



Application

HHI-EMD provides complete LNG package solutions

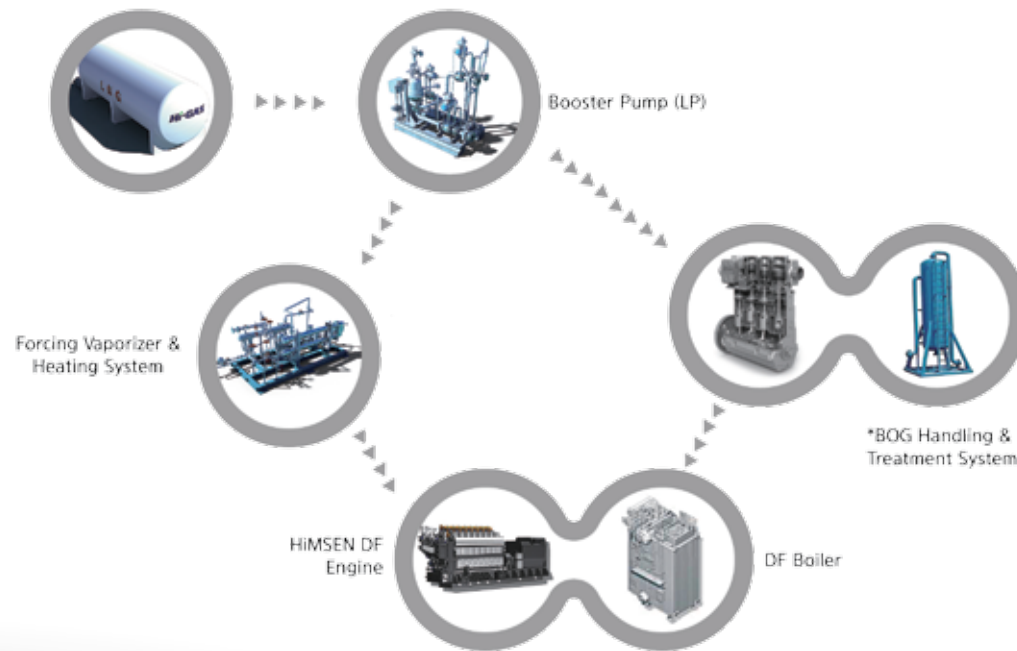


Benefits of Hi-GAS

Reliability	1. Verification of reliability through HAZID meeting with GL classification 2. Hi-GAS was verified and proven during ME-GI full scale test. 3. Hi-GAS is ready for ME-GI engines & HiMSEN DF Genset.
Proven Technology	1. ME-GI full scale test for 8S70ME-C8.2-GI in combination with Hi-GAS 2. AIP(Approval In Principle) from major classification societies through TAT
Design & Documents	1. Heat & mass calculation and dynamic simulation on Hi-GAS 2. Full automatic interface between Hi-GAS and DF engines (ME-GI / HiMSEN DF) 3. General guidance for operating ME-GI with Hi-GAS as an in-situ manual is available
Service & Engineering	1. Qualified & proven sub-suppliers for key components of Hi-GAS 2. Provided service and total engineering on Hi-GAS



www.hhi.co.kr
www.hyundai-engine.com



***Remark**
- BOG Handling & Treatment Systems are necessary for the Type B tank.
- X-DF and HiMSEN engine are required to handle the methane number.

HYUNDAI | **ENGINE & MACHINERY**
HEAVY INDUSTRIES

Contact Point
Engine Power Plant Dep't

1000, Bangeojinsunhwan-doro, Dong-gu, Ulsan, Korea
Tel : 82) 52-202-7302 / 7303
E-mail : k120hhi@hhi.co.kr
E-mail : k2f0a@hhi.co.kr

HHI-EMD
Korean-English 24/7 Call Center

+1-212-845-9803

Anytime, Anywhere, Any matters
Easy and convenient access!

(Korean-speaking agent is available
during Korean business hours)

Global Leader

www.hyundai-engine.com



TOTAL LNG POWER PLANT SOLUTION

copyright © 2015 Hyundai Heavy Industries



Hi-GAS Package solution LNG Fuel Gas Supply System

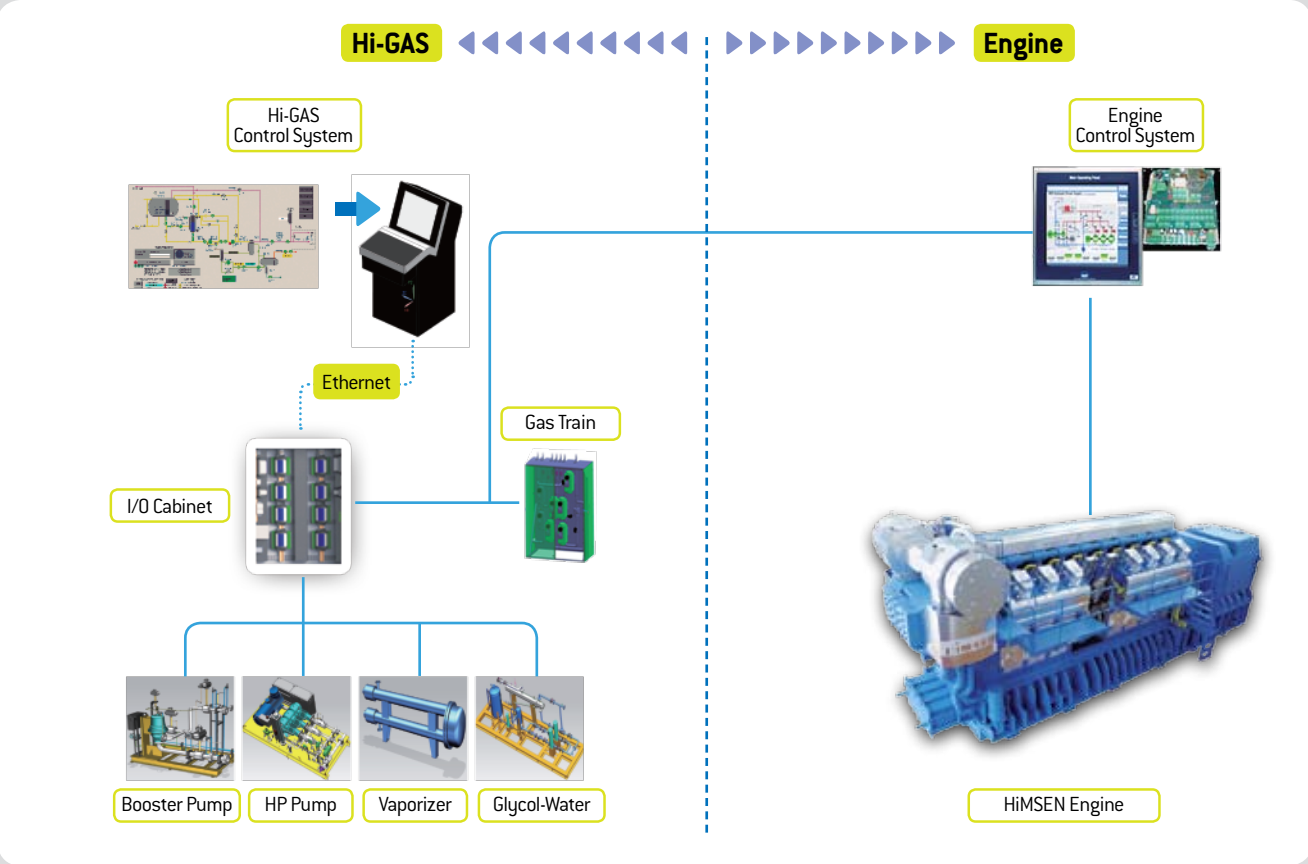
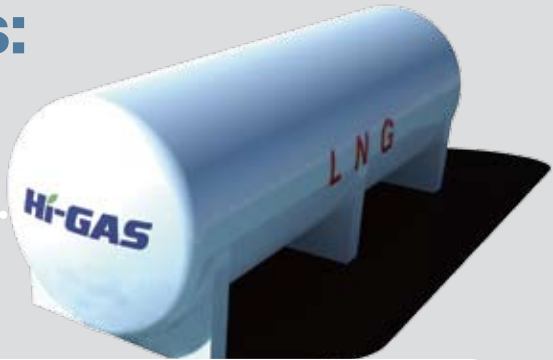
The LNG market is developing rapidly, and the demand for Total Gas Solution is increasing because LNG is a very attractive solution from an emission and economic point of view. The high efficiency of Gas engines and dual fuel engines has made the engine market the preferred prime mover choice for new projects. HHI-EMD has rich experience in manufacturing the 4-stroke Gas and dual fuel engine HiMSEN. The HiMSEN Genset can use both diesel and Gas on onshore power plant.

Hi-GAS is a remarkable design of the LNG fuel gas supply system for Gas and dual fuel engine engines based on low pressure supply. This means that Hi-GAS can effectively supply low pressure CNG to the 4-stroke Gas/DF GenSet.

The Hi-GAS system is composed of the following components:

LNG storage tank

The LNG storage tank is vacuum insulated with perlite to prevent heat ingress into the LNG storage tank. The capacity of the tank is determined by the operating profile of the ship in question.



FGSS Control system

The Hi-GAS Control System performs relevant monitoring and control functions to meet the demands of 4-stroke Gas/DF GenSet. The control and monitoring of the Hi-GAS is by a computerized control system which can be a stand-alone system interfaced with Intergrated Automation System (IAS). Alternatively, the control system can be a fully integral part of the IAS.



LNG suction drum (option)

A dedicated storage drum, the LNG Suction Drum is installed to filter out the vapor from the feeding LNG and to store LNG temporarily for protection of LNG pumps. This can be omitted if the NPSH for the booster pump is secured.

H35/40G & H35DF HiMSEN Family...

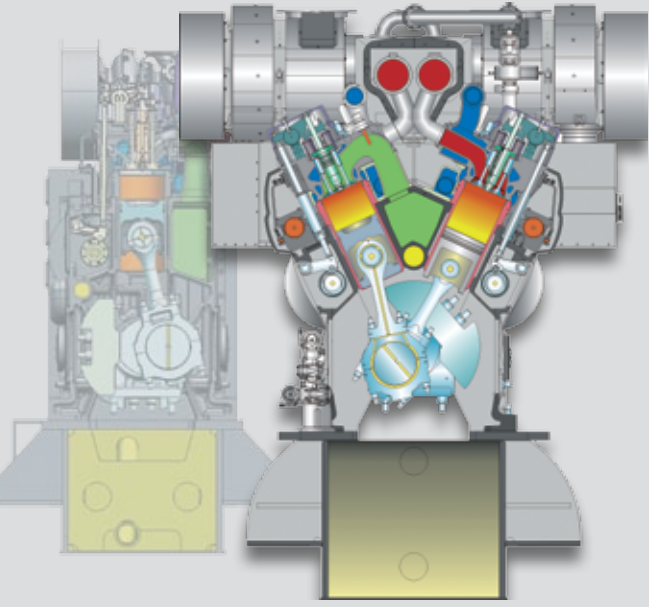
Design Philosophy

HiMSEN Family has simple and smart design which is suitable for marine & stationary power generation application with gas and diesel fuel with high reliability and performance. The key features are:

- Economical and Ecological Engine with higher efficiency and lower emission, etc., which is based on the following specific designs;
- Optimized turbocharging with enhanced Miller Cycle.
- Lowest NOx emission satisfied with Tier II (Diesel mode) and Tier III (Gas mode) without after-treatment device.

Reliable and Practical Engine

- Number of engine components is minimized for customer preference.
- Most of the components are directly accessible for easier maintenance.



No. of Cylinder In-line type 6, 7, 8, 9

No. of Cylinder V-type 12, 14, 16, 18, 20

Rated Speed 720 / 750 rpm

Power per Cylinder 480 kW

Cylinder Bore 350 mm

Piston Stroke 400 mm

Mean Piston Speed 9.6 / 10.0 m/s

Mean Effective Pressure 20.8 / 20.0 bar

Compression Ratio 13.5 : 1

H35/40G

Rated Power of Gen-Set at 100% Load

Engine Type	Rated Output (kW)			
	720 rpm / 60 Hz		750 rpm / 50 Hz	
	Engine	Generator	Engine	Generator
6H35/40G	2,880	2,779	2,779	2,779
7H35/40G	3,360	3,242	3,242	3,242
8H35/40G	3,840	3,706	3,706	3,706
9H35/40G	4,320	4,169	4,169	4,169
12H35/40GV	5,760	5,587	5,587	5,587
14H35/40GV	6,720	6,518	6,518	6,518
16H35/40GV	7,680	7,450	7,450	7,450
18H35/40GV	8,640	8,381	8,381	8,381
20H35/40GV	9,600	9,312	9,312	9,312

Remarks

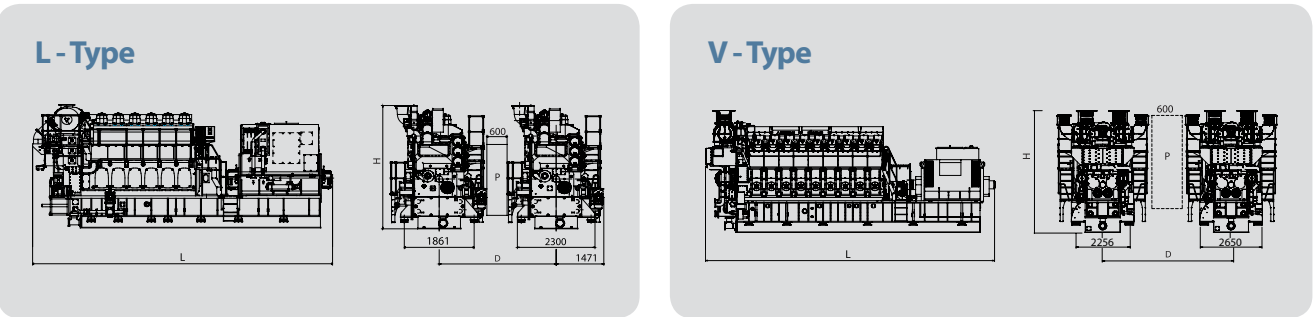
- The alternator outputs are calculated for an efficiency of 96.5% ~ 97%.

Specific Lubricating Oil Consumption: 0.4 g/kWh

(Tolerance: +25% depending on the operating conditions and 100% load)

Dimensions & Weights

Engine Type	Dimension (mm)		Dry Weight (ton)	
	L	H	Engine	Gen-Set
6H35/40G	8,890	3,959	33.7	68.6
7H35/40G	9,486	4,130	38.6	77.1
8H35/40G	10,196	4,130	41.5	82.0
9H35/40G	11,189	4,130	44.6	89.1
12H35/40GV	10,384	4,723	56.0	108.8
14H35/40GV	11,155	4,723	63.3	121.3
16H35/40GV	11,393	4,723	69.1	130.9
18H35/40GV	12,444	4,794	76.3	141.2
20H35/40GV	13,003	4,794	84.0	153.9



Remarks

- P: Free passage between the engines, width 600 mm and height 2,000 mm.
- Note) All dimensions and weight are approximate value and subject to change without prior notice.

H35DF

Rated Power of Gen-Set at 100% Load

Engine Type	Rated Output (kW)			
	720 rpm / 60 Hz		750 rpm / 50 Hz	
	Engine	Generator	Engine	Generator
6H35DF	2,880	2,779	2,880	2,779
7H35DF	3,360	3,242	3,360	3,242
8H35DF	3,840	3,706	3,840	3,706
9H35DF	4,320	4,169	4,320	4,169
12H35DFV	5,760	5,558	5,760	5,558
14H35DFV	6,720	6,485	6,720	6,485
16H35DFV	7,680	7,411	7,680	7,411
18H35DFV	8,640	8,338	8,640	8,338
20H35DFV	9,600	9,264	9,600	9,264

Remarks

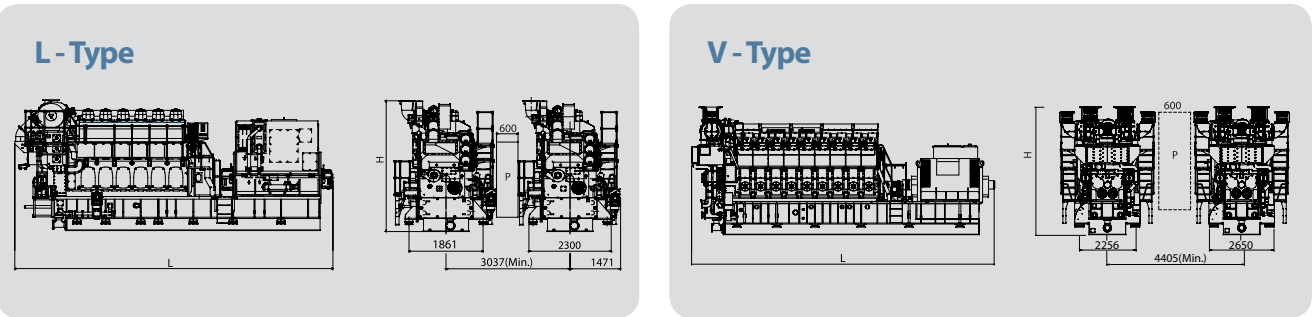
- The alternator outputs are calculated for an efficiency of 96.5%.

Specific Lubricating Oil Consumption: 0.4 g/kWh

(Tolerance: +25% depending on the operating conditions and 100% load)

Dimensions & Weights

Engine Type	Dimension (mm)		Dry Weight (ton)	
	L	H	Engine	Gen-Set
6H35DF	8,890	4,367	34.7	69.6
7H35DF	9,486	4,538	39.6	78.1
8H35DF	10,196	4,538	42.5	83.0
9H35DF	11,189	4,538	45.6	90.1
12H35DFV	10,384	4,723	58.0	110.8
14H35DFV	11,155	4,723	65.3	123.3
16H35DFV	11,393	4,723	71.1	132.9
18H35DFV	12,444	4,794	78.3	143.2
20H35DFV	13,003	4,794	86.0	155.9



Remarks

- P: Free passage between the engines, width 600 mm and height 2,000 mm.
- Note) All dimensions and weight are approximate value and subject to change without prior notice.