QUANTECH

MODEL QTC3

EQUIPMENT PRE-STARTUP AND STARTUP CHECKLIST

CUSTOMER: _____ JOB NAME: _____

ADDRESS: _____ LOCATION: _____

PHONE: _____ CUSTOMER ORDER NO: _____

TEL NO: _____ ORDER NO: _____ 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

Unit Checks (No Power)
Turn off the power to the unit and complete the following checks.

1. Inspect the unit for shipping or installation damage ☐
2. Ensure that all piping has been completed ☐
3. Visually check for refrigerant piping leaks ☐
4. If available, open the suction line ball valve, discharge line ball valve, and liquid line valve for each system ☐
5. At shutdown, check that the oil level is between the bottom and middle of the oil equalizing sight glass ☐
6. Are water pumps on?
   a. Check and adjust the water pump flow rate and pressure drop across the cooler. Refer to *Operating Limitations, Section 5 - Technical Data (Form QTC3-NM1)*. ☐
   b. Is the flow switch in place, wired correctly, and operational? ☐
   c. Are the chilled water pumps operational? ☐
   d. Is the water system filled with water? ☐
   e. Is all air purged from the water system? ☐

   NOTE: Any air found in the water system must be purged before the chiller can start up. Excessive flow may cause catastrophic damage to the heat exchanger (evaporator).
7. Check that the control panel is free of foreign material, for example, wires and metal chips ☐
8. Check that all power is wired to the chiller and meets the following NEC and local codes ☐
   a. High voltage ☐
   b. Low voltage ☐
   c. Check the tightness of the power wiring inside the power panel on both sides of the motor contactors and overloads. ☐
   d. Check that the BAS control is wired correctly and is operational ☐
9. Check for correct size fuses in main and control circuits, and verify that the overload setting corresponds with RLA and FLA values in electrical tables (refer to *Form QTC3-NM1*) ☐
10. Ensure that the 120 VAC (110 VAC for 50 Hz units) Control Power to TB1 has 15 A minimum capacity ☐
11. Check that all water temperature sensors are inserted completely into their respective wells and are coated with heat conductive compound ☐
12. Check that the evaporator TXV bulbs are strapped onto the suction lines at 4 o'clock or 8 o'clock positions or suction temperature sensors if EEVs are installed ☐
13. Check that all sides of the unit have the recommended amount of space for air ventilation. Refer to *Section 4 - Installation (Form QTC3-NM1)* ☐
14. Check that the cabinet edge clears the insulation of the cable at the power entry to avoid slicing the cable ☐

B. COMPRESSOR HEATER
(Power On - 24 Hours Before Start)

Apply 120 VAC and verify its value between terminals 5 and 2 of XTBC2. The voltage should be 120 VAC (110 VAC for 50 Hz units) plus or minus 10% ☐

NOTE: Power must be applied 24 hours before start-up. Each heater should draw approximately 0.5 A to 1 A.

C. STARTUP

Panel Checks (Power On - Both Unit Switch Off)

1. Apply three-phase power and verify its value. Voltage imbalance should be no more than 2% of the average voltage ..... ☐
2. Apply 120 VAC (110 VAC for 50 Hz units) 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 120 VAC plus or minus 10% ..... ☐
3. Program or verify the Cooling Setpoints, Program Setpoints, and Unit Options. Record the values in the Setpoints Entry List table ..... ☐
4. Place the unit into Service Mode and cycle each condenser fan to ensure correct rotation ..... ☐

If the chiller is equipped with VSD fans, the cycling condenser fan cannot be used to confirm phase sequence. Use a phase checker or temporarily bypass the VSD before starting a compressor.

5. Turn System 2 off and leave System 1 running. Refer to *Section 8 – Unit Operations (Form QTC3-NM1)*, *Unit Keys, Option 2* for more information on System Switches..... ☐
6. Connect a manifold gauge to system 1 suction and discharge service valves..... ☐
7. Place the Unit Switch in the control panel to the ON position. ..... ☐

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

   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.
8. Verify proper compressor rotation and then turn the Unit Switch to OFF ..... ☐

   NOTE: This unit uses scroll compressors, which can only operate in one direction. Failure to observe this will lead to compressor failure.
9. Turn System 1 OFF and System 2 ON (two system units only). Refer to *Section 8 – Unit Operations (Form QTC3-NM1), Unit Keys* for more information ... ☐
10. Place the Unit Switch in the control panel to the ON position. ..... ☐

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

    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.
11. Ensure that the Data Logging feature has been enabled ..... ☐
12. Verify correct compressor rotation and then turn the Unit Switch to OFF..... ☐

SETPOINTS ENTRY LIST

UNIT OPTIONS	
Display Language	✓
System 1 Switch	✓
System 2 Switch	✓
Chilled Liquid	✓
Ambient Control*	✓
Local/Remote Mode	✓
Control Mode	✓
Display Units	✓
Lead/Lag Control*	✓
Fan Control*	✓
Manual Override	✓
Current Feedback	✓
Power Fail Restart	✓
Soft Start**	✓
Unit Type**	✓
Refrigerant Type**	✓
Flash Card Update	✓
Remote Temperature Reset	✓
External Evaporator Pump	✓
YORK Hydro Kit Pump	✓
Pump Selection	✓
Data Log to Flashcard Enabled	✓
Expansion Valve Type**	✓
COOLING SETPOINTS	
Cooling Setpoint	✓
Range	✓
EMS-PWM Max. Setpoint	✓
PROGRAM SETPOINTS	
Discharge Pressure Cutout	✓
Suction Pressure Cutout	✓
Low Ambient Temp. Cutout	✓
Leaving Liquid Temp. Cutout	✓
Anti-Recycle Time	✓
Fan Control ON Pressure	✓
Fan Differential OFF Pressure	✓
Total # of Compressors	✓
Number of Fans/System*	✓
Unit/System Voltage*	✓
Remote Unit ID	✓

*Not on All Models **Viewable Only

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 temperature is converted from a temperature/pressure chart).

Example:

Liquid line pressure = 325 psig converted to temp.	101°F
minus liquid line temp.	- 83°F
Subcooling =	18°F

The subcooling should be adjusted to 18 °F (-8 °C) at design conditions.

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

	SYS 1	SYS 2	
Liquid line pressure =	_____	_____	psig
Saturated temperature =	_____	_____	°F
Liquid line temperature =	_____	_____	°F
Subcooling =	_____	_____	°F

After the subcooling is verified, check the suction superheat. Check the superheat only after steady state operation of the chiller 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. The correct superheat setting for a system is 10°F to 15°F (-12°C to -9°C) 18 in. (46 cm) from the heat exchanger.

Set the superheat for no less than 10°F (-12°C) 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 temperature =	46°F
minus suction pressure 105 psig converted to temp.	- 34°F
Superheat =	12°F

When adjusting the expansion valve (TXV only), turn the adjusting screw no more than one turn at a time. Allow sufficient time, approximately 15 minutes, between adjustments for the system and the thermal expansion valve to respond and stabilize.

Ensure that superheat is set at a minimum of 10°F (-12.2°C) with a single compressor running on each circuit.

2. Record the suction temperature, suction pressure, 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 with no safety trip and the compressors cycle to control water temperature to the setpoint, the chiller is considered ready to be placed into operation.

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