Parker Balston H2PD-150 and H2PD-300 Hydrogen Generators

Installation, Operation, and Maintenance Manual

Parker Balston

ENGINEERING YOUR SUCCESS.

Parker Balston®
Quick Start Summary, Models H2PD-150 and H2PD-300

This Quick Start Summary is designed to get the Parker Hydrogen Generator up and running quickly. This is not intended to replace the full instructions. Please read this entire manual.

CAUTION: DO NOT USE A FLAME OR OTHER IGNITION SOURCE WITHIN 10 INCHES (25 CM) OF THE OXYGEN VENT!

Materials and Utilities Needed

Electrical - 120 VAC, 230 VAC, 50/60 Hz models available.

Note: Main supply line voltage must be within ±10% of nominal rated voltage for the generator. Protect the generator from sudden, transient fluctuations in electrical power by using a surge suppressor. Please consult Parker for recommended products.

Deionized Water - 5 Megohm-cm or higher.

Piping - Clean refrigeration grade copper or stainless steel, 1/8" o.d.

Quick Start Instructions

1. Completely remove adhesive label (on water bottle cap), remove red plug (under water bottle cap) and plastic cap (on oxygen vent port) from generator and discard. See Photo A.
2. Connect tubing to the generator's fuel and/or carrier lines as required.
3. Pour the Electrolyte Solution into the water fill opening, using a funnel. Follow safety precautions for handling the electrolyte, (see page 8).
4. Allow the electrolyte solution to settle, and fill the generator with 3.0 liters of deionized water **(5 Megohm-cm or higher).** The water level should be approximately 1" above the “Add Water” level on the front panel.
5. Connect the generator to its power source. Turn the power switch on. Set the Hydrogen Output valve to “Auto”, and set the output pressure adjust knob to the desired output pressure. During the warm-up period (2 to 4 hours), the cell will heat up and the unit will begin producing high purity hydrogen. The “Output Pressure” message will be displayed.
6. Allow the lines to purge during the warm-up period before connecting to downstream instrument.
7. After the 2 to 4 hour warm-up period, the hydrogen generator can be connected to its downstream delivery points.
8. For the first 48 hours of operation, add deionized water, if needed, filling only to 1" above the “Add Water” level. After the unit has been pressurized and operated for 48 hours, add deionized water, filling to the “Water Full” level on the front panel, and continue to replenish bottle with deionized water over time, as necessary.

Read this manual in its entirety before installing the hydrogen generator.

For further assistance, please call the Technical Services Department at 800-343-4048, 8AM to 5PM Eastern Time (North America only). For other locations, please contact your local representative. Email may be sent to: balstontechsupport@parker.com.

See page 8 Operation section for photos on installing the ship kit.

Installation, Operation and Maintenance
Parker Balston® H2PD-150 and H2PD-300 Hydrogen Generators

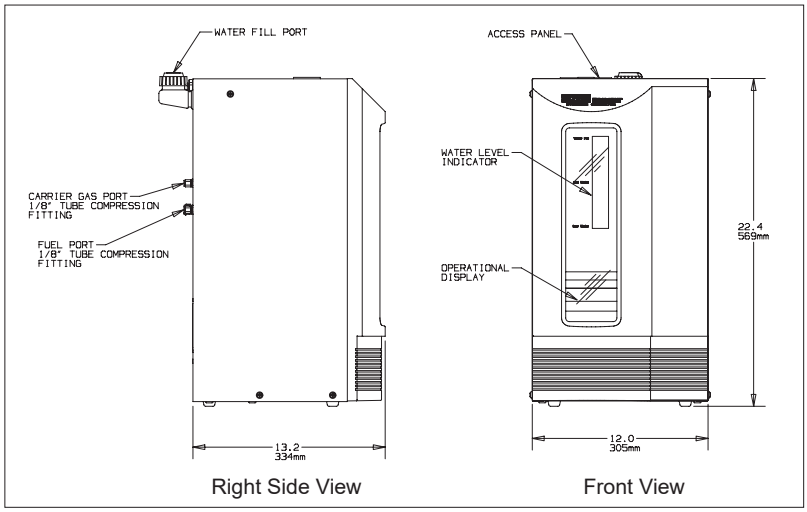

Figure 1 - Overall Dimensions

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 6 MONTHS PRIOR TO INSTALLATION AND OPERATION.

These instructions must be thoroughly read and understood before installing and operating the Parker Balston Hydrogen Generator. Follow the safety standards for handling hydrogen gas as set forth by the National Fire Protection Agency (NFPA) Standard 50A, the Compressed Gas Association (CGA) Pamphlet G15, OSHA Regulation 29CFR-1910.103, and other safety governing bodies. Modifications made to this unit will void the warranty. 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. If you have any questions or concerns, please call the Technical Services Department at 800-343-4048, 8AM to 5PM Eastern Time (North America only). For other locations, please contact your local representative. Email may be sent to: balstontechsupport@parker.com.

General Description

The Parker Balston H2PD-150 and H2PD-300 Hydrogen Generators are completely engineered systems designed to produce ultra-pure[1], dry hydrogen gas from deionized water and electricity. The hydrogen generator utilizes the principle of electrolytic dissociation of water and subsequent diffusion through a palladium membrane to generate ultra-pure hydrogen gas. The outlet pressure of the hydrogen generator is adjustable, and the generator can deliver hydrogen at pressures up to 60 psig (4.1 barg). The H2PD-150 has a hydrogen delivery capacity of 150 cc/min., and the H2PD-300 has a hydrogen delivery capacity of 300 cc/min. The high quality of the hydrogen produced by the Parker Balston Hydrogen Generators makes them a valuable addition to the analytical laboratory. The generators are ideal for use with high sensitivity Flame Ionization Detectors (FID's), Thermal Conductivity Detectors (TCD's), Trace Hydrocarbon Analyzers, and air pollution monitors. The ultra-pure hydrogen produced by the Parker Balston Hydrogen Generator may also be used to replace helium as a carrier gas in many GC applications.

1 The purity of the hydrogen gas produced by the Parker Balston Hydrogen Generator is in excess of 99.99998%.

The Parker Balston Hydrogen Generator has been certified to IEC 1010 Standards (CSA 22.2 No.1010.1-92) and UL standards (UL 3101-1). The generators bear the CSA and UL safety markings on the product label.

Note: Generators rated for 230 VAC service, carry the CE mark in addition to the CSA and UL marks.

The Parker Balston H2PD-150 and H2PD-300 Hydrogen Generators incorporate all the components necessary to convert deionized water into ultra high purity hydrogen gas using a nominal amount of electricity. The key operating components of the hydrogen generators are the electrolytic cell, the palladium membrane, and the pressure controller (see Flow Schematic, Figure 2).

Electrolytic Cell

The electrolytic dissociation of water to produce hydrogen and oxygen takes place in the electrolytic cell of the Parker Balston Hydrogen Generator. The operational components of the cell are the anode and cathode. The anode is nickel. The cathode is palladium, formed into tubes. (See “Palladium Membrane” section below for further details.) The electrolysis reaction:

$$H_2O \longrightarrow H_2 + (1/2)O_2$$

takes place in the cell as electricity passes through the deionized water. During electrolysis, oxygen and other impurities collect at the annode and are subsequently vented from the generator. Hydrogen ions collect at the cathode and pass through the palladium tubes, driven by the applied electric potential. Inside the palladium tubes, the hydrogen recombines to form purified molecular hydrogen. The newly formed, ultra-pure hydrogen is under pressure and ready to deliver, in a controlled flow, to the required usage point.

Palladium Membrane

The palladium membrane consists of bundles of palladium tubes. Because of its small atomic size, only hydrogen and its isotopes can pass through the palladium membrane; therefore, the hydrogen produced by the Parker Balston Hydrogen Generator is ultra-pure.

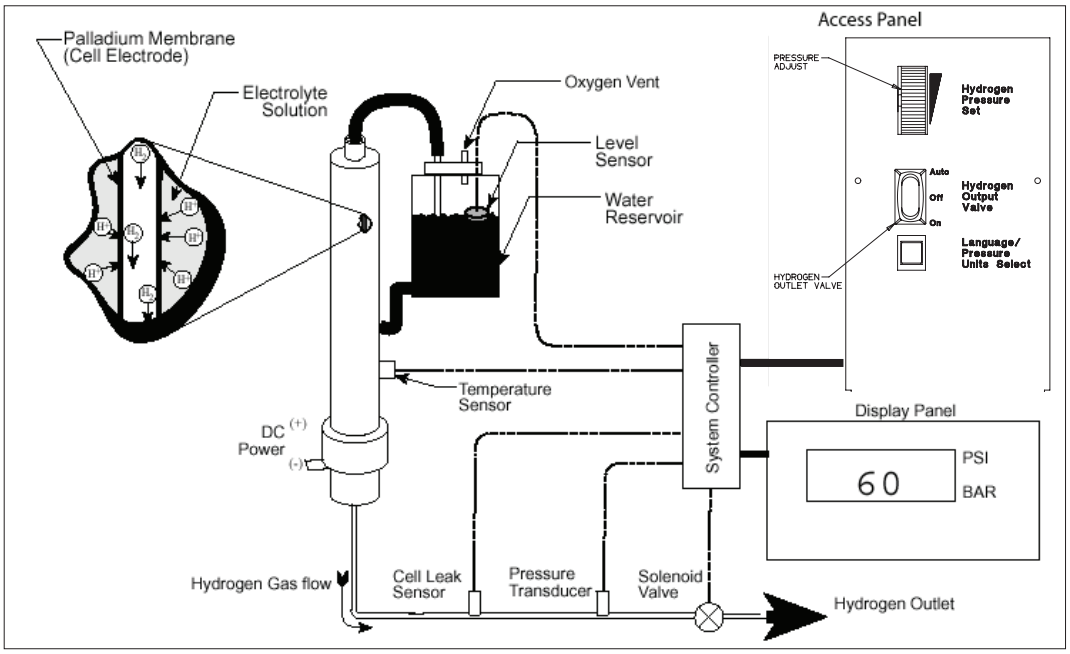

Figure 2 - Flow Schematic

Pressure Controller

The hydrogen pressure at the outlet is regulated by an electronic pressure control circuit. A pressure transducer monitors the hydrogen pressure at a point between the cell and the outlet of the hydrogen generator. The control circuit adjusts the electrical current to the cell as needed to maintain the hydrogen set pressure.

Language/Pressure Units Selection

The Parker Balston Hydrogen Generators have a configurable display on the front panel. Both language and pressure units can be selected by the user, by pressing the **Language/Pressure Unit Select** button located under the top access panel as shown in figure 4. To configure the display:

1. Press and hold the **Language/Pressure Unit Select** button to scroll through the language options. When the required language is displayed, release the button to select that language.
2. Following the language selection, pressure units can be selected. Press and hold the **Language/Pressure Unit Select** button to scroll through the pressure unit options. When the required pressure units are displayed, release the button to select the units.

Note: Pressure units can only be changed after selecting a language.

The Parker Balston H2PD-150 and H2PD-300 Hydrogen Generators have been designed with great attention to safety. The key safety features include: minimal hydrogen storage capacity (only 50 ml), a hydrogen production control circuit, an electrolyte leak detector, an over temperature sensor, a pressure sensor, and a low water shut-off control (see Figure 2). As a result of the minimal storage capacity and other safety features (detailed later in this text), the Parker Balston Hydrogen Generators comply with OSHA hydrogen safety requirements.

The Parker Balston Hydrogen Generators have built-in system diagnostics that monitor the operation of the generator and display its operational status to the user. When the system is operating normally, the display will be shown as in Figure 3. If a system fault occurs, the display will indicate the error and the current operating pressure. See Figure 3 for an explanation of the error messages.

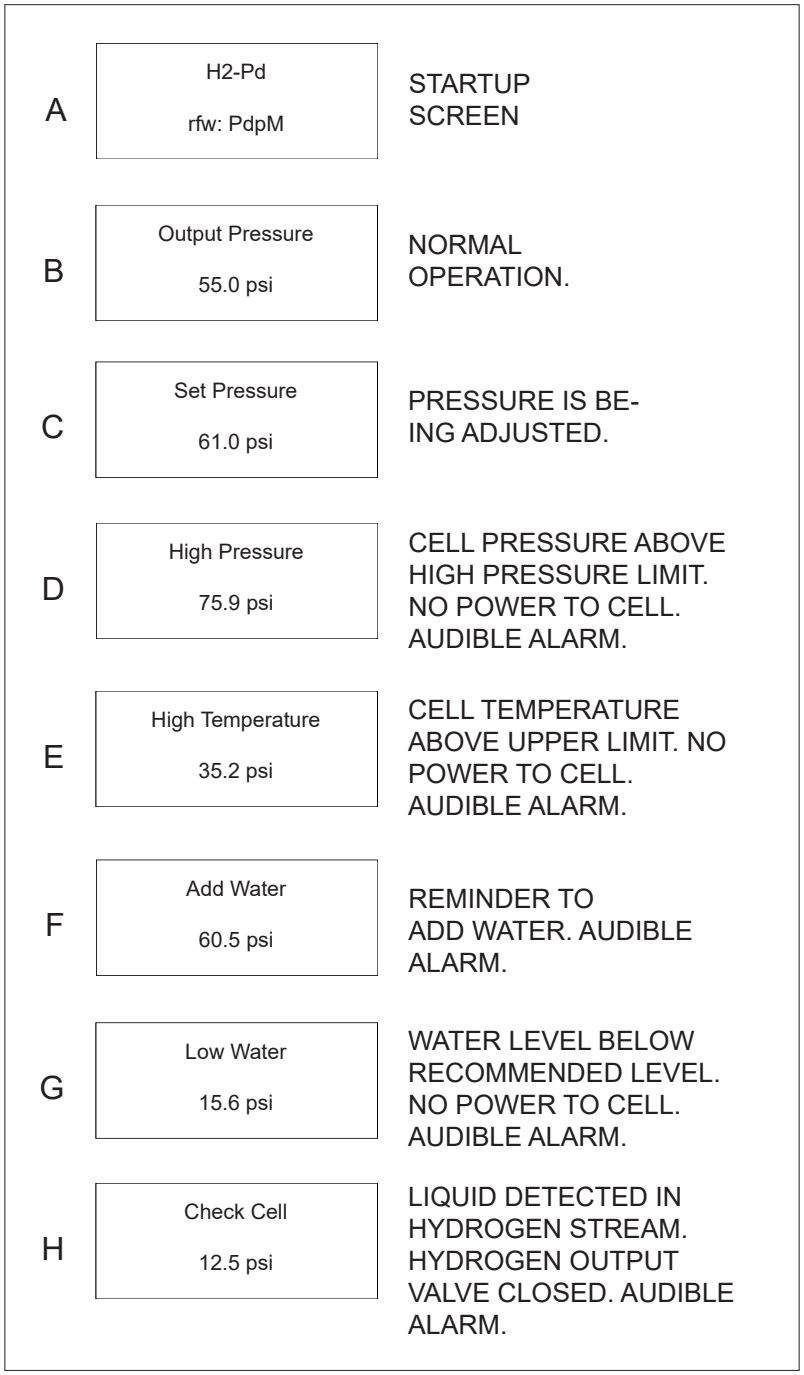

Figure 3 - Front Panel Display

Control Circuit

The internal circuitry of the Parker Balston Hydrogen Generator controls the electrolytic cell current to a safe level, eliminating the possibility of excessive hydrogen production.

Check Cell

If electrolyte solution should pass through the system into the hydrogen output stream, the “Check Cell” message will be displayed and the outlet solenoid valve will close, preventing damage to equipment installed downstream from the Parker Balston Hydrogen Generator.

High Temperature

If the electrolytic cell exceeds its maximum temperature safety setpoint, the generator will shut down until the cell cools. When the generator shuts down as a result of excessive cell temperature, the "High Temperature" message will be displayed.

High Pressure

If the hydrogen supply line is over pressurized, the generator will shut down. When the generator shuts down as a result of excessive pressure in the hydrogen supply line, the “High Pressure” message will be displayed.

Add Water

If the water supply in the feed water bottle reaches a preset **refill** level (3-1/2 day supply), the “Add Water” message will be displayed and a slow, audible signal will sound. The system remains operational. The signal will be reset when the water bottle is refilled above the “Add Water” mark.

Low Water

If the deionized water supply in the feed water bottle reaches the preset **minimum** level, the “Low Water” message will be displayed, and the hydrogen generator will shut down. A rapid, audible signal will sound when the minimum water condition occurs. The generator will re-start and the audible signal will be reset as soon as deionized water is added and the water level rises over the “Low Water” level mark. The Parker Balston Hydrogen Generator will run for 8-10 days (depending on ambient temperature, flow demand, etc.) at maximum flow on a full water bottle, before the “Add Water” message will be displayed.

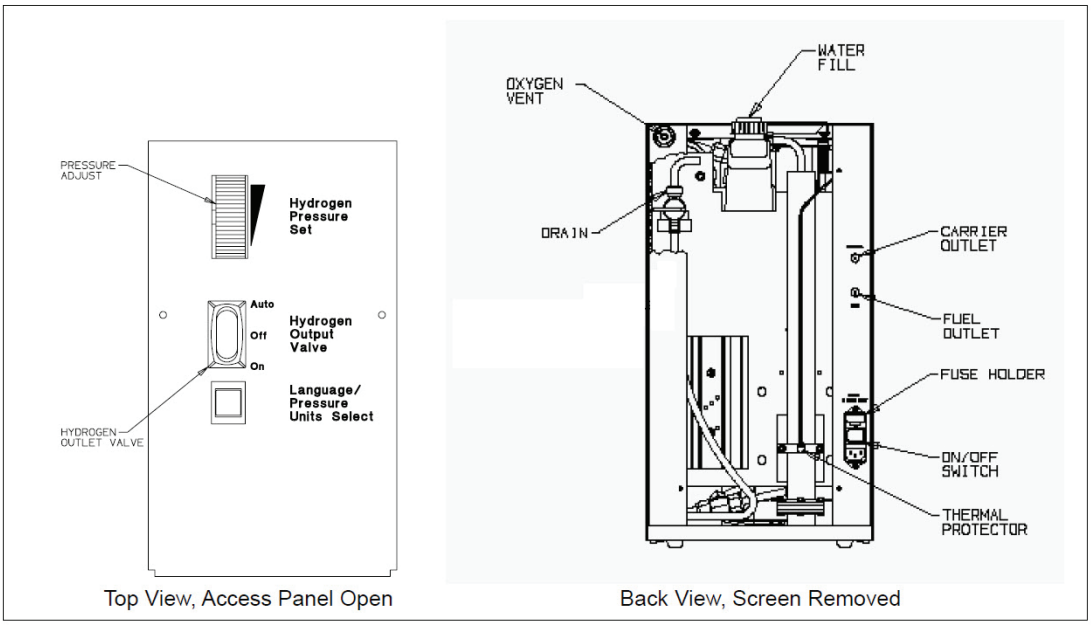

Figure 4 - Detailed Views

Installation

All installation, operation, and maintenance procedures for the Parker Balston Hydrogen Generator should be performed by suitable personnel using reasonable care.

Location

The Parker Balston H2PD-150 and H2PD-300 Hydrogen Generators are free-standing bench-top units. **Do not suspend the hydrogen 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 between 50°F and 104°F (10°C and 40°C). 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 the hydrogen supply.

Transporting

The Parker Balston Hydrogen Generator weighs 58 lbs. (26 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 and electrolyte. If necessary, the generator may be relocated over **short** distances when filled. **Do not grasp the front panel when moving the hydrogen generator.** Lift the generator by the metal case only. The generator should remain upright when moved. For long distance moves, the generator must be shut down and drained. (See Shutdown section of this manual.)

Utilities

Power - The Parker Balston Hydrogen Generator may be operated by a 120 VAC or a 230 VAC, 50/60 Hz power supply. **(Note: Main supply line voltage must be within ±10% of the nominal rated voltage for the generator.)** See product label on the rear panel of the hydrogen generator for factory voltage setting. To connect the generator to the power supply, simply plug the female end of the electrical cord into the receptacle on the right side of the generator, and the opposite end into a three-pronged earthed power receptacle.

Note: Protect the generator from sudden, transient fluctuations in electrical power by using a surge suppressor. Parker recommends using a surge suppressor meeting the following specifications:

Joule Rating	**1000 or greater**
Surge Amps	**84,000 or greater**
Max Noise Reduction	**80+ (db)**

Deionized Water - The Parker Balston Hydrogen Generator must be supplied with deionized water on a regular basis. The water should be 5 Megohm-cm, or better quality deionized water.

Caution: Do not use tap water or deionized water with less than 5 Megohm-cm resistivity. Metallic ions and suspended solids present in substandard water may poison the palladium membrane, rendering the cell inoperable. If the generator is operated with any liquid other than 5 Megohm-cm (or better) deionized water, the warranty will be void.

Piping - The outlet connections for the Parker Balston Hydrogen Generators are a 1/8” compression fitting. 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 Parker Balston Hydrogen Generator. The piping configuration for the hydrogen delivery system should include a means for venting subpurity hydrogen generated during system warm-up. This may also be accomplished by disconnecting the downstream instruments.

Parker strongly recommends the installation of a shutoff valve and pressure regulator at the process or instrument being supplied with hydrogen from the generator. (If the process or instrument has its own internal shutoff valve and pressure regulator to isolate it from the hydrogen line, this installation is unnecessary.)

Piping for Carrier Gas and Fuel Applications

For convenience, the hydrogen stream from the Parker Balston Hydrogen Generator is manifolded for carrier and fuel gas applications. There is no difference in hydrogen quality between the two ports. The generator is shipped with a 1/8" ferrule fitting on the fuel gas port and a pipe plug on the carrier gas port. If hydrogen is being used as a carrier gas, simply remove the pipe plug from the carrier port and replace with the nut and ferrule supplied in the accessories bag. **(Note: If one port is not being used, it must be capped.)** The combined flow from the carrier and fuel gas ports must not exceed the capacity of the generator.

Oxygen Venting

Parker recommends venting the oxygen port on the generator to the room. If the exhaust from the generator must be piped to an exhaust hood, the line from the generator exhaust should have a continuous upward or downward slope. Piping in this manner will prevent potential damage to the cell resulting from backpressure buildup in the exhaust line. **Under no circumstances should the generator exhaust be exposed to an open flame. This could pose a fire hazard. Also, if an exhaust hood is used, the hood should be equipped with an explosion-proof fan to prevent the explosion hazard of a spark.**

Warning: Do not block oxygen vent. Blockage may cause excess internal pressure which will seriously damage the unit and void the warranty. To ensure safe operation of and prevent potential damage to the Parker Balston Hydrogen Generator, do not vent multiple generators in a common line to an exhaust hood. Pipe each generator vent separately to the exhaust hood.

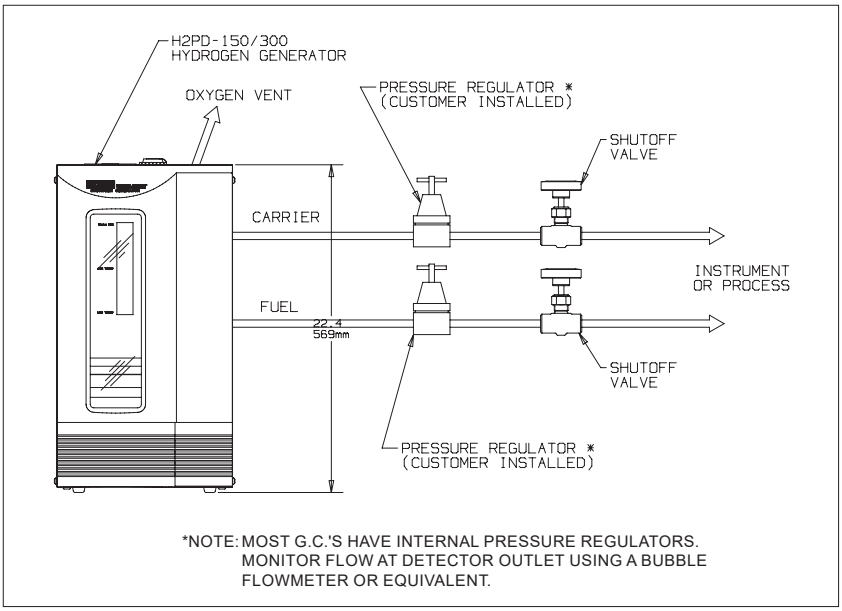

Figure 5- Recommended Installation

Operation

Caution: Electrolyte solution is a specially prepared solution of sodium hydroxide and may be dangerous if handled improperly. Read the Material Safety Data Sheet (MSDS) which is shipped with the Electrolyte solution prior to handling it. Always use eye protection and neoprene or butyl gloves when handling the electrolyte solution. A source of cool, clean, running water should be in close proximity to the area where electrolyte solution is being handled. In the event of a spill or splash, refer to the MSDS for remedial action procedures.

All preparation and start-up activities should be performed before the hydrogen generator is connected to the electrical supply and the downstream equipment or process.

Preparation

Remove adhesive label (on water bottle cap), remove red plug (under water bottle cap) and plastic cap (on oxygen vent port) from generator and discard (See Photo A). Open the bottle of Electrolyte Solution (P/N 920071, shipped with the generator) and set aside. Next, remove the water fill cap (on the back of the generator). Slowly pour the electrolyte solution into the feed water opening using a funnel. **Use extreme care to avoid spills when pouring electrolyte solution** (see warning message, above, for proper handling of electrolyte solution and possible spills). Allow the electrolyte to settle, and fill the generator with 4 liters of deionized water **(5 Megohm-cm or higher)** up to the “WATER FULL” level.

Install ship kit as shown:

A. Insert plug into bottle fill opening

B. Install cap over plug and tighten

C. Install yellow plug in vent tube and stick label over cap vent as shown

Note: Failure to use a funnel may result in caustic spills and damage to the hydrogen generator. If the funnel is used for chemicals other than the Electrolyte Solution and deionized water, contamination of the deionized water, electrolyte solution, or hydrogen generator may occur. If the generator fails as a result of contamination, the warranty will be void.

Connect the generator to its electrical supply and turn the power switch on.

Filling the Water Tank

The water tank should be maintained above the refill level. If the water level becomes too low the generator will automatically shut down. Additionally, the water quality should have an initial resistivity of greater than 5 meg-ohms/cm. If the water quality is insufficient, the generator will not perform to its specifications.

Manual Filling

1. Unscrew the fill cap on the water tank at the rear of the unit.
2. Fill the tank with deionized water until the water is at the "FULL" line.

Note: Follow "Preparation" instructions on first time startup.

Caution: *Do not overfill the water tanks. The water level should be kept below the port on the top inside of the tank.*

Controls

Hydrogen Pressure - The hydrogen delivery pressure may be adjusted using the pressure adjust knob located beneath the access panel on the top of the generator (see Figure 4). During pressure adjustment, LCD display will show the pressure setting and the “Set Pressure” message will be displayed. After approximately 20 seconds of pressure adjustment, the digital pressure display will automatically switch to display the actual system pressure, and the message will change to “Output Pressure”.

Hydrogen Flow - The hydrogen outlet valve is controlled by a switch located beneath the access panel on the top of the generator. To open the outlet valve and initiate flow, simply press the switch to the “AUTO” position. While operating in the “AUTO” position, the hydrogen outlet valve will remain open. If a fault in the operation of the system occurs, a system diagnostic message will show on the front panel and the hydrogen valve will be automatically controlled. For temporary shutdowns, move the switch to the “OFF” position. When the switch is closed in this manner, the generator will maintain its internal pressure. The valve should remain in the “AUTO” position for normal operation. The “ON” position will override the controls to allow for troubleshooting. **Do not leave the switch in “ON” position during normal operation.**

Startup

Set the hydrogen pressure adjust knob to the desired output pressure and set the hydrogen output switch (see Figure 2) to the “AUTO” position. The solenoid valve will then open. Using a flow controller or needle valve, set the warmup flow to 80-85% of the total generator capacity. Open the downstream vent valve(s) to purge the lines (see Figure 5). Hydrogen output will begin approximately 10 minutes after powering the unit on, and will increase to its rated capacity and purity in 2 to 4 hours. Over this period of time, the cell will warm up and all piping will be purged to prepare for high purity hydrogen delivery.

After the generator has warmed up (2 hours minimum) and the lines have been purged, connect the piping to the instrument or process which requires high purity hydrogen. Allow pressure to build in the line before initiating flow through the instrument or process. The digital pressure displayed slowly increases until the hydrogen lines reach the set pressure. The amount of time required to fill the line is dependent on the length and diameter of the piping used.

Note: The quality of the delivered hydrogen gas depends on the cleanliness of the delivery lines and accessories, both internal and external to the Parker Balston Hydrogen Generator. Leaks, traces of moisture, air, reducible oxides, and other contaminants must be flushed out of the system before the purity of the delivered hydrogen meets specifications.

Operation

Operate the Parker Balston Hydrogen Generator continuously for optimal hydrogen output and cell longevity. On a regular basis, monitor the water level and operational status. After the initial 48 hours of operation, fill the generator with deionized water **(5 Megohm-cm or higher)**, on an as needed basis, filling until the level indicator on the front panel is at or slightly beyond the “WATER FULL” level. **Do not overfill.** Monitor the hydrogen consumption of the downstream equipment to ensure flow is within the capacity of the generator (i.e., 150 cc/min. for the H2PD-150, and 300 cc/min. for the H2PD-300).

Note: It is not unusual for a faint mist to vent from the generator vent port during operation.

If there is a power interruption during operation, the generator will power up with the hydrogen output valve switch in the "ON" position when power is restored. If the built-in system diagnostics trigger a fault message, consult the Troubleshooting and Service section of this manual for further instructions.

Temporary Shutdown

To maximize the life of the palladium membrane, the Parker Balston Hydrogen Generator should be run continuously. If the hydrogen generator must be shut down for short periods of time (e.g., overnight), leave the power switch in the “on” position, and move the hydrogen output switch to the “OFF” position. Shutting the unit down in this manner will minimize water and energy consumption.

Note: When the hydrogen outlet valve is closed, the pressure inside the generator (and the digital pressure display) may increase to 75 psig to 80 psig (5.1 to 5.5 bar).

To re-start the Parker Balston Hydrogen Generator after a temporary shutdown, switch the hydrogen outlet valve to “Auto”, set the hydrogen output pressure to the desired reading, and adjust the flow using the (customer-provided) flow control device. If the cell has cooled during the shutdown period, the hydrogen generator will require 2 to 4 hours to achieve its specified hydrogen flow rate.

Long Term Shutdown/ Product Shipment

If the Parker Balston Hydrogen Generator is being shut down for shipment or for storage for an extended period, then the system must be drained and plugged. Instructions for long term shutdown and plugs may be requested from Parker Hannifin Corporation. **Failure to drain the generator prior to long term shut down will damage the electrolytic cell and void the warranty.**

Maintenance

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

To avoid electrical shock, disconnect power before servicing the generator.

The primary maintenance activities required by the Parker Balston Hydrogen Generator are filling the feed water bottle and changing the electrolyte solution. If necessary, the Parker Balston Hydrogen Generator may be wiped clean with a dry cloth on an as needed basis. Do not use water, aerosols, or other cleaning agents to clean the unit. Use of any liquid detergent to clean the generator could present an electrical hazard.

Water

If the Parker Balston Hydrogen Generator is operated 24 hours per day at its rated maximum flow rate, the water in the feed water bottle should last for 8 to 10 days. Parker Hannifin recommends checking the water consumption rate on a routine basis until a filling schedule can be established. (Note: If auto water fill is used this is not necessary.) Ambient temperatures will affect water consumption, and these conditions should be taken into consideration when planning a refill schedule for the hydrogen generator.

As needed, slowly refill the water reservoir with deionized water, using a funnel, to the “WATER FULL” mark. Do not overfill. Use deionized water with a rating of **5 Megohm-cm** or better. Failure to use a funnel may result in spills and subsequent damage to the generator (see warning on page 7). If the water supply is depleted beyond the refill level, the “Add Water” message will be displayed and the hydrogen generator will generate an audible signal.

If the water is not refilled before it drops to the minimum level, the “LOW WATER” message will be displayed and the system will safely shut down and a more rapid audible signal will sound.

Electrolyte Solution

The electrolyte solution may need to be changed so that the generator can be moved to another location OR at the direction of Tech Support due to generator performance issues. Please follow the procedure detailed below, exactly, to ensure normal operation of the generator.

Caution: The electrolyte is a specially prepared solution of sodium hydroxide and may be dangerous if handled improperly. **Read the MSDS accompanying the electrolyte solution for proper handling and disposal procedures. Always use eye protection and neoprene or butyl gloves when handling the electrolyte solution. In the event of a spill or splash, refer to the MSDS accompanying the electrolyte solution for remedial actions.**

Electrolyte solution drained from the generator must be disposed of according to the standards defined in the MSDS.

Note: Before changing the electrolyte, turn the Parker Balston Hydrogen Generator off and

disconnect it from its power source and all downstream equipment. Allow the unit to cool at least 4 hours, preferably overnight. If the cell is drained too soon after shutdown, the hydrogen which saturates the palladium membrane will be released too quickly and will react with the oxygen in the air. This is a vigorous reaction which will heat the palladium and permanently damage the cell.

Supplies

Protection - Eye protection and neoprene or butyl gloves (see warning notice above.)

Electrolyte - One bottle of Parker Balston Electrolyte Solution (P/N 920071).

Note: Use only Electrolyte Solution from Parker Balston to replace electrolyte. Use of any substitute will damage the unit and void the Parker Balston warranty.

Miscellaneous - Phillips head screwdriver, polyethylene catch basin (3-5 liter capacity), and funnel.

Procedure

NOTE: TO MINIMIZE EXPOSURE OF THE PALLADIUM MEMBRANE TO AIR, STEPS 2 THROUGH 5 (BELOW) MUST BE PERFORMED WITHOUT INTERRUPTION. ALLOW ENOUGH TIME (10 MINUTES) TO FINISH THIS PROCEDURE WITHOUT A BREAK.

PLEASE REVIEW THE FOLLOWING PROCEDURE AND HAVE ALL SUPPLIES READILY AVAILABLE PRIOR TO CHANGING ELECTROLYTE. FAILURE TO FOLLOW THE ELECTROLYTE CHANGE PROCEDURE AS DOCUMENTED WILL DAMAGE THE HYDROGEN CELL AND VOID THE WARRANTY.

The procedure for changing the electrolyte is as follows:

1 Turn off the Parker Balston Hydrogen Generator, disconnect it from the power supply, and allow it to cool for four hours, preferably overnight. Remove the back panel from the unit by removing the four panel screws.

2 Open electrolyte solution. Remove water fill cap from generator and insert funnel.

3 Remove the drain valve assembly from its holder and open the drain valve to empty contents to the catch basin. Close the drain valve when draining is complete. Quickly replace the drain assembly into its holder.

It is against federal regulations to dispose of the sodium hydroxide waste by dilution. Consult federal, state, and /or local guidelines for acceptable disposal methods.

4 **Immediately**, pour one bottle of Electrolyte Solution (P/N 920071) into the generator through the funnel.

5 Fill the generator with deionized water, until the level indicator on the front panel is 1" below the “WATER FULL” level (approximately 3 liters), as detailed in Preparation section (page 7) of this manual. Do not overfill.

6 Restart the generator following the instructions detailed in the Start-up section of this bulletin (page 6). Allow 2 to 4 hours for generator to reach flow and pressure specifications. During the first 48 hours of operation, add deionized water, if needed, filling only until the level indicator is 1" below the “WATER FULL” level.

Fuse Replacement

This equipment has fuses in both neutral and phase lines. Use care when servicing.

Occasionally, one or both of the fuses in the generator may burn out. The fuses are located in the power receptacle on the left hand side of the generator. **Before servicing the fuses, turn the generator off and disconnect the power cord from the power supply and the generator power receptacle.** Both fuses should be checked each time fuse replacement is warranted. To access the fuses, use a small screwdriver to remove the holder located in the power receptacle of the generator. Replace either one or both fuses as necessary and re-assemble.

For continued protection against risk of fire, replace only with fuse of specified rating.

Replacement Parts	P/N
Electrolyte Solution	920071
Fuse	See Specifications Table

Principal Specifications

Model Number	H2PD-150 Hydrogen Generator	H2PD-300 Hydrogen Generator
CSA Certification Standard	CAN/CSA C22.2 No.1010.1-92	→
IEC Certification Standard	IEC 1010-1/EN61010-1	→
IEC 1010 Installation Category	Category II	→
IEC 1010 Pollution Degree	Degree 2	→
UL Certification Standard	UL3101-1	→
EMC Standards	CISPR11/EN55011/EN50082-1	→
Hydrogen Purity (see footnote, page 1)	99.99999%	99.99999%
Max Flow Rate (@ 60 psig)	150 cc/min	300 cc/min
Discharge Pressure	0 to 60 psig (0-4.1 barg), regulated	0 to 60 psig (0-4.1 barg), regulated
Outlet Ports	1/8" compression	1/8" compression
Water Requirements	Deionized Water, 5 Megohm-cm or higher	→
Altitude	2000 m	2000 m
Max Ambient Relative Humidity	80%	80%
Min/Max Ambient Temperature	50°F/104°F (10°C/40°C)	50°F/104°F (10°C/40°C)
Electrical Requirements (1)	See table below	See table below
Power Consumption (@ max. flow)	3 Amps @ 120 VAC / 2 Amps @ 230 VAC	→
Dimensions	22"h x 12"w x 12"d (56 cm x 30 cm x 30 cm)	→
Shipping Weight	58 lbs (26 kg)	58 lbs (26 kg)
Fuse Type-NA, 120 VAC units	Type T, 3.15 Amp, P/N 13216	Type T, 5 Amp, P/N A03-0193
Fuse Type-UK, EU, 220 units	Type T, 2 Amp, P/N 13192	Type T, 3.15 Amp, P/N 13216

Ordering Information

Model Number	Description
H2PD-150NA	Parker Balston Hydrogen Gas Generator, 150 cc/min, 120 VAC 50/60 Hz (1)
H2PD-300NA	Parker Balston Hydrogen Gas Generator, 300 cc/min, 120 VAC 50/60 Hz (1)
H2PD-150UK	Parker Balston Hydrogen Gas Generator, 150 cc/min, 230 VAC 50/60 Hz, UK cord set (1)
H2PD-300UK	Parker Balston Hydrogen Gas Generator, 300 cc/min, 230 VAC 50/60 Hz, UK cord set (1)
H2PD-150EU	Parker Balston Hydrogen Gas Generator, 150 cc/min, 230 VAC 50/60 Hz, European cord set (1)
H2PD-300EU	Parker Balston Hydrogen Gas Generator, 300 cc/min, 230 VAC 50/60 Hz, European cord set (1)
H2PD-150-220	Parker Balston Hydrogen Gas Generator, 150 cc/min, 230 VAC 50/60 Hz, IEC connector (1)
H2PD-300-220	Parker Balston Hydrogen Gas Generator, 300 cc/min, 230 VAC 50/60 Hz, IEC Connector (1)
H2PD-150JA-100	Parker Balston Hydrogen Gas Generator, 150 cc/min, 100 VAC, 50/60 Hz, JA 100 cord set (1)
H2PD-300JA-100	Parker Balston Hydrogen Gas Generator, 300 cc/min, 100 VAC, 50/60 Hz, JA 100 cord set (1)
H2PD-150JA-200	Parker Balston Hydrogen Gas Generator, 150 cc/min, 200 VAC, 50/60 Hz, JA 200 cord set (1)
H2PD-300JA-200	Parker Balston Hydrogen Gas Generator, 300 cc/min, 200 VAC, 50/60 Hz, JA 200 cord set (1)
H2PD-150AU	Parker Balston Hydrogen Gas Generator, 150 cc/min, 230 VAC, 50/60 Hz, Australian cord set (1)
H2PD-300AU	Parker Balston Hydrogen Gas Generator, 300 cc/min, 230 VAC, 50/60 Hz, Australian cord set (1)

(1) Main supply line voltage must be within ±10% of nominal rated voltage for the generator.

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.

Symptom	Course of Action
No Power	Check power source and connection to power source. Check internal connections: power switch, terminal connections, power cord, and IEC fuses. Replace fuses if necessary (P/N 13216). Use only fuses with the proper rating.
"Add Water"	Completely fill feed water bottle with deionized water.
"Low Water"	Fill generator with deionized water and re-start. Press Reset button. Water level sensor inoperative or control board failure.(1)
Low Output Pressure or Capacity	Hydrogen demand exceeds generator capacity, check capacity of unit and install flow control device. Check external system piping for leaks. Check internal system piping for leaks.
No Hydrogen Delivered	Check power (see above). Check water level. Generator may have run out of water and shut down. Check generator and piping for leaks.
Moisture or Impurities in Output	Check for leaks (could cause impurities up to 1000 ppm). Gross moisture (visible drops in system, after warm-up) could indicate cell rupture.(1)
Electrolyte Seeping from Cell Flange	Call Parker Balston for service .(1)
"High Temperature"	Change electrolyte if generator is within 3 months of annual electrolyte replacement date. Consult factory.
"High Pressure"	Open the output valve. Set pressure to zero, wait 1-2 minutes.
"Check Cell"	Consult factory.

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

Don't Forget To:

1 Complete and mail or fax in your warranty registration card.

2 Keep your product certification in a safe place.

3 Call the Technical Services Department at 800-343-4048, 8AM to 5PM Eastern Time (North America only) with any questions. For other locations, please contact your local representative.

Serial Numbers

The serial number for the unit is attached to the back panel. 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.

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.

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

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Parker Hannifin Corporation
Industrial Gas Filtration and Generation Division
4087 Walden Avenue
Lancaster, NY 14086
Tel: 716-686-6400 Fax: 877-857-3800
www.parker.com/igfg

Parker Hannifin Manufacturing Limited
Industrial Gas Filtration and Generation Division EMEA
Dukesway, Team Valley Trading Estate
Gateshead, Tyne and Wear, England NE11 0PZ
Tel: +44 (0)191 402 9000 Fax: +44 (0)191 482 6296
www.parker.com/gsfe dhFNS_TSG@parker.com

CELL: AGS