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HYUNDAI HiMSEN

HYUNDAI-HiMSEN PROPULSION SYSTEM PROGRAMME 2018

Hi-OPTIMIZED POWER SOLUTIONS
Hi-touch Marine & Stationary ENgine

HYUNDAI HEAVY INDUSTRIES | ENGINE & MACHINERY

HYUNDAI HEAVY INDUSTRIES | ENGINE & MACHINERY

HIMSEN

Introduction

As one of the leading engine builders in the world, the Engine & Machinery Division of Hyundai Heavy Industries Co., Ltd. (HHI-EMD) has enjoyed its reputation since its beginning in 1978. HHI-EMD has taken up 35 % of the world's market share in 2-stroke engines covering marine and stationary purposes.

This shows that the superior quality of HYUNDAI engines has been recognized by customers all over the world. HHI-EMD developed its own specially designed HiMSEN engine as part of ongoing efforts to provide the most practical and highest quality engines to its customers.

Key advantages of the HiMSEN engine include reliability, durability, long service intervals, easy maintenance, operational economy, and environmental friendliness.

Based on its leading position in engine production, HHI-EMD has become the optimized solution provider in the sector of engine power generation and will be the most suitable partner in the sector of 4-stroke propulsion system with HiMSEN engine as well.

HiMSEN Family

Design Philosophy
Hyundai's HiMSEN Family have simple and smart design suitable for marine applications with high reliability and performance.
The key features are:

Heavy Fuel Engine with same fuel of main engine (Uni-Fuel concept). Hence, the diesel fuel and heavy fuel oil of the viscosity of upto 700cSt at 50°C is acceptable. To comply IMO Tier III emission limits, using fuel oil and gas oil is also applicable. (DF engine)

Economical and Ecological Engine with low fuel consumption, NOx emission, and Smoke, etc. , which is based on the below specific designs;
- Optimized Supercharging with Miller Cycle
- High Fuel Injection Pressure

Reliable and Practical Engine with simple, smart and robust structure.
- Number of engine components are minimized with Pipe-Free design
- Most of the components are directly accessible for easier maintenance
- 'Individual Part' maintenance concept is provided
- Feed System is fully modularized with direct accessibility

Earth-Friendly Engine

Main Features

Performance characteristics
- High output in the similar range engines
- Low fuel oil consumption
- Quick acceleration & load response

Maintenance
- Easier maintenance by modularized design
- Minimal number and kind of components

Earth-friendly engine
- Low NOx emissions
- Compliance with IMO NOx Tier II, Tier III
- Low vibration & noise

Jack-up Platform/Drilling Rig

FPSO

Drill ship

Major Application

Marine
- Propulsion system
- Generating sets

Offshore
- Drill ship
- FPSO

Stationary
- Power plants
- Packaged power stations
- Gas engine power plants
- Pre-fabricated power plants
- Barge-mounted diesel power plants
- Emergency diesel generator (EDG) for nuclear power plants

Emergency GenSets for Nuclear Power Plant

Power Plant

Car Ferry & Passenger Vessel

Container ship

HYUNDAI HiMSEN

HiMSEN ENGINE

Introduction

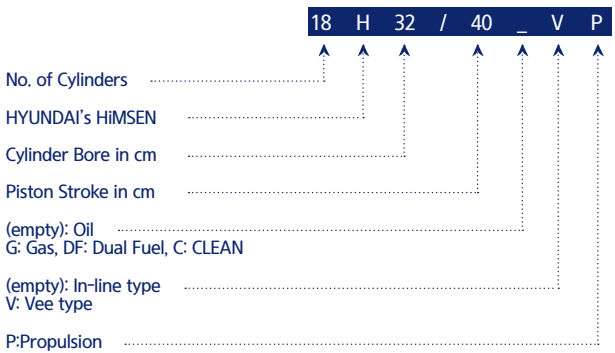
General

This programme provides necessary information and recommendations for the application of HYUNDAI's HiMSEN engines.

'HiMSEN'® is the registered brand name of HYUNDAI's own design engine and the abbreviation of 'Hi-touch Marine & Stationary ENgine'.

Please note that all data and information prepared in this programme are for guidance only and subject to change without notice. Therefore, please contact Hyundai Heavy Industries Co., Ltd. before actual applications of the data. Hyundai Heavy Industries Co., Ltd. will always provide the data for the installation of specific project.

Engine Model Designation



Engine Operation

Reference Condition

General definition of diesel engine rating is specified in accordance with ISO 3046/1:2002, ISO 15550:2002.
However the engine outputs are available within tropical conditions without derating.

Tropical Conditions

- Turbocharger air inlet pressure: 1,000 mbar
- Turbocharger air inlet temperature: 318 K (45 °C)
- Charge air coolant temperature: 309 K (36 °C)*

* Valid for central cooling system up to 36°C normally, 38°C specially.

Specific Fuel Oil Consumption (SFOC) & Heat Rate

The stated consumption figures refer to the following ISO reference conditions:

- Turbocharger air inlet pressure: 1,000 mbar
- Turbocharger air inlet temperature: 298 K (25 °C)
- Charge air coolant temperature: 298 K (25 °C)
- Lower calorific value of fuel 42,700 kJ/kg
- Without engine driven pumps
- Tolerance +5 %
- At 100 % load

Specific Lube Oil Consumption (SLOC)

The stated consumption is given with a tolerance of +25 %
depending on the operating conditions.

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HiMSEN ENGINE

Engine Operation

Information for Fuel oil control by EU Directive 2005-33-EC and California Code of Regulations

All HiMSEN engines are suitable and developed for continuous operation on HFO as well as MDO/MGO. There is no lower limit for the sulfur content of fuel oil. In connection to the low viscosity of MGO, (Marine Gas Oil, DMA as defined in ISO 8217) the viscosity at engine inlet should be kept within the value of 2 ~ 14 cSt in order to avoid possible wear or sticking of fuel injection pump due to low lubricity and in order to maintain the suitable hydrodynamic film between fuel injection pump plunger and barrel.

- Recommended stable viscosity at engine inlet: Min. 3 cSt
- Recommended minimum viscosity at engine inlet: Min. 2 cSt

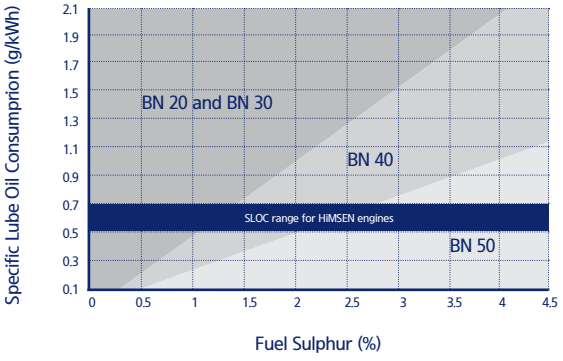
So, a proper cooling device (D.O cooler or chiller etc.) is to be considered, if needed, to keep the above mentioned viscosity (2 ~ 14 cSt) at engine inlet.

When the MGO is to be used only for temporary engine operation (e.g. in port), higher BN lube oil used for residual fuel (HFO) should not present any problems in case of short periods of running.
When engine is not operated continuously with low sulfur fuel such as MGO, lube oil should be chosen according to the highest sulfur contents of the fuel with normal operation.

Guideline for Lube Oil

Base Number (BN) must be carefully selected depending on fuel grade and sulfur contents.
Following are guidance values for initial filling.

Typical recommended BN depending on the fuel sulfur contents and SLOC (g/kWh)



Reference: CIMAC recommendation number 29/2008 'Guidelines for the lubrication of medium speed diesel engine'

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HiMSEN ENGINE

Engine Operation

IMO NOx EMISSION AND HiMSEN ENGINES

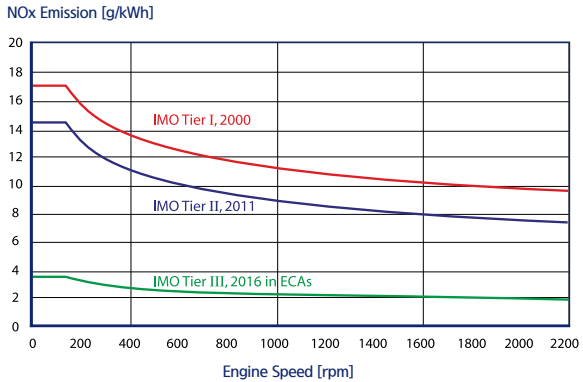
Annex VI of the MARPOL 73/78 convention entered into force 12 May 2005. All HiMSEN engines included in this booklet comply with the NOx Limits specified in the IMO regulation.

The exhaust emission regulations in Annex VI were referred to as IMO Tier I, MARPOL Annex VI regulations were amended at the MEPC (Marine Environment Protection Committee) in October 2008. These specify further NOx emission limits to be known as IMO Tier II and Tier III.

IMO Tier II regulations were entered into force on 1 January 2011 based on keel laying, according to a speed dependent function, with reduction of about 20 % in comparison with IMO Tier I (refer to chart).

Under IMO Tier III, the NOx emission limits for marine engines will become effective on 1 January 2016 based on keel laying, according to a speed dependent function, with reduction of 80 % in comparison with IMO Tier I when the ship is operated in a designated Emission Control Areas (so called ECAs).

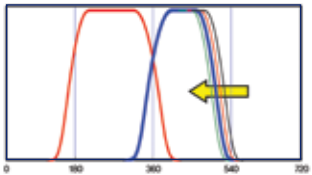
All types of HiMSEN engine are complied with the new upcoming NOx emission regulations, and do its best to satisfy further request if any from customers.



HYUNDAI ENVIRONMENTAL TECHNOLOGIES against IMO Tier II, Tier III

HYUNDAI is introducing technologies to meet IMO Tier II, Tier III regulation with internal engine measures only such as:

- Miller valve timing requiring increased charger air pressure by applying the high pressure ratio turbocharger
- Optimised combustion by applying the combustion control technologies with optimising the piston bowl shape and the fuel injection valve nozzle etc.

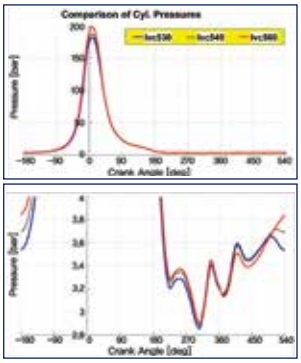


Various Intake Valve Closing Timing for 1-D Cycle Simulation

Miller valve timing

This technology is very useful to reduce the NOx emission by optimising the intake valve's closing timing especially, result in changing the effective compression and expansion ratio.

In order to apply this technology, the high pressure ratio turbocharger is required to increase the charge air pressure and new developed T/C with high pressure ratio is mounted on HiMSEN engine.



Combustion pressure depending on IVC timing from 1-D Cycle Simulation

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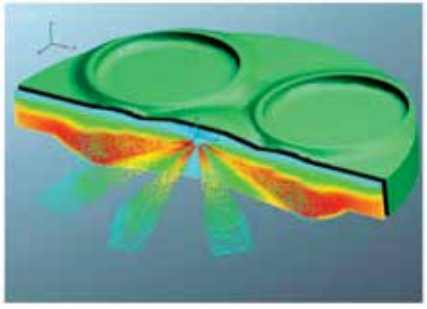
HiMSEN ENGINE

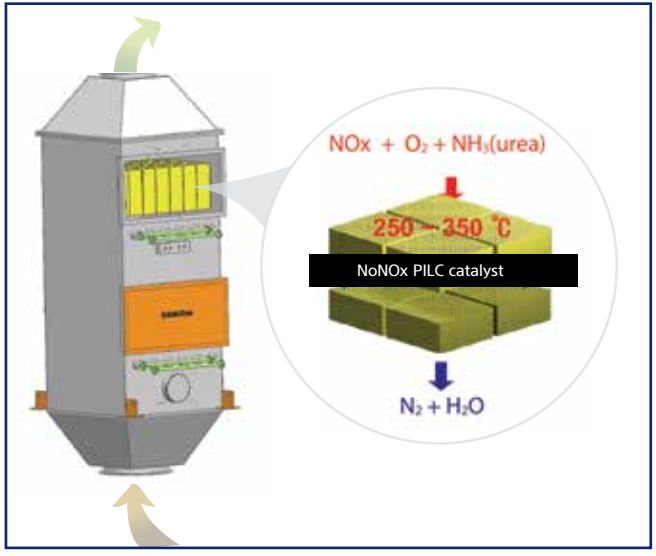
Engine Operation

Optimized combustion

The NOx emission can be reduced by the combustion control technologies with the optimum combination of the piston bowl shape and the fuel injection valve nozzle etc.
The piston bowl shape and the fule injection valve nozzle's specification are optimized to meet the IMO Tier II, Tier III regulation, which are evaluated by 3-D combustion analysis and verified by the measurement at HiMSEN Techno Center.



3-D Combustion Analysis



HYUNDAI ENVIRONMENTAL TECHNOLOGIES against IMO Tier III

As one of solutions, NoNOx™ SCR (Selective Catalytic Reduction) system

HYUNDAI can offer NoNOx™ SCR technology that can reduce NOx emissions by 95 %, designed for Tier III limits. HYUNDAI is optimizing the whole installation, performance and engine in order to achieve low cost of production and give benefits to the customers.

HYUNDAI HiMSEN

HiMSEN...

The best solution for all types of marine vessels and offshore applications with proven reliability, low emission, low operation cost, multi-fuel capability...Our extensive R&D facilities enable HHI to provide the customers with high quality and excellent services in all phases of designing, production, as sembly and commissioning of HiMSEN propulsion packaged system.

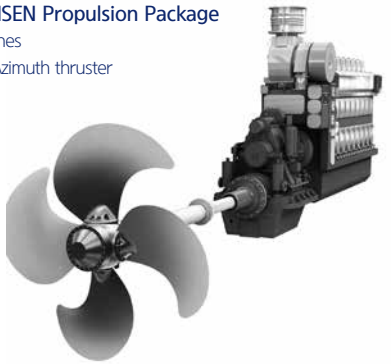
Marine Propulsion System

Long Term Commitment...

To provide the market with reliable, cost effective and earth-friendly solution

Optimized Matching of HiMSEN Propulsion Package

- HiMSEN Diesel or Dual fuel engines
- C.P/F.P Propeller with shafting, Azimuth thruster
- Pitch and speed control
- Load control
- Reduction gear
- Shaft generator
- Auxiliary machinery



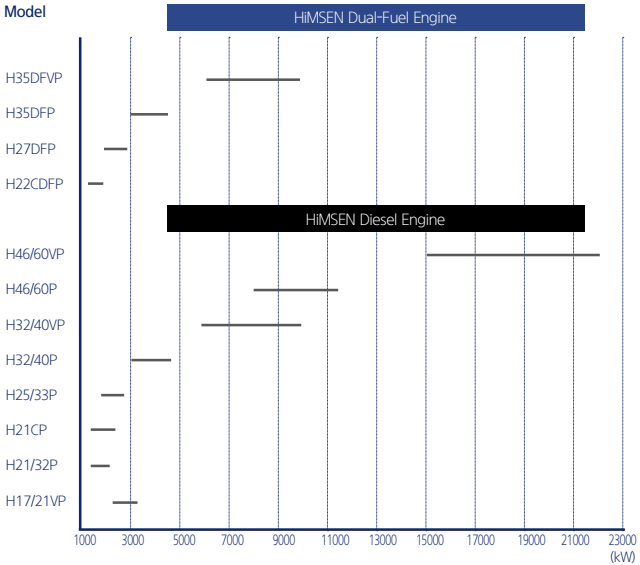
Application

- Controllable pitch propulsion
- Fixed pitch propulsion
- Azimuth thruster propulsion
- Pump drive

Excellent Performance of HiMSEN Propulsion Engine

- Improved transient operation with pulse charging turbocharger
- Invisible smoke
- Lower thermal load engine
- Low fuel consumption
- Low NOx emission

Power range for HiMSEN Propulsion engines



Power Range

H22CDFP	1,100~1,980kW
H27DFP	1,860~2,790kW
H35DFP	3,000~4,500kW
H35DFVP	6,000~10,000kW

H17/21VP	1,920~3,200kW
H21/32P	1,200~1,800kW
H21CP	1,200~2,160kW
H25/33P	1,740~2,610kW
H32/40P	3,000~4,500kW
H32/40VP	6,000~10,000kW
H46/60P	7,500~11,250kW
H46/60VP	15,000~22,500kW

HYUNDAI HiMSEN

HiMSEN Dual Fuel Engines for Propulsion

Model			H22CDFP	H27DFP	H35DFP	H35DFVP
Bore		mm	220	270	350	350
Stroke		mm	330	330	400	400
Speed		r/min.	1,000	1,000	750	750
Cylinder output		kW/cyl.	220	310	500	500
Rated output #)		cyl.	kW			
		5	1,100			
		6	1,320	1,860	3,000	
		7	1,540	2,170	3,500	
		8	1,760	2,480	4,000	
		9	1,980	2,790	4,500	
		12				6,000
		14				7,000
		16				8,000
		18				9,000
		20				10,000
SFOC *) on Diesel mode	at 100% MCR	g/kWh	192.0	186.0	185.0	185.0
	at 85% MCR		196.0	185.0	184.0	184.0
Heat rate *) on Gas mode	at 100% MCR	kJ/kWh	8,079	7,728	7,270	7,270

*) Note :
1) Reference condition based on ISO 3046/1
2) Fuel oil based on LCV(Lower Calorific Value) 42,700kJ/kg
3) Gas operation : Including pilot fuel oil and fuel gas based on LHV(Lower Heating Value) 35MJ/Nm³, MN80
4) Tolerance +5% and without engine driven pumps
5) NOx Emission limitation : IMO Tier II on Diesel mode, IMO Tier III on Gas mode

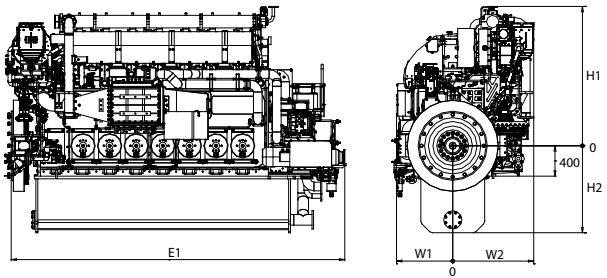
#) Based on the CPP Constant speed operation
(For FPP : Please contact HHI EMD)

Marine Propulsion System

Tier II, Tier III

H22CDFP I Bore: 220 mm, Stroke: 330 mm

Controllable Pitch Propeller
Permit high skew angles to minimize noise and vibration.



Dimensions

1000 rpm	cyl.	Rated Output at Engine (kW)	Engine dimension (mm) & dry weight (ton)					
			E1	H1	H2	W1	W2	Dry Weight
	5	1,100	3,680	1,825	1,145	737	1,015	16.0
	6	1,320	4,030	1,825	1,145	737	1,060	18.0
	7	1,540	4,380	1,825	1,145	737	1,060	20.0
	8	1,760	4,730	1,825	1,145	737	1,150	22.0
	9	1,980	5,080	1,825	1,145	737	1,150	24.0

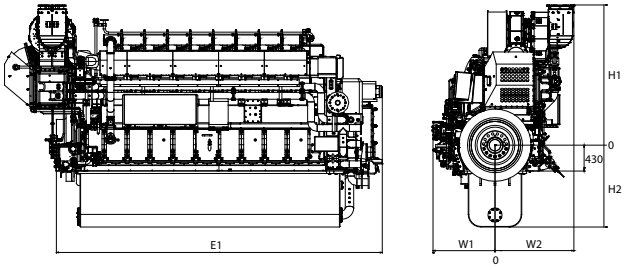
E1 : Dimension between eng. flywheel to eng. free end.
In case of dry sump, the weight and height will be reduced.

Marine Propulsion System

Tier II, Tier III

H27DFP I Bore: 270 mm, Stroke: 330 mm

Controllable Pitch Propeller
Permit high skew angles to minimize noise and vibration.



Dimensions

1000 rpm	cyl.	Rated Output at Engine (kW)	Engine dimension (mm) & dry weight (ton)					
			E1	H1	H2	W1	W2	Dry Weight
	6	1,860	4,060	2,199	1,360	1,030	1,214	24.2
	7	2,170	4,440	2,199	1,360	1,030	1,214	26.5
	8	2,480	4,820	2,199	1,360	1,030	1,214	28.1
	9	2,790	5,200	2,329	1,360	1,030	1,214	30.2

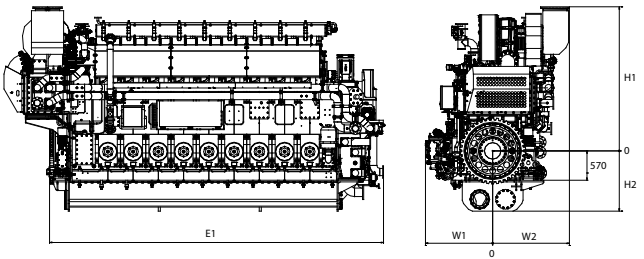
E1 : Dimension between eng. flywheel to eng. free end.
In case of dry sump, the weight and height will be reduced.

Marine Propulsion System

Tier II, Tier III

H35DFP I Bore: 350 mm, Stroke: 400 mm

Controllable Pitch Propeller
Permit high skew angles to minimize noise and vibration.



Dimensions

750 rpm	cyl.	Rated Output at Engine (kW)	Engine dimension (mm) & dry weight (ton)					
			E1	H1	H2	W1	W2	Dry Weight
	6	3,000	5,007	2,381	1,170	1,304	1,373	36.7
	7	3,500	5,497	2,473	1,170	1,304	1,430	41.6
	8	4,000	6,009	2,799	1,170	1,304	1,490	44.5
	9	4,500	6,477	2,799	1,170	1,304	1,490	47.6

E1 : Dimension between eng. flywheel to eng. free end.

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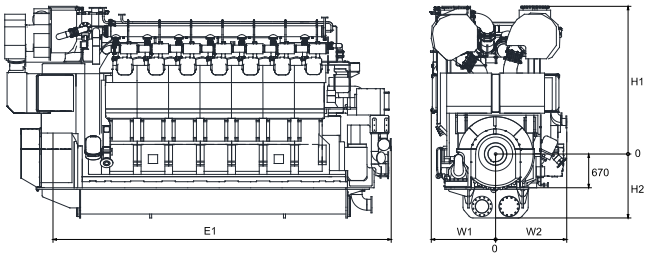
Marine Propulsion System

Tier II, Tier III

H35DFVP I Bore: 350 mm, Stroke: 400 mm

Controllable Pitch Propeller
Permit high skew angles to minimize noise and vibration.



Dimensions

750 rpm	cyl.	Rated Output at Engine (kW)	Engine dimension (mm) & dry weight (ton)					
			E1	H1	H2	W1	W2	Dry Weight
	12	6,000	6,092	2,933	1,192	1,277	1,412	60.0
	14	7,000	6,717	2,933	1,192	1,277	1,412	67.3
	16	8,000	7,342	2,933	1,192	1,277	1,412	73.1
	18	9,000	7,967	2,933	1,192	1,277	1,412	80.3
	20	10,000	8,592	2,933	1,192	1,277	1,412	88.0

E1 : Dimension between eng. flywheel to eng. free end.

HiMSEN Diesel Engines for Propulsion

Model			H21/32P	H21CP	H25/33P	H32/40P	H46/60P
Bore		mm	210	210	250	320	460
Stroke		mm	320	330	330	400	600
Speed		r/min.	900	900	900	750	600
Cylinder output		kW/cyl.	200	240	290	500	1,250
Rated output #)		cyl.	kW				
		5		1,200			
		6	1,200	1,440	1,740 / 1,800	3,000	7,500
		7	1,400	1,680	2,030	3,500	8,750
		8	1,600	1,920	2,320	4,000	10,000
		9	1,800	2,160	2,610	4,500	11,250
SFOC *)	at 100% MCR	g/kWh	183.0	183.0	181.0	184.0	177.0
	at 85% MCR		183.0	179.0	181.0	181.0	174.0

Model			H17/21VP	H32/40VP	H46/60VP
Bore		mm	170	320	460
Stroke		mm	210	400	600
Speed		r/min.	1,800	750	600
Cylinder output		kW/cyl.	160	500	1,250
Rated output #)		cyl.		kW	
		12	1,920	6,000	15,000
		14		7,000	
		16	2,560	8,000	20,000
		18	2,880	9,000	22,500
		20	3,200	10,000	
SFOC *)	at 100% MCR	g/kWh	199.0	186.0	177.0
	at 85% MCR		196.0	181.0	174.0

*) Note :
1) Reference condition based on ISO 3046/1
2) Fuel oil based on LCV(Lower Calorific Value) 42,700kJ/kg
3) Tolerance +5% and without engine driven pumps
4) NOx Emission limitation : IMO Tier II
5) H17/21VP Model:Only applicable on MGO operation

#) Based on the CPP Constant speed operation (For FPP : Please contact HHI EMD)

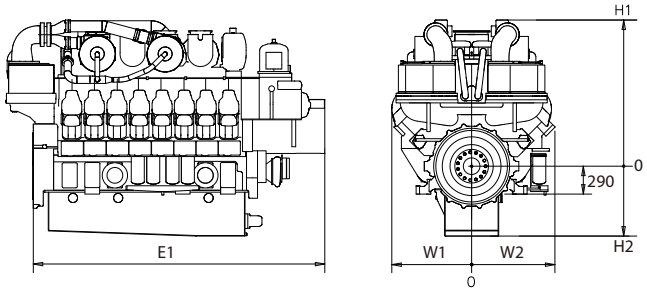
Marine Propulsion System

Tier II, Tier III (with SCR)

H17/21VP I Bore: 170 mm, Stroke: 210 mm

Controllable Pitch Propeller
Permit high skew angles to minimize noise and vibration.

Fixed Pitch Propeller
Guarantee optimum thrust, minimal noise and vibration level.



Dimensions

1800 rpm	cyl.	Rated Output at Engine (kW)	Engine dimension (mm) & dry weight (ton)					
			E1	H1	H2	W1	W2	Dry Weight
	12	1,920	2,559	1,373	726	830	865	8.7
	16	2,560	3,029	1,373	726	830	865	10.5
	18	2,880	3,264	1,373	726	830	865	11.4
	20	3,200	3,499	1,373	726	830	865	12.2

E1 : Dimension between eng. flywheel to eng. free end.

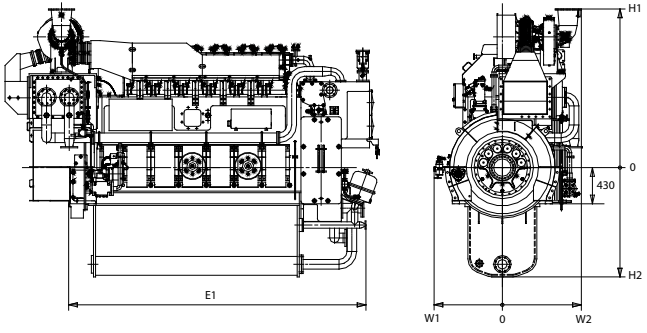
Marine Propulsion System

Tier II, Tier III (with SCR)

H21/32P I Bore: 210 mm, Stroke: 320 mm

Controllable Pitch Propeller
Permit high skew angles to minimize noise and vibration.

Fixed Pitch Propeller
Guarantee optimum thrust, minimal noise and vibration level.



Dimensions

900 rpm	cyl.	Rated Output at Engine (kW)	Engine dimension (mm) & dry weight (ton)					
			E1	H1	H2	W1	W2	Dry Weight
	6	1,200	3,535	1,885	1,300	812	939	18.0
	7	1,400	3,865	1,885	1,300	812	939	20.0
	8	1,600	4,195	2,059	1,355	812	1,005	21.0
	9	1,800	4,525	2,059	1,355	812	1,005	23.0

E1 : Dimension between eng. flywheel to eng. free end.
In case of dry sump, the weight and height will be reduced.

HYUNDAI HiMSEN

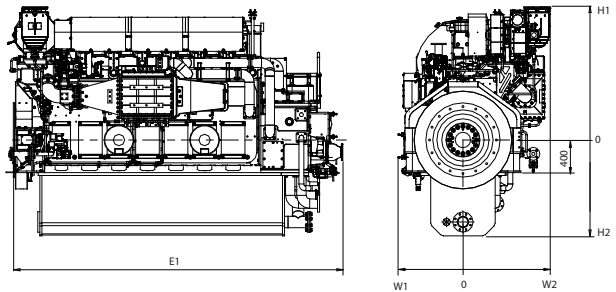
Marine Propulsion System

Tier II, Tier III (with SCR)

H21CP I Bore: 210 mm, Stroke: 330 mm

Controllable Pitch Propeller
Permit high skew angles to minimize noise and vibration.

Fixed Pitch Propeller
Guarantee optimum thrust, minimal noise and vibration level.



Dimensions

900 rpm	cyl.	Rated Output at Engine (kW)	Engine dimension (mm) & dry weight (ton)					
			E1	H1	H2	W1	W2	Dry Weight
	5	1,200	3,688	1,620	1,175	798	1,065	15.0
	6	1,440	4,038	1,620	1,175	798	1,065	17.0
	7	1,680	4,388	1,620	1,175	798	1,065	19.0
	8	1,920	4,738	1,620	1,175	798	1,065	20.0
	9	2,160	5,088	1,620	1,175	798	1,065	22.0

E1 : Dimension between eng. flywheel to eng. free end.
In case of dry sump, the weight and height will be reduced.

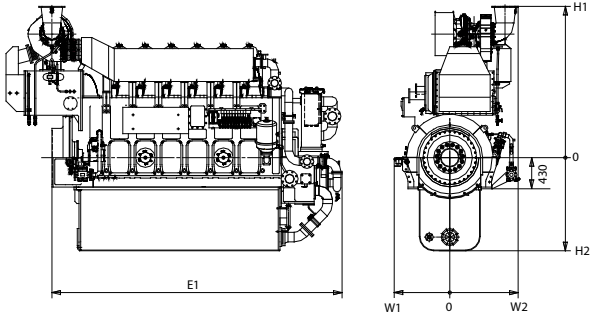
Marine Propulsion System

Tier II, Tier III (with SCR)

H25/33P I Bore: 250 mm, Stroke: 330 mm

Controllable Pitch Propeller
Permit high skew angles to minimize noise and vibration.

Fixed Pitch Propeller
Guarantee optimum thrust, minimal noise and vibration level.



Dimensions

900 rpm	cyl.	Rated Output at Engine (kW)	Engine dimension (mm) & dry weight (ton)					
			E1	H1	H2	W1	W2	Dry Weight
	6	1,740	4,238	2,209	1,360	812	998	23.0
	7	2,030	4,618	2,209	1,360	812	998	25.0
	8	2,320	4,998	2,331	1,360	812	1,068	26.9
	9	2,610	5,378	2,331	1,360	812	1,068	29.3

E1 : Dimension between eng. flywheel to eng. free end.
In case of dry sump, the weight and height will be reduced.

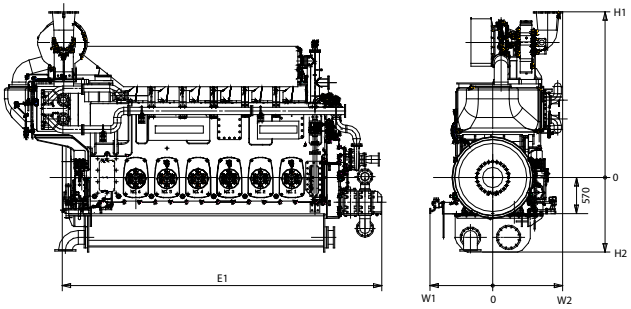
Marine Propulsion System

Tier II, Tier III (with SCR)

H32/40P I Bore: 320 mm, Stroke: 400 mm

Controllable Pitch Propeller
Permit high skew angles to minimize noise and vibration.

Fixed Pitch Propeller
Guarantee optimum thrust, minimal noise and vibration level.



Dimensions

750 rpm	cyl.	Rated Output at Engine (kW)	Engine dimension (mm) & dry weight (ton)					
			E1	H1	H2	W1	W2	Dry Weight
	6	3,000	5,021	2,602	1,170	986	1,100	35.7
	7	3,500	5,511	2,602	1,170	986	1,100	39.6
	8	4,000	6,079	2,734	1,170	986	1,100	43.5
	9	4,500	6,569	2,734	1,170	986	1,100	46.6

E1 : Dimension between eng. flywheel to eng. free end.

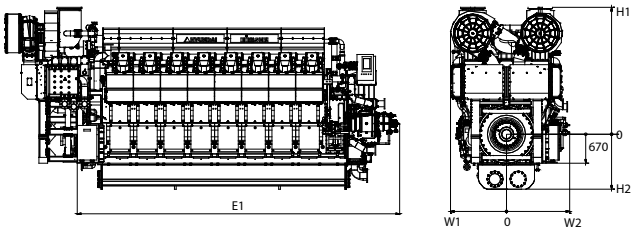
Marine Propulsion System

Tier II, Tier III (with SCR)

H32/40VP I Bore: 320 mm, Stroke: 400 mm

Controllable Pitch Propeller
Permit high skew angles to minimize noise and vibration.

Fixed Pitch Propeller
Guarantee optimum thrust, minimal noise and vibration level.



Dimensions

750 rpm	cyl.	Rated Output at Engine (kW)	Engine dimension (mm) & dry weight (ton)					
			E1	H1	H2	W1	W2	Dry Weight
	12	6,000	6,208	2,749	1,270	1,294	1,462	58.0
	14	7,000	6,833	2,933	1,270	1,294	1,462	65.3
	16	8,000	7,458	2,933	1,270	1,294	1,462	71.1
	18	9,000	8,083	2,933	1,270	1,294	1,462	78.3
	20	10,000	8,708	2,933	1,270	1,294	1,462	86.0

E1 : Dimension between eng. flywheel to eng. free end.

HYUNDAI HiMSEN

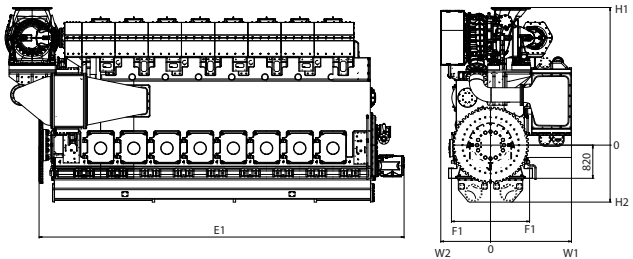
Marine Propulsion System

Tier II, Tier III (with SCR)

H46/60P I Bore: 460 mm, Stroke: 600 mm

Controllable Pitch Propeller
Permit high skew angles to minimize noise and vibration.

Fixed Pitch Propeller
Guarantee optimum thrust, minimal noise and vibration level.



Dimensions

600 rpm	cyl.	Rated Output at Engine (kW)	Engine dimension (mm) & dry weight (ton)						
			E1	H1	H2	F1	W1	W2	Dry Weight
	6	7,500	7,376	3,300	1,408	965	1,999	1,228	111
	7	8,750	8,196	3,400	1,408	965	1,999	1,228	126
	8	10,000	9,016	3,400	1,408	965	1,999	1,228	140
	9	11,250	9,836	3,400	1,408	965	1,999	1,228	154

E1 : Dimension between eng. flywheel to eng. free end.

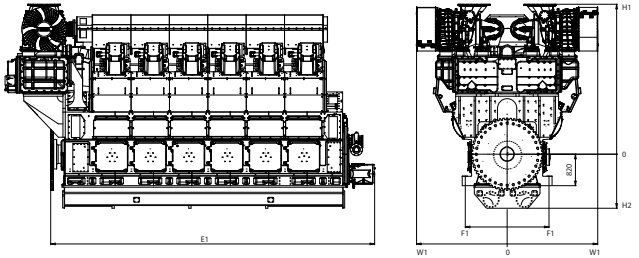
Marine Propulsion System

Tier II, Tier III (with SCR)

H46/60VP I Bore: 460 mm, Stroke: 600 mm

Controllable Pitch Propeller
Permit high skew angles to minimize noise and vibration.

Fixed Pitch Propeller
Guarantee optimum thrust, minimal noise and vibration level.



Dimensions

600 rpm	cyl.	Rated Output at Engine (kW)	Engine dimension (mm) & dry weight (ton)					
			E1	H1	H2	F1	W1	Dry Weight
	12	15,000	8,436	3,906	1,408	1,100	2,359	196
	16	20,000	10,436	4,006	1,408	1,100	2,668	244
	18	22,500	11,436	4,006	1,408	1,100	2,668	268

E1 : Dimension between eng. flywheel to eng. free end.

HYUNDAI HiMSEN

Quality Management

Approval Status of Quality Management System

Product or Service Ranges		Certifying Agency
Design and Manufacture of Two & Four-Stroke Marine and Stationary Diesel & Gas Engine and Engine Power with Components (Turbochargers, Blocks, Crankshafts, Cylinder Liners, Propellers, Forged Steel and Shafting etc.), Marine and Industrial Equipment, BWTS, SCR, Hydraulic Machinery (Pumps, Valves, Compressors, Steam & Gas Turbines, etc.), Industrial Machinery (Conveyors, Presses etc.)		DNV · GL • ISO 9001:2008 KS Q ISO 9001:2009 • ISO 14001:2004 KS I ISO 14:001:2009 • OHSAS 18001:2007
Nuclear Diesel Generator (Class 1E), Pump (Class 2, 3)		KEPIC-MN/EN
Forging Shop	Works Approval	ABS, BV, CCS, DNV · GL, KR, LR, NK, RINA
Casting Shop		ABS, BV, CCS, DNV · GL, KR, LR, RINA
Propeller		ABS, BV, CCS, DNV · GL, KR, LR, NK, RINA, RS
Crankshaft		ABS, BV, CCS, DNV · GL, KR, LR, NK, RINA
The Classification Approval of Quality Assurance System		DNV · GL-MSA, KR-QAS, LR-QAM

HYUNDAI GLOBAL SERVICE

Engine Hi-service system setup

Our target is to provide quickest and most precious technical support and parts supply towards the customers.
We do utmost to minimize the trouble and inconvenience from the ship owners which might be occurred due to the damage caused by the accident.

Easy Access to Engine CS Department

Regardless of the guarantee period whether it is over or not, HHI will make it a rule to support the clients with immediate service in the order of the receipt by e-mail or through homepage. But, considering its seriousness of the damage or the schedule of the vessel, the provision timing of our technical support including repair may be adjusted.

Genuine Spare Parts Purchase Guide

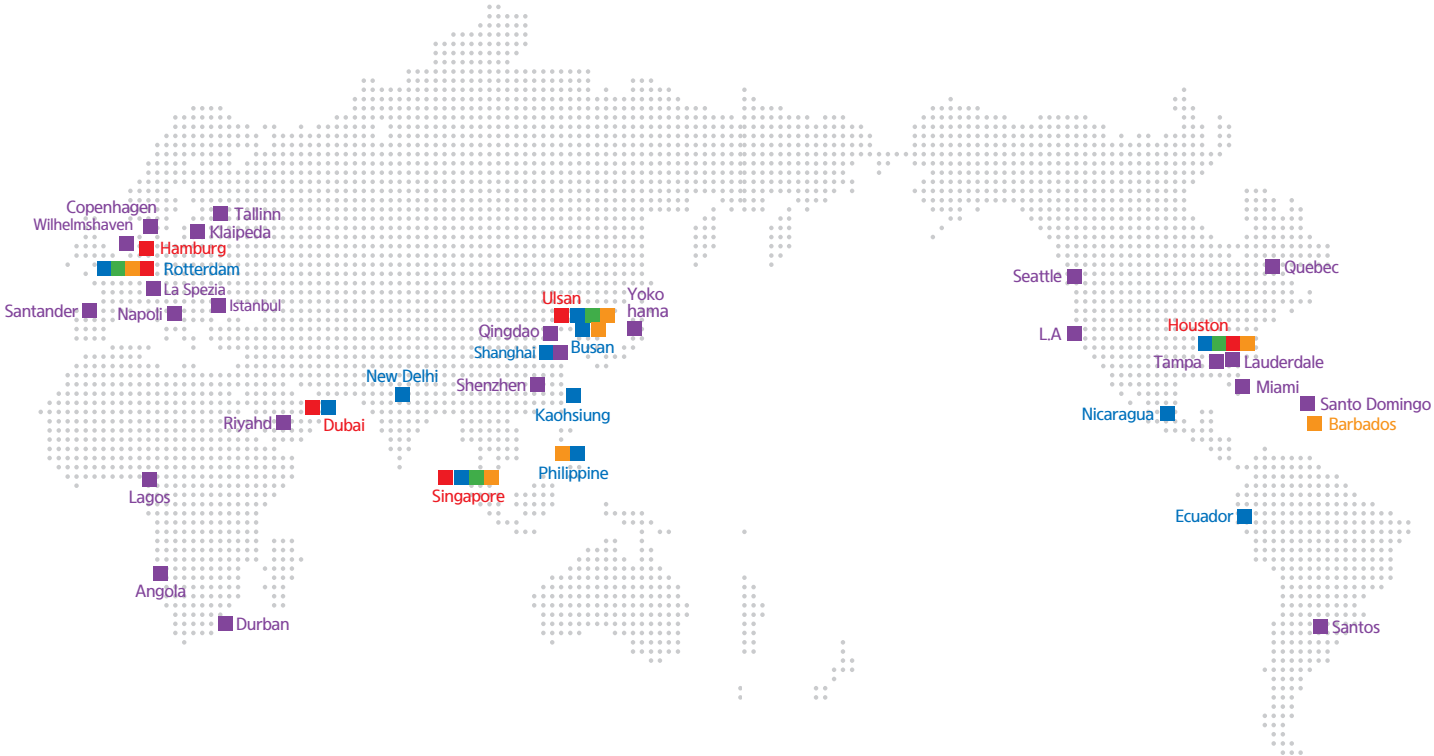
HHI's authorized sales agents will supply the clients with the original genuine spare parts at the competitive condition in aspect of price, delivery time and quality etc. Please do not hesitate to contact our sales agent with the inquiry or questionnaire.

Technical Support

After the guarantee period is expired or in case that the free support is limited even during the guarantee period due to special reason, we also provide the technical support including supervision, reconditioning, conversion, retrofit of alpha cylinder lubricator and technical consultancy etc.

Global Service Network

HHI is very proud of its well organized global service network which is efficiently and systematically designed to meet every requirement of the clients. HHI's direct service centers are established at Rotterdam, Singapore, Dubai, Hamburg and Houston in U.S.A.



World Wide HYUNDAI

- HHI-EMD Direct Service Center
- Authorized Repairer
- Cooperative Repairer
- Spare Parts Depot
- Parts Sales Agent

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MEMO

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