



A JOHNSON CONTROLS COMPANY

Air Cooled Scroll Chiller Performance Specification

Unit No.	Qty	Model No.	Capacity (Tons)	Volt/Ph/Hz	Refrigerant
07005026-51-01	1	YCAL0041EC46	28.6	460/3/60	R22
Pin No: YCAL0041EC46XDBSDTXAXXRLXXXX35XXXXXXXXXXXXXXXBXX1XXXLXNJXXAXX					

Evaporator Data		Condenser Data		Performance Data	
EWT (°F)	48.2	Ambient Temp. (°F)	95.0	EER / COP	8.1 / 2.4
LWT (°F)	35.0	Altitude (ft.)	0	EER NPLV/COP NPLV	12.2 / 3.6
Design Flow Rate (gpm)	55.5	Min. Ambient Temp. (°F)	0.0	Pin/Field Data	
Pressure Drop (ft.)	6.5	Max. Ambient Temp. (°F)	125.0	Rigging Wt. (lbs.)	2941.7
Fluid	P.G. 40.0%			Operating Wt. (lbs.)	2966.7
Fouling Factor	0.00010				
Water Volume. (gal)	2.7				

Electrical Data				
Circuit	1	2	3	4
Compressor RLA	17.2/17.2	17.2/17.2		
Compressor Start Current (LRA)	125.0/125.0	125.0/125.0		
Fan QTY/FLA (each)	2/4.0	2/4.0		

Single Point				
Min. Circuit Ampacity	87.0			
Min. Non-Fused Disconnect (Amps)	100			
Min. Dual Element Fuse Size (Amps)	100			
Max. Dual Element Fuse Size (Amps)	100			
Min. Circuit Breaker (Amps)	100			
Max. Circuit Breaker (Amps)	100			
Wire Lugs Per Phase*	1			
Wire Range (Lug Size)				

Total Amps	85.0	Inrush (PW) Amps	125.0	Starter Type	Across the Line
Compressor kW	36.8	Total Fan kW	5.6	Total kW	42.4

Notes: RATINGS OUTSIDE THE SCOPE OF ARI STANDARD 550/590.

* Use Copper Conductors only

Installing contractor must include vent and drain accommodations in the chilled water piping near the evaporator.

Load Rating Data				
Load %	Ambient (°F)	Capacity (Tons)	Compressor kW	Unit Efficiency
100.0	95.0	28.6	36.8	8.1 / 2.4
75.0	83.6	23.2	23.5	9.6 / 2.8
50.0	70.5	17.0	13.5	12.5 / 3.7
25.0	55.0	8.9	5.8	14.9 / 4.4

SOUND POWER LEVELS (in Accordance with ASHRAE 70) - Open-Road Central System / II YCAL001TC-16 (Equipped with Ultra Quiet Fans)										
Load %	Ambient (°F)	63	125	250	500	1K	2K	4K	8K	LWA
100.0	95.0	94.0	88.0	88.0	87.0	83.0	79.0	75.0	74.0	88.0
75.0	83.6	94.0	88.0	87.0	86.0	83.0	78.0	75.0	74.0	88.0
50.0	70.5	91.0	85.0	85.0	84.0	80.0	76.0	72.0	71.0	85.0
25.0	55.0	88.0	82.0	82.0	81.0	77.0	73.0	69.0	68.0	82.0

SOUND PRESSURE LEVELS (in dB) - II YCAL001TC-16 (Equipped with Ultra Quiet Fans)										
Load %	Ambient (°F)	63	125	250	500	1K	2K	4K	8K	dBA
100.0	95.0	67.0	61.0	61.0	60.0	56.0	52.0	48.0	47.0	61.0
75.0	83.6	67.0	61.0	60.0	59.0	56.0	51.0	48.0	47.0	61.0
50.0	70.5	64.0	58.0	58.0	57.0	53.0	49.0	45.0	44.0	58.0
25.0	55.0	61.0	55.0	55.0	54.0	50.0	46.0	42.0	41.0	55.0

** Chiller is assumed to be a point source on a reflecting surface (hemispherical radiation)

**AIR COOLED SCROLL LIQUID CHILLER
YORK YCAL 60 HZ GUIDE SPECIFICATIONS**

PART 1 — GENERAL

1.01 SCOPE

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, and Drawings apply to all work herein.
- B. Provide Microprocessor controlled, multiple-scroll compressor, air-cooled, liquid chillers of the scheduled capacities as shown and indicated on the Drawings, including but not limited to:
1. Chiller package
 2. Electrical power and control connections
 3. Chilled water connections
 4. Factory start-up
 5. Charge of refrigerant and

1.02 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 Standard 15 – Safety Code for Mechanical Refrigeration
 2. ASHRAE 90.1 – Energy Efficiency compliance.
 3. ANSI/NFPA Standard 70 – *National Electrical Code (NEC)*.
 4. ASME Boiler and Pressure Vessel Code, Section VIII, Division 1.
 5. ARI Standard 550/590 – Positive Displacement Compressors and Air Cooled Rotary Screw Water-Chilling Packages.
 6. Conform to Intertek Testing Services, formerly ETL, for construction of chillers and provide ETL/cETL Listing label.
 7. Manufactured in facility registered to ISO 9001.
 8. OSHA – Occupational Safety and Health Act
- B. **Factory 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 initial start-up or date of shipment, whichever occurs first.

1.03 Delivery and Handling

- A. Unit shall be delivered to job site fully assembled and charged with refrigerant and oil by the Manufacturer.
- B. Unit shall be stored and handled per Manufacturer's instructions.
- C. Protect the chiller and its accessories from the weather and dirt exposure during shipment.
- D. During shipment, provide protective covering over vulnerable components. Fit nozzles and open ends with plastic enclosures.

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PART 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 air 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 a single refrigerant circuit 35 tons (123kW) and below, and not less than two refrigerant circuits above 35 tons (123kW), scroll compressors, direct expansion type evaporator, air-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.
- B. Cabinet: External structural members shall be constructed of heavy gage, galvanized steel coated with baked on powder paint which, when subjected to ASTM B117, 1000 hour 5% salt spray test, yields minimum ASTM 1854 rating of "6".
- C. Wire Panels (full unit): Heavy gauge, welded wire-mesh, coated to resist corrosion, to protect condenser coils from incidental damage and restrict unauthorized access to internal components. Factory installed.

2.02 COMPRESSORS

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 sightglass.
8. Vibration isolator mounts for compressors.
9. Brazed-type connections for fully hermetic refrigerant circuits.

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, sight glass with moisture indicator, thermostatic expansion valves, and flexible, closed-cell foam insulated suction line and suction pressure transducer.

2.04 HEAT EXCHANGERS

A. Evaporator:

1. Evaporator shall be Brazed Plate, stainless steel construction, single or dual circuit, heat exchangers capable of refrigerant working pressure of 450 psig (3103 kPa) and liquid side pressure of 150 psig (1034 kPa).
2. Evaporator shall be covered with ¾" (19mm), flexible, closed cell insulation, thermal conductivity of 0.26k (BTU/HR-FT²-°F)/in.) maximum.
3. Cooler shall have a factory installed thermostatically controlled heater to protect to -20°F (29°C) ambient in off-cycle.
4. Brazed plate heat exchangers shall be UL (Underwriters Laboratories) listed.
5. Installing contractor must include accommodations in the chilled water piping to allow proper drainage and venting of the heat exchanger. A strainer with a mesh size between .5 and 1.5 mm is recommended upstream of the heat exchanger to prevent clogging.

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B. Air Cooled Condenser:

1. Coils: Internally enhanced, seamless copper tubes, mechanically expanded into aluminum alloy fins with full height collars. Subcooling coil an integral part of condenser. Design working pressure shall be 450 PSIG (31 bar).
2. Low Sound Fans: Shall be dynamically and statically balanced, direct drive, corrosion resistant glass fiber reinforced composite blades molded into a low noise, full-airfoil cross section, providing vertical air discharge and low sound. Each fan in its own compartment to prevent crossflow during fan cycling. Guards of heavy gauge, PVC (polyvinylchloride) coated steel.
3. Fan Motors: High efficiency, direct drive, 6 pole, 3 phase, insulation class "F", current protected, Totally Enclosed Air-Over (TEAO), rigid mounted, with double sealed, permanently lubricated, ball bearings.

2.05 POWER AND ELECTRICAL REQUIREMENTS

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

B. Microprocessor Enclosure: Rain and dust tight NEMA 3R/12 (IP55) powder painted steel cabinet and gasket sealed door.

C. Microprocessor Control Center:

1. Automatic control of compressor start/stop, anti-coincidence and anti-recycle timers, automatic pumpdown shutdown, condenser fans, evaporator pump, evaporator heater, unit alarm contacts, and chiller operation from 0°F to 125°F (-18°C to 52°C) ambient. Automatic reset to normal chiller operation after power failure.
2. Remote water temperature reset via a Pulse Width Modulated (PWM) input signal or up to two steps of demand (load) limiting.
3. Software stored in non-volatile memory, with programmed setpoints retained in lithium battery backed real time clock (RTC) memory for minimum 5 years.
4. Forty character liquid crystal display, descriptions in English (or Spanish, French, Italian, or German), numeric data in English (or Metric) units. Sealed keypad with sections for Setpoints, Display/Print, Entry, Unit Options & clock, and On/Off Switch.
5. 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, low and high ambient cutouts, 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).
6. Display Data: Return and leaving liquid temperatures, low leaving liquid temperature cutout setting, low ambient temperature cutout setting, outdoor air temperature, English or metric data, suction pressure cutout setting, each system suction pressure (optional on YCAL0014-0060 models), discharge pressure (optional), liquid temperature reset via a YORK ISN DDC or Building Automation System (by others) via PWM input as standard or a 4-20milliamp or 0-10 VDC input or contact closure with optional BAS interface, 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, evaporator heater and fan operation, run permissive status, number of compressors running, liquid solenoid valve status, load & unload timer status, water pump status.
7. 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.
8. 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 and wiring per chiller manufacturer requirements.
9. Alarm Contacts: Low ambient, low leaving chilled liquid temperature, low voltage, low battery, and (per

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compressor circuit): high discharge pressure, and low suction pressure.

D. 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 3R/12 (IP55) rain/dust tight, powder painted steel cabinets with hinged, latched, and gasket sealed outer doors. Provide main power connection(s), control power connections, compressor and fan motor 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.

2.07 ACCESSORIES and OPTIONS

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

A. Microprocessor controlled, Factory installed Across the-Line type compressor motor starters as standard.

B. Outdoor Ambient Temperature Control

Low Ambient Control (Factory mounted):

Permits unit operation to 0°F ambient. Standard unit controls to 25°F ambient.

High Ambient Control (Factory Mounted):

Permits unit operation above 115°F ambient.

C. Power Supply Connections:

Single Point Disconnect: Single Non-Fused Disconnect(s) and lockable external handle (in compliance with Article 440-14 of N.E.C.) can be supplied to isolate the unit power voltage for servicing. Separate external fusing must be supplied, by others, in the incoming power wiring, which must comply with the National Electric Code and/or local codes.

D. Pressure Transducers and Readout Capability:

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

F. 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.

F. Condenser Coil Environmental Protection:

Pre-Coated: Epoxy coated aluminum fin stock to guard from corrosive agents and insulate against galvanic potential. For mild seashore or industrial locations.

G. Flow Switch (Field-mounted):

Vapor proof SPDT, NEMA 3R switch, 150 PSIG (10.3 bar), -20°F to 250°F (-28.9°C to 121.1°C).

H. Thermal Storage: Leaving chilled liquid setpoint range for charge cycle from 25° F to 20° F minimum with automatic reset of the leaving brine temperature up to 40° F above the set point.

I. Low Temperature Process Brine: Leaving chilled liquid setpoint range 20° F to 50° F.

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J. Vibration Isolation (Field-mounted): 1. Neoprene Pad Isolators.

K. Low Speed , reduced noise fans

1. Provide the following options as required to meet scheduled sound performance data at all load points.
 - a. Ultra Quiet fans, Low speed, reduced noise (Factory-mounted).

SOUND POWER LEVELS (in Accordance With ARI 370) - Octave Band Center Frequency, Hz										
YCAL0041EC46 (Equipped with Ultra Quiet Fans)										
Load %	Ambient (°F)	63	125	250	500	1K	2K	4K	8K	LWA
100.0	95.0	94.0	88.0	88.0	87.0	83.0	79.0	75.0	74.0	88.0
75.0	83.7	94.0	88.0	87.0	86.0	83.0	78.0	75.0	74.0	88.0
50.0	70.6	91.0	85.0	85.0	84.0	80.0	76.0	72.0	71.0	85.0
25.0	55.0	88.0	82.0	82.0	81.0	77.0	73.0	69.0	68.0	82.0

SOUND PRESSURE LEVELS (in dB at 30.0 ft)										
YCAL0041EC46 (Equipped with Ultra Quiet Fans)										
Load %	Ambient (°F)	63	125	250	500	1K	2K	4K	8K	dBA
100.0	95.0	67.0	61.0	61.0	60.0	56.0	52.0	48.0	47.0	61.0
75.0	83.7	67.0	61.0	60.0	59.0	56.0	51.0	48.0	47.0	61.0
50.0	70.6	64.0	58.0	58.0	57.0	53.0	49.0	45.0	44.0	58.0
25.0	55.0	61.0	55.0	55.0	54.0	50.0	46.0	42.0	41.0	55.0

** Chiller is assumed to be a point source on a reflecting (hemispherical radiation)

PART 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 (Division 16).
- 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.