Retain this user guide for future reference.
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1 Safety Information

Important: Do not operate this equipment until the safety information and instructions in this user guide have been read and understood by all personnel concerned. Use of the equipment in a manner not specified within this user guide may impair the protection provided by the generator and could result in an unplanned release of pressure, which may cause serious personal injury or damage.

Only competent personnel trained, qualified, and approved by Parker Hannifin should perform commissioning, service and repair procedures.

When handling, installing or operating this equipment, personnel must employ safe engineering practices and observe all related local regulations, health & safety procedures, and legal requirements for safety.

This product is designed and built in compliance with the ATEX Directive. It is not suitable for use in any Hazardous, Flammable, or Explosive environments.

Hydrogen is a highly flammable gas. Keep the generator away from excessive heat and naked flames.

The accumulation of hydrogen can displace oxygen, thereby creating an asphyxiation hazard. Always ensure that the generator is operated in a well ventilated area and all of the vent ports on the rear of the generator are kept clear and free from blockages.

Ensure that the equipment is depressurized and electrically isolated, prior to carrying out any of the scheduled maintenance instructions specified within this user guide.

Most accidents that occur during the operation and maintenance of machinery are the result of failure to observe basic safety rules and procedures. Accidents can be avoided by recognizing that any machinery is potentially hazardous.

Parker Hannifin can not anticipate every possible circumstance which may represent a potential hazard. The warnings in this manual cover the most known potential hazards, but by definition can not be all-inclusive. If the user employs an operating procedure, item of equipment or a method of working which is not specifically recommended by Parker Hannifin the user must ensure that the equipment will not be damaged or become hazardous to persons or property.

Note: Any interference with the calibration warning labels will invalidate the gas generator’s warranty and may incur costs for the re-calibration of the gas generator.

Should you require an extended warranty, tailored service contracts or training on this equipment, or any other equipment within the Parker Hannifin range, please contact your local Parker Hannifin office. Details of your nearest Parker Hannifin sales office can be found at www.Parker.com

This equipment is for indoor use only. Do not operate outdoors.

1.1 Markings and symbols

The following markings and international symbols are used on the equipment and within this user guide:

<table>
<thead>
<tr>
<th>Marking</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caution, Read the User Guide.</td>
<td>When disposing of old parts always follow local waste disposal regulations.</td>
</tr>
<tr>
<td>Risk of electric shock.</td>
<td>Naked Flame</td>
</tr>
<tr>
<td>Warning</td>
<td>When disposing of electrical parts always follow local waste disposal regulations.</td>
</tr>
<tr>
<td>Warning</td>
<td>Conformité Européenne</td>
</tr>
<tr>
<td>Warning</td>
<td>Underwriters Laboratories</td>
</tr>
</tbody>
</table>

**WARNING**

DO NOT OBSTRUCT VENT PORTS LEAVE OPEN TO ATMOSPHERE OR PIPE TO VENTILATED AREA

GENERATOR MUST BE SHUTDOWN AND DEPRESSURIZED BEFORE PERFORMING ANY MAINTENANCE (REFER TO MANUAL)
2 Description

The gas generator will produce a constant stream of hydrogen at a pre-determined pressure and flow rate when connected to a suitable power supply and fed with a suitable quality of deionized water. These units are suitable for use in laboratories and light industrial environments and are non-hazardous for transportation purposes.

It should be noted that the Hydrogen generator must be installed and running within three months of dispatch from Parker Hannifin, to ensure the optimum efficiency of the PEM cell. Failure to do this can invalidate the warranty.

2.1 Technical Specification

This specification is valid when the equipment is located, installed, operated, and maintained as specified within this user guide.

<table>
<thead>
<tr>
<th>Units</th>
<th>H2PEM-100</th>
<th>H2PEM-165</th>
<th>H2PEM-260</th>
<th>H2PEM-510</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Quality</td>
<td>Deionized, ASTM II, &gt;1 MOhm - cm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Consumption (Approximate)</td>
<td>L/Week</td>
<td>0.75</td>
<td>1.25</td>
<td>2</td>
</tr>
<tr>
<td>* Supply Pressure (Max)</td>
<td>psig (barg)</td>
<td>14.5 (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Supply Flow Rate (Max)</td>
<td>cc/min</td>
<td>1000</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>High Purity Hydrogen (H₂)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outlet flow</td>
<td>cc/min</td>
<td>100</td>
<td>165</td>
<td>260</td>
</tr>
<tr>
<td>Outlet pressure</td>
<td>psig (barg)</td>
<td>5 – 100 ± 0.5 (0.3 – 6.89 ± 0.034)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purity</td>
<td>%</td>
<td>&gt;99.999%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
* Based on full flow with 24 hour 7 day operation at 22°C (71.6 °F) Ambient
* Applies only to generators fitted with the water fill option

### Mechanical connections

- **Hydrogen Outlet:** 1/8” Compression Fitting
- **Water Drain:** Quick Release Push in Fitting
- **Water Fill (Factory fitted option):** Quick Release Push in Fitting

### Electrical data

- **Connection Type:** IEC320
- **Supply Voltage Range:** Vac 100-230v 50-60Hz
- **Power Consumption:** W 90 125 185 235
- **Fuse:** A T (Anti Surge, 250v, 5 x 20mm) 5 5 5 5

### Environmental data

- **Temperature:** °F (°C) 41 – 104 (5 – 40)
- **Humidity (non condensing):** 50% @ 104°F (80% MAX • 87.8°F)
- **IP Rating:** IP20 / NEMA 1
- **Pollution Degree:** 2
- **Installation Category:** II
- **Altitude:** ft (m) <6562 (2000)
- **Noise:** dBA (<60)
2.1.1 Dimensions

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Units</th>
<th>H2PEM-100</th>
<th>H2PEM-165</th>
<th>H2PEM-260</th>
<th>H2PEM-510</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td>17.12</td>
<td>(435)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>13.46</td>
<td>(342)</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td>25.4</td>
<td>(645)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>17.95</td>
<td>(457)</td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td>4.25</td>
<td>(108)</td>
</tr>
<tr>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>In (mm)</td>
<td></td>
<td></td>
<td>52.92</td>
<td>(24)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>61.74</td>
<td>(28)</td>
</tr>
</tbody>
</table>

Weight

| Empty     | lbs (Kg) | 52.92 (24) |
| Full of Water | lbs (Kg) | 61.74 (28) |
2.2 Unpacking the equipment

This generator is heavy and should be carried by a minimum of two persons.

Remove the equipment from its packaging as shown and check that it has not been damaged in transit.

The following items have been included with your equipment:

<table>
<thead>
<tr>
<th>Description</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Drain Tube</td>
<td>1</td>
</tr>
<tr>
<td>Water Fill Tube*</td>
<td>1</td>
</tr>
<tr>
<td>De-ionizer Cartridge</td>
<td>1</td>
</tr>
<tr>
<td>Environmental filters</td>
<td>3</td>
</tr>
<tr>
<td>Mains supply cable</td>
<td>3</td>
</tr>
</tbody>
</table>

* Supplied only with generators fitted with the water fill option.

If any items are missing or damaged please contact your local Parker Hannifin office.

2.3 Overview of the equipment

Key:

1. Controller
2. O2 Vent
3. Excess H2 Vent
4. Water Bottle Vent
5. Options Board Connection Port
6. Water Drain
7. Water Fill Connection (Factory fitted option)
8. H2 Outlet
9. Power Inlet, switch and fuse
10. Environmental Filters
3 Installation & Commissioning

Only competent personnel trained, qualified, and approved by Parker Hannifin should perform commissioning and service procedures.

3.1 Recommended system layout

Key:
A  Single Generator
B  Multiple Generators
C  Application
D  Back up Supply
   Isolation Valve
   Flow Controller

Non Return Valve
Pressure Relief Valve
Pressure Regulator

All components used within the system must be rated to at least the maximum operating pressure of the equipment. It is recommended that the system be protected with suitably rated pressure relief valves.

All piping materials must be suitable for the application, clean and debris free. The outlet piping must be solid and non-porous; it is recommended that high quality 1/8\" stainless steel pipe be used.

The diameter of the pipes should be sufficient to allow unrestricted outlet gas to the application. When routing the pipes ensure that they are adequately supported to prevent damage and leaks in the system.
### 3.2 Mechanical Installation

The generator should be located indoors on a flat surface and protected from direct sunlight, moisture, and dust (Refer to section 2.1 of this user guide for the generator’s environmental specification).

Position the generator as close to the application as possible while leaving sufficient free space for ventilation and access purposes as shown.

**DO NOT** position the generator so that it is difficult to operate or disconnect.

![Diagram of generator installation](image)

- **Warning**
  - This equipment is designed and built in compliance with the ATEX Directive. It is not suitable for use in any hazardous, flammable, or explosive environments.

- **Caution**
  - The use of any water other than deionized water (Deionized, ASTM II, >1 Mohm – cm) within this generator will cause damage to the hydrogen cell and reduce its life time.

- **Caution**
  - The application piping will require purging for at least 15 minutes to remove any trapped oxygen.

Once suitably located, remove the three transit plugs from the O2 vent, excess H2 vent and the water bottle vent and fit the environmental filters.

Connect the Hydrogen outlet port of the generator to the application piping.

Fill the water bottle using deionized water (Deionized, ASTM II, >1 Mohm – cm) to the “FULL” mark on the water reservoir and insert the de-ionizer cartridge into the water bottle as shown in figure.
3.2.1 Optional Water Fill

The factory fitted optional water fill allows the generators water bottle to be pumped or gravity fed directly from a suitable de-ionized water supply. When the water level falls below the mid-point, the water bottle is replenished from the de-ionised water supply.

The generator should be connected to the de-ionized water supply using the tube supplied. Connect the quick release push in fitting to the water fill connection on the rear of the generator. Refer to section 2.1 for water supply requirements.

⚠️ The use of any water other than deionized water (Deionized, ASTM II, >1 Mohm – cm) within this generator will cause damage to the hydrogen cell and reduce its life time.

3.3 Electrical Installation

Attach the mains power supply cable provided to the IEC 320 socket located on the rear of the generator and connect to the electrical supply.

If a cordset, other than the one provided, is used to connect the equipment to the electrical supply ensure that it is suitably rated for the application and in accordance with local and national code regulations.

⚠️ The equipment must be grounded to earth through the cordset.

Installation Kits:

<table>
<thead>
<tr>
<th>Kit Number</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>IK7532</td>
<td>Installation Kit including:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Copper Tube</td>
<td>50 ft</td>
</tr>
<tr>
<td></td>
<td>1/8” tube nuts</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Front and back ferrules</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>1/8” tube T-piece</td>
<td>1</td>
</tr>
</tbody>
</table>
4 Operating the equipment

4.1 Overview of Controls

1. 16x2 line menus display.
2. Control key pad used for menu navigation and generator operation.
3. Tri colored System Check Indicator.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Generator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flashing Green</td>
<td>Start Up, Initialization</td>
</tr>
<tr>
<td>Solid Green</td>
<td>On-line</td>
</tr>
<tr>
<td>Flashing Red</td>
<td>Non Critical Errors</td>
</tr>
<tr>
<td>Red</td>
<td>Critical Errors</td>
</tr>
<tr>
<td></td>
<td>(System Locked)</td>
</tr>
<tr>
<td>Amber</td>
<td>On-line, Service Required</td>
</tr>
</tbody>
</table>

4.2 Starting the equipment

Turn the generator on at the power switch (located on the rear of the generator) and wait until the default menu is displayed as shown.

If the generator had an error prior to being powered down, it is possible that it will revert to this same error on power up. If so Press to clear the error and continue with the start up procedure.

Note: If the error cannot be cleared, use the fault finding procedure in section 6 for guidance.

The internal pressure (“ACT” pressure) of the generator will build up to the required operating pressure (“SET” pressure).

Once the required pressure is maintained the outlet valve of the generator will be opened, as indicated by “FLOW” on the display, and hydrogen will be supplied to the application.
4.3 Operating Menus

There are 6 menus used by the generator to display and access operational parameters and data. These can be accessed from the default menu by sequentially pressing the controller.

4.3.1 Default Menu

The default menu displays the following data:

- **SET** – The outlet pressure required by the application.

  The required outlet pressure can be adjusted up and down using the and keys respectively.

- **ACT** – Actual Pressure

  Current actual internal / outlet pressure of the generator

- **FLOW X ✓/☐** - Indicates the status of the generator outlet valve: “✓” - Outlet is closed, “☐” – Outlet is open.

  100% - The shaded blocks indicate the rate of hydrogen production. Each block represents 20% of the rated capacity of the generator.

  During initial start up or after a massive pressure drop all five blocks will be shaded indicating that the generator is building up pressure and not currently on line.

  When the generator is on-line and delivering gas to the application, the number of blocks shaded will depend upon the flow required by the application.

**Standby Mode**

The flow of hydrogen to the application can be interrupted by switching the generator into standby mode. Press and hold to select standby. The default menu will change to the standby menu as shown to indicate that the outlet valve is closed and hydrogen is no longer being supplied to the application.

To return to normal operation, press .

**Reset**

Pressing the enter key (middle key) during an error condition will reset the system.

4.3.2 Conductivity

The conductivity (Water Quality) menu gives a graphical indication of the water quality. When all 10 blocks are shaded the water quality is to specification.

When the number of shaded blocks drops to four, the “Change Water” error message will be displayed. The water bottle indicator will flash red and an intermittent alarm will sound. Hydrogen will continue to be delivered to the application.

If the water quality degrades to the point at which none of the blocks are shaded the outlet valve of the generator will be closed and a conductivity error generated. The water bottle indicator will illuminate red and a continuous alarm will sound. **Hydrogen will not be delivered to the application**

Press to advance to the next menu.

The water bottle should be drained and refilled with deionized water ASTM II, > 1 Mohm – cm at the earliest convenient time.
4.3.3 Pressure Measurement
The units of pressure measurement may be changed between bar, psi and Mpa.
Press to change the units of measurement.
When the desired units have been selected, press to advance to the next menu.

4.3.4 Run Time Data
The Run Time Data Menu displays the following data:

**HOURS RUN** – Time in hours that the generator has been producing hydrogen.

**SERVICE IN** – The time in hours that the generator can produce hydrogen before a service is required.

4.3.5 Flow
The Flow menu displays the current flow and the total amount of hydrogen produced by the generator when on-line.

**Flow cc/min** Current flow in cc/min being produced by the generator. This is for indication only and we recommend the use of a flow meter to gain an accurate measurement.

**Litres** Total amount of hydrogen produced by the generator measured in litres.

4.3.6 Generator Self Test

The outlet fitting must be removed before the self test is initiated

This menu is used for diagnostic purposes to allow the user to verify that the generator is operating correctly. From the Self Test Menu press and hold and .

The menus will change as follows during the self test:

**Pressure release** - All pressure in the generator is released the test will not proceed until 0 psi is achieved.

**Pressure build** - The unit will build pressure to 100 psi while monitoring the time taken.

**Pressure Hold** The generator will perform a pressure decay test for a pre-determined time.

**Pressure Release** The outlet solenoid is opened and the pressure released. The test will not progress unless 0 psi is achieved.

**Test Passed / Failed** If all criteria are met then a pass is displayed, otherwise fail is displayed.

**NOTE**
It is recommended that the self-test feature be used when a part of the pressure circuit is serviced, such as a desiccant cartridge change.
4.4 Hard Reset

The generator should have a hard reset whenever a critical error occurs or non-critical error occurs 3 times in succession.

Before a hard reset is performed the initial fault must be rectified; refer to section 6 of this user guide for troubleshooting guidance.

When the faults are rectified, switch the generator off at the mains switch.

Press and hold , at the same time re-apply the power to the generator. When the generator has powered up, press again. The generator will reset all errors then continue with the normal start up procedure.

4.5 Stopping the equipment and depressurizing

The equipment contains pressurized hydrogen gas. Ensure that it is fully depressurized prior to shipment or servicing.

1. Ensure that the application instrumentation no longer requires hydrogen.
2. Switch the generator off at the mains power switch and disconnect it from the electrical supply.
3. Slowly disconnect the Hydrogen outlet connection pipe from the side of the generator allowing the system to depressurize.
4. Hydrogen gas will escape under pressure when the piping is disconnected.

The generator is now shut down. If the generator is to be transported, drain the water from the generator as described in section 5.4.2. Re-fit the hydrogen outlet port cover and the three transit plugs to the O2 vent, excess H2 vent and the water bottle vent. Refer to section 3.2.
4.6 Options Board Accessory

4.6.1 Fitting the Options Board

Plug the options board into the 15-way D-type connector on the rear of the generator. The board should be secured in place using the retaining screw and spacer provided.

Place the cover over the options board and secure in place using the 2 retaining screws provided.

4.6.2 Wiring the Options Board

**JP3 Remote Stop**

The remote stop function allows the generator to be connected to an external stop circuit.

The terminals on JP3 should be volt free under normal operating conditions. When a dc voltage (9-12v) is applied to terminal (+) of JP3 (Terminal (-) is common) the generator will stop.

**JP4 Alarm Output**

The alarm output is an open collector digital output designed for remote alarm indication. When an error occurs on the generator, the output switching circuit is activated causing the remote circuit to be complete.

The remote alarm circuit will be reset when the generator error has been reset.

**JP5 Water Fill Output**

The water fill output is an open collector digital output designed for remote monitoring of the water bottle level. When the water level drops below the mid-point in the water bottle the output switching circuit is activated.

The circuit will only be de-energized when the water bottle is filled to its upper limit.

<table>
<thead>
<tr>
<th>RS485</th>
<th>JP1_1</th>
<th>NOT USED (DO NOT CONNECT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS485</td>
<td>JP2_1</td>
<td>NOT USED (DO NOT CONNECT)</td>
</tr>
<tr>
<td>Remote Stop</td>
<td>JP3_+</td>
<td>9 – 12vdc Input</td>
</tr>
<tr>
<td></td>
<td>JP3_-</td>
<td>GND</td>
</tr>
<tr>
<td>Alarm Output</td>
<td>JP4_+</td>
<td>Open Collector Output</td>
</tr>
<tr>
<td></td>
<td>JP4_-</td>
<td>Open Collector Output</td>
</tr>
<tr>
<td>Water Full Output</td>
<td>JP5_+</td>
<td></td>
</tr>
<tr>
<td></td>
<td>JP5_-</td>
<td>USJP6</td>
</tr>
</tbody>
</table>

**Caution**: JP4 and JP5 are designed for connection to Safe Extra Low Voltage (SELV) systems only: Maximum 12vdc 50mA. Refer to the markings on the Options board for the correct configuration of these outputs.
5 Servicing

The recommended service procedures identified in table 5.2 and all other repair and calibration work should be undertaken by a Parker Hannifin approved Engineer.

5.1 Cleaning
Clean the equipment with a damp cloth only and avoid excessive moisture around any electrical sockets.
If required you may use a mild detergent, however do not use abrasives or solvents as they may damage the warning labels on the equipment.

5.2. Service Intervals

<table>
<thead>
<tr>
<th>Description Of Maintenance Required</th>
<th>Recommended Maintenance Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Component</strong></td>
<td><strong>Operation</strong></td>
</tr>
<tr>
<td>Generator</td>
<td>Check the Power ON indicator is illuminated</td>
</tr>
<tr>
<td>Generator</td>
<td>Check STATUS / FAULT Indicators located on the controller</td>
</tr>
<tr>
<td>Generator</td>
<td>Check Water Level</td>
</tr>
<tr>
<td>Generator</td>
<td>Check Water Conductivity</td>
</tr>
<tr>
<td>Generator</td>
<td>Check for leaks</td>
</tr>
<tr>
<td>Generator</td>
<td>Check Desiccant Cartridge</td>
</tr>
<tr>
<td>Generator</td>
<td>(Replace when indicating material turns opaque)</td>
</tr>
<tr>
<td>Generator</td>
<td>6 Month Service Kit</td>
</tr>
<tr>
<td>Generator</td>
<td>24 Month Service Kit</td>
</tr>
</tbody>
</table>

**KEY:**
- Check
- Essential Procedure
### 5.3 Service Kits

<table>
<thead>
<tr>
<th>Service Kit</th>
<th>Interval</th>
<th>Description</th>
<th>Kit No</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desiccant Cartridge</td>
<td>As required</td>
<td>Replace cartridge</td>
<td>MKH2PEM-D</td>
<td>Kit Includes: (6) Desiccant Cartridge</td>
</tr>
<tr>
<td>A</td>
<td>Every 6 months (4000 Hrs)</td>
<td>Filter Service</td>
<td>MKH2PEM-6M</td>
<td>Kit Includes: (1) Deionizer Cartridge, (2) Water Filter, (3) 3 Environmental Filters (x3)</td>
</tr>
<tr>
<td>B</td>
<td>Every 24 months (16000 Hrs)</td>
<td>Complete Service</td>
<td>MKH2PEM-24M</td>
<td>Kit Includes: (1) Deionizer Cartridge, (2) Water Filter, (3) Environmental Filters (x3), (4) Float, (5) Water Pump, (6) Desiccant Cartridge, (7) Service Reset Dongle</td>
</tr>
</tbody>
</table>
5.4 Consumable Replacement Procedure

5.4.1 Re-Filling the Water Bottle

Remove the top front cover and the water bottle cap. Fill the water bottle to the “FULL” mark using deionized water (A) and refit the water bottle cap and top front cover.

Note: If the water has been changed due to high conductivity, the de-ionizer cartridge must also be changed.

5.4.2 Water Drain Procedure

Locate the drain port on the rear of the generator and insert the drain line (B). Allow the water bottle to drain completely into a suitable container. Once the water bottle is drained, remove the drain line by pressing the lock downwards and removing the line (C).

Caution

Do not re-use the old water.

5.4.3 Replacing the Water Filter.

Switch the generator into Standby mode, remove the top front cover and the water bottle cap and drain the water bottle. Remove the de-ionizer cartridge and store in a clean area for re-use later.

Caution

Always change the deionizer cartridge if the generator was indicating bad conductivity levels prior to starting this procedure or if it has become contaminated in any way.

The water filter is removed from the water bottle using the tool supplied in the Filter Service kit. Insert the tool into the barbed connection of the filter and push it until the filter is held by the tool. Lift the filter out of the water bottle (D) and discard. Fit the replacement filter onto the tool and put into the water bottle. Push down until the new filter is fully located in to position at the bottom of the water bottle. Refit the de-ionizer cartridge, fill the water bottle, and refit the water bottle cap and top front cover.

5.4.4 Replacing the De-ionizer Cartridge.

Caution

Care should be taken to avoid contamination from handling.

Switch the generator into Standby mode and remove the top front cover and the water bottle cap. Remove the deionizer cartridge and fit the replacement cartridge. Refit the water bottle cap and top front cover.

5.4.5 Replacing the Environmental Filters.

Locate the three vents on the rear of the generator (E). Push the outside of the gland upwards (E) to release the filters and remove. Fit the New Environmental Filters as supplied in the Filter Service Kit.

Note: Environmental filters should be changed every six months as there is no visual indication of exhausted filters.

5.4.6 Replacing the Desiccant Cartridge.

Switch the generator off and disconnect the electrical supply. Ensure that the generator is fully depressurized by removing the outlet fitting on the rear.

Remove the top front cover. Break the seal of the cartridge using a size 19mm open ended wrench (F) and then unscrew by hand. Remove the cartridge and fit the replacement. The new cartridge should be tightened by hand and then nipped up with the size 19mm open ended wrench. A 1/8th turn from hand tight will be sufficient.

Refit the top front cover and the outlet fitting. Restart the generator and initiate a self test as described in sub-section 4.3.6.
## 5.5 Service Record

<table>
<thead>
<tr>
<th>Service (Hours)</th>
<th>Hours Shown</th>
<th>Date</th>
<th>Serviced By</th>
<th>Work done / Comments / Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16,000</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>20,000</td>
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<tr>
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<td>40,000</td>
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<tr>
<td>44,000</td>
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<tr>
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<tr>
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</tr>
<tr>
<td>64,000</td>
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</tr>
<tr>
<td>68,000</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>72,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6 Troubleshooting guide

In the unlikely event that a problem occurs on the equipment, this troubleshooting guide can be used to identify the probable cause and remedy.

Troubleshooting should only be attempted by competent personnel. All major repair, and calibration work should be undertaken by a Parker Hannifin trained approved engineer.

When an error occurs the LCD will cycle between the default menu and the error message. In addition to the error messages the generator will provide a visual and audible indication using the System Check LED, Water Bottle Indicator and its integral sounder. The operating status of each indicator is dependent upon the error as shown in the table below.

<table>
<thead>
<tr>
<th>Error Type</th>
<th>System Check LED</th>
<th>Water Bottle Indicator</th>
<th>Audible Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical Error</td>
<td>Red</td>
<td>Not Illuminated</td>
<td>Continuous</td>
</tr>
<tr>
<td>Non Critical</td>
<td>Red (Flashing)</td>
<td>Normal Conductivity State*</td>
<td>Continuous</td>
</tr>
<tr>
<td>Pre-Alarm</td>
<td>Red / Green</td>
<td>Red / Normal Conductivity State*</td>
<td>Intermittent</td>
</tr>
</tbody>
</table>

Note: * Normal Conductivity is the status of the water bottle indicator prior to the error.

### Water Level and Quality

<table>
<thead>
<tr>
<th>Error Message / Probable Cause</th>
<th>Hydrogen Production</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fill Water ACT 100 PSI</td>
<td>Yes</td>
<td>Fill with &gt;1Mohm-cm water</td>
</tr>
<tr>
<td>Water Empty ACT 100 PSI</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Change Water ACT 100 PSI</td>
<td>Yes</td>
<td>Drain water and refill with &gt;1Mohm-cm water</td>
</tr>
<tr>
<td>Conductivity ACT 100 PSI</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

### Internal Electrical Faults

<table>
<thead>
<tr>
<th>Error Message / Probable Cause</th>
<th>Hydrogen Production</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Voltage ACT 100 PSI</td>
<td>Contact Parker Hannifin for advice.</td>
<td></td>
</tr>
<tr>
<td>Low Voltage ACT 100 PSI</td>
<td>No</td>
<td>Reset and/or Hard reset the generator.</td>
</tr>
<tr>
<td>High Current ACT 100 PSI</td>
<td>Contact your Service agent for advice.</td>
<td></td>
</tr>
<tr>
<td>Low Current ACT 100 PSI</td>
<td>If the problem persists contact Parker Hannifin.</td>
<td></td>
</tr>
</tbody>
</table>
### Pressure Errors

<table>
<thead>
<tr>
<th>Error Message / Probable Cause</th>
<th>Hydrogen Production</th>
<th>Remedy</th>
</tr>
</thead>
</table>
| Internal Leak ACT 100 PSI     | Hydrogen leak in the internal pressure system. | No | Check that the drying cartridge is fitted correctly.  
Contact Parker Hannifin for advice. |
| H2 Outlet ACT 100 PSI         | Massive pressure loss | No | Check outlet piping and connections.  
If problem persists contact Parker Hannifin for advice. |
| Hydrogen Leak ACT 100 PSI     | Internal leak.       | No | Check that the drying cartridge is fitted correctly.  
Check the internal pressure circuit.  
Contact Parker Hannifin for advice. |
| Over-Run ACT 100 PSI          | The generator is operating above 100% rated capacity or running to atmosphere. | No | Check for external leaks on the outlet of the generator.  
Verify that the generator is specified correctly for the application.  
Contact Parker Hannifin for advice. |
| Over Pressure ACT 100 PSI     | Maximum internal pressure is exceeded. | No (System Locked) | Depressurize the generator and perform a hard reset.  
If problem persists contact Parker Hannifin for advice. |

### Sensor Faults

<table>
<thead>
<tr>
<th>Error Message / Probable Cause</th>
<th>Hydrogen Production</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conduct Trans ACT 100 PSI</td>
<td>There is a fault with the conductivity transducer.</td>
<td>No</td>
</tr>
<tr>
<td>Pressure Trans ACT 100 PSI</td>
<td>There is a fault with the pressure transducer or wiring.</td>
<td>No</td>
</tr>
<tr>
<td>Water Pump ACT 100 PSI</td>
<td>Water Pump fault.</td>
<td>No</td>
</tr>
<tr>
<td>Calibration ACT 100 PSI</td>
<td>The calibration file is out of date.</td>
<td>No</td>
</tr>
<tr>
<td>Watchdog ACT 100 PSI</td>
<td>Internal software time out.</td>
<td>No</td>
</tr>
<tr>
<td>Float Trans ACT 100 PSI</td>
<td>There is a fault with the float chamber water level transducer.</td>
<td>No</td>
</tr>
<tr>
<td>Float Chamber ACT 100 PSI</td>
<td>There is a fault in the float chamber; the water level is too high.</td>
<td>No</td>
</tr>
</tbody>
</table>
### Other Faults

<table>
<thead>
<tr>
<th>Error Message / Probable Cause</th>
<th>Hydrogen Production</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Required</td>
<td>Yes</td>
<td>Fit Service Kit</td>
</tr>
<tr>
<td>The oxygen vent is blocked.</td>
<td>No (System Locked)</td>
<td>Remove the blockage and perform hard reset. If the problem persists contact Parker Hannifin for advice</td>
</tr>
<tr>
<td>Terminals on JP3 of the options board are short circuit.</td>
<td>No</td>
<td>Press [ ] when required to reset the generator.</td>
</tr>
<tr>
<td>Pressure error, O₂ vent blocked or three consecutive errors of the same type.</td>
<td>No (System locked)</td>
<td>Resolve the initial fault and reset the generator.</td>
</tr>
</tbody>
</table>
7 Warranty

This warranty applies to the generator and associated parts (the Equipment) manufactured and supplied by Parker Hannifin Ltd. (Parker Hannifin).

Use of the equipment without the recommended inlet air quality or genuine parts will expressly invalidate the warranty.

It should be noted that the generator must be installed and running within three months of dispatch from Parker Hannifin to ensure the optimum efficiency of the PEM cell. If this is not adhered to the warranty will be invalid.

Should the equipment be defective as to materials or workmanship, Parker Hannifin warrants that it will remedy such defect. Where the Equipment is the generator, the warranty period will be 12 months from the date of shipment to the buyer. Where the equipment is the PEM CELL, the warranty period will be 24 months from the date of shipment to the buyer. In the case of Equipment other than the generator, the warranty period shall commence from the date of dispatch. Should any defect occur during the warranty period and be notified in writing to Parker Hannifin or its authorized distributor within the said period, Parker Hannifin will, as its sole option, remedy such defect by repair or provision of a replacement part, provided that the Equipment has been used strictly in accordance with the instructions provided with each item of Equipment and has been stored, installed, commissioned, operated and maintained in accordance with such instruction and with good practice. Parker Hannifin shall not be under any liability whatsoever under the warranty, if, before giving notification in writing to Parker Hannifin as aforesaid, the Customer or any third party meddles, interferes, tampers with or carries out work whatsoever (apart from normal maintenance as specified in the said instructions) in relation to the Equipment or any part thereof.

Any accessories, parts and equipment supplied by Parker Hannifin but not manufactured by Parker Hannifin shall carry whatever warranty the manufacturer has given Parker Hannifin providing it is possible for Parker Hannifin to pass on such warranty to the customer.

To claim under the warranty, the goods must have been installed and continually maintained in the manner specified in the User Guide. Our product support engineers are qualified and equipped to assist you in this respect. They are also available to make repairs that may become necessary in which event they will require an official order before carrying out the work. If such work is to be the subject of a warranty claim, the order should be endorsed for consideration under warranty.
Declaration of Conformity

Parker Hannifin Ltd
Dukesway, TVTE, Gateshead, Tyne & Wear, NE11 0PZ. UK

Laboratory Hydrogen Generator
H2PEM-100, H2PEM-165, H2PEM-260, H2PEM-510

Directives
- 2006/42/EC
- 73/23/EEC,
- 89/336/EEC
- 93/68/EEC, 92/31/EEC

Standards used
- EN ISO 12100-1 : 2003, EN ISO 12100-2 : 2003,
- BSEN 50366 : 2003
- EN 61010-1 : 2001

Authorised Representative
Barry Wade
Quality Manager
Parker Hannifin

Declaration

I declare that as the authorized representative, the above information in relation to the supply / manufacture of this product, is in conformity with the standards and other related documents following the provisions of the above Directives.

Signature: [Signature]
Date: 28/11/2006

Declaration Number: 0045/281106
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