PROTON
THE LEADER IN ON SITE® GAS GENERATION.

Technical Specifications

# H Series

## Hydrogen Generation Systems

| MODEL | H2 | H4 | H6 |
|---|---|---|---|
| | On-site hydrogen generator in an integrated, automated, site-ready enclosure. Load Following operation automatically adjusts output to match demand. | | |
| **ELECTROLYTE** | | | |
| | Proton Exchange Membrane (PEM) - caustic-free | | |
| **HYDROGEN PRODUCTION** | | | |
| Net Production Rate<br>$Nm^3/hr$ @ 0°C, 1 bar<br>SCF/hr @ 70°F, 1 atm<br>SLPM @ 70°F, 1 atm<br>kg per 24 hours | <br>2 $Nm^3/hr$<br>76 SCF/hr<br>35.8 SLPM<br>4.31 kg/24hr | <br>4 $Nm^3/hr$<br>152 SCF/hr<br>71.7 SLPM<br>8.63 kg/24hr | <br>6 $Nm^3/hr$<br>228 SCF/hr<br>107.6 SLPM<br>12.94 kg/24hr |
| Delivery Pressure - Nominal | 15 barg (218 psig) / 30 barg option (435 psig) | | |
| Power Consumed per Volume of $H_2$ Gas Produced | 7.3 kWh/$Nm^3$<br>19.2 kWh/100 $ft^3$ | 7.0 kWh/$Nm^3$<br>18.5 kWh/100 $ft^3$ | 6.8 kWh/$Nm^3$<br>17.8 kWh/100 $ft^3$ |
| Purity (Concentration of Impurities) | 99.9995% (Water Vapor < 5 ppm, -65°C (-85°F) Dewpoint, $N_2$ < 2 ppm, $O_2$ < 1 ppm, All Others Undetectable) | | |
| Turndown Range | 0 to 100% net product delivery (Automatic) | | |
| Upgradeability | Field Upgradeable to a maximum of 6 $Nm^3/hr$ (228 SCF/hr) | | N/A |
| **DI WATER REQUIREMENT** | | | |
| Rate at Max Consumption Rate | 1.83 L/hr<br>0.50 gal/hr | 3.66 L/hr<br>0.96 gal/hr | 5.50 L/hr<br>1.42 gal/hr |
| Temperature | 5°C to 50°C / 41°F to 122°F | | |
| Pressure | 1.5 to 4 barg / 21.8 to 58.0 psig | | |
| Input Water Quality | ASTM Type II Deionized Water required, < 1 micro Siemen/cm (> 1 MegOhm-cm)<br>ASTM Type I Deionized Water recommended, < 0.1 micro Siemen/cm (> 10 MegOhm-cm) | | |
| **HEAT LOAD AND COOLANT REQUIREMENT** | | | |
| Cooling[1] | Liquid-Cooled; Anti-freeze, non-fouling; 5°C to 35°C (41°F to 95°F)<br>*25°C cooling water maximum for ambient temperatures above 40°C | | |
| Max Heat Load (Cooling Requirement) | 8.1 kW<br>27,368 BTU/hr<br>(2.3 tons refrig) | 16.1 kW<br>54,936 BTU/hr<br>(4.6 tons refrig) | 23.7 kW<br>80,868 BTU/hr<br>(6.8 tons refrig) |
| **ELECTRICAL SPECIFICATIONS** | | | |
| Recommended Breaker Rating | 22 kVA | 40 kVA | 58 kVA |
| Electrical Specification | 380 to 480 VAC, 3 phase, 50 or 60 Hz | | |

| | H2 | H4 | H6 |
|---|---|---|---|
| **INTERFACE CONNECTIONS - Consult Mechanical Interface Diagram drawing, PD-9900-0003 for details -** | | | |
| $H_2$ Product Port | 1/4" Parker CPI™ compression tube fitting, SS | | |
| $H_2$/$H_2O$ Vent Port | 1/2" FNPT, SS | | |
| DI Water Port | 1/4" FNPT, SS | | |
| Calibration-Gas Port | 1/8" FNPT, brass | | |
| Coolant Supply Port | 1" FNPT, brass | | |
| Coolant Return Port | 1" FNPT, brass | | |
| Drain Port | 3/8" FNPT, brass | | |
| Electrical | Connect to on-board circuit breaker | | |
| Communications | Ethernet | | |
| **CONTROL SYSTEMS** | | | |
| Standard Features | • Fully automated, push button start/stop<br>• E-stop<br>• On-board $H_2$ leak detection<br>• Automatic fault detection and system depressurization | | |
| Remote Alarm | Form C relay, 5A, 250V, 150W Max. rated switch | | |
| Remote Shutdown | Safety circuit trip | | |
| **ENCLOSURE CHARACTERISTICS** | | | |
| Dimensions, W x D x H<br>Product<br>Est. Shipping | 71" x 32 " x 75" / 180 cm x 81 cm x 191 cm<br>81" x 41" x 85" / 206 cm x 104 cm x 216 cm<br>Note: add 8 cm (3") to height for installed lifting brackets | | |
| Weight<br>Product<br>Est. Shipping | 1500 lbs / 682 kg<br>1776 lbs / 807 kg | 1600 lbs / 727 kg<br>1887 lbs / 858 kg | 1700 lbs / 773 kg<br>1998 lbs / 908 kg |
| IP Rating | IP66 for electronics compartment. IP43 for fluids compartment; Upgradeable to IP56. | | |
| **ENVIRONMENTAL CONSIDERATIONS - Do Not Freeze -** | | | |
| Standard Siting Location | Indoor, level ± 1°, 0 to 90% RH non-condensing,<br>Non-hazardous/non-classified environment | | |
| Storage/Transport Temperature | 5°C to 60°C / 41°F to 140°F | | |
| Ambient Temperature Range | 5°C to 50°C / 41°F to 122°F | | |
| Altitude Range- Sea Level | 2400 m / 7874 ft | | |
| Ventilation | Proper ventilation must be provided from a non-hazardous area, at a rate in accordance with IEC60079-10, Zone 2 NE | | |
| **SAFETY AND REGULATORY CONFORMITY** | | | |
| Maximum On-board $H_2$ Inventory at Full Production | 0.040 $Nm^3$ @ 15 barg; 0.08 $Nm^3$ @ 30 barg<br>1.5 SCF @ 15 barg; 2.9 SCF @ 30 barg<br>0.0036 kg @ 15 barg; 0.0069 kg @ 30 barg | | |
| Cabinet Ventilation with Environment | NFPA 69 and EN 1127-1, Clause 6.2.<br>Vent fan draws fresh air up to 28 $Nm^3$/min (1000 $ft^3$/min) | | |
| Noise dB(A) at 1 Meter | < 83 | | |
| Conformity | cTUVus (UL and CSA equivalent), CE (PED, ATEX, LVD, Mach. Dir., EMC), NYFD | | |

Specifications are subject to change. Please contact Proton OnSite for solutions to best fit your needs.
[1]Consult Proton OnSite Applications Engineering Department for proper installation guidelines.

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ProtonOnSite.com | 01.203.949.8697 | Info@ProtonOnSite.com

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