



# Parker Dual-Bed
# Nitrogen Generation Systems
# AGS200-600

Installation, Operation, and Maintenance Manual

Parker

ENGINEERING **YOUR** SUCCESS.

# Parker Dual-Bed Nitrogen Generation Systems
# Models AGS200, AGS400, AGS500, AGS600

Installation, Operation, and Maintenance Manual

⚠ **CAUTION: Excessive oil or moisture levels in the inlet air will cause irreversible contamination to the Adsorption Vessel (CMS) material. If there is any indication or suspicion of excessive oil levels in the feed air (e.g., oil-saturated filter elements, dryer malfunction), find and correct problem(s) before installing Parker Dual-Bed Nitrogen Generators.**


**Figure 1: Typical Setup of the Parker Dual Bed Nitrogen Generator**

**These instructions must be thoroughly read and understood before installing and operating this product. Failure to operate this product in accordance with the instructions set forth in this manual and by other safety governing bodies will void the safety certification of this product. For additional information refer to Warnings and Precautions section (page 38) of this manual or consult the factory for recommendations. If you have any questions or concerns, please call the Technical Services Department at 800-343-4048, 8AM to 5PM Eastern Time or email at balstontechsupport@parker.com (North America only). Please have the four-digit serial number ready. For other locations, please contact your local representative.**

The AGS200, AGS400, AGS500, and AGS600 PSA Nitrogen Generator Series are intended to produce nitrogen from compressed air through a system based on pressure swing adsorption. Any other use will not conform with the purpose of the DB unit. Parker Hannifin will not accept any liability for improper use.

Bulletin TI-AGS200-600

**Parker Hannifin Corporation**
Industrial Gas Filtration and
Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

# Contents



**Notes:** For enclosed drawings or schematics, please note the following:

**Part Number Conversions:**
**DB05:** AGS200
**DB10:** AGS400
**DB15:** AGS500
**DB20:** AGS600

**Parker Hannifin Corporation**
Industrial Gas Filtration and
Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

**General Description**

The Parker Dual-Bed Nitrogen Generators are completely engineered systems, which will convert a compressed air supply into 95-99.999% purity, compressed nitrogen. The units are based on state-of-the-art Dual-Bed Pressure Swing Adsorption (PSA) technology. The adsorption bed converts compressed air into a concentrated Nitrogen output stream.

**Engineered System**

The Parker Dual-Bed Nitrogen Generators include all the components required to convert compressed air into high purity nitrogen. The user need only connect a supply of clean, dry compressed air to the inlet of the Nitrogen generator, and then connect the outlet of the generator to the process requiring high purity nitrogen. The system can be broken down into four primary functional groups:

- Pre-filtration
- Nitrogen generation
- Final filtration
- Controls

**NOTE: Nitrogen produced by PSA Nitrogen Generators contains Argon which is also inert. Therefore, when mentioning Nitrogen purities, the composition of the product gas is determined by the residual Oxygen content. Ex. 1% Oxygen in product gas is equivalent to 100%-1% = 99% (Nitrogen + Argon).**

## Description

**Pre-filtration**

Refer to Figure 3. One high efficiency coalescing filter is incorporated into the nitrogen generator to protect the adsorption bed and valves from contamination. The coalescing filter is located inside the unit, just after the inlet air connection. It removes trace liquids and particulate matter from the incoming air supply. This filter is equipped with an automatic float drain to empty any liquids accumulated within the filter housing.

⚠ **CAUTION: It should be noted that this filter is present for final filtration of the incoming air only. The air supplied to the system should be clean and dry prior to reaching these filters. Any accumulation of oil or moisture in these filters should be an indication of possible CMS contamination. The amount of liquid present and the duration of time will determine the amount of contamination to the CMS Bed.**

**Nitrogen Generation**

Refer to Figure 3 and 4. The heart of the system is the pair of Adsorption Vessels loaded with Carbon Molecular Sieve (CMS). The CMS adsorbs Oxygen from compressed air, producing a Nitrogen stream, which is collected in the Nitrogen Surge Tank (NST 101). Essentially, one adsorption vessel will alternate between the adsorption and desorption phase. When one vessel (AV 101 or AV 102) is in its Adsorption Cycle, the other vessel is in its Desorption Cycle.

The cycling of the system is controlled by a PLC (Programmable Logic Controller), which sends electrical signals to solenoid valves. The solenoid valves in turn pneumatically actuate the process valves (controlling Air and Nitrogen flow). One of the two Inlet Air process valves (PV 101 or PV 102) is open, allowing air to enter the vessel set beginning its Adsorption Cycle. The corresponding

Nitrogen process valve downstream (PV107 or PV108 respectively) is also open, allowing the Product Nitrogen stream to leave the vessel during the Adsorption process. At the same time, the Desorption Vent valve (PV 104 or PV 103) of the other vessel set is open, releasing to the atmosphere, the Oxygen-rich gas from the vessel set undergoing the desorption process. At the end of the Adsorption Cycle of a vessel (approx. 1 minute), the pressures in the two sets of vessels are allowed to equalize (PV 105 and PV 106 open, while all feed, product, and desorption valves are closed). Then the vessel which had been in its Adsorption Cycle will undergo Desorption, and vice versa.

Since one Adsorption Vessel is essentially always in a production state (with the exception of the 4-second equalization period), a continuous flow of Nitrogen is produced. The system can be equipped with a continuous Oxygen analyzer to monitor the product purity. After the initial startup, the Nitrogen Generator is designed to operate continuously.

**Final Filtration**

The final filter (AF101) on the nitrogen generator is a Parker/Balston 6000 Series Stainless Steel Grade SA (sterile air) filter. The final filter removes particulate contamination with an efficiency of 99.9999% at 0.01 micron, assuring the user of clean high purity Nitrogen. The final filter is located on the right-hand-side, in a AGS200 and AGS400, and at the bottom-left, in an AGS500 and AGS600 (see Figure 3).

**Flow/Pressure Controls**

The flow and pressure controls are shown in Figure 2, and are comprised of:

- an outlet pressure regulator (PRV 101)
- outlet pressure gauge (PI 102)
- outlet flow meter (FE 101), and
- flow controller (PCV 101)

Proper use of these controls will assure the user of a 95% to 99.999% purity Nitrogen outlet stream (See note below). The outlet pressure regulator and gauge are used to set and monitor the Nitrogen outlet pressure from the generator. The flow controller and flow meter are used to set and monitor the Nitrogen outlet flow rate. The flowmeter is set to read in standard cubic feet per hour (SCFH) but may be programmed to read in standard cubic feet per minute (SCFH) by the user. Flows at various purity levels are shown on page 42 of this manual.

The system will produce higher purity Nitrogen (lower $O_2$ content) at lower flow rates; conversely, the same system will produce lower purity Nitrogen (high $O_2$ content) at higher flow rates. At higher flow rates, there will also be greater fluctuations in the Nitrogen Surge Tank pressure as the Dual-Bed goes through a full cycle of both Adsorption and Desorption phases.

**NOTE: Purities of 99.9 to 99.999% require an oxygen analyzer upgrade and must be sampled directly from the Nitrogen Surge Tank (NST 101) using copper or stainless steel tubing.**

**Electrical Controls**

The electrical control on the Parker Dual-Bed is an “O/I” switch. The “O/I” switch is located on the lower left side of the control panel (see Figure 2). This switch is used to start the Nitrogen generator through its normal cycle.

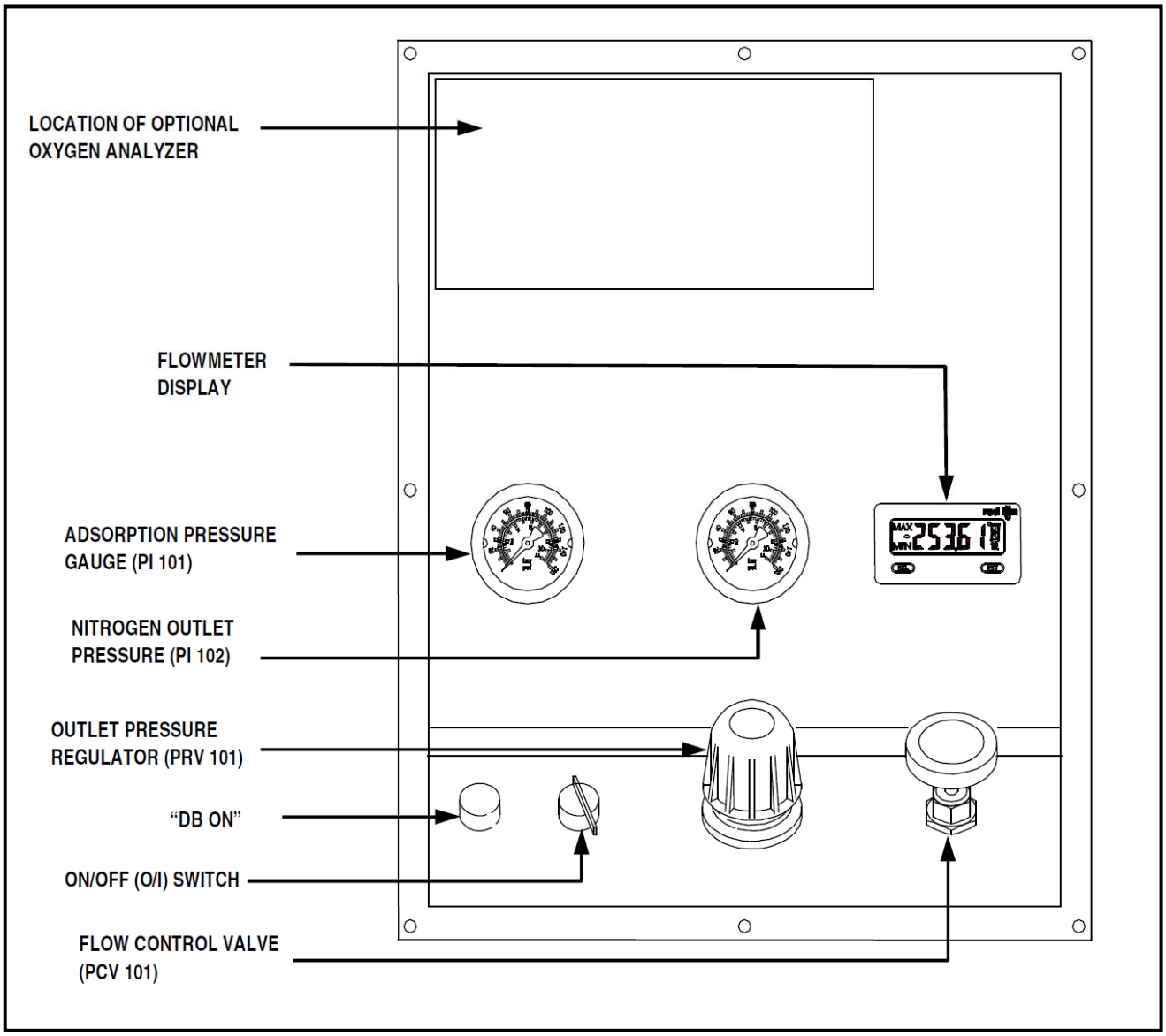


**Figure 2: Typical Control Panel Layout**

**Parker Hannifin Corporation**
Industrial Gas Filtration and
Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

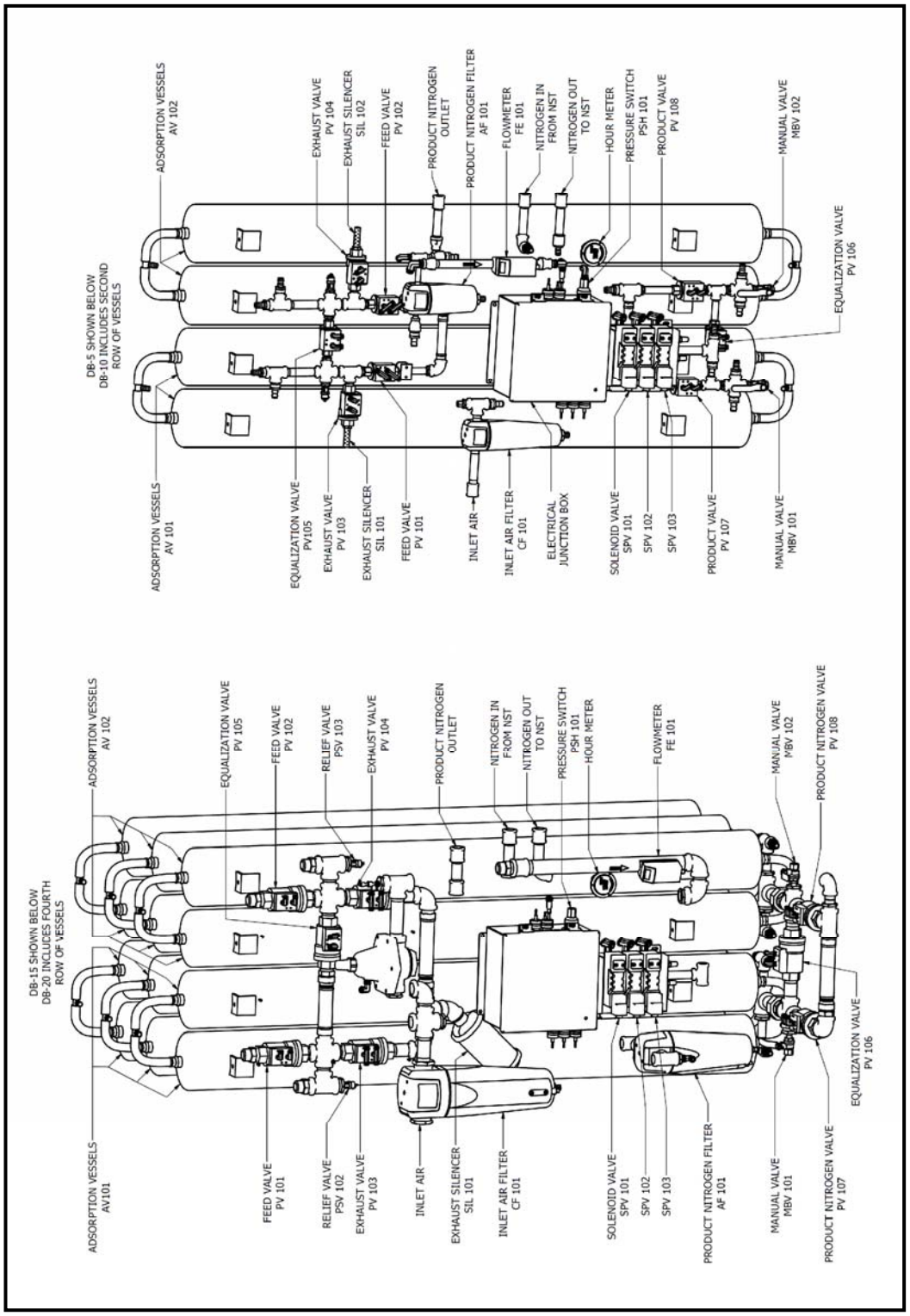


**Figure 3: Instrumentation Diagram**

**Parker Hannifin Corporation**
Industrial Gas Filtration and
Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

## Installation

**General**

The Parker Nitrogen Generation System is a freestanding unit. On each generator model, the air inlet port is located on the left side and the outlet ports are located on the right side of the unit. Use connectors that will withstand 150 psig and the maximum flow rate of the system to connect to the Nitrogen generator. Always transport the DB generator in an upright position when using a forklift.

**Location**

The AGS200, AGS400, AGS500, and AGS600 are intended for **indoor use** only and should be located in an area where the ambient temperature is between 40°F and 95°F (4°C and 35°C). Installation of the unit in an area where the ambient temperature exceeds 95°F (35°C) or falls below 40°F (4°C) may affect the performance and/or life of the system and void the warranty. The environment surrounding the nitrogen generator should also be vibration-free, dry, and adequately ventilated. The generator creates an oxygen-rich permeate stream which may pose a flammability problem in an oxygen sensitive environment.

⚠ **CAUTION**: **Nitrogen is nontoxic and largely inert. It can act as a simple asphyxiant by displacing oxygen in air. Inhalation of Nitrogen in excessive concentrations can result in unconsciousness without any warning symptoms such as dizziness, fatigue, etc. Install the generator in a well-ventilated area.**

⚠ **CAUTION: An oxygen-rich stream is released from the adsorption vessels. Oxygen enriched air leads to increased risk of fire in the event of contact with flammable products. Ensure that there is adequate ventilation at all times. Do not install the Dual Bed Nitrogen Generator where explosive mixtures may occur.**

**Utilities**

**Compressed Air** - The Parker Nitrogen Generation System requires a source of clean, dry compressed air for optimal operation. The compressed air should be of instrument quality and supplied at a pressure of 110 psig minimum to 140 maximum. If the compressed air supply pressure is less than 110 psig, purities and flows will vary from those shown on the Nitrogen Flow tables provided in the **Principal Specifications** section of this manual. At air supply pressures greater than 110 psig, the performance of the generator will be optimal. Consult the factory for flows and purities at pressures higher or lower than 110 psig. If the incoming air pressure is greater than 140 psig, the system may be damaged and the warranty will be void. The supply air should also be at room temperature and relatively free of water, compressor oil, hydrocarbons, and particulate matter. Parker recommends a dedicated compressed air system which includes a compressor, an after cooler, and a refrigerated dryer to supply compressed air at a dew point 40°F or better, a water separator, and final filtration. The compressor should provide enough airflow to prevent excessive pressure drops during the cycling of the PSA beds. Compressed air consumption rates at different outlet flows and purities are detailed in the **Principal Specifications** section at the end of this manual. An air surge tank is necessary to store air for peak air demand. An existing central bank may be used, or if a dedicated air compressor is being used for the DB, a properly sized surge tank will be required.

**NOTE: It is highly recommended that a qualified service technician from the compressor company set-up the feed air compressor when purchased with the package. Serious damage to the air compressor may result if improperly set-up.**

⚠ **CAUTION: Excessive quantities of water, compressor oil, hydrocarbons, or particulate in the compressed air supply will contaminate the CMS material and valves. If contamination of the system occurs as a result of an inferior compressed air supply, nitrogen purity specifications will not be met and the warranty will be void.**

**Power** - A 120 VAC/60 Hz, 15 amp power source will be required to energize the Parker Dual-Bed Nitrogen Generation Systems.

**Piping** - The inlet air and Nitrogen outlet piping should adapt to the inlet and outlet port properly. All piping and fittings used with the Nitrogen generator should be clean and rated to 150 psig minimally.

**Drain Lines** - The 1/4" plastic drain lines from the optional prefilter (PF 101 - Fig. 1) should be piped away to an appropriate disposal container. The drainage, consisting primarily of water and compressor oil, should be disposed of properly according to local regulations. One-quarter inch tubing can be used for the condensate drains on the Nitrogen Generator. Although no condensate should normally collect in these filters, the tubing attached should be run separately into the proper collection disposal container.

## Operation

**Pre-Start Procedure**

The DB unit requires approximately two hours of startup time to achieve rated purity (longer if higher purities are desired). Nitrogen generated during this period should be vented to atmosphere to avoid contaminating downstream processes. After the inlet and outlet piping has been connected to the generator, plug the power cord into a 120 VAC/60 Hz power source. If high purity Nitrogen is already stored in Nitrogen Surge Tank, follow Normal Start Up procedure.

**Initial Start-Up**

Follow the steps below after installation or any maintenance work on the DB unit.

1. Check to ensure the power cord is plugged into a properly protected 120 VAC, 1-phase, and 60 Hz power receptacle.

2. Check to ensure that a properly protected power connection has been made to the compressor according to the manufacturer's instructions (**IMPORTANT: Determine voltage specification of compressor. Follow compressor manufacturer's instructions, supplied with compressor, for proper set-up and operation)**. Connect compressor piping AND particulate filter (PF 101) to air surge tank (AST 101) according to diagram in Figure 1. Set compressor to unload at 125 psig and load at 110-115 psig.

3. Connect air surge tank (AST 101) to DB nitrogen generator as shown in Figure 1.

4. Secure all filter elements.

5. Connect NST101 (nitrogen surge tank) to the generator as shown in Figure 1. Be sure the petcock on the bottom of the NST is fully closed as a small leak can cause substantial degradation in the performance of the unit.

6. Turn on feed air and allow pressure to build up in AST 101.

⚠ **CAUTION: The user must read the oxygen analyzer manual for proper operation and important information about the device.**

**Parker Hannifin Corporation**
Industrial Gas Filtration and Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

7. Optional: If equipped, calibrate the Oxygen Analyzer by switching the “Calibrate/Generate” valve (TSV 101) to the “Calibrate” position. Adjust the “Span” potentiometer such that the display reads a steady “20.9” (amount of oxygen in atmospheric air). Once calibrated, return to the “Generate” position. Refer to the Oxygen analyzer technical manual for more information.

8. Switch the “O/I” to the “I” position.

9. The generator will begin its adsorption cycle. During the adsorption cycle the Nitrogen Surge Tank will begin to pressurize.

10. Once there is sufficient pressure in the nitrogen surge tank (NST 101), adjust the Outlet Pressure by turning pressure regulator PRV 101 until gauge reads desired setting.

11. Open PCV 101 and allow a small amount of nitrogen to purge into the room.

12. Verify outlet pressure reading. Adjust if necessary.

⚠ **CAUTION: Nitrogen is nontoxic and largely inert. It can act as a simple asphyxiant by displacing Oxygen in air. Inhalation of Nitrogen in excessive concentrations can result in unconsciousness without any warning symptoms such as dizziness, fatigue, etc. Install the generator in a well-ventilated area.**

13. After 2 hours of undisturbed operation or once the Oxygen content is at acceptable levels, close PCV 101 and connect outlet port to application.

**Normal Start-Up**

1. Set the inlet air pressure to between 110 psig and 125 psig.

2. Allow air to pressurize up to the inlet air filter.

3. Turn the “O/I” switch to the “I" position.

4. Calibrate the Oxygen Analyzer if equipped.

5. Allow the DB to cycle for approximately 3 minutes.

6. Slowly open MIV 101 and MIV 102 at NST 101.

7. Adjust the Outlet Pressure and Flow Rate based on individual system requirements (refer to **System Adjustment** section below).

## System Adjustment

After the Parker Nitrogen Generation System has been energized and pressurized, determine the outlet pressure and purity of Nitrogen required for the application. Set the flow parameters as follows:

1. **Pressure -** To adjust the outlet pressure from the generator, turn the outlet pressure regulator until the outlet pressure gauge displays the desired outlet pressure.

**NOTE: Not all flows are available at all pressures.**

2. **Flow** - Set the outlet flow after setting the outlet pressure, by turning the flow control valve until the desired flow meter reading is displayed on the flow meter display. Avoid exceeding the output capacity of the generator. If outlet capacity is exceeded, the Nitrogen generated will not meet purity specifications.

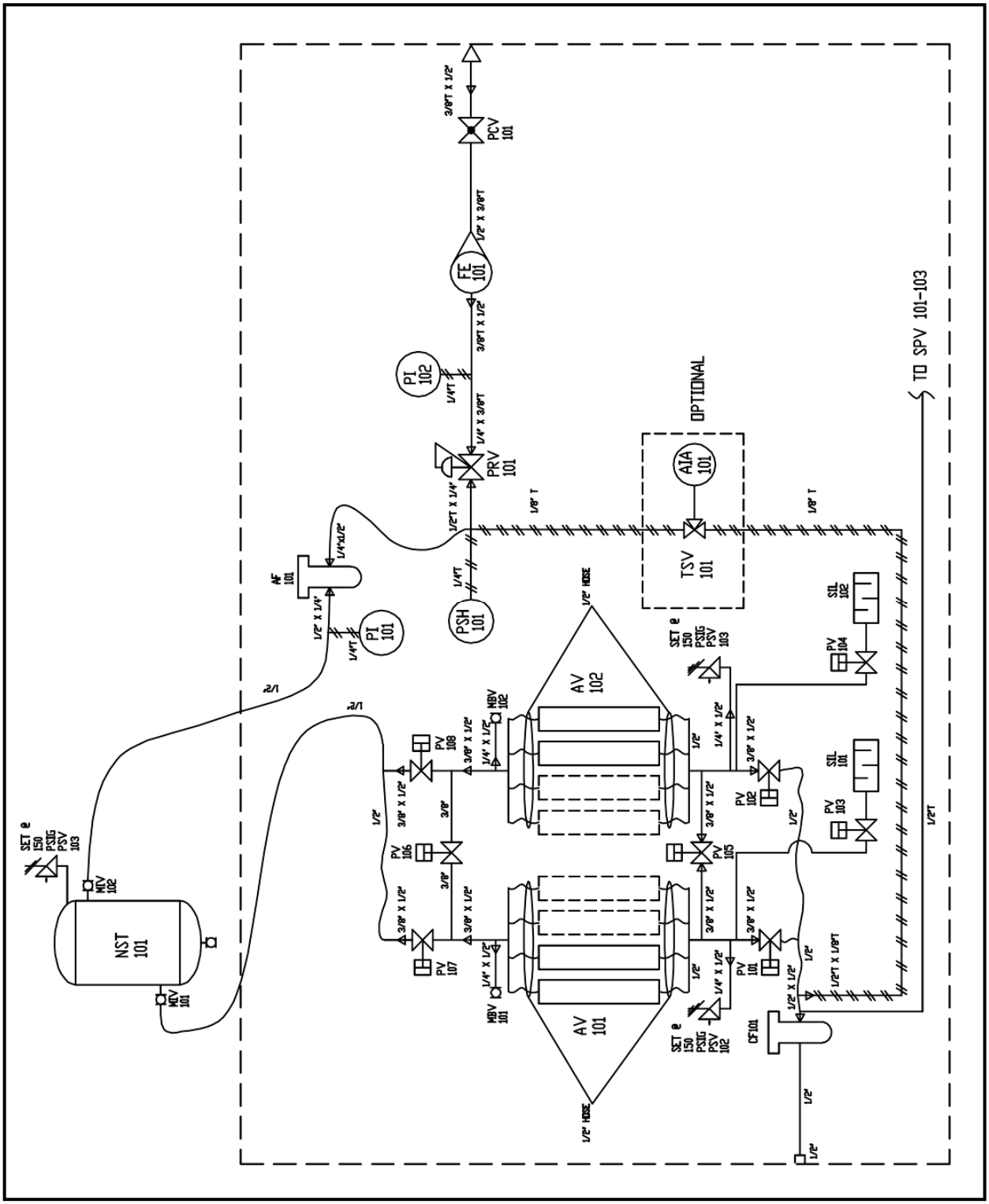


**Figure 4: Typical Process Flow Diagram**

**Parker Hannifin Corporation**
Industrial Gas Filtration and Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

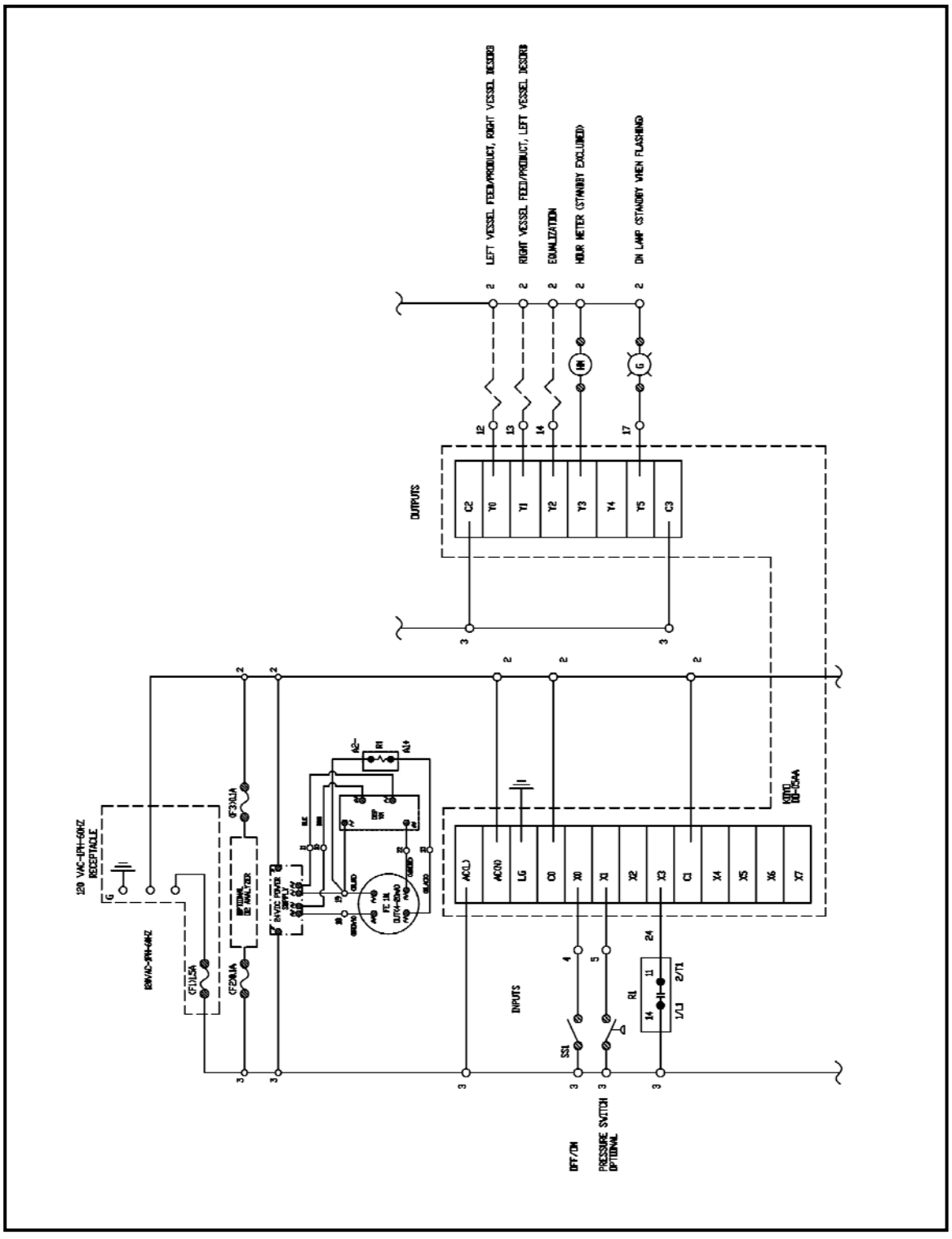


**Figure 5: Typical Wiring Diagram for 120 VAC/1 Phase/60 Hz**

**Parker Hannifin Corporation**
Industrial Gas Filtration and
Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

**Evaluation**

The performance and operating conditions of the Nitrogen Generation System should be monitored on a routine basis, as dictated by the application. This routine system check should include:

- confirming Nitrogen purity stability,
- adjusting flow meter reading (if necessary)
- confirming adsorption vessel cycling pressures
- checking outlet pressure

If any of these readings have changed significantly from their original settings, adjustments must be made as described in the **System Adjustment** section of this manual. If the Nitrogen purity must be altered during operation of the system, allow approximately 1 hour for the purity to stabilize.

**Temperature Considerations**

The data represented in this manual is based on an ambient operating temperature of 77°F (25°C). The standard unit is designed to operate in the temperature range of 40°F to 95°F (4°C to 35°C). Please consult factory if the ambient temperature in the generator location will be outside this range.

**Shutdown**

There are two different shutdown procedures for the Parker Nitrogen Generation System. The Normal Shutdown procedure should be followed for filter maintenance, oxygen analyzer maintenance, and temporary operational shutdowns (i.e. overnight, weekends).

After a Normal Shutdown, a supply of high purity Nitrogen gas will remain in the receiver tank and system start-up time will be reduced when the generator is restarted. The Total Shutdown is normally necessary only for long term storage or for preparing the unit for shipment. After a Total Shutdown, the Nitrogen receiver is empty; therefore, the start-up time for the generator will be approximately 2 hours (Follow Initial Start Up procedure).

**Normal Shutdown**

1. Turn the “O/I” switch to the “O” position, off.
2. Close both manual ball valves at the nitrogen surge tank.
3. Isolate system from feed air source and process.
4. Depressurize the system by opening MBV 101 & 102 to bleed trapped gas from both sets of vessels. This can be accomplished by opening both valves slowly until depressurized. Open manual bleed valves and drain valves found on the filter housings.

**Total Shutdown**

1. Perform Normal Shutdown procedure.
2. Empty the Nitrogen receiver by opening the 2-way valve beneath the receiver tank.
3. Remove power from the unit (unplug power cord).

⚠ **CAUTION**: **Pressure will remain in the adsorption vessel once the desorb valve is closed. DO NOT ATTEMPT TO PERFORM MAINTENANCE ON VALVES OR FILTERS WITH THE ADSORPTION VESSEL PRESSURIZED.**

**Parker Hannifin Corporation**
Industrial Gas Filtration and Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

**NOTE: It is normal for the adsorption vessels to slowly pressurize even when system is shut down. If maintenance is required, isolate unit from air system and process. Bleed remaining pressure in the system by opening the bleed valves on the filters, MBV 101 and 102 to bleed both sets of vessels, and Manual Drain Valve (MDV 101) on Nitrogen Surge Tank (NST 101).**

All maintenance activities should be performed by trained personnel using reasonable care.

The DB unit must be de-energized and depressurized before performing any maintenance procedures.

**Stand-By Pressure Switch Setting**

For the Dual-Bed nitrogen generator to switch to stand-by mode, the pressure switch (PSH 101) has to remain in closed (changed state) position for 10 minutes. This means that the pressure switch has to be set just below the lowest pressure point in the nitrogen surge tank during no flow. Refer to the electrical diagram (Figure 5) and Figure 6. If the pressure switch is not set below the lowest pressure reading in the nitrogen tank **during no-flow condition** PSH 101 will open during the nitrogen tank pressure swing before 10 minutes has elapsed and the PLC will not set the unit to stand-by. The pressure switch is located inside the electrical junction box. A flat head screw driver is required to turn the adjustment screw. Take great care in using tools around live terminals.

**NOTE: The stand-by feature should not be used in low flow/high purity applications as the pressure switch will not properly cycle under these conditions.**

**NOTE: During pressure switch adjustment, do not make any changes to the feed air system. If feed air supply has to be modified, it should be done prior to setting the pressure switch on the DB Nitrogen Generator.**

**NOTE: There may be a spike in oxygen content when the unit switches out of stand-by. It may be necessary to run the unit for up to 30 minutes to allow oxygen content to stabilize before flowing the product nitrogen into the application.**

To set the standby feature of the DB unit follow the steps below.

1. With the DB unit cycling normally, close the outlet product control valve (PCV 101).
2. Allow the nitrogen generator to cycle completely four to five times and the nitrogen tank to pressurize.
3. Locate pressure switch inside main control panel.
4. Turn the adjusting screw counter-clockwise until the moving contact in the pressure switch just touches the bottom contact (closed position). Note that X1 in the PLC is illuminated. X1 lamp is illuminated when the pressure switch is in the closed position. If the switch is already closed, turn the adjusting screw clockwise until the contacts no longer touch. Then turn the adjusting screw counter clockwise until the switch closes. Refer to Figure 6.

**NOTE: It is important to stop turning the screw immediately when PSH 101 changes to the closed position. Continuing to turn after the changed state sets the pressure switch lower than what is in the nitrogen surge tank.**

**Parker Hannifin Corporation**
Industrial Gas Filtration and Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

5. Let the nitrogen generator undergo further cycling (no flow - PCV 101 closed). Observe the pressure switch contacts or X1 on the PLC.

6. If the pressure switch switches back to the open position (bottom contact not touching and X1 not illuminated) during DB cycling with no flow, turn the adjusting screw further in a counter-clockwise direction until the pressure switch remains in the closed position (Input X1 illuminated) throughout the DB pressure swing cycles.

7. Once the pressure switch stays in the closed position throughout the DB cycling process, it is properly set.

8. After ten minutes have passed with the pressure switch in the closed position continuously, the nitrogen generator will go into stand-by mode, and the green “DB On” light will flash.

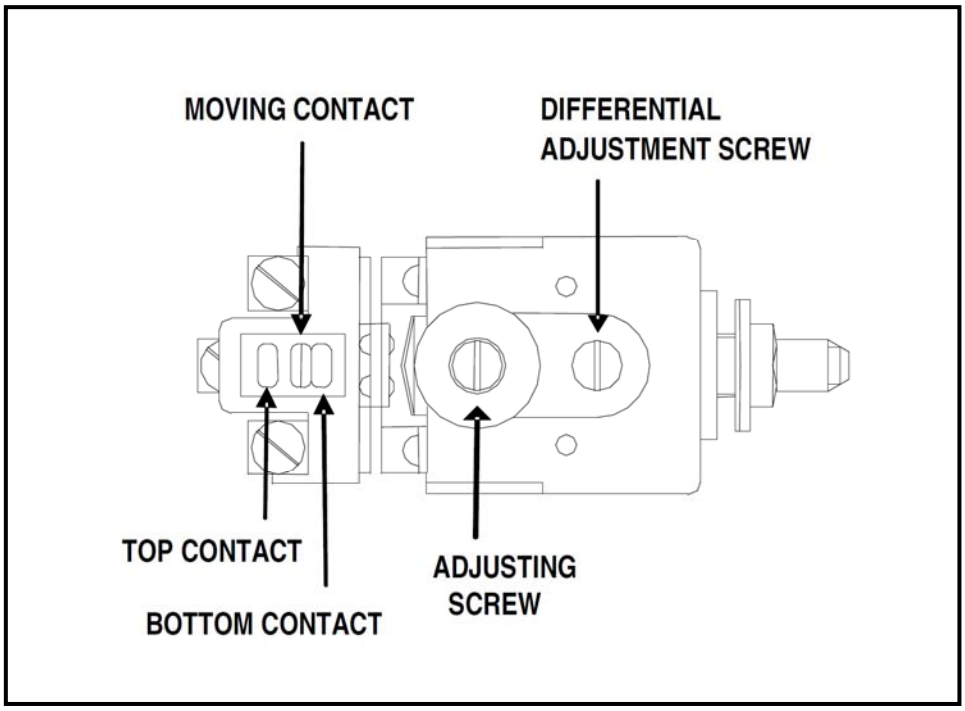


**Figure 6: Pressure Switch**

**Parker Hannifin Corporation**
Industrial Gas Filtration and
Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

### Resuming Flow

For automatic start-up out of stand-by mode, open the flow control valve to produce the normal flow rate. Once the pressure drops below the setting of the pressure switch (PSH 101) the nitrogen generator begins to resume pressurization and cycle normally.

### Verification

It is important to verify that the pressure switch does not stay in the closed position for 10 minutes **during normal flow conditions**. If that is the case, then the pressure switch is set too low, and the nitrogen generator will go into stand-by during normal flow conditions (especially at higher purities).

1. After setting the pressure switch, open PCV 101 to produce the normal nitrogen flow rate.
2. Adjust PRV 101 to the proper outlet pressure required by the process. Readjust PCV 101 if necessary.
3. While the DB unit undergoes the normal cycling process, observe the pressure switch and Input X1 on the PLC.
4. If the pressure switch closes (X1 illuminated), ensure that it **will** change state throughout the DB cycling process (i.e. X1 should switch on and off, but should not stay on for 10 minutes). If it does not change state, the unit will go into standby (pressure switch is set too low). If this is the case, the adjustment screw will require a minor clockwise adjustment until the switch is operating as required.
5. As a final check, turn off the flow and observe that the unit will go into standby. Then, turn the flow on and make sure it operates normally out of standby. At this point, the switch is set correctly.

**NOTE: Subsequent changes in the feed air system may interfere with the current pressure switch operation. After making any necessary changes in feed air pressure, check for proper pressure switch operation.**

**NOTE: The stand-by feature should not be used in low flow/high purity applications as the pressure switch will not properly cycle under these conditions.**

## Fuses

The most likely cause of a complete failure of electrical power is a blown fuse. Fuses for the main unit are located in the rear of the machine, near the bottom. To access the fuses, remove the power cord and gently pry open the fuse block cover plate as shown in Figure 7.

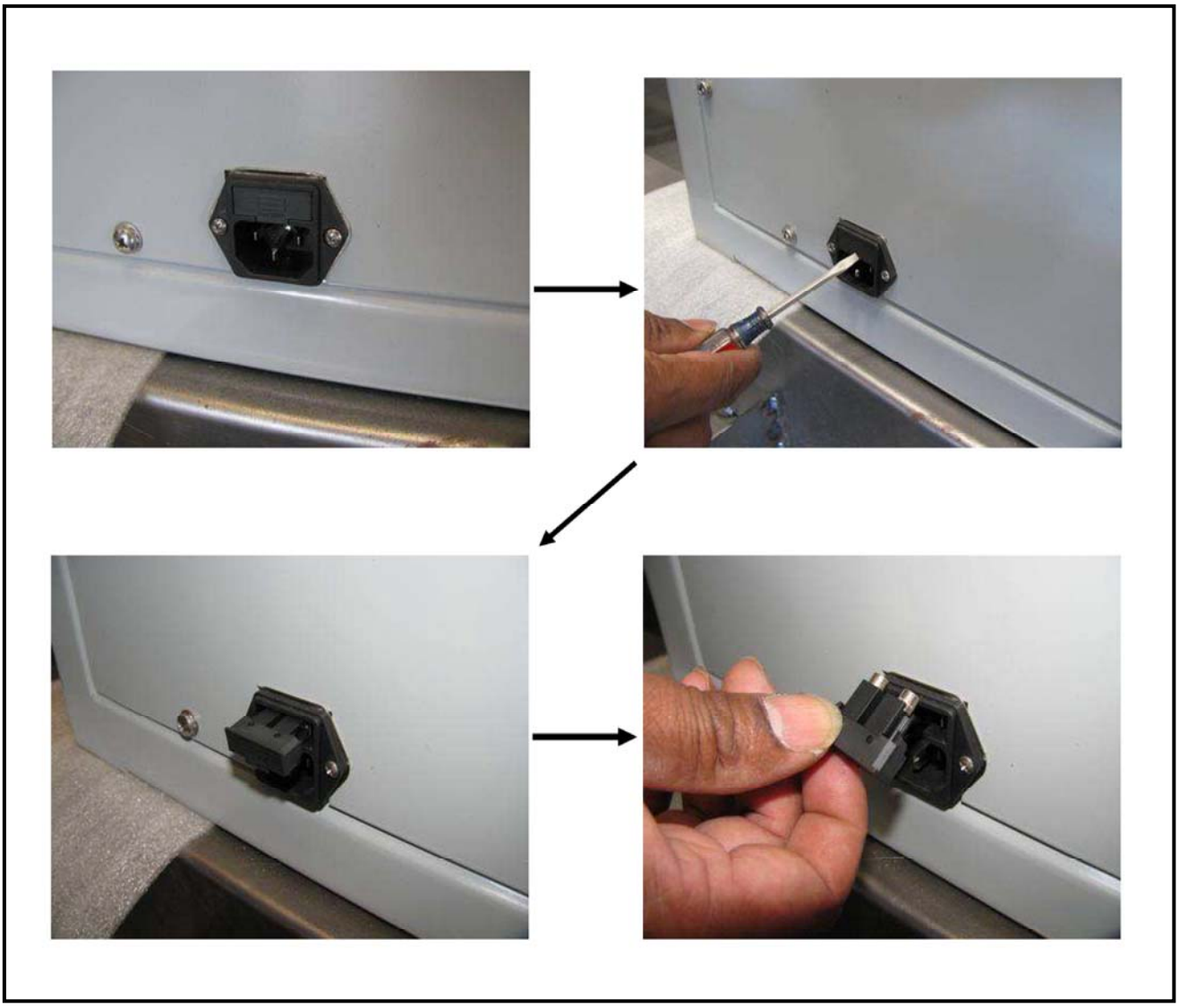

**Figure 7: Main Fuses**

**Parker Hannifin Corporation**
Industrial Gas Filtration and
Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

Fuses for the optional Balston O2 analyzer are located inside the unit. Remove the lower front access panel and replace the fuses as necessary as shown in Figure 8.

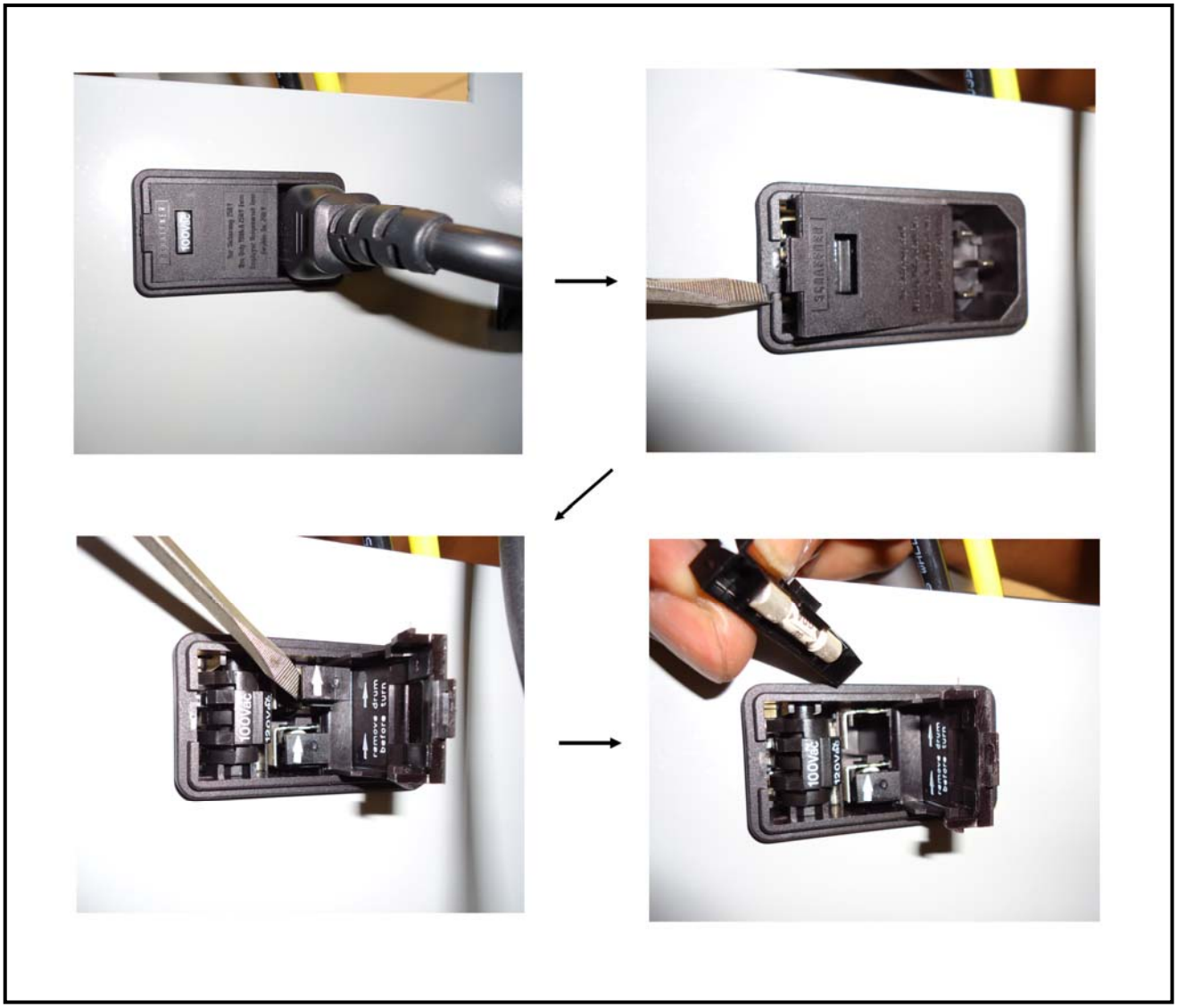

**Figure 8: Oxygen Analyzer Fuses**

**Parker Hannifin Corporation**
Industrial Gas Filtration and
Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

## Oxygen Analyzer

The fuel cell in the oxygen analyzer degrades over time and should be replaced approximately once per year, depending on the make and manufacturer of the analyzer. If large adjustments are required to calibrate the analyzer and calibration cannot be achieved, or if the reading continues to fall to zero, then the fuel cell needs to be replaced. After cell replacement, the proper calibration procedure must be performed.

**Parts**

Ensure that the replacement fuel is the correct model for the unit. The table below details the type of fuel cell needed for each type of oxygen analyzer:

| Replacement Oxygen Monitor Fuel Cells | |
|---|---|
| Parker/Balston 72-730 (Standard Units) | 72695 |
| Advanced Instruments % Oxygen Analyzer | GPR-11-60-4 |
| Advanced Instruments Trace Oxygen Analyzer | GPR-12-333 |

**Tools Required**

Phillips screwdriver
Calibrating tool or jewelers flathead screwdriver (for Parker/Balston Oxygen Analyzer)

**Procedure**

Consult proper oxygen analyzer manual (shipped with DB unit) for steps to replace fuel cell and calibrate analyzer.

## Oxygen analyzer alarm contacts

The O2 analyzers supplied with the AGS200-600 series have external alarm contacts that can be wired by the customer in the field. These are dry contacts that may be used for purposes as determined by the user. The connection points are high on the rear panel of the unit (see Figure 9).

**Parker Hannifin Corporation**
Industrial Gas Filtration and
Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg


**Figure 9: Oxygen Alarm Contacts**

There are six connection points. The three on the left are for the high alarm and the three on the right are for the low alarm. When an alarm is not activated there will be continuity between the COM and the NC terminal of either contact. When an alarm is activated there will be continuity between the COM and the NO terminal. These alarm set points are adjustable on the O2 analyzer itself.

⚠ **CAUTION: All maintenance should be done with the system power disconnected and fully depressurized. Failure to do so can cause serious injury.**

## Filter Maintenance

The coalescing filter is located inside the unit just after the inlet air connection. This filter is present for final filtration of the incoming air only. Any accumulation or oil or moisture in these filters should be an indication of possible CMS contamination. The final filter, located on the right hand side of the unit, removes particulate contamination with an efficiency of 99.9999% at 0.01 micron to ensure high purity product Nitrogen output. **The two filter elements on the DB unit should be inspected every 500 operating hours and replaced if necessary**. **Otherwise, replace the elements every 1,000 hours. Reference the on-board hour meter (see Figures 3 and 19) for elapsed operation time.**

**NOTE: Make sure that system is depressurized.**

**Procedure**

Refer to Figure 3.

1. Remove lower front access panel
2. Securely hold bottom portion of filter housing.
3. Push up gently against top portion, and twist counterclockwise (opposite direction of LOCK arrow).
4. Remove filter housing.
5. Unscrew round filter element retainer at the bottom.

**Parker Hannifin Corporation**
Industrial Gas Filtration and Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

6. Carefully pull out old filter element, and replace with new part.

7. Install fastener and filter housing.

## Process Valve Rebuild

Each DB unit has eight process valves that need timely maintenance annually. The AGS200 and AGS400 have six 3/8 inch and two 1/2 inch process valves. The AGS500 and AGS600 have eight 1-inch valves. The rebuild process mainly consists of changing the O-rings and valve seats. Order the appropriate valve rebuild kit, and make sure that the working environment is free of moisture and other contaminants.

**Parts**

| | Description | Part number | Quantity |
|---|---|---|---|
| **AGS200 and 400** | Process valve rebuild kit (3/8 inch) | RKVA037VV | 6 |
| | Process valve rebuild kit (1/2 inch) | RKVA050VV | 2 |
| **AGS500 and 600** | Process valve rebuild kit | RKVA100VV | 8 |

**Tools**

| | | |
|---|---|---|
| Phillips screwdriver | Masking or painter's tape | PTFE pipe paste |
| Flathead screwdriver | thin-tip permanent marker | White Lithium Grease |
| 5/32 hex key | 7/8 wrench | PTFE tape |

**Procedure**

Remove the side panels and the lower front access panel of the nitrogen generator to access the valve manifolds. If the air inlet and product nitrogen outlet ports are hard-piped and the side panels cannot be removed, then the front upper panel has to be removed for access. This is a rather involved procedure and it is recommended that if at all possible, the access be done by removing the side panels. If it is absolutely necessary that the front upper panel be removed, please contact the factory for detailed procedures.

**Mark all tubing and hose connections before removal to ensure correct reassembly.**

⚠ **CAUTION: Pressure will remain in the adsorption vessel once the desorb valve is closed. DO NOT ATTEMPT TO PERFORM MAINTENANCE ON VALVES OR FILTERS WITH THE ADSORPTION VESSEL PRESSURIZED.**

1. To reduce start up time, close both manual ball valves (MIV 101 and MIV 102) on NST 101 to keep nitrogen inside. Carefully set aside the pressurized tank until the valve rebuild process is finished. Refer to flow diagram (Figure 4).

2. Remove side panels and lower front access panel.

3. Depressurize the system by opening MBV 101 & 102 to bleed trapped gas from both sets of vessels (see Figure 17). This can be accomplished by opening the valves slowly. Open manual bleed valves and drain valves found on the filter housings

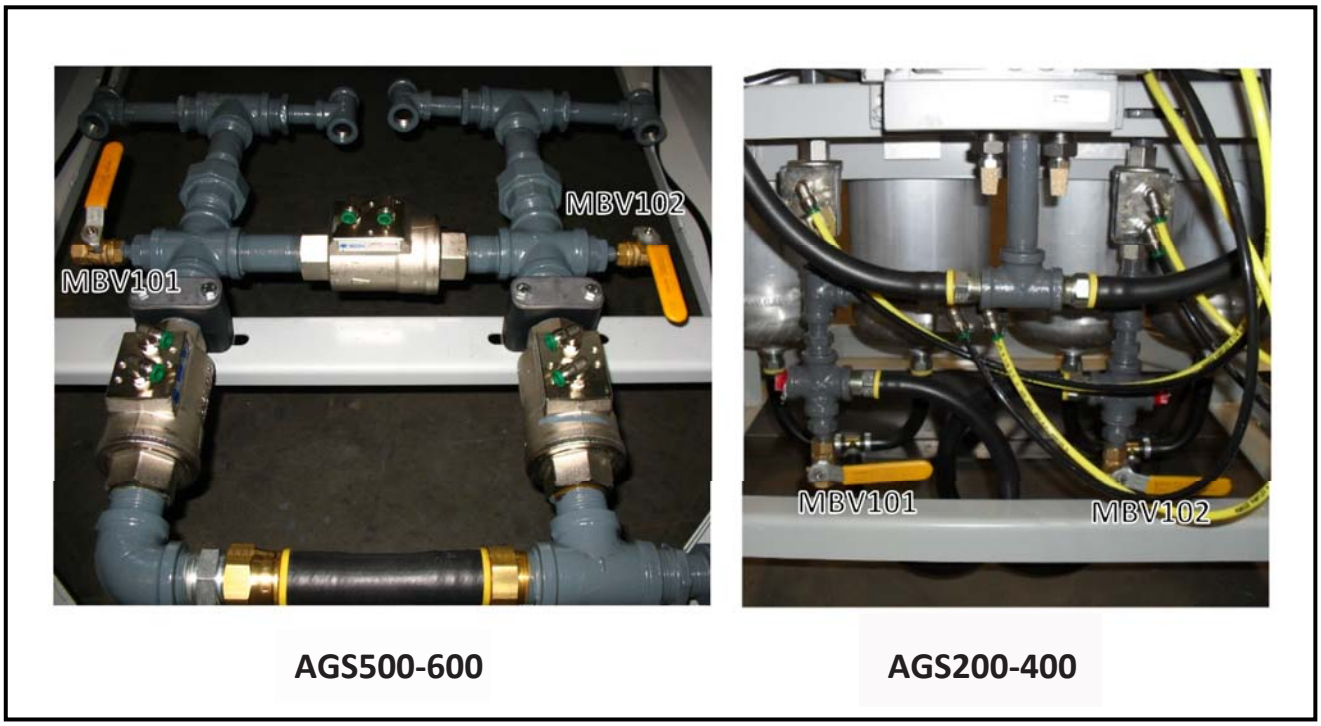


**Figure 10: Manual Bleed Valves**

⚠ **CAUTION: Label hoses, tubing, and fittings before disconnecting to insure proper re-assembly and generator operation after rebuild procedure is complete.**

⚠ **CAUTION: Excessive oil or moisture levels in the air will cause irreversible contamination of the CMS material in the Adsorption Vessel. Take extra care to prevent exposure of the CMS material to a moist environment during service. If there is any indication or suspicion of excessive oil levels in the feed air (e.g., oil-saturated filter elements, dryer malfunction), find and correct problem(s) before re-installing the nitrogen generator.**

**Parker Hannifin Corporation**
Industrial Gas Filtration and Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

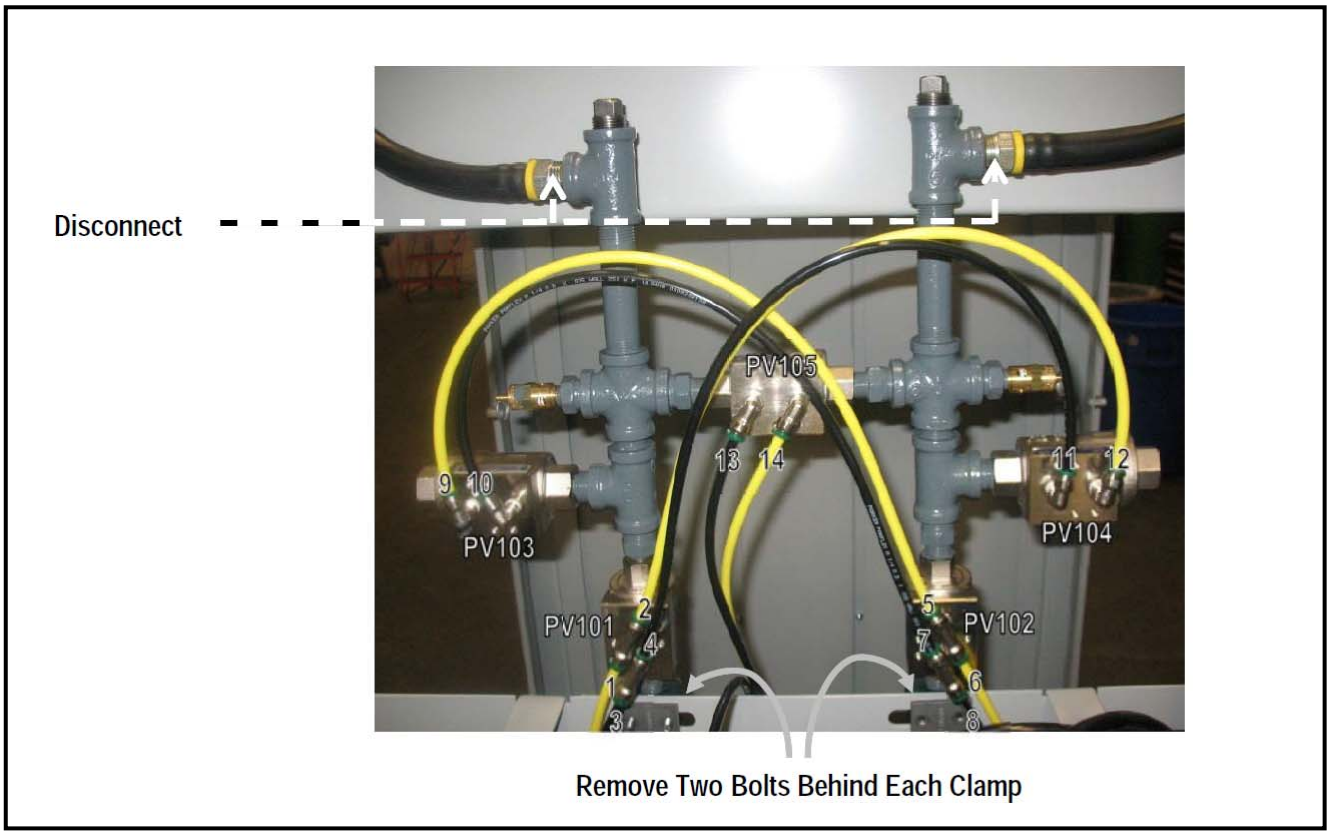


**Figure 11: AGS200/AGS400 Top Manifold - Label All Tubing connections**

4. Remove top manifold:

   a. For AGS200/400:

      i. Disconnect rubber hose fittings at three places:

         1) Left side

         2) Right side

         3) Upstream of top manifold – located underneath PV 102

      ii. Label all process valve tubing connections - 14 total.

      iii. Disconnect tubing from elbows and tees - all 14 (Figure 11).

      iv. Remove clamp hex bolts that secure manifold. Ensure that manifold is supported while removing clamp bolts (Figure 11).

   b. For AGS500/600:

      i. Disconnect rubber hose fittings at four places on top manifold (Figure 12):

         1) Both fittings at feed process valves PV 101 and PV 102 (dotted line)

         2) Both hose fittings at the tees going to both AV101 and AV102 (dotted line).

      ii. Label all process valve 1/4 in. flexible tubing connections - 14 total.

      iii. Disconnect tubing from elbows and tees - all 14 (Figure 12).

      iv. While supporting manifold, remove all four clamp hex bolts that secure manifold to frame (hidden in Figure 12).


**Figure 12: AGS500/600 Top Manifold - Label All Tubing Connections**

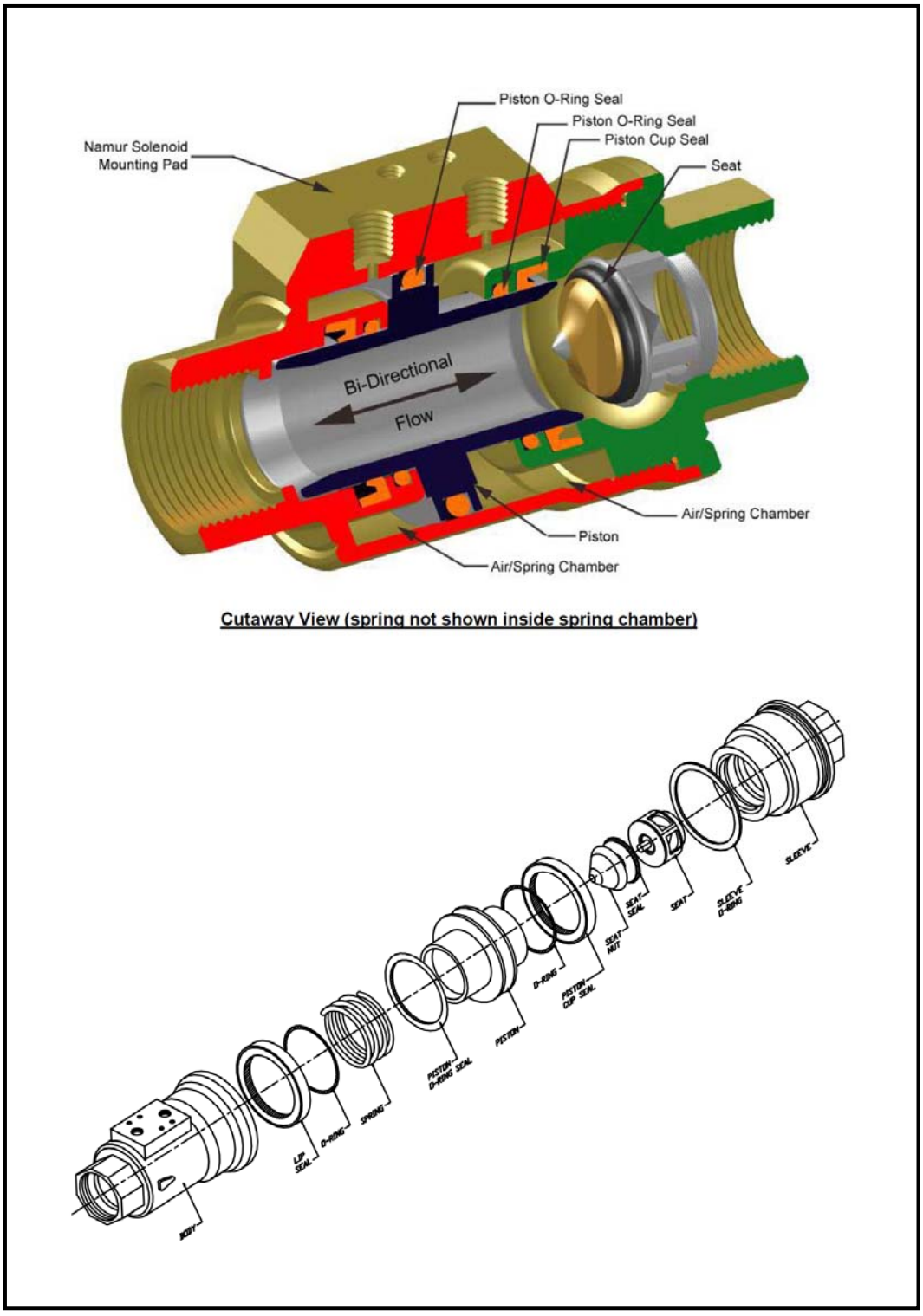


**Figure 13: Process Valve Components**

**Parker Hannifin Corporation**
Industrial Gas Filtration and
Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

5. Plug and seal any hose/tubing that leads to the adsorption vessels to avoid moisture contamination of the CMS material.

6. Carefully disassemble manifold to rebuild each process valve:

    a. Secure each valve body in a vise, then unscrew top to open.

    b. Disassemble subcomponents, and replace o-rings and seat material as shown in Figure 13.

    c. Apply white lithium grease to all seals, cups and seats during assembly.

**NOTE: Reassembly will be made easier if the piping is left connected to the valve bodies as much as possible during this process. When practical, leave piping, elbows and tees connected when opening the valve bodies.**

7. Reassemble manifolds and install in generator in the opposite manner in which they were removed.

**NOTE: Clean hose and brass tube fitting threads well, and apply proper layering of PTFE tape and correct amount of pipe paste.**

⚠ **CAUTION: Ensure that pipe paste does not spill or squeeze into the inner space of the hose and/or fitting.**

8. Remove bottom manifold:

    a. For AGS200/400:

        i. Disconnect rubber hose fittings at three places (Figure 14):

            1) Left side

            2) Right side

            3) Downstream of manifold – located above PV 108.

        ii. Label all process valve tubing connections - six total.

        iii. Disconnect tubing from elbows and tees - all six.

        iv. While supporting the manifold, remove clamp hex bolts that secure manifold (Figure 14).



**Parker Hannifin Corporation**
Industrial Gas Filtration and Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

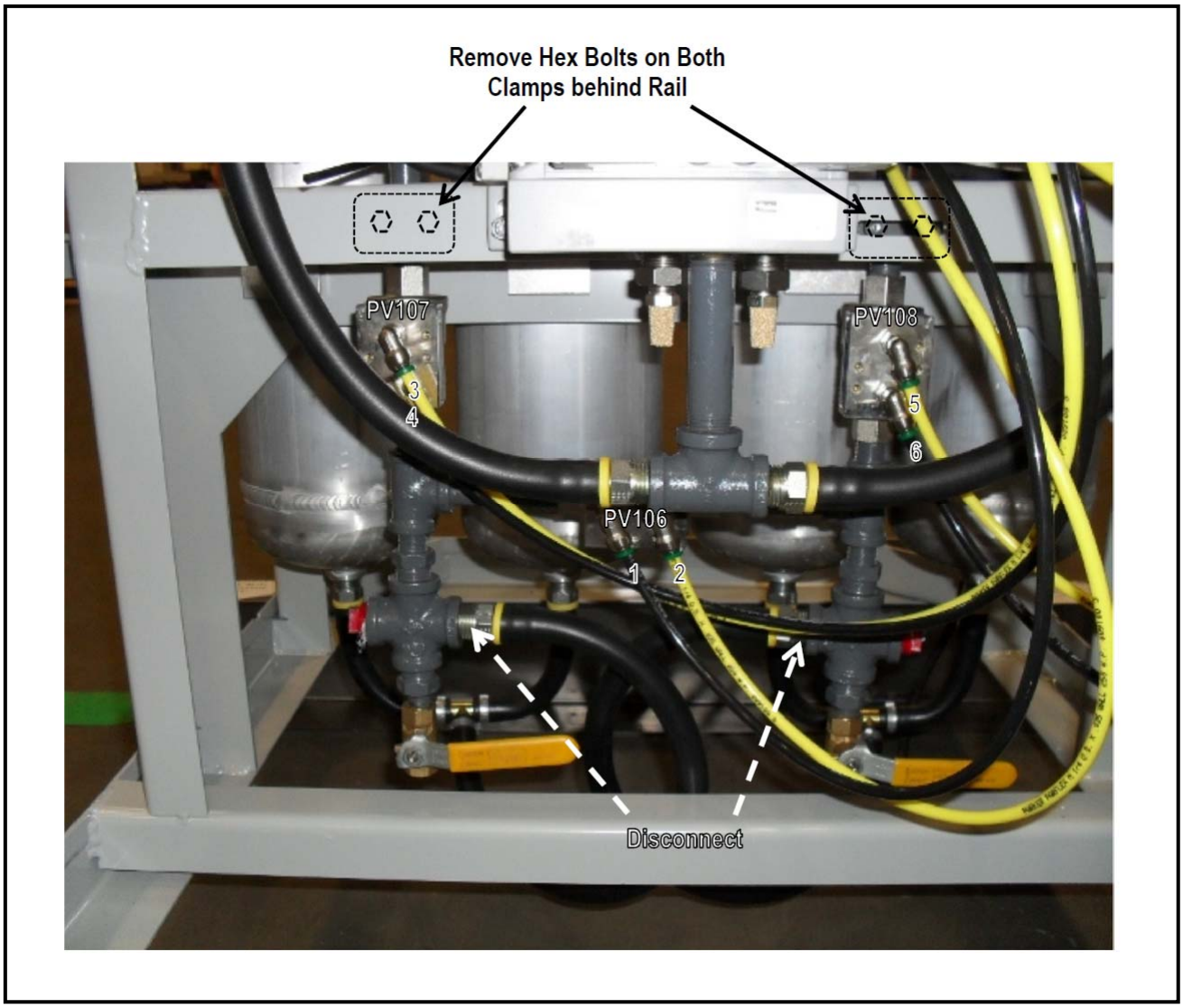


**Figure 14: AGS200/400 Lower Manifold - Label All Tubing Connections**

b. For AGS500/600 (Figure 15):

i. Disconnect rubber hose fittings at nine places (seven places for DB-15):

1) Manifold tees underneath the vessels - eight disconnections.

2) After-filter tee upstream side.

ii. Label all process valve tubing connections - six total.

iii. Disconnect tubing from elbows and tees - all six (Figure 15).

iv. Remove clamp hex bolts that secure manifold (Figure 15).

**Parker Hannifin Corporation**
Industrial Gas Filtration and
Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

v. Remove manifold.

9. Plug and seal any hose/tubing that leads to the adsorption vessels to avoid moisture contamination of the CMS material.


**Figure 15: AGS500/600 Bottom Manifold – Tubing Disconnected**

10. Carefully disassemble manifold to rebuild each process valve:

    a. Secure each valve body in a vise, then unscrew top to open.

    b. Disassemble subcomponents, and replace o-rings and seat material as shown in Figure 13.

    c. Apply white lithium grease to all seals, cups and seats during assembly.

**Parker Hannifin Corporation**
Industrial Gas Filtration and Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

**NOTE: Reassembly will be made easier if the piping is left connected to the valve bodies as much as possible during this process. When practical, leave piping, elbows and tees connected when opening the valve bodies.**

11. Reassemble manifolds and install in generator in the opposite manner in which they were removed.

**NOTE: Clean hose and brass tube fitting threads well, and apply proper layering of PTFE tape and correct amount of pipe paste.**

⚠ **CAUTION: Ensure that pipe paste does not spill or squeeze into the inner surface of the hose and/or fitting.**

12. Turn on DB unit, and perform bubble soap test to check for leaks.

13. Fix any leaks that are found.

14. Reattach side panels and front access panel.

## Pilot Valve Maintenance

Pilot valve spools should be inspected every 1,000 operating hours, and replaced if necessary. Otherwise the spool should be replaced every 2,000 hours. Reference the on-board hour meter (see Figures 3 and 19) for elapsed operation time. Maintenance to the solenoid pilot stack valve consists mainly of replacing the aluminum spool and gaskets. A small pair of needle nose pliers may be needed to grab the spool on the Parker solenoid stack valve. When replacing the spool, make sure that it is installed the same way it came out. Failure to do so will result in valve/system malfunction.

**Procedure**

**NOTE: Make sure that the system is depressurized.**

**Parker H-Series Pilot Valve**

1. Remove lower front access panel, and locate solenoid stack valve below electrical box (Figure 3).
2. Remove four mounting screws on pilot valve body using 4mm hex key (Figure 16) to disengage from stack.

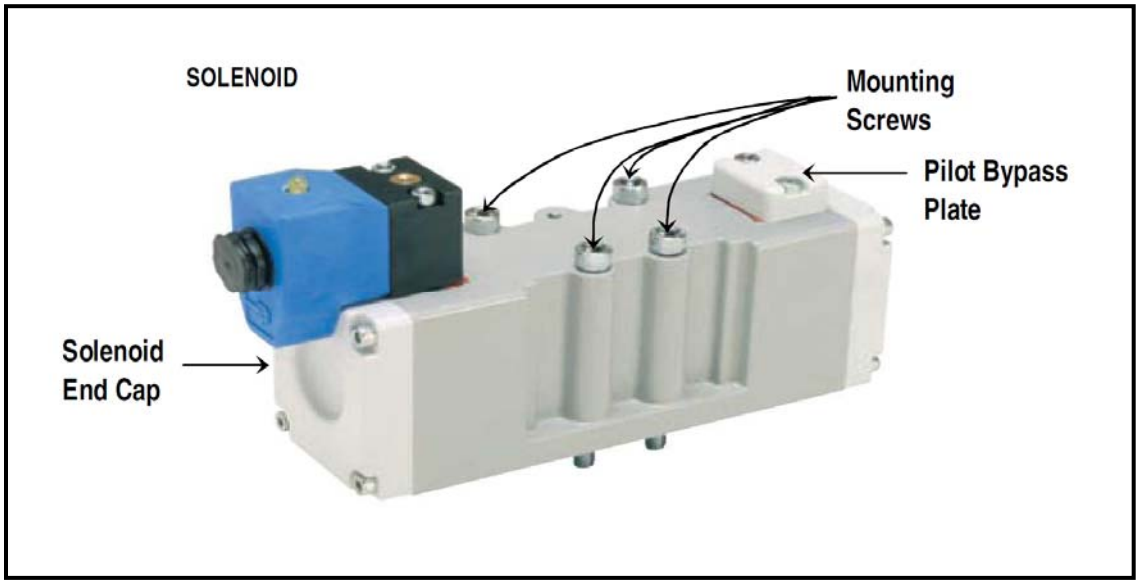


**Figure 16: Typical Parker H-Series Pilot Valve**

3. To change pilot select gaskets (follow instructions supplied in service kit):

⚠ **CAUTION: If the new pilot select gaskets are not oriented properly, the generator will not cycle properly. Take note of old gasket orientation before disassembly. Both tabs should be on the bottom pointing towards center of pilot valve body.**

a. Remove two solenoid screws using 3mm hex key (See Figure 16).

b. Remove old gasket, taking note of orientation, and replace with new one. Ensure that new gasket is positioned properly. The tab on the gasket should be pointing to the etched "I," towards the bottom (Figure 17).

c. Replace coil-to-end cap gasket with new part, if supplied in kit.

d. Remove pilot bypass plate.

e. Remove old gasket and replace with new one. Ensure that new gasket is oriented properly. The tab on the gasket should be pointing to the etched "I," towards the bottom.

f. Re-install solenoid pilot operator. Torque screws to 12-14 in.lb (1.4-1.6 Nm).

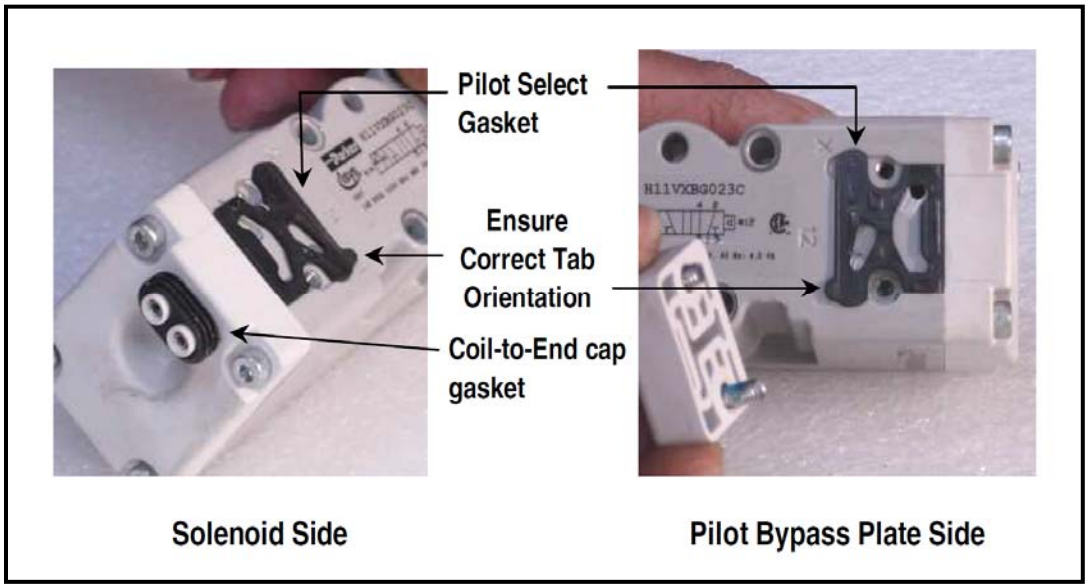


**Figure 17: Two Pilot Select Gaskets - Orientation**

4. To change valve spool (Figure 18):

   a. Remove solenoid end cap using 3mm hex key.

⚠ **CAUTION: Note proper piston orientation.**

   b. Remove piston. Refer to instructions supplied in service kit for additional information. Replace piston lip seal with new seal.

   c. Using needle-nose pliers, carefully grab end of spool firmly, and pull out of valve body.

   d. Lightly lubricate new spool with packaged lubricant, and insert spool back into valve body.

   e. Clean piston with clean lint-free cloth, and lightly grease with provided lubricant.

   f. Install piston correctly.

   g. Replace solenoid end cap, and torque screws to 12-14 in.lb (1.4-1.6 Nm). Replace coil-to-end cap gasket.

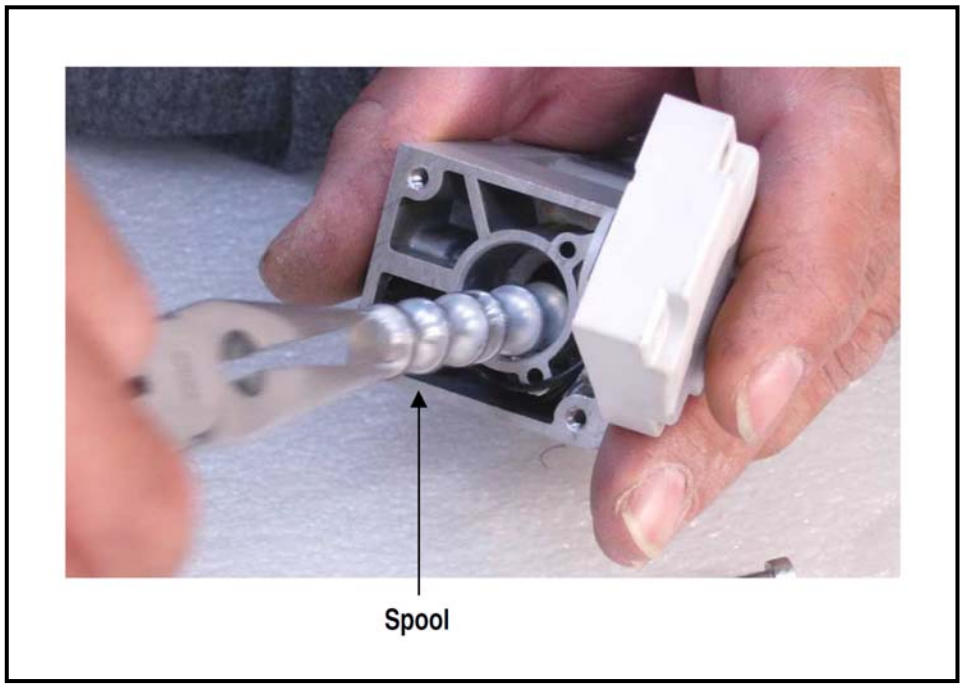


**Figure 18: Valve Spool Replacement with Needle-nose Pliers**

## Spare Parts Ordering Information

| Part Description | | P/N for AGS200 & 400 | P/N for AGS500 & AGS600 |
|---|---|---|---|
| Filter Elements & Valve Repair Kits | Prefilter (CF 101) – Replacement Element | 5/100-18-BX | 5/200-35-BX |
| | Final Filter (AF 101) – Replacement Element (box of 5) | 5/100-12-SA | 5/200-176-SA |
| | Process Valve Repair Kit (PV 101, 102, 105-108) QTY. 6 | RKVA037VV | RKVA100VV |
| | Process Valve Repair Kit (PV 103, 104) QTY. 2 | RKVA050VV | RKVA100VV |
| | H-Series Solenoid Pilot Valve Repair Kit for (SPV 101-103) QTY. 3 | PS4001CP | PS4001CP |
| | | | |
| Oxygen Monitor Fuel Cells | Parker/Balston 72-730 (Standard Units) | 72695 | 72695 |
| | Advanced Instruments % Oxygen Analyzer | GPR-11-60-4 | GPR-11-60-4 |
| | Advanced Instruments Trace Oxygen Analyzer | GPR-12-333 | GPR-12-333 |
| | | | |
| Fuses | Balston Analyzer, 0.1 amp, 250 volt - QTY. 2 | 13221 | 13221 |
| | Main power, 1.5 amp, 250 volt – QTY. 2 | 71924526 | 71924526 |

## Maintenance Kits

| Kit Information | P/N for AGS200 & 400 | P/N for AGS500 & AGS600 |
|---|---|---|
| Basic Maintenance Kit (no Oxygen Analyzer)<br>➢ CF 101 filter element – qty. 2<br>➢ AF 101 filter element – qty. 2<br>➢ Pilot valve Repair kit – qty. 3<br>➢ Process Valve Repair Kit (sizes of valves vary, depending on the model) – qty. 8 | MKDB5 | MKDB15SS1 |
| Basic Maintenance + Analyzer Kit (for units with Balston Analyzer)<br>➢ All components included with the Basic Maintenance Kit<br>➢ Oxygen Analyzer Fuel Cell P/N 72695 | MKDBO5 | MKDB015SS1 |
| Basic Maintenance + % Analyzer Kit (for units with Advanced Instruments % Oxygen Analyzer)<br>➢ All components included with the Basic Maintenance Kit<br>➢ Advanced Instruments % Oxygen Analyzer Fuel Cell P/N GPR-11-60-4 | MKDBOC5 | MKDBOC15SS1 |
| AGS200-600 Basic Maintenance + Trace Analyzer Kit (for units with Advanced Instruments Trace Oxygen Analyzer)<br>➢ All components included with the Basic Maintenance Kit<br>➢ Advanced Instruments Trace Oxygen Analyzer Fuel Cell P/N GPR-12-333 | MKDBOD5 | MKDBOD15SS1 |

**Parker Hannifin Corporation**
Industrial Gas Filtration and
Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

For placing orders for replacement parts or repair kits, call 1-800-343-4048.

## Additional emergency spare parts

Certain maintenance parts are recommended to be on hand for when they are needed. These include filters, valve rebuild kits and oxygen analyzer fuel cells. Other parts may fail rarely but when they do the machine will be down until that item is replaced. Even if the part is in stock at our plant it can take from 1 to 3 days to get the part and have the machine back up and running. If it is imperative that your generator remain in service, we suggest you also keep the following parts in your stock.

| | | |
|---|---|---|
| 10ea) | Fuse, 1.5 amp | 71924526 |
| 1ea) | Solenoid valve | H11VXBG023C |
| 2ea) | Solenoid coil | PS404123P |
| 1ea) | PLC, Koyo | D0-05AA |
| 1 ea) | Pressure regulator | R1002D |

Refer to Figures 19 (AGS200/400) and 20 (AGS500/600) for diagrams of replaceable parts.

## Expansion Kits

AGS200 generators may be converted in the field to AGS400's and AGS500's may be converted to AGS600's using the expansion kit, P/N EXP-DB-01. Please consult the factory for details on this option.

For placing orders for replacement parts or repair kits, call 1-800-343-4048.

**Parker Hannifin Corporation**
Industrial Gas Filtration and
Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

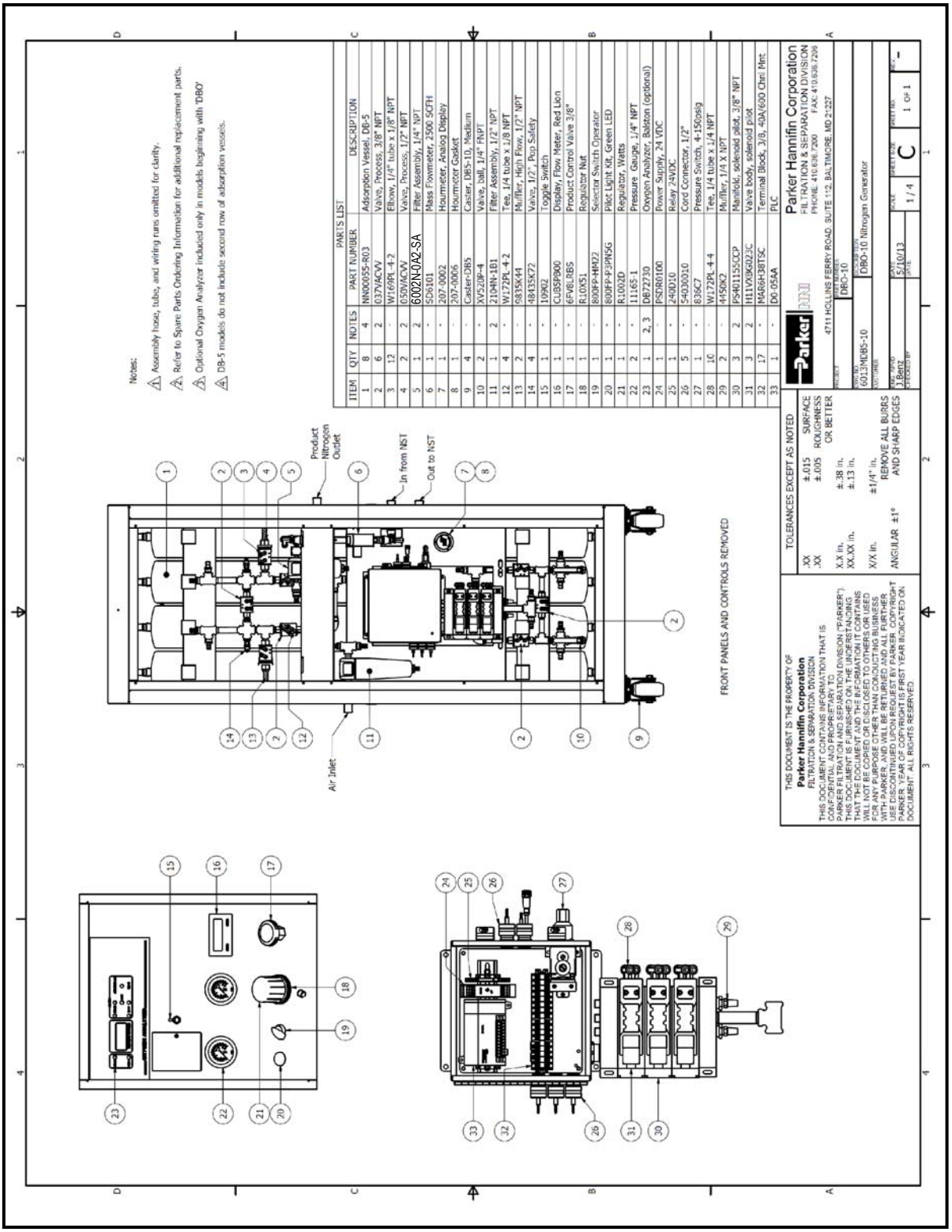


**Figure 19: AGS200/400 Replaceable Parts**

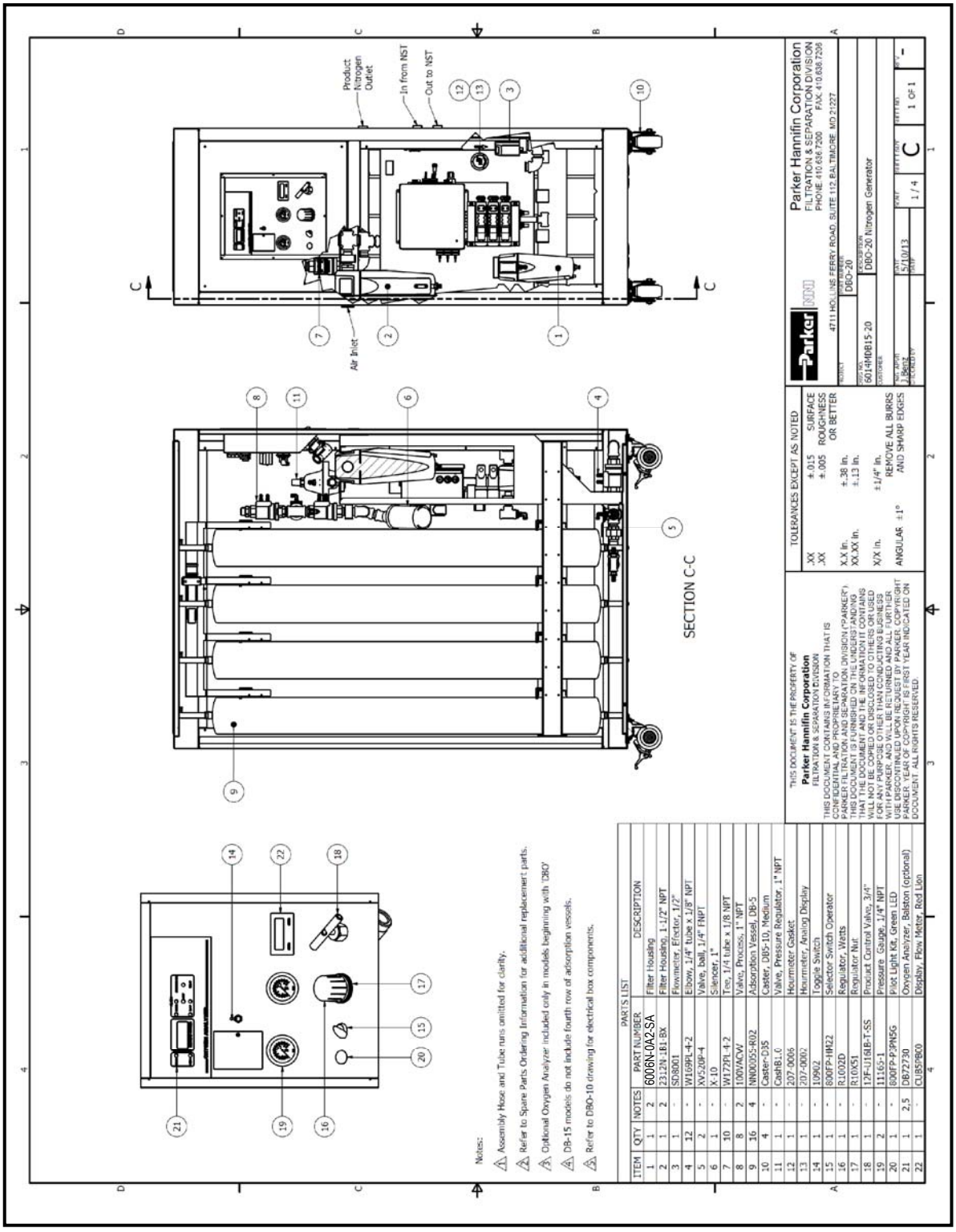


**Figure 20: AGS500/600 Replaceable Parts**

## Warnings and Precautions

**Oil Contamination**

Excessive oil levels in the inlet air are very detrimental to the Adsorption Vessel Carbon Molecular Sieve (CMS) material. Irreversible contamination of the CMS material is possible if oil levels are too high. If there is any indication or suspicion of excessive oil levels in the feed air (e.g., oil-saturated filter elements, dryer malfunction, loss of Dual-Bed performance), shut unit down, find and correct problem(s) before restarting. If the Dual-Bed unit is allowed to run with high oil content in the feed air, a major loss in performance is possible, necessitating a partial or complete CMS bed replacement.

**Moisture Contamination**

High moisture (water) content in the inlet air may be detrimental to the Dual-Bed unit's performance. While not as serious as oil contamination, a loss in performance will result. If a dryer, coalescing filter, or automatic drain malfunction is observed or suspected, shut unit down and correct problem(s) before re-starting.

**Carbon Dust**

A small amount of intermittent CMS (carbon) dust on the inside of final filter element does not present a problem. However, if accumulations of powder on filter element, or exhausting from the silencer during blow-down are observed, shut unit down IMMEDIATELY and contact factory. Excessive dust indicates physical deterioration of the CMS material, and will require replacement of carbon vessels.

**Initial Start Up**

Before initial start up, check all filters to verify filter elements are secured in place. Elements tend to shake loose during transit. Serious loss in performance and carbon contamination may result if filter elements are loose and or if the o-ring gasket is not making a seal with the filter head assembly. Correct any problems before proceeding with startup.

**Adequate Ventilation**

As Nitrogen is inert and can displace breathing air, it is imperative to avoid leaking or exhausting the gaseous product Nitrogen into a confined area where plant personnel may be present. Adequate ventilation should always be maintained in the area where the Nitrogen Generator is to be operated.

⚠ **CAUTION: Before performing any maintenance on the system such as repairing valves or changing filter elements, make sure system is fully depressurized and isolated from the air system. Failure to do so can cause serious injury**.

**Parker Hannifin Corporation**
Industrial Gas Filtration and
Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

## Troubleshooting and Service

⚠ **All troubleshooting and service activities should be performed by suitable personnel using reasonable care.**

| Symptom – Nitrogen Generator | Course of Action |
|---|---|
| No Power to Machine | Check for blown fuses (see p.17) |
| Loss of Outlet Pressure | Check that the flow control valve on the generator is adjusted properly.<br>Check inlet pressure to assure that it is greater than 110 psig.<br>Check the system for leaks. |
| Loss of Outlet Flow | Check inlet pressure to assure that it is greater than 110 psig.<br>Check setting of flow control valve. Adjust if necessary.<br>Check the system for leaks.<br>Check power.<br>Check that PLC 'Run" switch is in the "On" position. |
| Purity is Lower than Specified for Operating Conditions | Check the inlet air pressure to assure that it has not varied from the original reading.<br>Check the system for leaks, including the drain petcock on the NST.<br>Measure the temperature and dewpoint of the inlet air. The recommended temperature is 77°F (25°C) and the recommended dewpoint is 40°F (4°C) or lower.<br>Calibrate Oxygen analyzer (if needed).<br>Check inlet pressure to assure that it is greater than 110 psig. |
| Air Leak Through Drain of Prefilter | Check inlet pressure. It should be greater than 15 psig to seal drain.<br>Hold finger over drain opening for a few seconds to allow pressure to build and drain to seal.<br>Remove bowl from filter assembly and rinse with water. If leak persists, replace automatic float drain. |

| Symptom – Oxygen Analyzer | Course of Action |
|---|---|
| No Power to Analyzer | Check for blown fuses (see p.18) |
| Display Varies | Check process flow demand.<br>Check sample lines for leaks. Recalibrate oxygen analyzer. |
| Limited range during calibration | Replace oxygen sensor. |

To arrange for system service, contact the Technical Services Department at 410-636-7200, 8AM to 5PM Eastern Time or email at balstontechsupport@parker.com (North America only). For other locations please contact your local representative.

**Serial Numbers**

A four digit serial number can be found on the front of the DB nitrogen generator. For your own records, and in case service is required, please record the following:

**Parker Hannifin Corporation**
Industrial Gas Filtration and Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

DATE IN SERVICE _____ SERIAL NO. _____

## WARRANTY (NORTH AMERICA ONLY)

**(FOR INFORMATION CONTACT YOUR LOCAL REPRESENTATIVE)**

Parker Hannifin guarantees to the original purchaser of this product, that if the product fails or is defective within 12 months from the date of purchase, when this product is operated and maintained according to the instructions provided with the product, then Parker guarantees, at Parker's option, to replace the product, repair the product, or refund the original price for the product. This warranty applies only to defects in material or workmanship and does not cover routine maintenance recommended by the instructions provided with this product or filter cartridges. Any modification of the product without written approval from Parker will result in voiding this warranty. Complete details of the warranty are available on request. This warranty applies to units purchased and operated in North America.

## Principal Specifications

### Nominal Conditions – AGS200 thru AGS400

| | |
|---|---|
| Feed Pressure: | 110 psig |
| Temperature: | 77ºF (25°C) |
| Ambient Pressure: | 14.7 psig (1 Atmosphere) |

### Compressed Air Specifications – AGS500 thru AGS600

| | |
|---|---|
| Max. Pressure: | 140 psig |
| Temperature Range: | 60°F - 105°F (16°C - 40°C) |
| Dewpoint: | 40°F (4°C) pressure dewpoint or better |
| Residual Oil Content: | Trace |
| Particles: | <.01µ |

**Parker Hannifin Corporation**
Industrial Gas Filtration and
Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

### Ambient Conditions – AGS200 thru AGS600

| | |
|---|---|
| Temperature Range: | 40°F - 95°F (4°C - 35°C) |
| Ambient Pressure: | Atmospheric |
| Air Quality: | Clean Air w/o Contaminants |

### Dimensions, Weights, and Connections

| | AGS200 | AGS400 | AGS500 | AGS600 |
|---|---|---|---|---|
| **Dimensions** | 28.50”L x 32.25”D x 77.75”H | 28.50”L x 32.25”D x 77.75”H | 28.50”L x 51.50”D x 77.75”H | 28.50”L x 51.50”D x 77.75”H |
| **Weight (w/ $N_2$ tank)** | 1065 lbs | 1265 lbs | 1,553 lbs | 1,753 lbs |
| **Inlet** | ½” NPT | ½” NPT | 1” NPT | 1” NPT |
| **Outlet** | ½” NPT | ½” NPT | ¾” NPT | ¾” NPT |

### Outlet Pressure (based on nominal conditions and 60 gal $N_2$ tank)

| | |
|---|---|
| AGS200, AGS400, AGS500, AGS600 (99.999 – 98%) | 80 psig |
| AGS600 (97 – 95%) | 70 psig |

**Parker Hannifin Corporation**
Industrial Gas Filtration and Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

## **Performance Data** (nominal conditions)

| | AGS200 | | | AGS400 | | | AGS500 | | | AGS600 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % Oxygen | Nitrogen Flow (SCFH)† | Avg. Air Demand (SCFM) | LCMS Flow Rates LPM | Nitrogen Flow (SCFH)† | Avg. Air Demand (SCFM) | LCMS Flow Rates LPM | Nitrogen Flow (SCFH)† | Avg. Air Demand (SCFM) | LCMS Flow Rates LPM | Nitrogen Flow (SCFH)† | Avg. Air Demand (SCFM) | LCMS Flow Rates LPM |
| .001 | 94 | 20 | 44 | 189 | 41 | 89 | 283 | 61 | 134 | 377 | 81 | 178 |
| .005 | 150 | 21 | 71 | 300 | 42 | 142 | 450 | 64 | 212 | 600 | 85 | 283 |
| .01 | 194 | 22 | 92 | 388 | 44 | 183 | 583 | 66 | 275 | 777 | 88 | 367 |
| .05 | 314 | 25 | 148 | 629 | 49 | 297 | 943 | 74 | 445 | 1258 | 98 | 594 |
| .1 | 365 | 26 | 172 | 730 | 52 | 345 | 1095 | 78 | 517 | 1460 | 105 | 689 |
| .5 | 512 | 28 | 242 | 1024 | 57 | 483 | 1536 | 85 | 725 | 2048 | 114 | 967 |
| 1 | 618 | 30 | 292 | 1235 | 59 | 583 | 1853 | 89 | 875 | 2470 | 119 | 1166 |
| 2 | 770 | 32 | 363 | 1541 | 63 | 727 | 2311 | 95 | 1091 | 3081 | 126 | 1454 |
| 3 | 892 | 34 | 421 | 1783 | 68 | 842 | 2675 | 103 | 1263 | 3566 | 137 | 1683 |
| 4 | 983 | 36 | 464 | 1966 | 72 | 928 | 2949 | 108 | 1392 | 3931 | 144 | 1855 |
| 5 | 1065 | 37 | 503 | 2130 | 75 | 1005 | 3195 | 112 | 1508 | 4260 | 149 | 2011 |

†Nitrogen flow will be ±5%

**Parker Hannifin Corporation**
Industrial Gas Filtration and
Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

# WARNING SYMBOLS

| Symbol | Description |
|---|---|
|  | Caution, refer to accompanying documents for explanation. |
|  | Refer to the caution/warning note indicated for explanation. |
|  | Caution, risk of electric shock. |

**Parker Hannifin Corporation**
Industrial Gas Filtration and
Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

# Maintenance Log

| Maintenance Performed | Date | Hour Meter Reading | Comments | Initials |
|---|---|---|---|---|
| Commissioning | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Refer to Filter and Pilot Valve Maintenance sections of this manual for recommended replacement frequency.

**Parker Hannifin Corporation**
Industrial Gas Filtration and
Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

| Maintenance Performed | Date | Hour Meter Reading | Comments | Initials |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Refer to Filter and Pilot Valve Maintenance sections of this manual for recommended replacement frequency.

**Parker Hannifin Corporation**
Industrial Gas Filtration and
Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

# Notes

**Parker Hannifin Corporation**
Industrial Gas Filtration and
Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

# Notes

**Parker Hannifin Corporation**
Industrial Gas Filtration and
Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg


**Parker Hannifin Corporation**
Industrial Gas Filtration and
Generation Division
4087 Walden Ave.
Lancaster, NY 14086
www.parker.com /igfg

Bulletin TI-AGS200-600