Dehumidification
The Ultra-Aire SD12 is a split system dehumidifier that removes over 180 pints of water a day while adding no sensible heat load to the living space. The dehumidifying unit is located inside the house and the condensing coil is located outside. The two-piece design allows the sensible heat load generated from dehumidifying the house to be released in the outside condensing unit, thus eliminating additional cooling load and reducing air conditioner run time.

Sensible Cooling
The Ultra-Aire SD12 provides approximately 1/3 ton sensible cooling to the living space, allowing for first stage cooling and moisture removal. The HVAC system can be used as a second stage and be thermostatically set to a higher temperature to provide additional cooling if needed. By eliminating the HVAC system’s need to control latent load, the Ultra-Aire SD12 allows the system to work more efficiently.

Fresh Air Ventilation
Optional fresh outdoor air may be ducted to the unit via a six inch round duct. This provides fresh air to dilute pollutants and replenish oxygen content in the building. The amount of fresh air ventilation can be regulated by a variety of dampers and controls.

Air Filtration
The Ultra-Aire SD12 includes air filtration to improve indoor air quality. A MERV-11 media filter is standard. An optional external filter box with a MERV-14 deep pleated 95% media filter is available for optimum air filtration and to reduce potentially harmful airborne particles.
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FOR HVAC INSTALLER ONLY

ULTRA-AIRE SD12 Dehumidifier Installation Instructions

Safety Precautions
Read the installation, operation and maintenance instructions carefully before installing and operating this device. Proper adherence to these instructions is essential to obtain maximum benefit from your Ultra-Aire SD12 indoor air quality system.

⚠️ WARNING! IMPROPER INSTALLATION, ADJUSTMENT, ALTERATION, SERVICE OR MAINTAINCE CAN CAUSE PERSONAL INJURY, LOSS OF LIFE, OR DAMAGE TO PROPERTY. INSTALLATION AND SERVICE MUST BE PERFORMED BY A LICENSED PROFESSIONAL INSTALLER (OR EQUIVALENT) OR A SERVICE AGENCY.

⚠️ IMPORTANT! THE CLEAN AIR ACT OF 1990 BANS THE INTENTIONAL VENTING OF REFRIGERANT (CFCs, HCFCs, AND HFCs) AS OF JULY 1, 1992. APPROVED METHODS OF RECOVERY, RECYCLING OR RECLAIMING MUST BE FOLLOWED. FINES AND/OR INCARCERATION MAY BE LEVIED FOR NONCOMPLIANCE.

READ AND SAVE THESE INSTRUCTIONS
• The Ultra-Aire SD12 Dehumidifier is designed to be installed IN-DOORS IN A SPACE THAT IS PROTECTED FROM RAIN AND FLOODING.

• Install the Dehumidifier with space to access the back or side panels for maintenance and service. DO NOT INSTALL UNITS WITH THE SERVICE PANELS INACCESSIBLE.

• Install the Condensing unit with space to access the top and side panels for maintenance and service. DO NOT INSTALL UNITS WITH THE SERVICE PANELS INACCESSIBLE.

• Avoid directing the discharge air at people, or over the water in pool areas.

• If used near a pool or spa; be certain there is NO chance the dehumidifier or condensing unit could fall into the water, be splashed and that it is connected to a GFI GROUND FAULT INTERRUPT OUTLET OR CIRCUIT.

• DO NOT use the dehumidifier or condensing unit as a bench or table.

• DO NOT place the dehumidifier directly on structural members. Provide vibration isolation in order to minimize operational vibration and/or noise.

• A drain pan MUST be placed under the dehumidifier if installed above a living area or above an area where water leakage could cause damage.

1. Intended Application for the Ultra-Aire SD12
For the ideal installation, draw air from the central part of the home and return it to isolated areas of the home like the bedrooms, den, utility room, or family room. The ductwork of the existing heating or cooling system can be used to supply air to the home.

2. Specifications

2.1 Dehumidifier and Condensing Unit Specifications
Part Number: 4033170
Shipped Together on Pallet:
Dimensions

<table>
<thead>
<tr>
<th>Width</th>
<th>Height</th>
<th>Depth</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>42&quot;</td>
<td>32&quot;</td>
<td>42&quot;</td>
<td>220 lbs</td>
</tr>
</tbody>
</table>

2.2 Dehumidifier Specifications
Part Number: 4033175
Blower:

<table>
<thead>
<tr>
<th>CFM @ 0.0&quot; WG</th>
<th>CFM @ 0.2&quot; WG</th>
<th>CFM @ 0.4&quot; WG</th>
</tr>
</thead>
<tbody>
<tr>
<td>406</td>
<td>374</td>
<td>348</td>
</tr>
</tbody>
</table>

Power: 160 Watts @ 80°F and 60% RH
Supply Voltage: 115 VAC – 1 Phase – 60 Hz.
Current Draw: 1.4 Amps
Energy Factor: 3.1 L/kWh
Operating Range: 56°F Min, 95°F Max (Inlet Air Temperature)
Sized for: 4,000 Square Foot Typical
Minimum Performance at 80°F and 60% RH
Water Removal: 184 Pints/Day
Sensible Cooling: 4,300 BTUs/Hour
Efficiency: 6.6 Pints/kWh
Duct Connections:
6" Round Inlet; 10" Round Inlet; 10" Oval Outlet
Air Filter: MERV-11, Standard Pleat
Efficiency: 65% ASHRAE Dust Spot
Size: 16" x 20" x 2"
Optional Air Filter: MERV-14, Embossed Pleat (will need filter housing)
Efficiency: 95% ASHRAE Dust Spot
Size: 20" x 24" x 4"
Power Cord: 10’, 115 VAC, Ground
Drain Connection: 3/4” Threaded Female NPT
Refrigerant Type: R410A (Refer to manufacturers label for more information)
Refrigerant Amount: 15 oz.
FOR HVAC INSTALLER ONLY

Dimensions:

<table>
<thead>
<tr>
<th></th>
<th>Unit With Collars</th>
<th>Unit Without Collars</th>
<th>Shipping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width: 20 1/4&quot;</td>
<td>20 1/4&quot;</td>
<td>35&quot;</td>
<td></td>
</tr>
<tr>
<td>Height: 21 3/4&quot;</td>
<td>21 3/4&quot;</td>
<td>44&quot;</td>
<td></td>
</tr>
<tr>
<td>Length: 41 1/2&quot;</td>
<td>37 3/4&quot;</td>
<td>44&quot;</td>
<td></td>
</tr>
<tr>
<td>Weight: 110 lbs.</td>
<td>109 lbs.</td>
<td>225 lbs.</td>
<td></td>
</tr>
</tbody>
</table>

2.3 Condensing Unit Specifications

Part Number: 4033192

Power: 1080 Watts @ 80°F and 60% RH

Supply Voltage: 110-120 volt – 1phase – 60 Hz

Current Draw: 9.7 AMPS

Min. Circuit Ampacity: 20 AMPS

Max. Fuse/Breaker Size: 20 AMPS

Refrigerant: R410a

Operating Temp.: 40°F Min., 115°F Max.

3. Installation

3.1 Location

3.1A Dehumidifier Location

The Ultra-Aire SD12 Dehumidifier can be installed in a variety of locations to meet the owner’s needs as listed below. In all cases keep the following cautions in mind:

- It is designed to be installed INDOORS IN A SPACE THAT IS PROTECTED FROM RAIN AND FLOODING.

- Install the dehumidifier with space to access the back and side panels for maintenance and service and also to allow easy access to the filter cover panel. DO NOT INSTALL DEHUMIDIFIER WITH THE SIDE PANEL OR FILTER COVER PANEL INACCESSIBLE (See FIGURE 1 for diagram).

- Avoid discharging the supply air directly at people, or over the water in pool areas.

- If used near a pool or spa, be certain there is NO chance the dehumidifier could fall into the water or be splashed and that it is plugged into a GROUND FAULT INTERRUPTER.

- DO NOT use the Ultra-Aire SD12 as a bench or table.

- DO NOT place the Ultra-Aire SD12 directly on structural members. Provide vibration isolation in order to minimize operational vibration and/or noise.

- A drain pan MUST be placed under the dehumidifier if installed above a finished living area or above an area where water leakage could cause damage.

Place the Ultra-Aire SD12 on supports that raise the base of the unit 2.5" above the drain pan beneath it. Raising the Ultra-Aire SD12 will help the dehumidifier drain with gravity flow. Do not place the Ultra-Aire SD12 directly on structural building members without vibration absorbers or unwanted noise may result.

The Ultra-Aire SD12 may be suspended with steel hanger straps or a suitable alternative from structural members. The dehumidifier must be supported from underneath; don’t hang from sides or ends. Remember to place a drain pan under the dehumidifier if it is suspended above a finished area or above an area where water leakage could cause damage.

The Ultra-Aire SD12 should be located near the existing HVAC system to minimize the required ductwork for connecting the Ultra-Aire SD12 to the existing air handling system. The Ultra-Aire SD12 requires a drain to dispose of the condensate created. Often the Ultra-Aire SD12 can be connected to the existing air handler drain. The controls for the Ultra-Aire SD12 are remote from the unit and must be located in the space that is to be conditioned. The controls are low voltage (24 volt) and should be connected to the Ultra-Aire SD12 with low voltage thermostat cable.

If fresh air ventilation is desired, thought should be given to the location for the fresh air ducting. A 6" diameter round insulated duct can be installed on the Ultra-Aire SD12 and run to the outside of the structure to bring in fresh air. Use an 8" insulated round duct for lengths greater than 50 feet or if more than 100 CFM of fresh air is needed. Consult local codes for necessary distances from exhaust ports when installing fresh air return.
3.1B Condensing Unit Location

The condensing unit should be located outside of the conditioned space, but as close as possible to the dehumidifier to minimize the length of the connecting lines. The maximum line set length is 50 feet. In all cases keep the following cautions in mind:

- Install the condensing unit with space to access the top and side panels for maintenance and service. DO NOT INSTALL CONDENSING UNIT WITH THE TOP PANEL OR SIDE PANELS INACCESSIBLE (See FIGURE 2 for diagram).
- Avoid discharging air directly at people, or over the water near pool areas.
- If used near a pool or spa, be certain there is NO chance the condensing unit could fall into the water or be splashed and that it is supplied by a GROUND FAULT INTERRUPTER.
- Place the condensing unit where it is protected from extreme outdoor weather (rain, wind, etc…)
- Place the condensing unit on a level pad (or bracket) where the unit can be securely attached by the base.
- Place the condensing unit at least 1” above ground level
- Place the condensing unit where there is adequate space for the unit and the air required by the unit
- DO NOT place the condensing unit where the sound and vibration caused by the running unit will cause a nuisance.
- DO NOT use the condensing unit as a bench or table.
- DO NOT place the condensing unit in direct sunlight.
- The minimum installation clearances for the condensing unit are shown below.

FIGURE 2: MINIMUM DISTANCE REQUIRED FOR CONDENSING UNIT AND THE FOOTING DIMENSIONS

[Diagram showing minimum distances]

⚠️ ROOF DAMAGE! THIS SYSTEM CONTAINS BOTH REFRIGERANT AND OIL. SOME RUBBER ROOFING MATERIAL MAY ABSORB OIL AND CAUSE THE RUBBER TO SWELL WHEN IT COMES INTO CONTACT WITH OIL. THE RUBBER WILL THEN BUBBLE AND COULD CAUSE LEAKS. PROTECT THE ROOF SURFACE TO AVOID EXPOSURE TO REFRIGERANT AND OIL DURING SERVICE AND INSTALLATION. FAILURE TO FOLLOW THIS NOTICE COULD RESULT IN DAMAGE TO ROOF SURFACE.

3.2 Electrical Requirements

⚠️ WARNING! ELECTRIC SHOCK HAZARD. CAN CAUSE INJURY OR DEATH. UNIT MUST BE GROUNDED IN ACCORDANCE WITH NATIONAL AND LOCAL CODES. DISCONNECT ALL REMOTE ELECTRIC POWER SUPPLIES BEFORE OPENING ACCESS PANEL. UNIT MAY HAVE MULTIPLE POWER SUPPLIES.

Field wiring must comply with the National Electric Code (C.E.C. in Canada) and any applicable local codes or ordinances.

⚠️ WARNING! DO NOT ALLOW THE YELLOW LEAD TO CONTACT THE RED LEAD OR WHITE LEAD FROM THE ULTRA-AIRE DEHUMIDIFIER OR THE TRANSFORMER WILL BE DAMAGED.

3.2A Dehumidifier Electrical Power Connections

The Ultra-Aire SD12 Dehumidifier unit plugs into a common 120Vac grounded outlet. The Dehumidifier draws less than 2A and can be plugged into a shared branch circuit. If installed in a wet area (or basement prone to flooding), a ground fault interrupter protected circuit is required (See FIGURE 3 for schematic).
3.2B Remote Control Electrical Connection

The remote controls of the Ultra-Aire SD12 are powered by a low voltage circuit (24Vac) and must NEVER contact or be connected to a high voltage circuit. The control wires leaving the Ultra-Aire SD12 dehumidifier are numbered and color-coded to prevent confusion. Some of the control wires leaving the Ultra-Aire SD12 may not be used and should be left safely disconnected with wire nuts taped onto the stripped ends. Consult the electrical schematic in this manual (FIGURE 3) or inside the access panel of the Ultra-Aire SD12 dehumidifier before making the control connections.

The SD12 dehumidifier is controlled using seven color-coded wires.

Green = Fan control
Blue = Dehumidification (fan and compressor) control
Red = 24volt AC power transformer neutral side (common with white)
White = 24volt AC power transformer neutral side (common with red)
Yellow = 24volt AC power transformer high side
Black = control to condensing unit

Between the red/white lead and the yellow leads is a 40VA transformer. This low voltage power source powers the relay coils which control the fans and compressor. This 24VAC transformer can also be used to power HVAC accessories external to the dehumidifier.

- To turn the dehumidifier ON, make contact between yellow and blue wires.
- To turn the fan ON, make contact between yellow and green wires.
- To power a 24Vac HVAC accessory, connect the accessory to the white (or red) wire and the yellow wire.
- Connect the Green, Blue, Red, and Yellow control wires to the remote control (See FIGURE 4).
- Connect the black wires to terminals 3 & 4 on the condensing unit terminal block (see FIGURE 6).
- Connect the White wire to an optional 24Vac accessory such as a power damper if used. Wire nut and tape the White wire if it is not used for an accessory.

3.2C Condensing Unit Electrical Power Connection

The condensing unit requires a dedicated 120Vac 20A branch circuit. Install a properly sized branch circuit disconnect (20A) within sight of the unit. The Installer must supply the power wiring for the condensing unit. The power wiring must have a Minimum Circuit Ampacity of 20A and be run within a rain-tight conduit. The condensing unit must be grounded as required by applicable code(s).

3.2D Field Wiring the Condensing Unit

1. Take off the panel (top), by removing the 5 screws that secure it to the condensing unit.
2. Remove the plastic hole plugs from the conduit plate.
3. Insert the power and control wires through the conduit plate.
4. Connect the power supply wires and control wires to the corresponding terminals on the terminal board.
5. Ground the condensing unit in accordance with local and national electrical codes.
6. Secure the conduit to the conduit plate with locking nuts.
7. Install the panel (top) over the conduit plate by inserting the 5 screws that secure it to the condensing unit.

Condensing unit electrical control connections:

Connect the black control wire (8) from the dehumidifier to terminal 4 on the condensing unit terminal block.
Connect the black control wire (9) from the dehumidifier to terminal 3 on the condensing unit terminal block.
3.3 Line Set Installation
The installer must supply a line set (1/4” liquid line, 3/8” gas line) suitable for use with R410a refrigerant to connect the indoor unit to the outdoor unit. The maximum allowable length of the line set is 50 feet. The installer must braze the lines to the dehumidifier and the condensing unit. The gas (suction) line must be insulated to prevent the formation of condensation on the outside of the line.

Line Set Isolation — See FIGURE 7 for examples of proper refrigerant line set installation.

When installing the line set:
• Make sure the lines are suitable for use with R410a.
• Do not crush the lines and always allow a minimum bend radius of 2 inches.
• Keep the ends of the lines covered to prevent dirt and debris from entering the lines during installation.
• Secure the line set to the building with isolating hardware to prevent vibration transmission to the building.
• Seal and isolate the opening(s) where the line set is routed into the building.
• Insulate the gas (suction) line to prevent water condensation on the gas line.
• Flush the lines with an inert gas before and/or during brazing to prevent oxidation inside the lines.
• Release the inert gas holding charge and remove the plugs in the dehumidifier lines before brazing.
• Do not overheat the lines connected to the dehumidifier or the condensing unit when brazing.
• Be aware of the relative location of the dehumidifier (Indoor unit) and condensing unit (Outdoor Unit) when installing the line set.

See illustrations below:
The maximum allowable elevation difference between the dehumidifier and condensing unit is 30 feet (See FIGURE 8A). If the elevation difference between the dehumidifier and condensing unit is greater than 16 feet, an oil trap (as shown above) should be created in the line set (See FIGURE 8B).

3.4 Brazing the Line Set

⚠️ **WARNING!** Polyol ester (POE) oils used with HFC-410A refrigerant absorb moisture very quickly. It is very important that the refrigerant system be kept closed as much as possible. **DO NOT REMOVE LINE SET CAPS OR SERVICE VALVE STUB CAPS UNTIL YOU ARE READY TO MAKE CONNECTIONS.**

⚠️ **WARNING!** When using a high pressure gas such as dry nitrogen to pressurize a refrigeration or air conditioning system, use a regulator that can control the pressure down to 1 or 2 psig.

⚠️ **CAUTION!** Brazing alloys and flux contain materials which are hazardous to your health. Avoid breathing vapors or fumes from brazing operations. Perform operations only in well-ventilated areas. Wear gloves and protective goggles or face shield to protect against burns. Wash hands with soap and water after handling brazing alloys and flux.

⚠️ **IMPORTANT!** To prevent stripping of the various caps used, the appropriately sized wrench should be used and fitted snugly over the cap before tightening.

⚠️ **IMPORTANT!** Allow braze joint to cool before removing the wet rag from the service valve. Temperatures above 250° can damage valve seals.

⚠️ **IMPORTANT!** Use silver alloy brazing rods with 5% minimum silver alloy for copper-to-copper brazing. Use 45% minimum silver alloy for copper-to-brass and copper-to-steel brazing.

**WARNING!** Fire, explosion and personal safety hazard. Failure to follow this warning could result in damage, personal injury or death. Never use oxygen to pressurize or purge refrigeration lines. Oxygen when exposed to a spark or open flame, can cause fire and/or an explosion, that could result in property damage, personal injury or death.

*Note* – There is a service port inside the dehumidifier (on the gas line) and both stub tubes of condensing unit. These service ports can be used to introduce and release nitrogen during brazing.

Use the following procedure to connect the line set to the Dehumidifier:

⚠️ **CAUTION!** The dehumidifier is shipped from the factory pressurized with a charge of inert gas and with rubber plugs in the lines. Purge the inert gas from the dehumidifier by removing the rubber plugs in the liquid and gas lines to release the inert gas before connecting the line set.

*Note* – If there is no pressure in the dehumidifier when the first plug is removed, check the dehumidifier for damage and leaks before continuing with the installation.

1. Purge the inert gas from the dehumidifier by removing the rubber plugs in the liquid and gas lines to release the inert gas before connecting the line set.
2. Place a field-provided heat shield, such as a wet rag, against the dehumidifier and around the piping stubs. The heat shield must be in place to protect the cabinet from heat damage.
3. Swage the liquid and gas lines (if necessary) to fit onto the dehumidifier lines.
4. Purge the dehumidifier lines and the line set with dry nitrogen (Inert gas) to prevent oxidation during brazing. Flow dry nitrogen into the lines at a low pressure of 1 to 2 psig.
5. Braz the line set lines to the dehumidifier lines.
6. Remove the heat shield after brazing and allow the connections to cool.

Use the following procedure to connect the line set to the Condensing Unit:

1. Cut the line set lines to the proper required length. Deburr the cut ends of the line set lines.
2. Fit the line stubs with flare fittings (included with the condensing unit) onto the line set if necessary.
3. Swage the liquid and gas lines (if necessary) to fit onto the line stubs with the flare fittings.
4. Remove service valve caps and cores.
5. Purge the lines with dry nitrogen (Inert gas) to prevent oxidation during brazing.
6. Braz the line set lines to the line stubs.
7. Apply a light coating of refrigeration oil to the flare fitting threads on the condensing unit valves.
8. Start each flare nut on the corresponding flare fitting on the condensing unit valves by hand, making sure the threads are properly engaged. Tighten the flare nuts hand tight.
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9. Carefully torque the flare nuts to the corresponding flare fittings on the condensing unit valves.
   • Torque the liquid line flare nut to 13.3 ft-lbs.
   • Torque the suction line flare nut to 30.1 ft-lbs.

10. Reinstall service valve cores and caps.

   Note – Alternately, the stubs with the flare fittings can be connected to the condensing unit before brazing the line set. In this case a field provided heat shield, such as a wet rag, must be placed over the flare fittings and valves on the condensing unit to protect them from heat damage. The service valve cap and core should be removed before brazing near stub tubes.

3.5 Leak Test Line Set and Dehumidifier
Manifold Gage Set - When checking the system charge, use a manifold gage set that features low loss anti-blow back fittings.

Manifold gage set used with HFC-410A refrigerant systems must be capable of handling the higher system operating pressures. The gages should be rated for use with high side operating pressures of 0 – 800 psig and low side operating pressures of 30 inches of vacuum to 250 psig. Dampened gages or anti-flutter gages are recommended. Gage hoses must be rated for use at up to 800 psig of pressure with a 4000 psig burst rating.

⚠️ IMPORTANT! THE ENVIRONMENTAL PROTECTION AGENCY (EPA) PROHIBITS THE INTENTIONAL VENTING OF HFC REFRIGERANTS DURING MAINTENANCE, SERVICE, REPAIR AND DISPOSAL OF APPLIANCE. APPROVED METHODS OF RECOVERY, RECYCLING OR RECLAIMING MUST BE FOLLOWED.

⚠️ WARNING! WHEN USING A HIGH PRESSURE GAS SUCH AS DRY NITROGEN TO PRESSURIZE A REFRIGERATION OR AIR CONDITIONING SYSTEM, USE A REGULATOR THAT CAN CONTROL THE PRESSURE DOWN TO 1 OR 2 PSIG.

⚠️ IMPORTANT! LEAK DETECTOR MUST BE CAPABLE OF SENSING HFC REFRIGERANT.

⚠️ WARNING! REFRIGERANT CAN BE HARMFUL IF IT IS INHALED. REFRIGERANT MUST BE USED AND RECOVERED RESPONSIBLY. FAILURE TO FOLLOW THIS WARNING MAY RESULT IN PERSONAL INJURY OR DEATH.
3.6 Evacuating the Line Set and The Dehumidifier

1. Remove the valve cores from the service ports on the liquid and gas line stubs using no-loss valve core removal tools.
2. Connect a 1/4" SAE in-line tee to the gas line stub valve core removal tool.
3. Connect the low pressure side of the manifold gage set to one of the ports on the 1/4" SAE in-line tee.
4. Connect a micron gage to the remaining port of the 1/4" SAE in-line tee.
5. Connect the high pressure side of the manifold gage set to the liquid line stub service port.
6. Connect a vacuum pump to the center port on the manifold gage set.
7. Open the valve core removal tool valves.
8. Open the high and low pressure sides of the manifold gage set and start the vacuum pump.
9. After evacuating for a few minutes, close the high and low pressure sides of the manifold gage set and observe the behavior of the micron gage. A rapid rise in the micron gage reading (pressure) indicates a leak in the system. If this occurs, check the manifold gage set, hoses, tee, and valve core removal tools for leaks. If no leak is found, repeat the leak test procedure in Section 3.5.
10. Evacuate the line set and dehumidifier for a minimum of 15 minutes and check that the micron gauge reads below 500 microns.
11. Close the low and high pressure sides of the manifold gage set and stop the vacuum pump.
12. Wait 10 minutes.
13. If the micron gage reading rises above 800 microns, check for leaks and return to step 9.
14. If the micron gage reading remains below 800, close the valves on the valve core removal tools.
15. Remove the tee from the gas line stub valve core removal tool. Connect the low pressure side of the manifold gage set to the gas line stub valve core removal tool.
16. Install the valve core into the liquid line stub service port.
17. Remove the vacuum pump from the center port of the manifold gage set and proceed to the next section to charge the system.

3.7 Charging the System

The condensing unit is pre-charged with 42 oz. of HFC-410A refrigerant. The installer will add HFC-410A refrigerant for the dehumidifier and line set.

1. Calculate the amount of HFC-410A required by determining the length of the line set and performing the calculation below:
   i. 11oz + 2.2oz per every 10 feet of line set length = Total charge required
2. Connect a cylinder of HFC-410A refrigerant to the center port of the manifold gage set. Position the HFC410A refrigerant cylinder to deliver liquid only.
3. Open the valve on the HFC-410A cylinder.
4. Place the HFC-410A cylinder on a refrigerant scale and zero the scale.
5. Open the valve on the gas line stub valve core removal tool.
6. Open the low pressure side of the manifold gage set and weigh in the amount of HFC-410A calculated in step 1.
7. Close the valve on the HFC-410A cylinder and the low pressure side of the manifold gage set.
8. Close the valve on the gas line stub valve core removal tool.
9. Remove the high and low pressure sides of the manifold gage set from the valve core removal tools.
10. Install the valve core in the gas line stub port using the no-loss valve core removal tool.
11. Remove the no-loss valve core removal tools from the service ports on the liquid and gas line stubs.
12. Install the caps on the service ports of the liquid and gas line stubs finger tight, then tighten an additional 1/6 turn. Check the service port caps for leakage — reinstall if necessary.

3.8 Condensate Water Removal

**IMPORTANT! – AUXILIARY DRAIN PAN - WHEN THE DEHUMIDIFIER IS LOCATED ABOVE A FINISHED SPACE WHERE DAMAGE MAY RESULT FROM CONDENSATE OVERFLOW, AN ADDITIONAL DRAIN PAN WITH AN AUXILIARY DRAIN LINE OF 3/4" MINIMUM DIAMETER MUST BE INSTALLED.**
**FOR HVAC INSTALLER ONLY**

*Note* – Check the drain hole in the dehumidifier to verify the opening and that it is free of any debris before installing the drain line.

Condensate drains by gravity via the dehumidifier drain port. Often the Ultra-Aire SD12 can be connected to the existing air handler drain. Use a 3/4” male NPT PVC pipe or adapter to connect to the drain port. Route drain pipe to an approved drain. Install a trap in the drain line as shown below. Use an adjustable wrench to secure the NPT fitting to the drain port. The drain pipe should slope towards the drain at least 1 inch for every 10 feet of run.

**FIGURE 13A: HARD PIPE DRAIN**

When installing the drain hose, make sure the dehumidifier feet are extended to raise the dehumidifier 2 1/2” above the ground. Coil the drain hose under itself or position a spacer to lift the hose 1” off the ground after the hose has touched the ground. This procedure will create a trap that ensures your dehumidifier drains correctly. Keep the hose as flat to the floor as possible. Excessive humps or kinks will prevent proper drainage.

**FIGURE 13B: FLEXIBLE PIPE DRAIN**

An optional condensate pump kit may be installed if a lift is required to dispose of the condensate. The condensate pump kit can be ordered directly from the factory. See the optional parts list for information on the kit.

### 3.9 Ducting

#### 3.9A Installing Duct Collars

The Ultra-Aire SD12 is equipped with 10” and 6” round inlet collars and a 10” round (ovaled) exhaust collar. Follow instructions included with collars.

#### 3.9B Ducting for Dehumidification

For the ideal installation, draw air from the central part of the home and return it to the isolated areas of the home like the bedrooms, den, utility room, or family room. The ductwork of the existing HVAC system can be used to supply air to the home. If the existing supply goes to isolated areas of the home, discharge the supply of the Ultra-Aire SD12 into the supply of the existing HVAC system. If the existing heating system incorporates a central supply, installation of a separate supply duct from the Ultra-Aire SD12 to each isolated area is recommended. DO NOT draw air directly from the kitchen, laundry, or isolated basement. You may draw air from a basement that is open to the home. All flexible ducting connected to the Ultra-Aire SD12 should be UL listed.

The inlet of the Ultra-Aire SD12 is the 10” diameter hole in the filter enclosure of the unit. A 10” round collar is supplied with the unit to attach to round duct. The duct may be permanently attached to the collar. A 6” round collar is provided with the unit to attach to the 6” hole in the filter enclosure. The 6” collar should be capped if fresh make-up air is not desired. If fresh make-up air is desired, see Section 3.9C.

A 10” round (ovaled) collar is supplied with the unit for the outlet of the Ultra-Aire SD12.

A length of flexible ducting on all Ultra-Aire SD12 duct connections is recommended to reduce noise and vibration transmitted to rigid ductwork in the structure.

Ducting the Ultra-Aire SD12 as mentioned in Sections 3.9A-3.9G requires consideration of the following points:

**Duct Sizing:** For total duct lengths up to 25’, use a minimum 10” diameter round or equivalent rectangular. For longer lengths, use a minimum 12” diameter or equivalent. Grills or diffusers on the duct ends must not excessively restrict airflow.

**Isolated Areas:** Effective dehumidification may require that ducting be branched to isolated, stagnant areas. Use 8” or larger diameter branch ducting to each of two or three areas, use 6” or larger to each of four or more areas.

**Connecting to existing HVAC systems:** An optional 10” check damper is available from the factory to prevent reverse flow through the Ultra-Aire SD12. If the Ultra-Aire SD12 is ducted to the supply ducting of the HVAC system, it is recommended that the check damper be placed in the Ultra-Aire SD12 supply duct. Contact the factory when connecting to a static pressure of greater than or equal to +.5” WG.
3.9C Ducting for Fresh Air
Fresh air can be brought into the structure by connecting an insulated duct from outside to the 6” Ultra-Aire SD12 inlet and by turning on the fan switch or activating the humidity control (on units with the humidity control panel). Activate the ventilation timer on the remote control to bring in fresh air. Refer to Section 7.8B for programming instructions for the ventilation timer. Advantages of this form of ventilation include:

1. Outside air is filtered before entering the building.
2. Outside air will be dehumidified and cooled before entering if the Ultra-Aire SD12 is running in dehumidification mode.
3. Drawing air from outside and blowing inside aids in slightly pressurizing the structure. This helps prevent dirty and humid air from entering elsewhere. It also reduces the potential for carcinogenic radon gas to enter and provides make-up air for open combustion and exhaust devices like the clothes drier, fireplace, and water heater.
4. Adequate exhaust fans are recommended in the bath rooms and kitchen.

In cold climates or areas where the outdoor dew point is low at times, ventilation can be used to dehumidify the structure. This is accomplished by bringing the dry, low dew point air into the structure during these times. This approach is often more economical than running the dehumidifier to remove excess moisture from the structure. In cold climates, it is critical to adequately ventilate to reduce the inside moisture content to avoid moisture accumulating in the wall cavities. For example; in a house that experiences condensation on the interior surface of the windows during the winter, increasing the amount of ventilation will often cure the problem.

An insulated 6” diameter duct is generally sufficient to provide up to 100 CFM of outside air. Large quantities of outside air will either positively or negatively impact the performance of the Ultra-Aire SD12, depending upon inside and outside air conditions. Consult the factory by calling 1-800-533-7533 for recommendations regarding the use of higher flows with your specific application.

The outside air duct should be connected to the 6” round collar on the filter enclosure of the unit. The 6” round collar includes a manual damper. Adjust the manual damper to provide the desired amount of fresh air for ventilation. The amount of fresh air should be based on the size and occupancy of the residence. If you are unsure of your ventilation air requirements, consult the factory by calling 1-800-533-7533 for assistance or check your local building codes.

3.9D Installation in a Basement or Crawlspace with an Existing Forced Air HVAC System
It is recommended that a new, separate return duct be installed for the Ultra-Aire SD12 from a central area of the house. If this is not possible, and if the existing system has multiple returns, select one to disconnect from the existing forced air system and use it for the dedicated Ultra-Aire SD12 return. Always select a return from a central location in the structure in an area that is always open to the rest of the structure. Do not use a return from a room that may have its door closed much of the time.

If the structure in which the Ultra-Aire SD12 is to be installed has an existing forced air HVAC system, utilize the HVAC system ducting to make the Ultra-Aire SD12 installation easier.

Basement Installation: Install a separate 10” return for the Ultra-Aire SD12 in a central area of the structure. Duct the supply of the Ultra-Aire SD12 to an optional 10” x 10” x 10” tee/damper that is 20% open to the basement. This allows the dehumidifier to discharge a variable amount of dehumidified air into a basement that may not be well served by the existing duct system. Duct the other side of the tee to the air supply of the existing HVAC system. A backdraft damper is required in the duct between the 10” tee and the central supply duct to prevent air from being discharged into the basement during central fan operation. Connect a duct from outside to the 6” collar of the Ultra-Aire SD12 if you wish to provide fresh air ventilation.

Crawl Space Installation: Install a separate return for the Ultra-Aire SD12 in a central area of the structure. Duct the supply of the Ultra-Aire SD12 to a 10” x 10” x 10” tee/damper that is 20% open to the crawl space if desired. Duct the other side of the tee to the air supply of the existing HVAC system ventilation. Connect an insulated duct from outside to the 6” collar of the Ultra-Aire SD12 if you wish to provide optional fresh air.

**FIGURE 14A: DEHUMIDIFIER BASEMENT INSTALL**
3.9E Installation in an Attic with an Existing Forced Air HVAC System

Always install a catch pan with a drain and/or float interrupt switch for condensate under the Ultra-Aire SD12 in an attic to reduce likelihood of water damage.

Locate a separate return for the Ultra-Aire SD12 in a central area of the structure. Duct the supply of the Ultra-Aire SD12 to the air supply of the existing HVAC system. Connect an insulated duct from outside to the 6" collar of the Ultra-Aire SD12 if you wish to provide fresh air ventilation. Adjust damper in the collar to provide the desired amount of fresh air. Using a remote control, program the unit to bring in the desired amount of fresh air.

3.9F Installation in a Structure with Two Forced Air HVAC Systems

The Ultra-Aire SD12 can be installed into two typical HVAC ducting systems. Install a separate return for the Ultra-Aire SD12 as directed above. Discharge air from the dehumidifier should be split and routed to each supply ducting system. A balancing damper and a backdraft damper is required in each duct between the Ultra-Aire SD12 and the HVAC ducting system. This allows airflow to be adjusted and prevents flow of air between the ducting systems. Contact the factory for assistance, if necessary.

⚠️ IMPORTANT! INSULATED SUPPLY AND RETURN DUCTS MUST BE USED WHEN INSTALLING THE ULTRA-AIRE SD12 DEHUMIDIFIER IN UNCONDITIONED SPACES TO PREVENT WATER CONDENSATION ON THE DUCTING. THE ULTRA-AIRE SD12 DEHUMIDIFIER WILL REDUCE THE SUPPLY AIR TEMPERATURE 5°F TO 10°F BELOW THE RETURN AIR TEMPERATURE AND PROPERLY

3.9G Installation in a Structure with No Existing Forced Air HVAC System

When installing the Ultra-Aire SD12 in a structure that does not have a forced air HVAC system, a single return for the Ultra-Aire SD12 should be installed in central open area of the structure. DO NOT locate the return in a bathroom or a kitchen. The supply of the Ultra-Aire SD12 should be located in the remote areas of the structure (such as bedrooms, den, etc.). By ducting this way, the air inside the structure will circulate through the Ultra-Aire SD12 to be filtered and dehumidified. Avoid discharging all the air from the dehumidifier in one location to prevent overheating that area. 4" diameter duct is recommended for branches to the bedrooms, 6" diameter duct is recommended for branches to larger areas. Refer to section 3.9B for branch duct sizing.

Connect an insulated duct from outside to the 6" collar of the Ultra-Aire SD12 if you wish to provide fresh air ventilation.

3.10 Quiet Installation

Consider fan vibration and airflow noise during installation. Use of flex duct and/or vibration isolation materials during mounting and ducting will result in quieter operation.

A length of flexible ducting on all Ultra-Aire SD12 duct connections is recommended to reduce noise and vibration transmitted to rigid ductwork in the structure.

3.11 System Start Up

1. Rotate the condensing unit fan to check for binding.
2. Inspect all factory and field wiring for loose connections.
3. Check the voltage supply at the condensing unit disconnect switch and make sure it is 120Vac ±10%. If the supply voltage is outside this range, do not start the system and repair the power supply circuit.
4. Plug in the dehumidifier and set the remote control to dehumidify. Close the condensing unit disconnect to start the condensing unit.
5. Recheck the voltage supply at the condensing unit and make sure it is 120Vac ±10% while the unit is operating.
6. Check the condensing unit and dehumidifier operation.

4. Controls

The Ultra-Aire SD12 can be equipped with various accessories to enhance its operation. A remote control must be used with the Ultra-Aire SD12 system. Therma-Stor offers the DEH 3000 proprietary controller. The DEH 3000 allows homeowners the ability to monitor and control relative humidity levels in their home. This control is also offered with a remote sensing option. Refer to Section 3.2B for Control Installation.
**WARNING:** Allowing yellow wire to contact red or white wire will **DAMAGE** the transformer.

Dehumidifier on: Connect yellow and blue wires.
Fan only on: Connect yellow and green wires.

Accessory power: 24 volt AC power supply available for HVAC accessories between yellow and white (and/or red) wire. Red and white wires are common with each other.

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**FIGURE 15: Ultra-Aire DEH 3000 Dehumidification & Ventilation Control**

![Diagram of Ultra-Aire DEH 3000 Dehumidifier and associated connections]

OPTIONAL DAMPER

24 VAC

INTERNAL CONNECTIONS

DMP COMP FAN

Ultra-Aire Dehumidifier

(P/N 4028539; with remote: P/N 4028407)
5. Optional Dehumidifier & Ventilation System Controller

When used with Ultra-Aire Whole House Ventilating Dehumidifiers, the DEH 3000/3000R allows homeowners the ability to monitor and control relative humidity levels in their home.

DEH3000 P/N: 4028539
DEH3000R (remote) P/N: 4028407
Model: DEH 3000
DEH 3000R (remote)

Operating Voltage: 24 VAC
Max Current
DMP, COMP, FAN: 1 AMP each
Humidity Range/Accuracy: 10 – 95% RH, ± 5%
Humidity Setpoint 35% min – 70% max
Auxillary Relay Capacity: 5 Amps, 24VAC
Temp Range/Accuracy: 30°-90°F, ± 2°F
Size: 4.95”L x 1.06”W x 4.19”H

Major Operations
- Digital control of Relative Humidity (Digital Set-Point)
- Fan/Filter Operation
- Programmable Ventilation Timer
- Large, easy-to-read backlit LCD display
- Easy interaction with air handler fan (Interlock/Lockout)
- High Temperature Cut-Out
- Dryout Cycle Timer
- Auto Reboot
- Remote Sensor (DEH 3000R Only)

To order call Therma-Stor at 1-800-533-7533 or Contact your local distributor or HVAC contractor.
6. Maintenance

6.1 Standard Air Filter
The Ultra-Aire SD12 is equipped with a pleated cloth air filter. This filter should be checked every six months. Operating the unit with a dirty filter will reduce dehumidifier capacity and efficiency and may cause the compressor to cycle off and on unnecessarily on the defrost control.

To access the air filter, remove the filter access panel from the end of the Ultra-Aire SD12. The filter should be readily visible and can be removed by pulling them straight out of the Ultra-Aire SD12.

The pleated cloth filter can generally be vacuumed clean several times before needing replacement. DO NOT operate the unit without the standard filter or with a less effective filter than the standard filter. The heat exchange coils inside the unit could become clogged and require disassembly to clean. Filter non-compliance invalidates the product warranty.

6.2 High Efficiency Air Filter – MERV 14
An optional high efficiency pleated microglass paper filter is available for the Ultra-Aire SD12. This filter is rated as 90%-95% efficient by the ASHRAE Dust Spot test method 52-76. The high efficiency pleated microglass paper filter should be used in conjunction with the standard filter. The filter housing is a separate accessory that must be used with the MERV 14 filter. An additional MERV 11 pre-filter is sold with the filter housing.

This filter is able to remove allergy causing particles from the airstream. The high efficiency filter has a much larger surface area than the standard filter, thus the standard filter may need to be cleaned or replaced several times before the high efficiency filter requires replacement. Be careful not to damage the fabric media when handling the high efficiency pleated paper filter. Do not attempt to clean the high efficiency pleated paper filter. It should be replaced when it becomes restrictive.

6.3 Impeller Fan
The impeller fan motor is factory lubricated for many years of normal operation, and no further oiling is required.

6.4 Optional Fresh Air Return
Check and clean the screen on the outdoor fresh air return seasonally. The screen may become plugged during the seasons when there are many particles in the outdoor air.

6.5 Condensing Unit Maintenance
The compressor and fan motor inside the condensing unit are permanently lubricated for many years of normal operation, so maintenance is not required.

Keep the condensing unit clean and free from debris. Check the coil and other openings on the condensing unit for debris that will obstruct airflow. The coil on the condensing unit can be carefully vacuumed or cleaned with a soft bristle brush if needed. Do not bend the coil fins while cleaning the coil.

Keep the area around the condensing unit clear to allow the required airflow. Make sure the base of the condensing unit is at least 1” above ground level and that the condensing unit is level. Do not direct the discharge towards the condensing unit when mowing grass.

7. Service

7.1 Warranty
A warranty certificate has been enclosed with this unit; read it before any repair is initiated. If a warranty repair is required, call the factory first at 1-800-533-7533 Ext. 8459 for warranty claim authorization and technical assistance.

7.2 Technical Description
The Ultra-Aire SD12 uses a refrigeration system similar to an air conditioner’s to remove heat and moisture from incoming air, and add heat to the air that is discharged (See FIGURE 16).

Hot, high-pressure refrigerant gas is routed from the compressor to the condenser coil. The refrigerant is cooled and condensed by giving up its heat to the air that is about to be discharged from the unit. The refrigerant liquid then passes through a filter/drier and capillary tubing which causes the refrigerant pressure and temperature to drop. It next enters the evaporator coil where it absorbs heat from the incoming air and evaporates. The evaporator operates in a flooded condition, which means that all the evaporator tubes contain liquid refrigerant during normal operation. A flooded evaporator should maintain nearly constant pressure and temperature across the entire coil, from inlet to outlet.

The mixture of gas and liquid refrigerant enter the accumulator after leaving the evaporator coil. The accumulator prevents any liquid refrigerant from reaching the compressor. The compressor evacuates the cool refrigerant gas from the accumulator and compresses it to a high pressure and temperature to repeat the process.

FIGURE 16: REFRIGERATION SYSTEM
7.3 Troubleshooting

To turn the dehumidifier ON, make contact between yellow and blue wires.

To turn the fan ON, make contact between yellow and green wires.

To power an HVAC accessory, connect the accessory to the white (or red) wire and the yellow wire.

No fans or compressor running. Dehumidification is being called for.
1. Dehumidifier unplugged or no power to outlet.
2. Humidity control set too high.
3. Loose connection in dehumidifier internal or control wiring.
4. Defective control transformer.

Compressor is not running. Condensing unit fan and dehumidifier fan are running. Dehumidification is being called for.
1. Defective compressor run capacitor (Sec. 7.7).
2. Loose connection in compressor wiring.
3. Defective compressor overload (Sec. 7.7A).
4. Defective compressor (Sec. 7.7).

Compressor and condensing unit fan are not running. Dehumidifier fan is running. Dehumidification is being called for. No fan or ventilation call.
1. No power to condensing unit.
2. Defrost thermostat open.
3. Low pressure switch open.
5. Defective condensing unit fan motor.
6. Defective condensing unit fan motor capacitor.
7. Loose connection in condensing unit internal or control wiring.

Compressor and condensing unit fan cycle on and off. Dehumidifier fan is running. Dehumidification is being called for. No fan or ventilation call.
1. Low ambient temperature and/or humidity causing unit to cycle through defrost mode.
2. Dirty air filter(s) or dehumidifier air flow restricted.
3. Defrost thermostat defective (Sec. 7.9).
4. Problem with condensing unit power supply.
5. Loose connection in condensing unit internal or control wiring.

Compressor cycles on and off. Dehumidifier fan and condensing unit fan are running. Dehumidification is being called for.
1. Defective compressor overload (Sec. 7.7A).
2. Defective compressor (Sec. 7.7).
3. Loose connection in compressor wiring.

Condensing unit fan not running. Compressor cycles on and off. Dehumidifier fan is running.
1. Defective condensing unit fan motor.
2. Defective condensing unit fan motor capacitor.
3. Loose connection in condensing unit fan wiring.

Dehumidifier fan is not running. Dehumidification or fan or ventilation is being called for.
1. Dehumidifier unplugged or no power to outlet.
2. Loose connection in dehumidifier fan circuit.
3. Obstruction prevents fan impeller rotation.
4. Defective fan.
5. Defective fan relay.
6. Defective impeller run capacitor.

Low dehumidification capacity (evaporator is frosted continuously).
Dehumidification is being called for.
1. Defrost thermostat loose or defective (Sec. 7.9).
2. Low refrigerant charge.
3. Dirty air filter(s) or dehumidifier air flow restricted.
4. Excessively restrictive ducting connected to unit.
5. Low ambient temperature dehumidifier operation.
6. Low humidity dehumidifier operation.

No ventilation. Ventilation is being called for.
1. Loose connection in ventilation control circuit.
2. Loose connection in damper power circuit.
3. Defective fresh air damper.

Dehumidifier removes some water, but not as much as expected.
1. Air temperature and/or humidity have dropped.
2. Humidity meter and/or thermometer used are out of calibration.
3. Unit has entered defrost cycle (Sec. 7.9).
4. Defhumidifier air filter dirty (Sec. 6.1 & 6.2).
5. Defective defrost thermostat (Sec. 7.9).
6. Low refrigerant charge (Sec. 7.4).
7. Air leak such as loose cover or ducting leaks.
8. Defective compressor (Sec. 7.7).
9. Restrictive ducting (Sec. 3.8).
10. Optional Condensate Pump Safety Switch open (Sec 7.11).
11. Defective condensing unit fan motor.
12. Defective condensing unit fan motor capacitor.
13. Loose connection in condensing unit power or control wiring.

Unit Test to determine problem:
1. Detach remote control wiring connections from dehumidifier.
2. Connect the yellow and green pigtails from the main unit together; only the impeller fan should run. Disconnect the wires.
3. Connect the yellow and blue pigtails from the main unit together; the condensing unit and impeller fan should run.
4. If these tests work, the dehumidifier is working properly. You should check the remote control and control wiring for problems next.
5. Remove the remote control cover from the remote control base and detach the field installed control wiring. Remove the remote control base from the wall and carry the remote control to the dehumidifier. Connect the blue, yellow, red, and green wires from the dehumidifier directly to the corresponding terminals on the remote control. Leave the white wire disconnected!
6. Turn on the fan switch; the dehumidifier impeller fan should run. Turn off the fan switch.
7. Turn on the humidity control; the condensing unit and dehumidifier impeller fan should run.
8. If these tests work, the problem is most likely in the field control.


7.4 Refrigerant Charging
If the refrigerant charge is lost due to service or a leak, a new charge must be accurately weighed in. If any of the old charge is left in the system, it must be recovered before weighing in the new charge. Add 53 oz. of HFC-410A plus 2.2 oz. HFC-410A for every 10 feet of line set length to calculate the total refrigerant charge required. Refer to Section 3.7 for charging procedure.

**WARNING!** ELECTRIC SHOCK HAZARD. CAN CAUSE INJURY OR DEATH. UNIT MUST BE GROUNDED IN ACCORDANCE WITH NATIONAL AND LOCAL CODES. DISCONNECT ALL REMOTE ELECTRIC POWER SUPPLIES BEFORE OPENING ACCESS PANEL. UNIT MAY HAVE MULTIPLE POWER SUPPLIES.

7.5 Dehumidifier Impeller Fan Replacement
The motorized impeller fan is a unitary assembly consisting of the motor and impeller fan. If defective, the complete assembly must be replaced. See Figure 18B.

1. Unplug the dehumidifier power cord.
2. Remove the cabinet access panel.
3. Disconnect the wires from the dehumidifier fan run capacitor. Safely discharge the run capacitor. Measure the capacitance of the capacitor using a capacitance meter. Check the capacitance measurement against the capacitor marked capacitance. Replace the capacitor if the measured capacitance is not within 10% of the marked capacitance. If a capacitance meter is not available, an analog ohmmeter can be used to test the capacitor. Set the ohmmeter to the Rx1 scale. The capacitor is shorted and must be replaced if continuity exists across its terminals. If there is no needle movement with the meter set on the Rx100000 scale, the capacitor is open and must be replaced.
4. Remove the impeller fan support bracket.
5. Disconnect the impeller fan leads inside the electric box.
6. Remove the defective impeller fan from the bracket and replace with it with a new impeller fan.
7. Reassemble the new impeller fan by reversing the above procedure. **Note:** be sure that the impeller fan aligns with the inlet ring inside of the dehumidifier.

7.6 Condensing Unit Fan/Blade Replacement
Perform the following tests if the dehumidifier impeller fan and compressor run but the compressor does not with a call for dehumidification.

1. Disconnect power from the condensing unit; remove the cabinet top panel.
2. Disconnect the condensing unit power supply. See Figure 18C.
3. Remove the cabinet top panel.
4. Disconnect the condenser fan motor wiring.
5. Disconnect the wires from the condensing unit fan run capacitor. Safely discharge the run capacitor. Measure the capacitance of the capacitor using a capacitance meter. Check the capacitance measurement against the capacitor marked capacitance. Replace the capacitor of the measured capacitance is not within 10% of the marked capacitance. If a capacitance meter is not available, an analog ohmmeter can be used to test the capacitor. Set the ohmmeter to the Rx1 scale. The capacitor is shorted and must be replaced if continuity exists across its terminals. If there is no needle movement with the meter set on the Rx100000 scale, the capacitor is open and must be replaced.
6. Mark the location of the fan blade on the motor shaft. Remove the fan blade from the motor shaft and slide it to the front of the condensing unit.
7. Disconnect the fan leads inside the electric box.
8. Remove the defective fan motor from the bracket.
9. Transfer the mark for the fan blade location to the new fan motor shaft.
10. Attach the new fan motor to the bracket.
11. Slide the fan blade on to the new motor shaft until it is aligned with the mark you transferred. Attach the fan blade to the motor shaft.
12. Reconnect the condensing unit power supply.

7.7 Compressor/Capacitor Replacement
This compressor is equipped with a two terminal external overload and a run capacitor (See Figure 18C).

7.7A Checking Compressor Motor Circuits
Perform the following tests if the dehumidifier impeller fan and condensing unit run but the compressor does not with a call for dehumidification.

1. Disconnect power from the condensing unit; remove the cabinet top and the electrical connection cover on the compressor top.
2. Reconnect power to the condensing unit and turn the humidity control to ON. Check for 110 volts from compressor terminal R to overload terminal 3 using an AC voltmeter. If voltage is present, go to step 3. If no voltage, there may be a loose connection in the compressor circuit. Test each component for continuity. See the appropriate section if a defect is suspected.
3. Disconnect power from the condensing unit, and then disconnect the red and brown wires from compressor terminals R & S. Using an ohmmeter check continuity between the points listed below.
4. Compressor terminals C and S: No continuity indicates an open start winding. The compressor must be replaced. Normal start winding resistance is 3 to 7 ohms.
5. Compressor terminals C and R: No continuity indicates an open run winding. The compressor must be replaced. Normal run winding resistance is .5 to 2 ohms.
6. Compressor terminal C and overload terminal 1: No continuity indicates a defective overload lead.
7. Overload terminals 1 and 3: If there is no continuity, the overload may be tripped. Wait 10 minutes and try again. If there is still no continuity, the overload is defective and must be replaced.
8. Compressor terminal C and compressor case: Continuity indicates a grounded motor. The compressor must be replaced.
9. Disconnect the wires from the compressor run capacitor. Safely discharge the run capacitor. Measure the capacitance of the capacitor using a capacitance meter. Check the capacitance measurement against the capacitor marked capacitance. Replace the capacitor of the measured capacitance is not within 10% of the marked capacitance. If a capacitance meter is not available, an analog ohmmeter...
7.7B Replacing a Burned Out Compressor

**WARNING!** IMPROPER INSTALLATION, ADJUSTMENT, ALTERATION, SERVICE OR MAINTENANCE CAN CAUSE PERSONAL INJURY, LOSS OF LIFE, OR DAMAGE TO PROPERTY.

**IMPORTANT!** THE CLEAN AIR ACT OF 1990 BANS THE INTENTIONAL VENTING OF REFRIGERANT (CFCs, HCFCs, AND HFCs) AS OF JULY 1, 1992. APPROVED METHODS OF RECOVERY, RECYCLING OR RECLAIMING MUST BE FOLLOWED. FINES AND/OR INCARCERATION MAY BE LEVIED FOR NONCOMPLIANCE.

The refrigerant and oil mixture in a compressor is chemically very stable under normal operating conditions. However, when an electrical short occurs in the compressor motor, the resulting high temperature arc causes a portion of the refrigerant oil mixture to break down into carbonaceous sludge, a very corrosive acid, and water. These contaminants must be carefully removed otherwise even small residues will attack replacement compressor motors and cause failures.

The following procedure is effective only if the system is monitored after replacing the compressor to insure that the clean up was complete.

1. This procedure assumes that the previously listed compressor motor circuit tests revealed a shorted or open winding.
2. Remove and properly dispose of the system charge. DO NOT vent the refrigerant or allow it to contact your eyes or skin.
3. Remove the burned out compressor. Use rubber gloves if there is any possibility of contacting the oil or sludge.
4. To facilitate subsequent steps, determine the type of burn out that occurred. If the discharge line shows no evidence of sludge and the suction line is also clean or perhaps has some light carbon deposits, the burn out occurred while the compressor was not rotating. Contaminants are therefore largely confined to the compressor housing. A single installation of liquid and suction line filter/driers will probably clean up the system.

If sludge is evident in the discharge line, it will likely be found in the suction line. This indicates the compressor burned out while running. Sludge and acid have been pumped throughout the system. Several changes of the liquid and suction filter/driers may be necessary to cleanse the system.

5. Correct the system fault that caused the burn out. Consult the factory for advice.
6. Install the replacement compressor with a new capacitor and an oversized liquid line filter.

In a running burn out, install an oversized suction line filter/drier between the accumulator and compressor. Thoroughly flush the accumulator with refrigerant to remove all trapped sludge and to prevent the oil hole from becoming plugged. A standing burn out does not require a suction line filter/drier.

7. Evacuate the system with a good vacuum pump and accurate vacuum gauge. Leave the pump on the system for at least an hour. Once the evacuation is complete charge the system per section 7.4.

8. Operate the system for a short period of time, monitoring the suction pressure to determine that the suction filter is not becoming plugged. Replace the suction filter/drier if pressure drop occurs. If a severe running burn out has occurred, several filter/driers may have to be replaced to remove all of the acid and moisture.

**NOTE:** NEVER use the compressor to evacuate the system or any part of it.

7.7C Replacing a Compressor, Nonburn Out

Remove the refrigerant from the system. Replace the compressor and liquid line filter/drier. Refer to Section 3.5 to check for leaks. Remove the charge and charge the system per section 7.4. Operate the system to verify performance.

7.8 Remote Controls

The Ultra-Aire SD12 is controlled by a panel that is remote from the unit. You may or may not have the devices listed below depending on the model of the remote control panel you purchased. If the Ultra-Aire SD12 fails to operate as desired, always check the settings of the controls to insure that they are correct. Check that the controls are receiving 24Vac from the Ultra-Aire SD12. Check the connections between the Ultra-Aire SD12, the control panel, and the field control wiring.

7.8A Humidity Control

The humidity control is an adjustable switch that closes when the relative humidity of the air in which it is located rises to the screen set point.

The Ultra-Aire SD12 is equipped with an automatic defrost mechanism. If the Ultra-Aire SD12 operates in conditions that develop frost on the evaporator, it will sense the frost build-up and automatically defrost the evaporator. The Ultra-Aire SD12 may not appear to be operating correctly during the defrost sequence, but once the defrost sequence is complete, the Ultra-Aire SD12 will resume dehumidifying.

7.8B Programmable Ventilation Timer – DEH3000/3000R

The ventilation timer controls the dehumidifier impeller fan and the motorized fresh air damper. When the ventilation timer is activated, the Ultra-Aire SD12 will circulate the indoor air, and bring in fresh air from outside. The ventilation timer should be set for the required ventilation of the residence. The home should be ventilated with fresh air as suggested by applicable codes and standards.

If the Ultra-Aire SD12 fails to ventilate as expected, check that the time on the timer is correct. Also check the programs on the timer to be sure that the timer is calling for ventilation at the correct times.
7.9 Defrost Thermostat
The defrost thermostat is attached to the refrigerant suction tube between the accumulator and the compressor. It will automatically shut the condensing unit off if the low side refrigerant temperature drops due to excessive frost formation on the evaporator coil. The dehumidifier impeller fan will continue to run, causing air to flow through the evaporator coil and melt the ice. When the ice has melted, the evaporator temperature will rise and the thermostat will restart the condensing unit.

7.10 Electric Ventilation Damper
The damper will open when ventilation is called for, allowing fresh air into the structure through the fresh air inlet duct. The electric ventilation damper will remain closed when ventilation is not activated in order to prevent over-ventilating the structure when the unit is dehumidifying or recirculating the indoor air. The electric ventilation damper operates on 24 Vac from the control circuit. DO NOT connect high voltage to the damper motor or damage to the motor will result. DO NOT force the blade of the damper by hand or damage to the damper motor may result.

The damper opens in one direction only. The damper rotates very slowly, allow sufficient time for the damper to cycle. The damper will take approximately 1 minute to cycle from closed to open or from open to closed.

If the electric ventilation damper fails to operate:
1. Check that the wiring is correct and that voltage is present at the damper motor.
2. Check for any obstruction inside the damper. If the electric ventilation damper fails to operate after performing these checks, it must be replaced.

7.11 Condensate Pump Kit
An optional condensate pump kit is available from the factory for use with the Ultra-Aire SD12. Condensate is automatically pumped to a remote location when the water level in the pump’s reservoir rises to close the float switch.

The pump also contains a safety float switch. The white leads from this switch extend from beneath the pump cover. This switch should be installed in series with the field wire that connects the blue (#7) lead from the Ultra-Aire SD12 to the dehu terminal on the control panel. Contact a certified electrician to install the Safety Overflow Switch (optional).

If the pump fails, this switch opens the condensing unit control circuit and stops water production before the reservoir overflows. The Ultra-Aire SD12 will continue to ventilate or circulate air as normal, but will not dehumidify until this switch closes.

---

**FOR HVAC INSTALLER ONLY**

If the electric ventilation damper fails to operate:
1. Check that the wiring is correct and that voltage is present at the damper motor.
2. Check for any obstruction inside the damper. If the electric ventilation damper fails to operate after performing these checks, it must be replaced.

7.11 Condensate Pump Kit
An optional condensate pump kit is available from the factory for use with the Ultra-Aire SD12. Condensate is automatically pumped to a remote location when the water level in the pump’s reservoir rises to close the float switch.

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If the pump fails, this switch opens the condensing unit control circuit and stops water production before the reservoir overflows. The Ultra-Aire SD12 will continue to ventilate or circulate air as normal, but will not dehumidify until this switch closes.

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**FIGURE 17A: DEHUMIDIFIER WIRING DIAGRAM**

**FIGURE 17B: CONDENSING UNIT WIRING DIAGRAM**
### SERVICE PARTS LIST: Dehumidifier

<table>
<thead>
<tr>
<th>Item</th>
<th>Part No</th>
<th>Qty</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4021475</td>
<td>1</td>
<td>Air Filter 16x20x2” MERV-11</td>
</tr>
<tr>
<td>2</td>
<td>4026221</td>
<td>4</td>
<td>Foot, Leveling, 5/16-18</td>
</tr>
<tr>
<td>3</td>
<td>4031086</td>
<td>1</td>
<td>Evaporator Coil</td>
</tr>
<tr>
<td>4</td>
<td>4029510</td>
<td>1</td>
<td>Filter/Drier</td>
</tr>
<tr>
<td>5</td>
<td>4025741</td>
<td>1</td>
<td>Thermostat, Defrost Control</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>Part No</th>
<th>Qty</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>4029508</td>
<td>1</td>
<td>Low Pressure Switch</td>
</tr>
<tr>
<td>7</td>
<td>4026657</td>
<td>1</td>
<td>Impeller</td>
</tr>
<tr>
<td>8</td>
<td>4033031-07</td>
<td>1</td>
<td>Blower Capacitor, Run, 15 MFD, 370V</td>
</tr>
<tr>
<td>9</td>
<td>4020924</td>
<td>2</td>
<td>Blower Relay, SPDT, 24V, 15A</td>
</tr>
<tr>
<td>10</td>
<td>4022487</td>
<td>1</td>
<td>XFMR, 120V, 60Hz, 24V, 40VA</td>
</tr>
</tbody>
</table>

**FIGURE 18A**

**FIGURE 18B**

### SERVICE PARTS LIST: Condensing Unit

<table>
<thead>
<tr>
<th>Item</th>
<th>Part No</th>
<th>Qty</th>
<th>Description</th>
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<tbody>
<tr>
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<td>3</td>
<td>4033212</td>
<td>1</td>
<td>Fan-Axial</td>
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<td>16</td>
<td>4033213</td>
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<td>Compressor</td>
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<td>20</td>
<td>4033214</td>
<td>1</td>
<td>Capacitor</td>
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<tr>
<td>23</td>
<td>4033216</td>
<td>1</td>
<td>Capacitor-Fan Motor</td>
</tr>
<tr>
<td>30</td>
<td>4033215</td>
<td>1</td>
<td>Motor</td>
</tr>
<tr>
<td>31</td>
<td>4022484</td>
<td>1</td>
<td>Relay</td>
</tr>
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</table>

**FIGURE 18C**
### Optional Parts List

<table>
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<th>DESCRIPTION</th>
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<tr>
<td>4028539</td>
<td>1</td>
<td>DEH 3000 Control</td>
</tr>
<tr>
<td>4028407</td>
<td>1</td>
<td>DEH 3000R (with remote)</td>
</tr>
<tr>
<td>4021475</td>
<td>1</td>
<td>MERV 11 Filter (16&quot;x20&quot;x2&quot;)</td>
</tr>
<tr>
<td>4027420</td>
<td>1</td>
<td>MERV 11 Filters 4-Pack</td>
</tr>
<tr>
<td>4027424</td>
<td>1</td>
<td>MERV 11 Filters 12-Pack</td>
</tr>
<tr>
<td>4028614</td>
<td>1</td>
<td>Pump Kit</td>
</tr>
<tr>
<td>4025287</td>
<td>1</td>
<td>MERV 14 Filter Housing</td>
</tr>
<tr>
<td>4024370</td>
<td>1</td>
<td>MERV 14 Filter (20&quot;x24&quot;x4&quot;)</td>
</tr>
<tr>
<td>4029087</td>
<td>1</td>
<td>MERV 14 Filter 3-Pack</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td>4023672</td>
<td>1</td>
<td>6&quot; Motorized Damper</td>
</tr>
<tr>
<td>4026859</td>
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<td>6&quot; Flex Duct 25'</td>
</tr>
<tr>
<td>4020128</td>
<td>1</td>
<td>6&quot; Flex Insulated Duct 25'</td>
</tr>
<tr>
<td>4020656</td>
<td>1</td>
<td>6&quot; Inlet/Exhaust Hood</td>
</tr>
<tr>
<td>4024375</td>
<td>1</td>
<td>10&quot; Gravity Damper</td>
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<td>4026969</td>
<td>1</td>
<td>10&quot; Flex Duct 25'</td>
</tr>
<tr>
<td>4022126</td>
<td>1</td>
<td>10&quot; Flex Insulated Duct 25'</td>
</tr>
<tr>
<td>4028399</td>
<td>1</td>
<td>10&quot; Oval to Round Adapter</td>
</tr>
</tbody>
</table>

### Door and Collar Assembly

**Door Install**

Insert tab on the bottom of the door, in between the foam installation and the metal side.

Push down on the plastic door latch and swing door shut. Once the door is shut release the door latch.

![Door Install](Image)

**Collar Install**

Remove the 2 round duct collars, 3 seals and small bag of mounting hardware from inside the rectangle opening.

Mount the duct collars to the front of the dehumidifier using screws provided.

![Collar Install](Image)
Limited Warranty. Therma-Stor, LLC ("Therma-Stor") warrants as follows: (i) the Ultra-Aire SD12 dehumidifier ("Product") will be free of material defects in workmanship or materials for a period of one (1) year ("One-Year Warranty") following the date of initial purchase of such Product by an original customer purchasing from Therma-Stor or an authorized reseller ("Customer"); and (ii) the Product’s condenser, evaporator, and compressor will be free of material defects in workmanship or materials for a period of five (5) years following the date of initial purchase of such Product by a Customer.

Limitation of Remedies. CUSTOMER’S SOLE AND EXCLUSIVE REMEDY UNDER THE ABOVE LIMITED WARRANTY AND THERMA-STOR’S ENTIRE LIABILITY THEREUNDER, SHALL BE, AT THE SOLE OPTION OF THERMA-STOR, REPLACEMENT OR REPAIR OF SUCH PRODUCT OR ITS COMPONENTS ("COMPONENTS") BY THERMA-STOR OR THERMA-STOR’S AGENTS ONLY. REFRIGERANT, PIPING, SUPPLIES, TRANSPORTATION COSTS, LABOR COSTS INCURRED IN REPAIR OR REPLACEMENT OF SUCH COMPONENTS ARE NOT INCLUDED. THIS DISCLAIMER AND EXCLUSION SHALL APPLY EVEN IF THE EXPRESS WARRANTY AND LIMITED REMEDY SET FORTH HEREIN FAILS OF ITS ESSENTIAL PURPOSE. CUSTOMER ACKNOWLEDGES THAT NO REPRESENTATIVE OF THERMA-STOR OR OF ITS AFFILIATES OR RESELLERS IS AUTHORIZED TO MAKE ANY REPRESENTATION OR WARRANTY ON BEHALF OF THERMA-STOR OR ANY OF ITS AFFILIATES OR RESELLERS THAT IS NOT IN THIS AGREEMENT. Notwithstanding the above, during the term of the One-Year Warranty only, Therma-Stor will provide, free of charge to Customer, all Components and labor (except costs related to removal and installation of Product) required to fulfill its obligations under such One-Year Warranty.

Disclaimer of Warranties. EXCEPT FOR ABOVE LIMITED WARRANTY, WHICH IS THE SOLE AND EXCLUSIVE WARRANTY PROVIDED WITH RESPECT TO THE PRODUCT AND ITS COMPONENTS, THERMA-STOR HEREBY DISCLAIMS ALL EXPRESS AND IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Warranty Limitations. The foregoing limited warranty extends only to a Customer and shall be null and void upon attempted assignment or transfer. A "defect" under the terms of the limited warranty shall not include problems resulting from Customer’s or Customer’s employees’, agents’, invitees’ or a third party’s misuse, improper installation, improper design of any system in which the Product is included, abuse, lack of normal care, failure to follow written instructions, tampering, improper repair, or freezing, corrosion, acts of nature or other causes not arising out of defects in Therma-Stor’s workmanship or material. If a Product or Component is replaced while under warranty, the applicable limited warranty period shall not be extended beyond the original warranty time period. The limited warranty does not cover any costs related to changes to a Product or Component that may be required by any codes, laws, or regulations that may become effective after initial purchase of the Product by Customer.

Customer Responsibilities. As a further condition to obtaining warranty coverage hereunder, the Customer must send a valid warranty claim to Therma-Stor such that Therma-Stor receives such claim prior to the end of the applicable warranty period. Therma-Stor shall have no obligation hereunder with respect to any claim received by Therma-Stor after the expiration of the applicable warranty period. As a further condition to obtaining warranty coverage hereunder, the Customer must present forms of invoices evidencing proof of purchase of a Product. If such invoices do not clearly indicate the date of initial purchase by a Customer, the applicable Product’s date of manufacture will be used instead of the date of initial purchase for the purpose of calculating the commencement of the applicable warranty period. Warranty service must be performed by Therma-Stor or a servicer authorized by Therma-Stor. In order to obtain warranty service, the Customer should call Therma-Stor at 1-800-533-7533 and ask for the Therma-Stor Products Service Department, which will then arrange for applicable warranty service. Warranty service will be performed during customary, daytime working hours. If the Product must be shipped for service, Customer shall be solely responsible for properly packaging the Product, for all freight charges, and for all risk of loss associated with shipment.

Limitation of Liability. IN NO EVENT SHALL THERMA-STOR, IN CONNECTION WITH THE DESIGN, SALE, INSTALLATION, USE, REPAIR, REPLACEMENT OR PERFORMANCE OF ANY PRODUCT, COMPONENT, PART THEREOF OR WRITTEN MATERIAL PROVIDED THEREWITH, BE LIABLE, TO THE EXTENT ALLOWED UNDER APPLICABLE LAW, UNDER ANY LEGAL THEORY FOR ANY SPECIAL, DIRECT, INDIRECT, COLLATERAL OR CONSEQUENTIAL DAMAGES OF ANY KIND. NOTWITHSTANDING THE ABOVE LIMITATIONS AND WARRANTIES, THE SOLE AND EXCLUSIVE LIABILITY OF THERMA-STOR, REGARDLESS OF THE NATURE OR THEORY OF THE CLAIM, SHALL UNDER NO CIRCUMSTANCES EXCEED THE PURCHASE PRICE OF THE PRODUCT, COMPONENT OR PART UPON WHICH THE CLAIM IS PREMISED.

Applicable Law and Venue. ANY ARBITRATION, ENFORCEMENT OF AN ARBITRATION OR LITIGATION RELATED TO THE PRODUCT WILL BE BROUGHT EXCLUSIVELY IN DANE COUNTY, WISCONSIN, AND CUSTOMER CONSENTS TO THE JURISDICTION OF THE FEDERAL AND STATE COURTS LOCATED THEREIN, SUBMITS TO THE JURISDICTION THEREOF AND WAIVES THE RIGHT TO CHANGE VENUE. CUSTOMER FURTHER CONSENTS TO THE EXERCISE OF PERSONAL JURISDICTION BY ANY SUCH COURT WITH RESPECT TO ANY SUCH PROCEEDING.

Miscellaneous. If any term or condition of this Limited Warranty is found by a court of competent jurisdiction to be invalid, illegal or otherwise unenforceable, the same shall not affect the other terms or conditions hereof or thereof or the whole of this Limited Warranty. Any delay or failure by Therma-Stor to exercise any right or remedy will not constitute a waiver of Therma-Stor to thereafter enforce such rights.