



## M18 | Hydrogen Generator

*The Methanol to Hydrogen fuel delivery solution for marine vessels*

e1 Marine's Hydrogen generation technology produces Hydrogen from Methanol - on land, on board, and on demand. This proven solution is robust and efficient, enabling you to reduce your vessel's greenhouse gas emissions, while safely and economically re-powering your fleet for greater range and increased operational flexibility.



**Marine**

Getting hydrogen to work

# M Series | M18 Hydrogen Generator

*Hydrogen on demand - when you need it, where you need it!*

The e1 Marine M-Series M18 is scalable and compact easily integrating with PEMFCs and offers a variety of vessel fuel cell power applications.

## Advantages:

- ▶ On-demand, on board, fuel cell grade Hydrogen production
- ▶ Modular, scalable power output supporting MW power solutions
- ▶ CE Certified
- ▶ Uses low-cost Methanol/DI water feedstock
- ▶ Zero NOx, SOx, or Particulate Matter emissions
- ▶ Low noise and vibration
- ▶ Designed for cyclic and variable operations

## System Architecture

H2 Generator System	Includes feedstock pump and reformer, air blower, H2 purifier, controls
H2 Purifier	Proprietary bi-metallic membrane purifier

## H2 Product

Output	1,800 sLm   10 kg/hr (max output per unit)
Purity	≥ 99.97% (dry basis) with < 0.2 ppm CO (meets ISO 14687 purity standard)
H2 Buffer Tank Delivery Pressure	0.7 - 2.0 barg   10 - 30 psig

## Efficiency

Methanol/Water Consumption	132 L/hr   34.8 gal/hr average at 1,800 sLm Hydrogen production
Efficiency at Steady State Optimal	> 80%

## Electrical Power Requirements

Cold Startup Mode	≤ 7 kW at 200 VDC/VAC (Constant), < 0.2 kW at 24 VDC
Hot Standby	≤ 1 kW at 24 VDC
H2 Production Mode	≤ 2 kW at 200 VDC/VAC (avg. energy consumption), < 0.2kW at 24 VDC
Minimum Power to H2 Generator	35 A at 200 VAC, 35A at 24 VDC

## Startup Time

From Ambient Temperature	Typically < 24hrs depending on system power conditions & ambient temp.
From Hot Standby	< 5min to H2 production; < 30min to rated H2 production

## Environment

Temperature Range	5°C to 45°C   41°F to 113°F
Maximum Altitude	2,500 m   8,200 ft

## Dimensions

Size (L x W x H) = Volume	(2 m x 1 m x 1.55 m) = 3.2 m <sup>3</sup>   (79.5 in x 39.25 in x 61.2 in) = 110.5 ft <sup>3</sup>
Weight	1,550 kg (≈ 3,400 lbs.)

## Feedstock Requirements

Methanol/Water DI Blend Ratio	Premixed   Methanol 62.5 +/- 0.5 wt% with balance DI water
Methanol Specifications	Methanol must meet IMPCA purity standard
De-Ionized Water Specifications	DI water must be > 14MΩ-cm

*\*Specifications subject to change*



**Marine**  
Getting hydrogen to work



**e1 Marine, LLC**  
63050 Plateau Drive  
Bend, OR 97701, USA

Info@e1Marine.com  
e1Marine.com



## M30 | Hydrogen Generator

**Fuel cell grade Hydrogen generation**  
e1 Marine's Hydrogen generation technology produces Hydrogen from Methanol – on land, on board, and on demand. This proven solution is robust and efficient, enabling you to reduce your vessel's greenhouse gas emissions, while safely and economically repowering your fleet for greater range and increased operational flexibility.



**Marine**

Getting hydrogen to work

# M30 | Hydrogen Generator

## Auxiliary Electrical Requirements

Auxiliary Supply Requirements	Main Auxiliary AC Supply (Heaters): 400/230VAC, 3-Phase, 4-Wire (3C+N), 50Hz Electrical Heaters (Load Type: PWM / Variable Duty Cycle) Uninterruptible Power Supply (Double Conversion, Online) 200VAC – 240VAC, 1-Phase, 50/60Hz Internal Loads: Control System and Blowers Backup Time Requirements: 5 minutes for emergency shutdown
Cold Startup Mode	≤15 kW: 400-480VAC Supply (Heaters) – Varies on int. temp. <0.1 kW: 200-240VAC UPS Supply (Control Load) – Base <1kW: 200-240VAC Supply (Blowers) – Periodic operation
Hot Standby Mode	≤6 kW: 400-480VAC Supply (Heaters) – Constant duty cycle <0.1 kW: 200-240V UPS Supply (Control Load) – Base <1kW: 200-240V Supply (Blowers) – Periodic operation
H2 Production Mode	0kW: 400-480V Supply (Varies) <0.3 kW: 200-240V UPS Supply (Control Load) – Base

## Environment

Humidity	0 – 95% (non-condensing)
Temperature Range	0°C to 45°C

## Feedstock Requirements

Methanol Specifications	IMPCA Purity Standard / ISO 6583 (Grade A)
De-ionized Water Specifications	≥ 14MΩ-cm (Note if condensed vapor from fuel exhaust will be used, consult with e1 Marine for additional purification requirements)
Methanol/Water DI Blend Ratio	62.5% Methanol +/- 0.5wt% & 37.5% DI Water +/- 0.5wt%

## Fuel Consumption and Performance

Efficiency	≥ 80% (Full output @ 0.7barg buffer tank pressure)
Feedstock Consumption	220L/hr (3.67L/min) average @ 3000sLm
H2 Output Flow Modulation Capability	90% - 100% Rated Output (Buffer Tank pressure manipulation) 50% - 100% Rated Output (Internal feed pressure manipulation)

## H2 Output Specifications

H2 Purity	>99.97% (Dry Basis) with <0.2ppm CO2 (meets ISO 14687 Grade E purity standard)
H2 Buffer Tank Delivery Pressure	0.7 barg – 1.7 barg (H2 production varies with buffer tank pressure)
Rated Capacity	3,000sLM (16.2kg/hr) @ 0.7barg

## Physical Characteristics

Physical Size (W x D x H) in mm	1219 x 2261 x 2350
Weight	2300kg +/- 10%

## Startup Time

From Ambient Temperature	Typically <10 hours @ 25°C Ambient
From Hot Standby	From Hot Standby, time to: Start of Hydrogen Production <3 minutes 50% H2 Output (1500sLm) <12 minutes 80% Output (2800sLm) <31 minutes 100% Output (3000sLm) <48 minutes

*\*Specifications subject to change*



**Marine**  
Getting hydrogen to work



**e1 Marine, LLC**  
63050 Plateau Drive  
Bend, OR 97701, USA

Info@e1Marine.com  
e1Marine.com