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V-20

20 LPM Desiccant Air Dryer

Installation and Operation Manual



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Cautions, Warnings and Hazards

The aluminum tubes on the top of the unit get extremely hot! Do not touch these tubes while the unit is ON. Ensure that the tubes are not in contact with any material as fire may result.

Ensure that the Air Dryer is in a well-ventilated area. If the space is occupied, sufficient ventilation must be provided to prevent the accumulation of moisture in the space. Approximately 6-10 air changes per hour are necessary.

Do not allow rain or condensation to contact the Air Dryer. The Air Dryer is not weather proof. The unit must be operated indoors or in an enclosure in a non condensing environment.

Introduction

The V-20 Air Dryer is a device that removes moisture from the air to provide a very dry feed gas to ozone generators or other equipment. The air is dried to a -5 deg C dew point. The captured moisture is purged out of the unit during a purging cycle and sent back into the environment. The unit can dry air up to a rate of 20 LPM (60 SCFH/1 SCFM) if the environment is very dry. The air dryer cannot move air into or out of the unit, therefore a device must be used downstream (i.e. compressor or venturi) to pull air through the unit.

Typical applications for the V-20 Air Dryer include Corporate based research & University Research & Development using ozone. The unit can be used to provide dry air for commercial ozone equipment in water treatment or any other application where ozone is needed.

Theory of Operation

The operation of the Air Dryer is based on the heat regenerative cycle to purge the moisture from the desiccant. The desiccant absorbs water vapor when cool and will release it back to the environment when heated to 300-deg F during the purge cycle. The Air Dryer constantly cycles between the two tubes to create dry air without interruption.

Specifications

Dry Air Output

20-LPM (40-SCFH) from 55-deg F Dew Point ambient air. (See Dew point chart below)

Environmental Conditions

Indoor Use Only! (Operating a dehumidifier in the room of the V-20 is ***strongly*** recommended)

55-deg F dew point maximum(see chart below)

Temperature (Operating): 55°F to 95°F

Temperature (Storage): -20°F to 120°F

Relative Humidity: (see chart below)

No Dust, Oil Vapors or Volatile Organic Compounds (VOCs)

This chart below shows the maximum allowable humidity for each ambient temperature the V-20 can operate at. This unit will operate at humidity levels higher than specified, assuming the flowrate is reduced.

**55°F (12.8°C) Dewpoint
Temperature vs. Relative Humidity**

Ambient Temp F	Ambient Temp C	Max. Allowable R.H.
55	12.8	99%
60	15.6	82%
65	18.3	70%
70	21.1	59%
75	23.9	49%
80	26.7	42%
85	29.4	35%
90	32.2	30%
95	35.0	26%

Mechanical Specifications

Dimensions: 21-inch H x 10-inch W x 4-inch D (533mm H x 245mm W x 102mm D)

Weight: 25-lbs (11.3 kg)

Electrical Specifications

120V/60 Hz, 1.0 Amps, 100 Watts Average Power Consumption

Installation

Place the unit in a room or laboratory that has either a dehumidifier or central air conditioning. It is important to keep the dew point in the area below 55-deg F. For more information review the previous page.

Mount the Air Dryer vertically and secure it to the wall using keyholes on the back of the unit. Vertical mounting is needed to enhance the purging of moisture from the desiccant towers. **WARNING:** Ensure nothing touches the aluminum cylinders as they get extremely hot!

Be certain there is sufficient access space around the V-20 Air dryer to perform normal maintenance and service. Also ensure there will be a free flow of cooling air around the unit. Connect the unit to a grounded power source rated for the voltage and current requirements stated on the label on the unit.

Once the unit is plugged in, a white light will illuminate. There is no ON/OFF switch. After a 6 hour warm-up time, the unit is ready to use.

IMPORTANT: Choose a location for the air dryer that does not allow rain or condensation to contact the unit. The air dryer is not weather proof. It must be operated indoors or in an enclosure in a non condensing environment.

Connections:

The dry air connection is located on the bottom of the V-20 Air Dryer. This connection is a 1/4-inch stainless steel slip connection. 1/4-in ID tubing can be slid over this connection and clamped to prevent leaks. Ensure this tubing is sealed to the slip connection as this will operated under a vacuum. In the event of a leak moist ambient air can enter the tubing and contaminate your dry air stream. Any type of PVC, or polyethylene, grade tubing from your local hardware store can be used.

The dry air connection can also be converted to 1/4-inch compression fitting by installing a compression nut, and ferrule set. This will allow stainless steel tubing to be attached to the V-20 Air Dryer.

Initial Start-Up

Ensure the V-20 Air Dryer has been powered for at least 6 hours before air flow is started. This will allow any moisture absorbed during storage to purge from the desiccant.

After the V-20 has been properly warmed up and purged air flow can be started through the unit. Regulate this air flow to no more than 20 LPM of air.

Operation

The V-20 Air Dryer works automatically. If the rest of the system is to be shut down for any reason, do not shut down the V-20. The V-20 should remain powered up at all times.

If power to the V-20 is lost due to a power outage for more than 20 minutes the V-20 should be allowed to purge for 6 hours prior to air flow being resumed through the system. The 6 hours of purge time is needed since, the V-20 timing board does not remember its last cycle and can apply heat to a cylinder that should be providing dry air. This will cause moist air to be delivered from the opposite cylinder into the ozone generator causing decreased generator reliability.

WARNING: The air dryer tubes will become *extremely hot*. They will burn skin easily! Make sure that they are not touched while the unit is in operation.

In the event the moisture indicator crystals (colored crystals at the bottom of the unit) turn from blue to any other color reduce the air flow through the unit and/or improve the ambient conditions. Please see the color chart and course of actions found on the following page.

Maintenance

The only maintenance required for the V-20 Air Dryer is desiccant replacement. This should be done any time the moisture indicator irreversibly turns from blue to any color, or every year regardless of moisture indicator color. If any other repairs are needed call Ozone Solutions, Inc prior to any repair work.

Daily Maintenance:

The fan must be running and the airflow unobstructed. If the FUSE light is lit, call for service.

The moisture indicator should remain DARK BLUE all times. If the color changes, the new color will indicate:

PURPLE/White - the dew point is above the allowable -5°C . If a **power failure** took place within last five hours, continue to operate as is. Disconnect the tubing from the ozone generator and allow the unit to purge for 6 hours. If the ambient humidity or temperature is too high, repair this condition. After 6 hours, reconnect the tubing to the ozone generator to permit air flow through the V-20. After about 15 minutes, the indicator should turn dark blue again. If not, replace the desiccant inside the V-20, the moisture indicator should return to blue on it's own after this.

BLACK - the blue crystals are permanently damaged by an **exposure to ozone**. Check and restore the room ventilation or repair the ozone leak.. The desiccant & the moisture indicator

inside the V-20 should also be replaced at this time it has been damaged due to ozone exposure and will not recover.

YELLOW - the blue crystals are permanently damaged by an **exposure to oil vapors**. The source of the problem must be identified and removed. In this case, the air-drying desiccant in aluminum cylinders and moisture indicator must be replaced.

PINK/RED - the blue crystals are permanently damaged by an **exposure to acid vapors** in the air. The source of the problem must be identified and removed. Examples: A solid fuel burner near by, overcharged battery. The moisture indicator and air drying desiccant will both need to be replaced as they will not recover from this condition.

Annual Maintenance:

The desiccant inside the aluminum tubes of the V-20 will need to be replaced. Replacement is required of the color of the moisture indicator or ambient conditions.

Biennial Maintenance (every 2 years):

There is a small air pump inside the V-20 used to purge the desiccant of moisture. Open the cover and ensure this pump is still operational. The diaphragm should be intact and the top cover should be moving rapidly up and down during the purging cycle. The pump runs approximately 1.5 hours ON and 1.5 hours OFF.

Service Parts

Service parts listed below can be obtained directly from Ozone Solutions. Parts not listed are not considered regular service items. Please contact Ozone Solutions directly for further information on other parts.

Service Part	Ozone Solutions Part Number	Quantity Used
Air drying Desiccant	Z-9-Desiccant	5 lbs
Moisture Indicator	MI-1	1
Purge Air Pump	5050	1

Warranty

This piece of equipment is warranted against defects in workmanship and labor for period of 1 year on all parts that are not outlined in the maintenance schedule. The liability is limited to the value of the equipment; Ozone Solutions shall not be liable for incidental or consequential damages. This warranty will be void if any piece of the equipment is used in any other manner than is explicitly outlined in the manual.

In lieu of all other warranties, express or implied, we warrant the equipment covered by this warranty, to be free from defects in material and workmanship under normal use and service. Our obligation under this warranty is limited to repairing or replacing any part or correcting any workmanship defective at time of installation and with respect to which a claim specifying the particular defect shall be delivered to us within (1) year from the acceptance of the equipment by you. Defective, repair, or replacement parts shall be returned to us F.O.B. factory. The removal by you of parts returned to us for repair or replacement and the installation by you of replacement or repaired parts shall be at your expense.

We do not warrant equipment manufactured by others, but will submit to you upon request the manufacturer's warranty. We do not assume any other liability in connection with the equipment covered by this proposal or its installation or erection, for loss of production, product, equipment, profits and liability for consequential damage to persons or property. We will make no allowances for repairs, alterations or other work done unless specifically agreed to in writing. It is the customers responsibility to ensure this system is operated in accordance to the specific O&M procedures provided.

How to Contact Ozone Solutions

By mail:

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