



Marine

Electric power
systems for marine
applications

The benefits of working with Nidec



Nidec Industrial Solutions has more than a century of experience in marine electrical systems and is able to trace its involvement back to early naval electromechanical systems. The company has also been at the forefront in the development and manufacture of electrical variable speed technology from the advent of modern power electronics during the mid 1900s - providing flexible, versatile and efficient captive power solutions that have revolutionized offshore oil exploration and marine propulsion systems. Today, this deep understanding of marine applications allows us to create custom solutions for electrical power & propulsion systems, automation & dynamic positioning, as well as on-board power generation and distribution that benefit our customers by offering high levels of flexibility and reliability - meeting even the most stringent marine requirements.

The new global force in marine



Electric propulsion



Energy storage



Full electric package & system integration



Deck machinery



Power generation



Project management



Basic building blocks



The new global force in marine

An enhanced global presence that benefits all our customers

Through our integrated Drives & Motors and Electrical Power Generation organization, we have an extensive global presence that provides comprehensive local support & services.

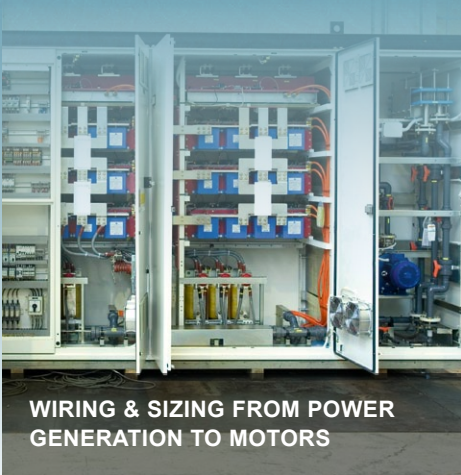
Nidec Industrial Solutions key figures:

- 18** SERVICE CENTERS
Providing excellent customer support for any product, automation solutions or service requirements
- 9** MANUFACTURING SITES
Producing a comprehensive range of high quality products, optimized for industry-specific customer requirements
- 12** ENGINEERING AND DESIGN FACILITIES
Develops market leading products and feature-sets using the latest design technology

One-stop shop for the entire electrical package



KEY EQUIPMENT
MANUFACTURE



WIRING & SIZING FROM POWER
GENERATION TO MOTORS



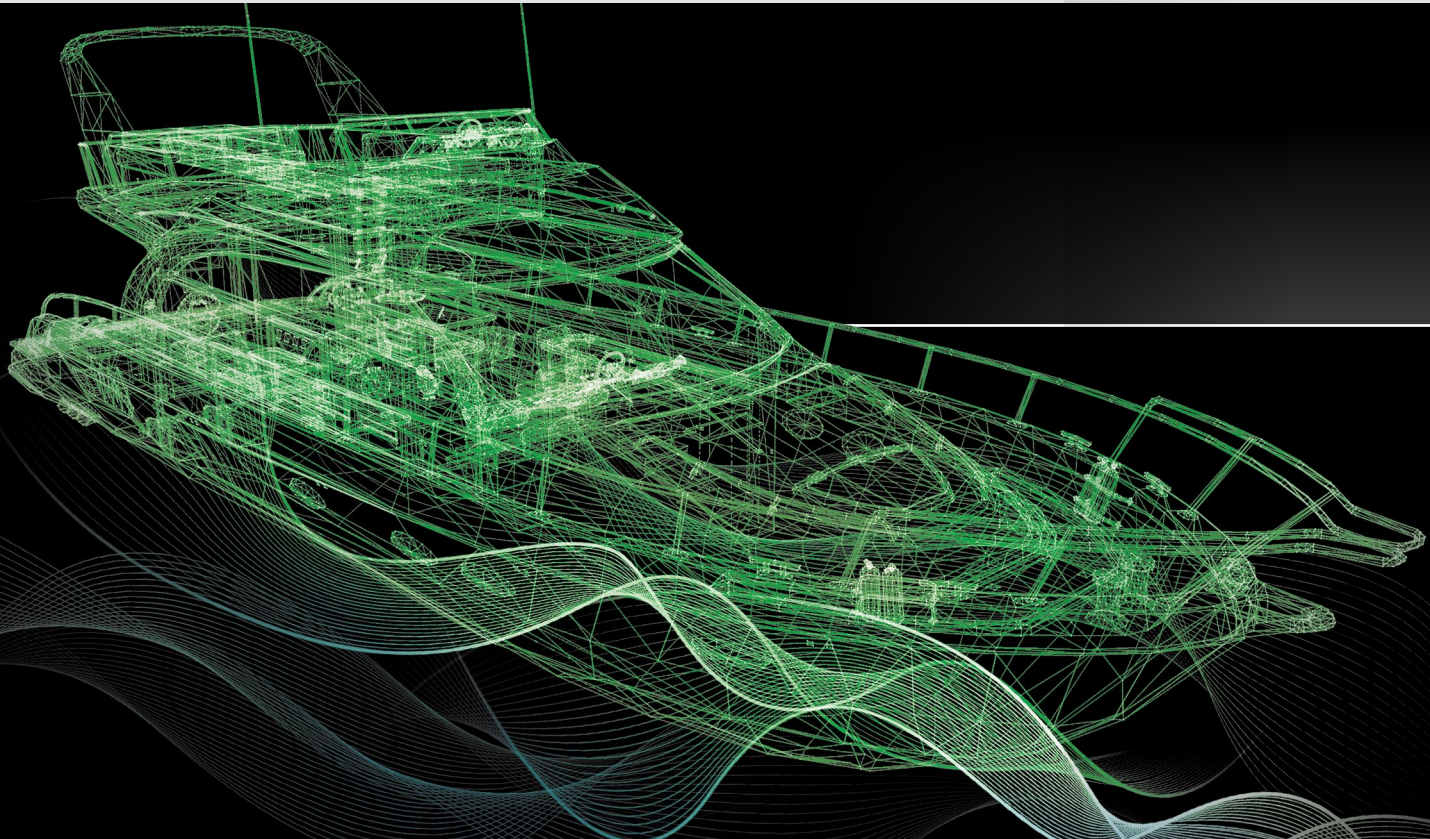
PRODUCTS & SYSTEM DESIGNED
TOGETHER BY A DEDICATED TEAM

We offer our customers qualified assistance and prompt intervention worldwide. With the acquisition of Control Techniques and Leroy Somer Nidec can now provide complete LV and MV solutions. We have a group within our organization that is dedicated to designing, managing and implementing global marine projects while dedicated local teams support each stage of the project life cycle. This allows us to leverage our worldwide marine expertise and automation knowledge for every project.

Global expertise perfectly executed at local level

Electric propulsion

Pioneer and technological partner for the complete electrical system on the next generation of vessels



LONG HISTORY OF INNOVATION, STARTING FROM THE FIRST ZERO EMISSION BOAT IN THE 80'S.



MORE THAN 10 ENERGY STORAGE SYSTEMS INSTALLED ONBOARD



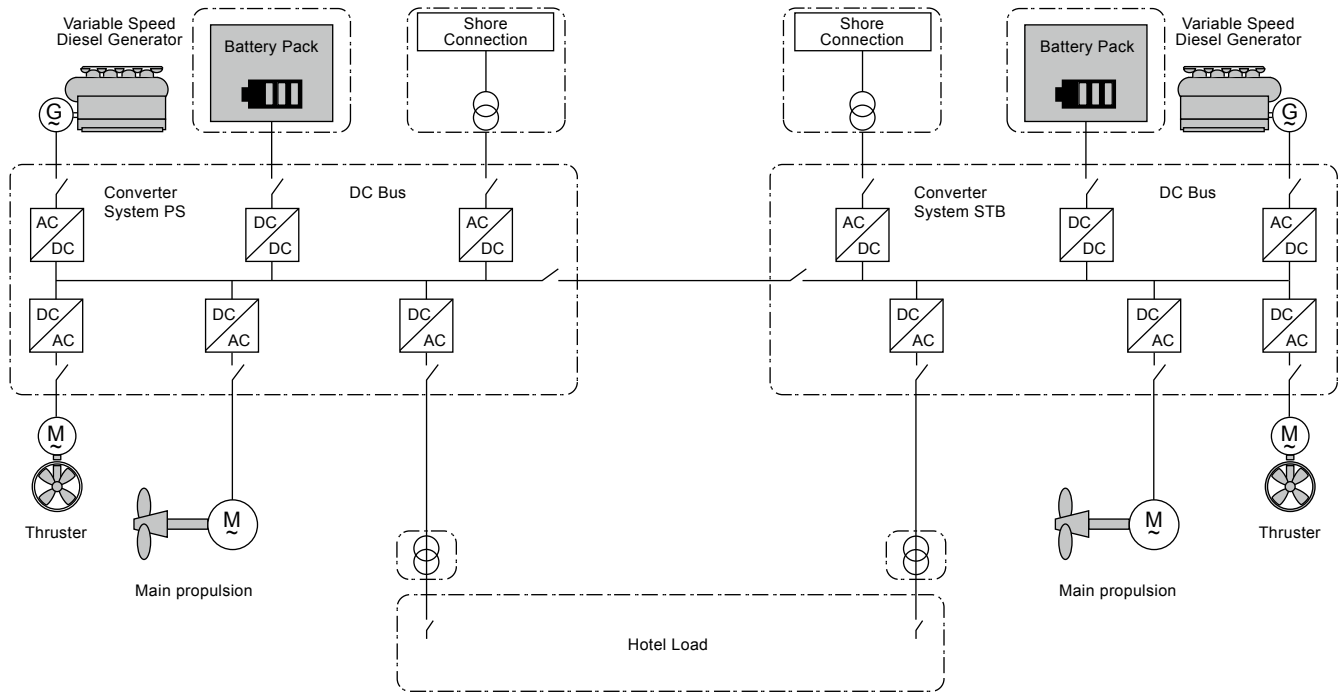
LEADING SUPPLIER OF BESS SYSTEMS WORLDWIDE, 500 MWH INSTALLED AND IN OPERATION ON LAND AND ON BOARD

Electric power solutions for hybrid propulsion

Our proven experience in marine propulsion and on-board power generation allows us to invest in innovation and develop new solutions

which take into account both our customers' requirements and eco-efficiency needs.

DC BUS ARCHITECTURE

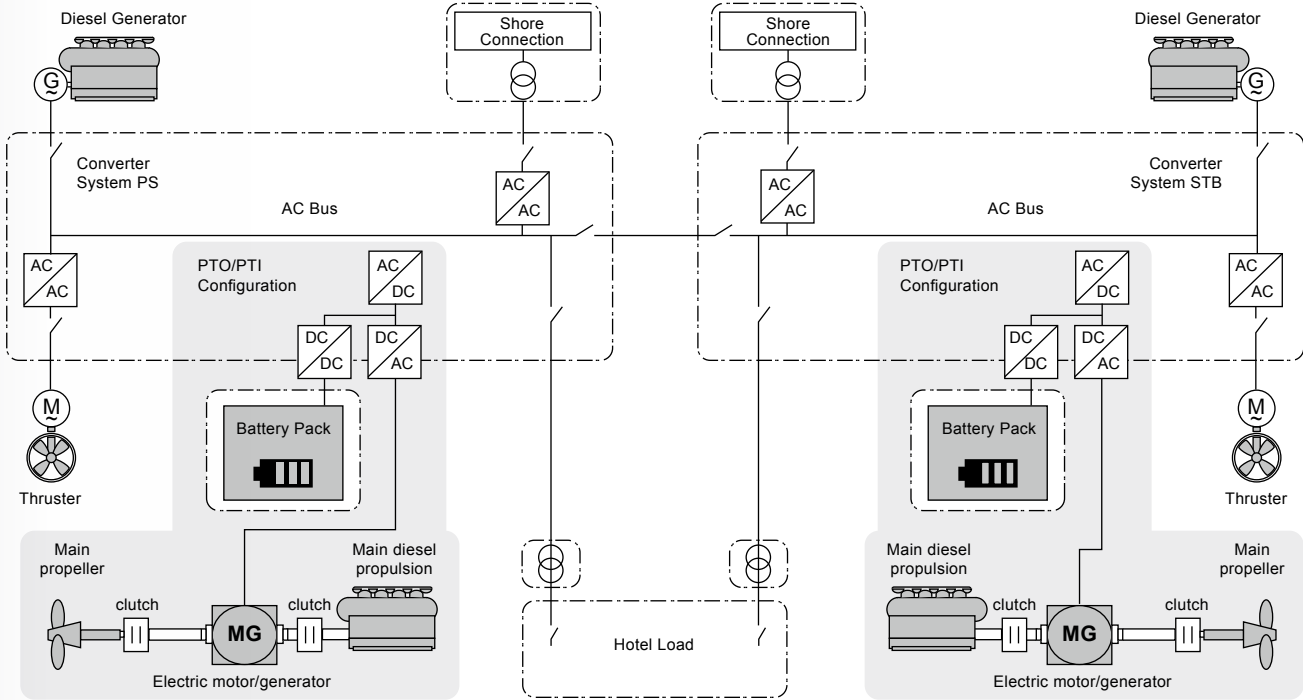


Hybrid and all-electric propulsion systems

Our engineering capabilities allow us to design electric propulsion systems to meet ship designers' space, noise and performance specifications. Thanks to their compact size and ease of installation, our components and solutions offer considerable design flexibility.

The deep project management expertise we bring to every project helps to ensure on-budget, on-time delivery. When combined with our significant experience in energy storage and power quality, we are able to provide a full electric propulsion system that is world class in terms of performance and efficiency.

AC BUS ARCHITECTURE & PTI/PTO CONFIGURATION



Energy storage



LOW NOISE



ENVIRONMENT PROTECTION



VERY FAST RECHARGE

Nidec Industrial Solutions has designed and installed environmentally friendly energy storage systems onboard different vessel types - including ferries, workboats and megayachts. We offer the best

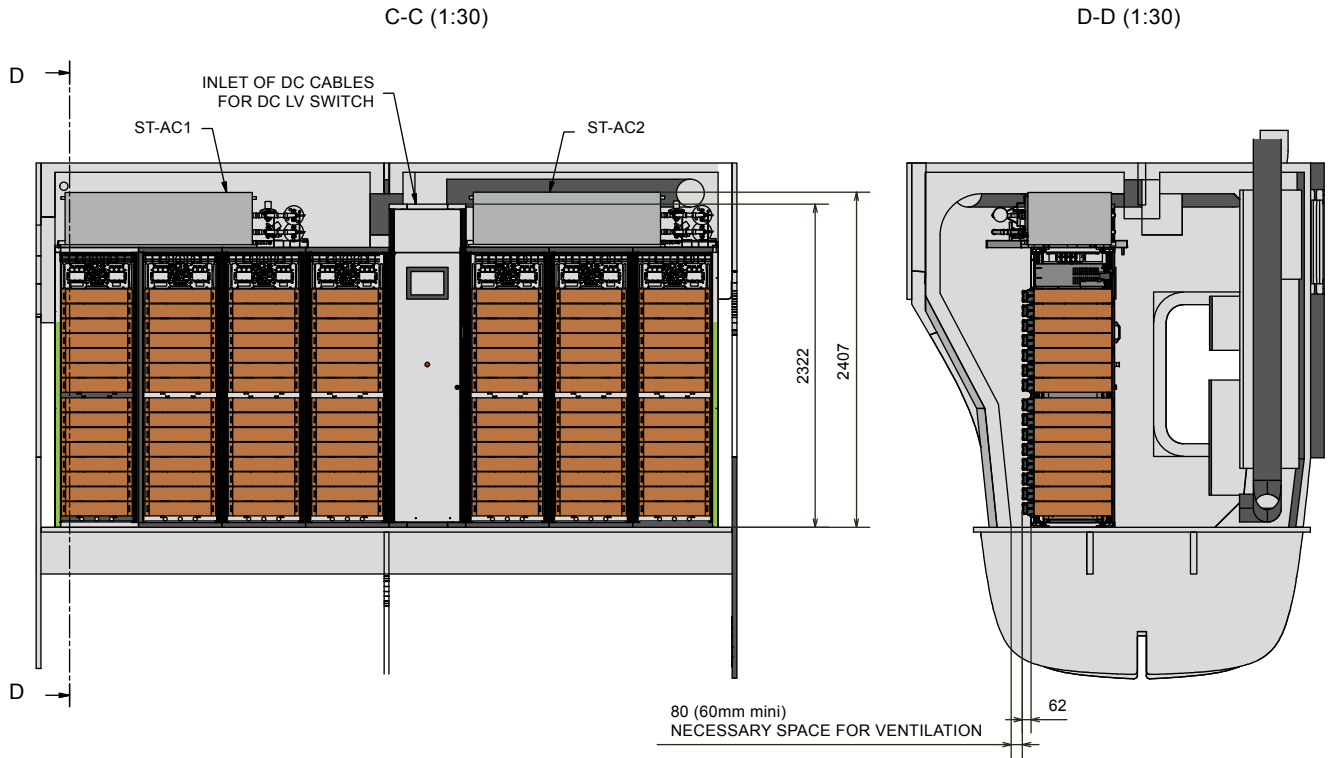
solution to reduce fuel consumption, emissions and maintenance costs, both for new-build vessels or retrofitting on existing ones. Battery energy storage systems (BESS) can reduce fuel consumption

by creating a more optimal load on a ship's current motors. They also provide silent-mode, all-electric propulsion and/or temporary power in areas where running diesel motors is not allowed or convenient.

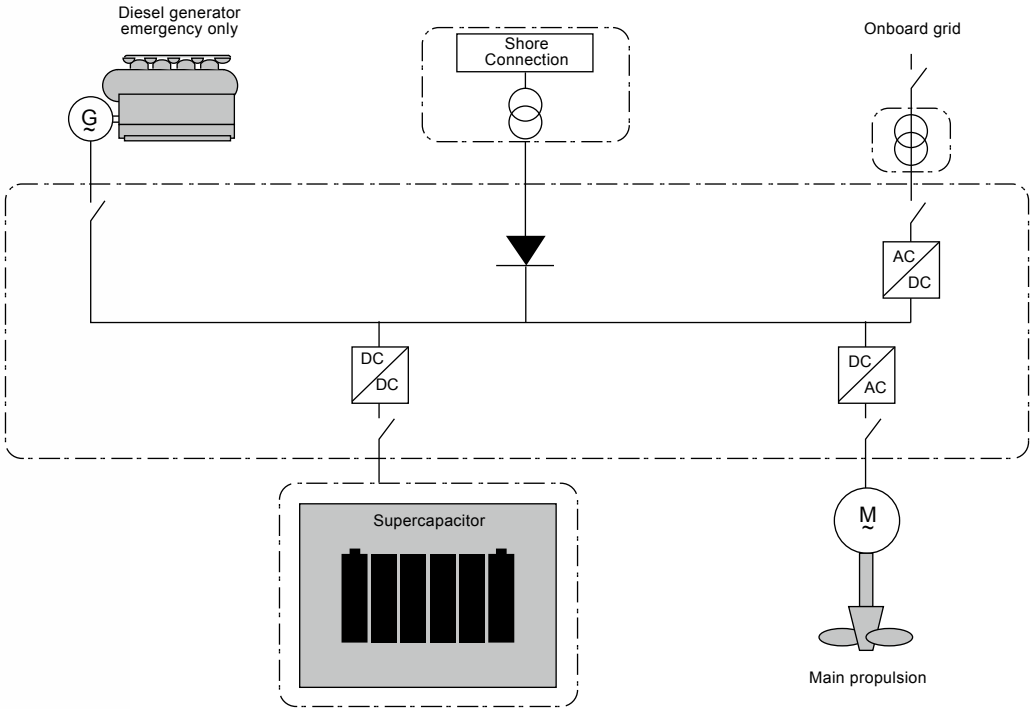
In addition to our experience in battery energy storage we also have proven experience in supercapacitors. Supercapacitors allow faster and more frequent recharging. Nidec Industrial

Solutions works closely with naval architects and ship operators to identify the best solution based on an analysis of ship duty, foreseeable navigational routes and loads.

BATTERY PACKS INSIDE THE VESSEL



FAST-CHARGING SUPERCAPACITORS



Full electric package & system integration

Solutions without compromise



WIDEST CHOICE OF DRIVE SOLUTIONS HIGHLY ADVANCED TECHNOLOGY RELIABLE COST-EFFECTIVE TAILOR-MADE

Engineering know-how



CONCEPT DESIGN SUPPORT IN-HOUSE TECHNOLOGY MODERN SYSTEM DESIGN TOOL

Electric propulsion systems, deck machinery, power generation

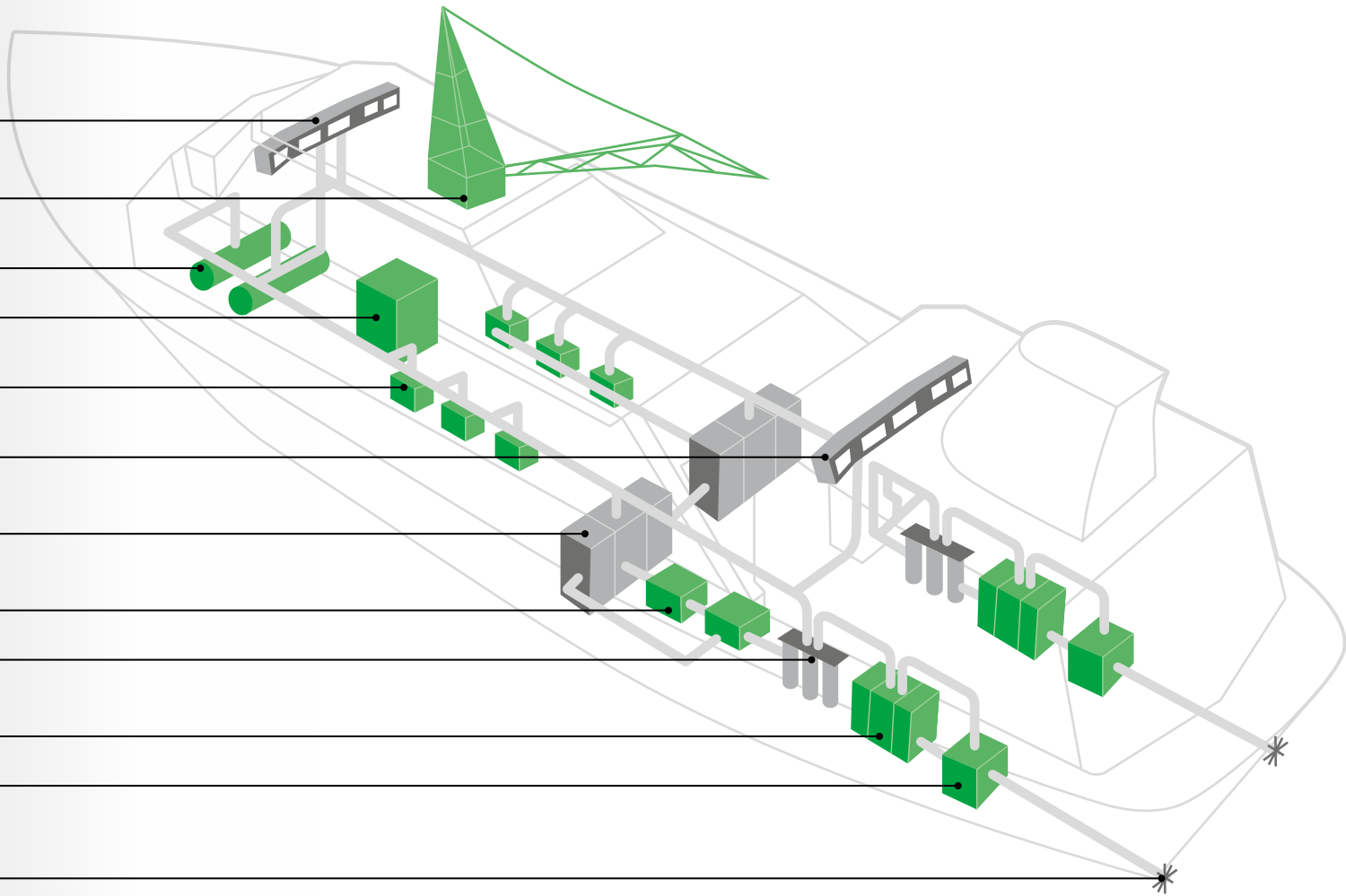
Nidec Industrial Solutions fully meets your dreams and desires in marine applications with a wide range of solutions, providing complete electrical packages or supporting system integrator.

When it comes to oil and gas, Nidec Industrial Solutions's got the drive, the power and the experience it takes to guarantee maximum uptime performance and reliable operation for your processes.

Wherever you are in the energy supply chain, from extraction to power generation, the breadth and depth of our product range provides the flexibility to engineer the optimum solution for your application.



- BRIDGE CONTROL ROOM & DYNAMIC POSITIONING
- ELECTRIC SUPPLY & CONTROL FOR DECK MACHINERY
- TUNNEL THRUSTER MOTORS
- BATTERY ENERGY STORAGE SYSTEMS
- ELECTRIC SUPPLY FOR ACCOMMODATION AND PUBLIC ROOMS
- PROPULSION AUTOMATION CONTROL AND MONITORING
- MAIN SWITCHBOARD AND INTEGRATED POWER MANAGEMENT
- ONBOARD POWER GENERATION
- SUPPLY PROPULSION TRANSFORMERS
- VARIABLE FREQUENCY DRIVES
- PROPULSION MOTORS
- PROPELLERS



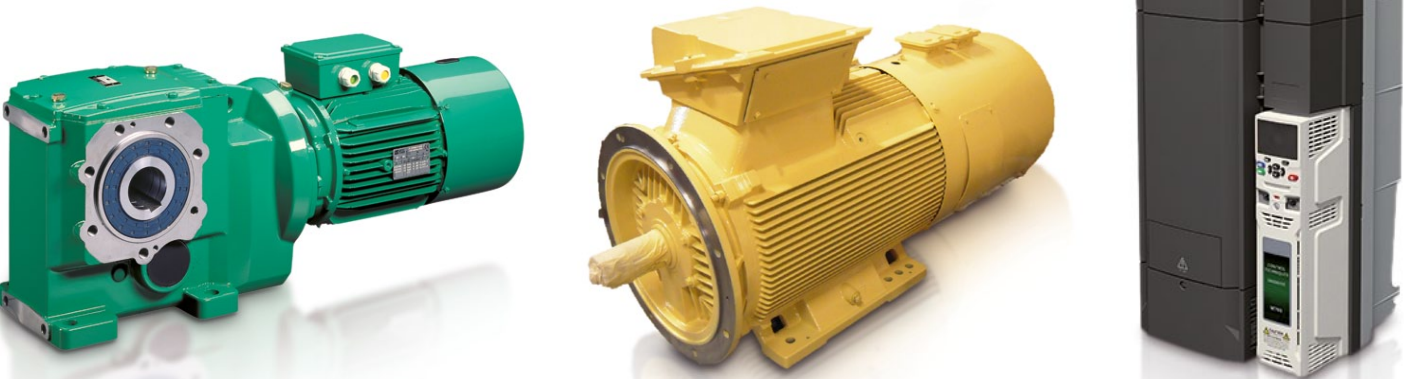
Deck machinery



Looking for increased reliability on deck? Nidec Industrial Solutions is the preferred partner of many winch and hoist manufacturers. Our products and control systems are commonly used in the following:

- Dynamic anchoring, mooring and winch applications
- Onboard crane and hoist applications
- Active heave compensation
 - safe load & offshore hoist operations while transporting to fixed points
 - low inertia motor technology to increase productivity

Nidec Industrial Solutions can provide the expertise, technology and services to deliver reliable, safe, high-performance control systems required to operate deck machinery in harsh marine conditions. Every system is individually designed to the exact requirements of each vessel and piece of machinery, and can be certified to marine standards.



Power generation



Nidec Industrial Solutions is one of the world's leading suppliers of synchronous generators for on-board applications coupled with diesel engines or as shaft generators (both fixed and variable speed). Nidec is able to provide complete solutions from LV to MV, flexible and customized to the exact requirements of customer's vessel, ensuring maximum performance and functionality.

Our range of generators is used on passenger vessels (cruise ships & ferries), offshore vessels and navy vessels with projects done with all the main classification societies. Nidec offers significant experience in engineered-to-order solutions. Our engineering capabilities allow us to design the best solution to meet vessel's targets in terms of space, noise levels and performance.



Project Management

Dedicated Project Manager with total responsibility for



CONSULTANCY

- Conceptual system design, layout, cooling, costs, weights and dimensions prior to the bidding process.

SYSTEM DESIGN

- Power system analysis
- Coordination studies
- Harmonic analysis
- Component specifications
- System interface
- Automation requirements
- Availability, reliability and maintenance studies
- Mechanical studies
- Plant layout

COMPONENT SUPPLY

- Main generators
- Main switchboard with integrated power management
- Variable speed drive systems (transformer, motor, power electronics)
- Fixed-speed motors
- Distribution transformers
- Ship service/auxiliary switchboards and group starters with integrated automation features
- Harbor and emergency diesel generator sets
- Wheelhouse controls
- Control room and special function consoles
- Integrated alarm monitoring, control and automation, dual network
- DP system
- Integrated bridge system
- Thrusters
- Spare parts



INSTALLATION AND START-UP

- Installation drawings
- Attend sea trials
- Operation & maintenance manuals

AFTER SALES SERVICE

- 24/7 Service and support
- Global spare parts availability
- Remote troubleshooting
- Preventative and predictive maintenance programs
- Extended warranty
- Product maintenance and crew training
- Refurbishment and upgrades
- Logistics support for worldwide site destinations



Basic building blocks

Flexible design, easy maintenance

Standard components

- Modular high-volume production
- Easy maintenance
- Long-term availability
- Reduced spares investment

Our engineering capabilities allow us to design the best solution to meet your targets in terms of space, noise levels and performance.

LV DRIVES

- Power range: 0.75 – 1,200 kW
- Voltage: 400-480 V, 525-690 V
- Output frequency: up to 200 Hz
- AC & DC Drives



MV DRIVES

- Power range: Air Cooling up to 10,400 kVA, Water cooling up to 21,600 kVA
- Voltage: up to 3300 V
- Output Frequency: Normal 5 - 70 Hz, Extended 5 - 140 Hz
- Active Front End, Direct Front End & LCI



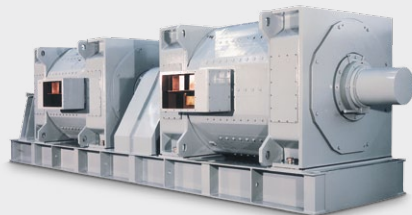
LV MOTORS

- Power rating: up to 1,500 kW, 2,000 HP
- Induction & Synchronous motors



DC MOTORS

- Power rating: up to 6,000 kW (in tandem)
- Voltage: up to 1000 V



MV MOTORS

- Power rating: 150 - 25,000 kW, 200 - 33,000 HP
- Voltage: up to 15 kV
- Induction & Synchronous motors



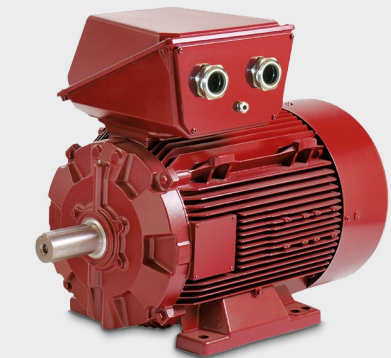
GENERATORS

- Power rating: 2,500 – 16,000 kVA
- Voltage: up to 11 kV
- Induction & Synchronous generators



PERMANENT MAGNET MACHINES

- Up to 10 MVA



AUTOMATION & CONTROL SYSTEMS



Services



With you everywhere, even in the middle of the ocean.

TECHNICAL SUPPORT

When you are on the go, you need to know that you can rely on finding the technical support, spares, assistance or repairs wherever you are. Nidec Industrial Solutions has a network of local technical support centers around the world and they are never more than a phone call away.

REMOTE DIAGNOSTICS

Nidec Industrial Solutions is world renowned for reliability. However, in the unlikely event of a failure our remote diagnostics provide the ship's crew with real-time assistance in fault-finding, 24 hours a day, 7 days a week.

TRAINING AND ON-BOARD

Nidec Industrial Solutions provides custom training program tailored to meet the customer's needs. We can also provide ship attendees for on-board assistance after commissioning and initial service.

UPGRADES

Nidec Industrial Solutions is continuously developing new equipment to bring our customers' current system to a higher state of efficiency and reliability. Upgrade packages can prolong the life and overall performance of your equipment.

SERVICE AGREEMENTS

Nidec Industrial Solutions is a "through-life" partner able to handle all of your service needs whether it's a contract of preventive or general maintenance. These programs are designed to meet your requirements and maximize your operating uptime.



Our experience



100+ SHIPS
SUPPLIED

MERCHANT SHIPS

- Bulk & Container vessels
- Oil tankers
- LNG carriers
- Shuttle & Coastal tankers
- Chemical & Product tankers
- Inland waterway barges

NAVAL, SCIENTIFIC & SPECIAL

- Surface combatants
- Submarines
- Aircraft carriers
- Logistic support
- Fleet auxiliary
- Coastguard & Patrol
- Oceanographic research
- Fisheries research
- Hydrographic research
- Seismic survey
- Icebreakers

OFFSHORE & WORKBOATS

- Drilling & Exploration FPSO's
- Pipelay vessels
- Cablelay vessels
- Heavy lift vessels
- Offshore & Platform support
- Well stimulation
- Fishing (trawlers, factories)
- Dredgers
- Tugs & Anchor handlers
- Aids to navigation
- Standby/multipurpose vessels

PASSENGER & VEHICLE

- Cruise liners
- Passenger ferries
- Ro-Ro ferries
- Luxury yachts
- Low emission (inland waterway) boats



INDUSTRIAL SOLUTIONS