

Section 236200 - PACKAGED COMPRESSOR AND CONDENSER UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Alternate #6: Refer to Section 012300 – “Alternates”.

1.2 SUMMARY

- A. Section includes a new condensing unit to replace the existing condensing unit.



- B. Related Requirements:
 - 1. 232300 - REFRIGERANT PIPING
 - 2. 238216.13 - REFRIGERANT AIR COILS

1.3 ACTION SUBMITTALS

- A. Product Data: For each compressor and condenser unit. Include rated capacities, operating characteristics, and furnished specialties and accessories. Include equipment dimensions, weights and structural loads, required clearances, method of field assembly, components, and location and size of each field connection.

- B. Shop Drawings: For compressor and condenser units. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Wiring Diagrams: For power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
 - 1. Structural members to which compressor and condenser units will be attached.
 - 2. Liquid and vapor pipe sizes.
 - 3. Refrigerant specialties.
 - 4. Piping including connections, oil traps, and double risers.
 - 5. Compressors.
 - 6. Evaporators.
- B. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For compressor and condenser units to include in emergency, operation, and maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Fabricate and label refrigeration system according to ASHRAE 15, "Safety Standard for Refrigeration Systems."
- C. ASHRAE/IESNA 90.1 Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6, "Heating, Ventilating, and Air-Conditioning."

1.7 COORDINATION

- A. Coordinate installation of roof supports and roof penetrations.
- B. Coordinate location of piping and electrical rough-ins.

1.8 WARRANTY

- A. The manufacturer shall provide 12 month parts only warranty. Defective parts will be repaired or replaced during the warranty period at no charge. The warranty period shall commence at start up, or 6 months after shipment, whichever occurs first.

- B. The manufacturer shall provide extended 48 month parts only warranty on the compressor.

PART 2 - PRODUCTS

2.1 COMPRESSOR AND CONDENSER UNITS, AIR COOLED

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Daikin Applied (Basis of Design)
 - 2. Carrier
 - 3. Trane
 - 4. York; a Johnson Controls company.
- B. The complete unit shall be UL listed.
- C. Unit shall be completely factory assembled and shipped in one piece.
- D. Unit to be shipped with a nitrogen holding charge only.
- E. The unit shall undergo an operational test prior to shipment. The factory test shall include a refrigeration circuit check test, a unit safety control system operations checkout, and a final unit inspection.
- F. All units shall have decals and tags to indicate caution areas and aid unit service. Unit nameplates shall be fixed to the main control panel door. Electrical wiring diagrams shall be attached to the control panels. Installation, operating and maintenance bulletins and start-up forms shall be supplied with each unit.
- G. Performance: All scheduled capacities and face areas are the minimum accepted value. All scheduled amps, KW, and HP are maximum accepted values that allow scheduled capacity to be met.
- H. Cabinet
 - 1. Exterior surfaces shall be constructed of pre-painted galvanized steel for aesthetics and long term durability. Paint finish to include a base primer with a high quality, polyester resin topcoat of a neutral beige color. Finished surface to withstand a minimum 750-hour salt spray test in accordance with ASTM B117 standard for salt spray resistance.
 - 2. Lifting brackets shall be provided on the unit base with lifting holes to accept cable or chain hooks.
- I. Electrical
 - 1. Unit wiring shall comply with NEC requirements and with all applicable UL standards. All electrical components shall be UL recognized where applicable. All wiring and electrical components provided with unit shall be number and color coded and labeled according to the electrical diagram provided for easy identification. The unit shall be provided with a factory wired weatherproof control panel. Unit shall have a power

terminal block for main power connection. A terminal board shall be provided for low voltage control wiring. Branch circuit short circuit protection, 115 volt control circuit transformer and fuse, system switches, and a high temperature sensor. Each compressor and condenser fan motor shall be furnished with contactors and inherent thermal overload protection. Knockouts shall be provided in the side of the main control panels for field wiring entrance. All 115-600 volt internal and external wiring between control boxes and components shall be protected from damage by raceways or conduit.

2. The receptacle shall be powered by a field supplied 115V source.
3. Single terminal block shall be provided for connecting electrical power at the unit.
4. Unit SCCR rating to be 10 kAIC.
5. Unit shall be provided with a 24 volt transformer and terminal strip for field supplied controls.

J. Condensing Section

1. Units shall have at least one head pressure sensing condenser fan controlled to maintain positive head pressure.
2. The condensing section shall be open on the sides and bottom to provide access and to allow airflow through the coils. Condenser coils shall be multi-row and fabricated from cast aluminum micro-channel coils. Each condenser coil shall be factory leak tested with high-pressure air under water. Coils are to be recessed so that the cabinet provides built in hail protection.
3. Condenser fans shall be direct drive, propeller type designed for low tip speed, vertical air discharge, and include service guards. Fan blades shall be constructed of steel and riveted to a steel center hub. Condenser fan motors shall be heavy-duty, inherently protected, three-phase, non-reversing type with permanently lubricated ball bearing and integral rain shield.

K. Scroll Compressors

1. Each unit shall have multiple, heavy-duty Copeland scroll compressors.
2. Each compressor shall be complete with gauge ports, crankcase heater, sight-glass, anti-slug protection, motor overload protection and a time delay to prevent short cycling and simultaneous starting of compressors following a power failure.
3. Compressors shall be isolated with resilient rubber isolators to decrease noise transmission.

L. Refrigeration Circuit

1. Each unit shall have two independent refrigeration circuits. Each circuit shall be complete with low pressure control, liquid line charging valve with a 3/8" charging port, a manual reset high pressure safety switch. Each circuit shall be dehydrated and leak tested.
2. Each circuit shall be dehydrated and factory charged with 410-A Refrigerant and oil. Refrigeration capacity control shall be accomplished by staging of the unit's multiple compressors. All compressor capacity control staging shall be controlled by the factory installed main unit control system.
3. Hot gas bypass capped T shall be factory installed on the discharge line of both refrigerant circuits.
4. Provide a liquid line kit with sight glass, solenoid valve, and replaceable core filter drier.
5. One liquid line charging/evacuation valve shall be provided per refrigeration circuit, located at end of condensing section opposite condenser control box.

6. Provide optional valves— one discharge valve for each refrigerant circuit; located between the compressors and condenser. One suction valve for each refrigerant circuit; located between the compressors and the evaporator.

M. Controls

1. Unit shall be equipped with a 120V terminal strip for field supplied and installed controls.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of compressor and condenser units.
- B. Examine roughing-in for refrigerant piping systems to verify actual locations of piping connections before equipment installation.
- C. Examine for suitable conditions where compressor and condenser units will be installed.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install units level and plumb, firmly anchored in locations indicated.
- B. Maintain manufacturer's recommended clearances for service and maintenance.
- C. Loose Components: Install electrical components, devices, and accessories that are not factory mounted.

3.3 ROOF SUPPORTS

- A. Provide in accordance with 230500 "Common Work Results for HVAC".

3.4 CONNECTIONS

- A. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.
- B. Connect refrigerant piping to air-cooled compressor and condenser units; maintain required access to unit. Install furnished field-mounted accessories.

3.5 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections, and to assist in testing.
- B. Tests and Inspections:
 - 1. Perform each visual and mechanical inspection and electrical test. Certify compliance with test parameters.
 - 2. Leak Test: After installation, charge system with refrigerant and oil and test for leaks. Repair leaks, replace lost refrigerant and oil, and retest until no leaks exist.
 - 3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor operation and unit operation, product capability, and compliance with requirements.
 - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - 5. Verify proper airflow over coils.
- C. Verify that vibration isolation and flexible connections properly dampen vibration transmission to structure.
- D. Compressor and condenser units will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

3.6 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions and perform the following:
 - a. Inspect for physical damage to unit casing.
 - b. Verify that access doors move freely and are weathertight.
 - c. Clean units and inspect for construction debris.
 - d. Verify that all bolts and screws are tight.
 - e. Adjust vibration isolation and flexible connections.
 - f. Verify that controls are connected and operational.
- B. Lubricate bearings on fan motors.
- C. Start unit according to manufacturer's written instructions and complete manufacturer's startup checklist.
- D. Measure and record airflow and air temperature rise over coils.

- E. Verify proper operation of condenser capacity control device.
- F. Verify that vibration isolation and flexible connections properly dampen vibration transmission to structure.
- G. After startup and performance test, lubricate bearings.

3.7 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain compressor and condenser units.

END OF SECTION 236200