Ling Chuan Marine Equipment Limited
# General Information

<table>
<thead>
<tr>
<th>Company Headquarters</th>
<th>Ling Chuan Marine Equipment Limited</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Manager</td>
<td>Peng Huaxin</td>
</tr>
<tr>
<td>Established time</td>
<td>2004</td>
</tr>
<tr>
<td>Company websites</td>
<td><a href="http://www.qdlcme.com">http://www.qdlcme.com</a></td>
</tr>
<tr>
<td>Staffs Number</td>
<td>More than 40 persons</td>
</tr>
<tr>
<td>Company Address</td>
<td>Unit A (RM 9) 3/F Choeng SunTower116–118 Wing Lok Street Sheung Wan Hong Kong</td>
</tr>
<tr>
<td>Branch Office</td>
<td>Qingdao Ling Chuan Marine Equipment Co.,Ltd</td>
</tr>
<tr>
<td>Branch office Address</td>
<td>Room 2305–2306, No.193 Jiangshan Mid Road, Qingdao Economic &amp; Technological Development Zone, Qingdao, China</td>
</tr>
</tbody>
</table>
LING CHUAN MARINE EQUIPMENT LIMITED is known as the sole Chinese agent (equipment sales, After service and spare parts supply) of MKK (MITSUBISHI KAKOKI KAISHA LTD).

As Mitsubishi Kakoki Kaisha Ltd the sole “three power” agent since 2004, throughout more than 10 years expanding the domestic and overseas market, we have formed a perfect sale and after-sales service system and can solve timely various problems anywhere on the global.

We have rich experience, getting Mitsubishi Kakoki Kaisha Ltd recognition professional after-sales service engineers to provide with a variety of problems of rationalization proposal and maintenance services for customers.
Since we became agent of MHI (Mitsubishi Heavy Industries LTD.), we are always committed to offer high-quality products and excellent, efficient, convenient service for all the users at home and abroad and realize ‘the professional service, on you side.’
This is to certify
LING CHUAN MARINE EQUIPMENT LIMITED

is appointed as Authorized Sales Agent of UEC Diesel Engines
designed, manufactured and/or licensed by MHI
in the People's Republic of China only,
excluding Taiwan, Hong Kong and Macau

MHI assigns the below matters according to AGENCY AGREEMENT.
The Agent shall provide MHI with the following assistance and/or support (hereinafter collectively referred to as “Service”) for the sale of the PRODUCTS in the TERRITORY.
(1) Market research
(2) Sales promotion (including advertisement)
(3) Sales support (including solicitation)
(4) Submission of written report to MHI for the Service as frequently as MHI reasonably request. The report shall include Monthly Sales Activity Report in the form requested by MHI.
(5) Arrangement of meetings with customers in Territory and/or assistance in negotiation of the contract for the sale of Product.
(6) Obtaining any and all appropriate approvals and/or license of regulatory agencies in the Territory which may be required by laws and/or regulations for the Service in the Territory (if any).

This certificate is valid: February 15, 2016

Yoshitaka Yamada, Director
Business Operation and Alliance Department
Business Development

The newest power of attorney is agreement format. Once necessary, will be offered.
Ling Chuan gains MKK many times award and honors in reputation and achievements.

30th of May, 2007

The Ling Chuan Marine Equipment Ltd.

Dear Sirs

Award to Great Contribution

On your splendid cooperation we have been able to develop Mitsubishi Oil Purifier business in the East Asian countries remarkably. It was our great pleasure to take this occasion to express our sincere thanks to your continuous endeavoring and herein to award the best prize.

Best regards.

Faithfully yours

Mitsubishi Kakoki Kaisha Ltd.
Satoru Hatano
President

www.qdlcme.com
Product List

MITSUBISHI KAKOKI KAISHA, LTD.
- Mitsubishi SJ–G oil purifier series
- Mitsubishi SJ–H oil purifier series
- Mitsubishi Oil Purifier spare parts

MITSUBISHI HEAVY INDUSTRIES, LTD.
- Mitsubishi UE Engine
- Mitsubishi UE Diesel Engine
- Mitsubishi UEC Eco–Engine (Electronically controlled engine)
- Other Marine Equipments
- Mitsubishi UE Engine / UE diesel Engine/ UEC Eco–Engine / other marine equipments spare parts

www.qdlcme.com
Mitsubishi oil purifier Model as follows:
SJH/HH  SJ15, SJ25, SJ35, SJ60, SJ85, SJ110, SJ160, SJ220
SJG/GH  SJ10, SJ20, SJ30, SJ50, SJ60, SJ70, SJ100, SJ120, SJ150
SJ0000  SJ400, SJ700, SJ2000, SJ3000, SJ4000, SJ6000, SJ8000
SJF/FH  SJ10, SJ15, SJ30, SJ40, SJ50, SJ80, SJ100, SJ120
SJE/EH/TPSJ10, SJ11, SJ15, SJ16, SJ20, SJ25, SJ30, SJ40, SJ60
OP     OP11, OP12, OP20, OP31, OP41, OP54, OP70
The SJ–G (Genius) Series oil purifier is the latest version of best-selling centrifugal disc type separators which are backed by seventy years of history and boasts sales of over 90,000 units to date. One of proudest products, the SJ–G series is tough and simple in construction and offers improved fine particulate removal as well as easier daily maintenance. The SJ–G series has a wide range of applications: from purification of fuel, lubricating and hydraulic oils to the purification of the chemical, food processing and pharmaceutical products (sanitary versions). of industrial applications.
Multi-display monitor panel integrated with detection and display functions

Graphic display automatic control panel (GBC-1 and GBC-2 models).

High reliability G-HIDENS*1 system is available (optional)*1.

Refer to Note 1

Extensive product lineup with 9 models.

High-performance solids discharge mechanism.

Direct-coupled feed pump and built-in discharge pump fitted as standard.

MK-JET Cleaner enables closed-circulation cleaning.

Advanced Unit package is available and it facilitates installation and maintenance.

Note 1: Purifying system for low-grade fuel oils with densities up to 1.01 @15°C. As opposed to the conventional method of directly measuring the water content of purified oil, the G-HIDENS purifier is capable of detecting water in the oil accumulated in the purifier bowl, thereby preventing water from mixing in with purified oil.
Mitsubishi Selfjector Hercules (SJ–H) Series, the latest version of its series, is compact and yet offers improved fine particulate removal and higher output, thanks to Mitsubishi's years of expertise.

With its outstanding reliability and purification performance, the Mitsubishi Selfjector Hercules (SJ–H) Series is ideal for purifying not only fuel oils and lubrication oils for vessels, but also mineral oils that are commonly used in a wide range of industrial applications.
SJ–H Series features:

- The rotating bowl employs well proven and highly reliable pilot-valve method.
- In addition to standard type, H–HIDENS or SUPER HIDENS (optional) systems is available for processing low-grade fuel oils (Note *1)
- To realize lower environmental load
- A gear pump fitted as standard for processing low-viscosity fuel oils
- Higher discharge pressure centripetal pump (25 m head) for processing light liquid enables the application of purifiers for larger vessels.
- Compact design requires less installation space
- Addition of higher-capacity models in lineups for higher-output engines

Note 1:
Purifying system for low-grade fuel oils with densities up to 1.01 @15°C. As opposed to the conventional method of directly measuring the water content of purified oil, the H–HIDENS purifier is capable of detecting water in the oil accumulated in the purifier bowl, thereby preventing water from mixing in with purified oil.
Mitsubishi Oil Purifier spare parts

Mitsubishi oil purifier Model as follows:
SJH/HH   SJ15, SJ25, SJ35, SJ60, SJ85, SJ110, SJ160, SJ220
SJG/GH   SJ10, SJ20, SJ30, SJ50, SJ60, SJ70, SJ100, SJ120, SJ150
SJ0000   SJ400, SJ700, SJ2000, SJ3000, SJ4000, SJ6000, SJ8000
SJF/FH   SJ10, SJ15, SJ30, SJ40, SJ50, SJ80, SJ100, SJ120
SJE/EH/TP SJ10, SJ11, SJ15, SJ16, SJ20, SJ25, SJ30, SJ40, SJ60
OP       OP11, OP12, OP20, OP31, OP41, OP54, OP70
三菱分油机备件

三菱船舶机械有限公司长期为客户提供各种三菱原厂正品分油机备件：

SJE: GEAR PUMP, SJ10E, SJ11E, SJ15E, SJ20, SJ25, SJ30, SJ40, SJ60
SJF: F-GEAR PUMP, SJ10, SJ15, SJ30, SJ40, SJ50, SJ80, SJ100, SJ120
SJG: O-GEAR PUMP, SJ10, SJ20, SJ30, SJ50, SJ60, SJ70, SJ100, SJ120, SJ150
SJ400, SJ700, SJ2000, SJ3000, SJ4000, SJ6000, SJ8000

O型圈 O-RING
压盖件 SPRING RETAINER
弹黄件 SPRING CASE
安全接头 SAFETY JOINT
分流板 DISC

OIL SEAL 摩擦片 FRICITION BLOCK
轴承 BEARING
MAIN SEAL RING
VALVE SHEET
Mitsubishi Oil Purifier spare parts
Through the cooperation with MKK, formed a global after-sale service network.
MHI’s original UE engines are state-of-the-art low-speed two-stroke diesel engines. These engines are widely used in oil tankers, bulk carriers, pure car and truck carriers, high-speed container ships, multi-purpose cargo ships and many other types of vessels.

MHI has now enhanced the UE engine lineup with next-generation UEC Eco-engines featuring electronically controlled fuel injection, exhaust valve actuation and startup.

UEC Eco-engines are environmentally friendly and provide many operational benefits for slow steaming.

**UE engines**

**Economical**
- Low fuel consumptions
- Low cylinder oil consumption

**Environmentally friendly**
- Full compliance with IMO NOx regulations

**Highly reliable**

**Compact design**

**Easy maintenance**
### UE发动机的功率范围

![Engine Output vs RPM Diagram]

### UE发动机的主要参数

<table>
<thead>
<tr>
<th>Series</th>
<th>UEC-LSII</th>
<th>UEC-LSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bore (cm)</td>
<td>33, 37, 43, 50, 60</td>
<td>35, 40, 45, 50, 52, 60, 68, 80</td>
</tr>
<tr>
<td>Engine Output (kW/Cyl)</td>
<td>566, 810, 1050, 1445, 2045</td>
<td>870, 1135, 1245, 1750, 1705, 2490, 2940, 4440</td>
</tr>
<tr>
<td>Engine Speed (min⁻¹)</td>
<td>215, 186, 160, 127, 105</td>
<td>167, 146, 130, 124, 127, 105, 95, 60</td>
</tr>
<tr>
<td>Stroke Bore (mm)</td>
<td>3.2<del>3.5, 3.7</del>3.9</td>
<td>4.4, 4.1, 3.9, 4.0, 3.9</td>
</tr>
<tr>
<td>B.M.E.P (MPa)</td>
<td>1.7~1.8, 2.1</td>
<td>2.1, 1.96, 2.1, 1.9, 2.1</td>
</tr>
<tr>
<td>Piston Speed (m/s)</td>
<td>≤8.3</td>
<td>8.6, 8.0, 8.5, 8.4, 8.5, 8.4</td>
</tr>
</tbody>
</table>

### 所对应的主要船型

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Typical Ship Type to be Applied</th>
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</thead>
<tbody>
<tr>
<td>80LSE / 85LSII</td>
<td>VLOC, VLCC</td>
</tr>
<tr>
<td>68LSE</td>
<td>Capesize BC, Suezmax T (2500 TEU class C/S)</td>
</tr>
<tr>
<td>60LSE / 60LSII</td>
<td>Panamax BC, PCTC, Aframax T (1700 TEU class C/S)</td>
</tr>
<tr>
<td>52LSE / 50LSII</td>
<td>RoRo, Panamax BC, PCTC</td>
</tr>
<tr>
<td>50LSE / 50LSII</td>
<td>Handymax BC, Panamax BC, Handyproducts T (1100 TEU class C/S)</td>
</tr>
<tr>
<td>45LSE</td>
<td>HandySize BC (approx. 30-40k dwt)</td>
</tr>
<tr>
<td>40LSE / 43LSII</td>
<td>various small/medium size ships (less than 30,000dwt)</td>
</tr>
<tr>
<td>35LSE / 33LSII / 37LSII</td>
<td>various small/medium size ships (less than 20,000dwt)</td>
</tr>
</tbody>
</table>

### UE发动机的燃油经济性

- Comparison of SFOC marked at catalogue
- Comparison of Mechanical type engine (based on standard SFOC, Tier2 regulation)

![Fuel Economy Graph]

### 高可靠性

*Engine users views of poor quality parts from engine builder-appointed subcontractors*  
(Paper No.03) K. Wilson, J. Dragstedt (APM)
Mitsubishi UE Diesel Engine

**LSE 系列**
- **Excellent reliability** （可靠性）
- **Economy** （经济性）
- **Easy maintenance** （易修性）
- **Environment-friendly** （环保性）

**LSII 系列**
- 75LSII
- 85LSII
- 33LSII
- 50LSII
- 85LSC
- 60LSII

**H/HA Type**
- A/B/C/D/E Type


Eco: Electronically controlled engine

▲ Mitsubishi UE Diesel Engine
柴油机的主要参数

<table>
<thead>
<tr>
<th>柴油机型号</th>
<th>缸径 (cm)</th>
<th>行程 (mm)</th>
<th>功率 (kW/cyl.)</th>
<th>典型的适用船型</th>
</tr>
</thead>
<tbody>
<tr>
<td>80LSE-Eco</td>
<td>80</td>
<td>3150</td>
<td>4400</td>
<td>VLOC (约28万吨)</td>
</tr>
<tr>
<td>85LSII</td>
<td>85</td>
<td>3150</td>
<td>3860</td>
<td>VLCC (约30万吨)</td>
</tr>
<tr>
<td>68LSE / 68LSE-Eco</td>
<td>68</td>
<td>2690</td>
<td>2940</td>
<td>好望角型散货船 (约15 - 20万吨)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Suezmax油轮 (约17万吨)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2500箱集装箱船</td>
</tr>
<tr>
<td>60LSE / 60LSE-Eco</td>
<td>60</td>
<td>2400</td>
<td>2490</td>
<td>巴拿马型散货船 (约8万吨)</td>
</tr>
<tr>
<td>60LSII / 60LSII-Eco</td>
<td>60</td>
<td>2300</td>
<td>2045</td>
<td>1700箱集装箱船</td>
</tr>
<tr>
<td>52LSE / 52LSE-Eco</td>
<td>52</td>
<td>2000</td>
<td>1705</td>
<td>巴拿马型散货船 (约8万吨)</td>
</tr>
<tr>
<td>50LSII / 50LSII-Eco</td>
<td>50</td>
<td>1950</td>
<td>1445</td>
<td>1700箱装货船</td>
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<tr>
<td>50LSE / 50LSE-Eco</td>
<td>50</td>
<td>2050</td>
<td>1750</td>
<td>灵便型散货船 (约5-6万吨)</td>
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<tr>
<td>50LSII / 50LSII-Eco</td>
<td>50</td>
<td>1950</td>
<td>1445</td>
<td>灵便型散货船 (约8万吨)</td>
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<tr>
<td>45LSE / 45LSE-Eco</td>
<td>45</td>
<td>1930</td>
<td>1440</td>
<td>灵便型散货船 (约5-6万吨)</td>
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<tr>
<td>40LSE / 40LSE-Eco</td>
<td>40</td>
<td>1770</td>
<td>1135</td>
<td>灵便型散货船 (约3万吨)</td>
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<tr>
<td>43LSII / 43LSII-Eco</td>
<td>43</td>
<td>1500</td>
<td>1050</td>
<td>3万吨以下的各种小型船</td>
</tr>
<tr>
<td>35LSE / 35LSE-Eco</td>
<td>35</td>
<td>1550</td>
<td>870</td>
<td>2万吨以下的各种小型船</td>
</tr>
<tr>
<td>37LSII / 37LSII-Eco</td>
<td>37</td>
<td>1290</td>
<td>772</td>
<td>2万吨以下的各种小型船</td>
</tr>
<tr>
<td>33LSE / 33LSE-Eco</td>
<td>33</td>
<td>1550</td>
<td>705</td>
<td>2万吨以下的各种小型船</td>
</tr>
<tr>
<td>33LSII / 33LSII-Eco</td>
<td>33</td>
<td>1050</td>
<td>565</td>
<td>2万吨以下的各种小型船</td>
</tr>
</tbody>
</table>

选择性催化还原法 SCR
(Selective Catalytic Reduction)

二级排放要求（2011年开始实施）
→ 所有UE柴油机都满足要求。

三级排放要求（2016年开始实施）
→ 各种技术正在研发中。

二级排放要求

1. VLOC
2. 灵便型散货船
3. 集装箱船
4. 7UEC80LSE-Eco-B1
5. 6UEC45LSE-B2
6. 6UEC35LSE-B2
7. 5UEC60LSE-Eco-A2

油耗比较

- VLOC: -0.2吨/天 (-1.1 g/kWh)
- 集装箱船: -1.3吨/天 (-6.3 g/kWh)
- 7UEC80LSE-Eco-B1: -0.8吨/天 (-2.5 g/kWh)
Mitsubishi UEC Eco-Engine (Electronically controlled engine)

**UEC Eco-engines**
In addition to the features of UE engines, UEC Eco-engines provide the following further benefits:

Ecological
- Low NOx emissions
- Smokeless operation

Economical
- Low fuel consumption
- Low maintenance costs

Excellent condition
- Reliable
- Early failure warning system

Easy to control
- Stable low-load operation
- Excellent startup and crush astern
UCEC电控主机的发展历程

1988 ~ 1997: Research on Test Engine (NC33)

1988: Start to research and develop

1999 ~: Research on prototype engine (Retrofit Eco-Engine parts on 7UEC33LSII)

2003: Develop UEC60LSII-Eco

2005: 8UEC60LSII-Eco in service

2011: 7UEC60LSII-Eco x 2set in service

2012: 12UEC52LSE-Eco x 1set in service

2013: 7UEC80LSE-Eco x 2sets in service

8UEC60LSII-Eco x 1sets in service

6UEC60LSII-Eco x 1sets in service

7UEC60LSE-Eco x 2sets in service

2014: 7UEC80LSE-Eco x 1sets in service

www.qdlcme.com
Mitsubishi UE Engine / UE diesel Engine/ UEC Eco-Engine/other marine equipment spare parts
Thank you for your attention