

# JSMEA Mission to India

for

## Seminar on Japanese Ship Machinery Industry

The Regal Room, Trident, Nariman Point, Mumbai, India, September 9, 2009



Delegation

*AKASAKA DIESELS LTD.*

*DAIHATSU DIESEL MFG. CO., LTD.*

*JAPAN RADIO CO., LTD.*

*KAMOME PROPELLER CO., LTD.*

*MITSUBISHI HEAVY INDUSTRIES, LTD.*

*NAKASHIMA PROPELLER CO., LTD.*

*NIIGATA POWER SYSTEMS CO., LTD.*

*NIPPON HAKUYO ELECTRONICS, LTD.*

*SASAKURA ENGINEERING CO., LTD.*

*TAIYO ELECTRIC CO., LTD.*

*YANMAR CO., LTD.*

*MANABE ZOKI CO., LTD.*

*UZUSHIO ELECTRIC CO., LTD.*

*M. C. TRADING, LTD.*

*SOJITZ MARINE & ENGINEERING CORPORATION*

*NIPPON PUSNES CO., LTD.*

*THE HANSHIN DIESEL WORKS, LTD.*

*FUJI TRADING CO., LTD.*

*MAKITA CORPORATION*

*YAMASHINA SEIKI CO., LTD.*

*JETRO SINGAPORE*

*MINISTRY OF LAND, INFRASTRUCTURE, TRANSPORT AND TOURISM*

*JAPAN MARINE EQUIPMENT ASSOCIATION*



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# Members



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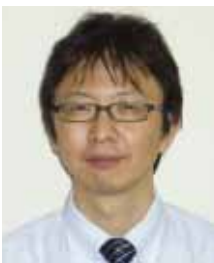
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# Members



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 Engineering Corporation



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 Fuji Trading Co., Ltd.



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 Makita Corporation



**Tsuneo OKUSA**  
 President & CEO  
 Yamashina Seiki Co.,  
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## Members



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<Keynote Speaker>  
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**Cheryl LONG**  
Ship Machinery  
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Japan Marine  
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**Takayuki SUZUKI**  
Deputy Manager,  
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Japan Marine  
Equipment Association



### Ministry of Land, Infrastructure, Transport and Tourism (MLIT)

Shipbuilding and Ship Machinery Division, Maritime Bureau, 1-3, Kasumigaseki 2-chome, Chiyoda-ku, Tokyo 100-8918 Japan

Tel.:+81-3-5253-8634 Fax:;81-3-5253-1644

Website : <http://www.mlit.go.jp>

#### Purpose :

The Maritime Bureau of the Ministry of Land, Infrastructure, Transport and Tourism takes necessary measures to develop shipping, shipbuilding and related industries including promotion of the research and development on advanced ship technology, establishment of rules and regulations for ship safety and marine pollution, conducts of ship inspections and tonnage measurements as well as international cooperation through the OECD Council Working Party on Shipbuilding.



## Japan Marine Equipment Association (JSMEA)

### Activities

JSMEA compiles the "JSMEA Action Plan" every year and implements the following activities.

#### I. Assisting industrial and inter-industrial exchange and cooperation

1. Strengthening exchange and cooperation within the industry
2. Fostering exchange and cooperation with the user industry

#### II. Promoting measures to secure manpower and to train specialists

1. Promoting the "Marine Equipment Meister" system to certify superior technicians who support the industry
2. Giving lecture by specialists, holding industry publicity meetings, etc.
3. Extending education in social awareness

#### III. Active contribution to safety & environment issues

1. Strengthening relations with the IMO and other organizations
2. Development of the "Super Clean Marine Diesel" (Supported by Nippon Foundation)
3. Correspondence the Ship Recycling

#### IV. Promoting technological development

1. Enhancement of international competitiveness and developing new products to take advantage of new demand (Supported by Nippon Foundation)
2. Execution of feasibility studies for new product development
3. Organize of study for systems such as onboard LAN
4. Creation of a forum for marine equipment technology

#### V. Stretching to the global arena

1. Participating in international maritime events (Supported by Nippon Foundation)
  - NorShipping (Norway)
  - Marintec China (Shanghai, China)
  - VietShip (Vietnam)
  - Posidonia (Greece)
  - SMM Hamburg (Germany)
2. Participating in Sea Japan
3. Holding seminars overseas (Supported by Nippon Foundation)
4. Publishing English PR brochures (Supported by Nippon Foundation)
5. Running overseas offices jointly with JETRO in London, Singapore and Shanghai (Supported by Nippon Foundation)

#### VI. Others

1. Recommendations for decoration/award
  - Spring & Autumn Conferrals/Accolades, MLIT Minister's award on Marine Day
  - JSMEA Chairman's award
2. New Year get-together, Celebration for award/decoration recipient, Regional meetings in autumn, Year-end get-together
3. Publishing of bulletin and issuing of various statistics



## ● Company Outline

AKASAKA DIESELS LIMITED is a Japanese leading manufacturer of main engine for various kinds of vessels.

In 1910, we started our business as engine repairer in Yaizu, a town of fishery in Shizuoka prefecture. Since then, we have been manufacturing a lot of engines for fishing boat and magnified our business along with the development of domestic fishery. Subsequently, we expanded our products' coverage to merchant vessels like cargos, tankers and bulk carriers.

Now our products are known worldwide by its high-reliability and superior performance based on authentic technologies, which is being succeeded over generations since our foundation.

However, the situation and the demand are always changing and they never let us stop from challenging to the market. We will always support you with customer creed and sincerity, which will surely meet your expectations.

## ● Main Products

4 Stroke diesel engine: Akasaka Diesel Engine

A TYPE / AX TYPE (1,103kW~3,309kW)

T TYPE / K TYPE (625kW~2,000kW)

U TYPE (1,838kW~2,427kW)

2 Stroke diesel engine: UE Diesel Engine licensed by Mitsubishi Heavy Industries, Ltd.

UEC50LSE / UEC45LSE (6,225kW~13,280kW)

UEC50LS II / UEC43LS II / UEC37LS II / UEC33LS II (2,830kW~11,560kW)

## ● Head Office (for Overseas Market)

14th Floor, South Tower, Yurakucho Denki Bldg., 1-7-1, Yurakucho, Chiyoda-Ku, Tokyo, Japan

Tel: +81-3-6860-9081

Fax: +81-3-6860-9083

E-mail: [info@akasaka.co.jp](mailto:info@akasaka.co.jp)

URL: <http://www.akasaka-diesel.jp>

## ● Product Features

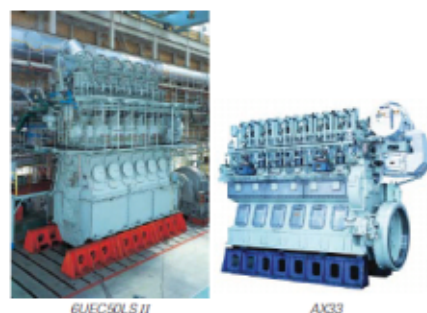
Akasaka 4 stroke Diesel Engine

- turbo charged diesel engine with 6 cylinders in-lined,
- Long stroke design for high efficiency
- Twin valve system for high reliability
- Cage type valves (Air intake, exhaust & starting air valves) for ease of maintenance
- Compatibility with Heavy fuel oil

Akasaka-Mitsubishi UE Diesel Engine

- High reliability as a world wide known brand
- Low specific fuel consumption
- High propeller efficiency
- Compatibility with low-quality fuel oil
- Ease of maintenance
- Space-saving design

- 6UEC50LS II 8,670kW (127min<sup>-1</sup>)
- AX33 1,618kW (310min<sup>-1</sup>)





## DAIHATSU DAIHATSU DIESEL

### Striving for excellence

Since our establishment in 1907, our pioneering technology has granted us a position at the forefront of our industry. Today, Daihatsu's products are used worldwide, and our high standards of performance and reliability have earned us our well-deserved reputation as a market leader. Drawing on the skills and wisdom gained from long tradition, we constantly strive to maintain our high standards of excellence by remaining at the forefront of innovation and technology. It is this corporate philosophy which drives us to respond creatively to the challenges of the 21st century: fuel innovation, environmental issues, energy problems, changes in lifestyle etc. We aim to contribute to the future by manufacturing world-class products which will meet the demands of our ever more borderless and information-oriented modern society. At Daihatsu, our goal is excellence, not just financial gain.



### DAIHATSU DIESEL MFG.CO.,LTD.

**Head Office** <http://www.dhtd.co.jp>  
1-30, Oyodo Naka1-chome, Kita-ku, Osaka, 531-0076 Japan  
TEL:81-6-6454-2393 FAX:81-6-6454-2686

### DAIHATSU DIESEL (ASIA PACIFIC) PTE. LTD.

128 Pioneer Road, Singapore 639586  
Phone: 65-6270-7235 Fax: 65-6270-6236  
e-mail: ddap@dds.com.sg

### DAIKAI ENGINEERING (INDIA) PTE. LTD.

144 "C", Mittal Court, Nariman Point, Mumbai-4000 21, India  
Phone: 91-22-22846641 Fax:91-22-22846642  
e-mail: info@daikai.co.in

#### ●Main Products

Marine Auxiliary Diesel Engine  
Marine Propulsion System &  
Diesel-Electric Propulsion System  
Daihatsu Oil Mist Detector  
Daihatsu Oil Mist Monitor



Auxiliary marine diesel engine



Marine propulsion diesel engine

# JAPAN RADIO CO., LTD.

JRC has long (from 1915) been involved in communication and navigation for safety at sea. JRC offers a full range of marine communications and navigation equipments for merchant ships, fishing vessels and passenger boats including Inmarsat mobile terminal, Radar with ARPA, ECDIS, VDR, and AIS. We consider it our technical mission to develop new products to further improve the safety and efficiency of ship navigation and operation.

JRC plays an integral role in the lives of seafarers...

Today, not only do thousands of vessels in the merchant, fishing and leisure sectors rely on our products for safe navigation, but also benefit from our advancements in technology

visit [www.jrc.co.jp](http://www.jrc.co.jp) to find out more

**JRC** Inmarsat  
FleetBroadband  
JFE-250

VHF radiotelephone  
JHS-2700/2 JHS-2800

Black box radar JMA-5300Mk2 series

**JRC** Japan Radio Co., Ltd. since 1915

# KAMOME PROPELLER CO., LTD.



# KAMOME PROPELLER

URL <http://www.kamome-propeller.co.jp>

## Company Profile

Kamome Propeller Co., Ltd., founded in 1924, has a long history of over 85 years, specialized in manufacturing marine propellers, including Controllable Pitch Propellers, Fixed Pitch Propellers, Side Thrusters and Shafting Equipments and Control Software for propulsion and maneuvering systems.

The factory has all workshops, including laboratory, foundry, machine, finishing and assembling shops, laid out to execute a thorough and complete process from design to finishing.

Furthermore, the company has introduced 5-axis NC blade milling machines to minimize the finishing time and to increase accuracy, so that the data of designing and machining can be unitarily produced and controlled. Now the company has completed the total control system of the data flow from designing to finishing by Kamome's own CAD/CAM system and thus propellers of the highest grade quality can be supplied.

Kamome C. P. Propellers have been obtaining a greater market year after year, and since 1961, over 5,000 units have been delivered for all kinds of ships.

<b>Company Name</b>	Kamome Propeller Co., Ltd.
<b>Head Office</b>	690 Kamiyabe-cho, Totsuka-ku, Yokohama 245-8542 Japan Phone: +81-45-811-2461
<b>Sales Offices</b>	Osaka, Kyushu and Tohoku
<b>Representative</b>	Hiroshi Itazawa, president
<b>Year of Establishment</b>	1924 (incorporated: 1943)
<b>Business</b>	Manufacturing and sale of propellers, control systems and power saving equipment for ships Repair and servicing for propellers and other systems Real estate leasing
<b>Capital</b>	100 million yen (as of December 2008)
<b>Quality System Registration</b>	ISO9001
<b>Certificate of Classification</b>	JG, NK, LRS, ABS, DNV, BV, GL, CCS, CR, KR, ZY

## Products





Mitsubishi's marine machinery, which are developed, using sophisticated and proprietary technology has a long track record. Our extensive product range meets and amazingly diverse range of customer's requirements.

## ● Main Products

### Main Engine

- UE Diesel Engine (2-stroke)
- MET Turbocharger
- Main Propulsion Turbine
- Main Boiler (for Steam Propulsion Vessels)

### Fuel Saving

- Mitsubishi Energy Recovery System

### Propulsion Equipment

- Fixed Pitch Propeller
- Water Jet Propulsion Unit

### Auxiliary Machinery

- Aux. Boiler
- Cargo Oil Pump & Turbine
- Generator Turbine
- Cable Engine

### Maneuvering Equipment

- Steering Gear
- Fin-stabilizer
- Side Thruster

### Deck Machinery

- Deck Crane
- Windlass
- Mooring Winch

## UEC ECO ENGINE CONCEPT

**ECOLOGY**

**ECONOMY**

**EXCELLENT CONDITION**

**EASY CONTROL**



*UEC Eco-Engine*

## ● Head Office

Mitsubishi Heavy Industries, Ltd.  
Marine Diesel & Machinery Business Section  
16-5 Konan 2-chome, Minato-ku, Tokyo  
108-8215, Japan  
Tel: +81-3-6716-3383, Fax: +81-3-6716-5778  
E-mail: san-ene-catalog-senyo@mhi.co.jp

## ● Information of UE Diesel Engines

Mitsubishi UE engine, which has been developed by Mitsubishi's own technologies, are the most modern low-speed two stroke diesel engines with single acting with crosshead, direct reversing, exhaust gas turbocharger, mechanically-driven camshaft, Bosch type fuel injection pump, exhaust valve actuator pumps.

UE Eco-Engine, new generation of Mitsubishi UE engine, is an electronically controlled engine, with below 4 concepts, which controls fuel injection, exhaust valve actuation and starting system electronically. UE Ego-Engine is more environmentally friendly than conventional one and brings huge operational benefits to the customer.

# NAKASHIMA PROPELLER CO., LTD.



## \* Outline of company

Nakashima Propeller is the leading company of marine propulsion specialists in the world. Since founded in 1926, we have continuously been advancing to be the world's only comprehensive designers / manufacturers of marine propulsion equipment applicable to a wide range from smaller-sized pleasure boats and fishing boats up to large-sized merchant vessels including ULCC, mega container vessels, and LNG carriers, by utilizing experiences accumulated and advanced technologies.

## \* Main Products



Fixed Pitch Propeller



Controllable Pitch Propeller



Side Thruster



Special Rudder



Contra Rotating Propeller



Shafting Equipment

## \* Head Office

688-1, Joto-Kitagata, Higashi-Ku, Okayama 709-0625, JAPAN

Tel : +81-86-279-511

Fax : +81-86-279-3107

URL : <http://www.nakashima.co.jp/en>

E-mail : [npcwebmaster@nakashima.co.jp](mailto:npcwebmaster@nakashima.co.jp)

**Address of Head Office**

9-7, Yaesu 2-chome, Chuo-ku, Tokyo 104-0028 Japan  
TEL +81-3-6214-2800 FAX +81-3-6214-2809

**Local Corporations**

**Niigata Power Systems (Singapore) Pte, Ltd.**  
50 Bukit Batok St.23, #04-21 Midview Building, Singapore 659578  
TEL +65-6899-1500 FAX +65-6899-1600

**Niigata Power Systems Philippines, Inc.**  
2nd Floor, BJ Marthel Building, No.5 Ascie Avaneue, Km.16 West Service Road, ParaOaque City Philippines  
TEL +63-2-822-3678 FAX +63-2-822-6380

URL <http://www.niigata-power.com>

**Company's Feature**

Reducing of exhaust emissions from prime movers is the most important theme for the environmental protection to the industry fields. Niigata concentrates upon supply of power systems products and services that shall make a grate contribution to exhaust gas emissions minimizing as well as keeping high grade of economy. Niigata's core products here are distinctive individualities to meet wide varieties of both environmental and economical demands worldwide.

**Service Network**

Niigata delves into high quality marine engineering, plant engineering and construction, taking advantage of the technology, know-how, and abundant experience we have accumulated over many years. Not to mention that Niigata also supplies parts and do maintenance work, we offer our comprehensive technology resources for a broad range of services as engine diagnosis, performance improvement, retrofit, etc.

**Main Products****Diesel Engines**

6L28HX Diesel Engine

The advanced medium and high speed diesel engines are accumulating positive results in marine and power generating markets while grappling with the external theme of the harmony with the environment. In the marine market, these engines are mainly used for tugboats, supply boats, high speed vessels and so on.

**Gas Engines**

18V28AG Gas Engine

The AG Series engine, which denotes 'Advanced Gas' with high BMEP and high electric thermal efficiency, produced 30% higher power than conventional spark ignition gas engines. 22AG and 28AG engines cover from 1 MW to 6MW in output. The micro-pilot compression ignition system is applied on the AG Series engines. Thanks to the Micro-Pilot ignition system, AG Series engines can also operate with a low calorific value gas such as sewage, bio and pyrolysis gases.

**Z-Pellers**

Z-Peller

Powerful thrust by Niigata Z-Peller is put forth in any of 360 degree direction with Niigata diesel engines. Twin Z-Peller system makes it possible to effect quick halting and starting, spinning and switching or astern. More than 3,000 units of Z-Peller have been put into worldwide services since 1969, securing reliability and durability required by customers.

# NIPPON HAKUYO ELECTRONICS, LTD.

日本船用エレクトロニクス株式会社  
NIPPON HAKUYO electronics, ltd.

## ●Company Profile

- \* Company Name : NIPPON HAKUYO electronics, Ltd.
- \* Headquarters : 2-40-7 Higashikanagawa, Kanagawa-ku,  
Yokohama, JAPAN 221-0044
- \* Incorporated : Oct. 1, 1981
- \* Paid-in Capital : 10 million yen ( As of Mar. 31, 2009 )
- \* Net Sales : 3 billion yen  
( Fiscal year 2008 ended Mar. 31, 2009 )
- \* Number of Employees : 60
- \* Board of Directors : Katsunobu Yasunaga, president  
Eiji Osaka, Director  
Shinobu Fukabayashi, Director
- \* Business Outline : Engineering Design, Manufacturing & Sales of ;
  - 1) Intercom System
  - 2) Public Addressing System
  - 3) Fire Detection & Alarm System
  - 4) Marine Clock System
  - 5) Satellite Data Reception & Processing System
 System Design/Installation/Maintenance services of  
the above products



OAE-1200MX



TXS-12LF



FF-1517

## ●Outline of Main Products

< Equipment/System >	< Model name & Series name / Features >
Marine Telephone Intercom Systems & Data Communications	OAE-8300, OAE-1200MX, OAE-1200MX-1, OAE-7100
Marine Telephones	ODA, ODC, ODS series, Explosion-proof types
Public Addressing System	OHE series
Marine Fire Detection & Alarm systems	FF-1517 series, FF-3062 series
Marine Crystal Clock	Marine CRYSTAL ClockTXS, TS series
Meteorological/Earth Observation Satellite Data Reception and Processing Systems	NOAA/METOP (HRPT/AHRPT) MTSAT/MSG (LRIT/HRIT), TERRA/AQUA (MODIS)
Cargo Loading System	MLA-5002
CCTV & CATV Systems	Closed-circuit television, Common aerial television

## ●If any, please feel free to contact to:

### <JAPAN >

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2-40-7 Higashikanagawa, Kanagawa-ku,  
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Phone No. +81-45-453-6911  
FAX No. +81-45-453-6910  
E-mail : nippaku@nhe.co.jp

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NORINCO PVT LTD.  
301- 302 Orbit Plaza, New Prabhadevi Road, OPP.  
Chaitanya Towers, Prabhadevi, Mumbai 40002  
Phone No. (91 22) 24389712/9713/9717  
FAX No. (91 22) 24389715  
E-mail : cochin@norinco.co.in



## ●Head Office

Address(Head Office) : 4-7-32, Takejima, Nishiyodogawa-ku, Osaka 555-0011, Japan

Founded : February 22, 1949

Capital : JP¥2,200,000,000 (Equivalent to US\$ 22 million)

President Representative Directors : Toshihiko Sasakura

Employee : 349

Sasakura is firmly committed to its mission of "creating a better environment through water, heat and sound technology"

Since the founding of Sasakura in 1949, we have been engaged in research and development of marine equipment, desalination plants, air-cooled heat exchangers and other environmental protection devices that have earned us worldwide distinction. In order to preserve the natural environment of the Earth, we constantly seek to develop new products that meet the needs of the times. It is our aim to create a better environment through fresh water production, energy savings and noise suppression.



Water treatment technology  
(Desalination Plant for Middle East)



Heat transfer technology  
(Air-cooled heat exchanger for petrochemical plant)



Noise control technology  
(Noise reduction system for engine testing plant)

## ●For marine equipment :

SASAKURA is the only maker in the world who have supplied more than 10,000 units of Fresh Water Generator !

Since its inauguration in 1949, Sasakura Engineering Co., Ltd. has been manufacturing and marketing seawater desalination plants for both marine and land-base applications, ranging in daily supply capacity from hundreds of liters to hundreds of thousands of tons.

The K Series of fresh water generators for marine use constitutes one of its diverse categories of seawater desalination plants.

Mainly installed aboard diesel-driven vessel, they are tubular seawater distillation plants that utilize the waste heat of diesel engine jacket cooling water. The daily product capacity ranges from 3 tons to 100 tons.

Having the notable original features and high reliability, Sasakura's fresh water generators are well known by their users and are in active service over the seven seas.



K Series Fresh Water Generator



## COMPREHENSIVE SUPPLIER OF ELECTRIC EQUIPMENT & MACHINERY FOR MARINE USE

Taiyo Electric Co., Ltd. has accumulated sales records since its founding nearly a century ago. Today, we deliver highly reliable electrical equipment for wide variety of vessels all over the world. Vessels equipped with our products range from small fishing boats and coastal ships to large vessels, including mega container ships, LNGCs and etc.

When developing new products, Taiyo Electric Co., Ltd. bears in mind the specific requirements of each individual vessel as well as the needs of the times, while pursuing the highest possible quality and technical standards. As a leading manufacturer of marine electrical equipment, we produce and market a diversity of system-based products, including thyristor type shaft generator systems and inverter control devices, in addition to general electrical machinery and equipment such as generators, motors, ventilators, switchboards, starters, and main engine monitoring boards.

Based upon our valuable experience and wealthy knowledge with the unique solution as "total supplier", Taiyo Electric Co., Ltd. has a favorable reception from shipyards & ship owners of various countries in the world.

### ● Main Products

- Generators
- Induction Motors
- Ventilation Fans
- Switchboards & Starters
- Alarm Monitoring System
- Inverter Speed Control Systems
- Diesel Electric Propulsion System
- Thyristor Control Shaft Generating System

### ● Head Office

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## ● Outline of Company

Yanmar, ever since its foundation, has been developing versatile energy and labor-saving diesel engines with output ranging from 3ps to 5,000ps through its unique diesel technologies, contributing to the community through energy conservation.

Our ceaseless efforts to produce ever higher quality products were rewarded with ISO9001 certification by Lloyds (LRQA) of Britain for the Amagasaki Plant of the Large Power Products Operations Division in July 1992, confirming international recognition for the excellent quality assurance system of the plant. The Large Power Products Operations Division of Yanmar has been a pioneer in tackling environmental problems and in June, 1997, the Amagasaki Plant became the first large industrial and marine diesel engine plant in Japan to be certified under ISO14001. The marine diesel engines produced by the Amagasaki Plant were also the first in Japan to clear the emission (NOx) control regulations of the IMO. The far-sighted efforts and excellent technologies of the Large Power Products Operations Division protect our environment and are highly evaluated in the world.

The Amagasaki Plant of Yanmar aims to ensure beautiful harmony with the global environment and to contribute widely throughout industry and society to create a better future for all.

## ● Head Office

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## ● Yanmar India Office

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Tel: 022-4155-5333

Fax: 022-4155-5310

## ● Main Products

Marine propulsion and auxiliary diesel engines

## ● New Model

Marine auxiliary diesel engine, Model 6EY18 (A) L

## ● Features 6EY18 (A) L

1. The low sac type fuel valves, variable jacket water temperature control and, valve stem seal with backpressure lip, are technologies included to reduce soiling of the combustion chamber which occurs with the use of low-grade heavy oil.
2. With the introduction of a new "stay clean" design turbocharger maintenance intervals will be lengthened while the automatic back washing LO filter allows for maintenance-free operation.
3. Compact design allows simplicity in the engine room layout.
4. With concentration of the pipe connections at the front of the engine, piping construction man-hours are reduced.
5. The intercooler and stand of turbocharger have been designed as a single compact unit. The number of parts has been reduced by 30%, further increasing ease of maintenance.
6. High probability of corresponding to future environmental regulations.



Model 6EY18 (A) L

# MANABE ZOKI CO., LTD.



During the past 50 years, we have won a reputation as a pioneering company of marine deck machinery and deck crane. Now it is recognized 『MANABE BRAND』 as a world quality and we increasingly widen our fields to a broader range of countries.

It has been seven years since we developed A.C. electric driven deck machinery with frequency inverter. There are no troubles and the delivery record also has been more than 100 vessels. We are willing to develop the deck machinery and deck crane under the theme of “Energy-saving” and “Environment & User friendly”.

We are happy to be of any assistance to you; please feel free to contact us whatever we can do to help you. Thank you.

## ■ Head Office ■

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HP: <http://www.manabezoki.co.jp/en/index.html>



## ■ Main Products ■

### -Deck Machinery

(Hydraulic Type and Electric Type)

Windlass: Chain dia.  $\Phi$  19~132mm

Mooring Winch: 19.6~315kN  $\times$  15~20m/min

Anchor Handling/Towing Winch: 294~3920kN (Brake)

### -Deck Crane

(Electro-Hydraulic Type)

Single Crane: 294~638kN

Twin Crane: 491~1275kN

### -Hose Handling Crane

(Hydraulic Type): 98~196kN





The Nippon Foundation

# JSMEA

Japan Marine Equipment Association

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