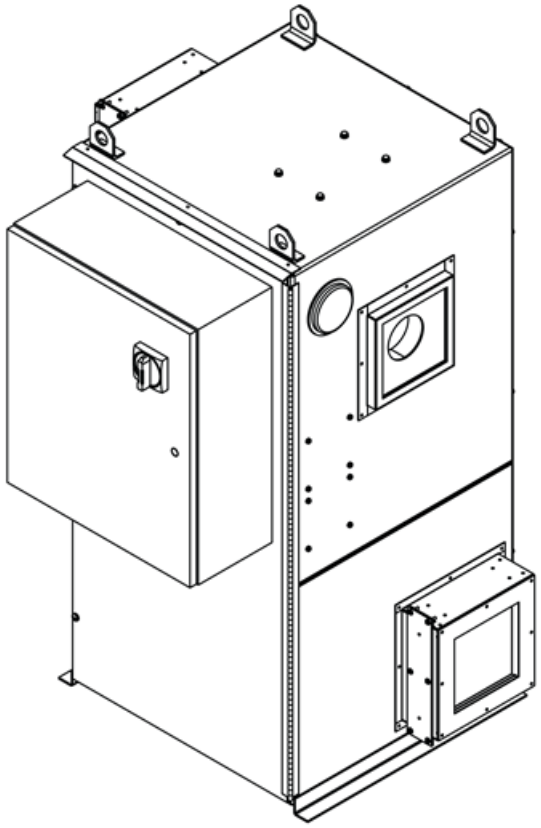
STULZ

CLIMATE. CUSTOMIZED.



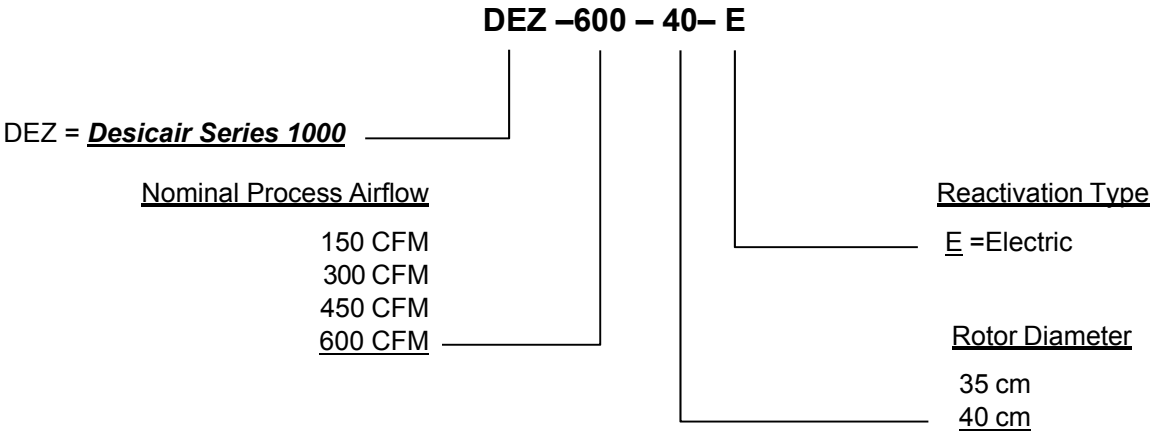
STULZ Desicair

DEZ Series 1000
Desiccant Dehumidification System

Installation, Operation and Maintenance Manual

MODEL NOMENCLATURE

DESICAiR Product Identification Number Example



Notice

Stulz Air Technology Systems, Inc.
1572 Tilco Drive
Frederick, MD 21704
USA

Table of Contents

1.0 GENERAL INFORMATION 1
1.1 About this Manual 1
1.2 Introduction 1
1.2.1 Technical Data Package 1
1.2.2 Dehumidifier Identification Number 1
1.2.3 Unit Nameplate 3
1.3 Safety 3
1.3.1 Warnings and Cautions 3
1.4 Theory of Operation 4
1.5 Construction 5
1.5.1 Design Features 5
1.5.2 Cabinet 5
1.5.3 Inlets and Outlets 6

2.0 INSTALLATION 7
2.1 Receipt of Unit 7
2.2 Rigging 7
2.3 System Location and Clearance 7
2.4 Connecting Ductwork 7
2.5 Utility Connections 8
2.6 Installing a Humidistat or Relative Humidity Transmitter 8

3.0 OPERATION 9
3.1 Installation Checks 9
3.2 Start Up 9
3.3 Reactivation Heater Controller 10
3.4 Capacity Control 10
3.4.1 D-Stat 10
3.4.2 H-Trac 10
3.4.3 Dew-Trac 10
3.4.4 C-Trol II 10
3.4.5 Proportional Reactivation Controls (H-Trac or Dew-Trac) 11
3.5 Control Panel 11
3.5.1 Mode Selector Switch 12
3.5.2 Hour Meter 12
3.5.3 Control Panel Lights 12
3.5.4 Optional Fault Indication Lights 12
3.6 Monitoring Unit Performance 13

4.0 UNIT FEATURES 14
4.1 Control Sensor Terminals 14
4.2 Remote Start/Stop Contact 14
4.3 Optional Customer Contacts 14
4.4 Sensor Retransmit Terminals 14
4.5 Electrical Disconnect 14
4.6 Emergency Stop 15
4.7 Dampers 15
4.8 Filter Status 15
4.9 Voltage Sensor/Phase Monitor 15
4.10 Process Air Proving 15
4.11 E2 Controller and Display 15

5.0 PREVENTIVE MAINTENANCE 16
5.1 Monthly 16
5.2 Yearly 16
5.3 Desiccant Rotor Drive Motor Maintenance 16
5.4 Blower Motor Maintenance 16
5.4.1 General Inspection 16
5.4.2 Lubrication & Bearings 17
5.4.3 Lubrication Procedure 18

6.0 TROUBLESHOOTING 19

7.0 REPAIR PROCEDURES 21
7.1 Rotor Handling Guidelines 21
7.2 Replacing the Rotor Drive Belt 21
7.2.1 Removing the Old Belt 22
7.2.2 Installing the New Belt 22
7.3 Removing the Rotor 22
7.4 Replacing Seals 22
7.4.1 Removing Old Seals 22
7.4.2 Installing New Seals 23
7.5 Washing the Rotor 23
7.5.1 Cleaning 23
7.6 Repairing the Rotor 23

8.0 PRODUCT SUPPORT 25
8.1 Technical Support 25
8.2 Obtaining Warranty Parts 25
8.3 Obtaining Spare/Replacement Parts 25

Appendix A
Installation Checklist A-1
Maintenance & Service Checklist A-2

Appendix B
Unit Performance Curves B-1

Appendix C
Glossary C-1

Figures

Figure 1 - Sample Nameplate....3
Figure 2 - General Theory of Operation Diagram....5
Figure 3 - Locating a Wall Mounted Control Sensor....8
Figure 4 - Proportional (Trac) Control Diagram....11
Figure 5 - Sample Non-E^2 Control Panel Layout....12
Figure 6 - Sample E^2 Control Panel Layout....12
Figure 7 - Differential Pressure Gauges....13
Figure 8 - E^2 Controller and Display....15
Figure 9 - Overheat Safety Switch....19
Figure 10 - Rotor Assembly Parts....22
Figure 11 - Rotor Scratch Repair....24

Tables

Table 1 - Blower Motor Lubrication Intervals....17
Table 2 - Service Conditions....17
Table 3 - Lubrication Interval Multiplier....17
Table 4 - Bearing Sizes and Types....18

1.0 GENERAL INFORMATION

1.1 About this Manual

This manual provides installation, operation, and maintenance information for the STULZ DESICAiR® DEZ Series 1000 dehumidification system. The DEZ system has several standard options which are covered in this manual. The exact configuration of your system is reflected in the Engineering drawings provided in the Technical Data Package shipped with your system. It is also described in the Dehumidifier Identification Number (DIN) sheet and other submittal package documents for your system. You can use these documents to determine the sections of this manual that are relevant to your system.

1.2 Introduction

The DEZ Series 1000 dehumidification system is designed and manufactured by Stulz Air Technology Systems, Inc. (STULZ) utilizing the latest, state-of-the-art control technology. Recognized as a world leader, STULZ provides dehumidification systems manufactured with the highest quality craftsmanship and materials. The unit will provide years of trouble free service if it is installed, operated and maintained as described in this manual. Damage to the unit from improper installation, operation or maintenance is not covered by the warranty.

Study the instructions in this manual; they must be followed to avoid difficulties. Spare parts are available from STULZ to ensure continuous operation. Using substitute parts or bypassing electrical or other components in order to continue operation is not recommended and will void the warranty.

1.2.1 Technical Data Package

This manual is part of the Technical Data Package provided with your unit. The Technical Data Package typically includes drawings, Technical Data Sheets, a Flow Diagram, a Test Report and component part manufacturer's manuals containing additional information about significant components. The Technical Data Package may also contain related STULZ manuals (for example, a system controller manual). These documents should be stored in a safe place on or near the unit for reference.

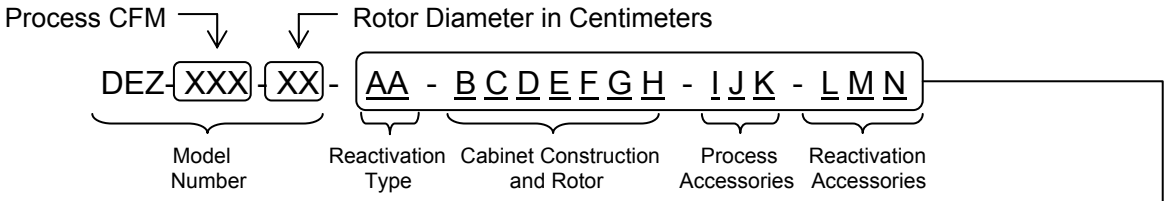
A Warranty Registration and Start-up Checklist form is also included in the Technical Data Package. This form must be completed during installation and returned to STULZ Product Support to activate your warranty.

1.2.2 Dehumidifier Identification Number

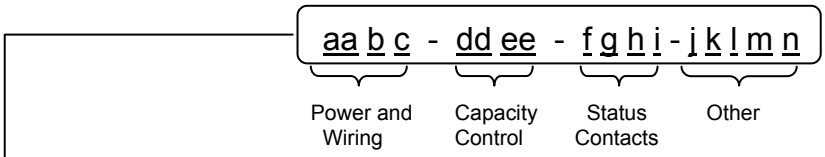
The Dehumidifier Identification Number (DIN) defines specific features that are provided with your unit (see section 1.2.2.1). The DIN Sheet for this unit is included for reference in the unit Technical Data Package. The Technical Data Package also contains a technical data sheet, a test report (showing performance information), drawings and this manual. A manual for the system controller is also provided under separate cover. These documents should be stored in a safe place on or near the unit for reference.

1.2.2.1 Dehumidifier Identification Number (DIN) Sheet

The DIN starts with the model number. The DEZ model number includes the nominal process CFM followed by the desiccant rotor diameter. (ex: DEZ-600-40). The first 15 digits after the model number (represented by the uppercase letters A–N below) pertain to the cabinet construction, rotor type, and process and reactivation accessories or options.



The last 17 digits (represented by the lowercase letters a-n below) pertain to the electrical system, unit controls, control scheme and control panel features.



The following is a sample DIN Sheet for a DESICAiR DEZ Series 1000 Desiccant Dehumidifier:

DESICAiR DEHUMIDIFIER SPECIFICATION REVIEW

Date:

DEHUMIDIFIER IDENTIFICATION NUMBER

DEZ-600-40-01-101011-0411-331-041-00100-0011-00011

Project File Name:

Cabinet construction, rotor, process and reactivation assemblies:

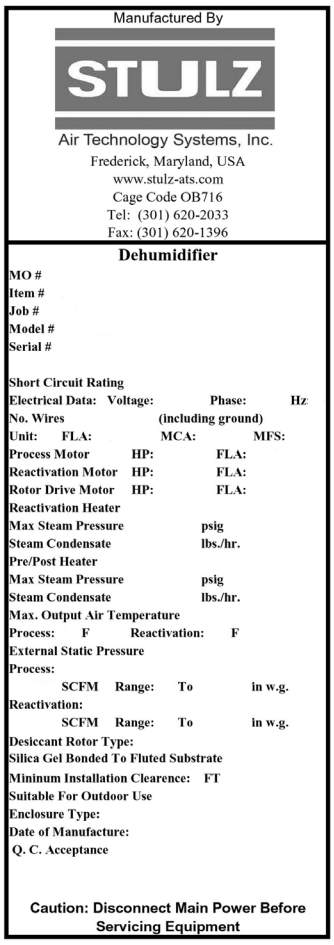
A - 01	Reactivation Heater:	Electric
B - 1	Cabinet Construction:	Standard: (Outdoor rated)
C - 0	Insulation:	None (Standard)
D - 1	Paint:	Standard (Gray)
E - 0	Lifting Lugs (Eyes):	No
F - 1	Process & React Filters:	Aluminum roughing (1 inch thick)
G - 1	Gauges:	Magnahelic (Ambient > 20 F)
H - 0	Rotor:	Standard
I - 4	Process Inlet:	Flange
J - 1	Process Outlet:	Round flex (std. dia. w/bead)
K - 1	Process Damper:	Yes
L - 3	Reactivation Inlet:	Weather louver
M - 3	Reactivation Outlet:	Weather hood w/screen
N - 1	Reactivation Damper:	Standard: Internal

Electrical system, power supply, control scheme, and control panel:

a - 04	Power Supply:	208/3/60
b - 1	Elect. Encl. & Wiring Practice:	STD: NEMA-4, Liquid Tight conduit
c - 0	Disconnect:	None
d - 01	Capacity Control:	D-Stat
e - 00	Sensor/Transmitter:	By others
f - 0	Start/Stop Dry Contact:	No
g - 0	Dirty Filter Contact:	No
h - 1	Process Air Proving Contact:	Yes
i - 1	React Air Proving Contact:	Yes
j - 0	Phase Monitor:	No
k - 0	Emergency STOP P-button:	No
l - 0	Retransmit Sensor Value:	No
m - 1	Summary Fault Contact:	Contact and light
n - 1	Rotor Rotation Detection:	Rotation Detection Light and Contact

1.2.3 Unit Nameplate

The Unit Nameplate, located on the front or side of the unit, is a quick source for useful information about your system, such as the unit model number, serial number and specific STULZ job number (see Figure 1 for an example). This data will be required if you contact STULZ for assistance, warranty information, or spare parts. The Unit Nameplate also includes the process and reactivation airflow targets, along with their corresponding rotor pressure drops.


Manufactured By

STULZ

Air Technology Systems, Inc.
Frederick, Maryland, USA
www.stulz-ats.com
Cage Code OB716
Tel: (301) 620-2033
Fax: (301) 620-1396

Dehumidifier

MO #
Item #
Job #
Model #
Serial #

Short Circuit Rating
Electrical Data: Voltage: Phase: Hz
No. Wires (including ground)
Unit: FLA: MCA: MFS:
Process Motor HP: FLA:
Reactivation Motor HP: FLA:
Rotor Drive Motor HP: FLA:
Reactivation Heater
Max Steam Pressure psig
Steam Condensate lbs./hr.
Pre/Post Heater
Max Steam Pressure psig
Steam Condensate lbs./hr.
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
Mininum Installation Clearence: FT
Suitable For Outdoor Use
Enclosure Type:
Date of Manufacture:
Q. C. Acceptance

Caution: Disconnect Main Power Before Servicing Equipment

Figure 1 - Sample Nameplate

1.3 Safety

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 main 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 working on or near ESD-sensitive components, use a wrist grounding strap if possible.

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 manufacturer's Safety Data Sheet (SDS) prior to handling any of these materials.

1.3.1 Warnings and Cautions

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

Prior to using any chemicals, cleansers, or solvents, refer to the manufacturers Safety Data Sheets (SDS) for proper handling and usage of such materials.


WARNING **Voltages used with this unit can be deadly. Be careful not to contact high AC 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 main power to the unit before 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 both familiar with the operation and hazards of the equipment and competent to administer 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 in this manual or on drawings or documents in the Technical Data Package. Electrical voltages as low as 50 volts can cause death under certain conditions.

WARNING Multiple power sources may be used in the unit. Ensure power is disconnected from all sources before servicing powered components.

WARNING Do not touch hot system components. The design reactivation temperature range is 250–300 °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 or near them.

WARNING Unless otherwise specifically instructed, do not operate the equipment without all grilles, guards, louvers and covers in place and tightly secured. When instructed to operate without a grille, guard, louver or cover in place, do so with care.

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 while it's 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.

CAUTION Ensure that the dehumidifier is properly phased. Improper phasing can cause severe damage to the equipment.

CAUTION Air intake and discharge openings must be completely free of obstructions. Ensure panels are on and properly secured into position.

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

1.4 Theory of Operation

The DEZ Series 1000 dehumidification system is designed to dehumidify a space to a level below that attainable with a refrigeration-based dehumidification system. Moisture is removed from the air by being passed through a desiccant wheel (called the "rotor") that is impregnated with a dry desiccant. Process air (the air being dehumidified) is filtered, dehumidified and supplied to a conditioned space at a lower relative humidity and a slightly higher dry bulb temperature than its inlet condition.

Simultaneously, a second airstream (reactivation air) is filtered and heated by a reactivation heater system, then passed through a separate segment of the rotor. This heated reactivation air removes the previously adsorbed moisture from the desiccant rotor and exhausts it to an area other than that being conditioned. During operation, the desiccant rotor rotates through the process and reactivation airstreams of the dehumidifier at a constant speed. The two airstreams are separated by face and peripheral seals and by internal fluting in the desiccant rotor. Process and reactivation airstreams are counter-flow to maximize the efficiency of the adsorption process and to help prevent the rotor's flutes from fouling.

The reactivation heater is sized to raise the temperature of the reactivation air entering the desiccant rotor approximately 180 ºF above ambient (depending upon moisture adsorbed from the process air and reactivation airflows). The energy from the heated reactivation air is used to desorb the moisture. Reactivation discharge air temperature will vary and can be as high as 150 ºF and moist. Controls are included in the unit to vary reactivation heat based upon the amount of moisture adsorbed from the process airstream.

Electric heat is generated by a heater controlled by an SSR (solid state relay) or SCR (silicon controlled rectifier). The SSR cycles the heater on and off based on signals received from the system controller to maintain the reactivation discharge air temperature. An SCR also receives controller signals, but modulates the percentage of heater output energy (as opposed to turning the heater on and off) for tighter temperature control.

There may be more than one heater bank depending upon the output required. Refer to the Electrical drawing and technical data sheet for more detail.

NOTE: The reactivation air temperatures mentioned in the preceding discussion may vary between DEZ systems. See the Technical Data Sheet for your unit for target temperatures.

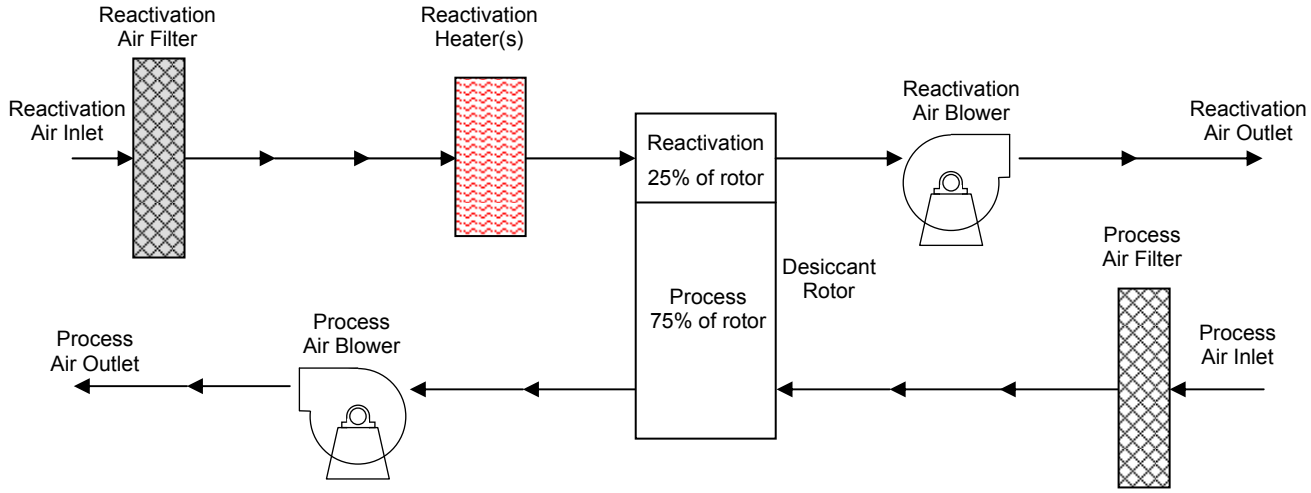


Figure 2 - General Theory of Operation Diagram

1.5 Construction

This desiccant dehumidifier was manufactured by STULZ and has passed all Quality Control checks, including a complete functional testing. Every effort has been made to ensure the dehumidification system will perform satisfactorily for many years.

1.5.1 Design Features

- Rugged All-Aluminum Cabinet
- Continuous or Automatic Operation
- Inert, Stable Silica Gel Desiccant
- Non-toxic, Non-corrosive Desiccant
- Capable of Withstanding 100% RH Without Adverse Effect
- Counterflow Process and Reactivation Air Patterns
- Overheat Safety Protection
- Electric Reactivation Heat
- Easy Access to Internal Components
- Low Operating Cost, Energy Efficient Dehumidification
- Optional Process and Reactivation Inlet Air Filters

For a comprehensive list of the features included, refer to the DIN Sheet provided specifically for this unit. The DIN sheet is a listing of all the standard and optional features that are included (see section 1.2.2). For particular detail of the features, refer to the drawings provided with this unit.

1.5.2 Cabinet

This unit is self-contained in an aluminum cabinet rated for either indoor or outdoor use (see Unit Nameplate). The exterior of the cabinet is finished with a durable paint 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 the installation drawing provided). The cabinet houses the desiccant rotor assembly and drive system, process and reactivation air blowers, a

reactivation heater system (electric), and electrical controls.

1.5.3 Inlets and Outlets

Inlets and outlets may be provided with flanged duct connections or with duct connections for round hard or round flexible duct. Depending on whether the unit is intended for indoor or outdoor use, the process and reactivation inlets and outlets may be equipped with louvers or hoods to prevent rain and snow from entering the unit. Screens may be provided to prevent birds and other small animals from nesting in the inlets and outlets.

For a comprehensive list of the features, refer to the DIN sheet provided specifically for this unit (see section 1.2.2). The DIN sheet is a listing of all the optional features that are included. For particular detail of the features, refer to the Installation drawing provided for this unit.

2.0 INSTALLATION

2.1 Receipt of Unit

Upon receiving the desiccant dehumidification unit, immediately inspect the equipment 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 freight carrier's delivery forms before signing for the equipment. Freight claims must be made through the freight carrier. Generally, all equipment ships F.O.B. Factory. STULZ can assist in the claim filing process with the freight company.

Carefully remove the shipping materials and protective packaging. 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.

If an overhead lifting device is used, use one with the appropriate capacity to ensure it can safely handle the weight of the unit. If using an overhead lifting device, utilize spreader bars that exceed the cabinet width to 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.**

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 space for necessary equipment, (forklift, lifting device, etc.). Refer to local and national electric codes for additional working clearance requirements.

To judge the clearance requirements, consider that of the components housed inside the 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 to anchor it. The following general requirements should also be considered:

1. The main power disconnect should be located as near as possible to the installed location of the equipment.
2. Provisions should be made to ensure that power is not accidently 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 unit in or near flammable or corrosive environments or allow flammable or corrosive air into the unit.
5. Refer to the wiring diagram for electrical connections.

2.4 Connecting Ductwork

All ducting must be airtight 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 airflow and pressure drop. The clearance required for the connection depends on whether the unit is to have ducts attached for the process air, reactivation air, or both. The reactivation air temperature at the outlet will be warm (approximately 150 °F) and humid during normal operation. (Reactivation air may approach 180 °F during a fault condition.)

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 returning to the conditioned space. If ductwork is connected to the reactivation outlet, it should be insulated and sloped down and away from the unit. This prevents 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 airstream. Refer to the

installation drawing for the duct connection sizes and locations.

NOTE: A flow regulation damper is required but may not be provided in the process air outlet. In such cases, it is the responsibility of the contractor or the owner to install a flow regulation damper. Adjust the regulating dampers after all ductwork is installed. Refer to section 3.6, "Monitoring Unit Performance," for more information concerning setting the correct airflows. If the process airflow is not set correctly, unit performance may be adversely affected. Refer to the Unit Nameplate for the correct air volume.

Ensure that inlets and outlets are free of obstructions and filters are clean.

2.5 Utility Connections

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 TB1 or the main disconnect per the electrical drawing for this unit. See the Unit Nameplate (mounted near the electrical control box) for the operating power supply requirements, minimum circuit ampacity (MCA) and maximum fuse size (MFS).

2.6 Installing a Humidistat or Relative Humidity Transmitter

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

Wall-mounted control sensors should typically be mounted 4–5 feet up from the floor in the conditioned space (see Figure 3). The sensor must be located so that it will properly sense the conditions to be controlled. The sensor should not be mounted in an open doorway or an area where it will be exposed to direct sunlight.

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 sensor 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 if the unit is configured for control schemes where the process blower runs continuously such as D-Stat II or H-Trac control (see section 3.4, Capacity Control).

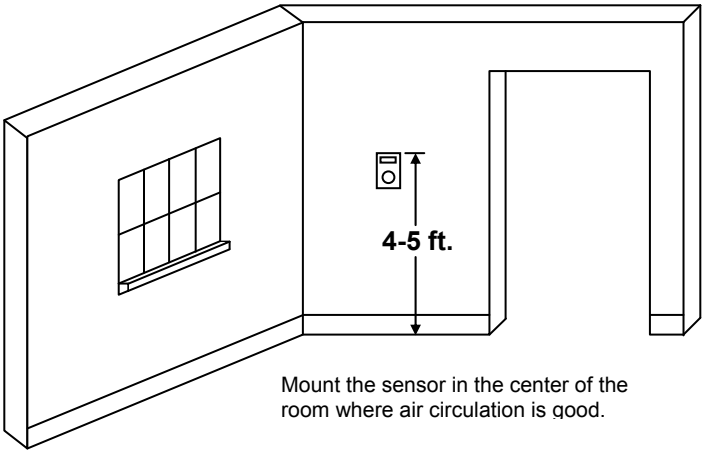


Figure 3 - Locating a Wall Mounted Control Sensor

3.0 OPERATION

The following information provides an overview of operating procedures and sequences for the DEZ unit. 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: A Warranty Registration and Start-Up Checklist are provided in the Technical Data Package supplied with your unit. It must be completed during installation and sent to STULZ Product Support. It will assist if service or troubleshooting support is needed. See section 8.0 for contact information.

3.1 Installation Checks

Using the Warranty Registration and Start-Up Checklist forms, record the steps taken during installation. 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 is correct per the Unit Nameplate. Only use power that's rated for this unit per the Unit Nameplate. Incorrect power may damage the unit and cause damage to property or injury or death to personnel.
2. Check the wiring to any remote sensors, humidistats, start/stop devices, etc. Refer to the electrical drawing for specific wiring connections.
3. Check all electrical connections for tightness.
4. Be sure there are no loose parts or spare parts (such as extra filters, etc.) located inside the unit or electric box.
5. Be sure all access panels or doors are closed tight. Small air leaks can significantly reduce unit performance.

3.2 Start Up

1. Apply main 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. The Unit Nameplate shows the optimum "Reactivation Side" and "Process Side" pressure drops (labeled as "Rotor Pressure Drop Gauge Values" with values shown as in. w.g.). Process airflow is set using an airflow damper (provided as an option), located at the process air outlet. Reactivation airflow is set using an internal slide-gate damper. Refer to section 3.6, "Monitoring Unit Performance" for a detailed description on monitoring and setting airflows.
3. Verify that amp draws of each component are within ±10% of the ratings shown on the Unit Nameplate.
4. Verify the operation of all switches and safeties.
5. The green Unit On and red fault 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.
6. Depending on the control methodology, set the humidity or dew-point to the desired setting with the system controller.
7. Insert a temperature probe into the reactivation discharge opening and note the temperature. The temperature leaving the rotor can be as high as 180 °F. The reactivation discharge temperature is typically 120–140 °F at full heater output. However, the dehumidifier may operate above or below this range based upon process and reactivation inlet air conditions and volumes.

   NOTE: The reactivation air temperatures mentioned above may vary between DEZ systems. See the Technical Data Sheet for your unit for target temperatures.

8. Verify the grain depression across the system (in the process airstream) is correct per the Unit Nameplate.

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 Reactivation Heater Controller

This unit may be equipped with a solid-state temperature controller or with a microprocessor-based temperature controller. Generally, these control devices are used to modulate the on-board reactivation heater to maintain the reactivation discharge air temperature setpoint. The controller is shipped from the factory pre-programmed. The source manufacturer's instructions for the controller are provided under separate cover. Refer to the source manufacturer's manual for detailed information on operating the controller and adjusting control parameters.

3.4 Capacity Control

The DEZ Series 1000 can be configured with one of two controllers: A Watlow controller, which comes standard with the unit, or optionally, the STULZ E^2 microprocessor controller. The control methods (described in the following sections) that are available to the unit depend on which controller is used.

The Watlow controller provides two basic control methods 1) D-Stat and 2) D-Stat II. The E2 controller supports both of these methods, plus H-Trac, Dew-Trac, and C-Trol II methods.

Refer to your order sheet or DIN Sheet for the control method used in your unit.

3.4.1 D-Stat

What it Does:

This control method cycles the dehumidifier on and off to maintain the relative humidity setting.

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 (provided as an option) or a customer-supplied dry contact control signal which cycles the unit on and off to maintain the relative humidity setting. See section 3.5.1, Mode Selector Switch for the correct mode setting to enable humidistat control.

3.4.1.1 D-Stat II

This control method function is similar to D-Stat, except the process blower runs continually. The reactivation heater and blower cycle on and off in response to a humidistat (provided as an option) or a customer-supplied dry contact control signal.

3.4.2 H-Trac

What it Does:

This control automatically regulates the reactivation heater to provide constant process discharge or space relative humidity.

Requires:

A factory or space-mounted RH sensor/transmitter and adjustable setpoint microprocessor controller.

How it Works:

The controller sends a signal to the on-board reactivation heater modulation control system to maintain the relative humidity setpoint. The dehumidifier runs continuously and continually adjusts capacity in response to load changes. In the AUTO mode, the dehumidifier responds to a customer-supplied start/stop signal.

3.4.3 Dew-Trac

What it Does:

This control method regulates the reactivation heater to provide constant process discharge or space dewpoint temperature.

Requires:

A factory or space-mounted dewpoint transmitter and adjustable setpoint microprocessor controller.

How it Works:

The controller determines the amount of reactivation energy required to maintain the dewpoint setpoint and develops an appropriate control output. The dehumidifier runs continuously and the controller continually adjusts reactivation heat in response to load changes. In Remote mode the dehumidifier responds to a customer-supplied start/stop signal.

3.4.4 C-Trol II

What it Does:

This control method regulates reactivation heat, to prevent condensation from forming on cold surfaces, by maintaining the ambient dewpoint temperature below the temperature of the cold surface.

Requires:

A cold surface temperature sensor (or temperature sensor at coldest point in room), an ambient dewpoint temperature transmitter, and an E² microprocessor controller.

How it Works:

The controller determines the amount of reactivation energy required to maintain dewpoint temperature. The controller compares the cold surface temperature to the ambient dewpoint temperature and develops a control output. The dehumidifier runs continuously and the controller continuously adjusts reactivation heat in response to load changes. The dehumidifier maintains the space dewpoint at 5 °F (adjustable) less than the cold surface temperature.

In Remote mode the process blower runs continuously and the dehumidifier responds to a customer-supplied start/stop signal.

3.4.5 Proportional Reactivation Controls (H-Trac or Dew-Trac)

If the system is configured for H-Trac or Dew-Trac reactivation control, the unit proportionally controls humidity. When the Humidity PI loop output exceeds 0%, the reactivation heater and reactivation blower turn on. The controller calculates PI loop outputs for humidity, reactivation discharge air temperature and reactivation heater temperature (see Figure 4).

As each of these PI loop outputs modulate, the controller selects the lower PI loop output and uses that output to control the reactivation heater. Note: This methodology prevents overheating of the desiccant, which would result in diminished drying performance. Once the Humidity PI loop output drops to 0% for the "Reactivation Idle" time, the Energy Savings Feature shuts off reactivation but the process blower continues to operate, ensuring accurate humidity measurement and control, even when dehumidification isn't required.

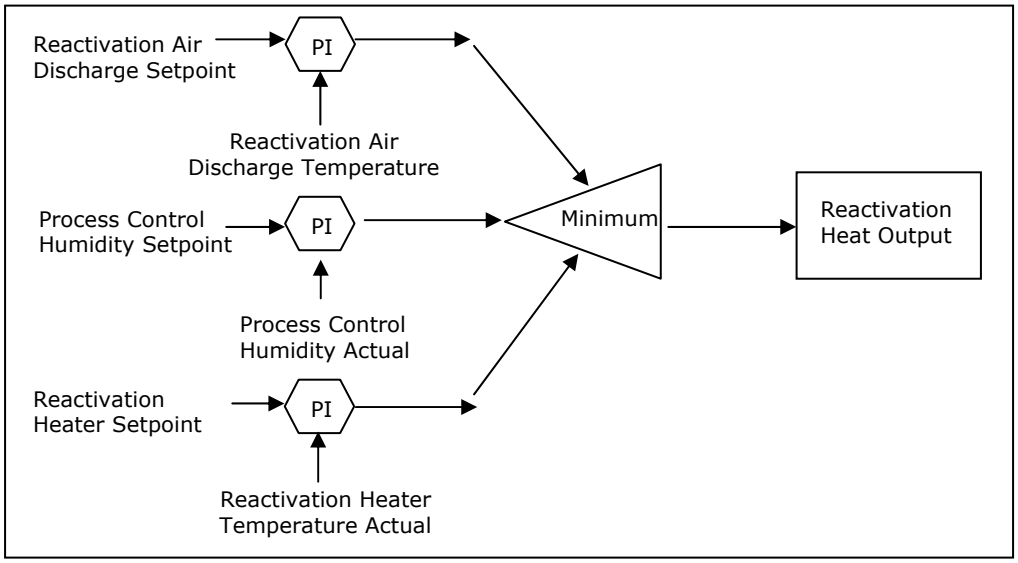


Figure 4 - Proportional (Trac) Control Diagram

3.5 Control Panel

The control panel on the unit will vary depending on whether the unit is equipped with a standard Watlow controller or an optional E^2 microprocessor controller.

E^2-equipped units typically have a single red Fault Status light that notifies the operator that a fault has occurred; the actual fault is indicated on a display connected to the E^2. Units without an E^2 controller can have one or more indicators, each indicating a different fault or status.

Units also have a three-way rotary switch labeled ON/OFF/AUTO or LOCAL/OFF/REMOTE as described in section 3.5.1. Two representative control/Indicator layouts are illustrated in Figure 5 and Figure 6.

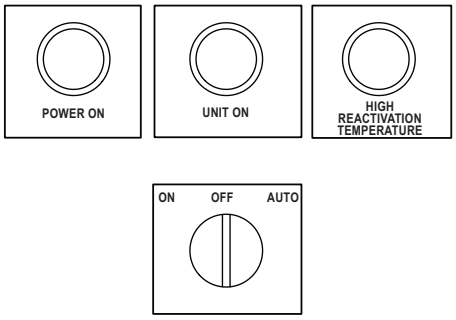


Figure 5 - Sample Non-E^2 Control Panel Layout

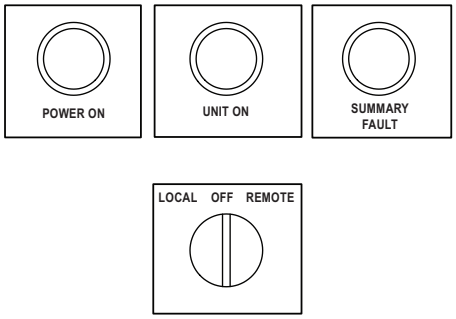


Figure 6 - Sample E^2 Control Panel Layout

3.5.1 Mode Selector Switch

The DEZ Series 1000 unit has a three-position selector switch located on the front side of the unit. The table below describes the modes of operation set by the switch:

Mode	Description
OFF	Unit is off, power is still live if the main disconnect is On; the white “Power On” indicator light is illuminated.
ON/ LOCAL	Unit is on and runs continuously; green “Unit On” indicator light is illuminated.
AUTO/ REMOTE	Unit cycles on and off in response to a humidistat or Remote Start/Stop signal; green “Unit On” indicator light is illuminated when the unit is running.

NOTE: The unit will not operate in the AUTO mode unless a humidistat is installed or the appropriate 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 may continue running for five minutes after the unit cycles off to remove residual heat from the unit (dependent on controller).

3.5.2 Hour Meter

An hour meter inside the electric box gives the elapsed run time for scheduling maintenance.

3.5.3 Control Panel Lights

The unit is equipped with indicator lights to notify the operator of the current status of the unit. The green “Unit On” and red fault indicator lights are equipped with “press-to-test” capability. This can be used to verify lights are working. If a light does not illuminate when pressed, it may be burned out or the electrical connections may be faulty. For specific information regarding troubleshooting indicator lights, refer to the Refer to section 6.0, Troubleshooting and to the electrical drawing provided with your unit.

The light icon next to the light name in the following text contains the light’s color: **W** for white, **G** for green and **R** for red.

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.

3.5.4 Optional Fault Indication Lights

This unit may be equipped with optional, fault indication light(s). Refer to the DIN Sheet that is provided with the unit for the characteristics of this unit and the optional features that are included.

SUMMARY FAULT

If unit is equipped with an E2 controller, this indicator will be provided to illuminate red when any of several pre-programmed faults occur, such as a high reactivation temperature fault, rotor rotation fault, a fault with the unit motors or insufficient reactivation airflow across the air proving switch. As an option, the controller may be programmed to activate the summary fault light upon detecting other pre-defined fault conditions or to provide certain status notifications such as dirty filters.

HIGH REACTIVATION TEMPERATURE FAULT

This illuminates red (and the reactivation heater shuts down) when the reactivation air temperature entering the rotor or the air temperature leaving the rotor is above the high temperature limit. A manual reset of the temperature limit switches is necessary. Refer to section 6.0, Troubleshooting.

ROTOR ROTATION FAULT

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

3.6 Monitoring Unit Performance

There are two differential pressure gauges on this system which indicate the pressure drops across the rotor (see Figure 7). Rotor pressure drop (static pressure) correlates directly to airflow. In order to maintain optimum performance, process and reactivation airflows are set using the rotor pressure drops. Refer to the Unit Nameplate for the appropriate settings for the Rotor Pressure Drops (inches w.c.).

The Unit Nameplate 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 test performance report.

Figure 7 - Differential Pressure Gauges

Set the airflows by adjusting the dampers while the unit is still cold. The process air damper is generally located in the process air outlet. The reactivation air damper is located internally at the reactivation air outlet.

Afterward, if the gauges show readings that are significantly lower than the initial factory settings, the filters may need to be replaced.

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

4.0 UNIT FEATURES

This unit may be equipped with one or more of the following options. For a detailed list of the options purchased with this unit, refer to the Dehumidifier Identification Number (DIN) sheet provided with the unit (see section 1.2.2). The DIN number for this unit can be found on the DIN sheet.

4.1 Control Sensor Terminals

The unit is equipped with terminal positions for the connection of a humidistat (S7) or relative humidity transmitter (TN11) for utilizing the selected control method (see section 3.4, Capacity Control). A humidistat or relative humidity transmitter (optionally provided) is required for the control scheme to function. Refer to the electrical drawing for details on interfacing the control sensor with the equipment.

4.2 Remote Start/Stop Contact

The unit may be equipped with optional terminal positions to connect a remotely operated “Start/Stop” control device. It may be used to start and stop the unit when the mode selector switch is in the “Auto” position. When the circuit is closed the unit will start operating; when opened the unit will stop operating (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 and for wiring details. NOTE: The unit will not start if the space humidity is below setpoint.

4.3 Optional Customer Contacts

The unit may be equipped with optional customer interface contact positions located on terminal blocks in the electrical enclosure(s). The contacts are utilized for remote monitoring and control purposes. Certain status contacts may operate together with an assigned status indicator light. Refer to the unit DIN sheet to determine which status contacts and indicator lights are provided with this unit.

NOTE: Refer to the electrical drawing for specific ratings of the contacts and for wiring details.

ROTOR ROTATION FAULT CONTACT

This contact closes if the rotor has not made a complete revolution within a specified period of time.

PROCESS BLOWER INTERLOCK DRY CONTACT

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

SUMMARY FAULT CONTACT

This contact notifies the operator of such problems as a heater fault, rotor motor fault or a fault with the process and/or reactivation blower motors.

REACTIVATION AIR PROVING CONTACT

This contact closes when the unit is turned on and the reactivation air proving switch detects sufficient airflow. When the unit is on, the contact opens upon loss of reactivation airflow and the reactivation heater will be de-energized. When the airflow problem is corrected, the heater will automatically re-energize.

PROCESS AIR PROVING CONTACT

This contact closes when the unit is turned on and the process air proving switch detects sufficient airflow. When the unit is on, the contact will open upon loss of process airflow.

DIRTY FILTER CONTACT

This contact closes when the differential pressure across the process or reactivation air filter reaches a predetermined value, indicating that the filter should be cleaned and/or changed. The differential pressure gauges may be used to determine which filters should be serviced (see section 3.6, Monitoring Unit Performance).

4.4 Sensor Retransmit Terminals

The unit may be equipped with optional terminal positions for monitoring unit performance by means of analog output signals that indicate operating parameters of the system. The system controller translates signal inputs for temperature as measured by the sensors. The controller retransmits the values as output signals to terminal block(s) located inside the electric box. Refer to the electrical drawing for the analog output signals provided, their applicable range and for wiring details.

4.5 Electrical Disconnect

The unit may be equipped with an optional fused or non-fused electrical disconnect switch. A switch is recommended and may be required by local or national electrical codes. Rotary disconnects are located on the front of the electrical enclosure. Knife-style disconnects have a separate box located adjacent to the electrical enclosure. The disconnect switch allows power to be removed during maintenance or service functions. If a disconnect switch is not provided, the unit will have power when

the electrical connections to the main power terminal block (TB1) are made. Use caution when servicing the unit. For wiring details, refer to the electrical drawing for this unit.

WARNING **Even with the optional Disconnect switch in the Off position, incoming power may still be live between the switch and the main power source. Power must be disconnected from the main source before servicing.**

4.6 Emergency Stop

The unit may be equipped with an optional emergency stop switch button mounted on the control panel. Press the button to disconnect control 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.

NOTE: The emergency stop switch disconnects control power from the unit contactors, causing them to open. Main power remains present inside the unit after the emergency stop switch is pressed.

4.7 Dampers

The unit may be equipped with an optional, manually adjustable air damper for the process air outlet. The damper is actuated by means of a slide/lock control handle located on the side of the duct transition. An internal slide gate damper is supplied as standard equipment at the reactivation air outlet. The dampers are used to adjust the process and reactivation airflows for optimal unit performance after installation of the ductwork is complete. Refer to section 3.6, Monitoring Unit Performance.

4.8 Filter Status

The unit is equipped with 30% efficient pleated filters on the process and reactivation air inlets. An optional status contact may be assigned to these filters to notify the user when they must be cleaned or replaced.

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

4.9 Voltage Sensor/Phase Monitor

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

4.10 Process Air Proving

The unit may be equipped with an optional process air proving switch. Operation of the dehumidifier's reactivation circuit is enabled only when there is process airflow. The process air proving switch closes when the unit is turned on and the air proving switch has detected sufficient airflow. The switch opens upon loss of process airflow, disabling the reactivation circuit. An alarm is signaled if process airflow is inadequate. When the airflow problem is corrected and the alarm is reset, the reactivation heater automatically resumes normal operation.

4.11 E^2 Controller and Display

Figure 8 - E^2 Controller and Display

The unit may be equipped with an E^2 microprocessor-based controller located in the main electric box. The controller is furnished with factory configured software designed to maintain space or process discharge air conditions (temperature and/or humidity).

A display/keypad is provided for interaction with the system controller. It may be located in the main electric enclosure, in a separate "window" box mounted on the unit or shipped loose for field installation.

Press the alarm ( ) key on the keypad to call up alarm screen messages. After the alarm condition is corrected, press the alarm key again to reset the controller and resume normal operation.

5.0 PREVENTIVE MAINTENANCE

Minimal periodic Preventive Maintenance Checks and Services (PMCS) are recommended to ensure optimal performance of the unit. Routine maintenance can correct deficiencies before they cause serious damage to the equipment and helps ensure 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 STULZ Product Support.

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

WARNING **Disconnect all power before performing any service or maintenance function. Turning the unit mode selector switch to the "Off" position does not disconnect the power.**

5.1 Monthly

- Check all electrical connections to ensure they are tight and not shorted to ground.
- Ensure that the control panel lights are functional and not burned out. (Use the "press-to-test" feature.)
- Remove, clean, and/or replace 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.
- Check that 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 each blower mounting and inspect the blower wheel for loose fasteners. Tighten if necessary. Ensure that the wheel is free of debris.
- Lubricate motor bearings if necessary.
- Check that shaft key, pulley, and bearing lockdowns are tight.

5.2 Yearly

Thoroughly clean the unit inside and out, making sure to remove any dust from fan blades.

5.3 Desiccant Rotor Drive Motor Maintenance

A speed-reducing gear motor rotates the desiccant rotor. The gear motor bearings are pre-lubricated and do not require re-lubrication. Periodically inspect around the gear motor for accumulated dirt and remove it by vacuuming. 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.

! CAUTION Dirt accumulation can cause motor heating and a fire hazard.

5.4 Blower Motor Maintenance

5.4.1 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 all 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. Ensure the motor is clean. Check to make sure the interior and exterior of the motor are free of dirt, oil, grease, water, etc., which may accumulate and block motor ventilation. If the motor is not properly ventilated, overheating can occur and cause premature motor failure.
2. Use a "Megger" periodically to verify the integrity of the winding insulation and record the readings. If there is a significant drop in insulation resistance, immediately investigate.
3. Ensure all electrical connections are tight.

5.4.2 Lubrication & Bearings
(For motors with grease fittings only)

The lubricating ability of 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 ability can be lost over time. The following steps will provide good results:

1. Use a high grade ball or roller bearing grease. Consult the motor manufacturer's nameplate, if provided, for the recommended grease to use. If none are listed, the recommended greases for standard service conditions are Shell Dolium R, Texaco Polystar, Amoco Rykon Premium #2 or Chevron SRI#2.
2. Lubrication should be performed at the intervals shown in the table below. These intervals are based on average use. See nameplate on motor for frame size and rated speed.

Table 1 - Blower Motor Lubrication Intervals

NEMA/(IEC) Frame Size	Rated Speed - RPM			
	3600	1800	1200	900
Up to 210 incl. (132)	5500 Hrs.	12000 Hrs.	18000 Hrs.	22000 Hrs.
Over 210 to 280 incl. (180)	3600 Hrs.	9500 Hrs.	15000 Hrs.	18000 Hrs.
Over 280	2200 Hrs.[1]	7400 Hrs.	12000 Hrs.	15000 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[1] or Class H Insulation	Severe dirt, Abrasive dust, Corrosion	All Bearings
Low Temperature	<-30°C[2]		

Table 3 - Lubrication Interval Multiplier

Severity of Service	Multiplier
Standard	1.0
Severe	0.5
Extreme	0.1

[1] Special high temperature grease is recommended (Dow Corning DC44 or Darmex 707).
[2] Special low temperature grease is recommended (Aeroshell 7).

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 280T (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.

5.4.3 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 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 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. Add grease slowly until new grease appears at shaft hole in the endplate or purge outlet plug.
4. Re-install the grease outlet plug if removed.

6.0 TROUBLESHOOTING

The unit 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 or loss of airflow.

NOTE: The thermal overheat 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 minutes until the reactivation time delay shuts off the reactivation blower.

The following guidelines are included to help you troubleshoot the dehumidifier when operation or performance problems occur.

Refer to the electrical and installation drawings provided with your unit for the location of the system components and their relationship to each other. If the problem can't be resolved using the guidelines below, contact the STULZ Product Support for assistance (see section 8.0 for contact information).

Problem: Unit Does Not Run

If the dehumidifier uses a remote device such as a humidistat, check the device before you check the dehumidifier itself.

In the AUTO mode:

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

In the On/Local mode:

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

Problem: "High Reactivation Temperature" Light is Illuminated

Check the reactivation thermal overheat safety switches (S4-1), (S4-2) and (S4-3) if provided. The switches are located in the reactivation outlet duct and in the duct connection box under the desiccant rotor. If one of the safety switches is tripped, turn the unit selector switch to Off and disconnect main power, then press the Reset button on the Overheat Safety Switch, shown in Figure 9.

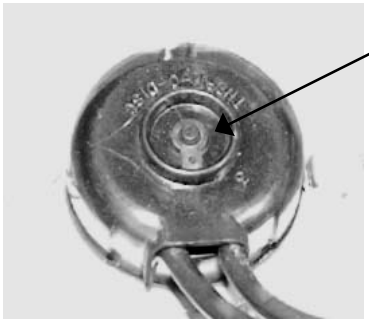


Figure 9 - Overheat Safety Switch

To prevent this problem from recurring, check that the reactivation air volume is sufficient. Refer to section 3.6, "Monitoring Unit Performance" for information on setting and verifying the correct airflow. Ensure the filters are clean and unclogged, the rotor flutes are not dirty (clogged), the dampers are in the proper position, and that the ductwork is not obstructed or damaged.

Problem: "Summary Fault" Light is Illuminated

A Summary Fault (on units equipped with an optional E^2 controller) can indicate a number of fault conditions, including a motor fault, tripped thermal overheat safety switch, 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 the unit or the 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 (e.g., High Reactivation Temperature Light On) for corrective action for fault condition(s) that are observed.

Problem: Process Blower Does Not Turn, Yet "UNIT ON" Light 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, ensure all wire connections are tight and no shorts are present.

Problem: Reactivation Blower Does Not Turn, Yet "UNIT ON" Light 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, ensure all wire connections are tight and no shorts are present.

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

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 on the control transformer.
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.

Problem: Dehumidifier Performance is Reduced

This condition could indicate a problem with the dehumidifier or a change in moisture loads within the space being conditioned. See the Unit Nameplate and refer to the performance curves in Appendix B to verify the performance conditions are as stated.

It is important that the power supply voltage and phase are correct and that the airflows are 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 (see Appendix B). Compare the results to those indicated by the Unit Nameplate. If the results are comparable, 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, and then disconnect main power. Check the motor wiring against the diagrams shown on the motor nameplate to ensure it matches the phase and voltage shown on the dehumidifier Unit Nameplate (see Figure 1). If the unit is 3-phase, simply switch any two power supply leads at the power distribution block. If the unit is single phase, reconnect the wires according to the motor nameplate diagram.
3. Check process and reactivation airflows. See section 3.6, "Monitoring Unit Performance".

The desiccant itself is designed for a ten 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 in the section 7.5, "Washing the Rotor."

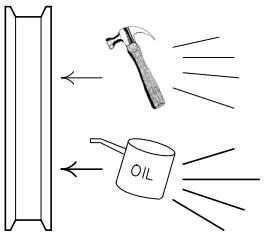
If the result of following the above troubleshooting steps doesn't solve the problem, contact STULZ Product Support.

7.0 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.

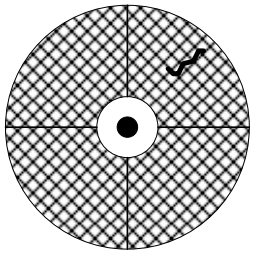
7.1 Rotor Handling Guidelines

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



DO NOT STRIKE ROTOR

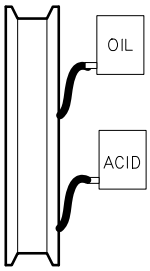
1. Do not strike the surface of the rotor or allow any objects to strike the surface which may cause damage to the shell and the fluted desiccant media.



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.

NOTE: If damage occurs to the face of the rotor, refer to section, Repairing the Rotor, or contact STULZ Product Support. See section 8.0, PRODUCT SUPPORT, for contact information.



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.

7.2 Replacing the Rotor Drive Belt

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. See Figure 10 for an illustration of 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 Philips-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
- A set of Allen wrenches
- A standard business card
- Wax paper sheet, approximately 1 ft²

See Figure 10 for an illustration of rotor assembly parts.

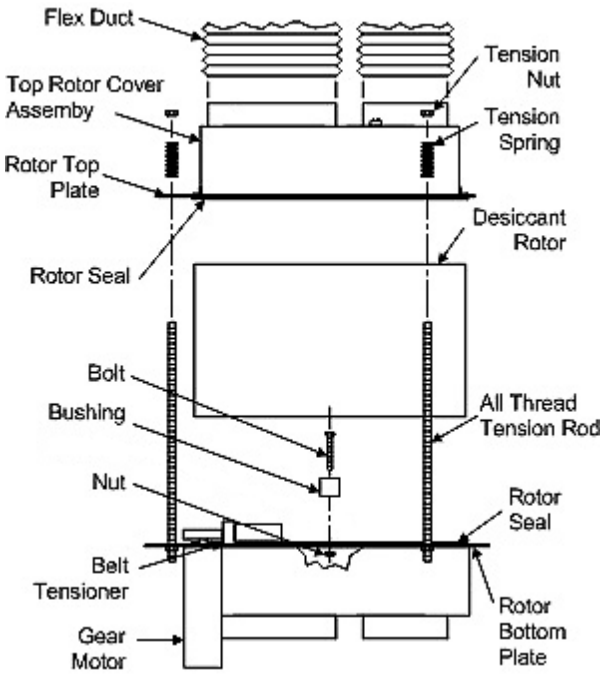


Figure 10 - Rotor Assembly Parts

7.2.1 Removing the Old Belt

1. Turn the unit off.
2. Allow the reactivation blower and rotor to run for 5 or more minutes to remove residual heat from the unit.
3. Disconnect all power to the unit.

   WARNING

   - **Turning the mode selector switch to "Off" does not disconnect power to the system.**
   - **Do not attempt to change the belt if the rotor or reactivation portion of the unit is warm.**
4. Remove the large access panel opposite the electric box. Refer to the installation drawing for the location of the correct access panel.
5. Remove the proximity switch located on the periphery of the rotor
6. Remove the overheat safety switch, if applicable, located in the top rotor cover assembly.
7. Remove top duct connections.
8. Label the clear pressure tubes in top rotor cover assembly and remove.
9. Remove the three springs, threaded rods and associated hardware that hold the top rotor cover assembly on the rotor. Note the compression distance of the spring for later reference.
10. Lift off the top rotor cover assembly and remove from unit.
11. Release the belt tensioner and remove belt.
12. NOTE: The rotor does not need to be removed if just changing the belt.
13. Inspect Teflon coated rubber seal in top rotor cover for any signs of wear/damage and replace if necessary. (See Replacing Seals)
14. If top rotor seal is removed and replaced, remove the rotor and replace bottom seal also. (See section 7.4, "Replacing Seals".)

7.2.2 Installing the New Belt

1. Replace belt and adjust tensioner, with belt correctly aligned around the rotor, until the tensioner is snug to the belt.
2. Replace the top rotor cover assembly.
3. Replace springs and associated hardware.
4. Tighten the nuts against the top the springs until the seal is seated against the rotor but rotor can still turn manually.
5. Replace the clear pressure tubing.
6. Replace the proximity switch.
7. Replace the overheat safety switch, if necessary.
8. Replace top duct connections.
9. Replace the access panel.
10. Reconnect all power to the unit.

7.3 Removing the Rotor

1. Remove the old belt as described in section 7.2.1.
2. Remove the belt tensioner if necessary.
3. Lift rotor off shaft that is connected to the bearing.

NOTE: If the rotor is tight, use a rubber mallet and rounded bar to strike the post connected to the bearing to loosen.

7.4 Replacing Seals

7.4.1 Removing Old Seals

1. Follow the procedure in section 7.3 for removing the rotor.

2. Visually inspect the top and bottom seals for cracks or worn areas.
3. If seals are worn or cracked, use a razor blade or putty knife to scrape the old seals off the rotor bottom and top plates. (See Figure 10 on page 22.)
4. Make sure all silicone is also removed from rotor bottom and top plates.

NOTE: If bottom seal is removed and replaced, the top seal should be replaced at the same time even if it is not worn or cracked.

7.4.2 Installing New Seals

1. Turn new seal to rubber side.
2. Generously apply silicone bead to cover all rubber.
3. Turn seal over and press down to attach to rotor bottom or top plate.
4. Make sure all air bubbles are gone.
5. Add silicone bead around all rubber edges. If silicone gets on Teflon side, let dry and wipe off.

7.5 Washing the Rotor

Over time, dirt may accumulate 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. Required materials include:

- Wet/Dry vacuum
- Hand-held spraying device (found at most hardware stores)
- Water/solution supply

7.5.1 Cleaning

1. Carefully remove the rotor from the unit. (See section 7.3 for instructions.)

! CAUTION Do not roll the rotor on its rim once it is outside of the cassette. This may cause damage to the rotor flutes. Allow the rotor to achieve equilibrium by leaving it in an area where humidity is not controlled for a minimum of eight hours.

2. Using an industrial dry vacuum with a clean, soft and smooth applicator, draw air through the rotor flutes into the vacuum. Vacuum the entire surface of the rotor.
3. With the water/solution in the spraying device, flush the rotor. If using a solution, rinse the rotor with water after flushing with the solution.
4. At the same time, wet vac the rotor. Then dry vac the same portion of the rotor.
5. Reinstall the rotor.
6. Remove the fuses for the reactivation heater and the process blower. Operate the unit with the reactivation blower On, the reactivation heater Off and the process blower Off for 60 minutes. Then replace the fuses and resume normal unit operation.
7. After six hours, check the performance of the unit. If the process outlet air is excessively humid (greater than 10% of original performance), turn the process blower Off and run the reactivation heater and blower for another two hours to “reactivate” the desiccant. If conditions still do not return to normal, consult the factory.

7.6 Repairing the Rotor

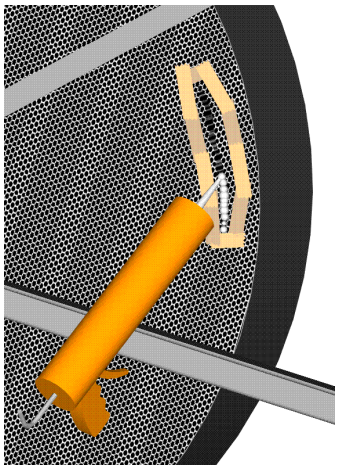
Minor repairs, such as rotor cracks, can be performed by service technicians when required. Materials needed include:

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

NOTE: These instructions are for small cracks in the rotor surface. For large cracks or to obtain a new rotor, contact STULZ Product Support. See section 8.0, PRODUCT SUPPORT, for contact information.

1. Turn the unit Off and disconnect the main power. Remove the large service panel opposite the electric box.
2. Remove the rotor from the unit. (See section 7.3.) Use caution when handling the rotor to avoid further damage. (See “Rotor Handling Guidelines” in section 7.1.)

3. Refer to Figure 11. 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. 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° 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 STULZ Product Support. See section 8.0, PRODUCT SUPPORT, for contact information.



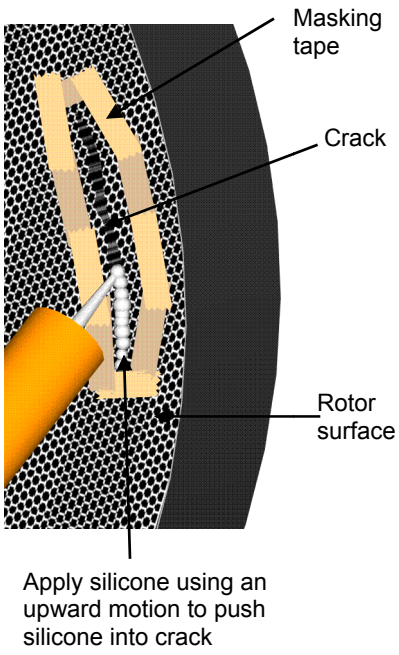


Figure 11 - Rotor Scratch Repair

8.0 PRODUCT SUPPORT

STULZ Product Support provides technical support, warranty authorization and parts. These additional services are available by request:

- Performance Evaluations
- Start-up Assistance
- Break Fix Repair
- Preventive Maintenance
- Training

8.1 Technical Support

The STULZ Technical Support Department is dedicated to the prompt reply and resolution to or issues experienced with DESICAiR equipment. Please contact (888) 529-1266 Monday through Friday from 8:00 a.m. to 5:00 p.m. EST. After business hours support is also available. Please provide your name and contact information and a support technician will return your call.

When calling to obtain support, it is important to have the following information readily available, (information is found on the Unit Nameplate):

- Unit Model Number (DEZ-XXX-XX-X)
- STULZ Sales Order Number (123456)
- STULZ Item Number (123456)
- Unit Serial Number (1234567)
- Description of Problem

8.2 Obtaining Warranty Parts

Warranty inquiries are to be made through the Technical Support Department at (888) 529-1266 Monday through Friday from 8:00 a.m. to 5:00 p.m. EST. A support technician at STULZ will troubleshoot the system over the telephone with a field service technician to determine the defect of the part. If it is determined that the part may be defective a replacement part will be sent UPS ground. If the customer requests that warranty part(s) be sent by any other method than UPS ground the customer is responsible for the shipping charges. If you do not have established credit with STULZ you must provide a freight carrier account number.

A written (or faxed) purchase order is required on warranty parts and must be received prior to 12:00 p.m. for same day shipment. The purchase order must contain the following items:

- Purchase Order Number
- Date of Order
- STULZ Stated Part Price
- Customer Billing Address
- Shipping Address
- Customer's Telephone and Fax Numbers
- Contact Name
- Unit Model No., Serial No. & STULZ Item No.

The customer is responsible for the shipping cost incurred for returning the defective part(s) back to STULZ. Return of defective part(s) must be within 30 days at which time an evaluation of the part(s) is conducted and if the part is found to have a manufacturing defect a credit will be issued.

When returning defective part(s), complete the Return Material Authorization Tag and the address label provided with the replacement part.

8.3 Obtaining Spare/Replacement Parts

Selected spare parts are recommended to have on hand to help ensure minimal down time for the system. Recommended spares and replacement parts sales are available through Product Support at (888)529-1266.

STULZ accepts Visa and MasterCard. STULZ may extend credit to its customers; a credit application must be prepared and approved (this process could take one week).

A 25% minimum restocking charge will be applied on returned stocked parts that were sold as spare/replacement parts. If the returned part is not a stocked item, a 50% restocking charge may be applied. Additionally a Return Material Authorization Number is required when returning parts. To receive credit for returned repair/replacement parts, the parts must be returned to STULZ within 30 days of the purchase date. Spare part sales over 30 days old will be considered final and the parts will remain the sole property of the ordering party.

Appendix A
Forms

STULZ Air Technology Systems, Inc.
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

- ☐ 1 Proper clearances for service access have been maintained around equipment.
- ☐ 2 Equipment is level and mounting fasteners (if applicable) are tight.
- ☐ 3 Foreign materials removed from inside and around equipment installed (shipping materials, blower lockdown bolts construction materials, tools, etc.).
- ☐ 4 Blowers rotate freely without unusual noise.
- ☐ 5 Filter(s) installed (if required).
- ☐ 6 Duct work installed and sealed against leaks.
- ☐ 7 Air dampers installed in ductwork (if required).
- ☐ 8 Incoming line voltage matches equipment nominal nameplate rating ± tolerance.
- ☐ 9 Main power wiring connections to the equipment, including earth ground, have been properly installed according to applicable codes.
- ☐ 10 Customer supplied main power branch circuit protection devices/fuses have proper ratings for the equipment.
- ☐ 11 All control wiring completed according to applicable codes to wall mounted control panel, temperature/RH sensor transmitter, etc. (as applicable).
- ☐ 12 Control sensors polarity (+/-) wired correctly.
- ☐ 13 All control wiring completed to terminal positions for customer control and monitoring lines.
- ☐ 14 All wiring connections are tight.

STULZ Air Technology Systems, Inc.
1572 Tilco Drive
Frederick, Maryland USA 21704

DESICAiR PRODUCT DIVISION

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

Periodic General Maintenance Checks and Services Checklist

Date: _____ Prepared By: _____

Model Number: _____ Serial Number: _____

Item Number: _____

Monthly

Filters

- ☐ Cleanliness
- ☐ No Obstructions

Rotor

- ☐ Check Condition of Rotor Face
- ☐ Check Condition of Seals

Miscellaneous

- ☐ Check and Tighten Loose Fasteners
- ☐ Check Condition of Belts
- ☐ Check Pressure Drop Readings on Gauges
- ☐ Status Indicator Lights “Press to Test” Feature Operates Properly (Should Illuminate When Pressed)

Quarter-Annually

- ☐ Tighten Electrical Connections and Check for Corrosion
- ☐ Check Contacts on Contactors for Pitting
- ☐ Clean Unit as Necessary
- ☐ Check Motor Amps Per Unit Name Plate
- ☐ Check Motors, Lubricate Per Maintenance Schedule

Annually

- ☐ Conduct a Complete Check of All Services Listed Above and Clean Unit’s Interior
- ☐ Inspect Wiring For Fraying, Discoloration

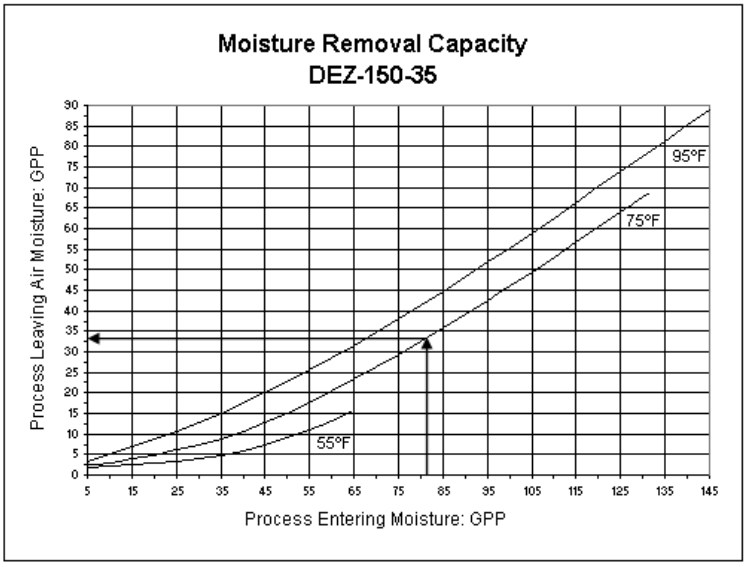
Appendix B
Unit Performance Curves

Note: Unit Performance Curves are provided for reference only. Data is based on reactivation entering air conditions at 95ºF/130 GPP. Refer to the Technical Data Sheet provided with the unit for specific unit performance data.

Performance for DEZ-150-35-E

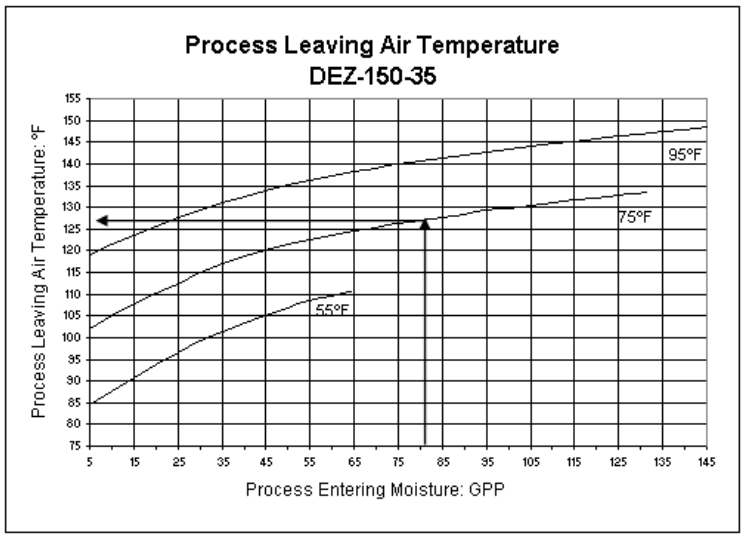
Grains Per Pound (GPP)

1. Find the correct "Process Entering Moisture" (humidity) value in grains per pound (GPP) on the x-axis of the Moisture Removal Capacity graph.
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 scale marked "Process Leaving Air Moisture". The value at this point represents the process air moisture (humidity) leaving the dehumidifier in GPP



Leaving Temperature

1. Find the correct "Process Entering Moisture" (humidity) value in grains per pound (GPP) on the x-axis of the Process Leaving Air Temperature graph.
2. Move vertically in a straight line to intersect the curve closest to the entering air temperature. Interpolate as required.
4. Move horizontally to the left and intersect the scale marked "Process leaving Air Temperature". The value at this point represents the air temperature leaving the dehumidifier in °F.

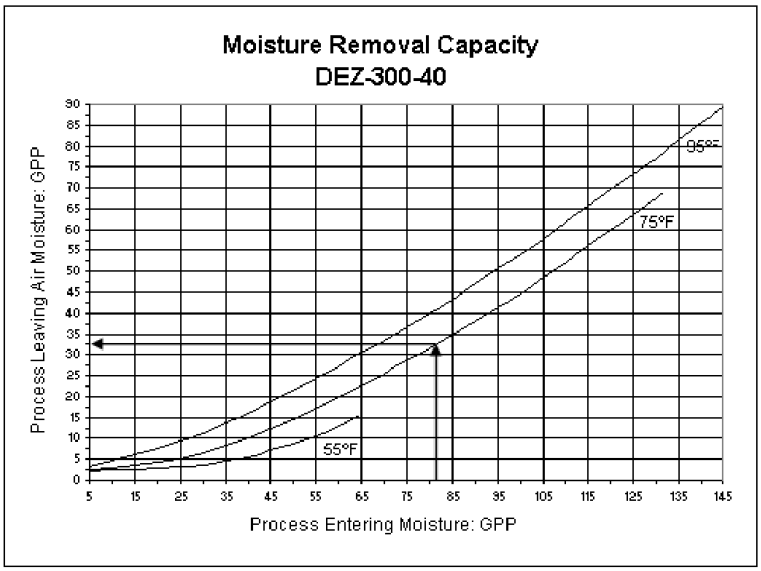


NOTE: Process air outlet temperatures as shown are maximum values at standard full rated heater output. The actual process outlet temperature will be lower when the heater output is below full rated output. This condition will occur during heater modulation cycles due to partial loading of the dehumidifier.

Performance for DEZ-300-40

Grains Per Pound (GPP)

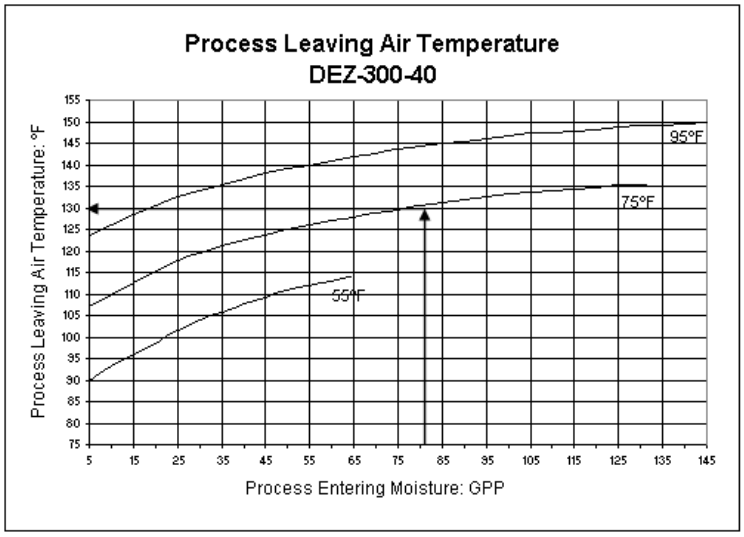
1. Find the correct "Process Entering Moisture" (humidity) value in grains per pound (GPP) on the x-axis of the Moisture Removal Capacity graph.
2. Move vertically in a straight line to intersect the curve closest to the entering air temperature. Interpolate as required.
3. Move horizontally to the left and intersect the scale marked "Process Leaving Air Moisture". The value at this point represents the process air moisture (humidity) leaving the dehumidifier in GPP



NOTE: Process air outlet temperatures as shown are maximum values at standard full rated heater output. The actual process 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.

Leaving Temperature

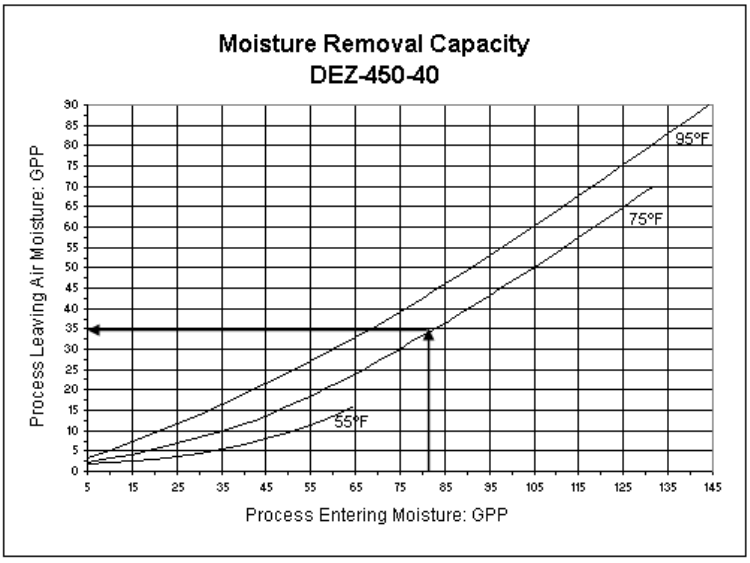
1. Find the correct "Process Entering Moisture" (humidity) value in grains per pound (GPP) on the x-axis of the Process Leaving Air Temperature graph.
2. Move vertically in a straight line to intersect the curve closest to the entering air temperature. Interpolate as required.
3. Move horizontally to the left and intersect the scale marked "Process leaving Air Temperature". The value at this point represents the air temperature leaving the dehumidifier in °F.



Performance for DEZ-450-40-E

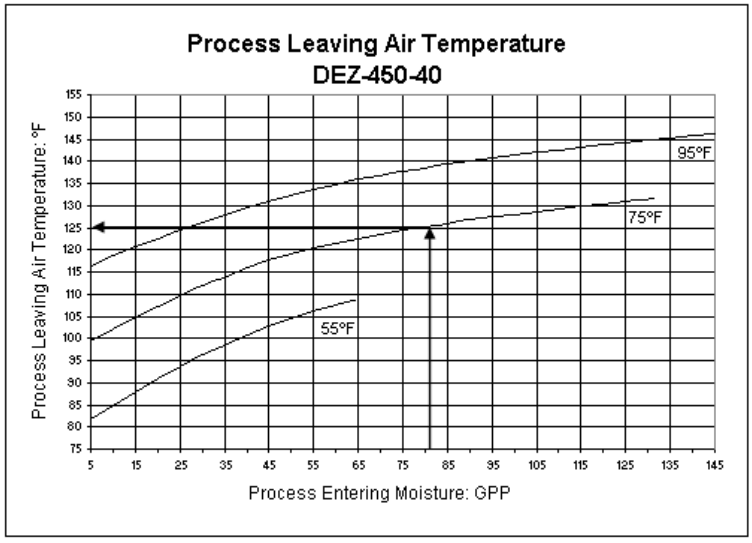
Grains Per Pound (GPP)

1. Find the correct “Process Entering Moisture” (humidity) value in grains per pound (GPP) on the x-axis of the Moisture Removal Capacity graph.
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 scale marked “Process Leaving Air Moisture”. The value at this point represents the process air moisture (humidity) leaving the dehumidifier in GPP



Leaving Temperature

1. Find the correct “Process Entering Moisture” (humidity) value in grains per pound (GPP) on the x-axis of the Process Leaving Air Temperature graph.
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 scale marked “Process leaving Air Temperature”. The value at this point represents the air temperature leaving the dehumidifier in °F.

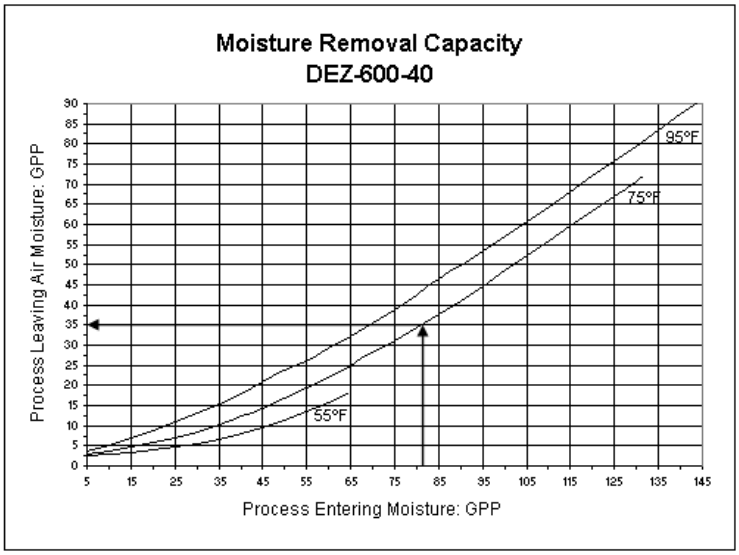


NOTE: Process air outlet temperatures as shown are maximum values at standard full rated heater output. The actual process outlet temperature will be lower when the heater output is below full rated output. This condition will occur during heater modulation cycles due to partial loading of the dehumidifier.

Performance for DEZ-600-40

Grains Per Pound (GPP)

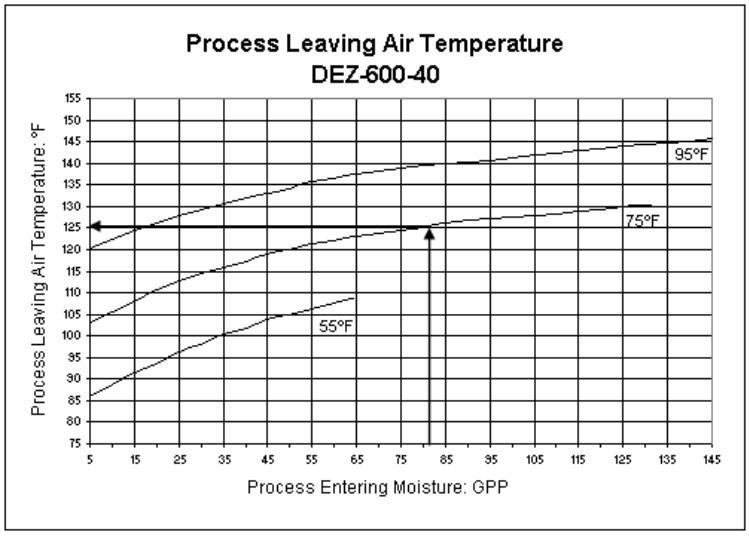
1. Find the correct “Process Entering Moisture” (humidity) value in grains per pound (GPP) on the x-axis of the Moisture Removal Capacity graph.
2. Move vertically in a straight line to intersect the curve closest to the entering air temperature. Interpolate as required.
3. Move horizontally to the left and intersect the scale marked “Process Leaving Air Moisture”. The value at this point represents the process air moisture (humidity) leaving the dehumidifier in GPP



NOTE: Process air outlet temperatures as shown are maximum values at standard full rated heater output. The actual process 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.

Leaving Temperature

1. Find the correct “Process Entering Moisture” (humidity) value in grains per pound (GPP) on the x-axis of the Process Leaving Air Temperature graph.
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 scale marked “Process leaving Air Temperature”. The value at this point represents the air temperature leaving the dehumidifier in °F.



APPENDIX C-GLOSSARY

Terms and Abbreviations

Absorb	Penetration of Vapor Molecules Into the Molecular Structure of Another Substance	**In. w.c.**	Inches of Water Column
Adsorb	Attraction of Vapor Molecules to the Surface of Another Substance	**In. w.g.**	Inches of Water Gauge
BTU/Hr	British Thermal Units Per Hour	**kVA**	Kilovolt-Amp (One Thousand Volt Amps)
C-TROL	Modulates Reactivation Heat To Prevent Condensation on Cold Surfaces	**kW**	Kilowatt (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	**MCA**	Minimum Circuit Ampacity
Dew Point	Temperature At Which Humid Air Becomes 100% Saturated	**NEC**	National Electric Code
DEW-TRAC™	Modulates Reactivation Heat To Maintain Dew Point Temperature	**PH**	Phase
Dry Bulb	Temperature of Air As Measured By a Thermometer.	**PSG**	Product Support Group
°F	Degrees Fahrenheit	**PSI**	Pounds per Square Inch
FLA	Full Load Amperage	**PSIG**	Pounds Per Square Inch Gauge
FOB	Free On Board	**RH**	Relative Humidity
GPP	Grains Per Pound	**SDS**	Safety Data Sheet
H-TRAC™	Modulates Reactivation Heat To Maintain Relative Humidity	**STULZ**	STULZ Air Technology Systems, Inc
HP	Horse Power	**VAC**	Voltage, Alternating Current
Hz	Hertz (Frequency)	**Wet Bulb**	Temperature of air as sensed by thermometer with a water saturated wick over the bulb.

STULZ North American Headquarters

STULZ AIR TECHNOLOGY SYSTEMS (STULZ USA) , INC.
1572 Tilco Drive | Frederick, MD 21704

Tel: 301.620.2033 | Fax: 301.662.5487 | info@stulz-ats.com

STULZ Company

Headquarters STULZ GmbH
Holsteiner Chaussee 283
22457 Hamburg
products@stulz.de

STULZ Subsidiaries

STULZ Australia Pty. Ltd.
34 Bearing Road
Seven Hills NSW 2147

STULZ Austria GmbH
Industriezentrum NÖ – SÜD,
Straße 15, Objekt 77, Stg. 4, Top 7
2355 Wiener Neudorf

STULZ Belgium BVBA
Tervurenlaan 34
1040 Brussels

STULZ Brasil
Ar Condicionado Ltda.
Rua Cancioneiro de Évora, 140
Bairro - Santo Amaro São
Paulo-SP, CEP 04708-010

STULZ España S.A.
Avenida de los Castillos 1034
28918 Leganés (Madrid)

STULZ France S. A. R. L.
107, Chemin de Ronde 78290
Croissy-sur-Seine
info@stulz.fr

STULZ S.p.A.
Via Torricelli, 3
37067 Valeggio sul Mincio (VR)

STULZ-CHSPL
(India) Pvt. Ltd.
006, Jagruti Industrial Estate
Mogul Lane, Mahim
Mumbai - 400016

STULZ México S.A. de C.V.
Avda. Santa Fe No. 170
Oficina 2-2-08, German Centre
Delegación Alvaro Obregon
MX- 01210 México
Distrito Federal

STULZ GROEP B. V.
Postbus 75
180 AB Amstelveen

STULZ New Zealand Ltd.
Office 71, 300 Richmond Rd.
Grey Lynn, Auckland

STULZ Polska SP. Z O.O.
Budynek Mistral.
Al. Jerozolimskie 162
02 – 342 Warszawa

STULZ Singapore Pte Ltd.
33 Ubi Ave 3 #03-38 Vertex
Singapore 408868
andrew.peh@stulz.sg

STULZ Air Technology and
Services Shanghai Co., Ltd.
Room 406, Building 5
457 North Shanxi Road
Shanghai 200040

STULZ South Africa Pty. Ltd.
Unit 3, Jan Smuts Business Park Jet
Park, Boksburg
Gauteng, South Africa

STULZ U. K. Ltd.
First Quarter,
Blenheim Rd. Epsom
Surrey KT 19 9 QN

OD10016E July 2017

www.stulz-usa.com