Seminar on Ship Machinery Industry in India Cancelled

Due to the terrorist attacks in Mumbai on November 26, 2008, JSMEA has decided to cancel its seminar on Japan ship machinery Industry scheduled for February 5, 2009 in Mumbai after consulting with other interested parties.

Participation in SMM 2008

JSMEA, together with 21 member companies, participated in the SMM 2008 in Hamburg, Germany on September 23-26 in 2008, under a grant from The Nippon Foundation.

Some 1,965 companies from 56 countries exhibited at the 23rd SMM, which attracted more than 52,000 visitors, an all-time record number, according to the SMM secretariat.

JSMEA Japan Marine Equipment Association

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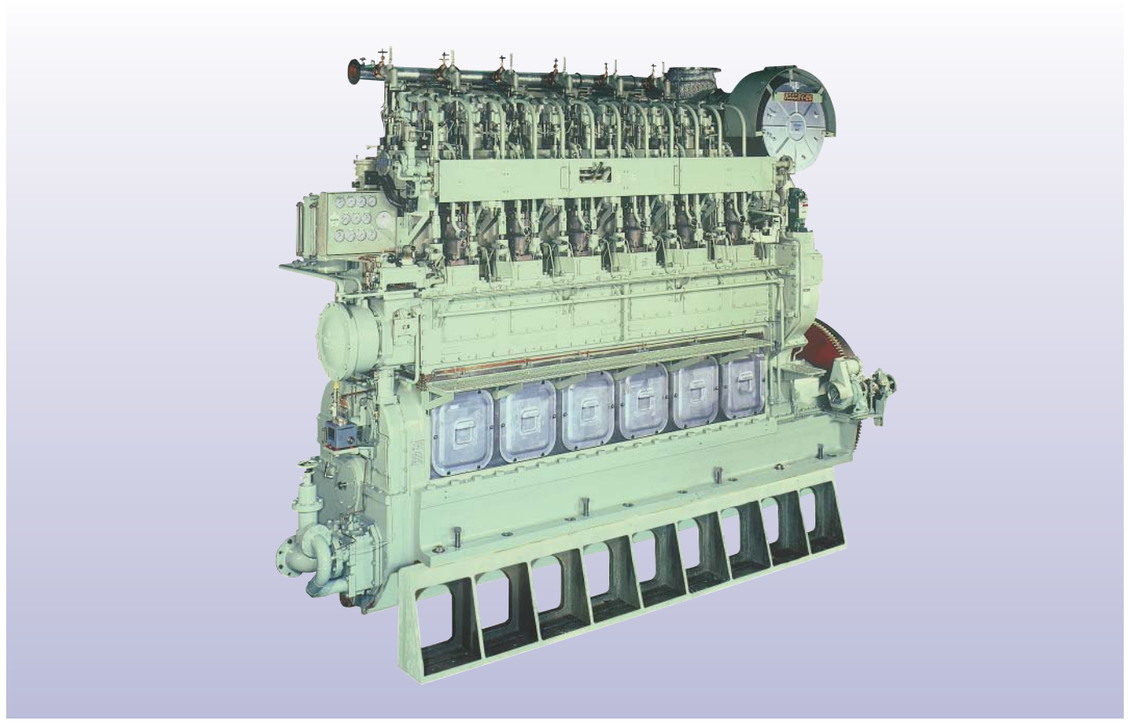
Jsmea News

LA Series of Low-Speed Four-Stroke Diesel Engines



1. Introduction

The LA series of engines produced by The Hanshin Diesel Works, Ltd. are reliable high-performance, low-speed and four-stroke diesels embodying the latest technology and structure developed on the basis of the technical know-how built up through the 90-year history of the manufacturer and its experience in producing diesel engines aggregating more than 14 million PS in power output.

LA engines are improved in cycle efficiency by elongating the piston stroke, and in propulsive efficiency by reducing the number of revolutions per minute with enlarging the applicable propeller diameter. With a view on meeting the requirements for global environmental friendliness and conservation of natural resources, they reduce fuel consumption (and accordingly, CO_2 emission) without sacrificing low NOx performance.

2. Main Particulars and Dimensions of Engines

The LA34 type engine went through the development phase in 1997, and so did the LA28 type in 2006. Now the first unit of the LA32 type is complete and in test operation.

3. Structure and Features of Engines

In designing the LA series of diesels, the manufacturer verified their strengths in both mechanical and thermal aspects by the Finite Element Method.

The crankcase is made more rigid by integrating the cylinders, cam chamber, air intake pipe and cooling water inlet, a structure that contributes to the reduction in vibration and noise and to its compact design.

The cylinder cover is shaped and sized to satisfy mechanical stress and thermal stress considerations, and is strongly built.

The cylinder cover is hydraulically fastened with four bolts for the LA28 or the LA 32 (six for the LA34), and the fastening force is uniform, which facilitates disassembling and assembling.

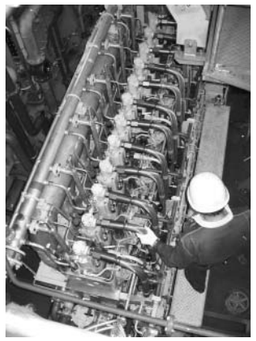
High-top land pistons are used to help make uniform the temperatures of combustion chamber components and reduce wear of the piston rings.

The cylinder liners are bore-cooled in the top internal circumferential parts constituting the combustion chamber, and the wall face temperature is thereby kept at an appropriate level. L-save rings are fitted to the cylinder liners at the top, and hard carbon is thereby prevented from sticking to the top lands of the pistons, resulting in reduced lubricating oil consumption and cylinder liner wear.

One intake valve and exhaust valve each is provided per cylinder, and the valve box is easy to maintain and inspect. As one of the most significant features of the LA series, the intake valves and exhaust valves are hydraulically driven to reduce noise and prevent oil from splashing from the valves.

The crankshaft is the strong R-R forged type, and the journal bearings and crank pin bearings are made of aluminum alloy-thin metals, which are highly reliable and easy to maintain and inspect.

The turbo-charging system is a pulsation pressure supercharging system with excellent performance under light load and in compliance with load variations, and the superchargers are high pressure-ratio, high efficiency and compact TPS type units manufactured by Turbo Systems United Co., Ltd.



4. Operational Records of LA Engines

The first unit of the LA34 type engine was delivered in 2001 as the main engine for a Taiwanese squid fishing vessel. So far nearly 20 units have been shipped out, and many more are on order.

As main engines for coasting vessels, LA engines were delivered in 2003 and have been in service for five years. The normal load is 75% to 80% of MCR (Max. Continuous Rating), and the consumption of lubricating oil is at a satisfactory level, ranging from 30 liters to 35 liters/day.

Favorable opinions have been received from engineering supervisors of vessels equipped with LA engines: "There is no tappet noise during operation; it is a quiet engine;" "No oil is sprayed from the valve mechanism; the superchargers and air coolers are only a little smeared;" "It is exactly what was conceived as the main engine for the vessel when it was planned; I am completely satisfied; we will also think of using LA engines for ships planned in the future."

Main Particulars of Engines

		Vertical In-line 4-stroke, single-acting diesel engines				
Model		LA28G	LA32G		LA34 (G)	
Rated output	kW	1323	1618	1618	1765	1912
Speed	min^{-1}	330	280	310	260	270
No. of cylinders		6	6		6	
Cylinder bore	mm	280	320		340	
Piston stroke	mm	590	680		720	
Stroke/bore		2.11	2.13		2.12	
Explosion pressure	MPa	14.7	14.7		14.2	14.7
Net mean effective pressure	MPa	2.207	2.113	1.906	2.077	2.167
Reversing system		Indirect	Indirect		Direct and indirect	

5. Postscript

The LA series, as successors to LH-L type engines, are high-powered engines that are further improved in reliability and operability, meeting the requirements of exhaust control and CO_2 reduction - which will become even more stringent - and compatible with engine rooms that will be even more limited in space by double hulls and other constraints.

Hanshin plans to further enrich the LA series.

The Hanshin Diesel Works, Ltd. Tokyo Branch
Address: Ochanomizu-Meikei Bldg., 3, Kanda Surugadai 2-chome, Chiyoda-ku, Tokyo 101-0062, Japan
Tel: +81-3-3259-5612 Fax: +81-3-3259-5628
E-mail: overseas-section@hanshin-dw.co.jp URL: http://www.hanshin-dw.co.jp/en/index.html

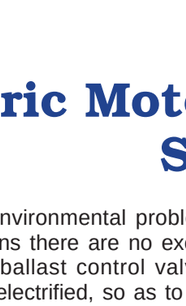
New Electric Motor Valve (IP68) Control System

Today's need to address environmental problems including marine pollution means there are no exceptions when choosing remote ballast control valves, which are now required to be electrified, so as to dispense with oil.

Electric motor valves in themselves are nothing new, but due to their "bulkiness" and "high price," their use has not been. However, recent improvements in the performance and compactness of electronic devices have made electric motor valves much more cost-effective. In addition, the trend these days has meant nobody can remain indifferent to environmental conservation, and those driven by electric motors have increasingly replaced hydraulic systems, which have traditionally constituted the main stream of marine equipment.

Utsuki Keiki Co., Ltd. manufactures ballast control systems centering on pressure-sensitive water level gauges, including an electric motor valve (CRW type actuator) system of waterproof International Protection Code 68 (IP68), the first such product in the industry. This system was developed jointly with Okamura Engineering Corporation (OKM), and has received favorable responses from users.

External view of CRW

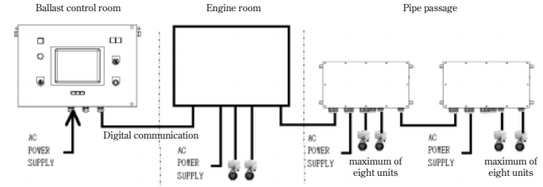


External view of CRW (rear side)

Outline

The system is basically intended for installation in a dry environment, but its design allows "operation for 72 hours at 30 meters," which ensures the minimum required operation even if the pipe duct becomes flooded due to incorrect valve operation or stranding.

Utsuki Keiki markets the electric motor valve as a remote ballast control system. The manufacturer has also developed a module enabling the valve to be remotely operated by incorporating it into a wiring relay point, instead of a main control board configured around a touch panel type LCD. A wireless system to which the module is applied is also under consideration.



Decentralized control using digital communication (wireless)

From now on, electric motor valves will become more advanced to meet the needs for greater values added.

Demonstration of submerged operation at the SEA JAPAN 2008 exhibition booth

Features of the CRW Type Electric Motor Valve

1) High waterproof property is provided by the use of an independent terminal box.
   * The wiring connection part (terminal box) and the inside of the motor are completely separated from each other as double-sealed structures.
2) Low-torque, secure and reliable sealing performance achieved by torque seating of the OKM valve.
   * Readjustment of the opening/closing position is unnecessary even after years of use.
3) Simplified internal wiring contributes to a reduction in weight and easier maintenance.
4) A built-in thermostat prevents the motor from burning-up in case of abnormal operation.
5) A torque switch prevents damage from the accidental mixture of foreign matters.
6) Operable in a broad ambient temperature range of -10˚C to + 60˚C.
7) Thicker epoxy coating provides increased endurance in adverse environments.

Utsuki Keiki Co., Ltd.
Address: 3530, Kamiyabe-cho, Totsuka-ku, Yokohama 245-0053, Japan
Tel: +81-45-813-1239 Fax: +81-45-811-0425
E-mail: guchenhong@utsukikeiki.co.jp URL: http://www.utsukikeiki.co.jp/e_framepage_01.html

Electronic Chart Display and Information System (ECDIS)
EC-8000/8500 Series

Outline

The EC-8000/8500 Series of TOKYO KEIKI are new types of electronic chart display and information systems (ECDIS) embodying the manufacturer's latest technology.

- Perfectly conforms to the latest IMO performance standards
- Design unified with TOKYO KEIKI's new radar BR-3200 Series
- Available in either the stand or unit type
- Type certificate to be acquired for the track control system (TCS) using a new adaptive control (NCT) link formula in addition to the conventional formula.

Features

1. Remarkable operating ease
A menu in an easy-to-handle tab form and a shallow hierarchical menu provide remarkable operating ease.

2. Temporary route automatically set
The route from the vessel's current position to any desired starting position is automatically set when in automated operation, allowing the user to enter a new route for the vessel by a simple operation under track control (TCS).

3. Maneuvering interface
The vessel can be maneuvered on the ECDIS to avoid an obstacle when in automated operation, and can be returned to automated operation by a simple operation.

4. Remote ECS control (optional)
Monitoring and route setting can be done on the ECDIS screen with a PC via LAN.

5. Permits real-time updating of chart by e-mail

6. Improved installation ease
The system can be flexibly adapted to a console or space-efficient installation by adding a unit or units.

Company name changed
(effective October 1, 2008).
Former name: TOKIMEC INC.
New name: TOKYO KEIKI INC.

Specifications

Display	LCD	19 Inch (EC-8000/ EC-8000K) 23.1 Inch (EC-8500/ EC-8500K) TFT color LCD panel
	Effective display range	376 x 301mm (EC-8000/ EC-8000K) 470 x 352mm (EC-8500/ EC-8500K)
	Resolution	SXGA(1280 x 1024 pixels EC-8000/ EC-8000K) UXGA(1600 x 1200 pixels EC-8500/ EC-8500K)
	Display	TFT Active Matrix model
	Display colors	Maximum 16.7 million colors
Mode	Operation mode	Route planning, Route Monitor, Chart Update
	Display mode	North Up, Course Up, Route Up, True motion and Relative motion
Function	Chart display, Ship position fixing, Target positioning measurement、 Route planning, Route monitoring, 24 hour record and play back, Navigation record （3 months), Navigational memo and No-go line / No-go area, RADAR overlay, Track target information display, AIS target information display, System self-diagnosis ＜Option＞ Track Control (TCS), Steering interface, ARCS chart display, Extended display, Remote ECS connection, Back-up ECDIS connection, Bridge alarm system connection, Route information display	
Power	AC100/110/220V 1Ph 50/60Hz 250VA(EC-8000/ EC-8000K)、300VA(EC-8500/ EC-8500K)、DC24V 4.5A(max)	

TOKYO KEIKI INC.
Address: 2-16-46 Minami-Kamata, Ohta-ku, Tokyo 144-8551, Japan
Tel: +81-3-3737-8631 Fax: +81-3-3737-8666
URL: http://www.tokyo-keiki.co.jp

Inmarsat FleetBroadband
JUE-250/JUE-500

Outline

The JUE-250/JUE-500, a pioneering next-generation Inmarsat satellite communication terminal, delivers the most advanced maritime service available, fully contributing to the operational efficiency of vessel and crew.

Unique features

Simultaneous access
The service provides simultaneous voice and broadband data through a compact antenna, allowing you to run online operation systems, whilst still having access to email, intranet and voice calls.

Cost-effective service
With FleetBroadband, performance and flexibility do not come at a high price. You will achieve greater operational efficiencies and significantly reduce the cost of both business and crew communications.

Optimal connectivity
Standard IP for email, internet and intranet access via a secure VPN connection, at speeds up to 284 kbps (JUE-250) / 432 kbps (JUE-500), streaming IP guaranteed data rates up to 128 kbps(JUE-250) / 256 kbps(JUE-500) and SMS up to 160 characters.

Specifications

Frequency
- Transmit 1626.5MHz - 1660.5MHz
- Receive 1525.0MHz - 1559.0MHz

Communication
- Voice 4kbps/digital 3.1kHz audio
- Fax group 3 fax via 3.1kHz audio
- Data standard IP
- Data streaming IP
- SMS up to 160 characters

Primary power
- Voltage DC 24V (-20% +30%)
- Consumption 120VA max

Environmental conditions
- Ambient condition temperature:
  - antenna -25˚C +55˚C
  - main unit -15˚C +55˚C

E.I.R.P.
- +15.1dBW +1/-2dB (JUE-250)
- +22.0dBW +1/-2dB (JUE-500)

G/T
- -15.5dB/K or more (JUE-250)
- -7dB/K or more (JUE-500)

Onboard unit

Inboard unit


Handset

Japan Radio Co., Ltd. Marine Electronics Business Department
Address: Nittochi Nishi-Shinjuku bldg. 10-1, Nishi-Shinjuku 6-chome, Shinjuku-ku, Tokyo 160-8328, Japan
Tel: +81-3-3348-4099 Fax: +81-3-3348-4139 URL: http://www.jrc.co.jp/eng/index.html

Mitsubishi-VOS (Ventri Oxygen Stripping) System

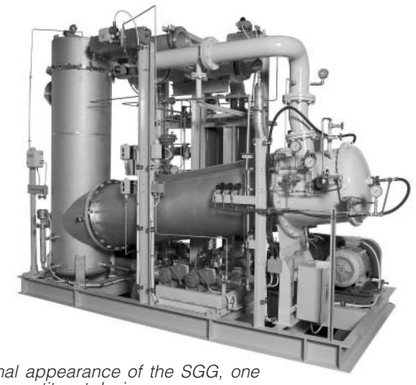
Mitsubishi Kakoki Kaisha, Ltd. (MKK) has entered into a technical license agreement with NEI Treatment Systems, LLC (NEI) of the U.S. on a de-oxygenation ballast water management system developed by NEI. Under the agreement, MKK is supplying the product as the Mitsubishi-VOS (Ventri Oxygen Stripping) System to Japanese shipbuilders and shipowners. The installation of ballast water management systems (BWMS) is a requirement that urgently needs to be addressed today. (For businesses outside of Japan, NEI or its agent is the contact.)

The main parts of the system are manufactured at MKK's Yokkaichi Works in Mie Prefecture, and maintenance service is provided through MKK's oil purifier (whose product name is Selfjector) servicing network and NEI's agent network.

The Mitsubishi-VOS System satisfies IMO's ballast water discharge standards, and has already acquired type certificates from the Republic of Liberia and the Republic of the Marshall Islands as a ship-mountable ballast water management system.

The system consists of a combustion type stripping gas generator that generates inert gas with an extremely low oxygen concentration and a venturi provided midway on the piping. By mixing low-oxygen gas with ballast water, oxygen dissolved in the ballast water begins separation according to the general theorem of chemistry immediately after the treatment and is maintained in the ballast tank to reduce marine life in the water.

This device is similar to the inert gas system installed on tankers and other ships from long ago to prevent explosions, and is therefore familiar equipment in the ship machinery industry. Although fuel must be loaded, there are no chemicals used, even for washing.

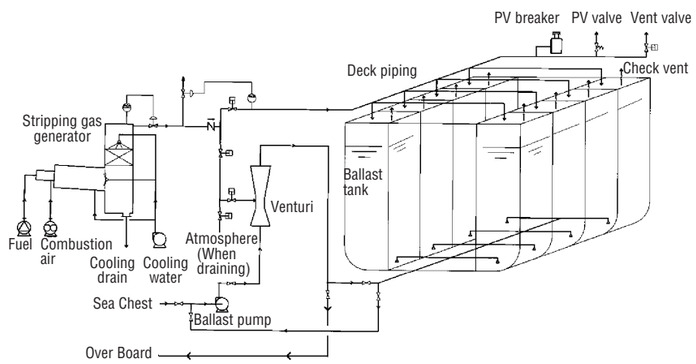


External appearance of the SGG, one of the constituent devices

Even though the IMO convention is intended for environmental conservation, once it is ratified, ballast water management will be quite expensive for ship operators. Yet, the system's rust proofing properties should encourage shipowners to install it. As the system reduces the oxygen in the tanks' ballast water, it can function not only as a ballast water management system but also as an anticorrosive system that can significantly reduce corrosion of ballast tanks, a problem that has been one of the major concerns in ship maintenance work.

Regarding the anticorrosive performance, the system has been evaluated with both coated and non-coated steel pieces during a 270-day ballast tank ambience test. It was confirmed that coated pieces were unaffected while non-coated pieces improved in corrosion- susceptibility by a maximum of 84%. This feature can also be safely and effectively applied even to PSPC tanks in minimizing the quantity of steel to be replaced and compressing the coating area when the ship is docked for maintenance.

This advantage in life cycle cost has been greatly appreciated, and installation of the system has already been ordered for 20 vessels - mainly by "green"-minded Western shipowners - and MKK has already delivered three units of the system to European shipyards via NEI.



Ballast pump Simple flow chart

Mitsubishi Kakouki Kaisha, Ltd. Selfjector Sales Sec.
Address: 1-2, Miyamae-cho, Kawasaki-ku, Kawasaki 210-0012, Japan
Tel: +81-44-246-7350 Fax: +81-44-246-7352
E-mail: mkkkikai@kakoki.co.jp URL: http://www.kakoki.co.jp/english/

Alarm Monitoring System TMC-M2K

The TMC-M2K manufactured by Taiyo Electric Co., Ltd., with a man-machine interface, is designed from the crew's viewpoint in support of safe ship operation. It represents the combined knowledge of the manufacturer gained over many years of experience with the latest computer technology. The system constantly monitors the engine and provides the crew with information needed for operation of each unit of equipment in the best possible state.

Features

(1) All in One Unit

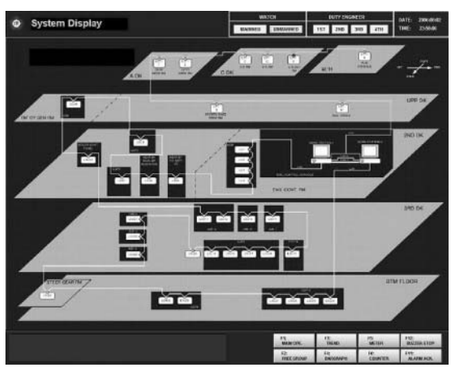
A panel computer arrangement integrates the main computer - the heart of the Alarm Monitoring System - with a liquid-crystal display (LCD) monitor, providing space savings and ease in maintenance.

Main unit

(2) Trouble Diagnosis

A system diagnostic screen is provided as a standard feature in case of trouble. The screen pinpoints at a glance the location of system trouble.

The units making up the system are simply configured to minimize trouble.

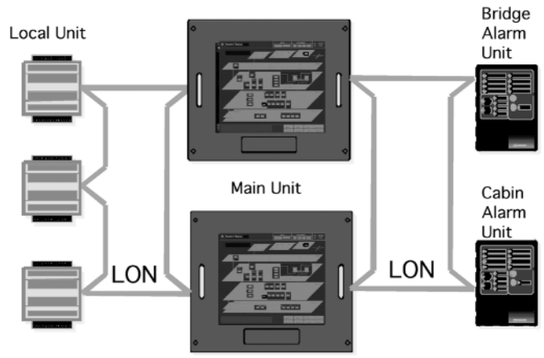


System diagnostic screen

(3) LonWorks®

LonWorks® is the communication protocol between local units/extension alarms and the main computer.

LonWorks® performance has been proven repeatedly in building automation and various other areas of automation to provide highly reliable data communication.



Communication network

(4) Simple Screen

Required functions are integrated on a 17-inch (or 19-inch) screen (graphic user interface: GUI) that is workable on a one key-one action platform for simple operation.

Display screen (example)

Taiyo Electric Co., Ltd.
Address: Sanritsusha Bldg., 16-8, Uchikanda 1-chome, Chiyoda-ku, Tokyo 101-0047, Japan
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E-mail: e-mail@taiyo-electric.co.jp URL: http://www.taiyo-electric.co.jp

The Role of FUELNAVI

What is FUELNAVI?

FUELNAVI is jointly developed by Monohakobi Technology Institute (MTI), Yamatake Corporation and NYK Trading Corporation. It is intended to enable the ship's crew to monitor various operational data, including fuel consumption. It displays the fuel consumption in tons/nm or tons/day on the basis of fuel consumption data obtained from the main engine flow meter (fuel flow counter) and speed over ground data from the GPS.

It also has functions to display the CO_2 emission levels (instantaneous value) and the price of fuel consumption (in US dollars) by inputting the unit price of fuel. Furthermore, it can display data from various nautical instruments, including an anemometer in trend graphs to analyze factors of effecting any drops in fuel efficiency.

Data display unit

* Optional measurable items
Main engine: Shaft horsepower, shaft-generater power and shaft revolution
Nautical instruments: Doppler sonar, anemometer, gyrocompass, motion sensor and autopilot


Signal processor

The Role of FUELNAVI is "Visualization"

Environmental problems and fuel costs today make it an urgent task to be approached by both hardware and software techniques. In terms of applicable software techniques, the ship's crew is enabled to get a clear grasp of the effect by environmental conditions on the fuel consumption by FUELNAVI. It is expected to facilitate energy-efficient ship operation. FUELNAVI can also be used as an instrument for measuring the performance of the ship.

On the other hand, the aviation industry is now faced with a decision by the EU to set a ceiling for total CO_2 emissions of aircraft entering the region (EU-ETS). Every airline company is obliged to replace its fleet with less CO_2-emitting (more fuel-efficient) aircrafts and to work out more efficient ways of fleet operation. This matter is now under discussion in IMO. Similar regulations to shipping industry could be a matter of time.

The cube of the sailing speed, the volume of fuel consumption and the amount of CO_2 emitted are said to be proportional to one another. It means, the operation is very important for improvement of fuel efficiency. FUELNAVI is an effective tool that can contribute to energy efficient operation by "Visualization".

NYK TRADING CORPORATION Technical & Engineering Group
Address: YS Kaigan Bldg., 2-2-6, Kaigan, Minato-ku, Tokyo 105-0022, Japan
Tel: +81-3-5765-1823 Fax: +81-3-5765-1873
E-mail: sakai-masanori@yusenshoji.co.jp URL: http://www.yusenshoji.co.jp/english/index.html

Development of new medium-speed diesel engine "28AHX" One of the cleanest marine engines in the world

Niigata Power Systems Co., Ltd. has been developing a new type of medium-speed marine engine (Bore: 280 mm, Stroke: 390 mm, Output: 2,070 - 3,330 kW) that achieves the green engine emissions standards. This engine complies with the IMO's NOx Regulation Tier II that will come into effect in 2011. A photo of the engine is shown in Photo 1.

The engines will be used in conjunction with Niigata's azimuth thruster "Z-Pellers" that are installed on tug boats (*1), supply boats and so on, and the first engine will be delivered in 2010. Niigata plans to manufacture 70 to 100 units a year. This engine was introduced at a ceremony and exhibited at the world's largest shipbuilding fair, "SMM 2008" in Hamburg, Germany. The ceremony was attended by over 200 customers and component suppliers, and included opening a Japanese Sake cask. The engine was highly evaluated. The 28AHX model that was exhibited, as well as scenes from the ceremony are shown in Photos 2 and 3.


Photo 2: SMM 2008 Exhibition scene

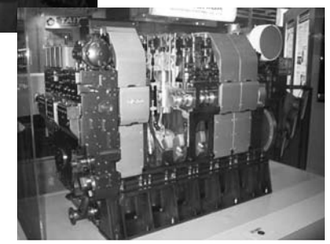


Photo 3: SMM 2008 Exhibition scene

This engine can reduce 30% of NOx emissions compared with the conventional type, and complies with IMO's NOx Regulation Tier II (reduction of NOx emissions by 20%) that will be enforced in 2011. It also improves specific fuel consumption by 2% compared with the conventional type by using Miller-cycle (*2), though it is said that the relation between fuel consumption and NOx emissions is a trade-off. Furthermore, output is increased by 20%, and still capable of compliance with NOx Regulation Tier II without any fuel consumption or output loss.

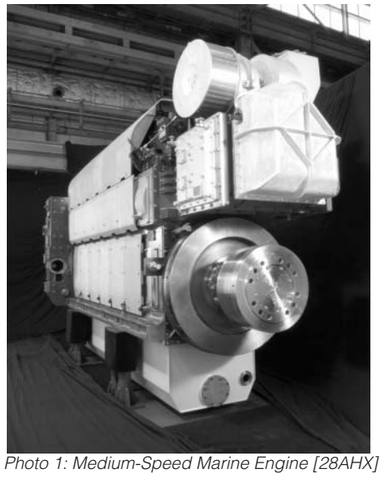


Photo 1: Medium-Speed Marine Engine [28AHX]

The enlargement of vessels (e.g. containerships) has resulted in more requests for high-powered tug boats to pull them into the harbor. Therefore, the demand for high-powered tug boats is expected to increase along with it. Niigata's Z-Peller has accounted for 30% of the global share for the azimuth thruster market mainly via small models. However, this engine can correspond to the medium 3,330 kW power rating that had not been handled by Niigata in the past and thus can be used as the propulsion engine for higher-powered tug boats.

Niigata, actively intend to accept more orders to expand their share in the global market from 30% to 40%, utilizing the advantage that Niigata is the only company able to produce all machinery relevant to the propulsion system, which includes both Z-Peller and engines.

*1 Tug boat: A boat that tows a large vessel toward the port in the harbor.
*2 Miller-cycle: One of the cycles in an internal-combustion engine. It sets the timing of the intake air valve as it closes, more advanced on the intake stroke than conventional models. This cycle can reduce NOx emissions by suppressing the substantial compression ratio to low and decreasing compression temperature. It also achieves high efficiency and steady combustion at the same time by increasing the expansion ratio.

Niigata Power Systems Co., Ltd.
Address: 9-7, Yaesu 2-chome, Chuo-ku, Tokyo 104-0028, Japan
Tel: +81-3-6214-2800 Fax: +81-3-6214-2809
E-mail: info1_sales1@niigata-power.com URL: http://www.niigata-power.com/

53 Series of IACS-Compliant New Air Vent Heads

Outline

53 Series of Air Vent Heads recently developed by Niikura Kogyo Co., Ltd. is designed in accordance with Unified Requirements P3 (1991) (Rev. 1 2001/Corr. 1 2002/Corr. 2/2004) of International Association of Classification Societies (IACS), and is one of the few air vent head series that meets the needs of classification societies of each country.

Features

A key change to IACS Rules is the addition of a requirement concerning the volume of water leakage. To meet the requirement, 53 Series devices have been upgraded with new ball-type float instead of the previous disc-type float. These new air vent heads are of the result of enormous efforts made by the developer to pursue high-performing and reliable capacity using their whole production know-how accumulated for more than 50 years. This 53 Series has cleared the extremely strict water-tightness tests stipulated in line with IACS Rule Revision.

Water-tightness Tests

Air vent heads are to be submerged underwater at the speed of 4 meters per minute, and also at the speed of 8 meters per minute respectively.

In the former case, they are to be brought up to the surface immediately thereafter, while in the latter case, they are brought up to the surface more than 5 minutes later.

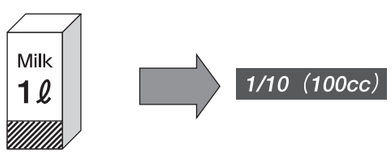
Both tests are to be carried out more than twice keeping the specimen in a perpendicular position with 40 degrees inclined in simulation to a rough weather condition. The volume of water leakage must not exceed 2 ml. per mm of the nominal air-inlet diameter.

In case of 50A devices, for example, the volume of water leakage must not exceed 100 ml., equivalent to one-liter milk pack, or one-tenth of the total capacity, and this shows how strict the requirements of tests are (Fig. 1).

As for Niikura's air vent heads, equipped with new ball-type float, they are designed to shut their top head completely even if in a slanted position. Thus their air vent heads, which have passed such severe tests, would be sure to exhibit their proper function.

Fig. 1

Where the nominal bore is 50 mm



Design registered

53C (for BALLAST TANK)
Size 100A~150A
53CW (for OIL TANK)
Size 50A~150A
- Material: FC 200
- Applicable uses: Weather deck and else

Design registered

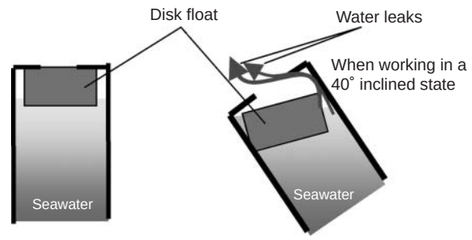
53B (for BALLAST TANK)
Size 200A~450A
53BW (for OIL TANK)
Size 200A~450A
- Material: SS 400
- Applicable uses: Weather deck and else

Design registered

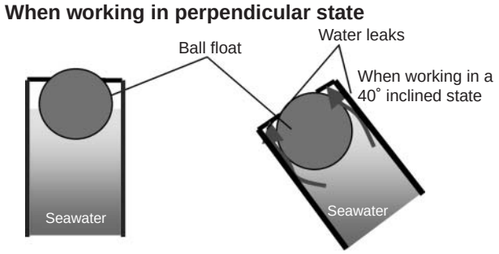
53P (for BALLAST TANK)
Size 50A~250A
53PW (for OIL TANK)
Size 50A~250A
- Material: FCD 450
- Applicable uses: Outer shell and else

Fig. 2

When working in perpendicular state



When working in perpendicular state



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LF-Sea Environmentally Friendly Fuel Saving Antifouling Paint

Outline

Nippon Paint Marine Coatings Co., Ltd. developed Ecoloflex, the world's first organic tin-free environmentally friendly antifouling paint, which is now used on more than 13,000 ships across the world. This product has been followed by LF-Sea, another antifouling paint incorporating a new technology which contributes to a further reduction in fuel consumption and CO_2 emissions.
LF-Sea is an antifouling paint jointly developed by Osaka University and Kobe University. They got the idea from observing tuna - their skin is coated with mucous membranes that help to reduce frictional resistance and also from observing the smooth elasticity of dolphin skin. Since 2005, the paint manufacturer has coated ships offered by domestic ferry operators with LF-Sea, which was confirmed to provide an approximate 4% fuel savings effect. To date, the new product is used on 60 vessels, both domestic and foreign, and more than 40 vessels including repeat vessels are scheduled to join them.

Features

1. Low-friction, fuel-saving antifouling paint using a water trapping mechanism
2. Copper Silyl acrylate copolymer hydrolytic antifouling paint
3. For five year life (*)
4. Applicable directly on the existing tin-free antifoulings without blasting (*)
5. Applicable with current painting tools and conditions. No special workload needed

(*) Depending on the vessel's condition

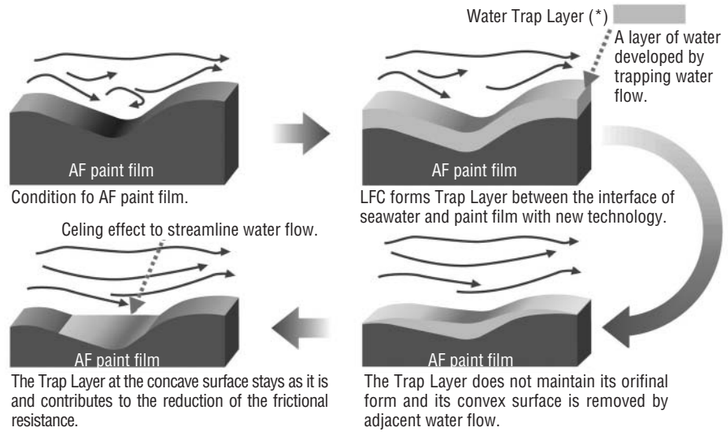
Advantages

Cost aspect:
- Bunker oil saving
- Application cost saving and less application investment than silicone type

Environmental aspect:
- Environmentally friendly with less fuel oil consumption, less CO_2 / SOx discharge

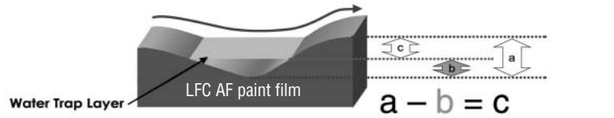
LFC Mechanism (1)

This illustrates how Water Trap Layer works to reduce the frictional resistance.



LFC Mechanism (2)

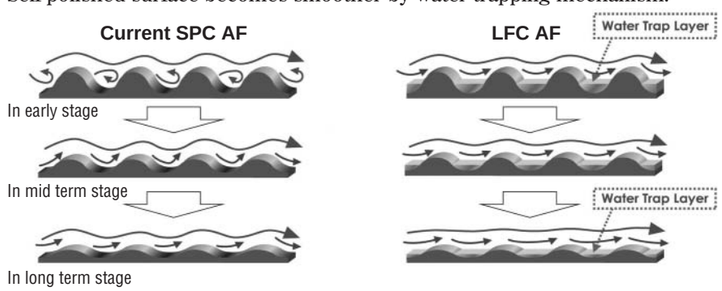
Water flow to smoother surface thanks to water trap layer.



a: (Normal Coating Wave)
b: (Water Trap Layer)
c: (Friction Affecting Film)

LFC Mechanism (3)

Self-polished surface becomes smoother by water trapping mechanism.



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