Two (2) Water Cooled Scroll Liquid Chillers -Quantech QWC R410a 60Hz

1. GENERAL

1.01. GENERAL REQUIREMENTS

The requirements of this Section shall conform to the general provisions of the Contract, including General and Supplementary Conditions, Conditions of the Contract, and Contract Drawings.

1.02. SCOPE

Provide Microprocessor controlled, multiple scroll compressor, water-cooled, liquid chillers of the scheduled capacities as shown and indicated on the Drawings, including but not limited to:

1. Chiller package
2. Charge of refrigerant and oil
3. Electrical power and control connections
4. Chilled liquid connections
5. Manufacturer start-up

1.03.QUALITY ASSURANCE

A.Products shall be Designed, Tested, Rated and Certified in accordance with, and Installed in compliance with applicable sections of the following Standards and Codes:

1. ANSI/ASHRAE 15 – Safety Code for Mechanical Refrigeration
2. ASHRAE 90.1 – Energy Standard for Buildings Except Low-Rise Residential Buildings
3. ANSI/NFPA 70 – National Electrical Code (N.E.C.)
4. ASME Boiler and Pressure Vessel Code, Section VIII, Division 1
5. ANSI/ASHRAE 34 – Number Designation and Safety Classification of Refrigerants
6. AHRI 550/590 – Water Chilling Packages Using the Vapor Compression Cycle
7. Conform to UL code 1995 for construction of chillers and provide ETL/cETL Listing label
8. Manufactured in facility registered to ISO 9001
9. OSHA – Occupational Safety and Health Act

B.Factory Run Test: Chiller shall be pressure-tested, evacuated and fully charged with refrigerant and oil, and shall be factory operational run tested with water flowing through the vessel.

C.Chiller manufacturer shall have a factory trained and supported service organization that is within a 50 mile radius of the site.

D.Warranty: Manufacturer shall Warrant all equipment and material of its manufacture against defects in workmanship and material for a period of eighteen (18) months from date of shipment or twelve (12) months from date of start-up, whichever occurs first.

E.Additonal Warranty: Provide a Two (2) Year Parts, Labor and Refrigerant warranty on entire unit, or 30 months from shipment, whichever occurs first. Also include a Five (5) year Compressor Parts warranty, or 66 months from shipment, whichever occurs first.

1.04.DELIVERY AND HANDLING

A.Unit shall be delivered to job site fully assembled with all interconnecting refrigerant piping and internal wiring ready for field installation and charged with refrigerant and oil by the Manufacturer.

B.Provide protective covering over vulnerable components for unit protection during shipment. Fit nozzles and open ends with plastic enclosures.

C.Unit shall be stored and handled per Manufacturer's instructions.

D.Unit and its accessories shall be protected from the weather and dirt exposure during shipment.

2. PRODUCTS

2.01.CHILLER MATERIALS AND COMPONENTS

A. General: Install and commission, as shown on the schedules and plans, factory assembled, charged, and tested water cooled scroll compressor chiller(s) as specified herein. Chiller shall be designed, selected, and constructed using a refrigerant with Flammability rating of "1", as defined by ANSI/ASHRAE STANDARD - 34 Number Designation and Safety Classification of Refrigerants. Chiller shall include, but is not limited to: a complete system with two refrigerant circuits, scroll compressors, direct expansion type evaporator, water-cooled condenser, refrigerant, lubrication system, interconnecting wiring, safety and operating controls including capacity controller, control center, motor starting components, and special features as specified herein or required for safe, automatic operation.

2.02.COMPRESSORS

A. Compressors: Shall be hermetic, scroll-type, including:

1.Compliant design for axial and radial sealing.

2.Refrigerant flow through the compressor with 100% suction cooled motor.

3.Large suction side free volume and oil sump to provide liquid handling capability.

4.Compressor crankcase heaters to provide extra liquid migration protection.

5.Annular discharge check valve and reverse vent assembly to provide low-pressure drop, silent shutdown and reverse rotation protection.

6.Initial oil charge.

7.Oil level sight glass.

8.Vibration isolator mouonts for compressors.

9.Brazed-type connections for fully hermetic refrigerant circuits.

10.Microprocessor controlled, Factory installed Across-the-Line type compressor motor starters

2.03. REFRIGERANT CIRCUIT COMPONENTS

Each refrigerant circuit shall include: liquid line shutoff valve with charging port, low side pressure relief device, filter-drier, solenoid valve, discharge service valve, system high pressure relief device, sight glass with moisture indicator, expansion valves, and flexible, closed-cell foam insulated suction line.

2.04.HEAT EXCHANGERS

A.Evaporator:

1.Evaporator shall be a direct expansion shell and tube construction, dual circuit heat exchanger capable of refrigerant working pressure of 450 PSIG (3103 kPa) and liquid side pressure of 150 psig (1034 kPa).

2.Heat exchangers shall be ASME pressure vessel code certified.

3.Installing contractor must include accommodations in the chilled water piping to allow proper drainage and venting of the heat exchanger.

B.Water Cooled Condener

1.Condenser shall be a cleanable thru-tube construction with removable heads and integral subcooling. Heat exchanger shall be capable of a refrigerant side working pressure of 560 PSIG (45 bar) and liquid side pressure of 150 psig (1034 kPa).

2.The condenser shall be equipped with relief valves and be capable of holding the full refrigerant charge for pumpdown

2.05. CONTROLS

A. General: Automatic start, stop, operating, and protection sequences across the range of scheduled conditions and transients.

B. Microprocessor Enclosure: NEMA 1 (IP32) powder painted steel cabinet with hinged, latched, and gasket sealed door.

C. Microprocessor Control Center:

1.Automatic control of compressor start/stop, anti coincidence and anti-recycle timers, automatic pumpdown on shutdown, evaporator pump, and unit alarm contacts. Automatic reset to normal chiller operation after power failure.

2.Software stored in non-volatile memory, with programmed setpoints retained in lithium battery backed real time clock (RTC) memory for minimum 5 years. <<?TEXT3>

3.Programmable Setpoints (within Manufacturer limits): display language; chilled liquid temperature setpoint and range, remote reset temperature range, set daily schedule/holiday for start/ stop, manual override for servicing, number of compressors, low liquid temperature cutout, low suction pressure cutout, high discharge pressure cutout, anti-recycle timer (compressor start cycle time), and anti-coincident timer (delay compressor starts).

4.Display Data: Return and leaving evaporator liquid temperatures, low leaving liquid temperature cutout setting, low ambient temperature cutout setting, English or metric data, suction pressure cutout setting, each system suction pressure, discharge pressure, liquid temperature reset via a 4-20milliamp or 0- 10 VDC input, anti-recycle timer status for each compressor, anti-coincident system start timer condition, compressor run status, no cooling load condition, day, date and time, daily start/ stop times, holiday status, automatic or manual system lead/lag control, lead system definition, compressor starts/operating hours (each), status of hot gas valves (if supplied), run permissive status, number of compressors running, liquid solenoid valve status, load & unload timer status, water pump status.

5.System Safeties: Shall cause individual compressor systems to perform auto shut down; manual reset required after the third trip in 90 minutes. Includes: high discharge pressure, low suction pressure, high pressure switch, and motor protector. Compressor motor protector shall protect against damage due to high input current or thermal overload of windings.

6.Unit Safeties: Shall be automatic reset and cause compressors to shut down if low ambient, low leaving chilled liquid temperature, under voltage, and flow switch operation. Contractor shall provide flow switch installation and wiring per chiller manufacturer requirements.

7.Alarm Contacts: Low ambient, low leaving chilled liquid temperature, low voltage, low battery, and (per compressor circuit): high discharge pressure, and low suction pressure.

8.BAS/EMS Temperature Reset: Chiller to accept 4 to 20mA, 0 to 10 VDC, input to reset the leaving chilled liquid temperature.

D.Pressure Transducers and Readout Capability

1.Discharge Pressure Transducers: Permits unit to sense and display discharge pressure.

2.Suction Pressure Transducers: Permits unit to sense and display suction pressure.

E.Manufacturer shall provide any controls not listed above, necessary for automatic chiller operation. Mechanical Contractor shall provide field control wiring necessary to interface sensors to the chiller control system.

2.06.POWER CONNECTION AND DISTRIBUTION

A.Power Panels:

1.NEMA 1 (IP32), powder painted steel cabinets with hinged, latched, and gasket sealed outer doors. Provide main power connection(s), control power connections, compressor start contactors, current overloads, and factory wiring.

2.Power supply shall enter unit at a single location, be 3 phase of scheduled voltage, and connect to individual terminal blocks per compressor. Separate disconnecting means and/ or external branch circuit protection (by Contractor) required per applicable local or national codes.

B.Exposed compressor, control and fan motor power wiring shall be routed through liquid tight conduit.

C. Power Supply Connection shall be Single Point Circuit Breaker: Single point Terminal Block with Circuit Breaker and lockable external handle (in compliance with Article 440 14 of N.E.C.) can be supplied to isolate power voltage for servicing. Incoming power wiring must comply with the National Electric Code and/or local codes.

2.07. ACCESSORIES AND OPTIONS

Some accessories and options supersede standard product features. Your Johnson Controls representative will be pleased to provide assistance.

A. Evaporator shall be covered with 3/4" (19mm), flexible, closed-cell insulation, thermal conductivity of 0.26k ([BTU/HR-Ft2-°F]/in.) maximum. Water nozzles shall be insulated by Contractor after pipe installation. <<?2.04.A.OP2.1>

B. The water connections shall be fully accessible and grooved to accept victaulic couplings if used (by others).

C. Forty character liquid crystal display, numeric data in English (or Metric) units. Sealed keypad with sections for Setpoints, Display/Print, Entry, Unit Options & clock, and On/Off Switch. Display descriptions and membrane keypad graphics shown in English language.

D. Control Power Transformer: Converts unit power voltage to 120-1-60 (500 VA capacity). Factory mounting includes primary and secondary wiring between the transformer and the control panel.

E.Evaporator Flow Switch (Field-mounted): Vapor proof SPDT, NEMA 3R switch (150 PSIG), -20°F to 250°F.

F.Vibration Isolation (Field-mounted): Elastomeric (Neoprene) Pad Isolators.

G.Final Paint Overspray: Overspray painting of assembled unit with Caribbean blue enamel.

3. EXECUTION

3.01.INSTALLATION

A.General: Rig and Install in full accordance with Manufacturer’s requirements, Project drawings, and Contract documents.

B.Location: Locate chiller as indicated on drawings, including cleaning and service maintenance clearance per Manufacturer instructions. Adjust and level chiller on support structure. If equipment provided exceeds height of scheduled chiller, installing contractor is responsible for additional costs associated with extending the height of parapet or screening walls/enclosures

C.Components: Installing Contractor shall provide and install all auxiliary devices and accessories for fully operational chiller.

D.Electrical: Coordinate electrical requirements and connections for all power feeds with Electrical Contractor.

E.Controls: Coordinate all control requirements and connections with Controls Contractor.

F.Finish: Installing Contractor shall paint damaged and abraded factory finish with touch-up paint matching factory finish.