

# HOKEN<sup>®</sup>

## Hydrogen Generation Systems



### H Series Hydrogen Generators

	H2m	H4m	H6m
<b>DESCRIPTION</b>			
	On-site hydrogen generator in an integrated, automated, site-ready enclosure. Load Following operation automatically adjusts output to match demand.		
<b>ELECTROLYTE</b>			
	Proton Exchange Membrane (PEM) - caustic-free		
<b>HYDROGEN PRODUCTION</b>			
Net Production Rate: Nm <sup>3</sup> /hr @ 0° C, 1 bar SCF/hr @ 70° F, 1 atm SLPM @ 70° F, 1 atm kg per 24 hours	2 Nm <sup>3</sup> /hr 76 SCF/hr 35.8 SLPM 4.31 kg/24hr	4 Nm <sup>3</sup> /hr 152 SCF/hr 71.7 SLPM 8.63 kg/24hr	6 Nm <sup>3</sup> /hr 228 SCF/hr 107.6 SLPM 12.94 kg/24hr
Delivery Pressure - Nominal	15 barg (218 PSIG) / 30 barg option (435 PSIG)		
Power Consumed per Volume of H <sub>2</sub> Gas Produced	7.3 kWh/ Nm <sup>3</sup> 19.2 kWh/100 ft <sup>3</sup>	7.0 kWh/ Nm <sup>3</sup> 18.5 kWh/100 ft <sup>3</sup>	6.8 kWh/ Nm <sup>3</sup> 17.8 kWh/100 ft <sup>3</sup>
Purity (Concentration of Impurities)	(99.9995%) Water Vapor < 5 ppm, -65°C (-85°F) Dewpoint, N <sub>2</sub> < 2 ppm O <sub>2</sub> < 1 ppm, All Others Undetectable		
Turndown Range	0 to 100% net product delivery (Automatic)		
Upgradeability	Field upgradeable to a maximum of 6 Nm <sup>3</sup> /hr (228 SCF/hr)		N/A
<b>DI WATER REQUIREMENT</b>			
Rate at Max Consumption Rate	1.83 L/hr (0.50 gal/hr)	3.66 L/hr (0.96 gal/hr)	5.50 L/hr (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) ASTM T ype I Deionized Water preferred, < 0.1 micro Siemen/cm (> 10 megOhm-cm)		



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<b>HEAT LOAD AND COOLANT REQUIREMENT</b>			
Cooling	Liquid-Cooled		
Heat Load from System	8.1kW Max.	16.1kW Max.	23.7 kW Max
Coolant	15-45 lpm (4-12 GPM)	15-68 lpm (4-18 GPM)	15-86 lpm (4-23 GPM)
	non-fouling; 1.4 to 6.9 barg (20 to 100 PSIG); 5°C to 35°C (41 F to 95°F)		

<b>ELECTRICAL SPECIFICATIONS</b>			
Recommended Breaker Rating	22 kVA	40 kVA	58 kVA
Electrical Specification	380 to 480 VAC, 3 phase, 50 or 60 Hz		

<b>INTERFACE CONNECTIONS</b>		<i>*Consult Installation Manual for details*</i>	
H <sub>2</sub> Product Port	1/4" Parker CPI™ compression tube fitting, SS		
H <sub>2</sub> / H <sub>2</sub> O 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		

<b>CONTROL SYSTEMS</b>	
Standard Features	Fully automated, push button start/stop. E-stop. On-board H <sub>2</sub> Liak detection. Automatic fault detection and system depressurization.
Remote Alarm	Form C relay, 5A, 250V, 150W Max. rated switching
Remote Shutdown	Safety circuit trip

<b>ENCLOSURE CHARACTERISTICS</b>			
Dimensions, W x D x H (Product / Est. Shipping)	71" x 32" x 75" (180 cm x 81 cm x 191 cm) / 81" x 41" x 85" (206 cm x 104 cm x 216 cm)		
	Note: add 8 cm (3") to height for installed lifting brackets		
Weight (Product / Est. Shipping)	1500 lbs (682 kg) / 1776 lbs (807kg)	1600 lbs (727 kg) / 1887 lbs (858 kg)	1700 lbs (773 kg) / 1998 lbs (908 kg)
Rating	IP66 for electronics compartment. IP43 for fluids compartment; Upgradeable to IP56.		

<b>ENVIRONMENTAL CONSIDERATIONS</b>		<i>*Do Not Freeze*</i>	
Standard Siting Location	Indoor, level ± 1°, 0 to 90% RH non-condensing, 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 to:	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		

<b>SAFETY AND REGULATORY CONFORMITY</b>	
Maximum On-board H <sub>2</sub> Inventory at Full Production	0.040 Nm <sup>3</sup> @ 15 barg; 0.08 Nm <sup>3</sup> @ 30 barg 1.5 SCF @ 15 barg; 2.9 SCF @ 30 barg 0.0036 kg @ 15 barg; 0.0069 kg @ 30 barg
Cabinet Ventilation with Environment	NFPA 69 and EN 1127-1, Clause 6.2. Vent fan draws fresh air up to 28 Nm <sup>3</sup> /min (1000 ft <sup>3</sup> /min)
Noise dB(A) at 1 Meter	< 83 Standard; < 79 w/optional shroud kit
Approvals	cTUVus (UL and CSA equivalent), CE (PED, ATEX, LVD, Mach. Dir., EMC), NYFD Approval

**OPTIONS**

Proton Energy Systems offers a wide range of options to tailor your HOGEN hydrogen generation system to meet your specific operational requirements. Please contact your local representative to discuss the current list of options available to best fit your needs.

Consult Proton Energy Systems Applications Department for proper installation guidelines. Specifications subject to change.