



## S Series

# Proton Exchange Membrane (PEM) Hydrogen Generation Systems



| MODEL   | S10  | S20   | S40   |
|---|--|---|---|
| Description   | On-site hydrogen generator in an integrated, automated, site-ready enclosure<br>Tank filling mode<br>Load following operation automatically adjusts output to match demand<br>Full differential pressure, H <sub>2</sub> over O <sub>2</sub> |   |   |
| Electrolyte   | Proton Exchange Membrane (PEM) – caustic-free  |   |   |
| <b>HYDROGEN PRODUCTION</b>  |  |   |   |
| Nominal Production Rate<br>Nm <sup>3</sup> /h (m <sup>3</sup> /h @ 0°C, 1 bar)<br>SCF/h (ft <sup>3</sup> /h @ 70°F, 1 atm)<br>kg/24 h | 0.27 Nm <sup>3</sup> /h<br>10 SCF/h<br>0.58 kg/24 h  | 0.53 Nm <sup>3</sup> /h<br>20 SCF/h<br>1.14 kg/24 h | 1.05 Nm <sup>3</sup> /h<br>40 SCF/h<br>2.27 kg/24 h |
| Delivery Pressure – Nominal   | 13.8 barg (200 psig)   |   |   |
| Power Consumption by System<br>per Unit of H <sub>2</sub> Gas Produced <sup>1</sup>   | 6.1 kWh/Nm <sup>3</sup> (16.3 kWh/100 SCF)   |   |   |
| Purity (Concentration of Impurities)  | 99.999+% [H <sub>2</sub> O < 5 ppm, -65°C (-85°F) Dew Point, N <sub>2</sub> < 2 ppm, O <sub>2</sub> < 1 ppm,<br>all other undetectable]  |   |   |
| Turndown Range  | 0 to 100% net product delivery (automatic)   |   |   |
| Upgradeability  | N/A  |   |   |
| <b>DI WATER REQUIREMENTS</b>  |  |   |   |
| Minimum DI Water Flow Rate  | 5 l/h (1.4 gal/h)  |   |   |
| Consumption Rate<br>at Maximum Production   | 0.35 l/h (0.10 gal/h)  | 0.55 l/h (0.15 gal/h)                               | 1.05 l/h (0.28 gal/h)                               |
| Temperature   | 5 to 35°C (41 to 95°F)   |   |   |
| Pressure  | 1.5 to 4 barg (21.8 to 58 psig)  |   |   |
| Input Water Quality   | Required: ASTM Type II Deionized Water, < 1 µS/cm (> 1 MΩ-cm)<br>Preferred: ASTM Type I Deionized Water, < 0.1 µS/cm (> 10 MΩ-cm)  |   |   |
| <b>HEAT LOAD AND COOLANT REQUIREMENTS</b>   |  |   |   |
| Coolant   | Air-cooled; ambient air  |   |   |
| Maximum Heat Load   | 1.1 kW (3,754 BTU/h)   | 2.2 kW (7,507 BTU/h)                                | 4.3 kW (14,673 BTU/h)                               |
| <b>ELECTRICAL SPECIFICATIONS</b>  |  |   |   |
| Maximum Power Required within<br>Expected System Life   | 3 kVA  | 4.5 kVA   | 8.5 kVA   |

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|--|--|---|---|
| <b>INTERFACE CONNECTIONS – CONSULT MECHANICAL INTERFACE DIAGRAM DRAWING PD-9900-0040 FOR DETAILS</b> |  |   |   |
| H <sub>2</sub> Product Port  | 1/4" compression tube fitting, SS  |   |   |
| H <sub>2</sub> /H <sub>2</sub> O Vent Port   | 1/2" compression tube fitting, SS  |   |   |
| O <sub>2</sub> Vent Port   | 3/8" FNPT  |   |   |
| DI Water Port  | 1/4" tube push-to-lock, polypropylene  |   |   |
| Drain Port   | 1/4" tube push-to-lock polypropylene   |   |   |
| Electrical   | Connect to on-board circuit breaker  |   |   |
| Communications   | Modbus TCP/IP, 24 VDC dry contacts   |   |   |
| <b>CONTROL SYSTEMS</b>   |  |   |   |
| Standard Features  | <ul style="list-style-type: none"> <li>Fully automated, push button start/stop</li> <li>Automatic fault detection and system depressurization</li> </ul> |   | <ul style="list-style-type: none"> <li>E-stop</li> <li>Remote start/stop</li> <li>Remote communications</li> <li>Optional: current command</li> </ul> |
| Remote Shutdown  | Hardwire input to safety PLC   |   |   |
| <b>PHYSICAL CHARACTERISTICS</b>  |  |   |   |
| Dimensions<br>W x D x H  | Product  | 79 cm x 97 cm x 112 cm (31" x 38" x 45")  |   |
|  | Est. Shipping  | 97 cm x 114 cm x 137 cm (38" x 45" x 55") |   |
| Weight   | Product  | 209 kg (460 lbs)                          |   |
|  | Est. Shipping  | 289 kg (635 lbs)                          |   |
| IP Rating  | IP 22  |   |   |
| <b>ENVIRONMENTAL CONSIDERATIONS – DO NOT FREEZE</b>  |  |   |   |
| Standard Siting Location   | Indoor, level ± 1°, 0 to 90% RH non-condensing, non-hazardous/non-classified environment   |   |   |
| Storage/Transport Temperature  | 5 to 60°C (41 to 140°F)  |   |   |
| Ambient Temperature Range  | 5 to 40°C (41 to 104°F);<br>Optional: 5 to 50°C (41 to 122°F)  | 5 to 40°C (41 to 104°F)                   |   |
| Altitude Range   | Sea level to 1,520 m (5,000 ft)  |   |   |
| Room Ventilation   | Proper ventilation must be provided from a non-hazardous area at a rate prescribed by the installation manual  |   |   |
| <b>SAFETY AND REGULATORY CONFORMITY</b>  |  |   |   |
| Maximum On-board H <sub>2</sub> Inventory at Full Production   | 0.016 Nm <sup>3</sup><br>0.56 SCF<br>0.001 kg  |   |   |
| Cabinet Ventilation with Environment   | NFPA 69, chapter 8 and EN 1127-1, clause 6.2<br>Vent fan draws fresh air up to 28 m <sup>3</sup> /min (1,000 ft <sup>3</sup> /min)                       |   |   |
| Noise dB(A) at 1 Meter   | < 70   |   |   |
| Conformity   | cTUVus (UL and CSA equivalent), CE (PED, Mach. Dir., EMC), ISO 22734-1   |   |   |



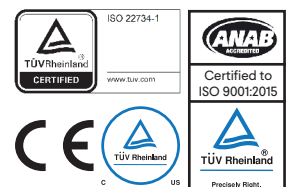
Specifications are subject to change. Please contact Nel Hydrogen for solutions to best fit your needs.

<sup>1</sup>. Beginning of life and dependent on configuration and operating conditions.

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