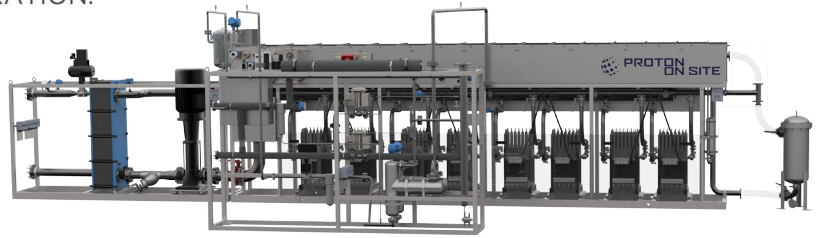


M400

Hydrogen Generation System



MODEL	M400
Features	<p>Fully-automated MW-class on-site hydrogen generator utilizing a modular skid-based design. Tri-mode operation (selectable):</p> <ul style="list-style-type: none"> • Command-following mode allows operation based on available input power. • Load Following mode automatically adjusts output 0-100% to match demand. • Tank Filling mode operates with power-conservation mode during standby.
ELECTROLYTE	
	Proton Exchange Membrane (PEM) - caustic-free
HYDROGEN PRODUCTION	
Net Production Rate	
Nm ³ /hr @ 0°C, 1 bar	417
SCF/hr @ 70°F, 1 atm	15882
SLPM @ 70°F, 1 atm	7495
kg per 24 hours	902
Delivery Pressure - Nominal	30 barg / 435 psig; Full Differential Pressure H ₂ Over O ₂
Hydrogen Purity	> 99.9% Water Vapor < 500 ppm, N ₂ < 2 ppm, O ₂ < 1 ppm, All others undetectable
With Optional High Purity Dryer	ISO 14687-1:1999 Type 1 Grade C / ISO 14687-2:2012 Type 1 grade D > 99.9995% Water Vapor < 2 ppm, N ₂ < 2 ppm, O ₂ < 1 ppm, All others undetectable
ELECTRICAL POWER CONSUMPTION	
MW's @ Cell Stack(s)	2.1
MW's @ System	2.2
Power Consumed per Volume of H ₂ Gas Produced ¹	5.3 kWh/Nm ³
Mass of H ₂ Gas	59 kWh/kg
SYSTEM OPERATION	
Start-Up Time (from Off State)	<5 min
Turndown Range	10 to 100% (Input Power Mode); 0 to 100% (H ₂ Demand Mode)
Ramp-Up Time (Minimum to Full Load)	<10 Sec
Ramp Rate (% of Full-Scale)	≥ 15% per sec (Power Input Mode)
DI WATER REQUIREMENT	
Consumption Rate at Maximum Production	373 L/hr 99 gal/hr
Maximum Inlet Flowrate	747 L/hr 197 gal/hr
Temperature	5°C to 40°C / 41°F to 104°F
Input Water Quality	ASTM Type II Deionized Water required, < 1 micro Siemen/cm (> 1 MegOhm-cm) ASTM Type I Deionized Water recommended, < 0.1 micro Siemen/cm (> 10 MegOhm-cm)

MODEL	M400
PHYSICAL CHARACTERISTICS- MASS (KG)	
Classified Area	
Water Circulation Skid (Operating)	10403
H2 Gas Management Skid	909
Unclassified Area	
Power Conversion Assembly (each) (Includes Rectifiers, Transformer, and AC Distribution)	6500
Power Conversion Quantity	4
MCC	909
Controls	300
PHYSICAL CHARACTERISTICS -DIMENSIONS (MM)	
Classified Area	
Water Circulation Skid	9918 W x 820 D 2141 H
H2 Gas Management Skid	3317 W x 575 D x 2083 H
Unclassified Area	
Power Conversion Assembly (each)	6200 W x 1200 D x 2850 H
MCC	2032 W x 549 D x 2210 H
Controls	1550 W x 382 D x 2190 H
ENVIRONMENTAL CONSIDERATIONS	
Standard Siting Location	Indoor, 10-90% RH non-condensing for Classified & Unclassified Equipment Outdoor Siting Options Available
Storage/Transport Temperature	5°C to 60°C / 41°F to 140°F
Ambient Temperature Range	10°C to 40°C / 50°F to 104°F
Altitude Range-Sea Level	1000 m /3281 ft
ELECTRICAL SPECIFICATIONS	
Electrical specification	Typical installation: 10 kV and 20 kV, 3 phase + Neutral, 50Hz/60Hz; For lower voltage connection, consult Proton Applications Engineering Department for specific requirements and options. Ancillary equipment powered by Customer or optionally powered by Proton OnSite
Power Quality	Designed to German TAB Specification
OPTIONS	

- Factory Matched RO/DI Water System
- Factory Matched Thermal Control Unit

- Dew Point Monitoring
- High Purity Hydrogen Dryer

- Air Compressor
- Containerization

Specifications are subject to change. Please contact Proton OnSite for solutions to best fit your needs.



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