
SEAPEX PTE LTD
海鑫私人有限公司

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SEAPEX PTE LTD

Seapex, based in Singapore, is your trusted maritime engineering consultancy service. We specialize in providing comprehensive solutions for all your vessel needs, from consultation to maintenance, installation, and upgrades for various electronic equipment. Our team, with its wealth of experience, is prepared to manage various aspects, including equipment procurement and the design and installation of electronic systems, to ensure optimal performance of your vessel. The company has equipment manufacturing bases in Wuhan and Nantong of China.

OUR SERVICES

ELECTRICAL CONSULTANCY

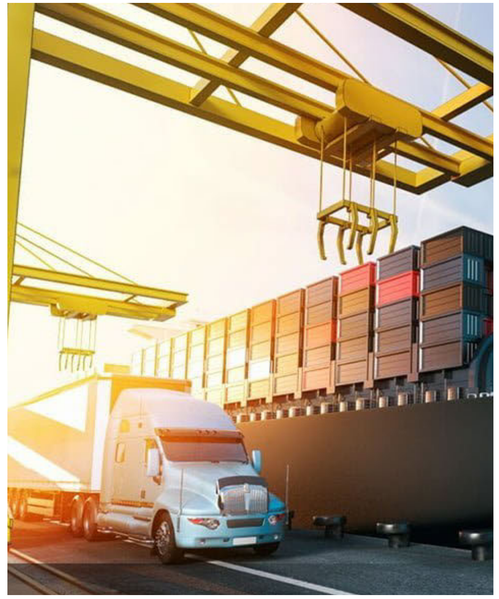
Our Electrical Consultancy services offer comprehensive solutions and expertise in electrical systems to optimize efficiency and safety onboard vessels.

DYNAMIC POSITIONING SYSTEM UPGRADE

Our Dynamic Positioning projects involve integrating cutting-edge systems to enhance vessel maneuverability and precision, ensuring safe and efficient operations in various marine environments.

HYBRID ENERGY STORAGE SYSTEM

Hybrid Energy Storage Systems (HESS) integrate various generation, storage, and consumption technologies into a single solution, optimizing efficiency and reducing costs while offering sustainability benefits.



MACHINERY AND ELECTRICAL COMPONENTS SUPPLY AND TRADING

Our Marine Equipment and Supplies provide high-quality and reliable maritime equipment to meet the diverse needs of vessels and marine operations.

ELECTRICAL CONSULTANCY

Our Electrical Consultancy services offer comprehensive solutions and expertise in electrical systems to optimize efficiency and safety onboard vessels.

ENGINEERING DESIGN

Engineering design plays a pivotal role by meticulously crafting comprehensive blueprints and plans that encompass all aspects of electrical systems, including power distribution, wiring layouts, equipment specifications, and safety protocols, ensuring the seamless integration and efficient operation of electrical infrastructure within diverse projects and industries.

EQUIPMENT SUPPLIES

Equipment supplies function as the vital components and materials necessary for implementing the designed electrical systems, encompassing a wide array of items such as cables, switches, transformers, panels, and other electrical devices sourced from reputable suppliers, ensuring reliability, quality, and compliance with industry standards in the execution of diverse projects and installations.

TROUBLESHOOTING

Troubleshooting plays a crucial role in identifying and resolving electrical issues, malfunctions, or failures encountered in various systems and components. This involves thorough analysis, diagnostic testing, and problem-solving techniques to pinpoint the root cause of electrical problems, followed by implementing effective solutions and preventive measures to ensure optimal performance, safety, and reliability of electrical systems in diverse industrial and commercial settings.

MODIFICATION

modification involves assessing existing electrical systems and components to identify opportunities for improvement, enhancement, or adaptation based on evolving needs, technological advancements, or regulatory requirements. This may include redesigning circuitry, upgrading equipment, integrating new technologies, or implementing changes to improve efficiency, reliability, safety, or compliance with industry standards. Through meticulous planning, design, and implementation, modifications aim to optimize the performance and functionality of electrical systems while minimizing downtime and maximizing cost-effectiveness for clients.

HIGH VOLTAGE SWITCH BOARD

With the increasing capacity and short-circuit current of marine electrical systems, more and more marine electrical systems are transitioning from low voltage to high voltage. Initially, a voltage of 3.6kV was applied in most cases, but today, voltages of 7.2kV and 12kV are widely used. At these voltage levels, the maximum rated current of the system can still reach 50 kA.

The characteristics that marine switchgear must have compared to standard switchgear can be summarized as follows:

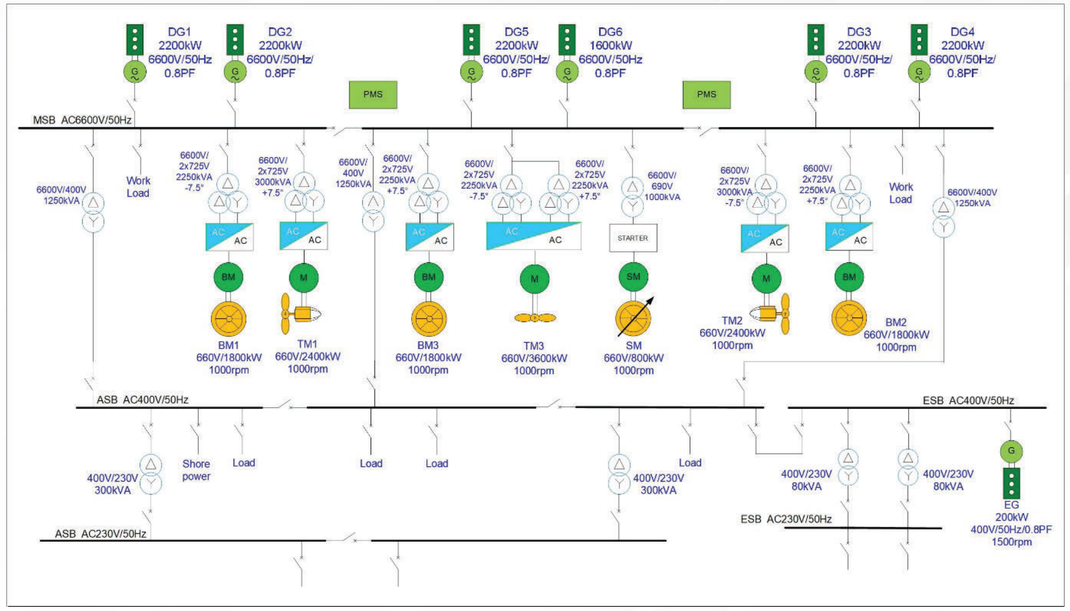
- Protection Level: The protection level of the enclosure is typically IP42.
- Secondary Cable Channels: Interconnected secondary cable channels are installed at the top of the low-voltage chamber.
- Pressure Relief Channels: Pressure relief channels are usually installed. Both ends of the pressure relief channel are sealed, and a chimney is installed at the top of the channel.

HIGH VOLTAGE SWITCH BOARD

Main Parameters

Rated voltage	kV (AC)	7.2	12
Rated insulation voltage	kV (AC)	7.2	12
Rated power frequency withstand voltage	kV/1min	30	42
Rated lightning impulse withstand voltage	kV	60	75
Rated frequency	Hz	50/60	50/60
Rated short-time withstand current	kA/4s	50	50
Rated peak withstand current	kA	125	125
Main bus rated current	A	630~1250	1250~3150
Branch bus rated current	A	630~1250	630~3150
Standard cabinet size (W*H*D)	mm	650*2300*1500	800*2300*1500

HIGH VOLTAGE SWITCH BOARD



Single Line Diagram of Power System

Case Study

The power system of the 155-meter offshore cable laying vessel is supplied by six 6.6kV/50Hz generators. Among these, five generators have a capacity of 2200kW each, and one generator has a capacity of 1600kW. The six generators are individually connected to three sections of busbars on the high-voltage distribution board. They are interconnected by two bus tie switches, allowing for arbitrary parallel operation of the six generators.

LOW-VOLTAGE SWITCH BOARD

The low-voltage distribution board is an integral part of the ship's power distribution system, providing monitoring and protection functions for generators and electrical networks. It enables centralized energy management and offers protection against generator overload, short-circuit, reverse power, differential current, frequency, voltage deviation, and other abnormalities. It also monitors and alerts on network insulation and power station status.

The panel layout is aesthetically pleasing, with a rational division of zones and a sturdy structure to meet marine environmental requirements. It features flexible methods for cable entry and exit (bottom or top), adapting to on-site installation conditions.

LOW-VOLTAGE SWITCH BOARD

Main Parameters

Rated voltage	V (AC)	220~690
Rated insulation voltage	V (AC)	1000
Power-frequency withstand Voltage	kV/1min	2.5
Rated impulse withstand voltage	kV	12.8
Rated frequency	Hz	50/60
Rated short-time withstand current	kA/1s	100
Rated peak withstand current	kA	250
Main bus rated current	A	630~6300
Branch bus rated current	A	630~6300
Standard cabinet size (W*H*D)	mm	650*2300*1000

Exterior view of distribution board

LOW-VOLTAGE SWITCH BOARD

Case Study

The low-voltage distribution board consists of 22 panels, including 8 generator control panels, 1 main bus panel, 1 parallel operation panel, 6 propulsion panels, 2 lifting panels, and 4 load panels.

ELECTRIC BOAT DISTRIBUTION PRODUCTS

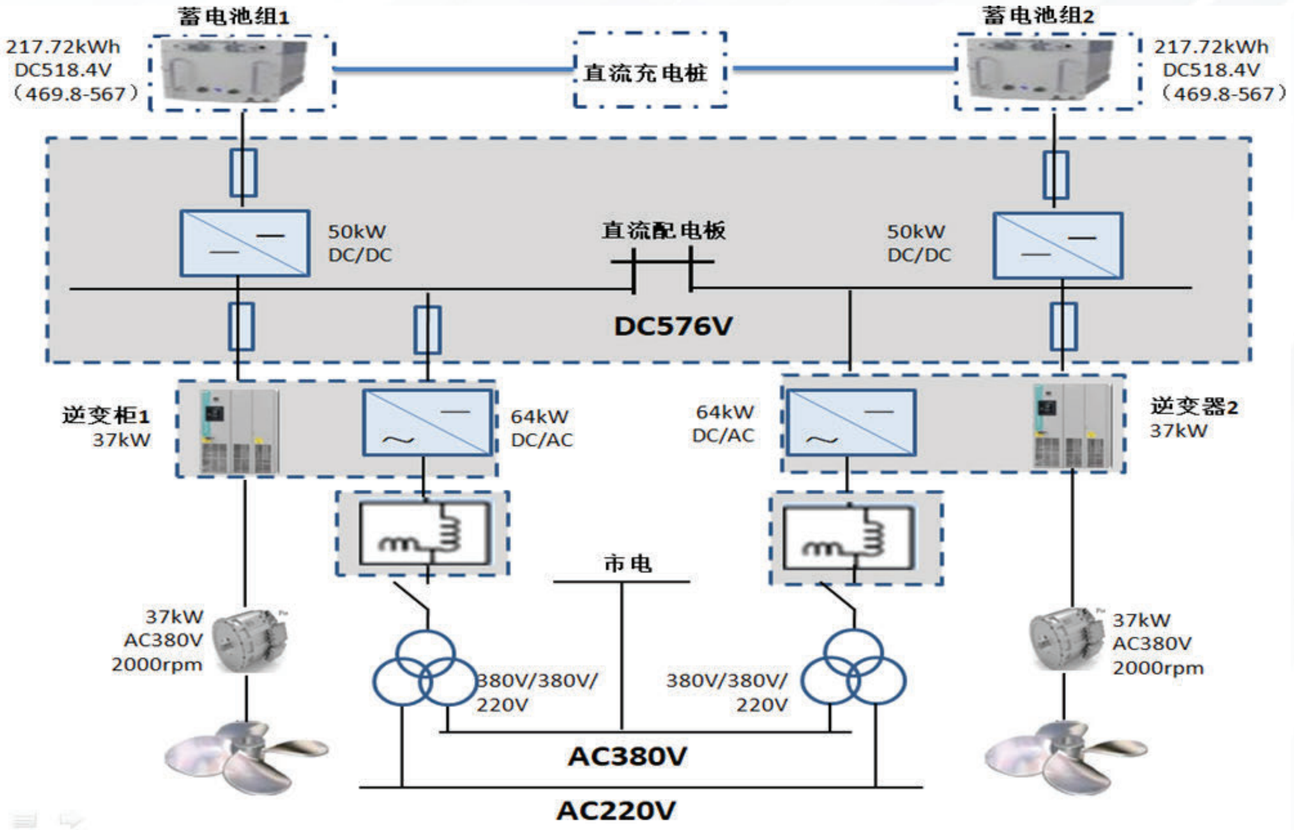
DC SWITCH BOARD

ENGINE ROOM CONTROL CONSOLE

SMART CONTROL CONSOLE

With the development of new energy ships, an increasing number of small and medium-sized ships are adopting new energy power systems to supply power to propulsion systems and daily systems. In recent years, our company has undertaken the manufacturing of electrical equipment for many such ships, including DC distribution boards, AC distribution boards, propulsion control cabinets, charging interface boxes, and control panel for bridge consoles.

ELECTRIC BOAT DISTRIBUTION - SYSTEM ARCHITECTURE



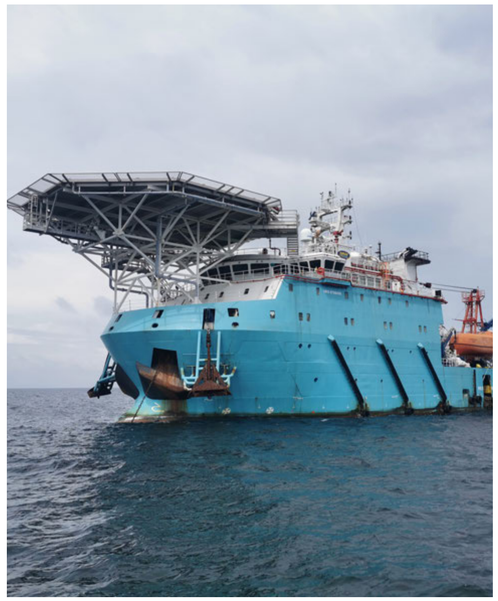
The DC electric boat typically adopts a 600V DC power system, powered by two sets of power storage batteries. They are connected to the two sections of the DC distribution board through DC/DC units respectively, and the two sections of the busbars are connected by bus-tie switches. Then, two sets of DC/AC propulsion inverters supply power to two propulsion motors, and two sets of DC/AC domestic inverters supply power to the AC distribution board.

SHIP PERFORMANCE LIST

Serial number	Ship name	Client	Supply content	Quantity	Shipowner
1	900T lifting and pipe laying ship	Nantong Yahua Shipbuilding Group Co., Ltd.	Power distribution system, host monitoring and alarm system, engine room monitoring system	1 boat set	Jiangsu Huaxi Village Marine Engineering Services Co., Ltd.
2	Hainan 1500-ton fishery administration ship	Wuhan Haiyi Technology Co., Ltd.	Cabin monitoring system, driving control, centralized control system	1 boat set	Hainan Provincial Fishery Administration
3	282 feet cable laying vessel	Nantong Yahua Shipbuilding Group Co., Ltd.	Power distribution system, host monitoring and alarm system, engine room monitoring system	2 boat sets	Jiangsu Huaxi Village Marine Engineering Services Co., Ltd.
4	3000T cable laying ship	Nantong Yahua Shipbuilding Group Co., Ltd.	Power distribution system, cabin monitoring system	2 boat sets	Jiangsu Hengtong Offshore Engineering Co., Ltd.
5	1000T crane ship	Jiangsu Jiusheng Shipbuilding Co., Ltd.	Host monitoring and alarm system, cabin monitoring system	1 boat set	Jiangsu Huaxi Village Marine Engineering Services Co., Ltd.
6	Maoming 300T fishery administration ship	Wuhan Ship Design and Research Institute Co., Ltd.	cabin monitoring system	1 boat set	Fishery Administration
7	318B patrol boat	Wuhan Ship Design and Research Institute Co., Ltd.	Host and liquid level monitoring and alarm device	2 boat sets	Foreign trade export
8	5,000-ton maritime cruise rescue ship	Wuhan Shipbuilding Industry Group	Tower comprehensive management desk	2 sets	China Ocean Administration

SHIP PERFORMANCE LIST

9	Huajing 001/5000T wind power installation ship	China Shipbuilding Industry Corporation No. 712	Power distribution system, cabin monitoring system, driving control system	1 boat set	Jiangsu Huaxi Village Marine Engineering Services Co., Ltd.
10	CMHI-193 MW wave energy power generation breeding platform	China Merchants Heavy Industries Youlian Shipyard	Power distribution system, cabin monitoring system	2 boat sets	Guangdong Academy of Agricultural Sciences
11	800t/h floating crane barge	Wuhan Wuchuan Heavy Equipment Engineering Co., Ltd.	Power distribution system, cabin monitoring system	1 boat set	Anwei Chizhou Jiuhua Power Plant
12	3000T fishery administration ship	China Shipbuilding Industry Corporation No. 701	cabin monitoring system	1 boat set	Fishery Administration
13	3700 m3 LPG ship	Hubei Jiangrun Shipbuilding Co., Ltd.	Power distribution system, cabin monitoring system	1 boat set	Guangzhou Hongguang Shipping Company
14	Zhenxin 1600T	CSSC No. 712 Research Institute	Power distribution system, cabin monitoring system	1 boat set	Shanghai Zhenhua Heavy Industry Group
15	YOFC Baosheng 4000t	Wuhan Changhai Electric Propulsion and Chemical Power Supply Co., Ltd.	Power distribution system, driving control, centralized control system	1 boat set	YOFC Baosheng Offshore Engineering Co., Ltd.



DYNAMIC POSITIONING SYSTEM UPGRADE

Our Dynamic Positioning projects involve integrating cutting-edge systems to enhance vessel maneuverability and precision, ensuring safe and efficient operations in various marine environments.

PROJECT MANAGEMENT

Project management in DP system upgrades involves coordinating various tasks such as system analysis, equipment procurement, installation scheduling, and commissioning to ensure a seamless transition to the upgraded system while adhering to project timelines and budget constraints.

ELECTRICAL LOAD ANALYSIS

Electrical load analysis in DP system upgrades entails assessing the power requirements of the vessel's electrical systems to ensure compatibility with the upgraded DP system. This involves analyzing the existing electrical load, identifying potential areas for optimization or upgrade, and designing a system that can efficiently handle the increased electrical demand while maintaining operational stability and safety.

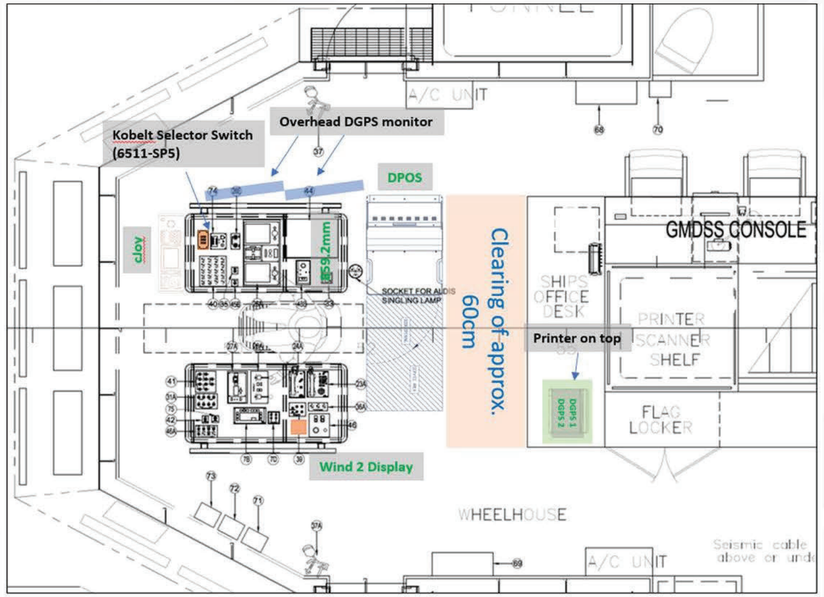
IDENTIFY LOCATION OF INSTALLATION

Identifying the location of installation in a DP system upgrade involves assessing the vessel's layout and structure to determine the optimal placement of new equipment and components. Factors such as accessibility, proximity to existing systems, and structural integrity are considered to ensure seamless integration and minimal disruption to vessel operations during the upgrade process.

ASSURE CLASS COMPLIANCE - DP1 TO DP3

Assuring class compliance from DP1 to DP3 in a dynamic positioning system upgrade involves enhancing the system's capabilities to meet the stringent standards set by classification societies for DP operations. This includes upgrading the system's redundancy, fault tolerance, and operational performance to align with the requirements specified for DP3 class vessels, ensuring enhanced safety and reliability in DP operations.

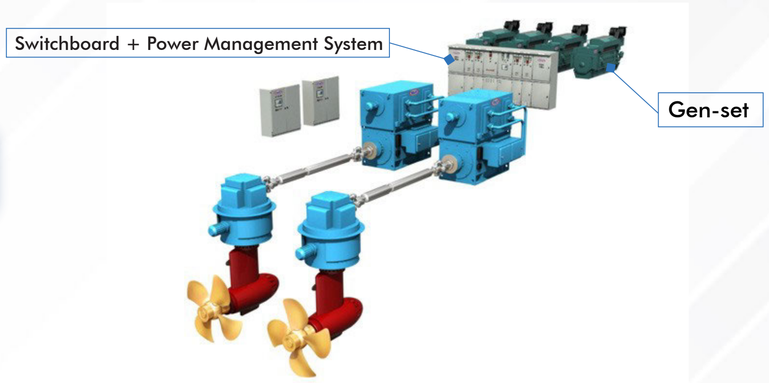
DP SYSTEM UPGRADE

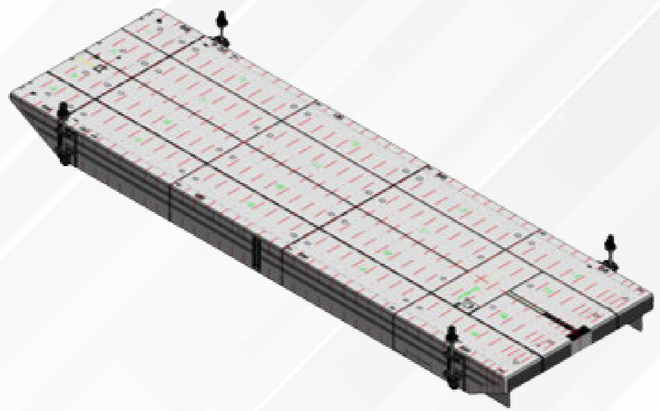


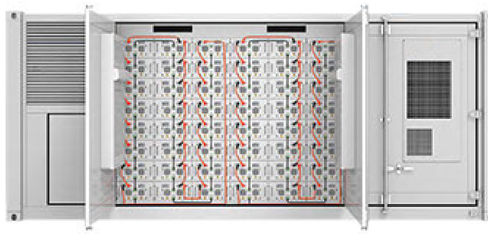
WHEELHOUSE AFT SECTION

- Placement of equipment
- Wiring requirement and routing
- Engineering works (i.e drawings amendment, interface drawings, documentation)
- DP FMEA Services
- Sizing thrusters and power plant to withstand environmental condition

Diesel Electric Drive







HYBRID ENERGY STORAGE SYSTEM

Hybrid Energy Storage Systems (HESS) integrate various generation, storage, and consumption technologies into a single solution, optimizing efficiency and reducing costs while offering sustainability benefits.

HYBRID ENERGY STORAGE SYSTEMS (HESS)

Hybrid Energy Storage Systems (HESS) brings together different generation, storage, & consumption technologies in a single system, improving the overall benefits compared to a system that depends on a single source. This particular application was designed as a combination of conventional, non-renewable generation (e.g., diesel generators) with Battery Energy Storage Systems.

20FT HYBRID ELECTRIC POWER SYSTEMS

The containerized system integrates smoothly with the vessel systems and is ideal for retrofits and new builds. In addition, the design enables the operator to access the system from outside the container for further safety and maximized use of space in the container.

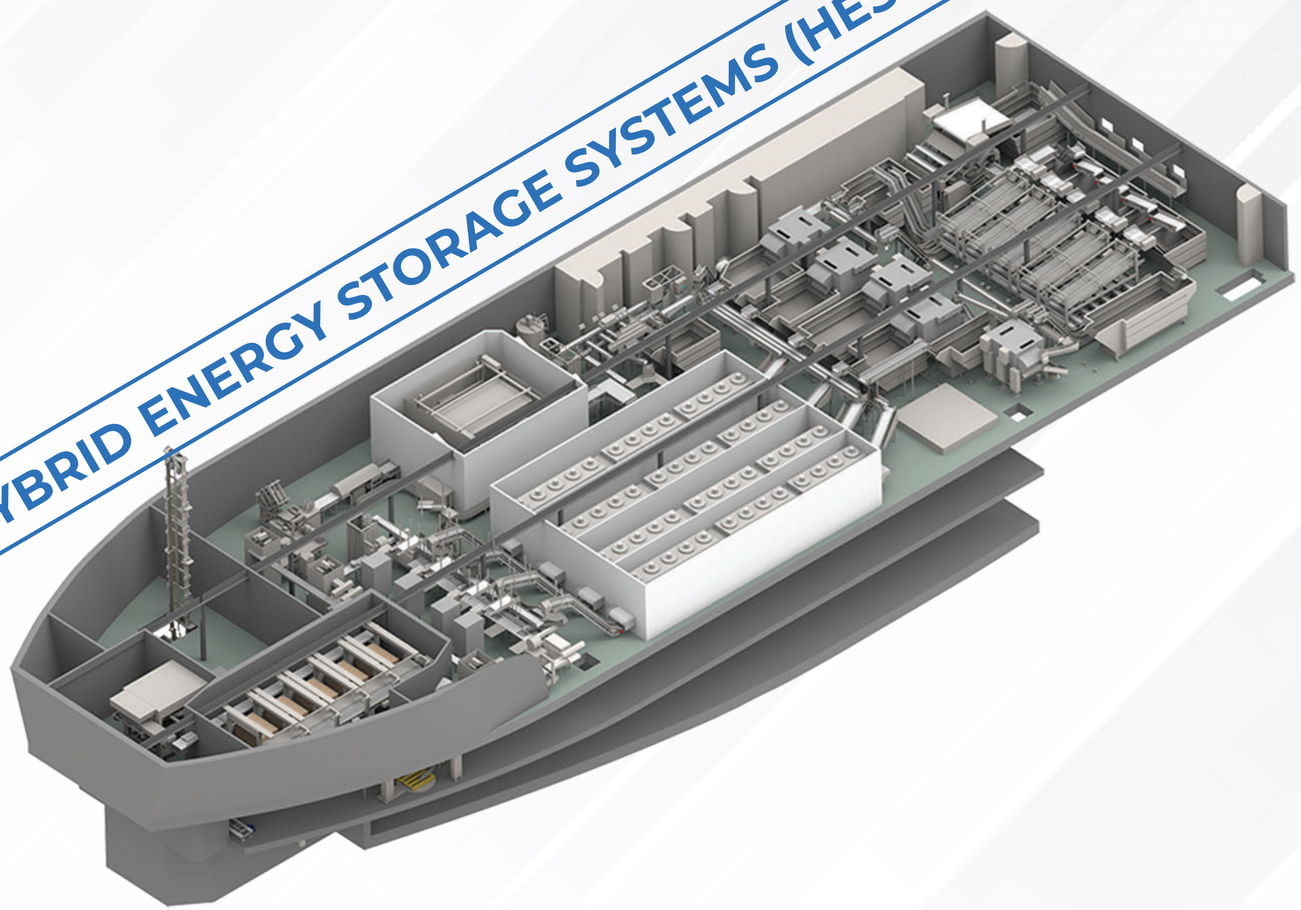
BENEFITS OF HESS

All the equipment (Batteries/ Controls / Aux equipment) is installed in as single container. It will make the onboard installation process very easy and fast.

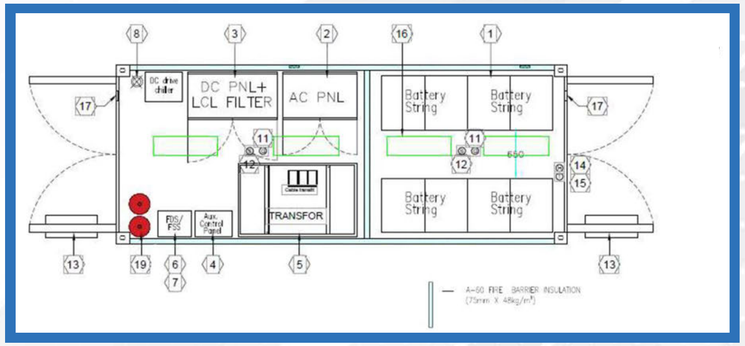
BATTERY PERFORMANCE & LIFETIME

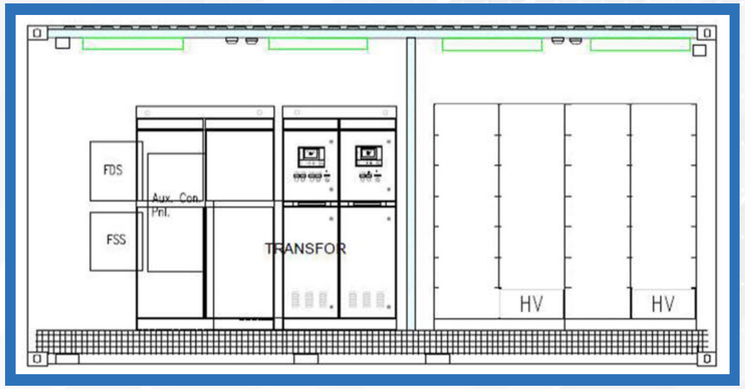
Performance and lifetime calculations are based on an economical lifespan on which the battery is amortized when remaining capacity reaches 80%.

HYBRID ENERGY STORAGE SYSTEMS (HESS)



INTERNAL TOP VIEW



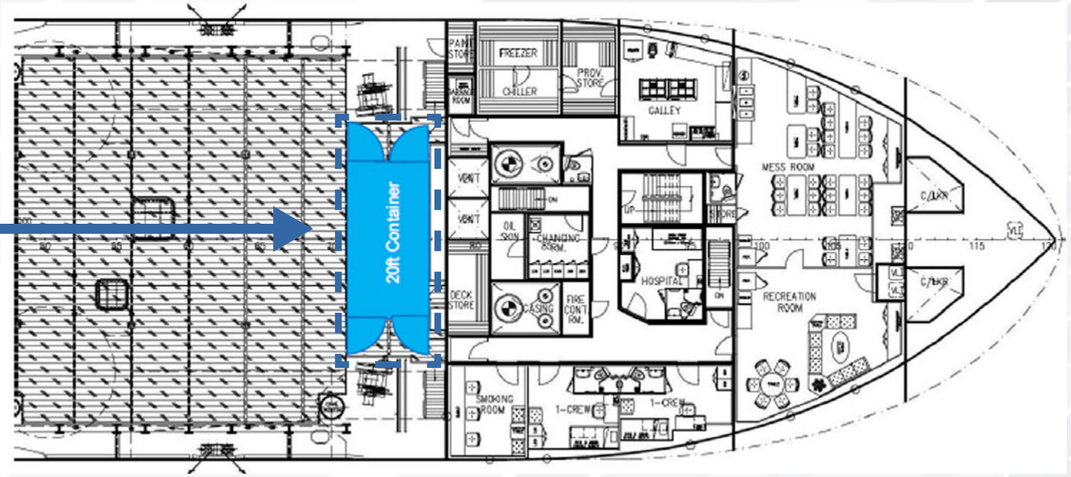


VIEW D-D (INTERNAL VIEW)

HESS represents a promising sustainable solution for power system. Research & development carried out in these emerging technologies will certainly result in reducing the cost of the systems, despite the complex procedure involved in the design and optimization of these systems. Power optimization based on load demand also promises to significantly reduce the total operating cost of the system. Lastly beside cost optimization factor, it is increasingly important to consider other factors such as minimization of carbon emissions and maximization of efficiency.

20FT HYBRID ELECTRIC POWER SYSTEM

Above is an illustration of how the 20ft Container Energy Storage System would look like.



Above figure shows the proposed layout of the 20ft container (with the doors access)

The Containerized Energy Storage System is a complete, self-contained battery solution designed for marine energy storage usage. All the necessary components such as the batteries, converters, transformers, controls, cooling, and auxiliary equipment are pre-assembled in the self-contained unit for "plug and play" use. The simple on-deck installation will simplify the modification process for almost all types of vessel types such as AHTS, PSVs, and other OSVs.

MACHINERY AND ELECTRICAL COMPONENTS SUPPLY AND TRADING

Our company specializes in the procurement, distribution, and trading of machinery and electrical components, offering comprehensive solutions to meet diverse industrial needs.

PARTS SUPPLIES

Part Supplies ensuring a consistent and reliable inventory of essential components, accessories, and consumables required for the maintenance, repair, and operation of port machinery. This involves sourcing, procuring, and stocking a wide range of parts from various manufacturers to meet the diverse needs of port facilities. Additionally, it involves managing inventory levels, tracking usage patterns, and implementing efficient logistics strategies to ensure timely availability of parts to minimize downtime and optimize operational efficiency in port operations.

NEW MACHINERY

New Machinery encompasses the procurement, distribution, and servicing of state-of-the-art machinery and equipment tailored to the evolving needs of port facilities. This involves offering a comprehensive range of new machinery solutions, including cranes, forklifts, conveyors, and other specialized equipment, sourced from leading manufacturers worldwide. Additionally, it entails providing technical expertise, customization options, and after-sales support to ensure seamless integration, optimal performance, and long-term reliability of the new machinery in port operations.

MACHINERY AND ELECTRICAL COMPONENTS LOGISTICS

Our logistics services for machinery and electrical components involve meticulous planning and execution to ensure timely procurement, efficient storage, and seamless delivery of essential equipment. With a focus on reliability and precision, we streamline the logistical process to meet the diverse needs of our clients, facilitating smooth operations and optimal performance.

PART SUPPLIES

Serial Number	TYPE OF PART	TYPE OF CRANE
1.	Motor	STS Crane
2.	Reducer	STS Crane
3.	Festoon Cable	STS Crane
4.	Operator Cabin	STS Crane
5.	Spreader	STS Crane
6.	Anti-collision Sensor	STS Crane
7.	Trolley Wheel Assembly	STS Crane
8.	Headblocks	STS Crane
9.	Power Chain	STS Crane
10.	Operator Cabin	RTG Crane
11.	Spreader	RTG Crane
12.	Anti-collision Sensor	RTG Crane
13.	Crane Tire	RTG Crane
14.	Crane Rail Clips	RTG Crane
15.	Wire Rope	RTG Crane
16.	Load Pins Sensor	RTG Crane
17.	VFD	Electrical Panel & Ehouse
18.	Soft Starter	Electrical Panel & Ehouse
19.	Breakers(ACB/MCCB/MCB)	Electrical Panel & Ehouse
20.	DC Battery Charger	Electrical Panel & Ehouse
21.	Multifunction Motor protection unit	Electrical Panel & Ehouse
22.	Contactor and Electrical Components	Electrical Panel & Ehouse
23.	PLC & Automation Devices	Electrical Panel & Ehouse
24.	Junction Box	Electrical Panel & Ehouse
25.	Electrical Cable gland	Electrical Panel & Ehouse
26.	ESD Loop Monitoring Devices	Electrical Panel & Ehouse

OUR GLOBAL END USER

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