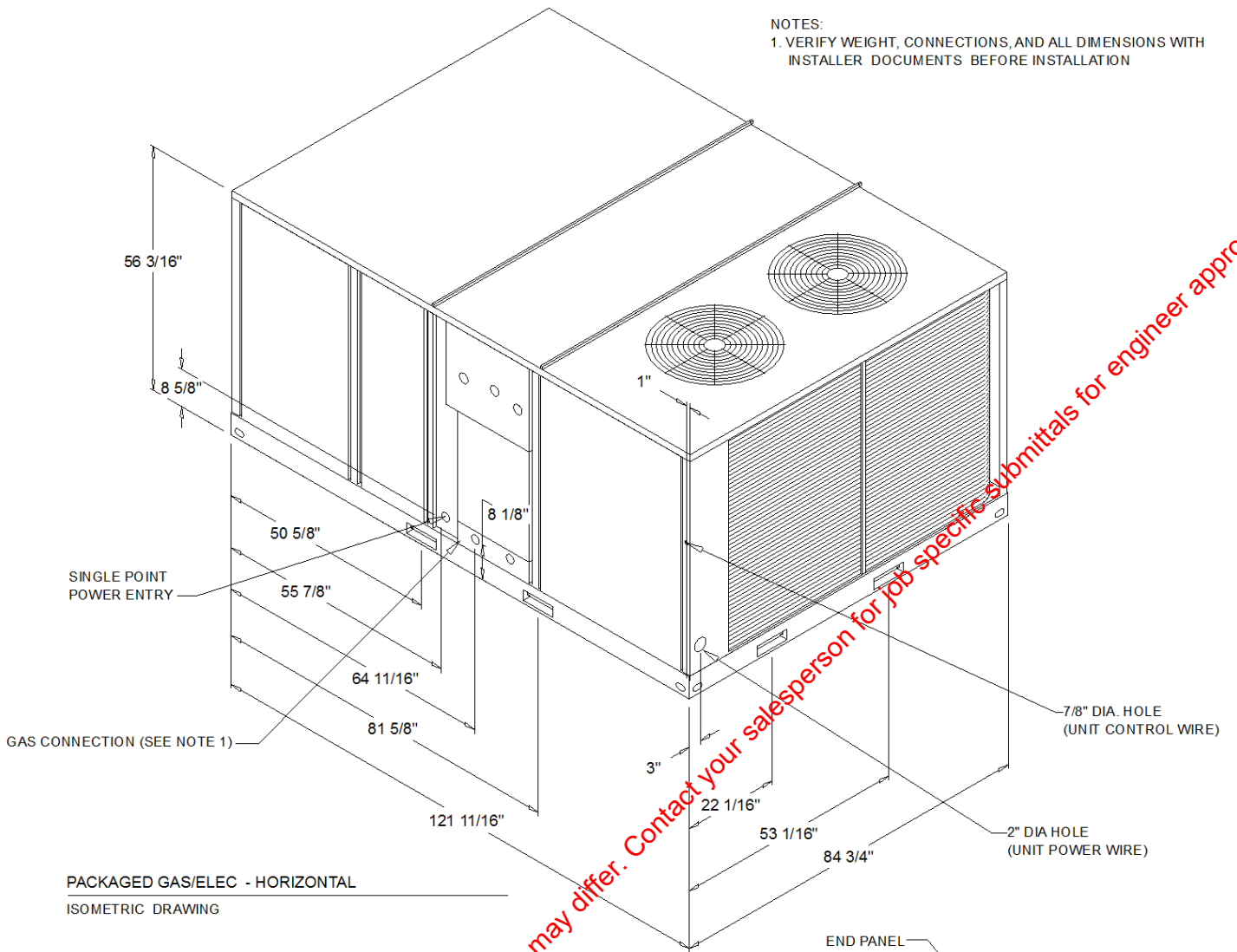
Power	19.76 kW
Circuit 1 RLA	44.16 A
Circuit 2 RLA	24.96 A

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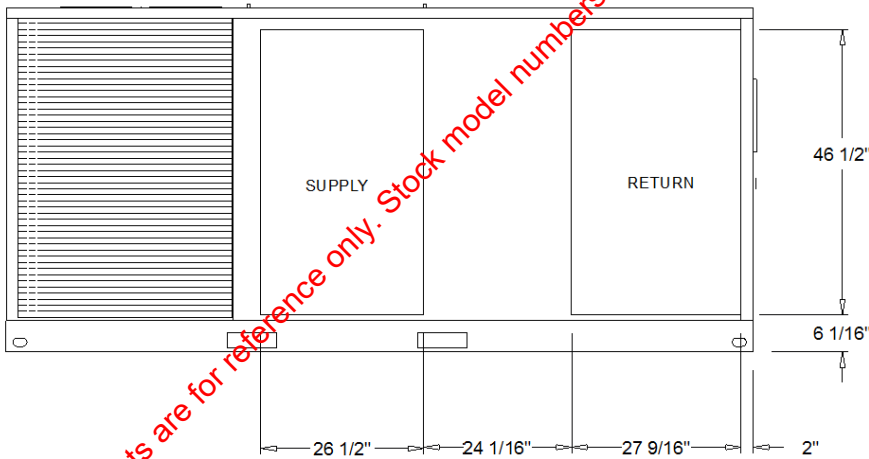
Acoustics								
Sound Path	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Ducted Discharge	89 dB	84 dB	76 dB	75 dB	71 dB	72 dB	71 dB	65 dB
Ducted Inlet	89 dB	80 dB	75 dB	70 dB	65 dB	66 dB	66 dB	60 dB
Outdoor Noise	105 dB	94 dB	96 dB	93 dB	90 dB	85 dB	82 dB	77 dB

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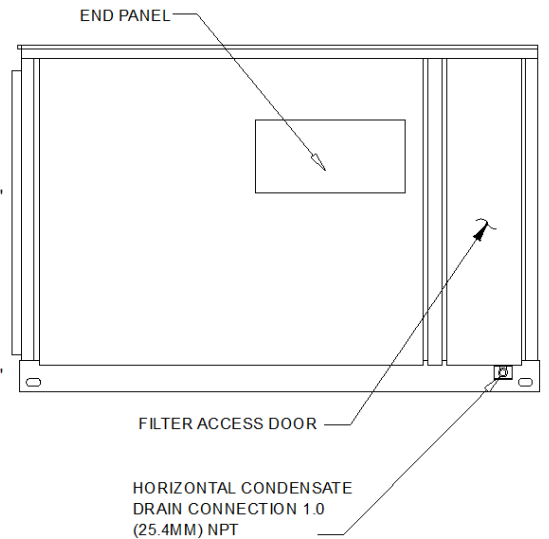
NOTES:
1. VERIFY WEIGHT, CONNECTIONS, AND ALL DIMENSIONS WITH INSTALLER DOCUMENTS BEFORE INSTALLATION



PACKAGED GAS/ELEC - HORIZONTAL
ISOMETRIC DRAWING



PACKAGED GAS/ELECTRIC -HORIZONTAL
AIR FLOW SIDE



HORIZONTAL CONDENSATE DRAIN AND FILTER ACCESS
SIDE VIEW

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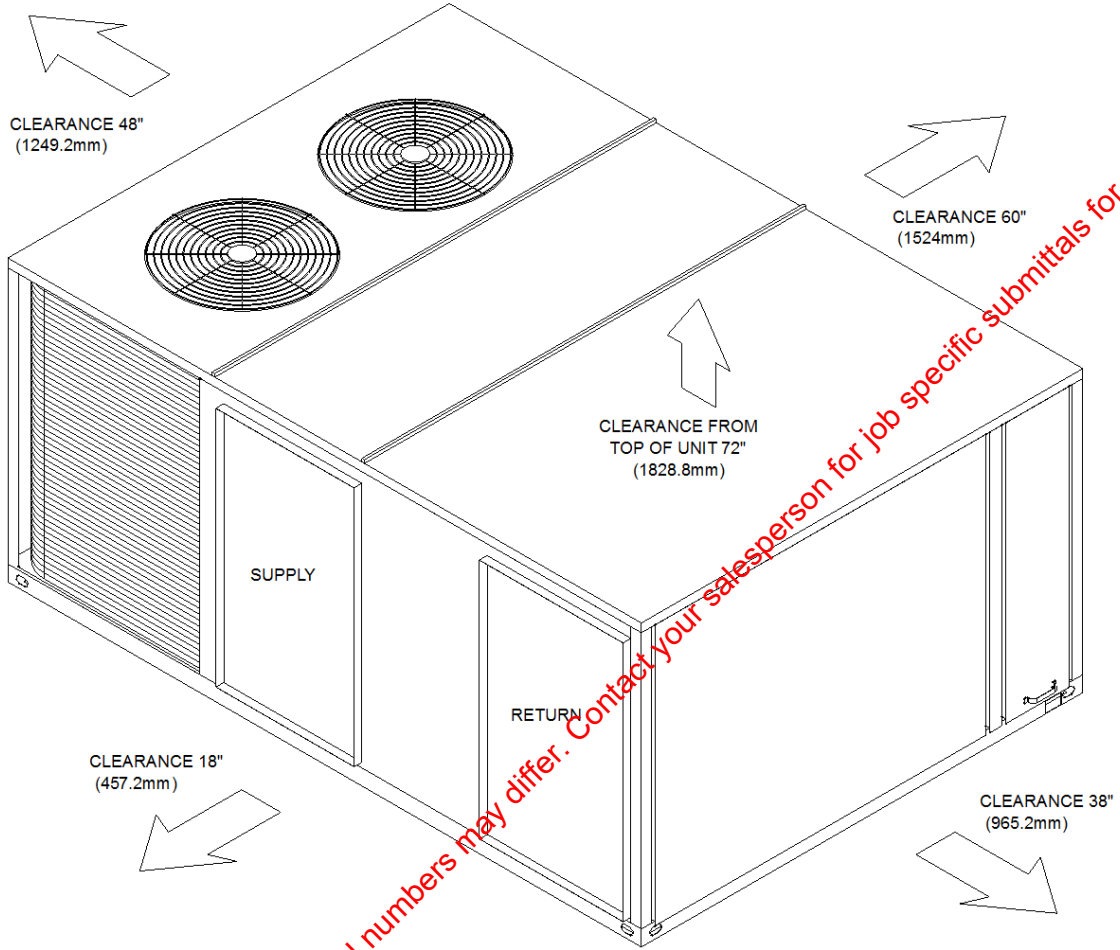
ELECTRICAL / GENERAL DATA

GENERAL PERFORMANCE			
Model (Ton): YSH240G (20.0) Unit Operating Voltage Range: 187-253 Unit Primary Voltage: 208 Unit Secondary Voltage: 230 Unit Hertz: 60 Unit Phase: 3 EER: ⁽⁵⁾ 10.0	Standard Motor ^{(1) (3)} Minimum Circuit Ampacity: 107.0/107.0 Maximum Fuse Size: 150.0/150.0 Maximum (HACR) Circuit Breaker: 150.0/150.0	Oversized Motor ^{(1) (4)} MCA: N/A MFS: N/A MCB (HACR): N/A	Field Installed Oversized Motor ^{(1) (4)} MCA: N/A MFS: N/A MCB (HACR): N/A
GAS HEATING		COMPRESSOR	
Heating Models: High Heating and 1 Stage Input (Btu/h): 400000 / 300000 Heating and 1 Stage Output (Btu/h): 320000 / 240000 Min./Max. Gas Input - Pressure Natural or LP: 2.5 / 14.0 Gas Connection Pipe Size: 3/4"		Circuit(s) Number: 2 Horsepower: 12.9/6.3 Phase: 3 Rated Load Amps: 44.2/25.0 Locked Rotor Amps: 315.0/164	
INDOOR MOTOR			
Number: ⁽³⁾ 1 Horsepower: 5.00 Motor Speed (RPM): 3,450 Phase: 3 Full Load Amps: 16.7 Locked Rotor Amps: 109.8		Oversized Motor ⁽⁴⁾ Number: N/A Horsepower: N/A Motor Speed (RPM): N/A Phase: N/A Full Load Amps: N/A Locked Rotor Amps: N/A	
		Field Installed Oversized Motor ⁽⁴⁾ Number: N/A Hp: N/A Motor Speed (RPM): N/A Phase: N/A FLA: N/A LRA: N/A	
OUTDOOR MOTOR		POWER EXHAUST (Field Installed Power Exhaust)	COMBUSTION BLOWER MOTOR (Gas-Fired Heating only)
Number: 2 Horsepower: 1.00 Motor speed (RPM): 1,125 Phase: 3 Full Load Amps: 4.8 Locked Rotor Amps: 20.0		Horsepower: N/A Motor Speed (RPM): N/A Phase: N/A Full Load Amps: N/A Locked Rotor Amps: N/A	Horsepower: 0.1 Motor Speed (RPM): 3,500/2,800 Phase: 1 Full Load Amps: 0.8 Locked Rotor Amps: 2.00
FILTER		REFRIGERANT ⁽²⁾	
Type: Throwaway Furnished: Yes Number: 8 Recommended Size: 20"x25"x2"		Circuit #1 / 2 Type: R410 Factory Charge Circuit #1 / 2: 11 11/16" / 6.8 lb	

NOTES:

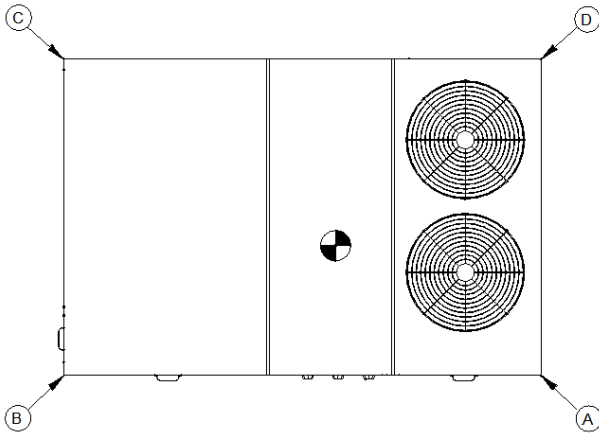
1. Maximum (HACR) Circuit Breaker sizing is for installations in the United States only.
2. Refrigerant charge is an approximate value. For a more precise value, see unit nameplate and service instructions.
3. Value includes oversized motor.
4. Value does not include Power Exhaust Accessory.
5. EER is rated at AHRI conditions and in accordance with DOE test procedures.

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HORIZONTAL ISOMETRIC-PACKAGED GAS/ELECTRIC CLEARANCE

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CORNER WEIGHT

Base Unit and Corner Weights Only

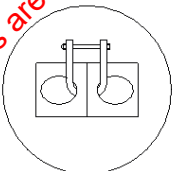
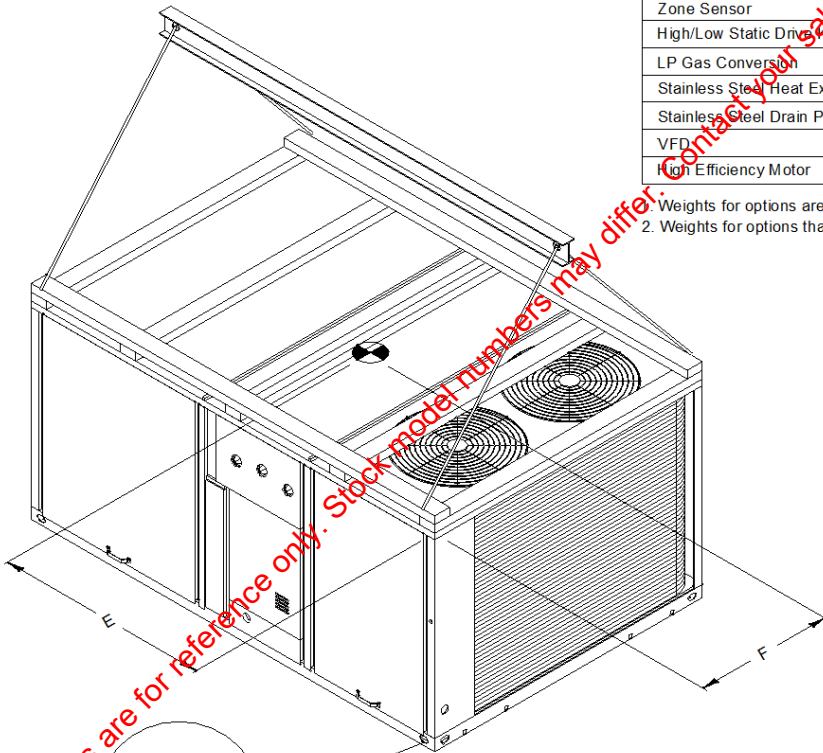
Base unit weights		Corner Weights				Center of Gravity	
SHIPPING	NET	(A)	(B)	(C)	(D)	E	F
2409.0 lb	1977.0 lb	635.0 lb	515.0 lb	374.0 lb	454.0 lb	55"	35"

1. All weights are approximate.
2. The actual weight are listed on the unit nameplate.
3. Refer to unit nameplate and installation guide for weights before scheduling transportation and installation of unit.
4. The weight shown represents the typical unit operating weight for the configuration selected. Estimated at +/- 10 % of the nameplate weight. .
5. Verify weight, connection, and all dimension with installer documents before installation.
6. Corner weights are given for information only.
7. Net/Shipping weight of optional accessories should be added to unit weight when ordering factory or field installed accessories.

Installed Options Net Weight Data

Accessory	Weight
Economizer, Manual and Motorized Outside Air Damper	
Power Exhaust	
Roof Curb	
Oversized Motor	
Hail Guard	
Hinged Access Doors	
Power Conv. Outlet	
Through the Base Electrical	
Circuit Breaker	
Disconnect	
Smoke Detector	
Novar	
Zone Sensor	
High/Low Static Drive Kit	
LP Gas Conversion	
Stainless Steel Heat Exchanger	
Stainless Steel Drain Pan	
VFD	
High Efficiency Motor	

1. Weights for options are approximate.
2. Weights for options that are not list refer to Installation guide.



PACKAGED GAS/ELECTRIC

RIGGING AND CENTER OF GRAVITY

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General - 60 Hz Horizontal Unit

The units shall be dedicated horizontal airflow. The operating range shall be between 115°F and 0°F in cooling as standard from the factory for all units. Cooling performance shall be rated in accordance with ARI testing procedures. All units shall be factory assembled, internally wired, fully charged with R-410A, and 100 percent run tested to check cooling operation, fan and blower rotation and control sequence, before leaving the factory. Wiring internal to the unit shall be colored and numbered for simplified identification. 60 Hz units shall be UL listed and labeled, classified in accordance to UL 1995/C 22.2, 236-05 3rd Edition.

Packaged Rooftop units cooling, heating capacities, and efficiencies are AHRI certified within scope of AHRI Standard 340/360 (I-P) and ANSI Z21.47 and 10 CFR Part 431 pertaining to Commercial Warm Air Furnaces (gas heating units).

Casing - Horizontal

Unit casing shall be constructed of zinc coated, heavy gauge, galvanized steel. Exterior surfaces shall be cleaned, phosphatized, and finished with a weather-resistant baked enamel finish. Unit's surface shall be tested 672 hours in a salt spray test in compliance with ASTM B117. Cabinet construction shall allow for all maintenance on one side of the unit. In order to ensure a water and air tight seal, service panels shall have lifting handles and no more than three screws to remove. All exposed vertical panels and top covers in the indoor air section shall be insulated with a 1/2 inch, 1 pound density foil-faced, fire-resistant, permanent, odorless, glass fiber material. The base of the unit shall have provisions for forklift and crane lifting.

Unit Top

The top cover shall be one piece, or where seams exist, double hemmed and gasket sealed to prevent water leakage.

Filters

Two inch standard filters shall be factory supplied on all units

Compressors

All units shall have direct-drive, hermetic, scroll type compressors with centrifugal type oil pumps. Motor shall be suction gas-cooled and shall have a voltage utilization range of plus or minus 10 percent of nameplate voltage. Internal overloads shall be provided with the scroll compressors. All models shall have crankcase heaters, phase monitors and low and high pressure control as standard. Dual compressors are available on all standard efficiency models and 12.5 to 20 tons high efficiency models and allow for efficient cooling utilizing 3 stages of compressor operation (high efficiency models only). 25 tons high efficiency units have 3 compressors for up to 4 stages of compressor operation.

Crankcase Heaters

These band heaters provide improved compressor reliability by warming the oil to prevent migration during off-cycles or low ambient conditions.

Refrigerant Circuits

Each refrigerant circuit shall have service pressure ports, and refrigerant line filter driers factory installed as standard. An area shall be provided for replacement suction line driers.

Evaporator and Condenser Coils

Evaporator Coils (only on T/YS*150, 180, 210, 240, 300G models)-

Microchannel evaporator coils will be burst tested by the manufacturer. Internally finned, 5/16" copper tubes mechanically bonded to a configured aluminum plate fin shall be standard for evaporator coils. Coils shall be leak tested to ensure the pressure integrity. The evaporator coil shall be leak tested to 225 psig and pressure tested to 450 psig.

Condenser Coils (available on T/Y**150, 180, 210, 240, 300G models) - Microchannel condenser coils shall be standard on all units. Coils shall be leak tested to ensure the pressure integrity. The condenser coil shall be leak tested to 225 psig and pressure tested to 450 psig.

Gas Heating Section

The heating section shall have a drum and tube heat exchanger design using corrosion resistant steel components. A forced combustion blower shall supply premixed fuel to a single burner ignited by a pilotless hot surface ignition system.

In order to provide reliable operation, a negative pressure gas valve shall be used on standard furnaces and a pressure switch on furnaces with modulating heat that requires blower operation to initiate gas flow. On an initial call for heat, the combustion blower shall purge the heat exchanger 45 seconds before ignition.

After three unsuccessful ignition attempts, the entire heating system shall be locked out until manually reset at the thermostat. Units shall be suitable for use with natural gas shall also comply with California requirements for low NOx emissions.

Condenser Coil

The microchannel type condenser coil is standard for the standard efficiency models. Due to flat streamlined tubes with small ports, and metallurgical tube-to-fin bond, microchannel coil has better heat transfer performance. Microchannel condenser coil can reduce system refrigerant charge by up to 50% because of smaller internal volume, which leads to better compressor reliability. Compact all-aluminum microchannel coils also help to reduce the unit weight. All-aluminum construction improves re-cyclability. Galvanic corrosion is also minimized due to all aluminum construction. Strong aluminum brazed structure provides better fin protection. In addition, flat streamlined tubes also make microchannel coils more dust resistant and easier to clean. Coils shall be leak tested at the factory to ensure the pressure integrity. The evaporator coil and condenser coil shall be leak tested to 600 psig. The assembled unit shall be leak tested to 465 psig.

Outdoor Fans

The outdoor fan shall be direct-drive, statically and dynamically balanced, draw-through in the vertical discharge position. The fan motor(s) shall be permanently lubricated and shall have built-in thermal overload protection.

Indoor Fan

Units above shall have belt driven, FC centrifugal fans with adjustable motor sheaves. Units with standard motors shall have an adjustable idler-arm assembly for quick-adjustment of fan belts and motor sheaves. All motors shall be thermally protected. All indoor fan motors meet the U.S. Energy Policy Act of 1992 (EPACT).

Controls

Unit shall be completely factory wired with necessary controls and contactor pressure lugs or terminal block for power wiring. Unit shall provide an external location for mounting a fused disconnect device. ReliaTel controls shall be provided for all 24 volt control functions. The resident control algorithms shall make all heating, cooling, and/or ventilating decisions in response to electronic signals from sensors measuring indoor and outdoor temperatures. The control algorithm maintains accurate temperature control, minimizes drift from set point, and provides better building comfort. A centralized control shall provide anti-short cycle timing and time delay between compressors to provide a higher level of machine protection.

High Pressure Cutout

This option is offered for units that do not have High Pressure cutout as standard.

Discharge Line Thermostat

A bi-metal element discharge line thermostat is installed as a standard option on the discharge line of each system. This standard option provides extra protection to the compressors against high discharge temperatures in case of loss of charge, extremely high ambient and other conditions which could drive the discharge temperature higher. Discharge line thermostat is wired in series with high pressure control. When the discharge temperature rises above the protection limit, the bi-metal disc in the thermostat switches to the off position, opening the 24 VAC circuit. When the temperature on the discharge line cools down, the bi-metal disc closes the contactor circuit, providing power to the compressor. When the thermostat opens the fourth time, the ReliaTel control must be manually reset to resume operation on that stage.

Sequence of Operation (if applied in a SINGLE-ZONE CONSTANT-VOLUME SYSTEM or a CHANGEOVER BYPASS SYSTEM)

B. SINGLE-ZONE CONSTANT-VOLUME SYSTEM

1. OCCUPIED HEAT/COOL:

The RTU shall operate the supply fan continuously and modulate (or cycle) compressors, modulate (or stage) heat, and/or enable airside economizing to maintain zone temperature at setpoint. The OA damper shall open to bring in the required amount of ventilation.

2. MORNING WARM-UP/PRE-COOL:

The RTU shall operate the supply fan and modulate (or cycle) compressors or modulate (or stage) heat to raise/lower zone temperature to its occupied setpoint. The OA damper shall remain closed, unless economizing.

D. CHANGEOVER BYPASS SYSTEM

1. OCCUPIED HEAT/COOL:

Each VAV terminal shall use pressure-independent control, with airflow measurement, to vary primary airflow to maintain zone temperature at its occupied setpoint. The RTU shall modulate the bypass damper to maintain duct static pressure at setpoint and modulate (or cycle) compressors, modulate (or stage) heat, and/or enable airside economizing based on current zone cooling/heating demands. The OA damper shall open to bring in the required amount of ventilation.

2. MORNING WARM-UP/PRE-COOL:

Each VAV terminal unit shall vary primary airflow to raise/lower zone temperature to its occupied setpoint. The RTU shall modulate the bypass damper to maintain duct static pressure at setpoint and modulate (or cycle) compressors or modulate (or stage) heat based on current zone cooling/heating demands. The OA damper shall remain closed, unless economizing.

3. COOLING/HEATING CHANGEOVER LOGIC:

The System Controller shall determine the overall system cooling/heating mode based on "voting" from each zone. When the majority of zones require cooling, the RTU shall operate in cooling mode and any zone that requires heating shall reduce primary airflow to minimum. When the majority of zones require heating, the RTU shall operate in heating mode and any zone that requires cooling shall reduce primary airflow to minimum.

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