Large Ceiling Systems

Air, Water and Glycol Cooled DX and Chilled Water
6, 8, 10 and 13 ton

Installation, Operation & Maintenance Manual

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dataaire
Precise by Design

Congratulations!

You have selected a Data Aire precision control system, one of the finest available in the market today. Proper installation, operation and maintenance of this equipment will ensure years of optimal performance.

This manual is intended to assist trained service personnel by providing necessary guidelines for this particular equipment. Service to Data Aire units should be done by qualified individuals with an adequate background in areas such as HVAC, electrical, plumbing and electronics, as applicable.

Service performed by unauthorized or unqualified technicians may void manufacturers' warranties and could result in property damage and/or personal injury.

Special care should be given to those areas where these symbols appear.

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1.0 INSTALLATION

There is no intent on the part of Data Aire, Inc. to define local codes or statutes which may supersede common trade practices. The manufacturer assumes no responsibility for their interpretation. Consult local building codes and the National Electrical Code for special installation requirements.

1.1 Room Considerations

Precision air conditioning equipment is designed to control spaces within close tolerances of temperature and humidity. However, the room must be built with a proper vapor barrier. A film of polyethylene is often used on walls and ceilings. Walls and floors must also be painted with a vapor-seal paint. All doors to the controlled space should be equipped with weather seals to prevent the infiltration of non-neutral conditioned air from external spaces. Failure to provide a vapor barrier can compromise the ability to control space conditions.

Introduction of outside air into the space should be minimized. Outside air in excess of 5% of the total circulated air volume can have a significant effect on the overall space conditions and result in poor space control. All outside air that is introduced should be conditioned to the humidity and temperature parameters of the computer room air conditioner (CRAC) unit set points to maintain proper room conditions and to prevent the CRAC units from running excessively to maintain the room's conditions.

1.2 Inspection

This Data Aire unit has been factory run-tested and has gone through a comprehensive inspection prior to its packaging and shipment to ensure that it arrives in excellent condition. However, shipping damage can occur and a visual inspection of the outer crating immediately upon delivery should be performed.

Note any external damage or other transportation damage on the freight carrier's forms. Inspect the unit itself for internal damage. A claim should be filed with the shipping company if the equipment is damaged or incomplete.

Loose items such as remote control panels, disconnect switch handles, spare belts and spare filters are packed inside the unit. Refer to the manila shipping tag located on the unit panel for details.

Freight damage claims are the responsibility of the purchaser. Action to recover losses should be filed immediately. Please notify factory personnel of any claims.

1.3 Locating the Unit

The unit is intended for above the ceiling installation and is typically suspended from structural members in the building above the ceiling. Add at least a 50% safety factor to the weight of the unit to determine the necessary strength of the supporting structural members or follow local code.

Appropriate service access above the ceiling is required around all service and electrical access panels. There must be unobstructed clearance below the unit allowing ladder access to enable routine maintenance and service. Consult local building codes and National Electric Code for special installation requirements.

Note: There are many available unit configurations for the LCS. Be sure to identify the unit type and style before installing. For instance there may be split condenser/condensing sections requiring separate or shared power.

Note to Installing Contractor: Condensation formation and frequent humidifier flushing (when humidifier is installed) are normal functions of this equipment. Drain connections must be made to ensure proper water removal. Unit will require drain connections for condensate removal and water connections possibly for humidifier (when installed) makeup water, condenser water, chilled water and/or hot water. Installation of units above equipment that could sustain water damage should be avoided.

1.3.1 Horizontal Airflow Units

All LCS units have horizontal airflow configuration with a 29.5" tall evaporator section. Duct collars are factory provided for the supply and return air.

Four threaded support rods must be securely attached to the building structure. Two field provided support channels connect to the pairs of threaded support rod. (See detail on drawing 536-900-001 shown on page 27.) Raise the evaporator section with an appropriate lifting device. Attach washers, nuts and jam nuts to each threaded rod. Tighten the nuts so the weight is supported evenly by the four rods and the unit is level.

1.3.2 Indoor Condensers and Condensing Units

Although most split air cooled systems have outdoor condensers or condensing units, indoor condensers and condensing units are occasionally used. These 29.5" tall sections are to be mounted in the same manner as the evaporator sections using four threaded rods. Air cooled condensers or condensing units have factory provided duct collars on the supply and intake air openings as appropriate.

Typical installations have the condenser or condensing section physically near the evaporator, especially since most have some shared electrical line power. The mounting of these sections is independent of the evaporator mounting. The same service and maintenance clearance requirements apply to these units as well.

1.4 Paperwork

Each Data Aire unit ships with a start-up sheet that must be completed during installation. Also included in the paperwork is a warranty/information packet that provides important wiring diagrams, specific component literature, warranty registration card and other valuable paperwork, including a copy of this Installation/Operation and Maintenance manual.

A manila (yellow) tag is attached to the outside panel to indicate articles that may have been packaged and shipped loose within the unit cabinet. Typically this would be a condensate pump and other loose components that are not factory mounted.

It is the responsibility of the installing contractor to return the start-up sheet and warranty registration card to Data Aire for proper activation of the unit warranty. Failure to do so may cause delays in warranty related services and in some cases void the warranty.

1.5 Storage

Your Data Aire equipment comes ready for immediate installation. In some instances it may be necessary to store the equipment for a period of time. If you must store the equipment it should be done in a dry area, out of the weather, in non-freezing temperatures, protected from damage by other equipment in storage or transportation equipment, never stacked, and avoid frequent relocation.

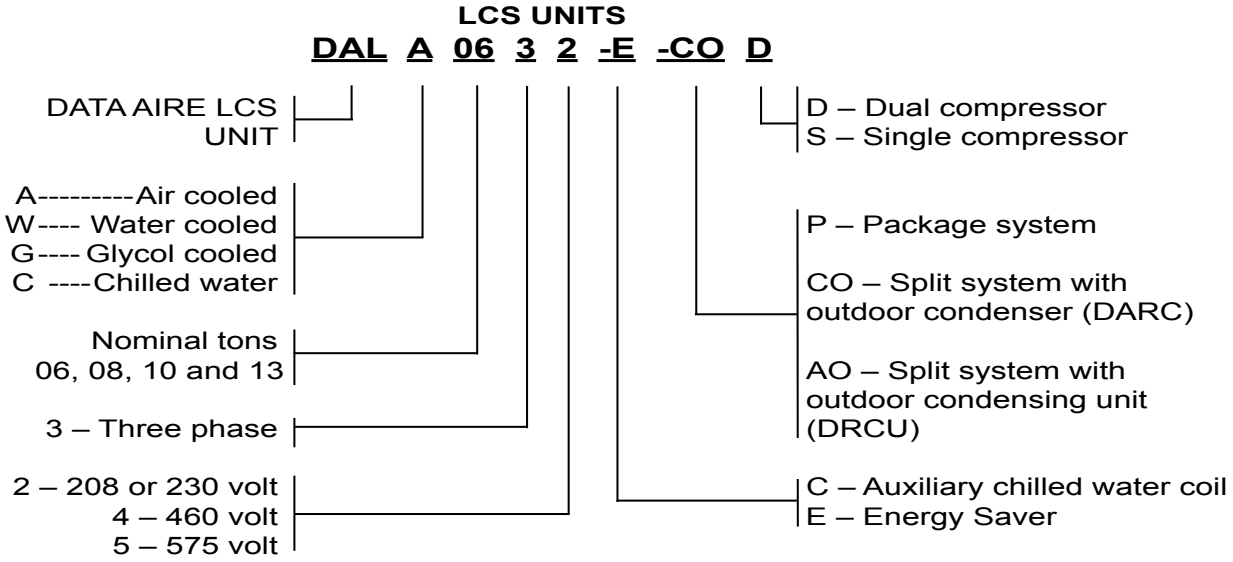
> CAUTION: Complete system drain-down cannot be assured for this product. Freezing system fluid can rupture piping.

If equipment is stored for longer than 30 days special precautions must be taken to avoid coil damage. All coils should be charged and sealed with a low pressure (1-3 PSIG) inert gas, such as nitrogen. This prevents contaminates from entering the coils; then when the seal is broken at installation, the rush of escaping gas verifies the coil is still leak free. If coils are not charged and sealed condensation mixes with air pollutants forming a weak acid and over time can cause pin hole leaks to develop in the coil tubes.

When equipment is installed after storage caution should be taken to inspect and replace, if required, rubber hoses and belts. All moving parts, such as blowers and motors, should be hand tested to ensure that they are free and clear prior to start-up. Finally, verify that all lubrication is fresh and full.

It is the responsibility of the installing contractor to return the start-up sheet and warranty registration card to Data Aire for proper activation of the unit warranty. Failure to do so may cause delays and in some cases void the warranty.

1.6 Model Identification



LCS units are not available in air cooled packaged configuration.

CONDENSER – Condenser coil only, no compressor_
CONDENSING UNIT – Condenser coil and compressor

The order write-up should have the condenser or condensing unit model number.
Refer to applicable condenser or condensing model number identification.

Example: DATA AIRE LCS unit, air cooled, 6 ton, 3Ø – 230 volt, split system with outdoor condenser and dual compressors –
Evaporator model: **DALA 0632 CO D** Condenser model: **DARC 0632**

2.0 PIPING

2.1 Split Air Cooled Unit Piping

Refer to the attached line sizing chart on page 31 for a guideline for sizing refrigerant lines. The ultimate responsibility for line size selection is that of the installing contractor or design engineer. Data Aire does not assume this responsibility. The chart covers distances up to 200 equivalent feet.

For installations greater than this distance, consult ASHRAE or similar references. Standard piping practice must be used to ensure proper oil return and efficient operation. The interconnecting lines to the remote air cooled condenser or condensing unit must be installed by a qualified refrigeration mechanic.

2.1.1 Discharge Lines

Discharge lines, also called hot gas lines, should be trapped at the top (inverted) and bottom, as well as every 15 to 20 feet (4.6 to 6.1 m) of vertical rise. Discharge line check valves are required on all installations, especially those where there are long pipe runs or cold climate.

For air-cooled units built after 3/14/2017, the discharge check valves are already installed inside the evaporator section and do not need to be installed external to the unit. For units built before this date, the check valves must be field supplied and installed externally to the evaporator section. If there is doubt as to whether or not the check valve is already installed in the unit, look for it on the hot gas line close to the exit point of the unit (see example picture below). The externally installed check valve should be placed from six (6) to ten (10) feet (1.8 to 3.1 m) from the compressor.

Note: Picture is only intended to show an example of a common check valve installation. It may not represent your specific unit, check valve size, location or orientation.

The check valve will prevent flow from the condenser to the compressor during the “off” cycle.

The discharge, suction and liquid lines need to be refrigerant grade copper and in accordance with local code. All refrigeration piping should be installed with high temperature brazed joints. When brazing, a supply of nitrogen gas needs to be fed through the refrigerant lines. Be sure to open the other end of the refrigerant line to allow the nitrogen to bleed off and not pressurize the piping. Prevailing good refrigeration practices should be employed for piping support, leak testing, dehydration and charging of the refrigerant circuits. During the installation the lines should be capped off and filled with dry nitrogen at the end of each day’s work or until the system is completed and sealed.

Data Aire recommends a silver/phosphorus/copper alloy with 5 to 15% silver be used to braze the refrigerant line sets to the indoor and outdoor units. Nitrogen needs to be flowing through the lines to eliminate carbon deposit buildup on the inside of the joints. Carbon could contaminate the refrigerant and restrict the metering device.
Piping must be supported within 18” of the inlet and outlet connections. The inlet connection is located on the top header of all units. The discharge outlet is located at the bottom of the header.

Discharge line pressure drop should not exceed 6 PSI for R-407C and 9 PSI for R-410A. Recommended gas velocity for proper oil return is 1,000 FPM. Slope horizontal lines downward in the direction of refrigerant flow, 1/2” for every ten feet of line length. Discharge lines do not require insulation but due to the high temperatures of the refrigerant inside the line, the pipes may be insulated to protect against burns to individuals near or around the lines.

2.1.2 Liquid Lines

Liquid line size is determined by pressure drop and velocity. The liquid line pressure drop for R-407C should not exceed 5 PSI or 9 PSI for R-410A. The recommended velocity should be between 200 and 300 FPM. To avoid excessive liquid line pressure drop, the air cooled condenser should be located above or at the same level as the evaporator. Condenser installation more than 15 feet below the evaporator is not recommended. Insulation of liquid lines is not required but can be useful in preventing excessive sub-cooling or flashing on long exposed pipe runs.

2.1.3 Suction Lines

Some applications call for the compressor(s) to be mounted as part of the condenser, more commonly referred to as a condensing unit. Such cases require field piping of liquid and suction lines. Suction lines are trapped similarly to discharge lines. Common practice for suction line selection and installation should be followed. Suction lines should always be insulated.

2.1.4 Connection Sizes

Air Cooled Units

Model	Circuiting	Hot Gas	Liquid	Suction
DALA 06	Single circuit	5/8”	5/8”	1 1/8”
DALA 08	Single circuit	3/4”	5/8”	1 3/8”
DALA 10	Single circuit	3/4”	5/8”	1 3/8”
DALA 13	Single circuit	7/8”	7/8”	1 3/8”
DALA 06	Dual circuit	1/2”	1/2”	7/8”
DALA 08	Dual circuit	5/8”	1/2”	7/8”
DALA 10	Dual circuit	5/8”	1/2”	1 1/8”
DALA 13	Dual circuit	5/8”	5/8”	1 1/8”

Field connections at the indoor evaporator and remote condenser or condensing unit will not necessarily be the same as the field pipe size required. In some cases these sizes will vary significantly.

Water/Glycol Cooled Units

Model	Condenser Water In	Condenser Water Out
DALW/G 06	1 5/8”	1 5/8”
DALW/G 08	1 5/8”	1 5/8”
DALW/G 10	1 5/8”	1 5/8”
DALW/G 13	1 5/8”	1 5/8”

Chilled Water Units with 3-Way Valves

Model	Chilled Water In	Valve CV
DALC 06	1 1/8”	14.0
DALC 08	1 5/8”	20.0
DALC 10	1 5/8”	20.0
DALC 13	1 5/8”	20.0

2-Way Chilled Water Units

Model	Chilled Water In	Valve CV
DALC 06	1 1/8”	14.0
DALC 08	1 5/8”	20.0
DALC 10	1 5/8”	20.0
DALC 13	1 5/8”	20.0

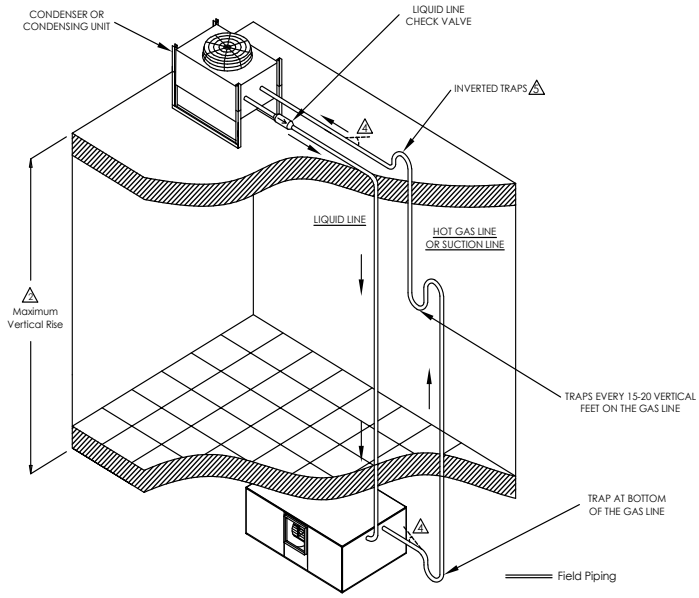
Fluid Coolers

Fluid Cooler Model	Water IN and OUT Connections, OD	Fluid Cooler Model	Water IN and OUT Connections, OD
DAFC 06	1 5/8”	DAFC 17	2 1/8”
DAFC 07	1 5/8”	DAFC 24	2 1/8”
DAFC 09	1 5/8”	DAFC 28	2 1/8”
DAFC 11	2 1/8”	DAFC 30	2 5/8”

2.1.5 Field Piping, Remote Condenser/ Condensing Unit Above Evaporator

NOTES:

1. THIS IS THE RECOMMENDED PIPING. ALL PIPING TO BE PER LOCAL AND/OR STATE CODE.
2. CONDENSER TO BE NO MORE THAN 60 FEET ABOVE EVAPORATOR.
3. FOR UNITS BUILT AFTER APRIL 2017, THE CHECK VALVES ARE INCLUDED INTERNALLY IN THE EVAPORATOR SECTION.
4. SLOPE HORIZONTAL LINES DOWNWARD IN THE DIRECTION OF THE REFRIGERANT FLOW, ½" FOR EVERY 10 FEET OF LINE LENGTH.
5. INVERTED TRAP TO EXTEND 8" ABOVE THE BOTTOM OF THE CONDENSER COIL.



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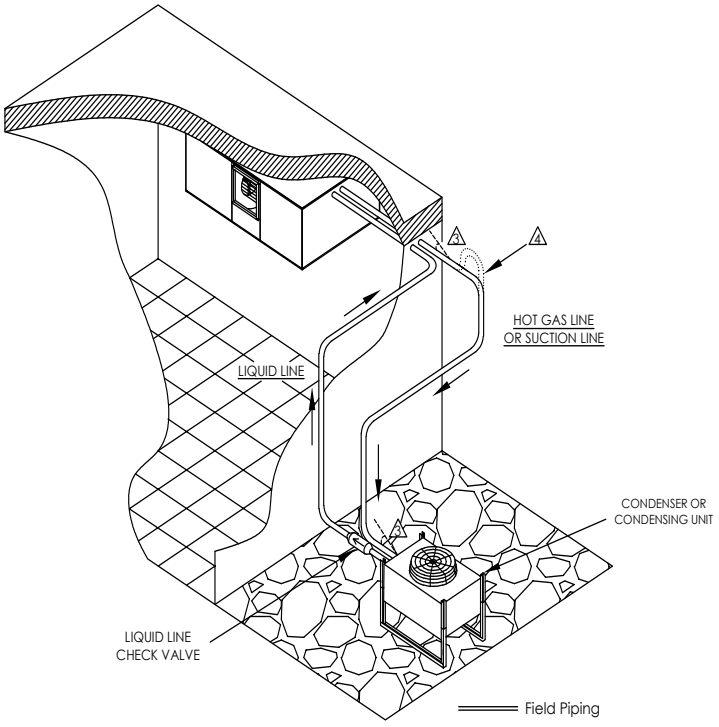
2.1.6 Field Piping, Remote Condenser/ Condensing Unit Below Evaporator

NOTES:

1. THIS IS THE RECOMMENDED PIPING. ALL PIPING TO BE PER LOCAL AND/OR STATE CODE.
2. CONDENSER TO BE NO MORE THAN 15 FEET BELOW EVAPORATOR.
3. SLOPE HORIZONTAL LINES DOWNWARD IN THE DIRECTION OF THE REFRIGERANT FLOW, ½" FOR EVERY 10 FEET OF LINE LENGTH.
4. INVERTED TRAP NEEDED ON SUCTION LINE WHEN COMPRESSOR IS OUTDOORS ONLY.



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2.2 Water/Glycol Cooled Unit Piping

The required field installed condenser water pipe sizes may or may not be the same as the connection sizes at the evaporator or fluid cooler. (Refer to 2.1.4 for connection sizing.) This will depend on the length of pipe and the calculated pressure drop of peripheral components.

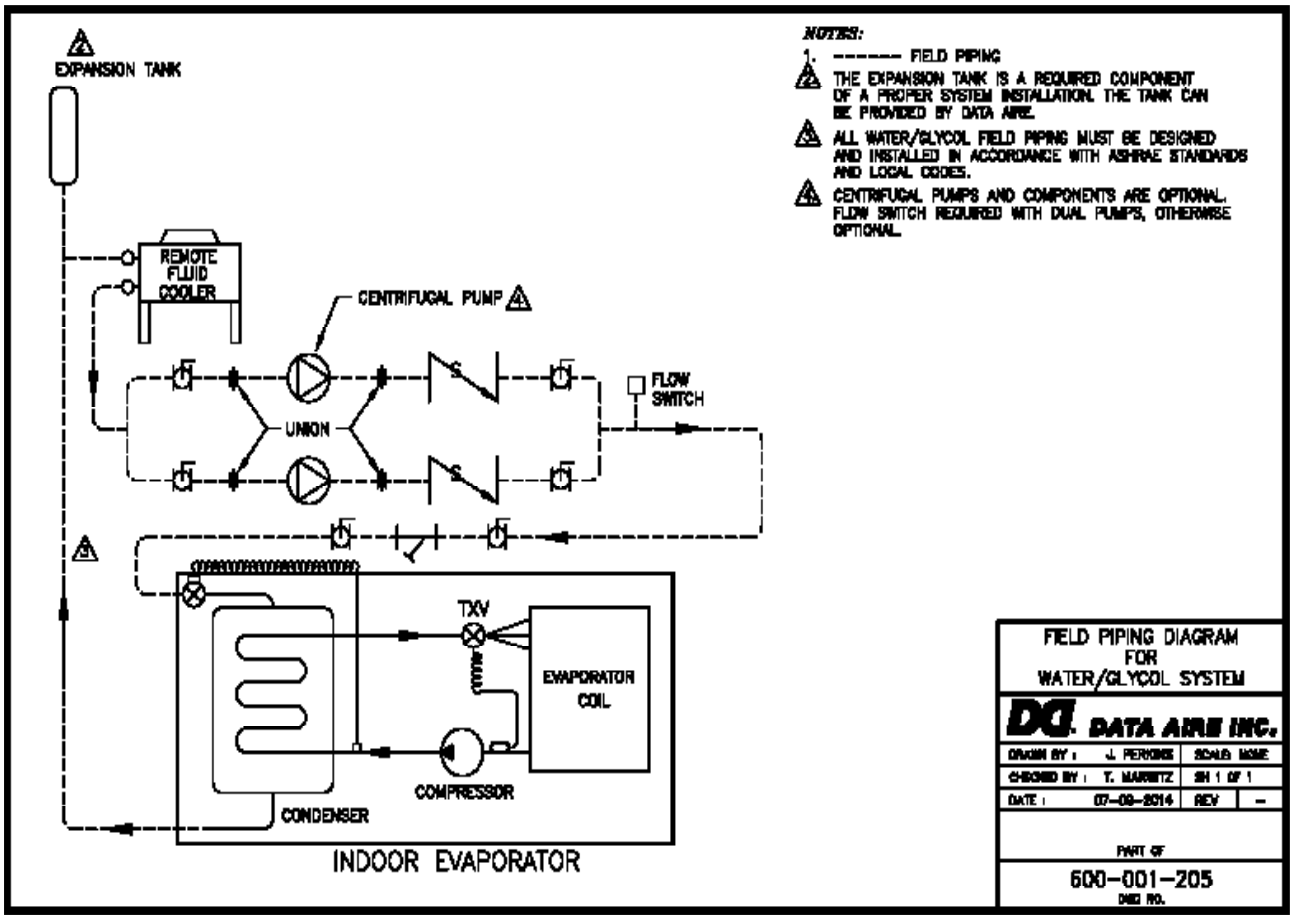
Water cooled units may also be connected to building water or tower water sources. Pipe size will depend on length of run and the maximum water flow required.

Shutoff valves, field provided, should be installed within a few feet of the inlet and outlet connections of the evaporator to allow the unit to be isolated for service. There should be a means of draining the unit for service. Drain/fill valves should be located at the lowest point on the connected piping.

All water/glycol units are shipped with plate/fin heat exchangers as standard equipment. A strainer is shipped loose and is to be field installed in the supply line with shut-off valves, field provided, before and after the strainer. The strainers and water/glycol piping must be cleaned on a periodic basis. If the unit is shipped with an optional shell and tube condenser, stainers are not required nor shipped with the unit.

> ⚠ One of the most common problems in a water/glycol system is the presence of air in the condenser water loop. Air vents must be installed in various locations in the piping system to purge the air.

Glycol system piping may include a centrifugal pump (or pumps for redundancy). Pumps must be primed before operating per the pump manufacturer's guidelines.



2.3 Auxiliary Chilled Water Coil Piping

Units with an Auxiliary Chilled Water cooling coil require a separate source of chilled water. These chilled water connection sizes will be equal to the condenser water connection sizes on the chart in Section 2.1.4. Units with an Energy Saver cooling coil typically have shared piping with the condenser supply and therefore do not require a separate water source.

All chilled water pipes have a cap installed on the end of the pipe for pressure testing the system. These caps need to be removed before installing the water piping to the unit. Use a tube cutter for smaller pipes and a reciprocating say with a metal cutting blade for larger pipes sizes or if there is a clearance problem. All connections need to be cleaned before connections are brazed together.

2.4 Condensate Drain System

To properly drain the condensate from the ceiling evaporator condensate pan, the evaporator section is equipped with a 3/4" FPT connection on the bottom of the unit for condensate removal. The following are recommendation for condensate drain systems:

1. Do not reduce the size of the condensate drain piping.
2. The condensate drain piping must be run to an unrestricted waste line and must be protected from freezing.
3. In high humidity conditions it is recommended to insulate the condensate drain line to prevent condensation forming on the exterior of the piping.
4. It is recommended that a union (field supplied) be installed at the ¾" FPT connection to permit easy disassembly of the condensate drain piping from the unit for cleaning.
5. Drain lines should be pitched downward not less than 1/4" for each ten (10) feet of horizontal run.
6. Where local codes permit, PVC pipe may be used.
7. Ceiling units with an optional vertical discharge have a 5" plenum below the evaporator drain pan. The plenum has knockouts that allow routing of the field supplied and installed condensate drain piping system. The drain line can be routed out either side of these units.

2.5 Condensate Trap

Probably the most misunderstood portion of a condensate drain system is trap installation. The primary purpose of a condensate trap is to prevent air from being drawn back into the unit during operation. Traps must be installed in a manner that will stop the air from passing through, but still allow the condensate to drain from the condensate pan.

Therefore, a trap (field supplied and installed) must be fabricated into the ceiling unit drain system external of the evaporator section. In order to eliminate air trapping, an air vent must be used to allow air to exit. Venting the drain after the first trap is recommended.

Figure 1 shows the recommended dimensions for fabricating a proper trap:

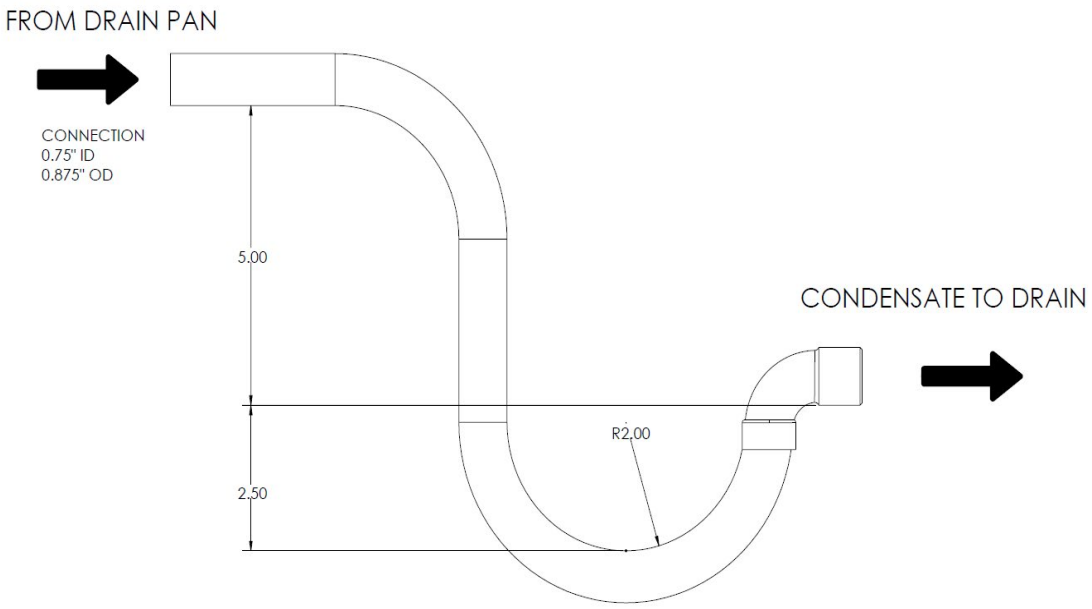


Figure 1 Recommended Condensate Trap Dimensions

Notes:

1. This trap is capable of handling static pressures equal to 4” H2O which is the maximum static available for ceiling units. If the unit fans are standard, there is no need to consider different dimensions but if higher total static pressure is expected, more vertical drop is required.

2. Some applications have no convenient means of allowing a gravity drain. In this case, a condensate pump can be used. These come either factory mounted or shipped loose. Factory mounted condensate pumps do not require a separate power source.

3. Condensate pumps that ship loose or are field provided, typically require a dedicated 110 volt power source. Field pipe connections must be made to the pump discharge connection. A check valve must be installed to prevent short cycling. Pumps must be located below the condensate drain pan level.

2.6 Humidifier Piping

The optional humidifier offered on LCSs is a steam generator type with a disposable cylinder. The humidifier makeup water should be brought to the humidifier through the field connection opening using 1/4” copper tubing. A compression fitting is provided at the humidifier. A shutoff valve should be provided outside the unit to allow disconnection for service. An in-line water pressure regulator and strainer should be installed. Water pressure should be set between 30 and 80 PSI.

The humidifier has a drain at the bottom which is factory piped to the main condensate drain line. The dispersion tube also has a drain line. No additional field piping is required.

2.7 Dry Steam Humidifier

Units with optional dry steam type humidifiers require a strainer on the inlet steam line. An outlet connection with field provided steam trap is also required. Steam pressure is typically 10-15 psi.

2.8 Leak Testing

No Installation is complete until the entire system has been thoroughly checked for leaks. This includes checking refrigerant tubing, flare fittings, pressure controls, shrader fittings and compressor rotolock service valves. Check both field and factory connections.

In addition to the refrigeration system, check all condenser water lines, humidifier makeup lines, condensate lines, condensate pumps, chilled water lines, centifugal pumps and fluid coolers as applicable.

When handling and recovering refrigerant, it is not permissible to release refrigerant into the atmosphere. Many leak-test methods recommended in the past are no longer possible. Current standard practices must be used.

Pressurize system circuit to 150 PSIG (1034kPa) by using dry nitrogen with a trace of refrigerant. Check the entire system for leaks with suitable leak finder, (per local code) including but not limited to all braze joints, caps and fittings, and flare nuts on both field and factory furnished components. After completion of leak testing, release test pressure and pull a vacuum on the system.

Tightening of fittings and valves is the responsibility of the installing contractor.

2.9 Evacuation

Evacuate the refrigerant lines, condenser coil, and evaporator coil to 250 microns or lower (a micron gauge and 2-stage vacuum pump are required). Valve off and turn off the vacuum pump and wait for at least 15 minutes to make sure the micron gauge reading does not go back up above 700 microns. If it does, re-start the vacuum pump and evacuate until the system reaches 250 microns. If the system still does not hold the pressure below 700 microns the system needs to be rechecked for leaks.

After the system has been satisfactorily evacuated the unit(s) can be charged with refrigerant. Connect the pressure gauge manifold set to the high and low ports near the compressor, connect the charging line to the refrigerant tank and set it for liquid feed. Open the refrigerant tank valve and purge the line at the manifold, then open the high side valve on the manifold only, and allow the refrigerant flow until the system pressure equalize, at this point the system will have 75 to 80% of the total refrigerant charge. Start the blower and then the compressor checking the operating pressure and temperatures.

Do not apply power to the compressor when in a vacuum.

3.0 ELECTRICAL CONNECTIONS

Before proceeding with the electrical connections, make certain that the volts, hertz and phase correspond to that specified on the unit electrical nameplate. Use copper conductors only.

3.1 Electrical Service

Check to be sure the service provided by the utility is sufficient to handle the additional load imposed by this equipment. Units with outdoor secondary heat exchangers will require a separate power source and field-provided, interconnecting control wires as well. Indoor split units typically have a single power source but can also be provided with separate sources. Field-provided, interconnecting control wires are also required. See section 3.5 below.

Remote outdoor condensers and condensing units require one power source. Glycol systems with fluid coolers and loose pump(s) typically require one power source for the fluid cooler and will require one additional source for a single pump or two additional sources for dual pumps. Systems where the pump(s) are mounted and piped integral to the fluid cooler will usually require a single power source.

3.2 Nameplate Ratings

Refer to the unit electrical nameplate for equipment electrical requirements. Minimum Circuit Ampacity (MCA), also known as wire sizing amps, will dictate the minimum required wire gauge. Maximum Overcurrent Protection (MOP) Device amps will dictate the maximum circuit breaker or fuse size.

3.3 Grounding

The unit cabinet must have an uninterrupted true earth ground. An electrical ground wire of adequate size must be connected to the ground lug provided inside the main electrical box.

3.4 Voltage Tolerance

The supply voltage to the unit must be within tolerance; - 5% to +10% for 208-230 voltage; +10% for 460 volts. Phase to phase imbalance must not exceed 3%. The local utility company should be contacted for correction of improper line voltage. Deviation from ratings can cause premature failures and possibly void unit warranty.

3.5 Auxiliary Control Wiring

The interconnection of auxiliary control wiring for remote heat exchangers (condensers and fluid coolers) requires the connection of two (2) - 18-gauge wires for installations up to 150 feet (45 m) or 16-gauge wires for installations from 151 feet (46 m) up to 200 feet (61 m) from the electrical control box of the indoor evaporator to the electrical control box of the remote heat exchanger. Condensing units (i.e., where the compressor(s) are mounted in the remote heat exchanger) will typically require (4) or more wiring connection points and may require heavier gauge wire. In this case, the installing contractor must follow the applicable electrical codes to determine the required wire gauge.

Because of the wide variety of indoor evaporators and remote heat exchangers offer by Data Aire, the installing contractor must refer to the schematic which is provided inside the electrical control box of each unit, for the required auxiliary control wiring interconnection terminal points.

Check the wiring connections in the unit control panel to ensure they are tight. Screw terminals may become loose in transit. Tightening of wiring connections is the responsibility of the installing contractor.

Examples:

Figure 1 - Typical Remote Heat Exchanger Interconnection Points

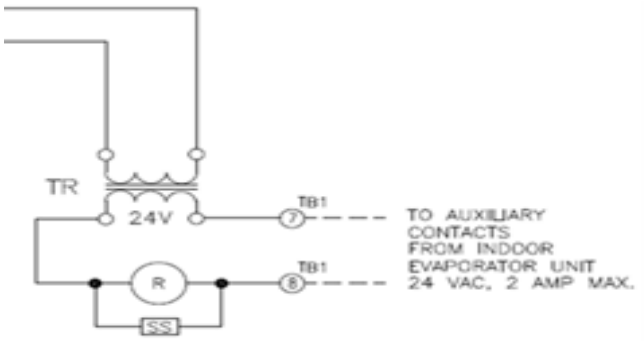
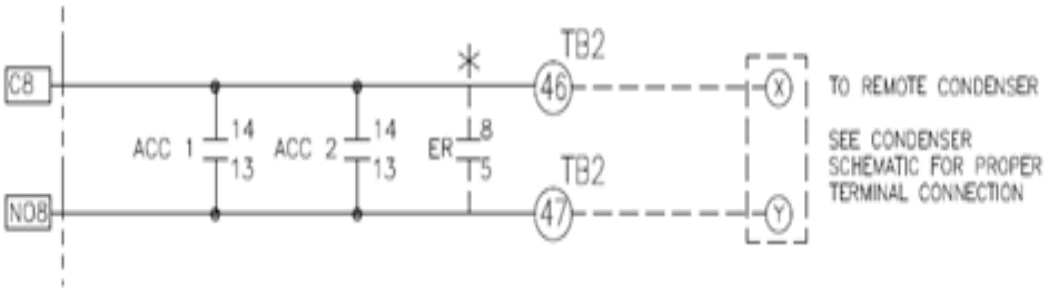


Figure 2 - Typical Indoor Evaporator Interconnection Points



3.6 Remote Shutdown

Every Data Aire evaporator has remote shutdown contacts points available. This is intended for a field supplied dry contact or switch to be wired across two terminals. When the contact or switch opens, the control circuit power is interrupted and the unit shuts down, including the control panel. The control circuit is 24 VAC and the field provided contact or switch should have a minimum rating of 10 amps. A minimum wire size of 18 gauge wire is recommended. Check wiring diagram for location of the terminals.

3.7 Remote Alarm Contacts

The Mini dap4 microprocessor control panel has, a remote alarm output contact that can be field accessed on terminals #14, #15 and #16 of terminal block TB1. This is a Normally Open, Close on Alarm, dry contact, intended to be used in a control circuit not exceeding 2 amps at 250 VAC. This output contact will reverse position on a failure and remain reversed until the alarm is no longer present.

3.8 Remote Sensors

The Mini dap4 panel comes with remote mounted sensors for field installation. The sensors are attached to 35 feet of cable and come mounted in a remote sensor enclosure. The temperature and humidity sensors require a total of four wires. This should be a twisted, shielded cable.

3.9 Condensate Pumps

Condensate pumps which ship loose normally require a separate source of 110 volt power. Always check the pump power requirements before connecting power. Condensate pumps are available in other voltages.

Condensate pumps may also come unit mounted and wired in the unit as a factory option. While no outside power source is required, field piping is still a requirement.

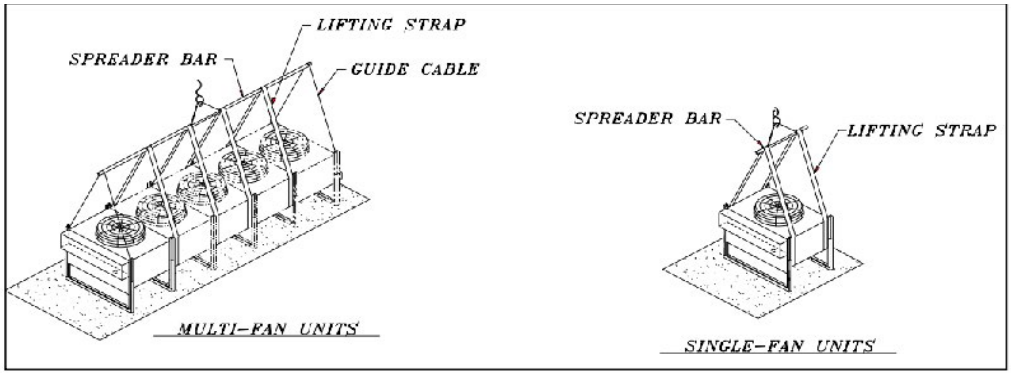
4.0 INSTALLATION OF REMOTE OUTDOOR HEAT EXCHANGER

Air cooled condensers and fluid coolers have individual Installation, Operation and Maintenance manuals which should be referred to for more complete details.

4.1 Rigging

This section covers outdoor condensers/condensing units and fluid coolers. Outdoor heat exchangers should be moved to their (typically rooftop) mounting location using a crane or fork lift. Each fan section has supports with lifting holes at the top.

Do not lift with a choke sling around the unit. Spreader bars are recommended for lifting multiple fan units. Under no circumstances should the coil headers or piping be used for lifting the unit. Ideally, the unit should be kept in its shipping crate until it is ready to be set in place.



4.2 Leg Assembly

The legs of remote heat exchanger are shipped with the unit and need to be lowered during the rigging process. The legs must be unbolted from their collapsed position and extended prior to placing the unit on its pad. Each leg extends down 18 inches and reattached using the same bolts. The bolts are placed through the lower set of holes on the bracket. Multiple fan units have leg supports between each fan section.

Model number DARC-03 and DARC-05 do not have legs and are ready for installation.

> ⚠ **Note:** Failure to extend the legs will result in poor air distribution over the cooling coil resulting in significant capacity reduction.

Concrete pads or a rail system are often used to provide support for the heat exchanger. Bolt holes in the bottom of each leg can be used to anchor the unit.

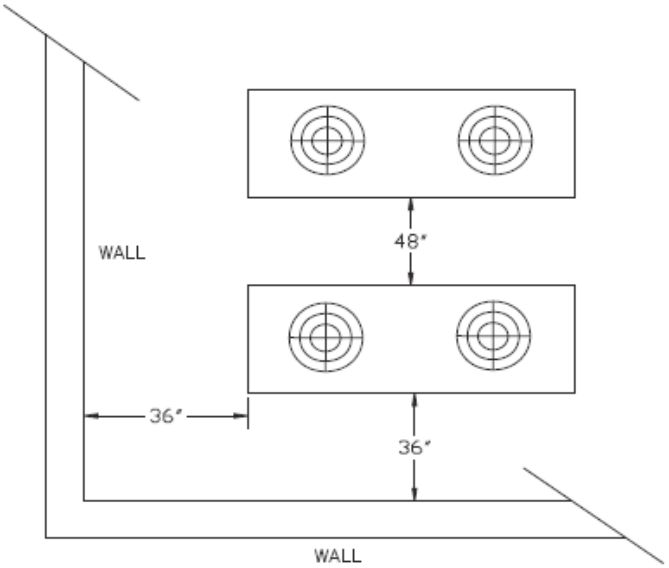
4.3 Locating the Remote Heat Exchanger

The remote heat exchanger must be located in an area that will ensure free air flow into and out of the heat exchanger plus adequate service access clearance. Short circuiting of the air flow or the intake of warmer air from another unit will seriously degrade the performance of the air cooled heat exchanger.

Do not locate the heat exchanger in a location that is bordered by tall obstructions (i.e., higher than 10 feet) on no more than two sides. See figure on next page for minimum clearance from obstructions and between units. With proper clearance on all sides, two units can be placed side by side. Additional units should be placed at least 48 inches apart.

Noise factors should be also considered when locating an air cooled heat exchanger. Proximity to windows, walls, and surrounding structures can cause objections by the occupants. An acoustical expert should be consulted when noise is of a particular concern.

Air cooled heat exchangers should be placed at a level that is higher than the indoor evaporator. Mounting the remote heat exchanger (condenser or condensing unit) more than 10 feet below the evaporator is not recommended. Excessive liquid line pressure drop can cause poor evaporator performance.



Piping must be supported within 18 inches of the inlet and outlet connections. The inlet connection is located on the top header on all remote heat exchangers and the outlet connection is located on the bottom header of all units.

Air cooled condensers should be placed at a level that is above the level of the indoor evaporator. Mounting a condenser or condensing unit more than ten feet below the evaporator is not recommended. Excessive liquid line pressure drop can cause poor evaporator performance.

4.4 Electrical Service

Refer to Sections 3.1 to 3.5 for information regarding line voltage and control voltage wiring details.

4.5 Air Cooled Condensers - Model DARC

4.5.1 Fan Speed Control

Standard outdoor air cooled condensers have a fan speed controller on the first fan. On single-fan condensers this is the only means of control. A variable speed controller modulates the motor speed based on system head pressure. The fan speed controller will normally not require field adjustment.

4.5.2 Ambient Thermostats

Additional motors (subsequent to the fan speed control operated motor) on multi-fan condensers are cycled by ambient-sensing thermostats. These thermostats have a capillary tube with a remote sensing bulb. They will function best if the sensing bulbs are mounted below the coil, away from exposure to direct sunlight, with the bulb in a vertical position. An instruction set comes as part of a mounting kit that includes a sheet metal bracket, mounting clamp(s) and TEK screws. This includes directions for field mounting and adjusting the thermostat bulbs. Desired head pressure should be maintained at approximately 250 psi.

Typical settings for the ambient thermostats are as follows:

Number of fans	Header fan	Fan 2	Fan 3	Fan 4	Fan 5
2	FSC	65°			
3	FSC	75°	65°		
4	FSC	75°	85°	65°	
5	FSC	65°	85°	75°	50°

4.6 Fluid Coolers - Model DAFC

4.6.1 Fluid-Sensing Thermostats

Fluid cooler fan motors are cycled on and off by individual water-sensing thermostats strapped to the leaving water header. The first fan motor will only have a thermostat if the unit has an energy saver coil. Without the optional energy saver coil, the first fan motor runs whenever there is a call for cooling via an auxiliary signal sent by the indoor evaporator (see also Section 3.5).

The water-sensing thermostats have adjustable setpoints which are typically staggered to maintain water temperature in the 85 to 105° F range. This is generally the desired range for glycol cooled systems.

A surge tank is standard with all fluid coolers. This is sufficient for most applications. However, an expansion tank should be installed at the highest point in the system and the point of least pressure.

4.6.2 Energy Saver Cooling

In colder climates, the evaporator will often be equipped with an additional free cooling coil to take advantage of the colder ambient temperatures. When incoming fluid falls below the setpoint of a water-sensing thermostat in the evaporator (typically about 50° F), energy saver cooling becomes available.

Systems with an energy saver coil should have at least one fluid-sensing thermostat on the fluid cooler set lower to take advantage of colder ambient temperatures. The desired fluid temperature for energy saver cooling is 45° F. Field adjustment of fluid-sensing thermostats is not unusual.

It is desirable to use the energy saver mode as much as possible. However, fluid temperature that is too cold can cause excessive dehumidification and coil sweating. Fluid temperature that is too high can also cause the indoor space temperature to rise. This could cause the evaporator's microprocessor control to lock out the energy saver mode for one hour while it reverts back to compressor (mechanical) cooling. Adjust the setpoints of the thermostats to allow the maximum free cooling time. Over cooling or under cooling the fluid should be avoided

Every application will have a different ambient temperature and indoor heat load/ air distribution profile. Therefore it is not possible to dictate the exact water-sensing thermostat setpoints. Field adjustments are typical to allow fine-tuning to specific conditions.

5.0 CHARGING

5.1 Voltage Phase Check

5.1.1 Evaporator

Prior to charging, the correct voltage phasing should be checked on the indoor evaporator. Check blower direction on the evaporator by momentarily energizing the fan motor. Reverse any two of the three line voltage wires at the line voltage field connection point to change the blower rotation.

Although the scroll compressor is phase dependent, units shipped from the factory are run tested, ensuring the compressor rotation is consistent with the evaporator fan motor. However, a field change-out of the compressor may require checking proper phase. An out-of-phase compressor will draw relatively low amps and both suction and discharge pressures will remain nearly equal.

5.1.2 Secondary Heat Exchanger

The secondary heat exchanger may be ordered as three phase but the individual fan motors are single phase and will only run in one direction. Check operation by placing a momentary jumper across low voltage field terminals #39 and #40. (Disconnect pumps on glycol systems unless already filled with water/glycol solution.) This will energize the control circuit. Fans may not run because: 1) the thermostat setpoint is above the current ambient, or 2) the #1 fan on air cooled condensers with fan speed control react to head pressure. The fan will not run until the head pressure is well over 200 psi.

5.2 Air Cooled Systems

5.2.1 Split Indoor Air Cooled Systems Charging

After the field refrigerant piping is properly completed, connect the refrigerant drum to the low side and charge with vapor. Charge with approximately three lbs. per nominal ton.

For example, a model DALA 0834-COS is a nominal 8 ton single circuit unit. Charge with about 24 lbs. of refrigerant to begin. It is likely that more refrigerant will be required to complete the charging procedure. Make sure all hoses are properly purged. Review the model number carefully because LCS units are available with either single or dual compressors.

Before starting a compressor, the crankcase heater should be energized for a minimum of 12 hours to reduce the possibility of liquid slugging on start-up. Failure to energize the crankcase heater could result in compressor damage.

Start the evaporator fan and compressor. Check the liquid line sight glass to get a feel for the approximate charge. Bubbles in the sight glass are not unusual at this point and can be caused by flashing from liquid line pressure drop, low sub-cooling or low charge. It is likely that more refrigerant will be required to complete the charging procedure.

Adjust the refrigerant charge until the sight glass clears or has only sparse bubbles. The unit should be allowed to stabilize for several minutes before meaningful measurements can be taken.

A properly charged system operating at typical parameters will have a head pressure of 240 - 295 psi for R-407C and 340 - 415 psi for R-410A. Suction temperature should be 58 psi or greater for R-407C and 104 - 121 psi for R-410A. The superheat at the compressor suction line at least 6 inches away from the compressor should be 8 - 15°.

Note: Charging to a full liquid line sight glass should never be the sole means of determining the correct refrigerant charge. Other parameters such as superheat, suction pressure, head pressure, sub-cooling and ambient temperature are also important parameters. A system charged to a clear sight glass is often overcharged.

5.2.2. Fan Speed Control System Charging

The standard outdoor air cooled condenser for Data Aire equipment is a Fan Speed Control system. After the field refrigerant piping is properly completed, connect the refrigerant drum to the low side and charge with vapor. Charge with approximately three lbs. per nominal ton.

For example, a model DALA 0834-COD is a nominal 8 ton unit but has two nominal four ton circuits. Charge each circuit with about 12 lbs. of refrigerant to begin. It is likely that more refrigerant will be required to complete the charging procedure. Make sure all hoses are properly purged. From a vacuum feed liquid refrigerant into the high side of the system until the pressure equalizes. At this point there will be about 70 - 80% of the total charge in the system.

Before starting a compressor, the crankcase heater should be energized for a minimum of 12 hours to reduce the possibility of liquid slugging on start-up. Failure to energize the crankcase heater could result in compressor damage.

If the system is charged from a vacuum, the preheating of the compressor is not necessary. Start the system and allow the system to stabilize to room temperature. Bubbles in the sight glass are not unusual at this point and can be caused by flashing from liquid line pressure drop, low sub-cooling or low charge. It is likely that more refrigerant will be required to complete the charging procedure. Adjust the refrigerant charge until the sub-cooling is between 8 - 10° F and the superheat is between 8 - 15° F. There may be flashing and/or bubbles in the sight glass when the system is properly charged.

The unit should be allowed to stabilize for several minutes before meaningful measurements can be taken. After the system is allowed to stabilize, verification of a few key measurements should be noted. The discharge should be between 110 - 125° F condensing temperature and the sub-cooling should be between 8 - 10° F depending on ambient conditions. Suction temperature should be 58 PSI or greater. Measure the superheat at the compressor suction line a least 6 inches away from the compressor. The superheat should be between 8 - 15° F for units that are water/glycol cooled and air-cooled units with air-cooled condensers. Units with remote condensing unit should have a superheat between 20 - 25° F at the compressor. The sub-cooling will be the same 8 - 10° F.

Note: Charging to a full liquid line sight glass should never be the sole means of determining the correct refrigerant charge. Other parameters such as superheat, suction pressure, head pressure, sub-cooling and ambient temperature are also important parameters. A system charged to a clear sight glass is often overcharged.

5.2.3. Flooded System Charging

Flooded systems are units having refrigerant circuits with an optional liquid receiver and head pressure control valve. When the ambient temperature falls during cold weather, the head pressure control valve will regulate the flow of refrigerant to ensure nearly constant receiver pressure. The condenser is partially flooded with liquid in cold weather. In warm weather the extra refrigerant is stored in the receiver.

Flooded systems require more refrigerant than fan speed control systems. Connect the pressure gauge manifold set to the high and low ports near the compressor. Connect the charging line to

the refrigerant tank and set it for liquid feed. Open the refrigerant tank valve and purge the line a the manifold. Open the high side valve on the manifold only and allow the refrigerant to flow until the system pressure equalizes. At this point the system will have 78 - 85% of the total refrigerant charge. Start the (evaporator) blower. Start the compressor and check the operating pressures and temperatures.

A quick and easy way to run the blower and compressor is using the manual switches on the unit microprocessor. Switch the blower and compressor manual switches to the “ON” position. All automatic control is disabled but safety switches will remain functional.

Before starting a compressor, the crankcase heaters should be energized for a minimum of 12 hours to reduce the possibility of liquid slugging on start-up. Failure to energize crankcase heaters could result in compressor damage.

Start the evaporator fan and verify the fan rotation. Start the compressor. Check the liquid line sight glass to get a feel for the approximate charge. Bubbles in the sight glass are not unusual at this point and can be caused by flashing from liquid pressure drop, low sub-cooling or low charge. It is likely that more refrigerant will be required to complete the charging procedure.

If the receiver (head) pressure is below 230 PSI, block part of the condenser coil surface until the pressure rises to 230 PSI or higher. During extremely cold weather all the condenser fans may have to be de-energized to maintain 230 PSI.

Observe the sight glass on the receiver. Add refrigerant through the suction line until the level of liquid in the receiver is approximately 1/3 from the bottom (the leveling ball in the receiver will start to float) of the sight glass. At this point the receiver is 80% full. Observing the receiver sight glass becomes difficult when they are remote mounted near the condenser. The unit should be allowed to stabilize for several minutes before meaningful measurements can be taken.

After the system is allowed to stabilize, the superheat at the compressor suction line (reading from at least 6 inched from the compressor) should be 8 - 15°F. Unit with remote condensing units (DRCU) the superheat should be 20 - 25°F at the compressor. The sub-cooling will be the same 8 - 10°F as a standard. Remove any block that may have been used on the condenser coil. If the ambient temperature while charging is below 60°F, some of the refrigerant will be backed up in the condenser coil causing the liquid level in the receiver to drop, this is normal.

Note: Charging to a full liquid line sight glass should never be the sole means of determining the correct refrigerant charge. Other parameters such as superheat, suction pressure, head pressure, sub-cooling and ambient temperature are also important parameters. A system charged to a clear sight glass is often overcharged.

5.3 Water/Glycol Cooled Systems

5.3.1. Water/Glycol Cooled Systems Charging

All water/glycol cooled units are factory charged with refrigerant. The water regulating valve should be adjusted to maintain condensing temperature of 105 - 119° F. Saturated suction temperature

should be 33° F or higher. The superheat at the compressor suction line at least 6 inches away from the compressor should be 8-15° F.

Field charging water/glycol systems should be done by referring to the unit electrical nameplate for the factory charge. Although this figure represents the original factory charge, it is still necessary to measure and note proper unit operation including superheat, head and suction pressure. Some adjustment to charge may be required.

Adjust the refrigerant charge until the sight glass clears or has only sparse bubbles. The unit should be allowed to stabilize for several minutes before meaningful measurements can be taken and the conditioned room should be at or near the temperature setpoint.

All water/glycol cooled units have a water regulating valve. A head pressure sensing transducer is connected to a shrader fitting on the discharge line and water is regulated into the condenser coil. Condenser coils may be plate fin or coaxial type.

Before starting a compressor, the crankcase heaters should be energized for a minimum of 12 hours to reduce the possibility of liquid slugging on start-up. Failure to energize crankcase heaters could result in compressor damage.

Note: Charging to a full liquid line sight glass should never be the sole means of determining the correct refrigerant charge. Other parameters such as superheat, suction pressure, head pressure, sub-cooling and ambient temperature are also important parameters. A system charged to a clear sight glass is often overcharged.

5.4 Refrigerant Handling

The use of recovery/recycling units is required by U.S. Environmental Protection Agency (EPA) regulations. Technicians who service and dispose of air conditioning and refrigeration equipment must recover the refrigerant instead of venting to atmosphere.

Except for extremely small releases of refrigerant such as what occurs when disconnecting service hoses (diminutive release), a technician who knowingly releases or vents refrigerant to the atmosphere is in violation of these regulations. Freon purchasers must be certified technicians and have a valid EPA certification card.

Warning! Pressure relief lines(s) must be vented to the atmosphere per the latest edition of ASHRAE Standard 15 and/or any local building, fire or mechanical codes.

This applies to all units with either sell and tube condensers or high pressure relief valve options.

5.5 Important Refrigeration Components

5.5.1. Expansion Valve

Each refrigerant circuit has an adjustable thermo-expansion valve (TXV). These are factory adjusted to their nominal rating. Any field adjustment should be to fine tune a system that has stabilized and already has acceptable operating parameters.

5.5.2. High Pressure Cutout Switch

Each refrigerant circuit is protected by a high head pressure cutout switch with a manual reset button. The cutout pressure rating for refrigerant R-407C is 400 psi. Physical location is near the compressor which may be either in the evaporator or the condensing section.

5.5.3. Low Pressure Cutout Switch

Each circuit also contains a low suction pressure cutout switch with automatic reset. The cutout pressure rating for this switch is 30 psi. Physical location is near the compressor which can be either in the evaporator or the condensing section.

6.0 GLYCOL SYSTEMS

6.1 Glycol Concentration

The system must be filled with water and the appropriate amount of ethylene or propylene glycol to protect against winter freeze-up. To achieve the approximate glycol concentration, it is necessary to know the total system volume. This consists of the sum of the fluid cooler volume, the evaporator unit volume, and the volume of the interconnecting piping.

The following tables can be used for arriving at an approximate system volume. After installation, the glycol percentage should be checked. The glycol percentage should also be checked at regular intervals to ensure freeze protection.

6.2 Internal (Fluid) Volume

Evaporator Internal Volume Model	Without Energy Saver Coil Volume, Gallons	With Energy Saver Coil* Volume, Gallons
DALG 06, single circuit	3.0	11.5
DALG 08, single circuit	3.0	11.5
DALG 10, single circuit	4.0	10.5
DALG 13, single circuit	4.0	10.5
DALG 06, dual circuit	4.0	12.5
DALG 08, dual circuit	4.0	12.5
DALG 10, dual circuit	5.0	11.5
DALG 13, dual circuit	5.0	11.5

6.3 Fluid Cooler Internal Volume

Fluid Cooler Model	Internal Volume, Gallons	Fluid Cooler Model	Internal Volume, Gallons
DAFC 06	2.5	DAFC 17	6.6
DAFC 07	3.4	DAFC 21	7.4
DAFC 09	4.2	DAFC 24	9.8
DAFC 11	3.3	DAFC 28	12.3
DAFC 15	4.9	DAFC 30	9.8

* 6 and 8 ton units use a 4 row energy save coil
10 and 13 ton units use a 3 row energy saver coil.

6.4 Copper Piping Internal Volume

Pipe Diameter, inches	Volume per 100 Feet of Pipe, Gallons
5/8	1.2
3/4	1.8
7/8	2.5
1-1/8	2.5
1-5/8	4.3
2-1/8	9.2

6.5 Freezing Point of Aqueous Solutions

Ethylene Glycol, % by Volume	Freezing Point Degrees F	Propylene Glycol, % by Volume	Freezing Point Degree F
0	32	0	32
10	24	10	27
20	15	20	18
30	4	30	8
40	-13	40	-6
50	-33	50	-2

7.0 CONTROLS

7.1 Mini dap®4 Microprocessor Controller

The Mini dap4 microprocessor controller is the standard controller on the LCS equipment. There is a separate manual that goes into extensive detail regarding functions, features, programming and troubleshooting.

The Mini dap4 microprocessor controller has an entire manual dedicated to its use and operation. This manual must be referenced to complete a thorough unit installation. Start-up is not complete until the Mini dap4 controller settings are established.

7.2 Optional Expanded dap4 Microprocessor Controller

The Expanded dap4 microprocessor controller is available as an upgrade from the Mini dap4 and offers additional features.

The dap4 microprocessor controller panel has an entire manual dedicated to its use and operation. This manual must be referenced to complete a thorough unit installation. Start-up is not complete until the dap4 control panel settings are established.

7.3 Secondary Heat Exchangers

Most of the controls on remote condensers, condensing unit and fluid coolers consist of basic electromechanical type components. Secondary heat exchangers have separate installation and operation manuals which give complete details on adjusting thermostat settings, etc. Refer also to details in Section 3.5 within this manual.

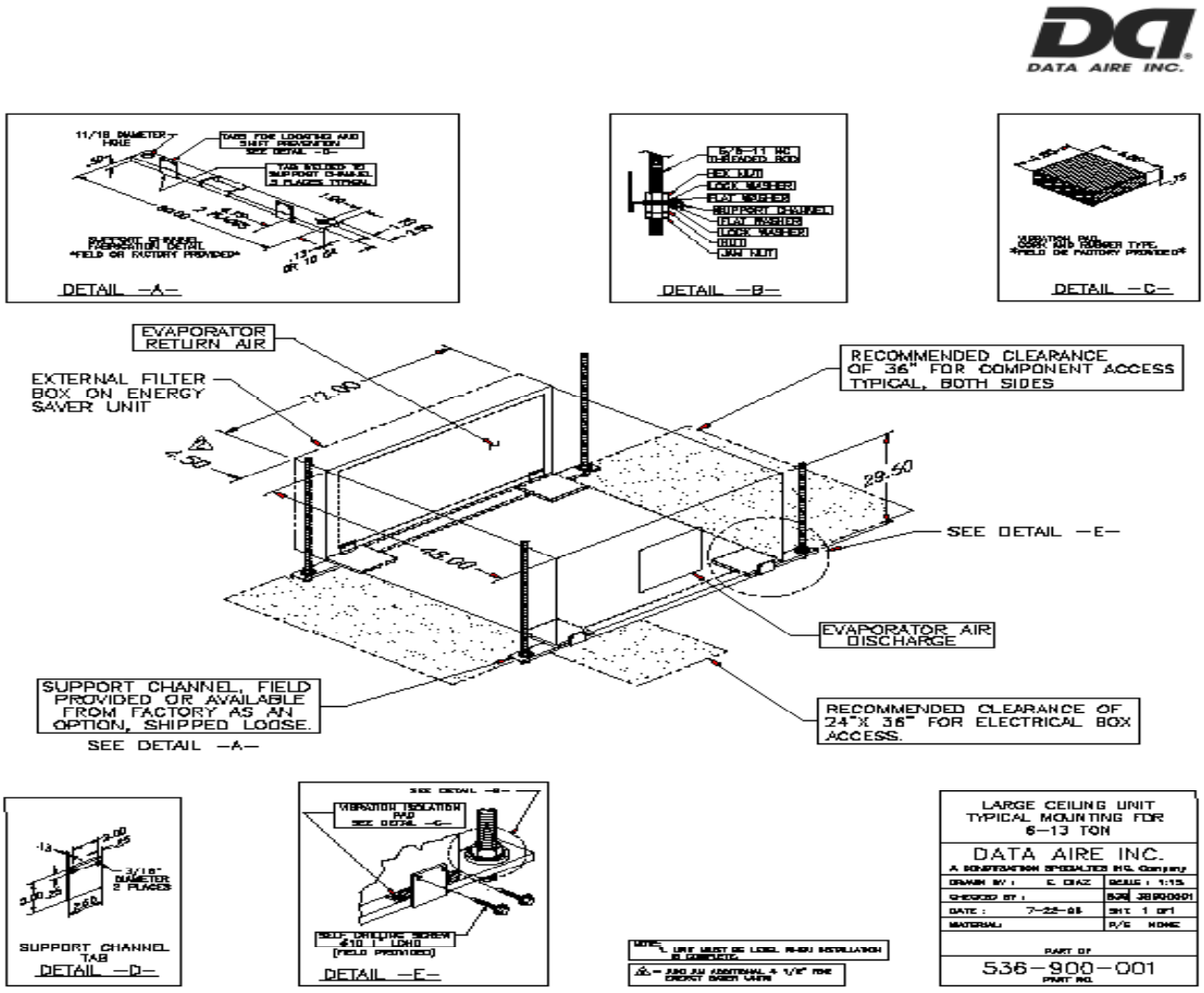
7.4 Wiring Diagrams

Every Data Aire evaporator, condenser, condensing unit or fluid cooler comes with a wiring diagram. These diagrams are 'ladder"- type schematics intended for service personnel. The intent is to allow the technician to understand the wiring details associated with the electrical components and how they interface with the controls as well as peripheral equipment, including secondary heat exchangers.

The wiring diagram in the evaporator will indicate field interface terminals to the secondary heat exchanger. The internal wiring of the heat exchanger is found on a separate diagram which can be found on the inside cover of the heat exchanger electrical box. Both diagram types are also placed inside the shipping/warranty packet that is placed inside the evaporator.

Evaporator wiring diagrams will have a drawing number which starts out with the three letter designation, "DAL". An example of a typical diagram is DAL-S-908. Wiring diagrams for condensers or condensing units start out with the three letter designation, "DRC". An example of a typical diagram is DRC-S-001. Wiring diagrams for fluid coolers start out with the three letter designation, "DFC". An example of a typical diagram is DFC-S-001

Drawing #536-900-001 Large Ceiling Unit Mounting for 6-13 ton



8.0 REGULAR MAINTENANCE ITEMS

8.1 Air Filters

Air filters should be checked on a regular basis and changed when they become dirty. This will ensure efficient operation of the unit. Spare air filters should be kept in stock as these tend to be a frequently replaced maintenance item. Air filters may require changing as often as monthly. Note also that construction dust on new installations will quickly clog new filters.

The Mini dap4 control panel can monitor air filters status with an optional dirty air filter sensor. Although the unit may have a dirty filter alarm, this should not be relied on as the only determinant for replacing air filters. A mis-adjusted air filter differential pressure switch may not give a proper indication of a clogged air filter.

To check the air filter differential pressure switch for proper adjustment, temporarily cover about 75% of the return air opening using heavy cardboard or similar material. The alarm should energize when 75% of the air is blocked, simulating dirty filters. If the alarm energizes prematurely or does not energize at all, the pressure switch should be adjusted. Panels must remain closed when determining if an adjustment is necessary.

Air filters that require changing can restrict airflow and create problems such as coil icing or poor air distribution.

8.2 Belts

Belt tension should be checked regularly (monthly) to ensure proper tension. If tightening is required, loosen the four motor mounting bolts. Turn the adjustment screw on the end of the motor mounting channel until the proper belt tension is attained. Retighten the four mounting bolts. Damage can occur to belts that are overtightened. The amount of play in a typical driveset should be 1/2 inch. When tightening the belts make sure the pulley alignment is true. If the belts are over tightened or if the pulleys are misaligned the bearing and belt life can be significantly shortened.

8.3 Bearings

LCS units with either one (1) and two (2) HP motors have permanent lubricated bearings. Motors of three (3) HP and above have a pillow block bearing that must be greased quarterly, or as needed.

Some motors have zirk type grease fittings on the bearings. If so the motor should be greased at least annually. Use NLGI grade 2 lithium or lithium complex grease. Care should be taken to avoid over-greasing. Only one or two pumps from a manual gun are required.

8.4 Humidifier Canisters

The optional steam generator type humidifier does not require maintenance other than to replace the canister as required. This frequency will depend on usage and water type. A set of manufacturer's instructions for the humidifier is sent as part of the paperwork placed inside the unit when it ships.

8.5 Fuses

Always replace fuses with those of the equivalent rating with regard to: 1) amperage, 2) voltage, and 3) speed. For instance compressors and motors are inductive loads which require time delay fuses. Electric reheat and humidifiers are resistive loads requiring fast acting fuses.

8.6 Heating Elements

Heating elements do not normally require maintenance. However sometimes they may accumulate a film of dust or dirt when unused for extended periods of time. When energized, the burning debris can create smoke or unpleasant odor. To help avoid this, periodic cleaning is recommended.

8.7 Refrigerant Filter Drier

Factory installed refrigerant filter driers do not normally require maintenance. When replacing compressors or other repairs that open the refrigeration system to atmosphere, it is advisable to replace the filter drier. The equivalent type and size should be used.

9.0 Warranty Policy

Seller warrants its equipment to Buyer to be free from defects in material and workmanship for a period of eighteen (18) months from date of shipment, as long as equipment is utilized under normal conditions and service and is properly installed; however, the warranty shall not be applicable to any of the following items: refrigerant, belts, filters, humidifier, heaters not regularly cleaned, light bulbs, and any other items either consumed or worn out by normal wear and tear, or by conditions beyond Seller's control, including (without limitation as to generally) polluted or contaminated air or water.

The Seller's obligation under this warranty is limited solely to the repair or replacement, at Seller's options, of any part or parts thereof which shall, within eighteen (18) months from date of shipment of the equipment to the original purchaser be returned to the factory, transportation charges prepaid, which upon examination shall disclose to the Seller's satisfaction to have been defective under normal use and service. This agreement to repair or replace defective parts is expressly in lieu of all other warranties, expressed or implied and all other obligations or liabilities on the part of Seller and Seller neither assumes nor authorizes any other person to assume for it any liability or obligation in connection with the sales or service of its equipment, except said repair or replacement of defective parts set forth above.

This warranty does not include any labor charges for work done outside of the factory for replacement of parts, adjustments, repairs, or any other work. Seller's liability does not include any resulting damage to persons, property, equipment, goods or merchandise arising out of any defect in or failure of any equipment of its manufacture and Buyer hereby waives any claim against Seller arising out of such claim. This warranty shall not cover the repair or replacement of any equipment which has been repaired or altered outside of the factory in any way or which has been subject to negligence, misuse, or abuse, or to pressures in excess of stated limits.

This warranty applies only to the original purchaser of the equipment and does not extend, expressly or by implication, to the third parties or others without the specific written approval and acknowledgment of Seller. Buyer's exclusive remedy and Seller's maximum liability for any and all loss, injury, damage, costs, or expense arising from any defect covered by this warranty shall be limited to the repair or replacement, but not the installation of any defective material, F.O.B., Seller's plant; provided however, that Seller shall not be required to replace any part or component (a) which can be repaired, or (b) unless Buyer has given Seller immediate written notice that replacement or repair. In addition, Seller shall not be liable for any cost or expense of replacement or repair contracted for by Buyer with any third person, unless, and then only to the extent that Seller authorizes in writing, such costs or expense.

Seller shall not be liable for any direct, indirect incidental, consequential, or other form of loss, injury, damage, cost, or expense, whether caused by delay, failure, or performance, breach of warranty, or by any cause whatsoever.

Seller's obligation under this warranty shall be void if Buyer fails: (a) without legal justification to pay Seller, when due, the full purchase price for the equipment sold hereunder; or (b) to have the equipment sold hereunder installed, maintained, and serviced by competent personnel and in accordance with Seller's instructions.

10.0 Contact Data Aire

Address:

Data Aire, Inc.
230 W. BlueRidge Avenue
Orange, CA 92865

Phone:

714-921-6000	
800-347-AIRE (2473)	Toll Free

Fax:

714-921-6010	Main
714-921-6011	Engineering

E-mail:

service@dataaire.com	Technical Support
engineering@dataaire.com	Engineering
sales@dataaire.com	Sales

Web site:

www.dataaire.com

Job Information:

Data Aire Job Number: _____

Evaporator Serial Number: _____

Evaporator Model Number: _____

Condenser/Condensing Unit/
Fluid Cooler Serial Number: _____

Condenser/Condensing Unit
Fluid Cooler Model Number: _____

RECOMMENDED LINE SIZING FOR AIR COOLED SPLIT SYSTEMS UP TO 200 EQUIVALENT FEET

HOT GAS LINES

SINGLE CIRCUIT SYSTEMS						DUAL CIRCUIT SYSTEMS					
Unit Tonnage	Tons per Circuit	EQUIVALENT FEET 50	100	150	200	Unit Tonnage	Tons per Circuit	EQUIVALENT FEET 50	100	150	200
6	6	7/8	1-1/8	1-1/8	1-1/8	6	3	7/8	7/8	7/8	7/8
8	8	1-1/8	1-1/8	1-3/8	1-3/8	8	4	7/8	7/8	7/8	1-1/8
10	10	1-1/8	1-1/8	1-3/8	1-3/8	10	5	7/8	1-1/8	1-1/8	1-1/8
13	13	1-1/8	1-3/8	1-3/8	1-3/8	13	6.5	7/8	1-1/8	1-1/8	1-1/8

LIQUID LINES

SINGLE CIRCUIT SYSTEMS						DUAL CIRCUIT SYSTEMS					
Unit Tonnage	Tons per Circuit	EQUIVALENT FEET 50	100	150	200	Unit Tonnage	Tons per Circuit	EQUIVALENT FEET 50	100	150	200
6	6	1/2	5/8	5/8	5/8	6	3	1/2	1/2	1/2	1/2
8	8	5/8	7/8	7/8	7/8	8	4	1/2	5/8	5/8	5/8
10	10	5/8	7/8	7/8	7/8	10	5	1/2	5/8	5/8	5/8
13	13	7/8	7/8	7/8	7/8	13	6.5	1/2	5/8	5/8	5/8

SUCTION LINES
SINGLE CIRCUIT SYSTEMS

Unit Tonnage	Tons per Circuit	EQUIVALENT FEET 50 HOR	50 VER	100 HOR	100 VER	150 HOR	150 VER	200 HOR	200 VER
6	6	1-1/8	1-1/8	1-3/8	1-1/8	1-3/8	1-1/8	1-5/8	1-3/8
8	8	1-3/8	1-3/8	1-3/8	1-3/8	1-3/8	1-3/8	1-5/8	1-3/8
10	10	1-3/8	1-3/8	1-5/8	1-3/8	1-5/8	1-5/8	1-5/8	1-5/8
13	13	1-3/8	1-3/8	1-5/8	1-5/8	1-5/8	1-5/8	2-1/8	1-5/8

SUCTION LINES
DUAL CIRCUIT SYSTEMS

Unit Tonnage	Tons per Circuit	EQUIVALENT FEET 50 HOR	50 VER	100 HOR	100 VER	150 HOR	150 VER	200 HOR	200 VER
6	3	7/8	7/8	1-1/8	7/8	1-1/8	7/8	1-1/8	7/8
8	4	1-1/8	1-1/8	1-1/8	1-1/8	1-1/8	1-1/8	1-3/8	1-1/8
10	5	1-1/8	1-1/8	1-1/8	1-1/8	1-3/8	1-1/8	1-3/8	1-1/8
13	6.5	1-1/8	1-1/8	1-3/8	1-1/8	1-3/8	1-1/8	1-5/8	1-3/8

HOR = HORIZONTAL **VERT** = VERTICAL

Data Aire, Inc.

Monthly Maintenance Inspection Checklist

Model No._____ Serial No. _____
Prepared by: _____ Date: ___ / ___/ 201__

Air Filters
___ Check for restricted air flow

Blower Section
___ Blower wheel free of debris moves freely
___ Check belt tension and condition
___ Bearings in good condition
___ Check pulleys and motor mounts

Air Distribution Section
___ Check for restriction in grille(s)

Compressor(s)
___ Check for leaks

Refrigeration Cycle/Section
___ Check crank case temperature

Air Cooled Condenser (if applicable)
___ Condenser coil clean
___ Motor mounts tight
___ Motor fan bearings in good condition
___ Refrigeration lines properly supported

Water/Glycol Fluid Cooler (if applicable)
___ Water regulating valve function
___ Check for water/glycol leaks (piping area)

Glycol Pump(s) (if applicable)
___ Glycol leaks (pump area)
___ Pump operation
___ Auto air vent clean of mineral deposits

Condensate Drain and Pump (if applicable)
___ Check for water leaks
___ Check for restricted air flow
___ Pump operation

Steam Generating Humidifier (if applicable)
___ Check canister for deposits and water level
___ Check condition of steam hose and clamps

Electrical Panel
___ Check contactor operation
___ Mini dap4 controller operations

Equipment Runtimes

Blower	_____	hrs
Condenser	_____	hrs
Compressor(s)	_____	hrs
Reheat	_____	hrs
Humidifier	_____	hrs
Dehumidification	_____	hrs
Energy Saver	_____	hrs

___ Reset all to read zero runtimes

Temperature/Humidity set at: ___° ___% RH

Notes: _____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Data Aire, Inc.

Quarterly Maintenance Inspection Checklist

Model No. _____ Serial No. _____
Prepared by: _____ Date: ___ / ___/ 201__

Air Filters
- ____ Check for restricted air flow
- ____ Check filter differential switch
- ____ Wipe filter rack section clean

Blower Section
- ____ Blower wheel free of debris and moves freely
- ____ Check belt tension and condition
- ____ Bearings in good condition
- ____ Check air flow safety switch operation
- ____ Check pulleys and motor mounts

Air Distribution Section
- ____ Check for restriction in grille(s)

Compressor(s)
- ____ Check for leaks

Refrigeration Cycle/Section
- ____ Check for moisture (site glass)
- ____ Check suction pressure
- ____ Check discharge pressure
- ____ Check hot gas bypass valve operation
- ____ Check thermostatic expansion valve operation
- ____ Check solenoid valve operation

Air Cooled Condenser (if applicable)
- ____ Condenser coil clean
- ____ Motor mounts tight
- ____ Motor fan bearings in good condition
- ____ Refrigeration lines properly supported
- ____ Heated receiver site

Water/Glycol Fluid Cooler (if applicable)
- ____ Water regulating valve function
- ____ Check solution _____%
- ____ Check for water/glycol leaks (piping area)
- ____ Water/Glycol flow switch operational

Glycol Pump(s) (if applicable)
- ____ Glycol leaks (pump area)
- ____ Pump operation
- ____ Auto air vent clean of mineral deposits

Condensate Drain and Pump (if applicable)
- ____ Check for water leaks and restricted flow
- ____ Pump operation

Steam Generating Humidifier (if applicable)
- ____ Check canister for deposits and water level
- ____ Check condition of steam hose and clamps
- ____ Check drain and fill valve for deposits

Reheat (if applicable)
- ____ Check reheat element(s) for dust
- ____ Check high limit switch operation

Electrical Panel
- ____ Check fuses
- ____ Check contactor operation
- ____ Check all electrical connections
- ____ Check operation sequence
- ____ Check calibration of change over thermostat (Energy Saver System Only)

Equipment Runtimes

Blower	_____	hrs
Condenser	_____	hrs
Compressor(s)	_____	hrs
Reheat	_____	hrs
Humidifier	_____	hrs
Dehumidification	_____	hrs
Energy Saver	_____	hrs

____Reset all to read zero runtimes

Temperature/Humidity set at: _____° _____% RH

Notes: _____
_____
_____
_____
_____

Superheat and Suction Pressure Trouble Shooting Guide

Low Suction Pressure and High Superheat

1. Moisture, dirt, wax
2. Undersized valve*
3. High superheat adjustment
4. Gas charge condensation
5. Dead thermostatic element charge
6. Wrong thermostatic charge
7. Evaporator pressure drop - no external equalizer
8. External equalizer location
9. Restricted or capped external equalizer
10. Low refrigerant charge
11. Liquid line vapor
    a. Vertical lift
    b. High friction loss
    c. Long or small line
    d. Plugged drier or strainer
12. Low pressure drop across valve
    a. Same as #11 above
    b. Undersized distributor nozzle or circuits
    c. Low condensing temperature

High Suction Pressure - Low Superheat

1. Oversized valve*
2. TXV seat leak
3. Low superheat adjustment
4. Bulb installation
    a. Poor thermal contact
    b. Warm location
5. Wrong thermostatic charge
6. Bad compressor - low capacity
7. Moisture, dirt, wax
8. Incorrectly located external equalizer

Low Suction Pressure - Low Superheat

1. Low load
    a. Not enough air
    b. Dirty air filters
    c. Coil icing
2. Poor air distribution
3. Poor refrigerant distribution
4. Improper compressor-evaporator balance
5. Evaporator oil logged
6. Flow from one TXV affecting another’s bulb

* Data Aire has ensured that valves are sized properly as the unit ships from the factory.

Temperature Pressure Chart

Temperature (°F)	R-407C	R-410A
26	43.6	89.7
27	44.7	91.6
28	45.9	93.5
29	47.1	95.5
30	48.4	97.5
31	49.6	99.5
32	50.9	101.6
33	52.1	103.6
34	53.4	105.7
35	54.8	107.9
36	53.2	110.0
37	57.5	112.2
38	58.9	114.4
39	60.3	116.7
40	61.7	118.9
41	63.1	121.2
42	64.6	123.6
43	66.1	125.9
44	67.6	128.3
45	69.1	130.7
46	70.6	133.2
47	72.2	135.6
48	73.8	138.2
49	75.1	140.7
50	77.1	143.3
55	106.0	156.6
60	116.2	170.7
65	127.0	185.7
70	138.5	201.5
75	150.6	218.2
80	163.5	235.9
85	177.0	254.6
90	191.3	274.3
95	206.4	295.0
100	222.3	316.9
105	239.0	339.9
110	256.5	364.1
115	274.9	389.6
120	294.2	416.4
125	314.5	444.5
130	335.7	474.0
135	357.8	505.0
140	380.9	537.6
145	405.1	571.7
150	430.3	607.6

Large Ceiling Systems

Air, Water and Glycol Cooled DX and Chilled Water
6, 8, 10 and 13 ton

Installation, Operation & Maintenance Manual

dataaire
Precise by Design

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