



PROTON® PEM

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 Full differential pressure, H ₂ over O ₂		
ELECTROLYTE			
	Proton Exchange Membrane (PEM) – Caustic-Free		
HYDROGEN PRODUCTION			
Net Production Rate Nm ³ /hr @ 0°C, 1 bar SCF/hr @ 70°F, 1 atm SLPM @ 70°F, 1 atm kg per 24 hours	2 Nm ³ /hr 76 SCF/hr 35.8 SLPM 4.31 kg/24 hr	4 Nm ³ /hr 152 SCF/hr 71.7 SLPM 8.63 kg/24 hr	6 Nm ³ /hr 228 SCF/hr 107.6 SLPM 12.94 kg/24 hr
Delivery Pressure – Nominal	15 barg (218 psig); Optional 30 barg (435 psig)		
Power Consumption by System per Volume of H ₂ Gas Produced ¹	7.3 kWh/Nm ³ (19.2 kWh/100 ft ³)	7.0 kWh/Nm ³ (18.5 kWh/100 ft ³)	6.8 kWh/Nm ³ (17.8 kWh/100 ft ³)
Purity (Concentration of Impurities)	99.9995% [H ₂ O < 5 ppm, -65°C (-85°F) Dew Point, N ₂ < 2 ppm, O ₂ < 1 ppm, all others undetectable]		
Turndown Range	0-100% net product delivery (automatic)		
Upgradeability	Field upgradeable to a maximum of 6 Nm ³ /hr (228 SCF/hr)		N/A
DI WATER REQUIREMENT			
Consumption Rate at Maximum Production	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	5-50°C (41-122°F)		
Pressure	1.5-4 barg (21.8 to 58 psig)		
Input Water Quality	Required: ASTM Type II Deionized Water, < 1 µS/cm (> 1 MΩ-cm) Preferred: ASTM Type I Deionized Water, < 0.1 µS/cm (> 10 MΩ-cm)		
HEAT LOAD AND COOLANT REQUIREMENT			
Coolant ²	Liquid-cooled; non-freezing, non-fouling; 5-35°C (41-95°F); 25°C cooling water maximum for ambient temperatures above 40°C		
Maximum Heat Load (Cooling Requirement)	8.1 kW 27,368 BTU/hr (2.3 tons refrigeration)	16.1 kW 54,936 BTU/hr (4.6 tons refrigeration)	23.7 kW 80,868 BTU/hr (6.8 tons refrigeration)
Coolant Flowrate	Up to 45 L/min (12 gal/min)	Up to 68 L/min (18 gal/min)	Up to 87 L/min (23 gal/min)
Pressure Drop (at Full Flow)	Up to ~3.4 barg (~50 psig)	Up to ~3.4 barg (~50 psig)	Up to ~3.4 barg (~50 psig)
ELECTRICAL SPECIFICATIONS			
Maximum Power Required within Expected System Life	22 kVA	38 kVA	55 kVA
Electrical Requirements	480 VAC, three phase, 60 Hz or 380-415 VAC, three phase, 50 Hz		

Model	H2	H4	H6
INTERFACE CONNECTIONS – CONSULT INSTALLATION MANUAL FOR DETAILS			
H ₂ Product Port	1/4" Parker CPI™ compression tube fitting, SS		
H ₂ Vent Port	1/2" FNPT, SS		
DI Water Port	1/4" FNPT, SS		
Calibration-Gas Port	1/8" FNPT, brass		
Coolant Supply and Return Ports	1" FNPT, brass		
Drain Port	3/8" FNPT, brass		
Electrical	Connect to on-board circuit breaker		
Communications	Ethernet, 24 VDC dry contacts		
CONTROL SYSTEMS			
Standard Features	<ul style="list-style-type: none"> Fully automated, push button start/stop Automatic fault detection and system depressurization 		<ul style="list-style-type: none"> E-stop Remote start/stop On-board H₂ leak detection Remote communications
Remote Shutdown	Hardwire input to safety PLC		
PHYSICAL CHARACTERISTICS			
Dimensions W x D x H	Product Est. Shipping	180 cm x 81 cm x 191 cm (71" x 32" x 75") 206 cm x 104 cm x 216 cm (81" x 41" x 85") Note: Add 8 cm (3") to height for installed lifting brackets.	
Weight	Product Est. Shipping	682 kg (1,500 lbs) 807 kg (1,776 lbs)	727 kg (1,600 lbs) 858 kg (1,887 lbs)
IP Rating	IP66 for electronics compartment. IP43 for fluids compartment; Upgradeable to IP56.		
ENVIRONMENTAL CONSIDERATIONS – DO NOT FREEZE			
Standard Siting Location	Indoor, level ± 1°, 0-90% RH non-condensing, non-hazardous/non-classified environment		
Storage/Transport Temperature	5-60°C (41-140°F)		
Ambient Temperature Range	5-50°C (41-122°F)		
Altitude Range – Sea Level	2,400 m (7,874 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 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 ³ /min (1,000 ft ³ /min)		
Noise dB(A) at 1 Meter	< 83		
Conformity	cTUVus (UL and CSA equivalent), CE (PED, Mach. Dir., EMC), ISO 22734-1		



Specifications are subject to change. Please contact Nel Hydrogen for solutions to best fit your needs.

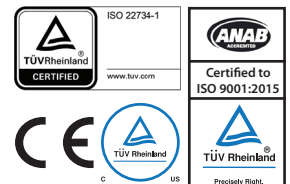
¹ Dependent on configuration and operating conditions.

² Consult Nel Hydrogen Applications Engineering Department for proper installation guidelines.

www.nelhydrogen.com | +1.203.949.8697 | info@nelhydrogen.com

MADE IN USA

© 2019 Nel ASA. All Rights Reserved. Nel, number one by nature, Proton, and the Nel and Proton logos are trademarks of Nel ASA or its subsidiaries.



PD-0600-0062 Rev G