



# AIR-COOLED SCROLL COMPRESSOR CONDENSING UNITS

STARTUP CHECKLIST

NEW RELEASE

Form 150.63-CL2 (1013)

## EQUIPMENT PRE-STARTUP AND STARTUP CHECKLIST

CUSTOMER: \_\_\_\_\_

JOB NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

LOCATION: \_\_\_\_\_

PHONE: \_\_\_\_\_

CUSTOMER ORDER NO: \_\_\_\_\_

JCI TEL NO: \_\_\_\_\_

JCI ORDER NO: \_\_\_\_\_

JCI CONTRACT NO: \_\_\_\_\_

CHILLER MODEL NO: \_\_\_\_\_

UNIT SERIAL NO: \_\_\_\_\_

The work (as checked below) is in process and will be completed by: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
Month Day Year

The following work must be completed in accordance with installation instructions:

### A. Pre-Startup

Checking the System Prior To Initial Start (No Power)

#### Unit Checks

1. Inspect the unit for shipping or installation damage. ....
2. Ensure that all refrigerant piping has been completed and is correctly designed. ....
3. Visually check for refrigerant piping leaks. ....
4. Open suction line ball valve, discharge line ball valve, and liquid line valve for each system. ....
5. The compressor oil level should be maintained so that an oil level is visible or splashing in the sight glass when fully loaded. At shutdown, the oil level should be between the bottom and middle of the oil equalizing sight glass. ....
6. Verify proper CFM of air across evaporator coil. Verify air flow switch operation. ....
7. Check the control panel to ensure it is free of foreign material (wires, metal chips, etc.). ....
8. Visually inspect wiring (power and control). Wiring MUST meet N.E.C. and local codes. ....
9. Check tightness of power wiring inside the power panel on both sides of the motor contactors and overloads. ....
10. Check for proper size fuses in main and control circuits, and verify overload setting corresponds with RLA and FLA values in electrical tables. ....
11. Ensure 120VAC Control Power to TB1 has 15 amp minimum capacity. ....
12. Be certain all temp sensors are installed correctly. .

13. Verify that TXV bulbs are strapped onto the suction lines at 4 or 8 o'clock positions or suction temperature sensors if EEVs are installed. ....

### B. Compressor Heaters

(Power on – 24 Hours Prior To Start)

Apply 120VAC and verify its value between terminals 5 and 2 of XTBC2. The voltage should be 120VAC plus or minus 10%. Power must be applied 24 hours prior to start-up. Each heater should draw approximately 0.5-1A. ....

### C. Startup

#### Panel Checks

(Power On – Both Unit Switch Off)

1. Apply 3-phase power and verify its value. Voltage imbalance should be no more than 2% of the average voltage. ....
2. Apply 120VAC and verify its value on the terminal block in the Power Panel. Make the measurement between terminals 5 and 2 of XTBC2. The voltage should be 120VAC plus or minus 10%. ....
3. Program/verify the cooling setpoints, program setpoints, and unit options. Record the values in Table 11 (see sections on Setpoints and Unit Keys for programming instruction in Table 16 and 17). ....
4. Put the unit into Service Mode (as described under the Control Service and Troubleshooting section) and cycle each condenser fan to ensure proper rotation. .
5. Prior to this step, turn system 2 OFF (if applicable –refer to Option 2 under “UNIT keys” in section 7 for more information on system switches). Connect a manifold gauge to system 1 suction and discharge service valves. ....

Setpoints Entry List

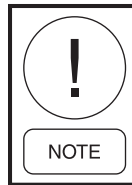
<b>OPTIONS</b>	
Display Language	
SYS 1 Switch	
Sys 2 Switch	
Chilled Liquid	
* Ambient Control	
Local/Remote Mode	
Control Mode	
Display Units	
* Lead/Lag Control	
* Fan Control	
Manual Override	
Current Feedback	
** Soft Start	
** Unit Type	
** Refrigerant Type	
** Expansion Valve Type	
<b>COOLING SETPOINTS</b>	
Cooling Setpoint	
Range	
EMS-PWM Max. Setpoint	
<b>PROGRAM</b>	
Discharge Pressure Cutout	
Suct. Pressure Cutout	
Low Amb. Temp. Cutout	
Anti-Recycle Time	
Fan Control On Pressure	
Fan Differential Off Pressure	
Total # of Compressors	
* Number of Fans/System	
* Unit/Sys Voltage	
Unit ID	
* Sys 1 Superheat Setpoint	
* Sys 2 Superheat Setpoint	

\*Not on All Models  
 \*\*Viewable Only

Place the Unit Switch in the control panel to the "ON" position. As each compressor cycles ON, ensure that the discharge pressure rises and the suction pressure decreases. If this does not occur, the compressor being tested is operating in the reverse direction and must be corrected. After verifying proper compressor rotation, turn the Unit Switch to "OFF."



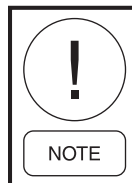
*The discharge air or suction pressure setpoint may need to be temporarily lowered to ensure all compressors cycle "ON."*



*This unit uses scroll compressors which can only operate in one direction. Failure to observe this will lead to compressor failure.*

- Turn system 1 "off" and system 2 "on" (refer to Option 2 under "UNIT keys" in Section 7 for more information on system switches).

Place the Unit Switch in the control panel to the "ON" position. As each compressor cycles "on", ensure that the discharge pressure rises and the suction pressure decreases. If this does not occur, the compressor being tested is operating in the reverse direction and must be corrected. After verifying proper compressor rotation, turn the Unit Switch to "OFF".



*The chilled liquid setpoint may need to be temporarily lowered to ensure all compressors cycle "ON".*

**D. CHECKING SUPERHEAT AND SUBCOOLING**

The subcooling temperature of each system can be calculated by recording the temperature of the liquid line at the outlet of the condenser and subtracting it from the liquid line saturation temperature at the liquid stop valve (liquid line saturation temp. is converted from a temperature/pressure chart).

Example:

Liquid line pressure =  
 202 PSIG converted to temp. 102°F  
 minus liquid line temp. - 84°F  
 Subcooling = 18°F

The subcooling should be adjusted to 18°F at design conditions.

1. Record the liquid line pressure and its corresponding temperature, liquid line temperature and subcooling below:

	SYS 1	SYS 2	
Liq Line Press =	_____	_____	PSIG
Saturated Temp =	_____	_____	°F
Liq Line Temp =	_____	_____	°F
Subcooling =	_____	_____	°F

After the subcooling is verified, the suction superheat should be checked. The superheat should be checked only after steady state operation of the condensing unit has been established, the leaving water temperature has been pulled down to the required leaving water temperature, and the unit is running in a fully loaded condition. Correct superheat setting for a system is 10°F to 15°F (5.56°C to 8.33°C) 18" (46 cm) from the cooler.

**Superheat should typically be set for no less than 10°F with only a single compressor running on a circuit.** The superheat is calculated as the difference between the actual temperature of the returned refrigerant gas in the suction line entering the compressor and the temperature corresponding to the suction pressure as shown in a standard pressure/temperature chart.

Example:

Suction Temp = 46°F  
 minus Suction Press  
 60 PSIG converted to Temp - 34°F  
 Superheat = 12°F

When adjusting the expansion valve (TXV only), the adjusting screw should be turned not more than one turn at a time, allowing sufficient time (approximately 15 minutes) between adjustments for the system and the thermal expansion valve to respond and stabilize.

Assure that superheat is set at a minimum of 10°F (5.56°C) with a single compressor running on each circuit.

2. Record the suction temperature, suction pressure, suction saturation temperature, and superheat of each system below:

	SYS 1	SYS 2	
Suction Temp =	_____	_____	°F
Suction Pressure =	_____	_____	PSIG
Saturation Temp =	_____	_____	°F
Superheat =	_____	_____	°F

**E. LEAK CHECKING**

Leak check compressors, fittings, and piping to ensure no leaks.

If the unit is functioning satisfactorily during the initial operating period, no safeties trip and the compressors cycle to control water temperature to setpoint, the chiller is ready to be placed into operation.

**Owner's operating personnel:**

Name: \_\_\_\_\_

Phone Number: \_\_\_\_\_

Name: \_\_\_\_\_

Phone Number: \_\_\_\_\_

Name: \_\_\_\_\_

Phone Number: \_\_\_\_\_

