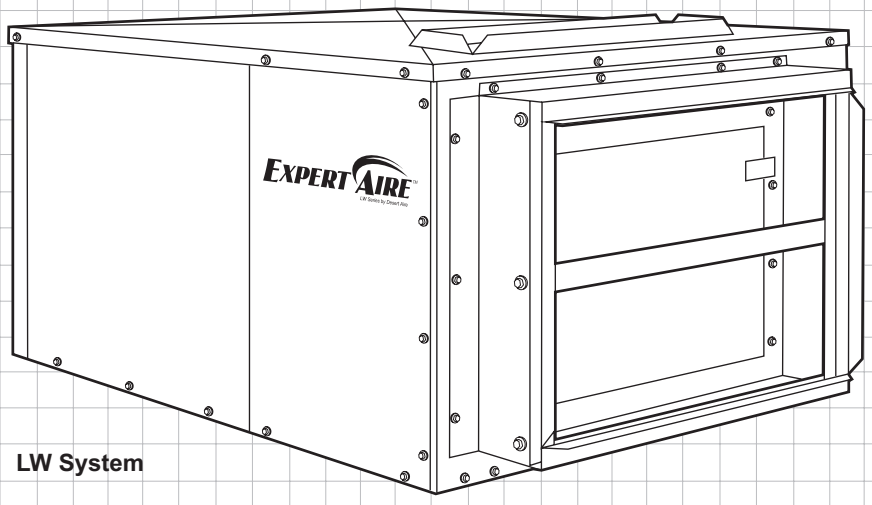
LW (ExpertAire™) Wide Temperature Range Dehumidifiers

- Designed for low ambient temperatures, 35° to 80°F
- Defrost cycle uses hot gas defrost to quickly eliminate frost from evaporator coils
- Timed defrost cycle initiated automatically only when required
- Heat of rejection can be delivered to the space or optional remote condenser

Installation and Operation Manual



LW System

EXPERT AIRE™

LW Series by Desert Aire

AHRI MEMBER

⚠ 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 two (2) years from the date of shipment. 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 for 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 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 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:

Desert Aire Corp
c/o Service Manager
N120 W18485 Freistadt Road
Germantown, WI 53022
PH: (262) 946-7400
TOLL FREE: (800) 443-5276
FAX: (262) 946-7401
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.

Safety Labels are used throughout this manual. They comply with the ANSI Z535.4 Standard. Please be familiar with the following labels and their definitions.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible death or injury.

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

Caution used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, could result in property damage.

Product Warning for the State of California

WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov

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1. Introduction

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

1.1 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 become 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.

1.2 Freight Damage Claims

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

1.3 Rigging

⚠ WARNING

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

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.

1.3.1 Rigging the Dehumidifier

Depending upon the unit type, various rigging methods are used to best fit the equipment. Personnel should avoid stepping on the top of the unit. Desert Aire dehumidifiers are not designed to support the weight of a person on all portions of the roof. Damage incurred through caved or distorted top panels will not be covered under warranty. If you must walk on the top panels, carefully walk on the edges where structural integrity is greatest.

⚠ CAUTION

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

1.3.2 Rigging the Remote Condenser

Refer to separate Remote Condenser Manual for specifications regarding rigging.

2 Installation

Manual applies to standard unit configurations only.

2.1 Location of Dehumidifier

Allow a minimum of 36 inches of clearance around all sides of the dehumidifier for piping, duct connections, and service access. Install the unit on a sturdy, level mounting base or a 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 2.2 for detailed duct installation instructions.

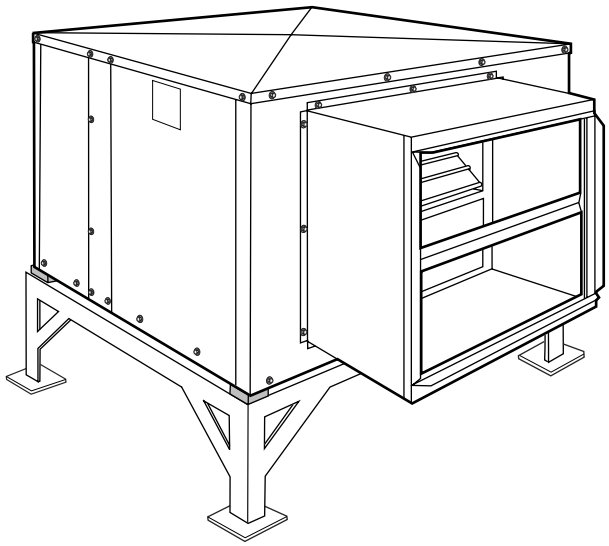

Figure 1 - Typical Floor Installation

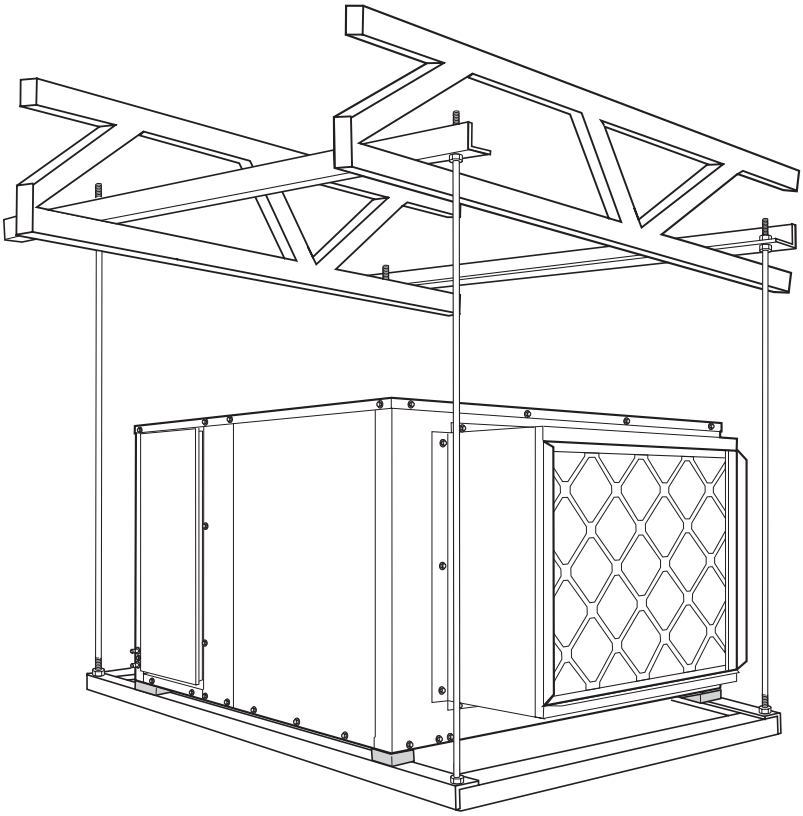

Figure 2 - Typical Suspended Installation

For ice rink applications it is recommended that two dehumidifiers be installed facing in opposite directions with the supply airflow direction along the rink perimeter. Both units should be approximately 12 feet above the ice surface and be equipped with a small section of discharge duct (see Figure 3 for layout).

If you must install the dehumidifier outside, you must use an outdoor-rated dehumidifier. Desert Aire seals and weatherproofs outdoor dehumidifiers to help prevent water infiltration. You can determine whether your dehumidifier is outdoor-rated by inspecting the unit rating plate (see section 5.5 for details).

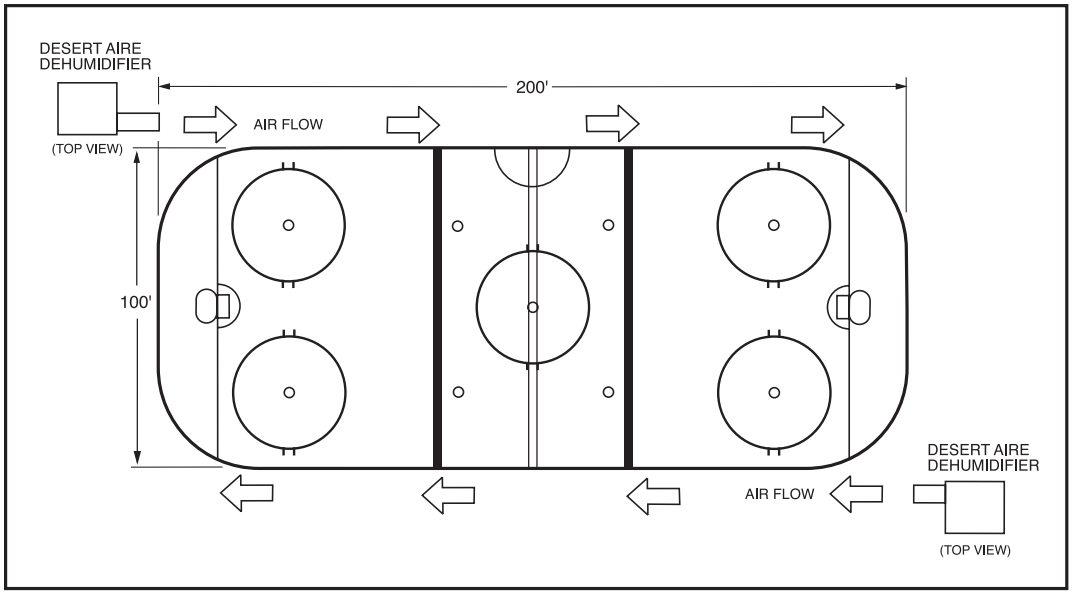

Figure 3 - Typical Ice Rink Installation

2.2 Duct Installation

Duct design and installations should conform to the latest ASHRAE and SMACNA low velocity duct standards (see section 5.2 for details). Undersized, restrictive ductwork with abrupt turns or transition can decrease the efficiency and the moisture removal capacity of your dehumidifier. Size the ductwork for an acceptable air pressure drop at the airflow volume shown on the dehumidifier's airflow label. Use neoprene flex connectors when you attach ductwork to the dehumidifier to prevent transmission of excess vibration and noise.

LW Model Size	External Static Pressure (Resistance of Ductwork and Grilles)
03	0.0" - 1.0" W.C.
05	0.0" - 1.0" W.C.
08	0.0" - 1.0" W.C.
10 / 12 / 15	0.0" - 1.0" W.C.

Figure 4 - Standard Unit External Static Pressure Specifications

Install the return air grilles or openings as high as possible in the room. In most cases one centrally-located return air grille will be adequate. To prevent air short-cycling, do not install the return air grille too close to a supply grille. Grille sizing is also important.

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, such as an indoor

swimming pool, choose components made from anodized aluminum or other non-corrosive materials.

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.

2.3 Condensate Drain Piping

⚠ CAUTION

1. **While the supply blower runs, the inside of the dehumidifier operates at a negative pressure. Your unit requires a p-trap in the condensate drain pipe to prevent condensate from being drawn into the cabinet of the dehumidifier, which may lead to premature corrosion and property damage.**

2. **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 raise the dehumidifier at least 12 inches above the floor to provide clearance for the condensate drain connection. You must supply and install a p-trap on the 1-inch drain line. Pitch the condensate drain line a minimum of 1/4 inch per linear foot, and support the pipe with code-approved hangers at least every 5 feet. A cleanout tee or plug may also be required near the trap to facilitate cleanout. When gravity disposal is not possible, you may use a condensate pump. Follow the pump manufacturer's installation instructions.

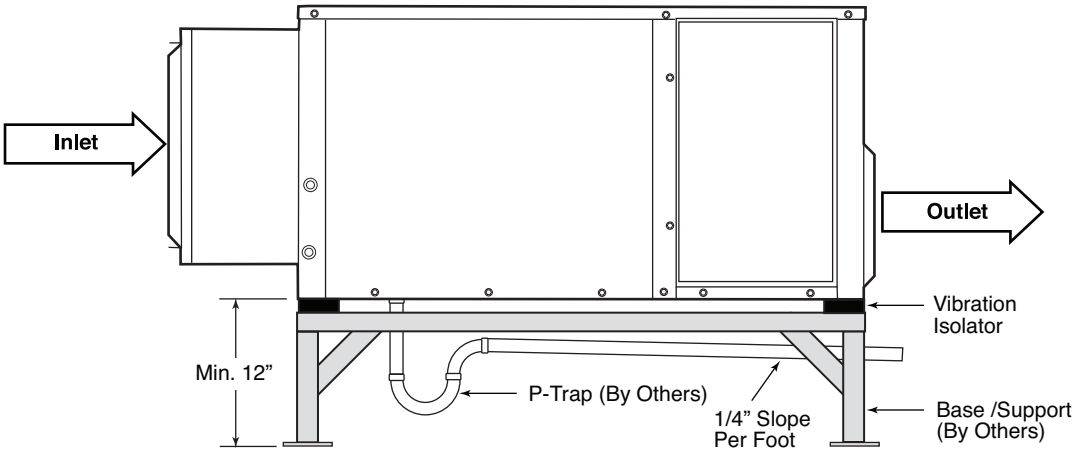

Figure 5 - Condensate Piping

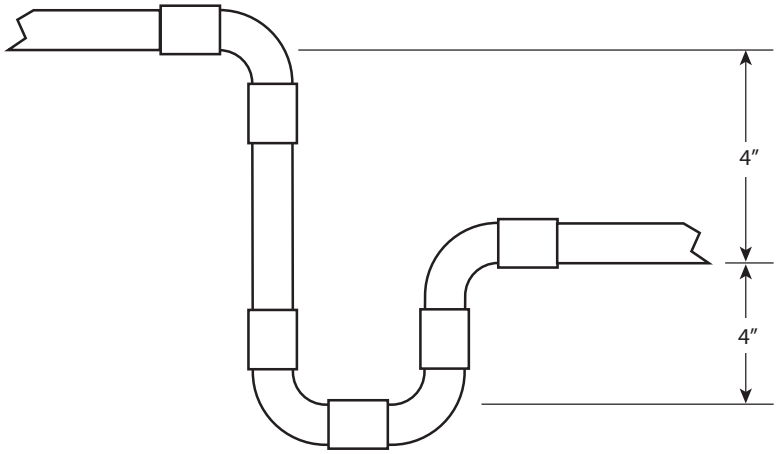

Figure 6 - Sectional View of Condensate Trap Requirements

Trap the condensate as shown in Figure 5. The P-trap dimensions in Figure 6 are sized for a maximum return air static of 2.0” of water. If your return air static exceeds this specification, consult Desert Aire for help in resizing the P-trap.

You may also need to install a cleanout tee or plug near the trap. Note that the drain opening in the drain pan is off-center to simplify its cleaning and servicing. Once you have designed and installed the trap, follow this sequence:

1. Connect the trap to a main drain line with 1/4” of downward pitch per linear foot of run.

2. Support the drain pipe every five feet to prevent sagging.

3. After you install the drain piping, prime the trap by pouring water into the drain pan of the dehumidifier.

2.4 High Voltage Wiring

⚠ WARNING

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

Electrical wiring must comply with all national, state, and local codes. Refer to the wiring diagram located inside the electrical section for all wiring connections.
To connect main power, attach the supply wires to the three-pole power block for three phase or two-pole power block for single phase units mounted on the electrical panel. Test the phasing of the three phase unit by "bumping" the blower contactor.

Verify that the blower rotates in the proper direction. If it rotates the wrong direction:

- Three-phase wiring: Switch any two of the three wires at the power block.
- Single-phase wiring: The motor must be re-wired according to wiring diagrams included with the motor.

2.4.1 High Voltage Connections

On single phase units the power supply must have 3 connections (2 power, 1 ground). On three phase units the power supply must have 4 connections (3 power, 1 ground). Connect the power supply wires to the main power block located in the upper section of the electrical compartment.

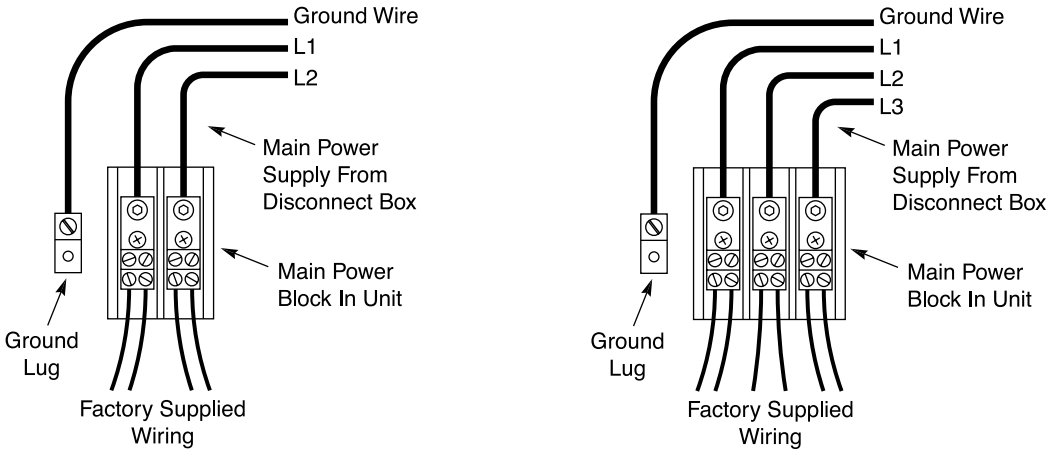

Figure 7 - Single-Phase and Three-Phase System Power Connection

2.4.2 Wire and Fuse Sizing

The field-installed power supply wires and overcurrent devices must be sized to handle the minimum ampacity of the dehumidifier without exceeding the maximum fuse size rating. Both the minimum ampacity and the maximum fuse size are printed on the unit rating plate.

2.5 Controls and Wiring

The standard Desert Aire LW Series dehumidifiers are controlled by the CM3540 microprocessor controller. This controller is designed for precise monitoring and control of air temperature and relative humidity (RH) within a conditioned environment. A separate controls manual has been provided. Refer to this separate manual for controller and sensor specifications, operation, and options.

You will need to run low voltage wires from the controller to the humidity sensor and to the dehumidifier if the unit was optioned with the wall-mount temperature and humidity sensor. The low voltage wiring diagram located on the inside of the dehumidifier's electrical box shows where to make wiring connections to the system. Units that have been configured with return mount sensors will not need these field installed wires.

2.6 Remote Condenser (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.

LW dehumidifiers installed with remote condensers may require additional oil and refrigerant charge at the time of field installation. Refer to the submittal documentation or label adjacent to the remote condenser connections to confirm the charge and connection tube sizes.

Standard Remote Condenser Line Sizes and Additional Charge

	Line Length (ft.)	Line Diameter (in. OD)		R-407C Charge				
		Discharge	Liquid					
LW03				RC5S018CXXXXXXX	RC5S024CXXXXXXX	RC5S032CXXXXXXX		
	0 < 25	5/8	1/2	10.5	9.6	13.4		
	25 < 50	5/8	1/2	12.7	11.8	15.6		
	50 < 75	3/4	1/2	15.2	14.4	18.1		
	75 < 100	3/4	1/2	17.6	16.7	N/A		
LW05				RC5S024CXXXXXXX	RC5S032CXXXXXXX	RC5S039CXXXXXXX	RC5S063CXXXXXXX	
	0 < 25	3/4	1/2	9.8	13.5	17.2	23.9	
	25 < 50	7/8	5/8	14.7	18.5	22.2	28.9	
	50 < 75	7/8	5/8	18.4	22.1	25.8	N/A	
	75 < 100	7/8	5/8	22.0	25.7	29.5	N/A	
LW08				RC5S039CXXXXXXX	RC5S051CXXXXXXX	RC5S063CXXXXXXX	RC5S079CXXXXXXX	
	0 < 25	7/8	1/2	18.5	19.8	25.2	34.2	
	25 < 50	7/8	5/8	22.2	23.5	28.9	37.9	
	50 < 75	1-1/8	5/8	31.5	32.8	38.2	N/A	
	75 < 100	1-1/8	3/4	37.1	38.4	N/A	N/A	
LW10				RC5S039CXXXXXXX	RC5S051CXXXXXXX	RC5S063CXXXXXXX	RC5S079CXXXXXXX	RC5S099CXXXXXXX
	0 < 25	7/8	5/8	18.5	19.8	25.2	34.2	36.0
	25 < 50	1-1/8	5/8	22.9	24.1	29.5	38.6	40.4
	50 < 75	1-1/8	3/4	31.5	32.8	38.2	N/A	N/A
	75 < 100	1-1/8	3/4	37.1	38.4	N/A	N/A	N/A
LW12				RC5S051CXXXXXXX	RC5S063CXXXXXXX	RC5S067CXXXXXXX	RC5S079CXXXXXXX	RC8S015CXXXXXXX
	0 < 25	7/8	5/8	19.8	25.2	26.6	34.2	47.1
	25 < 50	1-1/8	3/4	27.3	32.7	34.0	41.7	54.6
	50 < 75	1-1/8	3/4	32.8	38.2	39.5	47.2	N/A
	75 < 100	1-1/8	3/4	39.4	43.7	45.1	52.8	N/A
LW 15				RC5S063CXXXXXXX	RC5S079CXXXXXXX	RC8S011CXXXXXXX	RC8S015CXXXXXXX	
	0 < 25	1-1/8	5/8	25.5	34.6	33.0	47.5	
	25 < 50	1-1/8	3/4	32.7	41.7	40.1	54.6	
	51 < 75	1-3/8	7/8	45.0	54.0	52.4	N/A	
	75 < 100	1-3/8	7/8	52.8	N/A	N/A	N/A	

Figure 8 - Additional Refrigerant Charge (R-407C) and Line Size Required

Quiet Series Remote Condenser Line Sizes and Additional Charge

	Line Length (ft.)	Line Diameter (in. OD)		R-407C Charge		
		Discharge	Liquid			
LW10				RCUS005CXXXXXXX	RCUS006CXXXXXXX	RCUS008CXXXXXXX
	0 < 25	7/8	5/8	27.3	35.2	32.6
	25 < 50	1-1/8	5/8	31.7	39.8	37.0
	50 < 75	1-1/8	3/4	40.3	N/A	N/A
	75 < 100	1-1/8	3/4	N/A	N/A	N/A
LW12				RCUS005CXXXXXXX	RCUS006CXXXXXXX	RCUS008CXXXXXXX
	0 < 25	7/8	5/8	27.3	35.2	32.6
	25 < 50	1-1/8	3/4	34.8	42.7	40.1
	50 < 75	1-1/8	3/4	40.3	48.2	45.6
	75 < 100	1-1/8	3/4	45.9	53.8	51.2
LW 15				RCUS008CXXXXXXX	RCUS010CXXXXXXX	
	0 < 25	1-1/8	5/8	33.0	47.5	
	25 < 50	1-1/8	3/4	40.1	54.6	
	50 < 75	1-3/8	7/8	52.4	N/A	
	75 < 100	1-3/8	7/8	N/A	N/A	

Figure 9 - Additional Refrigerant Charge (R-407C) and Line Size Required - Quiet Series

3 Start-Up Procedures

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.

3.1 Preliminary Inspection

Verify that all contractors have completed their work. Find the Desert Aire "LW 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).
- Before starting unit, remove shipping restraining brackets on supply blower equipped with a spring isolation base, if applicable.
- 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.
- Check and adjust the belt tension for proper deflection at the mid-point of the blower belt(s). See Figure 10.
- The deflection is based on the belt length. The belt length can be found on the belt itself. Determine the force using the Belt Deflection table in Figure 11.
- Inspect the air filters and coils to assure 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.
- Check the drain pan and the condensate piping. Test the drain and prime the ptrap by pouring water into the drain pan or water side heat exchangers.
- Verify that all service valves in the refrigeration lines are fully open.
- If you installed a supplemental air heater, make sure you installed it in the air discharge (or "supply") duct and not the return duct.
- If your dehumidifier has a water heating condenser, turn on the circulating pump to run water through the system. Inspect the piping and repair any water leaks you find.
- After the remote condenser has been installed, enable its operation through the CM3540 Controller.

Specified Belt Deflection	
Belt Length	**Deflection**
25” to 50”	0.25”
51” to 70”	0.375”
71” to 110”	0.625”

Figure 10 - Specified Belt Deflection Table

Belt Deflection Force						
	New Belt Force (lbs.)			Used Belt Force (lbs.)		
HP	**1 Belt**	**2 Belts**	**3 Belts**	**1 Belt**	**2 Belts**	**3 Belts**
0.5	3			2 - 2.5		
1						
1.5						
2						
3	7			5 - 6		
5						
7.5						
10	12	7		9 - 10	5 - 6	
15						
20						
25		12			8 - 9	
30			12			8 - 9
40						

Figure 11 - Belt Deflection Force Table

3.2 System Operation Modes

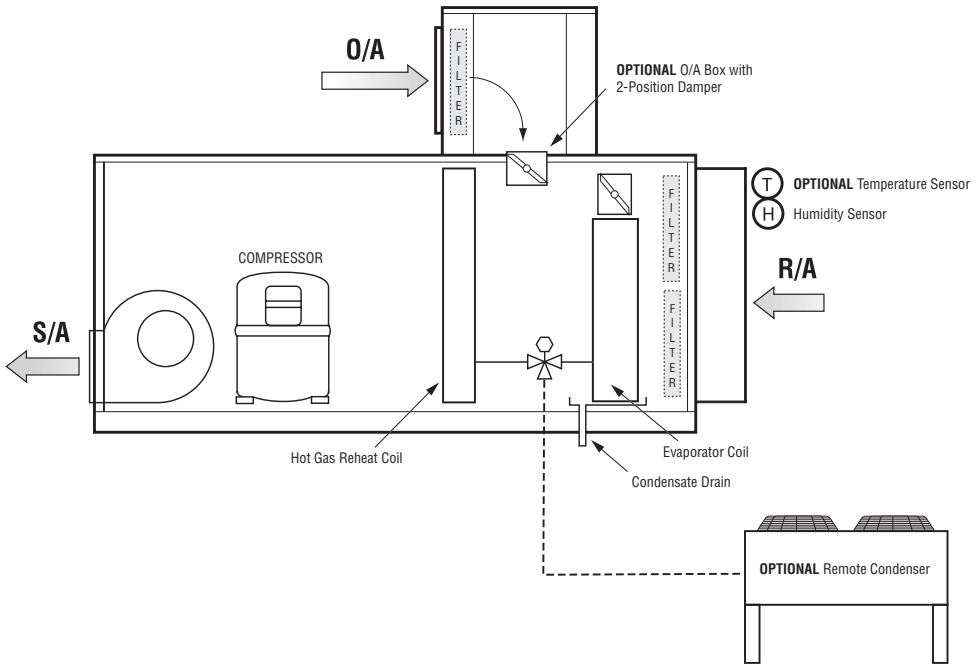

Figure 12 - LW Options that Impact System Operation Modes

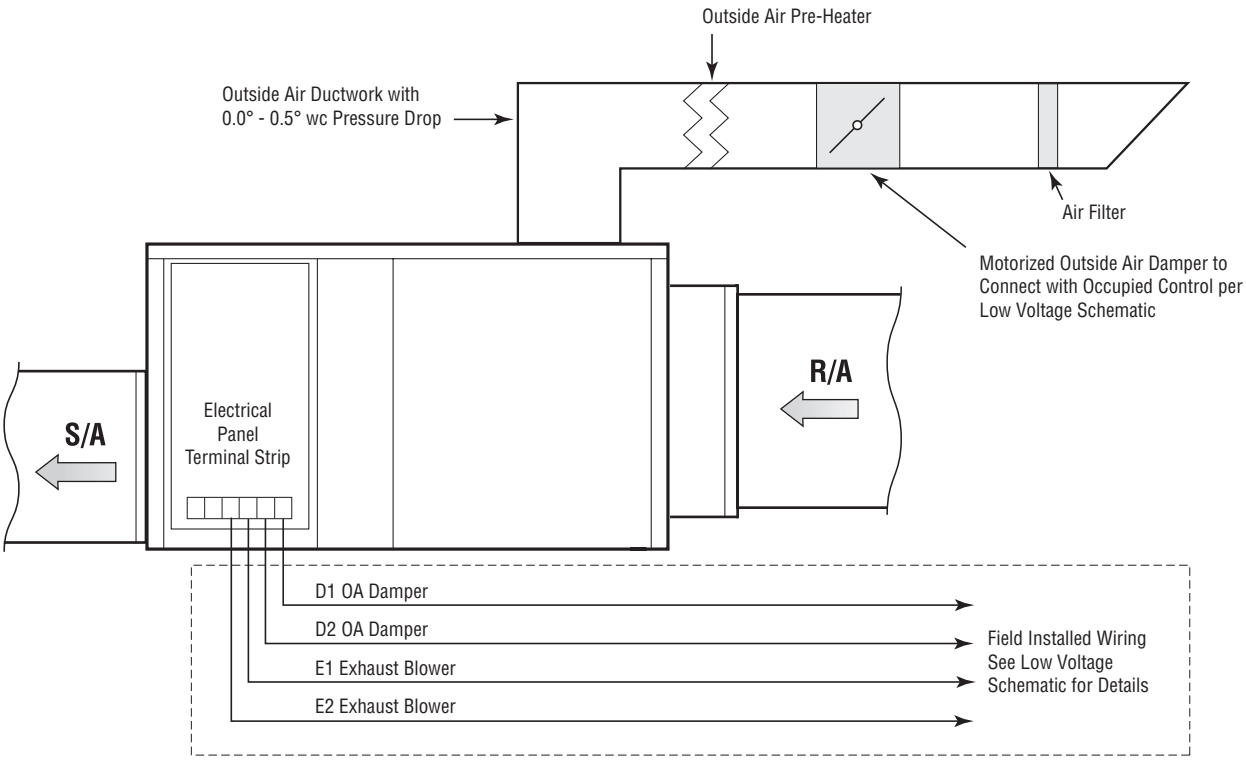

Figure 13 - LW Outdoor Operation Mode

3.2.1 Dehumidification / Air Reheat / Optional Outdoor Air

When the room air requires dehumidification, the dehumidifier runs in the “reheat” mode. Entering air is dehumidified as it passes over the evaporator coil. The energy absorbed at the evaporator is rejected at the reheat condenser, which warms the dehumidified air. The air which is discharged from the unit is drier and warmer than when it entered. Outdoor air can be introduced if the unit is equipped with an optional outdoor air box. In the occupied mode, the outdoor air damper opens and the evaporator bypass damper closes to keep a constant airflow. An exhaust fan dry contact then turns on the external exhaust fan. In unoccupied times, the outdoor air damper closes and the evaporator bypass damper opens to maintain constant airflow. Exhaust fan and damper dry contactors also turns off the external exhaust fan and closes this damper. See Figure 13.

3.2.2 Dehumidification / Air Cooling (Remote Ready Units Only)

When the room air requires cooling, or dehumidification and cooling, the dehumidifier attempts to run in the air cooling mode. The heat absorbed at the evaporator must be discharged to a condenser other than the reheat coil. The refrigerant can be discharged to an optional remote outdoor condenser (if so equipped). In this mode, the air which is discharged from the dehumidifier is drier and cooler than when it entered.

3.2.3 Evaporator Defrost Mode

Under normal conditions, evaporating temperatures may fall below 32°F causing frost to form on the coil. A timer within the unit's controller will initiate the defrost cycle as needed. The defrost cycle is terminated automatically when the coil is cleared of frost. During a defrost cycle, there is little difference between the dehumidifier's entering and leaving air conditions.

3.2.3.1 Defrost Cycle Settings

The LW series dehumidifier is factory set to run a defrost cycle at 15 minutes maximum timed cycles that are initiated with an evaporating temperature below 32°F. The delay between cycles is set at 30 minutes. The cycle terminated upon temperature rise to 40°F. If your application includes ambient temperatures above 50°F, you will improve system performance by resetting the defrost timer. Monitor system performance to determine an optimal setting for your application.

CAUTION

Do not deviate from factory settings unless you monitor the system closely!

3.2.4 Pump Down Cycle

LW series dehumidifiers are factory programmed for "pump down." This effectively reduces the likelihood of liquid refrigeration build-up in the low side of the system during the off cycle. Whenever there is power to the unit, the compressor will become energized if suction pressure rises above 40 psig and will run until it drops below 10 psig. Typically, this occurs during the off cycle with a typical compressor running interval of about 10 minutes.

3.2.5 Blower Operation

LW series dehumidifiers are designed for commercial use and consequently are programmed for continuous blower operation. This helps prevent the cycling of the unit due to false loads created by air stagnation and stratification. This is especially true in ice rink applications. However, if your application cycles the blower, you can accomplish this by changing the blower controller setup to "Automatic" operation.

- **Automatic Blower Operation** – the blower can be set to automatic or continuous operation. Automatic operation will activate the blower on a call for air dehumidification, air cooling (remote ready models only), air heating, or Occupancy. The blower will turn off when all set points are satisfied. Refer to the CM3540 Controller IO Manual for details.

3.3 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 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 gasses before connecting to the sealed system.
- Use only original equipment parts or factory approved equivalent for servicing.
- Use only refrigerant system oil.
- 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.
- Charge refrigerant blends, including R-410A and R-407C, with liquid only. Charging should be done into the high side of the system whenever possible. Refer to section 5.4 for addition procedures related to charging.

3.4 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 managements 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 using the “E1” and “E2” terminals as shown on the wiring diagram. Note that the contact has a limited current carrying capability. Use this to control a motor starter or larger relay if the current will exceed the stated rating.
- Check the condensate drain to make sure it has been trapped and 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 a condensate pump has been installed, 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.

3.5 Routine Maintenance Schedule

3.5.1 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.

3.5.2 Service Every Six Months

- Check the blower belts for wear or glazing. Tighten or replace them if necessary. Do not use the belt dressing compound.
- 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 blower motor.
- Check the current draw of each compressor.
- Lubricate the blower motor(s).
- Lubricate the blower bearings.

4 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.

4.1 Supply Blower will 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 relay or thermal overload has tripped.	Check blower amp draw and reset overload. Thermal protector or thermal overload will auto reset once motor has cooled. NOTE: Problem may be electrical or excessive system airflow (see Section 5.3.1.1).
Blown fuse in electrical circuit	Check for blown fuses
Defrost mode	Cycle power

4.2. Compressor Will Not Run

POSSIBLE CAUSE	REMEDY
Controller settings	A) Adjust controller set points. B) On models with a remote condenser installed, verify that the condenser is enabled.
Loss of main power	Check for tripped circuit breaker or blown fuses.
Faulty wiring	Check for loose or faulty wiring on system and controller.
Compressor overload has tripped	Inspect the following: A) elevated head pressure B) lack of oil to the compressor C) locked rotor amps (LRA) D) possible compressor failure
Comp. failure may have occurred if: A) Comp. draws locked rotor amps B) Comp. starts but does not pump C) Motor windings have shorted D) Incorrect rotation (reverse phasing)	A) Replace compressor (or check fuses on three-phase units). B) Replace compressor. C) Replace compressor.
NOTE: THE LW SERIES DEHUMIDIFIER IS DESIGNED FOR A MINIMUM RETURN AIR TEMPERATURE OF 35°F. If return air temperature drops below 32°F, an internal thermostat will trip preventing the compressor from activating. Operation below 32°F will accelerate system wear-and-tear and void the warranty.	Heat conditioned air to minimum 35°F. Note that heating air will also reduce relative humidity.

4.3 Evaporator Coil Does Not Fully Defrost

POSSIBLE CAUSE	REMEDY
Defrost cycle not working properly.	(See Section 3.2.3.1)
Faulty hot-gas bypass solenoid	Replace if defective.
Insufficient evaporator airflow rate	1) Evaluate system airflow. (See Section 5.3.1.1) 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.

NOTE: The LW series dehumidifier is NOT intended for use below 32° F ambient air temperatures. Running the system below 32° F will cause safety devices to shut down the unit.

4.4 Head Pressure Is Too High

POSSIBLE CAUSE	REMEDY
Insufficient system airflow	1) Evaluate system airflow (See Section 5.3.1.1) 2) Check for dirty air filters or restricted ductwork. 3) Verify that coils are clean.
Excessive refrigerant charge	Re-evaluate system charge.
Non-condensables in system	Evacuate 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 NOTE: LW SERIES DEHUMIDIFIERS ARE DESIGNED FOR A MAXIMUM RETURN AIR TEMPERATURE OF 70°F.	1) Reduce entering air temperature or relative humidity. 2) Check register locations for short cycling of air.
REMOTE CONDENSER PROBLEMS WHICH CAUSE EXCESSIVE PRESSURES:	
Lack of airflow	Assure remote condenser coil is clean and no airflow restrictions exist around unit.
Remote condenser fan does not run.	
A) Overload tripped	A) Overload is a thermo protector. Allow to cool to reset. If multiple trips occur, verify amp draw and replace motor if necessary.
B) Contactor faulty	B) Replace contactor.
C) Blower cycling on internal protection	C) Reduce blower speed.
D) Controller settings	D) On models with a remote condenser installed, verify that the condenser is enabled.
Excessive pressure drop in line sets	A) Fully open service valves. B) Re-evaluate remote condenser installation.
NOTE: When the remote condenser is active and the outdoor temperature is above 95°F, normal head pressure can be as high as 300 psig.	

4.5 Unit Runs but Excess Condensate Forms

POSSIBLE CAUSE	REMEDY
Poor air distribution	Evaluate duct design and dehumidifier location.
Unit airflow is too high	Evaluate system airflow. (See section 5.3.1.1)
Unit is undersized	Re-evaluate unit sizing. Check for initially neglected sources of heat or humidity.
Sensor installation	1) Assure that sensors are NOT located near supply registers, windows, heaters, saunas, etc. 2) Consider continuous blower operation.
Low refrigerant charge	Evaluate charge

5 Appendix

5.1 Compressor Failure

Although most 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, the cause of the failure must be determined and corrected.

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.

5.1.1 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.

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 conform 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.

Refrigeration 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, cloudness, 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. Longterm 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 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.

Returning to Service

- See Section 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 unit 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 a LW Series Compressor Replacement Form located in the back of this 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.

5.2 Recommended Duct Design

You must use proper duct design to ensure that the dehumidifier operates effectively 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.

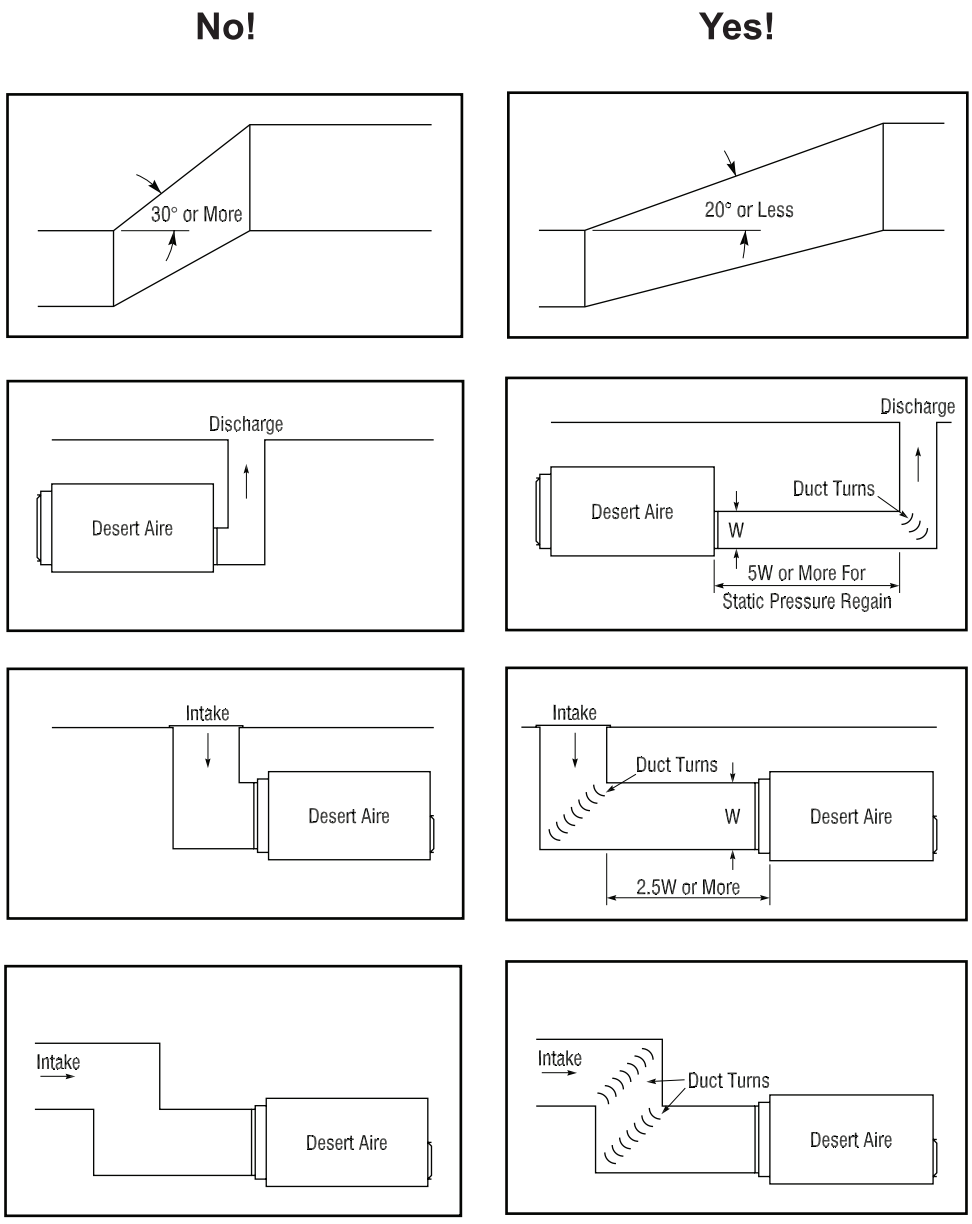

Figure 14 - Recommended Duct Designs for Desert Aire Dehumidifiers

5.3 System Guidelines

5.3.1 Unit Airflow

Desert Aire dehumidifiers are designed to operate at a specified airflow rate. System airflow must be checked prior to troubleshooting the refrigeration circuit to assure that such problems are not actually caused by improper unit airflow.

Problems with excessive airflow:

- Reduction in moisture removal capacity.
- High amperage draw by the blower motor.
- Water carries over from evaporator coil.
- Excessive unit noise levels.

Problems with inadequate airflow:

- Can cause excessive discharge (high side) refrigeration pressure.
- Increase in system energy consumption.
- Can lead to premature compressor failure.

5.3.1.1 Determining System Airflow

Using the unit controls, determine the static pressure drop in inches water column across the unit's condenser coil. A low static pressure drop indicates low airflow – you must speed up the blower. A high pressure drop indicates high airflow – you must slow down the blower.

NOTE: Low system airflow can also be caused by airflow restrictions such as dirty coils, filters and duct work. Assure that this is not the case before speeding up the blower.

5.3.1.2 Blower Adjustment Procedure

⚠ WARNING

Disconnect power to the unit before you adjust the blower!

Change the blower speed by adjusting the motor pulley. To adjust the variable pitch pulley, first loosen the set screw. To slow down the blower, turn the outer pulley face counterclockwise (to decrease its pitch diameter) utilizing half turn intervals. To speed up the blower, turn the outer pulley face clockwise (to increase its pitch diameter) in half turn intervals.

After Every Adjustment Be Sure To:

- Tighten the set screw against the flat spot on the pulley hub so you don't damage any threads. This will insure that the set screw as well as the pulley do not loosen during operation.
- Adjust the belt tension as needed.
- Check to assure that the blower motor current draw does not exceed the rating printed on the rating plate.

NOTE: System airflow will tend to decrease over time due to belt wear as well as dirty filters and ducts. Always adjust the blower speed to the high side of the pressure drop range.

If the blower motor current draw exceeds its rating but your airflow is still too low, the static pressure losses in the ductwork and grilles may be higher than the unit was designed for. If this happens, consult Desert Aire's Service Department. Please be prepared with your unit's model number and serial number.

UNIT AIRFLOW GUIDELINES

Each Desert Aire Dehumidifier is designed to operate at a specified airflow rate. Airflow must be set prior to starting the refrigeration circuit to assure that problems are not caused by improper unit airflow.

Using the units controls, determine the pressure drop in inches water column (in WC) across the unit's condenser coil. See unit airflow label for required settings.

Increasing or decreasing blower speed can be accomplished by adjusting the variable pitch motor pulley. To adjust the variable pitch pulley, first loosen set screw. To slow down the blower turn the outer pulley face counter clockwise. To speed up the blower turn the outer pulley face clockwise.

Failure to meet proper pressure drop without high current from the blower motor is an indication of other problems. If this happens, call (262) 946-7400 and ask for the service department. Please be prepared with system serial and model number.

5.3.2 Unit Operation

5.3.2.1 Controller Set Points

It is important to determine comfortable set points and to avoid further controller adjustments. It takes time for a unit to establish equilibrium at a given set point. Therefore, continued set point adjustments will lead to high energy consumption and user discomfort.

- SPACE PRESSURIZATION – Assure that doors and windows are sealed adequately to prevent infiltration of warm, humid air. A positive pressure in the controlled environment is strongly recommended. Only introduce required amounts of outdoor air when mandated by code.
- OPERATING PARAMETERS – LW series dehumidifiers are designed to operate in ambient temperatures between 32° and 70°F. Running the system beyond this envelope can lead to a host of problems and possible system failure.

5.3.2.2 Refrigeration System Pressures

Many factors affect refrigeration temperatures on a given day. Such factors include ambient temperature, airflow volume and relative humidity. However, for the sake of troubleshooting:

- Normal suction temperature range: 12° to 50°F
- Normal discharge temperature range: 80° to 120°F
- Defrost mode suction temperature range: 30° to 100°F
- Defrost mode discharge temperature range: 90° to 200°F

NOTE: Always check the system airflow before you troubleshoot the refrigeration circuit. (See Section 5.3.1 and 5.3.1.1)

5.4 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.

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.

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. Isolated 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.

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 particular 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 the 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 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 units when re-charging.

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 section 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 to 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 5.1.1 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.

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. 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.

Alternative Evacuation Specified by Process

After components have been repaired or replaced 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.

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

1. 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.
2. 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.
3. Start vacuum pump and draw system to 1,500 microns or less.
4. 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.
5. Start vacuum pump and draw system to 500 microns. Seal system. System may rise to higher level, but should not rise above 1000 microns in 10 minutes timeframe. If successful, continue evacuation or check for leaks.

It is anticipated 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.

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.
- 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.

Testing and Final Diagnosis

Check the oil level in the compressor after the system has been running for 24 hours. Oil may have been contaminated 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, lbs. x 0.352 = Oil charge, oz.

It is of critical importance to ensure that the system is operating as expected before the 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.

5.5 Rating Plate

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

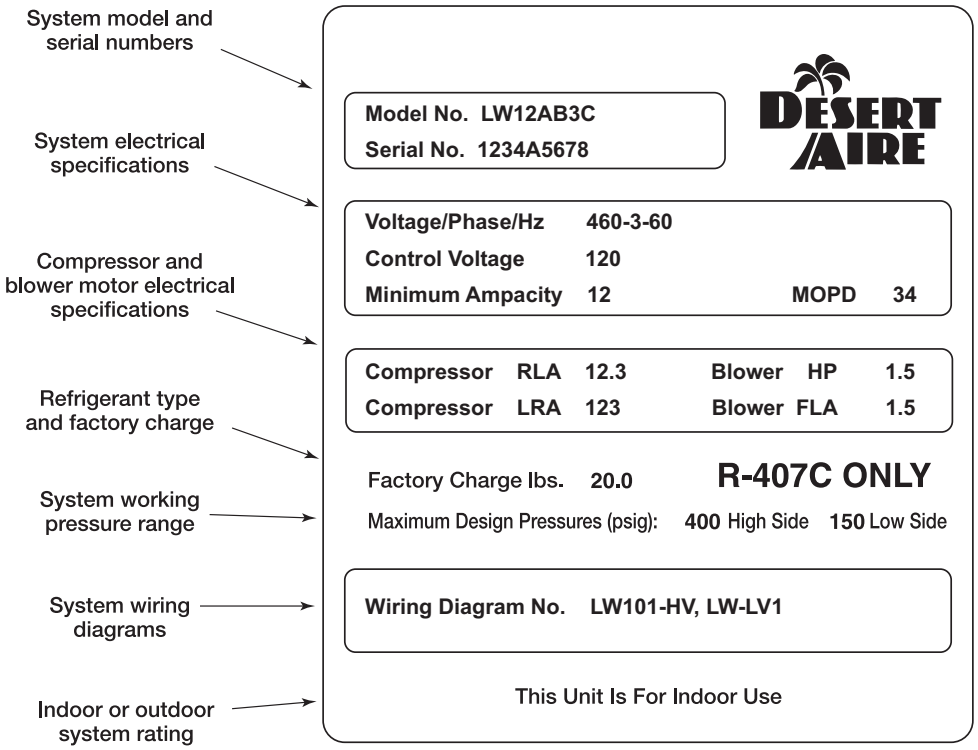

Figure 15 - System Rating Plate

5.6 System Start-Up Report

A copy of the system “Start-Up Report” can be found inside this manual. 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, fax the completed worksheet to Desert Aire’s Service Department using the number provided. Be sure to include your name and a telephone number where you can be reached.

Start-up request form for Low Temp units
Model LT / LW

Factory Assisted Start-Up consists of a Desert Aire Service Department Technician to visit the job-site 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.

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 **(800) 443-5276**
- ☐ Dehumidifier leveled and properly supported per the installation manuals recommendations.
- ☐ Outside air duct filters and damper installed (if applicable) – See installation manual.
- ☐ Condensate P Trap installed with heat trace for winter operation.
- ☐ Remote condenser plumbed, leak checked, evacuated, and charged if necessary. LC and LV Units require additional field charging. Refer to the I/O manual for details. Refrigerant added _____lbs.(if applicable)
- ☐ All electrical connections terminated and verified for proper voltage at the unit and the condenser (if applicable)
- ☐ All field controls, sensors and actuators installed and circuits verified that they are wired correctly. If you have questions, contact Desert Aire for instructions **(800) 443-5276**.
- ☐ Water condenser circuit connected to dehumidifier with flow meter and balancing valves installed in circuit (if applicable)
- ☐ Water flow verified and air purged from water the lines. (If applicable)

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

- ☐ Equipped service vehicle and service technician – Technician will be trained.
- ☐ Refrigerant manifold gauges – 2 sets
- ☐ Air balancing equipment (magnehelic or manometer differential pressure gauge – one inch scale)
- ☐ Volt/Amp/OHM meters in working order.
- ☐ Digital thermometer with sensors.
- ☐ 50# of the appropriate refrigerant & scale.
- ☐ Hand pump for adding oil to compressors.

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

I agree that all of 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 fax or email both pages to the Desert Aire service department. Fax (262) 946-7400 Email: service@desert-aire.com

Signature of responsible party:_____ (print) _____ (sign)

Company Name:_____ Phone #:_____

SB-038

Start-up request form for Low temp units

Model LT / LW

Unit Information

Model #_____

Serial #_____

Jobsite Information

Job site name_____

Job Site Address _____

_____

Contractor Information

Installing Contractor:_____

Manager's Name :_____Phone #:_____

Job Site Contact:_____Cell #_____

Controls Company Name:_____

Controls Contact: _____ Cell#_____

Test and Balance Company:_____

Contact: _____ Cell# _____

Factory use only – To be filled out by Desert Aire

Scheduled Start-up Date: _____

Unit Controls Protocol: JCI Metasys JCI FX Carel Honeywell Other:_____

Diagrams Forwarded to CST: Yes / No email address_____

Installing Contractor Contacted by: _____Date: _____

Network to be operational at time of start up: yes / no T&B to be on site during start up: yes / no

Additional Information:_____

_____

_____

SB-038

LW 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.

Desert Aire Corporation
c/o Service and Warranty Department
N120W18485 Freistadt Road
Germantown, WI 53022
Phone: (262) 946-7400 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:			

Factory Use Only					
Reviewed By:		**Date:**		**Report is:**	Choose
AireGuard Connection Verified:	Choose				

**** Denotes that this is a model dependant item***

Proper Installation Checklist		
☐ 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.	☐ Adjust and tighten blower belts if necessary.	☐ Check field and factory piping for leaks
☐ Condensate drain trapped and primed.	☐ 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

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	**Control Voltage - No Motors running**	Transformer 1	VA Rating
	L2-L3		Transformer 2	VA Rating
	L1-L3		Transformer 3	VA Rating

Line-set Installation* ***See label affixed to the unit for pipe sizes, charge and additional oil charge. See section 2.3 and 2.4 of the Air Cooled I&) for pipe design, support and trapping details***			
Line Sizes	**Hot Gas**	**Liquid Return**	
Lineset Length		**Elevation Change**	Choose
Hot gas line trapped at every riser	Choose	**Inverted traps at top of risers**	Choose
Check valve installed	Choose	**Line-set Clamped per I/O Manual**	Choose
Additional R410A Added	LBS	**Additional Oil Added**	OZS

Fan Cycle Controller Settings* – ***See sec 4.0 of the Air Cooled I&O manual for programming details. Insure the sensor wiring and jumpers positions are correct per sec 2.7-2.8***								
Voltage	L1-L2			L2-L3			L1-L3	
Amps - Motor 1	L1			L2			L3	
Amps - Motor 2	L1			L2			L3	
SENS	SN-1			SN-1			SN-1	
OUTR^1	ON^1	OFF^1	OND^1	OFFD^1	ONT^1	OFT^1	SNF^1	SENS^1
OUTR^2	ON^2	OFF^2	OND^2	OFFD^2	ONT^2	OFT^2	SNF^2	SENS^2
OUTR^3	ON^3	OFF^3	OND^3	OFFD^3	ONT^3	OFT^3	SNF^3	SENS^3
OUTR^4	ON^4	OFF^4	OND^4	OFFD^4	ONT^4	OFT^4	SNF^4	SENS^4

Air Flow Readings - ***Refer to Installation and Operations manual for correct balancing procedures.***					
	Unoccupied Mode			**Occupied Mode**	
Evaporator Static Pressure Drop	“wc			“wc	
Reheat Condenser Static Pressure Drop	“wc			“wc	
Supply Duct Static Pressure	“wc				
Return Duct Static Pressure	“wc				
OA Damper Setpoint	%			%	
Evap Bypass Damper Setpoint	%			%	
Blower FLA (off nameplate)	amps	**Actual**	L1	L2	L3
Blower Control Set to Continuous Operation or Automatic Operation				Choose	

Temperature Readings			
Room Air Temperature	°F	**Room Relative Humidity**	°F
Outdoor Air Temperature	°F	**Outdoor Relative Humidity**	°F

Compressors and Refrigeration in Reheat Mode						
Motor #						
Compressor RLA off nameplate	amps			amps		
Amperage	L1			L1		
	L2			L2		
	L3			L3		
Head Pressure	Psig		**Suction Pressure**	Psig		
Refrigerant Sight Glass Clear	Choose		**Oil Sight Glass**	Choose		
Suction Temp at Compressor	°F	**Superheat**	°F	**Sub-cooling**	°F	

Compressors and Refrigeration in Cooling Mode* *(Remote or Tower Water Condenser)*			
Head Pressure	Psig	**Suction Pressure**	Psig
Refrigerant Sight Glass Clear	Choose	**Oil Sight Glass**	Choose
Superheat	°F	**Sub-cooling**	°F
Water In (Tower Water App. Only)	°F	**Water Out (Tower Water App. Only)**	°F

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

Building Management System Information*						
BACnet MS/TP	Device Instance		MAC Address		Baud Rate	
BACnet Ethernet	IP Address			Netmask		

Additional Comments: _____

_____

_____

_____

_____

N120 W18485 Freistadt Road • Germantown, WI 53022 • E-mail: info@desert-aire.com
PH: (262) 946-7400 • Fax: (262) 946-7401 • Website: www.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#:	

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	☐	Other (Describe):			☐

Diagnostic/Corrective Action Summary

Describe what corrective action was taken to prevent a repeat failure.

_____

_____

_____

_____

Compressor Replacement Checklist

Required		Choose One		For Test Results Showing Acid or Particulate	
Acid and particulate test completed	☐	Unit Evacuated to 500 microns absolute and vacuum decay passed	☐	HH Cores used – Acid Core	☐
Liquid Line Filter Replaced	☐	Alternate triple evacuation process used	☐	SF filter used	☐

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

	Circuit A – Use both sides for tandem set		**Circuit 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
Refrigerant Sight Glass Condition (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

	Circuit A – Use both sides for tandem set		**Circuit 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
Refrigerant Sight Glass Condition (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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Ph: (262) 946-7400 • Fax: (262) 946-7401 • Website: www.desert-aire.com

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