

SECTION 238129 - DUCTLESS SPLIT SYSTEM AIR CONDITIONING UNITS

PART 1 - GENERAL

1.1 SUBMITTAL REQUIREMENTS

- A. Product Data

1.2 EXTRA MATERIALS

- A. General: Furnish to Owner, with receipt, the following spare parts for AC unit:
 - 1. 1 set filters for each unit.

PART 2 - PRODUCTS

2.1 MANUFACTURER:

- A. Subject to compliance with requirements, provide ductless split system air conditioning units of one of the following manufacturers:
 - 1. Carrier
 - 2. Mitsubishi
 - 3. Sanyo
 - 4. LG
 - 5. Daikin
 - 6. Samsung

2.2 OUTDOOR CONDENSING UNITS

- A. General
 - 1. Factory assembled, single piece, air-cooled outdoor unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, compressor, full charge of HFC refrigerant, and special features required prior to field start-up.
- B. Unit Cabinet
 - 1. Unit cabinet shall be constructed of galvanized steel, bonderized and coated with a baked-enamel finish.
 - 2. Unit access panels shall be removable with minimal screws and shall provide full access to the compressor, fan, and control components.
 - 3. Outdoor compartment shall be isolated and have an acoustic lining to assure quiet operation.
- C. Fans

1. Outdoor fans shall be direct-drive propeller type, and shall discharge air horizontally. Fans shall blow air through the outdoor coil.
2. Outdoor fan motors shall be totally-enclosed, single-phase motors with Class B insulation and permanently-lubricated sleeve bearings. Motor shall be protected by internal thermal overload protection.
3. Shaft shall have inherent corrosion resistance.
4. Fan blades shall be corrosion resistant and shall be statically and dynamically balanced.
5. Outdoor fan openings shall be equipped with PVC coated protection grille over fan and coil.

D. Compressor

1. Compressor shall be fully hermetic reciprocating or scroll type.
2. Compressor shall be equipped with oil system, operating oil charge, and motor. Internal overloads shall protect the compressor from overtemperature and overcurrent. Scroll compressors shall also have high discharge gas temperature protection if required.
3. Motor shall be NEMA rated Class F, suitable for operation in a refrigerant atmosphere.
4. Reciprocating compressors shall be equipped with crankcase heaters to minimize liquid refrigerant accumulation in compressor during shutdown and to prevent refrigerant dilution of oil.
5. Compressor assembly shall be installed on rubber vibration isolators and shall have internal spring isolation.
6. Compressors shall be single-phase or 3-phase as specified on the contract drawings.

E. Outdoor Coil

1. Coil shall be constructed of aluminum fins mechanically bonded to internally enhanced, seamless copper tubes which are cleaned, dehydrated, and sealed.

F. Refrigeration Components

1. Refrigerant circuit components shall include brass external liquid line service valve with service gage port connections, suction line service valve with service gage connection port, service gage port connections on compressor suction and discharge lines with Schrader-type fittings with brass caps, accumulator, pressure relief, and a full charge of refrigerant.

G. Controls and Safeties

1. Operating controls and safeties shall be factory selected, assembled, and tested. The minimum control functions shall include the following:

H. Controls

1. Time delay restart to prevent compressor reverse rotation on signal-phase scroll compressors.
2. Automatic restart on power failure.
3. Safety lockout if any outdoor unit safety is open.
4. A time delay control sequence provided through the fan coil board, thermostat, or controller.
5. High-pressure and liquid line low-pressure switches.
6. Automatic outdoor fan motor protection.
7. Start capacitor and relay (single phase units without scroll compressors).

I. Safeties

1. System diagnostics.
2. Compressor motor current and temperature overload protection
3. High pressure relief.
4. Outdoor fan failure protection.

J. Electrical Requirements

1. Unit electrical power shall be a single point connection.
2. Unit control voltage to the indoor-fan coil shall be 24 volt
3. All power and control wiring must be installed per NEC and all local building codes.
4. High and low voltage terminal block connections.

K. Special Features (Field Installed)

1. Low-Ambient Kit
 - a. Control shall regulate fan-motor cycles in response to saturated condensing pressure of the unit. The control shall be capable of maintaining a condensing temperature of 100 F +/- 10 F with outdoor temperatures to -20F. Installation of kit shall not require changing the outdoor-fan motor.
2. Liquid Solenoid Valve
 - a. This electronically operated shutoff valve shall close and opening response to compressor operation. The valve should be used with all long-lines applications (over 100 ft.).
3. Winter Start Control
 - a. Field supplied and installed winter start control shall permit start-up for cooling operation under low-load conditions and at low-ambient temperatures by bypassing the low-pressure switch for a 3-minute delay period.
4. Crankcase Heater (units with scroll compressors only).

- a. Unit shall be shipped with a clamp-on compressor oil sump heater.
- L. Low Ambient Control: Provide head pressure control, designed to operate at temperatures down to 0 deg. F (-18 deg. C).
1. The outdoor unit shall be capable of providing full heating or cooling at the following operating ambient air conditions:
 - a. Cooling: 4°F DB to 122°F DB with low ambient kit
 - b. Heating: -10°F DB to 61°F WB
 2. Manufacturers that cannot provide heating operation at -10°F dry bulb shall provide supplemental electric heat or additional low ambient heating components in the condensing unit to allow for operation down to -10°F dry bulb. All additional engineering, electrical and installation costs shall be by the unit manufacturer.

2.3 HIGH WALL UNITS

A. General

1. Indoor, direct-expansion, wall-mounted fan coil. Unit shall be complete with cooling/heating (heat pump systems only) coil, fan, fan motor, piping connectors, electrical controls, microprocessor control system, and integral temperature sensing. Unit shall be furnished with integral wall-mounting bracket and mounting hardware.

B. Unit Cabinet

1. Cabinet discharge and inlet grilles shall be attractively styled, high-impact polystyrene. Cabinet shall be fully insulated for improved thermal and acoustic performance.

C. Fans

1. Fan shall be tangential direct-drive blower type with air intake at the upper front face of the unit and discharge at the bottom front. Automatic, motor-driven vertical air sweep shall be provided standard.
2. Air sweep operation shall be user selectable. Horizontal direction may be manually adjusted (using remote controller) and vertical air sweep may be manually set.

D. Coil

1. Coil shall be copper tube with aluminum fins and galvanized steel tube sheets. Fins shall be bonded to the tubes by mechanical expansion. A drip pan under the coil shall have a drain connection for hose attachment to remove condensate. Condensate pan shall have internal trap and auxiliary drip pan under coil header.

2. Condensate Pan: Provide IAQ galvanized steel, double sloping drain pan. Provide high condensate in primary condensate pan to de-energize unit upon detection of high condensate levels.

E. Motors

1. Motors shall be open drip-proof, permanently lubricated ball bearing with inherent overload protection. Fan motors shall be 3-speed.

F. Controls

1. Controls shall consist of a microprocessor-based control system, which shall control space temperature, determine optimum fan speed, and run self diagnostics. The temperature control range shall be from 64F to 84F. The unit shall have the following functions as a minimum.
 - a. Provide hard wired wall thermostat secured to wall. (remote control stats are not acceptable).
 - b. An automatic restart after power failure at the same operating conditions as at failure.
 - c. A timer function to provide a minimum 24-hour timer cycle for system Auto. Start/Stop.
 - d. Temperature-sensing controls shall sense return air temperature. Indoor air high discharge temperature shutdown shall be provided.
 - e. Indoor coil freeze protection.
 - f. Wireless infrared remote control to enter set points and operating conditions.
 - g. Auto Stop features shall have integral setback control.
 - h. Automatic airsweep control to provide on or off activation of airsweep louvers.
 - i. Dehumidification mode shall provide increased latent removal capability by modulating fan speed and set point temperature.
 - j. Fan only operation shall provide room air circulation when no cooling is required.
 - k. Diagnostics shall provide continuous checks of unit operation and warn of possible malfunctions. Error messages shall be displayed at the unit and at the remote controller.
 - l. Fan speed control shall be user-selectable: high, medium, low or microprocessor automatic operation during all operating modes.
 - m. A time delay shall prevent compressor restart in less than 3 minutes.

G. Filters

1. Unit shall have filter track with factory-supplied cleanable filters.

H. Electrical Requirements

1. Unit shall operate on 115 volt, 208 volt, or 230 volt, 60 Hz power supply as specified on the equipment schedule. Power and control connections shall have terminal block connections.
- I. Operating Characteristics
 1. The unit shall be matched with an outdoor unit. The combination of the outdoor unit and the indoor fan coil unit shall be sized as scheduled
 2. The system shall have a minimum listed SEER (seasonal energy efficiency ratio) of 10.0 at ARI conditions.
 3. Outdoor unit shall be rated at low decibels at ARI conditions.
 - J. Refrigerant Lines
 1. The 009 and 012 units shall have rotatable refrigerant lines for penetration through the wall using flare connections. All units shall have flare connections and a 90-degree suction elbow shall be provided for rear connection.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Support: Install exterior units on roof on equipment curb with flashing to roof. Provide curb type and flashing per roofing manufacturer requirements.
- B. The condensing units shall be installed a minimum of 10'-0" from any roof edge regardless of location indicated on plans, unless a screen wall or railing is installed per the local building code. See the architectural plans for coordination.
- C. Electrical Wiring: Install electrical devices furnished by manufacturer but not specified to be factory-mounted. Furnish copy of manufacturer's wiring diagram submittal to Electrical Installer.
- D. Drain Piping: Connect unit drain to nearest indirect waste connection. Provide trap at drain pan; construct at least 1" deeper than fan pressure in inches of water.
- E. Provide locking-type tamper-resistant caps on all refrigerant circuit access ports.

END OF SECTION 238129