PROTON® PEM

M Series Containerized

Hydrogen Generation Systems

MODEL	MC100	MC200	MC400
Class	0.5 MW	1.0 MW	2.0 MW
Description	Fully-automated MW-class on-site hydrogen generator utilizing a modular skid-based design Tri-mode operation (selectable): • 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/h @ 0°C, 1 bar SCF/h @ 70°F, 1 atm SLPM @ 70°F, 1 atm kg/24 h	 103 Nm^3/h 3,909 SCF/h 1,845 SLPM 222 kg/24 h	 207 Nm^3/h 7,857 SCF/h 3,708 SLPM 446 kg/24 h	 413 Nm^3/h 15,714 SCF/h 7,416 SLPM 892 kg/24 h
Delivery Pressure – Nominal	30 barg (435 psig); full differential pressure H_2 over O_2		
Average Power Consumption at Stack per Volume of H_2 Gas Produced[1]	4.53 kWh/Nm^3		
Average Power Consumed at Stack per Mass of H_2 Gas[1]	50.33 kWh/kg		
Purity (Concentration of Impurities)	99.9% [H_2O < 500 ppm, N_2 < 2 ppm, O_2 < 1 ppm, all others undetectable]		
Purity (Concentration of Impurities with Optional High Purity Dryer)	ISO 14687-1:1999 Type 1 Grade C / ISO 14687-2:2012 Type 1 Grade D 99.9998% [H_2O < 2 ppm, N_2 < 2 ppm, O_2 < 1 ppm, all others undetectable]		
Start-Up Time (from Off State)	<5 min		
Ramp-Up Time (Minimum to Full Load)	<10 Sec		
Ramp Rate (% of Full-Scale)	≥ 15% per sec (Power Input Mode)		
Turndown Range	10-100% (Input Power Mode); 0-100% (H_2 Demand Mode)		
DI WATER REQUIREMENT			
Consumption Rate at Maximum Production	93 L/h (25 gal/h)	187 L/h (49 gal/h)	373 L/h (99 gal/h)
Temperature	5°C to 40°C (41°F to 104°F)		
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)		

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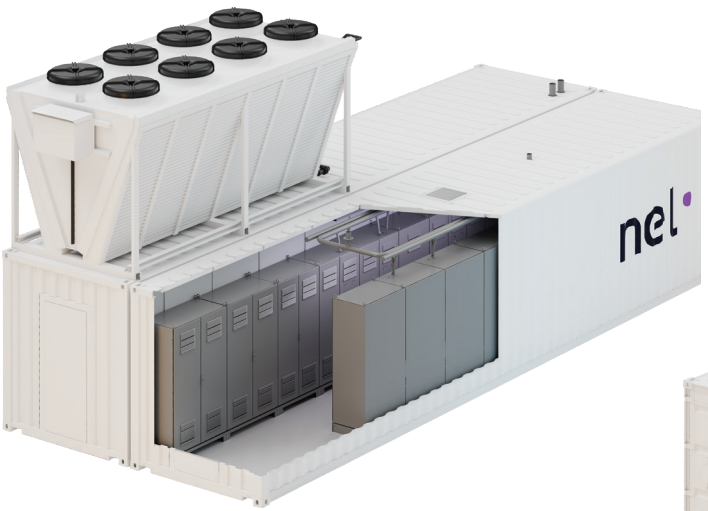
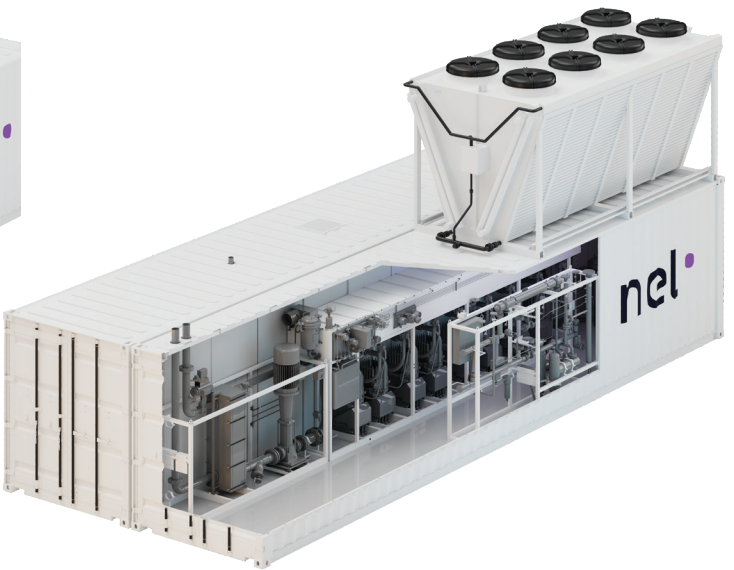
ELECTRICAL SPECIFICATIONS			
Electrical Requirements	Typical installation: 10 kV and 20 kV, three phase + Neutral, 50Hz/60Hz; for lower voltage connection, consult Nel Hydrogen Applications Engineering Department for specific requirements and options Ancillary equipment powered by customer or optionally powered by Nel Hydrogen		
Power Quality	Designed to German TAB specification		
PHYSICAL CHARACTERISTICS			
Rectifier Transformer Area[2] W x D x H	3.5 m x 3 m x 3 m (11.5’ x 9.8’ x 9.8’)	3.5 m x 3 m x 3 m (11.5’ x 9.8’ x 9.8’)	4 m x 3.5 m x 3.5 m (13.2’ x 11.5’ x 11.25’)
Electrolyser Container Dimensions[3] W x D x H	12.2 m x 2.5 m x 3 m (40’ x 8’ x 9.9’)	12.2 m x 2.5 m x 3 m (40’ x 8’ x 9.9’)	12.2 m x 2.5 m x 3 m (40’ x 8’ x 9.9’)
Power Supply Container Dimensions[3] W x D x H	12.2 m x 2.5 m x 3 m (40’ x 8’ x 9.9’)	12.2 m x 2.5 m x 3 m (40’ x 8’ x 9.9’)	12.2 m x 2.5 m x 3 m (40’ x 8’ x 9.9’)
ENVIRONMENTAL CONSIDERATIONS – DO NOT FREEZE			
Standard Siting Location	Outdoor, cover required for high dust or snow load areas Flatness 35/25 per ACI-117-10 Bottom access for AC and DC electrical connections		
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	1,000 m (3,281 ft)		

OPTIONS

- Factory matched RO/DI water system
- Factory matched thermal control unit
- Dew point monitoring (requires dryer option)
- High purity hydrogen dryer
- Air compressor
- Low ambient temperature package (-20°C)





Representative views of MC400 – installation may vary.

Specifications are subject to change based on siting and configuration. Please contact Nel Hydrogen for solutions to best fit your needs.

1. Dependent on configuration and operating conditions.
2. Requires access restriction and cover – site and configuration specific.
3. Plus vent and rooftop equipment, site specific – add 5 m (16.5’) to height.

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MADE IN USA

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