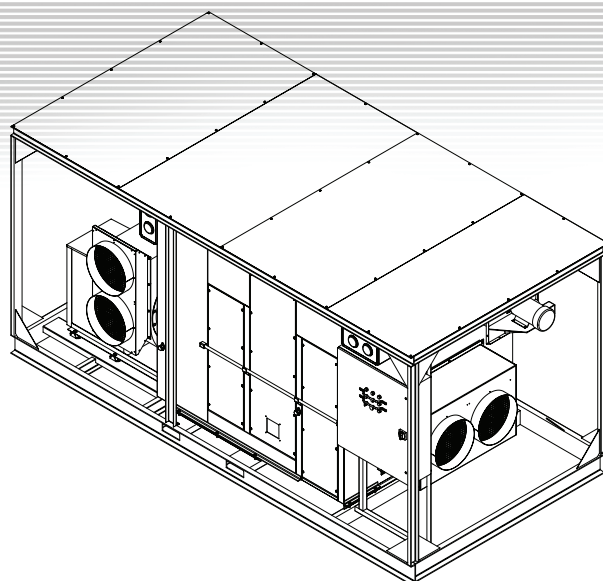


Installation, Operation &
Maintenance Manual

SD2 Series 2900

Desiccant Dehumidification Systems



**Models: SD2-9000-152-E
SD2-9000-152-G
SD2-9000-152-E/G**

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10/06



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1.0 GENERAL INFORMATION

1.1 Forward

Congratulations, the *DESICAiR SD2 2900 Series* dehumidification systems covered by this manual are designed and manufactured by Stulz Air Technology Systems, Inc. utilizing the latest, state-of-the-art control technology. Recognized as a world leader, Stulz Air Technology Systems, Inc (SATS) provides dehumidification systems manufactured with the highest quality craftsmanship using the finest materials available in the industry. The unit will provide years of trouble free service if it is installed, operated and maintained in accordance with this manual. Damage to the unit from improper installation, operation or maintenance is not covered by the warranty.

STUDY the instructions contained in this manual. They must be followed to avoid difficulties. Spare parts are available from Stulz Air Technology Systems to ensure continuous operation. Using substitute parts or bypassing electrical or refrigeration components in order to continue operation is not recommended and will VOID THE WARRANTY.

1.2 Safety Summary

Read and understand all instructions, recommendations, and guidelines in this manual regarding the installation, maintenance, and operation of this unit prior to installation and start-up. All maintenance and repairs should be conducted by personnel thoroughly trained in the operation and maintenance of this or like equipment.

The input power supply to the equipment must be shut off before beginning work on the equipment. Take extreme care to ensure that every capacitor likely to hold electrical charge has been grounded. Always remove all rings, watches, and other jewelry when working on electrical equipment. Some of the equipment used may present the hazard of Electrostatic Discharge (ESD). When working inside the equipment, always ground all parts before touching. When possible, use a wrist grounding strap when working on or near ESD sensitive components.

Never operate the unit with any cover, screen, guard, panel, etc., removed unless the instructions specifically state to do so and then, do so with extreme caution to avoid personal

injury. Never attempt to lift any component in excess of 35 pounds without additional help.

Placards and/or stickers have been placed in various locations on or in the unit. These placards/stickers are intended to call attention to personal safety and equipment damage hazards.

Certain maintenance and cleaning procedures may either recommend or specify the use of solvents, chemicals, or cleansers. Always refer to the Manufacturers Material Safety Data Sheet (MSDS) prior to the handling of any of these solvents, chemicals, or cleansers.

1.3 Warnings & Cautions

The following is a condensed list of WARNINGS and CAUTIONS that are noted throughout this manual. All personnel who operate, maintain or service this dehumidifier should read and understand these WARNINGS and CAUTIONS. All WARNINGS indicate a potential threat to personnel and all CAUTIONS indicate a potential threat of equipment damage.



WARNING Voltages used with this unit can be deadly. Be careful not to contact high AC input voltage connections when installing or operating this equipment. Use the services of a qualified electrician and/or technician to make the electrical power connections and perform maintenance.



WARNING DISCONNECT THE MAIN POWER TO THE UNIT PRIOR TO PERFORMING ANY MAINTENANCE OR SERVICE. Turning the mode selector switch to the OFF position **DOES NOT** disconnect power to controls or the unit itself.



WARNING Whenever the nature of the operation permits, keep one hand away from the equipment to reduce the hazard of current flowing through vital organs of the body.



WARNING Never work on electrical equipment unless there is someone nearby who is familiar with the operation and hazards of the equipment and is competent in administering first aid. When operators aid the technician, the technician must warn them about dangerous areas.



WARNING Do not be misled by the term "low voltage" which may appear either within this manual or on enclosed drawings or documents. Electrical voltages as low as 50 volts may cause death under certain conditions.



WARNING DO NOT TOUCH the hot system components. The design reactivation temperature range is 250°F to 300°F. The components of the reactivation system may be extremely hot during operation. Be absolutely certain that the unit and/or reactivation components are cool before attempting to work on any components.



CAUTION Air intake and discharge openings must be free of obstructions. Ensure that filters are clean and that panels are on and properly fastened into position.



CAUTION Do not operate the unit without filters. It is better to operate the unit with dirty filters than with no filters. Operating the unit with no filters may void the warranty.



WARNING The connection and service of gas components presents an extreme explosive hazard. Use the services of a qualified technician only.



WARNING Blower motors may start unexpectedly when the unit is running due to an automatic resetting of the internal overload device.



WARNING Do not allow anyone under the equipment suspended from a lifting device.



WARNING Do not allow the unit to swing while suspended from a lifting device. Failure to observe this warning may result in injury to personnel and damage to the equipment.

1.4 Product Warranty

1.4.1 Dehumidifier

Stulz Air Technology Systems, Inc. warrants to the original buyer of its products that the goods are free from defects in material and workmanship. Stulz Air Technology Systems, Inc.'s obligation under this warranty is to repair or replace, at its option, free of charge to the customer, any part or parts which are determined by Stulz Air Technology Systems Inc. to be defective for a period of 24 months from date of shipment when a completed start-up form has been submitted to Stulz Air Technology Systems, Inc. within 90 days from shipment. In the event that a completed start-up form is not received by Stulz Air Technology Systems, Inc. within 90 days from shipment, the company's obligation will be for a period of 12 months from date of shipment. Parts replaced under warranty are warranted for a period of 90 days from shipment or for the remainder of the Standard 1-year warranty period, whichever is greater.

Stulz Air Technology Systems, Inc.'s warranty does not cover failures caused by improper installation, abuse, misuse, misapplication, improper or lack of maintenance, negligence, accident, normal deterioration (including wear and tear), or the use of improper parts or improper repair..

Purchaser's remedies are limited to replacement or repair of non-conforming materials in accordance with the written warranty. This warranty does not include costs for transportation, costs for removal or reinstallation of equipment or labor for repairs or replacement made in the field.

If any sample was shown to the buyer, such sample was used merely to illustrate the general type and quality of the product, and not to represent that the equipment would necessarily conform to the sample.

This is the only warranty given by the seller, and such warranty is only given to buyers for commercial or industrial purposes. This warranty is not enforceable until the invoice(s) is paid in full.

1.4.2 Desiccant Rotor

Stulz Air Technology Systems, Inc. warrants to the original buyer of its *DESICAiR* products that silica gel desiccant dehumidification rotors are free from defects in material and workmanship. Stulz Air Technology Systems, Inc. specifically warrants the structural integrity of the desiccant element that it will not fail solely due to exposure to saturated (humid) air streams, subject to the conditions and exclusions set forth below. Stulz Air Technology Systems, Inc.'s sole obligation under this Limited Warranty is to repair or replace, at its option, free of charge to the customer (except as provided below), FOB factory, **for a period of 60 months from the date of shipment**, any rotor or rotor element determined by Stulz Air Technology Systems, Inc. to be defective.

Stulz Air Technology Systems, Inc.'s Limited Warranty does not cover defects, reduced performance or failures caused directly or indirectly by subjecting the rotor to conditions outside of manufactured operating parameters, improper installation, abuse, misuse, misapplication, improper maintenance, lack of maintenance, negligence, accident, normal deterioration (including wear and tear), or the use of improper parts or improper repair.

This warranty is invalid for applications other than water vapor dehumidification. Reduced performance or structural failure of the rotor element due to exposure to corrosive gases or liquids is excluded. Stulz Air Technology Systems, Inc. does not warrant the fitness of the equipment or its components to a specific application. The application of the equipment to a specific use is the sole responsibility of the user.

This Limited Warranty does not include costs for transportation (including, without limitation, freight and return freight charges, costs and insurance), costs for removal or re-installation of parts or equipment, premiums for overtime or labor for performing repairs, or replacements made in the field. Stulz Air Technology Systems, Inc. is not responsible for damages occurring during transport to or from Stulz Air Technology Systems, Inc.

THE OBLIGATION AND LIABILITY OF STULZ AIR TECHNOLOGY SYSTEMS, INC. UNDER THIS LIMITED WARRANTY DOES NOT INCLUDE LOSSES, DIRECT OR INDIRECT, FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES. This limited warranty is provided exclusively to the original buyer of products and may not be assigned or otherwise transferred.

THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF.

1.5 General Theory of Operation

This unit is designed to dehumidify a user-defined space or process application to humidity levels that are below those attainable with a refrigeration-based system. Moisture is removed from the air through an adsorption process using a dry desiccant material that is impregnated to the desiccant rotor's fluted surface area. Air to be dehumidified (process air) is filtered, dehumidified, and supplied to the conditioned space at a lower relative humidity and a slightly higher dry bulb temperature than its inlet condition.

Simultaneously a second air stream (reactivation air) is filtered, heated by the reactivation heater system and passed through a separate segment of the rotor. The heated air removes the previously adsorbed moisture from the desiccant in the rotor and exhausts it to an area other than that being conditioned.

During operation, the desiccant rotor continuously rotates at a constant speed through the process and reactivation sections of the dehumidifier. The two air streams are separated by face and peripheral seals and by the internal fluting of the rotor. Process and reactivation airflows are counterflow to each other to maximize the efficiency of the adsorption process and to help prevent the rotor's flutes from fouling.

The reactivation heater is designed to raise the reactivation air temperature approximately 190°F above ambient. The energy from the heated air is used to desorb the moisture. Reactivation discharge air temperature is approximately 120°F and moist. Controls are included in the unit to vary the amount of reactivation heat based upon the amount of moisture adsorbed from the process airstream.

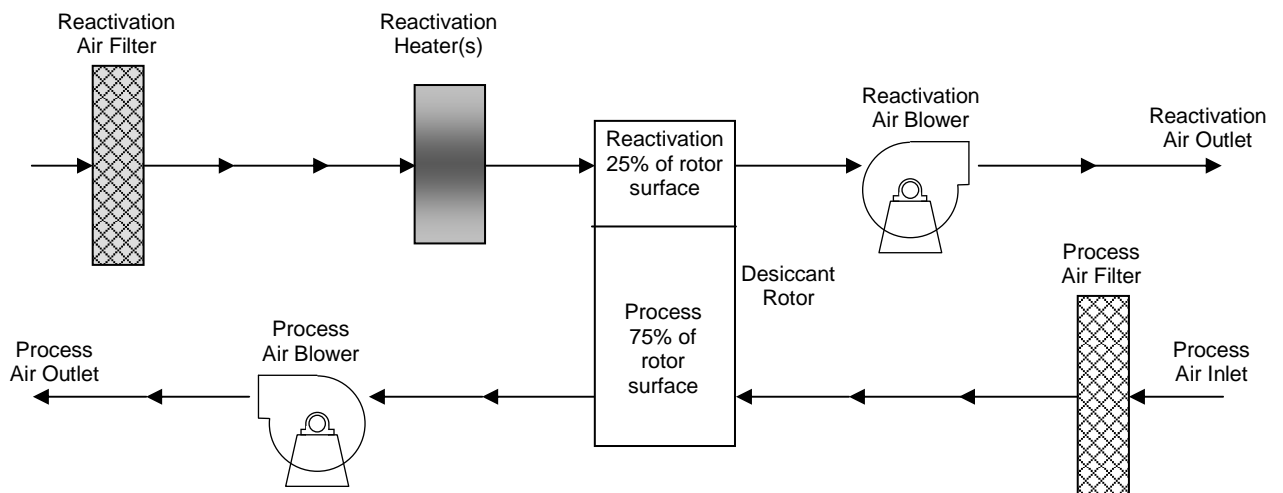


Figure 1 - General Theory of Operation

SD2 Series 2900 Installation, Operation & Maintenance

1.6 Construction

1.6.1 Cabinet

This unit is self-contained in an aluminum cabinet rated for outdoor use. The cabinet is equipped with an extruded aluminum frame which surrounds and protects the profile of the cabinet. The mounting base has forklift slots to facilitate moving and positioning the unit. The exterior of the cabinet is finished with a durable painted finish to protect it against corrosion. Removable access panels are provided for easy access to all major components for maintenance and/or service. The operator controls are conveniently located in the front of the unit (see Installation drawing). The cabinet houses the desiccant rotor assembly and drive system, process and reactivation air blowers, a reactivation heater system and electrical controls.

1.6.2 Inlets and Outlets

The process air inlet and outlet are each equipped with two duct openings. The openings have round, flex duct connections. The reactivation inlet and outlet single, round flex duct openings. Screens are provided in the inlets and outlets to prevent birds or other small animals from entering or nesting. For the location of the duct connections,

see the installation drawing that was provided with the unit.

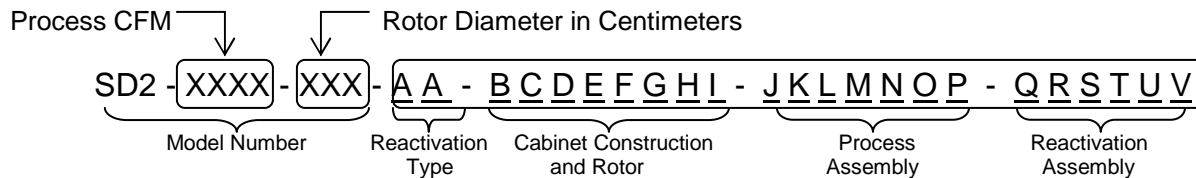
For a comprehensive list of the dehumidifier's features, refer to the DIN Sheet provided specifically for this unit. The DIN sheet provides a listing of all the optional features that are included. For particular detail of the features, refer to the Installation and Electrical drawings provided for the unit.

1.6.3 Dehumidifier Identification Number

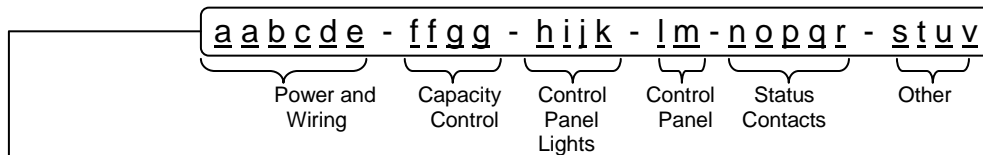
The Dehumidifier Identification Number (DIN) defines the specific features and options that are provided with the unit. (See following page.) The DIN Sheet for this unit is included for reference in a Technical Data Package. The Technical Data Package also contains a Technical Data Sheet, a Test Report (showing performance information), Drawings and this Manual. These documents should be stored in a safe place on or near the unit for reference.

1.6.4 SD2 Series 2900 Dehumidifier Identification Number (DIN) Sheet

The Dehumidifier Identification Number (DIN) starts with the model number cfm/rotor diameter combination (ex. SD2-9000-152). The first 23 digits after the model number (represented by the uppercase letters A-V below) pertain to the cabinet construction, rotor, and process and reactivation accessories or options.



The last 25 numbers (represented by lowercase letters a-v) pertain to the electrical system, unit controls, the power supply, control scheme, and the control panel.



The following is a sample DIN Sheet for a *DESICAIr* SD2 Series 2900 Desiccant Dehumidifier

DESICAIr DEHUMIDIFIER SPECIFICATION REVIEW			Date:
DEHUMIDIFIER IDENTIFICATION NUMBER			
DES-9000-152-01-04099110-9292111-629211-061901-0100-0000-21-10001-1100			
Cabinet construction, rotor, process and reactivation assemblies:			
A - 01	Reactivation Heater:	Electric	
B - 0	Unit Configuration:	Left-hand: View Proc. In - Access on Left	
C - 4	Cabinet Construction:	Rental: Single-wall (Portable)	
D - 0	Insulation (Process Inlet):	None	
E - 9	Paint:	Other/aggreko Blue	
F - 9	Mounting:	Rental Skid w/ struct.cage/frame-4way slots w/roof	
G - 1	Rotor:	Standard	
H - 1	Rotor Drive Motor:	Standard	
I - 0	Gauges:	Magnehelic (Ambient > 20 F)	
J - 9	Process Inlet:	20" Rental- Round Flex w/screen	
K - 2	Process Inlet Filters:	30% pleated	
L - 9	Process Outlet:	20" Rental- Round Flex w/screen	
M - 2	Process Blower Size Range:	DES Flow @ 600 FPM thru rotor	
N - 1	Process Blower Orientation:	Standard: Horizontal - front	
O - 1	Blower Isolation:	Standard: DD-none / BD-rubber	
P - 1	Process Blower Motor:	Standard efficiency, TEFC	
Q - 6	Reactivation Inlet:	Rental	
R - 2	Reactivation Inlet Filters:	30% pleated	
S - 9	Reactivation Outlet:	20" Rental- Round Flex w/screen	
T - 2	Reactivation Blower:	Flow @ 600 FPM thru rotor	
U - 1	Reactivation Blower Orientation:	Standard: Horizontal - rear	
V - 1	Reactivation Blower Motor:	Standard efficiency, TEFC	
Electrical system, power supply, control scheme, and control panel:			
a - 06	Power Supply:	460/3/60	
b - 1	Elect. Encl. & Wiring:	STD: NEMA-4 box, Liquid Tight conduit	
c - 9	Disconnect:	Knife, fused w/ cam lock connectors	
d - 0	Electrical Enclosure Heater:	None	
e - 1	Control Panel (Op Station/MMI):	Standard: Mtd on elect. enclosure	
f - 01	Capacity Control:	D-Stat	
g - 00	Sensor/Transmitter:	By others	
h - 0	Dirty Filter Indicator Light:	None	
i - 0	Future Feature:	Reserved	
j - 0	Future Feature:	Reserved	
k - 0	Future Feature:	Reserved	
l - 2	Overheat Reset P-button:	Externally-mtd on elect. enclosure	
m - 1	Press-to-Test Lights:	Yes	
n - 1	Process Blower Interlock Dry Contact:	Yes	
o - 0	Dirty Filter Contact:	No	
p - 0	Process Air Proving Contact:	No	
q - 0	React Air Proving Contact:	No	
r - 1	Summary Fault Contact:	Contact and lights	
s - 1	Phase Monitor/ Voltage Monitor:	Yes	
t - 1	Emergency STOP P-button:	Yes	
u - 0	Future Feature:	Reserved	
v - 0	Future Feature:	Reserved	

2.0 INSTALLATION

2.1 Receipt of the Unit

Upon receiving the *DESICAiR* desiccant dehumidification unit, immediately inspect the unit for damage which may have occurred during shipment. If any is found, report it to the carrier immediately. **Any obvious damage incurred during shipping must be noted on the bill of lading BEFORE signing for the equipment. Freight claims must be done through the freight carrier.** Generally, all equipment ships "F.O.B. Factory". SATS can assist in the claim filing process with the freight company.

Carefully remove the shipping cover. Remove/open the access panels, remove any loose parts, and check the equipment against the packing list to see if the shipment is complete. Report all discrepancies to the appropriate authority.

2.2 Rigging

The dehumidifier is designed to be kept in a vertical position. Move the unit with a suitable device such as a forklift or attach an overhead lifting sling to the unit, supporting it from beneath the mounting base or the skid rails if provided. Use an appropriate capacity lifting device to ensure that it can safely handle the weight of the unit. Weight tables are provided on the installation drawing. If using an overhead lifting device, utilize lifting bars that exceed the cabinet width, (see Figure 2) so as to avoid crushing the sides of the unit and/or damaging the components mounted to the sides.

CAUTION Avoid crushing the sides of the unit and/or damaging components mounted to the sides.

WARNING Do not allow the unit to swing while suspended from a lifting device. Failure to observe this warning may result in injury and damage to the equipment.

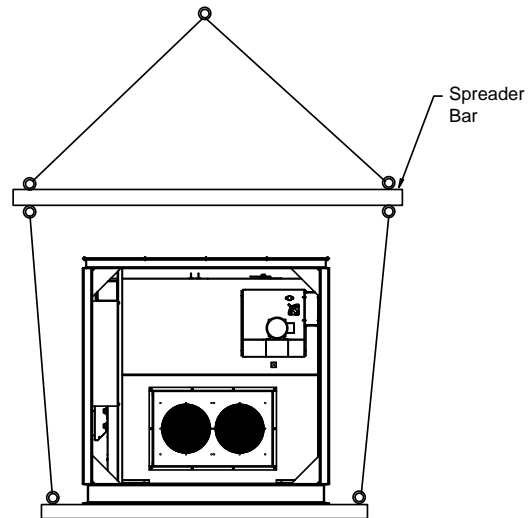


Figure 2 - End View

2.3 System Location and Clearance

Allow unrestricted access to the dehumidifier to perform routine inspection and maintenance. Recommended minimum clearance on at least one side of the unit is the full width of the unit plus necessary equipment (forklift, lifting device, etc.).

To judge the clearance requirements, consider that all the components are housed inside the *DESICAiR* dehumidifier cabinet. The desiccant rotor is typically the largest component requiring removal, although blower assemblies, while somewhat smaller, also require sufficient clearance for removal.

WARNING The leaving reactivation air can be very warm and humid. Keep items that may be damaged by excessive heat and humidity away from the reactivation air outlet.

Position the unit in the desired location. Make sure the mounting surface is able to support the weight of the equipment and keep it level. Secure the unit to the mounting surface. Mounting holes may be drilled into the base of the unit for anchoring it. The following general requirements should also be considered:

- 1) The power source should be located as near as possible to the installed location of the equipment.
- 2) The power source wiring should include a disconnect switch however, provisions should be made to ensure that power is not disconnected during normal operation and that the disconnect switch is not used to turn off the unit for normal shut-down.

- 3) If possible, avoid locations where the air intakes will be laden with dust, dirt, soot, smoke, or other debris.
- 4) DO NOT operate the unit in or near flammable or corrosive environments or allow flammable or corrosive air into the unit.
- 5) Refer to the wiring diagram and refrigeration diagram (if applicable) for electrical connections.

2.4 Spring Mounted Process Blowers

See Figure 3. If the process blower is mounted on optional vibration isolator springs, remove the temporary "shipping tie-down" bolts after the unit is positioned. Remove the bolts from each side of the process blower assembly where it attaches to the lower frame.

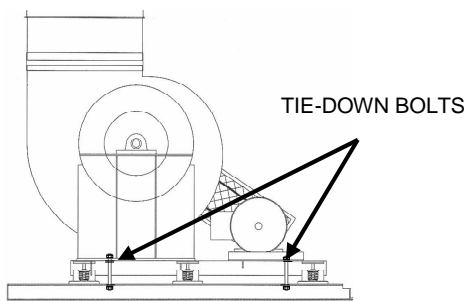


Figure 3 - Blower Tie-Down Bolts

2.5 Connecting Ductwork

All ducting must be air-tight or the dehumidification system will not perform to maximum capability. Even small leaks can have a dramatic effect on system performance. Ducting should be sized for the appropriate air quantity and pressure drop. The clearance required for the connection sides of the unit depends on whether the unit is to be ducted for process air, reactivation air, or both.

When installing a unit in the conditioned space, the reactivation inlet and outlet must be ducted to and from another area to prevent warm, moist air from being returned to the conditioned space. Refer to the Installation drawing for the duct connection locations.

The reactivation air temperature at the outlet will be warm (approximately 120°F) and humid. If duct work is to be connected to the reactivation outlet, it should be insulated and sloped down and away from the unit. This will prevent condensed moisture from accumulating at the reactivation outlet.

When installing a unit outside the conditioned space, the process inlet and outlet must be ducted to and from the conditioned space to prevent humid air from entering the process air stream.

NOTICE Flow regulation dampers are required but may not be provided with this unit. In such cases, it is the responsibility of the contractor or the owner to install flow regulation dampers. Refer to the Technical Data Sheet provided with the unit for the correct air volume. If these volumes are not set correctly, unit performance may be affected.

Be sure that inlets and outlets are free of obstructions and filters are clean.

2.6 Utility Connections

2.6.1 Power Hookup

Main power is supplied to the unit through customer provided, main power cables equipped with Cam-Lok® plugs. Four male panel receptacles are furnished on the electric box to connect the power cables. Only Cam-Lok series connectors can be used to mate with these panel receptacles.



WARNING HIGH VOLTAGE IS USED IN THE OPERATION OF THIS UNIT. Use the services of a QUALIFIED ELECTRICIAN ONLY to make the electrical power connections.

1. Refer to the Electrical drawing for the main power connections.
2. Connect power to the main disconnect per the Electrical drawing for this unit. See the unit name plate (mounted near the electrical control box) for maximum circuit ampacity (MCA) and maximum fuse size (MFS) for determining the appropriate wire gauge.

SD2 Series 2900 Installation, Operation & Maintenance

2.6.2 Gas Connections

Have your local gas company connect the gas supply line if applicable (natural or propane as specified on the unit name plate), making sure it is adequately sized for the required Btu/hr (also on the name plate). Design inlet gas pressure required is 10" to 14" w.c. or as defined on the unit name plate. Do not exceed the maximum gas pressure shown. Refer to the Gas Flow drawing for more detail on the gas connections.

NOTE: DO NOT interchange natural and propane gas on any gas-fired unit. Use only the type of gas specified on the name plate.

2.7 Installing a Humidistat or RH Transmitter

Refer to the Electrical drawing for the electrical connections. A terminal block is provided for the connection of a humidistat or temperature/RH transmitter. Interconnecting field wiring should be installed in accordance with NFPA 70 of the National Electrical Code (N.E.C.).

Wire the humidistat or transmitter per the Electrical drawing. Wall-mounted control devices should typically be mounted 4-5 feet up from the floor in the conditioned space (see diagram below).

Locate the sensor according to the application. To control the conditions in a space, a wall mounted sensor may be used in the space or a duct mounted sensor may be located in the return air inlet duct if the air is re-circulated. To control the air supplying a process, a duct mounted RH Transmitter may be located in the supply air duct near the process. Duct mounted sensors cannot be used for D-Stat control but can be used for control schemes where the process blower runs continuously such as D-Stat II control.

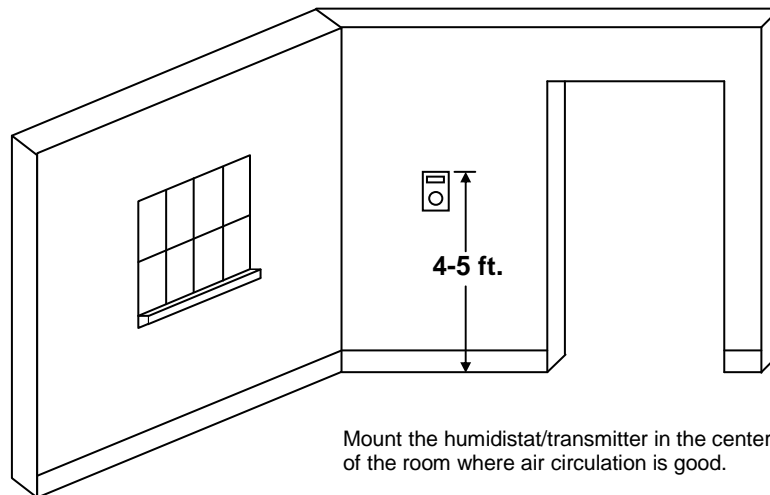


Figure 4 - Locating Wall-Mounted Humidistat/Transmitter

3.0 OPERATION

The following information provides an overview of the operating procedures and sequences. Before operating the unit, go through the checklist below to make sure all electrical and utility connections are correct and that the unit is ready for operation.

NOTE: The Start-Up Checklist and Warranty Registration in the Appendix of this manual should be completed during installation and sent to SATS Product Support Group (PSG). It will assist PSG if service or troubleshooting support is needed.

3.1 Installation Checks

Recommended tools for performing the pre-operation checkout include a voltage meter with temperature probe, a flashlight, a Phillips and flathead screwdriver, and a digital amp meter.

1. Verify the main power per the unit name plate. **ONLY USE POWER THAT'S RATED FOR THIS UNIT PER THE NAME PLATE. INCORRECT POWER MAY DAMAGE THE UNIT AND CAUSE DAMAGE TO PROPERTY OR INJURY OR DEATH TO PERSONNEL.**
2. If the unit operation is dual voltage (208/230), ensure the Voltage Monitor (KR32) and Primary Control Transformer (T1) are configured correctly for the applied voltage as depicted in the diagram located on each component.
3. Check the transformer secondary voltage.
4. Check any remote wiring (sensors, humidistats, start/stops, etc.). Refer to the Electrical drawing for specific wiring connections.
5. Check all electrical connections for tightness.
6. If applicable, verify the correct gas pressure per the unit name plate. For gas units, make sure all lines are purged of air.
7. Be sure there are no loose parts or spare parts (such as extra filters, etc.) located inside the unit or the electric box.
8. Be sure all access panels are closed tight. Small air leaks can significantly reduce unit performance.

3.2 Start-Up

1. Apply power to the unit and turn the mode selector switch to "ON". Check that the rotation of all motors, (process, reactivation, and rotor drive motor), are as indicated by the arrow labels.

2. Set airflows to the required rotor pressure drop versus the airflow required for this application. Airflow is indicated by rotor pressure drop values as viewed on the differential pressure gauges mounted on the unit. The Technical Data Sheet shows the optimum "Reactivation Side" and "Process Side" pressure drops (*Rot. Press. Drop, in. w.c.*). Process and reactivation airflows are set using airflow dampers (optional), located in the air outlets. Refer to "Monitoring Unit Performance" for a detailed description of setting and monitoring airflows.
3. Verify that amp draws of each component are within $\pm 10\%$ of the ratings shown on the unit name plate. A "Start-up Checklist" in Appendix A is provided to record the amp draws for the components.
4. Ensure the operation of the heater controls, gas train or reactivation dampers. Refer to the Initial System Start-Up for Gas-Fired Units for detail on starting gas units.
5. Verify the operation of all switches and safeties.
6. The green "Unit On" and red "Status Indication" lights are equipped with "press-to-test" capability. This feature can be used to test operation of the lamp element when main power is on. If a "press-to-test" light does not illuminate when pressed, it may be burned out or the electrical connections may be faulty.
7. Depending on the control methodology, set the humidity or dew-point to the desired setting.
8. Insert a temperature probe into the temperature test ports to verify the reactivation temperature entering the rotor (varies up to 190°F above ambient). Also verify the reactivation temperature leaving the rotor (120 - 130°F at full output).
9. Verify the grain depression across the system (in the process air stream) is correct per the Technical Data Sheet.

NOTE: During basic unit operation, process air will enter one side of the unit cool and humid and leave the other side of the unit warm and dry. Reactivation air will enter one side of the unit cool and will leave the other side very warm and moist.

3.3 Initial Start-Up for Gas Fired Units

3.3.1 Gas Train Ignition Sequence

There are several important parts to an industrial gas unit. On the gas train itself is a pilot solenoid valve, two main gas solenoid valves, a main and pilot gas regulator, a main gas valve actuator, and several hand valves. The burner assembly consists of a spark ignitor, a flame rod to detect a flame, and the burner. Inside the electric box is a flame safety relay. Refer to the source manufacturers wiring diagram provided for the gas monitoring and control (flame control) board.

Applying power on terminals L1 and L2 of the gas monitoring and control board provides power to the electronic network.

The flame control initiates the ignition sequence with a pre-purge cycle. Following the pre-purge cycle, the pilot solenoid opens and the ignition transformer is energized. Refer to the flame control board source manufacturer's information for the ignition sequence (provided separately).

The unit is equipped with a High/Low Gas Pressure Switch (S20). If the gas supply pressure is not within the limits of the switch, the Check Air/Gas indicator light will illuminate and the burner will not light or operate.

Failure to establish pilot flame during limited ignition trial cycle will cause the pilot valve to de-energize and electric ignition is stopped. The flame control will remain locked out until a manual reset occurs.

Note: The safety lockout requires a manual reset.

Flame failure during operation de-energizes fuel valves and the gas control circuit automatically goes into a new purge and then another ignition trial cycle.

Power interruption to the Gas Monitoring and Control Board de-energizes relays and valves. Resumption of power will cause the timer motor to run to the completion of its cycle plus another safe-start check, complete purge and new ignition trial.

If the flame rod senses a flame, it notifies the flame safety relay, which opens the main gas solenoid valves (V21& V22). The system controller determines how much heat is required to achieve the set point and modulates the gas valve actuator (AT20) accordingly. If power is cut to the unit at any time, the main gas and pilot solenoid

valves close immediately. The main gas valve actuator is spring-return and will also close when the unit loses power.

3.3.2 Gas Burner System Start-Up

NOTE: The burner has been run/setup tested at the factory. Steps 1 – 4 have been taken as required.

For initial system start-up:

1. Close all burner fuel valves and/or gas cocks. Make preliminary adjustments to fuel regulators. Verify fuel gas supply pressure is within the unit's required range shown on the unit nameplate.
2. Check all electric circuitry. Verify that all safety devices and interlocks are operable and functioning within their respective ranges and settings. Be sure that all manifolds are tight and that all test ports are plugged if not being used.
3. Check that all dampers are properly positioned and locked into operating position.
4. Start unit with gas valves closed. Check for proper motor rotation and impeller direction. Verify air volume and velocity across the burner element to be within the burner operating specifications.

! CAUTION Do not bypass any control panel timers typically controlling sequential operation.

5. To light and adjust the gas pilot: Open the main fuel gas valve and open pilot gas valve (See Figure 7). Start unit and ensure the pilot indicator light illuminates (See Figure 5). Observe pilot ignition through the burner viewing window.

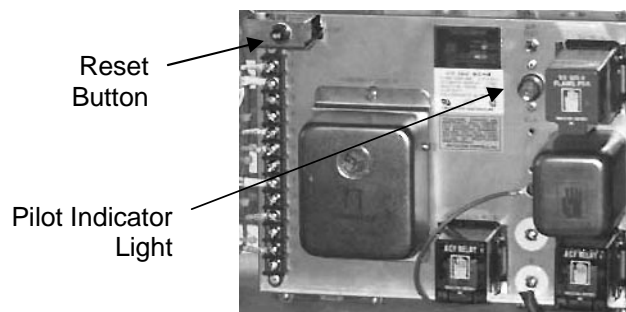


Figure 5 - Flame Control Panel

- Refine pilot setting for a hard blue flame by adjusting the gas flow through the pilot orifice and/or pilot regulator. Any thin spots or gaps indicate uneven air velocity over the burner which must be corrected. Adjust the profile plate located on the inlet side of the burner (See Figure 6), together with the Reactivation Outlet Damper to achieve the correct burner differential pressure (inches w.c.) and correct Reactivation static pressure as indicated on the unit's pressure gauges. Shut off unit then start it again. The burner should light quickly after the pre-purge time delay.

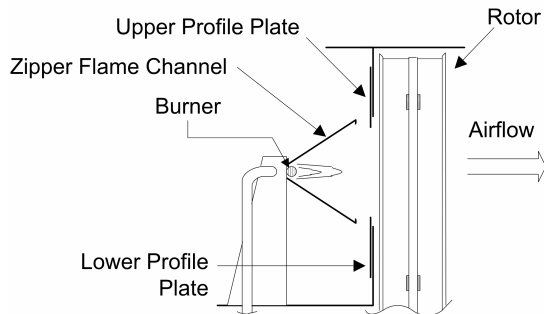


Figure 6 - Burner Assembly

- Prepare to ignite main burner by manually controlling the modulating gas valve to the minimum output using the system controller.
- With the control valve at "minimum", ignite main burner by opening the main burner fuel shutoff valve. Adjust main gas regulator to give the desired outlet pressure. Refine pilot adjustment if it has been affected. A good minimum fire should provide uniform flame across the entire burner face, contained within the zipper flame channel at the base of the burner mixing plates.
- Manually control modulating gas valve to maximum output. Adjust hand control valve to limit the reactivation air temperature so as not to exceed design temperature. Adjust main gas regulator and profile plates as required to obtain an even blue flame.
- Return the modulating gas valve control to Automatic operation.

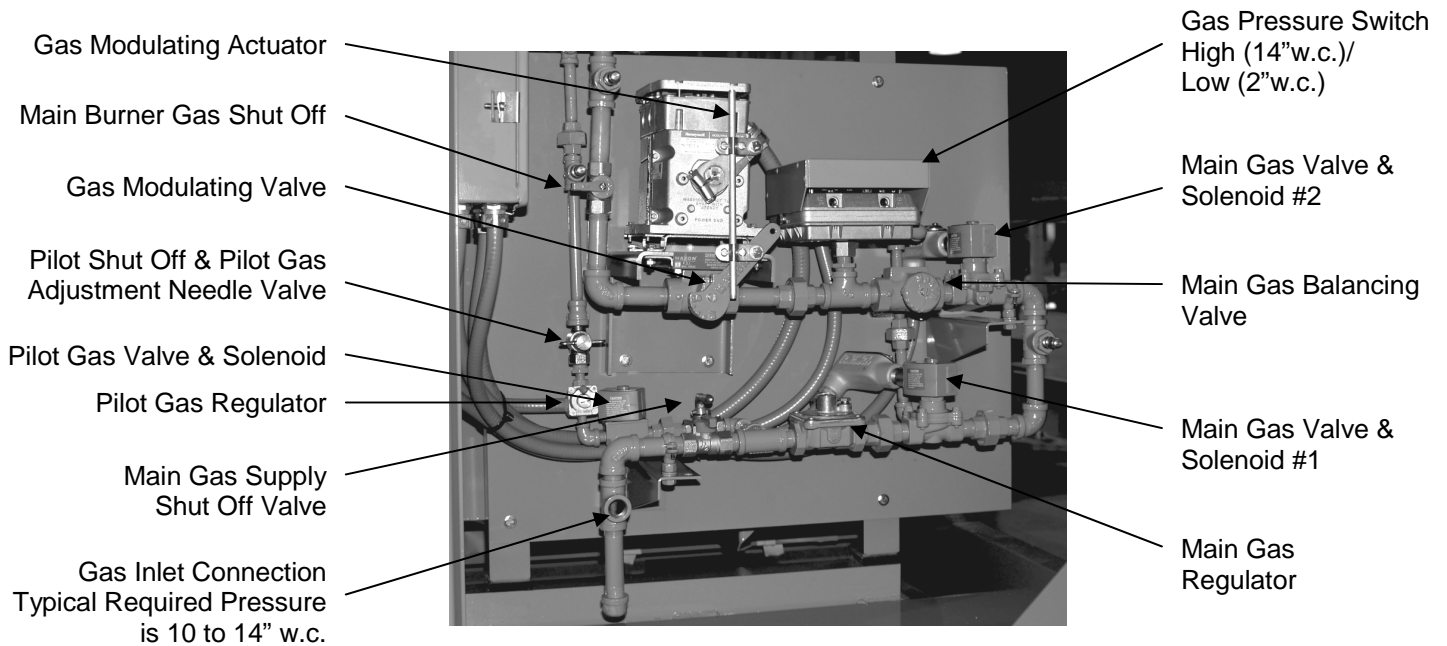


Figure 7 - Gas Train Assembly

3.4 Control Device

This unit is equipped with a solid state microprocessor based controller mounted inside the electric box. Generally, this device is used to modulate the on-board reactivation heater controller to maintain a reactivation discharge air temperature set point of 120°F at the reactivation air outlet. The controller is shipped from the

factory pre-programmed. The source manufacturer's operating manual for the controller is provided under separate cover. Refer to the source manufacturer's instructions for detailed information on operating and programming the controller.

3.5 Capacity Control

There are two basic control methods for SD2 Series 2900 dehumidifiers. 1) **D-Stat**, 2) **D-Stat II**. The way in which your unit operates depends upon which features are purchased for your unit. Refer to your order sheet or DIN Sheet for specific details on the control method selected for your unit.

3.5.1 D-Stat

What it Does:

This control cycles the dehumidifier on and off to maintain the relative humidity set point.

Requires:

A wall-mounted humidistat or dry contact to enable remote start/stop.

How it Works:

The dehumidifier responds to a control signal from a humidistat or a customer-supplied signal, which cycles the unit on and off to maintain the relative humidity set point. The unit will turn on when the relative humidity (measured) in the conditioned space is greater than the relative humidity set point (user defined).

The system controller automatically modulates reactivation heat to provide constant process discharge or constant space relative humidity.

The unit will shut down when the conditioned space relative humidity is less than the relative humidity set point minus differential. The unit mode selector switch (S15) must be set to AUTO.

Conditions:

Sensor control range: 15% RH to 90% RH
Ambient range: 40°F to 125°F
Space control accuracy: +/-7% RH

D-Stat II

How it Works:

This control functions the same as D-Stat, but the process blower runs continually. The reactivation heater and blower cycles on and off in response to an optional humidistat or customer-supplied signal. As an option, the process blower may cycle on and off based upon a separate customer-supplied contact.

Conditions:

Sensor control range: 15% RH to 90% RH
Ambient range: 40°F to 125°F
Space control accuracy: +/-7% RH

3.6 Reactivation Types

Reactivation heat is controlled during operation to maintain the post (leaving) reactivation air temperature generally between 120°F and 130°F. The temperature of the reactivation air entering the rotor is about 190°F above ambient (depending upon the moisture load of the process air, the reactivation inlet air temperature, and/or the flow of reactivation air).

There are two basic reactivation types for Series 2900 dehumidifier units: electric or gas-fired. The general theory of each reactivation type is described below:

3.6.1 Electric Reactivation

Electric heat can be generated by an SSR (solid state relay) controlled heater or SCR (silicon controlled rectifier) controlled heater.

SSR's cycle the heaters on and off based upon a signal from the on-board reactivation heater controller to maintain the reactivation discharge air temperature set point.

SCR's also receive a signal from the on-board heater controller, but modulate the percentage of energy output for tighter control.

To prevent high "in-rush" currents during starting, the reactivation starting sequence is delayed. Once the process blower starts, the reactivation rotor motor and blower will begin to operate following a built in time delay. Heater (HR25-5) starts following a time delay after the reactivation rotor and blower. After heater (HR25-5) starts, heaters (HR25-1) & (HR25-2) are activated following a time delay. Heaters (HR25-1) & (HR25-2) are modulated up to 100% full power to maintain reactivation temperature.

If the 1st two stages of heat don't satisfy the demand for reactivation heat, the controller will turn on heaters (HR25-3) & (HR25-4). The output of heaters (HR25-1) & (HR25-2) continues to be modulated by the system controller to accurately maintain reactivation heat at the correct level.

Refer to the Electrical drawing for more detail.

3.6.2 Direct Gas-fired Reactivation

The gas supplied for a direct-fired unit may be natural or propane. In a direct-fired unit, the burner is mounted in the reactivation air stream. The ignition sequence is controlled by a flame safety relay device. Refer to Section 3.3, Initial Start-Up for Gas Fired Systems. Piping detail can be found on the gas flow drawing included with this manual.

The heater controller modulates a gas valve to regulate the amount of gas reaching the burner, thereby maintaining the reactivation outlet temperature set point.

NOTE: DO NOT inter-change natural and propane gas on any gas-fired unit. Use only the type of gas specified on the unit name plate.

3.7 Control Panel

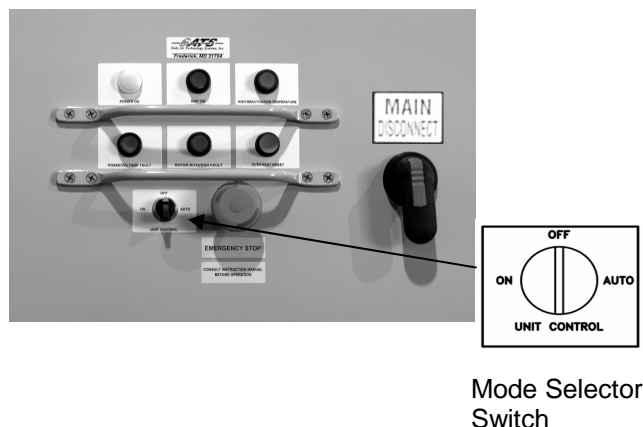


Figure 8 - Control Panel

3.7.1 Mode Selector Switch

The Series 2900 unit is equipped with a three (3) position selector switch (ON/OFF/AUTO) located on the front side of the unit. Refer to the table below for the basic modes of operation:

Mode	Status of Unit
OFF	Unit is off, power is still on if disconnect is ON; white "Power On" indicator light is illuminated.
ON	Unit is on and runs continuously; green "Unit On" indicator light is illuminated
AUTO	Unit cycles on and off in response to a humidistat or Remote Start/Stop signal; green "Unit On" indicator light is illuminated when unit is running

NOTE: The unit will not operate in the AUTO mode unless an optional humidistat is installed or the appropriate jumper connection is made on the unit terminal block to enable remote start/stop control of the dehumidifier. Refer to the Electrical diagram for specific wiring connections.

NOTE: The reactivation blower and the rotor will continue to run for five (5) minutes after the unit cycles off to remove residual heat from the unit.

3.7.2 Reactivation Mode Switch (Optional)

As an option, the dehumidification system may be designed to operate using either gas or electric power for the reactivation heat. In such cases the unit will be provided with an optional selector switch, located on the control panel labeled "ELECTRIC – GAS".

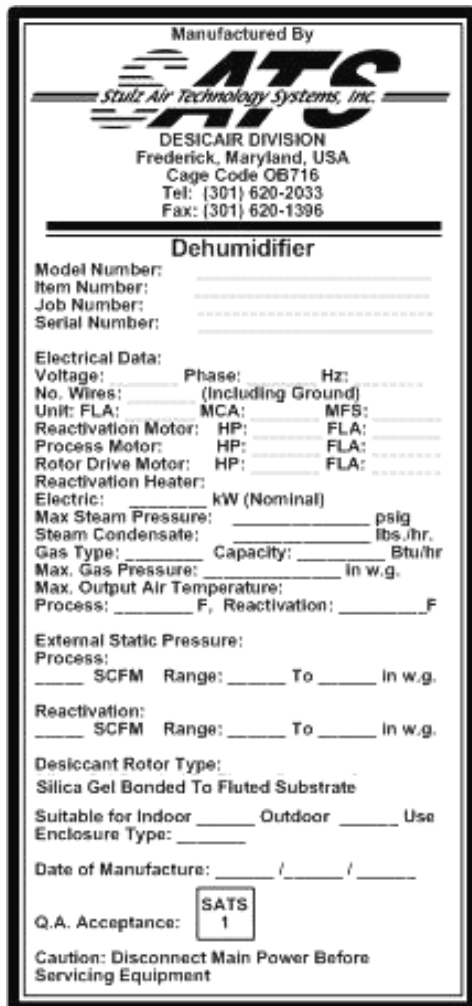
The Electric/Gas mode selector switch allows the operator to choose between Electric or Gas as the energy source for reactivation. The reactivation mode must be selected before starting the unit.

Once the reactivation mode is selected, the system will start and operate in the manner described in Section 3.6 of this manual, for that method of reactivation.

CAUTION Allow the unit to fully shut-down before switching the reactivation mode. If the dehumidification system has been operating, it will be necessary to allow the timed, reactivation purge cycle to finish. The purge cycle is complete when the reactivation blower shuts off.

3.7.3 Sample Name Plate

For information about operating voltage for this unit, refer to the name plate located near the electrical control box. A sample name plate is shown in Figure 9. The unit name plate provides technical operating information along with the model number, serial number and specific Stulz Air Technology Systems job number. This data will be required if it is necessary to contact SATS for additional information, warranty information, or spare parts.



Manufactured By
ATS
Stulz Air Technology Systems, Inc.
DESICAIR DIVISION
Frederick, Maryland, USA
Cage Code OB716
Tel: (301) 620-2033
Fax: (301) 620-1396

Dehumidifier

Model Number: _____
Item Number: _____
Job Number: _____
Serial Number: _____

Electrical Data:
Voltage: _____ Phase: _____ Hz: _____
No. Wires: _____ (Including Ground)
Unit: FLA: _____ MCA: _____ MFS: _____
Reactivation Motor: HP: _____ FLA: _____
Process Motor: HP: _____ FLA: _____
Rotor Drive Motor: HP: _____ FLA: _____
Reactivation Heater:
Electric: _____ kW (Nominal)
Max Steam Pressure: _____ psig
Steam Condensate: _____ lbs./hr.
Gas Type: _____ Capacity: _____ Btu/hr
Max. Gas Pressure: _____ in w.g.
Max. Output Air Temperature: _____
Process: _____ F, Reactivation: _____ F

External Static Pressure:
Process: _____ SCFM Range: _____ To _____ in w.g.
Reactivation: _____ SCFM Range: _____ To _____ in w.g.

Desiccant Rotor Type:
Silica Gel Bonded To Fluted Substrate

Suitable for Indoor _____ Outdoor _____ Use
Enclosure Type: _____

Date of Manufacture: _____ / _____ / _____

Q.A. Acceptance: SATS
1

Caution: Disconnect Main Power Before
Servicing Equipment


Figure 9 - Sample SATS Name Plate

3.7.4 Hour Meter

An hour meter in the control panel electric box gives the elapsed run time for purposes of scheduling maintenance.

3.7.5 Control Panel Lights

Each unit is equipped with visual indication lights to notify the operator of the current status of the unit. The green "Unit On" and optional, red status indicator lights are equipped with "Press to Test" capability. This should be used to test operation of the lamp element. If a light does not illuminate when pressed, it may be burned out or the electrical connections may be faulty. Certain status indicator lights may operate together with optional customer interface contact terminals (See Optional Features). For specific information regarding troubleshooting with fault lights, refer to the Troubleshooting section of this manual.

The "light"  next to the indicator light name specifies its color. W=white, R=red, and G=green.

Standard Indication Lights



POWER ON

This illuminates white when main power is supplied to the unit.



UNIT ON

This illuminates green when main power is supplied to the unit and the unit is running.



HIGH REACTIVATION TEMPERATURE

This illuminates red and the heater shuts off when the reactivation temperature entering the rotor or the air temperature leaving the rotor is above the high temperature set point. A manual reset of the Overheat Safety Switch (S22) is necessary.

Gas-fired Units Only



BURNER FAULT

This illuminates red when the flame rod does not detect a flame or there has been no ignition of the burner. A manual reset of KR20 is necessary (located in the electrical enclosure).



CHECK AIR/GAS FAULT

This illuminates red when the air proving switch has detected a loss of airflow or when the gas pressure is not within the desired range (high or low). This automatically resets when the Air/Gas fault is remedied.

3.7.6 Optional Status Indication Lights

The unit may be equipped with optional status indication lights. Refer to the DIN sheet provided with the unit which defines the characteristics of

the unit and the optional features that are included.

**DIRTY FILTER(S)**

This illuminates red when the filters must be changed. There may be more than one filter indication light depending upon whether a light is assigned for process filters, reactivation filters, or both.

**ROTOR ROTATION FAULT**

This illuminates red if the unit determines the rotor has not made a complete revolution within a specified period of time.

**PHASE /VOLTAGE FAULT**

This illuminates red in the event of an incorrect phase sequence, loss of a single phase, low voltage, or a voltage unbalance. The voltage monitor relay (used on 1 phase units) and the phase monitor relay (used on 3 phase units) causes control power to be interrupted. This ensures the protection of the unit motors. An automatic reset occurs when the fault condition is corrected. (See 5.1.3, Voltage Sensor/Phase Monitor.)

4.0 UNIT FEATURES

4.1.1 Control Sensor Terminals

This unit is equipped with terminal positions for the connection of a customer installed control device such as a humidistat, temperature/RH transmitter or dewpoint transmitter for operating the selected control scheme. (See 3.5, Capacity Control)

In general the sensor/transmitter provides a signal to the system controller used to modulate the reactivation heater. The control scheme manages the unit to maintain the space humidity levels to a set point as programmed into the system controller. Refer to the Electrical drawing for details on interfacing the control sensor/transmitter with the equipment.

4.1.2 Overheat Reset Push Button

This push button (S22) located on the control panel door, is used to reset the unit when the "High Reactivation Temperature" light illuminates. (See 3.7.4, Control Panel Lights)



CAUTION Try to determine the cause of the overheat condition prior to resetting the unit. For example, check the condition of the filters and the system airflow, as indicated by rotor pressure drops. (See 4.1.3, Monitoring Unit Performance)

4.1.3 Monitoring Unit Performance

There are two (2) differential pressure gauges which indicate the pressure drops across the rotor. (See Figure 10) The "Process" and "Reactivation" airflow through the desiccant rotor are set to provide optimum performance. Refer to the Technical Data Sheet included with the unit to determine the appropriate values for the rotor pressure drops (inches w.c.).

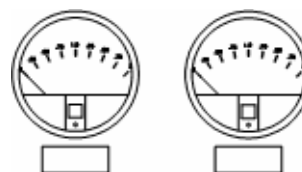


Figure 10 - Differential Pressure Gauges

The unit Technical Data Sheet indicates the pressure drops across the rotor as set by the factory. After all ductwork is installed during initial installation, the airflows may need to be adjusted to re-establish rotor pressure drops to the values indicated on the unit Technical Data Sheet.

Set the airflows by adjusting the process and reactivation air dampers while the unit is still cold. The air dampers (provided optionally) are generally located in the process and reactivation air outlets.

Afterward, if the gauges show readings that are significantly lower than the initial factory settings, there may be an obstruction or the filters may need to be changed. Operating the unit with dirty filters will reduce unit performance and may damage the desiccant rotor.

4.1.4 Test Ports

Test ports are conveniently located at strategic points before and after the desiccant rotor in the process and reactivation airstreams. These test ports are equipped with 1" NPT threaded stubs which are capped off during normal operation. The test ports allow for measurement probes to be inserted for monitoring the temperature or humidity conditions within the unit while it's operating.

5.0 OPTIONAL FEATURES

This unit may be equipped with one or more of the following optional features. For a detailed list of the options purchased with this unit, refer to the Dehumidifier Identification Number (DIN) sheet provided with the unit. The DIN number for this unit can be found on the DIN sheet.

5.1.1 Burner Gauge

If Gas is used for reactivation, a separate differential pressure gauge is provided to monitor the pressure drop across the burner. For optimal performance the burner gauge reading should be between 0.7" w.c. and 1.3" w.c. The burner pressure drop is pre-set at the factory and should not require adjustment.

5.1.2 Filter Gauges

The unit may be provided with optional, differential pressure gauges for the filters that are selected. These differential pressure gauges may be used to monitor the condition of the filters for maintenance purposes.

The differential pressure values below indicate the change-out value for the filters:

30% Pleated w/ Aluminum Pre-Filter 1.0" w.c.

When a filter gauge shows the maximum value listed above, the filter to which it's assigned should be changed. Operating the unit with dirty filters may reduce performance and/or damage the rotor. DO NOT operate the unit without filters. It is better to operate the unit with dirty filters than with no filters. Operating the unit with dirty filters or with no filters may void the warranty.

5.1.3 Voltage Sensor/ Phase Monitor

This unit may be equipped with either a voltage sensor or a phase monitor device. A voltage sensor (used on single phase units) causes control power to be interrupted in the event of low line voltage. A phase monitor (used on 3 phase units) causes control power to be interrupted in the event of an incorrect phase sequence, loss of a single phase, low voltage, or voltage unbalance. This ensures the protection of the unit motors. An automatic reset occurs when the fault condition is corrected. A LED on the device will illuminate to indicate that operating conditions are normal.

5.1.4 Emergency Stop

This unit may be equipped with an optional emergency stop push button switch mounted on the control panel. In an emergency the button may be pressed to disconnect power from the unit to cease operation. To restore control power, twist the switch button to release it and it will return to the normal position. If the unit is equipped with a main power circuit breaker, this must be re-set also.

NOTE: The emergency stop switch disconnects power from the unit contactors causing them to open. Main power is still present in the unit when the emergency stop switch is pressed.

5.1.5 Electrical Disconnect

This unit is equipped with “through the door” power disconnect located on the door of the electric box. The “**Power On**” light should illuminate white when the switch is in the “ON” position. The switch allows power to be removed during maintenance or service. The handle of the switch is equipped with a lockout feature to prevent unauthorized switch actuation during periods of service or maintenance. Use caution when servicing the unit. For wiring details, refer to the Electrical drawing provided with the unit.

WARNING Even with the disconnect switch in the “OFF” position, incoming power may still be “live” between the disconnect switch and the main power source. Power must be disconnected from the sources before servicing.

5.1.6 Spare Rotor Belt

This unit may be equipped with a spare rotor drive belt mounted to the rotor ring adjacent to the peripheral seal. This simplifies the belt removal and new belt installation steps that are discussed in the Repair Procedures section. To change belts, follow steps 1 – 4 of the Belt Removal Instructions in the Repair Procedures section. Cut the old belt to remove it or affix it to the rotor ring like the spare belt. Remove the clamp securing the spare belt and slide it over the rotor and onto rotor drive timing pulley. Restore tension by positioning the tensioner pulley on the belt.

5.1.7 Electrical Enclosure Heater

This unit may be equipped with an electrical enclosure heater to prevent damage to or malfunction of the controls. When the temperature in the control panel drops below a pre-determined

level, the heater will energize and when it rises above a pre-determined level, the heater will de-energize. For wiring detail, refer to the electrical drawing supplied with the unit.

5.1.8 Customer Contacts

This unit may be equipped with optional customer interface contact positions on terminal block TB3 located in the electrical enclosure. The contacts are utilized for remote monitoring and control purposes. Certain status contacts may operate together with assigned status indicator lights. For the wiring connections, refer to the Electrical drawing for this unit. Note: Refer to the Electrical drawing for specifics on the ratings of the contacts and for wiring details.

ROTOR ROTATION FAULT CONTACT

This contact closes when the unit determines that the rotor has not made a complete revolution within a specified period of time.

PROCESS BLOWER INTERLOCK CONTACT

This *dry* contact closes when the unit is turned on. It can be used to indicate unit operating status or to start and stop auxiliary equipment such as a circulating fan or condensing unit.

5.1.9 Auxiliary Control Terminals

This unit may be equipped with optional customer control interface positions on terminal blocks located in the electrical enclosure. The terminals are utilized for remote control and monitoring purposes. For the wiring connections, refer to the Electrical drawing for this unit.

REMOTE START STOP CONTACT

Terminal positions may be provided to connect a remotely operated, “Start/Stop” control device. It may be used to start and stop the unit independent of the systems controls when the mode selector switch is in the “Auto” position. When the circuit is closed the unit will start running; when opened the unit will stop running (after the purge cycle). The contact must be correctly sized to match the voltage and current requirements of the circuit. Refer to the Electrical drawing to determine the correct rating for the contact.

NOTE: The unit will not start if the maximum space humidity is below set point.

6.0 PREVENTIVE MAINTENANCE

Minimal periodic Preventive Maintenance Checks and Services (PMCS) are recommended to ensure utmost performance of the *DESICaIR* Series 2900 dehumidification unit. Routine maintenance can correct deficiencies before they can cause serious damage to the equipment and helps to ensure that the unit is ready for operation at all times.

A schedule for preventive maintenance inspection and service should be established immediately after installation of the unit. A system should be established to record any problems, defects, and deficiencies noted by operators and discovered during maintenance inspections, together with the corrective actions taken. Use copies of the Periodic General Maintenance Checklist in Appendix A to record maintenance inspections. For assistance, contact SATS Product Support Group.

The following lists the preventive maintenance checks and services that should be performed and the recommended intervals. When operating under extreme or unusual conditions, such as a very dusty or sandy environment, it may be necessary to reduce the maintenance intervals indicated. The schedule below assumes that your system is operating continuously.



WARNING Disconnect all power before performing any service or maintenance functions. Turning the unit selector switch (S15) to the "OFF" position DOES NOT disconnect power.

6.1 Monthly

- Check all electrical connections to ensure they are tight and not shorted to ground.
- Ensure the control panel lights are functional and not burned out. (Use "Press to Test" feature)
- Remove, clean, and/or replace the filters to ensure proper airflow through the unit. If your environment is exceptionally dusty or sandy, this may be required on a more frequent basis.
- Inspect the flame on gas units. It should be clean and blue as described in # 8 and 9 of Initial System Start-up for Gas-fired Units in the Gas Burner System Start-Up section.

- Check the rotor seals for wear and ensure the seals are touching the rotor face and rotor flange.
- Check the rotor drive belt for signs of abnormal wear.
- Check the blower belts (if applicable) for signs of abnormal wear.
- Lubricate motor bearings if necessary.
- Verify that pillow block bearing shaft set screws are tight.
- Check that shaft key, pulley and bearing lockdowns are tight.

6.2 Yearly

- Thoroughly clean the unit inside and out, making sure to remove any dust from fan blades and dirt buildup on rotor. (See 8.4, Rotor Cleaning.)

6.3 Desiccant Rotor Drive Motor Maintenance

A speed reducing gear motor is used to rotate the desiccant rotor. The gear motor bearings are pre-lubricated and do not require re-lubrication. Periodically inspect around the gear motor for dirt accumulations and remove by vacuuming. **Dirt accumulations can cause motor heating and a fire hazard.** Also observe the motor while operating for high motor current, unusual noises or vibration, overheating, worn or loose couplings and belts or loose mounting bolts

6.4 Blower Motor Maintenance

6.4.1 General Inspection

Inspect the blower motors at regular intervals (approximately every 550 hours of operation or every 3 months). Keep the motors clean and make sure the ventilation openings are clear. The steps listed below should be performed at each inspection.



WARNING Voltages used with this unit can be deadly. Use the services of a qualified electrician and/or technician to make the electrical power connections and perform maintenance.

1. Check that the motor is clean. Check to make sure the interior and exterior of the motor are

free of dirt, oil, grease, water, etc. because these things can accumulate and block motor ventilation. If the motor is not properly ventilated, overheating can occur and cause early motor failure.

2. Use a "Megger" periodically to ensure the integrity of the winding insulation has been maintained and record the readings. If there is a significant drop in insulation resistance, immediately investigate.
3. Ensure all electrical connections are tight.

6.4.2 Lubrication & Bearings

The lubricating ability of bearing grease depends primarily on the type of grease, the size of the bearing, the speed at which the bearing operates and the severity of the operating conditions. This lubricating ability can be lost over time.

For motors that require periodic service, the following recommended lubrication interval and procedure should be followed.

1. A high grade ball or roller bearing grease should be used. Several recommended greases for standard service conditions are Shell Dolium R (factory installed), Texaco Polystar, Amoco Rykon Premium #2 or Chevron SRI#2.
2. Lubrication should be performed at the recommended intervals shown in the table below. These recommended intervals are based on average use. See name plate on motor for frame size and rated speed.

NOTE: Some motors are provided permanently lubricated and will not require service for the lifetime of the equipment.

Table 1 - Lubrication Intervals

NEMA/IEC Frame Size	Rated Speed - RPM	
	3600	1800
Up to 210 incl. (132)	5500 Hrs.	12000 Hrs.
Over 210 to 280 incl. (180)	3600 Hrs.	9500 Hrs.
Over 280	2200 Hrs	7400 Hrs.

Table 2 - Service Conditions

Severity of Service	Ambient Temperature Maximum	Atmospheric Contamination	Type of Bearing
Standard	40°C	Clean, Little Corrosion	Deep Groove Ball Bearing
Severe	50°C	Moderate dirt, Corrosion	Ball Thrust, Roller
Extreme	>50°C* or Class H Insulation	Severe dirt, Abrasive dust, Corrosion	All Bearings
Low Temperature	<-30°C**		

*Special high temperature grease is recommended (Darmex 707).

**Special low temperature grease is recommended (Arrowshell 7).

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Table 3 - Lubrication Interval Multiplier

Severity of Service	Multiplier
Standard	1.0
Severe	0.5
Extreme	0.1

Table 4 - Bearing Sizes and Types

Frame Size NEMA (IEC)	Bearing Description (These are the "Large" bearings (shaft End) in each frame size)					
	Bearing	OD mm	Width mm	Weight of Grease to add oz (grams)	Volume of grease to be added	
					in ³	teaspoon
Up to 210 incl. (132)	6307	80	21	0.30 (8.4)	0.6	2.0
Over 210 to 280 incl. (180)	6311	120	29	0.61 (17.4)	1.2	3.9
Over 280	6313	140	33	0.81 (23.1)	1.5	5.2


Sample Lubrication Determination

Assume NEMA 286T (IEC 180), 1750 RPM motor driving an exhaust fan in an ambient temperature of 43°C and an atmosphere that is moderately corrosive.

1. Table 1 lists 9500 hrs for standard conditions.
2. Table 2 classifies severity of service as "Severe".
3. Table 3 lists a multiplier of 0.5 for severe conditions.
4. Table 4 shows 1.2 in³ or 3.9 teaspoons of grease to be added.

6.4.3 Lubrication Procedure

Be sure that the grease you are adding is compatible with the grease already in the motor. Consult the factory or the motor manufacturer if you are using a grease other than the recommended type.

 **CAUTION** To avoid damage to motor bearings, keep grease free of dirt. If you have an extremely dirty environment, contact the factory or the motor manufacturer for additional information.

1. Clean the grease fitting.
2. If motor has a grease outlet plug remove it.
3. If the motor is stopped, slowly add the recommended amount of grease. If the motor is to be greased while running, add a slightly greater quantity of grease.
4. Add grease slowly until new grease appears at shaft hole in the endplate or purge outlet plug.
5. Re-install grease outlet plug if removed.

7.0 TROUBLESHOOTING

The *DESICAir* dehumidifier is designed for continuous and dependable operation. A fault circuit and air proving switch is built into the reactivation air path to detect high reactivation air temperature.

The following guidelines are included to assist you in troubleshooting the dehumidifier due to operational or performance problems.

NOTE: The thermal overload safety could trip if the main power is disconnected from the unit while it is running. Before disconnecting main power, turn the dehumidifier mode selector switch to the OFF position and wait five (5) minutes until the reactivation time delay shuts off the reactivation blower.

Problem: Unit Does Not Run

If the dehumidifier is controlled by a remote device such as a humidistat, check this device before you check the dehumidifier itself.

In the AUTO mode:

1. Check remote humidistat or controller.
2. If this check-out does not solve the problem, then set the mode selector switch to the ON position. If the unit operates, the problem is related to the remote controller or the wiring between the controller and the dehumidifier.

In the ON mode:

1. Check power supply for correct voltage and phase.
2. Check wiring connections. Refer to the electrical diagram included in the appendices of this manual.
3. Check fuses and replace if necessary.
4. Check the motor thermal overloads or circuit controllers.

Problem: "Summary Fault" Lamp is Illuminated

A Summary Fault can indicate a number of fault conditions including a motor fault, high reactivation temperature condition, rotor rotation fault or air proving fault. To correct the fault condition, check that the airflows are sufficient (refer to "Monitoring Unit Performance"). Check that all filters are clean, check for obstructions in unit or ductwork and check the rotor drive belt.

Check the other status indicator lights and status contacts, if the unit is so equipped, for troubleshooting a specific fault. Refer to the other troubleshooting guidelines (i.e. High Reactivation Temperature Light On), for corrective action for fault condition(s) that are observed.

Problem: "High Reactivation Temperature" Light is Illuminated

Allow at least 10 seconds for the blowers to cool the unit and then press the Overheat Reset switch (S22). To prevent this problem from recurring, check that the reactivation air volume is sufficient. Refer to "Monitoring Unit Performance" for information on setting and verifying the correct airflow. Check that the filters are clean and unclogged, the rotor is not dirty, the dampers are in the proper position, and that the ductwork is not damaged.

Problem: Process Blower Does Not Turn, Yet "Unit On" Lamp is Illuminated

1. Check the thermal overload or circuit controllers.
2. Identify and correct cause of overload condition.
3. Reset if necessary.

In this case, amp draw exceeded the design condition. Check that the filters are clean and unclogged, that the damper is in the proper position, and that no other obstructions exist. Also check all wire connections to ensure they are tight and no shorts are present.

Problem: Reactivation Blower Does Not Turn, Yet "Unit On" Lamp is Illuminated

1. Check the thermal overload or circuit controllers.
2. Identify and correct cause of overload condition.
3. Reset if necessary.

In this case, amp draw exceeded the design condition. Check that the filters are clean and unclogged, that the damper is in the proper position, and that no other obstructions exist. Also check all wire connections to ensure they are tight and ensure no shorts are present.

Problem: Desiccant Rotor Does Not Turn

1. Check that the belt and tensioner are properly positioned.
2. Realign the belt or reset the tensioner.
3. Check the power supply to the rotor drive motor.
4. Check the primary and secondary fuses.
5. Check the seals for wear. If the surface is worn through, then increased drag will occur. This may cause increased power draw or too much torque for the motor.

NOTE: With D-Stat II capacity control, the reactivation blower and desiccant rotor do not run if humidity conditions are satisfied.

Problem: Burner Faults Continuously (Gas units only)

1. Check the manual valves in the gas line.
2. Purge all air out of the gas line supplying the dehumidifier.
3. Reset the flame safety relay (KR20), located in the main electrical enclosure.

Problem: Dehumidifier Performance is Reduced

This condition could indicate a problem with the dehumidifier or a change in moisture loads within the space which is being conditioned. Refer to the performance curves in Appendix B.

It is important that the power supply voltage and phase be correct and that the airflow rate be adjusted to the correct values.

1. To check the dehumidifier performance, take dry bulb and wet bulb temperature measurements upstream and downstream of the dehumidifier rotor in the process airstream. Convert the readings to dry bulb temperature and grains per pound. Compare the results to those indicated by the published performance curve. If the results are "on the curve" then the problem is not with the unit. In this case, analysis of the entire "system" of duct work and space, including any changes in moisture loads (occupancy etc.), is required.
2. Ensure the fans are rotating in the correct direction. If they are reversed, turn the unit off, allow for the cool down cycle, then disconnect main power and switch any two of the three power supply leads at the power distribution block located inside the electrical enclosure.
3. Check the process and reactivation airflows. See section 4.1.3, Monitoring Unit Performance.

The desiccant itself is designed for a ten (10) year life with little degradation over time (<10% over 10 years). However, improperly filtered air or oil-contaminated air can affect the capacity of the desiccant. If this is the case, performance may be restored by washing the rotor as described within the Repairs Section and of this manual.

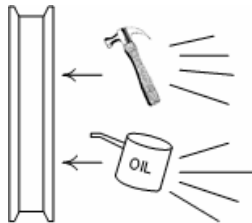
If the result of rechecking is unsatisfactory, call the DESICAiR Product Support Group.

8.0 REPAIR PROCEDURES

Under normal operating conditions and with the proper preventive maintenance, the unit should provide excellent service for many years. If necessary, the unit may be returned to the manufacturer or a suitably qualified depot for major overhaul and refurbishment. All work must be performed by qualified technicians and should include replacement of rotor, seals, motors, starters, contactors, bearings and other accessories as necessary.

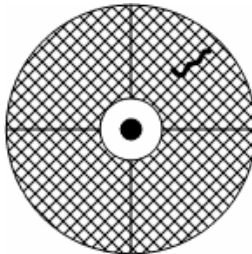
8.1 General Rotor Handling Guidelines

When performing maintenance on the rotor, please observe the following guidelines:



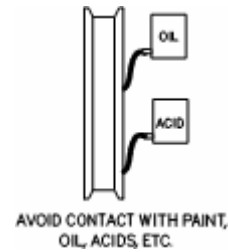
DO NOT STRIKE ROTOR

1. DO NOT strike the surface of the rotor or allow any objects to strike the surface which may cause damage to the shell and the fluted ceramic desiccant media.



DO NOT SCRATCH ROTOR

2. DO NOT allow the surface of the rotor to become scratched. Use caution around the rotor when working with any tools that could cause scratches to the surface.



AVOID CONTACT WITH PAINT, OIL, ACIDS, ETC.

3. DO NOT allow the rotor to come into contact with paint, oil, acids, etc.
4. DO NOT allow dirt, dust, or debris to settle into the rotor element. Follow rotor washing instructions if the rotor has been subjected to long periods of storage in extreme conditions.
5. DO NOT subject the rotor to vibration.

NOTE: If damage DOES occur to the face of the rotor, refer to the Rotor Repair Section or contact SATS's Product Support Group at (240) 529-1399 for repair assistance.

8.2 Belt Removal Instructions

The following instructions for removing and replacing a drive belt for the rotor are in sequential order. Do not skip or rearrange the steps listed below when replacing the belt. Refer to Figure 11 for details on the rotor assembly parts.

Before replacing the belt, read the instructions below. Make sure the tools listed below are available, that power has been disconnected, and the new belt is free from cracks, rips, tears, or other defects.

The following tools are necessary for the proper removal of the belt:

- Rubber mallet
- One large and one small phillips-head screwdriver
- One large, flat head-type screwdriver
- A utility (razor) knife
- One tube of RTV silicone sealant and a caulking gun
- Wrenches (box end or socket) 7/16", 9/16", 3/4" (avoid open-end wrenches because they can slip off the head or nut causing rotor damage)
- Flashlight
- Black permanent marker or scribe
- One 4 x 4 block of wood, 8-12" long
- One 2 x 4 piece of wood, 3-4" long

- A set of Allen wrenches
- A standard business card
- Wax paper sheet, approximately 1ft²

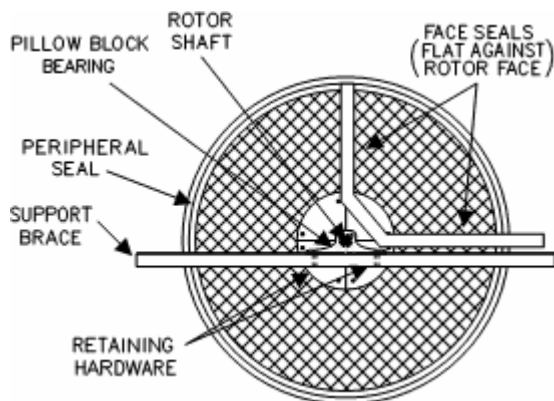


Figure 11 - Rotor Assembly Parts

8.2.1 Removing the Old Belt

1. Allow the reactivation blower and rotor to run for 5 or more minutes to remove residual heat from the unit. Then disconnect all power to the unit. Turning the mode selector switch to the "Off" position DOES NOT disconnect power to the unit. Do not attempt to change the belt if the rotor or reactivation portion of the unit is warm.
2. Open or remove the access panels around the rotor. Refer to the Installation drawing for the location of the correct access panels.
3. On the rotor cassette, remove the cover (held in place by Phillips head screws). Set the cover and screws aside.
4. Remove the belt from the tensioner (near the drive motor). Pull the arm of the tensioner towards you to release the tension, then slip the belt off the drive wheel of the motor. The belt should now hang free off of the rotor.
5. Next, using a phillips head screwdriver, remove and set aside the "hold down" cleats that secure the horizontal and vertical face seals on the reactivation outlet side of the rotor. Then locate the point where the vertical seal and the peripheral seal meet. This connection has been made using RTV silicone. Using a razor utility knife, CAREFULLY break the RTV bond only. Use caution to avoid cutting through the peripheral seal.
6. Remove the flat square panel covering the reactivation outlet duct. Locate the point where the horizontal seal and peripheral seal meet. Break the RTV bond for the horizontal face seal. You should now be able to slide the face seals past the surface of the rotor and remove them from the unit.
7. Using a permanent marker or scribe, mark the location of the pillow block bearings on the support brace. (Both sides of rotor.)
8. Locate the bearing collar on the side of the rotor that you removed the face seals from. The bearing collar is on the inside, between the rotor and the bearing. Loosen (DO NOT REMOVE) the two 1/8" Allen set screws that secure the rotor shaft, located 90° apart from each other on the collar.
9. Remove the two 3/8" bolts that hold the pillow block bearing on the support brace. On the opposite side of the rotor (heater side), loosen (DO NOT REMOVE) the two bolts that hold the pillow block bearing on the support brace.
10. Disconnect the wires from the rotor drive motor and remove the motor and tensioner assembly from the cabinet and set aside.
11. From the end of the cassette (where the motor was located), place a 4 x 4 block on the floor of the unit underneath the angled support attached to the edge of the rotor (Same side of the rotor that the pillow block bearing bolts were removed.)
12. Next, wedge a 2 x 4 between the 4 x 4 and the angled rotor edge support closest to the side that you removed the bearing bolts from. Make sure the 2 x 4 does not lift the rotor at the center away from the edge support or the rotor will become damaged. Apply leverage to raise the rotor shaft. Only raise the rotor enough to take the pressure off the shaft (no more than 1/8"). Raising it too high may damage the pillow block bearing or the rotor surface on the opposite side.
13. Secure the 2 x 4 by wedging it between the rotor support angle and the 4 x 4. Remove the pillow block bearing from the shaft.
14. Remove the old belt by working it past the peripheral seals and towards the rotor shaft (center of the rotor).
15. Once the entire belt is free of the rotor, slip it past the gap between the rotor shaft and the brace. Then discard the old belt.

8.2.2 Installing the New Belt

1. Work the new belt between the rotor shaft and the brace.
2. Next, work the belt past the inside peripheral seals until the belt is resting on the rotor. Make sure there are no twists in the belt.
3. Replace the pillow block bearing and tighten the set screws on the bearing collar. Then remove the 2 x 4 and 4 x 4 pieces of wood making sure the marks or scribes on the brace line up with those on the bearing.
4. Reinstall the bolts and tighten the pillow block bearings on the braces. (Both sides of rotor.) Reinstall the drive motor assembly.
5. Using your fingers or a non-metallic rounded object (like a pencil), work the peripheral seals of the rotor to return them to their original configuration so they provide a double barrier against mixing air streams. See Figure 9.
6. Reinstall the face seals reversing the procedure followed to remove them. Do not completely tighten the cleats at this time.
7. Using hand pressure, seat the face seals against the rotor (both horizontal and vertical). Using a standard business card, check the clearance between the face seals and rotor by sliding it between the seals and the rotor. There should be a slight drag. If not, use the rubber mallet and blade screwdriver to move the seal closer to the rotor. Place the tip of the screwdriver at the apex of the face seal bracket and tap the end of the screwdriver GENTLY with the rubber mallet. If the seal is too close to the rotor, excessive friction and wear will occur to the rotor and the seal.
8. Tighten the cleats on the face seals (both horizontal and vertical).
9. Seal the union between the face seals and the peripheral seal with RTV silicone. DO NOT GET RTV ON THE ROTOR. (Slip a piece of wax paper between the rotor and the area to be sealed to prevent RTV from sticking to the rotor surface.)
10. After applying the RTV silicone, allow it to set up to 3-4 hours (6-8 hours for excessively humid environments). Remove the wax paper used in step #9.

11. Replace the reactivation duct panel using the original fasteners and reseal the edges with RTV.
12. Place the new drive belt on the motor drive pulley making sure the belt is lined up on the rotor and the pulley.
13. Make sure all tools, silicone and equipment is removed from the unit then replace the access panels/doors.
14. When the unit returns to normal operational mode, observe the rotor making sure it turns freely and uninterrupted.

8.3 Replacing Seals

8.3.1 Removing Old Face Seals

1. Follow steps #1 to 6 for "Removing the Old Belt". (Skip step #4.)
2. Visually inspect the seals for cracks or worn areas. (Inlet side and outlet side of rotor.)
3. If seals are worn or cracked, they should be replaced.

NOTE: If the rotor seals are removed and replaced on one side, the seals on the opposite side should be replaced at the same time even if they don't appear worn or cracked.

8.3.2 Installing New Face Seals

1. Carefully slide the new rotor seals between the rotor surface and the mounting brace, taking care not to scratch the rotor surface.
2. Follow steps #6 to 11 for "Installing the New Belt".

8.3.3 Replacing Peripheral Seals

1. Follow steps #1 to 6 for "Removing the Old Belt". Perform the steps on both sides of rotor, first removing the face seals from each side.
2. Locate the point where the ends of the peripheral seals meet and using a razor knife, break the RTV silicone bond (both sides of rotor).
3. Working from one end of a peripheral seal, carefully slide it out of the gap between the

rotor and the mounting edge, removing it from the unit.

4. Repeat step #3 on the opposite side peripheral seal.
5. Install the new peripheral seals in the same manner in which the old ones were removed (Both sides of rotor).

NOTE: The narrow flap of the seal goes towards the center of the rotor, the wide flap goes towards the outer edge. (See Figure 12)

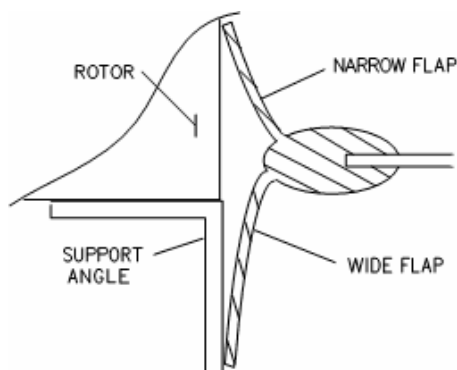


Figure 12 - Peripheral Seal, Edge View

6. Reattach the ends of the seals together with RTV silicone. **DO NOT GET RTV ON THE ROTOR.** (Slip a piece of wax paper between the rotor and the area to be sealed.)

8.4 Rotor Cleaning Instructions

Over time dirt accumulations may form on the surface of the rotor blocking the openings of the flutes. The rotor may require periodic cleaning to maintain peak performance. Dry accumulations can be removed from the surface of the rotor using a vacuum cleaner. Heavier accumulations may be removed by washing the rotor with clean water. If the desiccant wheel is continuously exposed to air containing oil laden vapors it may be necessary to wash the rotor with a solution of water mixed with a light, non-alkaline detergent.

The following procedure describes the steps required to wash the rotor. At least two (2) people are required to efficiently and safely clean the rotor. Required materials include:

- Plastic sheeting to protect internal electrical components;
- Dry vacuum
- Wet vacuum
- Wood block
- Hand-held spraying device (found at most hardware stores)
- Water/solution supply

8.4.1 Preparation

Operate the unit with the reactivation blower ON, the reactivation heater OFF, and the process blower OFF for two hours or until the entering and reactivation discharge air temperature is the same. Pre-cooling of the air stream is not necessary.

8.4.2 Unit Shut Down

1. Disconnect the power (turning the mode selector switch to the OFF position DOES NOT disconnect the power).
2. Remove the rotor service panels to allow access to the unit and the cassette.
3. Loosen the drive belt tensioner and allow the belt to drop free from the drive system.
4. Carefully cover the drive motor with plastic to prevent the water/solution from coming in contact with the drive motor.

8.4.3 Cleaning

1. Note the initial starting point. Using an industrial dry vacuum cleaner with a clean, soft bristle brush applicator, draw air through the rotor flutes into the vacuum. Vacuum the entire surface of the rotor. With one person operating the vacuum, the other person slowly rotates the rotor by pulling on the drive belt.
2. Dry vacuum for at least one full revolution of the rotor. Repeat this process for the other side of the rotor (if possible).
3. After dry vacuuming, stabilize the rotor by placing a wood block under the rotor near the drive motor to prevent rotation during washing.

NOTE: DO NOT blow air through the flutes as any particulate blown free would scatter through the work site.

4. Open the drain holes in the floor of the cabinet to allow the cleaning solution to flow out.

NOTE: Ensure that a means of collecting the cleaning solution for proper disposal is provided.

5. With the water/solution in the spraying device, flush the rotor through the lower section (process section).

NOTE: If using a detergent solution, thoroughly rinse the rotor with clean water after flushing with the solution.

6. Remove the wood block and rotate the wet part of the rotor 1/4 turn AWAY from the reactivation section of the cassette. Replace the wood block under the rotor.
7. Continue washing/rinsing the next section of the rotor. At the same time, wet vac the rotor at the upper section of the cassette. Then dry vac the same portion of the rotor. After dry vacuuming, remove the wood block and rotate the rotor in the same direction 1/4 turn. Begin washing/rinsing and vacuuming as before.
8. Continue this operation until the entire rotor has been washed, rinsed, and vacuumed.
9. When finished, use the wet/dry vac to remove any water from around the hub, spokes, and

flange areas. Spin/rotate the rotor to check for balance. An unbalanced rotor may indicate the need for more wet/dry vacuuming. Repeat the drying operations as necessary.

10. Drain, wet vac, and dry mop the bottom of the cabinet on both the upstream and downstream side of the rotor/cassette.
11. Remove the wood block, the plastic sheeting, and make sure the rotor turns freely and there is no moisture around the base of the drive motor.

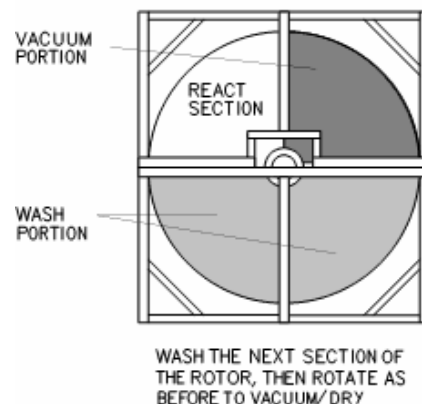
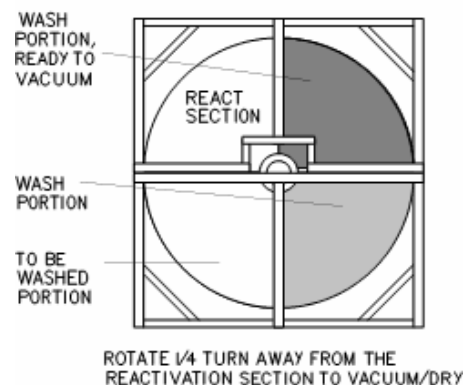
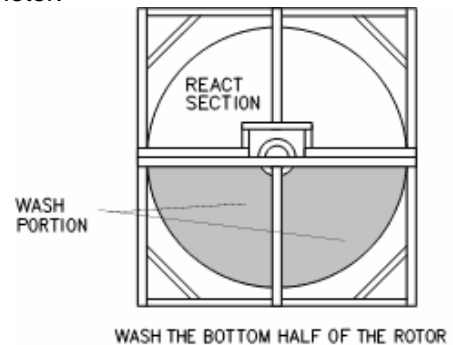


Figure 13 - Rotor Washing

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12. Align and reinstall the rotor drive belt and tensioner. Replace all service panels (making sure all tools/supplies are removed from unit first). Reconnect the power.
13. Operate the unit with the reactivation blower ON, the reactivation heater OFF and the process blower OFF for 60 minutes. Then resume normal unit operation.
14. After 6 hours, check the performance of the unit. If the process air discharge is excessively humid (greater than 10% of original performance), turn the process blower OFF and run the reactivation heater and blower for another 2 hours to "reactivate" the desiccant. If conditions still do not return to normal, consult the factory.

8.5 Rotor Repair

Minor repairs, such as rotor cracks, can be performed by service technicians when required. Materials needed include:

- Masking tape
- Small piece of stiff cardboard with flat edge
- 100% Silicone tube
- Caulking gun

NOTE: These instructions are for small cracks in the rotor surface. For large cracks or for information on replacing the rotor, contact SATS' Product Support Group at (240) 529-1399

1. Turn the unit OFF and disconnect the power. Remove the service panels to the unit.
2. Remove the belt from the rotor drive pulley so you can turn the rotor freely. Position the rotor so you have unobstructed access to the cracked portion of the rotor.
3. Apply masking tape to the face of the rotor on the right and left sides of the crack. Allow for about two "corrugations" on each side of the crack.
4. Apply 100% silicone to the crack, keeping the angled cut of the silicone tube parallel and very close to the surface of the rotor to ensure good penetration. Allow the silicon seal to extend ½" beyond the crack. For best results,

apply the silicone in an upward motion to push the silicone into the crack.

5. After applying the silicone, take the piece of cardboard, and at a 45 degree angle, drag the cardboard over the bead to press the silicone into the crack and make the surface of the silicone smooth and flush with the face of the rotor. This will further enhance the penetration of the silicone and will ensure that the silicone does not protrude above the surface of the rotor.
6. Immediately after pressing the silicone into the crack with the cardboard, remove the masking tape. This must be done before the silicone starts to cure, or "skin over".
7. Allow the silicone 24 hours to fully cure prior to running the unit. Should any questions or problems arise, contact SATS' Product Support Group at (240) 529-1399.

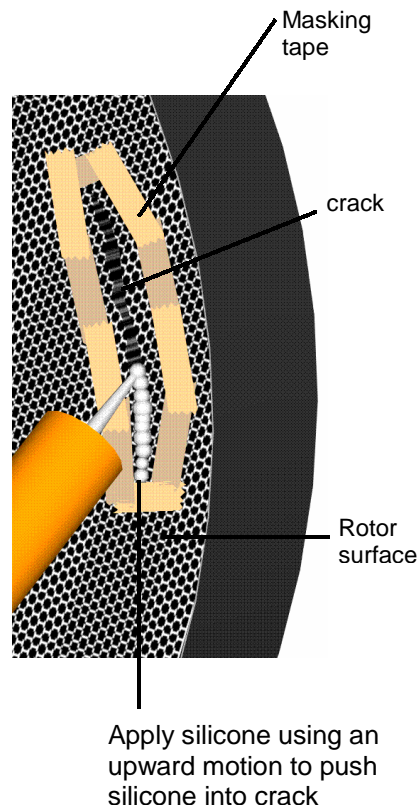


Figure 14 - Rotor Scratch Repair

9.0 RECOMMENDED SPARE PARTS

Selected spare parts are recommended to have on hand to help ensure minimal downtime for the unit. The following table lists the spare part descriptions and SATS part number by rotor size. To purchase any replacement part, contact SATS Product Support Group for additional information or to place an order.

Table 5 - Recommended Spare Parts List

PART DESCRIPTION	ROTOR DIAMETER				
	SATS PART #				
	055cm	077cm	106cm	122cm	152cm
Process Filter- Aluminum	FILCA2EKX	FILCA2EKX	FILCA2KPX	FILCA2GKX	FILCA2KKX
“ “ Pleated 30%	FILTP2EKX	FILTP2EKX	102890	FILTP2GKX	102897
Reactivation Filter- Aluminum	FILCA2CCX	FILCA2GKX	FILCA2KPX	FILCA2GKX	FILCA2GKX
“ “ Pleated 30%	FILTP2CCX	FILTP2GKX	102890	FILTP2GKX	FILTP2GKX
Control Panel Lamp- Red	← 137981 (Same Part # For All Models) →				
Control Panel Lamp- Green	← 137987 (Same Part # For All Models) →				
Control Panel Lamp- White	← 137977 (Same Part # For All Models) →				
Rotor Drive Belt	BELTBB77X	103553	BELTTBE0X	103554	BELTTGK1X
Cassette Seal Kit	103299	117839	117004	103305	103307

10.0 SATS PRODUCT SUPPORT GROUP

The SATS Product Support Group (PSG) is dedicated to the prompt reply and solution to any problem encountered with this unit. Should a problem develop that cannot be resolved using the Installation, Operation, and Maintenance manual, you may contact the PSG at (240) 529-1399 Monday through Friday from 8:00 a.m. to 5:00 p.m. If a problem occurs after business hours, dial the pager number (301) 414-4514 and follow the steps listed below:

1. Wait for the dial tone.
2. Dial your telephone number (including area code).
3. Press the pound (#) key.
4. Wait to hear the busy signal.
5. Hang up the phone.

One of our service technicians will return your call. When calling to obtain support, please have the following information readily available:

- SATS Job Number (found on unit name plate).
- Unit Serial Number (on unit name plate).
- Unit Model Number (on unit name plate).
- Description of problem.

10.1 Obtaining Warranty Parts

Warranty Parts inquiries are to be directed to SATS' Product Support Group (PSG) at (240) 529-1399 Monday - Friday from 8:00 a.m. to 5:00 p.m. **ORDERS MUST BE PLACED BY 2:00 p.m. FOR SAME DAY SHIPMENT.** So PSG can better service our customers, we request that the following information be available when claiming warranty items:

- Unit Serial Number and SATS Job Number.
- Complete description of possible defective part(s) and description of failure.
- Purchase Order for replacement part(s).
Invoice will be credited upon SATS' receipt of defective part only if received within 30 days of shipment. The purchase order must include the following information:
 - P.O. number
 - Date of order
 - SATS stated part price
 - Customer billing & "ship to" address
 - Customer's phone and fax numbers
 - Contact name

Unit serial number (found on name plate)
SATS job number (found on name plate)

When returning defective parts, please complete and include the "Returns Authorization Form" that is provided with the new/replacement part(s) received. Ensure that the RMA number is clearly marked on the outside of the packaging. Parts that do not have the warranty information will be returned.

Please note the following:

1. **Purchase Order Before Shipment** - For ALL warranty replacement parts, SATS requires that a written or faxed PO be sent before replacement parts are shipped. SATS shall credit the invoice for the replacement part upon receipt of the original defective part.
2. **Freight Handling Fees** - SATS' Standard Warranty terms include the shipping/freight handling cost for standard UPS Ground or Common Carrier shipping. This only applies to PSG shipping the parts to the field. Return shipping is the responsibility of the purchaser on the invoice.
3. **Special Delivery/Next Day** - Special delivery requests (e.g., Next Day Delivery) are NOT INCLUDED in SATS' Standard Warranty Terms. At the request of the customer, SATS will ship warranty items via Express Delivery; however, the customer will be invoiced for the additional shipping cost.
4. **Warranty of Replacement Parts** - As stated in our Standard Warranty, SATS warrants replacement warranty parts for a period of 90 days from shipment or for the remainder of the Standard 1-year warranty period, whichever is greater (e.g., if a replacement part is shipped 4 months into the unit's Standard 1-year warranty, the new replacement part is warranted for the term of your unit 1-year warranty, or 8 months).

For questions about these conditions, please contact SATS' PSG at (240) 529-1399.

Appendix A

Forms



1572 Tilco Drive
Frederick, Maryland USA 21704

DESICAIR PRODUCT DIVISION

Telephone: (301) 620-2033
Facsimile: (301) 620-1396

Appendix A- Forms

Checklist for Completed Installation

- | | |
|--|--|
| <input type="checkbox"/> 1 Proper clearances for service access have been maintained around equipment. | <input type="checkbox"/> 10 Customer supplied main power branch circuit protection device/ fuses have proper ratings for equipment installed. |
| <input type="checkbox"/> 2 Equipment is level and mounting fasteners (if applicable) are tight. | <input type="checkbox"/> 11 All control wiring completed according to applicable codes to wall mounted control panel, temperature/RH sensor transmitter, etc. (as applicable). |
| <input type="checkbox"/> 3 Foreign materials removed from inside and around equipment installed (shipping materials, blower lockdown bolts construction materials, tools, etc.). | <input type="checkbox"/> 12 Control Sensors (+/-) polarity wired correctly. |
| <input type="checkbox"/> 4 Blowers rotate freely without unusual noise. | <input type="checkbox"/> 13 All control wiring completed to terminal positions for customer control and monitoring lines. |
| <input type="checkbox"/> 5 Filter(s) installed (if required). | <input type="checkbox"/> 14 All wiring connections are tight. |
| <input type="checkbox"/> 6 Duct work installed and sealed against leaks | <input type="checkbox"/> 15 Steam piping, control valves, etc. installed (if required). |
| <input type="checkbox"/> 7 Air dampers installed in ductwork (if required). | <input type="checkbox"/> 16 All field installed piping leak tested. |
| <input type="checkbox"/> 8 Incoming line voltage matches equipment nominal nameplate rating \pm tolerances. | <input type="checkbox"/> 17 Gas inlet supply pressure matches nominal nameplate rating (if required). |
| <input type="checkbox"/> 9 Main power wiring connections to the equipment, including earth ground, have been properly installed according to applicable codes. | |

Name _____ Date _____

Company _____

SATS Model # _____ Job # _____



1572 Tilco Drive
Frederick, Maryland USA 21704

DESICAIR PRODUCT DIVISION

Telephone: (301) 620-2033
Facsimile: (301) 620-1396

Warranty Registration and Start-Up Checklist

Please fill out the following information and return to Stulz Air Technology System, Inc. (SATS) within 30 days so that your system can be registered for warranty purposes. Failure to register your system may affect your warranty status.

Installer's Name: _____	Owner's Name: _____
Company Name: _____	Company Name: _____
Street Address: _____	Street Address: _____
City, State, Zip: _____	City, State, Zip: _____

Model Number: _____	Item Number: _____	Serial Number: _____
---------------------	--------------------	----------------------

Has the Installation, Operation and maintenance Manual been supplied with the unit? ☐ YES ☐ NO
If not, when were you told you would receive it? _____

Receiving Inspection

Was the unit received in satisfactory condition? ☐ YES ☐ NO
If not, was the damage reported to the carrier? ☐ YES ☐ NO
If the unit was damaged in transit, who was the carrier? _____
Has the damage been reported to SATS? ☐ YES ☐ NO

Pre-Start Up Inspection

Read The Installation, Operation and Maintenance Manual Before You Do Anything Else!

With the **POWER OFF**:

- | | | | |
|---|---|------------------------------|-----------------------------|
| 1 | Is the unit firmly mounted and secured on the mounting surface? | <input type="checkbox"/> YES | <input type="checkbox"/> NO |
| 2 | Is all the wiring done in accordance with applicable codes? | <input type="checkbox"/> YES | <input type="checkbox"/> NO |
| 3 | Does the unit have an adequate ground? | <input type="checkbox"/> YES | <input type="checkbox"/> NO |
| 4 | Does the power servicing unit match the nameplate voltage? | <input type="checkbox"/> YES | <input type="checkbox"/> NO |
| 5 | Has field-installed piping been leak tested (if applicable)? | <input type="checkbox"/> YES | <input type="checkbox"/> NO |
| 6 | Are external Temp, RH or other control sensors wired with correct polarity? | <input type="checkbox"/> YES | <input type="checkbox"/> NO |

With the **POWER ON**:

- | | | | | |
|---|---|------------------------------|----------------------------------|---------------------|
| 1 | What is the voltage at main power terminal block? | Line #1 _____ Volts | Line #2 _____ Volts | Line #3 _____ Volts |
| 2 | What is the control voltage? | _____ Volts | | |
| 3 | Is the blower rotation correct? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | |
| 4 | Static Pressure | Rotor _____ "w.g. | Reactivation Rotor _____ "w.g. | Burner _____ "w.g. |
| | Gauge Readings: | *Process Filter _____ "w.g. | *Reactivation Filter _____ "w.g. | |
| | | *If applicable | | |

Name of person filling out this form: _____ Date: _____

(Use continuation Sheet)



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Frederick, Maryland USA 21704

DESICAIr PRODUCT DIVISION

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Warranty Registration and Start-Up Checklist (Cont)

Electrical Information

Fill in the current draw for the following components:

	Line #1	Line #2	Line #3
FLA	_____ Amps	_____ Amps	_____ Amps
Process Blower Motor	_____ Amps	_____ Amps	_____ Amps
Reactivation Blower Motor	_____ Amps	_____ Amps	_____ Amps
Rotor Drive Motor	_____ Amps	_____ Amps	_____ Amps
*Electric Reactivation Heater #1	_____ Amps	_____ Amps	_____ Amps
*Electric Reactivation Heater #2	_____ Amps	_____ Amps	_____ Amps
*Electric Reactivation Heater #3	_____ Amps	_____ Amps	_____ Amps
*Electric Reactivation Heater #4	_____ Amps	_____ Amps	_____ Amps

*If Applicable

Gas Reactivation Operating Information (If Applicable)

Type	<input type="checkbox"/> Natural	<input type="checkbox"/> LP	Inlet Air Temperature	Outlet Air Temperature
Gas Inlet Pressure:	_____ In w.c.		_____ °F Dry Bulb	_____ °F Dry Bulb
Modulation Output Signal	_____ mA		_____ °F Wet Bulb	_____ °F Wet Bulb
Any adjustments made? _____				

Steam Operating Information (If Applicable)

Inlet Pressure:	_____ PSIG	Inlet Air Temperature	Outlet Air Temperature
Modulation Output Signal	_____ mA	_____ °F Dry Bulb	_____ °F Dry Bulb
		_____ °F Wet Bulb	_____ °F Wet Bulb
Any adjustments made? _____			



1572 Tilco Drive
Frederick, Maryland USA 21704

DESICAIr PRODUCT DIVISION

Telephone: (301) 620-2033
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Periodic General Maintenance Checks and Services Checklist

Date: _____ Prepared By: _____
Model Number: _____ Serial Number: _____
Item Number: _____

Monthly

<u>Filters</u>	<u>Rotor</u>	<u>Reactivation Heater</u>
<input type="checkbox"/> Cleanliness	<input type="checkbox"/> Check Condition of Rotor Face	<input type="checkbox"/> Inspect Flame (Gas Units)
<input type="checkbox"/> No Obstructions	<input type="checkbox"/> Check Condition of Seals	<input type="checkbox"/> Inspect For Leaks (Steam Units)
<u>Miscellaneous</u>		
<input type="checkbox"/> Check and Tighten Loose Fasteners		
<input type="checkbox"/> Check Condition of Belts		
<input type="checkbox"/> Check Pressure Drop Readings on Gauges		
<input type="checkbox"/> Check Steam Lines for Air (bleed as required)		
<input type="checkbox"/> Status Indicator Lights "Press to Test" Feature Operates Properly (Should Illuminate When Pressed)		

Quarter-Annually

<input type="checkbox"/> Tighten Electrical Connections	<input type="checkbox"/> Check Motors, Lubricate Per Maintenance Schedule
<input type="checkbox"/> Check Contacts on Contactors for Pitting	<input type="checkbox"/> Check Gas/Steam Pressure Per Unit Name Plate
<input type="checkbox"/> Clean Unit as Necessary	<input type="checkbox"/> Clean Strainers as Necessary (Steam Units)
<input type="checkbox"/> Check Motor Amps Per Unit Name Plate	<input type="checkbox"/> Clean Coils as Necessary

Annually

<input type="checkbox"/> Conduct a Complete Check of All Services Listed Above and Clean Unit's Interior
<input type="checkbox"/> Inspect Wiring For Fraying, Discoloration
<input type="checkbox"/> Inspect Piping System for Leaks and Corrosion (If Applicable)

Notes: _____

Signature: _____

*** If factory assistance is required for any reason, provide the model number, serial number and SATS item number found on the unit nameplate. This will speed the process and insure accuracy of information. ***



1572 Tilco Drive
Frederick, Maryland USA 21704

DESICAir PRODUCT DIVISION

Telephone: (301) 620-2033
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Parts Inquiry Form – Stock Parts Today

Date: _____

Please

Check One:

- ☐ Quote for below parts
☐ Unit Specific Priced Parts List
☐ Purchase Order _____

Bill To:		Ship To:	
Phone:		Tag:	
Fax:		Attn:	
FOB Point Frederick, MD	Ship Via: (Check One) (prepay & add) <input type="checkbox"/> Next Day <input type="checkbox"/> 2 nd Day <input type="checkbox"/> 3 rd Day <input type="checkbox"/> UPS Ground	Payment Details: (Check One) <input type="checkbox"/> Terms with SATS <input type="checkbox"/> COD <input type="checkbox"/> Credit Card (fill in below) Card Type: <input type="checkbox"/> VISA <input type="checkbox"/> Mastercard CC# _____ Expiration Date: _____ Card Holder's Name: _____	Unit Information: (Mandatory) SATS Model No.: _____ SATS Item No.: _____ SATS Serial No.: _____

Please fill below recommended parts to stock. Fill in quantity column. SATS will complete remaining columns.

Part Description	Quantity	SATS Part No.	Avail:	Unit Price	Total Price

Prices are subject to change in 30 days

Prices do not include shipping charges

Prices do not include labor or installation

Authorized Signature (Please Print Name Also)

Appendix B

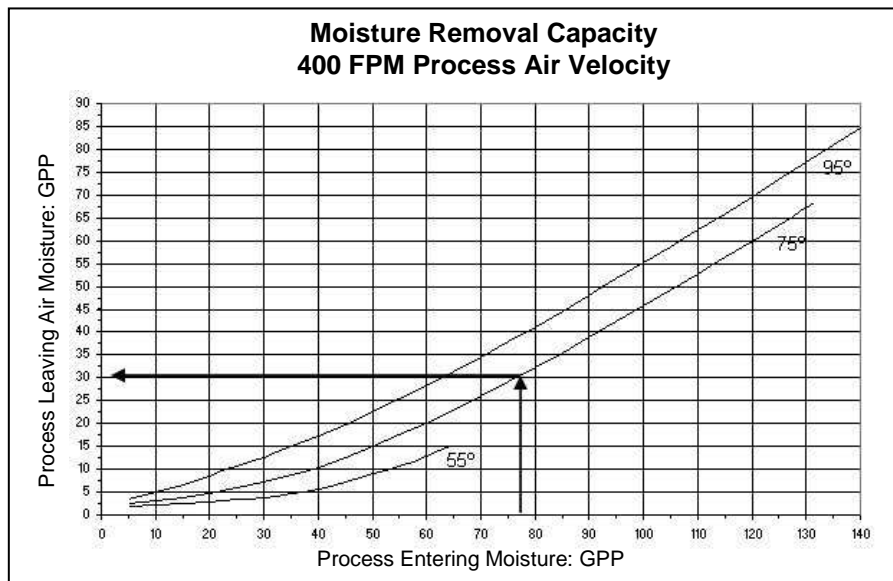
Unit Performance Curves

Note: Unit Performance Curves are for reference only. Refer to the Technical Data Sheet for specific unit performance.

Performance for 400FPM Rotor Face Velocity

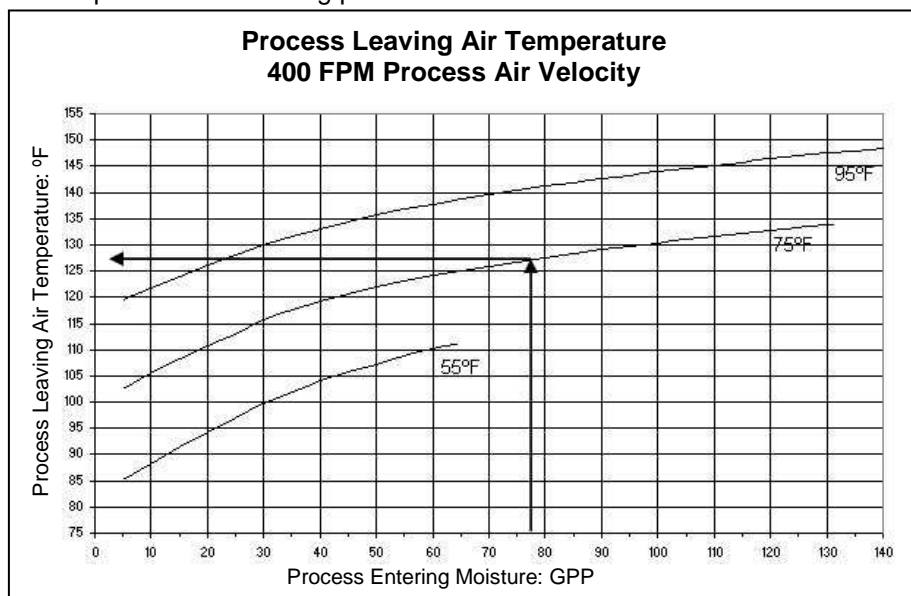
Grains Per Pound (GPP)

1. Enter the Performance Chart from the X-axis at the entering process air moisture in grains per pound (GPP).
2. Move vertically in a straight line to intersect the curve closest to the entering air temperature. Interpolate as required.
3. Move horizontally to the left and intersect the Y-axis. This point represents the leaving process air moisture from the dehumidifier in GPP



Leaving Temperature

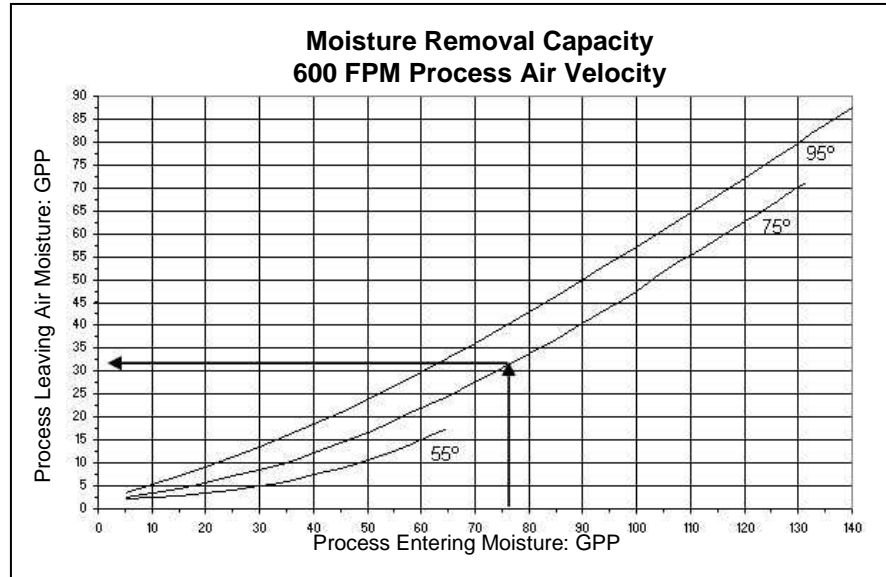
1. Enter the Performance Chart from the X-axis at the entering process air moisture in grains per pound (GPP).
2. Move vertically in a straight line to intersect the curve closest to the entering air temperature. Interpolate as required.
3. Move horizontally to the left and intersect the Y-axis. This point represents the leaving process air moisture from the dehumidifier in °F.



NOTE: Process air outlet temperatures as shown are maximum values at standard full rated heater output. The actual process outlet air temperature will be lower when the heater output is below full rated output. This condition will occur during heater modulation cycles due to partial loading of the dehumidifier.

Performance for 600 FPM Rotor Face Velocity Grains Per Pound (GPP)

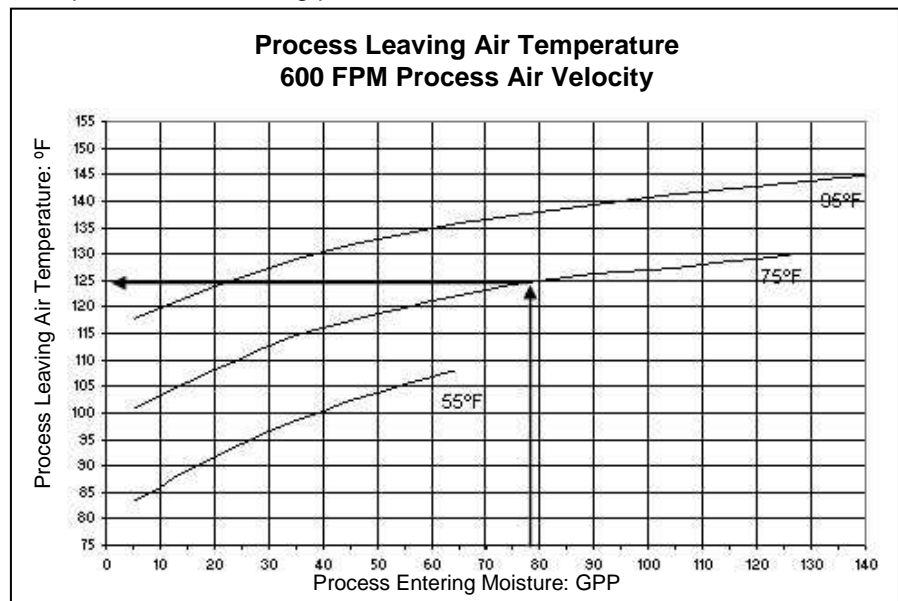
1. Enter the Performance Chart from the X-axis at the entering process air moisture in grains per pound (GPP).
2. Move vertically in a straight line to intersect the curve closest to the entering air temperature. Interpolate as required.
3. Move horizontally to the left and intersect the Y-axis. This point represents the leaving process air moisture from the dehumidifier in GPP.



NOTE: Process air outlet temperatures as shown are maximum values at standard full rated heater output. The actual process outlet air temperature will be lower when the heater output is below full rated output. This condition will occur during heater modulation cycles due to partial loading of the dehumidifier.

Leaving Temperature

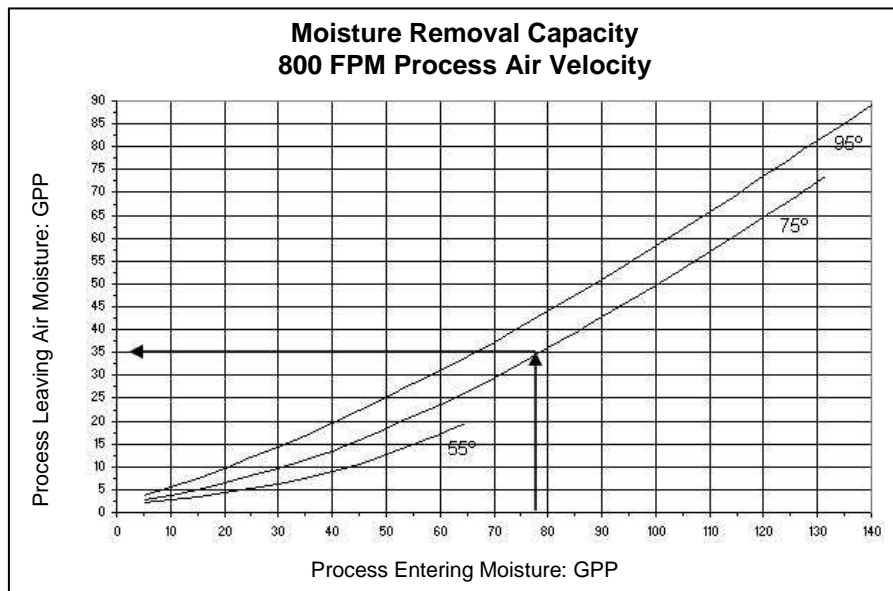
1. Enter the Performance Chart from the X-axis at the entering process air moisture in grains per pound (GPP).
2. Move vertically in a straight line to intersect the curve closest to the entering air temperature. Interpolate as required.
3. Move horizontally to the left and intersect the Y-axis. This point represents the leaving process air moisture from the dehumidifier in °F.



Performance for 800 FPM Rotor Face Velocity

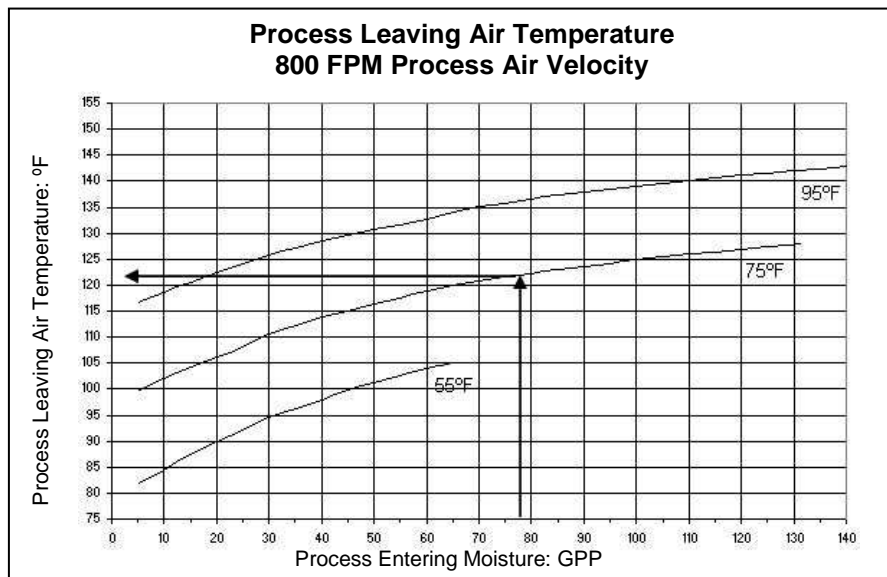
Grains Per Pound (GPP)

1. Enter the Performance Chart from the X-axis at the entering process air moisture in grains per pound (GPP).
2. Move vertically in a straight line to intersect the curve closest to the entering air temperature. Interpolate as required.
3. Move horizontally to the left and intersect the Y-axis. This point represents the leaving process air moisture from the dehumidifier in GPP



Leaving Temperature

1. Enter the Performance Chart from the X-axis at the entering process air moisture in grains per pound (GPP).
2. Move vertically in a straight line to intersect the curve closest to the entering air temperature. Interpolate as required.
3. Move horizontally to the left and intersect the Y-axis. This point represents the leaving process air moisture from the dehumidifier in °F.



NOTE: Process air outlet temperatures as shown are maximum values at standard full rated heater output. The actual process air outlet temperature will be lower when the heater output is below full rated output. This condition will occur during heater modulation cycles due to partial loading of the dehumidifier.

[illegible]

APPENDIX C-GLOSSARY**Terms and Abbreviations**

Absorb	Penetration of Vapor Molecules Into the Molecular Structure of Another Substance	In. w.g.	Inches of Water Gauge
Adsorb	Attraction of Vapor Molecules to the Surface of Another Substance	KVA	Kilo-VoltAmp (One Thousand Volt Amps)
BTU/Hr	British Thermal Units Per Hour	KW	Kilo-Watts (One Thousand Watts)
CFM	Cubic Feet Per Minute	LRA	Locked Rotor Amps
D-STAT™	Cycles Dehumidifier On & Off To Maintain Relative Humidity	MFS	Maximum Fuse Size
Desorb	Removal of Absorbed or Adsorbed Vapor Molecules	MSDS	Material Safety Data Sheet
Dew Point	Temperature At Which Humid Air Becomes 100% Saturated	MCA	Minimum Circuit Ampacity
Dry Bulb	Temperature of Air As Measured By a Thermometer.	NEC	National Electric Code
°F	Degrees Fahrenheit	PH	Phase
FLA	Full Load Amperage	PSG	Product Support Group
FOB	Freight On Board	PSI	Pounds per Square Inch
GPP	Grains Per Pound	PSIG	Pounds Per Square Inch Gauge
HP	Horse Power	RH	Relative Humidity
Hz	Hertz (Frequency)	SATS	Stulz Air Technology Systems, Inc
In. w.c.	Inches of Water Column	VAC	Voltage, Alternating Current
		Wet Bulb	Temperature of air as sensed by thermometer with a water saturated wick over the bulb.



SATS

Globally Close To You

Stulz-ATS, located in Frederick, MD USA, is part of The STULZ Group with headquarters in Hamburg, Germany and production facilities world wide. Our network of manufacturer's representatives and sales partners span the globe, providing innovative solutions to your unique environmental control need

North American Headquarters



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