

Headway has established more than **120** sales/after-sales service stations in **56** countries and regions around the world.



 海德威科技集团（青岛）有限公司
HEADWAY HEADWAY TECHNOLOGY GROUP CO., LTD

TEL: +86 532 8578 8888
FAX: +86 532 8310 7816
Email: info@headwaytech.com
<http://en.headwaytech.com>



OCEANGUARD®
METHANOL FUEL SUPPLY SYSTEM

HEADWAY TECHNOLOGY GROUP CO., LTD



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ABOUT HEADWAY

Headway is a high-tech enterprise with the purpose of scientific and technological innovation, dedicated into providing low carbon solutions and technical service world-wide. Headway owns independent R&D center and production base in Qingdao, China.

Headway established independent R&D centers and manufacturing facilities. The BWMS manufacturing facility has an annual production capacity of 1,000 sets. With branches in Shanghai, Singapore, Japan and Greece, 15 agencies in Guangzhou, Dalian, Zhoushan, and more than 120 service/technical support stations in 56 countries and regions, Headway built a comprehensive global service network.

Headway's product portfolio includes 3 segments: Carbon Neutralization, Water Treatment and Smart Shipping, which are all developed under the long adherent R&D ideology of "Be Innovative, Stay Excelsior".

Headway is willing to continue the cooperation with global partners based on mutual trust and benefit, to embrace the future of green shipping and sustainable development, pioneer in decarbonization strategy, zero-emission shipping and marine environmental protection.



BACKGROUND

-99% SO_x -80% NO_x

-95% PM -15% CO₂

The shipping industry is likely to be driven towards decarbonisation by the twin pressures of customer demand and regulation. Methanol has drawn much attention as a marine fuel due to its potential in GHG emission reduction, ease of handling, operational safety and engine compatibility.

Methanol burns with only water and carbon dioxide as by-products when combustion is complete. Methanol is an oxygen-rich fuel that combusts in an ICE (Internal Combustion Engine) emitting no sulphur oxides (SO_x), a negligible amount of particulate matter (PM) and nitrogen oxides (NO_x).



Methanol is a clean, water-soluble, biodegradable fluid and in contrast to other alternative fuels such as LNG, it offers the crucial advantage of being very easy to handle.

- Eelco Dekker,
Methanol Institute Chief Representative Europe



Fuel	Technical Readiness	Calorific Value	SFOC	Operational Fuel Emission Factor (g/kWh)					
		MJ/kg	g/kWh	CO ₂	CH ₄	N ₂ O	SO _x	NO _x	PM
LSHFO	9	40.5	179	541	0.01	0.027	3.23	15.8	0.72
MDO	9	42.6	170	524	0.01	0.026	0.32	14.8	0.16
LNG	9	48.6	150	412	3	0.016	0.003	1.17	0.027
LH2	3~4	120	57	0	0	0	0	0	0
Methanol	8~9	20	381	522	0	0	0	3.05	0
Ammonia	6	18.9	381	0	0	n/a	0	n/a	0

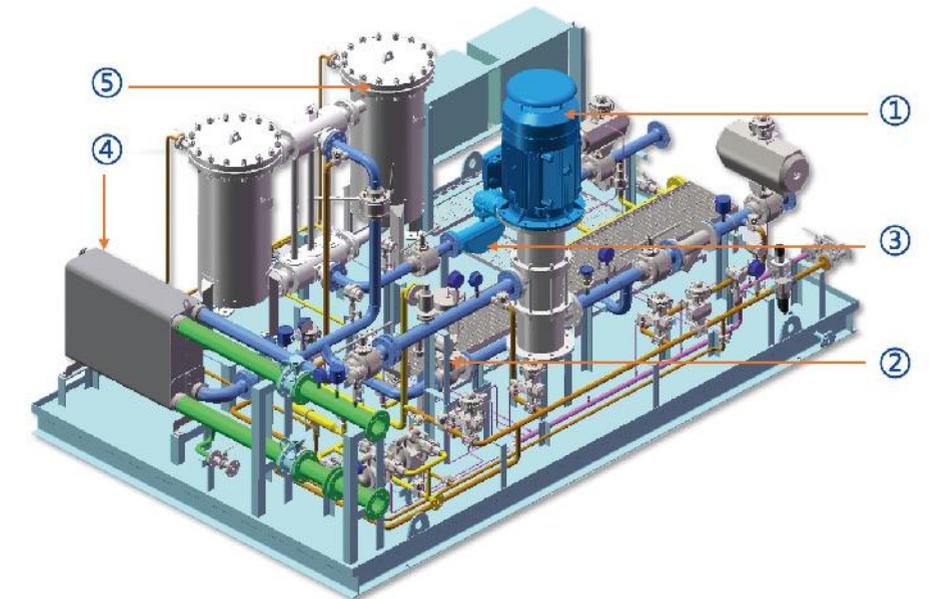
SOLUTIONS

INTRODUCTION

OceanGuard® Methanol Fuel Supply System adopts an optimized and upgraded single-pump supply scheme, featuring a flexible layout, space-saving design, easy maintenance and a low risk of failure.

The methanol fuel supply skid comprises the following components:

- ①: Methanol Pump ×1
- ②: Pressure Regulating Valve ×1
- ③: Mass Flow Meter ×1
- ④: Heat Exchanger ×1
- ⑤: Duplex Filter ×1



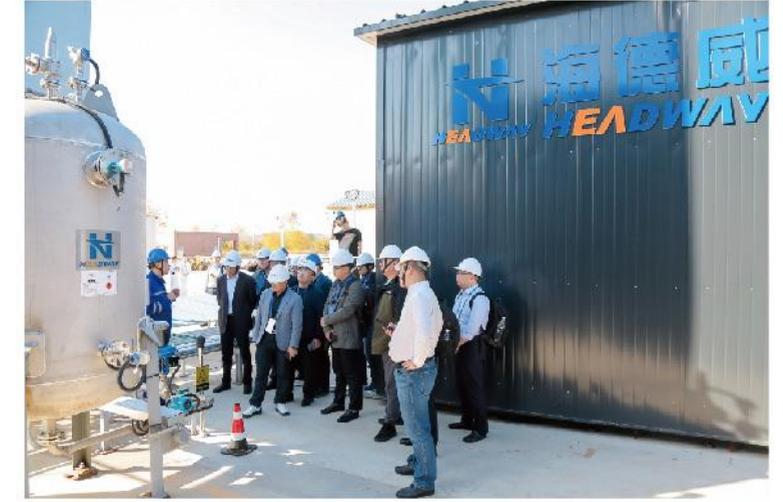
SPECIFICATION

Model	Flow Capacity	Dimension	Engine Capability	Note
OG-LFSS-LP-M5	4,000 kg/h	3,000*2,000*2,300	6S50ME-C9.6-LGIM	≤ 11,000 kW
OG-LFSS-LP-M10	7,500 kg/h	3,200*2,300*2,500	7S60/6G70ME-C9.6-LGIM	≤ 20,000 kW
OG-LFSS-LP-M20	13,000 kg/h	3,600*2,500*2,600	7G80ME-C10.5-LGIM	≤ 35,000 kW
OG-LFSS-LP-M35	25,000 kg/h	4,500*2,800*2,700	9G95ME-C10.5-LGIM	≤ 65,000 kW

TEST PLATFORM

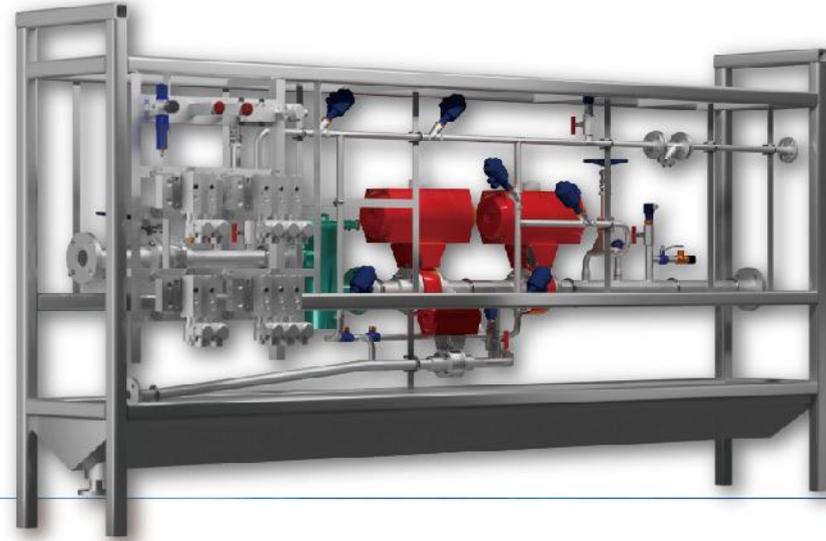


Headway established a dedicated Alternative Fuel Test Center with a USD 2.8 million investment. This facility supports key activities such as technological advancements, performance optimization, product testing, and personnel training for the application of alternative marine fuels like LNG, methanol, and ammonia. Headway has successfully completed LFSS testing for low-speed and medium-speed engines, accumulating over 1,600 hours of operation. The test data has been instrumental in optimizing the LFSS design.



COMPONENTS

FUEL VALVE TRAIN



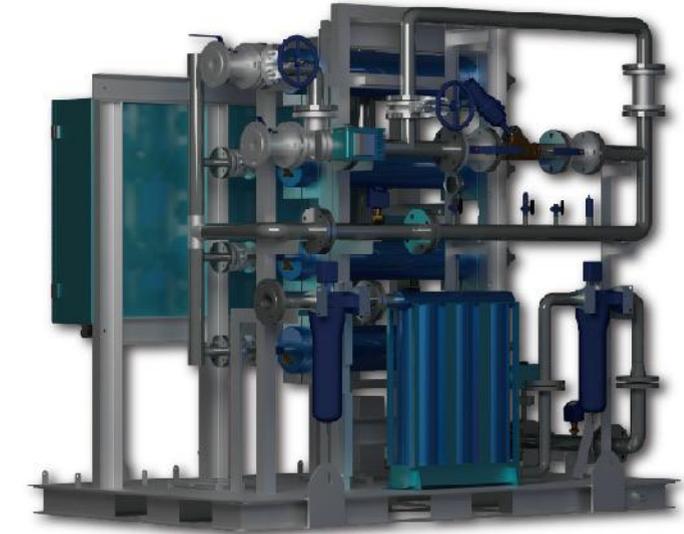
The Fuel Valve Train (FVT) is compatible with Dual Fuel Low-Speed Marine Engines.

The Headway FVT is capable of real-time communication with the main engine and quickly adjusts the valve to supply and cut off the fuel supply based on the working condition. With the advantages of compact design and easy maintenance, the FVT can be deployed according to the condition onboard while ensuring complete purge effects.

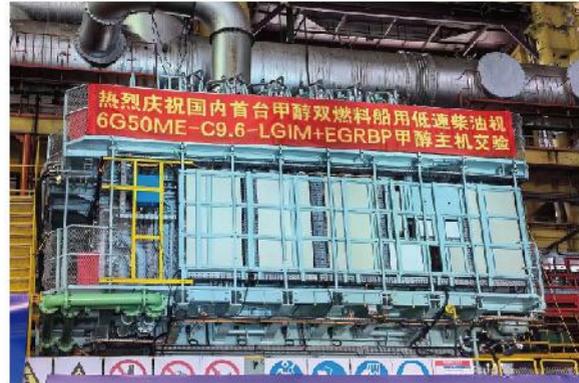
NITROGEN GENERATOR

The Nitrogen Generator can generate required volume of nitrogen at rated purity to be used in fuel supply pipelines. With the permeation process, water, oxygen and some of the argon exit through the membrane sides of the fibers. Only nitrogen will remain as product.

The Nitrogen Generator can meet the nitrogen requirement of most vessels with low power consumption, small size and high purity (no less than 99.5%).



REFERENCE



BENCH TEST PLATFORM FOR METHANOL DF LOW-SPEED ENGINE

General Information

LFSS Model: OG-LFSS-LP-M35-N

Location: Dalian, China

Customer: CSSC Engine Co.,Ltd. (CSE)

Engine: MAN 9G95ME-LGIM, MAN 7G80ME-LGIM,
MAN 7S60ME-LGIM, MAN 6G50ME-LGIM

Main Particulars

Methanol Containment Spec.:

180m³ Methanol Storage Tank ×1
2.5m³ Drainage Tank ×1
Methanol Drainage Pump ×2

40m³ Methanol Service Tank ×1
Methanol Transferring Pump ×2

Methanol Treatment Spec.:

Methanol Supply Pump ×2
Methanol Venting Tank ×1
Methanol Fuel Flowmeter ×1
Water Glycol Pump ×1
Water Expansion Tank ×1
Flammable Gas Detection System ×1
Fuel Feeding Single/Double Wall Pipe ×1

Methanol Circulation Pump ×2
Methanol Drainage Pump ×1
Methanol Fuel Duplex Filter ×1
Water Glycol Heating Exchanger ×2
Methanol Heating/Cooling Exchanger ×1
Liquid Leakage Detection System ×1

Nitrogen System Spec.:

10m³ Nitrogen Storage Tank ×1
5m³ Nitrogen Buffer Tank ×3

800NM³ Nitrogen Vaporizer ×2
Nitrogen Booster ×1

*Dalian Marine Diesel Engine Co., Ltd. (DMD) utilizes Headway's one-stop solution for its CSE test platform. This comprehensive system integrates a Methanol Fuel Supply Module, Bunkering and Containment Module, Auxiliary Heat Exchange System, Nitrogen Generator, and Safety & Control System. Notably, Headway independently researched, developed, and manufactured both the solution and its individual modules. This achievement marks the first commercially applied LFSS in China.

REFERENCE

10,000 DWT METHANOL DF BULK CARRIER



General Information

LFSS Model: OG-LFSS-LP-M1-N
Location: Hubei, China
Class: CCS
Customer: Guoneng Ocean Shipping Co., Ltd.
Engine: ZICHAI Z8180/SCM

Main Particulars

Methanol Containment and Bunkering Spec.:

76m³ Methanol Tank ×1
Methanol Bunkering Station ×1
1m³ Methanol Drainage Tank ×1

Methanol Treatment Spec.:

Methanol Supply Pump ×2
Methanol Mass Flow Meter ×1
Water Glycol Pump ×1
Water Glycol Expansion Tank ×2
Flammable Gas Detection System ×1
Methanol Drainage Pump ×2
Methanol Fuel Duplex Filter ×1
Water Glycol Heater ×1
Methanol Heat Exchanger ×1
Liquid Leakage Detection System ×1

Nitrogen Generator Spec.:

Nitrogen Bottle Batch ×1
Nitrogen Buffer Tank ×1

Other Equipment.:

Fuel Feeding Pipe(Single/Double Wall) ×1

*This pioneering project marks the world's first bulk carrier exceeding 10,000 DWT to utilize electric propulsion. Headway supplied a turnkey methanol fuel supply system for the vessel.

REFERENCE

BENCH TEST PLATFORM FOR METHANOL DF MEDIUM-SPEED ENGINE



General Information

LFSS Model: OG-LFSS-LP-M1

Location: Chongqing, China

Customer: Weichai Heavy Machinery Co., Ltd.

Engine: Medium-Speed Engine Manufactured by WeiChai Heavy Machinery

Main Particulars

Methanol Treatment Spec.:

Methanol Supply Pump ×2
Methanol Mass Flowmeter ×1
Liquid Leakage Detection System ×1
Methanol Heating/Cooling Exchanger ×1

Methanol Drainage Pump ×1
Methanol Fuel Duplex Filter ×1
Nitrogen Purging System ×1
Service Tank ×1

Water Glycol Heat Exchanger Spec.:

Water Glycol Pump ×2
Water Glycol Expansion Tank ×1

Water Glycol Heater ×1

*Headway tailored a methanol fuel supply system for WeiChai's medium-speed engine, specifically designed for R&D, testing, and commissioning of their methanol DF engine. The LFSS surpassed WeiChai's expectations in both functionality and flexibility, garnering positive customer feedback.

REFERENCE

7990T METHANOL DF BUNKERING VESSEL

General Information

LFSS Model: OG-LFSS-LP-M1
Location: Singapore
Class: RINA
Customer: Fratelli Cosulich Bunkers (S) Pte Ltd
Engine: MAN E&S 6L21/31DF-M



Main Particulars

Methanol Bunkering Spec.:

Methanol Bunkering Station ×1
Methanol Drainage Pump ×1

Methanol Transfer Pump ×2

Methanol Treatment Spec.:

Methanol Supply Pump ×2
Methanol Heating/Cooling Exchanger ×2
Water Glycol Heat Exchanger ×1
Liquid Leakage Detection System ×1

Methanol Fuel Duplex Filter ×1
Water Glycol Pump ×1
Water Glycol Expansion Tank ×1

Piping and Other Equipment:

Fuel Feeding Pipe(Double Wall) ×1

*The vessel is the first one in the world that leverages the MAN 21/31 GenSet as its main propulsion system. Headway provided a comprehensive one-stop solution for the vessel, encompassing core modules such as the Bunkering and Transfer System, Methanol Treatment System, Double Wall Pipeline Purging System, and Safety & Control System.