

JAPANESE MARINE ECO PRODUCTS



Japanese Marine Eco-Products

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MISSIN REFRIGERATION & ENGINEERING LTD.

http://www.nissin-ref.co.jp/english/

Heat pump type Ultra compact size Water Chilling Unit



Ultra compact size Water Chilling and Heat pump Unit

Our heat pump chiller unit has various capabilities by combining each 10 HP (or 5 HP) compressor unit.

Only suitable number of compressor running, also heat pump mode contributes ecological operation.

Every compressor units are independent; hence, even if one unit fails, the operation can be continued with the remaining units.

It's hermetic type compressor benefits maintenance free. Being lightweight, compact, and reliable, this chiller unit has been widely equipped on government and municipal ships.

INQUIRIES

1-12-30, Mikuni Hommachi, Yodogawa-ku, Osaka, 532-0005, Japan

Tel : +81-6-6394-1171 Fax : +81-6-6394-1251 E-mail : nre-webmaster@nissin-ref.co.jp

Energy Saving, CO2 Reduction, Power Reduction, Environmental Loading Reduction

USHIO USHIO REINETSU CO., LTD.

Inverter control of FAN and COMPRESSOR



Realize the reduction of CO_2 emissions, will contribute greatly to the global environment.

- Inverter control of FAN
- Can obtain a greater energy savings by setting the rotation speed of the wind amount corresponding to each operation mode "cooling", "heating" and "blast", and improves the comfort of the accommodation space.
- Compared with the damper controlled, there are about 57% reduction of the ratio in the energy equivalent. And there is a reduction of 53.1ton CO₂ / year.
- Inverter control of COMPRESSOR
- Control by an inverter the rotation speed of the COMPRESSOR.

It is effective to keep the operation stable and to reduce power consumption by controlling the finely optimal cooling capacity.

INQUIRIES -

5-3, Creative-Hills, Imabari, Ehime, 794-0069, Japan Tel : +81-898-34-1203 Fax : +81-898-34-1204 E-mail : ushio@ushioreinetsu.co.jp

Port Enterprise Co., Ltd. Port Enterprise Co., Ltd.

http://www.portenterprise.com

Hasytec Dynamic Biofilm Protection (DBP) Ultrasound Antifouling Device



Hasytec Dynamic Biofilm Protection protects any surface coming in contact with water from marine fouling with its own chemical-free ultrasound technology at really low cost without any maintenance.

Product Specification

<u>Transducer</u>

 $\begin{array}{l} \text{Stainless steel case} \\ \text{Dimensions: } \emptyset \ 70 \ \text{mm}, \ \text{H} = 94 \ \text{mm}, \ \text{Weight: } 1400 \ \text{g} \\ \text{Dimensions: } \emptyset \ 54 \ \text{mm}, \ \text{H} = 94 \ \text{mm}, \ \text{Weight: } 1000 \ \text{g} \\ \text{Sealed in PU casting compound} \\ \text{Power consumption: } 20 \ \text{Watt} \\ \end{array}$

Number of cores and cross section: 2 x 2 x 0,75 mm³ Conductor: bare copper wires Insulation: cross linkid polyethylene (RJPE) Screen: plain copper wire braid Halogen free Duter sheath: polyolefin compound, type SHF-1 Outer 0 ž: 8,7 mm Bending radius: 6 x 0 (min) – 53 mm Weight: 103 g / m Temperature: from 35° C to 90 ° C Certificater/Standards: DNVGL, IEC 60092-376, IEC 60092-360 class 2

LCD: operating hours, power supply voltage, temperature LED: output signal control

Control Box

alloy, EN AC-44300 DIN EN 1706

ut voltage: 85 – 264 VAC ut frequency: 47 – 63 Hz ut protection: TA4 / 250 V ed input current: max 16A ommended Fuse rating: 16A (characteristic B) direation: Bureau Veritas, CSA/UL, CB, SIQ, RoHS, Reach

ice: powder coated insions: 330 x 300 x 120 mm rction class: IP66 EN 60529 nting screws: M5x8 inting spacing: 312 x 244 mm ification: DNVGL, CSA, GOST

The product is well proven, completely safe, consumes very little energy, needs no maintenance, and comes with 5-year warranty.

INQUIRIES -

s nickel-plated ection class: IP68 EN50262/EN60529 ification: DNVGL, UL, RoHS

No. 2-1-28, Chikko, Minato, Osaka, 552-0021, Japan Tel : +81-6-6573-5391 Fax : +81-6-6575-3036 E-mail : penterj@penterj.co.jp

ΚΕΙΚΙ ΤΟΚΥΟ ΚΕΙΚΙ ΙΝΟ.

http://www.tokyo-keiki.co.jp/e/index.html

PR-9000

Autopilot

The model PR-9000 is the latest autopilot system from TOKYO KEIKI. The PR-9000 is designed using the latest technology from a wealth of engineering and manufacturing experience of navigational instruments. Safety, accuracy, and reliability of information have been enhanced in our model lineup thereby significantly improving situational awareness and navigational safety.

An indispensable autopilot system providing effective and safe bridge resource

management and energy efficient navigation.

Repeater Unit with color LCD

Color LCDs are incorporated into each system which enhances reliability of information and improves situational awareness.



Maintaining Safe Navigation via Guidance Screen

Steering-related monitoring information can be displayed on the monitor screen.

If a warning alert is generated, the navigator can simply view the proper guidance procedures on the screen in order to carry out evasive measures.

Route Control function (ACE) Route Control is performed only with Autopilot

Due to reduced route deviation / shorter sailing distance / reduction of wasted rudder, it ultimately contributes to safety and energy efficient navigation.



(Avoidance operating procedures Guidance Screen)



(ACE Screen)

http://www.yokogawa.com/ydk

INQUIRIES

Marine Systems Company

2-16-46, Minami-Kamata, Ohta-ku, Tokyo, 144-8551, Japan Tel : +81-3-3737-8611 Fax : +81-3-3737-8663 Inquiry https://www.tokyo-keiki.co.jp/form/webform_marinee.html

Fuel Saving

YOKOGAWA



YOKOGAWA DENSHIKIKI CO., LTD.

Next Generation Autopilot PT900



PT900 is the next generation autopilot, modern controlled fuel saving function (BNAAC/E-COurse Pilot) is installed. By introducing 7 inches LCD, navigation information and autopilot parameters are confirmed and changed very easily.

YOKOGAWA "GREEN" PRODUCTS



INQUIRIES -

Marine Equipment Business Division Minami Shinjuku Hoshino Bldg,5-23-13, Sendagaya, Shibuyaku, Tokyo, 151-0051, Japan Tel : +81-3-3225-5383 Fax : +81-3-3225-5316 E-mail : navigation_info@ydk.yokogawa.co.jp

MITSUBISHI HEAVY INDUSTRIES MARINE MACHINERY & EQUIPMENT CO., LTD.

https://www.mhi-mme.com/

Auxiliary Boiler

Auxiliary Boiler



(MAC-B is an oil-fired auxiliary boiler with 20-100 t/h capacity at 1.76MPag design pressure.

MAC-B is two-drum water tube boiler of the latest design produced on basis of Mitsubishi's newest technologies and long experiences acquired through manufacturing a large number of high pressure high temperature marine boilers. The design pressure is changeable to over 1.76MPag according to the customer's request.

Design Feature

- 1. Simple and compact design
- -Smaller footprint with the top-firing burner design
- 2. High reliability and long life
- -Drum shape with less stress concentration
- -Water walled furnace
- 3. Easy maintenance
- -Less soot deposit and easy cleaning using plain tube
- -Easy inspection with in-line tube arrangement
- 4. Easy and safe operation
- -Automated control with PLC and adoption of furnace safeguard supervisory system

-Adoption of touch panel monitor providing easy operation and monitoring

INQUIRIES

Business Development Division Tel : +81-3-6716-5330 E-mail : info_meet@mhi-mme.com

Ballast Water, Sampling, IMO, USCG, PSC

MOL MOL Techno-Trade, Ltd. Creating the Future SATAKE

http://www.motech.co.jp/e_index.html

Viable Organism Analyzer



SATAKE CORPORATION, which located in Hiroshima prefecture, developed machinery for maritime calls "Viable Organism Analyzer" and MOL Techno-Trade, Ltd. handles to sell it in domestic and foreign market. "Viable Organism Analyzer" can detect number of viable organisms in the ballast water with using a stain reagent (FDA) and a detector. It can cover 2 categories of ballast water discharge standard (D-2) which established by IMO. SATAKE's test method "Pulse counting FDA" is one of analysis method and the target organism admitted by IMO. Test data has high correlation with microscope counts. This Analyzer weight 5kg and can use backpack to carry onboard.

INQUIRIES -

MOL Techno-Trade, Ltd. / Marketing & Sales Dept. 1-1, 1-Chome, Kyobashi, Chuo-ku, Tokyo, 104-0031, Japan Tel: +81-3-6367-5480 E-mail : s-voa@motech.co.jp

JFE JFE Engineering Corporation

http://www.jfe-eng.co.jp/en/index.html

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Filtration + Formulated Chemical Injection method

- Simple System Configuration
- · Installation arrangement is flexible by each component.
- Extremely low power consumption and low impact on the generators.
- Simplicity of the system minimizes the risk of mechanical failure. It's easy to operate and maintenance.
- Treatment method
- Effectiveness of chlorine treatment is proven in our daily life by use in such applications as tap water or swimming pools.
- Why formulated chemical ?
- Efficient sterilization regardless of turbidity, salinity or temperature.
- Capability to meet strict standards and expected tightened regulations.

INQUIRIES

Ballast Water Management System Division 2-1, Suehiro-cho, Tsurumi-ku, Yokohama, 230-8611, Japan Tel : +81-45-505-6538

E-mail : jfe-bwms@jfe-eng.co.jp

Ballast Water Management System

MIURA MIURA CO., LTD.



MIURA work towards our mission of "Helping customers all over the world in energy conservation and environmental preservation."

With fifty years of proven result of ship machinery department, utilizing our technology and trust in MIURA, we put all effort to achieve our goal.

We introduce "Miura Ballast water management system" that contribute to marine environment conservation all over the world.

Miura BWMS adopts filter and UV method which is environmentally friendly that does not affect natural ecosystem of sea area where water is discharged. http://www.miuraz.co.jp/en/bwts/

With its uniquely developed filter, system can surely capture organisms larger than $50\mu m$, and multi-stage cleaning function can maintain filter clean.

In addition, operation of UV reactor is controlled to be energy saving. Control panel is operated using touch panel, which has high visibility and operability.

We also offer 3D scanning, design and dispatching engineer, accumulating actual experiences.

2014.3 BWMS received approval from Ministry of Land, Infrastructure, Transport and Tourism.

- 2014.10 Started shipping Miura BWMS
- 2014.11 Obtained AMS approval
- 2017.3 Start of USCG land-based test
- 2017.4 Start of USCG onboard test
- 2017 Scheduled for obtaining USCG approval

INQUIRIES

7 Horie-cho, Matsuyama, Ehime, 799-2696, Japan Tel : +81-89-979-7060 Fax : +81-89-979-7067 E-mail : hakuyo_eka@miuraz.co.jp atteries

BEMAC BEMAC UZUSHIO ELECTRIC CO., LTD.

Optimizing Electric Power System by Applying Lithium-ion Batteries





Fig.2 Li-ion Battery system

BEMAC has been introducing application of Lithium-ion batteries on ship's electrical system for electrical power efficient usage.

Ship's electrical energy volumes are consumed according to running mode which also the usages of Lithium-ion batteries' applications depends on (Fig.1). For example, its application to bow thruster during entering / existing the port may be used, and during the voyage, it may be applicable for charging the batteries by surplus electric power. Depending on its running mode, system will control charging and discharging of the Lithium-ion batteries by time shifting the ship's electrical power consumption; thus, to cut down the cost of generators' fuel.

BEMAC could supply Lithium-ion Battery Charging and Discharging equipments, Monitoring system and all necessary equipments (Fig.2).

INQUIRIES

Head Office / MIRAI Factory 105 Noma, Imabari-city, Ehime Pref., 794-8582, Japan Tel : +81-898-25-8282 Fax : +81-898-25-3777 E-mail : sales@bemac-uzushio.com

Energy Saving, Environment Friendly, Water Lubricated Bearing

MIKASA MIKASA CORPORATION

Water Lubricated Bearing F.F.Bearing (Friction-Free-Bearing)



As a result of pursuing superior low friction property and heavy duty property, we developed combined bearings made of P.T.F.E. and synthetic rubber and metal shell for Water-lubricated Bearing. F.F. Bearing dramatically minimizes both shaft sleeve and bearing wear.

http://www.mikasa-industry.com/en/

This is the result of using PTFE of high self-lubricating as the slide member, distributing rubber to the back as the cushion to obtain the self-alignmentability, and decreasing the load by the deflected contact.

It is available water lubricating system as an alternative system of oil lubricating system.

By changing into F.F. Bearing were resulting in:

- Reduced Fuel Consumption
- · Lower Vibration
- · Lower Noise Levels
- Less Maintenance Cost
- No Possibility of Sea Contamination

INQUIRIES

Mr. Noriaki Hirata General Manager International Sales Dept., Industrial Products Div. MIKASA CORPORATION 1, Kuchi, Asa-cho, Asakita-ku, Hiroshima, 731-3362, Japan Tel : +81-82-810-3930 Fax : +81-82-837-3947

E-mail : hirata@mikasasports.co.jp

Volcano VOLCANO CO., LTD.

http://www.volcano.co.jp/english/index.html

WASTE OIL/

BILGE CONCENTRATOR "BILCON-X"



Waste oil / Bilge Concentrator "BILCON-X" concentrates the Waste Oil mixed with water or the Bilge Water by using humidification-evaporation method. This system can save cost and a labor. It can also help reducing the vessel's impact on the environment. Features are as followings.,

- "BILCON-X" can condense ship bilge to one-tenth in 24 hours.
- Fully automatic operation does not require labor.
- · Energy saving design allows use of low temperature heat source.

(Ex. Residual steam, Engine coolant water)

- The lineup of the processing capacity of "BILCON"-X is from 1 m / day to 3 m / day.
- "Completely closed system" does not discharge any processed bilge water from the vessel.

BILCON-X is installed in Ferries and the other types of vessels because of easy waste-oil-handling.

INQUIRIES

Sales Department, Combustion Engineering Division 1-3-38 Nonaka-kita, Yodogawa-ku, Osaka, 532-0034, Japan Tel:+81-6-6392-5541 Fax:+81-6-6396-7609 E-mail : info-m@volcano.co.jp

To save the energy for vessel, which is to be generated the steam by recovering the waste heat of Diesel Generator Engine.

OSAKA BOILER OSAKA BOILER MFG. CO., LTD.

http://www.osakaboiler.co.jp

OSAKA BOILERS'S 'OH series' Hybrid Boiler



'OH series' are possible to recover the waste heat from Main Diesel Engine and Diesel Generator Engine simultaneously or from Diesel Generator Engine independently.

'OH series' are adoptable not only for new building but also for navigating vessel as retrofit.

Now 'OH series' have 3 models as

OHB : Composite boiler (Recovered the waste heat from Main Diesel Engine and Diesel Generator Engine simultaneously.)

OHEE : Exhaust gas economizer without steam space (Recovered the waste heat from Generator Engine independently.)

OHEB : Exhaust gas boiler with steam space (Recovered the waste heat from Generator Engine independently.)

INQUIRIES -

Marine Boiler Sales Dept. 2-28, 5-chome, Takejima, Nishiyodogawa-ku, Osaka, 555-0011, Japan Tel:+81-6-6471-2451 Fax:+81-6-6474-1740 E-mail : marine@osakaboiler.co.jp

T SUNFLAME CO., LTD.

Water Emulsion Combustion System





http://www.sunflame.net/english/

19 The data from actual record of our delivery. It may vary some at different boiler / working condition

A new combustion theory from Sunflame which emulsifies fuel and water for better fuel efficiency.

INQUIRIES -

1-30, Nishinohata, Okubo-cho, Uji, Kyoto, 611-0033, Japan Tel : +81-774-41-3310 Fax : +81-774-41-3311 E-mail : info@sunflame.net

Boiler Burners

Boiler Burners

LNG, Environmental friendly

T SUNFLAME CO., LTD.

Dual Fuel Burner, LNG & HFO / MGO



Features of the Duel Fuel Burner

- ·Low NOx and O2
- •HFO 700cSt, MGO 1.5cSt & LNG
- ·Good mixture of LNG & air
- ·Adjustable flame shape
- •Designed for boilers up to 9t.
- •Turn down 10:1
- •Mixed fuel combustion of gas & oil

Get ready for

- *Stricter regulation of SOx / NOx emission
- *Extension of ECA applications
- *Implementation of Shale Gas supply



http://www.sunflame.net/english/

Gas Nozzle with Rotary Cup Burner

A dual fuel burner for HFO / MGO and LNG combustion originally designed by Sunflame.

INQUIRIES -

1-30, Nishinohata, Okubo-cho, Uji, Kyoto, 611-0033, Japan Tel : +81-774-41-3310 Fax : +81-774-41-3311 E-mail : info@sunflame.net

Volcano VOLCANO CO., LTD.

Proportional control type oil burner "MJ II -M"



Design and development of "MJ II -M" fully automated pressure jet proportional control burner allows energy saving operation with composite boiler. Features are as followings.

http://www.volcano.co.jp/english/index.html

- Proportional control (turn down ratio / 3:1) allows for reducing the burner ON / OFF switching and improving the boiler efficiency.
- Combustion of both HFO and MGO fuels without changing atomizers.
- Easy and quick replaceable coupler attached on fuel line allows for less maintenance time.
- "MJII-M" is applied for 1~3t/h boiler.

INQUIRIES

Sales Department, Combustion Engineering Division 1-3-38 Nonaka-kita, Yodogawa-ku, Osaka, 532-0034, Japan Tel : +81-6-6392-5541 Fax : +81-6-6396-7609 E-mail : info-m@volcano.co.jp

Boiler Burners

Boiler Burners

Energy saving / Environment

ofcano VOLCANO CO., LTD.

OIL / GAS COMBINATION BURNER "Vignis"



This Oil / Gas combination burner "Vignis" is suitable for LNG Fueled vessels which are expected to increase. Features are as followings.,

http://www.volcano.co.jp/english/index.html

- "Vignis", featuring the turndown ratio of 10:1, allows for energy-saving operation.
- Equipped with the Oil / Gas dual combustion mode as well as the Oil / Gas mono-fuel combustion modes, "Vignis" will allow for energy-saving operation.
- With the Oil / Gas dual combustion mode, the Oil / Gas ratio can be freely set to allow for economical operation in accordance with each vessel's circumstances.
- "Vignis" is applied for $4 \sim 10$ t/h boiler.

INQUIRIES -

Sales Department, Combustion Engineering Division 1-3-38 Nonaka-kita, Yodogawa-ku, Osaka, 532-0034, Japan Tel : +81-6-6392-5541 Fax : +81-6-6396-7609 E-mail : info-m@volcano.co.jp

Volcano VOLCANO CO., LTD.

OIL / GAS COMBINATION BURNER "Vignis-mini"



http://www.volcano.co.jp/english/index.html

This Oil / Gas combination burner "Vignis-mini" is suitable for LNG Fueled vessels which are expected to increase. Features are as followings.

- "Vignis-mini", featuring the turndown ratio in the range of 3:1 to 10:1, allows for energy-saving operation.
- Equipped with the Oil / Gas dual combustion mode as well as the Oil / Gas mono-fuel combustion modes, "Vignis-mini" will allow for energy-saving operation.
- With the Oil / Gas dual combustion mode, the Oil / Gas ratio can be freely set to allow for economical operation in accordance with each vessel's circumstances.
- "Vignis-mini" is applied for 1 to 3 t/h boiler.

INQUIRIES

Sales Department, Combustion Engineering Division 1-3-38 Nonaka-kita, Yodogawa-ku, Osaka, 532-0034, Japan Tel : +81-6-6392-5541 Fax : +81-6-6396-7609 E-mail : info-m@volcano.co.jp

Halogen – free



HIEN HIEN ELECTRIC INDUSTRIES, LTD.

www.hien.co.jp/e/e_index

Halogen-free Flame-retardant cables for F ClassNK ISO 9001 ISO 14001 In compliance with the ISO9001 quality management system In compliance with the ISO9001 quality management system In v ir o n m e n tal management system

high degree of toughness

- (1) Protection against external impact
- (2) Steel wire braid against sparks during welding
- (3) Plastic coating protected against steel wire corrosion

for Control & Instrumental Multicore cable

150/250V FA-MPOC-7×1.0 (Multi core, EP rubber insulated, Polyolefin sheathed and steel wire braided cable)



Remarks 1.A suitable separator may be applied on the conductor.2.A suitable tape may be applied on the insulation for identification of core.

for Power & Lighting cable

0.6/1kV FA-TPOCO-70

(Three core, EP rubber insulated, Polyolefin sheathed and steel wire braided cable with Polyolefin protective covering)



Remarks 1.A suitable separator may be applied on the conductor. 2.A suitable tape may be applied on the insulation for identification of core.

INQUIRIES -

505, Shinshibakawa Bldg., 3-4-11, Dosho-machi, Chuo-ku, Osaka, 541-0045, Japan Tel : +81-6-6226-1501 Fax : +81-6-6226-1507 E-mail : hien-sales@hien.co.jp

Boiler Burners

(IICO) HITACHI NICO TRANSMISSION CO., LTD.

http://www.hitachi-nico.jp/en/index.html

Large Size Hydraulic Clutch



Large Size Hydraulic Clutch Prototype model



3D model

[Outline]

Large size hydraulic clutch has been developed as the technological development aid project in 2011, 2012 by The Nippon Foundation.

- Selectable for 2kinds of clutch plate of ϕ 1100mm and ϕ 1500mm.
- 6 times of transmitting capacity compared with experienced clutch plate,φ810mm max.

[Feature]

- Appropriate for 20000kw class of large vessel such as Capesize, Handymax.
- Remote control connected with electric valve enable easy operation for Clutch On-Off.
- Can be used for various layout like Two engine-one shaft vessel, Two engine-two shaft vessel, Hybrid propulsion vessel.

INQUIRIES -

405-3 Yoshinocho 1-chome, Kita-ku, Saitama, 331-0811, Japan Tel : +81-48-652-6708 Fax : +81-48-652-8719 https://www8.hitachi.co.jp/inquiry/hitachi-nico/en/form.jsp

Energy-saving & safety

e-DRAIN

TAMASHINA SEIKI CO., LTD.

http://yasec.co.jp/english/

The boiler efficiency is improved by controlling temperatures of drain at the drain cooler exit at a constant level, instead of wasting heat of steam and drain into seawater.

INQUIRIES -

525, Higashizaka, Ritto-City, Shiga, 520-3031, Japan Tel : +81-77-558-2311 Fax : +81-77-558-2319 E-mail : info@yasec.co.jp

JRCS MFG CO., LTD.

J-S/Eco (JRCS Smart Eco system)



J-S/Eco applies a smart frequency drive system which controls the speed of the motor of the main cooling sea water pumps at the most efficient point. It enables to reduce the power consumed by the motors to the minimum level, resulting inreduction of the vessel's fuel consumption. The equipment is specially designed for marine application for its harsh environment with long term guarantee by JRCS making sure that the ship owners recoup the initial investment back as fast as possible.

http://www.jrcs.co.jp/index_e.html

INQUIRIES

JRCS MFG. CO., LTD. Power System Technical Team Susumu Yoshida (Mr.) 2155 Kawatana, Toyoura-cho, Shimonoseki, Yamaguchi, 759-6301, Japan Tel : +81-83-775-2027 Fax : +81-83-775-2022 E-mail : s.yoshida@jrcs.co.jp

Control Systems & Equipment

Inverter Energy Saving Retro-fit

NISHISHIBA ELECTRIC CO., LTD.

http://www.nishishiba.co.jp/nsdk/index.htm

C.S.W. Pump Motor Inverter Driven System





The C.S.W. pump is operated at rated constant speed in existing way no concerning with secondary thermal load, so it consumes unnecessary electric power inboard and the C.F.W. line tends to overcool.

Therefore we propose the optimum system which controls the rotational speed of C.S.W. pump by inverter and PLC, with sensing cooler outlet temperature of C.F.W. line.

This system can be also applied to the existing ship. (retro-fit)



INQUIRIES

NISHISHIBA ELECTRIC CO., LTD. Osaka Branch 29th Fl., Umeda Sky Building West Tower, 1-30 Oyodonaka 1-chome, Kita-ku, Osaka, 531-6129, Japan Tel : +81-6-4797-2451 Fax : +81-6-4797-2453 -#

TAIYO ELECTRIC CO., LTD.

Power Saupply System

Control Systems & Equipment





- Thyristor Inverter Type Shaft Generating System SG mode (Generator) /SM mode (M/E boosting) /PM mode (Electric propulsion)
- 2. PWM Shaft Gen System
- 3. TC Generating System by PWM Inverter
- 4. DC Power System by PWM Inverter

This system supplies the stable AC power to the vessel which obtained from the various source.

This system contributes to users energy saving and maintenance cost saving.

Also, the output of this system has same electric characteristic as that of Diesel Generators (DG).

Therefore, it can be operated not only single running but also parallel running with DG.

INQUIRIES

Marine Business Division, Overseas Business Dept. 1-16-8 Uchikanda, Chiyoda-ku, Tokyo, 101-0047, Japan Tel : +81-3-3293-3067 Fax : +81-3-3292-7012 E-mail : e-mail@taiyo-electric.co.jp

Energy Saving

TAIYO ELECTRIC CO., LTD.

Speed Control System by Inverter



- 1. Electric Propulsion System
- 2. Cargo Oil Pump
- 3. Electric Deck Machinery
- 4. Air Lub. Blower
- 5. Cool SW Pump
- 6. Refrigerator Compressor
- 7. E/R Ventilation Fan

The speed of Induction motor shall be variably controlled by inverter.

Energy saving can be achieved by saving consumed power which is done by controlling motor speed properly. This system also contributes ship's operation by easy maintenance.

INQUIRIES

Marine Business Division, Overseas Business Dept. 1-16-8 Uchikanda, Chiyoda-ku, Tokyo, 101-0047, Japan Tel : +81-3-3293-3067 Fax : +81-3-3292-7012 E-mail : e-mail@taiyo-electric.co.jp

USHIO USHIO REINETSU CO., LTD.

http://www.ushioreinetsu.co.jp/english/

MGO cooling system



The low viscosity of the sulphur fuels may cause engine troubles.

This MGO Cooling System is the best solution to achieve both "low sulphur" and "low viscosity".

- SOx emission control from ships
- EU Directive / Less than 0.1% sulphur content from 1st January, 2010
- CARB(California Air Resource Board) /Less than0.1% sulphur content from 1st January, 2012
- SECA(Sulfur Emission Control Area)/Less than0.1% sulphur content from 1st January, 2015

INQUIRIES

5-3, Creative-Hills, Imabari, Ehime, 794-0069, Japan Tel : +81-898-34-1203 Fax : +81-898-34-1204 E-mail : ushio@ushioreinetsu.co.jp

DAIHATSU DAIHATSU DIESEL MFG. CO., LTD.

http://www.dhtd.co.jp/en/index.html

6DE-18 / 6DE-23



We have developed 6DE-18 and 6DE-23 as the environmentally friendly economical engines for energy saving, low maintenance cost and have a high potential for meeting stricter exhaust gas regulations in the future, of course IMO NOx Tier II compliant.

6DE-18 : Bore 185mm, Output and speed 680kWm/720min-1 and 860kWm/900min-1

6DE-23 : Bore 230mm, Output and speed 1,200kWm/720min-1 and 1,500kWm/900min-1

These engines realized the environmental harmony and high performance by long-held technologies of DAIHATSU DIESEL. Besides they have achieved top-class fuel efficiency by thorough weight-saving and optimized design.

INQUIRIES

2-10, Nihonbashi-Honcho 2-chome, Chuo-ku, Tokyo, 103-0023, Japan

Tel : +81-3-3279-0821 Fax : +81-3-3245-0395 E-mail : katsunobu.ochiai@dhtd.co.jp

Dual fuel diesel engine, Exhaust emission reduction, NOx, CO2, SOx, PM

DAIHATSU DAIHATSU DIESEL MFG. CO., LTD.

Dual fuel engine DE28DF / DE35DF



DE28DF is 285mm bore x 390mm stroke and DE35DF is 350mm bore x 440mm stroke. Their 6 and 8 cylinders engines cover the output range of 1.7-4.0MWe.

Both dual fuel engines apply the common rail micro-pilot injection system, and can be use MDO, HFO and Natural gas as fuel. Based on the optimization of A/F-ratio and other many parameters on gas mode operation, these engines are applicable to IMO NOx Tier III regulation without any exhaust gas after-treatment, can also reduce CO_2 of 23%, SOx/PM of over 99%.

The safety concept is in accordance with IGF code. If a gas mode trip happens, the engine switches over from gas mode to diesel mode operation immediately without any fluctuation of the engine output and revolution.

INQUIRIES -

2-10, Nihonbashi-Honcho 2-chome, Chuo-ku, Tokyo, 103-0023, Japan

Tel : +81-3-3279-0821 Fax : +81-3-3245-0395 E-mail : katsunobu.ochiai@dhtd.co.jp



http://www.hanshin-dw.co.jp/english/product.html

Electronically controlled low speed four-stroke diesel engines



We The HANSHIN DIESEL WORKS, LTD. are the general maker of main engines and propulsion systems for ships, and have produced products by our own technology since 1918.

In order to meet the recent environmental requirements, the electronic management of engines is one of the most effective solutions. Electronically controlled two-stroke diesel engines have already been launched in the market. However such kind of Low-Speed four-stroke diesel engine has not been introduced yet.

The HANSHIN DIESEL WORKS, LTD. has newly developed electronically controlled low speed four-stroke diesel engines. One of the most typical features of this type of engine is to save fuel oil consumption by controlling electronically the fuel injection pattern in partial load. This system reduces fuel oil consumption by 3 to 5% in comparison with the conventional mechanically controlled system.

This new system is adopted in the engine series of LH46LE, LH41LE, and LA32E.

INQUIRIES

Overseas Business Section Tel : +81-78-332-2081 E-mail : overseas-section@hanshin-dw.co.jp

MGATA POWER SYSTEMS CO., LTD.

http://www.niigata-power.com/english/index.html

28AHX-DF



- The 28AHX-DF is an environmentally friendly engine, satisfying IMO Tier III NOx regulations. It uses clean gas combustion, making it possible to meet the new regulations without the need for an exhaust gas processing reactor.
- The 28AHX-DF offers both gas and diesel operation modes. It can be instantly switched at full load from gas to diesel operation, ensuring safe ship operation even in emergency situations.
- The 28AHX-DF is the world's first FPP directly couplable gas engine. It offers high dynamic performance equivalent to that of a diesel engine even during gas operation, as well as load pickup times, from idling to rated output, which compare favorably with diesel gas engines.

INQUIRIES

14-5, Sotokanda 2-Chome, Chiyoda-ku, Tokyo, 101-0021, Japan Tel : +81-3-4366-1226 Fax : +81-3-4366-1310 E-mail : info1_sales1@niigata-power.com

Dual Fuel Engines, Propulsior

Environmental Technologies

YANMAR YANMAR CO., LTD.

http://www.yanmar.com/global/

6EY26DF



The major feature of this engine is the redundancy capability due to the use of dual fuels. This engine is possible to continue operation by changing over to the diesel mode automatically, even when the gas mode operation fail.

In addition, the micro-pilot with its intense energy, ensures stable ignition capability. And the air-flow quantity control system with the bypass and waste-gate improves the engine transient response.

These techninologies enables adapt the engine as a ship propulsion engine.

- Dual fuel engine has the following characteristics.
- Adaption IMO Tier 3 regulation.
- Redundancy by Dual Fuel (LNG and MDO / HFO).
- Stable ignition ability by Micro Pilot.

INQUIRIES

No.1 Sales Group Overseas Sales Division Marine Products Sales and Marketing Division Power Solution Business 2-1-1, Yaesu, Chuo-ku, Tokyo, 104-8486, Japan Tel : +81-3-3275-4909 Fax : +81-3-3275-4969 http://www.yanmar.com/global/ E-mail : ichiro_fuwa@yanmar.com

DIESEL UNITED, LTD.



W6X72DF

Low-speed Low-pressure Dual fuel engine "X-DF"

X-DF applies the pre-mixed lean burn technology and can meet IMO TierIII requirement without the exhaust gas aftertreatment.



IHI GROUP

Realize your dreams

http://www.ihi.co.jp/du/english/home/home.html

- ◆X-DF has advantages of
 - lower Capex and Opex due to no requirement of a high pressure compressor.
- For safety concerns, X-DF uses low-pressure LNG. (< 16bar)</p>
- X-DF can switch from gas mode to diesel mode immediately.
- X-DF is based on the low-speed two-stroke engine which is much proven in marine use.

DU-WinGD X-DF engine is the best eco-friendly solution!

INQUIRIES

Prime Kanda Building, 2-8, Suda-cho, Kanda, Chiyoda-ku, Tokyo, 101-0041, Japan Tel : +81-3-3257-8222 Fax : +81-3-3257-8220 E-mail : info@du.ihi.co.jp

MOL MOL Techno-Trade, Ltd.

AIR GARBAGE COMPACTOR Type AGC-II



MOL Techno-Trade, Ltd. developed air actuate Garbage Compactor AGC-Ilwhich is available to compress various waste materials such as plastic film, bottle and beverage cans by using compression air onboard. Simple design with easy operation will much effective for organizing waste materials with reduction of waste disposal cost.

http://www.motech.co.jp/e_index.html

INQUIRIES

MOL Techno-Trade, Ltd. / Supply Chain Management Dept. 1-1, 1-Chome, Kyobashi, Chuo-ku, Tokyo, 104-0031, Japan Tel : +81-3-6367-5370 Fax : +81-3-6367-5515 E-mail : control@motech.co.jp

KEIsystem KEI SYSTEM CO., LTD.

http://www.kei-system.co.jp/indexe.html

Fuel consumption meter



Our data logger system is possible to display the following information by connecting with GPS by serial communication.

Confirm the fuel cost in real time inboard.

- Fuel consumption rate per day. (Tonnage)
- Distance of cruise per a ton of fuel. (Mile)
- Fuel consumption rate per hour.
- Possible to display and to record the fuel consumption rate etc. per a navigation.

INQUIRIES

1-5, 1-Chome, Ikunonishi, Ikuno-Ku, Osaka, 544-0024, Japan Tel : +81-6-6712-1151 Fax : +81-6-6712-1311 E-mail : info3@kei-system.co.jp

ngine Telegraphs & Loggers

Exhaust Gas Heat Recovery Unit

MIURA MIURA CO., LTD.

GK-G



http://www.miuraz.co.jp/en/bwts/

The GK- G exhaust gas heat recovery unit works with a composite boiler to recover the waste heat from the G/ E for use as a heat source. It can contribute significantly to saving space and reducing fuel costs. Air pollution regulations in the IMO MARPOL Convention have resulted in changes in the conditions for exhaust heat recovery and in future, it is anticipated that the amount of steam produced will be insufficient.

The GK- G makes effective use of the normally unused exhaust heat from auxiliary generators, enabling it to be used as a heat source.

INQUIRIES

7 Horie-cho, Matsuyama, Ehime, 799-2696, Japan Tel : +81-89-979-7060 Fax : +81-89-979-7067 E-mail : hakuyo_eka@miuraz.co.jp

🐼 SASAKURA ENGINEERING CO., LTD.

http://www.sasakura.co.jp/e/index.html

Multi-Effect Submerged Tube Type Fresh Water Generator



The Double-Effect plant is a compact, highly heat efficient seawater distilling plant with two chambers of 1st and 2nd effect in a single shell. The Triple-Effect plant contains three chambers of1st, 2nd and 3rd effect, and is an even more highly efficient plant.

As a heat source, either the waste heat from a diesel engine jacket cooling water or steam can be used. 40~200 tons per day type of capacity can be provided.



INQUIRIES

7-32, 4-chome, Takejima, Nishiyodogawa-ku, Osaka, 555-0011, Japan

Tel : +81-6-6473-2134 E-mail : marine@skm.sasakura.co.jp

resh Water Generating Plan

Energy saving type distilling plant

SASAKURA ENGINEERING CO., LTD.

http://www.sasakura.co.jp/e/index.html

Vacuum Vapor Compression Shell & Tube Evaporation Type Fresh water generator



The VVC distiller system has four main components; a horizontal-tube, thin-film evaporator; a rotary blower and a back-up heater. Vacuum in the unit is maintained by a small vacuum pump.

Features:

- Scale-free horizontal tubular evaporator
- Maintenance-free & compact type heat-pump
- Evaporation can be operated by only electricity.



INQUIRIES

7-32, 4-chome, Takejima, Nishiyodogawa-ku, Osaka, 555-0011, Japan Tel : +81-6-6473-2134

E-mail : marine@skm.sasakura.co.jp

Fuel Reformer

I ANASHINA SEIKI CO., LTD.

Fuel Pilot



Supply fuel oil is changed over, with simple switch operation, at a preset blend ratio, ranging from H.F.O. 100% to M.G.O. 100%, so as to heat or cool the main engine F.O. heater at a preset temperature gradient ($2^{\circ}C/min$).

http://yasec.co.jp/english/

INQUIRIES

525, Higashizaka, Ritto-City, Shiga, 520-3031, Japan Tel : +81-77-558-2311 Fax : +81-77-558-2319 E-mail : info@yasec.co.jp

Reduces Fuel Consumption, Carbon Emissions, and Engine Maintenance

Port Enterprise Co., Ltd. Port Enterprise Co., Ltd.

http://www.portenterprise.com

FENIC Alpha Fuel Reformer



FENIC Alpha upgrades a variety of fuels by breaking chemical bonds of complex hydrocarbons through ionization using our own proprietary ceramic technology.



It is well proven, completely safe, extremely easy to install, and requires absolutely no power source.

INQUIRIES

No. 2-1-28, Chikko, Minato, Osaka, 552-0021, Japan Tel : +81-6-6573-5391 Fax : +81-6-6575-3036 E-mail : penterj@penterj.co.jp

Volcano VOLCANO CO., LTD.

Gas Combustion Unit for LNG Fueled vessel "MECS-GCU"



http://www.volcano.co.jp/english/index.html

This system "MECS-GCU" can process Boil Off Gas(BOG) in the range from 250kW to 2400kW for LNG Fueled vessels which are expected to increase.

This system safely incinerates and processes BOG or Gas vaporized when bunkering on LNG Fueled vessels. When docking a LNG Fueled vessel, combustible gas in the fuel tank should be incinerated and replaced to inert gas. This system can incinerate various BOG consisting of CH_4 or inert gas.

INQUIRIES

Sales Department, Combustion Engineering Division 1-3-38 Nonaka-kita, Yodogawa-ku, Osaka, 532-0034, Japan Tel : +81-6-6392-5541 Fax : +81-6-6396-7609 E-mail : info-m@volcano.co.jp

Gas Engine

Gas Combustion Unit

Natural gas, NOx, GHG

Powering your potential

KAWASAKI HEAVY INDUSTRIES, LTD.

Green Gas Engine (L30KG)



http://global.kawasaki.com/en/mobility/marine/machinery/index.html

In April 2014, Kawasaki Heavy Industries, Ltd. obtained the type approval certificate from DNV-GL for Green Gas Engine L30KG — the main engine for large vessels fueled solely by gas with an output capacity of over 2 MW.

Green Gas Engine L30KG can reduce emissions far below the level set by IMO NOx Tier III regulations without relying on special equipment such as an SCR (Selective Catalytic Reduction) system. Its superior environmental performance also allows significant reduction of CO₂ and SOx emissions compared to diesel engines, thus helping marine vessels comply with various environmental regulations.

INQUIRIES

Marine Machinery Sales Department 1-14-5, Kaigan, Minato-ku, Tokyo, 105-8315, Japan Tel : +81-3-3435-2374 Fax : +81-3-3435-2022 E-mail : marine-machinery-sales-e@khi.co.jp

WAKEFIELD CORPORATION

http://www.wakefieldcorp.com

Exhaust Valve Grinding Machine Cylinder Liner Honing Machine



With increasingly severe restrictions regarding the emission of NOx and SOx in the exhaust gas from Diesel Engines, it is necessary to:

Exhaust Valve Grinding Machines

Maintain a proper sealing between the Exhaust Valve Seat/Bottom Piece and Valve Spindle.

Obtainable using certified Valve Grinding Machines, achieving a surface roughness of less than 0.4 Ra and a total run-out less than 0.02 mm.

Cylinder Liner Honing Machines

Prohibit gas blow-byes between the Cylinder Liner wall and Piston Rings.

Pneumatically and electrically operated Cylinder Liner Honing Machines will remove ovality and deformation / defects in the cylinder liner, restore the roundness with a final surface roughness of 0.5 to 5 Ra, as per Diesel Engine manufacturers' requirements.

INQUIRIES

3-7-23, Yamakawa-Aino, Kurume, Fukuoka, 839-0812, Japan Tel : +81-942-27-6627 Fax : +81-942-27-8975 E-mail : info@wakefield.co.jp

Reduction of fuel consumption and emission

Nabtesco Nabtesco Corporation

http://www.nabtesco.com/en/index.html

FIVA(Fuel Injection and Valve Actuation) Valve

FIVA valve is an electro-hydraulic servo valve which controls fuel oil injection timing, quantity and exhaust valve actuation timing in order to optimize combustion condition at any load. That is applied for a MAN Diesel and Turbo ME (electric controlled) engine and installed each cylinder. This contributes eco-friendly engine actuation because of low fuel consumption and low emissions to be enabled. We, Nabtesco Corporation, developed our own a highprecision pilot valve and a feedback sensor, which bring high-quality and high-reliability. And customers are able to

gain rapid aftersales service due to our world-wide service network.



INQUIRIES

Service Department Marine Control System Company 1-1617-1, Fukuyoshidai, Nishi-ku, Kobe, 651-2413, Japan Tel : +81-78-967-1405 E-mail : Yoshinobu_Nakayama@nabtesco.com

SHINKO IND. LTD.

LNG Pump

NG Pump



http://www.shinkohir.co.jp/en/

In anticipation of the growing need for safe and clean energies, our company began developing low-temperature liquefied gas pumps in the 1970's.

In 1992, we supplied our first marine LNG pumps to a LNG carrier. Since then, our global market share has increased and now reached over 85%. These LNG pumps have become one of our main products that supports our company, much like our cargo oil pumps.

Our LNG pump specifications can adapt to the shale gas energy revolution and other new demands, allowing us to receive a high reputation from customers worldwide.

INQUIRIES

Department : Business Dept.1 5-7-21 Ohzu, Minami-ku, Hiroshima, 732-0802, Japan Tel : +81-82-508-1000 E-mail : master@shinkohir.co.jp

ECO MARINE POWER CO., LTD.

Aquarius Marine Solar Power



Aquarius Marine Solar Power is an integrated renewable energy system for ships that includes a computer system, energy storage solution & marine solar power array.

The energy collected via the marine solar panel array or string of photovoltaic (PV) panels can be used to power a DC load, provide back-up power or be connected to an AC load via an inverter. Thus any ship can tap into the clean and renewable energy provided by the sun.

Equipment performance, system management, alarm monitoring and data logging functions are performed by the Aquarius MAS. This reliable marine computer system can also calculate vessel emissions and monitor fuel consumption.

INQUIRIES -

Aqua Hakata 5F, 5-3-8, Nakasu, Hakata-ku, Fukuoka, 810-0801, Japan Tel : +81-92-287-9677 Fax : +81-92-287-9501 E-mail : enquiries@ecomarinepower.com

larine Solar Power

The ready fighting power of the ECO

NIPPON SENTO CO., LTD.

http://www.nipponsento.co.jp/

LED Navigation Lights Type NL WL series



Type Approval JG NL series Type Approval MED WL series

Highly reliable design of LED light sources

Conditions of the LED are always monitored. If a problem occurs in the LED, the inner circuit detects it, turns off the LED immediately, and sends an error signal to the control panel.

Both the LED light source and frame are highly-reliable and made in Japan.

Vibration-proof characteristics

Incandescent lamps burn out when vibrations are applied to them. LED lamps will not burn out.

Projection-free lamp windows

Lamp windows need no projections, such as Fresnel lenses, owing to superior LED light distribution characteristics of LED light sources.

These characteristics reduce possibility of ice coating and snow accretion and prevent adhesion of dust and stain.

Power saving and long life

The LED light source reduces power consumption down to 1/6 in comparison with the traditional incandescent lamps and allows remarkable power saving.

The rated life of the LED light source is as long as 50000 hours.

Replaceable light source unit

The LED light source and power supply are unitized and can be replaced easily. Three types have common units, allowing immediate replacement and recovery from problems with the minimum stocks.

INQUIRIES -

555, Takahisa, Yoshikawa, Saitama, 342-0035, Japan Tel: +81-48-981-2661 Fax: +81-48-981-2664 E-mail: nissen@nipponsento.co.jp

CHUGOKU MARINE PAINTS, LTD.

SEAFLO NEO CF Z / SEAFLO NEO CF PREMIUM



PREMIUM ANTIFOULING PERFORMANCE FROM PREMIUM ANTIFOULING TECHNOLOGIES

CHUGOKU MARNE PAINTS, LTD. (CMP) reaches the day of 100th anniversary of its company's foundation in May 2017.

SEAFLO NEO CF Z and SEAFLO NEO CF PREMIUM are premium range of the latest antifouling products from CMP, both provide high performance incorporating a new biocide technology combined with a zinc acrylate polymer.

These products have been designed as a premium solution for vessels trading at a wide range of speed and activity, where the main focuses are long term hull performance, reducing hull resistance and fuel saving by maintaining very thin leached layer.

INQUIRIES –

Chugoku Marine Paints, Ltd. Headquarter Tel : +81-3-3506-3951 Contact URL : https://www.cmp.co.jp/global/contact_global.html



Fuel saving, Low Friction, Foul-Release-Coating (FRC)

CHUGOKU MARINE PAINTS, LTD.

CMP BIOCLEAN PLUS



"CMP BIOCLEAN PLUS" is a third generation advanced silicone elastomer foul-release coating (FRC). Key of this product is "ultra-low friction" which based on the ultrasmooth surface which is regulated with the rheology control technology and improved foul-release performance. Contrary to the second generation of silicone FRC, this product have adopted a newly designed "PLUS Technology" which induces resisting and releasing slime and contributes to long term fouling control. This product is able to keep vessel's hull in optimum condition for long term, improves vessel's performance and contributes to fuel saving.

INQUIRIES -

Chugoku Marine Paints, Ltd. Headquarter Tel : +81-3-3506-3951 Contact URL : https://www.cmp.co.jp/global/contact_global.html

MIPPON PAINT MARINE D NIPPON PAINT MARINE COATINGS CO., LTD.

http://www.nipponpaint-marine.com

A-LF-Sea

- Ultra Low Friction Underwater Coating System -



A-LF-Sea is an advanced version of our low-friction coating "LF-Sea" delivering further propulsion benefits.

A biomimetic ultra-low-friction antifouling that worksusing a patented water trapping function to lower the hydrodynamic footprint of thehull.

Stable and long term antifouling is guaranteed by the use of a low frictioncopper-silyl-acrylate copolymer.

Used in conjunction with Nippon Paint Marine's 'Rheo' anticorrosive systems, fuel-savings can be further enhanced.

A-LF-Sea provides 10% fuel-saving effect in case of new building or full-blasting at M&R and 7~8% fuel-saving effect in case of spot blasting at M&R to be applied A-LF-Sea only without Rheological anti-corrosive coatings. Over 780 ships has already been applied with A-LF-Sea in the world as of December 2016. And the number of track recordincluding LF-Sea (1st generation of A-LF-Sea) has reached 2100.

INQUIRIES -

NIPPON PAINT MARINE COATING CO., LTD. Tel:+81-78-735-5301 Contact URL: http://www.nipponpaint-marine.com/en/inquire/ index.php

Paints

Long-term corrosion protection, Reduction of VOC emissions, Protective coating

NIPPON PAINT MARINE D NIPPON PAINT MARINE COATINGS CO., LTD.

http://www.nipponpaint-marine.com

SI paint NOA – Protective Coating System with SI (Self-Indication) technology



NOA is Nippon's unique technology providing users for the first time with the ability to judge the correct thickness of the paint. NOA's unique patented technology reduces the need for complicated thickness checking by thickness gauge. NOA contributes to reduce workload for (1)coating inspection, (2) physical thickness measurement & marking and (3) post painting repair & touch-up. Furthermore, NOA contributes to secure (a) uniform coating, (b) specifiedthickness, (c) minimal excessive thickness and (d) corrosion protection for ship's life.

Especiallyfor WBT, NOA has been applied over 1100 newbuildings since 1998. And its 10 year corrosionprotection records are recently confirmed on large LNG carriers.

INQUIRIES –

NIPPON PAINT MARINE COATING CO., LTD. Tel : +81-78-735-5301 Contact URL : http://www.nipponpaint-marine.com/en/inquire/ index.php

MOL MOL Techno-Trade, Ltd.

http://www.pbcf.jp

PBCF (Propeller Boss Cap Fins)



PBCF is an energy saving device installed on a propeller to improve propulsive efficiency by eliminating hub-vortex and by reducing torque loss. In consequence, vessel fuel consumption is reduced up to 5%. This effective device is originally developed by Mitsui O.S.K. Lines in 1987, and it has been installed on over 3,100 vessels.

Benefits of PBCF

- Saving fuel up to 5%, corresponding reduction of NOx and CO₂ emissions.
- Individually custom-designed for each propeller profile.
- Reduces propeller-induced underwater-noise and vibrations.
- Simple and quick installation, just the replacement of the existing propeller boss cap.
- Suitable to both new buildings and retrofit applications.
- No moving parts, thus, no maintenance necessary after installed.
- Pay-back time is less than 1 year, even at low fuel prices.

INQUIRIES

MOL Techno-Trade, Ltd. / PBCF Dept.

1-1, 1-Chome, Kyobashi, Chuo-ku, Tokyo, 104-0031, Japan Tel : +81-3-6367-5380, Fax : +81-3-6367-5516 E-mail : pbcf@motech.co.jp

KAMOME KAMOME PROPELLER CO., LTD.

CP Propeller

^oropellers, Controllable



As the torque-rich of main engine caused by the fouling of the hull or the effect of waves and wind can be avoidable by adjusting CPP pitch angle and speed properly through ALC or combination control, when building the vessel, the main engine output can be minimized compared with FPP without considering margin to reduce fuel consumption.

The advantage of CPP for large energy saving is exercised by the shaft generator system driven by main engine with constant speed or the hybrid propulsion system where diesel main engine and electric motor/generator are combined as a propulsion prime mover.

INQUIRIES

Business Operation Division, International Department 690 Kamiyabe-cho, Totsuka-ku, Yokohama, 245-8542, Japan Tel : +81-45-811-2461 Fax : +81-45-811-9444 E-mail : info@kamome-propeller.co.jp

Energy saving, GHG, EEDI, Propulsion efficiency, Hub vortex

KAMOME KAMOME PROPELLER CO., LTD.

SG Propeller





The SG propeller applies the reducing technology of the hub vortex strength and the optimization technology of the blade loading distribution and the numerical calculations including the cavitation simulation, the propeller exciting force estimation, etc. are introduced in its design. The reduced hub vortex strength improves the lower pressure region behind the hub which causes the thrust deterioration. The optimized blade loading distribution increases the propeller open water efficiency without deteriorating the cavitation performance.

Accordingly the SG propeller improves the efficiency about 3% than the conventional propeller and has been installed in over 200 vessels for the last 4 years.

INQUIRIES

Business Operation Division, International Department 690 Kamiyabe-cho, Totsuka-ku, Yokohama, 245-8542, Japan Tel : +81-45-811-2461 Fax : +81-45-811-9444 E-mail : info@kamome-propeller.co.jp

MITSUBISHI HEAVY INDUSTRIES MARINE MACHINERY & EQUIPMENT CO., LTD.

https://www.mhi-mme.com/

MAP (Mitsubishi Advanced Propeller) Mark-W Propeller



Compatibility of MAP Propeller

MAP Propeller Suits all engin
MAP Propeller suits all engin

120,000

Energy Saving, EEDI, NHV

GPX PROPELLER





Improvement of the tip shape enhanced the efficiency of MAP Mark-W propellers while keeping cavitation performance levels virtually unaffected. These propellers can be tailored so suit slow-steaming needs and are also ideal for retrofitting existing propulsion systems.

(Features)

- Economical
- High propulsion efficiency
- ·Highly reliable
- Maintains excellent propeller strength
- •Excellent cavitation performance with streamlined tips and reduced blade area
- Compact design
- Lower propeller mass and inertia moment

INQUIRIES

Business Development Division

16-5, Konan 2-Chome, Minato-ku, Tokyo, 108-0075, Japan Tel : +81-3-6716-5330 Fax : +81-3-6716-5325 E-mail : info_meet@mhi-mme.com

Propellers, Fixec

NAKASHIMA NAKASHIMA PROPELLER CO., LTD.

http://www.nakashima.co.jp/eng/

GPX PROPELLER is the latest fixed pitch propeller which integrates several design technologies including Non-Hub Vortex, Small blade area, Coordination of Wake distribution and Tip rake.

- Non-Hub Vortex technology can recover energy loss which is caused by hub vortex.
- Small blade area can reduce friction resistance and use CFD analysis.
- Though Wake distribution is different by each vessel, GPX propeller is coordinated based on each wake pattern.
- Tip rake is also developed throughout many model tests and calculations, and now Tip rake can stabilize cavitation and reduce Pressure amplitude.

GPX propeller is optimized by considering balance of those technologies and can achieve higher efficiency.

INQUIRIES -

Sales & Marketing Department

688-1, Joto-Kitagata, Higashi-Ku, Okayama, 709-0625, Japan Tel : +81-86-279-5111 Fax : +81-86-279-3107 E-mail : npcwebmaster@nakashima.co.jp

DAIHATSU DAIHATSU DIESEL MFG. CO., LTD.

http://www.dhtd.co.jp/en/index.html

Daihatsu Generating Engines : DK Series, DC Series, DE Series



Electrical propulsion systems are different from the systems on conventional ships, where the propellers are turned directly by the main diesel engine; instead, the propellers are turned by an electric motor.

INQUIRIES -

Tokyo Office

2-10, Nihonbashi-Honcho 2-chome, Chuo-ku, Tokyo, 103-0023, Japan

Tel:+81-3-3279-0821 Fax:+81-3-3245-0395

28th Floor, One Canada Square, Canary Wharf, London E14 5AB, United Kingdom Tel : +44-20-3871-5000

E-mail : daihatsu@ddeuk.com

◆ DAIHATSU DIESEL (AMERICA), INC.

380 N Broadway, Suite 302, Jericho, N.Y. 11753 U.S.A. Tel : +1-516-822-3483/4 Fax : +1-516-822-3485 E-mail: dda@ddany.com

Propulsion Systems (electric)

Environmental Technologies

ANMAR YANMAR CO., LTD.

http://www.yanmar.com/global/

6EYG26L



Marine gas engine EYG26L has 25% reduction of the CO2 emission from the base diesel engine by adopting new technology against fluctuation of propulsion load and fuel calorie.

This engine has won both of type approval certificate of Engine type and Engine Safety, Control and Alarm System by DNV.

 \sim Features \sim

- NOx emission adapts to IMO/Tier 3 regulation, by applying lean-burn system.
- 6EYG26 engine accomplishes the prescribed performance against the fuel of methane number 65 or more.
- 6EYG26 engine also maintains the performance against the fuel calorie variation.
- 6EYG26 equips knocking detection and avoidance system.

INQUIRIES

No.1 Sales Group Overseas Sales Division Marine Products Sales and Marketing Division Power Solution Business

2-1-1, Yaesu, Chuo-ku, Tokyo, 104-8486, Japan Tel : +81-3-3275-4909 Fax : +81-3-3275-4969 http://www.yanmar.com/global/ E-mail : ichiro_fuwa@yanmar.com



NANIWA PUMP MFG. CO., LTD.

http://www.naniwa-pump.co.jp/english/

SOx/Nox Scrubber Water Circ. Pump



Water Circulating Pump which is designed for NOx & SOx Scrubber System has been developed.

- Its features are as follows:
- Specially designed for SOx/NOx Scrubber System.All wetted parts are made of stainless steel enduring a
- wide range of pH value (pH3~11).
- Newly designed diaphragm type mechanical seals in order to resist smoke dust which contaminates the pumping water.

INQUIRIES -

Tel : +81-6-6541-6231 E-mail : info@naniwa-pump.co.jp

Inverter Control Main Cooling S.W. Pump

NANIWA PUMP MFG. CO., LTD.

http://www.naniwa-pump.co.jp/english/

NEO-ME



Naniwa Pump supports customer expectation for "greener ships", paying close attention to the following parameters.

- Environmental Protection
- Safety of Operation
- Saving Energy

NEO-ME series control rotational speed of Main Cooling Sea Water Pump according to following information.

- Main Engine Load
- Sea Water Temperature
- Temperature Regulation Valve Position
- Fresh Water Temperature

NEO-ME series operate Main Cooling Sea Water Pumps with economy and safety. Its standard features are as following:

- High response performance to main engine load
- 0% Speed at 100% F.W. Circulation
- Adaptive to sea water temperature change
- Based on those features NEO-ME series realizes:
- Full time minimum fuel consumption

- Optimized operation for vessel speed reduction For safety operation:

Or Salety Operation.

- Flushing alert system is incorporated.

INQUIRIES

Tel : +81-6-6541-6231 E-mail : info@naniwa-pump.co.jp

DEISHIN Ltd.

Heishin PC Pump

umps, Bilge



Heishin PC Pump is capable of handling high-viscosity fluids, high-concentration slurries and fluids containing solids. As conveyed materials move through pipes, practically no unpleasant odors are produced. Also, it is a quiet pump that makes no drive noise aside from the motor. Heishin PC Pump with these features is best suited for conveyance of bilge water.

http://www.heishin.jp/en/

INQUIRIES

Nihombashi Kato Bldg. 8F, 2-1-14, Nihombashi, Chuoh-ku, Tokyo 103-0027, Japan Tel : +81-3-5204-6380 Fax : +81-3-5204-6377 E-mail : info@mohno-pump.co.jp

Energy Saving

Reduction Gear

(11CO) HITACHI NICO TRANSMISSION CO., LTD.

http://www.hitachi-nico.jp/en/index.html

Reduction Gearbox for Exhaust Power Recovery System



Exhausted gas from marine diesel engine remains much energy to be recovered.

Our reduction gearbox is used in the exhaust power recovery system with power turbine and steam turbine.

- Light weight and compact design.
- High reliability on many production experience for continuous use high speed turbine.
- Two kinds of type are selectable as parallel-type and planetary-type, depend on turbine speed.



Reduction Gearbox (Model : PGM71)

INQUIRIES

405-3 Yoshinocho 1-chome, Kita-ku, Saitama, 331-0811, Japan Tel : +81-48-652-6708 Fax : +81-48-652-8719 https://www8.hitachi.co.jp/inquiry/hitachi-nico/en/form.jsp

JAPAN HAMWORTHY & CO., LTD. MWORT

http://www.japanham.com/en

Super VecTwin System

JAPAN



Outline of VecTwin Rudder





Example of thrust vector

- · Excellent maneuvering system with a pair of high lift rudders fixed behind a propeller.
- · Safe navigation maneuverability having any operation mode including going-astern with turning capability, hovering, extra dead slow forwarding, and turning port and starboard, with forward direction propeller revolution, which develop thrust in all directions.
- · Improved propulsive efficiency with reaction fins and propeller boss cap fins (PBCF) which removes propeller hub vortex.
- · Function of easy and short-time approaching to and departing from berth reduces mental and physical hardships of crew, which brings an excellent economical effect.
- An emergency stop which reduces the stopping distance to about a half of that of a conventional ship.

INQUIRIES

Omodaka Bldg., 1-15-1, Shigino-nishi, Joto-ku, Osaka, 536-0014, Japan Tel: +81-6-6962-8877 Fax: +81-6-6962-8899 E-mail : jhc@japanham.co.jp

K-7 Rudder

Energy Saving, Hull Resistance

KAMOME KAMOME PROPELLER CO., LTD. PROPELLER

http://www.kamome-propeller.co.jp/en

The K-7 Rudder consists of the main rudder and the flap fitted to the rudder with hinge. As the flap turns more than 2 times of the main rudder angle during steering, the lift generated in the propeller slip stream is higher than the conventional rudder by the effect of the camber composed by the main rudder and the flap.

As the K-7 rudder area required to attain the same turning performance becomes smaller than the conventional rudder required for the same ship, K-7 rudder makes the rudder resistance reduced and contributes to the energy saving.

INQUIRIES

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DAIHATSU DAIHATSU DIESEL MFG. CO., LTD.

http://www.dhtd.co.jp/en/index.html

DAIHATSU SCR System



The IMO Tier III NOx regulation which comes into force in 2016, requires an additional 80% reduction over the Tier I regulation.

In order to cope with such stringent standard, DAIHATSU DIESEL has been implementing technology of D.E.C. Marine AB who is the leading company of SCR (Selective Catalytic Reduction) system and has more than 350 unit delivery so far.

The SCR system has been commercialized as a set with DAIHATSU DIESEL's engines to ensure reliability and durability in marine usage, and the system has achieved the world's first SOC (Statement of Compliance) certifying compliance with the IMO Tier III regulation by classification societies.

INQUIRIES

2-10, Nihonbashi-Honcho 2-chome, Chuo-ku, Tokyo, 103-0023, Japan

Tel : +81-3-3279-0821 Fax : +81-3-3245-0395 E-mail : katsunobu.ochiai@dhtd.co.jp

Selective Catalytic Reduction System

Hitz Green SCR for NOx Tier III regulation

Hitz HITACHI ZOSEN CORPORATION

SCR (Selective Catalytic Reduction) system for 2 stroke engines



http://www.hitachizosen.co.jp/english/index.html

Hitachi Zosen developed an SCR system (jointly developed with MAN Diesel & Turbo) for marine vessels by adopting NOx removal catalysts for industrial plants in order to comply with TIER III NOx emission standards (The TIER III standards regulate 80% reduction of NOx from 2016 compared with the TIER I standards in 2005). This system is a Marine HP SCR for low speed Main Engine which is compliant with TIER III and enables Engines not to emit extra CO₂ and has the feature of compacting, too.

INQUIRIES

Sales Department Marine Machinery & SCR System Business Unit Machinery Business Headquarters Tel : +81-3-6404-0143 Fax : +81-3-6404-0149 E-mail : scr-maritime@hitachizosen.co.jp

NIIGATA POWER SYSTEMS CO., LTD.

Selective Catalytic Reduction System



• Niigata has developed marine SCR compliant with the NOx Tier III enforced by the IMO, and prepared SCR for each engine (550 to 6600kW) as the line-up.

- Niigata has delivered the first SCR system for the marine propulsion engine in 1995, nearly 20 years ago, which is still working. Based on such experiences, Niigata started to supply SCR which can be apply to not only new building ships but also existing ships.
- Development of this SCR system utilizes the part of technologies and findings for compact design in the research undertaken by Niigata for "Super-clean Marine Diesel" Project of the JSMEA.

INQUIRIES

14-5, Sotokanda 2-Chome, Chiyoda-ku, Tokyo, 101-0021, Japan Tel : +81-3-4366-1226 Fax : +81-3-4366-1310 E-mail : info1_sales1@niigata-power.com

Environmental Technologies

ANMAR YANMAR CO., LTD.

http://www.yanmar.com/global/

Selective Catalytic Reduction System



The SCR System with Three Unit Engine Installations



YANMAR will offer you our SCR system, which is suited perfectly to our engine specifications, to meet the requirements of Tier III NOx emission standards by IMO. NOx emissions can be reduced by more than 80% after our SCR system is loaded.

A catalyst reactor is set up after the turbocharger in flow. Our SCR system is combined with a bypass system both for switching in Emission Control Areas ("ECA") and for saving space in the engine room. The urea injection nozzle with the air-assisted is implemented within a branched exhaust pipe. The piping design is essential in converting (waste) into ammonia, which functions as a reducing agent. The reactor is also equipped with an automatic soot blower system. Each engine requires a catalyst reactor, whereas only one set of pumping unit and one set of control panel are installed for all reactors.

On the other hand, an engine with SCR system is designed to set a minimum exhaust gas temperature depended on the sulfur content in fuel. With this design, our engine can achieve a high durability and an excellent reliability for a long time.

INQUIRIES

No.1 Sales Group Overseas Sales Division Marine Products Sales and Marketing Division Power Solution Business 2-1-1, Yaesu, Chuo-ku, Tokyo, 104-8486, Japan Tel : +81-3-3275-4909 Fax : +81-3-3275-4969 http://www.yanmar.com/global/ E-mail : ichiro_fuwa@yanmar.com

SASAKURA ENGINEERING CO., LTD.

Biological type Sewage Treatment Plant



The vessel discharge restrictions of the International Convention for the Prevention of Pollution from Ships are not limited to oil, but rather control sewage as well.

Sasakura's Sewage Treatment Plant has met to IMO(International Maritime Organization) regulation, MEPC. 159(55).



INQUIRIES

7-32, 4-chome, Takejima, Nishiyodogawa-ku, Osaka, 555-0011, Japan Tel : +81-6-6473-2134

E-mail : marine@skm.sasakura.co.jp

Shaft Driven Generating System

Inverter Energy Saving

NSDK NISHISHIBA ELECTRIC CO., LTD.

Shaft Driven Generating System







The shaft generating system driven by a high-efficiency main engine enables energy saving.

Operation of the shaft generating system reduces the operation time of the diesel generator engine, resulting in maintenance work saving.

INQUIRIES

NISHISHIBA ELECTRIC CO., LTD. Osaka Branch 29th Fl., Umeda Sky Building West Tower, 1-30 Oyodonaka 1-chome, Kita-ku, Osaka, 531-6129, Japan Tel : +81-6-4797-2451 Fax : +81-6-4797-2453

SOx Scrubber

TERASAKI TERASAKI ELECTRIC CO., LTD.

TERANET50X



TERANET 50X system integrates interchangeable and standard components over a dual loop Ethernet network, which effectively minimizes the impact of equipment. Then, the ship-to shore information sharing platform enables ships and land- based offices to share data with wide range of applications through communication and storage features designed for utilizing "Big Data" base. In addition, the system is put on energy-saving ship and contributes to global environmental protection by increasing the optimum operating efficiency of the plant.

INQUIRIES

6-13-47 Kamihigashi, Hirano-ku, Osaka, 547-0002, Japan Tel : +81-6-6791-2790 Fax : +81-6-6791-2773 E-mail: hakuei-osaka@terasaki.co.jp

Marine Propulsion & Auxiliary Machinery 2015 Environmental Performance Award

Port Enterprise Co., Ltd. Port Enterprise Co., Ltd.

http://www.portenterprise.com

ME Production SOx Scrubber Marine Propulsion & Auxiliary Machinery 2015 Environmental Performance Award



ME Production SOx scrubber is 100% order made in order to ensure its efficacy as well as easy installation. Both the size and shape can tailored to match any vessel without compromising its performance.

In addition to that, this award-winning system offers options of Na2CO3 and MgO for alkaline chemical along with conventional NaOH. Both Na2CO3 and MgO can be carried in powder instead of liquid. They are totally safe, easy to handle, and less expensive than NaOH.



ME Production SOx scrubber can also be catered for special needs, such as "Open Loop Plus" with optional active alkaline chemical dosing function to operate in freshwater/low salinity water areas or where strict pH discharge limit applies, containerization of wash water processing system for retrofit projects or vessels with rather limited space, and many more, limited only by your imagination.

INQUIRIES -

No. 2-1-28, Chikko, Minato, Osaka, 552-0021, Japan Tel : +81-6-6573-5391 Fax : +81-6-6575-3036 E-mail: penterj@penterj.co.jp

MITSUBISHI HEAVY INDUSTRIES MARINE MACHINERY & EQUIPMENT CO., LTD.



urbochargers

Hybrid Turbochargers

The compact hybrid turbocharger has a built-in power generator so that it not only supplies supercharged air to the engine but also uses rotational energy to generate electrical power at the same time. It contributes to the improvement of fuel efficiency by supplying all electrical power necessary while at sea.

https://www.mhi-mme.com/

Electric Assist Turbochargers

The electric assist turbocharger is a turbocharger that incorporates a compact electric motor that assists the driving of the turbocharger. This provides optimization of plant efficiency when a ship is operating under slow steaming, enabling equal or better performance than an auxiliary blower while consuming little power.



Turbochargers By adjusting the turbine nozzle's

VTI (Variable Turbine Inlet)

inlet area through which exhaust gas passes, the VTI turbocharger increases scavenging air pressure under low loads, thereby improving the performance of the main engine, It can be retrofitted to improve fuel-efficiency of ships in service.

INQUIRIES

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Energy Saving, Less Fuel Consumption, GHG (CO₂) Reduction

MITSUBISHI HEAVY INDUSTRIES MARINE MACHINERY & EQUIPMENT CO., LTD.

https://www.mhi-mme.com/

STG (Super Turbo Generating) system



ORC (Organic Ranking Cycle) system



Selection chart of MHI-MME WHRS

STG (Super Turbo Generating) system

WHRS is a marine waste heat recovery system that carries out highly efficient power generation onboard ships through effective utilization of energy harnessed from the marine engines' exhaust gas. Exhaust gas energy is effectively recovered though the optimal control of the combination of exhaust gas and steam turbines lowering a ship's fuel costs.

ORC (Organic Ranking Cycle) system

Presently, engine cooling water below 100°C was dumped into the ocean. ORC is compact power generation systems that enable electrical power recovery and power generation using a heat transfer medium with a boiling point lower than that of water, like those used in air conditioners.

Available heat source

125kW…Jacket cooling water with 85°C

375kW...High energy source with Main Engine exhaust gas and or Air Cooler are also utilized to the ORC.

INQUIRIES

Business Development Division

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JAPANESE MARIN ECO PRODUCTS

April.2017.Revision

http://www.jsmea.or.jp/eco-products

