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**SECTION 23 62 13****PACKAGED AIR-COOLED REFRIGERANT COMPRESSOR AND CONDENSER UNITS****PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Condensing unit package.
- B. Charge of refrigerant and oil.
- C. Controls and control connections.
- D. Refrigerant piping connections.
- E. Motor starters.
- F. Electrical power connections.

**1.2 RELATED REQUIREMENTS**

- A. Section 23 05 13 - Common Motor Requirements for HVAC Equipment.
- B. Section 23 23 00 - Refrigerant Piping.
- C. Section 26 05 83 - Wiring Connections: Electrical characteristics and wiring connections.

**1.3 REFERENCE STANDARDS**

- A. AHRI 210/240 - Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment 2023.
- B. AHRI 365 (I-P) - Performance Rating of Commercial and Industrial Unitary Air-Conditioning Condensing Units 2009.
- C. ASHRAE Std 15 - Safety Standard for Refrigeration Systems 2019, with All Amendments and Errata.
- D. ASHRAE Std 23.1 - Methods for Performance Testing Positive Displacement Refrigerant Compressors and Condensing Units that Operate at Subcritical Pressures of the Refrigerant 2019.
- E. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2020.

**1.4 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide rated capacities, weights specialties and accessories, electrical nameplate data, and wiring diagrams. Include equipment served by condensing units in submittal, or submit at same time, to ensure capacities are complementary.
- C. Design Data: Indicate pipe and equipment sizing.
- D. Manufacturer's Instructions: Submit manufacturer's complete installation instructions.
- E. Operation and Maintenance Data: Include start-up instructions, maintenance instructions, parts lists, controls, and accessories.
- F. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with manufacturer's installation instructions for rigging, unloading, and transporting units.
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**1.6 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide a five year warranty to include coverage for refrigerant compressors.

**PART 2 PRODUCTS****2.1 MANUFACTURERS**

- A. Trane, a brand of Ingersoll Rand: [www.trane.com/#sle](http://www.trane.com/#sle).
- B. Substitutions: See Section 01 60 00 - Product Requirements.

**2.2 MANUFACTURED UNITS**

- A. Units: Self-contained, packaged, factory assembled and pre-wired units suitable for outdoor use consisting of cabinet, compressors, condensing coil and fans, integral sub-cooling coil, controls, liquid receiver, wind deflector, and screens.
- B. Construction and Ratings: In accordance with AHRI 210/240. Test in accordance with ASHRAE Std 23.1.
- C. Performance Ratings: Energy Efficiency Rating (EER) and Coefficient of Performance (COP) not less than prescribed by ASHRAE Std 90.1.

**2.3 CASING**

- A. House components in welded steel frame with galvanized steel panels with weather resistant, baked enamel finish.
- B. Mount starters, disconnects, and controls in weatherproof panel provided with full opening access doors. Provide mechanical interlock to disconnect power when door is opened.
- C. Provide removable access doors or panels with quick fasteners and piano hinges.

**2.4 CONDENSER COILS**

- A. Coils: Aluminum fins mechanically bonded to seamless copper tubing. Provide sub-cooling circuits. Air test under water to 425 psig, and vacuum dehydrate. Seal with holding charge of nitrogen.
- B. Coil Guard: Expanded metal with lint screens.

**2.5 FANS AND MOTORS**

- A. Vertical discharge direct driven propeller type condenser fans with fan guard on discharge. Equip with roller or ball bearings with grease fittings extended to outside of casing.
- B. Weatherproof motors suitable for outdoor use, single phase permanent split capacitor or 3 phase, with permanent lubricated ball bearings and built in current and thermal overload protection. Refer to Section 23 0513.

**2.6 COMPRESSORS**

- A. Mounting: Statically and dynamically balance rotating parts and mount on spring vibration isolators.
    - 1. Internally isolate hermetic units on springs.
  - B. Lubrication System: Reversible, positive displacement oil pump with oil charging valve, oil level sight glass, and magnetic plug or strainer.
  - C. Motor: Constant speed 1800 rpm suction gas cooled with electronic sensor and winding over temperature protection, designed for across-the-line starting. Furnish with starter.
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- D. Capacity Reduction Equipment: Suction valve unloaders, with lifting mechanism operated by electrically actuated solenoid valve, with unloaded compressor start; controlled from suction pressure.

## **2.7 REFRIGERANT CIRCUIT**

- A. Provide each unit with one refrigerant circuit, factory supplied and piped. Refer to Section 23 23 00.
- B. For each refrigerant circuit, provide:
  - 1. Filter dryer replaceable core type.
  - 2. Liquid line sight glass and moisture indicator.
  - 3. Thermal expansion valve for maximum operating pressure.
  - 4. Insulated suction line.
  - 5. Suction and liquid line service valves and gauge ports.
  - 6. Liquid line solenoid valve.
  - 7. Charging valve.
  - 8. Discharge line check valve.
  - 9. Compressor discharge service valve.
  - 10. Condenser pressure relief valve.
- C. For heat pump units, provide reversing valve, suction line accumulator, discharge muffler, flow control check valve, and solid-state defrost control utilizing thermistors.

## **2.8 CONTROLS**

- A. On unit, mount weatherproof steel control panel, NEMA 250, containing power and control wiring, molded case disconnect switch, factory wired with single point power connection.
  - 1. Factory mount disconnect switch on unit under provisions of Section 26 05 83.
- B. For each compressor, provide across-the-line starter, non-recycling compressor overload, starter relay, and control power transformer or terminal for controls power. Provide manual reset current overload protection. For each condenser fan, provide across-the-line starter with starter relay.
- C. Provide safety controls arranged so any one will shut down machine:
  - 1. High discharge pressure switch (manual reset) for each compressor.
  - 2. Low suction pressure switch (automatic reset) for each compressor.
  - 3. Oil Pressure switch (manual reset).
- D. Provide the following operating controls:
  - 1. Thermostat located in room cycles compressors activates cylinder unloaders.
  - 2. One minute off timer prevents compressor from short cycling.
  - 3. Low ambient thermostat to lock out compressor at low ambient temperatures.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- A. Install in accordance with manufacturer's installation instructions.
  - B. Complete structural, mechanical, and electrical connections in accordance with manufacturer's installation instructions.
  - C. Provide for connection to electrical service. Refer to Section 26 05 83.
  - D. Provide connection to refrigeration piping system and evaporators. Refer to Section 23 23 00. Comply with ASHRAE Std 15.
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**3.2 SYSTEM STARTUP**

- A. Supply initial charge of refrigerant and oil for each refrigeration system. Replace losses of oil or refrigerant prior to end of correction period.
- B. Charge system with refrigerant and test entire system for leaks after completion of installation. Repair leaks, put system into operation, and test equipment performance.

**END OF SECTION 23 62 13**