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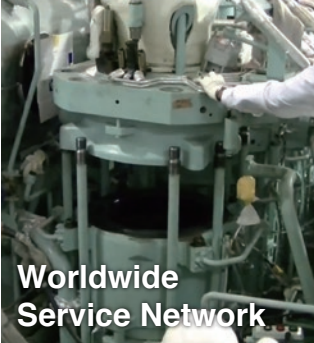
JAPAN ENGINE CORPORATION UE Engine 2022

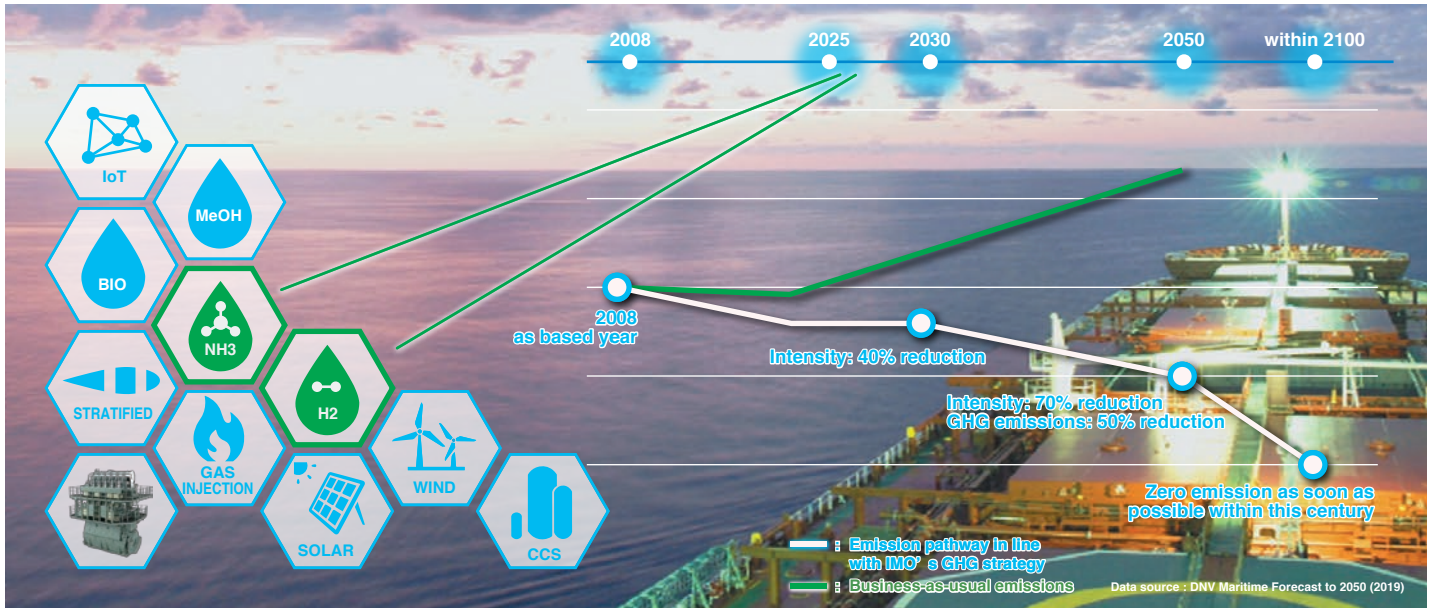


UE Engine 2022





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Paris Agreement was adopted in 2015, and the IMO adopted an initial strategy for emission reduction from shipping at MEPC72 held in 2018. This strategy aims to reduce the total annual GHG emissions from international shipping by at least 50% by 2050, and to reduce the average carbon intensity by at least 40% by 2030 while aiming for 70% in 2050 (all figures compared to 2008). Furthermore, it is planning to move the schedule of GHG emission reduction forward (e.g. achieving GHG zero emission by 2050) at MEPC.

Alternative fuels such as **LNG, LPG, methanol, biofuels** etc. are already beginning to be used in the shipping industry, but synthetic fuels such as ammonia and hydrogen from renewable energies are needed to reach the GHG reduction target.

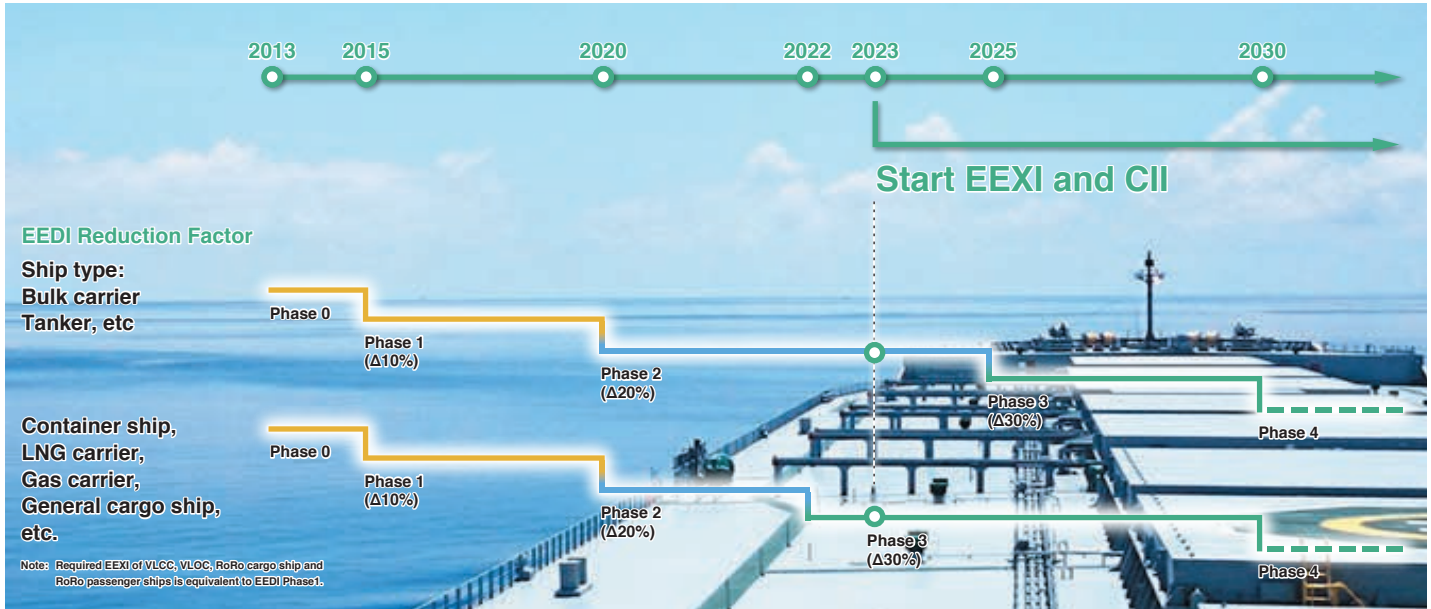
Japan Engine Corporation will continue to develop engines that can operate by burning these **Alternative fuels**. So far, we had developed dual-fuel combustion technology for LNG fuels, and then have developed LSJ engines equipped with stratified fuel-water injection technology that can be applied to two different fuel combustion technologies. Then, in 2021, we started development of ammonia fuel engine and hydrogen fuel engine in order to contribute to the achievement of sustainable shipping and GHG zero emission.

Ammonia fuel engine :

Ammonia fuel engines will be developed by applying our unique stratified fuel injection technology. Flame-retardant ammonia and pilot fuel are layered in the fuel valve to completely burn ammonia during combustion. This stratified fuel injection technology is also being studied for application to liquid fuels such as **LPG, methanol, biofuels etc.** which are expected to contribute to GHG reduction as well as ammonia. First ammonia fuel engine will complete full-scale engine testing around 2025.

Hydrogen fuel engine :

For the hydrogen fuel engines, the technology cultivated in the development of the DF engine in the past will be applied in the first stage, and the combustion technology without fossil fuel will be applied in the second stage to achieve the goal of GHG zero emission. For developing the hydrogen fuel engine, we formed a consortium with two Japanese engine manufacturers (Kawasaki Heavy Industries, Ltd. and Yanmar Power Technology, Co., Ltd.) and established a joint development company HyENG corp. in 2021. First engine will complete full-scale engine testing around 2026.



EEDI (Energy Efficiency Design Index) and SEEMP (Ship Energy Efficiency Management Plan) has been applied to new ships engaged in international voyages since 2013 because of regulating CO₂ emissions from shipping and, for specific ship type, moving schedule of EEDI Phase 3 forward was adopted at MEPC75 (2020). Furthermore, in order to achieve the IMO 2030 targets, the EEXI and CII for existing ship have been adopted at MEPC76 (2021). UE engines with low SFOC contribute to GHG emissions reduction.

EEXI (Energy Efficiency EXisting ship Index):

The EEXI requirements shall apply to all ships of 400 GT and above which are engaged in the international voyages, regardless of delivery data. The EEXI verification shall take place at first annual, intermediate or renewal survey of the International Air Pollution Certificate (IAPP Certificate), whichever is the first, on or after January 1, 2023.

The EEXI is introduced as the energy efficiency index for existing ship and is calculated and evaluated by the same formula as EEDI. As a result, CO₂ emission from existing ships will be regulated by the same level as CO₂ emission from new ships as of 2023.

CII (Carbon Intensity Indicator):

The CII rating shall apply to all ships of 5,000 GT and above which are engaged in international voyage, regardless of delivery data. Each ship will be rated on five-tiered scale (A to E) by the CII guidelines from 2023 consumption data, based on data of IMO DCS (Data Collection System). Low rating ships (E or D for 3 consecutive years) should be developed the corrective action plan as a part of SEEMP and need to be operated with the corrective action plan.

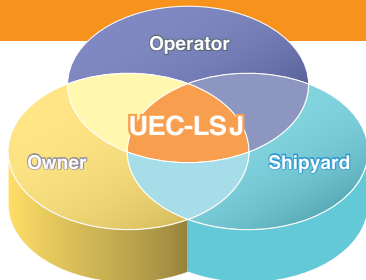
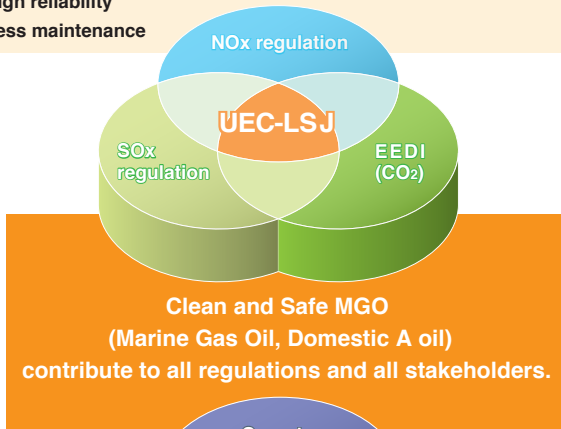
Short-term Measures for the IMO 2030 target:

According to the common concept of EEDI/EEXI formula, reducing the engine output, fuel consumption and/or CO₂ conversion factor is the common measures. For a new ship, installing the latest LSH series and LSJ series which is applied the layered water injection system, de-rating and the use of low carbon fuels (eventually, zero carbon fuels) is effective. For an existing ship which is difficult to change the engine specification and to convert to alternative low carbon fuels, EPL (Engine Power Limitation) as regulating the maximum continuous output of the main engine is an effective and realistic measure, but, we can propose **the further measures (e.g. changing the engine tuning, retrofit items)** for reducing CO₂ emission, due to each UE engine type.

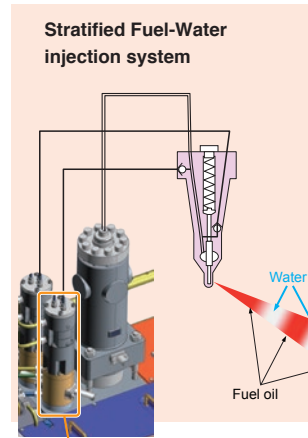
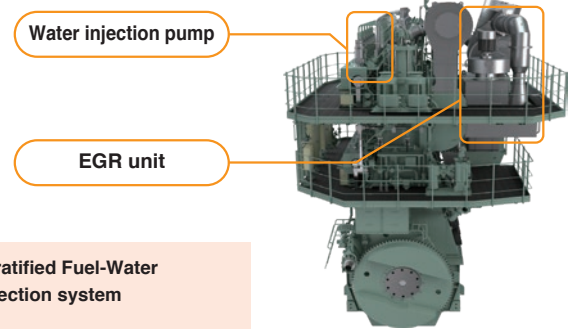
MGO mono-fuel engine, UEC60LSJ/50LSJ/42LSJ/35LSJ, the best solution for SOx regulation 2020

Features

- One of the best GHG reduction measures for ships that have difficulty installing LNG fuel engine
- Compliant with SOx regulation 2020
- Compliant with NOx regulation Tier II / Tier III
- Extra low SFOC, contribute to EEDI, by ultimate combustion technology and stratified Fuel-Water injection system
- SOx scrubber-less
- Simple engine room by mono-fuel without heating.
- High reliability
- Less maintenance

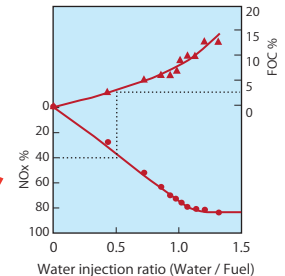


■ Correspondence table for each Tier III technologies



Water Injection pump

Less trade-off between SFOC and NOx reduction

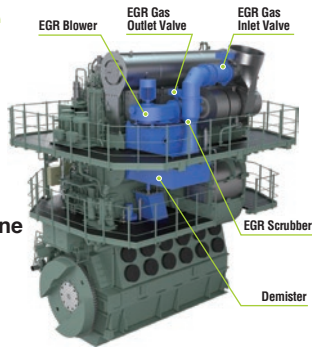


J-ENG is jumping toward the world ocean, by the **U**nique **M**arine **P**ower.



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

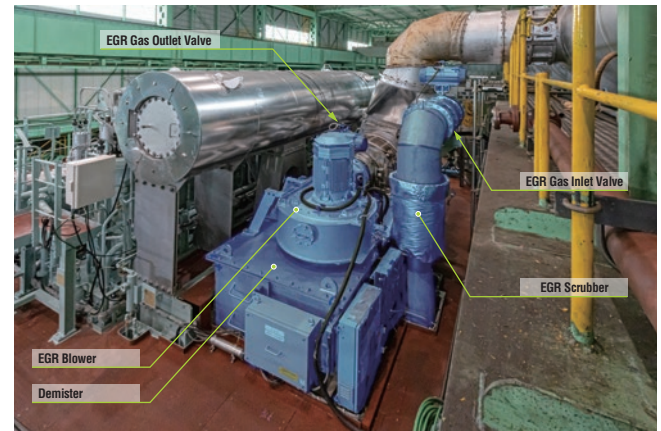
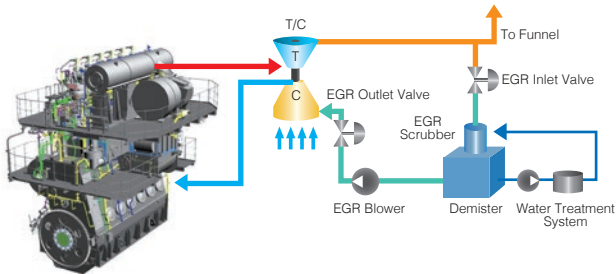
- Operation is executed by an on/off control of the EGR valves.

Low CAPEX, Low OPEX

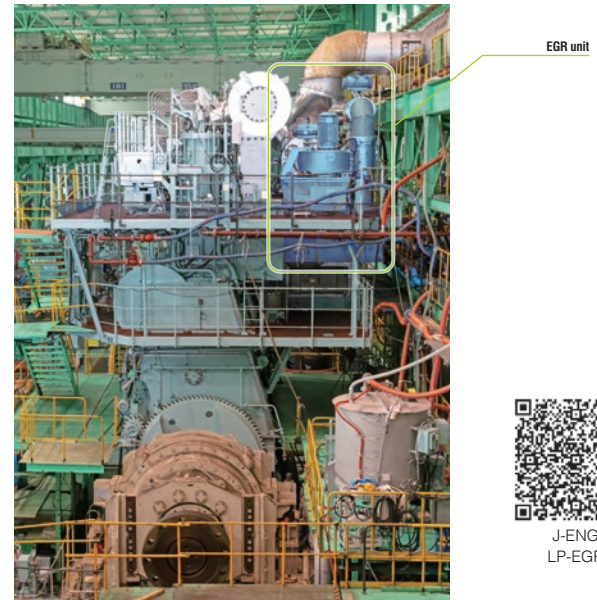
- Low capital expenditure required to produce this simple system.
- The EGR blower's low electric power consumption, coupled with no requirement for additional boiling for steam allows for low operating costs.

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



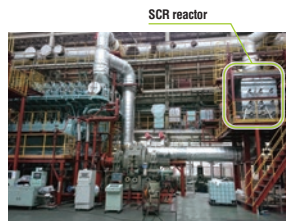
6UEC50LSH-Eco-C2-EGR overview



J-ENG
LP-EGR

SCR System

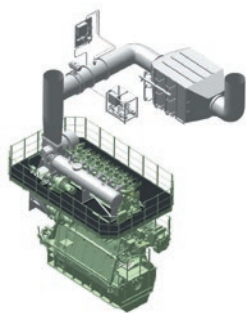
UEC small bore-size engines have applied the LP-SCR system as standard Tier III solution. Other size engines (over 40 cm bore-size) have applied LP-EGR system, but, from now on, the specific engines will also be able to select the HP-SCR system. The specific engines, which can apply the HP-SCR system, 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
UEC60LSJ	✓	✓	
UEC50LSJ	✓	✓	
UEC42LSJ	✓	✓	
UEC35LSJ		on request	✓
UEC50LSH-Eco-C3/C4	✓	✓	
UEC50LSH-Eco-C2	✓		✓
UEC42LSH-Eco	✓	✓	
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.

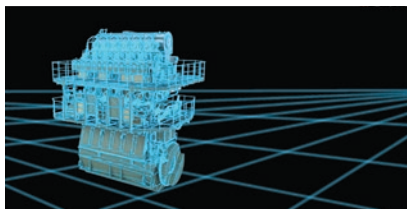
<https://www.j-eng.co.jp/en/technical/index.html>



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



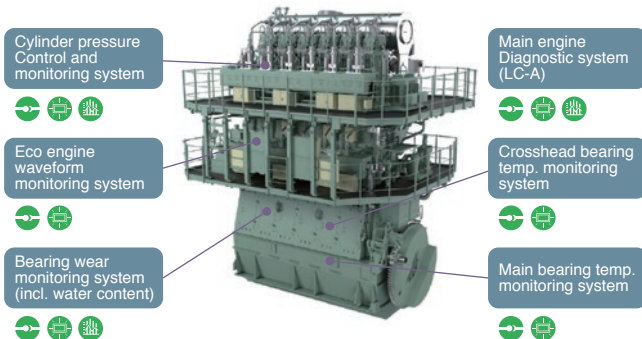
Upcoming: New system, using digital twin technology



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.

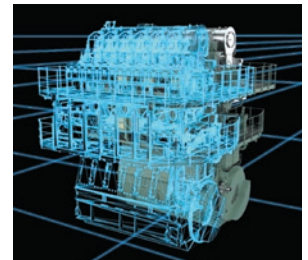
Monitoring System Initiatives

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.

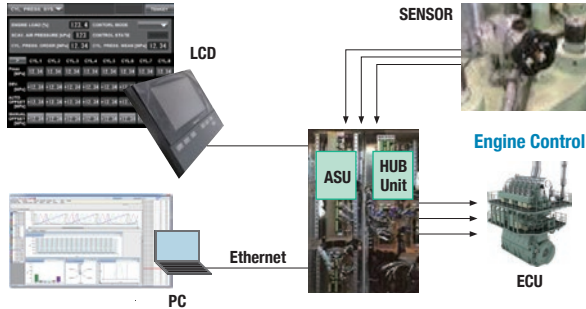
By providing this 5G Eco-system and introducing CBM and digital twin technologies, J-ENG can contribute to the optimization of safe operation, energy saving operation, maintenance cost and life cycle cost of customers.



Cylinder pressure control and monitoring system



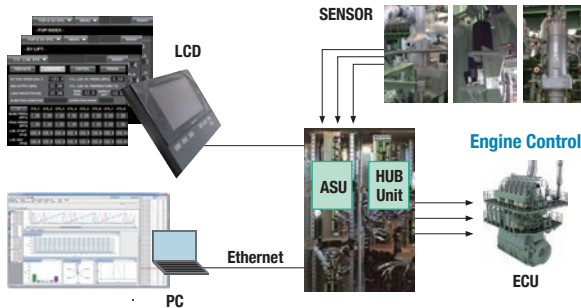
This system is installed as an additional system of Eco control system, and consists of cylinder pressure sensor, Analogue Sampling Unit (ASU), HUB unit and PC.



Eco engine waveform monitoring system



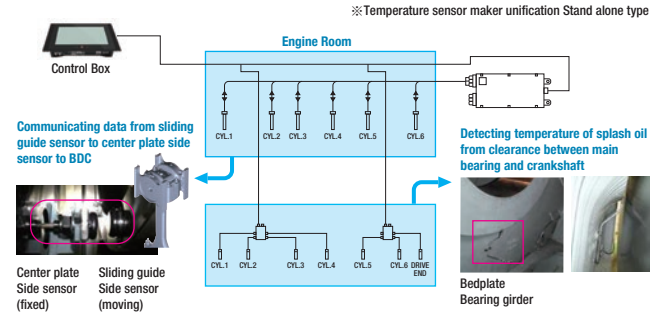
This system is installed as an additional system as well as cylinder pressure control and monitoring system, and consists of lift sensors of fuel injection pump / upper exhaust valve driving system, pressure sensor of cylinder lubricator, ASU, HUB unit and PC.



Bearing temperature monitoring system



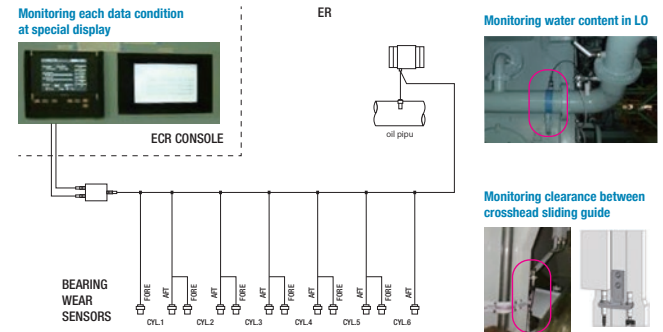
This system consists of sensors and signal transformer installing each bearing in crankcase.



Bearing wear monitoring system



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

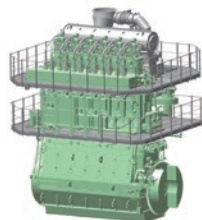


UE Engines

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**



UE-Eco Engine

In addition to the features of UE Engine, the UE 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

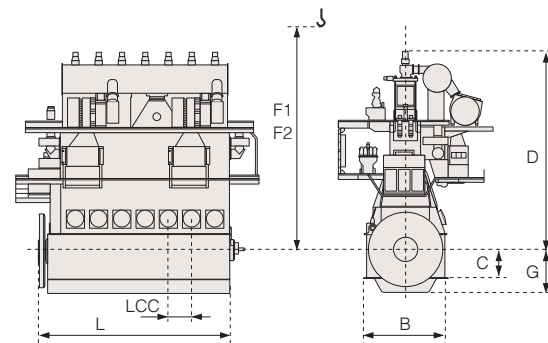
The A-ECL (Advanced Electronically Controlled Lubricating) system can reduce the explicit minimum dosage down to 0.5g/kWh, depending on engine conditions. The A-ECL system can further reduce the cylinder oil feed rate, compared with a mechanical lubricating system, particularly under partial load operation, 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
UEC60LSJ	✓		UEC80LSE-Eco	✓	
UEC50LSJ	✓		UEC60LSE-Eco	✓	
UEC42LSJ	✓		UEC50LSE-Eco	✓	✓
UEC35LSJ	✓	✓*2	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.

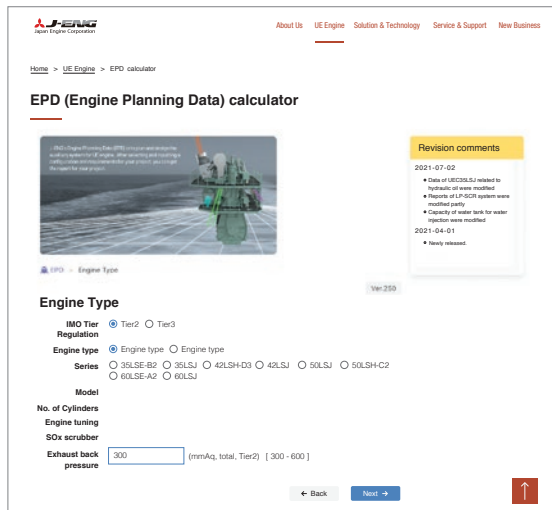
The data in this catalog is subject to change without prior notice. For the latest data, please check the data in the EPD calculator.

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/PIanning/Page1>



EPD



Other useful information is available

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



Technical Data



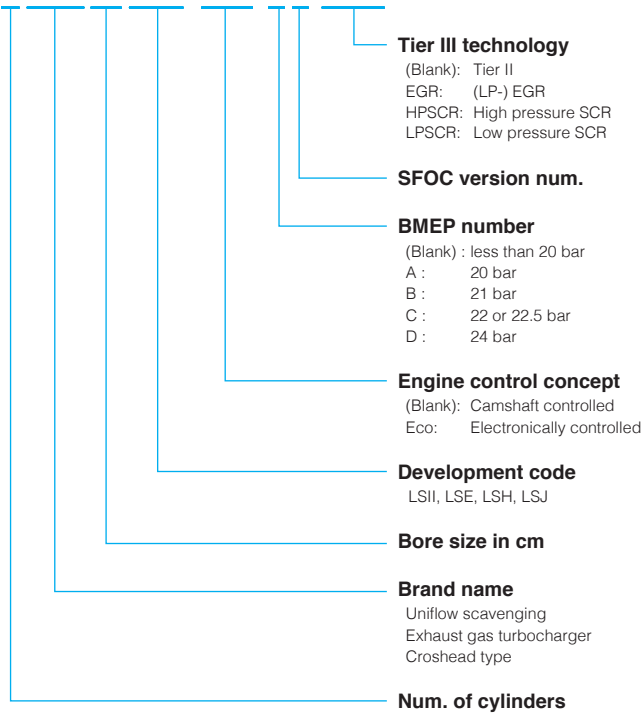
Installation Drawings



EoD

6UEC42LSH-Eco-D4-EGR

UE Engines
LSJ
LSH
LSE
LSII



SFOC version

■ Addition of new SFOC version 4

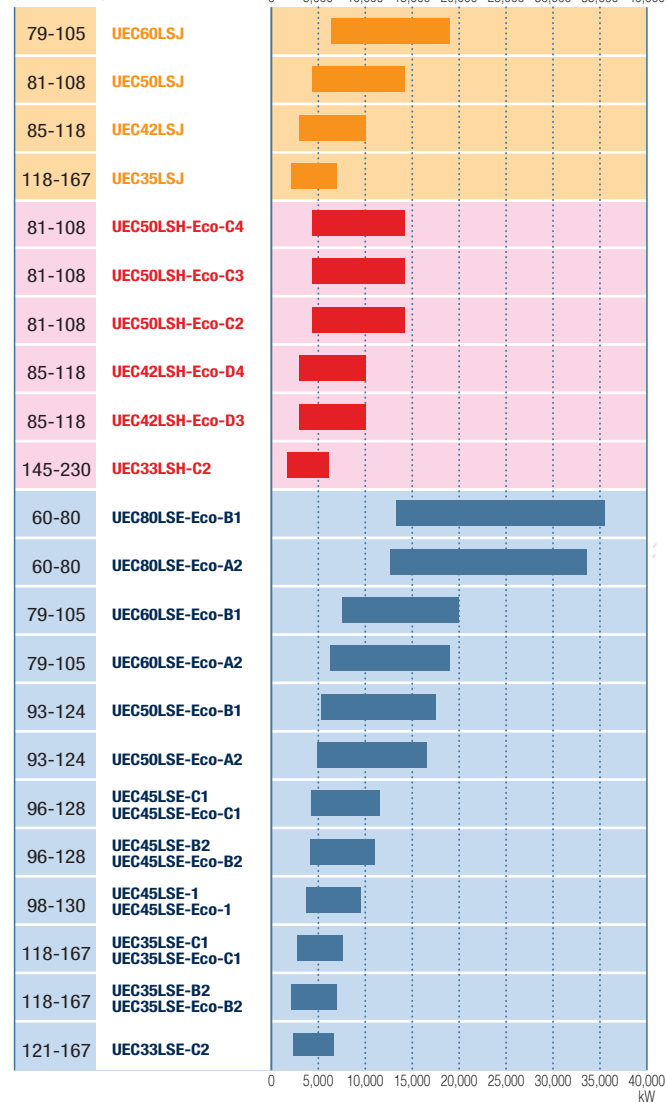
For UEC50LSH / UEC42LSH, the specific fuel oil consumption has been further improved by upgrading the fuel injection system.

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

Engine Speed
(P4-P1/min⁻¹)

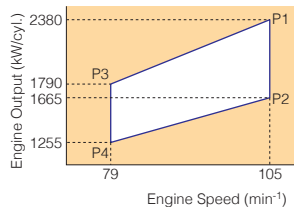
kW



UE Engines
LSJ
LSH
LSE
LSII

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



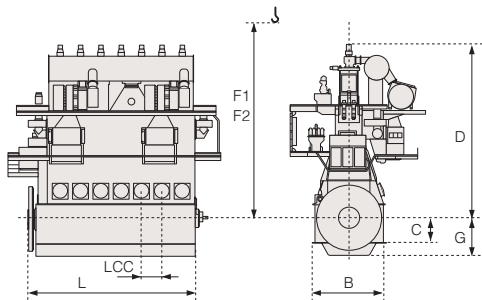
Rated power (kW), principle dimension (mm) and weight (ton)

Speed	105 min ⁻¹		79 min ⁻¹		Dimension L	Weight	
	P1	P2	P3	P4			
Cyl.							
5	11 900	8 325	8 950	6 275	6 780	302	
6	14 280	9 990	10 740	7 530	7 866	352	
7	16 660	11 655	12 530	8 785	8 952	402	
8	19 040	13 320	14 320	10 040	10 038	451	
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

UEC60LSJ, complied with IMO Tier II SFOC (g/kWh)

Load	P1	P2	P3	P4
100%	158.8	152.8	158.8	152.8
75%	153.3	147.3	153.3	147.3
50%	154.8	148.8	154.8	148.8

UEC60LSJ-EGR, complied with IMO Tier III SFOC (g/kWh)

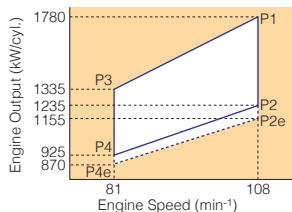
Mode	Load	P1	P2	P3	P4
Tier II mode	100%	158.8	152.8	158.8	152.8
	75%	153.3	147.3	153.3	147.3
	50%	154.8	148.8	154.8	148.8
Tier III mode	100%	160.4	154.4	160.4	154.4
	75%	154.9	148.9	154.9	148.9
	50%	156.4	150.4	156.4	150.4

UEC60LSJ-HPSCR, complied with IMO Tier III SFOC (g/kWh)

Mode	Load	P1	P2	P3	P4
Tier II mode	100%	158.8	152.8	158.8	152.8
	75%	153.3	147.3	153.3	147.3
	50%	154.8	148.8	154.8	148.8
Tier III mode	100%	159.1	153.1	159.1	153.1
	75%	153.5	147.5	153.5	147.5
	50%	155.2	149.2	155.2	149.6

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



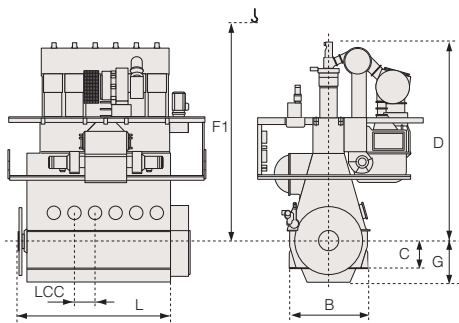
Rated power (kW), principle dimension (mm) and weight (ton)

Speed	108 min ⁻¹			81 min ⁻¹			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	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	G		
	870	3 350	1 190	8 448	10 050	1 700		

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

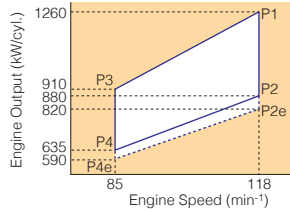
UEC50LSJ-HPSCR, complied with IMO Tier III

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



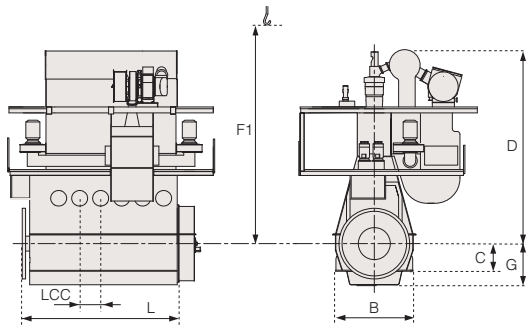
Rated power (kW), principle dimension (mm) and weight (ton)

Speed	118 min ⁻¹			85 min ⁻¹			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	G		
	760	2 800	1 000	6 952	8 700	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)

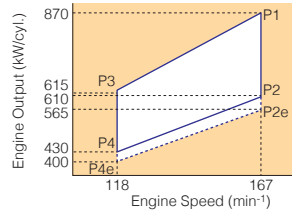
Mode	Load	P1	P2	P2e	P3	P4	P4e
Tier II mode	100%	157.0	151.0	151.5	157.0	151.0	151.5
	75%	151.5	145.5	146.0	151.5	145.5	146.0
	50%	153.0	147.0	147.5	153.0	147.0	147.5
Tier III mode	100%	158.6	152.6	153.1	158.6	152.6	153.1
	75%	153.1	147.1	147.6	153.1	147.1	147.6
	50%	154.6	148.6	149.1	154.6	148.6	149.1

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

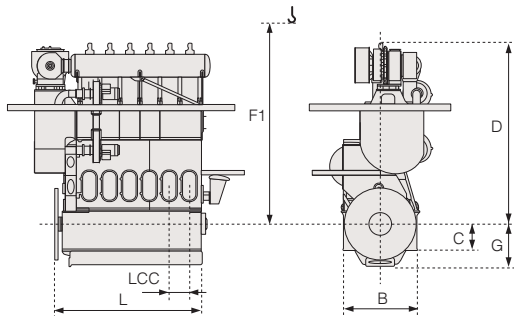


Rated power (kW), principle dimension (mm) and weight (ton)

Speed	167 min ⁻¹			118 min ⁻¹			Dimension		Weight
	P1	P2	P2e	P3	P4	P4e	L		
5 Cyl.	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

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

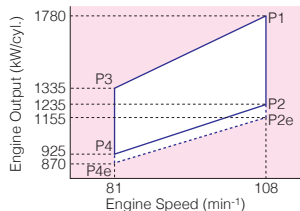
UEC35LSJ-LPSCR, complied with IMO Tier III

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%	159.4	153.4	153.9	159.4	153.4	153.9
	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]	500
Piston stroke	[mm]	2 300
BMEP at P1	[bar]	21.9
Piston speed at P1	[m/s]	8.3
Stroke / bore	[-]	4.60



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

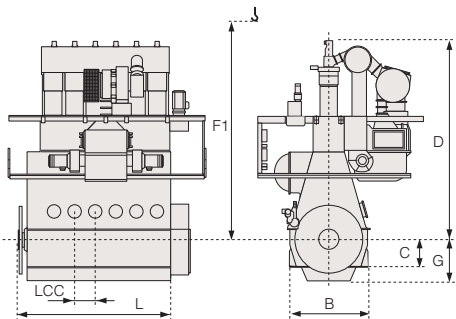
Speed	108 min ⁻¹			81 min ⁻¹			Dimension L	Weight
	P1	P2	P2e	P3	P4	P4e		
Cyl.								
5	8 900	6 175	5 775	6 675	4 625	4 350	5 547	194
6	10 680	7 410	6 930	8 010	5 550	5 220	6 417	225
7	12 460	8 645	8 085	9 345	6 475	6 090	7 287	257
8	14 240	9 880	9 240	10 680	7 400	6 960	8 157	289
Dimensions	LCC	B	C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

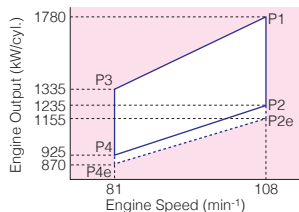
Mode	Load	P1	P2	P2e	P3	P4	P4e
Tier II mode	100%	165.1	158.4	158.9	165.1	158.4	158.8
	75%	155.3	148.6	149.1	155.3	148.6	149.0
	50%	154.6	148.7	149.1	154.6	148.7	149.1
Tier III mode	100%	165.2	158.5	159.0	165.2	158.5	158.9
	75%	157.4	150.7	151.2	157.4	150.7	151.1
	50%	157.3	150.6	151.1	157.3	150.6	151.0

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



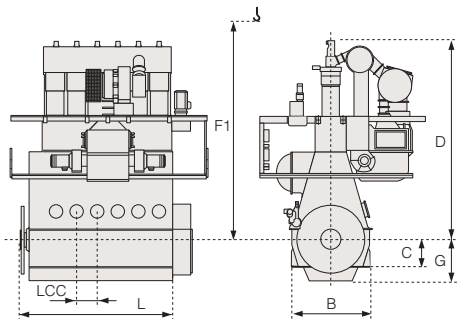
Rated power (kW), principle dimension (mm) and weight (ton)

Speed	108 min ⁻¹			81 min ⁻¹			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	G		
	870	3 350	1 190	8 448	10 050	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+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

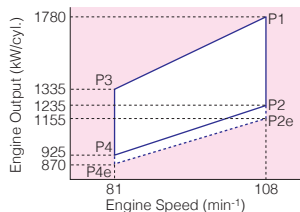
UEC50LSH-Eco-C3-HPSCR, complied with IMO Tier III

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

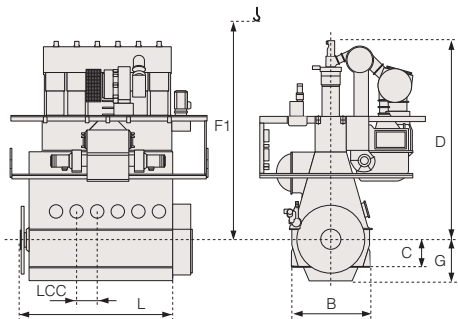


Rated power (kW), principle dimension (mm) and weight (ton)

Speed	108 min ⁻¹			81 min ⁻¹			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	G		
	870	3 350	1 190	8 448	10 050	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+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

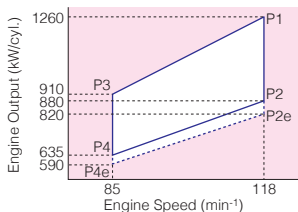
Mode	Load	P1	P2	P2e	P3	P4	P4e
Tier II mode	100%	167.2	161.3	161.7	167.2	161.3	161.7
	75%	159.4	153.5	153.9	159.4	153.5	153.9
	50%	158.2	152.3	152.7	158.2	152.3	152.7
Tier III mode	100%	168.8	162.9	163.3	168.8	162.9	163.3
	75%	161.0	155.1	155.5	161.0	155.1	155.5
	50%	160.9	155.0	155.4	160.9	155.0	155.4

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

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%	156.6	150.7	151.1	156.6	150.7	151.1
Tier III mode	100%	165.6	159.7	160.1	165.6	159.9	160.4
	75%	158.1	152.7	153.1	158.7	153.2	153.6
	50%	157.3	151.8	152.3	158.0	152.4	152.9

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



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

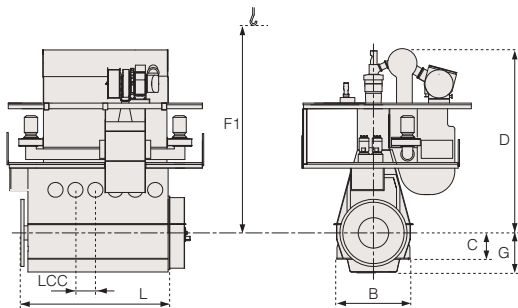
Speed	118 min ⁻¹				85 min ⁻¹			Dimension L	Weight
	P1	P2	P2e	P3	P4	P4e			
Cyl.									
5	6 300	4 400	4 100	4 550	3 175	2 950	4 857	146	
6	7 560	5 280	4 920	5 460	3 810	3 540	5 617	170	
7	8 820	6 160	5 740	6 370	4 445	4 130	6 337	195	
8	10 080	7 040	6 560	7 280	5 080	4 720	7 137	219	
Dimensions	LCC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

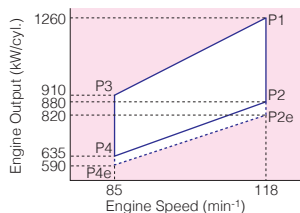
Mode	Load	P1	P2	P2e	P3	P4	P4e
Tier II mode	100%	165.1	159.1	159.6	165.1	159.1	159.6
	75%	155.3	149.3	149.8	155.3	149.3	149.8
	50%	154.6	148.6	149.1	154.6	148.6	149.1
Tier III mode	100%	165.2	159.2	159.7	165.2	159.2	159.7
	75%	157.4	151.4	151.9	157.4	151.4	151.9
	50%	157.3	151.3	151.8	157.3	151.3	151.8

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



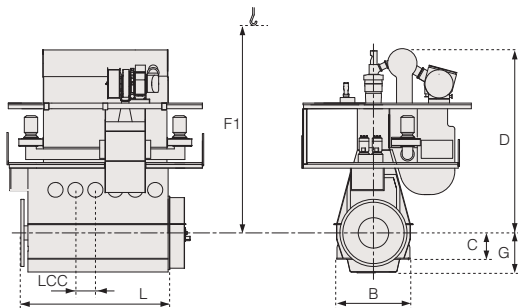
Rated power (kW), principle dimension (mm) and weight (ton)

Speed	118 min ⁻¹			85 min ⁻¹			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	G		
	760	2 800	1 000	6 952	8 700	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+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

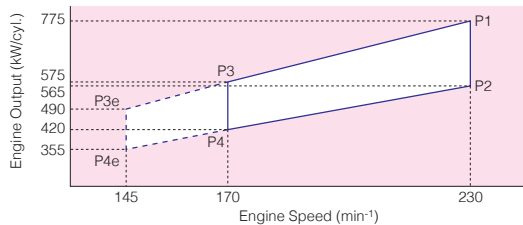
Mode	Load	P1	P2	P2e	P3	P4	P4e
Tier II mode	100%	167.1	161.1	161.6	167.1	161.1	161.6
	75%	157.3	151.3	151.8	157.3	151.3	151.8
	50%	156.6	150.6	151.1	156.6	150.6	151.1
Tier III mode	100%	167.2	161.2	161.7	167.2	161.2	161.7
	75%	159.4	153.4	153.9	159.4	153.4	153.9
	50%	159.3	153.3	153.8	159.3	153.3	153.8

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

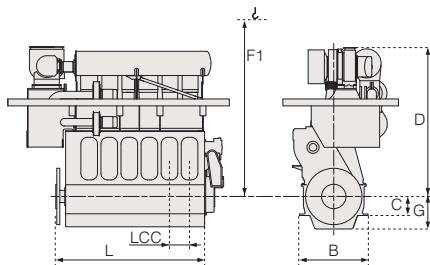


Rated power (kW), principle dimension (mm) and weight (ton)

Speed	230 min ⁻¹		170 min ⁻¹		145 min ⁻¹		Dimension	
	P1	P2	P3	P4	P3e	P4e	L	Weight
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	G
		580	1 980	550	4 300	5 100

All dimensions and weight will be changed during development period.



SFOC variation

UEC33LSH-Eco-C2, complied with IMO Tier II

SFOC (g/kWh)

Load	P1	P2	P3	P4	P3e	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

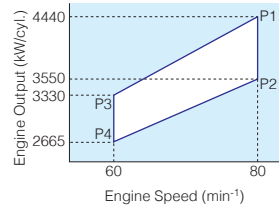
UEC33LSH-C2-LPSCR, complied with IMO Tier III

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



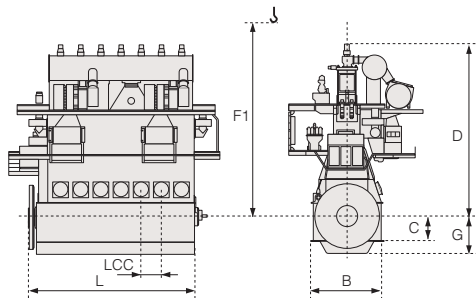
Rated power (kW), principle dimension (mm) and weight (ton)

Speed	80 min ⁻¹		60 min ⁻¹		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+EGB

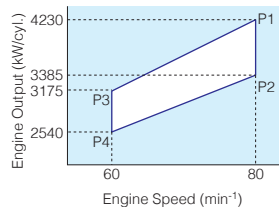
Load	P1	P2	P3	P4
100%	164.6	159.3	164.6	159.3
75%	157.6	153.5	157.6	153.5
50%	156.4	153.4	156.4	153.4

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



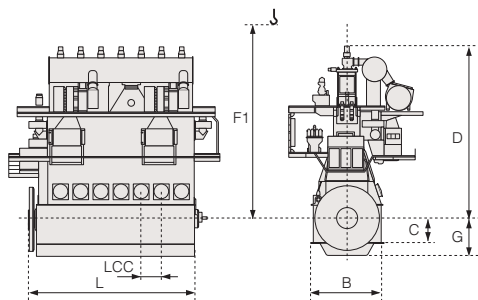
Rated power (kW), principle dimension (mm) and weight (ton)

Speed	80 min ⁻¹		60 min ⁻¹		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	2 524

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+EGB

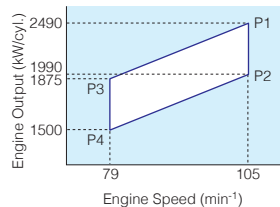
Load	P1	P2	P3	P4
100%	164.6	158.6	164.6	158.6
75%	156.8	150.8	156.8	150.8
50%	155.4	149.4	155.4	149.4

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



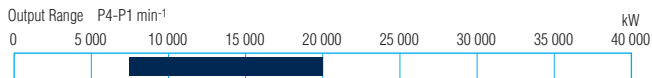
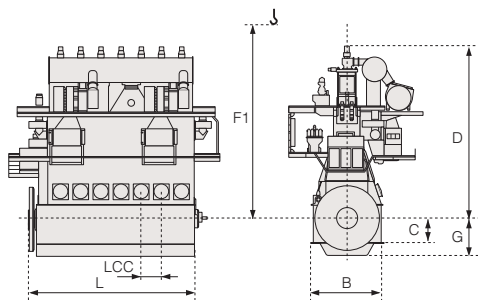
Rated power (kW), principle dimension (mm) and weight (ton)

Speed	105 min ⁻¹				79 min ⁻¹				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+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

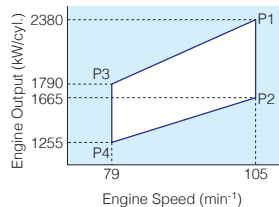
Mode	Load	P1	P2	P3	P4
Tier II mode	100%	167.6	162.3	167.6	162.3
	75%	160.6	156.5	160.6	156.5
	50%	159.4	156.4	159.4	156.4
Tier III mode	100%	169.2	163.9	169.2	163.9
	75%	162.2	158.1	162.2	158.1
	50%	162.4	159.4	162.4	159.4

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



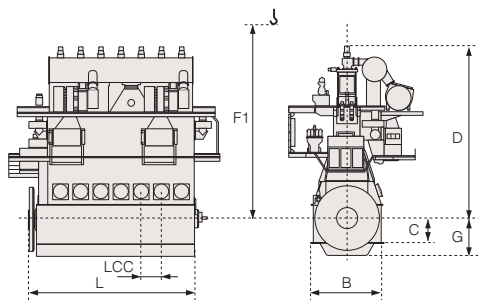
Rated power (kW), principle dimension (mm) and weight (ton)

Speed	105 min ⁻¹				79 min ⁻¹				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+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

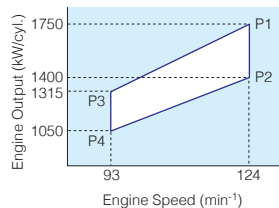
Mode	Load	P1	P2	P3	P4
Tier II mode	100%	169.9	163.9	169.9	163.9
	75%	158.8	152.8	158.8	152.8
	50%	155.5	149.5	155.5	149.5
Tier III mode	100%	169.7	163.7	169.7	163.7
	75%	161.2	155.2	161.2	155.2
	50%	160.4	154.4	160.4	154.4

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

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



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

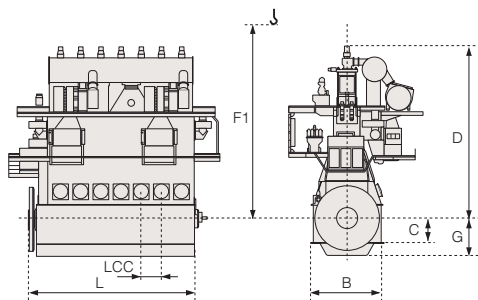
Speed	124 min ⁻¹				93 min ⁻¹				Dimension L	Weight
	P1	P2	P3	P4	P1	P2	P3	P4		
Cyl.										
5	8 750	7 000	6 575	5 250	5 550 (5 575)				188 (215)	
6	10 500	8 400	7 890	6 300	6 430 (6 455)				219 (250)	
7	12 250	9 800	9 205	7 350	7 310 (7 335)				251 (287)	
8	14 000	11 200	10 520	8 400	8 190 (8 215)				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+EGB

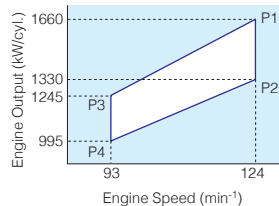
Load	P1	P2	P3	P4
100%	168.6	163.3	168.6	163.3
75%	161.6	157.5	161.6	157.5
50%	160.4	157.4	160.4	157.4

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



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

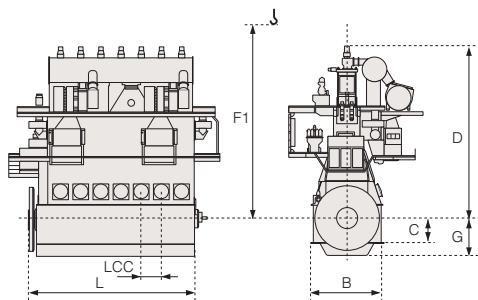
Speed	124 min ⁻¹				93 min ⁻¹				Dimension L	Weight
	P1	P2	P3	P4	P1	P2	P3	P4		
Cyl.										
5	8 300	6 650	6 225	4 975	5 550 (5 575)				188 (215)	
6	9 960	7 980	7 470	5 970	6 430 (6 455)				219 (250)	
7	11 620	9 310	8 715	6 965	7 310 (7 335)				251 (287)	
8	13 280	10 640	9 960	7 960	8 190 (8 215)				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+EGB

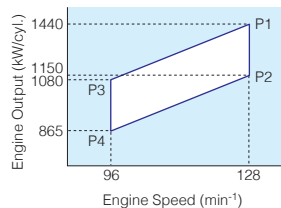
Load	P1	P2	P3	P4
100%	168.6	162.6	168.6	162.6
75%	160.8	154.8	160.8	154.8
50%	159.4	153.4	159.4	153.4

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



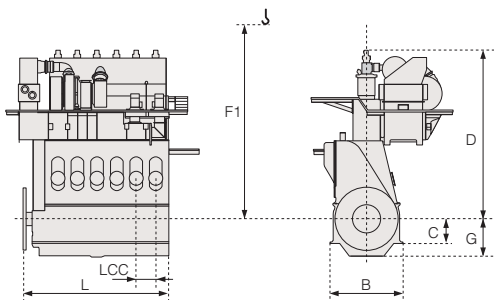
Rated power (kW), principle dimension (mm) and weight (ton)

Speed	128 min ⁻¹				96 min ⁻¹				Dimension L	Weight
	P1	P2	P3	P4	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+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

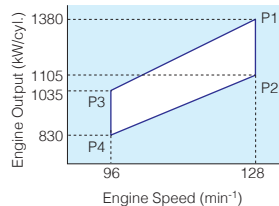
Mode	Load	P1	P2	P3	P4
Tier II mode	100%	172.6	167.3	172.6	167.3
	75%	165.6	161.5	165.6	161.5
	50%	164.4	161.4	164.4	161.4
Tier III mode	100%	174.2	168.9	174.2	168.9
	75%	167.2	163.1	167.2	163.1
	50%	167.4	164.4	167.4	164.4

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



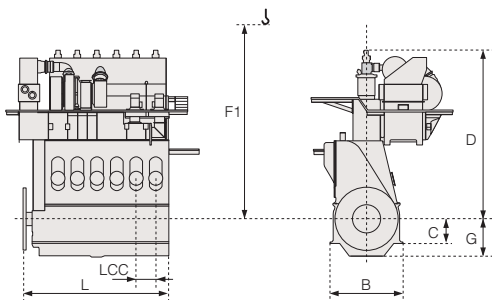
Rated power (kW), principle dimension (mm) and weight (ton)

Speed	128 min ⁻¹		96 min ⁻¹		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+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

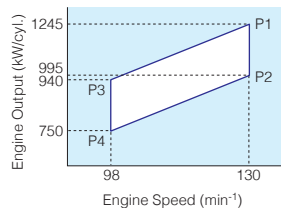
Mode	Load	P1	P2	P3	P4
Tier II mode	100%	170.6	164.6	170.6	164.7
	75%	162.8	156.8	162.8	156.9
	50%	161.4	155.4	161.4	155.5
Tier III mode	100%	172.2	166.2	172.2	166.3
	75%	164.4	158.4	164.4	158.5
	50%	164.4	158.4	164.4	158.5

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

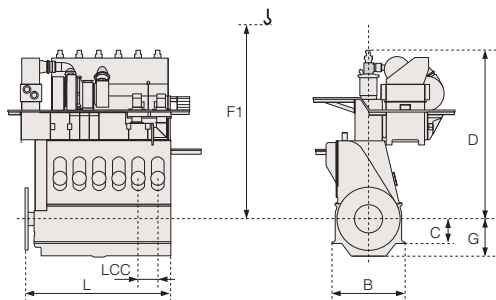
Cylinder bore	[mm]	450
Piston stroke	[mm]	1 840
BMEP at P1	[bar]	19.6
Piston speed at P1	[m/s]	8.0
Stroke / bore	[-]	4.09



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

Cyl.	Speed 130 min ⁻¹				Speed 98 min ⁻¹				Dimension L	Weight
	P1	P2	P3	P4	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

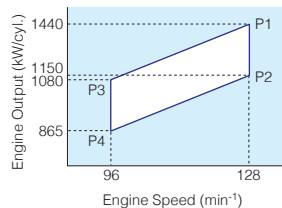
Load	P1	P2	P3	P4
100%	173.6	168.3	173.6	168.3
75%	166.6	162.5	166.6	162.5
50%	167.6	164.6	167.6	164.6

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



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

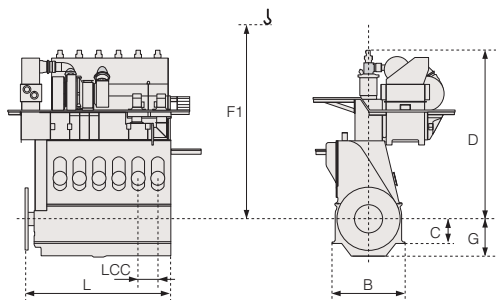
Cyl.	128 min ⁻¹		96 min ⁻¹		Dimension		Weight
	P1	P2	P3	P4	L		
5	7 200	5 750	5 400	4 325	5 102		158
6	8 640	6 900	6 480	5 190	5 894		183
7	10 080	8 050	7 560	6 055	6 686		208
8	11 520	9 200	8 640	6 920	7 478		236
Dimensions	LCC	B	C	D	F1	G	
	792	3 000	1 000	7 080	8 860	1 540	

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

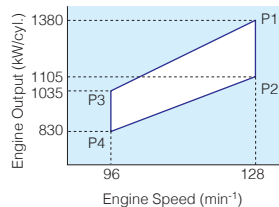
UEC45LSE-C1-LPSCR, complied with IMO Tier III SFOC (g/kWh)

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



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

Speed	128 min ⁻¹				96 min ⁻¹				Dimension L	Weight
	P1	P2	P3	P4	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				

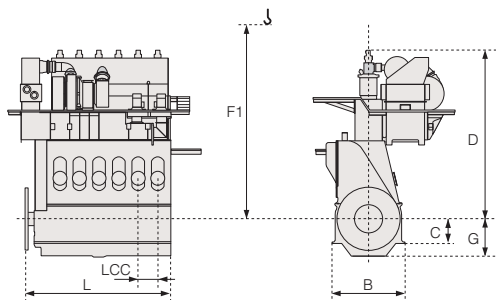
SFOC variation

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

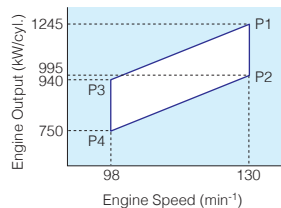
UEC45LSE-B2-LPSCR, complied with IMO Tier III SFOC (g/kWh)

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

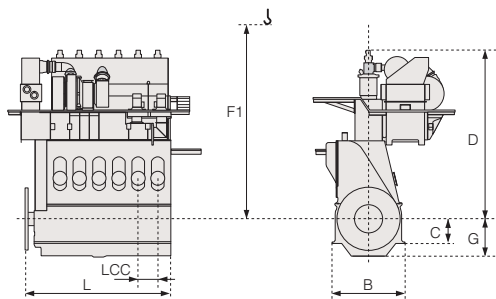


Rated power (kW), principle dimension (mm) and weight (ton)

Cyl.	Speed				Dimension L	Weight
	130 min ⁻¹		98 min ⁻¹			
	P1	P2	P3	P4		
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

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)

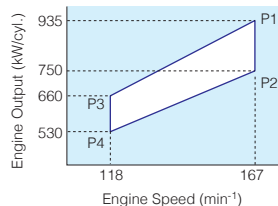
Load	P1	P2	P3	P4
100%	174.0	168.7	174.0	168.7
75%	170.1	166.4	170.1	166.4
50%	171.4	169.0	171.4	169.0

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
	50%	171.4	169.0	171.4	169.0
Tier III mode	100%	174.0	169.3	174.3	169.8
	75%	170.7	167.1	171.4	167.7
	50%	171.4	169.0	172.1	169.6

Main specifications

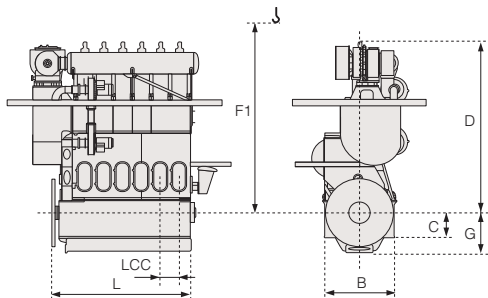
Cylinder bore	[mm]	350
Piston stroke	[mm]	1 550
BMEP at P1	[bar]	22.5
Piston speed at P1	[m/s]	8.6
Stroke / bore	[-]	4.43



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

Speed	167 min ⁻¹				118 min ⁻¹				Dimension L	Weight
	P1	P2	P3	P4	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

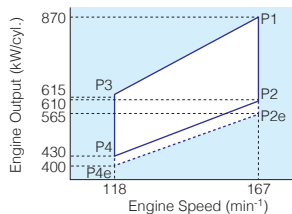
Load	P1	P2	P3	P4
100%	169.6	164.4	169.6	164.4
75%	162.6	158.6	162.6	158.6
50%	163.6	160.7	163.6	160.7

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	159.4	164.0	160.2
	50%	163.6	161.0	164.6	161.9

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

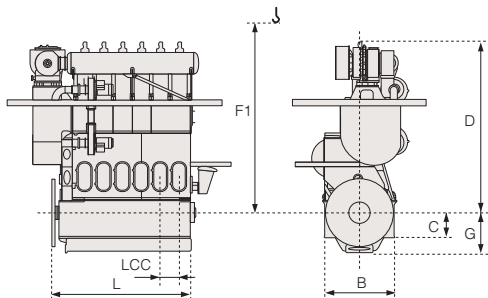


Rated power (kW), principle dimension (mm) and weight (ton)

Speed	167 min ⁻¹			118 min ⁻¹			Dimension L	Weight
	P1	P2	P2e	P3	P4	P4e		
Cyl.								
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

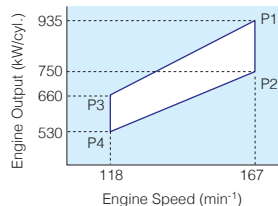
Load	P1	P2	P2e	P3	P4	P4e
100%	168.6	162.6	163.1	168.6	162.6	163.1
75%	160.8	154.8	155.3	160.8	154.8	155.3
50%	161.6	155.6	156.1	161.6	155.6	156.1

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

Mode	Load	P1	P2	P2e	P3	P4	P4e
		100%	168.6	162.6	163.1	168.6	162.6
Tier II mode	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

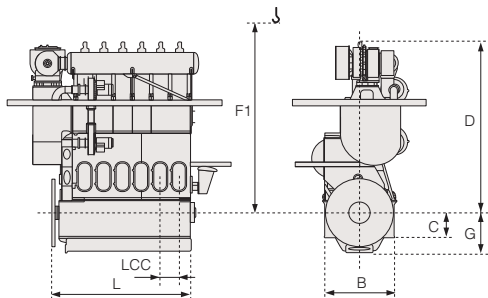
Cylinder bore	[mm]	350
Piston stroke	[mm]	1 550
BMEP at P1	[bar]	22.5
Piston speed at P1	[m/s]	8.6
Stroke / bore	[-]	4.43



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

Speed	167 min ⁻¹		118 min ⁻¹		Dimension L	Weight
	P1	P2	P3	P4		
Cyl.						
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)

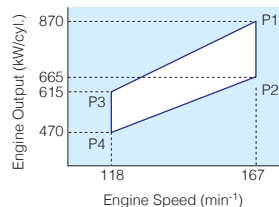
Load	P1	P2	P3	P4
100%	171.0	165.8	171.0	165.8
75%	167.1	163.4	167.1	163.4
50%	168.4	166.0	168.4	166.0

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

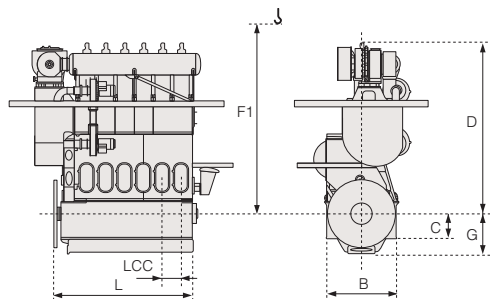
Cylinder bore	[mm]	350
Piston stroke	[mm]	1 550
BMEP at P1	[bar]	21.0
Piston speed at P1	[m/s]	8.6
Stroke / bore	[-]	4.43



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

Speed	167 min ⁻¹		118 min ⁻¹		Dimension L	Weight
	P1	P2	P3	P4		
Cyl.						
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)

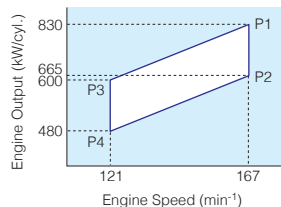
Load	P1	P2	P3	P4
100%	170.0	166.0	170.0	166.0
75%	165.5	161.5	165.5	161.5
50%	167.1	163.1	167.1	163.1

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

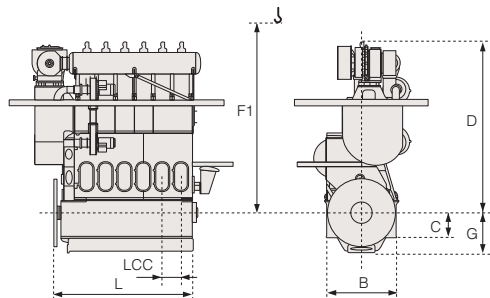
Cylinder bore	[mm]	330
Piston stroke	[mm]	1 550
BMEP at P1	[bar]	22.5
Piston speed at P1	[m/s]	8.6
Stroke / bore	[-]	4.70



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

Speed	167 min ⁻¹				121 min ⁻¹				Dimension L	Weight		
	P1	P2	P3	P4	P1	P2	P3	P4				
Cyl.	5	6	7	8	5	6	7	8				
	4 150	3 325	3 000	2 400	4 398	79 (81)	4 980	3 990	3 600	2 880	5 010	88 (90)
	5 810	4 655	4 200	3 360	5 622	97 (100)	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

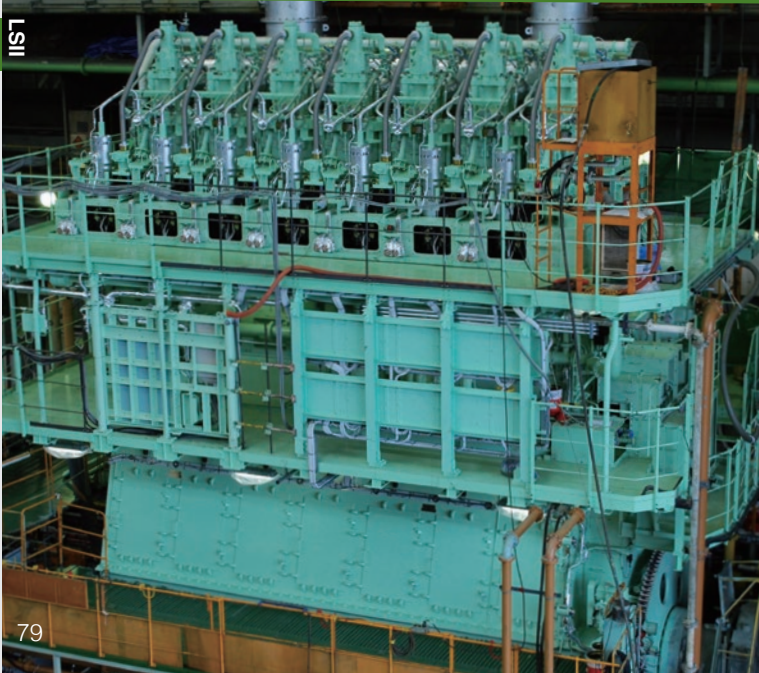
UE Engines

UEC-LSII Series

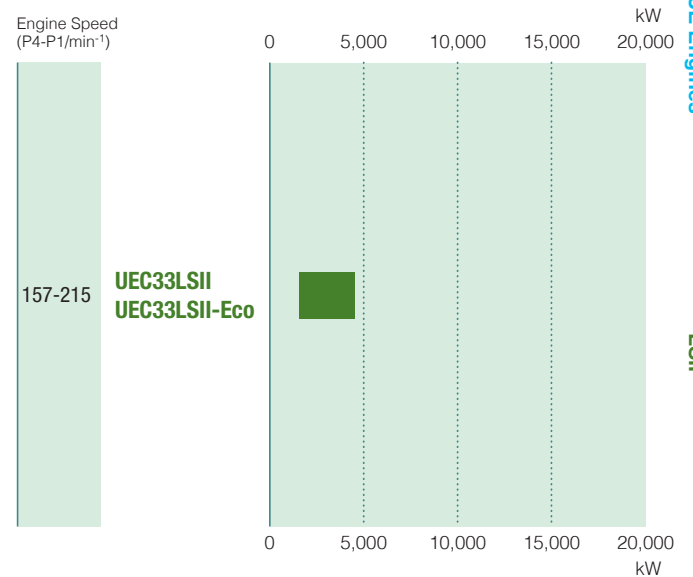
UE Engines

UEC-LSII Series are valued by customers as well as proven engines which have excellent service experiences.

LSII



UEC-LSII Series Output Range

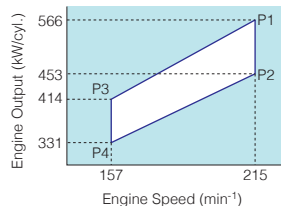


UE Engines

LSII

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



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

Speed	215 min ⁻¹		157 min ⁻¹		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

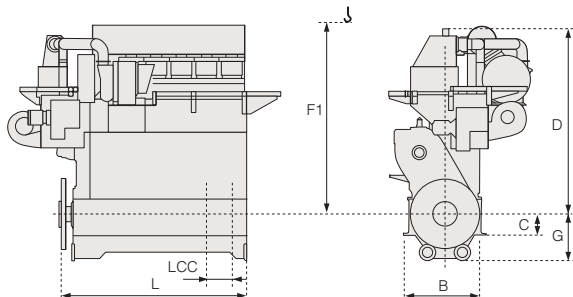
Load	P1	P2	P3	P4
100%	172.0	166.7	172.0	166.7
75%	167.3	163.2	167.3	163.2
50%	169.1	166.1	169.1	166.1

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

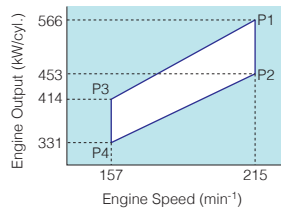
UEC33LSII-Eco-LPSCR, complied with IMO Tier III SFOC (g/kWh) with LLO

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



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

Speed	215 min ⁻¹		157 min ⁻¹		Dimension L	Weight
	P1	P2	P3	P4		
Cyl.						
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

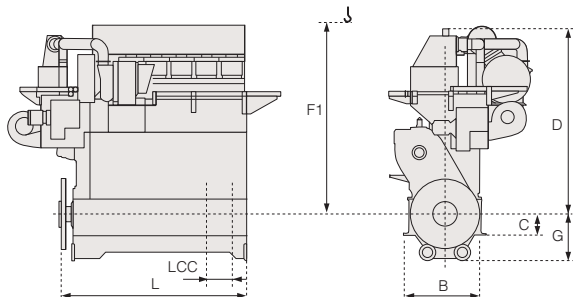
SFOC variation

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

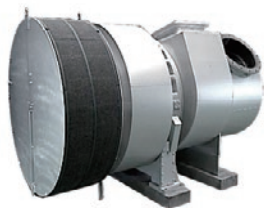
UEC33LSII-LPSCR, complied with IMO Tier III SFOC (g/kWh)

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**





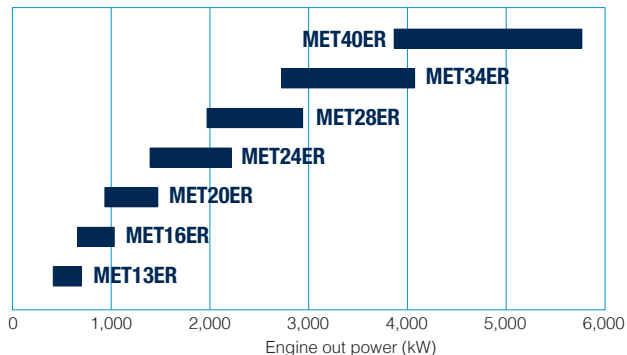
MET-ER Series

MET-ER Series, a new type of radial turbocharger succeed the high reliability and maintainability of MET-SRC series. This new turbocharger has improved it's 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.

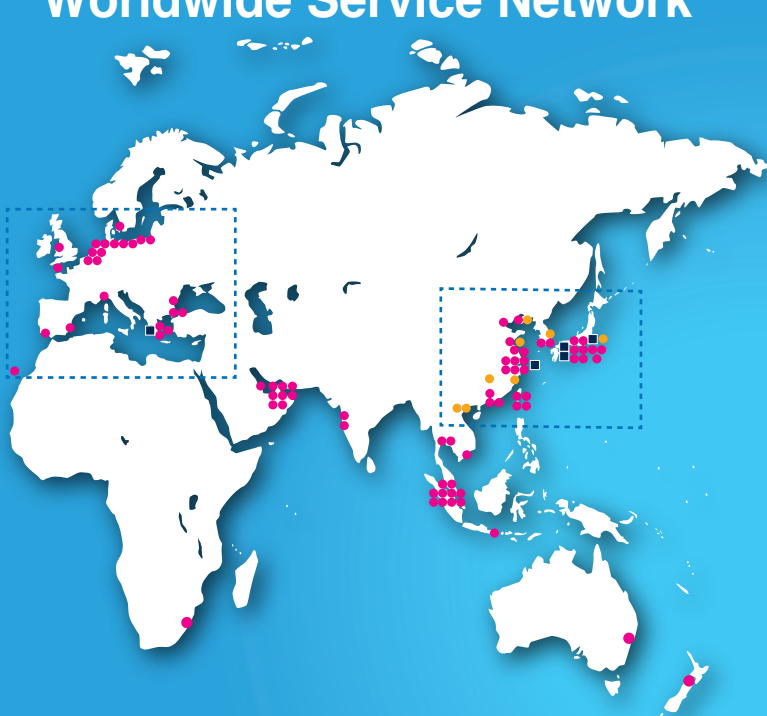
Features

- 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

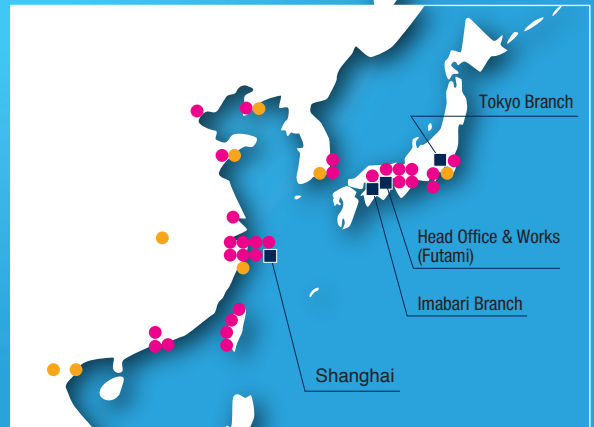
Type		MET33MB	MET37MB	MET42MB	MET48MB		MET53MB	MET60MB	MET66MB	MET71MB	MET83MB	MET90MB
Max. Pressure Ratio	—	5.0					5.0					
Engine Output Range per Turbocharger	kW	2,600-4,600	3,800-6,300	4,700-7,700	6,000-10,000		7,500-12,500	9,300-15,500	11,700-19,400	13,700-22,700	18,800-31,100	22,900-37,900
Maximum 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)



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