ON SITE Gas Systems

OnSiteGas.com

NM-1
Nitrogen Generator
User Guide

Customer: COLOR SERVICES
Model: NM-1 (10 SCFH @ 99%)
Serial Number: 8772
Manufacturing Date: 03/14/2025
Air Inlet: 1 SCFM @ 100 PSI
MAWP: 200 PSI
Power: N/A

- ✓ ***STARTUP / SHUTDOWN***
- ✓ ***SAFE USE***
- ✓ ***OPERATING INSTRUCTIONS***
- ✓ ***MAINTENANCE***
- ✓ ***REPLACEMENT FILTERS***

Keep this guide in a convenient location for future use.

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Introduction

Congratulations on purchasing a simple, cost-effective, On Site Gas Systems membrane nitrogen generator.

Using a specialized polymer fiber membrane technology, the generator separates and collects the nitrogen present in air and exhausts oxygen back into the atmosphere. Coalescing and carbon filters remove impurities from the feed air and protect the membrane fibers.

Before shipment, On Site Gas Systems pretests and tunes your nitrogen generator to meet your specified nitrogen flow rate and purity.

You must perform all scheduled maintenance—minimal as it is—to ensure proper performance and a long service life.

About On Site Gas Systems

On Site Gas Systems, founded in 1987, is a world leader in the design and manufacturing of oxygen and nitrogen generating systems. Our capabilities include conceptual and detailed engineering design, procurement, fabrication, supply, and installation of generators. We serve scores of industries worldwide.

Where to Get Help

If you do not understand these user instructions or need additional assistance to operate your gas generator properly and safely, contact customer service at On Site Gas Systems.

On Site Gas Systems, Inc.
35 Budney Road
Budney Industrial Park
Newington, CT 06111 USA

Telephone: 860–667–8888
Toll Free: 1–888–748–3429
Fax: 860–667–2222

E-mail: info@onsitegas.com
Website: www.onsitegas.com

Important Safety Information

WARNING! *Read all instructions in this user guide before installing and using your nitrogen generator.*

WARNING! *The nitrogen generator system can contain pressurized gas. Pressurized gas may cause injury or death if you use or handle it inappropriately.*
Read and follow the safety instructions below.

If you do not understand any part of the safety warnings or operating instructions, call On Site Gas Systems for assistance. You can reach a customer service representative at 860-667-8888.

- Read and keep this user guide in a convenient location for future use. Make this user guide available to all operators of the nitrogen generator.
- If any statement or specification within this user guide (especially with regard to safety) does not agree with legislation or standard industry practices, the more demanding directive shall apply.
- Direct any nitrogen vented from the generator to the outside of your facility so that it does not displace the air in the room and cause suffocation and death.
- You must employ federal, state, local, and your plant's safe working practices and rules when operating the generator.
- The owner is responsible for maintaining the generator in a safe operating condition.
- Materials that you use to maintain, assemble, and connect the generator to supporting equipment should be rated and approved for use at the pressures generated by the generator.
- The generator remains pressurized after shutdown. Before performing maintenance, filter changes, or opening piping, you must depressurize the system. Depressurizing the system prevents the uncontrolled escape of high-pressure gas and possible injury or death. You must wear eye and hearing protection during the depressurizing process to avoid possible injury.
- Follow your plant's lockout program before performing maintenance on the generator.
- Only trained maintenance technicians who are familiar with high-pressure air systems and who have read this user guide should perform maintenance on the generator.
- Wear personal protective equipment when in proximity to the system.
- Never allow high-pressure gas to exhaust from an unsecured hose. An unsecured hose may whip around and cause serious injury. If a hose should burst during use, immediately close all isolation valves.
- Never disable or bypass any pressure safety valve on the generator.

Unpack Your Nitrogen Generator

Perform the following actions upon delivery:

1. Inspect the container for damage. If “Tip-N-Tells” are on the container, verify that they have not been triggered. If triggered, notify the carrier immediately.
2. Open the container and inspect it for damage that may have occurred during transit. If you observe damage, notify the carrier immediately.
3. Check the components against the packing list. If components are missing, contact your local distributor or On Site Gas Systems, and provide the model number and the serial number of your unit.
4. Remove all packing materials prior to operating the generator.
    a. Remove any shrink and bubble wrap from the piping, valves, etc.
5. Save all packing supplies in case the equipment needs to be returned.

What’s in the Container

Your shipment should contain the following items.

Standard Equipment

- NM Model membrane nitrogen generator

Documentation

- Nitrogen generator user guide

Select a Location

Install your nitrogen generator according to the recommendations below to ensure optimum performance, safe operation, and warranty coverage.

You should locate the nitrogen generator indoors and maintain an ambient air temperature around the unit of above 33°F (0.5°C) **at all times**. The humidity of the location can range from 0-95% humidity, non-condensing. Allow sufficient space around the generator to: a) install vent piping and access pipe connections, and b), perform maintenance.

The ground area you select as a location should be flat and stable.

Utility Requirements

Utilities should meet the requirements below to ensure optimum performance, safe operation, and warranty coverage.

Compressed Air Supply Requirements

The compressed air entering the generator should be at approx. 70 deg F (21 deg C) to meet the output specification. The generator can, however, function with air between 50 and 130 deg F (10 to 55 deg C) if required, though the output will vary accordingly. The dew point of compressed air supplied to the generator must be 40 deg F (5 deg C) or lower.

Compressed air not meeting this dew point requirement can damage the generator and will void the warranty. Air at temperatures higher or lower than this may cause damage not covered by the warranty.

NOTE—A compressed air receiving tank may be necessary to provide a reserve of compressed air to meet the demand of the nitrogen generator.

NOTE—The use of a correctly sized air dryer can ensure that the compressed air supply meets the dew point requirements.

Inlet Air Pressure and Volume Requirements

The inlet air pressure requirement varies by model and is found the cover of this user guide. If your inlet air pressure is not equal to the requirement, the nitrogen output may be above or below the system's design capability. Inlet air pressures higher than the maximum allowable working pressure (MAWP) will damage the nitrogen generating system and void the warranty. In addition, a given model will consume more or less compressed air depending upon the desired nitrogen purity and flow rate. Consult customer support at On Site Gas Systems for details.

Adjustment for Length of Air Supply Piping

The air supply piping must supply the required volume of feed air at the required pressure as measured at the generator inlet connection. If the supply piping from the compressed air receiving tank to the generator is greater than 50 feet, increase the air supply line one standard NPT size larger than the generator inlet size (Table 1). If your piping is greater than 100 feet, consult customer support at On Site Gas Systems.

Table 1. Standard NPT Pipe Sizes

NPT Pipe Sizes (inches)											
1/4	3/8	1/2	3/4	1.0	1¼	1½	2.0	2½	3.0	4.0	6.0

Nitrogen Output Piping Requirements

Nitrogen output piping should be the same size as the nitrogen discharge piping on the generator. If the length of the output piping connecting the generator to your process is greater than 50 feet, use piping one standard NPT size larger than the generator output line (Table 1). If your piping is greater than 100 feet, consult customer support at On Site Gas Systems.

Install the Membrane Nitrogen Generator

WARNING! *Materials that you use to maintain, assemble, and connect the nitrogen generator to supporting equipment should be rated and approved for use at the pressures generated by the generator.*

1. Secure the unit to a wall with appropriately rated equipment to anchor the weight of the system.
2. Install any supporting equipment (including air compressor, booster, air dryer or receiving tanks) according to the manufacturers' recommendations.
3. Have a qualified pipefitter install suitable piping from:
    a. the compressed air supply to the inlet of the nitrogen generator
    b. the nitrogen generator outlet to your process

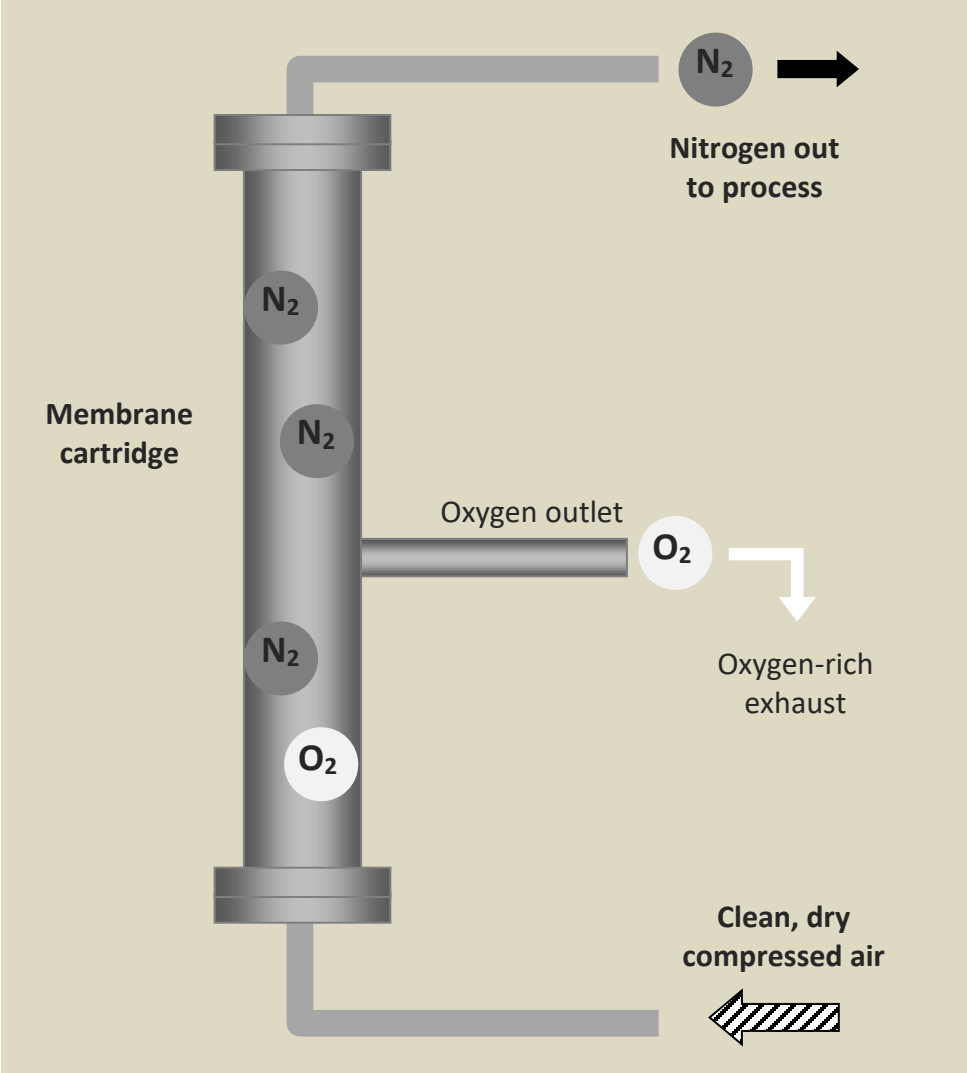
    NOTE—Use of piping sizes smaller than the recommended size will significantly decrease system performance and void the warranty.
4. Any tanks that you use in conjunction with the generator should be fitted with applicable pressure safety valves.

Theory of operation

Clean, dry compressed air flows through two filters and then into the membrane cartridge.

The cartridge contains hundreds of hollow fibers that run along its length to an outlet. The oxygen in the air passes more easily through the walls of the hollow fibers than nitrogen. The nitrogen flows down the hollow fibers to the outlet, where it is collected and sent to the process. The oxygen collects inside the cartridge housing and then is exhausted to the atmosphere.

Figure 1. Flow through a membrane cartridge



1. Inlet Valve
2. Particulate Filter
3. Carbon Filter
4. Inlet Pressure Regulator
5. Inlet Pressure Safety Valve
6. Membrane
7. Outlet Check Valve
8. Needle Valve
9. Sensor Valve
10. Sensor Orifice
11. Outlet Valve
12. Unistrut®

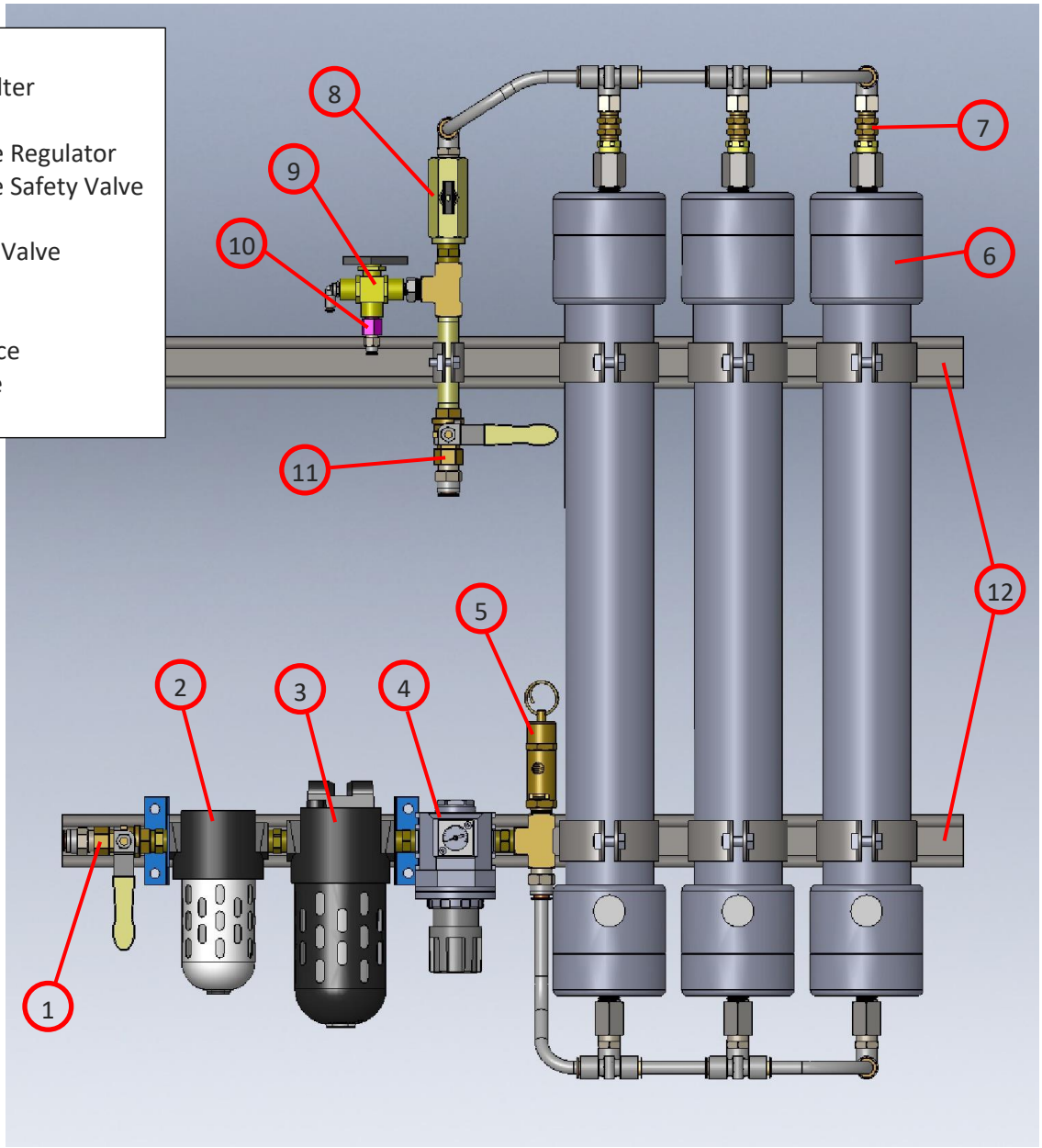


Figure 2 – Nitrogen Membrane Generator Layout

Startup and Shutdown Procedures

Starting the Generator

Start the air compressor per the manufacturer's instructions before starting the nitrogen generator. Be sure that all valves from the air compressor to the generator inlet are open.

1. Be sure the **Inlet Valve** and **Outlet Valve** is closed.
2. Slowly open the I**nlet Valve**.
3. Be sure the **Inlet pressure regulator** is set to the specification.
4. Open the **Outlet Control Valve**.

System Shutdown

1. Slowly close the **Outlet Valve**.
2. Close the **Inlet Valve**.

WARNING! *The generator remains pressurized after shutdown. Before performing maintenance, filter changes, or opening piping, you must depressurize the system. Depressurizing the system prevents the uncontrolled escape of high-pressure gas and possible injury or death.*

Depressurize the System

WARNING! *You must wear eye and hearing protection during the depressurizing process to avoid possible injury.*

Follow these steps before performing system maintenance.

1. Wear eye and hearing personal protection equipment.
2. Close the **Inlet Valve**.
3. Close the **Outlet Valve**.
4. Wait for all the pressure gauges on the system to read 0 psig before disconnecting lines or performing maintenance.

Equipment Maintenance Schedule

WARNING! *Only trained maintenance technicians who are familiar with high-pressure air systems and who have read this user guide should perform maintenance on the nitrogen generator.*

The generator remains pressurized after shutdown. Before performing maintenance, filter changes, or opening piping, you must depressurize the system. Depressurizing the system (page 12) prevents the uncontrolled escape of high-pressure gas and possible injury or death.

Important Maintenance Notes

- To ensure peak performance from your nitrogen generator, you must also maintain all related equipment—such as the air compressor and air dryer—according to the manufacturers' recommendations.
- Where any component manufacturer's specifications are different from those of On Site Gas Systems, adopt the more demanding schedule.
- You may need to shorten the filter replacement interval due to excessive runtime, poor air quality, or other conditions.

Preventive Maintenance Schedule

Action	Frequency (at 8 hrs. daily runtime)						
	Daily	Weekly	Monthly	Quarterly	Semi-Annually	Annually	Bi-Annually
Check for air/nitrogen leaks	X						
Check that filter drains work	X						
Clean filter bowls				X			
Check pressure safety valve				X			
Check manual valves				X			
Change carbon filter element					X		
Change coalescing elements						X	

Maintenance Procedures

WARNING! *Only trained maintenance technicians who are familiar with high-pressure air systems and who have read this user guide should perform maintenance on the nitrogen generator.*

The generator remains pressurized after shutdown. Before performing maintenance, other than leak checking, you must depressurize the system. Depressurizing the system prevents the uncontrolled escape of high-pressure gas and possible injury or death. See Depressurize the System (page 12) to learn how to depressurize the system.

Check for Air and Nitrogen Leaks

Check all connections and valves for leaks using a liquid leak detector.

Check that Filter Drains Work and that Filters are Dry

Loosen the drain petcock and allow any moisture to drain from the bowl. Then tighten the petcock snug. If an excess of moisture is found, remove the filter bowls and check to see that the filters are dry and not badly watermarked.

Clean Filter Bowl

Inspect filter bowl. Be sure they are not cracked or damaged. Wipe with a clean, dry towel, as necessary, to remove particles or debris. Be sure that O-ring is not damaged when re-setting the filter housing.

Check Pressure Safety Valve

Wear hearing and eye protection. Pull up on the safety valve ring and then push it back into position. The valve should move easily. If the valve does not operate smoothly, replace the valve.

Check Manual Valves

When the system is off, operate all the manual valves to prevent them from sticking shut. Check valves for leaks and smooth operation. Rebuild if necessary.

Replace Coalescing Filter Element

Procedure

1. Depressurize the generator (page 12).
2. Turn the filter bowl counterclockwise and remove it from the mounting bracket.
3. Inspect bowl. Be sure it is not cracked or damaged. Wipe bowl with a clean, dry towel, as necessary, to remove particles or debris.
4. Remove element by pulling it downward.
5. Inspect element. Replace if the maintenance interval has been reached; or if it is watermarked, discolored, covered with debris or damaged.

NOTE—A plugged filter drain will allow water and oil into the membrane cartridges, which will CAUSE PERMANENT DAMAGE to the membrane. On Site Gas Systems' warranty does not cover such damage. Use of filters other than those specified by On Site Gas Systems could result in damages not covered by the warranty.

6. Insert new filter element onto filter housing.
7. Be sure the bowl O-ring is in its groove.
8. Turn the bowl counterclockwise. Tighten snugly.

Replacement Filter

On Site Gas Systems offers a kit that contains a year's supply of filter elements (based on eight hours of running time per day). To order a filter kit, call Customer Service (+1-860-667-8888) with your model and serial number.

Troubleshooting

If your system does not perform as expected, follow the troubleshooting steps below. If your problems persist, contact your local distributor or On Site Gas Systems customer support at 860-667-8888.

Table 2.

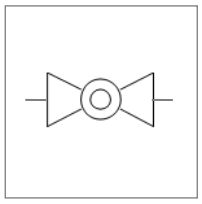
Symptom	Possible Cause	Corrective Action
Low product purity, flow, and/or pressure	*Product flow too high*	**Reduce product flow at application**
	Feed air pressure too low	**Check feed air compressor operation. Check pressure difference across inlet filters**
	Oil or water in system	**Contact On Site Gas Systems**
	Faulty check valve	**Replace check valve(s)**
	Leaks	**Repair Leak**
	Needle valve adjusted	**Open/close needle valve to increase/decrease flow**
Filter drain stuck open or closed	*Drain valve dirty or plugged*	**Clean/repair/replace drain valve**

Required Information for Customer Support

For the fastest service, collect the following information before calling our customer hotline: model number, serial number, operating log with historical and current data, maintenance information, and a description of the operating problem.

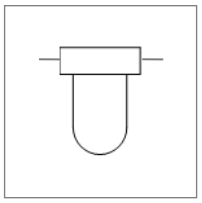
Appendix 1—Component Descriptions

This appendix describes the major system components and shows their illustrations as used in the P&ID diagram on page 21.



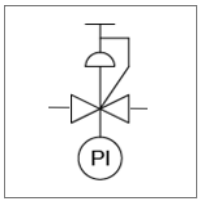
Manual Shutoff Valve

A manual shutoff valve enables you to stop and start the flow of gas in the generator.



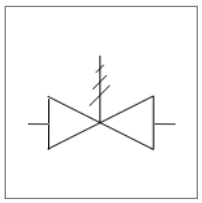
Filters

Coalescing Filter—removes particles down to 0.01 microns in size from the air stream. **Carbon Filter**—uses activated carbon to remove oil vapor down to 0.003 parts per million from the air stream.



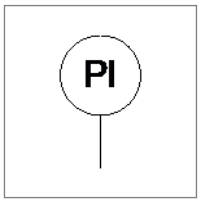
Pressure Regulators with Pressure Gauge

Pressure regulators are used to adjust the pressure of gas upward or downward. The gauge indicates the regulated pressure.



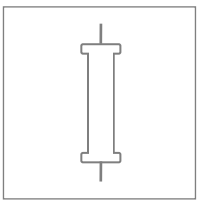
Pressure Safety Valve

Pressure safety valves automatically open at a preset high-limit, to release high pressure and prevent equipment failure and injury.



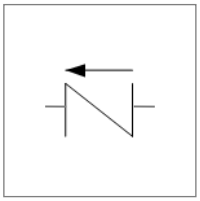
Analog Pressure Gauge

Analog pressure gauges indicate pressures (in psig) in a pipe, tank, or tubing.



Membrane Cartridge

A membrane cartridge contains hundreds of hollow fibers with permeable walls. When air is blown through the fibers, oxygen passes through the walls and is exhausted. At the same time, nitrogen flows down the length of the fibers and is sent to the application.

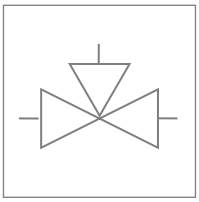


Check Valve

A check valve allows gas to flow only in one direction, preventing gas from flowing backwards in a pipe.

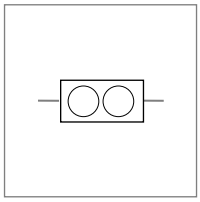
Flow Orifice

A flow orifice restricts the flow through a pipe.



Three-way Manual Flow Control Valve

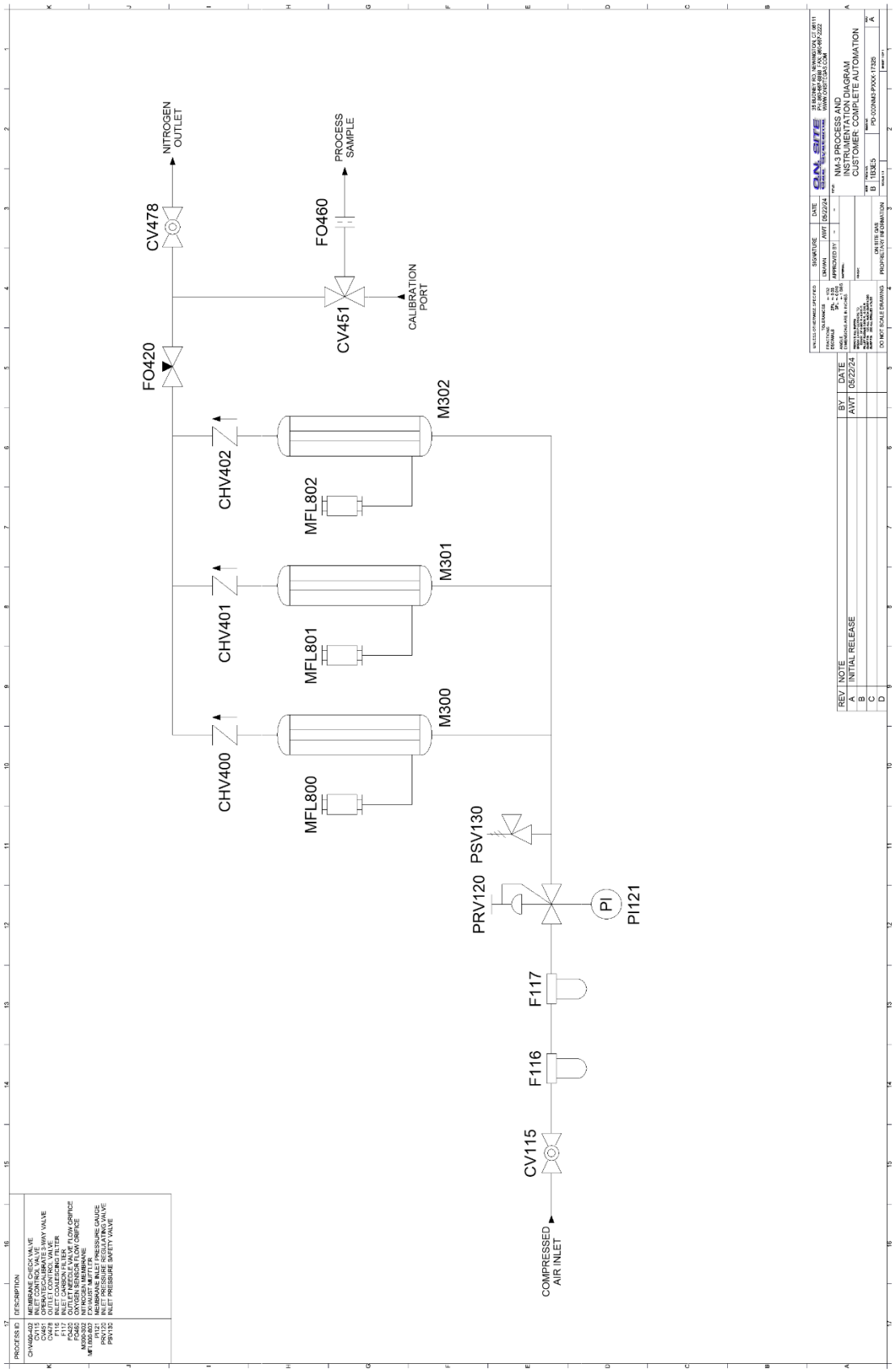
A three-way manual flow control valve enables you to direct the flow of a gas to one of two different directions or to stop the flow of gas entirely.



Flowmeter

A flowmeter is used to monitor and adjust the rate of flow of gas.

Appendix 2—Process and Instrumentation Diagram



Appendix 3—Operating Log

Model No. _____ Serial No. _____ Placed-in-Service-Date _____

Date	Inlet Air Pressure (psig)	Oxygen Purity (%) at application	N2 Pressure at application (psig)	Notes (e.g. Filter Element replacement)

Appendix 4—Specifications

NM-1 Nitrogen Generator	
Inlet	Compressed air
Filters	(1) Carbon, (1) Particulate
Membrane Cartridges	2
Maximum Allowable Working Pressure	200 psi
Instrument Electrical Service	N/A
Output Flow	10 SCFH
Output Purity	99.0 %

Warranty

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.

Warranty

The nitrogen generator, excluding air supply system, is warranted against defects in materials and workmanship, under normal use within the purity and flow parameters as per the quote 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 whichever 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.

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.

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.

ON SITE
Gas Systems

Manufacturer of Oxygen and Nitrogen Generating Systems

35 Budney Road

Newington, CT 06111 USA

1-860-680-2914

1-888-748-3429 (toll free)