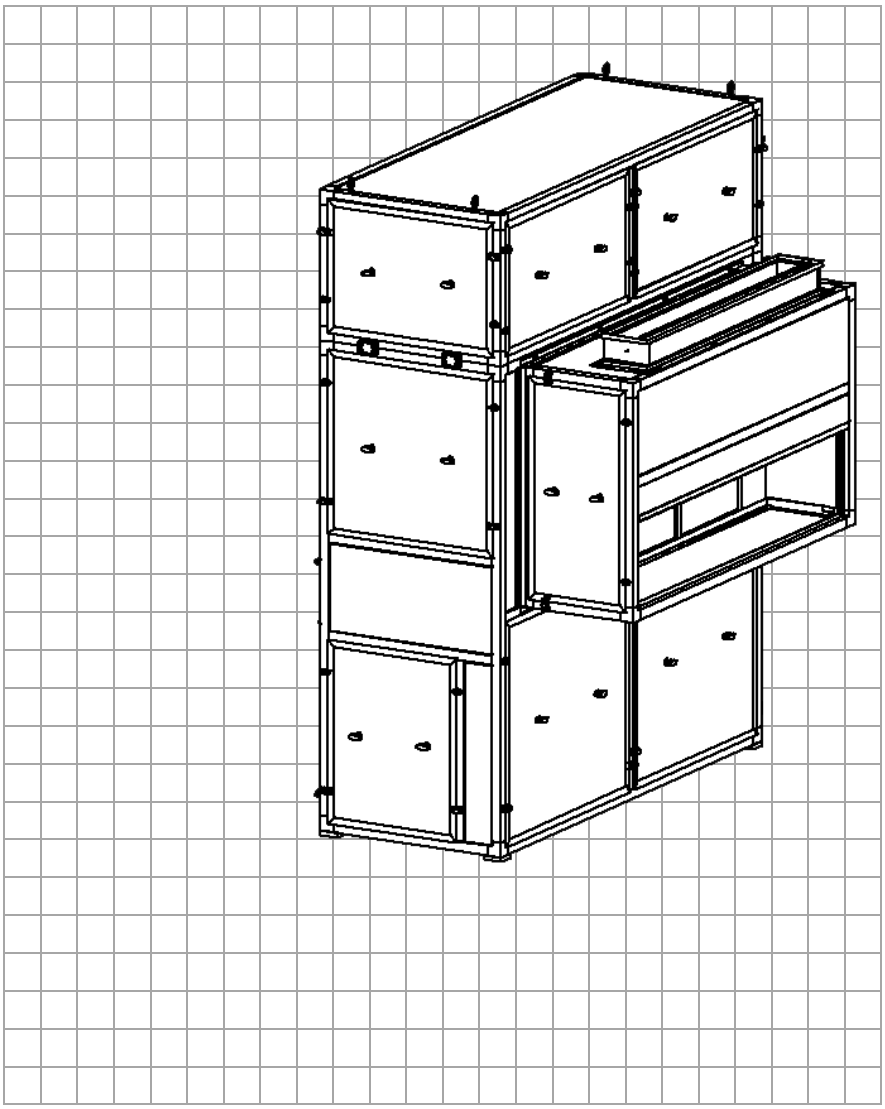
LS (SwimAire) Series Dehumidifiers

Installation and Operation Manual

- Meets AHRI Standard 9.10
- Effective humidity control: 40 to 130 lbs per hour
- Outdoor air intake to help meet ASHRAE 62 ventilation requirements
- Multiple heat sink options including pool water heating
- EC Fans for accurate and efficient airflow control
- Variable reheat for maximum comfort
- Aluminum and foam composite cabinet



⚠ DANGER

ONLY TRAINED, QUALIFIED PERSONNEL SHOULD INSTALL AND / OR SERVICE DESERT AIRE EQUIPMENT. SERIOUS INJURY, DEATH AND PROPERTY DAMAGE CAN RESULT FROM IMPROPER INSTALLATION / SERVICE OF THIS EQUIPMENT. HIGH VOLTAGE ELECTRICAL COMPONENTS AND REFRIGERANT UNDER PRESSURE ARE PRESENT.

Desert Aire

Dehumidification Equipment Standard Limited Warranty

Desert Aire warrants the dehumidifying unit to be free from defects in materials and workmanship subject to the terms, conditions and limitations stated herein.

TERMS

Desert Aire warrants all components (except as noted) for a period of one (1) year from the date of shipment contingent on validation of unit startup by Desert Aire Service. Upon connection of the unit to Desert Aire's AireGuard™ remote access system via onboard Ethernet connection the warranty is extended one additional year for a total warranty period of two (2) years from date of shipment. This requires validation of unit start up by Desert Aire Service. This warranty shall be limited to the supply of new or rebuilt parts for the part which has failed because of defects in workmanship or material, and does not include the cost of labor, transportation or other costs not herein provided for. Replaced parts are warranted only for the remaining portion of the original warranty period.

CONDITIONS

The warranty is subject to the following conditions:

1. The unit must be properly installed and maintained in accordance with the Desert Aire "Installation and Operation Manual" provided with each unit and/or other documentation provided.
2. The Start-Up Report must be completed and returned to Desert Aire Service for evaluation. If no deficiencies are identified a Warranty Validation Letter will be issued that provides all warranty dates and coverage. If installation or start-up deficiencies are present, these must be corrected and communicated to Desert Aire in order to activate the warranty.
3. This warranty shall not apply to any part that has been tampered with, or has been subject to misuse, negligence or accident. A warranty can be obtained for altered equipment but only with written consent from Desert Aire.
4. The following parts and components are excluded from the warranty: belts, filters, driers, fuses, pulleys and refrigerant.

5. Refrigerant coils or other components that corrode due to improperly balanced pool chemistry or corrosive air quality will not be warranted.
6. All replacements or repairs will be FOB Germantown, WI.
7. This warranty shall be null and void if defects or damages result from unauthorized opening of the refrigerant circuit, tampering with factory set controls, or operating outside the original design conditions.
8. Desert Aire shall not be liable for labor costs incurred in diagnosing the problem, or the removal or replacement of the part or parts being repaired.
9. Desert Aire must preauthorize all warranty coverage described herein.

EXTENDED WARRANTY

Your Desert Aire unit may have extended warrantees beyond this Standard Limited Warranty document.

Extended warrantees are only available at the time of the purchase of the original equipment. These extended warrantees are covered under a separate document and their terms and conditions are separate from this document. It is mentioned in this document for informational purposes only. Any Extended Warranties will be identified on the Warranty Validation Letter.

Any and all incidental or consequential damages are expressly excluded from this warranty. Some states do not allow the exclusion of incidental or consequential damages for personal injury, so the above limitations may not apply to you for certain damages. This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state. No person or representative is authorized to make any warranty or assume any liability not strictly in accordance with the aforementioned.

Inquiries regarding warranty matters should be addressed to:

COMPANY: Desert Aire LLC

DEPARTMENT: Service Manager

ADDRESS: N120 W18485 Freistadt Road Germantown, WI 53022

OFFICE: (262) 946-7400

E-MAIL: service@desert-aire.com

Additional copies of this manual can be purchased for a nominal fee from Desert Aire. Desert Aire also posts the most current revision of our I/O Manuals on our website. For a digital copy of the I/O Manual for your unit revision, please submit request to the contact information listed above.

Dangers, Warnings, Cautions

This manual uses safety labels to show potential risks and necessary precautions. The labels comply with ANSI Z535.4 standards and incorporate ISO 7010 symbols for universal recognition. They are placed to ensure hazards are easily identified and understood.

⚠ DANGER

Indicate the most severe and **immediate** consequences, warning installation professionals of situations that **will** result in fatal or catastrophic injury. These messages require immediate attention and strict compliance to prevent life-threatening outcomes.

⚠ WARNING

Indicate the most severe potential consequences, warning installation professionals of situations that may result in fatal or catastrophic injury. These messages also require immediate attention and strict compliance to avoid life-threatening scenarios.

⚠ CAUTION

Indicate hazardous conditions that may cause personal injury, equipment damage, or property-related incidents. These situations require careful attention and proactive safety measures to protect personnel and prevent operational or structural damage.

Review the entire manual BEFORE initiating equipment installation, operation, or service procedures.

Proposition 65

⚠WARNING

This product can expose you to chemicals including lead, which are known to the State of California to cause cancer and birth defects or other reproductive harm.

For more information go to www.P65Warnings.ca.gov

This warning is required by the State of California to meet Poposition 65 requirements.

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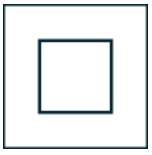
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1 ISO 7010 – Signs

1.1 Classification

	Mandatory action required where ignoring mandatory action can result in property damage, significant injury, and / or death.		Prohibited Action. You must never perform the action shown or described.
	General Hazard warning where if the corresponding precautions are not taken it could result in significant property damage, severe injury and / or death.		Important additional information and advice for user.

1.2 Information

	Before installation, start-up, and service, read these instructions carefully to ensure correct use. Use this manual to work safely with and on the equipment. They contain safety instructions that must be complied with as well as information required for optimal performance of the equipment. Failure to follow instructions can result in significant property damage, severe injury and / or death.		Before operating equipment read these instructions carefully. They contain safety instructions and hazard warnings that must be complied with. Failure to follow instructions can result in significant property damage, severe injury and / or death.
	Protective Earth IEC 60417-2019 Located near customer ground connection		CLASS 2

1.3 Prohibition

<table>
<tr><td></td><td>Do not step on this surface. It is not designed to support weight and may result in injury or damage.</td><td></td><td>Warning, Fire Hazard
Keep this area free of open containers with flammable liquids or combustible vapors.</td></tr>
<tr><td></td><td>Health Hazard, Equipment contains refrigerants, oils, and hazardous chemical substances.
Prolonged or repeated exposure may cause severe respiratory damage.</td><td></td><td>No open flame near this equipment. Open flames may cause fire or explosion hazards.</td></tr>
<tr><td rowspan="3"></td><td rowspan="3">WARNING: Environmental Protection - Chemical Disposal Protocol
Prohibited: discharge of refrigerants, oils, or chemical substances into municipal wastewater systems, groundwater sources, or natural water bodies.
Mandatory action: comply strictly with local environmental regulations. Use certified hazardous waste disposal facilities and document all chemical disposal procedures.
Unauthorized disposal violates environmental protection laws and will result in immediate legal and environmental consequences.</td><td></td><td>Do not stand under any load. Falling objects can result in severe injury or death.</td></tr>
<tr><td></td><td>Never operate the equipment with doors or covers removed. Access to hazardous voltage and moving parts can result in significant property damage, severe injury, and / or death.</td></tr>
<tr><td></td><td>Equipment contains flammable gas. No smoking, no open flames, and no sparks. Ignoring this warning can lead to fire or explosion.</td></tr>
</table>

1.4 Mandatory

	Lock Electrical Disconnect Switch or Circuit Breaker supplying the equipment when opening any access doors or covers. Follow Lock Out - Tag Out protocol when servicing equipment.		This equipment has high leakage current. Ensure a protective earth connection is established before connecting the main supply. Minimum ground wire size: 8.4 mm² Cu.
	Disconnect all incoming sources of power before opening any access doors or covers on the equipment.		Ensure proper equipotential bonding is established to eliminate potential differences and enhance safety during operation.
	Wear protective gloves. Equipment can contain contaminated refrigerant and oil which can cause severe burns.		Lift point: Use designated lift points when handling the unit. Ensure all lifting operations comply with equipment specifications and safety guidelines.
	Wear eye protection when servicing equipment containing refrigerants, which can be hazardous.		Lifting equipment must be used whenever the unit is moved to prevent injury or damage.

1.5 Hazard Warnings

	**WARNING:** This equipment contains hazardous voltage and live electrical parts. Contact with these parts can result in severe injury or death. Take all necessary precautions to avoid contact with live parts.		Units equipped with the CO_2 option have associated CO_2-specific hazards. Correct installation, selection of alarms, warnings, and safety components is required. Failure to comply may result in injury or death.
 	The unit contains an electronically commutated motor that retains hazardous voltage even after power is disconnected. **Wait at least three (3) minutes** after disconnecting power before servicing motors or electrical components in the remote condenser unit. Sealed electrical components must be replaced if damaged or faulty. Intrinsically safe components must be replaced if required to maintain safety integrity.		**WARNING:** equipment contains refrigerant gas that can be under high pressure. Only qualified, trained, and licensed person(s) should open the refrigeration circuit with authorization from the manufacturer and following these instructions. Failure to do so can result in property damage, serious injury, and / or death.
	**WARNING**: This equipment poses a potential arc flash hazard. Use appropriate personal protective equipment (PPE) and tools when working on this equipment. Failure to comply may result in severe injury or death.		**WARNING**: This equipment may contain multiple supply mains connections with hazardous live voltage. Disconnect all supply connections before removing doors or covers. Failure to comply may result in severe injury or death.
	**WARNING**: Beware of overhead obstacles. Ensure proper clearance to avoid injury or damage.		**WARNING:** contact with rotating fan blades can result in significant property damage, severe injury, or death. Take all necessary precautions to avoid contact with rotating components.
	**WARNING**: Keep hands and loose items away from moving parts. Contact with rotating components can result in serious injury.		This equipment may contain substances or mixtures that pose a health hazard. Handle with care and follow all applicable safety guidelines.
	This equipment may have hot surfaces. Avoid contact to prevent burns.		Overhead loads may be present. Stay clear of the area to avoid injury or death

2 Equipment Safety

The equipment must be installed, operated, and serviced/maintained in accordance with this manual and national and local codes. Only authorized and knowledgeable personnel may access the unit, and they must be qualified as specified by Annex HH of UL 60335-2-40 4th edition. Desert Aire is not liable for any personal harm, or material damage arising from failure to comply with this manual and national or local codes.

2.1 General Warnings and Safety

⚠ WARNING

- The appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction.
- Children should be supervised to ensure that they do not play with the appliance.
- Do not use equipment in an explosive atmosphere, or with improperly balanced air chemistry or corrosive air quality that causes undue corrosion on refrigerant coils and other components.
- Do not use equipment as a resting surface, climbing aid, or storage device.
- Do not attempt unauthorized constructional modifications, unauthorized opening of the refrigeration circuit, tampering with the factory set controls, or operation outside the original design conditions.
- HVAC liquids and chemicals can be dangerous if used incorrectly or if spills or accidents occur. Handle detergents and solvents with care to avoid spills and burns.

⚠ WARNING

- Do not attempt any electrical work if you are not a qualified/ licensed electrician or technician.
- Do not power the system using an extension cable or smaller than specified gauge wiring.
- Do not share the electrical supply mains with other appliances. Improper or insufficient power supply can cause undesirable operation, fire or electrical shock.
- For all electrical work follow all local and national wiring standards and regulations as well as this installation manual. You must use an independent overcurrent protection device to supply power.
- For all electrical work use the specified wiring.
- Ensure wiring connections are tight and clamped securely to prevent external forces from damaging the terminals. Improper connections can overheat and cause fire and/or electrical shock.

2.2 Warnings Concerning Flammable Refrigerants

⚠ WARNING

Risk of Fire – UNIT CONTAINS R-454B REFRIGERANT

Flammable Refrigerant Used

- To Be Repaired Only by Trained Service Personnel. Do Not Puncture Refrigerant Tubing.
- Dispose Of Properly in Accordance with Federal or Local Regulations.
- Consult Repair Manual/Owner's Guide before attempting to Service this Product. All Safety Precautions Must Be Followed.
- Follow Handling Instructions Carefully in Compliance with National Regulations.
- Auxiliary devices which may be ignition sources shall not be installed in the ductwork, other than auxiliary devices listed for use with the specific appliance. See instructions.
- Proper service equipment is required. Failure to use proper service tools may result in equipment damage or personal injury.
- Refrigerant cylinders can explode causing serious injury and/or death if not handled and stored properly.

⚠ WARNING

- Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
- Do not pierce or burn. Be aware that refrigerants may not contain an odor.

	Units with mildly flammable refrigerants (A2L), such as R-454B, shall be installed in accordance with all national and local regulations where applicable. The following information is provided in accordance with standard UL 60335-2-40 4th edition and its annexes and clauses.
	**(Annex DD.3.3) Qualification of Workers** Any operation concerning the installation, maintenance, repair, disassembly, and dismantling of the unit shall be carried out by qualified personnel, in accordance with Annex HH to the standard UL 60335-2-40 4th edition, who hold a valid certificate of compliance with the existing standards. The above-mentioned operations include: • Breaking into the refrigeration circuit; • Opening of sealed components; • Opening of ventilated enclosures.

(Annex DD.4) Information on Servicing	
	**(Annex DD.4.2) Checks to the area** Prior to beginning work on systems containing FLAMMABLE REFRIGERANTS, safety checks are necessary to ensure that the risk of ignition is minimized. For repair to the REFRIGERATING SYSTEM, **DD.4.3** to **DD.4.7** shall be completed prior to conducting work on the system.
	**(Annex DD.4.3) Work procedure** Work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapor being present while the work is being performed.
	**(Annex DD.4.4) General work area** All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.
	**(Annex DD.4.5) Checking for presence of refrigerant** The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.
	**(Annex DD.4.6) Presence of fire extinguisher** If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.
	**(Annex DD.4.7) No ignition sources** No person carrying out work in relation to a REFRIGERATING SYSTEM which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. “No Smoking” signs shall be displayed.



(Annex DD.4.8) Ventilated area

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.



(Annex DD.4.9) Checks to the refrigerating equipment

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance.

The following checks shall be applied to installations using FLAMMABLE REFRIGERANTS:

- The actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant-containing parts are installed;
- The ventilation machinery and outlets are operating adequately and are not obstructed;
- If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;
- Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
- Refrigerant pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant-containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.



(Annex DD.4.10) Checks to electrical devices

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.

Initial safety checks shall include:

- That capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
- That no live electrical components and wiring are exposed while charging, recovering or purging the system;
- That there is continuity of earth bonding.

(Annex DD.5) Repairs to sealed components	
	Sealed electrical components shall be replaced.

(Annex DD.6) Repairs to intrinsically safe components	
	Intrinsically safe components must be replaced.

(Annex DD.7) Cabling	
	Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

(Annex DD.8) Detection of flammable refrigerants	
	Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used. The following leak detection methods are deemed acceptable for all refrigerant systems: Electronic leak detectors may be used to detect refrigerant leaks but, in the case of FLAMMABLE REFRIGERANTS, the sensitivity may not be adequate or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the Lower Flammable Limit of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed. Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipework. NOTE Examples of leak detection fluids are: • bubble method, • fluorescent method agents. If a leak is suspected, all naked flames shall be removed/ extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Removal of refrigerant shall be according to Clause **DD.9**.

(Annex DD.9) Removal and evacuation	
	When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to: • Safely remove refrigerant following local and national regulations; • Purge the circuit with inert gas (optional for A2L); • Evacuate (optional for A2L); • Continuously flush or purge with inert gas when using flame to open circuit; • Open the circuit • The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems. • For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum (optional for A2L). This process shall be repeated until no refrigerant is within the system (optional for A2L). When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. • The outlet for the vacuum pump shall not be close to any potential ignition sources, and ventilation shall be available.

(Annex DD.10) Charging procedures	
	In addition to conventional charging procedures, the following requirements shall be followed. • Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them. • Cylinders shall be kept in an appropriate position according to the instructions. • Ensure that the REFRIGERATING SYSTEM is earthed prior to charging the system with refrigerant. • Label the system when charging is complete (if not already). • Extreme care shall be taken not to overfill the REFRIGERATING SYSTEM. • Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. • The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

(Annex DD.11) Decommissioning	

	Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task is commenced.
	• Become familiar with the equipment and its operation
	• Isolate system electrically.
	• Before attempting the procedure, ensure that:
	  ○ Mechanical handling equipment is available, if required, for handling refrigerant cylinders.
	  ○ All personal protective equipment is available and being used correctly;
	  ○ The recovery process is supervised at all times by a competent person;
	  ○ Recovery equipment and cylinders conform to the appropriate standards.
	• Pump down refrigerant system, if possible.
	• If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
	• Make sure that cylinder is situated on the scales before recovery takes place.
	• Start the recovery machine and operate in accordance with instructions.
	• Do not overfill cylinders (no more than 80% volume liquid charge).
	• Do not exceed the maximum working pressure of the cylinder, even temporarily.
	• When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
	• Recovered refrigerant shall not be charged into another REFRIGERATING SYSTEM unless it has been cleaned and checked.
	• The outlet for the vacuum pump shall not be close to any potential ignition sources and ventilation shall be available.

(Annex DD.12) Labelling	
	Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing FLAMMABLE REFRIGERANTS, ensure that there are labels on the equipment stating the equipment contains FLAMMABLE REFRIGERANT.

(Annex DD.13) Recovery	
	When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely. When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible cooled before recovery occurs. The recovery of equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of the flammable refrigerant. If in doubt, the manufacturer should be consulted. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. The recovered refrigerant shall be processed according to local legislation in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders. If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The compressor body shall not be heated by an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it shall be carried out safely.

2.3 Installation Safety

⚠ WARNING

- Failure to observe rigging instructions may lead to equipment damage, personal injury, or death.
- Lifting method and procedure must comply with all local and national codes and regulations.
- The use of safety slings in addition to lifting lugs is required.
- Do not lift the dehumidifier in high winds or above people.

⚠ CAUTION

Do not tip the dehumidifier on its side.

Avoid dropping the unit down stairways or subjecting it to severe mechanical shock.



- Installation must be performed according to the installation instructions.
- Installation must be performed by a licensed and trained technician. In addition, they must be knowledgeable about the safety regulations, rules for the prevention of accidents, and national / in-house regulations.
- Only use the included accessories, parts and specified items for installation. Using non-OEM parts can cause equipment failure which can lead to serious injury or death.
- Install the equipment on top of a firm structure that can fully support its weight. If the chosen location cannot support the equipment's weight, or the installation is not done properly, the equipment may fall and cause significant property damage, severe injury, and / or death.

2.4 Service & Maintenance Safety

⚠ WARNING

Disconnect power before servicing. The unit contains high voltage wiring and moving parts which may cause serious injury or death. Failure to properly wire the dehumidifier may create the possibility of shock and can lead to premature system failure.

Disconnect Power to the Unit before you adjust the Blower.

⚠ CAUTION

Condensate drain lines installed in an unconditioned space must be heat taped to prevent freezing. Check the heat tape yearly before winter operation.

You must clean the system thoroughly to prevent repeated compressor burnouts.



Any operation concerning the installation, maintenance, repair, disassembly, and dismantling of the unit shall be carried out by qualified personnel, in accordance with Annex HH to the standard UL 60335-2-40 4th edition, who hold a valid certificate of compliance with the existing standards.

The above-mentioned operations include:

- Breaking into the refrigeration circuit;
- Opening of sealed components;
- Opening of ventilated enclosures.

Maintenance must be performed in accordance with Section 3.2 of this manual and the relevant Annexes of DD. Failure to do so can result in fire or explosion.







Danger Due to Live Hazardous Voltage

Work on electrical components and wiring may only be carried out by trained electricians or by persons instructed in electricity under the supervision of an electrician in accordance with electrical engineering regulations.

A second person must always be present when working on energized part or lines.

Disconnect Supply Mains and use Lock Out–Tag Out procedures before servicing equipment. It is generally forbidden to carry out work on electrical live parts. Failure to disconnect power and follow Lock Out-Tag Out can result in contact with Hazardous Live Voltages. This can cause serious injury and/or death.

When doors and/or covers are removed the equipment protection class becomes IP00.



Wear protective gloves. Equipment can contain contaminated refrigerant and oil which can cause severe burns.



Wear eye protection when servicing equipment containing refrigerants, which can be hazardous.

2.5 Equipment Lifecycle

2.5.1 Transport

<table>
<tr>
<td>
</td>
<td>This equipment contains refrigerants, oils and other harmful liquids.

These liquids shall not be permitted to enter municipal wastewater or groundwater sources.

Dispose of liquids as required by local environmental law.</td>
<td></td>
<td>Equipment weight exceeds unassisted lifting limits.

The use of lifting equipment is mandatory any time the unit is to be moved.</td>
</tr>
<tr>
<td>

</td>
<td colspan="3">Always observe weight specifications and permissible carrying loads of means of transport.

Failure to observe rigging instructions may lead to equipment damage, personal injury, or death.

Lifting method and procedure must comply with all local and national codes and regulations.

The use of safety slings in addition to lifting lugs is required.

Do not lift the equipment in high winds or above people

Never stand underneath suspended equipment because defective transport equipment could cause death.

Avoid mechanical shocks and impacts to the equipment during transport.

Avoid extreme heat or cold.

Do not stack equipment.

Only handle equipment with suitable hoisting gear.

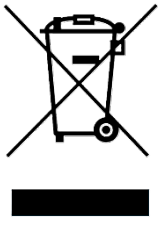
Do not tip the unit on its side.

Do not step on top of unit.</td>
</tr>
</table>

2.5.2 Storage

	Store equipment in its original packaging in a dry area that is protected from weather and contamination until final installation. **Do not stack equipment.**
	Avoid exposure to extreme temperatures. Prevent prolonged storage.
	Maintain a safe distance from open flames, as R-454B refrigerant is flammable.

2.5.3 Disposal/Recycle

	Wear protective gloves. Equipment can contain contaminated refrigerant and oil which can cause severe burns.		This Equipment contains refrigerants, oils and other harmful liquids. These liquids shall not be permitted to enter municipal wastewater or groundwater sources. Dispose of liquids as required by local environmental law.
	This equipment contains electronics, and other components/hazardous materials. Do not dispose as household waste or unsorted municipal waste. Dispose or recycle as required by local environmental law.		This Equipment contains metals and other recyclable materials which must be recycled as required by local environmental law.

3 Minimum Room Size Requirements for A2L Refrigerants



Equipment contains flammable gas. Failure to comply with the Installation Requirement for Equipment using R-454B Refrigerant can lead to fire or explosion.

⚠WARNING

Equipment containing R-454B refrigerant shall be installed, operated and stored in a room with floor area larger than the area defined in the following section based on the total refrigerant charge in the system.

⚠WARNING

Pipe-work including piping material, pipe routing, and installation shall include protection from physical damage in operation and service and be in compliance with national and local codes and standards, such as AHSRAE 15, AHSRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.

To comply with the requirements of UL 60335-2-40 the equipment, installed rooms, and conditioned rooms must meet the requirements laid out in this section. The flowcharts in the figures below can roughly be followed to determine what requirements apply. One flowchart is required for the conditioned spaces, and the other flowchart is required for the machinery room (or installed room), if applicable.

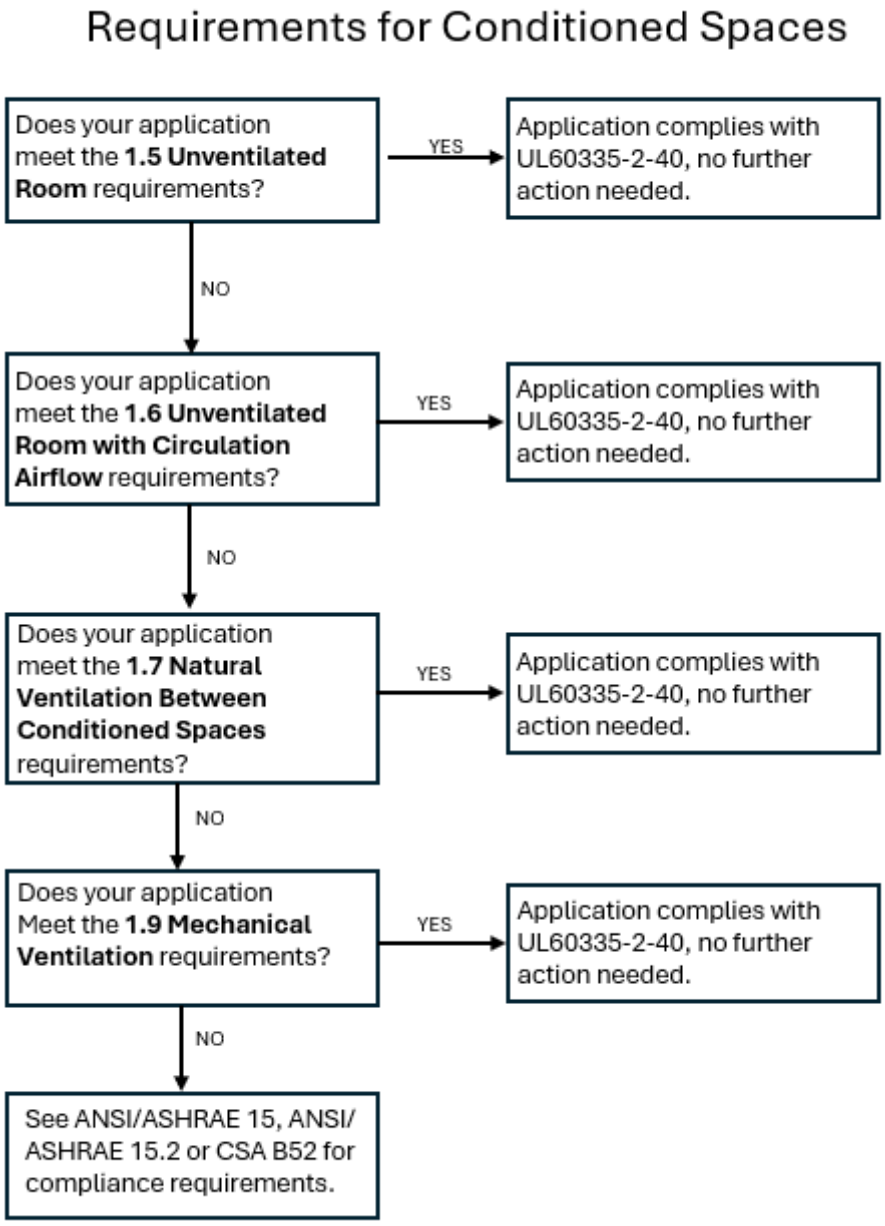


Figure 1 : Flowchart for Conditioned Spaces

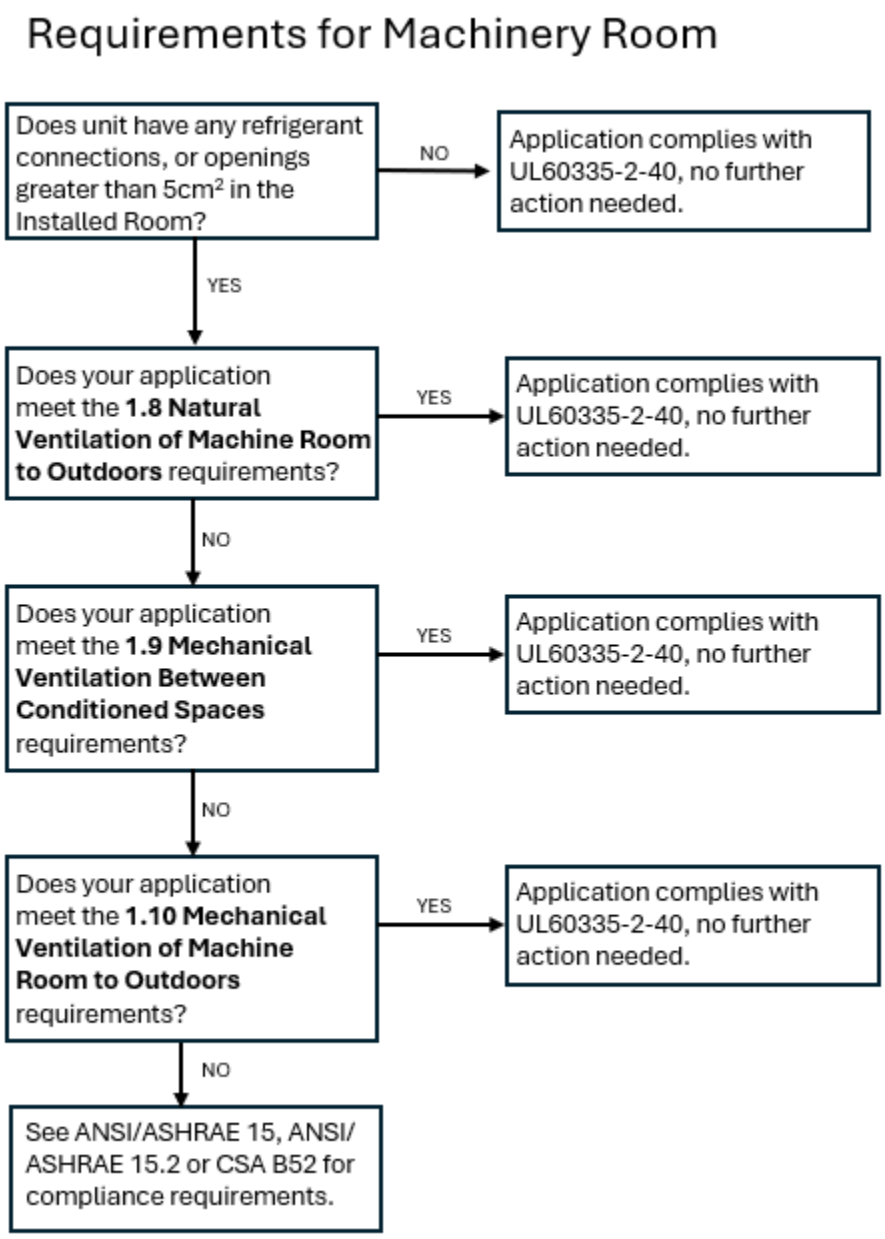


Figure 2: Flowchart for Machinery Room

3.1 Refrigerant Leak Detection and Mitigation

⚠WARNING

This equipment comes with a factory installed Refrigerant Detection Device. To be effective the unit must be electrically powered at all times after installing, other than when servicing. The Refrigerant Detection Device can determine its end-of-life.

Refrigerant sensors for refrigerant detection systems shall only be replaced with sensors specified by the appliance manufacturer.

General Maintenance for refrigerant detection sensors:

- Keep all debris from around the openings of the sensors.
- Check connections and wiring schedule basics.
- Don't try to repair sensors, only replace.

All Desert Aire equipment will be provided with A2L leak detection sensor(s) compliant with Annex LL of the UL 60335-2-40 and the location within the equipment has been tested according to Annex MM of UL 60335-2-40. The leak detector has a N.O. contact that will "close" when the sensor is powered and DOES NOT detect a high level of refrigerant. If the sensor loses power, or enters an alarm state, the contact will "open". This contact will be used to energize/de-energize a relay with a N.O. and N.C. contact available for customer connection. The leak detection strategy will occur at the unit level, and the leak mitigation strategy can occur at either the unit level or the room level, depending on the application.



The A2L sensor will perform a series of self-diagnostics when first powered. If these self-diagnostics are passed the sensor will be put into normal operation state. If these self-diagnostics fail, the sensor will be put in an alarm/ fail-safe state. During normal operation the sensor health is continuously monitored, and if an error is found the sensor will be put in an alarm/ fail-safe state. Refer to the table below for sensor diagnostics.

STATE	*GREEN LED*	*RED LED*	*ACTION*
Power-up Fail Safe	*ON*	*ON*	*Recycle Power*
End of Life	*OFF*	*Blinking*	*Replace Sensor*
Runtime Fail Safe	*OFF*	*Blinking*	*Over 5min- Replace Sensor*
Alarm	*OFF*	*ON*	*Service Equipment*
Warning	*ON*	*Heartbeat*	*Schedule Service*
Near End of Life	*Blinking*	*Heartbeat*	*Schedule Service*
Normal Operation	*Heartbeat*	*OFF*	-
Power-up	*ON*	*OFF*	*Wait ~5sec*

Table 1: A2L Sensor LED Status

All Desert Aire equipment is provided with a blower to handle the process air during normal operation. This blower can provide circulation airflow as a leak mitigation strategy depending on the application.

When the refrigerant detection system detects a leak, the following will be initiated by the unit.

- De-energize a dedicated A2L alarm relay. The Normally Open and Normally Closed dry contacts of this relay will be made available for field wiring to interface with room level mitigation systems.
- Disable compressor operation.
- The unit supply blower(s) will be commanded to run at full speed. This can be used to provide minimum circulation airflow (Qmin) if applicable.
- The refrigerant detection system and controls will maintain the above action until at least 5 minutes after the refrigerant detection system has reset. Building fire and smoke systems may override these functions.



If the leak detector detects a leak, the above operations will be initiated even if the unit is in standby mode by system switch, BMS or digital input.

3.2 Determination of Room Area

The room area is defined as the area enclosed by the projection of walls, doors and partitions to the floor. Rooms on the same floor connected by an open passageway can be added to the room area so long as they meet the following criteria.

- It is a permanent opening
- It extends to the floor
- It is intended for people to walk through

When the location of the equipment is above 1,969 ft (600m), the Altitude Adjustment Factor in the table is needed to calculate the minimum room size.

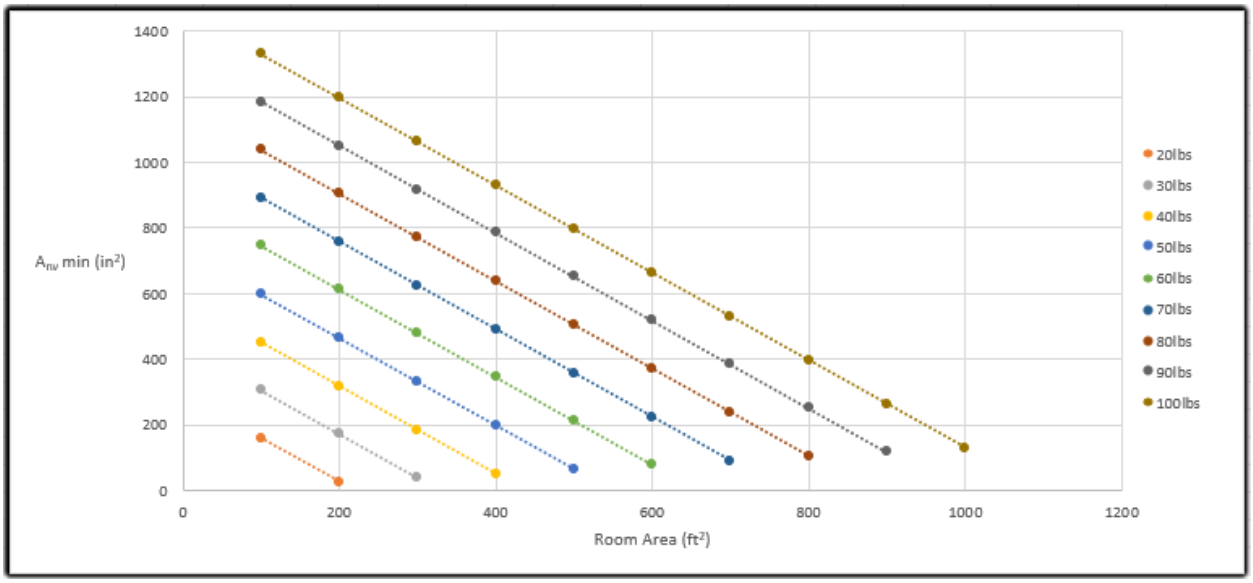
H_{alt}		AF
Meter	**ft**	
0	0	1.00
200	656	1.00
400	1312	1.00
600	1969	1.00
800	2625	1.02
1,000	3281	1.05
1,200	3937	1.07
1,400	4593	1.10
1,600	5,249	1.12
1,800	5,906	1.15
2,000	6,562	1.18
2,200	7,218	1.21
2,400	7,874	1.25
2,600	8,530	1.28
2,800	9,186	1.32
3,000	9,843	1.36
3,200	10,499	1.40
3,400	11,155	1.49
3,600	11,811	1.58
3,800	12,467	1.66

Table 2: Minimum Room Size Altitude Adjustment Factor

Depending on the application, the conditioned room, installed room, and rooms connected via an airduct system will need to be evaluated.

3.3 Opening Conditions for Connected Rooms and Natural Ventilation

Adjacent rooms on the same floor connected by a permanent opening can be considered a single room provided they meet the following criteria. This is also the requirement for natural ventilation between occupied spaces.



The minimum opening area for natural ventilation shall not be less than A_{nv}min. Figure 3: Chart GG.7 - Required Opening (in^2) per Given Room Area (ft^2)

The opening is permanent and cannot be closed.

Any opening above 300mm cannot be counted towards minimum opening for natural ventilation (Anv_{min}) (Figure 4).

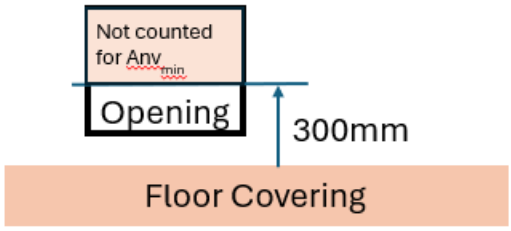


Figure 4: Openings Above 300mm and Minimum Natural Ventilation Criteria

At least 50% of Anv_{min} shall be below 200mm from the floor (Figure 5).

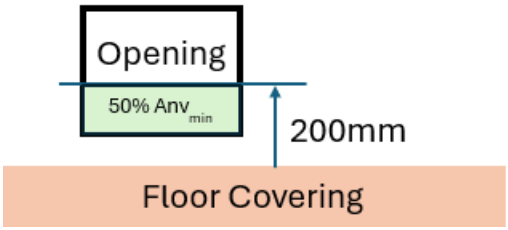


Figure 5: Minimum Natural Ventilation Opening Requirements Below 200mm .

The bottom of the lowest opening shall not be higher than the point of release when the unit is installed and not more than 100mm from the floor (Figure 6).

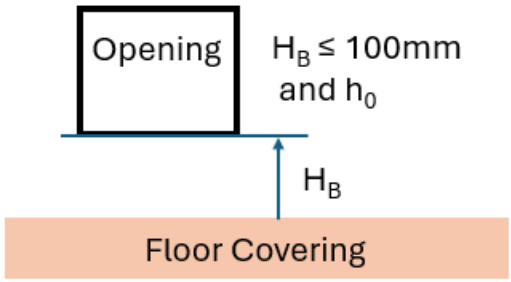


Figure 6: Height Regulations for the Lowest Opening in Installation

For openings extending to the floor the height shall not be 20mm (Figure 7)

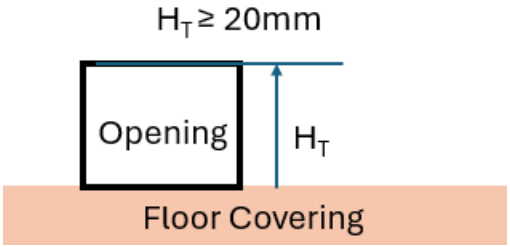


Figure 7: Minimum Height Requirement for Floor-Extending Openings

3.4 Opening Requirements for Mechanical Ventilation

When mechanical ventilation is applied, the openings must meet the following requirements:

- The lower edge of openings extracting air from the room shall not be more than 100 mm above the floor. (see Figure 8)

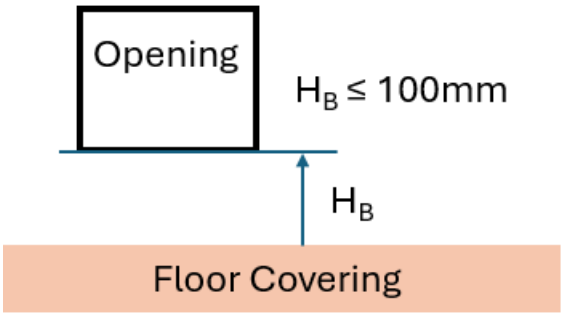


Figure 8: Opening Requirements for Mechanical Ventilation

- The openings supplying makeup air to the room shall be located such that the supplied makeup air mixes with the leaked refrigerant.
- When makeup air is supplied from the same space where ventilation air extracted from the space is discharged, ventilation air discharge openings shall be separated by a sufficient distance, but not less than 3m, from the makeup air intake openings to prevent re-circulation to the space.

3.5 Unventilated Room (GG 1.5)

For non-ducted units where the installed space is the conditioned space and the total charge is less than 15.39kg (33.93lb), determine the total charge of the system and use Table to find the minimum floor area, A_{min}.

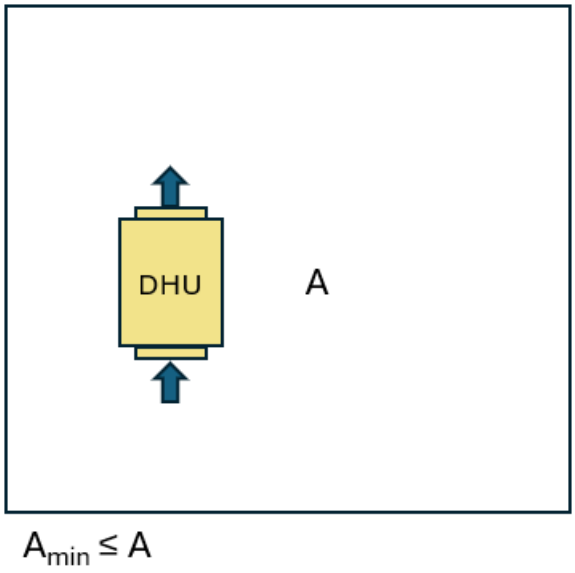


Figure 9: Unventilated non-ducted unit

Charge			Minimum Floor Area (A_{min})	
lbs	**oz**	**kg**	**ft^2**	**m^2**
10	0	4.54	1,980.2	184.0
15	0	6.80	4,455.4	413.9
20	0	9.07	7,920.7	735.9
25	0	11.34	12,376.1	1,149.8
30	0	13.61	17,821.5	1,655.7

Note: If the area of the room is larger than A_{min}, then no further measures are required.

Table 3: Minimum Floor Area for Unventilated Room Non-Ducted Unit

3.6 Unventilated Room with Circulation Airflow (GG 1.6)

The room area can be increased per Table if the requirements of circulation airflow are met.

- The appliance must be connected via an airduct system to one or more rooms where the supply and return air are directly ducted to the space.
- Spaces where airflow may be limited by zoning dampers cannot be included when determining total area.
- The minimum airflow Q_{min} from Table must be achieved by the unit.

Desert Aire units typically provide continuous airflow but, in all cases, a refrigerant detection sensor(s) is provided to ensure circulation airflow is achieved if there is a refrigerant leak.

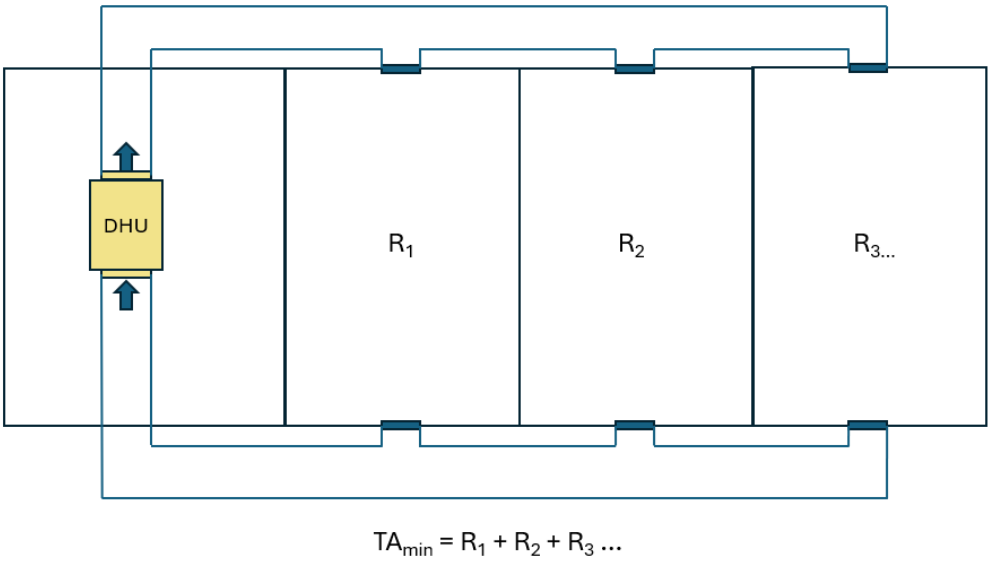


Figure 10: Air Duct Diagram for one or more rooms.

Charge			A_{min}		Q_{min}	
lbs	oz	kg	ft^2	m^2	ft^3/min	m^3/h
10	0	4.54	147.5	13.7	266	452
15	0	6.80	221.2	20.5	399	678
20	0	9.07	294.9	27.4	532	904
25	0	11.34	368.7	34.2	665	1130
30	0	13.61	442.4	41.1	798	1356
35	0	15.88	516.1	47.9	931	1582
40	0	18.14	589.8	54.8	1064	1808
45	0	20.41	663.6	61.6	1197	2034
50	0	22.68	737.3	68.5	1330	2260
55	0	24.95	811.0	75.3	1464	2486
60	0	27.22	884.8	82.2	1597	2713
65	0	29.48	958.5	89.0	1730	2939
70	0	31.75	1,032.2	95.9	1863	3165
75	0	34.02	1,106.0	102.7	1996	3391
80	0	36.29	1,179.7	109.6	2129	3617
85	0	38.56	1,253.4	116.4	2262	3843
90	0	40.82	1,327.1	123.3	2395	4069
95	0	43.09	1,400.9	130.1	2528	4295
100	0	45.36	1,474.6	137.0	2661	4521
105	0	47.63	1,548.3	143.8	2794	4747
110	0	49.90	1,622.1	150.7	2927	4973
115	0	52.16	1,695.8	157.5	3060	5199
120	0	54.43	1,769.5	164.4	3193	5425
125	0	56.70	1,843.3	171.2	3326	5651
130	0	58.97	1,917.0	178.1	3459	5877
135	0	61.23	1,990.7	184.9	3592	6103
140	0	63.50	2,064.5	191.8	3725	6329
145	0	65.77	2,138.2	198.6	3858	6555
150	0	68.04	2,211.9	205.5	3991	6781
155	0	70.31	2,285.6	212.3	4125	7007
160	0	72.57	2,359.4	219.2	4258	7233
165	0	74.84	2,433.1	226.0	4391	7459
170	0	77.11	2,506.8	232.9	4524	7685

Table 4: Minimum Area, and Airflow for Unventilated Room with Circulation Airflow

3.7 Natural Ventilation Between Conditioned Spaces (GG 1.7)

If natural ventilation is applied between conditioned (occupied) spaces the following requirements must be met.

- Natural ventilation from an occupied space cannot be made to the outdoors.

The openings must comply with the requirements described in **3.3 Opening Conditions for Connected Rooms and Natural Ventilation**.

- For ducted equipment use Table to determine A_{min}. The area of the conditioned space plus the area of the ventilation room must be larger than A_{min}.
- For non-ducted equipment use Table to determine A_{min}. The area of the conditioned space plus the area of the ventilation room must be larger than A_{min}. The area of the installed room must be at least 20% of A_{min}.

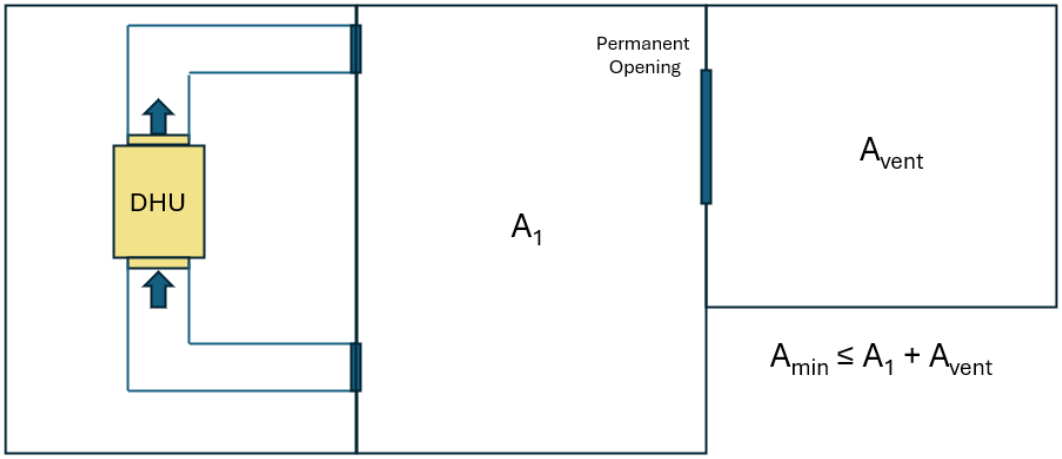


Figure 11: Ducted unit with Natural Ventilation

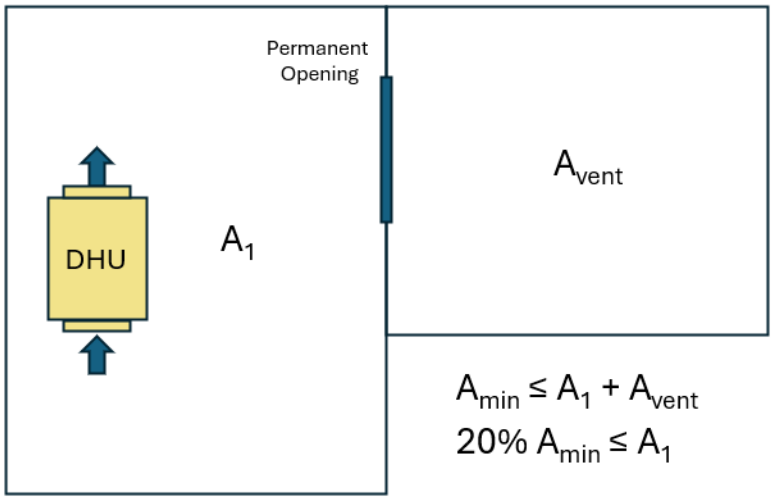


Figure 12: Non-Ducted unit with Natural Ventilation

3.8 Natural Ventilation of Machine Room to Outdoors (GG 1.8)

If natural ventilation of a Machinery Room (Unoccupied space) to the outdoors is applied the following requirements must be met.

- Natural ventilation to the outdoors is not allowed below ground level.
- Natural ventilation from occupied spaces shall not be made to the outdoors.

The openings must comply with the requirements described in section **3.3 Opening Conditions for Connected Rooms and Natural Ventilation**, but the minimum opening area will be calculated differently, as described below.

- The minimum opening area Anv_{min} shall be determined by Table .

See Figure 13 for more details.

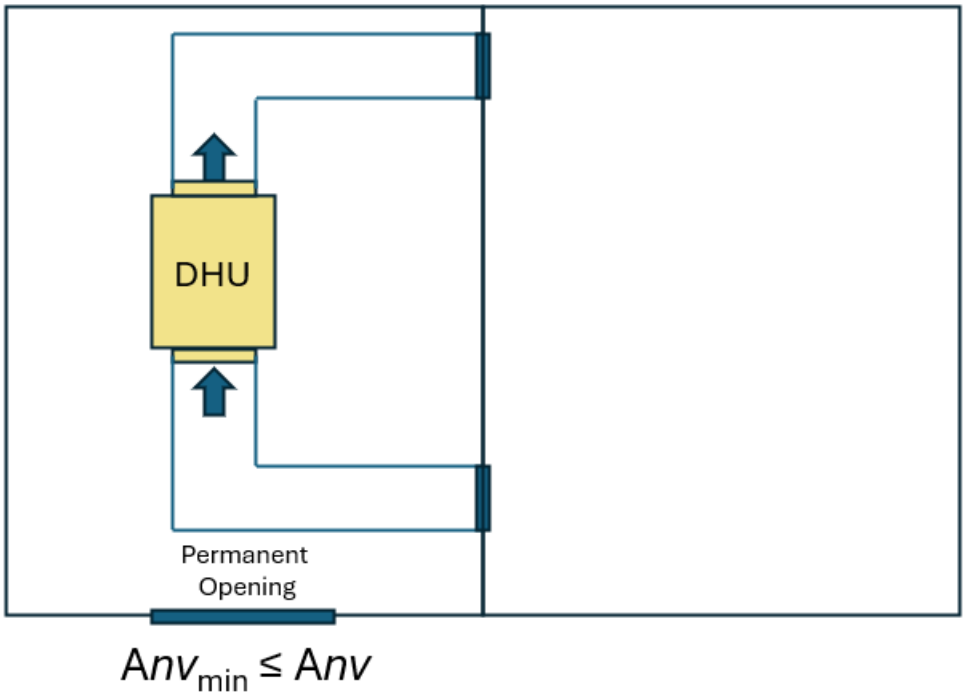


Figure 13: Natural Ventilation of Machinery Room to the Outdoors

Charge			Anv_{min}	
lbs	**oz**	**kg**	**ft^2**	**m^2**
10	0	4.54	0.5	0.042
15	0	6.80	0.7	0.063
20	0	9.07	0.9	0.084
25	0	11.34	1.1	0.105
30	0	13.61	1.4	0.127
35	0	15.88	1.6	0.148
40	0	18.14	1.8	0.169
45	0	20.41	2.0	0.190
50	0	22.68	2.3	0.211
55	0	24.95	2.5	0.232
60	0	27.22	2.7	0.253
65	0	29.48	3.0	0.274
70	0	31.75	3.2	0.295
75	0	34.02	3.4	0.316
80	0	36.29	3.6	0.338
85	0	38.56	3.9	0.359
90	0	40.82	4.1	0.380
95	0	43.09	4.3	0.401
100	0	45.36	4.5	0.422
105	0	47.63	4.8	0.443
110	0	49.90	5.0	0.464
115	0	52.16	5.2	0.485
120	0	54.43	5.5	0.506
125	0	56.70	5.7	0.527
130	0	58.97	5.9	0.549
135	0	61.23	6.1	0.570
140	0	63.50	6.4	0.591
145	0	65.77	6.6	0.612
150	0	68.04	6.8	0.633
155	0	70.31	7.0	0.654
160	0	72.57	7.3	0.675
165	0	74.84	7.5	0.696
170	0	77.11	7.7	0.717

Table 5: Minimum Opening Area for Natural Ventilation of Machinery Room to the Outdoors

3.9 Mechanical Ventilation Between Conditioned Spaces (GG 1.9)

Desert Aire units will be equipped with a refrigerant detection sensor(s) and have the following controls provided. The following controls will be active for at least 5 minutes after the refrigerant detection sensor has reset.

- Close an alarm contact provided for the customer to indicate refrigerant leak.
- Compressor operation will be disabled.

If mechanical ventilation between conditioned spaces is required (Figures Figure 14,Figure 15,Figure 16 illustrate Ducted, Non-Ducted, and Mechanical Ventilation respectively), refer to Table to determine Q_{min} and EA_{min} for the application.

The following requirements must be met.

- The Desert Aire provided alarm contact will need to be integrated into a room level mitigation system that will provide minimum airflow Q_{min}.
- The area of the ventilation room must be greater than or equal to the EA_{min}.
- The openings must meet the **Opening Requirements for Mechanical Ventilation** (see Figure 8 above).

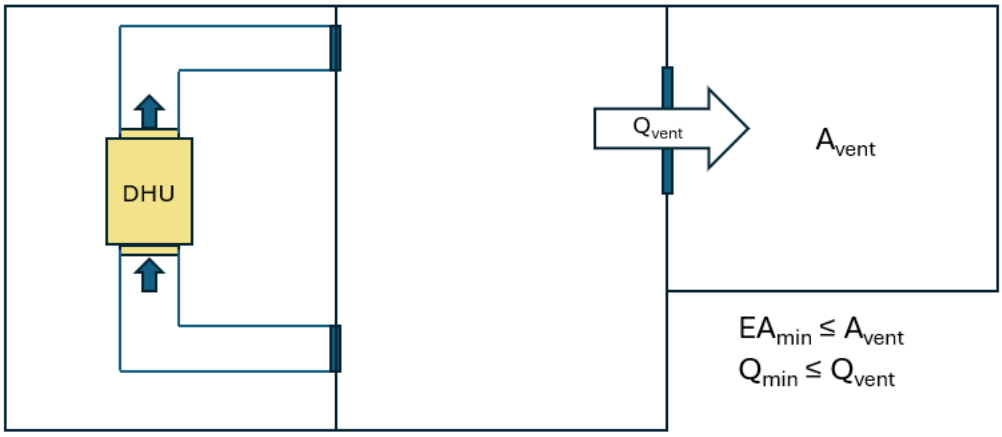


Figure 14: Ducted Unit with Mechanical Ventilation Between Conditioned Spaces Ducted Unit with Mechanical Ventilation Between Conditioned Spaces

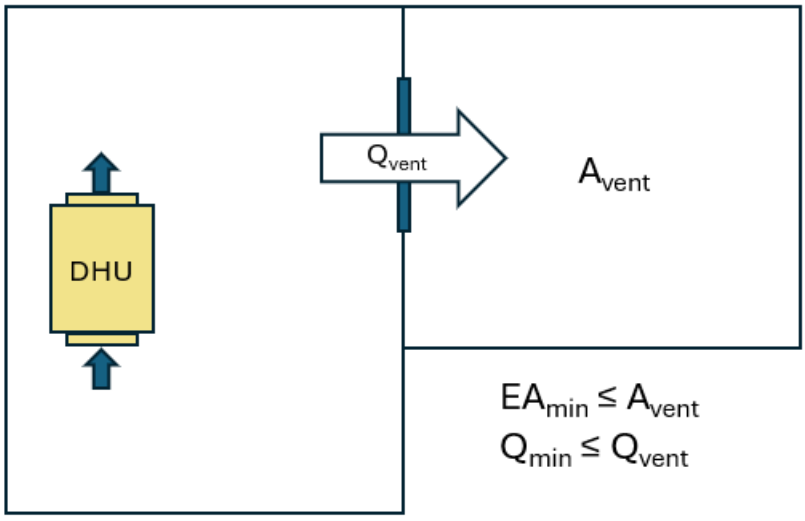


Figure 15: Non-Ducted Unit with Mechanical Ventilation Between Conditioned Spaces

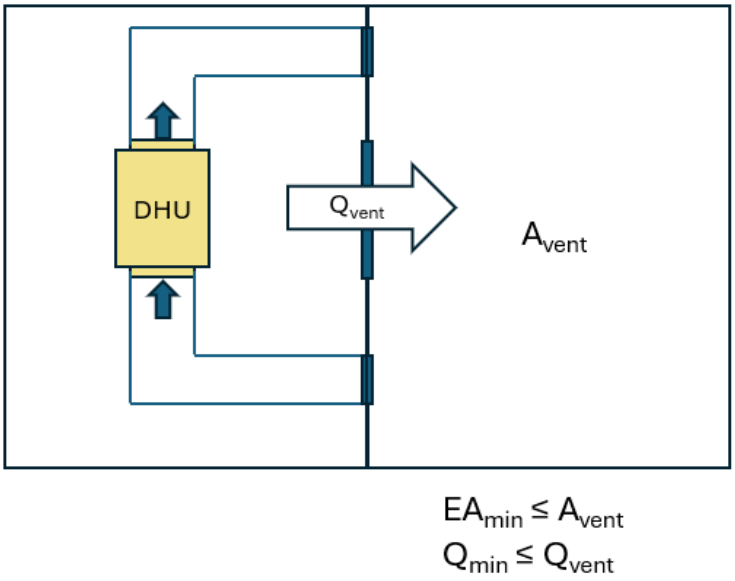


Figure 16: Mechanical Ventilation to Conditioned Spaces from Mechanical Room

Charge			EA_{min}		Q_{min}	
lbs	**oz**	**kg**	**ft^2**	**m^2**	**ft^3/min**	**m^3/hr**
10	0	4.54	0.0	0.0	240.8	409.1
15	0	6.80	0.0	0.0	401.0	681.3
20	0	9.07	0.0	0.0	561.2	953.5
25	0	11.34	0.0	0.0	721.4	1,225.6
30	0	13.61	0.0	0.0	881.6	1,497.8
35	0	15.88	29.5	2.7	1,041.7	1,769.9
40	0	18.14	103.2	9.6	1,201.9	2,042.1
45	0	20.41	177.0	16.4	1,362.1	2,314.2
50	0	22.68	250.7	23.3	1,522.3	2,586.4
55	0	24.95	324.4	30.1	1,682.5	2,858.5
60	0	27.22	398.1	37.0	1,842.7	3,130.7
65	0	29.48	471.9	43.8	2,002.8	3,402.9
70	0	31.75	545.6	50.7	2,163.0	3,675.0
75	0	34.02	619.3	57.5	2,323.2	3,947.2
80	0	36.29	693.1	64.4	2,483.4	4,219.3
85	0	38.56	766.8	71.2	2,643.6	4,491.5
90	0	40.82	840.5	78.1	2,803.8	4,763.6
95	0	43.09	914.3	84.9	2,964.0	5,035.8
100	0	45.36	988.0	91.8	3,124.1	5,307.9
105	0	47.63	1,061.7	98.6	3,284.3	5,580.1
110	0	49.90	1,135.4	105.5	3,444.5	5,852.3
115	0	52.16	1,209.2	112.3	3,604.7	6,124.4
120	0	54.43	1,282.9	119.2	3,764.9	6,396.6
125	0	56.70	1,356.6	126.0	3,925.1	6,668.7
130	0	58.97	1,430.4	132.9	4,085.2	6,940.9
135	0	61.23	1,504.1	139.7	4,245.4	7,213.0
140	0	63.50	1,577.8	146.6	4,405.6	7,485.2
145	0	65.77	1,651.6	153.4	4,565.8	7,757.3
150	0	68.04	1,725.3	160.3	4,726.0	8,029.5
155	0	70.31	1,799.0	167.1	4,886.2	8,301.7
160	0	72.57	1,872.8	174.0	5,046.4	8,573.8
165	0	74.84	1,946.5	180.8	5,206.5	8,846.0
170	0	77.11	2,020.2	187.7	5,366.7	9,118.1

Table 6: Minimum Entering Area & Minimum Airflow for Mechanical Ventilation between Conditioned space and Mechanical Ventilation of Machine Room to the Outdoors

3.10 Mechanical Ventilation of Machine Room to Outdoors (GG 1.10)

Desert Aire units will be equipped with a refrigerant detection sensor(s) and have the following controls provided. The following controls will be active for at least 5 minutes after the refrigerant detection sensor has reset.

- Close an alarm contact provided for the customer to indicate refrigerant leak.
- Compressor operation will be disabled.

If mechanical ventilation to the outdoors is required (Figure Q), use Table to determine Q_{min} for the application.

The following requirements must be met.

- The Desert Aire provided alarm contact will need to be integrated into a room level mitigation system that will provide minimum airflow Q_{min}.
- The openings must meet the Opening Requirements for Mechanical Ventilation (see Figure 8).

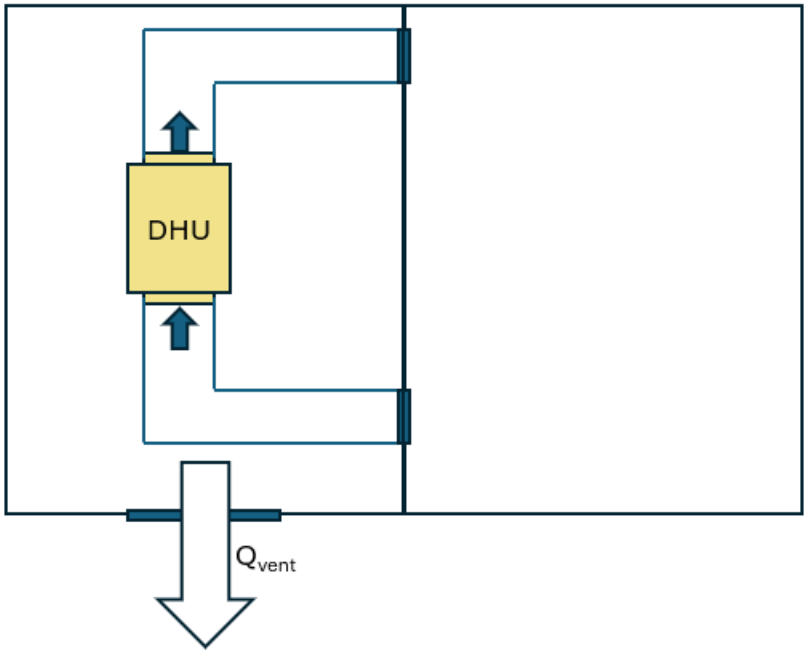


Figure 17: Mechanical Ventilation of Machinery Room to Outdoors

4 Introduction

Desert Aire dehumidifiers are designed to provide years of reliable service when installed properly. Read these instructions carefully before you install the dehumidifier.

4.1 Inspection

Desert Aire inspects and tests each dehumidifier before it leaves the factory so that you receive a quality piece of equipment. Unfortunately, equipment may be damaged in transit. Inspect the dehumidifier carefully before signing the receiving papers. Check for both visible and concealed damage. Remove crating and inspect the exterior cabinet for damage. Dented panels, broken crating or any fluids leaking from the unit should be documented upon delivery.

4.2 Freight Damage Claims

If the dehumidifier has been damaged, document the extent of the damage. Take pictures. Next, obtain a claim form from the carrier. Promptly fill out and return the form. Carriers may deny claims that you have not filled out within a week of delivery. Notify Desert Aire of any damage.

4.3 Rigging and Handling



- Failure to observe rigging instructions may lead to equipment damage, personal injury and/or death.
- Lifting methods and procedures must comply with all local and national codes and regulations.
- The use of safety slings in addition to lifting lugs is required.
- Do not lift the dehumidifier in high winds or above people.
- See Equipment Safety Installation section for warnings and hazards associated with rigging equipment.

Desert Aire dehumidifiers are solidly built and can be very heavy. Avoid personal injury and damaging the equipment by planning the installation carefully. Use moving equipment whenever possible. The modules ship separate to each other and are mounted on pallets (Figure 18). They can be moved around on these pallets.



Figure 18 – Example of Modules Shipped on Separate Pallets. Note that the Electric Heater can ship on its own pallet.

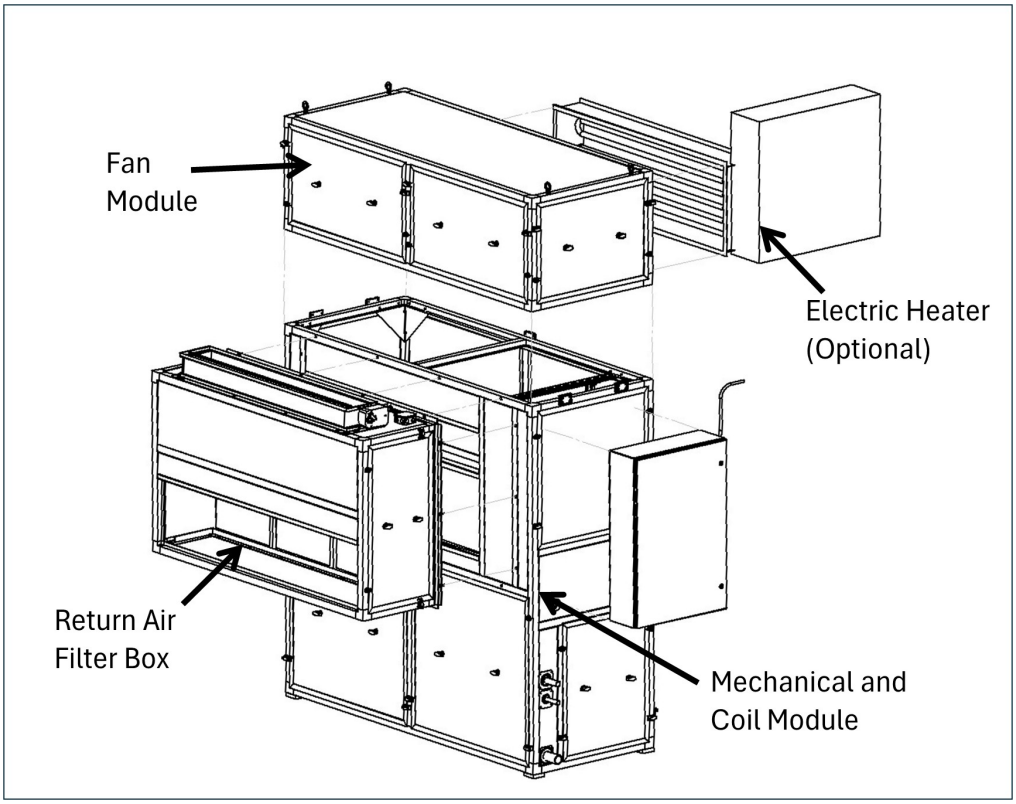


Figure 19 – Exploded View of Modules

4.3.1 Handling Dehumidifier

The LS is designed as a retrofit friendly dehumidifier, and it ships in the following separate sections (see Figure 18 and Figure 19):

- Mechanical and Coil Module
- Return Air Filter Box
- Fan Module
- Electric Heater (Optional)
- Remote Electric Control Panel (Optional)

Personnel should avoid stepping on top of the unit. Damage incurred through caved or distorted top panels will not be covered under warranty.

⚠ CAUTION

- Do not tip the dehumidifier on its side.
- Avoid dropping the unit down stairways or subjecting it to severe mechanical shock.

In rare occurrence, the modules may need to be rotated to fit through a space. The Fan Module, Return Air Filter Box, Electric Heater, and Remote Electric Control Panel can be rotated during handling without impacting the performance of the unit. The Mechanical and Coil Module should not be rotated. It is not designed to support the heavy internal components at all angles.

4.3.2 Rigging the Remote Condenser

The optional remote condensers are equipped with four or more lifting eyes. Test-lift the remote condenser to verify that it is properly balanced.

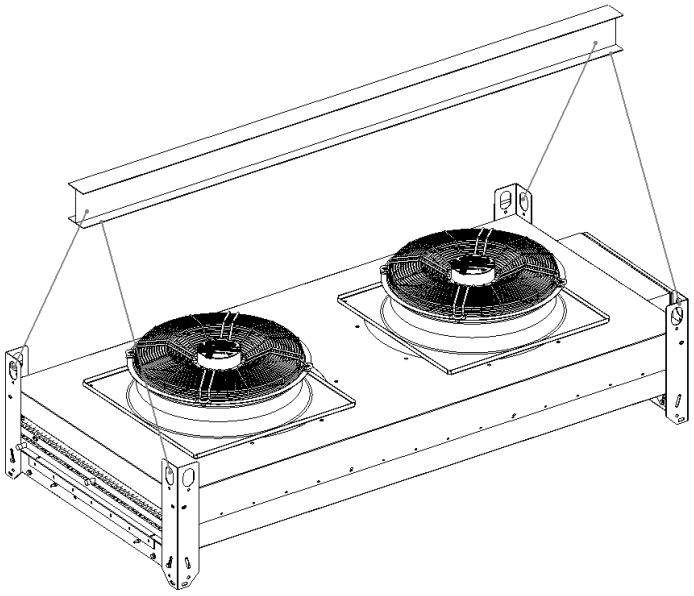


Figure 20 - Typical Rigging for an Optional Remote Condenser

⚠ CAUTION

Do not lift the remote condenser by its refrigeration headers or return bends.

4.4 Operating Range

	Water Cooled	Pool/ Spa
Maximum allowable refrigerant pressure	600 psig (4.14 MPa)	600 psig (4.14 MPa)
Maximum altitude	12,000 ft (3,657 m)	12,000 ft (3,657 m)
Maximum operating water pressure	225 psig (1,551 kPA)	225 psig (1,551 kPA)
Minimum operating water pressure	0 psig (0 kPA)	0 psig (0 kPA)
Maximum operating water temperature	105°F (40°C)	105°F (40°C)
Minimum operating water temperature	50°F (10°C) – cooling tower option 35°F (1.7°C) – chilled water option	60°F (7.3°C)
Minimum Ambient Around Unit (Indoor)	45°F (7.2°C)	

Table 7– Operating Ranges for Water Cooled and Pool Water Cooled Condensers

4.5 Unit Conversion

US Customary

$$°F = \left(°C + \frac{9}{5}\right) + 32$$

$$psig = 6.8945 * kPa$$

$$In.WC = \frac{kPa}{4.0416}$$

$$CFM = 0.02832 * \left(\frac{m^3}{min}\right)$$

International System of Units (SI)

$$°C = (°F - 32) * \frac{5}{9}$$

$$kPa = \frac{psig}{6.8945}$$

$$kPa = 4.0416 * In.WC$$

$$\frac{m^3}{min} = 35.31467 * (CFM)$$

5 Installation

The manual applies to standard unit configurations only.

5.1 Location of Dehumidifier

5.1.1 Access

The LS dehumidifier is designed with flexibility in mind. Figure 21 indicates where access panels are located and what can be accessed from them.

- Access Panels – Best practice is to allow 36 inches around the whole unit for access and maintenance. In many cases there is more than one access panel.
- Allow at least 12 inches around access panels where there are obstructions. Plan for at least one removal path for major components.
- Ducts – Hatching shows location of air ducts. Do not attempt to conserve installation space by fabricating restrictive ductwork with abrupt bends. You may reduce the operating efficiency and the moisture removal capacity of the dehumidifier.
- Electrical Panel – requires at least 36" unobstructed clearance in front of panel.
- Pipes – Note location of pipe connections and ensure access for pipe routing, without blocking removable panels.

Consult local, state, and national electric codes for other minimum service clearances.

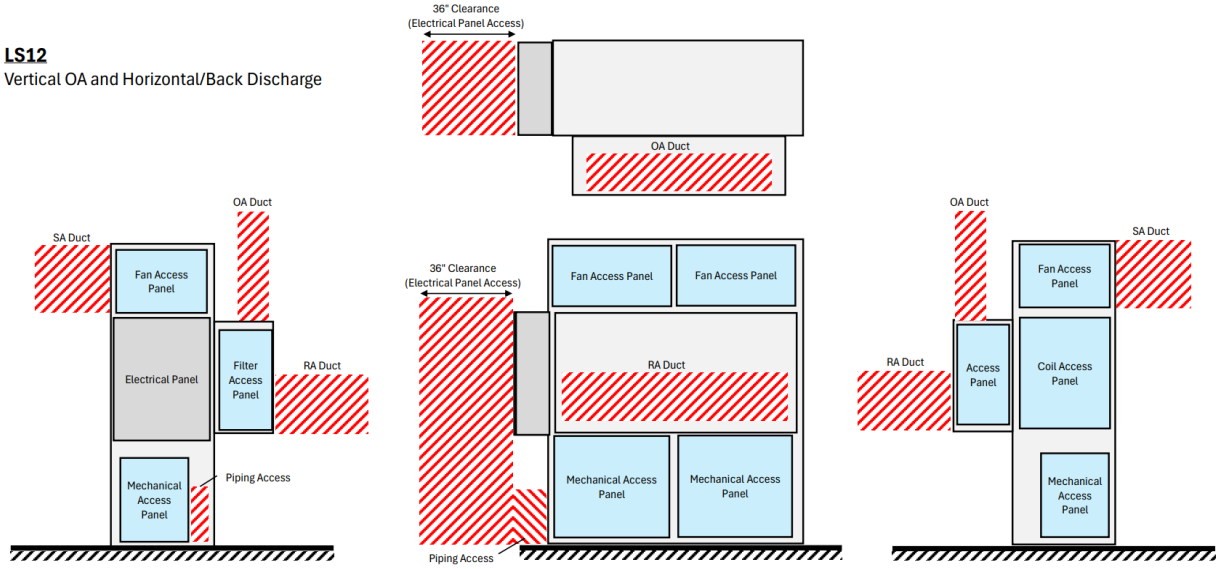


Figure 21 – Example Required Clearances Around Unit

5.1.2 Mounting Surface

Install the unit on a sturdy, level mounting surface or platform that will prevent vibration and sound transmission. Never install the dehumidifier on a wooden platform without consulting the design engineer for spring isolation requirements and sound control materials. Do not install the unit near occupied rooms such as offices or guestrooms. Do not attempt to conserve installation space by fabricating restrictive ductwork with abrupt bends. You may reduce the operating efficiency and the moisture removal capacity of the dehumidifier. See section 5.3 for detailed duct installation instructions.

You must not install a standard dehumidifier in an unconditioned space or where ambient temperatures can fall below 45°F. If you must install the dehumidifier outside or in an unconditioned space, such as an attic, you must use an outdoor-rated dehumidifier. Desert Aire equips outdoor-rated dehumidifiers with weatherproofing and thicker insulation. You can determine whether your dehumidifier is outdoor rated by inspecting the unit rating plate. See section 8.6 for details.

5.2 Module Assembly

The LS ships in modules which require three types of connection in the field: Mechanical, Electrical (Power), and Electrical (Low Voltage Data).
The mechanical connections are described here. See Sections 5.7 and 5.8 for information on the electrical connections.
Refer to Figure 22 for location of Joint 1 and Joint 2:

- Joint 1 – Connects the Fan Module to the Mechanical and Coil Module.
  - Check there is 1/8” foam insulation installed on the mating surface of the Mechanical and Coil Module.
  - Lift the Fan Module onto the Mechanical and Coil Module. If the module has eye bolts, use these to lift only the module. The eye bolts are not rated to lift the whole unit.
  - Loosen the clamp blocks from the module frames, and insert bolts to join the pairs of blocks together. Working around the unit, tighten the bolts joining the blocks together and the bolts joining the blocks to the frame. (Figure 23 shows an example of a clamp block.)
- Joint 2 – Connects the Return Air Filter Box to the Mechanical and Coil Module.
  - Check there is 1/8” foam insulation installed on the mating surface of the Mechanical and Coil Module.
  - Lift the Return Air Filter Box to the correct height, aligning the holes in the angle bars with the rivnuts on the mating frame. Ensure the module is oriented with the OA connection above the RA connection.
  - Continue to support the weight of the Return Air Filter Box whilst installing all bolts into the holes. Figure 24 shows an example of the bolted connection between the angle bar and the frame.

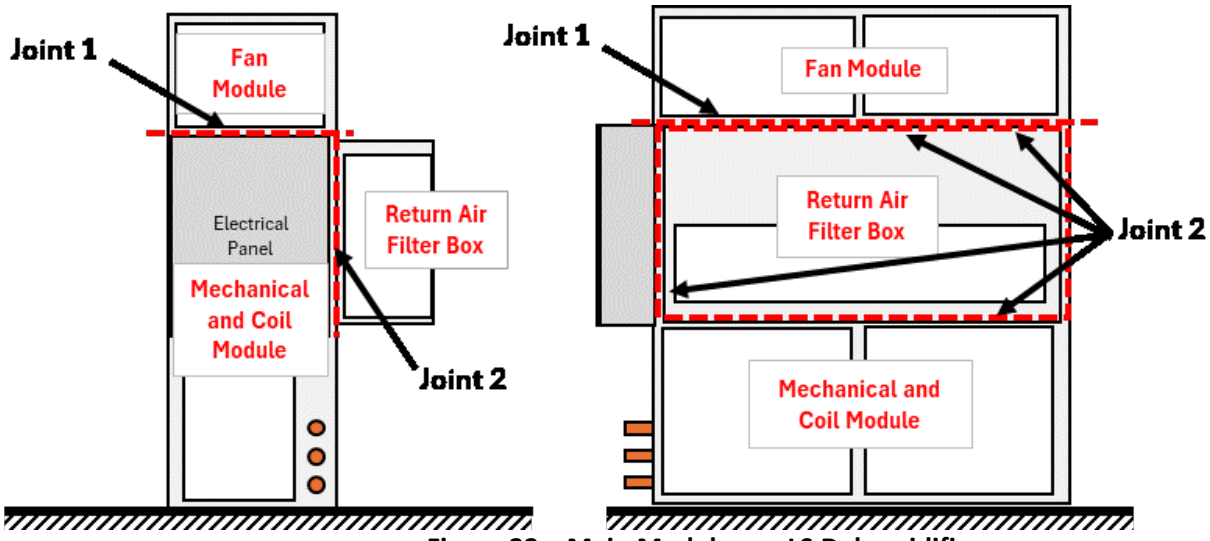


Figure 22 – Main Modules on LS Dehumidifier

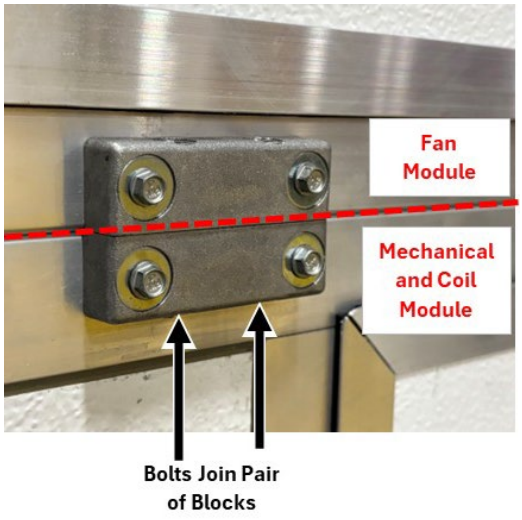


Figure 23 – Bolted Connector Blocks

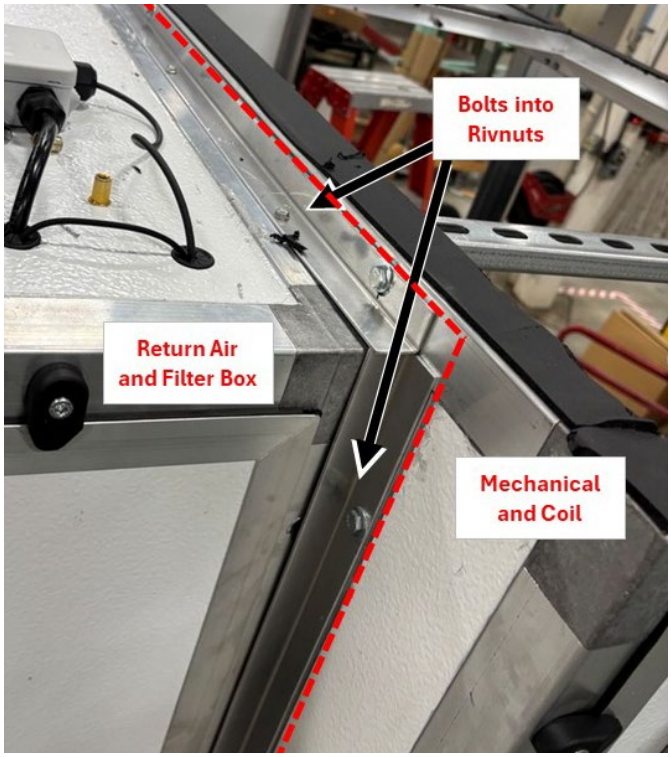


Figure 24 – Bolting the Return Air and Filter Box

5.3 Duct Installation

Duct design and installation should conform to the latest ASHRAE and SMACNA low velocity duct standards. See section 8.2 for details. Undersized restrictive ductwork with abrupt turns or transitions can decrease the efficiency and the moisture removal capacity of your dehumidifier and may lead to unit failure. Size the ductwork for an acceptable air pressure drop at the airflow volume of your dehumidifier. Use neoprene flex connectors when you attach ductwork to the dehumidifier to prevent transmission of excess vibration and noise.

Select the grilles, registers and diffusers for low static pressure loss, required throw distance, and the specified CFM rating. You can find this information in most grille manufacturers' catalogs. If you are installing the grilles in a corrosive environment, choose components made from anodized aluminum.

If you must install ductwork in an unconditioned area, use fiberglass duct wrap with vapor barrier facing. You must install the outdoor air intake away from all sources of airborne contamination such as exhaust fans or plumbing vents. You can use galvanized sheet metal ducts for most applications. However, you should use aluminum or stainless-steel ducts for extreme applications such as chemical-laden environments.

Model Size	Airflow Rate (SCFM)	External Static Pressure (ESP)
08	3,000	0-2.0 in.wc.
09	3,500	
12	4,100	
16	5,500	
19	7,200	
23	8,500	

Figure 25 - LS Standard Unit Airflow Specifications

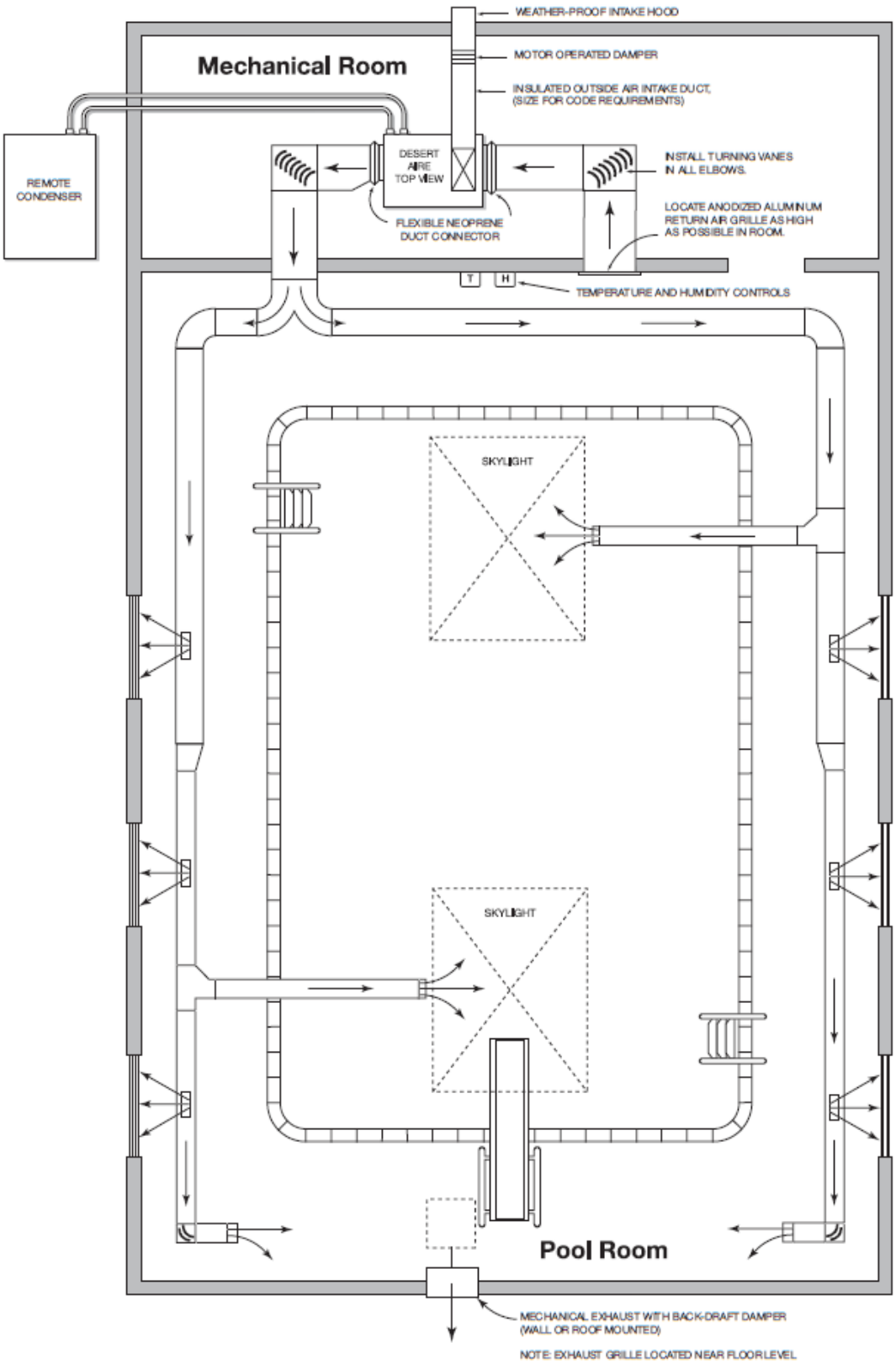


Figure 26 – Basic Pool Room Layout

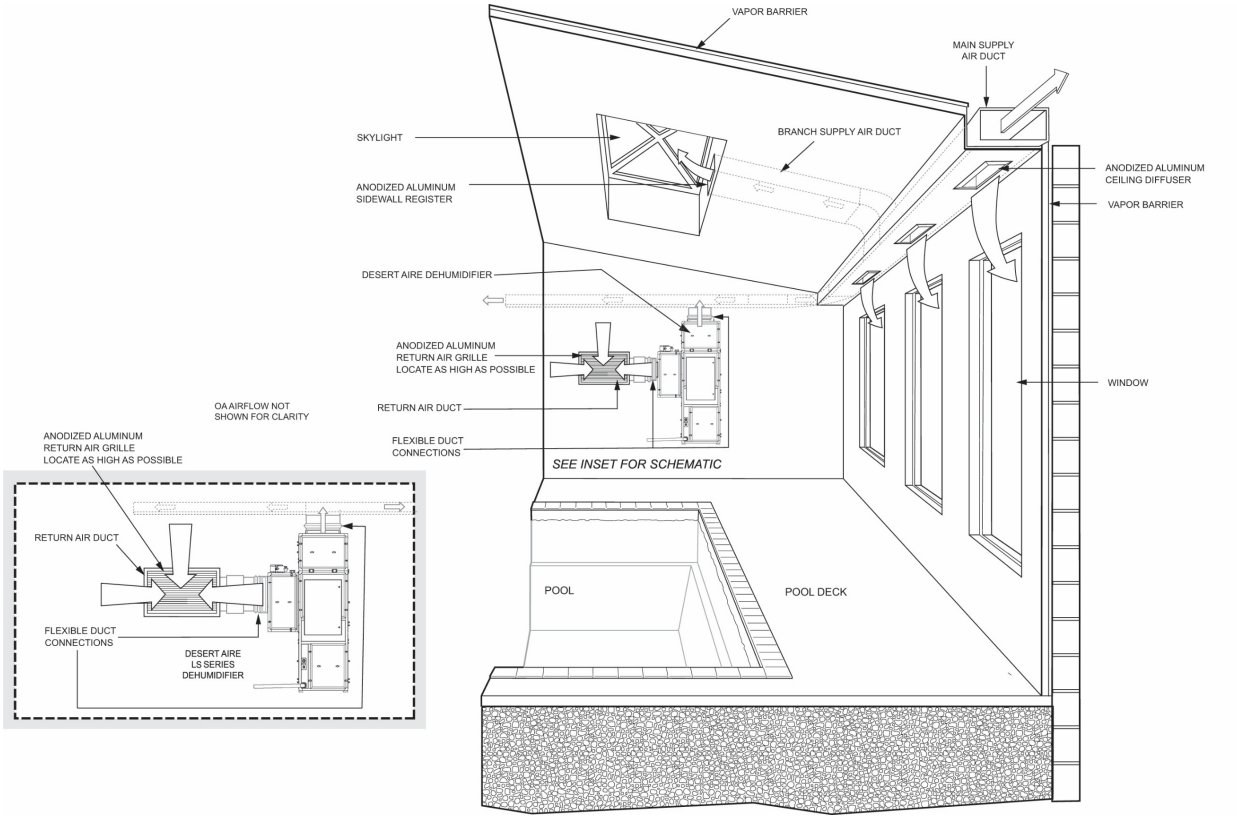


Figure 27 – Soffit Duct Layout

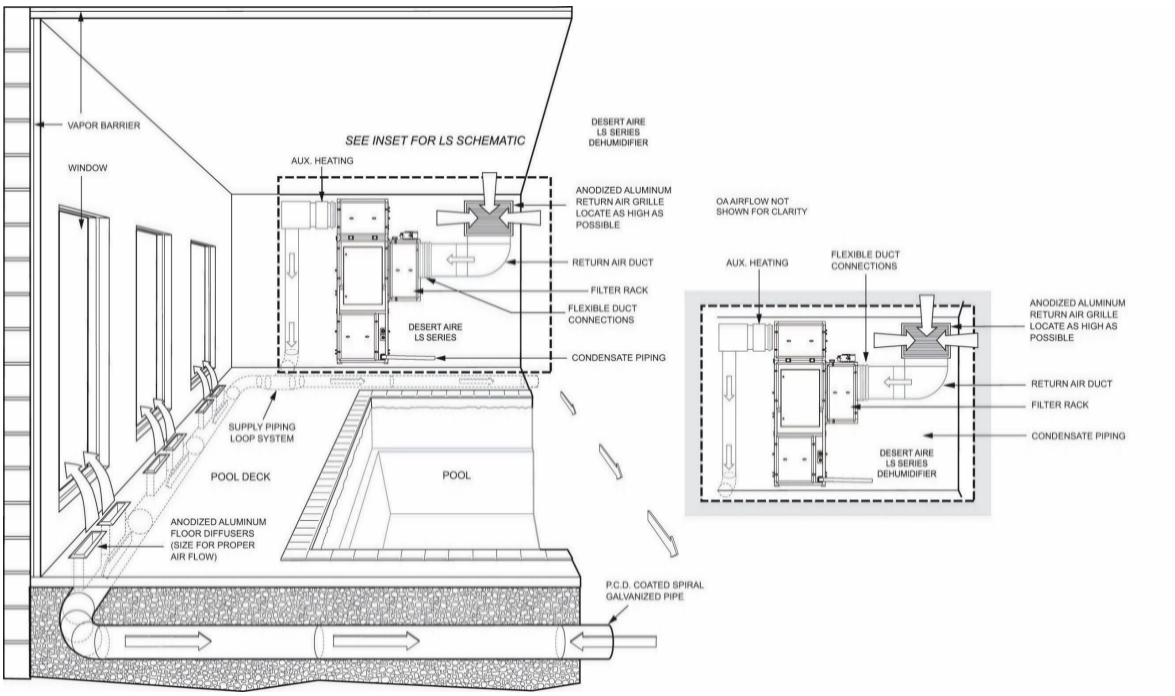


Figure 28 – Under-Floor Duct Layout

5.4 Condensate Drain Piping

The condensate drain connection is on the side of the dehumidifier. There is a condensate drain trap installed inside the unit, so there is no need for an external trap. A cleanout tee is installed inside the unit.

- Connect the trap to a main drain line with 1/4" of downward pitch per linear foot of run.
- Support the drain pipe every five feet to prevent sagging.
- After you install the drain piping, prime the trap by pouring water into the drain pan of the dehumidifier.

5.5 Water Heating Applications

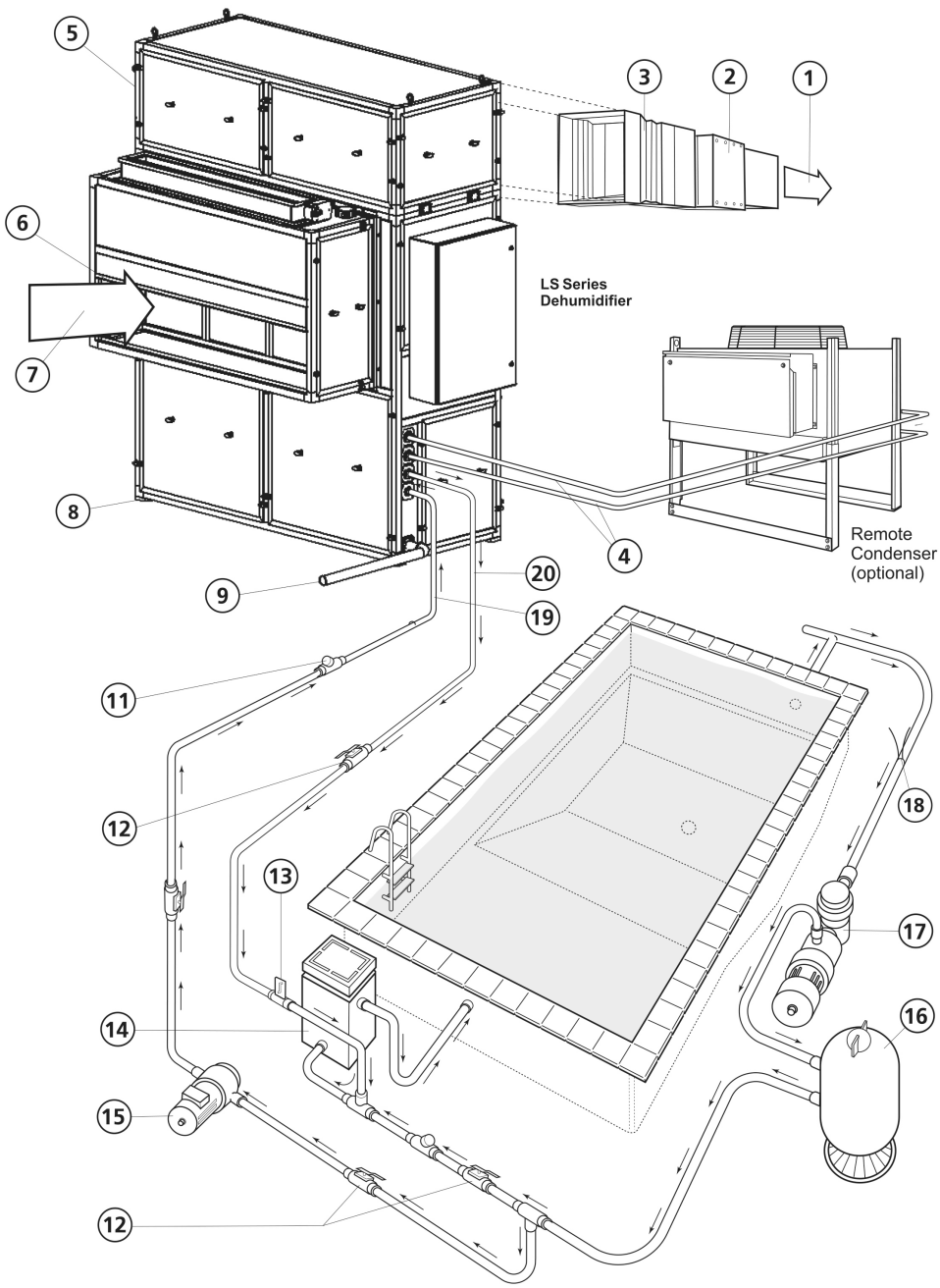
5.5.1 Water Piping Connections

If equipped with optional pool water heating condensers the unit must be connected to pool water filtration lines to operate as intended. The dehumidifier water supply circuit must tap into the main pool water line downstream from the main filter. If the main pool circulating pump is large enough, you can use a manual throttling valve to divert a portion of the water to the dehumidifier. Normally, you must size and install an auxiliary water pump which can handle the unit's required water flow rate, which is listed in Table. If you are using a water source other than a pool or a spa (such as a chilled water loop), the required flow rate has been printed on a label affixed near the water line stubs of the dehumidifier.

Model Size	Water Flow Rate and Pressure Drop Pool Application
LS08	9 GPM @ 13.8 ft W.C.
LS09	9 GPM @ 14.1 ft W.C.
LS12	14 GPM @ 14.5 ft W.C.
LS16	20 GPM @ 19.4 ft W.C.
LS19	20 GPM @ 19.4 ft W.C.
LS23	24 GPM @ 12.0 W.C.

Table 8– Standard Unit Pool Water Flow Rates

A typical water circuit arrangement is shown in Figure 29. To simplify the commissioning and servicing, install a flow meter and isolation valves in the pool water lines which feed the dehumidifier.



1. Supply Air
2. Duct Heater (Gas, Electric, Etc.)
3. Flex Duct Connector
4. Piping to Remote Condenser
5. Desert Aire LS Dehumidifier
6. Filter Rack Assembly with Filters
7. Return Air
8. Vibration Isolators
9. Condensate Line (P-Trap inside unit)
10. Base (If Required – not shown)
11. Check Valve
12. Ball Valve
13. Flow Meter
14. Main Pool Heater
15. Auxiliary Pump
16. Filter Assembly
17. Main Pool Pump
18. Water Temp Sensor (Dry Well)
19. Water Inlet
20. Water Outlet

Figure 29 – Proper Pool Water Heating Installation for Desert Aire LC and LV dehumidifiers

5.6 Remote Condenser and Additional Charge (Optional)

Important: Refer to the separate Air-Cooled Condensers Installation and Operation manual for additional details on line design, traps, clamping, and other condenser installation requirements.

LS dehumidifiers installed with remote condensers may require additional oil and refrigerant charge at the time of field installation. Figure 30 shows the factory charge for each unit size, and additional field installed charge required for various line lengths and remote condensers. Note that custom systems or non-standard line configurations may have been specified. Refer to submittal documentation or label adjacent to the remote condenser connections to confirm the charge and lines for those systems.

LS Model Size	Factory Charge (lbs)	Line Length (ft.)	Line Diameter (in.)		Additional R-454B Charge (lbs.)	
			Discharge Line	Liquid Line		
08	*24*				*RCDA4VPNN-18414PNNA*	*RCDB4VPNN-30414PNNA*
		0 to 25	*3/4*	*1/2*	*14.3*	*27.6*
		26 to 50	*3/4*	*5/8*	*17.7*	*31.0*
		51 to 75	*3/4*	*5/8*	*20.3*	*33.6*
		76 to 100	*3/4*	*5/8*	*22.9*	*36.2*
09	*41*				*RCDA4VPNN-18414PNNA*	*RCDB4VPNN-30414PNNA*
		0 to 25	*3/4*	*1/2*	*14.3*	*27.6*
		26 to 50	*7/8*	*5/8*	*18.0*	*31.4*
		51 to 75	*7/8*	*5/8*	*20.8*	*34.1*
		76 to 100	*7/8*	*3/4*	*27.9*	*41.1*
12	*50*				*RCDA4VPNN-18414PNNA*	*RCDB4VPNN-30414PNNA*
		0 to 25	*7/8*	*5/8*	*15.3*	*28.6*
		26 to 50	*7/8*	*5/8*	*18.0*	*31.4*
		51 to 75	*7/8*	*3/4*	*24.1*	*37.3*
		76 to 100	*7/8*	*3/4*	*27.9*	*41.1*
16	*65*				*RCDB4VPNN-30414PNNA*	
		0 to 25	*7/8*	*5/8*	*29.0*	
		26 to 50	*7/8*	*3/4*	*34.0*	
		51 to 75	*7/8*	*3/4*	*37.8*	
		76 to 100	*7/8*	*7/8*	*46.8*	
19	*80*				*RCDB4VPNN-30414PNNA*	
		0 to 25	*1-1/8*	*3/4*	*30.5*	
		26 to 50	*1-1/8*	*3/4*	*34.7*	
		51 to 75	*1-1/8*	*7/8*	*42.8*	
		76 to 100	*1-1/8*	*7/8*	*48.3*	
23	*95*				*RCDB4VPNN-30414PNNA*	
		0 to 25	*1-1/8*	*3/4*	*30.5*	
		26 to 50	*1-1/8*	*7/8*	*37.3*	
		51 to 75	*1-1/8*	*7/8*	*42.8*	
		76 to 100	*1-1/8*	*7/8*	*48.3*	

Figure 30 - Standard RCD Series Remote Condenser Line Sizes and Additional Charge

5.7 High Voltage Wiring

⚠ WARNING
Disconnect power before servicing. The unit contains high voltage wiring and moving parts which may cause serious injury or death. Failure to properly wire the dehumidifier may create the possibility of shock and can lead to premature system failure.

  	**Danger Due to Hazardous Live Voltage** **Work on Electrical components and wiring may only be carried out by trained electricians or by persons instructed in electricity under the supervision of an electrician in accordance with electrical engineering regulation.** **A second person must always be present when working on energized parts or lines.** **Disconnect Supply Mains Power and use Lock Out – Tag Out procedures before servicing equipment. It is generally forbidden to carry out work on electrical live parts. Protection class of equipment with doors and covers removed is IP00! Failure to disconnect power and follow lock out – tag out can result in contact with Hazardous Live Voltages. This can cause serious injury and or death.**
	**Warning, equipment has potential arc flash hazard. Appropriate PPE and tools required when working on this equipment. Failure to comply may result in severe injury, and or death.**
	**Warning, equipment may contain multiple supply mains connections to Hazardous Live Voltage. Disconnect all supply connections before removal of doors or covers. Failure to comply may result in severe injury, and or death.**

The electrical supply connection must comply with all national, state, and local codes. Refer to the wiring diagram located inside the electrical compartment for all required supply connections.

To assist in compliance with NEC and local codes, a second lug connected to the service panel in equipment with pool water condensers is provided. This lug is intended to be connected to the pool equipotential bonding grid in the field when required by code. This also removes the possibility of differences in potential between metals in the pool water and the water condenser that may accelerate corrosion. The bonding lug should be connected to the equipotential grid with 8 AWG or larger solid copper conductor.

5.7.1 High Voltage Connections

Three phase units will require 4 connections (3 power and 1 ground) for the main power supply. Connect the power supply wires to the main power block or disconnect switch located in the electrical compartment. Ensure that the wire terminals of the power block or disconnect switch are in contact with copper conductor only and no wire insulation is pinched. If using stranded conductors, ensure that no stranding crosses phases. Tighten the conductors in accordance with the torque requirements printed on the power block or disconnect switch.

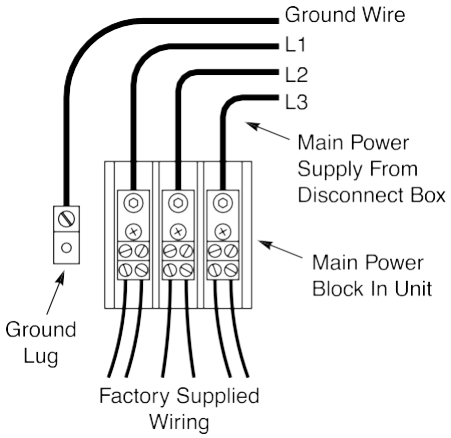


Figure 31 – Three-Phase System Power Connection

5.7.2 Wire and Fuse Sizing

	**WARNING: Improperly sized Mains Power Supply wire can lead to risk of fire, electrical shock, serious injury, and or death.**

All wire sizing and construction design for the connection to mains power supply or any auxiliary power supplies should follow the local and national codes. When sizing the mains power supply the MCA (Minimum Circuit Ampacity) should be used. The conductor must be sized to handle the current of the MCA at a minimum. The MCA is marked on the unit nameplate. When sizing the mains power supply the methods of installation, ambient correction factors, and safety factors should be taken into consideration.

	**For Units NOT supplied with a Fused Disconnect Switch from the Manufacturer:** It is the responsibility of the installer of this equipment to provide a suitable disconnecting means for this equipment. This disconnect must: - Be suitable for the Voltage and Full Load Ampere Rating of all downstream equipment supplied. - Be approved for use as a disconnect by the local authority having jurisdiction. -Be provided with a Lock Out Tag Out capability in the Off (Down) position. If the disconnect acts as an emergency switching off device, the handle must be red in color to denote the emergency use function.

Units not provided with main fusing from the Manufacturer must be provided with an overcurrent protection device. The overcurrent protection device must be sized not to exceed the MOPD (Maximum Overcurrent Protection Device) rating marked on the unit nameplate.

5.7.3 Connecting Remote Panel (Optional)

When a remote panel is supplied, the electrical panel ships loose. The panel has three flexible conduits that are routed by the contractor, to the junction box mounted on the unit. The junction box has three apertures, through which the whips are attached. The contractor will connect the power and controls wired to the terminals inside the junction box.

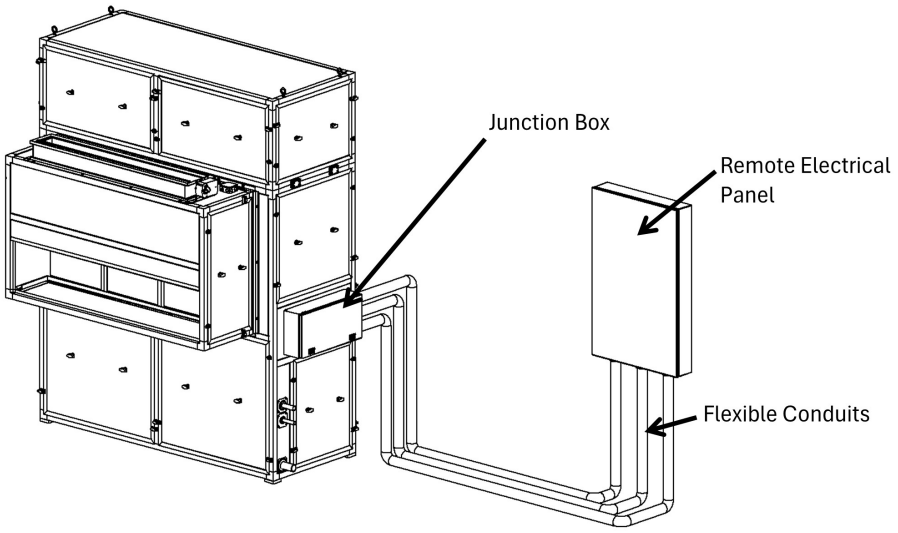


Figure 32 – Assembled Unit Showing Remote Electrical Panel

5.7.4 Connecting Electric Heater (Optional)

The electric heater is powered separately to the dehumidifier. Follow the manufacturer's instructions for connecting the power.

5.8 Controls and Sensors

The dehumidifier's controller is designed for precise monitoring and control of air temperature and relative humidity (RH) within a conditioned environment. Depending on the unit configuration sensors and additional inputs/outputs may need to be connected to the unit controller. Refer to the separate controller manual for sensor operation and options. Refer to the field connections diagram provided with the unit for details on the wiring and hardware requirements.

5.8.1 Humidity and Temperature Sensors

The Swim Aire units contain two humidity and temperature sensors. One monitors the conditioned room with an option to be mounted in the return air duct, or wall mounted in the room. The other sensor monitors the supply air to the room with an option to be mounted in the fan box, or in the supply duct connected to the conditioned room. See the field connection diagram for wiring details on both the zone and supply air sensor as well as the maximum cable length.

5.8.1.1 Zone Sensor – Wall Mount

If your dehumidifier was ordered with a wall-mount humidity and temperature sensor, mount the sensor about five feet above the pool deck on an interior wall with natural air circulation. Avoid the following locations:

- Hot spots near concealed heating pipes, warm air ducts, supply register outlets, or solar radiation.
- Cold spots due to a cold wall or drafts from stairwells, doors, windows, or supply register outlets.
- Dead spots such as behind doors or in corners where room air cannot circulate freely.

5.8.1.2 Zone Sensor – Return Air

The return air sensor is normally used in applications where continuous blower operation is desired. A return air sensor helps ensure consistent conditions throughout the space and it relies on a continuous stream of air moving past it. Using a return air sensor with a non-continuous blower may lead to short cycling of the refrigeration compressor or loss of temperature and humidity control in the space.

5.8.1.3 Supply Air Sensor – Fan Box

For units that do not require an auxiliary heater the supply air sensor will be mounted in the fan box near the supply duct connection. This sensor monitors the supply air to the conditioned room and helps the unit determine which modes of operation to run. If any equipment that controls the process air (heater or humidifier) is installed after the dehumidifier then the supply air sensor will need to be duct mounted and installed after that equipment.

5.8.1.4 Supply Air Sensor – Duct Mounted

If your dehumidifier was ordered with a duct-mount supply humidity and temperature sensor then mount this sensor in the supply duct to the conditioned room. Mount this sensor downstream of any field provided heaters. Seal the penetration for the duct holder. Install the sensor at least 5 ft downstream of all heaters and not in the “line of sight” of the heater elements as the radiant heat produced by the heater may affect the reading. Do not mount the sensor in a section of duct where false readings may occur due to dead air regions, solar heat gains, or thermal losses in winter. Do not mount the sensor where water is likely to drip on it. Liquid moisture will ruin the humidity sensing element in the sensor.

5.9 Auxiliary Heating Control Wiring

Note: You must use the Desert Aire control system to control or interlock with the room heating system. This prevents wide fluctuations in room air temperature. It also prevents the heater from trying to heat the room while the dehumidifier is running in cooling mode.

5.9.1 Unit Mount Electric Heater (Optional)

The dehumidifier’s electrical panel is equipped with a conduit whip for connecting to the controls of the unit mounted electrical heater. After the heater has been mounted to the unit wire the dry contact and analog signal to the electrical heater. See the field connection diagram for wiring details on the unit controller. See the attached electrical schematic provided with the electric heater for the terminals that need to connect to the unit controller. Section 5.7.3 describes the power connection.

5.9.2 Auxiliary Heating – Dry Contact Closure

Desert Aire provides a dry contact closure to interlock with the building heating system. This contact closure is used to interlock with an electric duct heater which has its own power supply transformer. When the room air temperature drops below the set point, the dry contact will close to energize the auxiliary heater. Install two wires from the thermostat terminal blocks on the heater to the dry contact terminal blocks of the dehumidifier. See the field connection diagram for details.

5.9.3 Auxiliary Heating – Proportional Signal

Desert Aire provides a proportional signal to modulate a heating coil control valve on units equipped with an integral heating coil.

This signal is reverse acting or direct acting depending on the settings in the controller. It is critical that units with hot water or steam coils be set properly for freeze protection. See controller manual for details on the settings and outputs.

Most proportional valves have either three or four terminals for field-installed wiring.

- Four-terminal valves have two terminals for 24 VAC power and two terminals for the signal input.
- Three-terminal valves have one terminal for the "hot" 24 VAC input, a second terminal for the "positive" signal input, and a third, common terminal for the "neutral" 24 VAC input and the "negative" signal input.

You must follow the instructions included from the valve manufacturer. Observe the proper polarity, or you may damage both the valve and the Desert Aire controller. See the field connection diagram for information on signal wire connection points.

5.10 Pool/Tower Water Temperature Sensors

Units that have the Pool Water or Tower Water option selected are supplied with two water temperature sensors and two immersion wells.

- Screw the wells into the adapter fittings of the inlet and outlet pool/tower water piping. The wells are equipped with a ½" MPT connection.
    - Install the sensors upstream (for inlet sensor) and downstream (for outlet sensor) from the dehumidifier.For pool water units that also have an auxiliary pool water heater, install the inlet sensor upstream of the auxiliary heater.
- The sensors must be installed in a location where they will accurately sense the pool/tower water inlet and outlet temperature conditions. This means you must have continuous water flow at the sensor locations.

See the field connection diagram for wiring details of the Pool or Tower water inlet and outlet temperature sensors.

5.11 A2L Sensor Relay

In compliance with UL 60335-2-40, the dehumidifier is equipped with refrigerant detection sensors wired to a dry relay contact (both a normally open and normally closed contacts are provided). If a leak is detected the relay will energize and the contact will make or break depending on which is wired to. This contact must be wired to the building emergency system based on local requirements. See section 3.1 Refrigerant Leak Detection and Mitigation for details on the refrigerant detection system. See the field connection diagram for details on the wiring and hardware requirements.

5.12 Smoke Alarm Interlock

The dehumidifier is equipped with a set of terminal blocks for interlocking with a smoke alarm (alarm provided and installed by others). The contacts must break when smoke is present. This will shut off the blower and compressors. See the dehumidification wiring diagram for connection details.

5.13 Remote Panel Connections

The remote panel option will come with controls wiring pre-wired to a harness that utilizes flexible conduit and pluggable terminal block ends. The junction box panel on the side of the unit will have an associated pluggable terminal block that needs to be matched by wire number. See the provided wiring diagrams for details on the required connections between the unit and the remote panel.

5.14 Additional Inputs and Outputs

The controller is equipped with additional digital inputs and digital and analog outputs. These inputs/outputs are optional and will need to be enabled by the factory or the Desert Aire Service Team. These inputs/outputs will not affect unit performance until they are enabled or the jumper is removed. See the controller manual for details on input/output operation. See the field connection diagram for details on wiring and hardware requirements.

5.14.1 Digital Inputs

The additional digital inputs that can be connected to the controller are the following.

- Remote On/Off Switch – Will place the unit in standby. Comes disabled with a factory jumper.
- Emergency Off Switch – Will trigger an alarm and stop unit operation. Comes disabled with a factory jumper.
- Standby/Roof Access Switch – Will disable selectable components (fan, compressor, etc.). Comes disabled with a factory jumper.
- Occupancy Contact – Will place unit in occupied/unoccupied mode. Comes disabled with factory jumper.

5.14.2 Digital Outputs

The additional digital outputs that can be connected to the controller are the following.

- Occupied Contact – Can be wired with external exhaust fan or damper.
- Remote Alarms Contact – Can be wired to building emergency system.
- Enable Pool Aux Heat Contact – Can be wired to an auxiliary pool heater.
- Enable ROC Contact – Can be wired to a remote condensing unit.
- Enable Tower Pump Contact – Can be wired to controller of a tower water pump when a water-cooled remote condenser is configured.
- Enable Pool Pump Contact – Can be wired to controller of a pool pump when pool condenser is configured.

5.14.3 Analog Outputs

The additional analog outputs that can be connected to the controller are the following.

- 0-10VDC Modulating ROC Signal – Can control fan speed or demand for a remote condenser unit.
- 0-10VDC Modulating Humidify Signal – Can control demand for a humidifier unit.

6 Start-up Procedure

Read this section thoroughly before attempting to commission the Desert Aire dehumidifier.

A complete start-up will minimize operational problems and expensive callbacks. The start-up will be quicker and easier if there is a heat and humidity load present in the space. Energize any auxiliary heaters before start-up so that the air is at the design temperature.

6.1 Preliminary Inspection

Verify that all contractors have completed their work. Find the Desert Aire "LS Start-Up Report," which is normally placed inside this manual within the electrical compartment of the dehumidifier. You must fill out the start-up report to validate the dehumidifier warranty.

Check the following items:

- Before starting unit, remove wooden shipping blocks found beneath compressor(s).
- Make sure that the unit is level and securely mounted so that it cannot shift or transmit vibration to the building.
- Verify that the incoming power supply matches the rating plate of the dehumidifier. The available power supply voltage must be within ±5% of the voltage printed on the rating plate.
- With the power supply disconnected and locked, tighten all field and factory electrical connections.
- Inspect the air filters and coils to ensure they are clean. If necessary, clean the coils and install new filters.
- Check the field and factory piping for leaks. The internal piping may have been damaged during shipping.
- Purge any air, dirt, or debris from water lines (if used) to avoid clogging the internal passages of optional heating coils or water side heat exchangers.
- Check the drain pan and the condensate piping. Test the drain and prime the p-trap by pouring water into the drain pan.
- Verify that all service valves in the refrigeration lines are fully open.

6.2 Outdoor Air Application

6.2.1 Outdoor Air Option Equipped Units

Construction codes often require you to introduce outdoor air into a commercial building while it is occupied. Desert Aire dehumidifiers can be factory-configured to help you comply with these codes. Several factory-installed options, which are available by special order, can include flanging for an outdoor air duct connection and a fresh air intake box with air filters and a damper.

The LS 1.x.x controller can be programmed to set occupied and unoccupied operation times. Units ordered with the outdoor air intake option are provided with an automatically controlled outdoor air intake damper. See the controller manual for details on the outdoor air damper operation.

You must install an exhaust blower whenever you bring outdoor air into a dehumidified room. Without the exhaust fan, the room would be under a positive pressure, which can drive moisture and chlorine odors into insulation, building materials, and adjacent rooms.

Size the exhaust blower to maintain the dehumidified room at a neutral or slightly negative pressure.

You must install the outdoor air intake away from any sources of airborne contamination such as exhaust fans or plumbing vents. The outdoor air is filtered by a permanent metal filter, which can be removed for cleaning.

If the outdoor air temperature falls below 40°F (adjustable) the unit will close the outdoor air damper. This safety will remain active until the outdoor air rises above 50°F (adjustable). **IF OUTDOOR TEMPERATURES IN CONJUNCTION WITH YOUR OUTDOOR AIRFLOW RATE ARE CAPABLE OF TRIPPING THIS SAFETY, YOU MUST INSTALL AN OUTDOOR AIR PRE-HEATING COIL.** See the controller manual for further details on operation of the outdoor air damper and associated safeties.

Refer to section 6.2.3 to determine if the pre-heating of outdoor air is required for your application. An example of proper outdoor air installation is shown in Figure 33.

NOTE: Desert Aire LS dehumidifiers are designed to handle a range of external static pressures. In applications where strict outdoor air code compliance is required, proper system airflow must be determined by a professional balancing contractor. When an approximation of outdoor air volume is all that is necessary, the procedures detailed in Section 6.2.4 can be used.

6.2.2 Standard Systems in Conjunction with Outdoor Air

The introduction of outdoor air into the return air duct can lead to a number of problems. This is not recommended and will void the warranty in most instances. Contact the Desert Aire Service Department before proceeding with such an installation. If outdoor air must be added to satisfy code requirements on a non-outdoor air equipped system, it is advised that the intake and exhaust be connected directly to the space being conditioned. **SYSTEM FAILURES CAUSE BY IMPROPER OUTDOOR AIR INSTALLATIONS ARE NOT COVERED BY WARRANTY.**

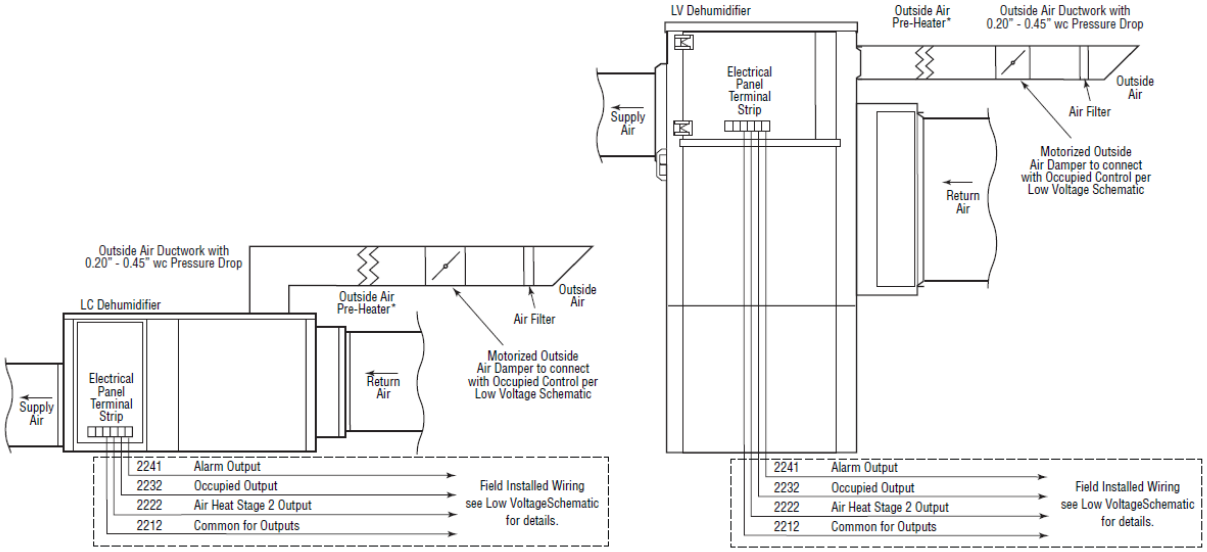


Figure 33 – Proper Installation for an Outdoor Air Application

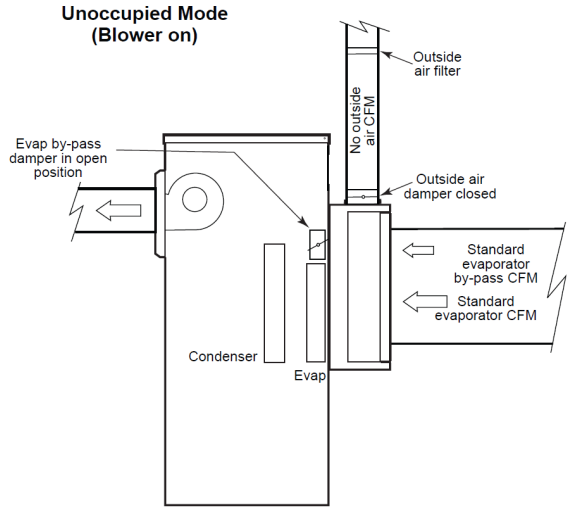


Figure 34 – Unoccupied Mode Operation

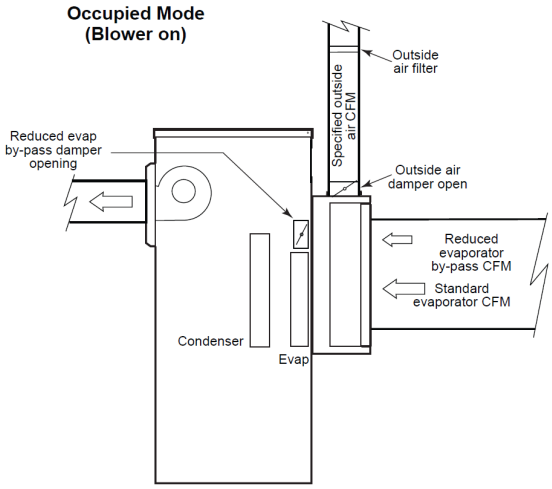


Figure 35 – Occupied Mode Operation

6.2.3 Determining if Outdoor Air Pre-Heating is Required

Desert Aire systems require that outdoor air be pre-heated if mixed air temperatures inside the unit may fall below 45°F. To determine if an application requires outdoor air pre-heating, the following study needs to be conducted:

- Determine the following:
  - Design return air temperature. For pool rooms, typically 82°F
  - Outdoor air winter design temperature. Use values as specified by design engineer or ASHRAE tables
  - Total system CFM and required outdoor air CFM
- Determine worst case Mixed Air Temperature (MAT) using the following equation:

$$MAT = \frac{(\text{winter temp °F}) \times (\text{OA CFM})}{(\text{system CFM})} + \frac{(\text{return air temp °F}) \times (\text{system CFM} - \text{OA CFM})}{(\text{system CFM})}$$

- If MAT is less than 45°F, then the pre-heating of outdoor air is required.

NOTE:

- Proper system airflow and outdoor air CFM must be confirmed at the time of installation
- Outdoor air duct must be insulated to prevent condensation which may form on the exterior of the duct during winter months

6.2.4 Approximating Outdoor Air Volume

When servicing or installing a Desert Aire unit, it may be necessary to determine and/or set the amount of outdoor air CFM entering the unit. Proper outdoor air CFM settings can be approximated using two simple equations as follows:

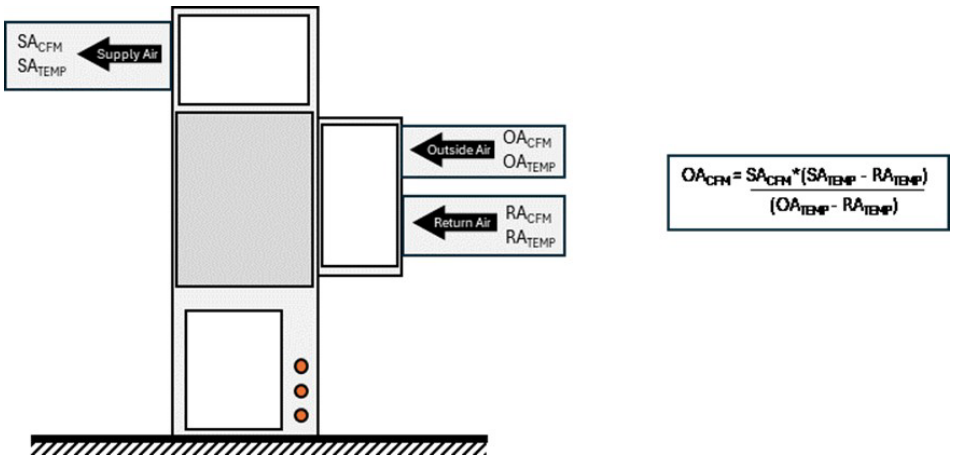


Figure 36 – Approximating Outdoor Air CFM Using Measured Temperatures

NOTE:

- This method is just an approximation! In applications where strict code compliance is required, proper airflow must be determined by a professional testing and balancing contractor.
- Refrigeration circuit must remain inactive during this procedure (blower on only).
- When measuring air temperatures, several readings must be taken across a duct and averaged.

Proper Supply Airflow, SA_{CFM}, must be confirmed prior to this procedure. This can be obtained from the dehumidifier's controller, which measures the velocity pressure changes through the fans to calculate airflow. It should be verified during commissioning - see Section 6.3 for details.

6.3 Airflow Balancing

To ensure code compliance and long equipment service life, proper airflow must be verified by a qualified air balancer. Shut off the compressor to prevent the refrigeration system from running while you balance the air.

The EC fan speed is controlled by a Modbus signal from the controller. Airflow monitoring is achieved within the unit based on differential pressure measured by a transducer. Airflow rate is maintained by a control loop which varies the signal to the blower in order to achieve the differential pressure associated with the required airflow.

Once the airflow is adjusted, review the motor current draw. If the current draw is more than the current rating listed on the unit nameplate, or fans are unable to achieve the airflow at the maximum setting, the unit may be exposed to external static pressure exceeding the design condition. Check the external static of the ducting to/from the unit and reduce it until it is equal to or less than the design condition indicated on the rating plate. If issues persist, consult the Desert Aire Service Department 262-946-7400. Prior to any calls to the Desert Aire Service Department please have the unit serial number and model number available.

6.4 Refrigeration Testing

Refrigeration-based cooling systems are sometimes referred to as “sealed systems”. This is in reference to the refrigeration system being hermetically sealed, no refrigerant can leave the system and no contaminants are allowed inside. Factory equipment and procedures ensure a clean and tight refrigeration system where only the specified refrigerant and oil are in the system. This is a critical component to the longevity of the system. Some Desert Aire systems are shipped in sections to allow for installation of some of the sections in a location much different than another. An example is a unit with a remote condenser ready circuit. The dehumidifier may be installed indoors near the conditioned space while the remote condenser used to reject waste heat is located outdoors. The piping of the condenser is completed in the field before the unit is commissioned. The design and processing of the field piping is just as important as the factory piping in ensuring the longevity of the system. Selection of quality components, quality procedures, and full testing help to ensure the sealed system failures are minimized wherever possible. Nonetheless, the mechanical nature of many components creates some unforeseen wear and failure in certain instances. Some units may need service at a point in the life of the product that requires opening of the hermetic refrigeration system. Special care must be taken to ensure that the system is returned to service without contamination.

Whenever servicing Desert Aire equipment, observe the following:

- Use only equipment rated for the pressures of the refrigerant being serviced.
- Use only equipment dedicated to service of the refrigerant in the system. Do not use equipment to service multiple refrigerant types.
- Purge all hoses and equipment of non-condensable gases before connecting to the sealed system.
- Use only original equipment parts or factory approved equivalent for servicing.
- Oil added to the system should be from new, sealed containers. New systems with R-454B should use only the following oils:
  - Copeland® Ultra 32-3MAF
  - Lubrizol Emkarate RL 32-3MAF
  - Parker Emkarate RL 32-3MAF
  - Nu Calgon 4314-66 (RL 32-3MAF). SCA
- Minimize the time the system is open to atmosphere while servicing. Cap all connections when there is no active service work on the system. This is particularly important with units that contain POE oils as moisture will be absorbed quickly and cannot be removed with a vacuum.
- Never open the system while under a vacuum. Should the system require opening to repair a leak or other service when in a vacuum, fill with dry nitrogen to atmospheric pressure before opening.

- Have a Schrader core replacement tool available when servicing the refrigeration system. Although rare, defective or damaged Schrader valve cores can contribute to refrigerant loss.
- Charge systems only by weight after servicing. Review the rating plate and any field charge labels.
- When servicing, additional liquid line filter dryers and suction filters may be required. This does not apply to installation of remote condensers.
- Charge refrigerant blends, including R-454B, with liquid only. Charging should be done into the high side of the system whenever possible. Refer to Section 5.6 for additional procedures related to charging. Note that the superheat should be stable and within 4°F of fluctuation. Minimum value for superheat at compressor in all modes:

Superheat Minimum Values Chart Temp (°F)							
Relative Air Temperature (°F)		65.0 - 70.0	70.1 - 75.0	75.1 - 80.0	80.1 - 85.0	85.1 - 90.0	90.1 - 95.0
Relative Air Humidity (%RH)	30.0 - 40.0	12	13	14	14	15	15
	40.1 - 50.0	13	13	14	15	15	16
	50.1 - 60.0	14	14	15	15	16	16
	60.1 - 70.0	14	15	15	16	16	17
	70.1 - 80.0	15	15	15	16	17	18
	80.1 - 90.0	15	16	16	17	18	

Figure 37 – Superheat Minimum Values Chart

6.5 General Testing

After you balance the airflow and test the refrigeration circuits, verify that the other equipment and accessories connected to the dehumidifier work properly. Although this may be difficult, since the dehumidifier is usually interlocked with a variety of equipment installed by different contractors, you must not skip this step.

Each of these devices (which may include auxiliary air and water heaters, smoke alarms, circulating pumps, and a building management system) is vital in maintaining the performance of the unit. Many customer complaints are caused by improper interlocks between these devices. Make sure you check the following:

- Check the outdoor air and exhaust devices. The outdoor air and exhaust dampers must open when they receive an “occupied” signal from the dehumidifier. If you have installed an exhaust blower, make sure that it is interlocked with the “occupied” signal or with an end switch on the outdoor air damper actuator.
- Check the condensate drain to make sure it has been primed with water. Verify that it drains freely, with no leaks. If the drain is outside or in an unconditioned space, make sure it has been heat traced. If you installed a condensate pump, make sure it operates properly.
- Check the operation of the remote condenser (on units equipped with this option). Make sure that the fans cycling switches, which are mounted on the condenser, are correctly piped and have been set according to the Desert Aire condenser wiring diagram. Verify that the fans are blowing air vertically upward when they run.
- Check the temperature and humidity readings displayed on the controller. If you think the values are incorrect, check the sensor or its field-installed wiring for damage.
- Check the operation of the auxiliary heaters by temporarily raising the air temperature set point on the Desert Aire controller. The duct heater(s) or heating valve should energize.

6.6 Routine Maintenance Schedule

6.6.1 Service Every Month

- Check the air filters and replace them if necessary.
- Check the coils in the dehumidifier and the remote condenser. Use compressed air or a commercial coil cleaner if they are dirty or plugged.
- Verify that the air flow around the remote condenser remains unobstructed.

6.6.2 Service Every Six Months

- Check and tighten all field and factory electrical connections.
- Check for dirty coils in the dehumidifier and the optional remote condenser.
- Check and clean the drain pans and blow out the condensate drain line. If the drain is plugged, water will back up into the dehumidifier and flood the mechanical room.
- Check and adjust the air flow per specifications. Dirty ducts, filters, and coils may have reduced the total air volume.
- Check the operating pressures of the refrigeration circuits.
- Check the current draw of each fan.
- Check the current draw of each compressor.
- Lubricate the blower motor(s), if applicable.

6.6.3 Pool Water Chemistry

Pool chemistry must be maintained to ensure the proper pH, total alkalinity, calcium hardness and free chlorine. NSPI recommends the following levels for pool chemistry:

pH:	7.4-7.6
Total Alkalinity (ppm):	100-150
Calcium Hardness (Plaster Pool) (ppm):	200-250
Calcium Hardness (Vinyl or Painted Pool (ppm):	175-225
Free Chlorine (ppm):	1.0-3.0

Figure 38 – Recommended Pool chemistry

Excessive chemical levels in the pool can be dangerous to users and can damage pool hardware, including the dehumidification system. Service Problems caused by excessive chemical levels invalidate the warranty.

6.6.4 ElectroFin Coated Coil Cleaning

Dehumidifiers equipped with the ElectroFin coated coils must be cleaned regularly. A scheduled and documented QUARTERLY cleaning procedure is REQUIRED for all HVAC/R equipment coated with ElectroFin coil and/or cabinet protection.

Required quarterly cleaning and chloride removal of ElectroFin coated equipment

Quarterly cleaning is required to maintain warranty coverage and is essential to maintain the life of an ElectroFin coated coil and cabinet. Coil and cabinet cleaning shall be part of the unit's regularly scheduled maintenance procedures. Failure to clean an ElectroFin coated coil or cabinet on the prescribed quarterly cycle will void the warranty and may result in reduced efficiency and durability in the environment.

A routine two-step quarterly coil cleaning is required to maintain warranty. Step one is to clean the coil with the below approved coil cleaner (see approved products list under the "Recommended Coil Cleaners" section). Step two is to use the approved salt/chloride remover under the "Recommended Chloride Remover" section to dissolve soluble salts and revitalize the unit. It is very important when cleaning and/or rinsing not to exceed 130°F and potable water pressure is less than 100 psig to avoid damaging the unit and coil fin edges.

Recommended Coil Cleaners

The following are recommended coil cleaners, assuming it is used in accordance with the manufacturer's directions on the container for proper mixing and cleaning. They have been approved for use on ElectroFin coated coils to remove mold, mildew, dust, soot, greasy residue, lint and other particulate. Never use any cleaners that are not approved.

Coil Cleaner	**Reseller**
GulfCoat™ Coil Cleaner	Desert Aire Parts Dept. Tel: (262) 946-7400 Email: service@desert-aire.com

Recommended Chloride Remover

The following chloride remover is recommended, assuming it is used in accordance with the manufacturer's directions on the container for proper mixing, has been approved for use on ElectroFin coated coils and cabinets to remove chloride/salts and sulfates. Never use any chloride removers that are not approved.

Chloride Remover	**Reseller**
CHLOR*RIDE® Concentrate	Desert Aire Parts Dept. Tel: (262) 946-7400 Email: service@desert-aire.com

Harsh Chemical and Acid Cleaners

Harsh chemicals, household bleach or acid cleaners should not be used to clean outdoor or indoor ElectroFin coated coils. These cleaners can be very difficult to rinse out of the coil and can accelerate the corrosion attack of the coil.

High Velocity Water or Compressed Air

High velocity water from a pressure washer or compressed air should only be used at a very low pressure, (< 100 psi), to prevent fin and/or coil damages. The force of the water or air jet may bend the fin edges and increase airside pressure drop. Reduced unit performance or nuisance unit shutdowns may occur.

Detailed Protection Plan Instructions:

The Warranty Protection plan consists of a two-step process. Step 1 is to clean the coils and step 2 is to remove the salts/chlorides. The coils are to be thoroughly cleaned using an approved coil cleaner as listed previously. Once cleaned, they will then need to have the chlorides/salts removed by using preferred chloride remover as listed previously.

Warranty Protection Step 1 of 2

- Complete the coil cleaning following these steps
- Ensure that the power to the unit is off and locked out.
- Clean the area around the unit if needed to ensure leaves, grass or loose debris will not be blown into the coil.
- Remove panels or tops as required gaining access to the coil(s) to be cleaned.

• Using a pump up sprayer, fill to the appropriate level with potable water and add the correct amount of approved cleaner as per manufacturer instructions leaving room for the pump plunger to be reinserted.

NOTE: Coils should always be cleaned / back flushed, opposite of airflow to prevent impacting the direct into the coil

• If the coils have heavy dirt, fibers, grass, leaves, etc. on the interior or exterior face areas, a vacuum and brush should be used to remove those surface contaminants prior to applying cleaner. The interior floor, drain tray or pan areas should also be vacuumed.

Apply the mixed cleaner to coil surfaces using a pressurized pump up sprayer maintaining a good rate of pressure and at a medium size nozzle spray, (not a solid stream and not a wide fan but somewhere in the middle). Work in sections/panels ensuring that all areas are covered and kept wetted.

• Apply the mixed cleaner to coil surfaces using a pressurized pump up sprayer maintaining a good rate of pressure and at a medium size nozzle spray, (not a solid stream and not a wide fan but somewhere in the middle). Work in sections/ panels ensuring that all areas are covered and kept wetted.

• Apply the cleaner to unit interior air exiting side of coil surfaces first. Work in sections/panels moving side to side and from top to bottom.

• Generously soak coils by spraying cleaner directly on and into the fin pack section to be cleaned and allow the cleaner solution to soak for 5 to 10 minutes.

• Using pressurized potable water, (<100 psi), rinse the coils and continue to always work in sections/panels. Start at the top of the coil and slowly move vertically downward to the bottom. Then, staying in the same vertical area, slowly move back up the top where you started. Now move over slightly overlapping the area just completed and repeat above. Continue until all coil areas on the inside of the unit have been rinsed.

Complete steps below for the exterior air entering side of the coils

• Final rinse – Now complete a quick rinse of both sides of the coil including the headers, piping, U-bends and hairpins.

• If the coil has a drain pan or unit flood that is holding rinse water or cleaner, extra time and attention will need to be taken in those areas to ensure a proper rinse has been completed.

Warranty Protection Step 2 of 2

Complete the coil chloride (salt) removal following these steps

• CHLOR*RID® is a concentrate to be used for both normal inland applications at a 100:1 mix ratio OR for severe coastal applications 50:1 mix ratio with potable water, (2.56 ounces of CHLOR*RID® to 1 gallon of water). Using a pump up sprayer, fill to the appropriate level with potable water and add the correct amount of CHLOR*RID® salt remover leaving room for the pump plunger to be reinserted.

• Apply CHLOR*RID® to all external coil surfaces using a pressurized pump up sprayer maintaining a good rate of pressure and at a medium size nozzle spray, (not a solid stream and not a wide fan but somewhere in the middle). Work in sections/panels ensuring that all areas are covered and kept wetted.

• Generously soak coils by spraying CHLOR*RID® directly on and into the fin pack section. Let stand 5 to 10 minutes keeping the area wetted. Do not allow to dry before rinsing.

• Using pressurized potable water, (< 100 psi), rinse the CHLOR*RID® and dissolved chlorides/salts off of the coils continuing to always work in sections/panels.

• Starting at the top of the coil, begin rinsing the coil form side to side until you reach the bottom. Repeat as many times as is necessary to ensure all coil sections/panels have been completed and are thoroughly rinsed.

• Reinstall all panels and tops that were removed.

7 Troubleshooting

Although Desert Aire dehumidifiers have been designed for reliable and trouble-free operation, you may occasionally encounter a service-related problem. If you cannot immediately diagnose and fix the problem, do not be intimidated by the apparent complexity of the dehumidifier. Your common sense and experience can help you solve the majority of these problems.

These problems or complaints are frequently caused by improper interlocks between the dehumidifier and the other equipment and accessories at the jobsite. You may need to consult with other contractors who have worked on different portions of this project.

The following list will help you diagnose some of the most obvious symptoms of a system which does not work properly.

7.1 The Blower Does Not Run

POSSIBLE CAUSE	REMEDY
System terminal switch in open position	Close system terminal switch.
Loss of main power	Check for tripped circuit breaker or blown fuses.
Blower overload has tripped	Correct cause and reset overload.
Faulty control wiring	Check for loose or incorrect wires on system and controller.

7.2 The Compressor Does Not Run

NOTE: Under some circumstances the compressor will not run even though the humidity in the room may be too high. See Section 8.4 for more information on the control sequence for the dehumidifier.

POSSIBLE CAUSE	REMEDY
Control logic	A) Adjust controller set points. B) On Remote ready models with a remote condenser installed, verify that the RC jumper has been installed in dehumidifier and the ROC is enabled in the service menu. C) Check that the RDS alarm has not tripped. (this will lock out the compressor).
Loss of main power	Check for tripped circuit breaker or blown fuse(s)
Blower overload has tripped	Correct cause and reset overload
Faulty wiring	Check for loose or faulty wiring on system and controller.
Compressor overload has tripped	Correct cause and reset overload.
Comp. failure may have occurred if: A) Comp. draws locked rotor amps B) Comp. starts but does not pump C) Motor windings have shorted	A) Replace compressor (or check fuses on three-phase units). B or C) Replace Compressor.
Compressor delay-timer	Wait 6 minutes for timer.
Verify "Low Airflow" is not displayed on the control	Verify airflow across reheat coil

7.3 Evaporator Coil Ices Up

POSSIBLE CAUSE	REMEDY
Entering air below 70°F	Raise entering air temperature
Faulty or improperly set hot-gas bypass valve	1) Set hot-gas valve to maintain 32°F suction. 2) Replace if defective. 3) Open hot-gas isolation valve.
Insufficient evaporator airflow rate	1) Evaluate system airflow. 2) Check for dirty filters or restricted ductwork. 3) Assure coils are clean.
Lack of refrigerant	Re-evaluate system charge.
Restrictive filter drier	Evaluate filter pressure drop and replace if necessary.
Defective expansion valve	Evaluate expansion valve performance and replace if necessary.
Restriction in refrigeration piping	1) Check coil for kinks in tubing. 2) Evaluate debris in distributor.

7.4 Head Pressure is Too High

POSSIBLE CAUSE	REMEDY
Insufficient system airflow	1) Evaluate system airflow 2) Check for dirty filters or restricted ductwork. 3) Verify that coils are clean.
Excessive refrigerant charge	Re-evaluate system charge.
Non-condensables in system	Evaluate or purge system.
Defective refrigeration valves	Check 3-way, flooding, solenoid and check valves for sticking.
Restriction in refrigeration piping	1) Check coil and tubing for kinks. 2) Replace dirty drier filter.
Refrigeration system is overloaded	1) Reduce entering air temperature or relative humidity. 2) Check register locations for short cycling of air.
Low water flow	Evaluate water flow rate for your application.

REMOTE CONDENSER PROBLEMS WHICH CAUSE EXCESSIVE PRESSURES

Lack of airflow	Assure coil is clean and no airflow restrictions exist around unit
Remote condenser fan troubleshooting	
1) Faulty Contactor	1) Replace contactor.
2) Fan cycling on internal protection	2) Verify motor voltage & ensure free spinning motor shaft.
3) Remote condenser jumper missing at dehumidifier	3) Add necessary jumper in dehumidifier.
4) Pressure control inactive	4) Verify pressure control cut-in and differential settings.
Service valves closed or not fully open	Fully open service valves.
Excessive pressure drop in line sets	Re-evaluate remote condenser installation

7.5 Unit Runs but Excess Condensation on Walls and Windows

POSSIBLE CAUSE	REMEDY
Air and pool water temperature imbalance	Adjust set points so that air temperature is 2°F above water temperature. 80°F water and 82°F air recommended for most jobs.
Poor air distribution	Evaluate duct design and dehumidifier location.
Unit airflow is too high	Evaluate system airflow.
Unit is undersized	Re-evaluate unit sizing. Check for initially neglected sources of heat or humidity.
UNITS EQUIPPED WITH WALL- MOUNTED SENSOR OPTION:	
1) Controller installation	1) Assure that sensors are NOT located near supply registers, windows, heaters, saunas, etc.
2) Air stratification	2) Consider continuous blower operation.

7.6 Pool Water Heating Problems (Water-Cooled Units Only)

NOTE:

- Water-cooled models include a water proving switch to confirm water flow before the water heating mode can be activated.
- Lack of water heating may be a symptom of another refrigeration or controls problem not related to the water circuit.
- Under normal conditions the water temperature rise across the dehumidifier should be between 4°F and 15°F.
  - LOW TEMPERATURE INCREASE OF WATER is a symptom of excessive water flow rate. Excessive water flow can erode the water condenser and cause premature equipment failure.
  - HIGH TEMPERATURE INCREASE OF WATER is a symptom of insufficient water flow. This can be caused by an undersized pump, insufficient water diversion or restrictions in the water piping such as dirty filter(s). This would also lead to high refrigerant discharge operating pressures in the water heating mode.

8 Appendix

8.1 Compressor Failure

Although some compressors fail because they are mechanically flawed, most failures are due to system-related problems. Compressor failure can be caused by liquid flood back, air/moisture in the refrigeration system, solid contaminants, excessive heat or electrical service malfunctions. To avoid repeated callbacks, you must determine the cause of the failure and then correct it.

If the compressor has failed because its motor has burned out, the refrigerant, oil, and piping may have become severely contaminated. If a burnout has occurred, use the following procedures to replace the compressor and clean the refrigerant system. Use an oil test kit to determine the severity of the burnout. Make sure you use rubber gloves and eye protection, as contaminated refrigerant and oil can cause severe burns!

CAUTION

You must clean the system thoroughly to prevent repeated compressor burnouts.

8.1.1 Compressor Replacement

Desert Aire dehumidifiers are designed with scroll compressors. Scroll compressors are known for operating more reliably than other compressors in air conditioning and dehumidification applications due to their ability to cope with occasional periods of liquid refrigerant return. There are fewer moving parts in a scroll compressor subject to wear compared to alternative compressor designs. Nonetheless, there are still many mechanical and electrical parts with close tolerances. Replacement of the compressor may be required during the normal service life of the dehumidifier.

8.1.2 Inspection and Initial Diagnosis

Generally, the compressor will have two basic failure modes, mechanical or electrical. The compressors are a hermetic design, meaning all components, including the motor, are in a sealed shell. It can be very difficult to determine which issue was the root cause of the failure in the field by inspection of the damaged compressor. For example, an initial bearing failure inside the compressor may create debris that contaminates motor windings. High current draw may be related to a bearing issue or a motor winding issue. The initial inspection must be combined with a final analysis of the machine when returned to working order to confirm diagnosis.

Specific items should be noted before the replacement to give the best indications of the failure and complete the diagnosis as the new compressor is installed.

The following data should be taken to assist in diagnosis:

- Current draw for each leg of power (if the compressor will run and pump).
- High side and low side pressure (if the compressor will run and pump).
- Resistance of each leg to leg on three phase compressor or each leg to neutral on single phase compressors.
- Check of continuity from each leg to ground.
- Review of all system alarms including the relative timing of the alarms and mode of operation.

It is important to note that other components or lines may have been damaged if the compressor has failed. At times the internal damage to a compressor creates extreme levels of vibration before complete failure. Refrigerant lines and connections may be damaged before the compressor stops. Inspect tubing and components of the system before completing the compressor replacement.

Compressor Replacement

- Refrigeration oil must be tested for acid and particulate during any compressor replacement. For the initial testing, the compressor sump should be used to sample the oil. Oil can be recovered through the Schrader port on the low point compressor shell or through the suction line connection after the compressor has been removed.
- Use Virginia KMP, New-Calgon Phase III, Sporlan Test-All, or equivalent oil test where oil is sampled into a container. Vapor sampling methods may not show particulate and should not be used.
- Read the oil test kit manufacturer's instructions to determine if there is acid present in the oil. Determine if there are other contaminants by viewing the samples for darkness, cloudiness, or particulate.
- The following procedures must be used depending on the results of the test above:

Any Compressor Service

- A new filter dryer must be installed when the system has been opened. If there is no acid or particulates indicated, the new compressor can be installed and run. Proceed to Testing and Final Diagnosis.

Acid Indicated

- Install a suction line filter shell and charcoal activated core such as a Sporlan or Emerson HH core type or equivalent. The acid levels will be monitored and several core changes may be required. Install ball valves on either side of the suction filter to facilitate these changes. Note that larger Desert Aire systems will have suction filter shells installed from the factory. The shell can be used with charcoal activated cores. Note that a "safety screen" may be required with some manufacturer's cores to prevent small pieces of the core from dislodging and finding their way to the compressor. Follow filter shell and core manufacturer's instructions.
- Review compressor and suction line for area where future oil samples can be taken from the system. If an access fitting exists on the compressor shell below the oil level, no further action is needed. If this is not available, an access fitting can be located at the bottom of a trap in the suction line. Braze in a fitting as required to be able to remove an oil sample. **Note:** It is acceptable to use acid test kits that sample the refrigerant and connect to Schrader fittings.
- Ensure there are access fittings directly upstream and downstream of the suction filter. There is typically one fitting installed on the suction filter. There may be a bulkhead fitting attached to the compressor suction side.
- Do not use acid neutralizing additives or other chemicals for acid removal. The refrigeration system must contain only oil and refrigerant. Precipitates of additives and acids may be considered contamination in the refrigeration system. Other compounds may be present in additives as carriers. Long-term effects of specific additives or compounds with a particular system or design are unknown without significant controlled testing.

Particulate Indicated

- Install a replaceable core liquid line filter shell. Note that larger Desert Aire systems will have replaceable core liquid line filter shells installed from the factory. The pressure drop levels will be monitored and several core changes may be required. Install ball valves on either side of the filter shell to facilitate these changes.
- Install a secondary filter such as Sporlan FS-series or equivalent 20-micron filter in the replaceable core.
- Ensure there are access fittings directly upstream and downstream of the liquid filter. There is typically one fitting installed on the filter shell. There is typically a fitting installed on the outlet side of the receiver.

Returning to Service

See Sections 8.5.3 and 8.5.4 for evacuation and charging.

- Restart unit and set unit to run compressors.
- Record the pressure drop across the suction filter and liquid line filter dryer.
- Check sight glass indicator for moisture level.
- Monitor pressure drop across the liquid and suction filters during the first hour of operation. Compare the reading taken earlier. If the pressure differential across the filters is 5 PSI or greater, isolate the filters using the valves installed and recover the refrigerant from the filters. Replace cores. If activated carbon filters were installed in the suction side to remove acid, replace with similar cores. If a secondary filter was installed in the liquid line core to remove particulate, install cores and secondary filter in this location.
- Run unit for 24 hours and review acid levels (if found previously) and pressure differentials.
  - If acid is found, replace with activated charcoal cores and test at 24-hour intervals until acids are at acceptable levels. Once acid is no longer detected, replace cores with standard filter elements. Remove outlet screens if they were required by filter manufacturer.
  - If the pressure differential across the liquid line filter is 5 PSI or greater, replace cores and secondary filter with new components and test at 24-hour intervals until pressure drop is at acceptable levels. Once pressure differential is less than 5 PSI, remove secondary filter and replace cores.

Testing and Final Diagnosis

It is of critical importance to ensure that the system is operating as expected before unit is returned to normal service. Complete an Compressor Replacement Form located in the Installation and Operation Manual. Validation of this report allows for the continued coverage of the compressor under the original warranty.

It is possible that there was an internal defect in the compressor or normal mechanical wear occurred over time. Compressor longevity generally is a function of load, lubrication, electrical input conditions, and temperatures.

The cause for the compressor failure must be identified before unit is placed back into full service. Both the identification of the cause of compressor failure and the proper cleanup of the system must be addressed to avoid repeat compressor damage.

8.2 Recommended Duct Design

You must use proper duct design to ensure that the dehumidifier operates efficiently and without problems. Undersized or restrictive ducts reduce the system airflow, which can cause premature compressor failure. Use the following diagrams as a guide when you design the duct system.

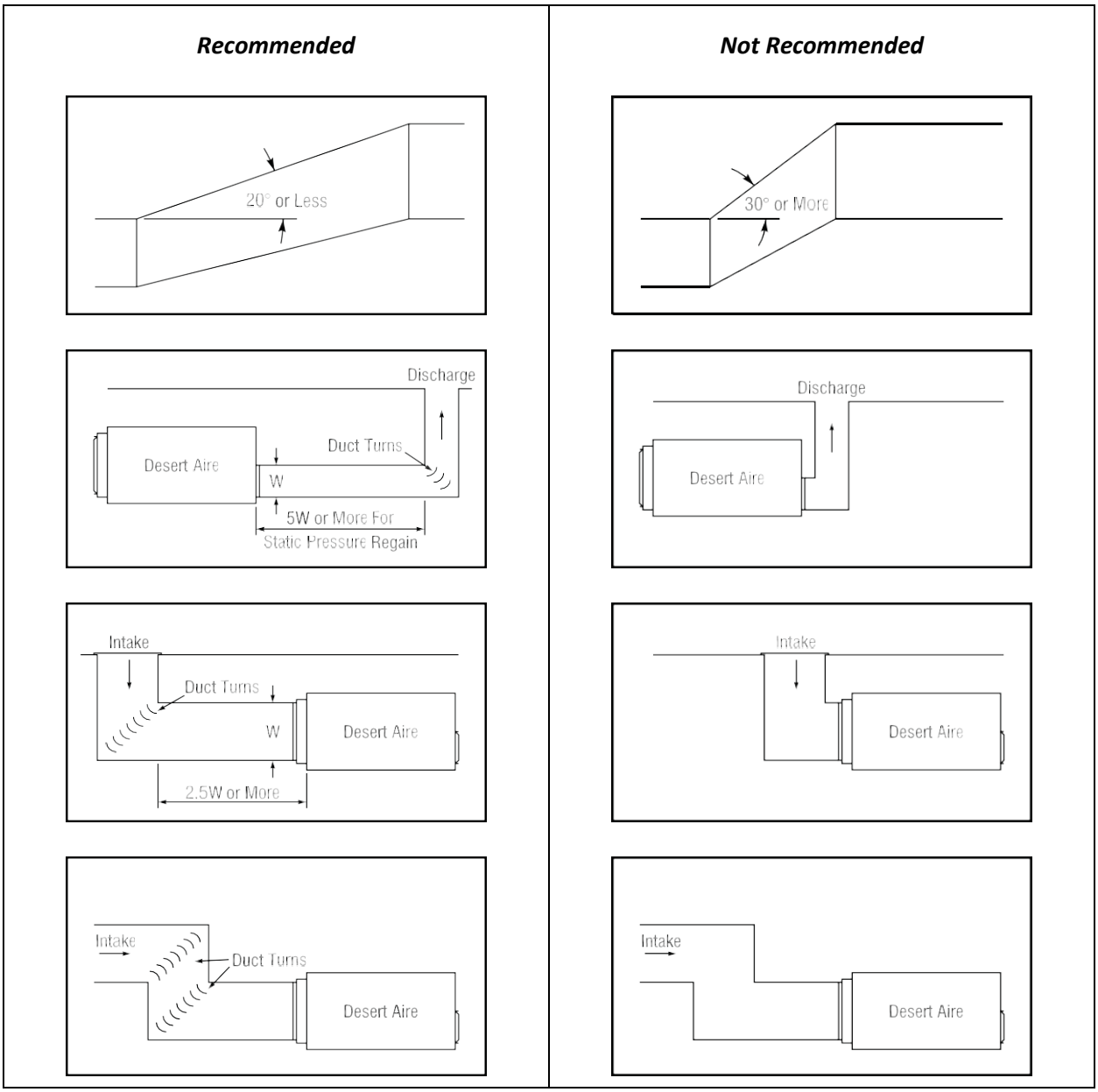


Figure 39 – Recommended Duct Designs for Desert Aire dehumidifiers

8.3 System Guidelines

8.3.1 Recommended Controller Settings

It is important to determine your comfort set points and to avoid further controller adjustments. It takes time for the unit to establish equilibrium at a given set point. Therefore, continued set point adjustments will lead to high energy consumption and user discomfort. Continuous blower operation is recommended. This will reduce air stratification and ensure that the refrigeration circuit is activated only when it is necessary.

RECOMMENDED SET POINTS:

- Humidity 50% to 60% RH
- Air Temperature 2° to 4°F above the pool water temperature

WARNING: Never disable a dehumidifier in a pool / spa room application unless the pool / spa has been drained. Even when a pool / spa is not in use, the pool / spa water continues to evaporate and add moisture to the air. During these periods of high humidity, moisture will seep into walls, ceilings, furniture, etc. Although the dehumidifier may be capable of regaining control of pool / spa room conditions after re-start, moisture damage to the pool / spa room may result from the period when the dehumidifier was disabled.

8.3.2 Refrigeration System Pressures

Many factors affect refrigeration pressures on a given day. Such factors include ambient temperature, water temperature, airflow volume and relative humidity.

Directly measured suction / discharge temperatures will differ due to suction / discharge superheat. However, for the sake of troubleshooting:

- Normal Suction Temperature Range 32° to 50°F
- Normal Discharge Temperature Range 95° to 130°F

8.3.3 Temperature Rise or Drop Across Unit

- Typical air temperature rise across unit (reheat mode) 10° to 15°F
- Typical air temperature drop across unit (air conditioning or water heating mode) 10° to 15°F

NOTE:

- If your unit does not meet these temperature ranges, check the system airflow
- These guidelines do not apply to dehumidifiers with outdoor air intakes when they are in the “occupied” mode.

8.4 Sequence of Operation

The Swim Aire controller is optimized to maintain the temperature and relative humidity of pool room applications. The Swim Aire contains a refrigeration system that operates to control the zone temperature and humidity based off user adjustable setpoints. The refrigeration system contains various components to achieve proper performance. The general components are as follows; an evaporator coil that is used for cooling the process air and removing moisture, a condenser coil that is used to reheat the process air, an optional remote condensing coil that is used to reject heat from the process air, and a three way modulating valve that directs which condenser the system rejects heat to. If the pool water option has been selected, an additional condenser is available to reject heat to the pool water for pool water heating applications. See the controller manual Section ***6.1 Sequence of Operation*** for more details.

8.5 Component Replacement, Charge, Evacuation, & Leak Instructions

Note that a new liquid line filter dryer will be required any time a refrigeration system is opened for servicing. New dryer should be of the same capacity as the original or larger.

8.5.1 Recovery

When there has not been a major refrigeration system leak, the system will contain refrigerant. This refrigerant must be either recovered to separate cylinders appropriate for the refrigerant type or isolated in a portion of the refrigeration system that will not be open for service. In all cases you must comply with Section 608 Refrigerant Recycling Rule of the Clean Air Act.

8.5.1.1 Recovery of Systems with a Refrigeration System Leak

As much refrigerant as possible must be recovered into separate refrigerant cylinders appropriate for the refrigerant being serviced. System pressure near the leak site should be monitored closely to ensure this area is not pulled to a vacuum. Isolate sections of the system as required and recover independently to avoid refrigerant contamination.

Uncontaminated refrigerant can be reused in the refrigeration system it was recovered from.

8.5.1.2 Recovery of Systems without a Leak

Systems that do not have leaks, but still require refrigeration system service, may have charge isolated in receivers and condensers if these components do not require direct service.

Desert Aire dehumidifiers have different receiver sizes depending on the model and size. Condenser sizes and configurations may also vary. In general, larger receivers will come equipped with isolation valves that will allow for a portion of the charge to be contained in the receiver during servicing. Units equipped with remote condensers will have isolation valves located inside the unit cabinet near the area where the connections are made.

The compressor can be used to move refrigerant to the system components that will be used to temporarily hold the charge. Note that cooling a condenser by running as many fans as possible and/or cooling the coil surface with a stream of water can assist in storing charge.

The low side pressure should be monitored closely while using this procedure to store charge. Under no circumstances should a compressor be allowed to run in a vacuum. When most of the refrigerant is isolated in the receiver and/or condensers, recover remaining charge into separate refrigerant cylinders appropriate for the refrigerant being serviced. Carefully track the amount of refrigerant charge removed as this exact amount should be placed into the unit when re-charging.

8.5.2 Repair / Component Replacement

- If any portion of the system was at a vacuum, place dry nitrogen in the system until atmospheric pressure is reached.
- It is preferred that components are removed by heating the braze alloy to the re-melt temperature and mechanically moving the component. When this is not possible due to proximity of cabinet structure or other components, a tubing cutter can be used to remove sections of piping. Where new tube is required for replacement, use dehydrated tube where possible. Use the same type of fittings as original. Route the pipe in the exact manner as originally routed. Use Type K per ASTM B 88 or ASTM B 819 or Type ACR per ASTM B 280 copper tubing or for all tubes 1 1/8” and smaller.
- Tubes 1 3/8” and larger shall use Type K per ASTM B 88 or ASTM B 819.
- Cap sections of tube and components that are not actively being installed to prevent infiltration of moisture and contaminants.
- Use only braze alloy to join tube.
  - The selection of filler metals is highly dependent on the tube fit, clearance, and operator preference for flow. When flux is to be used, care should be taken to ensure that the flux is not introduced to the inside of the tube. It is recommended that phosphorous bearing alloys be considered for copper-to-copper connections due to their self-

fluxing on copper-to-copper joints. Refer to alloy manufacturer's guidelines for details on compatibility.

- Flow nitrogen into tubing to prevent the formation of copper oxides.
  - Copper oxides form rapidly when copper is heated to temperatures required by the brazing process and exposed to oxygen in the air. Copper oxides flake easily on the inside of the tubing and dislodge easily when the system is filled with refrigerant and oil. The particulate can move throughout the system and cause contamination on valves and other critical components. System filters may become fouled.
  - Flowing nitrogen into the system and ensuring that the inside of the tube is significantly free from oxygen while brazing ensures that oxides do not form. As the last joints of a system are made, additional thought must be made on the location where the nitrogen can escape. Schrader valves are placed throughout the system. These valves can be opened to allow for nitrogen to flow without generating pressure behind the braze joint that is being created.

See Section 8.1 for special procedures related to compressor replacements.

- Replace liquid line filter dryer as last step in system repair. Note that the dryer will readily absorb moisture from the ambient air and must be open only for as long as required for installation.
- After completion of all repairs, pressure test system using nitrogen pressure decay test or nitrogen with tracer gas and appropriate leak detector.

8.5.3 Evacuation

- Carefully inspect pump and related equipment before connecting to system.
- Ensuring gaskets are in good condition and pump is capable of low vacuum levels can save time. Connect pump(s) to as many locations as possible ensuring all locations are well sealed. Recommended recovery / evacuation points are at each condenser, and both sides of the compressor. If a field charge will be required, connecting a refrigerant tank to the system with a good valve is recommended. Any hose connections requiring purging of non-condensable can be done at this point.
- Evacuate the line and remote condenser to 400 microns measured at a point on the system furthest away from the pump.
- Note that a gauge installed on the pump or in close proximity will give a lower reading while the unit is being evacuated.
- A deep vacuum gauge should be used to evaluate the pressure. Compound manifold gauges do not allow for enough accuracy at the pressures required.
- The system should be able to hold a vacuum under 500 microns for more than 10 minutes.
- If pressure continuously rises at a rapid rate there is likely a system leak. Review all piping connections and correct before continuing evacuation.
- Pressure rising above 500 microns and tending to stabilize at a higher pressure indicates the system has moisture above specifications. Continue evacuation until 500 microns or lower can be held for a minimum of 10 minutes.

8.5.3.1 Alternative Evacuation Specified by Process

After components have been repaired or replaced, the evacuation procedure should take place. Very small amounts of refrigerant may still be mixed with the oil in the system. Out-gassing of this refrigerant may interfere with the evacuation and vacuum decay testing.

IFa unit has been previously charged with refrigerant, and standard evacuation method has not been successful after 24 hours minimum using the standard procedure, the following alternative method should be used.

- Check vacuum level. It should be a maximum of 1,500 microns absolute pressure. If this is not the case, review system for leaks and continue evacuation process until 1,500 microns is achieved.

Purge system with nitrogen to atmospheric pressure (0-gauge pressure). Ensure all portions of systems are at this pressure. Seal system and wait 10 minutes. Start vacuum pump and draw system to 1,500 microns or less.

Purge system with nitrogen to atmospheric pressure (0-gauge pressure) again. Ensure all portions of systems are at this pressure. Seal system and wait 10 minutes.

- Start vacuum pump and draw system to 500 microns. Seal system. System may rise to a higher level, but should not rise above 1000 microns in a 10-minute timeframe. If unsuccessful, continue evacuation or check for leaks.

It is assumed that the system was clean and tight from the original process and refrigerant only is mixed with oil. Alternative process should not be considered if there is chance of free water entering the system or the system was open for any significant time.

8.5.4 Charging

- Charge should be weighed into the system using a scale. In cases where the full charge was recovered, weigh in the charge with the recovered refrigerant and add the appropriate amount to meet the rating plate and field charge (if applicable). This should be placed in the high side of the system at the receiver.
- In cases where the full charge cannot be added to the system high side, the charge can be added to the low side of the system only when compressors are energized. If this is required, the compressors should be energized and the charge should be slowly metered into the suction line as far as possible upstream of the compressor. If the unit is equipped with an accumulator, the charge needs to be added to the port upstream of this location. The bulkhead fittings on the side of the unit should not be used for charge addition. Monitor superheat at the compressor suction inlet using the bulkhead fitting and a temperature sensor on the suction line near the compressor. Superheat should not drop below 10 degrees during the process of adding charge.

8.5.5 Testing and Final Diagnosis

Check the oil level in the compressor after the system has been running for 24 hours. Oil may have been contained in the liquid refrigerant when recovered from the system. Most of this oil will be returned if the recovered refrigerant is used. If new refrigerant is added, additional oil should be added based on the following ratio:

New Refrigerant Charge Added(lb). x 0.352 = Oil charge(oz).

It is of critical importance to ensure that the system is operating as expected before unit is returned to normal service. Test component replaced and function of the system. Many times a separate component in the system may have set a condition that causes a failure of another. Thoroughly test systems to ensure repeat failures do not occur.

Note: Compressors supplied with an oil sight glass should be viewed and filled to 75% capacity.

8.6 Rating Plate

The system rating plate is attached near the electrical enclosure of the dehumidifier.

DESERT AIRE						Max. Ambient Temperature:	48.9°C (120°F)
						Voltage/Phase/Hz:	460/3~/60
Model No: XXXXXXXXXX-XXXXXXX						Control Voltage:	24 Volts
Serial No: 2224E32001						Min Ampacity:	65 Amps
Unit Tag #: DHU-1						Max Overcurrent Protective Device	80 Amps
For Outdoor Use, IPX4						Minimum Disconnect Current Ratir	70 Amps
SCCR: 65kA rms symmetrical, at nameplate voltage maximum							
Compressors			**Supply Blower(s)**			**Transformers**	
Mtr #	**RLA**	**LRA**	**Qty**	**HP**	**FLA**	**Xfmr #**	**VA**
2	17.9	125.0	1	15	18.5	1	150
3	N/A	N/A	**Exhaust Blower(s)**			2	150.0
4	N/A	N/A	**Qty**	**HP**	**FLA**	3	N/A
5	N/A	N/A	N/A	N/A	N/A	4	N/A
Condenser Fans			**Maximum Allowable Pressure**			5	N/A
Qty	**HP**	**FLA**	Low Side	1.72 Mpa (250 psig)		6	N/A
0	0	0.0	High Side	4.14 MPa (600 psig)		7	N/A
Heat Wheel Motor			**R-454B Factory Charge**			**Electric Heater**	
Mtr #	**HP**	**FLA**	Circuit A	32 kg (72 lbs)		**kW**	N/A
N/A	0	0	Circuit B	N/A		**FLA**	N/A
Motors powered by VFDs or 3Ph transformers use line-side current for MCA/MOPD calculation. Load side FLA						**Wiring Diagrams**	
Maximum operating water pressure 225 psig Minimum operating water pressure 0 psig						HIAQ3-32FNVN, , LIAQ3-1A, LIAQ3-2D, LIAQ3-3A, LIAQ3-4A, , HT-1	
For Installation Only in Locations Not Accessible to the General Public						***Independent Powered Electric Heater***	
This product may be covered by one or more patents. Www.desert-aire.com/marking						*Voltage/Phase/Hz:*	N/A
Desert Aire LLC - N120 W18485 Freistadt Rd. Germantown, WI 53022 P: (262)946-7400 F:(262)946-7401						*Control Voltage:*	N/A
						Min Ampacity:	N/A
						MOPD:	N/A

Figure 40 – System Rating Plate

8.7 Start-Up Supervision Supplemental Information (Optional)

A Desert Aire factory start-up is an option as well as CST or Remote Startup Assistance which can be purchased with the equipment. A factory start-up includes several key services: The expertise of an accomplished, factory-trained technician who will supervise the commissioning of the equipment.

- The Desert Aire representative will assist the installing contractor with filling out the Start-Up Report.

The Desert Aire representative will also inspect the installation to make sure that the dehumidifier has been properly integrated with the rest of the equipment on the jobsite.

Finally, The Desert Aire representative can train the maintenance personnel to operate and service the equipment if necessary.

- A factory start-up does not include installation assistance. The installing contractor is responsible for ensuring that the system is ready for start-up when the Desert Aire technician arrives.
- When the installing contractor is confident the system will be ready, they should contact the Desert Aire Sales representative to schedule the start-up. Please call at least two weeks before the desired start-up date to help prevent scheduling conflicts.

8.8 System Start-Up Report

A copy of the system "Start-Up Report" can be found on the following page. This report needs to be filled out thoroughly by a qualified service technician and returned to Desert Aire for warranty validation. Please ensure that the model and serial number of the unit are noted on this form. The model and serial number can be found on the system's rating plate located on or near the electrical compartment service door. Failure to complete and return this form will void the unit's warranty. These reports are also helpful when trying to correct existing problems. Should you need system diagnosis help, email the completed worksheet to Desert Aire's Service Department using the email address provided. Be sure to include your name and telephone number where you can be reached.

LS Onsite Start-Up Request Form

Factory Assisted Start-Up consists of a Desert Aire Service Department Technician to visit the jobsite and provide **supervisory** experience to installing contractors as they perform the required procedures as outlined in our warranty activation start-up report. The company technician will also present an educational review of the dehumidifier's operating and maintenance requirements. **Factory Assisted Start-Up is not an installation bid & therefore the system must be ready to run before scheduling.**

CST Start-Up is performed by a local Certified Service Technician who has been trained by Desert Aire. The CST performs all duties listed above. In addition they will supply the "items to be supplied for start-up" as listed below. Please note charges for refrigerant will apply if refrigerant is necessary to complete the start up.

Remote Assisted Start Up – Refer to Remote Start-up Request Form.

Unit Information

Model # _____ **Serial #** _____

Jobsite Information

Jobsite Name _____

Jobsite Address _____

Contractor Information

Installing Contractor _____

Manager's Name _____ **Phone Number** _____

Field Technician's Name **Cell Phone Number** _____

Prior to scheduling start-up with Desert Aire, the site must be fully prepared for commissioning with the following items completed.

Required pictures of installation. To be included with this start-up request.

- ☐ Disconnect / Wiring, Electrical Panel
- ☐ Ductwork
- ☐ Pool Water / Hot Water Plumbing – If Applicable
- ☐ Lineset

Items to be supplied by the installing contractor (Factory Assisted or Remote Assisted Start-Up only)

- ☐ Equipped service vehicle and service technician – Technician will be trained.
- ☐ Volt/Amp/OHM meters. Refrigerant Manifold Gauges (R454B)
- ☐ Air balancing equipment (magnehelic or manometer differential pressure gauge – one inch scale preferred)
- ☐ 50# of the appropriate refrigerant & scale (R454B)
- ☐ Hand pump for adding oil to compressors and 1 gallon of one of the following oils:
  - Copeland® Ultra 32-3MAF Hatcol 22 CC
  - Parker Emkarate RL 32-3MAF Mobil Arctic 22 CC
  - Lubrizol Emkarate RL 32-3MAF Copeland® Ultra 22 CC
  - Nu Calgon 4314-66 (RL 32-3MAF)

  (This is required on split systems based on line set calculations and trapping)

LS Onsite Start-Up Request Form (continued)

Items to be completed by the installing contractor before any Start-Up can be scheduled:

- ☐ Dehumidifier leak checked and inspected for internal concealed damage. Remove access panels and inspect the interior of the unit for transit damage. Contact Desert Aire immediately if damage is noted. **(262) 946-7400**
- ☐ Remove shipping blocks from under the compressor.
- ☐ Pool filled with water and heated to 80°F and 75°F air temp
- ☐ Dehumidifier leveled and properly supported per the installation manual recommendations**. See section 5 of the LS I&O Manual for details**
- ☐ Return and supply duct work complete with grills, registers, and turning veins installed where necessary.
- ☐ Outside air duct, filters and damper installed (if applicable) – **See LS I&O Manual section 5.3 for details**
- ☐ Condensate line installed. **See LS I&O Manual section 5.4 for details**
- ☐ Remote condenser plumbed per **Air Cooled I&O Manual section 5.5**, Traps installed at the base of all hot gas risers and check valve installed in the hot gas discharge line as close to the remote condenser header as possible.
- ☐ Refrigeration line set is clamped and the header supported per the **Air Cooled IO manual section 5.3**
- ☐ Lineset and remote condenser leak checked, evacuated, and charged if necessary. All units require additional field charging. **Refer to the charge label affixed to the unit for details**.
  Refrigerant added: _____lbs. (R454B)
- ☐ All electrical connections terminated and verified for proper voltage at the unit and the condenser (if applicable).
- ☐ Units ordered with room mounted T/RH sensors will have a sensor, cable and housing shipped loose in the electrical compartment of the dehumidifier. **See section 5.8.1.1 for details.** Units ordered with return air sensors will be pre-installed by the factory.
- ☐ Water condenser circuit connected to dehumidifier with flow meter and balancing valves installed in circuit. Water flow verified and air purged from water the lines (if applicable).
- ☐ Water temperature sensor wells and temp sensors installed and wired per **section 5.10** (These sensors and wells are shipped loose in the electrical compartment of the dehumidifier if the unit has a water heating circuit.)

If you are unable to supply any of the required equipment listed on page 2, you must contact Desert Aire before returning this document.

I agree that all the above has been completed as of _____(Date) If a return trip must be scheduled due to insufficient job-site preparation an additional purchase order must be issued to Desert Aire for re-scheduling. **A two-week minimum is needed to schedule start-up.** Once the form is completed, please email both pages to the Desert Aire service department at startup@desert-aire.com.

Signature of Project Manager _____ _____
Sign Print

Company Name _____ **Phone Number** _____

LS AireGuard Remote Startup Assistance

AireGuard Assisted Start Up consists of a Desert Aire factory technician remotely assisting a job-site technician to complete the commissioning process of the dehumidifier. Using a field installed Ethernet connection, Desert Aire will be able to navigate the controller and verify critical set up details to ensure proper equipment operation. The field technician will work under the guidance of Desert Aire to make any mechanical adjustments identified by Desert Aire to complete the commissioning process.

Unit Information

Model # _____ **Serial #** _____

Jobsite Information

Jobsite Name _____

Jobsite Address _____

Contractor Information

Installing Contractor _____

Manager's Name _____ **Phone Number** _____

Field Technician's Name _____ **Cell Phone Number** _____

Prior to scheduling start-up with Desert Aire, the site must be fully prepared for commissioning with the following items completed.

Required pictures of installation. To be included with this start-up request.

- ☐ Disconnect / Wiring, Electrical Panel
- ☐ Pool Water / Hot Water Plumbing – If Applicable
- ☐ Ductwork
- ☐ Lineset

Tool Requirements – These items are required to make adjustments to the system

- ☐ Volt/Amp/OHM meters. / Refrigerant Manifold Gauges (R454B)
- ☐ Hand Tools – Refrigeration Service Wrenches, Allen Wrenches, Assorted Screwdrivers & Crescent Wrenches
- ☐ Air Balancing Equipment (Magnehelic or Manometer differential pressure gauge – one inch scale is preferred)
- ☐ 25 # cylinder of the appropriate refrigerant & scale. (R454B)
- ☐ Hand pump for adding oil to compressors and 1 gallon of one of the following POE oils:

  Copeland® Ultra 32-3MAF Hatcol 22 CC
  Lubrizol Emkarate RL 32-3MAF Copeland® Ultra 22 CC
  Parker Emkarate RL 32-3MAF Mobil Arctic 22 CC
  Nu Calgon 4314-66 (RL 32-3MAF)
  (This is required on split systems based on line set calculations and trapping)

LS AireGuard Remote Startup Assistance (continued)

Job Site Preparation - Items completed by the installing contractor before Start-Up can be scheduled:

- ☐ Dehumidifier leak checked and inspected for internal concealed damage – remove access panels and inspect the interior of the unit for transit damage. Contact Desert Aire immediately if damage is noted **(262)946-7400**
- ☐ Dehumidifier leveled and properly supported per the installation manuals recommendations**. See section 5.1 for details**
- ☐ Outside air duct filters and damper installed (if applicable) – **See section 5.3 for details**
- ☐ Condensate P Trap installed with heat trace for winter operation. **See section 5.4 for details**
- ☐ Remote condenser plumbed per **section 5.6**, Traps installed at the base of all hot gas risers and check valve installed in the hot gas discharge line as close to the remote condenser header as possible.
- ☐ Refrigeration line set is clamped and the header supported per **section 5.6**
- ☐ Lineset and remote condenser leak checked, evacuated, and charged if necessary. All units require additional field charging. **Refer to the charge label affixed to the unit for details**. Refrigerant added _____lbs. (R454B)
- ☐ All electrical connections terminated and verified for proper voltage at the Dehumidifier and the Remote Condenser (if applicable)
- ☐ Temperature / RH sensors – (wall mount applications only) installed per **Section 5.8.1**.
- ☐ Optional Water Condenser circuit connected to dehumidifier with flow meter, balancing valves and temperature sensors installed in circuit.
- ☐ Remove shipping blocks from compressors and blowers.
- ☐ Ethernet Connection – Verify the RJ-45 Ethernet connection is installed and active. Contact Desert Aire to verify the connection. **(262)946-7400**
- ☐ Photo Document the ductwork and refrigerant line sets used for the remote condensers, be specific with photos showing oil recovery traps and the method of securing the refrigerant lines.
- ☐ Pool filled with water and heated to 80°F and 75°F air temp
- ☐ Gas heater lines plumbed and purged. Record gas pressure entering the unit. ____'wc (if applicable)

If you are unable to supply any of the required equipment you must contact Desert Aire before returning this document.

I agree that all the above has been completed as of _____(Date)

Once this form is completed please email both pages to the Desert Aire Service Department at startup@desert-aire.com

Desert Aire will schedule an appointment within 7 Business Days to commission the unit and will contact the Field Technician directly. The Field Technician will be expected to be onsite at the scheduled time to begin the commissioning process.

If rescheduling is required – Please contact Desert Aire immediately for availability

Signature of Project Manager _____ _____
Sign Print

Company Name _____ **Phone Number** _____

LS Series Start up Report

Important – To ensure warranty validation and continued customer satisfaction, complete this form and return it to Desert Aire immediately after start-up. Validation of this report activates the warranty.

COMPANY: Desert Aire Corp
DEPARTMENT: Service Manager
ADDRESS: N120 W18485 Freistadt Road Germantown, WI 53022
OFFICE: (262) 946-7400
E-MAIL: service@desert-aire.com

Instructions

- **Warning** – Only trained, qualified personnel should install and service Desert Aire equipment. Serious Injury or death can result from improper handling of this equipment. High voltage electrical components and refrigeration under pressure are present.
- Before continuing, read the Installation and Operations manual. If you do not fully understand the manual contact the Desert Aire Service Department. Please be prepared with the model and serial numbers located on the rating plate of the unit.
- Use one start up report per unit. Print or type all information. If there is not enough space available for readings or comments please attach additional pages directly to the start up report.

Location and Unit Information				
Installation Name:			**Date:**	
Installation Address:				
Dehumidifier Model #:			**Serial #:**	
Remote Condenser Model #:			**Serial #:**	
Form Completed By (Print):		**Signed:**		
Company Name:			**Phone #:**	
Company Address:				

Denotes that this is a model dependent item

Proper Installation Checklist- ***Refer to the LS I&O manual for items label "Sec"***		
☐ Installation manual read and understood	☐ Tighten all field and factory wiring	☐ Open all refrigeration service valves and tighten packing nuts
☐ Dehumidifier installed and leveled properly. **Sec 5.1**		☐ Check field and factory piping for leaks
☐ Condensate drain trapped and primed. **Sec 5.4**	☐ Check rotation of blower on 3 phase units	☐ Inspect air filters. Clean or replace as necessary
☐ Verify that the power supply matches the rating plate	☐ Check rotation of remote condenser fans	☐ 120-volt circuit run to heat trace and powered up **– Pool Water Circuit Only**

Unit Power Supply – Wire Transformers 240 volt for 240-volt applications. Unit leaves factory wired 208 or 460.			
Voltage at power block - No motors running	L1-L2	L2-L3	L1-L3
Control Voltage - No motors running	Transformer 1	VA Rating	

Line-set Installation* ***See label affixed to the unit for pipe sizes, charge and additional oil charge. See sections 5.3 and 5.5 of the Air Cooled I&O for pipe design, support and trapping details***					
Line Sizes	**Hot Gas**		**Liquid Return**		
Line-set Length		**Elevation Change**		Above Level Below	
Hot gas line trapped at every riser	Yes No NA	**Inverted traps at top of riser**		Yes No NA	
Check valve installed	Yes No	**Line-set Clamped per I/O Manual**		Yes No NA	
Additional R454B Added	LBS	**Additional Oil Added**	OZS	**Oil Traps Primed**	Yes No

Fan Cycle Controller Settings* – ***See sec 7.1.2 of the Air Cooled I&O manual for default condenser pressure setpoints.***			
Voltage	L1-L2	L2-L3	L1-L3
Amps - Motor 1	L1	L2	L3
Amps - Motor 2	L1	L2	L3
Discharge Pressure Setpoint			

Temperature Readings- *Testing should be done with at a minimum of 70degs*			
Room Air Temperature	°F	**Room Relative Humidity**	%
Outdoor Air Temperature	°F	**Outdoor Relative Humidity**	%
Water Temp (main pool)	°F	**Water temp (spa or other)***	°F

Supply Airflow				
Reheat Condenser Pressure Drop:	"wc	**Supply Duct Pressure :**	"wc	
Return Duct Pressure:	"wc			
EC Fan DP:	"wc	**High Airflow Setting:**	CFM	
Blower Motor 1 Current:	FLA	Amps L1	Amps L2	Amps L3
Blower Motor 2 Current:	FLA	Amps L1	Amps L2	Amps L3
Blower Motor 3 Current:	FLA	Amps L1	Amps L2	Amps L3

Compressors and Refrigeration in Cooling/Dehumidification Mode (Airside Evaporator Coil Active)				
	Circuit A		**Circuit B**	
Motor #				
RLA off nameplate	amps	amps	amps	amps
Amperage	L1	L1	L1	L1
	L2	L2	L2	L2
	L3	L3	L3	L3
Head Pressure / Suction Pressure	Psig / Psig		Psig / Psig	
Refrigerant Sight Glass Clear	Yes No		Yes No	
Superheat / Sub-cooling	°F / °F		°F / °F	
Compressor Oil Level Sight Glass* (level should be at least 3/4 full at completion of the start up)	½ ¾ F N/A		½ ¾ F N/A	

Auxiliary Water / Steam Coil Information*				
	Signal	**Inlet Temp**	**Outlet Temp**	**Discharge Air Temp**
Water Coil		°F	°F	°F

Auxiliary Electric Heater Information*					
	Signal	**L1 Amps**	**L2 Amps**	**L3 Amps**	**Discharge Air Temp**
Electric Heater					°F

Gas Heater Information*			
Gas Heater Model #:		**Serial #:**	
Gas Inlet Pressure	Psig	**Supply Air Temp at 100% Signal**	°F

Additional Comments:

N120 W18485 Freistadt Road, Germantown, WI 53022 (262)946-7400
This completed form must be submitted for compressor warranty credit consideration.
Remit to: service@desert-aire.com

Compressor Replacement Form

Location and Unit Information

Installation Name:			
Dehumidifier Model #:		**Serial #:**	
Form Completed By (Print):		**Signed:**	
Company Name:		**Date:**	
Company Address:		**Phone #:**	
		Fax #:	
Defective Comp. Model #:		**Serial#:**	
(If Tandem Set – Only list the specific failed compressor)			
New Compressor Model #:		**Serial#:**	
Refrigerant Used: (Circle One)	**R22 R407C R410A R454B Other:**		

Compressor Condition at Time of Initial Review

Continuity (0 resistance) to Ground on one or more legs	☐	Compressor drawing higher current than design	☐
Continuity (0 resistance) between two or more legs (3 phase units)	☐	Compressor drawing locked rotor current	☐
Other (describe):	☐	Runs without pumping: Pressures: /	☐
Continuity (0 resistance) to Ground on one or more legs	☐	Compressor drawing higher current than design	☐
Continuity (0 resistance) between two or more legs (3 phase units)	☐	Compressor drawing locked rotor current	☐
Other (describe):	☐	Runs without pumping: Pressures: /	☐

Final Determination of Failure

Liquid Floodback	☐	Low Superheat	☐	Debris	☐	Defective Expansion Valve	☐
Low Sump Oil	☐	Insufficient Motor Cooling	☐	Defective CC Heater	☐	Other (Describe):	☐

Diagnostic/Corrective Action Summary
Describe what corrective action was taken to prevent a repeat failure.

_____

_____

Compressor Replacement Comments/Checklist

- Generally, compressors will have two basic failure modes, mechanical or electrical. Refrigeration oil must be tested for acid particulate during any compressor replacement. Oil can be recovered through the Schrader port on the low point of the compressor or through the suction line connection after the compressor has been removed.
- A new filter dryer **must** be installed whenever changing a compressor. If the oil is acidic, HH filters will be required to assist in the cleanup. Acid levels must be monitored and several filter core changes may be required.
- Please refer to the installation and operations manual for the detailed compressor replacement cleanup process.

Required				Choose One		For Results of Acid or Particulate			
Acid & particulate test completed			☐	Unit Evacuated to 500 microns absolute & vacuum decay passed	☐	HH / Acid Core Used	☐	Pressure Drop	PSIG
LL Filter Replaced	☐	Pressure Drop	PSIG	Alternate triple evacuation process used	☐	SF Filter Used	☐	Pressure Drop	PSIG

Air Flow Readings: Refer to Installation and Operations manual for correct balancing procedures.

Evaporator Static Pressure Drop	"WC	Supply Duct Static Pressure Drop	"WC
Reheat Condenser Static Pressure Drop	"WC	Return Duct Static Pressure Drop	"WC

Temperature Readings

Room Air Temperature	°F	Water Temp (Circle: **Pool** / **Tower**)	°F	Room Relative Humidity	%
Outdoor Air Temperature	°F	Water Temp (Circle: **Pool** / **Tower**)*	°F	Outdoor Relative Humidity	%

Compressors and Refrigeration in Reheat Mode

	Cir A – Use both sides for tandem set		**Cir B** – Use both sides for tandem set	
Motor # (See wiring schematic for details)				
Discharge Pressure	PSIG	PSIG	PSIG	PSIG
Liquid Line Pressure (At access fitting nearest TXV)	PSIG	PSIG	PSIG	PSIG
Suction Pressure (At compressor)	PSIG	PSIG	PSIG	PSIG
Liquid Line Temperature (At access fitting nearest TXV)	°F	°F	°F	°F
Suction Temperature (At Compressor)	°F	°F	°F	°F
Refrig. Sight Glass Cond. (Clear, Intermittent Vapor, Flashing)				
Comp. Oil Level Sight Glass (Shut down comps., wait 5 minutes)	½ ¾ F	½ ¾ F	½ ¾ F	½ ¾ F

Compressors and Refrigeration in Cooling Mode

	Cir A – Use both sides for tandem set		**Cir B** – Use both sides for tandem set	
Motor # (See wiring schematic for details)				
Discharge Pressure	PSIG	PSIG	PSIG	PSIG
Liquid Line Pressure (At access fitting nearest TXV)	PSIG	PSIG	PSIG	PSIG
Suction Pressure (At compressor)	PSIG	PSIG	PSIG	PSIG
Liquid Line Temperature (At access fitting nearest TXV)	°F	°F	°F	°F
Suction Temperature (At Compressor)	°F	°F	°F	°F
Refrig. Sight Glass Cond. (Clear, Intermittent Vapor, Flashing)				
Comp. Oil Level Sight Glass (Shut down comps., wait 5 minutes)	½ ¾ F	½ ¾ F	½ ¾ F	½ ¾ F



Optimizing Solutions Through Superior Dehumidification Technology

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