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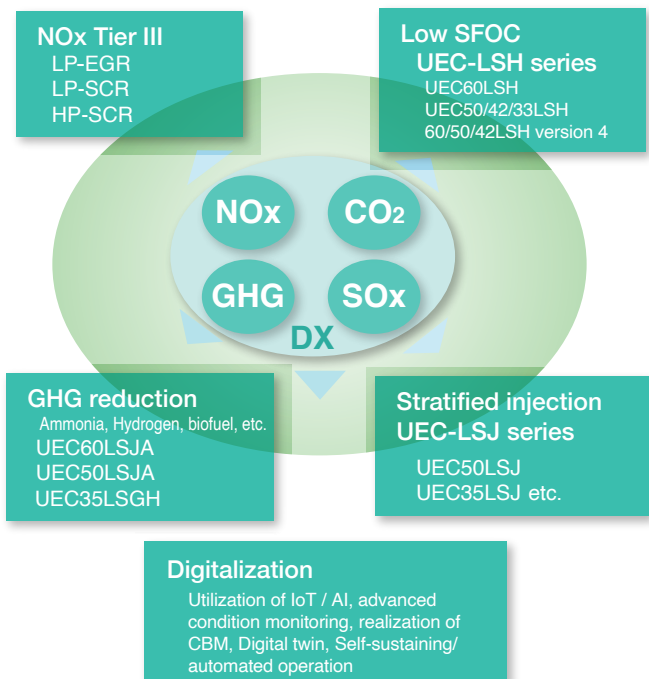


GHG Emission Reduction	3-6
MGO mono-fuel engines	7-8
Tier III technologies EGR/SCR	9-12
Digital Solution	13-18
<b>UE Engines</b>	19-86
LSJ Series	29-34
LSH Series	35-48
LSE Series	49-82
LSII Series	83-86
MHI-MME Product <b>MET Turbochargers</b>	87-92
<b>Worldwide Service Network</b>	93-94
Contacts of JAPAN ENGINE CORPORATION	95-96
After-Sales Services	97
Licensees	98
Authorized Repair Agents (ARA)	99-110

## To achieve carbon neutrality

IMO adopted the IMO GHG reduction strategy in 2018, setting GHG emission reduction targets of "50% emissions reduction by 2050". The Japanese Ministry of Land, Infrastructure, Transport and Tourism indicated a policy of "proposing to IMO to aim for carbon neutrality in international shipping by 2050" in 2021. Strategy review work began in 2021, and in July 2023 at MEPC80, the "2023 IMO GHG reduction strategy" was adopted, which includes newly enhanced GHG reduction targets, including "zero GHG emissions by around 2050". In this new GHG reduction strategy, new targets have been agreed regarding the percentage of use of zero-emission fuels, etc., and reduction targets have been set for achieving zero GHG emissions around 2050.

We have provided a variety of solutions to respond to the NOx, SOx, and CO2 emission regulations that have been phased-in. In addition, we are working on the development of next-generation fuel engines to address the requirement for significant reductions in GHG emissions in the future.

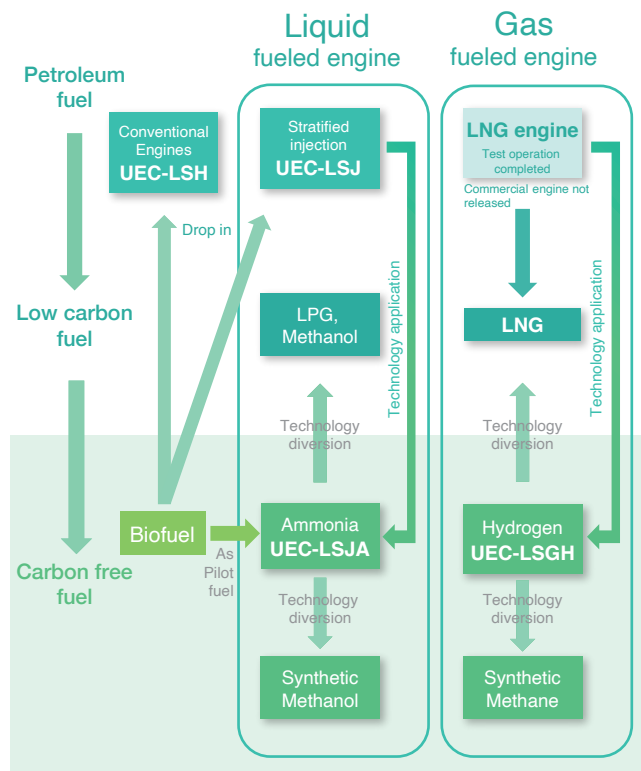


Technology strategy for UE Engine (Overview)

## Next-generation fuel engines

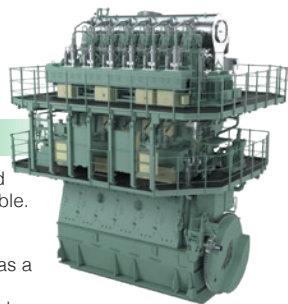
To achieve carbon neutrality by 2050, it is necessary to start replacing old vessels with the vessels that can significantly reduce GHGs from the late 2020s. Although, alternative fuels such as LNG, LPG, and methanol are expected to serve as bridge solutions, the GHG reduction rate is only about 20%. We believe that the use of decarbonized fuels is indispensable, and we are working on the development of ammonia fuel and hydrogen fuel engines.

The core technologies of these next-generation fuel engines can be applied to a wide variety of liquid and gas fuels, including methanol, and have broad deployment potential for the future.



Carbon neutral strategy for UE engine

## Ammonia fueled engine

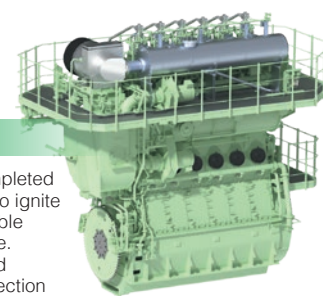


### UEC-LSJA

UEC50LSJA is scheduled to be completed in FY2025. Ammonia fuel is hardly flammable. It is a technical challenge to achieve efficient combustion and to minimize the generation of nitrous oxide (N<sub>2</sub>O), which has a high global warming potential.

Ammonia fueled engines use our proprietary "Stratified injection technology" to solve these problems by optimizing combustion control. It is possible to change a co-combustion rate of ammonia in accordance with the future progress of ammonia infrastructure development and trends in environmental regulations, thereby contributing to avoiding loss of ship's competitiveness and ship obsolescence.

## Hydrogen fueled engine



### UEC-LSGH

UEC35LSGH is scheduled to be completed in FY2026. Hydrogen fuels are easy to ignite and burn very quickly. Therefore, stable control of their combustion is an issue. We are developing a hydrogen fueled engine that uses a "high-pressure injection system" that directly injects hydrogen when the combustion chamber reaches high temperature and high pressure. Furthermore, we are aiming for the practical application of hydrogen firing engines with even higher environmental performance using electric ignition systems.

### Issues and Measures for Hydrogen fueled engine

Issues	Measures
The combustion speed is very fast and the minimum ignition energy is small.	Establishment of stable combustion control technology is necessary.
Have a wide flammable range of air-hydrogen ratio	Safety measures such as double wall piping and purging are to be applied.
Concern about hydrogen embrittlement, which reduces mechanical properties by entering metallic materials.	Selection of appropriate materials with hydrogen embrittlement resistance
Easy to leak because of small molecular weight	Establishment of gas sealing technology
International standards are not yet in place	Japan leads in the creation of international standards

### Various Verification Activities

The bench test of the hydrogen injection unit has started. Through this test, it will be confirmed that each valve meets the required operating performance and is durable.



Hydrogen injection test bench



Hydrogen injection unit

The development of ammonia and hydrogen fueled engines is part of the Green Innovation Fund project of the New Energy and Industrial Technology Development Organization (NEDO).

### Issues and Measures for Ammonia fueled engine

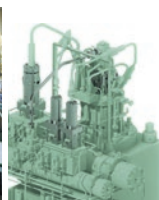
Issues	Measures
Hardly flammable. The combustion speed is low at 1/5 of methane, and the minimum self-ignition temperature is high at 651°C.	Proprietary stratified injection technology controls optimal combustion
Possibility of generating greenhouse gas N <sub>2</sub> O	Stratified injection technology minimizes N <sub>2</sub> O generation (emission)
Possibility of generating Fuel NO <sub>x</sub>	Exhaust gas after-treatment equipment (SCR) applied
Toxicity	Applying safety measures such as double wall piping, purging, separation and recovery equipment, etc.
Corrosive	Selection of appropriate materials with corrosion resistance

### Various Verification Activities

The operation of ammonia fueled single-cylinder test engine has started and various verifications are also underway.



Ammonia fueled test engine



Ammonia fuel tank

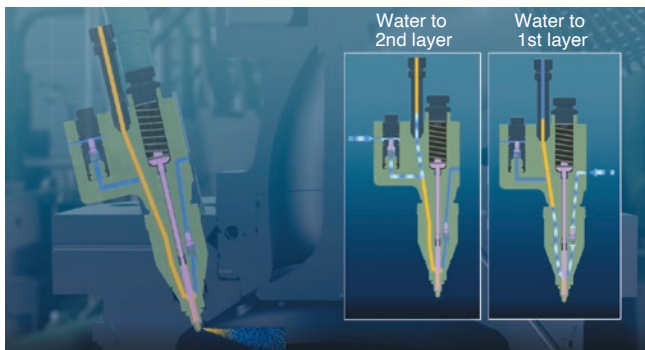
## Pursuit of environmental performance

**UEC-LSJ series** combines our original “complete combustion technology” and “Stratified water injection technology” based on the LSH series, and is an engine that uses only by MGO or MDO as fuel.



5UEC50LSJ-EGR overview

**Stratified water injection** is a technology that injects fuel and water in layers from a single fuel valve. After fuel injection, water is loaded into the fuel injection line from the water injection pump before the next fuel injection. By combining complete fuel-efficient tuning with Stratified water injection technology that can effectively reduce NOx, NOx emissions are reduced and fuel consumption is greatly reduced.



Fuel injection valve for stratified water injection

## Stratified water injection unit on 6UEC35LSJ



Fuel injection pump (left)  
Water injection pump (right)



Fuel injection valves  
(Stratified injection)

## Benefits for all shipping stakeholders

**Stratified water injection + MGO/MDO mono-fuel** can lead various benefits to all shipping stakeholders. In addition to the advantage of excellent fuel efficiency, there is no need to heat the fuel, which eliminates the need for heating systems and piping, eliminating the need for crew work related to conventional heavy fuel oil. In addition, since it is a high-quality fuel, it can reduce engine trouble and wear.

### For shipping company

- Excellent fuel-efficient (Both sailing and anchored)
- Reduce Non-operation risk
- CSR improvement

### For ship owner

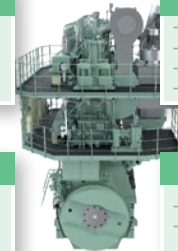
- Improved engine reliability
- Reduce non-operation risk
- Maintenance cost reduction
- Reduce marine pollution risk

### For crew

- Easy operation (No fuel change over)
- Less maintenance work → Burden reduction

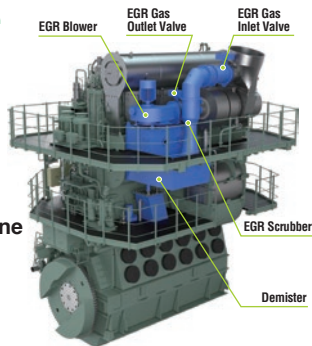
### For shipyard

- No SOx scrubber
- Simplified engine room (mono-fuel, no-heating)



# Low Pressure EGR System

Low Pressure EGR gas line is located off the Turbocharger. EGR Unit is installed on the engine as shown in the right figure.



## Features

### ■ Simple System

- Low pressure and low temperature require less equipment & pipes, allowing for a simple structure.

### ■ Simple Operation

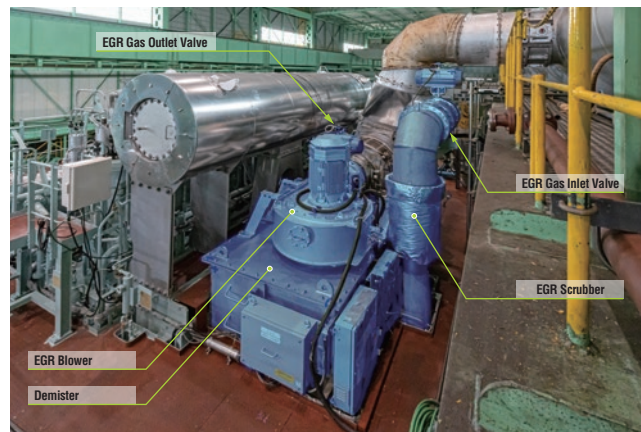
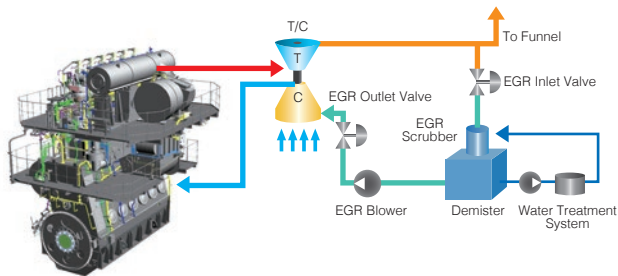
- Operation is executed by an on/off control of the EGR valves.

### ■ Low CAPEX, Low OPEX

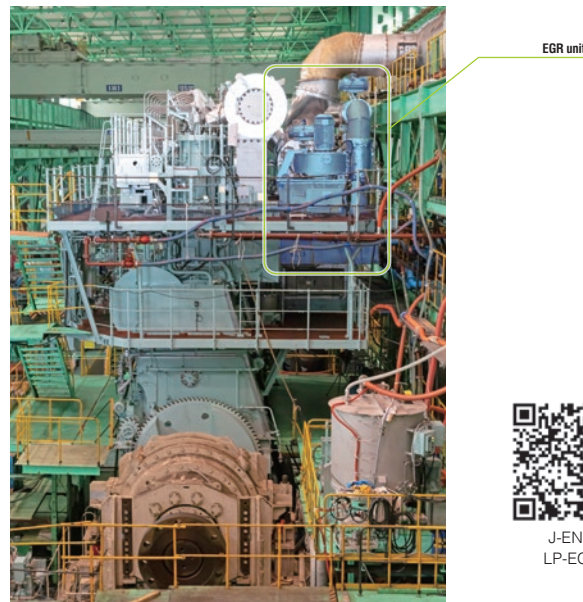
- Low capital expenditure required to produce this simple system.
- The EGR blower's low electric power consumption, coupled with no requirement for additional boiling for steam allows for low operating costs.

### ■ Applicable to a Variety of Engines

- Low Pressure EGR System fits well with any low speed marine engine.



First integrated EGR unit on 6UEC50LSH-Eco-C2-EGR



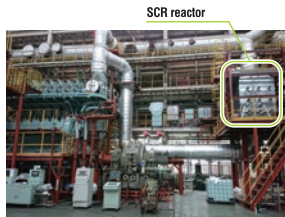
J-ENG  
LP-EGR

6UEC50LSH-Eco-C2-EGR overview

# SCR System

UEC small bore-size engines have applied the LP-SCR system as standard Tier III solution. Other size engines (over 40 cm bore-size) have applied LP-EGR or HP-SCR system.

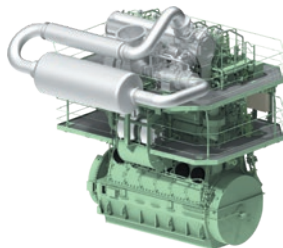
The specific engines, which can apply the HP-SCR system, shows on the table of next page.



Overview of 6UEC33LSE-C2-SCR in work shop

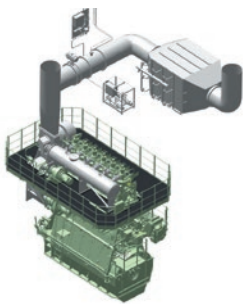
### ■HP-SCR system:

The components of the HP-SCR system are installed before turbocharger(s) on high pressure exhaust side. A part of the HP-SCR system is integrated in engine configuration and the HP-SCR system works with engine control. The reactor for HP-SCR is designed to be more compact than that of LP-SCR, due to the higher density of the exhaust gas.



### ■LP-SCR system:

The components of the LP-SCR system are installed after turbocharger(s) on low pressure exhaust side. The LP-SCR system separates from engine configuration and control. Therefore, the arrangement and control of the LP-SCR system is simple.



### ■Applied Tier III technologies to UEC Engine

Tier III solution is due to the engine type, as shown in the below table. For medium or large bore-size engines, the EGR system is available. In addition, the HP-SCR are available for specified engines in medium or large bore-size engines.

The LP-SCR system is recommended for small bore size engines and mechanically controlled engines (camshaft driven).

If you would like to apply the solution which is not applicable to the engines in the below table, J-ENG will consider applying it. Please contact J-ENG and/or licensees.

Engine type	Applied Tier III technology		
	EGR	HP-SCR	LP-SCR
UEC50LSJ	✓	✓	
UEC42LSJ	✓	✓	
UEC35LSJ			✓
UEC60LSH-Eco-C4	✓	✓	
UEC50LSH-Eco-C3/C4	✓	✓	on request
UEC50LSH-Eco-C2	✓		✓
UEC42LSH-Eco	✓	✓	on request
UEC33LSH			✓
UEC80LSE-Eco	on request	✓	
UEC60LSE-Eco	✓	✓	
UEC50LSE-Eco	on request	✓	
UEC45LSE-Eco-B2/C1	✓	✓	
UEC45LSE-Eco-1			✓
UEC45LSE			✓
UEC35LSE-Eco		on request	✓
UEC35LSE			✓
UEC33LSE			✓
UEC33LSII-Eco		on request	✓
UEC33LSII			✓

### ■Technical documentation

"Technical Data" for Tier III application is available on our web site.

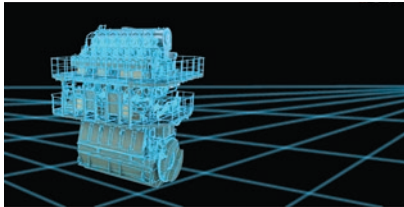
<https://www2.j-eng.co.jp/web/site/tech/TechnicalDataTierIII/>



Technical Data

## Utilizing the digital data and creating new value

J-ENG have applied the various computerized system to UE engine for supporting the customers, so far. J-ENG is continuing to develop the new system not only collecting, monitoring and analyzing the engine data, but creating the new valuable and real-time information for the customer, which may contribute to the preventive maintenance and further optimized operation.



**Phase 1**

**CONNECT**  
Measure and store the operating data

**Phase 2**

**VISUALIZE**  
Accumulate and visualize the operating data

**Phase 3**

**ANALYZE**  
Predict the condition and prescribe the next action

**Phase 4**

**CREATE**  
Further optimize the operating condition  
New valuable information

Eco Engine waveform monitoring system



Bearing temperature monitoring system



Bearing wear monitoring system



Cylinder pressure control and monitoring system



Main engine diagnostic system



Upcoming: CBM system



Upcoming: New system, using digital twin technology

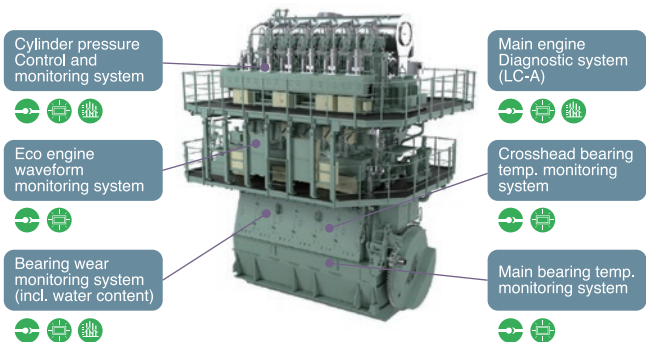
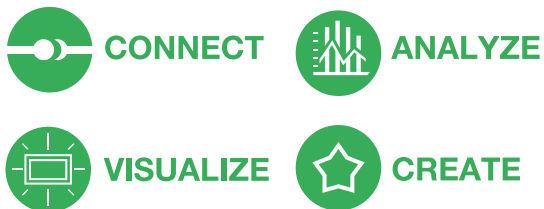




## IoT Initiatives

We are taking initiatives for research and development, and data analysis, with the goal of creating new value using operational data.

In recent years, sensing technology and analysis have been developed due to the growing interest in IoT and AI technology application, and we aim for customer satisfaction by introducing these technologies and integrating them with our know-how.



## CBM Initiatives

We are taking CBM initiatives using the main engine diagnostic system and monitoring system.

### Main Engine Diagnostic System

The integrated support system is a navigation support system for the main engine by remote monitoring, using the internal and external networks, and is a total-support package where the following effects can be expected.

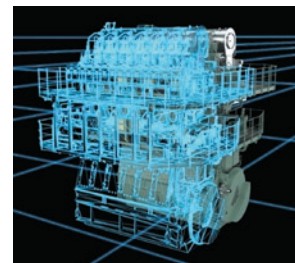
### Monitoring System Initiatives

As a part of IoT and AI technology applications, we are developing monitoring technologies such as in-cylinder pressure control, electronic control engine waveform monitoring, bearing wear monitoring, and bearing temperature monitoring systems.

### Next Generation 5G Eco Control System

J-ENG is focusing on the development of Condition Based Maintenance (CBM) and digital twins technologies, in order to provide more convenient after-sales service to customers. And, J-ENG is developing the 5th generation electronically-control system (5G Eco-system) based on the current 4G Eco-system, so that this CBM and digital twin can be implemented in the future.

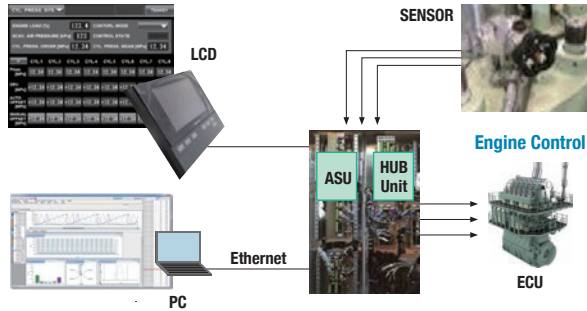
By providing this 5G Eco-system and introducing CBM and digital twin technologies, J-ENG can contribute to the optimization of safe operation, energy saving operation, maintenance cost and life cycle cost of customers.



## Cylinder pressure control and monitoring system



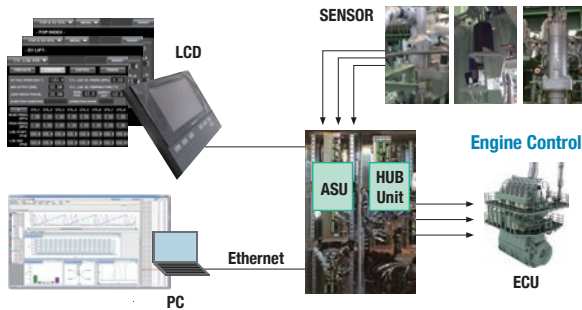
This system is installed as an additional system of Eco control system, and consists of cylinder pressure sensor, Analogue Sampling Unit (ASU), HUB unit and PC.



## Eco engine waveform monitoring system



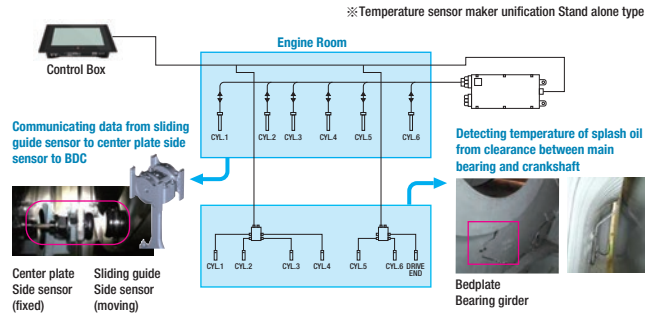
This system is installed as an additional system as well as cylinder pressure control and monitoring system, and consists of lift sensors of fuel injection pump / upper exhaust valve driving system, pressure sensor of cylinder lubricator, ASU, HUB unit and PC.



## Bearing temperature monitoring system



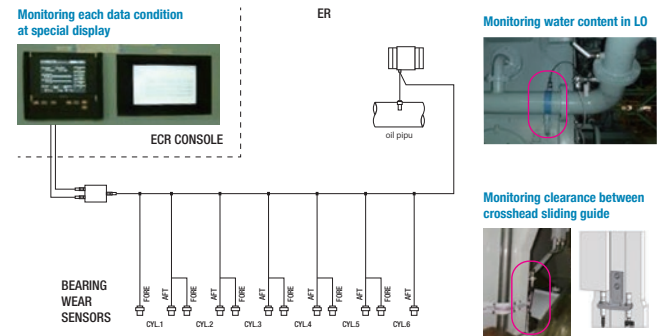
This system consists of sensors and signal transformer installing each bearing in crankcase.



## Bearing wear monitoring system



This system consists of bearing wear sensor, water content in LO sensor, relay unit and special display.



# UE Engines

UE Engine is a large sized, two-stroke and low speed engine type developed in-house using our own technologies. It is widely used in bulk carriers, oil/chemical tankers, pure car & truck carriers, containerships, LPG carriers, multi-purpose carriers and many other types of vessel.

## Main Features of UE Engines

- Economical
- Environmentally friendly
- Highly reliable
- Compact design
- Easy maintenance



## UEC Eco-Engine

In addition to the features of UE Engine, the UEC Eco-Engine provide the following benefits:

- Ecological
  - Low NOx emissions
  - Smokeless operation
- Economical
  - Low fuel consumption
  - Low maintenance costs
  - Low cylinder oil consumption
- Excellent condition
  - Reliable
  - Early failure warning system
- Easy to control
  - Stable low-load operation
  - Excellent startup and crush astern

## CYLINDER LUBRICATION

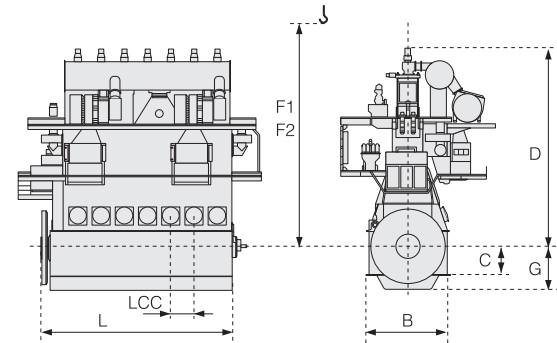
The A-ECL (Advanced Electronically Controlled Lubricating) system can reduce the explicit minimum dosage down to 0.5g/kWh, depending on engine conditions. The A-ECL system can further reduce the cylinder oil feed rate, compared with a mechanical lubricating system, particularly under partial load operation, by controlling cylinder oil consumption according to the mean effective pressure.

Available for  
Retrofitting



## DIMENSIONS AND WEIGHT

- The engine weight is net in metric tonnes (t), without oil and water.
- The engine weight and dimensions do not include torsional damper, axial damper, tuning wheel and compensator, etc., subject to the design of each project.



- L : Minimum length of engine
- LCC : Distance between cylinder centers
- B : Bedplate width at foot flange
- C : Crankshaft to underside of foot flange
- D : Engine height from crankshaft center
- G : Distance from bedplate bottom to crankshaft center
- F1 : Piston overhaul height with standard tool
- F2 : Piston overhaul height with special tool

As shown in the below table, the specification (welded steel plate or cast iron) of bedplate and column is according to engine type. In this booklet, the weight of engine made by cast iron is shown in brackets.

Engine type	Welded	Cast iron	Engine type	Welded	Cast iron
UEC50LSJ	✓		UEC80LSE-Eco	✓	
UEC42LSJ	✓		UEC60LSE-Eco	✓	
UEC35LSJ	✓	✓*2	UEC50LSE-Eco	✓	✓
UEC60LSH-Eco	✓		UEC45LSE / -Eco	✓*1	
UEC50LSH-Eco	✓		UEC35LSE / -Eco	✓	✓*2
UEC42LSH-Eco	✓		UEC33LSE	✓	✓*2
UEC33LSH		✓	UEC33LSII / -Eco		✓

\*1 : Bedplate of UEC45LSE-Eco-1 can be made by cast iron.  
(Column is made by welded steel plate only.)

\*2 : Bedplate can be made by cast iron.  
(Column is made by welded steel plate only.)

All UE engine described in this booklet are fully compliant with IMO NOx Tier II and Tier III regulations in ANNEX VI of the MARPOL 73/78.

The specific fuel oil consumption ("SFOC") figures are based on the below conditions,

- ISO standard reference condition
- Diesel fuel oil
- Lower calorific value (LCV) of fuel (42,700 kJ/kg)

ISO standard reference condition (ISO 3046-1 and 15550)

Total barometric pressure	.....	1.0 bar
Ambient air temperature	.....	25 °C
Relative humidity	.....	30 %
Cooling water temperature	.....	25 °C

## Tolerance

SFOC guarantee tolerance is as follows;

- 5% tolerance for 100 - 85% engine load
- 6% tolerance for < 85 - 65% engine load
- 7% tolerance for < 65 - 25% engine load

SFOC guarantee can only be at one load point (either MCR or NCR) for Tier II engine or with Tier II mode for Tier III engine.

## SFOC optimize

We have added the fuel optimized "Low-SFOC" version, etc. to UE Engine line-up in order to bring maximum benefit to our customers. By changing some engine parts and optimizing the electronically controlled system, the SFOC can be reduced when compared with a conventional "Standard" version. The figures for SFOC for a representative version are described in this booklet.

In addition, the UE Engine has also improved part-load and low-load SFOC by introducing tuning methods such as the LLO (Low Load Optimize), EGB, the turbocharger cut-out system, and so on. Details of each can be discussed with regard to each project according to each customer's requirement.

J-ENG's Engine Planning Data ("EPD") calculator is an application to obtain the technical information and data for installing the UE engine at an initial stage for new project.

The operation of the EPD calculator is intuitive and visual, so you can obtain the SFOC, engine performance data, auxiliary system, etc. as PDF file, only by selecting or entering the basic specifications of the new project.

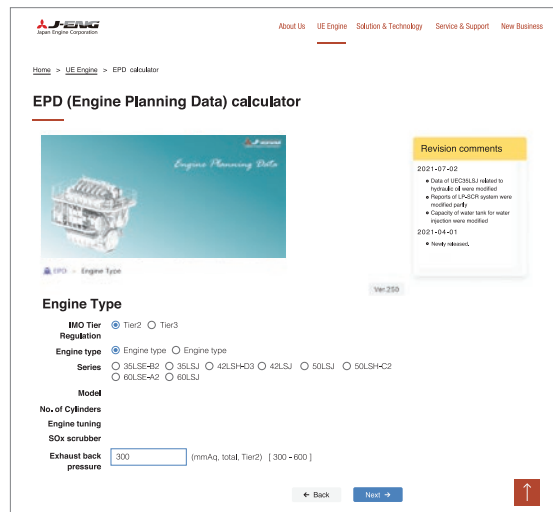
The data in this catalog is subject to change without prior notice. For the latest data, please check the data in the EPD calculator.

EPD calculator can be started by accessing the below address or scanning the below QR-code.

<https://www2.j-eng.co.jp/web/site/tech/EPD/Planning/Page1>



EPD



## Other useful information is available

<https://www.j-eng.co.jp/en/index.html>



Technical Data

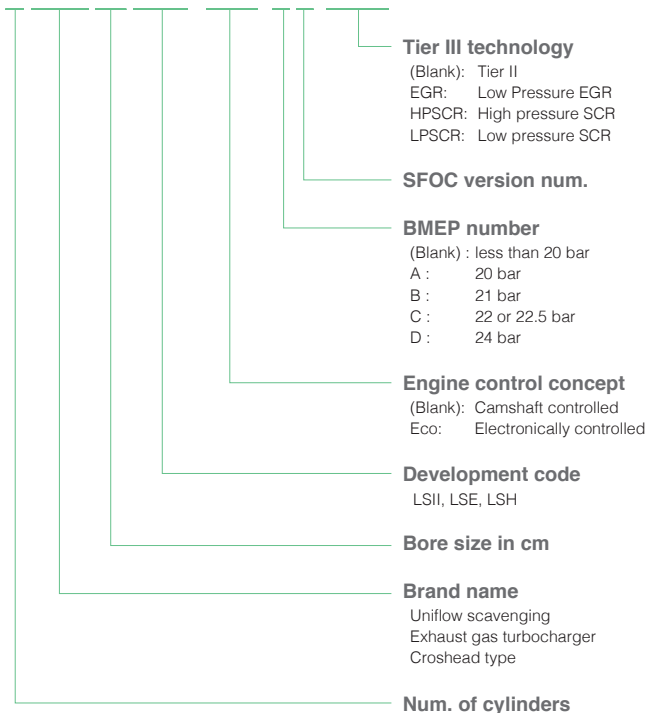


Installation Drawings



EoD

## 6UEC42LSH-Eco-D4-EGR



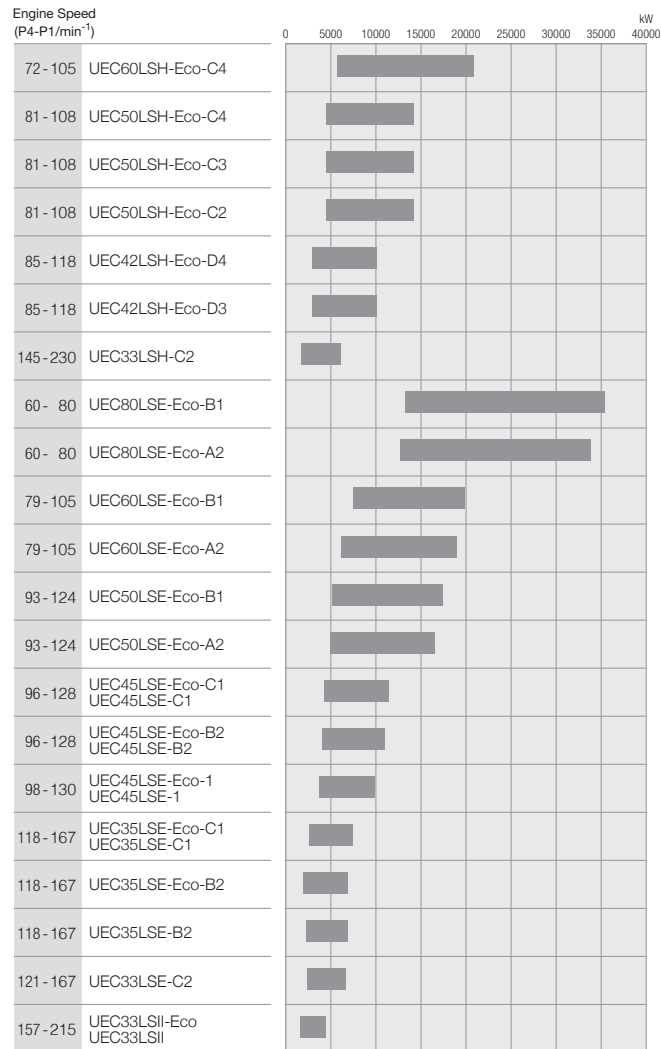
## SFOC version

### SFOC version 4

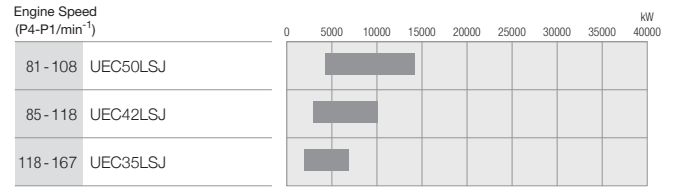
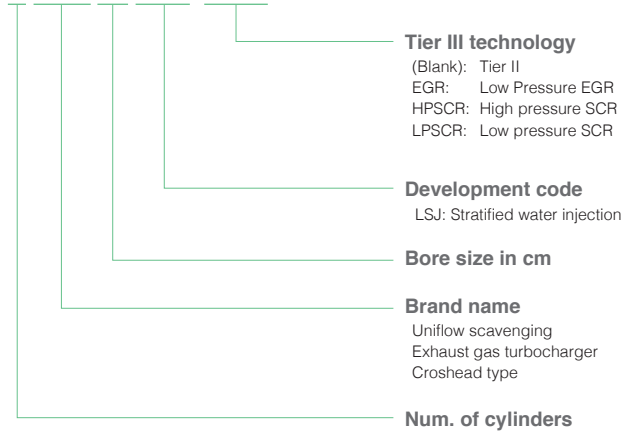
For UEC50LSH / UEC42LSH, the specific fuel oil consumption has been further improved by upgrading the fuel injection system.

By individually changing the fuel injection pattern from multiple fuel injection valves, the shape of heat release rate in the cylinder is improved and the trade-off between NOx and SFOC is improved.

The UEC60LSH-Eco-C4, UEC50LSH-Eco-C4 and UEC42LSH-Eco-D4 engines equipped with the above fuel injection system have been added to the UE engine lineup.



# 6UEC50LSJ-EGR



## 7UEC50LSJA-HPSCR

### Tier III technology

(Blank): Tier II  
 EGR: Low Pressure EGR  
 HPSCR: High pressure SCR  
 LPSCR: Low pressure SCR

### Development code

### Liquid fuels

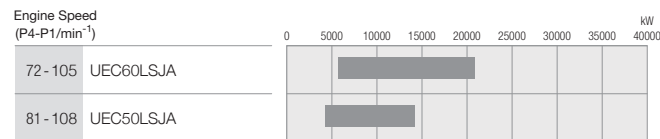
LSJA: Ammonia (DF)

### Bore size in cm

### Brand name

Uniflow scavenging  
 Exhaust gas turbocharger  
 Croshead type

### Num. of cylinders



## 6UEC35LSGH-LPSCR

### Tier III technology

(Blank): Tier II  
 EGR: Low Pressure EGR  
 HPSCR: High pressure SCR  
 LPSCR: Low pressure SCR

### Development code

### Liquid fuels

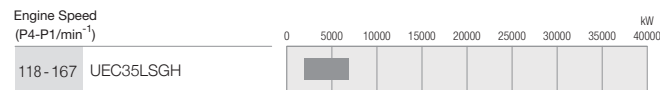
LSGH: Hydrogen (DF)

### Bore size in cm

### Brand name

Uniflow scavenging  
 Exhaust gas turbocharger  
 Croshead type

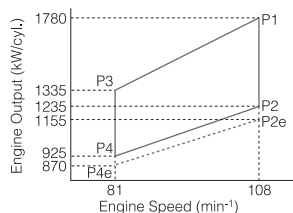
### Num. of cylinders



## Main specifications

Cylinder bore	[ mm ]	500
Piston stroke	[ mm ]	2 300
BMEP at P1	[ bar ]	21.9
Piston speed at P1	[ m/s ]	8.3
Stroke / bore	[ - ]	4.6

Electronically controlled



## Rated power (kW), principle dimension (mm) and weight (ton)

Cyl.	108 min <sup>-1</sup>			81 min <sup>-1</sup>			Dimension L	Weight
	P1	P2	P2e	P3	P4	P4e		
5	8 900	6 175	5 775	6 675	4 625	4 350	5 547	199
6	10 680	7 410	6 930	8 010	5 550	5 220	6 417	231
7	12 460	8 645	8 085	9 345	6 475	6 090	7 287	264
8	14 240	9 880	9 240	10 680	7 400	6 960	8 157	297

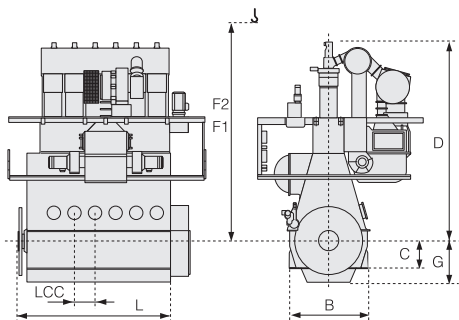
  

Dimensions	LCC	B	C	D	F1	F2	G
		870	3 350	1 190	8 448	10 050	9 140

## Tier III added weight (ton)

Cyl	5	6	7	8
EGR	9	11	12	14
HPSCR	*	*	*	*

\*: To be determined



## SFOC variation

UEC50LSJ, complied with IMO Tier II  
SFOC (g/kWh)

Load	P1	P2	P2e	P3	P4	P4e
100%	157.0	151.1	151.5	157.0	151.1	151.5
75%	151.5	145.6	146.0	151.5	145.6	146.0
50%	153.0	147.1	147.5	153.0	147.1	147.5

UEC50LSJ-EGR, complied with IMO Tier III  
SFOC (g/kWh)

Mode	Load	P1	P2	P2e	P3	P4	P4e
Tier II mode	100%	157.0	151.1	151.5	157.0	151.1	151.5
	75%	151.5	145.6	146.0	151.5	145.6	146.0
	50%	153.0	147.1	147.5	153.0	147.1	147.5
Tier III mode	100%	158.6	152.7	153.1	158.6	152.7	153.1
	75%	153.1	147.2	147.6	153.1	147.2	147.6
	50%	154.6	148.7	149.1	154.6	148.7	149.1

UEC50LSJ-HPSCR, complied with IMO Tier III  
SFOC (g/kWh)

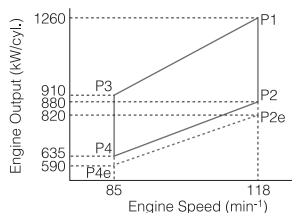
Mode	Load	P1	P2	P2e	P3	P4	P4e
Tier II mode	100%	157.0	151.1	151.5	157.0	151.1	151.5
	75%	151.5	145.6	146.0	151.5	145.6	146.0
	50%	153.0	147.1	147.5	153.0	147.1	147.5
Tier III mode	100%	157.3	151.4	151.8	157.3	151.4	151.8
	75%	151.7	145.8	146.2	151.7	145.8	146.2
	50%	153.4	147.5	147.9	153.4	147.5	148.0



## Main specifications

Cylinder bore	[ mm ]	420
Piston stroke	[ mm ]	1 930
BMEP at P1	[ bar ]	24.0
Piston speed at P1	[ m/s ]	7.6
Stroke / bore	[ - ]	4.60

Electronically controlled



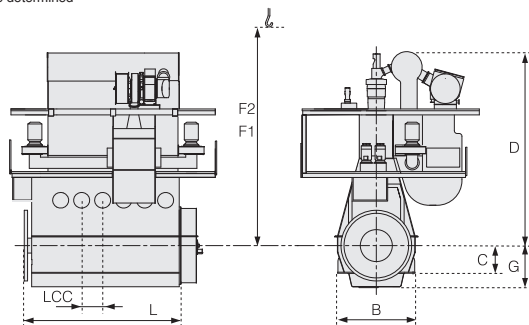
## Rated power (kW), principle dimension (mm) and weight (ton)

Speed	118 min <sup>-1</sup>				85 min <sup>-1</sup>			Dimension L	Weight
	P1	P2	P2e	P3	P4	P4e			
Cyl.									
5	6 300	4 400	4 100	4 550	3 175	2 950	4 857	149	
6	7 560	5 280	4 920	5 460	3 810	3 540	5 617	174	
7	8 820	6 160	5 740	6 370	4 445	4 130	6 337	200	
8	10 080	7 040	6 560	7 280	5 080	4 720	7 137	224	
Dimensions	LCC	B	C	D	F1	F2	G		
	760	2 800	1 000	6 952	8 700	7 830	1 490		

## Tier III added weight (ton)

Cyl	5	6	7	8
EGR	6	8	9	10
HPSCR	*	*	*	*

\*: To be determined



## SFOC variation

UEC42LSJ, complied with IMO Tier II  
SFOC (g/kWh)

Load	P1	P2	P2e	P3	P4	P4e
100%	157.0	151.0	151.5	157.0	151.0	151.5
75%	151.5	145.5	146.0	151.5	145.5	146.0
50%	153.0	147.0	147.5	153.0	147.0	147.5

## UEC42LSJ-EGR, complied with IMO Tier III

SFOC (g/kWh)

Mode	Load	P1	P2	P2e	P3	P4	P4e
Tier II mode	100%	157.0	151.0	151.5	157.0	151.0	151.5
	75%	151.5	145.5	146.0	151.5	145.5	146.0
	50%	153.0	147.0	147.5	153.0	147.0	147.5
Tier III mode	100%	158.6	152.6	153.1	158.6	152.6	153.1
	75%	153.1	147.1	147.6	153.1	147.1	147.6
	50%	154.6	148.6	149.1	154.6	148.6	149.1

## UEC42LSJ-HPSCR, complied with IMO Tier III

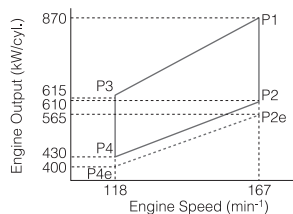
SFOC (g/kWh)

Mode	Load	P1	P2	P2e	P3	P4	P4e
Tier II mode	100%	157.0	151.0	151.5	157.0	151.0	151.5
	75%	151.5	145.5	146.0	151.5	145.5	146.0
	50%	153.0	147.0	147.5	153.0	147.0	147.5
Tier III mode	100%	157.3	151.3	151.8	157.3	151.3	151.8
	75%	151.7	145.7	146.2	151.7	145.7	146.2
	50%	153.4	147.4	147.9	153.4	147.4	147.9

### Main specifications

Cylinder bore	[ mm ]	350
Piston stroke	[ mm ]	1 550
BMEP at P1	[ bar ]	21.0
Piston speed at P1	[ m/s ]	8.6
Stroke / bore	[ - ]	4.43

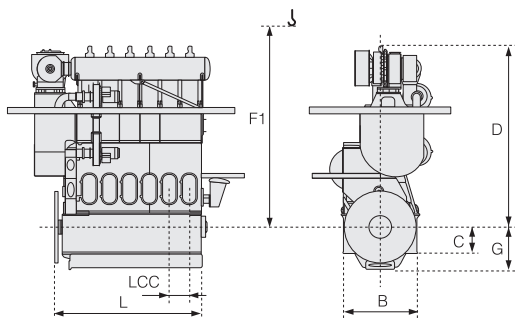
Electronically controlled with exhaust camshaft



### Rated power (kW), principle dimension (mm) and weight (ton)

Cyl.	167 min <sup>-1</sup>			118 min <sup>-1</sup>			Dimension L	Weight
	P1	P2	P2e	P3	P4	P4e		
5	4 350	3 050	2 825	3 075	2 150	2 000	4 398	83 (85)
6	5 220	3 660	3 390	3 690	2 580	2 400	5 010	93 (95)
7	6 090	4 270	3 955	4 305	3 010	2 800	5 622	104 (107)
8	6 960	4 880	4 520	4 920	3 440	3 200	6 234	116 (119)
Dimensions	LCC		B	C	D	F1	G	
	612		2 284	830	5 623	6 725	1 326	

Weight in ( ) is for engine of bedplate, made by cast iron.



### SFOC variation

UEC35LSJ, complied with IMO Tier II

SFOC (g/kWh)

Load	P1	P2	P2e	P3	P4	P4e
100%	163.3	157.3	157.8	163.3	157.3	157.8
75%	157.8	151.8	152.3	157.8	151.8	152.3
50%	159.4	153.4	153.9	159.4	153.4	153.9

UEC35LSJ-LPSCR, complied with IMO Tier III

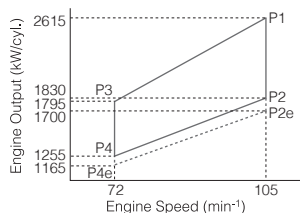
SFOC (g/kWh)

Mode	Load	P1	P2	P2e	P3	P4	P4e
Tier II mode	100%	163.3	157.3	157.8	163.3	157.3	157.8
	75%	157.8	151.8	152.3	157.8	151.8	152.3
Tier III mode	100%	163.3	158.1	158.8	163.5	158.6	159.3
	75%	158.8	153.1	153.6	159.4	153.6	154.1
	50%	159.9	154.1	154.6	160.7	154.8	155.2

## Main specifications

Cylinder bore	[ mm ]	600
Piston stroke	[ mm ]	2 400
BMEP at P1	[ bar ]	22.0
Piston speed at P1	[ m/s ]	8.4
Stroke / bore	[ - ]	4.0

Electronically controlled



## Rated power (kW), principle dimension (mm) and weight (ton)

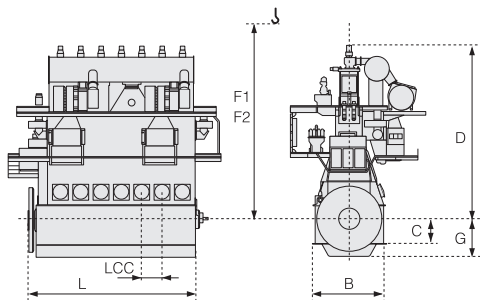
Speed	105 min <sup>-1</sup>			72 min <sup>-1</sup>			Dimension L	Weight
	P1	P2	P2e	P3	P4	P4e		
Cyl.								
5	13 075	9 150	8 500	8 975	6 275	5 825	6 502	283
6	15 690	10 980	10 200	10 770	7 530	6 990	7 442	329
7	18 305	12 810	11 900	12 565	8 785	8 155	8 382	375
8	20 920	14 640	13 600	14 360	10 040	9 320	9 322	424
Dimensions	LCC	B	C	D	F1	F2	G	
	940	3 420	1 300	8 903	10 800	10 040	1 944	

Weight will be changed during development period.

## Tier III added weight (ton)

Cyl	5	6	7	8
EGR	13	16	18	21
HPSCR	*	*	*	*

\*: To be determined



## SFOC variation

UEC60LSH-Eco-C4, complied with IMO Tier II  
SFOC (g/kWh) with standard

Load	P1	P2	P2e	P3	P4	P4e
100%	161.0	155.0	155.5	161.0	155.0	155.5
75%	155.5	149.5	150.0	155.5	149.5	150.0
50%	157.0	151.0	151.5	157.0	151.0	151.5

UEC60LSH-Eco-C4, complied with IMO Tier II  
SFOC (g/kWh) with LLO

Load	P1	P2	P2e	P3	P4	P4e
100%	162.6	156.6	157.1	162.6	156.6	157.1
75%	154.8	148.8	149.3	154.8	148.8	149.3
50%	155.5	149.5	150.0	155.5	149.5	150.0

UEC60LSH-Eco-C4, complied with IMO Tier II  
SFOC (g/kWh) with LLO+EGB

Load	P1	P2	P2e	P3	P4	P4e
100%	164.1	158.1	158.6	164.1	158.1	158.6
75%	154.3	148.3	148.8	154.3	148.3	148.8
50%	153.6	148.6	149.1	153.6	148.6	149.1

UEC60LSH-Eco-C4-EGR, complied with IMO Tier III  
SFOC (g/kWh) with LLO+EGB

Mode	Load	P1	P2	P2e	P3	P4	P4e
Tier II mode	100%	164.1	158.1	158.6	164.1	158.1	158.6
	75%	154.3	148.3	148.8	154.3	148.3	148.8
	50%	153.6	148.6	149.1	153.6	148.6	149.1
Tier III mode	100%	164.2	158.2	158.7	164.2	158.2	158.7
	75%	156.4	150.4	150.9	156.4	150.4	150.9
	50%	156.3	150.3	150.8	156.3	150.3	150.8

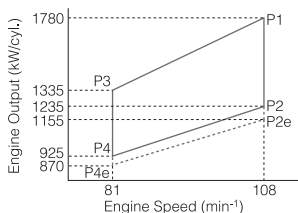
UEC60LSH-Eco-C4-HPSCR, complied with IMO Tier III  
SFOC (g/kWh) with LLO+EGB

Mode	Load	P1	P2	P2e	P3	P4	P4e
Tier II mode	100%	164.1	158.1	158.6	164.1	158.1	158.6
	75%	154.3	148.3	148.8	154.3	148.3	148.8
	50%	153.6	148.6	149.1	153.6	148.6	149.1
Tier III mode	100%	164.4	158.4	158.9	164.4	158.4	158.9
	75%	154.5	148.5	149.0	154.5	148.5	149.0
	50%	154.0	149.0	149.5	154.0	149.2	149.9

## Main specifications

Cylinder bore	[ mm ]	500
Piston stroke	[ mm ]	2 300
BMEP at P1	[ bar ]	21.9
Piston speed at P1	[ m/s ]	8.3
Stroke / bore	[ - ]	4.60

Electronically controlled



## Rated power (kW), principle dimension (mm) and weight (ton)

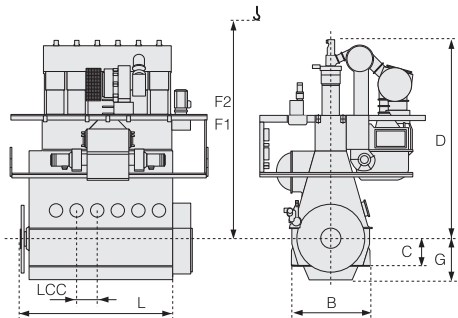
Speed	108 min <sup>-1</sup>			81 min <sup>-1</sup>			Dimension L	Weight
	P1	P2	P2e	P3	P4	P4e		
Cyl.								
5	8 900	6 175	5 775	6 675	4 625	4 350	5 547	194
6	10 680	7 410	6 930	8 010	5 550	5 220	6 417	225
7	12 460	8 645	8 085	9 345	6 475	6 090	7 287	257
8	14 240	9 880	9 240	10 680	7 400	6 960	8 157	289
Dimensions	LCC	B	C	D	F1	F2	G	
	870	3 350	1 190	8 448	10 050	9 140	1 700	

Weight will be changed during development period.

## Tier III added weight (ton)

Cyl	5	6	7	8
EGR	9	11	12	14
HPSCR	*	*	*	*

\*: To be determined



## SFOC variation

UEC50LSH-Eco-C4, complied with IMO Tier II  
SFOC (g/kWh) with standard

Load	P1	P2	P2e	P3	P4	P4e
100%	162.0	155.3	155.8	162.0	155.3	155.7
75%	156.5	149.8	150.3	156.5	149.8	150.2
50%	158.0	151.3	151.8	158.0	151.3	151.7

UEC50LSH-Eco-C4, complied with IMO Tier II  
SFOC (g/kWh) with LLO

Load	P1	P2	P2e	P3	P4	P4e
100%	163.6	156.9	157.4	163.6	156.9	157.3
75%	155.8	149.1	149.6	155.8	149.1	149.5
50%	156.5	149.8	150.3	156.5	149.8	150.2

UEC50LSH-Eco-C4, complied with IMO Tier II  
SFOC (g/kWh) with LLO+EGB

Load	P1	P2	P2e	P3	P4	P4e
100%	165.1	158.4	158.9	165.1	158.4	158.8
75%	155.3	148.6	149.1	155.3	148.6	149.0
50%	154.6	148.7	149.1	154.6	148.7	149.1

UEC50LSH-Eco-C4-EGR, complied with IMO Tier III  
SFOC (g/kWh) with LLO+EGB

Mode	Load	P1	P2	P2e	P3	P4	P4e
Tier II mode	100%	165.1	158.4	158.9	165.1	158.4	158.8
	75%	155.3	148.6	149.1	155.3	148.6	149.0
	50%	154.6	148.7	149.1	154.6	148.7	149.1
Tier III mode	100%	165.2	158.5	159.0	165.2	158.5	158.9
	75%	157.4	150.7	151.2	157.4	150.7	151.1
	50%	157.3	150.6	151.1	157.3	150.6	151.0

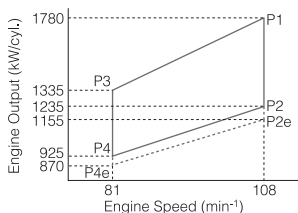
UEC50LSH-Eco-C4-HPSCR, complied with IMO Tier III  
SFOC (g/kWh) with LLO+EGB

Mode	Load	P1	P2	P2e	P3	P4	P4e
Tier II mode	100%	165.1	158.4	158.9	165.1	158.4	158.8
	75%	155.3	148.6	149.1	155.3	148.6	149.0
	50%	154.6	148.7	149.1	154.6	148.7	149.1
Tier III mode	100%	165.4	158.7	159.2	165.4	158.7	159.1
	75%	155.5	148.8	149.3	155.5	148.8	149.2
	50%	155.0	149.1	149.5	155.0	149.1	149.5

## Main specifications

Cylinder bore	[ mm ]	500
Piston stroke	[ mm ]	2 300
BMEP at P1	[ bar ]	21.9
Piston speed at P1	[ m/s ]	8.3
Stroke / bore	[ - ]	4.60

Electronically controlled



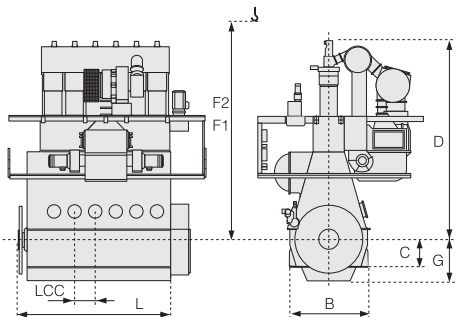
## Rated power (kW), principle dimension (mm) and weight (ton)

Speed	108 min <sup>-1</sup>			81 min <sup>-1</sup>			Dimension L	Weight
	P1	P2	P2e	P3	P4	P4e		
Cyl.								
5	8 900	6 175	5 775	6 675	4 625	4 350	5 547	194
6	10 680	7 410	6 930	8 010	5 550	5 220	6 417	225
7	12 460	8 645	8 085	9 345	6 475	6 090	7 287	257
8	14 240	9 880	9 240	10 680	7 400	6 960	8 157	289
Dimensions	LCC	B	C	D	F1	F2	G	
	870	3 350	1 190	8 448	10 050	9 140	1 700	

## Tier III added weight (ton)

Cyl	5	6	7	8
EGR	9	11	12	14
HPSCR	*	*	*	*

\*: To be determined



## SFOC variation

UEC50LSH-Eco-C3, complied with IMO Tier II  
SFOC (g/kWh) with standard

Load	P1	P2	P2e	P3	P4	P4e
100%	164.0	157.3	157.8	164.0	157.3	157.7
75%	158.5	151.8	152.3	158.5	151.8	152.2
50%	160.0	153.3	153.8	160.0	153.3	153.7

UEC50LSH-Eco-C3, complied with IMO Tier II  
SFOC (g/kWh) with LLO

Load	P1	P2	P2e	P3	P4	P4e
100%	165.6	158.9	159.4	165.6	158.9	159.3
75%	157.8	151.1	151.6	157.8	151.1	151.5
50%	158.5	151.8	152.3	158.5	151.8	152.2

UEC50LSH-Eco-C3, complied with IMO Tier II  
SFOC (g/kWh) with LLO+EGB

Load	P1	P2	P2e	P3	P4	P4e
100%	167.1	160.4	160.9	167.1	160.4	160.8
75%	157.3	150.6	151.1	157.3	150.6	151.0
50%	156.6	149.9	150.4	156.6	149.9	150.3

UEC50LSH-Eco-C3-EGR, complied with IMO Tier III  
SFOC (g/kWh) with LLO+EGB

Mode	Load	P1	P2	P2e	P3	P4	P4e
Tier II mode	100%	167.1	160.4	160.9	167.1	160.4	160.8
	75%	157.3	150.6	151.1	157.3	150.6	151.0
	50%	156.6	149.9	150.4	156.6	149.9	150.3
Tier III mode	100%	167.2	160.5	161.0	167.2	160.5	160.9
	75%	159.4	152.7	153.2	159.4	152.7	153.1
	50%	159.3	152.6	153.1	159.3	152.6	153.0

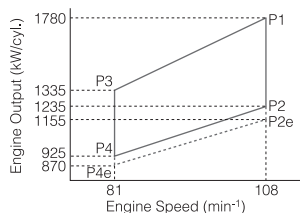
UEC50LSH-Eco-C3-HPSCR, complied with IMO Tier III  
SFOC (g/kWh) with LLO+EGB

Mode	Load	P1	P2	P2e	P3	P4	P4e
Tier II mode	100%	167.1	160.4	160.9	167.1	160.4	160.8
	75%	157.3	150.6	151.1	157.3	150.6	151.0
	50%	156.6	149.9	150.4	156.6	149.9	150.3
Tier III mode	100%	167.4	160.7	161.2	167.4	160.7	161.1
	75%	157.5	150.8	151.3	157.5	150.8	151.2
	50%	157.0	150.3	150.8	157.0	150.3	150.7

## Main specifications

Cylinder bore	[ mm ]	500
Piston stroke	[ mm ]	2 300
BMEP at P1	[ bar ]	21.9
Piston speed at P1	[ m/s ]	8.3
Stroke / bore	[ - ]	4.60

Electronically controlled with exhaust camshaft

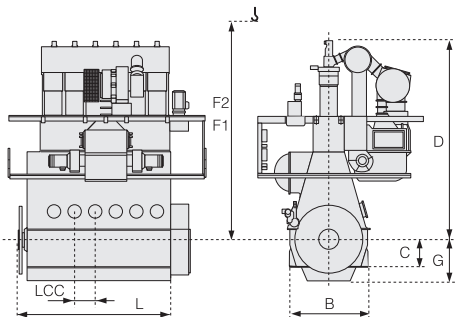


## Rated power (kW), principle dimension (mm) and weight (ton)

Speed	108 min <sup>-1</sup>			81 min <sup>-1</sup>			Dimension L	Weight
	P1	P2	P2e	P3	P4	P4e		
Cyl.								
5	8 900	6 175	5 775	6 675	4 625	4 350	5 547	194
6	10 680	7 410	6 930	8 010	5 550	5 220	6 417	225
7	12 460	8 645	8 085	9 345	6 475	6 090	7 287	257
8	14 240	9 880	9 240	10 680	7 400	6 960	8 157	289
Dimensions	LCC	B	C	D	F1	F2	G	
	870	3 350	1 190	8 448	10 050	9 140	1 700	

## Tier III added weight (ton)

Cyl	5	6	7	8
EGR	9	11	12	14
LPSCR	-	-	-	-



## SFOC variation

UEC50LSH-Eco-C2, complied with IMO Tier II  
SFOC (g/kWh) with standard

Load	P1	P2	P2e	P3	P4	P4e
100%	164.0	158.1	158.5	164.0	158.1	158.5
75%	158.5	152.6	153.0	158.5	152.6	153.0
50%	160.0	154.1	154.5	160.0	154.1	154.5

UEC50LSH-Eco-C2, complied with IMO Tier II  
SFOC (g/kWh) with LLO

Load	P1	P2	P2e	P3	P4	P4e
100%	165.6	159.7	160.1	165.6	159.7	160.1
75%	157.8	151.9	152.3	157.8	151.9	152.3
50%	158.5	152.6	153.0	158.5	152.6	153.0

UEC50LSH-Eco-C2, complied with IMO Tier II  
SFOC (g/kWh) with LLO+EGB

Load	P1	P2	P2e	P3	P4	P4e
100%	165.6	159.7	160.1	165.6	159.7	160.1
75%	157.8	151.9	152.3	157.8	151.9	152.3
50%	156.6	150.7	151.1	156.6	150.7	151.1

UEC50LSH-Eco-C2-EGR, complied with IMO Tier III  
SFOC (g/kWh) with LLO+EGB

Mode	Load	P1	P2	P2e	P3	P4	P4e
Tier II mode	100%	167.2	161.3	161.7	167.2	161.3	161.7
	75%	159.4	153.5	153.9	159.4	153.5	153.9
	50%	158.2	152.3	152.7	158.2	152.3	152.7
Tier III mode	100%	168.8	162.9	163.3	168.8	162.9	163.3
	75%	161.0	155.1	155.5	161.0	155.1	155.5
	50%	160.9	155.0	155.4	160.9	155.0	155.4

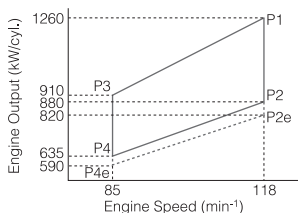
UEC50LSH-Eco-C2-LPSCR, complied with IMO Tier III  
SFOC (g/kWh) with LLO

Mode	Load	P1	P2	P2e	P3	P4	P4e
Tier II mode	100%	165.6	159.7	160.1	165.6	159.7	160.1
	75%	157.8	151.9	152.3	157.8	151.9	152.3
	50%	158.5	152.6	153.0	158.5	152.6	153.0
Tier III mode	100%	165.6	160.7	161.2	166.0	161.2	161.8
	75%	158.8	153.3	153.8	159.6	154.0	154.4
	50%	158.7	153.3	153.7	159.6	154.0	154.5

## Main specifications

Cylinder bore	[ mm ]	420
Piston stroke	[ mm ]	1 930
BMEP at P1	[ bar ]	24.0
Piston speed at P1	[ m/s ]	7.6
Stroke / bore	[ - ]	4.60

Electronically controlled



## Rated power (kW), principle dimension (mm) and weight (ton)

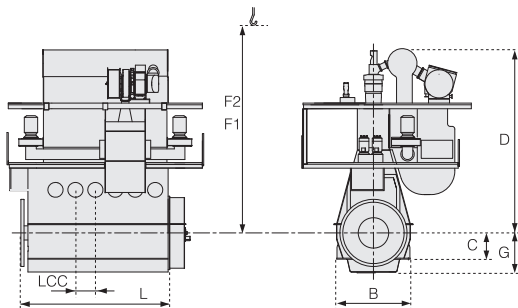
Speed	118 min <sup>-1</sup>			85 min <sup>-1</sup>			Dimension L	Weight
	P1	P2	P2e	P3	P4	P4e		
Cyl.								
5	6 300	4 400	4 100	4 550	3 175	2 950	4 857	146
6	7 560	5 280	4 920	5 460	3 810	3 540	5 617	170
7	8 820	6 160	5 740	6 370	4 445	4 130	6 337	195
8	10 080	7 040	6 560	7 280	5 080	4 720	7 137	219
Dimensions	LCC	B	C	D	F1	F2	G	
	760	2 800	1 000	6 952	8 700	7 830	1 490	

Weight will be changed during development period.

## Tier III added weight (ton)

Cyl	5	6	7	8
EGR	6	8	9	10
HPSCR	*	*	*	*

\*: To be determined



## SFOC variation

UEC42LSH-Eco-D4, complied with IMO Tier II

SFOC (g/kWh) with standard

Load	P1	P2	P2e	P3	P4	P4e
100%	162.0	156.0	156.5	162.0	156.0	156.5
75%	156.5	150.5	151.0	156.5	150.5	151.0
50%	158.0	152.0	152.5	158.0	152.0	152.5

UEC42LSH-Eco-D4, complied with IMO Tier II

SFOC (g/kWh) with LLO

Load	P1	P2	P2e	P3	P4	P4e
100%	163.6	157.6	158.1	163.6	157.6	158.1
75%	155.8	149.8	150.3	155.8	149.8	150.3
50%	156.5	150.5	151.0	156.5	150.5	151.0

UEC42LSH-Eco-D4, complied with IMO Tier II

SFOC (g/kWh) with LLO+EGB

Load	P1	P2	P2e	P3	P4	P4e
100%	165.1	159.1	159.6	165.1	159.1	159.6
75%	155.3	149.3	149.8	155.3	149.3	149.8
50%	154.6	148.6	149.1	154.6	148.6	149.1

UEC42LSH-Eco-D4-EGR, complied with IMO Tier III

SFOC (g/kWh) with LLO+EGB

Mode	Load	P1	P2	P2e	P3	P4	P4e
Tier II mode	100%	165.1	159.1	159.6	165.1	159.1	159.6
	75%	155.3	149.3	149.8	155.3	149.3	149.8
	50%	154.6	148.6	149.1	154.6	148.6	149.1
Tier III mode	100%	165.2	159.2	159.7	165.2	159.2	159.7
	75%	157.4	151.4	151.9	157.4	151.4	151.9
	50%	157.3	151.3	151.8	157.3	151.3	151.8

UEC42LSH-Eco-D4-HPSCR, complied with IMO Tier III

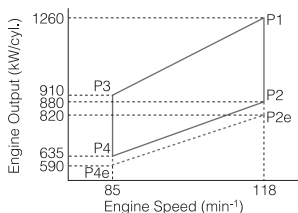
SFOC (g/kWh) with LLO+EGB

Mode	Load	P1	P2	P2e	P3	P4	P4e
Tier II mode	100%	165.1	159.1	159.6	165.1	159.1	159.6
	75%	155.3	149.3	149.8	155.3	149.3	149.8
	50%	154.6	148.6	149.1	154.6	148.6	149.1
Tier III mode	100%	165.4	159.4	159.9	165.4	159.4	159.9
	75%	155.5	149.5	150.0	155.5	149.5	150.0
	50%	155.0	149.0	149.5	155.0	149.0	149.5

## Main specifications

Cylinder bore	[ mm ]	420
Piston stroke	[ mm ]	1 930
BMEP at P1	[ bar ]	24.0
Piston speed at P1	[ m/s ]	7.6
Stroke / bore	[ - ]	4.60

Electronically controlled



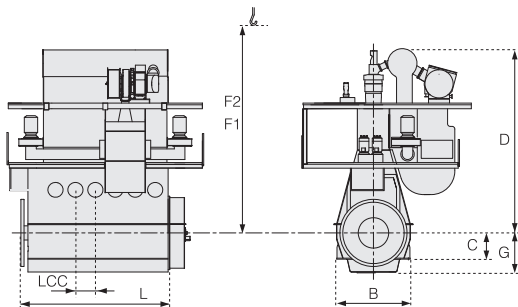
## Rated power (kW), principle dimension (mm) and weight (ton)

Speed	118 min <sup>-1</sup>			85 min <sup>-1</sup>			Dimension L	Weight
	P1	P2	P2e	P3	P4	P4e		
Cyl.								
5	6 300	4 400	4 100	4 550	3 175	2 950	4 857	146
6	7 560	5 280	4 920	5 460	3 810	3 540	5 617	170
7	8 820	6 160	5 740	6 370	4 445	4 130	6 337	195
8	10 080	7 040	6 560	7 280	5 080	4 720	7 137	219
Dimensions	LCC	B	C	D	F1	F2	G	
	760	2 800	1 000	6 952	8 700	7 830	1 490	

## Tier III added weight (ton)

Cyl	5	6	7	8
EGR	6	8	9	10
HPSCR	*	*	*	*

\*: To be determined



## SFOC variation

UEC42LSH-Eco-D3, complied with IMO Tier II

SFOC (g/kWh) with standard

Load	P1	P2	P2e	P3	P4	P4e
100%	164.0	158.0	158.5	164.0	158.0	158.5
75%	158.5	152.5	153.0	158.5	152.5	153.0
50%	160.0	154.0	154.5	160.0	154.0	154.5

UEC42LSH-Eco-D3, complied with IMO Tier II

SFOC (g/kWh) with LLO

Load	P1	P2	P2e	P3	P4	P4e
100%	165.6	159.6	160.1	165.6	159.6	160.1
75%	157.8	151.8	152.3	157.8	151.8	152.3
50%	158.5	152.5	153.0	158.5	152.5	153.0

UEC42LSH-Eco-D3, complied with IMO Tier II

SFOC (g/kWh) with LLO+EGB

Load	P1	P2	P2e	P3	P4	P4e
100%	167.1	161.1	161.6	167.1	161.1	161.6
75%	157.3	151.3	151.8	157.3	151.3	151.8
50%	156.6	150.6	151.1	156.6	150.6	151.1

UEC42LSH-Eco-D3-EGR, complied with IMO Tier III

SFOC (g/kWh) with LLO+EGB

Mode	Load	P1	P2	P2e	P3	P4	P4e
Tier II mode	100%	167.1	161.1	161.6	167.1	161.1	161.6
	75%	157.3	151.3	151.8	157.3	151.3	151.8
	50%	156.6	150.6	151.1	156.6	150.6	151.1
Tier III mode	100%	167.2	161.2	161.7	167.2	161.2	161.7
	75%	159.4	153.4	153.9	159.4	153.4	153.9
	50%	159.3	153.3	153.8	159.3	153.3	153.8

UEC42LSH-Eco-D3-HPSCR, complied with IMO Tier III

SFOC (g/kWh) with LLO+EGB

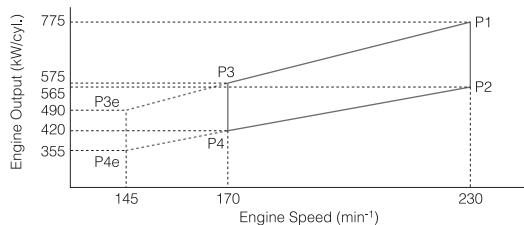
Mode	Load	P1	P2	P2e	P3	P4	P4e
Tier II mode	100%	167.1	161.1	161.6	167.1	161.1	161.6
	75%	157.3	151.3	151.8	157.3	151.3	151.8
	50%	156.6	150.6	151.1	156.6	150.6	151.1
Tier III mode	100%	167.4	161.4	161.9	167.4	161.4	161.9
	75%	157.5	151.5	152.0	157.5	151.5	152.0
	50%	157.0	151.0	151.5	157.0	151.0	151.5



## Main specifications

Cylinder bore	[ mm ]	330
Piston stroke	[ mm ]	1 050
BMEP at P1	[ bar ]	22.5
Piston speed at P1	[ m/s ]	8.1
Stroke / bore	[ - ]	3.18

Camshaft controlled

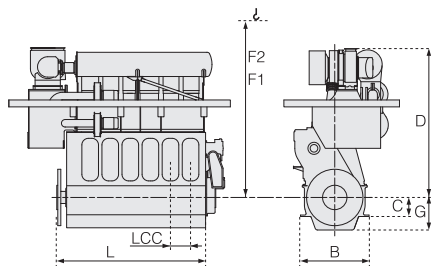


## Rated power (kW), principle dimension (mm) and weight (ton)

Speed	230 min <sup>-1</sup>		170 min <sup>-1</sup>		145 min <sup>-1</sup>		Dimension L	Weight
	P1	P2	P3	P4	P3e	P4e		
5	3 875	2 825	2 875	2 100	2 450	1 775	3 720	51
6	4 650	3 390	3 450	2 520	2 940	2 130	4 300	59
7	5 425	3 955	4 025	2 940	3 430	2 485	4 880	67
8	6 200	4 520	4 600	3 360	3 920	2 840	5 460	77

Dimensions	LCC	B	C	D	F1	F2	G
	580	1 980	550	4 300	5 100	4 590	940



## SFOC variation

UEC33LSH-Eco-C2, complied with IMO Tier II

SFOC (g/kWh)

Load	P1	P2	P2e	P3	P4	P4e
100%	172.0	168.0	172.0	168.0	174.0	170.0
75%	167.5	163.5	167.5	163.5	169.5	165.5
50%	169.1	165.1	169.1	165.1	171.1	167.1

UEC33LSH-C2-LPSCR, complied with IMO Tier III

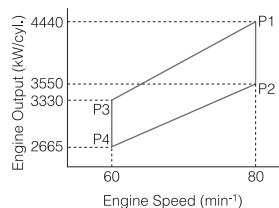
SFOC (g/kWh)

Mode	Load	P1	P2	P3	P4	P3e	P4e
Tier II mode	100%	172.0	168.0	172.0	168.0	174.0	170.0
	75%	167.5	163.5	167.5	163.5	169.5	165.5
Tier III mode	100%	172.0	168.0	172.0	168.4	174.0	170.6
	75%	167.6	164.2	168.4	164.7	170.6	166.9
	50%	169.1	165.1	169.7	165.8	171.9	168.1

## Main specifications

Cylinder bore	[ mm ]	800
Piston stroke	[ mm ]	3 150
BMEP at P1	[ bar ]	21.0
Piston speed at P1	[ m/s ]	8.4
Stroke / bore	[ - ]	3.94

Electronically controlled



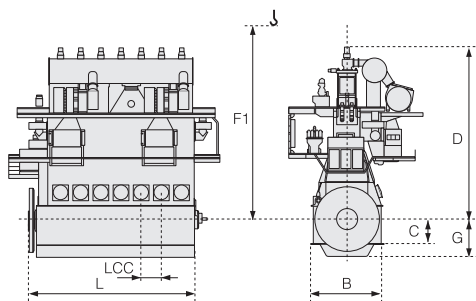
## Rated power (kW), principle dimension (mm) and weight (ton)

Speed	80 min <sup>-1</sup>		60 min <sup>-1</sup>		Dimension L	Weight
	P1	P2	P3	P4		
Cyl.						
5	22 200	17 750	16 650	13 325	8 658	693
6	26 640	21 300	19 980	15 990	10 038	794
7	31 080	24 850	23 310	18 655	11 418	895
8	35 520	28 400	26 640	21 320	12 798	996
Dimensions	LCC	B	C	D	F1	G
	1 380	5 000	1 736	11 725	14 247	2 524

## Tier III added weight (ton)

Cyl	5	6	7	8
HPSCR	*	*	*	*

\*: To be determined



## SFOC variation

UEC80LSE-Eco-B1, complied with IMO Tier II  
SFOC (g/kWh) with standard

Load	P1	P2	P3	P4
100%	163.0	157.7	163.0	157.7
75%	158.3	154.2	158.3	154.2
50%	160.1	157.1	160.1	157.1

UEC80LSE-Eco-B1, complied with IMO Tier II  
SFOC (g/kWh) with LLO

Load	P1	P2	P3	P4
100%	164.6	159.3	164.6	159.3
75%	157.6	153.5	157.6	153.5
50%	158.6	155.6	158.6	155.6

UEC80LSE-Eco-B1, complied with IMO Tier II  
SFOC (g/kWh) with LLO+EGB

Load	P1	P2	P3	P4
100%	164.6	159.3	164.6	159.3
75%	157.6	153.5	157.6	153.5
50%	156.4	153.4	156.4	153.4

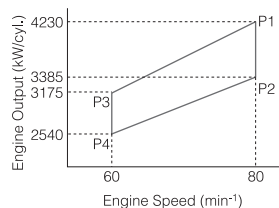
UEC80LSE-Eco-B1-HPSCR, complied with IMO Tier III  
SFOC (g/kWh) with LLO+EGB

Mode	Load	P1	P2	P3	P4
Tier II mode	100%	164.6	159.3	164.6	159.3
	75%	157.6	153.5	157.6	153.5
	50%	156.4	153.4	156.4	153.4
Tier III mode	100%	164.9	159.6	164.9	159.6
	75%	157.8	153.7	157.8	153.7
	50%	156.8	153.8	156.8	153.8

## Main specifications

Cylinder bore	[ mm ]	800
Piston stroke	[ mm ]	3 150
BMEP at P1	[ bar ]	20.0
Piston speed at P1	[ m/s ]	8.4
Stroke / bore	[ - ]	3.94

Electronically controlled



## Rated power (kW), principle dimension (mm) and weight (ton)

Speed	80 min <sup>-1</sup>			60 min <sup>-1</sup>		Dimension L	Weight
	P1	P2	P3	P4			
Cyl.							
5	21 150	16 925	15 875	12 700	8 658	693	
6	25 380	20 310	19 050	15 240	10 038	794	
7	29 610	23 695	22 225	17 780	11 418	895	
8	33 840	27 080	25 400	20 320	12 798	996	

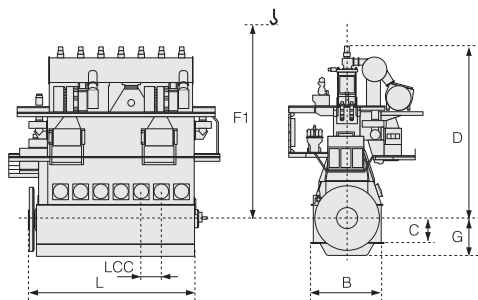
  

Dimensions	LCC	B	C	D	F1	G
		1 380	5 000	1 736	11 725	14 247

## Tier III added weight (ton)

Cyl	5	6	7	8
HPSCR	*	*	*	*

\*: To be determined



## SFOC variation

UEC80LSE-Eco-A2, complied with IMO Tier II  
SFOC (g/kWh) with standard

Load	P1	P2	P3	P4
100%	163.0	157.0	163.0	157.0
75%	157.5	151.5	157.5	151.5
50%	159.1	153.1	159.1	153.1

UEC80LSE-Eco-A2, complied with IMO Tier II  
SFOC (g/kWh) with LLO

Load	P1	P2	P3	P4
100%	164.6	158.6	164.6	158.6
75%	156.8	150.8	156.8	150.8
50%	157.6	151.6	157.6	151.6

UEC80LSE-Eco-A2, complied with IMO Tier II  
SFOC (g/kWh) with LLO+EGB

Load	P1	P2	P3	P4
100%	164.6	158.6	164.6	158.6
75%	156.8	150.8	156.8	150.8
50%	155.4	149.4	155.4	149.4

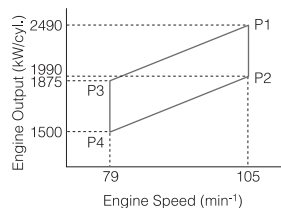
UEC80LSE-Eco-A2-HPSCR, complied with IMO Tier III  
SFOC (g/kWh) with LLO+EGB

Mode	Load	P1	P2	P3	P4
Tier II mode	100%	164.6	158.6	164.6	158.6
	75%	156.8	150.8	156.8	150.8
	50%	155.4	149.4	155.4	149.4
Tier III mode	100%	164.9	158.9	164.9	158.9
	75%	157.0	151.0	157.0	151.0
	50%	155.8	149.8	155.8	149.8

## Main specifications

Cylinder bore	[ mm ]	600
Piston stroke	[ mm ]	2 400
BMEP at P1	[ bar ]	21.0
Piston speed at P1	[ m/s ]	8.4
Stroke / bore	[ - ]	4.00

Electronically controlled



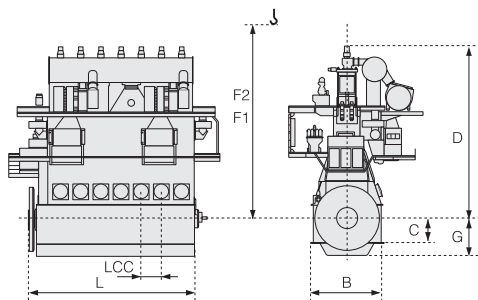
## Rated power (kW), principle dimension (mm) and weight (ton)

Speed	105 min <sup>-1</sup>				79 min <sup>-1</sup>				Dimension L	Weight
	P1	P2	P3	P4	P1	P2	P3	P4		
Cyl.										
5	12 450	9 950	9 375	7 500	6 780	300				
6	14 940	11 940	11 250	9 000	7 866	349				
7	17 430	13 930	13 125	10 500	8 952	399				
8	19 920	15 920	15 000	12 000	10 038	447				
Dimensions	LCC	B	C	D	F1	F2	G			
	1 086	3 770	1 300	8 903	10 800	10 040	1 944			

## Tier III added weight (ton)

Cyl	5	6	7	8
EGR	12	15	17	20
HPSCR	*	*	*	*

\*: To be determined



## SFOC variation

UEC60LSE-Eco-B1, complied with IMO Tier II  
SFOC (g/kWh) with standard

Load	P1	P2	P3	P4
100%	166.0	160.7	166.0	160.7
75%	161.3	157.2	161.3	157.2
50%	163.1	160.1	163.1	160.1

UEC60LSE-Eco-B1, complied with IMO Tier II  
SFOC (g/kWh) with LLO

Load	P1	P2	P3	P4
100%	167.6	162.3	167.6	162.3
75%	160.6	156.5	160.6	156.5
50%	161.6	158.6	161.6	158.6

UEC60LSE-Eco-B1, complied with IMO Tier II  
SFOC (g/kWh) with LLO+EGB

Load	P1	P2	P3	P4
100%	167.6	162.3	167.6	162.3
75%	160.6	156.5	160.6	156.5
50%	159.4	156.4	159.4	156.4

UEC60LSE-Eco-B1-EGR, complied with IMO Tier III  
SFOC (g/kWh) with LLO+EGB

Mode	Load	P1	P2	P3	P4
Tier II mode	100%	167.6	162.3	167.6	162.3
	75%	160.6	156.5	160.6	156.5
	50%	159.4	156.4	159.4	156.4
Tier III mode	100%	169.2	163.9	169.2	163.9
	75%	162.2	158.1	162.2	158.1
	50%	162.4	159.4	162.4	159.4

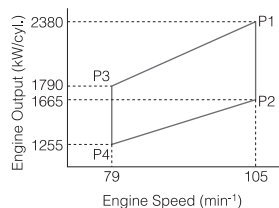
UEC60LSE-Eco-B1-HPSCR, complied with IMO Tier III  
SFOC (g/kWh) with LLO+EGB

Mode	Load	P1	P2	P3	P4
Tier II mode	100%	167.6	162.3	167.6	162.3
	75%	160.6	156.5	160.6	156.5
	50%	159.4	156.4	159.4	156.4
Tier III mode	100%	167.9	162.6	167.9	162.6
	75%	160.8	156.7	160.8	156.7
	50%	159.8	156.8	159.8	156.8

## Main specifications

Cylinder bore	[ mm ]	600
Piston stroke	[ mm ]	2 400
BMEP at P1	[ bar ]	20.0
Piston speed at P1	[ m/s ]	8.4
Stroke / bore	[ - ]	4.00

Electronically controlled



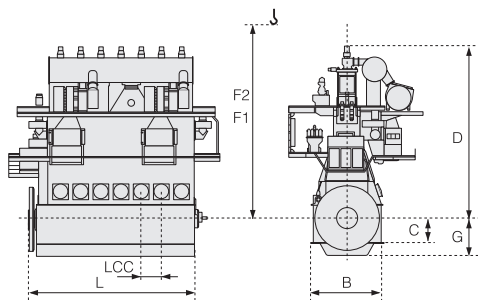
## Rated power (kW), principle dimension (mm) and weight (ton)

Speed	105 min <sup>-1</sup>				79 min <sup>-1</sup>				Dimension L	Weight
	P1	P2	P3	P4	P1	P2	P3	P4		
Cyl.										
5	11 900	8 325	8 950	6 275	6 780	300				
6	14 280	9 990	10 740	7 530	7 866	349				
7	16 660	11 655	12 530	8 785	8 952	399				
8	19 040	13 320	14 320	10 040	10 038	447				
Dimensions	LCC	B	C	D	F1	F2	G			
	1 086	3 770	1 300	8 903	10 800	10 040	1 944			

## Tier III added weight (ton)

Cyl	5	6	7	8
EGR	12	14	17	19
HPSCR	*	*	*	*

\*: To be determined



## SFOC variation

UEC60LSE-Eco-A2, complied with IMO Tier II  
SFOC (g/kWh) with standard

Load	P1	P2	P3	P4
100%	166.0	160.0	166.0	160.0
75%	160.5	154.5	160.5	154.5
50%	162.0	156.0	162.0	156.0

UEC60LSE-Eco-A2, complied with IMO Tier II  
SFOC (g/kWh) with LLO

Load	P1	P2	P3	P4
100%	168.0	162.0	168.0	162.0
75%	159.6	153.6	159.6	153.6
50%	159.6	153.6	159.6	153.6

UEC60LSE-Eco-A2, complied with IMO Tier II  
SFOC (g/kWh) with LLO+EGB

Load	P1	P2	P3	P4
100%	169.9	163.9	169.9	163.9
75%	158.8	152.8	158.8	152.8
50%	155.5	149.5	155.5	149.5

UEC60LSE-Eco-A2-EGR, complied with IMO Tier III  
SFOC (g/kWh) with LLO+EGB

Mode	Load	P1	P2	P3	P4
Tier II mode	100%	169.9	163.9	169.9	163.9
	75%	158.8	152.8	158.8	152.8
	50%	155.5	149.5	155.5	149.5
Tier III mode	100%	169.7	163.7	169.7	163.7
	75%	161.2	155.2	161.2	155.2
	50%	160.4	154.4	160.4	154.4

UEC60LSE-Eco-A2-HPSCR, complied with IMO Tier III  
SFOC (g/kWh) with LLO+EGB

Mode	Load	P1	P2	P3	P4
Tier II mode	100%	169.9	163.9	169.9	163.9
	75%	158.8	152.8	158.8	152.8
	50%	155.5	149.5	155.5	149.5
Tier III mode	100%	170.2	164.2	170.2	164.2
	75%	159.0	153.0	159.0	153.0
	50%	155.9	149.9	155.9	150.1

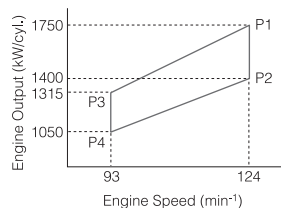
# UEC50LSE-Eco-B1

Tier II Tier III

## Main specifications

Cylinder bore	[ mm ]	500
Piston stroke	[ mm ]	2 050
BMEP at P1	[ bar ]	21.0
Piston speed at P1	[ m/s ]	8.5
Stroke / bore	[ - ]	4.10

Electronically controlled



## Rated power (kW), principle dimension (mm) and weight (ton)

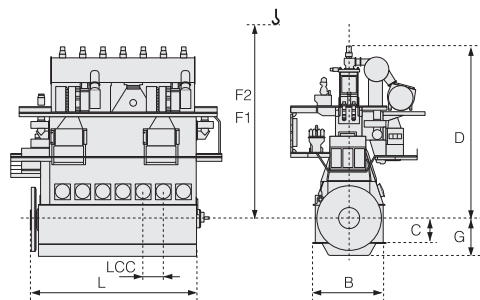
Speed	124 min <sup>-1</sup>				93 min <sup>-1</sup>				Dimension L	Weight
	P1	P2	P3	P4	P1	P2	P3	P4		
Cyl.										
5	8 750	17 000	6 575	5 250	5 550 (5 575)				188 (215)	
6	10 500	8 400	7 890	6 300	6 430 (6 455)				219 (250)	
7	12 250	9 800	9 205	7 350	7 310 (7 335)				251 (287)	
8	14 000	11 200	10 520	8 400	8 190 (8 215)				281 (321)	
9	15 750	12 600	11 835	9 450	9 070 (9 095)				312 (356)	
10	17 500	14 000	13 150	10 500	9 950 (9 975)				356 (405)	
Dimensions	LCC	B	C	D	F1	F2	G			
	880	3 150	1 088	7 688	9 250	8 409	1 636 (1 704)			

Dimensions and weight in ( ) are for engine of bedplate and column made by cast iron.

## Tier III added weight (ton)

Cyl	5	6	7	8	9	10
HPSCR	*	*	*	*	*	*

\*: To be determined



## SFOC variation

UEC50LSE-Eco-B1, complied with IMO Tier II  
SFOC (g/kWh) with standard

Load	P1	P2	P3	P4
100%	167.0	161.7	167.0	161.7
75%	162.3	158.2	162.3	158.2
50%	164.1	161.1	164.1	161.1

UEC50LSE-Eco-B1, complied with IMO Tier II  
SFOC (g/kWh) with LLO

Load	P1	P2	P3	P4
100%	168.6	163.3	168.6	163.3
75%	161.6	157.5	161.6	157.5
50%	162.6	159.6	162.6	159.6

UEC50LSE-Eco-B1, complied with IMO Tier II  
SFOC (g/kWh) with LLO+EGB

Load	P1	P2	P3	P4
100%	168.6	163.3	168.6	163.3
75%	161.6	157.5	161.6	157.5
50%	160.4	157.4	160.4	157.4

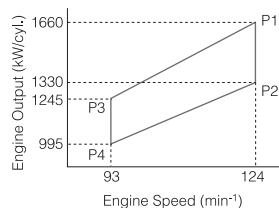
UEC50LSE-Eco-B1-HPSCR, complied with IMO Tier III  
SFOC (g/kWh) with LLO+EGB

Mode	Load	P1	P2	P3	P4
Tier II mode	100%	168.6	163.3	168.6	163.3
	75%	161.6	157.5	161.6	157.5
	50%	160.4	157.4	160.4	157.4
Tier III mode	100%	168.9	163.6	168.9	163.6
	75%	161.8	157.7	161.8	157.7
	50%	160.8	157.8	160.8	157.8

## Main specifications

Cylinder bore	[ mm ]	500
Piston stroke	[ mm ]	2 050
BMEP at P1	[ bar ]	20.0
Piston speed at P1	[ m/s ]	8.5
Stroke / bore	[ - ]	4.10

Electronically controlled



## Rated power (kW), principle dimension (mm) and weight (ton)

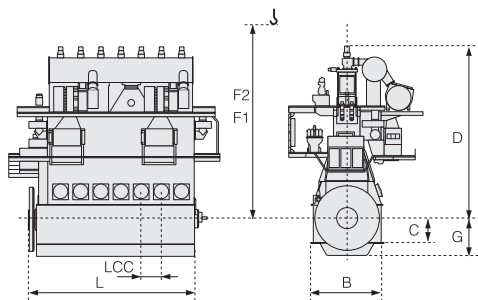
Speed	124 min <sup>-1</sup>				93 min <sup>-1</sup>				Dimension L	Weight
	P1	P2	P3	P4	P1	P2	P3	P4		
Cyl.										
5	8 300	6 650	6 225	4 975	5 550 (5 575)	188 (215)				
6	9 960	7 980	7 470	5 970	6 430 (6 455)	219 (250)				
7	11 620	9 310	8 715	6 965	7 310 (7 335)	251 (287)				
8	13 280	10 640	9 960	7 960	8 190 (8 215)	281 (321)				
9	14 940	11 970	11 205	8 955	9 070 (9 095)	312 (356)				
10	16 600	13 300	12 450	9 950	9 950 (9 975)	356 (405)				
Dimensions	LCC	B	C	D	F1	F2	G			
	880	3 150	1 088	7 688	9 250	8 409	1 636 (1 704)			

Dimensions and weight in ( ) are for engine of bedplate and column made by cast iron.

## Tier III added weight (ton)

Cyl	5	6	7	8	9	10
HPSCR	*	*	*	*	*	*

\*: To be determined



## SFOC variation

UEC50LSE-Eco-A2, complied with IMO Tier II  
SFOC (g/kWh) with standard

Load	P1	P2	P3	P4
100%	167.0	161.0	167.0	161.0
75%	161.5	155.5	161.5	155.5
50%	163.1	157.1	163.1	157.1

UEC50LSE-Eco-A2, complied with IMO Tier II  
SFOC (g/kWh) with LLO

Load	P1	P2	P3	P4
100%	168.6	162.6	168.6	162.6
75%	160.8	154.8	160.8	154.8
50%	161.6	155.6	161.6	155.6

UEC50LSE-Eco-A2, complied with IMO Tier II  
SFOC (g/kWh) with LLO+EGB

Load	P1	P2	P3	P4
100%	168.6	162.6	168.6	162.6
75%	160.8	154.8	160.8	154.8
50%	159.4	153.4	159.4	153.4

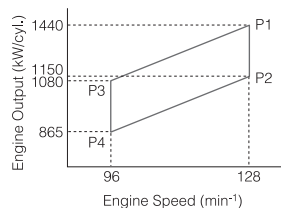
UEC50LSE-Eco-A2-HPSCR, complied with IMO Tier III  
SFOC (g/kWh) with LLO+EGB

Mode	Load	P1	P2	P3	P4
Tier II mode	100%	168.6	162.6	168.6	162.6
	75%	160.8	154.8	160.8	154.8
	50%	159.4	153.4	159.4	153.4
Tier III mode	100%	168.9	162.9	168.9	162.9
	75%	161.0	155.0	161.0	155.0
	50%	159.8	153.8	159.8	153.8

## Main specifications

Cylinder bore	[ mm ]	450
Piston stroke	[ mm ]	1 930
BMEP at P1	[ bar ]	22.0
Piston speed at P1	[ m/s ]	8.2
Stroke / bore	[ - ]	4.29

Electronically controlled



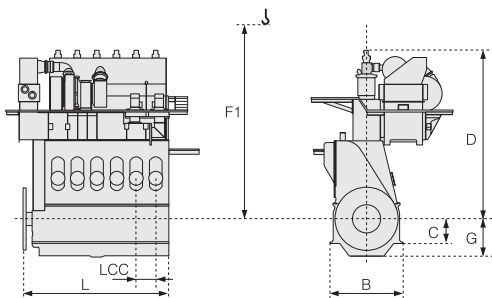
## Rated power (kW), principle dimension (mm) and weight (ton)

Speed	128 min <sup>-1</sup>			96 min <sup>-1</sup>		Dimension L	Weight
	P1	P2	P3	P4			
Cyl.							
5	7 200	5 750	5 400	4 325	5 102	161	
6	8 640	6 900	6 480	5 190	5 894	187	
7	10 080	8 050	7 560	6 055	6 686	212	
8	11 520	9 200	8 640	6 920	7 478	240	
Dimensions	LCC	B	C	D	F1	G	
	792	3 000	1 000	7 185	8 860	1 540	

## Tier III added weight (ton)

Cyl	5	6	7	8
EGR	7	9	10	12
HPSCR	*	*	*	*

\*: To be determined



## SFOC variation

UEC45LSE-Eco-C1, complied with IMO Tier II  
SFOC (g/kWh) with standard

Load	P1	P2	P3	P4
100%	171.0	165.7	171.0	165.7
75%	166.3	162.2	166.3	162.2
50%	168.1	165.1	168.1	165.1

UEC45LSE-Eco-C1, complied with IMO Tier II  
SFOC (g/kWh) with LLO

Load	P1	P2	P3	P4
100%	172.6	167.3	172.6	167.3
75%	165.6	161.5	165.6	161.5
50%	166.6	163.6	166.6	163.6

UEC45LSE-Eco-C1, complied with IMO Tier II  
SFOC (g/kWh) with LLO+EGB

Load	P1	P2	P3	P4
100%	172.6	167.3	172.6	167.3
75%	165.6	161.5	165.6	161.5
50%	164.4	161.4	164.4	161.4

UEC45LSE-Eco-C1-EGR, complied with IMO Tier III  
SFOC (g/kWh) with LLO+EGB

Mode	Load	P1	P2	P3	P4
Tier II mode	100%	172.6	167.3	172.6	167.3
	75%	165.6	161.5	165.6	161.5
	50%	164.4	161.4	164.4	161.4
Tier III mode	100%	174.2	168.9	174.2	168.9
	75%	167.2	163.1	167.2	163.1
	50%	167.4	164.4	167.4	164.4

UEC45LSE-Eco-C1-HPSCR, complied with IMO Tier III  
SFOC (g/kWh) with LLO+EGB

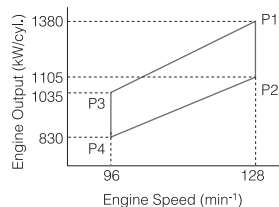
Mode	Load	P1	P2	P3	P4
Tier II mode	100%	172.6	167.3	172.6	167.3
	75%	165.6	161.5	165.6	161.5
	50%	164.4	161.4	164.4	161.4
Tier III mode	100%	172.9	167.6	172.9	167.6
	75%	165.8	161.7	165.8	161.7
	50%	164.8	161.8	164.8	161.8



## Main specifications

Cylinder bore	[ mm ]	450
Piston stroke	[ mm ]	1 930
BMEP at P1	[ bar ]	21.1
Piston speed at P1	[ m/s ]	8.2
Stroke / bore	[ - ]	4.29

Electronically controlled



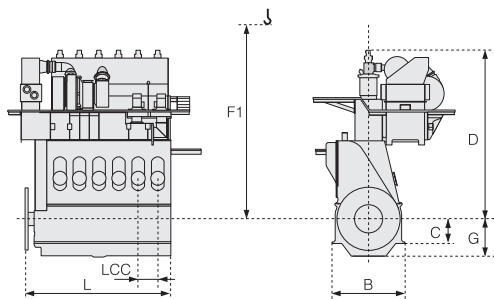
## Rated power (kW), principle dimension (mm) and weight (ton)

Speed	128 min <sup>-1</sup>			96 min <sup>-1</sup>		Dimension L	Weight
	P1	P2	P3	P4			
Cyl.							
5	6 900	5 525	5 175	4 150	5 102	161	
6	8 280	6 630	6 210	4 980	5 894	187	
7	9 660	7 735	7 245	5 810	6 686	212	
8	11 040	8 840	8 280	6 640	7 478	240	
Dimensions	LCC	B	C	D	F1	G	
	792	3 000	1 000	7 185	8 860	1 540	

## Tier III added weight (ton)

Cyl	5	6	7	8
EGR	7	8	10	11
HPSCR	*	*	*	*

\*: To be determined



## SFOC variation

UEC45LSE-Eco-B2, complied with IMO Tier II  
SFOC (g/kWh) with standard

Load	P1	P2	P3	P4
100%	169.0	163.0	169.0	163.1
75%	163.5	157.5	163.5	157.6
50%	165.1	159.1	165.1	159.2

UEC45LSE-Eco-B2, complied with IMO Tier II  
SFOC (g/kWh) with LLO

Load	P1	P2	P3	P4
100%	170.6	164.6	170.6	164.7
75%	162.8	156.8	162.8	156.9
50%	163.6	157.6	163.6	157.7

UEC45LSE-Eco-B2, complied with IMO Tier II  
SFOC (g/kWh) with LLO+EGB

Load	P1	P2	P3	P4
100%	170.6	164.6	170.6	164.7
75%	162.8	156.8	162.8	156.9
50%	161.4	155.4	161.4	155.5

UEC45LSE-Eco-B2-EGR, complied with IMO Tier III  
SFOC (g/kWh) with LLO+EGB

Mode	Load	P1	P2	P3	P4
Tier II mode	100%	170.6	164.6	170.6	164.7
	75%	162.8	156.8	162.8	156.9
	50%	161.4	155.4	161.4	155.5
Tier III mode	100%	172.2	166.2	172.2	166.3
	75%	164.4	158.4	164.4	158.5
	50%	164.4	158.4	164.4	158.5

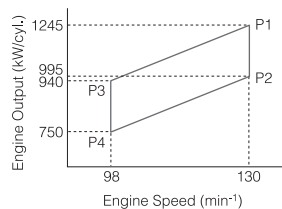
UEC45LSE-Eco-B2-HPSCR, complied with IMO Tier III  
SFOC (g/kWh) with LLO+EGB

Mode	Load	P1	P2	P3	P4
Tier II mode	100%	170.6	164.6	170.6	164.7
	75%	162.8	156.8	162.8	156.9
	50%	161.4	155.4	161.4	155.5
Tier III mode	100%	170.9	164.9	170.9	165.0
	75%	163.0	157.0	163.0	157.1
	50%	161.8	155.8	161.8	155.9

## Main specifications

Cylinder bore	[ mm ]	450
Piston stroke	[ mm ]	1 840
BMEP at P1	[ bar ]	19.6
Piston speed at P1	[ m/s ]	8.0
Stroke / bore	[ - ]	4.09

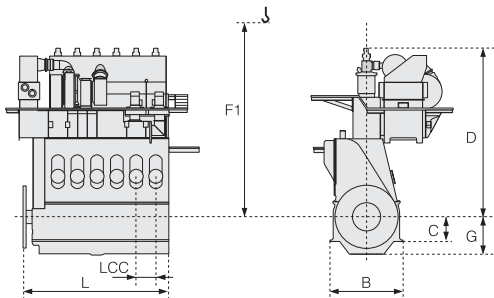
Electronically controlled



## Rated power (kW), principle dimension (mm) and weight (ton)

Speed	130 min <sup>-1</sup>			98 min <sup>-1</sup>		Dimension L	Weight
	P1	P2	P3	P4			
Cyl.	P1	P2	P3	P4			
5	6 225	4 975	4 700	3 750	5 102	162	
6	7 470	5 970	5 640	4 500	5 894	189	
7	8 715	6 965	6 580	5 250	6 686	215	
8	9 960	7 960	7 520	6 000	7 478	243	
Dimensions	LCC	B	C	D	F1	G	
	792	3 000	1 000	6 900	8 600	1 560	

Dimensions and weight are for engine of bedplate, made by cast iron.



## SFOC variation

UEC45LSE-Eco-1, complied with IMO Tier II  
SFOC (g/kWh) with standard

Load	P1	P2	P3	P4
100%	172.0	166.7	172.0	166.7
75%	167.3	163.2	167.3	163.2
50%	169.1	166.1	169.1	166.1

UEC45LSE-Eco-1, complied with IMO Tier II  
SFOC (g/kWh) with LLO

Load	P1	P2	P3	P4
100%	173.6	168.3	173.6	168.3
75%	166.6	162.5	166.6	162.5
50%	167.6	164.6	167.6	164.6

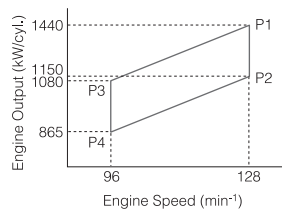
UEC45LSE-Eco-1-LPSCR, complied with IMO Tier III  
SFOC (g/kWh) with LLO

Mode	Load	P1	P2	P3	P4
Tier II mode	100%	173.6	168.3	173.6	168.3
	75%	166.6	162.5	166.6	162.5
	50%	167.6	164.6	167.6	164.6
Tier III mode	100%	173.6	168.9	173.7	169.4
	75%	167.2	163.1	167.9	163.7
	50%	167.6	164.6	168.3	165.2

## Main specifications

Cylinder bore	[ mm ]	450
Piston stroke	[ mm ]	1 930
BMEP at P1	[ bar ]	22.0
Piston speed at P1	[ m/s ]	8.2
Stroke / bore	[ - ]	4.29

Camshaft controlled



## Rated power (kW), principle dimension (mm) and weight (ton)

Speed	128 min <sup>-1</sup>		96 min <sup>-1</sup>		Dimension L	Weight
	P1	P2	P3	P4		
Cyl.						
5	7 200	5 750	5 400	4 325	5 102	158
6	8 640	6 900	6 480	5 190	5 894	183
7	10 080	8 050	7 560	6 055	6 686	208
8	11 520	9 200	8 640	6 920	7 478	236
Dimensions	LCC	B	C	D	F1	G
	792	3 000	1 000	7 080	8 860	1 540

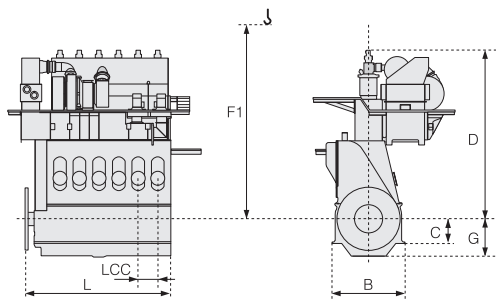
## SFOC variation

UEC45LSE-C1, complied with IMO Tier II  
SFOC (g/kWh)

Load	P1	P2	P3	P4
100%	173.0	167.7	173.0	167.7
75%	169.1	165.4	169.1	165.4
50%	170.4	168.0	170.4	168.0

UEC45LSE-C1-LPSCR, complied with IMO Tier III  
SFOC (g/kWh)

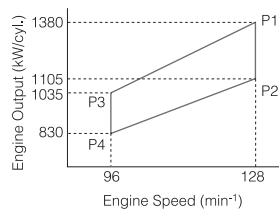
Mode	Load	P1	P2	P3	P4
Tier II mode	100%	173.0	167.7	173.0	167.7
	75%	169.1	165.4	169.1	165.4
	50%	170.4	168.0	170.4	168.0
Tier III mode	100%	173.0	168.6	173.1	169.1
	75%	170.4	166.9	171.0	167.5
	50%	171.3	168.8	172.1	169.6



## Main specifications

Cylinder bore	[ mm ]	450
Piston stroke	[ mm ]	1 930
BMEP at P1	[ bar ]	21.1
Piston speed at P1	[ m/s ]	8.2
Stroke / bore	[ - ]	4.29

Camshaft controlled



## Rated power (kW), principle dimension (mm) and weight (ton)

Speed	128 min <sup>-1</sup>		96 min <sup>-1</sup>		Dimension L	Weight
	P1	P2	P3	P4		
Cyl.						
5	6 900	5 525	5 175	4 150	5 102	158
6	8 280	6 630	6 210	4 980	5 894	183
7	9 660	7 735	7 245	5 810	6 686	208
8	11 040	8 840	8 280	6 640	7 478	236
Dimensions	LCC	B	C	D	F1	G
	792	3 000	1 000	7 080	8 860	1 540

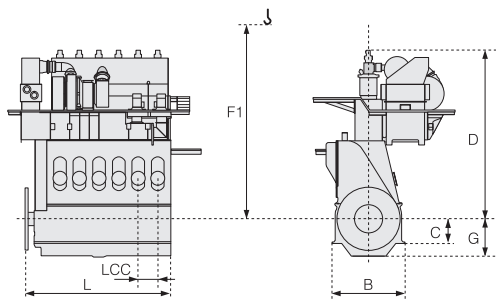
## SFOC variation

UEC45LSE-B2, complied with IMO Tier II  
SFOC (g/kWh)

Load	P1	P2	P3	P4
100%	171.0	165.0	171.0	165.1
75%	166.5	160.5	166.5	160.6
50%	168.1	162.1	168.1	162.2

UEC45LSE-B2-LPSCR, complied with IMO Tier III  
SFOC (g/kWh)

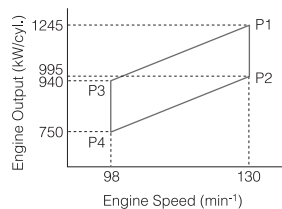
Mode	Load	P1	P2	P3	P4
Tier II mode	100%	171.0	165.0	171.0	165.1
	75%	166.5	160.5	166.5	160.6
	50%	168.1	162.1	168.1	162.2
Tier III mode	100%	171.0	166.0	171.3	166.6
	75%	167.9	162.1	168.5	162.7
	50%	169.1	162.9	169.8	163.7



## Main specifications

Cylinder bore	[ mm ]	450
Piston stroke	[ mm ]	1 840
BMEP at P1	[ bar ]	19.6
Piston speed at P1	[ m/s ]	8.0
Stroke / bore	[ - ]	4.09

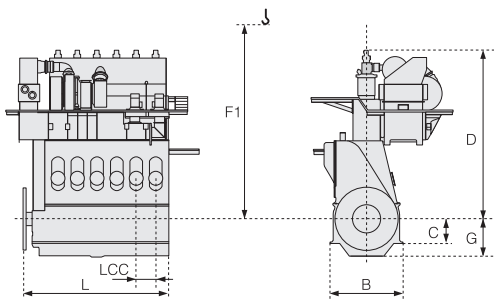
Camshaft controlled



## Rated power (kW), principle dimension (mm) and weight (ton)

Speed	130 min <sup>-1</sup>				98 min <sup>-1</sup>				Dimension L	Weight
	P1	P2	P3	P4	P1	P2	P3	P4		
Cyl.										
5	6 225	4 975	4 700	3 750	5 102	168				
6	7 470	5 970	5 640	4 500	5 894	195				
7	8 715	6 965	6 580	5 250	6 686	222				
8	9 960	7 960	7 520	6 000	7 478	252				
Dimensions	LCC	B	C	D	F1	G				
	792	3 000	1 000	6 900	8 600	1 560				

Dimensions and weight are for engine of bedplate and column, made by cast iron.



## SFOC variation

UEC45LSE-1, complied with IMO Tier II  
SFOC (g/kWh)

Load	P1	P2	P3	P4
100%	174.0	168.7	174.0	168.7
75%	170.1	166.4	170.1	166.4
50%	171.4	169.0	171.4	169.0

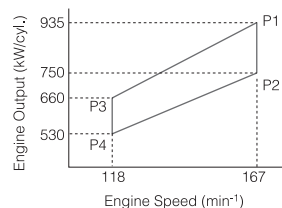
UEC45LSE-1-LPSCR, complied with IMO Tier III  
SFOC (g/kWh)

Mode	Load	P1	P2	P3	P4
Tier II mode	100%	174.0	168.7	174.0	168.7
	75%	170.1	166.4	170.1	166.4
Tier III mode	50%	171.4	169.0	171.4	169.0
	100%	174.0	169.3	174.3	169.8
Tier III mode	75%	170.7	167.1	171.4	167.7
	50%	171.4	169.0	172.1	169.6

## Main specifications

Cylinder bore	[ mm ]	350
Piston stroke	[ mm ]	1 550
BMEP at P1	[ bar ]	22.5
Piston speed at P1	[ m/s ]	8.6
Stroke / bore	[ - ]	4.43

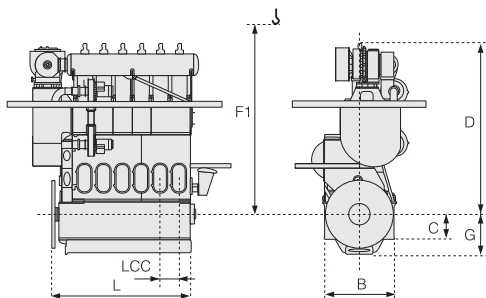
Electronically controlled



## Rated power (kW), principle dimension (mm) and weight (ton)

Speed	167 min <sup>-1</sup>		118 min <sup>-1</sup>		Dimension L	Weight
	P1	P2	P3	P4		
Cyl.						
5	4 675	3 750	3 300	2 650	4 398	79 (81)
6	5 610	4 500	3 960	3 180	5 010	88 (90)
7	6 545	5 250	4 620	3 710	5 622	98 (101)
8	7 480	6 000	5 280	4 240	6 234	109 (112)
Dimensions	LCC	B	C	D	F1	G
	612	2 284	830	5 623	6 725	1 326

Weight in ( ) is for engine of bedplate, made by cast iron.



## SFOC variation

UEC35LSE-Eco-C1, complied with IMO Tier II  
SFOC (g/kWh) with standard

Load	P1	P2	P3	P4
100%	168.0	162.8	168.0	162.8
75%	163.3	159.3	163.3	159.3
50%	165.1	162.2	165.1	162.2

UEC35LSE-Eco-C1, complied with IMO Tier II  
SFOC (g/kWh) with LLO

Load	P1	P2	P3	P4
100%	169.6	164.4	169.6	164.4
75%	162.6	158.6	162.6	158.6
50%	163.6	160.7	163.6	160.7

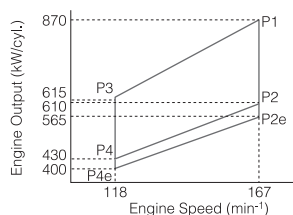
UEC35LSE-Eco-C1-LPSCR, complied with IMO Tier III  
SFOC (g/kWh) with LLO

Mode	Load	P1	P2	P3	P4
Tier II mode	100%	169.6	164.4	169.6	164.4
	75%	162.6	158.6	162.6	158.6
	50%	163.6	160.7	163.6	160.7
Tier III mode	100%	169.6	164.4	169.6	165.1
	75%	163.2	159.5	164.0	160.2
	50%	163.6	161.0	164.6	162.0

## Main specifications

Cylinder bore	[ mm ]	350
Piston stroke	[ mm ]	1 550
BMEP at P1	[ bar ]	21.0
Piston speed at P1	[ m/s ]	8.6
Stroke / bore	[ - ]	4.43

Electronically controlled



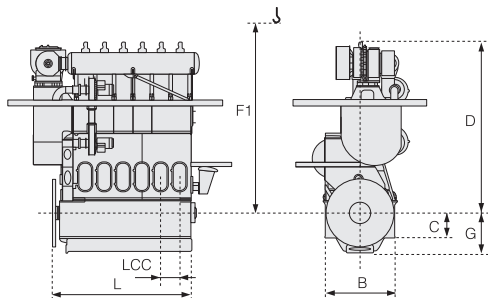
## Rated power (kW), principle dimension (mm) and weight (ton)

Cyl.	167 min <sup>-1</sup>			118 min <sup>-1</sup>			Dimension L	Weight
	P1	P2	P2e	P3	P4	P4e		
5	4 350	3 050	2 825	3 075	2 150	2 000	4 398	79 (81)
6	5 220	3 660	3 390	3 690	2 580	2 400	5 010	88 (90)
7	6 090	4 270	3 955	4 305	3 010	2 800	5 622	98 (101)
8	6 960	4 880	4 520	4 920	3 440	3 200	6 234	109 (112)

Dimensions	LCC	B	C	D	F1	G
		612	2 284	830	5 623	6 725

Weight in ( ) is for engine of bedplate, made by cast iron.



## SFOC variation

UEC35LSE-Eco-B2, complied with IMO Tier II  
SFOC (g/kWh) with standard

Load	P1	P2	P2e	P3	P4	P4e
100%	167.0	161.0	161.5	167.0	161.0	161.5
75%	161.5	155.5	156.0	161.5	155.5	156.0
50%	163.1	157.1	157.6	163.1	157.1	157.6

UEC35LSE-Eco-B2, complied with IMO Tier II  
SFOC (g/kWh) with LLO

Load	P1	P2	P2e	P3	P4	P4e
100%	168.6	162.6	163.1	168.6	162.6	163.1
75%	160.8	154.8	155.3	160.8	154.8	155.3
50%	161.6	155.6	156.1	161.6	155.6	156.1

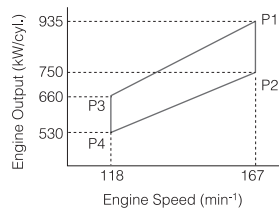
UEC35LSE-Eco-B2-LPSCR, complied with IMO Tier III  
SFOC (g/kWh) with LLO

Mode	Load	P1	P2	P2e	P3	P4	P4e
Tier II mode	100%	168.6	162.6	163.1	168.6	162.6	163.1
	75%	160.8	154.8	155.3	160.8	154.8	155.3
	50%	161.6	155.6	156.1	161.6	155.6	156.1
Tier III mode	100%	168.6	163.2	163.9	168.6	163.7	164.4
	75%	161.6	155.9	156.4	162.3	156.5	157.0
	50%	161.8	156.0	156.5	162.7	156.8	157.2

## Main specifications

Cylinder bore	[ mm ]	350
Piston stroke	[ mm ]	1 550
BMEP at P1	[ bar ]	22.5
Piston speed at P1	[ m/s ]	8.6
Stroke / bore	[ - ]	4.43

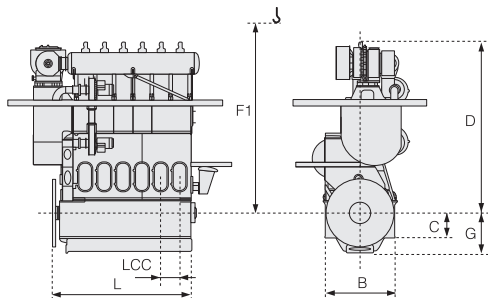
Camshaft controlled



## Rated power (kW), principle dimension (mm) and weight (ton)

Speed	167 min <sup>-1</sup>		118 min <sup>-1</sup>		Dimension L	Weight
	P1	P2	P3	P4		
Cyl.	P1	P2	P3	P4	L	
5	4 675	3 750	3 300	2 650	4 398	80 (82)
6	5 610	4 500	3 960	3 180	5 010	89 (91)
7	6 545	5 250	4 620	3 710	5 622	98 (101)
8	7 480	6 000	5 280	4 240	6 234	108 (111)
Dimensions	LCC	B	C	D	F1	G
	612	2 284	830	5 623	6 725	1 326

Weight in ( ) is for engine of bedplate, made by cast iron.



## SFOC variation

### UEC35LSE-C1, complied with IMO Tier II SFOC (g/kWh)

Load	P1	P2	P3	P4
100%	171.0	165.8	171.0	165.8
75%	167.1	163.4	167.1	163.4
50%	168.4	166.0	168.4	166.0

### UEC35LSE-C1-LPSCR, complied with IMO Tier III SFOC (g/kWh)

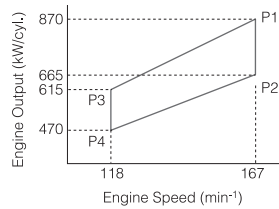
Mode	Load	P1	P2	P3	P4
Tier II mode	100%	171.0	165.8	171.0	165.8
	75%	167.1	163.4	167.1	163.4
	50%	168.4	166.0	168.4	166.0
Tier III mode	100%	171.0	165.8	171.0	166.6
	75%	167.7	164.3	168.5	165.0
	50%	168.4	166.4	169.5	167.3



## Main specifications

Cylinder bore	[ mm ]	350
Piston stroke	[ mm ]	1 550
BMEP at P1	[ bar ]	21.0
Piston speed at P1	[ m/s ]	8.6
Stroke / bore	[ - ]	4.43

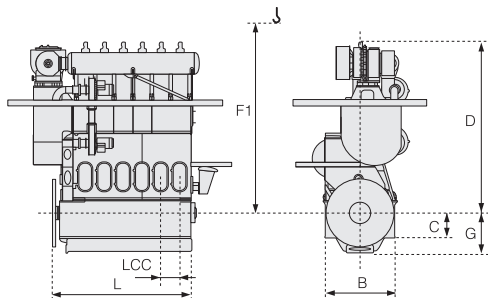
Camshaft controlled



## Rated power (kW), principle dimension (mm) and weight (ton)

Speed	167 min <sup>-1</sup>			118 min <sup>-1</sup>		Dimension L	Weight
	P1	P2	P3	P4			
Cyl.	P1	P2	P3	P4			
5	4 350	3 325	3 075	2 350	4 398	80 (82)	
6	5 220	3 990	3 690	2 820	5 010	89 (91)	
7	6 090	4 655	4 305	3 290	5 622	98 (101)	
8	6 960	5 320	4 920	3 760	6 234	108 (111)	
Dimensions	LCC	B	C	D	F1	G	
	612	2 284	830	5 623	6 725	1 326	

Weight in ( ) is for engine of bedplate, made by cast iron.



## SFOC variation

### UEC35LSE-B2, complied with IMO Tier II SFOC (g/kWh)

Load	P1	P2	P3	P4
100%	170.0	166.0	170.0	166.0
75%	165.5	161.5	165.5	161.5
50%	167.1	163.1	167.1	163.1

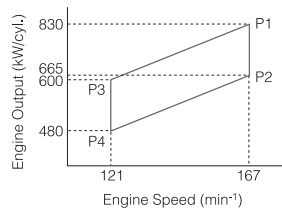
### UEC35LSE-B2-LPSCR, complied with IMO Tier III SFOC (g/kWh)

Mode	Load	P1	P2	P3	P4
Tier II mode	100%	170.0	166.0	170.0	166.0
	75%	165.5	161.5	165.5	161.5
	50%	167.1	163.1	167.1	163.1
Tier III mode	100%	170.0	166.4	170.0	167.0
	75%	166.2	162.6	167.0	163.2
	50%	167.3	163.6	168.3	164.4

## Main specifications

Cylinder bore	[ mm ]	330
Piston stroke	[ mm ]	1 550
BMEP at P1	[ bar ]	22.5
Piston speed at P1	[ m/s ]	8.6
Stroke / bore	[ - ]	4.70

Camshaft controlled



## Rated power (kW), principle dimension (mm) and weight (ton)

Speed	167 min <sup>-1</sup>		121 min <sup>-1</sup>		Dimension L	Weight
	P1	P2	P3	P4		
Cyl.						
5	4 150	3 325	3 000	2 400	4 398	79 (81)
6	4 980	3 990	3 600	2 880	5 010	88 (90)
7	5 810	4 655	4 200	3 360	5 622	97 (100)
8	6 640	5 320	4 800	3 840	6 234	107 (110)
Dimensions	LCC	B	C	D	F1	G
	612	2 284	830	5 576	6 725	1 326

Weight in ( ) is for engine of bedplate, made by cast iron.

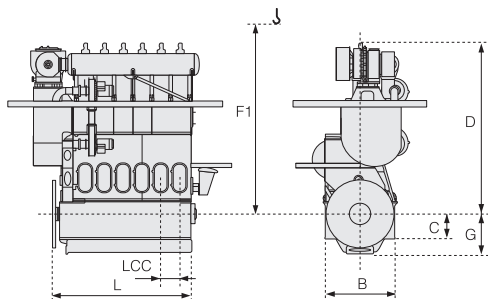
## SFOC variation

### UEC33LSE-C2, complied with IMO Tier II SFOC (g/kWh)

Load	P1	P2	P3	P4
100%	171.0	167.0	171.0	167.0
75%	166.5	162.5	166.5	162.5
50%	168.1	164.1	168.1	164.1

### UEC33LSE-C2-LPSCR, complied with IMO Tier III SFOC (g/kWh)

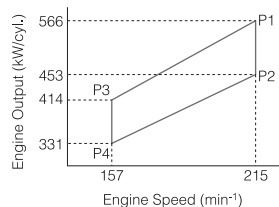
Mode	Load	P1	P2	P3	P4
Tier II mode	100%	171.0	167.0	171.0	167.0
	75%	166.5	162.5	166.5	162.5
	50%	168.1	164.1	168.1	164.1
Tier III mode	100%	171.0	167.0	171.0	167.0
	75%	166.9	163.2	167.5	163.8
	50%	168.1	164.2	168.9	165.0



## Main specifications

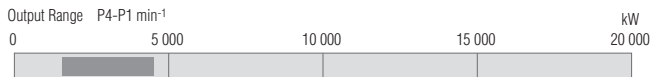
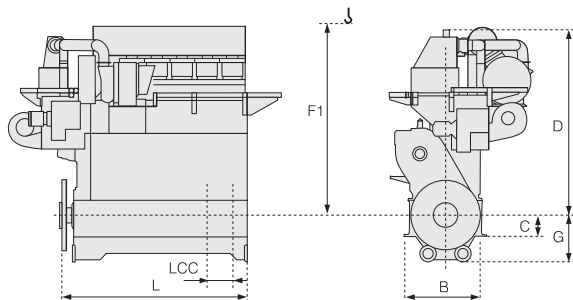
Cylinder bore	[ mm ]	330
Piston stroke	[ mm ]	1 050
BMEP at P1	[ bar ]	17.6
Piston speed at P1	[ m/s ]	7.5
Stroke / bore	[ - ]	3.18

Electronically controlled



## Rated power (kW), principle dimension (mm) and weight (ton)

Speed	215 min <sup>-1</sup>			157 min <sup>-1</sup>		Dimension L	Weight
	P1	P2	P3	P4			
Cyl.							
5	2 830	2 265	2 070	1 655	3 765	57	
6	3 400	2 720	2 480	1 985	4 345	65	
7	3 965	3 170	2 895	2 315	4 925	73	
8	4 530	3 625	3 310	2 645	5 505	83	
Dimensions	LCC	B	C	D	F1	G	
	580	1 900	500	4 301	5 150	906	



## SFOC variation

UEC33LSII-Eco, complied with IMO Tier II  
SFOC (g/kWh) with standard

Load	P1	P2	P3	P4
100%	172.0	166.7	172.0	166.7
75%	167.3	163.2	167.3	163.2
50%	169.1	166.1	169.1	166.1

UEC33LSII-Eco, complied with IMO Tier II  
SFOC (g/kWh) with LLO

Load	P1	P2	P3	P4
100%	173.6	168.3	173.6	168.3
75%	166.6	162.5	166.6	162.5
50%	167.6	164.6	167.6	164.6

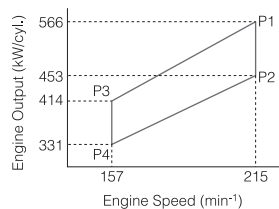
UEC33LSII-Eco-LPSCR, complied with IMO Tier III  
SFOC (g/kWh) with LLO

Mode	Load	P1	P2	P3	P4
Tier II mode	100%	173.6	168.3	173.6	168.3
	75%	166.6	162.5	166.6	162.5
	50%	167.6	164.6	167.6	164.6
Tier III mode	100%	173.7	168.9	174.5	169.5
	75%	166.7	162.6	167.5	163.4
	50%	167.6	164.6	167.7	164.7

## Main specifications

Cylinder bore	[ mm ]	330
Piston stroke	[ mm ]	1 050
BMEP at P1	[ bar ]	17.6
Piston speed at P1	[ m/s ]	7.5
Stroke / bore	[ - ]	3.18

Camshaft controlled



## Rated power (kW), principle dimension (mm) and weight (ton)

Cyl.	215 min <sup>-1</sup>		157 min <sup>-1</sup>		Dimension L	Weight
	P1	P2	P3	P4		
5	2 830	2 265	2 070	1 655	3 765	52
6	3 400	2 720	2 480	1 985	4 345	60
7	3 965	3 170	2 895	2 315	4 925	68
8	4 530	3 625	3 310	2 645	5 505	78
Dimensions	LCC	B	C	D	F1	G
	580	1 900	500	4 301	5 150	906

## SFOC variation

UEC33LSII, complied with IMO Tier II

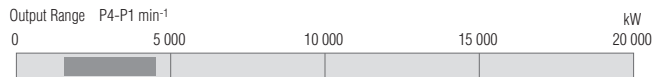
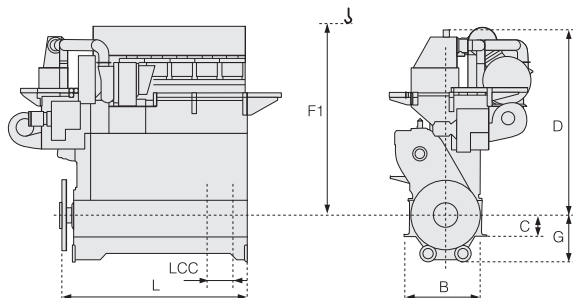
SFOC (g/kWh)

Load	P1	P2	P3	P4
100%	179.0	173.7	179.0	173.7
75%	175.1	171.4	175.1	171.4
50%	176.4	174.0	176.4	174.0

UEC33LSII-LPSCR, complied with IMO Tier III

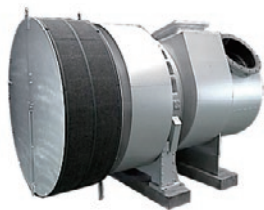
SFOC (g/kWh)

Mode	Load	P1	P2	P3	P4
Tier II mode	100%	179.0	173.7	179.0	173.7
	75%	175.1	171.4	175.1	171.4
	50%	176.4	174.0	176.4	174.0
Tier III mode	100%	179.0	174.1	179.8	174.8
	75%	175.1	171.4	175.9	172.2
	50%	176.4	174.0	176.4	174.0



# METurbo

Global standard exhaust gas turbochargers used widely for marine and stationary engines.



## Features

- Applicable to all major engines (MAN ES, WinGD and J-ENG)
- Advanced aerodynamic design based on numerous tests and analysis results
- Long lifetime and High reliability
- Low noise silencer application
- Simple and compact
- High robustness of bearing pedestal type structure

## Integrated EGB Turbochargers

Ordinary, exhaust bypass line has been installed between exhaust gas receiver and exhaust gas duct of the engine. Integrated EGB enables to bypass the exhaust gas by integrating the bypass pipe and open/close valve on turbocharger in between gas inlet casing and outlet gas casing. Integrated EGB is also available by retrofitting from standard MET turbocharger by just changing several parts. Also, this system could be applicable to temperature increment procedure at 2-stroke engine with Low Pressure SCR system.

## Features

- Connected directly to turbocharger
- No EGB pipe (engine side)

Also Available  
for Retrofitting





# MET-ER Series

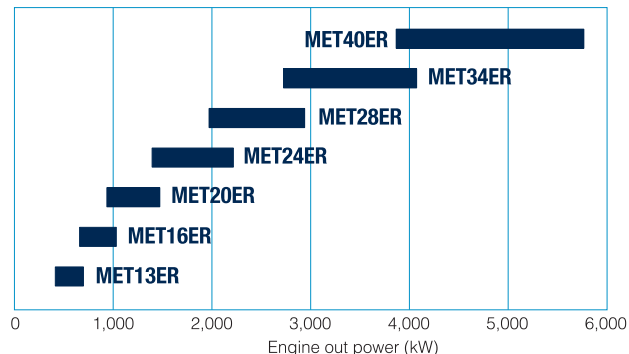
MET-ER Series, a new type of radial turbocharger succeed the high reliability and maintainability of MET-SRC series. This new turbocharger has improved its responsiveness and reduces the number of parts to achieve a more compact design and high maintainability.

MET-ER Series has been developed based on high pressure ratio requirements for turbochargers, in order to improve the performance of and reduce the NOx emissions of engines.



### Features

- MET-ER takes advantage of MET-SCR features
- Compact design (about 40%)
- Optimized to engine power range
- Applicable to high pressure ratio
- Reduced number of parts by 30%
- Excellent performance and better transient response



# MET-SRC Series

Developed to meet the demand for higher performance and reliability, well proven by the excellent service records of axial type MET turbochargers.



### Features

- Applicable to high pressure ratio
- Non-water cooling
- Easy overhaul
- Crew-maintainable design
- Condition based maintenance
- High reliability
- High efficiency
- Applicable to heavy fuel oil

Type		MET18SRC	MET22SRC	MET26SRC	MET30SRC	MET37SRC
Max. Pressure Ratio	—	5.5			5.5	
Engine Output Range per Turbocharger	kW	400 - 1,100	650 - 1,600	850 - 2,200	1,150 - 3,300	2,000 - 4,400
Maximum Continuous Gas Temperature before Turbine	°C	610				
Momentary Maximum Temperature before Turbine	°C	640				
Length	mm	712	835	1,075	1,368	1,661
Breadth	mm	510	605	735	860	1,070
Height	mm	510	605	735	860	1,070

\* Engine Output Range is the reference values subject to pressure ratio 3.5.



# MET-MBII Series

MET-MBII Series, a new type of axial turbocharger for achieving a further increase in air flow volume while maintaining the reliability and ease of maintenance of the MET-MB turbocharger.

The MBII turbocharger provides 16% larger air flow volume than the MET-MB Series, which leads one or two models more compact compared to previous models.

### Features

- MET-MBII takes advantage of MET-MB features
- Increased air-flow rate by 16%
- Downsizing by increasing air flow



Type		MET33MBII	MET37MBII	MET42MBII	MET48MBII		MET53MBII	MET60MBII	MET66MBII	MET71MBII	MET83MBII	MET90MBII
Max. Pressure Ratio	—	5.0						5.0				
Engine Output Range per Turbocharger	kW	3,400-6,000	4,600-7,600	5,600-9,300	7,200-11,900		9,000-14,900	11,200-18,400	14,000-23,100	16,400-27,100	22,500-37,100	27,400-45,200
Maximum Continuous Gas Temperature before Turbine	°C	580						580				
Momentary Maximum Temperature before Turbine	°C	610						610				
Length	mm	1,740	1,940	2,020	2,400		2,610	2,960	3,200	3,290	3,940	4,440
Breadth	mm	899	998	1,094	1,255		1,390	1,530	1,718	1,820	2,233	2,465
Height	mm	945	1,095	1,171	1,330		1,439	1,570	1,780	1,865	2,225	2,410

\* Engine Output Range is the reference values subject to pressure ratio 4.0.

# MET-MB Series

Global standard turbochargers for marine and stationary engines for J-ENG, WinGD and MAN Energy Solutions.

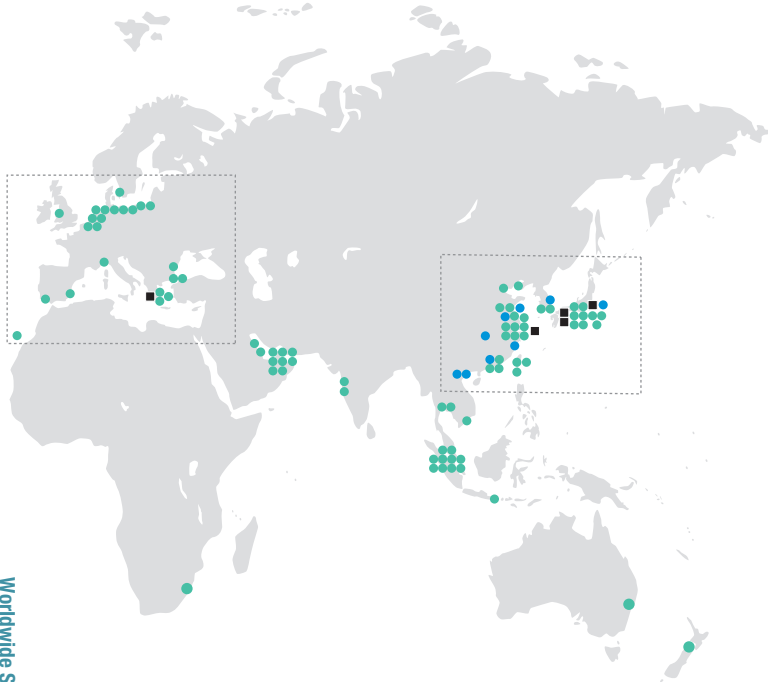
### Features

- Applicable to all major engines (J-ENG, WinGD, MAN ES)
- Crew-maintainable design
- Condition based maintenance
- Advanced aerodynamic design based on numerous tests and analysis results
- High reliability
- High efficiency
- Easy overhaul
- Applicable to heavy fuel oil

Type		MET33MB	MET37MB	MET42MB	MET48MB		MET53MB	MET60MB	MET66MB	MET71MB	MET83MB	MET90MB
Max. Pressure Ratio	—	5.0						5.0				
Engine Output Range per Turbocharger	kW	2,600 -4,600	3,800 -6,300	4,700 -7,700	6,000 -10,000		7,500 -12,500	9,300 -15,500	11,700 -19,400	13,700 -22,700	18,800 -31,100	22,900 -37,900
Maximum Continuous Gas Temperature before Turbine	°C	580						580				
Momentary Maximum Temperature before Turbine	°C	610						610				
Length	mm	1,661	1,851	1,944	2,280		2,504	2,825	3,065	3,143	3,771	4,241
Breadth	mm	899	998	1,134	1,255		1,417	1,530	1,785	1,820	2,233	2,465
Height	mm	945	1,095	1,155	1,330		1,435	1,540	1,720	1,865	2,180	2,410

\* Engine Output Range is the reference values subject to pressure ratio 4.0.

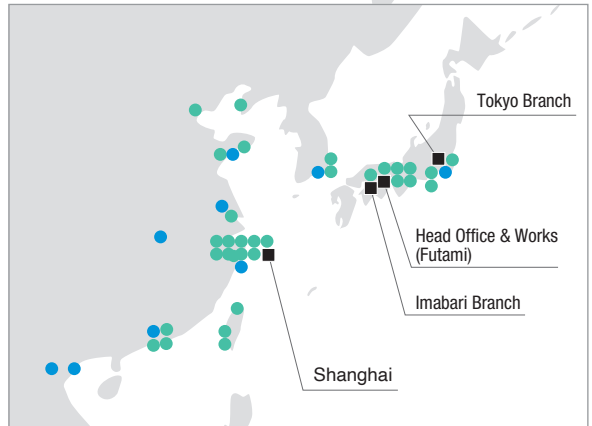
# Worldwide Service Network



- Base of J-ENG offices
- Licensees
- Authorized Repair Agents (ARA)

Worldwide Service Network

Worldwide Service Network





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## After-Sales Services

### Marine Engines (UE Engines and Mitsubishi-Wärtsilä Diesel Engines)

#### China

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##### Spare parts and service engineers, and technical inquiries

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#### Japan and Other Countries

---

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##### Technical inquiries

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MET

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UE

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