# Air-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 access doors open freely and are the handles operational? | ☐ Yes | ☐ No |
| **6.** Have all shipping braces been removed? | ☐ Yes | ☐ No |
| **7.** Have all electrical connections been tested for tightness? | ☐ Yes | ☐ No |
| **8.** Does the electrical service correspond to the unit nameplate? | ☐ Yes | ☐ No |
| **9.** On 208/230V units, has transformer tap been checked? | ☐ Yes | ☐ No |
| **10.** Has overcurrent protection been installed to match the unit nameplate requirement? | ☐ Yes | ☐ No |
| **11.** Do all fans rotate freely? | ☐ Yes | ☐ No |
| **12.** Does the field water piping to the unit appear to be correct per design parameters? | ☐ Yes | ☐ No |
| **13.** Is all copper tubing isolated so that it does not rub? | ☐ Yes | ☐ No |
| **14.** Are air filters installed with proper orientation? | ☐ Yes | ☐ No |
| **15.** Have condensate drain and p-trap been connected? | ☐ Yes | ☐ No |
| **16.** Is the TXV sensing bulb in the correct location? | ☐ Yes | ☐ No |
| **17.** Does the TXV sensing bulb have proper thermal contact and is properly insulated? | ☐ Yes | ☐ No |
| **18.** Confirm ship loose items required for proper installation | ☐ Yes | ☐ No |

# Start-Up Procedures (R-410a Systems)

Some of the numbered items below are referenced on the Start Up Form that needs to be completed.

This procedure has been created based on utilizing a standard wall thermostat. If another controller is being utilized some of the steps below may need to be altered.

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. Locate the unit thermostat and check all electrical terminations against the unit electrical diagram and for the unit thermostat.

**NOTE: If using a digital thermostat with a "C" (Common) terminal, this terminal MUST be terminated to the "C" terminal in the unit. Failure to do so will result in the thermostat shorting out and being destroyed.**

7. Leak check the refrigerant system. While the unit was leak checked at the factory, leaks can develop during transit and / or handling.
8. Confirm that the unit condensate has been adequately trapped and taken to a suitable point for disposal.
9. Verify that the filters are in place, clean and usable.
10. Switch the unit thermostat to the "OFF" position.
11. 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 the flooded condenser option the scroll compressors will have crankcase heaters. If the outdoor ambient is 70˚ F or lower, let the compressors sit for approximately 24 hours before proceeding.**

12. Record the voltage at the unit terminals.
13. If possible with the thermostat provided, switch the evaporator blower to the RUN position. Verify that the evaporator blower is activated.
14. Verify that the evaporator blower is 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 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 suitable refrigerant gauge set to the unit Schrader connections. Install temperature sensors to record the appropriate refrigerant line temperatures. Service gauge access ports have been provided in the cabinet corner posts so that the gauge line hoses can be run outside the cabinet with the access panels installed.**

15. Set the thermostat switch to a temperature set point approximately 5˚ lower than the space temperature. Set the thermostat fan switch to the AUTO position. Set the thermostat operating mode to the COOL position. This should energize the compressor(s) and both blowers.

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

16. Verify that the condenser blower rotation is correct.
17. While waiting for the compressor(s) to stabilize, record the External Static Pressure (ESP) for both the evaporator and condenser blowers.

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

18. Record the return air temperature to the evaporator coil along with the supply air temperature. (The unit should have operated for at least 15 minutes before taking these readings).
19. Record the outdoor ambient entering the condenser coil along with the discharge air temperature of the condensing section.
20. Record the suction line pressure and the suction line temperature for each circuit near the compressor.

***Continued on next page***

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

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

**22.** 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.

**23.** Record the liquid line pressure and the liquid line temperature for each circuit near the condenser coil outlet.

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

**25.** 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.

**26.** Record the Amps for the evaporator blower motor, each compressor and the condenser blower motor. 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 values 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.

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

**28.** Shut the system down and remove all test instruments and test sensors.

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

### Optional Heating Start Up:

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

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

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

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

# Air-Cooled Unit

## Start-Up Procedures

Complete the form by listing your name, company name, phone and fax number. Sign and date the form and provide a copy as required to all interested parties.

**Job Name:** _____ **Date:** _____
**Address:** _____
**City:** _____ **State:** _____ **ZIP** _____
**Country:** _____
**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 checked OK? ..... Yes ☐ No ☐
If leak was located describe where and how repaired:

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

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

Single Phase Unit
Measured Voltage ..... L1-L2 _____ L1-GND _____ L2-GND _____

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:

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

***Continued on Next Page***

UNITED CoolAir
All-Indoor Solutions

# Air-Cooled Unit

***Start-Up Procedures*** (R-410a Systems)

Evaporator External Static Pressure .....(ESP): _____ In. WG _____

Condenser External Static Pressure .....(ESP): _____ In. WG _____

## Cooling Mode

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

Condenser Coil.....Outdoor Ambient: °F _____ Condenser Discharge: °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. Motor Amps .....L1 _____ L2 _____ L3 _____

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

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

Cond. Motor Amps.....L1 _____ L2 _____ L3 _____

## Heating Mode (Optional)

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

Entering Water Temperature:.....Return: °F _____Fluid Type:_____

Leaving Water Temperature: .....Return: °F _____

Steam Pressure:.....psi _____

**Electric:**

kW: _____ Voltage: _____

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

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

Misc.

Technician (print name): _____

Company: _____

Phone: _____ Fax: _____

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. |
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**NOTE: United CoolAir service contact information: 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 — 4:00 PM**
**Call: (717) 843-4311 and Dial extension 165**