

SECTION 23 6100
REFRIGERANT COMPRESSORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Reciprocating compressors.
- B. Screw compressors.
- C. Scroll compressors.
- D. Internal piping and accessories.
- E. Controls and control panel.
- F. Electrical power connections.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete bases.
- B. Section 22 0513 - Common Motor Requirements for Plumbing Equipment.
- C. Section 22 0548 - Vibration and Seismic Controls for Plumbing Piping and Equipment.
- D. Section 23 0513 - Common Motor Requirements for HVAC Equipment.
- E. Section 23 0548 - Vibration and Seismic Controls for HVAC Piping and Equipment.
- F. Section 23 0993 - Sequence of Operations for HVAC Controls.
- G. Section 23 2300 - Refrigerant Piping.
- H. Section 26 2717 - Equipment Wiring: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS

- A. AHRI 520 - Performance Rating of Positive Displacement Condensing Units; 2004.
- B. ASHRAE Std 23.1 - Methods of Testing for Rating Positive Displacement Refrigerant Compressors and Condensing Units; 2010.
- C. ASHRAE Std 90.1 - Energy Standard for Buildings Except Low-Rise Residential Buildings; 2013, Including All Addenda.
- D. NEMA ICS 4 - Application Guideline for Terminal Blocks; 2015.
- E. UL 207 - Standard for Refrigerant-Containing Components and Accessories, Nonelectrical; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide rated capacities, weights, accessories, electrical nameplate data and wiring diagrams.
- C. Shop Drawings: Indicate components, assembly, dimensions, weights and loadings, required clearances, and location and size of field connections. Indicate accessories where required for complete system.
- D. Manufacturer's Instructions: Submit manufacturer's complete installation instructions.
- E. Sustainable Design Documentation: Submit manufacturer's product data on refrigerant used, showing compliance with specified requirements.
- F. Operation and Maintenance Data: Include start-up instructions, maintenance instructions, parts lists, controls, and accessories.
- G. Warranty: Submit manufacturers warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

1.05 REGULATORY REQUIREMENTS

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.
- B. Conform to requirements of UL and applicable codes.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide a five year warranty to include coverage for total package.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Trane; _____: www.trane.com.
- B. Vilter; _____: www.vilter.com.
- C. York International Corporation / Johnson Controls; _____: www.york.com.
- D. Carrier Corporation _____ . www.carrier.com.
- E. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MANUFACTURED UNITS

- A. Compressor Units: Hermetic compressor and motor, with cylinder unloaders, crankcase heater, suction and discharge service valves, vibration isolators, and control panel.
- B. Construction and Ratings: In accordance with AHRI 520 and UL 207. Testing shall be 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.

2.03 HERMETIC COMPRESSORS

- A. Manufacturers:
 - 1. Trane; [_____]: www.trane.com.
 - 2. Vilter; _____: www.vilter.com.
 - 3. York International Corporation / Johnson Controls; _____: www.york.com.
 - 4. Carrier Corporation[_____]. www.carrier.com._____.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Reciprocating Compressors:
 - 1. Unit: Hermetically sealed motor-compressor with crankcase heater, suction and discharge service valves, rubber-in-shear isolators, and control panel.
 - 2. Motor: Constant speed 3600 rpm, suction gas cooled with overheating protection.
 - 3. Crankcase Heater: Energize continuously.
 - 4. Controls: Factory wired for crankcase heater, terminal strip for connection to power with electronic protection module incorporating overload and single phase protection, high discharge temperature, and anti-recycling timer.
- C. Scroll Compressors:
 - 1. Unit: Direct drive, hermetic, 3600 RPM, fixed compression, scroll motor-compressor with control panel.
 - 2. Features: Centrifugal oil pump, sump oil heater, oil level sight glass, oil charging valve, two point lubrication for each motor bearing, flooded lubrication for the journal and thrust bearings, check valve on scroll discharge port.
 - 3. Motor: Suction gas cooled, hermetically sealed, squirrel cage induction.
 - 4. Control panel: Factory mounted panel with separate starter and refrigeration control sections:
 - a. Starter section:
 - 1) Non-fused molded case disconnect switch.
 - 2) Single point power connection and grounding lug.

- 3) Control power transformer with fuse.
- 4) Solid state overload relay for each compressor.
- 5) Phase loss/reversal monitor.
- 6) Cycle counter and hour meter per compressor.
- b. Refrigeration section:
 - 1) Anti-recycle timer.
 - 2) Reset relay.
 - 3) Reset switch.
 - 4) Low and high pressure control.
 - 5) Motor winding temperature protection.
- c. Manual reset for compressor overload, high motor temperature, and low and high refrigerant pressure.
5. Automatic Capacity Reduction: Wire steps to terminal strip; refer to Section 23 0993.

2.04 SEMI-HERMETIC COMPRESSORS

- A. Manufacturers:
 1. Trane; [_____]: www.trane.com.
 2. Vilter; _____: www.vilter.com.
 3. York International Corporation / Johnson Controls; _____: www.york.com.
 4. Carrier Corporation[_____]. www.carrier.com._____.
 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Reciprocating Compressors:
 1. Unit: Serviceable hermetic reciprocating motor-compressor with positive displacement oil pump lubrication system, spring loaded heads and replaceable cylinder liners, crankcase heater, suction inlet screen, discharge service valves and control panel.
 2. Automatic Capacity Reduction Equipment: Suction valve unloaders with lifting mechanism solenoid operated. Provide for unloaded compressor start.
 3. Motor: Constant speed 1800 rpm, suction gas cooled with electronic overheating protection in each phase, full voltage starting.
 4. Crankcase Heater: Energize continuously.
 5. Controls:
 - a. Control Panel: Factory wired, steel, containing power and control wiring, molded case disconnect switch, factory wired for single point power connection.
 - b. Starter: Full, with manual reset current overload protection, starter relay, control power transformer, terminal strip for connection to interface equipment.
 - c. Safety Controls: Manually reset, adjustable high and low pressure cutouts, low oil pressure cutout.
 - d. Panel Face: Compressor run light, start-stop switch, circuit breaker, demand limit switch, elapsed time meter, crankcase heater start-stop switch and light.
- C. Screw Compressors:
 1. Unit: Direct drive, semi-hermetic 3600 RPM, fixed compression, rotary screw compressor with control panel.
 2. Features: Differential refrigerant pressure oil pump, oil heater, oil separator and filter, oil charging valve.
 3. Motor: Suction gas cooled, hermetically sealed, squirrel cage induction.
 4. Control panel: Factory mounted NEMA ICS 4 panel with starter and refrigeration controls including:
 - a. Non-fused molded case disconnect switch.
 - b. Single point power connection and grounding lug.
 - c. Anti-recycle timer.
 - d. Solid state overload relay for each compressor.
 - e. Phase loss/reversal monitor.
 - f. Cycle counter and hour meter per compressor.
 - g. Low and high pressure control.

- h. Automatic shutdown compressor overload and low and high refrigerant pressure.
- 5. Automatic Capacity Reduction: Continuously variable slide valve with infinitely variable control to 25 percent of full load.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Provide for connection to electrical service.
 - 1. Refer to Section 26 2717.
- C. Align compressor package on steel or concrete foundations.
 - 1. Refer to Section 03 3000.
- D. Install units on rubber-in-shear vibration isolation.
 - 1. Refer to Section 23 0548.
- E. Provide connection to refrigerant piping. Refer to Section 23 2300.

3.02 SYSTEM STARTUP

- A. Supply service of factory trained representative for a period of ____ days to supervise testing, dehydration and charging of machine, and start-up.
- B. Supply initial charge of refrigerant and oil.

3.03 CLOSEOUT ACTIVITIES

- A. See Section 01 7800 - Closeout Submittals, for closeout submittals.
- B. Train operating personnel in operation and maintenance of units.
- C. Provide the services of the manufacturer's field representative to conduct training.

END OF SECTION 23 6100