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1. **INTRODUCTION**

Congratulations on your purchase of an **On Site Gas Systems, Inc. Pressure Swing Adsorption (PSA) type Nitrogen Generator**. This simple, turnkey machine provides a cost-effective means for on-site generation of nitrogen. The Nitrogen Generator is based on the latest PSA technology and utilizes Carbon Molecular Sieve (CMS) to separate the nitrogen from the other gases contained in the air. The Nitrogen Generator uses two beds of CMS to separate compressed air into a high-pressure nitrogen product stream and low-pressure oxygen enriched waste stream. Particulate, coalescing and carbon filters are included to remove impurities from the feed air. Each Nitrogen Generator comes pre-tested and tuned to meet the customer specified nitrogen flow rate and purity.

Since the system contains very few moving parts, maintenance and repairs are minimal. Maintenance is simple yet necessary. Air compressor and filter maintenance procedures are especially important and should be followed carefully. If the recommended maintenance procedures are followed, your nitrogen generator will provide you with many years of reliable service.

1.1 **Company Presentation**

On Site Gas Systems is an established world leader in the design and supply of systems for generation of oxygen and nitrogen. We have been manufacturing oxygen and nitrogen generators since 1987. Information about our products and our company can be found at our web site: [www.onsitegas.com](http://www.onsitegas.com)

On Site Gas Systems activities frequently include full responsibility for conceptual and detail engineering design, procurement, fabrication, supply and installation of packages for various industries worldwide.

On Site Gas Systems' Nitrogen Generators offer operators the benefits of this advanced, but simple technology. The principle advantages of PSA systems are:

- Compact
- Low weight
- Safe, reliable operation
- Simple maintenance
- Ease of operation
- Rapid start-up
1.2 Safety Information

The following section outlines the basic safety considerations regarding use of your Nitrogen Generator. Please refer to the technical references for additional information.

Read carefully and act accordingly before installing, operating or repairing the unit.

- The operator must employ safe working practices and rules when operating the nitrogen generator.
- The owner is responsible for maintaining the unit in a safe operating condition.
- Always use approved parts when performing maintenance and repairs. Make sure that replacement parts meet or exceed the pressure requirements.
- Only authorized, trained and competent individuals must perform installation, operation, maintenance and repairs.
- Completely depressurize the generator, tanks, and lines prior to performing any mechanical work, including changing the filters. The nitrogen must be vented to the outside or to a large, well-ventilated room to avoid suffocation due to lack of oxygen.
- Safety glasses should be worn if the cabinet door is open while the machine is operating, only open doors while the machine is off or in standby if exhaust is internal to the cabinet.

**WARNING**

Pressurized gases are contained within the generator, the air receiver and nitrogen receiver tanks. High-pressure gases are dangerous and may cause injury or death if handled or used inappropriately.

- Never allow high-pressure gas to exhaust from an unsecured hose. An unsecured hose may exhibit a whipping action, which can cause serious injury. If a hose should burst during use, immediately close all isolation valves.
- Never disable or bypass any safety relief valves on the air receiver or nitrogen receiver tanks.
Always make certain that the nitrogen generator is unplugged prior to performing any electrical work.

**NOTE**
If any statement or specification within this booklet, especially with regard to safety, does not agree with legislation or standard industry practices, the more demanding shall apply.

1.3 **Limits of Liability**

Buyer's exclusive remedy for all claims shall be for damages, and seller's total liability for any and all losses and damages arising out of any cause whatsoever including, without limitation, defects in or defective performance of the system, (whether such claim be based in contract, negligence, strictly liability, other tort or otherwise) shall in no event exceed the purchase price of the system in respect of which such cause arises or, at seller's option, the repair or replacement of such; and in no event shall seller be liable for incidental, consequential or punitive damages resulting from any such cause.

Seller shall not be liable for, and Buyer assumes all liability for, the suitability and the results of using Nitrogen by itself or in any manufacturing or other industrial process or procedure, all personal injury and property damages connected with the possession, operation, maintenance, other use or resale of the System. Transportation charges for the return of the System shall not be paid unless authorized in advance by Seller.

**NOTE**
Any modifications made by the customer without the consent of On Site Gas Systems will negatively affect the product purity and output specifications, and subsequently void the warranty.

1.4 **Warranty**

The Nitrogen Generator, excluding air supply system, is warrantied against defects in materials and workmanship, under normal use within the purity and flow parameters quoted on the P.O. and operation, as applicable on the warranty listed below. All compressors and dryers are covered by the original equipment manufacturer’s warranty.
The On Site Gas Systems Warranty includes the following:

Free repair or replacement of component parts where defects occur within the first twelve (12) months of operation or twelve (12) months from the date of invoice which ever comes first applies.

These warranties shall be null, void, inoperative, and not binding upon On Site Gas Systems, Inc. if a defect or malfunction occurs in the product or any part thereof from any **feed air malfunction, or improper filter element maintenance**, or repair, attempted repair, adjustment or servicing by anyone other than an authorized representative of On Site Gas Systems, or **external causes**. Said warranty shall extend and apply to the Nitrogen Generator only while said system is owned and used exclusively by the original purchaser.

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**NOTE**

THERE ARE NO EXPRESS WARRANTIES BY ON SITE GAS SYSTEMS INC, OTHER THAN THOSE SPECIFIED HERE. NO WARRANTY OF TITLE AS PROVIDED IN THE UNIFORM COMMERCIAL CODE SHALL BE IMPLIED OR OTHERWISE CREATED UNDER THE UNIFORM COMMERCIAL CODE, INCLUDING BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY AND WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

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1.5 **Service Return Policy**

If it is necessary to return a system for service, follow the procedure given below. This procedure **must** be followed when returning a system for service.

- If the system cannot be repaired at the site, then the owner must obtain a written **Return Material Authorization (RMA) number**, which references the model and serial number, from On Site Gas Systems Inc. No items will be accepted for service or credit unless prior written authorization has been issued by On Site Gas Systems Inc.

- All items are to be returned with the original packaging material if possible. Make sure that all items are packaged for safe return to On Site Gas Systems Inc. On Site Gas Systems Inc. will not be responsible for damages, which may occur in transit. Any damage that occurs to the system because of failure to adhere to this
procedure will be the sole responsibility of the customer. Contact On Site Gas Systems Inc. for a return shipping address.

- Shipping charges must be prepaid on all returns.

2. **UNPACKING AND INSPECTING**

The Nitrogen Generator is typically shipped in a single crate or skid. If you ordered an optional air receiver or nitrogen receiver tanks, these would be shipped separately. The crate(s) and its' contents should be inspected upon delivery to assure that no damage has taken place during transit. Save the carton and wrapping, as it may be necessary to return the generator in the event of shipping damage. If 'Tip-N-Tells' have been affixed to the crate, verify they have not been triggered. If the crate or any components have been damaged, the carrier should be notified immediately. The individual pieces should be checked against the packing list. If any discrepancy is found, contact your local distributor or On Site Gas Systems Inc. at (860) 667-8888. Please include the model number and the serial number with all correspondence.

3. **SITE AND UTILITY REQUIREMENTS**

The following requirements must be met to enable the nitrogen generator to perform at its rated capacity. Deviation from these requirements may result in poor performance, injury to persons or machinery, and voiding of warranty.

Select a suitable area indoor for installation, which remains above 33° F/0.5° C and below 100° F/38° C. Adequate space should be provided around the generator for access and routine maintenance. Ensure that there is enough space for the air receiver and nitrogen receiver tanks next to the unit.

3.1 **Air Supply**

Air supplied to the generator must be between 33°F/0.5°C and 100°F/38°C, with a water dew point of 40°F/5°C or below. Air at temperatures higher or lower than this may cause damage not covered by warranty. Likewise, moisture content higher than that specified may damage the adsorbent material and void the warranty. (The air receiver tank may be necessary to accommodate the variation in supply to the generator.) Use of a correctly sized refrigerant dryer will ensure that air meets specified standards.

The performance of our PSA type Nitrogen Generators is based on 100psig/6.9 barg operating pressure. Operation at higher or lower pressure will result in a nitrogen production above or below design. Refer to your cover
page to verify the air supply pressure your generator was tuned to at the factory. Air consumption for each Nitrogen Generator depends on nitrogen product purity and flow rate. Please consult On Site Gas Systems for details.

3.11 **Altitude Adjustment**
Add 1% to the feed air requirement per every 300 feet above sea level

3.12 **Additional Piping and Hoses**
The air supply piping components must be capable of supplying the required amount of feed air at the required pressure measured at the generator inlet connection. If the length of piping from the air receiver is greater than 50 feet, an air supply line one standard NPT size larger than the Nitrogen Generator inlet air nozzle size should be used, refer to Table 1.

<table>
<thead>
<tr>
<th>Standard NPT Pipe Sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4&quot;</td>
</tr>
</tbody>
</table>

3.2 **Electrical Supply**
Power supply must be as labeled on the unit (refer to cover page). Power consumption is less than 0.1 kW.

3.3 **Exhaust**
The exhaust piping from the nitrogen generator may be vented outside, but any additional piping used should be the same size as the exhaust piping supplied with the generator or larger depending on the length of the pipe. Exhaust piping should not have any restrictions or valves, and should be as short as possible. If the length of the exhaust piping from the generator is greater than 50 feet, an exhaust line one standard NPT size larger than the Generator exhaust line size should be used, refer to Table 1.

3.4 **Nitrogen Product Output**
Piping should be the same size as the nitrogen output piping supplied with the generator. If the length of the output piping from the generator is greater than 50 feet, an output line one standard pipe size larger than the Generator output line should be used, refer to Table 1.
4. SYSTEM ASSEMBLY

This section provides a step-by-step procedure for easy assembly of the Nitrogen Generator with optional air supply system and tanks.

1. Position the nitrogen generator in an area as described in Section 3. ‘Site and Utility Requirements’. Lift the nitrogen generator carefully to avoid damaging piping or the control system. Generators may be designed to accommodate lifting with a tow motor for cabinet models. Pro Series and Tire Fill should be moved with a tow motor on the shipping pallet. Large generators should be moved with the lifting lugs on the top of the adsorber beds.

2. Carefully lift the air receiver tank and nitrogen receiver tank (if supplied) and position next to the nitrogen generator skid. The tanks should be located as close as possible to the unit. It is recommended tanks be anchored to the floor.

   NOTE
   Pro Series and Tire Fill have the Nitrogen Receiver Tank incorporated with the generator.

   NOTE
   Carefully attach lifting devices and any rigging to ensure that piping and valves are not damaged.

3. Install the air compressor and refrigerant dryer (if supplied) in accordance with the manufacturer’s instructions. Install suitable piping or hoses from the compressor to the dryer, from the dryer to the air receiver, from the air receiver to the Nitrogen Generator, and from the Nitrogen Generator to the Nitrogen Receiver Tank. The connections may be "hard plumbed" by the user, if desired.

   NOTE
   Use of piping sizes smaller than the recommended size will significantly decrease system performance and void the warranty.

   WARNING
   Use only materials with compatible pressure rating on components on product pipelines.
4. Install relief valves on the air receiver and nitrogen receiver tanks, if not provided by On Site Gas Systems.

5. On initial start up all fittings will be checked for leaks using a leak detecting solution, (see section 7.1.1.)

6. A qualified electrician should install all electrical connections and the electrical power supply. Plug in the nitrogen generator into an approved outlet of the correct voltage and frequency. Connect the optional compressor(s) and dryer to an appropriate power supply (according to the requirements stated in the equipment manual).

5. **SYSTEM OVERVIEW**

5.1 **Controls and Instrumentation Overview**

This section describes the function of each control on the PSA Nitrogen Generator. The location and purpose of all instrumentation is also listed. An electro-mechanical timer or a programmable logic controller (PLC), is located inside the control enclosure, which controls your On Site Nitrogen Generator. (*Do not attempt to alter the timer or the optional PLC program; any changes made will alter the performance specifications, and void the warranty.*)

Controls for supporting equipment, such as the compressor and dryer, are not included in this section. Please consult the original manufacturer’s instructions for further information.

5.1.1 **Main Power Switch**

This switch supplies power to the nitrogen generator. The green “Power Light” is lit when the switch is “ON”. The “Main Power” switch is located on the front of the control panel.

The “Main Power” switch allows the operator to disconnect power to the generator. PSA cycling will stop immediately whenever the switch is turned off or may be stopped manually by closing the isolation valve. The inlet ball valve must be opened and the switch must be returned to the “ON” position before the unit can be restarted.
5.1.2 **Power Light**

The green indicator is lit when the “Main Power” switch is “ON”.

5.1.3 **Hour Meter**

This meter shows the number of hours the generator has produced nitrogen and excludes standby time.

5.1.4 **Pressure Switch**

The nitrogen product pressure switch controls the on and off pressure range of the Nitrogen Generator. The pressure switch is installed in the nitrogen product line inside the cabinet.

The pressure switch is set to turn the unit to standby at the product pressure level. The factory setting calls for the generator to switch “ON” when product pressure falls below a factory set pressure.

5.1.5 **Standby Light**

This amber indicator is lit when the nitrogen receiver tank pressure is above the high set point of the pressure switch.

5.1.6 **Air Supply Pressure Gauge**

This gauge monitors the feed air pressure. The inlet air pressure gauge is located on the optional air receiver tank.

5.1.7 **Peak Pressure Gauge**

This gauge monitors the pressure changes in the adsorber beds throughout the cycle. The “Peak Pressure” gauge is located on the front of the control panel on cabinet models; additional gauges are on the piping going from the cabinet to the top of the adsorber beds on larger units.

5.1.8 **Tank Pressure Gauge**

The “Tank Pressure” gauge monitors the pressure of the nitrogen receiver tank. The gauge is located on the front of the control panel.

5.1.9 **Inlet Air Pressure Regulator**

The regulator allows the operator to adjust the pressure of the feed air to the pressure range desired. The inlet air pressure regulator is located inside the cabinet.

The regulator is set at the factory but may require minor adjustment in the
field. Note that the output pressure of the compressor limits the maximum input pressure. Refer to your cover page to verify the air supply pressure your generator was tuned to at the factory.

5.1.10 **Tank Pressure Regulator**

The regulator sets the delivery pressure of the nitrogen product. The regulator is located on the optional nitrogen receiver tank.

Please refer to Section 1.2 for safety information regarding high-pressure nitrogen.

5.1.11 **Product Oxygen Analyzer**

The oxygen analyzer (optional) receives a small sample flow from the nitrogen receiver tank to continuously monitor the product nitrogen purity. Most of the oxygen analyzers are equipped with alarms that will be activated when the oxygen content gets too high. The oxygen analyzer display is located on the front of the control panel. If equipped with an external sensor, the sensor is installed inside the panel. The sample must be connected to the 5/32” tube located at the side of the control panel. It should be supplied from the Nitrogen receiver tank through 5/32” tubing.

5.2 **Control Timer**

**PLC**

A Programmed Logic Controller (PLC) controls the nitrogen generator. The program allows for the optimum time settings and is set at the factory. **(Do not attempt to alter the timer or the optional PLC program; any changes made will alter the performance specifications, and void the warranty.)**

**Mechanical Timer**

Some generators use an electro-mechanical cam timer to control the nitrogen generator. The cams are adjusted to the optimum time settings at the factory. **(Do not attempt to alter the timer or the optional PLC program; any changes made will alter the performance specifications, and void the warranty.)**
6. **PRINCIPLES OF OPERATION**

The **On Site Nitrogen Generator** uses state-of-the-art technology to provide the end user with a reliable source of nitrogen. An overview of the operation of the generator is given below.

The Nitrogen Generator is a two-bed adsorber system. The Nitrogen Generator consists of two adsorber vessels filled with Carbon Molecular Sieve (CMS), a valve assembly, air filters, main pressure regulator, and a nitrogen receiver tank. Dry, (less than a dew point of 40º F), compressed air (78% nitrogen, 21% oxygen, <1% argon) at about 100psig/6.9 barg and normally 68°F/20°C is passed through the air filters, which remove particles and oil vapor, and then through the air inlet regulator, which reduces the air to the final operating pressure. It is important to maintain the inlet air at the correct pressure; otherwise generator performance may deviate from design. Clean and dry air is directed to one of the adsorber beds where oxygen is adsorbed in the pore structure of the CMS, thus increasing the nitrogen purity of the product gas stream to the desired level (95-99.999% as required by customer). This product flows out of the top of the adsorber bed, through the pureflo control valve, and into the nitrogen receiver tank at a pressure slightly below the feed air pressure.

At this point the first adsorber bed stops processing and the pressure in the adsorber vessels are equalized before the next cycle starts. The beds switch roles; the first bed is purged while the second bed produces nitrogen product. Oxygen enriched exhaust gas is piped to the atmosphere through a silencer.

A portion of the product produced is directed back through the outlet flow orifice. This nitrogen is allowed to flow back through the first adsorber sieve bed and out through the exhaust line at atmospheric pressure. This action purges the oxygen, and prepares the second adsorber bed for the next cycle.

Dry nitrogen product stream, with the specified purity content, exits the adsorber vessels and is stored in the nitrogen receiver tank. Nitrogen purity can be checked using an optional oxygen analyzer. Table 2 below graphically describes the generators process.
Table 2: Process and Instrumentation Diagram (P & ID)
7. **GENERATOR OPERATION**

This section describes the procedure for starting, running, and stopping the nitrogen generator. The operator should notify personnel in the area that the generator will be started and make sure the start-up will not interfere with any other operations.

**NOTE**

In the event of a power failure the Nitrogen Generator will resume operating upon return of power

7.1 **Start-Up**

This section describes the necessary steps of both the initial start-up and a normal routine start-up. If this is the first time the unit has been started, follow the Initial Startup procedure.

7.1.1 **Initial Start-Up**

1. Verify the Main Power switch is in the “OFF” position.

2. Verify that the power supply is as labeled on the unit and that the unit is plugged in.

**NOTE**

During the start up sequence, check for leaks in all pipe-fittings and valves. Remember, even a small leak on the nitrogen product piping can severely reduce production capacity!

3. Turn on the compressed air supply. Follow air compressor manufacturer's start-up instructions. (See the manufacturer's manual). Check that the air inlet pressure is at or above the generator inlet pressure, as indicated on the manual coverpage. Open the inlet ball valve. Turn on the main power switch on the generator.

4. The generator should go to standby within a couple cycles. After the generator standby light illuminates, open the outlet ball valve between the generator and nitrogen storage tank.
5. Observe pressure gauges for several cycles. There should be pressure indicated on the “Peak Pressure” gauge(s). (product pressure will vary with certain models.)

6. Nitrogen will start to flow to the nitrogen receiver tank, allow the tank to pressurize until the generator returns to standby.

7. The contents in the nitrogen receiver tank is a mixture of the generator output and the air that was in the tank as delivered. Depending on the purity, it may be necessary to purge the tank several times to attain the nitrogen purity. Purging is accomplished by releasing nitrogen until the nitrogen receiver tank reaches 40 – 50 psi, then allowing the generator to reach standby. Purity may be checked using the optional oxygen analyzer.

8. Set the nitrogen product regulator pressure to the desired delivery pressure and open the nitrogen valve.

9. Check the nitrogen product delivery piping for leaks.

**NOTE**
When the nitrogen generator is turned on for the first time, or after a prolonged shutdown period, it is likely that the product purity can be increased by purging the Nitrogen Receiver to a safe area / outside the building for approximately 15 minutes before using the product.

**7.1.2 Normal Start-Up**
Follow this procedure to start the generator for normal operation. (If this is the first time the unit has been started, follow the Initial Startup procedure in Section 7.1.1)

1. Open the inlet ball valve

2. Turn on the Main Power switch.

3. Open any shut-off valves in the nitrogen product line to the user’s piping system.
7.2 **Shutdown**

Follow this procedure to shut down the generator

1. Turn the Main Power switch to “OFF”. There is no need to close the nitrogen product ball valve, but it may be closed to prevent Nitrogen loss due to down stream leaks

7.3 **Depressurize System**

Follow this procedure to depressurize the generator before addressing any Maintenance on the equipment

1. Close air input and nitrogen output valves

2. **Wearing eye and hearing protection**, confirming the valves have been closed tightly, open the cabinet door and pull the ring on the pressure relief valve until all the pressure has been released and the pressure gauges are reading zero.

8. **MAINTENANCE**

On Site Gas Systems Generators will provide many years of trouble-free operation if the recommended maintenance is performed thoroughly and regularly. In addition to the procedures given below, the customer must also perform all maintenance recommended by the manufacturers of the component items employed in the On Site Gas Systems Generators. Note that where any component manufacturer specifications are different from
those of On Site Gas Systems, the more demanding schedule should be adopted. Reference Table 3 for filter change intervals.

Table 3

<table>
<thead>
<tr>
<th>Filter Maintenance</th>
<th>Change Frequency: 3 months</th>
<th>6 months</th>
<th>12 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Particulate</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coalescing</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Carbon</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

WARNING
Read and follow all safety procedures given below and in Section 1.2, Safety Information.

8.1 Nitrogen Generator Preventive Maintenance (PM)

The nitrogen generator is a rugged unit and requires only minimal maintenance. Failure to follow the maintenance schedule may result in damage to the unit and void the warranty. (Table 4 summarizes the Generator PM Schedule) (Table 6 log can be used)

**Every day:**
1. Check for air and product leaks.
2. Check instrument air pressure.
3. Visually check control panel.
4. Record nitrogen concentration and flow rate; operating or ambient temperature, feed air pressure, nitrogen receiver tank pressure, and sieve bed pressures throughout one cycle.

**Weekly:**
1. Verify that the automatic filter drain is working properly.
2. Manually operate air receiver tank drains to remove any accumulation of moisture in the air receiving tank
**Every month:**
1. Clean filter bowls.
3. Calibrate optional oxygen analyzer per the manufacturer's instructions.

**Three months:**
2. Operate safety valves.
3. Operate manual valves.
4. Check for leaks and repair if necessary.
5. The pressure variations throughout the cycle should be recorded for one complete cycle.

**Six months:**
1. Change Coalescing filter element

**Annually:**
1. Disassemble and inspect all air-operated valves; install repair kits if required.
2. Test all air pilot valves.
3. Check for air and product leaks.
4. Change the activated carbon tower and/or the activated carbon filter element upstream of the adsorber vessels. The steel activated carbon towers should be returned to On Site for refill. We recommend keeping a filled, spare tower in stock to reduce downtime during replacement.
5. Check $O_2$ analyzer sensor for proper operation per the manufacturer’s instructions.
Table 4

<table>
<thead>
<tr>
<th>General Preventive Maintenance Schedule</th>
<th>Daily</th>
<th>Weekly</th>
<th>Monthly</th>
<th>Quarterly</th>
<th>6 Months</th>
<th>Annually</th>
</tr>
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<tbody>
<tr>
<td>Check for Leaks</td>
<td>X</td>
<td></td>
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<tr>
<td>Check for Instrument Air Pressure</td>
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<td>X</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Visually check Control Panel</td>
<td></td>
<td></td>
<td>X</td>
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<td></td>
</tr>
<tr>
<td>Record Flow/ Pressure/ Purity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Verify Filter Drains Work</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Manually Operate Air Receiver Drains</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Clean Filter Bowls</td>
<td>X</td>
<td></td>
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<td></td>
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<tr>
<td>Calibrate Analyzer*</td>
<td></td>
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<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Change Particulate Filter Element</td>
<td>X</td>
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<td></td>
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<td></td>
<td></td>
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<tr>
<td>Operate Safely Valves</td>
<td></td>
<td>X</td>
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<tr>
<td>Operate Manual Valves</td>
<td>X</td>
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<tr>
<td>Record cycle pressure variations</td>
<td></td>
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<td>X</td>
<td></td>
</tr>
<tr>
<td>Change Coalescing Filter Element</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Inspect Valve, Repair Kit as needed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Inspect/ repair air operated valves</td>
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<td></td>
<td></td>
<td>X</td>
<td></td>
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<tr>
<td>Test air pilot valves</td>
<td></td>
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<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Change activated carbon tower or filter</td>
<td></td>
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<td></td>
<td>X</td>
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<tr>
<td>Check Oxygen sensor*</td>
<td></td>
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<td></td>
<td>X</td>
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<td>X</td>
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</tbody>
</table>

* Per manufacturers instructions

8.2 Filter Removal Procedure

Clean filter elements are vital to good system performance. The filters remove particulates as well as water and oil. The particulate filter removes particles down to 5 microns in size. It should be changed every three months.

The coalescing filter removes particles down to 0.01 microns in size. The life of the coalescing filter is dependent on how well the particulate filter performs its job; it will last for 6 months when the particulate filter is regularly maintained.
The activated carbon tower and/or activated carbon filter element removes oil vapor down to about 0.003 ppm. The life of the activated carbon tower and/or activated carbon filter element is dependent on the oil content in the feed air. An activated carbon tower will typically last for 12 months when the upstream filters are regularly maintained. See section 7.3 before any filter changes.

**WARNING**

Do not try to remove filter bowls unless both the Air Supply gauge and the Process Pressure gauge clearly read zero psig.

1. Close the air inlet valve and depressurize the generator, if applicable, disconnect the tubes from the bottom of the bowls.

2. To remove the bowls, push the bowl latch down and rotate the bowl while pulling down.

3. Inspect the bowls. If the drain system is working properly, the bowls should be empty.

4. Replace any filter element that looks damaged or excessively dirty, or according to generator PM schedule, see Table 3.

**NOTE**

A plugged drain system will cause water and oil to carry over into the adsorber, which will cause permanent damage to the adsorbent. Such damage is not covered by the Manufacturer's Warranty. Use of filters other than those specified by On Site Gas Systems could result in damages not covered by the warranty.

5. The bowls must be visually clean. Wipe out the bowls or if necessary wash the bowls in soapy water and rinse thoroughly.
6. If applicable, reconnect the drain tubes. Make sure the bowl latches are securely locked in place. Be careful to avoid damaging the O-rings.

7. If applicable, remove activated carbon tower and replace with a new activated carbon tower.

8. Slowly open the air inlet valve to pressurize the bowls. Examine for leaks and tighten if needed.

9. **TROUBLE SHOOTING**

This section enables the operator to determine the cause of operation problems and suggests remedies for the problems. If there are several likely causes, investigate the simpler solutions first. Regardless of the type of malfunction, a person who is thoroughly familiar with the system performs the troubleshooting best. See table 5 for trouble shooting details. If further assistance is required, contact your local distributor or On Site Gas Systems Inc.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Probable Cause</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen generator not cycling</td>
<td>Low voltage or low amperage</td>
<td>Check electrical source</td>
</tr>
<tr>
<td></td>
<td>Circuit breaker tripped</td>
<td>Reset circuit breaker</td>
</tr>
<tr>
<td></td>
<td>Fuse blown</td>
<td>Replace fuses inside control enclosure</td>
</tr>
<tr>
<td></td>
<td>Main Power is OFF</td>
<td>Turn Nitrogen generator power switch ON</td>
</tr>
<tr>
<td>Nitrogen generator runs continuously; Amber light OFF</td>
<td>Low operator air pressure</td>
<td>Increase air regulator pressure</td>
</tr>
<tr>
<td></td>
<td>N2 pressure switch set too high</td>
<td>Reduce standby pressure</td>
</tr>
<tr>
<td>Symptom</td>
<td>Probable Cause</td>
<td>Corrective Action</td>
</tr>
<tr>
<td>--------------------------------------------------------------</td>
<td>-------------------------------------</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td>Nitrogen generator runs continuously; Amber light OFF</td>
<td>Defective N2 pressure switch</td>
<td>Replace switch</td>
</tr>
<tr>
<td></td>
<td>Excessive product usage</td>
<td>Reduce product consumption</td>
</tr>
<tr>
<td></td>
<td>Product line leak</td>
<td>Repair leak</td>
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<tr>
<td></td>
<td>Cycle pressure too low</td>
<td>Increase leak pressure</td>
</tr>
<tr>
<td></td>
<td>Defective wiring</td>
<td>Check wiring connections</td>
</tr>
<tr>
<td>Low product flow</td>
<td>Feed air flow rate is too low</td>
<td>Adjust air supply pressure and/ or flow</td>
</tr>
<tr>
<td>Low product purity</td>
<td>Product flow too high</td>
<td>Decrease product flow</td>
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<tr>
<td></td>
<td>O2 analyzer malfunction</td>
<td>Check operation and calibration</td>
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<tr>
<td></td>
<td>Feed air pressure too low</td>
<td>Increase operating pressure of flow</td>
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<tr>
<td></td>
<td>Switching valve not opening/ closing</td>
<td>Dirty or defective valve; clean or replace</td>
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<td>No pilot signal; check pilot valve using manual override; replace coil or pilot valve</td>
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<td></td>
<td></td>
<td>Tubing plugged or pinched; replace tubing</td>
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<tr>
<td></td>
<td>Check-valves leak</td>
<td>Rebuild or replace check valves</td>
</tr>
<tr>
<td></td>
<td>Muffler plugged</td>
<td>Clean muffler</td>
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<tr>
<td></td>
<td>Oil or water in unit</td>
<td>Contact On Site Gas Systems</td>
</tr>
<tr>
<td>Filter drain remains open</td>
<td>Drain valve dirty</td>
<td>Clean valve</td>
</tr>
<tr>
<td>Filter drain does not open</td>
<td>Drain valve plugged</td>
<td>Clean valve</td>
</tr>
<tr>
<td></td>
<td>Low operator air pressure</td>
<td>Increase regulator pressure</td>
</tr>
<tr>
<td></td>
<td>Tubing plugged or pinched</td>
<td>Replace tubing</td>
</tr>
</tbody>
</table>

IF NONE OF THESE CORRECTIVE ACTIONS RESOLVE THE PROBLEM, CALL ON SITE GAS SYSTEMS – TECHNICAL SUPPORT- AT 860-667-8888
## Nitrogen Generator Data Log

Table 6

**Model:**

**Serial Number:**

**Date Received:**

<table>
<thead>
<tr>
<th>Date</th>
<th>Input PSI@ Regulator</th>
<th>Peak PSI on Gauges</th>
<th>N2 Tank PSI</th>
<th>O2 Purity (Analyzer)</th>
<th>Analyzer Calibration Date</th>
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