Application

<table>
<thead>
<tr>
<th>Electronics</th>
<th>Semiconductor, Capacitor, LED, Optical fiber, Photovoltaics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metallurgical industry</td>
<td>Bright annealing, Sintering, Brazing</td>
</tr>
<tr>
<td>Chemical</td>
<td>Pharmaceutical products, Food(Hydrogenation), Ceramics</td>
</tr>
<tr>
<td>Industrial gas</td>
<td>Gas purification, Hydrogen gas production, Oxygen gas production</td>
</tr>
<tr>
<td>Power plant</td>
<td>Coolant gas for generator, Inhibitor for stress corrosion cracking of cooling water piping</td>
</tr>
<tr>
<td>Energy industry</td>
<td>Fuel cell, Hydrogen turbine, Power to gas, biogas purification</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>BCP, Emergency power system, Absorption of renewable energy fluctuation</td>
</tr>
<tr>
<td>Vehicle</td>
<td>Hydrogen Station for FCV or FCFL, Plane, Ship</td>
</tr>
<tr>
<td>Communication</td>
<td>Aerospace use(Airship), Radiosonde balloon</td>
</tr>
<tr>
<td>Others</td>
<td>Disposal of PCB (Polychlorinated Biphenyl), Recovery of radioactive material, R&amp;D</td>
</tr>
</tbody>
</table>

Photos

HB1 (3.0t/4s/150m, 320k)
CL/CH-5GD (600×1,300×2,800)
CL/CH-1ODD (1,300×2,800×1,800)
SH-20D (3,700×2,800×2,800)
SL-5GD (1,300×2,350×1,800)

SH-30D, Special specification (simplified explosion-proof type, both H₂ and O₂ use) (1400×2550×2800)
except for Control panel & Power supply unit

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Recycled paper is used for this leaflet.
The HHOG (High-purity Hydrogen Oxygen Generator) is on-site gas generator which produces high-purity hydrogen and oxygen gases by electrolysis of deionized water using proton exchange membranes.

Features

Simple operation and maintenance
- HHOG is a full automatic operation, and it quickly starts and stops by only pressing the switch button.
- No idle operation is required since gases are generated as soon as the switch is turned on unlike methanol reforming and natural gas reforming. The hydrogen gas production is controlled automatically in the range of 0 to 100% according to demand.
- The simple construction and no use of dangerous chemicals which are necessary for alkaline electrolysis lead to simple maintenance. Only annual inspection is required.

High-purity hydrogen gas
- HHOG can generate high-purity hydrogen gas since HHOG directly electrolyzes deionized water, which avoids contamination of the produced gases.

High level of safety and reliability
- Since HHOG quickly generates the necessary amount of gas on demand, it can eliminate gas storage facilities.
- HHOG is designed to ensure safety and shuts down in the event of equipment malfunction.

Environment-friendly
- HHOG needs only water and electricity as materials, unlike methanol reforming and natural gas reforming in which dangerous raw materials and poisonous substances are used.
- No chemical and waste water treatment facilities enable you to minimize the required space. HHOG frees you from transportation work for gas cylinders by truck or trailer.

Principle of deionized water electrolysis

A proton exchange membrane functions as both an electrolyte and a gas separator. Electro catalysts are bonded on both surfaces of the membrane. Deionized water fed into the anode chamber is decomposed into oxygen and proton(H⁺). The proton passes through the membrane to the cathode by force of electrical field, and then is converted to hydrogen gas by accepting the electron(e⁻).

System flow

This is the system flow of Hydrogen Server.

Example of hydrogen gas analysis

<table>
<thead>
<tr>
<th>Analyzed impurities</th>
<th>CO</th>
<th>CO₂</th>
<th>CnHm</th>
<th>Ar</th>
<th>N₂</th>
<th>O₂</th>
<th>Dew point at atmospheric pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentration(ppm)</td>
<td>≤0.01</td>
<td>≤0.01</td>
<td>≤0.01</td>
<td>≤0.01</td>
<td>0.03</td>
<td>≤0.01</td>
<td>≤70 degree C</td>
</tr>
</tbody>
</table>

The data is based on the analysis of hydrogen gas generated by standard model CH-5D.

Utilities


Power consumption

6.5kWh/Nm³-H₂

The value includes that of all equipment in above system flow at rated operation by standard model CH-5D.

Standard specifications

<table>
<thead>
<tr>
<th>Type</th>
<th>Hydrogen Box</th>
<th>Hydrogen Server</th>
<th>Skid mounted type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low pressure type (0.37MPa[Gauge], H₂)</td>
<td>–</td>
<td>CL-5D</td>
<td>CL-10D</td>
</tr>
<tr>
<td>High pressure type (0.82MPa[Gauge], H₂)</td>
<td>HB1</td>
<td>CH-5D</td>
<td>CH-10D</td>
</tr>
</tbody>
</table>

The equipment except above specifications can be manufactured.