UNITED COOLAIR

START-UP PROCEDURES

WATER-COOLED UNIT

MEMBER AHRI AIR-CONDITIONING, HEATING, & REFRIGERATION INSTITUTE

we make life better™

Water-Cooled Unit

Pre Startup Checklist

Installing contractor should verify the following items.		
1. Is there any visible shipping damage?	◯ Yes	◯ No
2. Is the unit level?	◯ Yes	◯ No
3. Is proper vibration isolation provided in accordance with IOM?	◯ Yes	◯ No
4. Are the unit clearances adequate for service and operation?	◯ Yes	◯ No
5. Do all panel and/or access doors open freely and are the handles operational?	◯ Yes	◯ No
6. Have all shipping braces been removed?	◯ Yes	◯ No
7. If iDDP/DDP fans are installed, have shipping blocks been removed and spring isolators been adjusted?	◯ Yes	◯ No
8. Have all electrical connections been tested for tightness?	◯ Yes	◯ No
9. Does the electrical service correspond to the unit nameplate?	◯ Yes	◯ No
10. On 208/230V units, has the transformer tap been adjusted to the voltage being applied?	◯ Yes	◯ No
11. Has overcurrent protection (breakers/fuses) been installed to match the unit nameplate requirement?	◯ Yes	◯ No
12. Do all fans rotate freely?	◯ Yes	◯ No
13. Does the field water piping to the unit appear to be correct size and pressure rating per design parameters?	◯ Yes	◯ No
14. Does the inlet (supply) water piping of the main water loop run to the inlet water connection of the unit?	◯ Yes	◯ No
15. Does the outlet (return) water piping of the main water loop run to the outlet water connection of the unit?	◯ Yes	◯ No
16. Is all copper tubing isolated so that it does not rub?	◯ Yes	◯ No
17. Are air filters installed with proper orientation?	◯ Yes	◯ No
18. Have condensate drain and p-trap been connected?	◯ Yes	◯ No
19. Is the condensate trap primed with water?	◯ Yes	◯ No
20. Is the TXV sensing bulb in the correct location?	◯ Yes	◯ No
21. Does the TXV sensing bulb have proper thermal contact and is properly insulated?	◯ Yes	◯ No
22. Are all ship loose items installed and wired properly?	◯ Yes	◯ No

Start-Up Procedures (R-410a Systems)

1. Start up must be performed by a qualified HVAC Technician.
2. Make certain that all power is disconnected at the main power circuit breaker or service disconnect before starting any of this procedure.
3. Check all electrical screw terminals and wiring lugs for tightness internal to the equipment. Components may have loosened due to vibration during transit or handling. Verify that the main power block lug connections made in the field are tight and secure.
4. Confirm that the voltage rating of the equipment data tag coincides with the power that will be delivered to the unit.
5. Verify that the circuit protection for the unit satisfies Local and National Codes according to the unit data tag Minimum Circuit Ampacity (MCA) and Maximum Fuse Size (MFS).
6. Leak check the refrigerant system. While the unit was leak checked at the factory, leaks can develop during transit and / or handling.
7. Confirm that the unit condensate has been adequately trapped and taken to a suitable point for disposal.
8. Verify that the filters are in place, clean and usable.
9. Apply power to the unit. Switch the circuit breaker or field supplied electrical service disconnect switch to the on position.

NOTE: If the unit has crankcase heaters and the surrounding ambient is 70˚ F or lower, let the compressors sit for approximately 24 hours before proceeding.

10. Record the voltage at the unit terminals.
11. On the wall controller, navigate to the system enables menu. Set the compressor to OFF. Set the system ON/OFF menu to the ON position.
12. Verify that the evaporator blower(s) are rotating in the correct direction (three phase units only).

NOTE: If the evaporator blower motor runs backwards, shut off all power to the unit. Switch any two of the incoming power leads at the unit main power terminal block. The unit has been wired and phased properly at the factory. DO NOT change any factory wiring to correct for a phase problem.

NOTE: Before conducting the following start up sections connect a refrigerant gauge set to the unit Schrader connections. Install temperature sensors or probes to record the appropriate refrigerant line temperatures.

13. Set the wall controller to a temperature set point approximately 5˚ lower than the entering air temperature. This should energize the compressor(s).

NOTE: Dependent upon the options and/or the thermostat, there may be a delay for the compressor(s) operation.

14. While waiting for the compressor(s) to stabilize, record the External Static Pressure (ESP) for the evaporator blower.

NOTE: Make sure all the unit access panels are in place when taking these readings.

WARNING

HEAT EXCHANGER FREEZE RISK: Heat Exchanger will fail if operated at or near the freezing point of water/glycol mixture.

The following precautions must be taken:

- At startup, fluid side must be started first.
- At shutdown, refrigerant side must be shut down first
- Fluid side outlet must have temperature monitoring and emergency shutdown equipment in case temperature approaches too close to the freezing point.

15. Verify that the incoming water / fluid pressure does not exceed the rating for the water / fluid control valves.
16. Verify that the unit piping and heat exchangers will not be subjected to freezing conditions.
17. Confirm that no joints are leaking in the cooling fluid circuit(s).
18. Document the type of fluid being used as the cooling medium. If glycol is being used, make sure the mixture is adequate for any low ambient conditions that may be possible.

Continued on next page

Start-Up Procedures (R-410a Systems) Continued:

19. If possible, record the fluid flow rate (GPM).

- **a.** Make sure the flow rate is within the proper limits:
  - **i.** Minimum 2.5 GPM / Ton
  - **ii.** Maximum 3.5 GPM / Ton

20. Record the entering and leaving fluid temperatures.

- **b.** Make sure the leaving fluid temperature is within the proper limits:
  - **i.** Minimum 60˚ F
  - **ii.** Maximum 115˚ F

21. Record the pressure drop of the water / fluid across the unit.

22. Verify that all valves on each fluid circuit function properly.

23. Record the suction line pressure and the suction line temperature for each circuit near the compressor.

24. Using an appropriate pressure / temperature chart for R-410a refrigerant, look up and record the saturation temperature corresponding to the suction pressure.

25. Calculate and record the suction superheat for each circuit by taking the difference between the suction line temperature and the saturation temperature corresponding to the suction pressure.

26. Record the liquid line pressure and the liquid line temperature for each circuit near the condenser heat exchanger outlet.

27. Using an appropriate pressure / temperature chart for R-410a refrigerant, look up and record the saturation temperature corresponding to the liquid line pressure.

28. Calculate and record the liquid sub-cooling for each circuit by taking the difference between the liquid line temperature and the saturation temperature corresponding to the liquid line pressure.

29. Record the Amps for the evaporator blower motor and each compressor. If the system is single phase, use L1 and L2 only.

- **a.** Make sure the pressures on each compressor circuit are within the proper limits:
  - **i.** 290 – 550 Discharge
  - **ii.** 100 – 140 psig Suction
- **b.** Compressor Amperage is below the RLA Amps listed on the unit data tag.
  - **i.** The maximum compressor operating current (amps) at start up depends a lot on the system loading. The lower the load, the less the current. The higher the load, the higher the current.
- **c.** The blower motor FLA value should never be exceeded.
  - **i.** If the FLA value is exceeded, shut the unit off and check the duct design, sheave turns open or make sure there is no blockage / obstruction in the duct or filters.

30. Document any additional information deemed appropriate for the specific application or installation.

31. Shut the system down and remove all test instruments and test sensors.

32. Leave the system in the operating mode as appropriate for the customer and the application.

Optional Heating Start Up:

33. If the system has any optional heat, set the room thermostat approximately 5° higher than the actual room temperature. Set the thermostat operating mode to the HEAT position.

34. Dependent upon the heating source the heating valve or switch / contactor should be activated.

35. After several minutes of operation, record the return air temperature and the supply air temperature.

36. Based on the heating source, document the appropriate temperatures, pressures, voltage or amp values.

UNITED COOLAIR

Water-Cooled Unit

Start-Up Procedures

Please complete the form and include contact, start-up date and all requested information.

Water-Cooled Unit

Start-Up Procedures (R-410a Systems)

Job Name: _____ **Date:** _____

Address: _____

City: _____ **State:** _____ **ZIP** _____

Unit Model No.: _____

Unit Serial No.: _____

Screw Lugs & Terminals OK? ..... Yes ☐ No ☐
Describe any loose connections and action(s) taken:

Power Supply Correct Voltage and Phase? ..... Yes ☐ No ☐
If not in agreement with unit data tag contact the Distributor.

Is the Circuit Protection the correct type and does it meet the unit data tag requirements? ..... Yes ☐ No ☐

If not correct describe what action(s) have been taken to correct:

Unit controller wiring verified? ..... Yes ☐ No ☐

"C" Terminal hooked up if necessary? ..... Yes ☐ No ☐

Unit leak check OK? ..... Yes ☐ No ☐
If leak was located describe where and how repaired:

Condensate trapped & run to a suitable disposal point? ..... Yes ☐ No ☐

Is the condensate trap primed? ..... Yes ☐ No ☐

Air Filters are in place, clean & usable? ..... Yes ☐ No ☐

Three Phase Measured Voltage ..... L1-L2 _____ L2-L3 _____ L1-L3 _____

Evaporator Blower Motor Rotation OK? ..... Yes ☐ No ☐
If three phase power and rotation is not correct describe action(s) taken to correct:

Supply Air External Static Pressure ..... (ESP): In. WG _____

Verify that incoming fluid pressure does not exceed ..... Yes ☐ No ☐
rating for the fluid control valves.

Are unit piping and heat exchangers subject to freezing conditions?. ..... Yes ☐ No ☐

If yes, is corrective action being taken? ..... Yes ☐ No ☐
Please Describe:

UNITED COOLAIR

Water-Cooled Unit

Start-Up Procedures (R-410a Systems)

Are there cooling fluid leaks? ..... Circuit 1: Yes ☐ No ☐ Circuit 2: Yes ☐ No ☐

Cooling Fluid Type
If Glycol what percentage of mix:. _____ Good to a temperature of _____

Water / Fluid flow rate..... GPM _____

Entering Water Temperature (EFT): °F _____ Leaving Water Temperature (LFT): °F _____

Water / Fluid Pressure Drop across unit:..... PSI _____

Verify that all valves on each circuit are functioning properly. .....Yes ☐ No ☐

Verify water/fluid discharge pressure set point. .....Yes ☐ No ☐

Water mesh screen installed and mesh size. .....Yes ☐ No ☐ Mesh Size _____

Cooling Mode

System Air Temperatures .....Return: °F _____ Supply: °F_____

	Compressor 1	Compressor 2	Compressor 3	Compressor 4
Suction Pressure:	psi _____	psi _____	psi _____	psi _____
Suction Line Temperature:	°F_____	°F_____	°F_____	°F_____
Saturation Temperature:	°F_____	°F_____	°F_____	°F_____
Suction Superheat:	° _____	° _____	° _____	° _____
Liquid Line Pressure:	psi _____	psi _____	psi _____	psi _____
Saturation Temperature:	°F_____	°F_____	°F_____	°F_____
Liquid Line Temperature:	°F_____	°F_____	°F_____	°F_____
Sub-cooling:	° _____	° _____	° _____	° _____

Electrical

Evap. 1 Motor Amps .....L1 _____ L2 _____ L3 _____

Evap. 2 Motor Amps .....L1 _____ L2 _____ L3 _____

Compressor 1 Amps .....L1 _____ L2 _____ L3 _____

Compressor 2 Amps .....L1 _____ L2 _____ L3 _____

Heating Mode (Optional Hot Water Coil, Steam Coil or Electric Heat)

System Air Temperatures .....Return: °F _____ Supply: °F_____

Entering Water Temperature:.....°F_____ Leaving Water Temperature:.....°F _____
Steam Pressure: psi_____

Electric Heat kW: _____ Voltage:_____

Electric Heat Amps: Stage1..... L1 _____ L2 _____ L3 _____

Stage2..... L1 _____ L2 _____ L3 _____

Misc.

_____

Technician (print name):_____ Phone: _____

Company: _____

Signature: _____ Date: _____

Maintenance Log

This log must be kept with the unit. It is the responsibility of the owner and/or maintenance/service contractor to document any service, repair or adjustments. United CoolAir Service and Warranty Departments are available to advise and provide phone help for proper operation and replacement parts. The responsibility for proper startup, maintenance and servicing of the equipment falls to the owner and qualified licensed HVAC technician.

Entry Date	Action Taken	Name/Tel.

Note: **United CoolAir Service: Phone (717) 843-4311**
Please have the serial number of the unit. Service team members are available Monday through Friday from 7:00 AM to 5:00 PM Eastern Standard Time.

After hours tech support available Monday — Friday till 7:00 PM Eastern Standard Time.
Saturday 8:00 AM — 1:00 PM
Call: (717) 676-6765