

# MARINE HYDROGEN FUEL CELL TECHNOLOGY



## Company Introduction

VINSSEN is a maritime technology company leading the charge in reducing greenhouse emissions through innovative and sustainable products/solutions.

VINSSEN enables the use of hydrogen (and alternative fuels like ammonia and methanol) as cleaner and more efficient energy sources for the maritime industry. VINSSEN offers differentiated performances via a proprietary Titanium Bipolar Plate PEM Fuel Cell Technology, which results in better durability and weight profiles for maritime applications.

VINSSEN is also positioned to support maritime electrification with battery solutions. When paired with batteries, fuel cells can benefit from increased efficiency and longer operational ranges.

With support from a dedicated team in Korea that has a deep affiliation with the shipbuilding industry, VINSSEN is able to provide customized solutions for diversified use cases across a large spectrum of clients.



## History

### 2023

- Acquired Lithium Battery Type Approval (KR & KOMSA)
- Established 2nd VINSSEN Factory and Water Tank (abt 30m Length)
- First Factory Acceptance Test for Hydrogen Fuel Cell
- First Shipment of Hydrogen Fuel Cell for Marine to Singapore
- Awarded 14M Class Passenger Ferry for Suncheonman International Garden Expo 2023

### 2022

- Acquired AIP(KR) for marine Fuel Cell
- Awarded Fuel Cell K-Energy Observer Project
- Awarded Fuel Cell 3MW Tug Propulsion System Project
- Awarded e-Propulsion for Autonomous Ship
- Awarded Fuel Cell System For Ocean Cleaning Ship

### 2021

- Established VINSSEN INTERNATIONAL PTE. LTD. in Singapore
- Received the President's Award from Korean Environmental Industry & Technology Institute
- Constructed the first manufacturing complex (5,000m<sup>2</sup>) at Daebul Industrial Complex in Jeollanamdo
- Awarded "Boat of the Year" for the Hydrogen electric boat 'Hydrogenia' at the 2021 Busan International Boat Show
- Presented 'Hydrogenia' to President Moon Jae-In in Ulsan City

### 2020

- Signed agreement to construct and demonstrate hydrogen vessels with Jeolla Province Municipal Council
- Signed MOU between VINSSEN and ABB Ltd to develop an electric vessel
- Signed comprehensive agreement to supply fuel cell systems to the Hyundai Motor Company

### 2019

- Awarded "Boat of the Year" at the 2019 Busan International Boat Show
- Awarded "Contribution to Development of Shipbuilding and Marine Industry" from the Jeollanamdo Municipal Council
- Acquired the 2020 Hydrogen Industry Regulation Free Zone R&D titled "33ft H<sub>2</sub> Electric-Powered Boat-Engineering, Manufacturing, Sea Trial"

### 2018

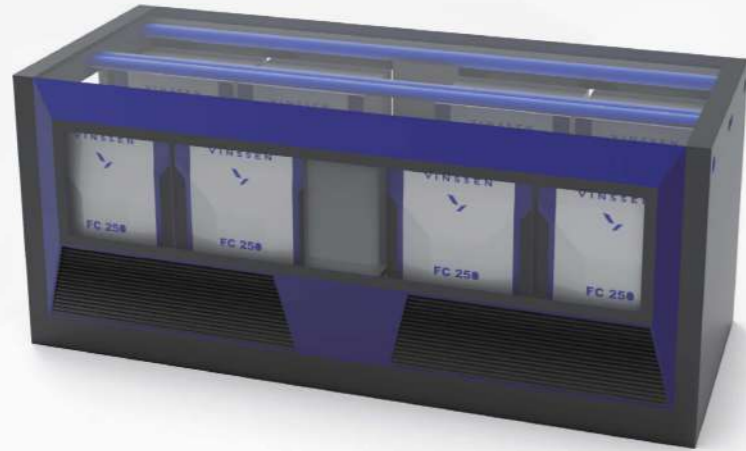
- Acquired venture company certification from the Korea SMEs and Startups Agency
- Acquired ISO9001:2015 (DNVGL)
- Established R&D Center

### 2017

- Founded VINSSEN Co., Ltd.

# Flagship Product

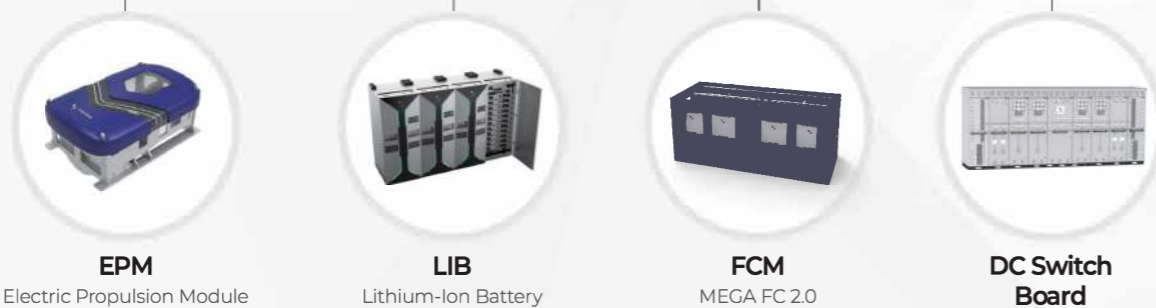
## MEGA FC 2.0



### Specification

Type	PEM Fuel Cell	Rated Power	2.0 MW (Total)
Size(WxDxH)	6.0 × 2.5 × 2.5M (20ft Cnt.)	Weight(Estimate)	14,000 kg
Ambient Temperature	0°C ~ 45°C	Certificate	KR (Available in 2025Y)

## Application



Specification	50K Product Carrier	115K Crude Oil Tanker
Total Required Electric Power	7MW	15MW
Capacity of MEGA FC 2.0	6MW (3 Sets)	14MW (7 Sets)
Capacity of Battery	abt 1MW (10 Sets)	abt 1MW (10 Sets)
Type of Propulsion	Electric Motor Driven	Electric Motor Driven

## Fuel Cell Module 100kW / 250kW



Specification	FC 100kW	FC 250kW
Target Application	Boat	Vessel
Installation Type	Horizontal	Vertical
H <sub>2</sub> Inlet Pressure(barg)	12	12
Rated Power(Continuous, kW)	100	250
Rated Power(Peak, kW)	120	300
Ambient Temperature(°C)	0 ~ 45	0 ~ 45
Ambient Humidity(%)	0 ~ 95	0 ~ 95
Cooling Type	Water-Cooled	Water-Cooled
IP Rating	IP54	IP54
System Size(mm, W×D×H)	2,000 × 700 × 1,000	1,600 × 700 × 2,000

## Lithium-Ion Battery System

\*For Large Fleets



126 kW

\*For Small & Medium Fleets



92 kW

### Specification (126kW)

Nominal Voltage	480VDC
Max Capacity	126kW
Charge Voltage	540V
Discharge Voltage	396V
IP Rating	IP44
Weight(kg)	1,100
Size(mm, W×D×H)	600 × 800 × 1,700
Communication	CAN 2.0A

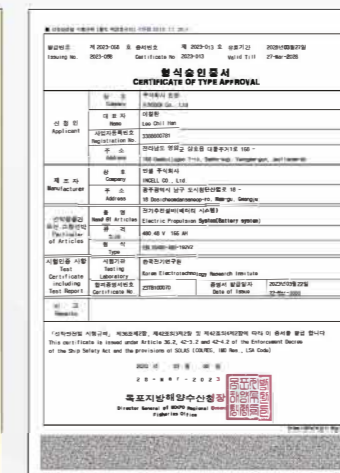
## Certificate



ISO 9001:2015(KR)



Approval In Principle(KR)  
120kW Fuel Cell Power System for Ship



Type Approval(KOMSA)  
'Electric Propulsion System'  
(Battery System)

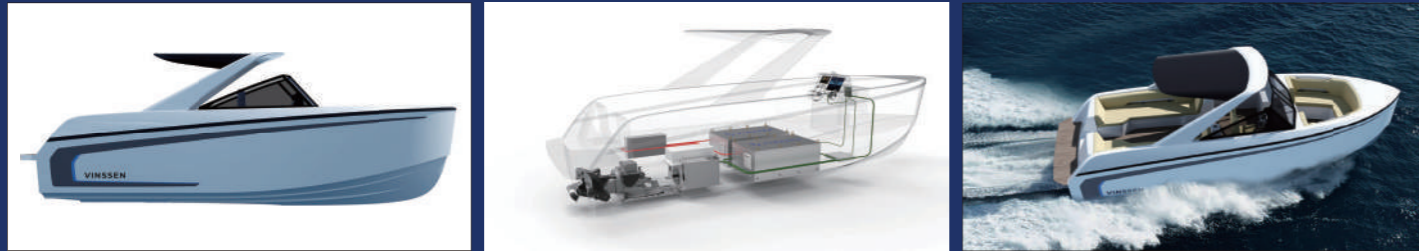


Type Approval(KR)  
'Lithium Ion Battery'

## Eco-Friendly Pleasure Craft

### 8.5M Leisure Boat

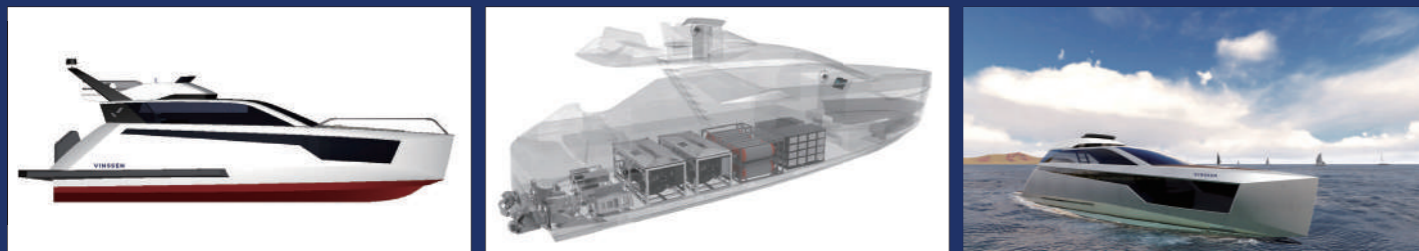
Electric Battery Propulsion



Hull		Electric Propulsion	
Length Overall	27.7ft (8.45m)	Type	Waterjet
Beam Overall	8.6ft (2.63m)	Speed	15.0knots
Depth	2.8ft (1.0m)	Battery	92kWh × 2
Draft	3.3ft (0.55m)	Propulsion Motor	150kW × 1
Max Person	6 Pax	Cooling	Water
Light Weight	11,023Lbs (5,000kg)	Hull Material	Aluminum

### 16M Leisure Boat

Hydrogen-Battery(Hybrid) Propulsion



Hull		Electric Propulsion	
Length Overall	59.0ft (18.0m)	Type	Waterjet
Beam Overall	14.1ft (4.3m)	Speed	15.0knots
Depth	6.2ft (1.9m)	Fuel-Cell	100kW × 2
Draft	2.3ft (0.7m)	Battery	92kWh × 2
Max Person	10 Pax	Propulsion Motor	175kW × 2
Light Weight	42,990Lbs (19,500kg)	Hull Material	Aluminum

## WORLD WIDE NETWORK SERVICE



### DOMESTIC

- HEAD OFFICE**  
 158, Daebuljugeo 1-ro, Samho-eup, Yeongam-gun, Jeollanam-do, Republic of Korea  
**T** +82 61-462-7004  
**F** +82 51-980-7004  
**E** business@vinssen.com
- Ulsan Branch**  
 #311, 37-19, Techno saneop-ro 55beon-gil, Nam-gu, Ulsan, Republic of Korea
- Gyeong-Nam Branch**  
 1350, Geojebuk-ro, Jangmok-myeon, Geoje-si, Gyeongsangnam-do, Republic of Korea
- Gyeong-Buk Branch**  
 7, Yeongilmansandannam-ro 37beon-gil, Heunghae-eup, Buk-gu, Pohang-si, Gyeongsangbuk-do, Republic of Korea
- Gangwon Branch**  
 #207, 27, Eonjang 1-gil, Samcheok-si, Gangwon-do, Republic of Korea



### OVERSEAS

- SINGAPORE OFFICE**  
 9 Straits View, Marina One West Tower, #05-07, Singapore  
**VINSEN INTERNATIONAL**  
**T** +82 70-4252-0194  
**F** +82 51-980-7004  
**E** business@vinssen.com
- Luxembourg Agency**  
 Avenue du Bois, L-1251 Luxembourg, Luxembourg  
**M** +352 621499593  
**F** +82 51-980-7004  
**E** ukychoi@vinssen.com
- Greece Agency**  
 4, Skouze Str., 185 36 Piraeus, Greece  
**INTRA MARE**  
**T** +30 210 4293843  
**F** +30 210 4293845  
**E** g.gerassimou@intramare.gr
- Russia Agency**  
 KORPROD, 190121, Russian Federation, St. Petersburg, st. Soyuz Pechatnikov, d.13-15, Lit.A, Room 1-N, office 2  
**T** +7 921 922 60 44  
**F** +82 51-980-7004  
**E** sinwoosik@mail.ru
- Malaysia Agency**  
 26th Floor, Menara Maxis, Kuala Lumpur City Center 50088 Kuala Lumpur, Malaysia  
**T** +603 2615 2755  
**F** +603 2615 2699  
**E** shahrir@vestera.com.my
- Indonesia Agency**  
 JAPFA Tower II Floor 12, Jl, Panglima Sudirman Kav, 66-68 Kota Surabaya - Jawa Timur 60271  
**T** +62 031 6001 8557  
**M** +62 813 9467 9955  
**E** iqbal.safitra@tbmmarine.com



Homepage



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Sales Manager

TEL +82-61-462-7004

FAX +82-51-980-7004

E-MAIL business@vinssen.com

HEAD OFFICE (58457) 158, Daebuljugeo 1-ro, Samho-eup, Yeongam-Gun, Jeollanam-do, Republic of Korea

SINGAPORE OFFICE (018937) 9 Straits view, Marina One West Tower, #05-07, Singapore

