User Guide

AEHD Externally Heated Desiccant Air Dryer

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www.nano-purification.com

EXTERNALLY HEATED REGENERATIVE DRYERS
OPERATION MANUAL

Introduction

Thank you for purchasing the nano Aircel Externally Heated Desiccant Air Dryer. You are now the proud owner of one of the finest desiccant dryers in the market. nano Aircel dryers are engineered and manufactured to provide you with many years of trouble free service. To ensure that you get first class service from this equipment, we recommend you take some time and read the contents of this manual.

This manual contains information required for installing and maintaining your new equipment. It also includes the safety procedures and corresponding drawings. We strongly suggest that all personnel involved with the machine, read the entire contents of the manual before proceeding with the installation or maintenance activities.

Dryer Type	
Dryer Model Number	
Dryer Serial Number	
Dryer Year of Manufacture	

The manufacturer reserves the right to make changes without any prior notification and is not obligated in any manner. Information in this manual is deemed current at the time of publication and nano disclaims all liability for any errors resulting in any loss or damage.

If you have questions or need additional copies or would like to schedule a nano serviceman visit, contact your distributor.

WARNING: This product can expose you to chemicals including lead, which is known to the State of California to cause cancer and/or birth defects or other reproductive harm. For more information, go to www.P65Warning.ca.gov.

Safety Instructions

Safety symbols used in the manual

 This represents Important Information. Readers of the manual must pay extra attention to instructions and information succeeding this symbol.

 This is a Warning symbol. It indicates that it is dangerous and could result in physical injury and death if the instructions are not followed correctly.

 Electrical Danger High Voltage symbol. This means that there is a risk of electric shock and only authorized personnel with proper gear must approach it

 High Noise Area - All personnel are required to wear ear protectors before approaching the vicinity of the equipment

 Hazardous Fumes and gases – Personnel must wear protective gear to prevent inhaling of the gases and fumes

 Suspension points – look for these symbols before making any attempt to move or relocate your equipment

 This represents valuable tips and suggestions. Following these tips can make your work easier

 This indicates that there might be possible risk of material damage and personnel are advised to exercise extra caution

General Safety Instructions

What you must do: 

1. Certified/authorized electricians must perform electrical work
2. Electrical work must conform to the specifications indicated by nano and the local state laws and Power Company.
3. Personnel must wear appropriate safety gear before working on any electrical or mechanical aspects of the machine.
4. Appropriate tools have to be used for all installation and maintenance work. If special tools are required and are not available to the installation crew, contact the factory or your nano Aircel representative.
5. A copy of the Operation Manual must be made available to all personnel involved with the installation, operation and maintenance of the equipment.
6. Before performing any maintenance operations on the equipment, the unit must be halted and completely depressurized.
7. To ensure compatibility and continued trouble free operation, only genuine nano Aircel parts must be used.

What you must not do:

1. Do not make constructional changes to the unit. Only nano or its authorized representatives with the prior approval can perform any constructional work on the machine.
2. Do not use parts other than nano Aircel parts.
3. Compressed air from the dryers is not to be used for breathing purposes – install a breathing air package to ensure conformance with OSHA regulations
4. Do not disable or disengage any protective equipment used on the machine.

Safe operating procedures:

1. Pressurize and depressurize compressed air SLOWLY! Always open air valves slowly when pressurizing the air line system or equipment. Replace air slowly when depressurizing your air system or equipment.
2. Circuit breakers, fusible disconnects, and wiring should conform to national and/or local electrical codes. Make certain that the electrical installation for this unit is performed by qualified electrical personnel.

3. Only use original fuses for the rated voltage and current.
4. Shut down the unit in the correct recommended procedure. Depressurize the unit and remove all electrical connections.
5. After shut down, put up warning notice to prevent the unit from being switched "ON" accidentally.
6. Inspect all piping, hoses and connections. Make sure that all hoses are in good condition and are rated for the correct working pressure. Do not allow hoses to come into contact with oil, chemicals, or sharp objects.

7. Secure condensate drain lines. Unsecured flexible drain lines may whip violently under pressure and may cause bodily harm.

nano Aircel air dryers do not remove carbon monoxide and is not safe for human respiration (breathing). Breathing air must be at least grade D quality as described in compressed air and gas association (CAGI) commodity specifications 67.1-1966. User may refer to OSHA 29 CFI 1910.134 for special precautions and equipment suitable for breathing air applications. nano disclaims any liability what so ever for loss, injury or damage.

Unpacking and Inspection:

All nano Aircel dryers are tested and operated before shipment. However, during shipment it can get damaged or certain parts might come loose. To ensure you have a smooth installation we recommend –

Immediately upon receipt of the unit, check carefully for external damage that may have occurred in shipping. In the event of any damage, immediately file a claim with the carrier and notify your nano Distributor or the factory 704-897-2182 of the nature of the damage. The carrier is legally responsible for all damages.

After you are assured that the unit has not sustained any external shipping damage –

1. Make sure you have received all the crates/packages that are indicated in the packing slip.
2. Remove the crate and packaging.
3. Inspect the unit for any internal damages. If you notice anything, follow the same procedure as above and notify the shipping agency and factory.
4. Check the nano Aircel nameplate and make sure that it is the correct Model that you had ordered.
5. Note the equipment Capacity and Power Supply requirements and ensure that they are in accordance with your specifications. The rated conditions of the dryer are indicated on the data plate. If you notice any discrepancy, contact the nano Aircel representative or the factory at 704-897-2182.

Vibration during shipping can loosen the connections. So inspect all pipe and tubing and make sure they are all tightened and secured.

Product Description

Why we need compressed air dryers

Untreated compressed air contains many contaminants such as water, compressor oil, pipe scale and contamination from ambient air. these contaminants cause excessive corrosion, erosion, freezing and product contamination to components that come in contact with the untreated compressed air. A regenerative type dryer system with recommended filtration will remove these contaminants to harmless levels. The end result is that instruments that come in contact with the dry compressed air stay clean and do not corrode, therefore lasting much longer. Products that may come in contact with clean dry compressed air is virtually unaffected, hence rejection rates are reduced.

nano ircel Regenerative Desiccant Air Dryers can dry compressed air down to -40°F PDP (Pressure Dew Point). The compressed air stream is passed through a desiccant bed, which removes the moisture through the process of adsorption. Twin towers filled with desiccant alternate between drying and regeneration either based on an energy management system or a fixed time cycle. n a n o Aircel manufactures various types of desiccant air/ gas dryers. These dryers offer fail-safe design in the event of power interruption, along with tower operating status indication and the highest quality non-lubricated air/gas inlet valves to ensure reliable operation for many years to come.

Standard Features:

- Optimal tower size for low velocities, high contact time and minimal desiccant fluidization
- Tower pressure relief valves.
- Purge adjustment valve to control purge flow.
- Purge flow indicator
- Purge exhaust mufflers for quiet operation.
- Tower pressure gauges.
- Stainless steel desiccant supports and air diffusers to prevent channeling.
- Counter-current reactivation.
- Advanced PLC controls with display
- Energy management system (monitors sample air from each desiccant bed and extends drying time under lower load conditions to reduce energy cost)
- Controlled repressurization.
- Fail safe design: failure of electrical power causes the purge exhaust valves to close.
- Control pilot air filter.
- Desiccant towers are designed and fabricated according to ASME code
- Desiccant fill and drain ports for ease of desiccant replacement.
- Structural steel frame
- ON/OFF switch and power ON light.
- Common alarm indicator
- Common alarm dry relay contact for remote indication
- Failure to shift alarm using pressure transducers
- High heater temperature alarms
- Heater insulation
- Hot purge air pipe insulation
- NEMA 4 electrical construction

Optional Features:

- NEMA 7 (Explosion Proof) electrical construction.
- Outlet dew point sensor with dew point readout on system display (also includes outlet high humidity and integration into the dryer energy management control system)
- Outlet dew point 4-20 ma signal
- Pre-piped filters and by-pass valve packages
- Visual moisture indicator
- Tower vessel insulation

Technical Specifications

How does it work?

nano Aircel’s Fully automatic, dual-tower externally heated desiccant dryers continuously adsorbs water vapor from compressed air. The air is dried as it passes through the desiccant bed of one tower while the bed in a second tower is being reactivated. Reactivation of the saturated desiccant is accomplished with the use of heat. The desiccant bed is reactivated by expanding a portion of the system's dried outlet air through an orifice to near atmospheric pressure. This dry low-pressure air is then passed through a heater and into the chamber being reactivated in a direction counter to drying circuit. As it passes through the desiccant, the hot air adsorbs the moisture from the surface of the desiccant and is vented into the atmosphere through the purge exhaust valves. Dryer operation is performed automatically via a PLC controlled electrical system. In order to prevent line surge and to minimize desiccant attrition, switching from one chamber to the other is carried out only when both desiccant chambers are at equal pressure. The tower being reactivated will be re-pressurized at the end of its reactivation cycle before switch-over takes place. Purge flow and depressurization are in a downward direction, counter to the drying flow which is upward.

Design parameters of the Dryer:

Type of Dryer:
Model Number:
Power Supply:
Heater KW:
Pressure vessel:
- Rated Pressure in PSIG:
- Design Pressure in PSIG:
- Rated Temperature in Deg. F:
- Design Temperature in Deg. F:

Timer Setting:
- Adsorption Time in minutes:
- Regeneration Time in minutes:
- Repressurization Time in minutes:

Type of Insulation:
Inlet and Outlet Size in Inches:
Overall Dimensions (L x B x H in inches):
Desiccant:
- Type of Desiccant:
- Size of Desiccant in inches:
- Chemical composition:

Parameter Description	Optimum	Maximum	Minimum
Air Flow in SCFM			
Air Pressure in PSIG			
Air Inlet Temperature in Degrees F			
Ambient Temperature in Degrees F			
Purge Air Flow in SCFM			
Purge Line Air Pressure			

Pre-requisites for Installation:

To ensure a safe and smooth installation, we recommend you go through the steps indicated below:

- Make sure that all personnel involved have read this Operation Manual thoroughly. If you have any questions, feel free to contact your nano Aircel representative or the factory and we will be glad to assist you. If you need help with the installation and commissioning, we will be glad to schedule a factory serviceman to visit your site and perform the entire process of installation for a nominal fee.
- Have extra copies of the Operation Manuals
- Special care must be taken while transporting the unit to the installation site.
- Dryer must not be moved or lifted by the attached piping

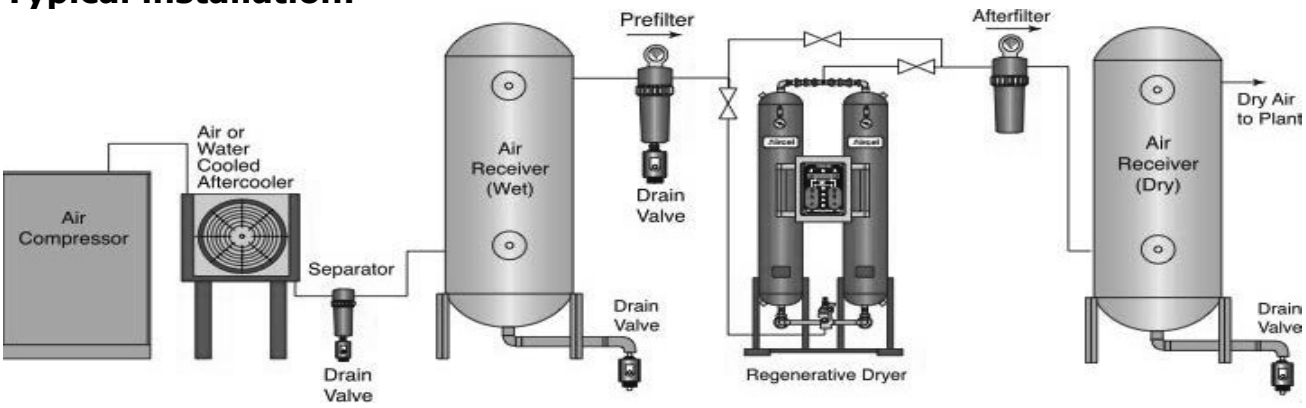
Location:

- Careful consideration should be given to the location of the dryer in order to assure optimum results. Ensure that the load bearing weight of the floor is adequate for the weight of the dryer.
- The dryer should be located in an open area and a level ground. Dryer should be bolted to the floor to eliminate vibrations.
- The ambient temperature should be between 40 Deg.F and 100 Deg.F. In conditions where the ambient drops below freezing, nano Aircel recommends the use of heat trace for the equipment.
- Dryer and accompanying filters should be installed with at least 3 feet clearance from the adjoining walls to provide easy access for routine maintenance.

Installation

Note: Only Qualified personnel should make electrical and mechanical connections.

Typical installation:



Foundation:

Dryer should be mounted on a suitably structured flat and level floor or base that is free from vibration. Special care must be used when lifting the dryer to prevent tip-over

Mounting:

Bolt dryer to the foundation using the bolt holes provided in the frame.

Piping:

Make certain the piping components are rated for the system pressures and temperatures. Outlet piping and components should be rated for at least 250 deg.F. temperature (this temperature should not be seen for more than 20 min. at the end of each half cycle ... which is once every 4 hours)
Connect the inlet of the dryer to the moist gas from the compressor/receiver/inlet filter. Install the inlet piping and the inlet shutoff valve. Install the Outlet piping and the outlet shutoff valve (a union with a valve by-pass can be installed at the inlet and outlet valves to accommodate isolation of the dryer for maintenance).
Compressed air piping has to be at least the same size as that of the inlet and outlet connections of the dryer. Larger pipe sizes can be used with reducers.

Back Pressure regulators:

Install backpressure regulator at the air outlet of the dryer to prevent any possibility of fluidization of the desiccant bed. When there is a sudden increase in the demand for compressed air downstream of the dryer, a huge pressure drop develops which can affect the performance the dryer and reduce the life of the desiccant bed media.

Desiccant:
Make sure that the dryer towers are filled with desiccant. Larger dryers may have desiccant shipped separately – in which case, the media has to be filled into the pressure vessels from the desiccant fill ports. Care must be taken when filling the media and it must be done gradually to prevent powdering.

Muffler:
In the event that mufflers have been shipped loose, they must be installed and secured

By-pass:
If the dryer is not supplied with optional block and by-pass valve system it is highly recommended that a block and by-pass valve system be installed around the dryer and filters. This block and by-pass valve system will permit the dryer and filters to be removed from the compressed air system for servicing without shutting down the entire compressed air system. Ensure that the bypass valves are rated for more than 250 Deg. F.

Electrical:


Make all electrical connections to the System as shown on the wiring diagram. Special care must be taken in connecting the proper voltage as indicated on the specification sheet and wiring schematic. It is recommended to supply power to the purifier through a customer supplied fused disconnect switch to remove all power to the purifier.
Note: It is mandatory that System be grounded.
A fused disconnect is not supplied with this equipment therefore one must be supplied by customer. All electrical fuses, breakers, etc. should be properly sized.
nano is not liable for any code violations, component damage, downtime or consequential damage related to customer supplied electrical components and connections.

Exhaust:
If you intend to vent your exhaust with additional piping, the discharge piping from the exhaust should not be piped upward without an arrangement for removing trapped condensate. Make sure that you do not apply a backpressure on this exhaust system, additional piping length generally should be of a larger diameter than the purifier system exhaust piping.

Condensate drain piping:
The automatic drain can be piped to an open drain system if allowed, or to condensate treatment system then to an open drain system. Make sure the piping is secured and can be removed if filter bowl needs to be removed for servicing.

Equipment for Installation

This dryer doesn't require special tools for installation.

Start-up procedure

At any point during the process of startup or shutdown, if you notice anything unusual; we recommend you refer to the operation manual immediately. If you cannot find the answer in the troubleshooting section, contact your nano Aircel representative or the factory at once.

(NOTE: REFER TO THE ELECTRICAL, FLOW , MECHANICAL DWGS AND DISPLAY SCREEN SHOTS AND DESCRIPTIONS)

1. MAKE CERTAIN THE CORRECT VOLTAGE IS SUPPLIED TO THE DRYER.

2. MAKE CERTAIN AIR INLET AND AIR OUTLET ARE PIPED CORRECTLY. (AIR INLET GOES TO BOTTOM OF DRYER, AIR OUTLET GOES FROM TOP OF DRYER)

3. THE DRYER OFF/ON SWITCH INITIALLY SHOULD BE IN THE OFF POSITION

4. MAKE CERTAIN THE INLET COALESCING PREFILTER DRAIN ISOLATION MANUAL VALVE IS OPEN.

5. IF THERE ARE BLOCK AND BYPASS VALVES MAKE CERTAIN THE OUTLET BLOCK VALVE IS CLOSED AND THE BYPASS VALVE IS OPEN. THE INLET BLOCK VALVE SHOULD BE OPEN. (ALWAYS OPEN VALVES SLOWLY).

6. SLOWLY PRESSURIZE THE DRYER VESSELS TO OPERATING PRESSURE, ONE DRYER VESSEL WILL PRESSURIZE SLOWER THAN THE OTHER. IF THE OTHER VESSEL DOES NOT PRESSURIZE OPEN THE PURGE ADJUSTMENT VALVE TO PRESSURIZE.

7. MAKE CERTAIN THE CONTROL AIR PRESSURE IS SET FOR 100 PSIG ADJUST VIA. THE CONTROL AIR PRESSURE REGULATOR LOCATED AT FRONT OR REAR OF DRYER.

8. THE DRYER CAN NOW BE TURNED ON VIA THE POWER OFF/ON SWITCH.

(CONTINUED NEXT PAGE)

9. AFTER DRYER IS ON AND OPERATING ONE TOWER WILL SOON DEPRESSURIZE TO ATMOSPHERIC PRESSURE. THE PURGE ADJUSTMENT VALVE CAN NOW BE ADJUSTED TO 55 PSIG READ ON THE PURGE PRESSURE GAUGE. INCREASE OR DECREASE PURGE PRESSURE VIA PURGE ADJUSTMENT VALVE.

10. NOW OPEN THE OUTLET BLOCK VALVE SLOWLY. THEN CLOSE THE BYPASS VALVE. THE AIR WILL NOW FLOW THROUGH THE DRYER THEN TO THE CUSTOMER PROCESS AIR SYSTEM.

11. WHEN UNIT IS IN OPERATION THE DISPLAY ON THE ENCLOSURE DOOR WILL SHOW THE DRYER STATUS AND ANY ALARM CONDITIONS (REFER TO THE DRYER DISPLAY SCREEN SHOTS AND DESCRIPTIONS).
    THE CONTROLS HAVE A SERVICE MODE TO ALLOW THE OPERATOR TO CHECK TO MAKE CERTAIN THE DRYER OPERATES CORRECTLY IN EACH STEP (NOTE: JUST MAKE CERTAIN TO RETURN TO THE VESSEL THAT WAS PREVIOUSLY ON-LINE (DRYING) BEFORE SERVICE MODE/QUICK STEPPING WAS ACTIVATED, (CAUTION: ALLOW TIME TO FULLY REPRESSURIZE AND DEPRESSURIZE BEFORE ADVANCING TO NEXT STEP.)

12. WHEN AN ALARM CONDITION IS ACTIVE THE DISPLAY WILL SHOW A FLASHING TRIANGLE, GO TO THE ALARM SCREEN TO SEE WHAT ALARM OCCURRED. THE SHUTDOWN ALARM LIGHT ON THE DOOR IS ACTIVE IF THE ALARM IS A SHUTDOWN ALARM, SUCH AS A PRESSURE PROBLEM OR A HIGH TEMPERATURE PROBLEM, THESE ALARMS WILL ALL REQUIRE MANUAL RESETTING. THE SHUTDOWN ALARM RELAY WILL DE-ENERGIZE.
    IF AN ALARM IS AN EMS (ENERGY MANAGEMENT SYSTEM) OR HIGH HUMIDITY TYPE ALARM THE BLINKING ALARM TRIANGLE WILL OCCUR AND THE EMS ALARM RELAY WILL DE-ENERGIZE, BUT THE RED LIGHT ON THE DOOR WILL NOT ENERGIZE, THIS ALARM DOES NOT NEED MANUAL RESETTING.
    AFTER PROBLEM HAS BEEN CORRECTED THE PRESSURE ALARM CONDITIONS WILL NEED TO BE MANUALLY RESET, TEMPERATURE ALARMS WILL ALSO NEED TO BE MANUALLY RESET.
    (NOTE: THERE IS A SEPARATE SET OF DRY ALARM CONTACTS FOR THE SHUTDOWN ALARMS... AND ALSO, FOR THE EMS OR HIGH HUMIDITY TYPE ALARMS, FOR REMOTE INDICATION ARE AVAILABLE INSIDE THE ENCLOSURE, SEE ELECTRICAL DWG. FOR TERMINAL NUMBERS)

13. HEATER TEMPERATURE CONTROLS SETTINGS ARE ALL FACTORY SET. THE TYPICAL SETTING FOR THE **HEAT CONTROL** (OR PURGE AIR TEMPERATURE) IS 375 DEG.F. TO 400 DEG.F.
    HEATER MID-RANGE TEMP SETTING: 850 DEG.F.
    HEATER HIGH LIMIT TEMP SETTING: 1000 DEG.F.
    PURGE AIR HIGH LIMIT TEMP SETTING: 500 DEG.F.

14. MAKE CERTAIN THE EMS (ENERGY MANAGEMENT SYSTEM) FLOW ADJUSTMENT NEEDLE VALVE ON THE BACK OF THE DRYER (ATTACHED TO A 6" LONG ALUMINUM BLOCK (WHICH HOUSES THE EMS SENSOR) IS ADJUSTED TO ALLOW A SLIGHT AMOUNT OF FLOW OUT OF THE EXHAUST COIL TO AMBIENT.

15. IF THE SYSTEM HAS AN OPTIONAL OUTLET DEW POINT SENSOR WITH HIGH HUMIDITY AND OUTLET DEWPOINT DISPLAY ON THE PANEL DISPLAY... VERIFY THE NEEDLE VALVES ARE SET PROPERLY.... THE VALVE PROIR TO THE DEWPOINT SENSOR SHOULD BE FULLY OPEN ... THE VALVE AFTER THE SENSOR SHOULD BE SLIGHTLY CRACKED OPEN UNTIL A SLIGHT AMOUNT OF AIR IS FELT AT THE END OF THE EXHAUST COILED TUBE TO AMBIENT. THESE DJUSTMENTS WILL SETUP THE AIRFLOW FOR THE DEW POINT SENSOR.

16. THE OPTIONAL DEWPOINT CONTROL (**DP**) SETTING IS SET AT -50 PDP, AND THE **HUMIDITY ALARM** IS SET FOR +10 DEG.F. (THESE SETTINGS CAN BE CHANGED IF NEEDED... RECOMMENDED RANGE OF DEWPOINT CONTROL ADJUSTMENT SHOULD BE WITHIN -20 TO -70 PDP)

17. THE DRYER CYCLE TIMES ARE:

    4 HOURS DRYING
    2 MINUTES DEPRESSURIZATION
    180 MINUTES HEATING
    55 MINUTES COOLING
    3 MINUTES REPRESSURIZATION

Shut-down procedure

(**caution:** disconnect main high voltage to the dryer before removing heater fuses or working on the electrical system)

Note: this type of dryer operates best if left "on" whenever possible with air supplied to the unit.
The unit can be left pressurized after the dryer is switched off.
If the dryer needs to be turned off and depressurized, do the following:

1. Slowly OPEN the by-pass valve.
2. Slowly CLOSE the Inlet and outlet "shut-off" valves.
3. The dryer can be depressurized through the manual drain valve on the outlet afterfilter... then allow the system to depressurize. When both towers are depressurized take the system out of the service mode then turn power off and disconnect/remove main power to the dryer then replace the heater fuses. (Refer to screen shots and descriptions for service mode operation)

Operation

After the initial startup, the dryer operation is completely automatic. To understand the details of the operation, we recommend you use the flow diagram and the timing sequence of the dryer.

Fully automatic, dual-tower externally heated desiccant dryers continuously adsorbs water vapor from compressed air. The air is dried as it passes through the desiccant bed of one tower while the bed in a second tower is being reactivated. Reactivation of the saturated desiccant is accomplished with the use of heat. The desiccant bed is reactivated by expanding a portion of the system's dried air through an orifice to near atmospheric pressure. This dry low-pressure air is then passed through a heater and into the chamber being reactivated in a direction counter to drying circuit. As it passes through the desiccant, the hot air adsorbs the moisture from the surface of the desiccant and is vented into the atmosphere through the purge exhaust valves. Dryer operation is performed automatically via a PLC controlled electrical system. In order to prevent line surge and to minimize desiccant attrition, switching from one chamber to the other is carried out only when both desiccant chambers are at equal pressure, before the end of the repressurization period the EMS system checks moisture in the drying tower desiccant bed, if low enough the drying tower will remain on-stream drying for an extended period of time, if moisture level is high the towers will switch.
Purge flow and depressurization are in a downward direction, counter to the drying flow which is upward.

Maintenance

Prior to performing any maintenance on the dryer, all personnel are strongly advised to familiarize themselves with the equipment by reading the entire contents of this operation manual. nano strongly recommends the strict adherence of all the safety procedures prior to any performing any maintenance activity on the dryer.

A. The pressure differential indicator referred to as the “Delta-P” is a very good indicator of the state of the filter elements. Maintenance personnel must pay attention to these to keep the dryer running with full efficiency.
B. The useful life of a filter element depends on the quality of air.
C. Powdered desiccant can accumulate in the muffler and increase the backpressure in the regenerating tower.
D. Oil and oil vapor can drastically reduce the life of the desiccant. Take precautions to eliminate all traces of oil from the airflow

Weekly checklist:

1. Check all drain valves, prefilter, afterfilter and separators
2. Check each filter pressure differential indicator, if it turns red or differential pressure is too high (5-6 psid) replace the element. A typical rule of thumb for element replacement is every 3000 hours of operation. Elements can be replaced more often if the higher pressure differential can't be tolerated.
3. Check dryer operation... make certain all control panel lights and display sequences are functioning properly with dryer operation.
4. Verify the control air pressure is set at 100 psig
5. Verify the purge air pressure is set at 55 psig.
6. Verify prefilter drain is operating.
7. Verify the Dewpoint is being achieved (if equipped) .
8. Verify dewpoint sensor needle valves are set correctly (if equipped) .
9. Check mufflers, clean or replace as needed... (note: it is recommended to change muffler/s after first week of operation ... then, every 3 to 6 months thereafter.

Semi-annual checklist:

1. Repeat weekly checklist
2. Remove and inspect all filters for excessive particulate loading and physical damage – if required replace prefilters, afterfilters, pilot air filter and mufflers
3. Check desiccant condition. Powder in the mufflers is one indication of the status of the desiccant
4. Check all solenoid valves – check valve seating, coil condition and control circuit

Annual checklist:

1. Replace prefilters, afterfilters, pilot air filter and mufflers.
2. Recalibrate outlet dewpoint sensor probe (if equipped).
3. Check desiccant condition. Powder in the mufflers is an indication of the status of the desiccant
4. Check all solenoid valves – check valve seating, coil condition and control circuit
5. Check dryer operation... make certain all control panel lights and display sequences are functioning properly with dryer operation.
6. Verify the control air pressure is set at 100 psig
7. Verify the purge air pressure is set at 55 psig.
8. Verify prefilter drain is operating.
9. Verify the Dewpoint is being achieved (if equipped).
10. Verify dewpoint sensor needle valves are set correctly (if equipped).

Troubleshooting

The following section briefly discusses the various faults that can occur in the dryer, the reason of the fault and how it can be rectified. If you do not find the solution to your problem, contact your nano Aircel representative or the factory. All necessary safety and precautionary steps must be followed before attempting to perform any of the recommended measures to resolve any faults in the air dryer.
Before any attempt is made to undertake any action, the machine must be shut down. Follow the shut down procedures.

1. Depressurize the unit
2. Check to make sure if the unit has been damaged externally or if any part is missing.
3. Check if there is proper power supply and if it corresponds to that mentioned on the data plate.
4. Check to see if there is power at all the electrical connections in the machine and if it's the required amount
5. Check if control air is available all pneumatically operated components
6. Make sure all shut-off valves are in the correct position
7. Check the Airflow, inlet temperature and pressure and make sure it falls within the operating range

Problem/Reaction of the Unit	Possible Cause	Measure to be taken
High dew point	High inlet air flow.	Reduce inlet air flow.
	Inlet air temperature above design spec.	Reduce inlet air temperature to design spec.
	Poor pre-filtration.	Check pre-filter element.
	Inlet air pressure below design spec.	Increase pressure to the dryer.
	Desiccant contaminated.	Replace desiccant.
	Purge flow shut off or not properly adjusted.	Set purge flow to correct setting using purge adjustment valve.
	Back pressure in regenerating chambers.	Mufflers are clogged, install new mufflers.
	Repressurization valve not closing, or leaking.	Clean and re-pack valve.
	Exhaust valve(s) not fully opening or closing.	Clean and re-pack exhaust valve(s).
High dew point	Controller energy management, dewpoint or high humidity settings not set correctly	Check settings, set as needed, recommended settings are in the display screen shot section

	Outlet dewpoint sensor out of calibration or bad	Recalibrate outlet dewpoint sensor or replace
	Bed RH sensor for EMS system not functioning correctly	Replace bed RH sensor
	Outlet check valve leaking.	Clean and re-pack check valve.
	Purge check valves leaking.	Clean and re-pack both check valves.
	Low heater temperature or heater not working	Check heater temperature controller adjust if necessary. Check thermocouples. Check PLC. Checks fuses
High-pressure drop.	High inlet flow rate.	Reduce inlet flow rate to meet dryer spec.
	Inlet prefilter dirty.	Inspect and replace as needed.
	Low inlet pressure.	Increase inlet pressure to design pressure.
	Desiccant dusting.	High inlet flow velocities due to high flow.
Dryer fails to switch towers.	Inlet valve not operating.	Check for pilot air signal.
	No input power.	Check to assure that dryer is being on with correct voltage.
	Exhaust valves(s) not functioning.	Check exhaust solenoid valve.
	Pilot air supply restricted.	Check pilot filter, and pilot tubing restriction.
	Controller malfunction	Reset controller. If it does not reset, replace.
Purge Failure	Purge flow control valve or orifice clogged	Remove orifice and clean
	Purge exhaust valve fails to close	Check solenoid actuator, purge exhaust valve and control module
	Purge muffler clogged	Remove and clean, replace if necessary
	Pressure switch failure	Rest or replace pressure switch
Pressurization Failure	Repressurization failure	Check orifice, check valve and regulator

High back pressure	Purge muffler clogged	Clean and replace if required
	Restrictive purge exhaust piping	Clean and replace with larger pipe if required
	Check valve leakage	Clean, repair or replace

Note: To test outlet check valves, by-pass and depressurize dryer, shut off purge adjustment valve, pressurize outlet to the dryer. Tower should remain depressurized. If one or both chambers pressurize, clean and re-pack corresponding outlet check valve.

Experience. Customer. Service.

nano-purification solutions
Charlotte, North Carolina
Tel: +1 704 897 2182
support@nano-purification.com
www.nano-purification.com

nano-purification solutions
Maryville, Tennessee
Tel: +1 704 897 2182
support@nano-purification.com

nano-purification solutions
St. Catharines, Ontario, Canada
Tel: +1 905 684 6266
canadasupport@nano-purification.com

nano-purification solutions
Gateshead, United Kingdom
Tel: +44 (0) 191 497 7700
sales_uk@nano-purification.com

nano-purification solutions
Erkelenz, Germany
Tel: +49 (0) 2431 9550 600
sales_de@nano-purification.com

nano-purification solutions
Singapore
Tel: +65 6748 7988
sales.asia@nano-purification.com