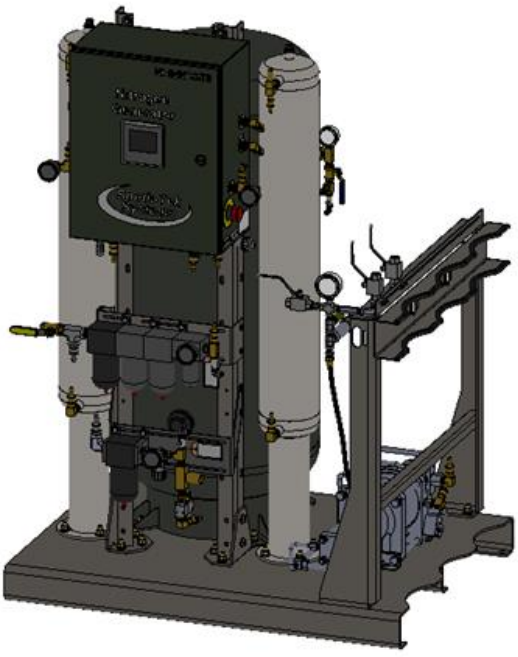
PSA NITROGEN GENERATOR
CYLINDER FILL “HPCF” SERIES
O&M MANUAL

Revision 5

Date 04/28/20



VERSION HISTORY

Rev #	Revised By	Revision Date	Approved By	Approval Date	Reason
02	J. Nguyen	08/04/16	A. Norman	08/04/06	
03	S. Andrews	06/27/18	M. Thomas	06/27/18	Updated for multiple set pressure and Booster
04	S. Andrews	08/29/18	M. Thomas	08/30/18	Updated for Booster inlet filtration
05	K. Mellott	07/23/19	S. Andrews	04/28/20	New program updates and O2 analyzer, remove non applicable options

User password: 6557

PLC Name: PSA

General Arrangement Drawing #: _____

Electrical Schematic Drawing #: ES-PSA, R07

Other Documentation(s):

_____

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Service or Questions Contact:
South-Tek Systems Service Department
3700 U.S. Highway 421 North, Wilmington, NC 28401
Phone: 1-(888)-526-6284
Email: info@southteksystems.com
Visit: www.southteksystems.com

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1 INTRODUCTION

1.1 PURPOSE

South-Tek Systems welcomes you to the exciting world of nitrogen generators! We provide leading edge technologies in **Pressure Swing Adsorption (PSA)** nitrogen generators that produce nitrogen on demand. The technology can reduce nitrogen gas costs by as much as 90% versus purchasing from a gas supplier. We develop PSA systems worldwide that are utilized in industrial, lab, restaurants, fire-protection, educational, and military facilities. We pride ourselves in our abilities to communicate and engineer nitrogen generation systems to meet specific requirements of our customers!

At South-Tek Systems, we engineer simple, turn-key generators to provide cost-effective means of producing nitrogen gas. The technology is based on years of continuous R&D on how to most effectively utilize carbon molecular sieve (CMS) to filter the nitrogen from oxygen in compressed air. We use the highest quality CMS provided to the market which goes through extensive in-house quality testing procedures. Our design principles require clean dry compressed air alternating through two adsorption pressure vessels packed with CMS. We have engineered our nitrogen generator with minimum maintenance and care requirements to provide our customers with years of confidence and reliability.

The nitrogen generator comes individually tuned, tested, and certified to meet the customer's specified nitrogen flow rate and purity using our Data Acquisition System (DAS). The certification and data analysis provides the necessary criteria to replicate a successful field installation. The systems are turn-key with detailed installation drawings, instruction manual, and phone/text support. We have field service, commissioning, and other engineering services available to provide support any way we can!

1.2 ABOUT SOUTH-TEK SYSTEMS

South-Tek Systems, founded in 1997, is a nitrogen generator manufacturer, designing and producing nitrogen generating systems for worldwide distribution.

Why not generate nitrogen at your own facility for a fraction of the cost versus endlessly paying for bulk liquid or delivered gas cylinders? We manufacture a full line of nitrogen generating equipment including:

- The N2 GEN® Series with generators ranging from the compact 1 LPM table top lab generator on up to the 50,000 SCFH unit
- The BeerBlast™ Mixed Gas Dispense System for restaurants and bars seeking the perfect draft pour
- The TireBlast™ Nitrogen Tire Filling System for automotive and tire shops seeking optimal tire pressure maintenance and fuel economy
- The N2-Blast™ Corrosion Inhibiting Systems for Fire Protection Industries seeking solutions to preventing corrosion within the piping system

With purities ranging from 95% up to 99.999%, we provide nitrogen generators that are sure to suit your needs. For more information about our complete nitrogen generator capabilities, please visit www.southteksystems.com.

1.3 AUDIENCE

This manual is intended for Installer/Equipment Operator/Supervisory Staff and should be read in its entirety prior to operation. Please contact South-Tek Systems for any operation and maintenance questions.

1.4 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 written consent of South-Tek Systems will void the product's design specifications.

1.5 SERVICE RETURN POLICY

If the system cannot be repaired at the site, and it is necessary to return a system for service, the following procedures must be followed:

- The owner must obtain a written **Return Material Authorization** number**,** which references the model and serial number, from South-Tek Systems. No items will be accepted for service or credit unless prior written authorization has been issued by South-Tek Systems.
- All items are to be returned with the original packaging material if possible. Make sure that all items are packaged for safe return to South-Tek Systems. South-Tek Systems will not be responsible for damages, which 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 South-Tek Systems for a return shipping address.
- Shipping charges must be prepaid on all returns.

2 SAFETY GUIDELINES

The following section outlines the basic safety considerations regarding installation and operation of the nitrogen generator. For additional safety information regarding other equipment used in conjunction with the nitrogen generator, such as air compressors, dryers, boosters, etc., please refer to individual manufacturer recommendations and safety guidelines.

2.1 GENERAL SAFETY PRACTICES

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

- Operator must use safe working practices and rules when operating the nitrogen generator.
- The owner is responsible for keeping the unit in safe operating condition at all times.
- Always use approved parts when performing maintenance and repairs. Make sure that replacement parts meet or exceed the original parts' specification.
- Only authorized, trained, and competent individuals are allowed to perform installation, operation, maintenance, and repair.
- Completely isolate incoming and outgoing pressures to the generator, and make sure to depressurize the service/repair section prior to performing any mechanical work, including changing the filters. The

nitrogen generator's exhaust gas and/or any venting gas 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.
- Use ear protection when the equipment is operating.

WARNING: Pressurized gases are contained within the generator, the receiver, and product tanks. Pressurized gases are dangerous and may cause injury or death if handled or used inappropriately.

- Never allow pressurized 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 if it is safe to do so and power down the unit.
- Never disable or bypass any safety relief valves.
- Always make certain that the nitrogen generator is disconnected from the supply power prior to performing any electrical work.

NOTE: Always following local and site safety regulations in conjunction with this manual.

Correct use of the nitrogen generator is important for your personal safety. Incorrect safety practices can cause damage to yourself and/or to the equipment.

2.2 ROOM VENTILATION RECOMMENDATION

The nitrogen generator will exhaust a slightly higher oxygen (O2) to nitrogen (N2) concentration than normally found in air. Typically concentration will be between 20.9 to 40% O2 balance with N2. The volume of gas exhausted to the room is approximately equal to bed's pressurized volume at 50% of the incoming air pressure to the generator every minute. For example, let's assume the bed volume at atmosphere is 10 cubic feet, and the incoming air pressure is equal to 100 PSIG, then the calculations are as follows:

100 PSIG x 50% = 50 PSIG, then convert PSIG to PSIA,

50 PSIG +14.7 PSIG = 64.7 PSIA, then convert to ATM,

64.7 PSIA / 14.7 (PSIA/ATM) = 4.4 ATM, then calculate total volume stored,

4.4 ATM x 10 cubic feet/ATM = 44 cubic feet, then consider this once every minute,

44 cubic feet / 1 minutes = 44 standard cubic feet per minute vented from the unit.

2.3 SAFETY INFORMATION

Nitrogen is not poisonous but it should not be directly inhaled, since in high concentrations, it can cause asphyxiation. Ensure that the unit is installed within a well-ventilated room, one that is not sealed off from normal living space air changes.

All personnel involved with installation, operations, and maintenance of the nitrogen generator must follow safe working practices, OSHA, and local health/safety code regulations during the installation, operation, and maintenance of the unit.

Warnings:

- This manual shall be read in its entirety before installing and operating the nitrogen generator to prevent accidents and damage.
- Contact South-Tek Systems if there is a problem that you cannot solve with this manual.
- Use the nitrogen generator in accordance with its designed purpose.
- Qualified personnel are permitted to perform installation, maintenance, and repairs. Work performed by unqualified persons shall result in a voided warranty.
- Do not tamper with, experiment on, or exceed the technical specifications of the equipment.

3 RECEIVING, UNPACKING, AND STORAGE INSTRUCTIONS

3.1 RECEIVING EQUIPMENT

The Nitrogen Generator – Cylinder Fill and all components are securely packed to minimize possibilities of damages during shipment. The contents of the shipment should be inspected upon delivery to assure that no damage has taken place during transit. Save the packaging material, as it may be necessary to return the generator in event of shipping damage. If any components are found to be 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 South-Tek Systems at (888) 526-6284. Please include the model number and the serial number with all correspondence.

3.2 UNPACKING, MOVING, AND SECURING EQUIPMENT

The Nitrogen Generator Cylinder Fill is securely bolted down inside of a wooden crate and shipped upright. Removal of this system is easily accomplished by opening the wooden crate from the side that is stamped "open this side" and unbolting the unit from the bottom of the crate. To remove the HPCF out of the box, insert forks from the forklift through the open slots on the bottom skid of the generator. Slowly back the nitrogen generator out of the box and move it to its final location.

Figure 1: HPCF Wooden Shipping Crate

Once the equipment is moved to its final destination, follow all local/site codes for anchoring requirements and any other safely procedures in securing the equipment.

3.3 STORAGE INSTRUCTIONS

If the unit is not to be installed until a later date, a safe dry storage location is needed, preferably inside a controlled environment. Place desiccant packets into the electrical cabinet to keep moisture from damaging the electronics. Do not store around moving objects that could fall or damage the unit.

4 SITE AND UTILITY REQUIREMENTS

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

4.1 AIR SUPPLY

Air supplied to the generator must be between 40-100°F (4-38°C) (unless specially designed – refer to unit specific design details), with a water dew point of 40°F (4°C) or better (some models will require -100°F (-73°C)). Air at temperatures higher or lower than this may cause damage not covered by warranty. Moisture content higher than specified may damage the adsorbent material and void the warranty. Other auxiliary equipment such is the air dryer, air and nitrogen pressure vessels must be sized correctly to the generator to meet full design specifications.

The nitrogen generators requires 100 PSIG minimum / 150 PSIG max incoming air pressure, but must be set per the design incoming air pressure to meet the purity and nitrogen production specifications. Operation at higher or lower pressures will result in a nitrogen production/purity above or below design. Operation at higher pressures than 150 PSIG may damage the media inside the pressure beds. Air consumption for each nitrogen generator depends on nitrogen product purity and flow rate. Please consult South-Tek Systems for specific details.

4.2 ADDITIONAL PIPING AND HOSES

The air supply piping components, supplied and installed by others, must be capable of supplying the required amount of max feed air at the required pressure measured at the generator inlet connection. It is safe to assume that the max feed air flowrate can be up to 3 times the specified average feed air flowrate (all incoming feed air flowrate references in any documentation regarding the nitrogen generator is considered average feed air unless otherwise noted). If the length of piping from the air receiver is greater than 50 feet, consult with a piping contractor for appropriate line size to still deliver the required air flow and pressure to the nitrogen generator.

4.3 ELECTRICAL REQUIREMENTS

Power supply must be 110 V or 220 V / 1 ph / 50 - 60 Hz as labeled on the unit. Operating amp draw is less than 2 amps. The nitrogen generator must be hard wired unless otherwise specified in the customer installation drawings. The internal control panel is UL 508A Open Industrial Control Panel approved with a 7-amp time delay fuse. A hard copy of the electrical schematic is included with the system. Electronic copy available upon request.

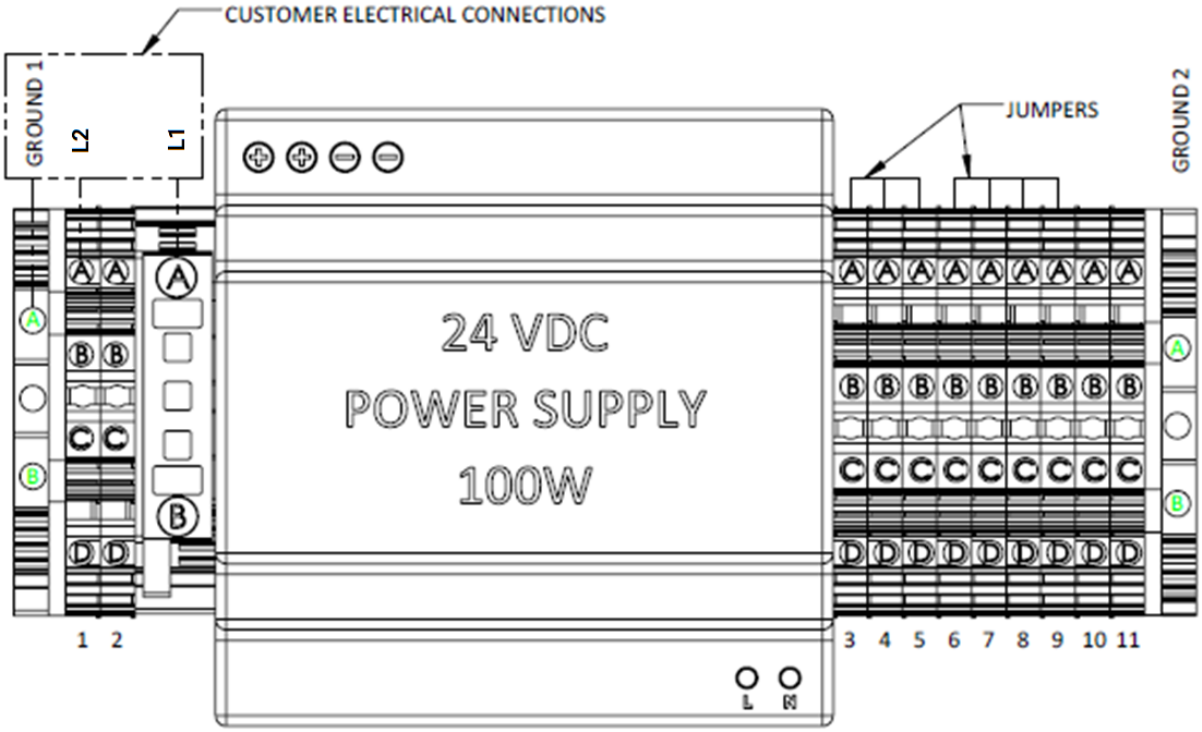


Figure 2: Customer Electrical Connection to Nitrogen Generator

Note: Always obey all local and site code to finalize power connection to the equipment.

4.4 SITE SPECIFICATIONS

Select a non-hazardous area indoors (unless the unit was specifically design for other areas) 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 product receiver skid next to the unit.

The exhaust piping from the nitrogen generator may be vented outside, but any additional piping used should be the same size or larger than the exhaust piping supplied with the generator. In the case where exhaust piping distance are greater than 10 feet, consult with a piping contractor for appropriate pipe size to keep the pressure drop less than 0.5 PSIG. Exhaust piping should provide minimal restrictions, and should be as short as possible.

4.5 OUTDOOR PACKAGE UNITS (OPTIONAL)

The outdoor package allows the nitrogen generators to be installed outdoors with limitations (refer to project specifications for details). It is highly recommended that a roof and or walls help shield from driving rains when possible.

5 SYSTEM INSTALLATION

This section provides a step-by-step Nitrogen Generator HPCF installation procedure with consideration of other peripheral equipment.

1. Follow the instructions for unloading/unpacking the system as described in **Section 3.2 Unpacking, Moving, and Securing Equipment**.

2. Position the nitrogen generator in an area as described in **Section 4.4 Site Specifications**. Lift the system carefully to avoid damaging components.

3. Review the supplied customer "General Arrangement Drawing" (included in the documentation package) for detailed designed layout drawings specific to the package. This may include a combination of an air compressor, air dryer, air cooler, air receiver tank, air filtration, nitrogen generator, nitrogen storage tank, and/or nitrogen booster.

4. Carefully lift the equipment and position them in a manner most suitable to the site conditions. Use lifting and strapping devices that are rated to move the equipment.

   NOTE: Carefully attach lifting devices and other rigging devices to limit heavy impacts and jolting motions which may damage internal components/material.

5. Install other equipment included in the package (ie: air compressor and refrigerant dryer) in accordance with the original equipment manufacturer's instructions. Complete the connecting plumbing between components as described in the "General Arrangement Drawing" included with the nitrogen generator. Connection plumbing to other components are not supplied as a standard option. Final pipe sizing is to be determined by the local pipe contractor.

   WARNING: Only use materials with compatible pressure rating on components on the product pipelines.

6. Follow local codes when installing tank accessories such as safety relief valves, gauges and isolation valves. If tank accessories are included with the package, please refer to the "Detail Tank Drawings" included with the nitrogen generator.

7. A qualified electrician should ensure correct available power and complete all electrical connections to the equipment. Connect the nitrogen generator into an approved electrical box with the correct voltage and frequency. Connect any other electrical equipment in the package per the original equipment manufacturer's instructions.

8. Check all fittings and piping/hose connections for pressure leaks.

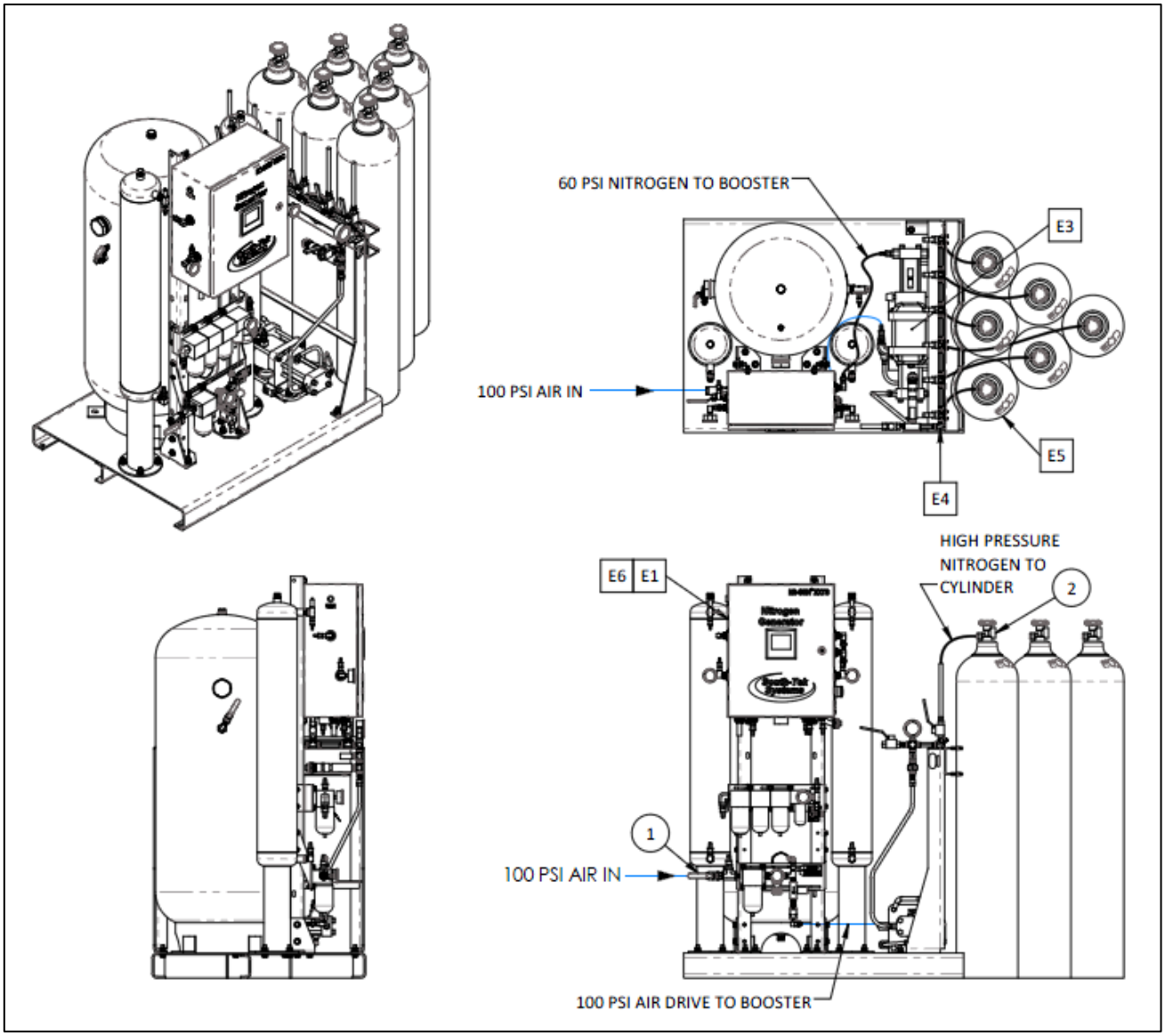


Figure 3: Typical Setup for Nitrogen Generator Cylinder Fill System (Picture is of a 6 Cylinder Filling Station)

6 SYSTEM DESIGN

6.1 SPECIFICATIONS

The table below is a general specification for standard Nitrogen Generator HPCF. Refer to specification project documents for specific details of the unit.

Table 1: Specification Table

General Specifications (see Unit Detail Drawing for Specific Design Data)	
Nitrogen Purity	95-99.999% (purity is set at factory)
Installation	Floor standing, Skid Mount
Display	3.5" Full Color Touchscreen
# of K cylinder / day	1/2/4/6 bottles per day systems available
Cabinet Port Connections	NPT Female
Electrical	110-220V / 50-60Hz / 1Phase
Ambient Temperature	40° to 104°F (4° to 40°C)
Noise Level (dbA)	< 90 dbA

6.2 STANDARD FEATURES

The Nitrogen Generator HPCF key features include the following:

- Incoming Air Filters and Regulator
- Programmable Logic Controller (PLC) with User Touchscreen
- Pressure Swing Adsorption Beds
- Pressure Transducer
- Safety Relief Valves
- N2 Storage Tank
- N2 Air Amplifier and High Pressure CGA 580 connection

Incoming Air Filters and Regulator:

The nitrogen generator includes (3) filters, a 5-micron particulate, 0.01-micron coalescing, and a 0.003-micron activated carbon absorber filter for the incoming compressed air source. The particulate filter element meets or exceeds ISO Class 3 for maximum particle size and concentration of solid contaminants. The coalescing filter element exceeds ISO Class 1 for maximum particle size and concentration of solid contaminants, and exceed Class 1 on maximum oil content (ppm/wt). The absorber filter element exceeds ISO Class 1 on maximum oil content (ppm/wt).

Table 2: ISO 8573-1 Air Quality Standards

ISO Quality Class	Solid / Dirt Particle size in micron	Vapor Pressure Dewpoint		Oil (including Vapor)	
		°C	°F	Mg/m^3	PPM
0	As specified by the equipment supplier and more stringent than Class 1				
1	0.1	-70	-94	0.01	0.008
2	1	-40	-40	0.1	0.08
3	5	-20	-4	1	0.8
4	15	3	38	5	4
5	40	7	45	25	21
6	-	10	50	-	-

All incoming air filter/regulator set will be arranged as follows: particulate, coalescing, absorber, and then pressure regulator.

The booster air drive section also includes a particulate filter (same as above) as well as a pressure regulator.

The nitrogen generators will include a built-in air pressure regulator to regulate incoming air. Depending on the incoming air pressure to the regulator, it may need to be re-adjusted at site. If the unit is not receiving the designed incoming air pressure, check issues with the air compressor and/or restrictions in the pipeline to the nitrogen generator. If the issue cannot be resolved, please contact South-Tek Systems for further assistance.

**Note – Incoming air pressure should be set so that the bed pressure reaches within 3 psig of the incoming design pressure at the end of each half cycle (which is right when the bed pressure switches).

Programmable Logic Controller (PLC) with User Touchscreen:

There is an integrated PLC with a full color touchscreen. It features smart and efficient coding to maximize the performance. It controls the timing and sequencing of the valves to move compressed gas throughout the system. It is programmed to automatically go in and out of "standby" based on the storage tank pressure. A visual touchscreen is included which displays information such as run hours, alarms, sensor readings, and graphs of historical data.

Pressure Swing Adsorption Beds:

Every unit is equipped with a pair of pressurized vessels containing carbon molecular sieve. These vessels are referred to as "Adsorption Beds". They each contain a safety relief valve and pressure gauge. Beds over 4" in diameter will come certified ASME. Please contact South-Tek systems if ASME is required on smaller beds or if others certification(s) is required.

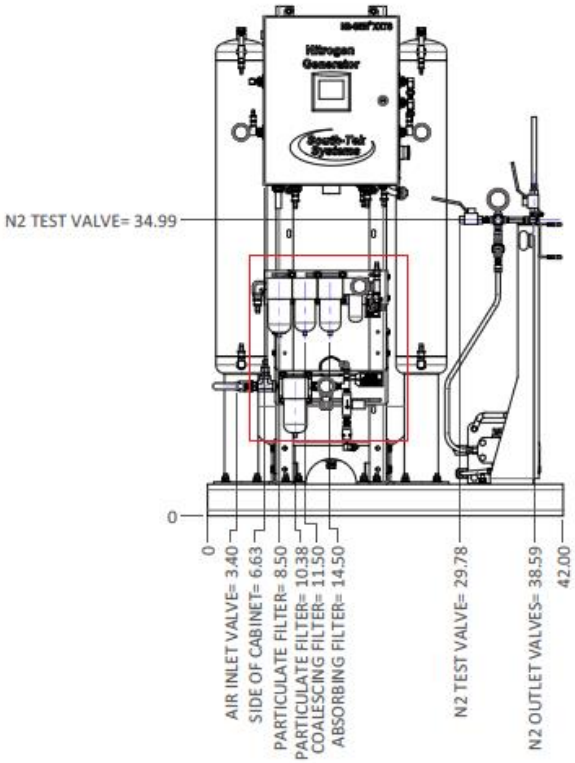


Figure 4: Filters/Air Regulator Set

Pressure Transducer:

An electronic pressure transducer is installed in the control panel to measure the pressure in the nitrogen storage tank. The PLC utilizes this information to automatically start and stop the nitrogen generator. It tracks the pressure levels and charts it on the graph screen for the past (2) hours. The user can input a low tank pressure level for alarm notification which will display on the screen.

Safety Relief Valves:

Safety relief valves are installed on the system for maximum safety. They are ASME approved. Follow local/site codes for safe venting requirements.

N2 Storage Tank:

A N2 Storage Tank, if supplied from South-Tek Systems, will come with an input and output ball valve, a safety relief valve, a pressure gauge, and a gas sample port. Some of the instruments may require installation on site. Refer to the "General Arrangement Drawing" for customer connection sizes.

N2 Air Amplifier and High Pressure CGA 580 connection:

An Air Amplifier is included to boost up the nitrogen pressure up to 3000 PSIG, though this is pressure is determined at time of order and preset from the factory. It includes a safety relief, pressure gauge, line pressure relief ball valve, and a metal braided line with a CGA 580 connection fitting to mate with the high-pressure cylinder.

6.3 OPTIONAL FEATURES

6.3.1 Oxygen Analyzer

An oxygen analyzer is an optional piece of instrument that can be installed with the nitrogen generator to verify the purity of the nitrogen in the storage tank. For all units designed for 99.9% or lower, a galvanic cell type can be installed. The chemistry of the sensor is unique in that it implements a weak acid electrolyte and is unaffected by CO2, CO, and NOx. It has a response time of 25 seconds or less and will respond to a 90% step change in oxygen concentration within 15 seconds or better.

This sensor is installed inside the cabinet enclosure and receive a small sample flow from the nitrogen storage tank to continuously monitor the nitrogen purity. The sensor also has an output exhaust port that relieves excess flow. It is important not to plug or restrict this flow; doing so will cause damage to the sensor.

If the O_2 analyzer is included, the system will come with the sample line already connected to the O_2 sensor since the nitrogen tank is integrated on the skid with the nitrogen generator.

The O_2 sensor provides a digital signal that is sent to the PLC. It is then converted into an engineering valve and sent to the main screen for user visibility. Alarms can be set up via the touchscreen. Note the analyzer reads O_2 content on the screen. 99.9% is equivalent to 1000 ppm or 0.1% O2. Then, if if the product in the storage tank is composed of only nitrogen and oxygen, 100% - 0.1% O2 equal 99.9% N2. Oxygen readings from analyzers measure oxygen content only, the balance of gas is considered nitrogen but includes other atmospheric gases.

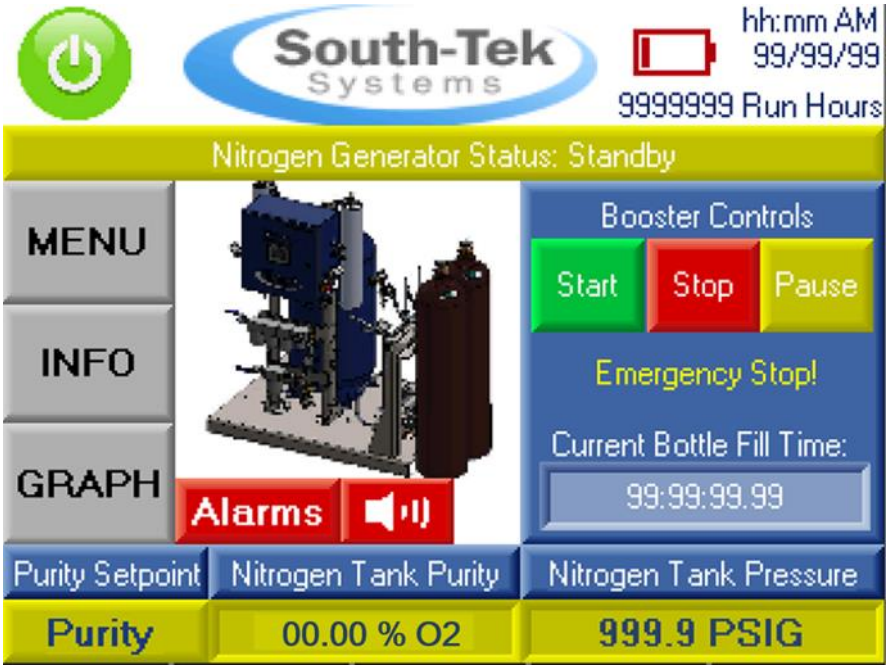


Figure 5: Home Screen

7 SYSTEM CONTROLS AND COMMUNICATIONS

The nitrogen generator comes with controls and instrumentations uniquely programmed (proprietary to South-Tek) with a control sequence to effectively and efficiently generate high quality nitrogen on demand. It can be customized and engineered to meet specific needs. Any changes/customization must be performed/approved by South-Tek Systems or written approval must be obtained from South-Tek Systems. Unauthorized changes to the system will void all warranties and may cause damages to the system or cause it to malfunction.

This section describes the function of the major controls and instrumentations associated with the nitrogen generators. Do not attempt to alter any controls or instrumentations; any changes without South-Tek Systems' consent will void the performance specifications unique to the system.

The PLC is used for the control sequence of the valves and controls the nitrogen generator's functionality. All programs are proprietary and password protected from the factory.

Note: 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.

7.1 HOME SCREEN

The home screen displays relevant information regarding the nitrogen generator such as system status, purity set-point, nitrogen storage tank pressure/purity (if sensor option is included), and run hours. The user can manually start/stop and navigate to either the "Menu", "Graph" or "Alarms" (if any alarms are active) screens.

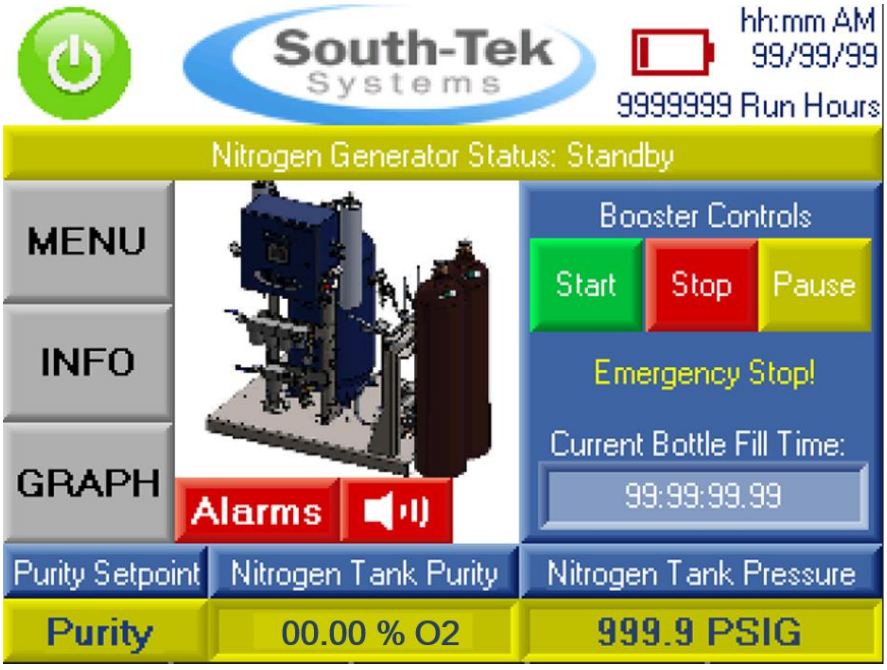


Figure 6: Home Screen

7.2 POWERING ON/OFF

Powering On/Off the unit can be done with an external power switch or disconnect, typically supplied by others.

7.3 STARTING/STOPPING

The nitrogen generator can be started and stopped on the controller touchscreen. The "Start/Stop" button is located in the upper left corner. When illuminated green, the unit has been started and is considered "On". When illuminated red, the unit is "Stopped" and considered "Off". To change from the "On/Off" state, press the "Start/Stop" button and the switch will change colors indicating a mode change.

When the system is stopped, all valves will return to the normal position. The air compressor does not need to be valved off from the generator as the internal valving system will automatically stop air flow to the system. It is recommended, though, to valve off the nitrogen storage tank outlet to the process so that the pressure levels in the tank do not fall below the cut-in pressure. Losing the tank pressure may cause the purity to fall out of specification for a brief period when the unit is restarted.

When the nitrogen generator is in the "On" state, it will automatically cycle through the adsorption beds to produce nitrogen to fill the storage tank. Once the storage tank reaches the cut-out pressure, it automatically goes into a "Standby" state, where it pauses the production of nitrogen. Once the storage tank pressure falls to the cut-in pressure, the system will automatically re-start and produce nitrogen to the tank again.

7.4 SYSTEM RUN HOURS

On the "Home Screen", the nitrogen generator run hours is displayed in the upper right-hand corner below the current time and date. The run hours are calculated when the system is cycling and producing nitrogen. The "standby hours" are not included.

7.5 TRENDING GRAPHS

The "Graph" button on the "Home" screen will bring up historical trending data of the sensors included with the generator. Every generator will include a nitrogen storage pressure transducer, therefore, every unit will trend the tank pressure. Other optional graphing displays include oxygen purity, air flow, nitrogen flow, and incoming air pressure. Please contact South-Tek if other graphical displays are desired.

Figure 7: Left - Graph Screen, Right, Graph Screen with History Scroll and Grid Lines

The user can adjust the "Y-Axis" scale (pressure reading range) by adjusting the min and max values in the lower left corner of the screen. Press the box and a numerical keypad will appear. Enter in the desired values and press enter. The graph will automatically adjust once the min and max values are entered.

The "M" button is for scrolling through the history and the "G" button is to bring up horizontal gridlines. Press the "Next" button to go to the next graph, or press the "Exit" button to return to the home screen.

7.6 MENU SCREEN

The "Main Menu" screen (accessed from home screen), is password protected. Please consult the second page under "Revision History" of the provided hard-copy manual for the user password.

Figure 8: Main Menu Screen

Once access is granted to the "Main Menu", the user can access all but the "Factory Settings" options shown in the **above** figure.

7.7 SENSOR SETUP/CALIBRATION

The "Sensor Setup/Calibration" screen allows the user to calibrate sensors included with the nitrogen generator. Every unit will have a nitrogen storage pressure sensor an oxygen (O2) sensor.. Other additional sensors that are available include incoming air temperature, incoming air pressure, incoming air flowmeter, incoming air pressure dewpoint meter, nitrogen out pressure dewpoint meter, and/or nitrogen out flowmeter.

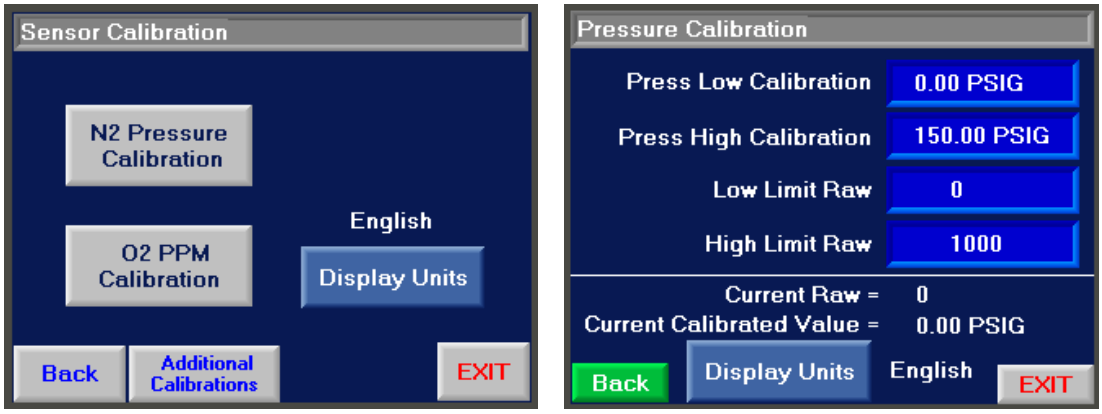


Figure 9: Left Screen - Sensor Calibration Selection, Right Screen - 2-Pt Calibration Values

All sensors are setup with a 2-point linear calibration. To setup the calibration, the user will need two known points. It is best to select two points at opposite ends of the sensor's calibration range. The following charts is the recommended 2-Point Calibration range for the "Low" and "High" point.

Table 3: Recommended 2-Point Calibration Ranges

	Calibration Value Ranges	
	Low Point	High Point
Pressure	0-5 PSIG	100-150 PSIG
O2 %	0.5-1.5% O2	10-21% O2

The "Low Limit Raw" and "High Limit Raw" are determined by the "current raw" reading at the time the known calibration source is applied to the sensors. For example, when the known pressure is 0 PSIG to the pressure sensor, read the "Current Raw" value and enter that in the box next to the "Low Limit Raw" text. Then apply a known pressure of 100 PSIG to the sensor and read the "Current Raw" valve (which should be different – if not, the sensor or wiring connection may be bad) and enter that value in the box next to the "High Limit Raw" text.

Other notes for calibrating units with % O2 sensors:

1. Make sure certified gas is being used for the low point.
2. Clean dry compressed air (20.9) can be used for the high point.
3. Make sure to only flow 1-2 scfh to the sensor. Higher flow may damage the sensor.
4. Never block the outlet purge line – it is a ¼" OD polytubing that extends 12-18" from the output of the sensor.

7.8 ALARMS/FILTER PARAMETERS

The "Alarms/Filter Parameters" menu displays the O2 alarms and low-pressure alarm setpoints.

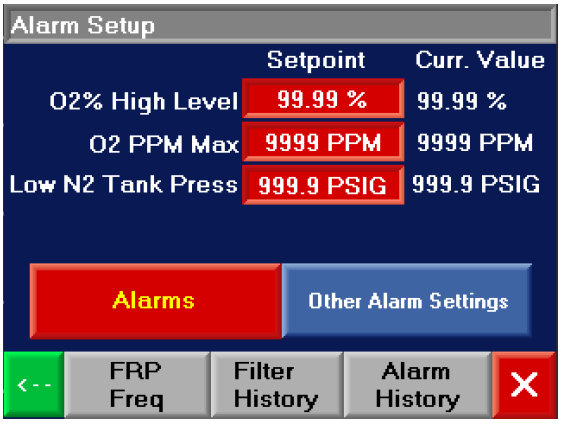


Figure 10: Alarm Setup Screen

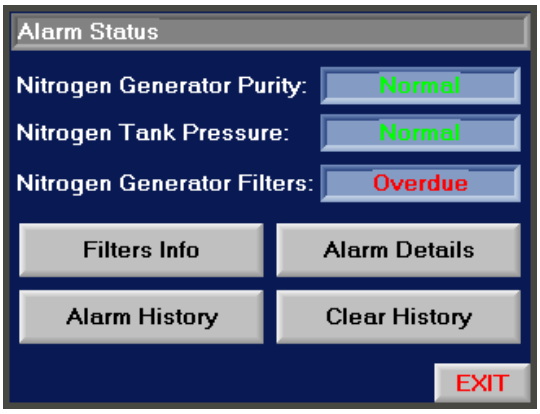
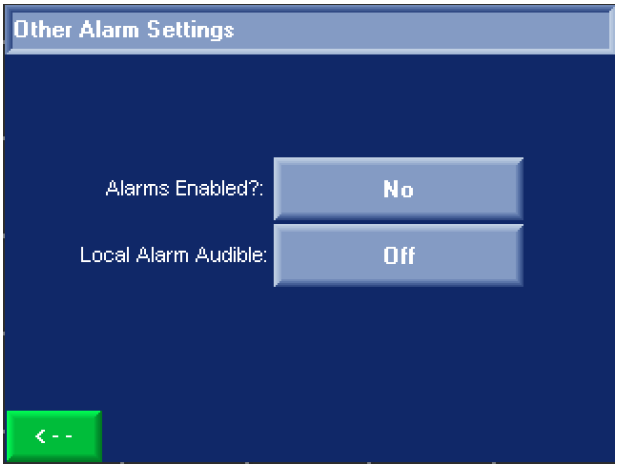


Figure 11: Alarm Status Screen

The box next to the "O2 High Level" and "Low N2 Tank Press" is the user alarm setpoint. The "O2 Alarm" is triggered when the current O2 purity reading is higher than the setpoint value, and the "Low N2 Tank Press" alarm is triggered when the current nitrogen tank pressure reading is below the setpoint value. These alarms can be disabled by toggling the "On/Off" button on the "Alarm Setup" screen.

The red "Alarm" button will bring up a secondary "Alarm Status" screen. This button will only be displayed if an alarm is active. Here, the user can get a read out of the current alarm statuses. The user can get more information by going to "Filters Info", "Alarm Details", "Alarm History", or "Clear History".



Other Alarm Settings:

All alarms may be toggled on or off with the Alarms Enabled button. The Local Alarm Audible toggle allows the buzzer in an alarm condition to be on or off.

Alarm Details:

The "Alarm Details" screen will allow the user to see a list of alarms and when the alarm was triggered (time and date).

Figure 12: Alarm Detail Screens (Button below "Details" Column Brings up the Next Screen)

Alarm History/Clear Alarm History:

Pressing the "Alarm History" button will take you to the alarm history log. Here, the user can scroll through the history of alarms and see what alarm, when it was triggered, time, duration, and when it was deactivated. Up to 256 alarms can be stored. The user can clear the alarm history log pressing the "Clear History" button. It will bring up another screen requesting an entry of "1111" to confirm clearing the alarm history.

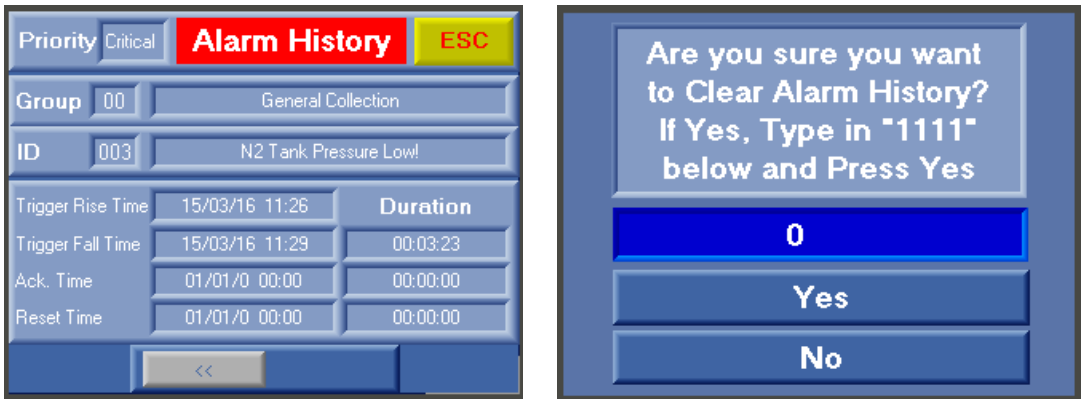


Figure 13: Alarm History Log (Left), Clear Alarm History Confirmation Screen (Right)

Filter Information Screens:

The "Filter Info" screen will display the current filter status of either "Good" or "Overdue". If "Overdue" is highlighted, it is advisable to change out the corresponding filter as soon as possible. Once changed out, the user can press the corresponding green filter element button to reset the filter calendar.

Figure 14: Filter Info Screen

The "FRP Freq" screen will display the factory recommended filter element replacement schedule. It will also display the current status of each individual filter – "Ok" or "Overdue". The user can reset the filters by pressing the reset button.

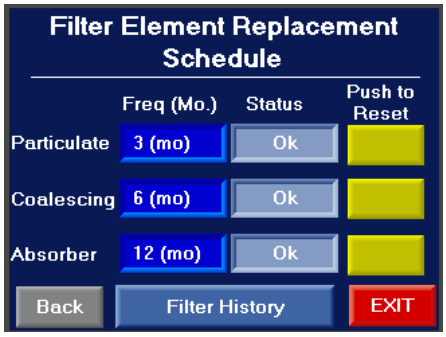
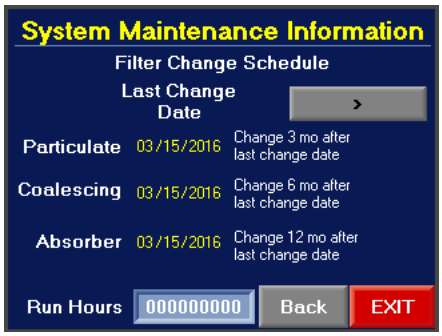


Figure 15: "FRP Freq" - Filter Replacement Parts Frequency

The "Filter History" screen will display the last change dates of each individual filter element. The grey arrow button in the upper right will allow the user to manually enter in the last change dates if for some reason the filter change acknowledgement button was prematurely pressed.



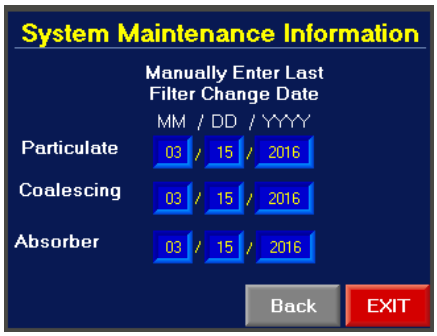


Figure 16: Element Last Change Date (Left), Manual Entry of Last Element Change Date (Right)

7.9 PRESSURE CUT-IN/CUT-OUT SETUP

The nitrogen generator is equipped with a pressure transducer to measure the nitrogen storage tank pressure. It is connected to the controller and the value is used to determine the cut-in and cut-out pressures, allowing the system to be more energy efficient. When the nitrogen storage tank reaches the cut-out pressure, the generator will go into a "standby" mode, where the delivery of air to the nitrogen generator will stop, and therefore, the production of nitrogen to the storage tank will also stop. The system will stay in standby until the nitrogen storage tank pressure falls to the cut-in pressure. The nitrogen generator will resume separating the oxygen from the compressed air and delivering nitrogen to the storage tank.

Note: The cut in / cut out settings are factory set and should not be adjusted without contacting South- Tek Systems. Adjusting the settings may alter the nitrogen purity and flow capabilities.

To see what the factory setpoints are, the user can press the "Menu" button from the main screen, then "Cut-in / Cut-out Parameters".

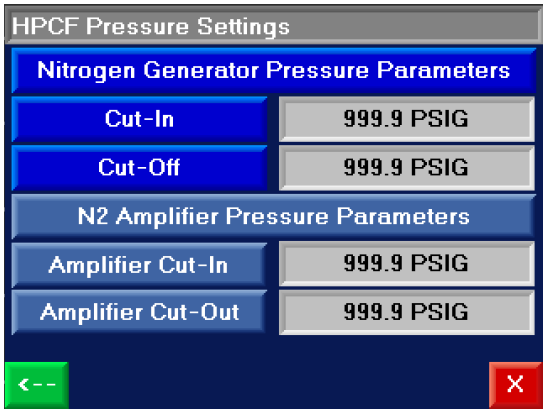


Figure 17: Cut-In/Out Screen

7.10 MAINTENANCE MENU

The "Maintenance Menu" allows the user to individually toggle each valve to verify that they are working. It is recommended to have the unit in the "Stopped" mode and the nitrogen outlet valve (from the nitrogen generator) valved off prior to toggling the valves individually. Make sure to reset the valves to "Off" prior to restarting the system.

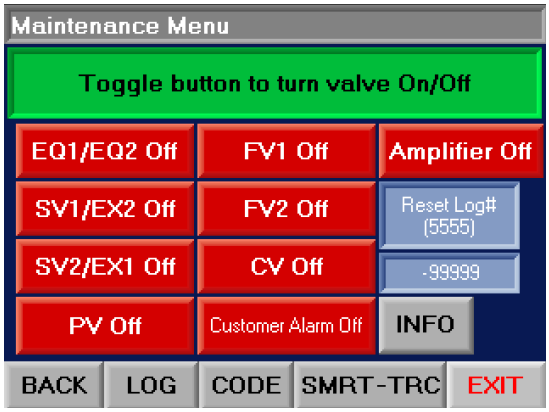


Figure 18: Maintenance Menu

7.11 INFORMATION SCREEN

The "Information" screen will provide specific details such as current run hours, software version, manufacture build date, serial #, and date of commission. There is a short cut button to show the filter history too.

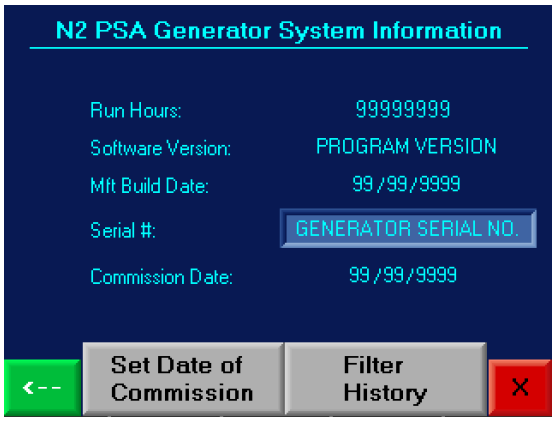


Figure 19: Information Screen

7.12 LOGGING FUNCTIONALITY (OPTIONAL)

The logging functionality is an optional feature that allows the user to capture and record the system's data. To maximize the full logging capabilities, the system must be designed to equip an air flowmeter, N2 flowmeter, O2 analyzer, nitrogen storage pressure transducer (standard), incoming air pressure transducer, and incoming air thermocouple. The table displays the current, average, max, and min values once the log is started (which can be started by pressing the "Press to **Start** Data Analysis" button located on the bottom left corner). Pressing the "Press to **Stop** Data Analysis" will pause the data collection, and then pressing the "Press to **Start** Data Analysis" will resume data collection. In order to restart the data collection with a fresh set of data, the user must press the "Reset Stats" button and then pressing the "Press to **Start** Data Analysis" button.

Figure 20: Data Logging Screen

Logging to SD Card:

In order to log the data to a Microsoft .CSV file (MS Excel file), a specially formatted South-Tek System's micro SD card must be inserted into the controller. If the unit was purchased with the "Logging Functionality" option, the micro SD card will already be inserted to the controller (located on upper left side – looking at the back of the controller).

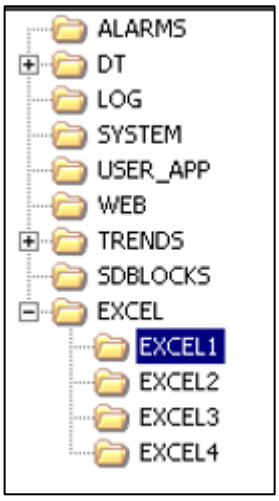
To start logging to SD card, do the following in the order listed:

1. Make sure the screen reads: "SD Card: OK" in the lower right corner of the screen.
2. Reset the Stats.
3. Press "Press to Log to Excel".
4. Press "Press to Start Data Analysis", and the data will start recording to the SD card.

To stop logging and retrieve data, do the following in the order listed:

1. Press "Press to Stop Excel Logging".
2. Press "Remove SD" card.

3. Wait for the green "Ready" message below the "Remove SD" button. If the message does not appear after 5 seconds, press it again.
4. Once the "Ready" message appears, remove the SD card from the back of the controller and insert it to a computer.
5. Open up the computer drive that the SD card is loaded on and open the folder.
6. To get to the file, navigate through the following folders: Excel > Excel 1. Within the "Excel 1" folder, find the file # to which the file was saved under (the file number is shown on the "Data Logging" screen.
7. Open the "Logging Header Template" also located under the "Excel 1" folder and copy the column headers into the saved data log table.
8. Save the .CSV file with the copied column headers as a Microsoft Excel document to edit the document with personalized graphs.



7.13 COMMUNICATION SETTINGS FOR ETHERNET CONNECTION (OPTIONAL)

If the optional Ethernet card is included with the nitrogen generator and the user wants to communicate with the system, a static IP address must be assigned to the controller. Once the static IP address is assigned, it must be manually entered into the controller. The subnet and gateway is not needed when accessing the controller within the organization's intranet. Once the static IP is entered, the user must press the connect button or cycle the power to the controller to see the device on their intranet network. Communication through Ethernet includes Remote Access, SD Card Access, and MODBUS TCP/IP communication. A connection status message will indicate if a successful connection has been made.

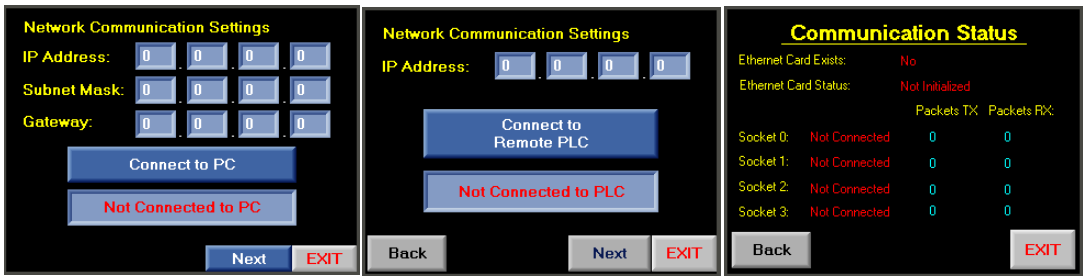


Figure 21: Network Connection Screens

Remote Access

A copy of the setup files for this software will be included on the microSD card installed in the PLC. This software can be installed on any Windows-based PC with Windows 7 or higher. The user will have full access of the controller touchscreen as if the user was standing in front of the machine and using the mouse to navigate through the screens. To set up communication connection to the controller, the communication settings on the computer must be set up to as the following:

1. Open the Remote Access Software and go to the "Configurations >Communication - PC settings".

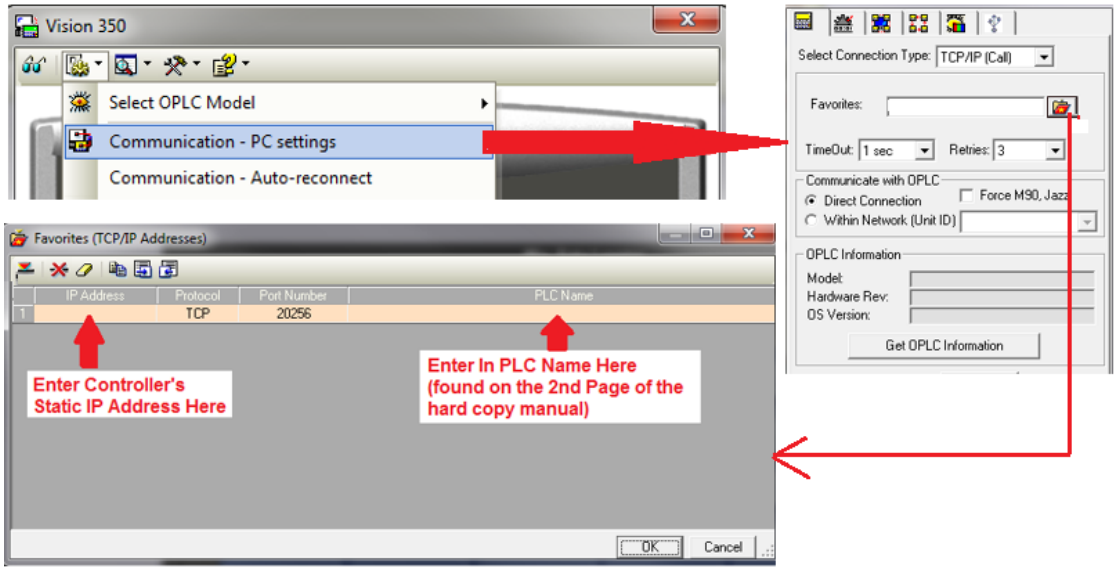


Figure 22: Remote Access Communication Setup

2. Select Connection Type: TCP/IP (Call)
3. Press the red folder to bring up the TCP/IP Addresses setup.
4. Enter in the static IP address assigned to the controller under "IP Address" column.
5. Select "TCP" under "Protocol" column.
6. Enter in the PLC Name (found on the 2nd page of the hard copy manual included with the Nitrogen Generator).
7. Press the "Get OPLC Information" to make sure the connection information is correct. An error message will appear if the information is not correct.
8. Press "Exit" once the connection information has been confirmed.

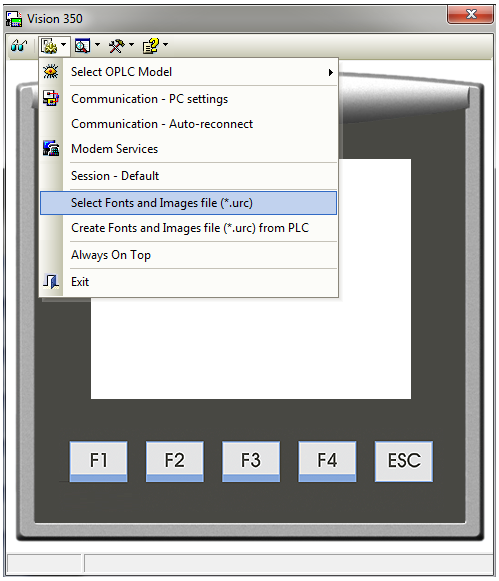


Figure 23: Loading Image File

Loading Image File and Logging on

1. Open the Remote Access Software and go to the "Configurations > Select Fonts and Images file (*urc)".
2. Browse for the file "PLC Image File.urc" which is loaded onto the SD card.
3. Press the "Glasses" icon in the left corner of the software to establish real time connection with the controller.

SD Card Access

The setup SD Card Access file will also be included on the microSD card installed in the PLC. The SD Card Explorer software can be installed on any windows based PC with Windows 7 or higher. This allows the user to have access of the files on the SD card without having to physically remove the SD card. Set up the communication similar to how the Remote Access is set up.

MODBUS Communication

Once the nitrogen generator is provided with a static IP addressed and can be seen on the network, MODBUS communication can be set up to retrieve real time data. The nitrogen generator MODBUS Communication settings are as follows:

- Protocol: TCP
- Local Port: 502
- PLC Controller: Slave

See MODBUS addressing table below:

Coils		MODBUS Command Number	
Pointer Value From	Operand Type	Read	Write
0000	MB	#01 Read Coils	#15 Force Coils

Registers		MODBUS Command Number	
Pointer Value From	Operand Type	Read	Write
0000	MI (16 Bit)	#03 Read Coils	#16 Preset Holding Registers

Table 4: MODBUS Addressing Table

Registers (16 bit)	STS Controller (Unitronics)	Modbus TCP/IP Address	Units/Status	Read/ Write
Nitrogen Storage Pressure	MI 118	40119	XXX.XX PSIG/kPa	R
Oxygen Concentration (%)	MI 5	40006	XX.XX % O2	R
Oxygen Concentration (PPM)	MI 112	40113	XXXX PPM	R
Supply Air Pressure	MI 161	40162	XXX.X PSIG/kPa	R
Supply Air Flow	MI 155	40156	XXX.X SCFM/SCMH	R
Nitrogen Flow	MI 167	40168	XXXXX SCFH/SLPM	R
Supply Air Temperature	MI 173	40174	XXX.X ° F/° C	R
Supply Air Pressure Dewpoint	MI 255	40256	XXX.XX ° F/° C	R
N2 Generator Cut-In Pressure	MI 20	40021	XXX.XX PSIG/kPa	R/W
N2 Generator Cut-Out Pressure	MI 21	40022	XXX.XX PSIG/kPa	R/W
Low Tank Pressure Alarm Point	MI 98	40099	XXX.XX PSIG/kPa	R/W
O2% Alarm Point	MI 14	40015	XXX.XX % O2	R/W
O2 PPM Alarm Point	MI 16	40017	XXXX PPM	R/W
Duplex Switch-Over Hours Setpoint	MI 239	40240	XXXXX Hours	R
Duplex Current Run Hours	MI 242	40243	XXXXX Hours	R
Nitrogen Booster Status	MI 189	40190	0=Filling, 1=Full, 2=Paused, 3=Stopped, 4=E-Stop	R
Registers (32 bit)				
Staging Current Run Hours	ML 36	28709	XXXXX Hours	R
Staging Switch-Over Hours Setpoint	ML 37	28710	XXXXX Hours	R
Generator Total Run Hours	ML 14	28687	XXXXXXXXX Hours	R
Booster Run Hours	ML 38	28711	XXXXXXXXX Hours	R

Coils	STS Controller (Unitronics)	Modbus TCP/IP Address	Units/Status	Read/ Write
Start / Stop	MB 12	00013	0=Off, 1=On	R/W
Running / Standby	MB 7	00008	0=Standby, 1=Running	R
Start Cylinder Fill	MB 171	00172	0=Not Started, 1=Started	R/W
Stop Cylinder Fill	MB 172	00173	0=Not Stopped, 1=Stopped	R/W
Pause Cylinder Fill	MB 173	00174	0=Not Paused, 1=Paused	R/W
Common Alarm	MB 61	00062	0=Good, 1=Alarm	R
Common Alarm Toggle	MB 19	00020	0=Off, 1=On	R/W
BlastOff Alarm	MB 2050	02051	0=Good, 1=Alarm	R
Oxygen Concentration Alarm	MB 0	00001	0=Good, 1=Alarm	R
PurityProtect On/Off	MB 225	00226	0=Off, 1=On	R/W
Low Tank Pressure Alarm	MB 106	00107	0=Good, 1=Alarm	R
Particulate Filter Status	MB 14	00015	0=Good, 1=Change Needed	R
Coalescing Filter Status	MB 28	00029	0=Good, 1=Change Needed	R
Absorbing Filter Status	MB 29	00030	0=Good, 1=Change Needed	R
Low Battery Indicator	SB 8	20489	0=Good, 1=Low Batt	R
Local Alarm Buzzer Toggle	MB 227	00228	0=Off, 1=On	R/W
PSA Staging Toggle	MB 170	00171	0=Off, 1=On	R/W
PSA Duplex Toggle	MB 208	00209	0=Off, 1=On	R/W
Duplex - Set Primary	MB 211	00212	High Transition Sets Primary on Start-Up	R/W
Duplex Identification	MB 210	00211	0=Secondary, 1=Primary	R
PSA Staging Toggle	MB 170	00171	0=Off, 1=On	R/W

7.14 FACTORY SETTING

This section is password protected for South-Tek Systems' Technicians only. Please contact South-Tek Systems for further assistance.

8 NITROGEN GENERATOR OPERATIONS

This section describes the procedure for starting, running, and stopping the nitrogen generator. The operator should notify personnel in the area of the equipment start-up. Make sure the start-up will not interfere with other operations.

8.1 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 Start-up procedure.

8.1.1 Initial Start-Up

1. Verify that power connection is 110 V or 220 V / 1 PH / 50 - 60 Hz as labeled on the unit and that the touchscreen on the generator is in the "Stopped" mode (the "start/stop" button in the upper left corner of the "Home" screen – red button indicates that the system is in stopped mode).

2. Start-up air compressor following the original equipment manufacturer's instructions. Once it has been started up and the air receiver is fully pressurized to the air compressor design pressure, open the air valve to the generator.

   NOTE: During the start-up sequence, check for leaks in all pipe-fittings and valves.

   WARNING: Shut off air supply valve and depressurize the system before repairing any leaks.

3. Open the nitrogen supply out to the nitrogen storage tank and the gas sample valve from the tank to the generator. Keep the nitrogen out to process valve closed for now.

4. On the nitrogen generator controller, toggle the "Start/Stop" and Booster "Start" button so that it toggles to green and the nitrogen generator should start cycling through valves and pressurizing the left bed. The booster will fill once nitrogen storage has sufficient pressure

5. Observe pressure gauges on the pressure vessels for 10 minutes and make sure that the pressure swings from bed to bed every 50-90 seconds. The bed pressurized bed pressure should reach within 3-5 PSIG of the incoming air supply pressure (incoming air supply pressure verified and readjusted if needed, to the incoming design pressure specifications). While one bed is pressurizing, the other bed should be exhausting down to 0-10 PSIG.

6. Nitrogen will start to flow to the nitrogen storage tank where it should begin building up pressure.

7. When the nitrogen storage pressure reaches the cut-out pressure, the system will go into "standby" mode, indicated on the "Home" screen and the nitrogen production will pause.

8. Now that the system is in "standby", open the nitrogen to process valve and the nitrogen storage tank will start losing pressure. Once the pressure falls to the "cut-in" pressure, the system will automatically restart and fill nitrogen into the storage tank again.

   NOTE: When the nitrogen generator is turned on for the first time or after a prolonged shutdown period, some of the lines may have equalized and balanced the nitrogen and oxygen. Therefore, at the restart, the first few cycles of nitrogen being delivered to the storage tank may not be producing the design purity specification.

8.1.2 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 Start-up procedure, 7.1.1.

1. Open the air isolation valve.
2. Toggle the "start/stop" button to "start" (button should be illuminated green to indicate that the system has started.
3. Toggle the booster "start" button. The booster will fill once nitrogen storage has sufficient pressure.
4. Open any shut off valves in the product Nitrogen line to the user's piping system. Allow the system purity to rise before using product.

NOTE: If the generator or any part of the system has been opened to the atmosphere, the system must be purged of any residual air.

8.2 SHUTDOWN

In case of an emergency, simply turn off the main power switch to the nitrogen generator. This will stop all generator functions immediately. Nitrogen supply can be shut off manually closing the nitrogen to process valve located on the output of the nitrogen storage tank.

For normal shutdown, valve off the nitrogen to process valve on the output of the nitrogen storage tank. Then, toggle the "Start/Stop" button to off on the "Home" screen.

WARNING: The generator will remain pressurized after shut down. Before performing any maintenance or opening any piping systems, always depressurize the system. Failure to do so may result in injuries.

9 SYSTEM MAINTENANCE

9.1 INCOMING AIR FILTRATION

All units come equipped with a standard filter set that includes (2x) particulate, (1x) coalescing, and (1x) adsorber filter (**Figure 4**). Clean filter elements are important for good system performance. Factory recommendation on filter change out schedule are as follows:

- Particulate every 3 months (4x per year)
- Coalescing every 6 months (2x per year)
- Adsorber every 12 months (1x per year)

See figures below for illustration of how to remove typical filter bowl for HPCF, TS Series and some CS Series and replacing the filter element.

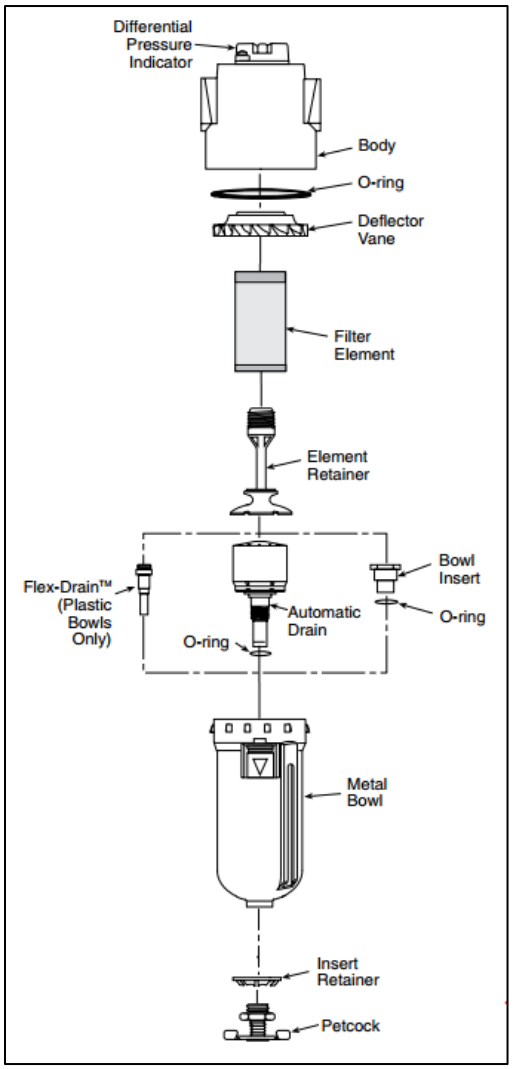


Figure 26: Filter Element Removal for all HPCF, TS Series and some CS

WARNING: Do not try to remove filter bowls unless both the air supply gauge clearly read zero PSIG. Valve off the incoming air supply. Relieve system pressure by opening the wedge valve after the filters.

1. Disconnect the tubes from the bottom of the bowls (if tied into condensate drain system).

2. To remove the bowls from the TS and some CS models, push the bowl latch down and rotate the bowl while pulling down. To remove the bowls from some CS and S Series models, remove the screws holding the bowl to the cover, and pull the bowl off.

3. Inspect the bowls. If the drain system is working properly, the bowls should not be full of water.

4. Remove the filter element by unscrewing it off. Take notice of how the element looks. If the element is excessively dirty, more frequent filter changes is recommended.

   NOTE: A plugged drain system will cause water and oil to carry over into the adsorber, which will cause permanent damage to the media inside the nitrogen generator. Such damage is not covered by the manufacturer's warranty. Use of filters other than those specified by South-Tek Systems could result in damages not covered by the warranty.

5. Wash the bowls in soapy water and rinse thoroughly as needed. Use of light air gun to remove debris is also acceptable. Make sure to always clean and dry with a clean and dry cloth.

6. Install new filter element and replace O-rings as needed.

7. Put the filter bowl back on the system opposite of how it was removed making sure the bowl is seated in place correctly.

8. Reconnect the drain tubes.

9. Slowly open the air inlet valve to pressurize the bowls and examine for any leaks.

9.2 REBUILD PROCESS VALVE

It is recommended that every 5 years or 15,000 hours, that all the process valves be rebuilt. Contact South-Tek System for the specific rebuild kit parts and instructions.

9.3 BOOSTER

The boosters are designed so that the soft goods (seals) are installed to bear the highest wear. If operated and maintained properly, the seals can be replaced many times usually before any need arises to replace a "hard part", e.g. piston, piston rod, gas barrel, etc. Please refer to the O&M manual and drawings for detail information and instructions.

Before/ After each use:

1. Perform overall visual check of system.

Every 20,000 cycles: (or 3-6 months approximate)

1. Check Booster for gas leaking from vents external leakage, overall performance.
2. Check **Air Drive** tie rod bolts(25ft lbs) & **Gas Barrel** tie rod bolts(15ft lbs), Re-torque is needed

Every 6 months:

1. Test all pressure gauges.
2. Inspect, clean or replace drive air filter.
3. Inspect, clean or replace booster inline air supply filter, inline nitrogen supply filter.

Every 12-18 months. Or 500-2000 hours of continuous use:

1. Inspect piping at full system pressure.
2. Reseal Booster Complete, and all System Components.

Aluminium filters on booster inlet: If an issue with the booster arises from particles in the booster's chambers or particulates/PTFE tape are found in the booster during maintenance, check these two (2) filters and blow them out as needed with oil-free air. When re-installing, ensure that 2 threads are exposed from the PTFE tape.

*****Contact STS for service support or service contracts.**

10 KEY CONTACTS

For any questions with the performance and/or maintenance of the system, contact:

South-Tek Systems
2940 Orville Wright Way, Wilmington, NC 28409
Phone: 1-(888)-526-6284
Email: info@southteksystems.com
Visit: www.southteksystems.com

11 FAQS

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. If further assistance is required, contact your local distributor or South-Tek Systems.

Symptoms	Probable Cause	Corrective Action
Nitrogen Generator Not Cycling	Low Voltage/Amperage	Check Electrical Source
	Circuit breaker tripped	Reset circuit breaker
	Fuse Blown	Replace fuses on electrical panel
	System is OFF (Left button on Home screen is Red)	Touch the Red switch for 2 seconds until it turns green
	Booster needs starting	Touch the booster start button
	High pressure cylinder is full	Connect cylinders that need refilling or drain
	Low Operator Air Pressure	Check incoming air source and/or internal air pressure regulator
	Defective Wiring	Check all wiring connections
Nitrogen Generator Running Continuously	Incorrect Cut-Out pressure	Set cutout pressure to factory setting
	Defective wiring with pressure transducer to the Touchscreen	Check the wiring connections
	Excessive N2 Leakage	Correct all N2 leakage
	Cycle Pressure too low	Check incoming air source and/or internal air pressure regulator
Low N2 purity	Product flow too high	Decrease product flow
	O2 analyzer malfunction	Replace O2 analyzer
	O2 flow port valved off	Open the O2 sample port
	Exhaust port plugged	Check exhaust tube is not blocked
Not building any storage pressure	Bad Process valve	Check each individual valve is working properly.
	Defective wiring	Check all wiring
	Disconnected pneumatic line	Check all pneumatic lines for leakage
	No Air Pressure going to the pilot valves	Make sure the pilot valves are getting adequate pressure

APPENDIX A: WARRANTY

The PSA Nitrogen Generator System is warrantied against any defects in workmanship and materials for 12 months from the date of shipment from South-Tek Systems. The purchaser has the liability to ensure that the system is fully inspected upon delivery and shall contact the appropriate shipping company to make any claims on damaged goods due to transit within that shipping company's policies. If the system is received with defects that are not due to shipping, a written claim should be submitted to South-Tek Systems within 1 week of receiving the shipment. South-Tek Systems can deny all other claims at their discretion.

All warranty work shall be done at a South-Tek System facility or at a PSA Nitrogen Generator Authorized Service Center. Only factory trained and authorized personnel are covered under warranty. Any part that is returned / repaired / replaced under warranty may be remanufactured or changed to a different specification at the factory's option. Any work performed by an unauthorized person/company or usage of non-factory parts, may void all warranties to the product.

Any item not manufactured by South-Tek may carry its own warranty from its manufacturer and will be warrantied by that manufacturer. All parts that need to be returned should be announced. Any item(s) that is returned to South-Tek Systems without an RMA number (return authorization number) may be denied and returned to the sender. Contact the factory for RMA #'s, prior to return shipment.

South-Tek Systems is not liable for damages caused by normal wear and tear, water, fire, erosion, corrosion, explosion, misuse, oil/gas vapors or unauthorized modifications. South-Tek Systems is also not liable for any losses, damages, or cost of delays, including incidental or consequential damages. There are no warranties or guarantees, expressed or implied, including the warranties of merchantability or fitness for a particular purpose or use, other than those warranties expressed herein.

For Claims, contact South-Tek Systems LLC at:

Tel: (888)526-6284

Email: service@southteksystems.com

Or write to:

South-Tek Systems, Warranty Claims, 2940 Orville Wright Way, Wilmington, NC, 28405

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