

Service Step by Step Trouble-Shooting Check-List

WARNING: Only Data Aire trained technician or experience technicians should be working on Data Aire Equipment. Protect yourself at all times and work safe.

Date: _____
Dates at the job site: From: _____ to _____
Job#: _____ Serial#: _____ Model#: _____

Service Company: _____
Name: _____ Phone#: _____

Problem Reported:

Does Problem occur on other units? _____

MAINTENACE AGREEMENT TERMS

- Is there a periodic maintenance contract? _____.
- How often is the periodic maintenance performed on the units? _____
- On what date was the last maintenance performed: _____

Recommendations / Additional Info: _____

PIPING INSTALLATION (Maximum equivalent line is 200 feet) *Contact Data Aire Engineering Department before installing equipment on pipe runs exceeding 200 feet.*

- Are the refrigerant pipe lines pitched in the direction of refrigerant flow? _____. **A minimum of 1/2" slope for every ten feet of horizontal line is required for proper oil return.**
- Are there traps on the vertical riser? _____. **Traps must be installed on the refrigerant hot gas line at the bottom of the riser and every 15-20 feet in height. An inverted trap needs to be installed at the top of the refrigerant hot gas line and at the condenser and should equal the height of the condenser coil.**
- Total height of vertical riser? _____
- Number of traps? _____
- Total horizontal run? _____
- Number of elbows? _____
- Total pipe run in equivalent feet? _____
- Is the liquid line insulated? _____. **Heat gain across the liquid line may cause the refrigerant to flash in the liquid line upstream of the metering device**
- Is there a discharge check valve installed on the discharge line? _____. **The check valve is required to prevent the unit from having a liquid migration on the high side of the system on cold days during the off-cycle. Note: New units should have factory-installed check valves in the unit.**
- Was dry nitrogen flowing through the system during brazing? _____. **Purging is required to eliminate carbon deposit build-up on the inside of the joints. Carbon could contaminate the refrigerant and restrict the metering device.**
- Was silver/phosphorus/copper alloy with 5 to 15% silver used for brazing? _____

Service Step by Step Trouble-Shooting Check-List

Recommendations / Additional Info: _____

REFRIGERANT LINE SET (Maximum equivalent line is 200 feet) *Contact Data Aire Engineering Department before installing equipment on pipe runs exceeding 200 feet.*

- Pipe size for the liquid line? _____
- Pipe size for the discharge line? _____
- Pipe size for the suction line? _____

Recommendations / Additional Info: _____

PRESSURE TEST AND LEAK TEST

- During leak testing, were the valves in the system open? _____. *All valves need to be open to pressure test the full system.*
- Did the system hold 150 PSIG over 24 hours? _____
- Where in the system are you reading vacuum level (microns)? _____. *Read Micron levels as far away from the vacuum pump as possible, in the refrigerant system if possible.*
- During vacuum, were the valves in the system open? _____. *All valves need to be open to eliminate non-contaminants in the refrigeration system.*
- After the triple evacuation, did the system hold 500 microns for at least half an hour? _____ *If not, inspect for leaks and repeat vacuum procedure.*

Recommendations / Additional Info: _____

ELECTRICAL

- Is there any visual signs of arcing? _____
- Were copper conductors used? _____
- What is the total length of the copper conductors supplied to the unit? _____
- Size of gauge? _____
- How is the unit grounded? Is it grounded per applicable code regulations and guidelines? _____
- Are all the factory and field supplied electrical connections tight? _____.
- Does the electrical supply corresponds with rating on the unit's nameplate? _____
- What is the test voltage: A-B: _____ A-C: _____ B-C: _____
- Was the crankcase heater energized 12hrs before start-up? _____

Recommendations / Additional Info: _____

Service Step by Step Trouble-Shooting Check-List

AIR FLOW

- Are the filters installed and clean? _____
- Is the ductwork connected and sealed to prevent air loss? _____. **If the ducts are warmer than the air traveling through them there will be a transfer of heat. If there is any duct leakage latent heat (moisture) and sensible heat will be added as well.**
- Are all raised floor tiles and discharge grills (perforated panels) installed and adjusted for optimum air movement? _____
- Height of raised floor? _____
- Do the units share supply or return ducts? _____. If yes, are mechanical back draft dampers or AirSeal being utilized? _____.
- When the unit is in standby or in the off cycle, is the return air warmer than the saturated evaporator coil temp? _____. **If the return air is colder than the evaporator coil temp (saturation) than the superheated refrigerant can condense in the evaporator coil. This can then flow down and accumulate into the compressor, wash out the oil, and result in damaging the compressor because of a flooded start.**

Recommendations / Additional Info: _____

INSIDE UNIT

- Are the units in the conditioned space? _____
- What are the clearances around the unit?
 - Front _____ inches
 - Back _____ inches
 - Right side _____ inches
 - Left side _____ inches
- Does the unit have vibration isolators? _____

Recommendations / Additional Info: _____

CONDENSER

- Is the condenser free of obstruction? _____
- What is the clearance above and around the condenser? _____
- What is the ambient temperature? _____°F
- Does it have a fan speed control? _____
- Does it have a flooded system? _____

Recommendations / Additional Info: _____

CONDENSER COIL

- Is the condenser coil clean? _____
- Is there any visual oil stains? _____

Service Step by Step Trouble-Shooting Check-List

Recommendations / Additional Info: _____

CONDENSER FAN MOTOR (WITH POWER OFF)

- Do the motor blades spin freely?
- Is there any damages on the blades?
- Motor HP: _____ F.L.A.: _____ Voltage: _____

Recommendations / Additional Info: _____

CONDENSER FAN MOTOR (WITH POWER ON)

- Is there any vibration?
- Are there any abnormal noises?
- Entering Air: _____ °F
- Leaving Air: _____ °F
- Microfarads readings on the capacitor?
- Running Amps: _____
- Rotation: _____ Clockwise _____ Counter Clockwise
- Distribution of Air: _____ Up _____ down
- Fan Starting Pressure: _____ R.P.M.: _____ Voltage: _____

Recommendations / Additional Info: _____

WATER COOLED CONDENSER

- What is the design water temperature for the coil? _____ Actual water loop temp? _____
- What is the design water flow for the coil? _____ Actual water flow? _____
- What is the design water pressure drop across the coil? _____ Actual water pressure drop? _____
- What is the design water temperature drop across the coil? _____ Actual water temp drop across the coil? _____

Recommendations / Additional Info: _____

INSIDE BLOWER MOTOR (WITH POWER OFF)

- Are the drive and driven blower pulleys aligned? _____
- Are the set screws on the pulleys tight? _____
- Are the walls of the pulley smooth and free of debris? _____
- Is motor base secure? _____
- Is the belt tension good? _____
- Record pulley and belt sizes. _____
- Are the blower wheel clean and clear of debris? _____
- Does the blower wheel spin freely? _____

Service Step by Step Trouble-Shooting Check-List

INSIDE BLOWER MOTOR (WITH POWER OFF)

- Are the wheel bearings lubricated? _____
- Is there any damages on the blades? _____
- Motor KW: _____
- Name Plate Voltage: _____
- Name Plate F.L.A: _____

Recommendations / Additional Info: _____

STANDING PRESSURES (WITH POWER Off TO THE COMPRESSOR)

- Discharge Pressure: _____ PSI
- Suction Pressure: _____ PSI
- Suction Saturated temp: _____ °F
- Return air Temp: _____ °F *Return air temp needs to be higher than evaporator temp (Saturation) to prevent the superheated gas to condense in the evaporator and prevent from compressor failure.*
- Liquid line pressure: _____ PSI
- Is the crankcase heater on? _____. *(Note: A crankcase heater's sole purpose is to prevent refrigerant migration and mixing with crankcase oil when the unit is off, and to prevent condensation of refrigerant in the crankcase of a compressor. The crankcase heater keeps refrigerant at a temperature higher than the coldest part of the system).*

Recommendations / Additional Info: _____

INSIDE BLOWER MOTOR (WITH POWER ON)

- Is there any vibration? _____
- Are there any abnormal noises? _____
- Operating Amps: L1 _____ L2 _____ L3 _____
- Discharge air temperature? _____.
- Return air temperature? _____. *Return air temp needs to be above design room temp before starting compressor. If the return air temp is not above design room temp please turn unit off and create a heat load to prevent compressor failure. (Note: Heat load is required to get heated air across the evaporator coil to boil liquid refrigerant into a superheated gas and prevent liquid from entering the compressor).*
- Return relative humidity? _____.
- Delta-T across the evaporator? _____.
- What is the total external static pressure? _____. *Total external static pressure should not go over .9 wg*
- How has the airflow been adjusted to achieve design airflow? _____. *Airflow needs to be adjusted before starting up the compressor. If air flow is not adjusted it can result in damaging the compressor.*

Recommendations / Additional Info: _____

Service Step by Step Trouble-Shooting Check-List

COMPRESSOR - (Note- When checking operating conditions allow the unit to run for 10 minutes before recording any readings. This will allow the refrigeration to stabilize, the coil to get wet, and the room conditions to stabilize).

Ambient Temperature: _____ °F
Refrigerant Type: _____ # of pounds/oz. _____
Compressor oil Level (sight-glass) before start-up _____ %
Compressor oil condition during the first 7 minutes of start-up _____ Clear _____ Foam
Discharge pressure leaving the compressor: _____ PSI. = Discharge Saturation Temp? _____ °F
Discharge line Temp leaving the compressor: _____ °F
Liquid Line Pressure before it enters the metering device _____ PSIG = Liquid Saturation Temp? _____ °F
Liquid Line Temperature before it enters the metering device _____ °F Sub-cooling _____ °F
Suction Pressure: _____ PSIG, Suction line temperature: _____ °F Superheat: _____ °F
Delta-T across liquid line filter dryer _____ °F
Hot Gas Bypass? Y/N _____.
What's the superheat on the Hot Gas Bypass adjusted too? _____ °F
Crankcase Temperature _____ °F
Return Air Temperature _____ °F Return air temp needs to be above design set point. If the return air temp is lower than design room temp or the same as the discharge air temp please turn unit off and create a heat load to prevent compressor failure. If you cannot get a heat load consult with engineering. A heater and hot gas by pass might be needed. (Note: Heat load is required to get heated air across the evaporator coil to boil liquid refrigerant into a superheated gas and prevent liquid from entering the compressor).
Supply Air Temperature _____ °F
Delta-T across evaporator coil _____ °F If you have low delta-T across the evaporator than it is not absorbing any heat and liquid could be flooding the compressor.
Return relative humidity? _____. If the return temp is at 68°F or below and the relative humidity at 40% or below, compressor damage can result.
Return Air Humidity _____ %
VFD Operating Amps: L1 _____ L2 _____ L3 _____
Fixed Speed Compressor Operating Amps: L1 _____ L2 _____ L3 _____
Discharge pressure entering the condenser? _____ PSI = Discharge Saturation Temp? _____ °F
Discharge line Temp entering the condenser? _____ °F
Liquid pressure leaving the condenser? _____ PSI = Liquid Saturation Temp? _____ °F
Liquid line temp leaving the condenser? _____ °F
What is the liquid line temperature drop on the liquid line leaving the condenser to the entering of the metering device? _____ (Answer only if the condenser sits below the evaporator coil) A good way to check for flash gas is to compare the temperature of the liquid line exiting the condenser and the liquid line temperature entering the metering device. A huge temperature drop can indicate the presence of flash gas.
What is the saturated temperature drop on the discharge line from the inside unit to the condenser unit? _____ Design pipe size for a pressure drop equivalent to a 2°F saturation temperature drop.
What is the saturated temperature drop on the liquid line from the inside unit to the condenser unit? _____ Design pipe size for a pressure drop equivalent to a 2°F saturation temperature drop.
Are there any vibrations?
Is there any abnormal noises?
Compressor Unloader: Yes or No _____ Discharge Pressure (unloaded) _____ PSIG
Suction Temperature (unloaded) _____ °F Amps (unloaded) L1 ____ L2 ____ L3 ____
Liquid Line Sight glass Color? _____
What color is the EEV sight glass? _____

Service Step by Step Trouble-Shooting Check-List

Receiver sight glass refrigerant level _____%

Was oil added to the system? _____. If yes, how many ounces? _____ Oz.

Does the crankcase heater turn on when the compressor shuts off? _____. *(Note: A crankcase heater's sole purpose is to prevent refrigerant migration and mixing with crankcase oil when the unit is off, and to prevent condensation of refrigerant in the crankcase of a compressor. The crankcase heater keeps refrigerant at a temperature higher than the coldest part of the system).*

Run Cycle (How long does the unit stay on vs. off cycle) _____

Recommendations / Additional Info: _____

EVAPORATOR COIL

- Is the evaporator coil clean? _____
- Is there any visual oil stains? _____
- Is the drain pan clean? _____
- Does the water on the drain pan drain freely? _____. *If the water does not drain quickly enough, it can cause high humidity issues and water damage.*

Recommendations / Additional Info: _____

EEV VALVE SETTINGS

Regulations: A

- Superheat Set point: _____°F
- Valve position at start-up: _____%
- Valve opened in stand-by: _____
- Valve position in stand-by: _____%
- Start-up delay after defrost: _____Min
- Pre-position Time _____s
- PID Proport. Gain _____
- PID Integral Time _____s
- PID Derivative Time = _____s
- Low SH Protect Threshold: _____°F
- Low SH Protect integral time: _____s
- MOP protection threshold: _____°F
- MOP protection integral time: _____°F
- Liquid level Percentage: _____%

Regulations: B

- Superheat Set point: _____°F
- Valve position at start-up: _____%
- Valve opened in stand-by: _____
- Valve position in stand-by: _____%
- Start-up delay after defrost: _____Min
- Pre-position Time _____s
- PID Proport. Gain _____
- PID Integral Time _____s
- PID Derivative Time = _____s
- Low SH Protect Threshold: _____°F
- Low SH Protect integral time: _____s
- MOP protection threshold: _____°F
- MOP protection integral time: _____°F
- Liquid level Percentage: _____%

Recommendations / Additional Info: _____

Service Step by Step Trouble-Shooting Check-List

TXV

- Is the sensing bulb located on the horizontal suction line leaving the evaporator coil? _____
- Is the sensing bulb secured to the suction line? _____
- Does the sensing bulb sit in the correct angel of the suction line? _____
- Does the super heat change to a change in sensing bulb temperature? _____
- Is the sensing bulb insulated? _____
- Can the superheat be set by adjusting the stem? _____

Recommendations / Additional Info: _____

CHILLED WATER:

- Water in Temp: _____
- Water out Temp: _____
- Delta T: _____

Recommendations / Additional Info: _____

HUMIDIFIER

- Is the humidifier cylinder clean?
- Does the humidifier operate?
- Steam Generator: Yes or No Operating Amps: L1 _____ L2 _____ L3 _____

Recommendations / Additional Info: _____

RE-HEAT COILS

- Type: Electric _____ Hot Water _____ Hot Gas _____ Steam _____
- (For Electric Reheat) Operating Amps: L1 _____ L2 _____ L3 _____
- Do the re-heat coils operate? _____

Recommendations / Additional Info: _____

MENU B SETPOINT:

- Temp Set point: _____ °F
- Temp Dead Band: _____ °F
- Stage to Stage: _____ °F

Recommendations / Additional Info: _____

Service Step by Step Trouble-Shooting Check-List

EC FAN SETTINGS

- CW Mode: _____
- CW Speed: _____
- DX Mode: _____
- DX Speed: _____

Recommendations / Additional Info: _____

ALARM HISTORY

Alarm Description	Date	Time
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Recommendations / Additional Info: _____

ZONE MASTER

Is the zone master control being utilized? _____
How many units are being controlled by the zone master? _____
Number of units that are ON at the same time? _____
When are they schedule to rotate (Schedule)? _____

Recommendations / Additional Info: _____