WARNING: This product generates hydrogen gas. If hydrogen is contained and combined with oxygen and an ignition source, it can create an explosion. While normal use of this product would not create an explosion hazard, care must always be taken when using hydrogen. Failure to operate this product in accordance with instructions set forth in this manual can create a hazardous situation.

- Do not use a hydrogen gas storage vessel in conjunction with the hydrogen generator. Stored quantities of hydrogen pose an explosion hazard.
- Normal precautions for any hydrogen supply should be taken when using the hydrogen generator. DO NOT USE IN A SEALED OR UNVENTED ROOM.
- DO NOT USE AN OPEN FLAME OR OTHER IGNITION SOURCE WITHIN 10 INCHES (25cm) OF THE OXYGEN VENT!

CAUTION: THIS PRODUCT IS SHELF LIFE SENSITIVE. DO NOT STORE FOR MORE THAN 3 MONTHS PRIOR TO INSTALLATION AND OPERATION. Failure to follow this will cause the product to fail due to the drying of the membrane used for separation.

These instructions must be thoroughly read and understood before installing and operating this product. Any modification of the product will void the warranty. Failure to operate this product in accordance with the instructions set forth in this manual could jeopardize the safety of the operator.

If you have any questions or concerns, please call Technical Services Department at 800-343-4048, 8AM to 5PM Eastern Time (North America only). For other locations, please contact your local representative. Send email to: BalstonTechSupport@Parker.com.

General Description

The Hydrogen Generator Model H2-500 (see Figure 1), is a completely engineered system designed to produce ultra-pure, dry hydrogen gas from deionized water using a Proton Exchange Membrane cell\(^1\). The hydrogen generator utilizes the principle of electrolytic dissociation of water and hydrogen proton conduction through a Solid Polymer Electrolytic membrane. The hydrogen stream is purified using a coalescing filter, a drying tube, and a palladium purifier. The outlet pressure of the unit is 90 psig (6.12 barg) with a maximum hydrogen delivery flow rate of 500 cc/min.

The hydrogen generator is ideal for use in Flame Ionization Detectors (FIDs), Thermal Conductivity Detectors (TCDs), Trace Hydrocarbon Analyzers, and other general laboratory equipment requiring a source of pure hydrogen.

\(^1\) The purity of the hydrogen gas produced by the Parker Balston hydrogen generator is 99.99999% with respect to oxygen.
The H2-500 Hydrogen Generator is certified to the electrical safety requirements as specified by the IEC, CSA, and UL standards. This unit bears the CSA marking on the product label. Product supplied to Europe carries the CE mark (230 VAC units only). The generator complies with EMC standards.

Installation

**General**

*NOTE: All installation, operation and maintenance activities for the hydrogen generators should be performed by suitable personnel using reasonable care.*

The hydrogen generators are free-standing bench-top units. **Do not suspend the generator from the wall or ceiling.** Its weight and size could pose a falling hazard. The generator should be located indoors, protected from severe weather conditions, and free from excessive ambient dust or dirt. **Do not install the generator outdoors.**

The ambient temperature of the air surrounding the generator must be 60-90°F (16 - 32°C). **Do not place the generator in an area where there is a chance of freezing.** Place the hydrogen generator in an upright position, on a level surface, in close proximity to both the electrical power supply and the equipment requiring hydrogen.

Do not place generator over a source of heat, as this may cause the generator components to overheat. Maintain adequate airflow around the generator to reduce heat buildup. Do not block the vents located on the back and the left side of the hydrogen generator. Do not locate the generator in a sealed or unvented room, or in close proximity to open flame or other ignition sources. Do not locate the generator where it will be subject to freezing temperatures. The generator is designed for indoor use only.

**Symbols**

See *Explanation of Symbols* insert for a list of the symbols displayed on the generator and referred to in this manual.

**Transporting**

The hydrogen generator weighs 45 lbs (20 kg). Use proper equipment and lifting techniques for transporting this equipment to its installation location. The hydrogen generator is intended to remain stationary when filled with water. If necessary, the generator may be transported over short distances when filled. Do not grasp the front panel when moving the generator, **lift only from the bottom.** Keep the generator in an upright position.

**Preparation**

Remove all red tape from the top cover, the back panel, inside the water bottles, and on any other surfaces. Remove the red cap sealing the hydrogen outlet fitting and the bleed vent, on the back of the unit.

**Deionized Water Bags** - Remove the deionizer bags from the plastic shipping container and inspect for holes or tears. Insert the “T” end of the plastic cable running through the deionizer bag into the hole of one of the water reservoir caps (see Figure 2). Pull the “T” end through the hole to the outside of the cap (see Figure 3). Repeat for the other cap. Do not let any foreign material fall into the water bottles. Insert one bag into each water reservoir.

**Caution:** Cell contamination is a cumulative and irreversible process, which will eventually cause an over-voltage, automatically shutting down the generator. The deionizer bags are for a final decontamination stage and should not be used to purify low grade water.

**Utilities**

**Power** - The hydrogen generator may be operated by a 100-120 / 200 -240 VAC, 50-60 Hz single phase power supply (check the product label on the generator for specific generator voltage). To connect the generator to the power supply, simply plug the female end of the electrical cord into the receptacle on the back of the generator, and the opposite end into a three-pronged grounded power receptacle.

**Deionized Water** - The hydrogen generator must be supplied with deionized water with a minimum resistivity of 5 Meg-Ohm/cm. Parker Hannifin provides a point of use accessory, the HydroGen™ Mate (P/N 72-230) that provides high purity water (>5 Meg-Ohm/cm) from tap water for manually filling the generator.
Piping - The outlet connection for the hydrogen generator is a 1/8” compression fitting, the bleed port is 1/8” compression, and the relief port is 1/4” NPT. All tubing and fittings downstream from the hydrogen generator should be clean stainless steel to minimize contamination of the hydrogen stream. If copper tubing has been used with hydrogen in the past and has yielded acceptable results, there is no need to alter an existing piping configuration to install the hydrogen generator.

Caution: If you pipe the gas away from the bleed port, the tubing must angle downward to avoid water condensing in the line and plugging the vent to the purifier. Also, the bleed line must vent to atmosphere to avoid introducing back pressure on the cell.

Pressure Regulator – The pressure is controlled using the Pressure Regulator located on the front panel, exposed when opening the front gray panel door (see Figure 4). The pressure can be monitored using the gauge located on the front of the unit. There is a Pressure Relief valve inside the generator that is set for 125 psig (8.6 barg) in case of internal pressure build up. The expelled gas is channeled through the Pressure Relief Port located on the back of the unit.

(Note: the generator pressure regulator is pre-set to deliver hydrogen at 90 psig.)

Shutoff Valve – The generator includes a shutoff valve located on the front panel behind the gray door (see Figure 4). Use this valve to shut the unit off when not in use. In case of extended periods of downtime see the Operation / Shutdown / Storage sections.
Operation

Water Reservoir
After carefully following all the preparation procedures in the Installation section, open the top panel and remove the water reservoir caps (with the deionizer bags already attached). Fill both reservoirs with deionized water until the level in the tank reaches the “Full” mark. It will take approximately 3 liters of deionized water to fill the generator. Do not overfill the water bottles.

Insert the drain tube fitting (with drain tube attached) into the drain port and remove approximately 100 ml of water (see Figures 5, 6).

Make sure that the deionizer bags are fully immersed in the water and that they do not block the outlet port on the bottom. Do not block the small vent hole in the water reservoir cap with the “T” fitting or anything else. Be sure to remove all of the red tape that was applied to the unit for shipping purposes. Do not let the deionizer bags dry out.

Note: The generator will automatically shut down if the water level becomes too low, or the water quality is not sufficient.

Startup
Open the gray panel door on the front of the generator to expose the generator controls (See Figure 4). Turn the Shutoff Valve to the closed position. Connect the electrical power cord to the power receptacle on the back left side of the generator, and connect the other end to the wall receptacle.

1 If the line needs to be purged before the hydrogen can be used in the instrument, make sure a 3-way valve is in the line near to the instrument.

Note: The recommended 3-way valve is Parker 2F-HB4X-K-SSP

2 Make sure all the gas connections are secure.

3 Set the Pressure Regulator (see Figure 4) to minimal pressure by turning the knob counter clockwise until the knob moves out approximately 1/2” from the front panel.

4 Turn on the Power Switch located on the power receptacle on the back. The Power and the No Hydrogen Flow indicators should illuminate on the front panel (see Figure 7). DO NOT PRESS THE START BUTTON.

Note: Except when the unit requires servicing, keep the Power Switch on, to prevent damage to the purifier.

5 The unit must warm up for at least one full hour or damage will occur. The unit will beep once every 60 seconds to let you know that there is no flow being produced.

6 After the minimum one hour warm up, press the Start button located on the front panel (see Figure 4). The Hydrogen Flow and the High Hydrogen Flow indicators should now be illuminated. The bargraph will also illuminate, from zero to maximum. The No Hydrogen Flow indicator will be off. Do not open the outlet valve until the bargraph has illuminated to maximum and started to decline. This indicates that the internal system pressure is sufficient to provide the required hydrogen flow.

Note: The High Hydrogen Flow light comes on when the generator is operating at the maximum flow rate. During normal operation the indicator will be illuminated as the generator builds up pressure when you first start the system or when you are running at or near the maximum capacity of the generator. If the system senses that the pressure is not increasing at the internally preset rate or is actually decreasing, the unit will assume abnormal conditions are present and automatically shut the unit down. If the unit shuts down, press the start button to try to re-initiate flow. If this is not effective, then proceed to the Mass Leak section for instructions.

7 Slowly open the Outlet Valve.

Note: The pressure will drop initially then begin to increase as the volume downstream begins to fill. The High Hydrogen Flow light will be illuminated. If the volume is so large that the system is unable to maintain a preset filling rate then the Mass Leak error condition is reached and the unit will automatically shut down. See Mass Leak section for instructions.
8 Purging - If you have installed a 3-way valve in the line and want to purge the lines, first turn the 3-way valve to the closed position to pressurize the lines. Next turn the valve to the vent position and vent the hydrogen gas for 2 minutes. Repeat the pressurization / purge routine at least 5 times.

*Note: Make sure that flow rate out the vent port is less than 500 cc/min to avoid shutting the unit down. Use a needle valve or other flow restrictor on the vent.*

9 Flowing - Turn the 3-way valve to the instrument flow direction. Adjust the flow controller on the instrument until desired flow rate is reached, with a maximum of 500 cc/min.

**Mass Leak**

Follow the instructions listed in the *Initial Startup* section. If the pressure continues to drop, the **High Hydrogen Flow** (Mass Leak) light will illuminate (see Figure 4) and the generator will shut down. A Mass Leak may be caused by a leak in the piping to the downstream equipment, or it may be caused by the downstream piping volume being too large for the generator to fill. If it is determined that a Mass Leak is present, please follow the procedure below:

1 Close the **Shutoff Valve** (see Figure 4, shown in the CLOSED position).
2 Press the **Start** switch to reset the Mass Leak detector which is indicated by the **High Hydrogen Flow** indicator light turning off (see Figure 4).
3 Re-pressurize the generator.
4 Repeat the Initial Startup procedure three times to verify the leak.

If the system continues to detect a leak, check all the external tubing connections and make sure that the volume is not too large for the generator purchased (500 cc/min). If the leak still persists, check the fittings inside the generator.

**Caution:** Do not use commercial leak detection fluids on any Lexan® plastic parts in the generator. These fluids may cause cracking and crazing which leads to part failure. Use a solution of 4-5 ml of liquid dish soap in one liter of water.

**Caution:** Use extreme care when checking for internal leaks. Due to the nature of the gases involved use a protective face shield or other appropriate equipment whenever servicing or trouble-shooting the generator with the cover removed.
Operation

Operational Summary

Warning: Under no circumstances should the generator be operated with the cover removed.

To maintain the highest purity, the hydrogen generator should be run continuously. Monitor the hydrogen consumption of the downstream equipment to ensure flow is within the capacity of the generator (500 cc/min.). Both the Power Indicator light and the Hydrogen Flow Indicator light should be illuminated (see Explanation of Symbols at the back of the manual).

The water level should be monitored regularly and refilled as necessary. The reservoirs hold enough water for at least 3 days of continuous operation (3 liters total). Water can be added by removing the cap of the water reservoir (do not pull the deionizer bag out) and adding enough water to reach the Full mark on the front view port. Replace the cap, and make sure the deionizer bag does not block any of the ports.

To maintain the integrity of the hydrogen cell, follow the guidelines listed below:

• Keep a supply of deionized water in the reservoir above the Refill line at all times.
• Minimize the “dead - volume” in the piping between the generator and the downstream equipment.
• Never expose the unit to temperatures below freezing.
• Never abruptly open the Shutoff Valve to large volumes. The large hydrogen demand can trigger the Mass Leak safety feature.

If the built-in diagnostics trigger a fault LED to illuminate, consult the Troubleshooting section of this manual for further instructions.

Caution: Long periods of unattended operation are possible, provided that an adequate water supply is maintained. If more than 6 hours of standby service is anticipated, close the Shutoff Valve.

Note: To prolong the life of the purifier assembly, maintain power to the system unless extended periods of non-use are expected.
### Shutdown

If the unit is to be idle for a few months or more, the generator should be turned off and the internal pressure vented.

### Storage

To store the unit:

1. Turn the **Pressure Regulator** counter-clockwise until the knob is about 1/2" from the front panel (see Figure 4). Wait until the outlet pressure gauge reads zero.
2. Shut the Power OFF. Leave the generator connected to the downstream equipment or switch the 3-way valve (if installed) to VENT.
3. Fill the tanks at least half full with deionized water. Make sure that the cell has at least 2” (5 cm) of water showing in the cell assembly tube. This can be viewed from the vent holes in the back of the generator.
4. Check the water level in the hydrogen cell assembly every 6 months to maintain the 2” (5cm) water height.

### Shipping

If the generator is being returned to the factory for repair, contact the Technical Support Services Department at 800-343-4048 for a Return Authorization (RA) number and new packaging if the original is no longer available.

1. Turn the **Pressure Regulator** counter-clockwise until the knob is about 1/2" from the front panel (see Figure 4). Leave the **Shutoff Valve** open and wait until the outlet pressure gauge reads zero.
2. Shut the power off. Allow the generator to cool for a minimum of 4 hours.
3. Drain the water from the water reservoirs using the Drain Port Insert Kit. Connect a length of tubing to the drain port inset fitting, and connect the fitting to the generator at the drain port. The drain port is located on the front gray panel behind the gray door (see Figure 5).
4. Press down on the metal tab on the top of the **Drain Port** connector to remove the Drain Port insert and tube after the unit has been drained (see Figure 6).
5. Place a piece of tape over the vent holes in the water bottles cap.
6. Pack the generator carefully in the original packing box or request new packaging from Parker Hannifin. Be sure to display the RA number on the outside of the box for prompt response.
7. In order to maintain the warranty on the generator, **ship the generator in a manner that will prevent freezing**. Freezing temperatures will cause irreparable damage to the hydrogen cell assembly.
**Diagnostics**

The Parker Balston Model H2-500 hydrogen generator has built-in system diagnostics to monitor the operation of the generator and alert the operator in case of a failure. There is a **Power Indicator** light on the front panel of the generator to signal the operational status of the system (see Figure 7).

The **Control Circuitry** controls the membrane cell current to a safe level and eliminates the possibility of excessive hydrogen production. If a fault occurs and an indicator is illuminated, follow the instructions in the **Troubleshooting** section to clear the fault.

The hydrogen generator has a **Bar Graph** that is used to check the hydrogen flow (Flow Check) and the water quality (Water Check) (see Figure 7).

**Note:** See the **Explanation of Symbols** section at the back of the manual to match the symbols on the generator to the descriptions listed below.

### Hydrogen Flow Indicators

- **Hydrogen Flow Indicator** - The Hydrogen Flow Indicator illuminates to indicate the cell is generating hydrogen (see Figure 7).

- **Flow Check Bar Graph** - In normal operating mode (the side Mode Button is out), the bar graph displays the percentage of flow produced by the system (see Figure 7). The Bar Graph feature displays the flow from High (500cc/min) to Low (less than 5 cc/min).

- **No Hydrogen Flow Indicator** - The No Hydrogen Flow Indicator illuminates when the generator is no longer producing hydrogen (see Figure 7). An audible alarm will sound once every 60 seconds to alert the user that no hydrogen is being produced.

- **High Hydrogen Flow Indicator (Mass Leak)** - The High Hydrogen Flow Indicator illuminates when the generator is operating at the maximum flow rate (see Figure 4). During normal operation the indicator will be illuminated as the generator builds up pressure when you first start the system or when you are running at or near the maximum capacity of the generator. If the demand on the unit exceeds capacity then the generator will shut down and the No Hydrogen Flow Indicator will illuminate and begin to beep. This may be caused either from a leak in the piping to the equipment or it may indicate the volume being filled is too large for the generator (see Mass Leak section). The unit must be reset with the Start button once the leak has been found.

### Water Quality Indicators

- **Water Check Bar Graph** - If the Mode Button is pressed in, the Bar Graph will display the Water Check quality (see Figure 7). The Bar Graph indicates the water quality level from High (>5 Meg-Ohm/cm) to Low. This quality level corresponds to the changes in the current going through the water.

- **Change Water Indicator** - If the water quality in the reservoir reaches the Low level, the Change Water Indicator (see Figure 4) will illuminate and the unit will shut down. The water in the unit and the deionizer bags must be replaced.

- **Low Water Indicator** - If the water level drops too low in the water reservoir, the generator will stop producing hydrogen. Refill the water bottles to the full line and press Start to begin the flow of hydrogen.
Maintenance

General

When performing routine maintenance, carefully follow the instructions provided in this section to avoid injury or damage. Service should be performed by persons familiar with the service and safety requirements of electromechanical / electrochemical devices.

With proper care and maintenance the hydrogen generator will provide years of trouble-free operation. Only routine service is needed to maintain peak operational conditions.

The primary maintenance tasks required by the hydrogen generator are replacing the deionizer bags (approximately every 6 months), and refilling the water reservoirs (every 3 days). A summary of replacement part numbers and recommended service frequency is shown at the end of this section.

Do not use water, aerosols, or other cleaning agents on the unit. If necessary, the generator can be wiped down with a clean dry cloth on an as needed basis. Use of any liquid detergent to clean the generator could present an electrical hazard.

Do not use commercial leak detection fluids on any Lexan® plastic parts in the generator. These fluids may cause cracking and crazing which leads to part failure. Use a solution of 4-5 ml of liquid dish soap in one liter of water.

Water Refill

Refill the water in the generator whenever the water level reaches the Refill level displayed on the front panel (see Figure 7). The water supply should last approximately 3 days when the reservoirs are filled to the Full level (They hold 3 liters approximately of water).

If the Low Water indicator (see Figure 4) should illuminate, the generator will stop producing hydrogen to safeguard the hydrogen cell from permanent damage. If this happens, close the shutoff valve. Add water to the generator until the Full level is reached and press the Start switch to begin generating hydrogen and building pressure after operational pressure is obtained, slowly open the shutoff valve.
Deionizer Bag Replacement

The water reservoirs should be rinsed and the deionizer bags replaced every six months, or whenever the Change Water light illuminates (see Figure 4). No tools are necessary to change the deionizer bags.

1. Turn the Power Switch to OFF and make sure the Shutoff Valve is in the OPEN position (see Figure 4) in order to vent the hydrogen from the generator.
2. Lift the top cover and unscrew the water reservoir caps. Lift the deionizer bag out of the reservoir along with the cap. Disconnect the deionizer bags from the caps and discard.
3. Inspect the new deionizer bags (P/N 7601132) for holes or tears. (Contact Parker for replacement if damaged.) Insert the “T” end into the cap until it secures the bag to the cap (see Figures 2 and 3). Repeat for second bag.

Change Water

1. Follow instructions for deionizer bag replacement then continue on.
2. Use the drain port insert with the 1/4” tube connected to it to drain the water reservoir. There is approximately 3 liters of water in the generator when full. Connect the insert to the Drain Port located on the front panel behind the gray door (see Figure 4) and drain the unit (see Figure 5).
3. Remove the drain port insert by pressing down on the metal tab and pulling the fitting out (see Figure 6). Next refill the reservoirs with deionized water. Repeat steps 2 and 3 several times.
4. Finally, remove the drain port insert and fill the reservoirs completely with approximately 3 liters of deionized water.
5. Replace the caps with the new deionizer bags attached, being careful to avoid blocking any of the ports in the generator.

Note: Do not allow the deionizer bags to dry out, they must be immersed in water to perform.

Fuse Replacement

Occasionally, the fuses in the hydrogen generator may burn out. The main fuses are located in the power receptacle on the back side of the generator. The transformer fuses are located just below the power receptacle. Before servicing the fuses, turn the generator off and disconnect the power cord from both the power supply and the generator power receptacle.

To access the main fuses, use a small screwdriver to remove the fuse holder located in the back of the generator and in the power receptacle. Replace with the appropriate fuse and re-assemble.

To access the transformer fuses, use a small screwdriver, press in and rotate one quarter turn, and remove the fuse. Replace with the appropriate fuse and reassemble.

To maintain the safety and performance integrity of the product, use only the fuse of the size and type detailed in the Specifications, Parts, and Accessories sections of this bulletin.

<table>
<thead>
<tr>
<th>Replacement Parts</th>
<th>Description</th>
<th>P/N</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deionizer Bag</td>
<td>Replacement Deionizer Bags</td>
<td>7601132</td>
<td>6 Months</td>
</tr>
<tr>
<td></td>
<td>Replacement Main Fuse (100V or 120V)</td>
<td>A03-0066</td>
<td>As Needed</td>
</tr>
<tr>
<td></td>
<td>Replacement Main Fuse (220V)</td>
<td>13216</td>
<td>As Needed</td>
</tr>
<tr>
<td></td>
<td>Replacement Transformer Fuse</td>
<td>B02-0203</td>
<td>As Needed</td>
</tr>
</tbody>
</table>

Note: To ensure consistent product performance and reliability use only genuine Balston replacement parts and filter cartridges.
System Specifications

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen Purity (1)</td>
<td>99.99999%</td>
</tr>
<tr>
<td>CSA Safety Standard</td>
<td>CAN/CSA 22.2 No. 1010.1-92</td>
</tr>
<tr>
<td>IEC 1010</td>
<td>Installation Category II, Pollution Degree 2</td>
</tr>
<tr>
<td>UL Safety Standard</td>
<td>UL 3101-1, First Edition</td>
</tr>
<tr>
<td>Maximum Flow Rate (@100 psig/7 barg)</td>
<td>500cc/min.</td>
</tr>
<tr>
<td>Outlet Pressure</td>
<td>0-90 psig (0-6.12 barg)</td>
</tr>
<tr>
<td>Hydrogen Outlet Port</td>
<td>1/8” Compression</td>
</tr>
<tr>
<td>Hydrogen Bleed Port</td>
<td>1/4” Compression</td>
</tr>
<tr>
<td>Hydrogen Relief Port</td>
<td>1/4” Female NPT</td>
</tr>
<tr>
<td>Water Requirements</td>
<td>Deionized Water (≥5 Meg-Ohm/cm)</td>
</tr>
<tr>
<td>Maximum Ambient Relative Humidity</td>
<td>80% (Indoor Use Only)</td>
</tr>
<tr>
<td>Min/Max Ambient Temperature</td>
<td>60/90°F (16/32°C)</td>
</tr>
<tr>
<td>Electrical Requirements (2)</td>
<td>100-120/200-240 VAC, 47-63 Hz</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>650 Watts@ 120 VAC / 575 Watts @ 220 VAC</td>
</tr>
<tr>
<td>Main Fuse 100 VAC, 120 VAC</td>
<td>6.3 Amp SB 5x20 GDC</td>
</tr>
<tr>
<td>Main Fuse 220 VAC</td>
<td>3.15 Amp SB 5x20 GDC</td>
</tr>
<tr>
<td>Transformer Fuse (all voltages)</td>
<td>0.63 Amp SB 5x20 GDC</td>
</tr>
<tr>
<td>Product Dimensions</td>
<td>13”h x 15”w x 18”d (33cm x 38cm x 43cm)</td>
</tr>
<tr>
<td>Product Weight/Shipping Weight</td>
<td>45 lbs./51 lbs. (20 kg / 23 kg)</td>
</tr>
</tbody>
</table>

Optional Accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>P/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>HydroGen™ Mate</td>
<td>72-230</td>
</tr>
</tbody>
</table>

Notes:
1. The purity of the hydrogen gas produced by the Parker Balston Hydrogen Generator is 99.99999+% with respect to oxygen.
2. Main power supply must be between 95 VAC and 250 VAC and 47-63 Hz.

Don’t Forget To:
1. To activate your warranty go to www.labgasgenerators.com/warrantyregistrations.
2. Keep your product certification in a safe place.
3. Call the Technical Services Department at 800-343-4048, 8AM to 5PM Eastern Time with any questions (North America only). Send email to: BalstonTechSupport@Parker.com. For other locations, please contact your local representative.

Serial Numbers

The serial number for the unit is located on the back of the unit. For your own records, and in case service is required, please record the following:

DATE IN SERVICE ________________ SERIAL NO. ______________________

Please have the serial number available when calling for assistance.
Troubleshooting

All troubleshooting activities should be performed by suitable personnel using reasonable care.

Warning: Any troubleshooting or service activity which requires removal of the generator cover should be done using extreme caution. Exposed AC may be present.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Course of Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Power</td>
<td>Check power source and connections to the power source. Check terminal connections and power cord. Check power source fuses. Check generator fuses.</td>
</tr>
<tr>
<td>Refill Water Indicator Light Illuminated</td>
<td>Completely fill water reservoir with deionized water and press the Start button on the front panel. Water reservoir ports are blocked by the deionizer bags or other debris. Remove obstruction. Consult Factory if light does not go off. (1)</td>
</tr>
<tr>
<td>Change Water Indicator Light Illuminated</td>
<td>Water Quality is bad; see Maintenance section for draining and rinsing procedure.</td>
</tr>
<tr>
<td>Low Output Pressure</td>
<td>Hydrogen demand exceeds generator capacity. Check capacity of equipment and piping downstream and install a flow control device. Check external system piping for leaks. Check internal system piping for leaks.</td>
</tr>
<tr>
<td>High Hydrogen Flow Indicator Light Illuminated</td>
<td>Flow is at or near maximum rating of 500 cc/min. On start up, light is illuminated as the cell is working at full capacity. In both cases there is no problem unless unit shuts down, if that occurs then see the next listing for instructions.</td>
</tr>
<tr>
<td>High Hydrogen Flow Indicator Light Illuminated Unit still running</td>
<td>Mass Leak detected in system. Check external piping for leaks. Hydrogen demand exceeds generator capacity. Check capacity of equipment and piping downstream and install a flow control device. Check internal system for piping leaks.</td>
</tr>
<tr>
<td>No Hydrogen Delivered</td>
<td>Check power connections (see above). Check water level. Generator will shut down if water level is below the Low Level. Shut-off valve is closed; open Shut-off valve. Attempted to start generator before purifier reached working temperatures. Check piping for leaks. Consult factory. (1)</td>
</tr>
<tr>
<td>Moisture at Bleed Outlet</td>
<td>Bad purifier or heater. Consult factory. (1) Back pressure in the purifier bleed outlet tubing; check the angle of the bleed outlet - make sure it angles downward. Make sure bleed outlet is venting properly.</td>
</tr>
</tbody>
</table>

Notes
1 To arrange for system service, contact the Technical Services Department at 800-343-4048, 8AM to 5PM Eastern Time. For other locations, please contact your local representative. Send email to: BalstonTechSupport@Parker.com.

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: ring and valve wear on compressors, 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.
# Explanation of Symbols

The symbols listed below are found on the front panel of the Hydrogen Generator.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Power Indicator" /></td>
<td>POWER INDICATOR</td>
</tr>
<tr>
<td><img src="image" alt="Hydrogen Flow Indicator" /></td>
<td>HYDROGEN FLOW INDICATOR</td>
</tr>
<tr>
<td><img src="image" alt="No Hydrogen Flow Indicator" /></td>
<td>NO HYDROGEN FLOW INDICATOR</td>
</tr>
<tr>
<td><img src="image" alt="Maximum Hydrogen Flow Indicator" /></td>
<td>MAXIMUM HYDROGEN FLOW or EXCESSIVE FLOW RATE INDICATOR (MASS LEAK)</td>
</tr>
<tr>
<td><img src="image" alt="Change Water Indicator" /></td>
<td>CHANGE WATER INDICATOR</td>
</tr>
<tr>
<td><img src="image" alt="Low Water Indicator" /></td>
<td>LOW WATER INDICATOR</td>
</tr>
<tr>
<td><img src="image" alt="Hydrogen Flow Start Button" /></td>
<td>HYDROGEN FLOW START BUTTON</td>
</tr>
<tr>
<td><img src="image" alt="Full Water Tank Indicator" /></td>
<td>FULL WATER TANK INDICATOR</td>
</tr>
<tr>
<td><img src="image" alt="Refill Water Tank Indicator" /></td>
<td>REFILL WATER TANK INDICATOR</td>
</tr>
<tr>
<td><img src="image" alt="Water Drain Port" /></td>
<td>WATER DRAIN PORT</td>
</tr>
</tbody>
</table>
# Explanation of Warning Symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Caution symbol" /></td>
<td>Caution, refer to accompanying documents for explanation.</td>
</tr>
<tr>
<td><img src="image" alt="3 and triangle symbol" /></td>
<td>Refer to the caution/warning note indicated for explanation.</td>
</tr>
<tr>
<td><img src="image" alt="Triangle symbol" /></td>
<td>Caution, risk of electric shock.</td>
</tr>
</tbody>
</table>