

Diesel-electric propulsion systems are gaining more and more importance in shipping. Shipping installations having higher fuel efficiency in all operational stages will be increasingly favored and will presumably have great potential for future growth. Additionally, the requirements of reliability, redundancy, vibration and noise reduction, maneuverability, and convenient maintenance are gradually becoming stricter. Operators and owners are consequently focusing more and more on ships that pose a smaller environmental risk as well as offering greater crew comfort.



The advantages of SISHIP^{CIS} DRIVE LV at a glance

- Technology proven by more than 100 vessels with electric propulsion is delivered with this solution
- A unique control function secures the highest efficiency in the power station and in the electric system, which achieves more savings in fuel
- Reduced emissions from the diesel engines through the Generator Power Adaptation System
- Redundant design and "take me home safely" functions ensure high availability of the propulsion system
- User- and maintenance-friendly, modular design
- Core components from the Siemens product families, which are in operation in all industries around the whole world, secure availability of spare parts and service engineers
- Longer service intervals reduce maintenance costs and downtime

The basic idea with the SISHIP^{CIS} DRIVE LV is to see the power station, with its diesel generators, main switchboard, frequency converter, and propulsion motor, as one system. Siemens has continuously developed the dynamic behavior and protection features of these vessels to secure their highest possible reliability and operational safety, even in fault situations.

Diesel-electric propulsion as a low-voltage (LV) solution is currently used on offshore support and construction vessels, ferries, passenger vessels, research vessels, cable and pipe laying vessels, icebreakers, product and chemical tankers, and fishing vessels. A diesel-electric propulsion system will normally get its electrical power from four or more diesel engines. A great deal of energy can be saved by using only the number of diesel engines needed for propulsion and the other energy needs on board. In addition, a diesel-electric propulsion system enables a more flexible ship design, reducing the total area required.

SISHIP^{CIS} DRIVE LV

Powerful and economical to operate



SISHIP^{CIS} DRIVE LV Our solution in detail

Standard configurations for SISHIP^{CIS} DRIVE LV ships are available up to 4500 kW at 690 V for each propeller. The solutions are available in 6-, 12-, 24 pulse and AFE-rectifier models. The low-voltage frequency converters use IGBTs as power semiconductors. Siemens has been the market leader in increasing blocking to obtain higher current carrying capacities. The highly reliable SISHIP^{CIS} DRIVE LV converters are based on a freshwater cooling system. Closed-loop internal cooling, with heat exchanger, pump, valves, and all required monitoring and controlling equipment are included as standard equipment in the frequency converter system.

Of the numerous customer benefits of utilizing diesel-electric propulsion systems, better redundancy and improved operational safety are among the most significant. Our aim in developing the SISHIP^{CIS} DRIVE LV has been an overall protection system where only a few types of failures can cause a loss of propulsion, or the shut-down of generators. The result is a system that automatically prevents fault situations from developing towards a blackout, and at the same time sends sensible warnings to the staff on the bridge.

Integrated control systems

SISHIP^{CIS} DRIVE LV is an integrated propulsion control and monitoring system composed of the following independent system parts to create an improved solution, with higher reliability, and higher operational safety for the vessel and the crew:

- PCS – Propulsion control system
- GPA – Generator Power Adaptation
- P³ – Power Plant Protection
- PMS – Power Management System

The overall system is designed for a wide variety of fail-safe normal operations and fault management actions, and is the most reliable low-voltage diesel-electric propulsion system ever.

The four interacting systems mentioned above are separated due to our philosophy of redundancy, and so they can perform independent calculations. These four systems are designed to interact and will perform as one unified system with a unified philosophy especially developed for diesel-electric propulsion systems.

Different propulsion concepts with SISHIP^{CIS} DRIVE LV

SISHIP^{CIS} DRIVE LV can be realized in different configurations to meet the operational requirements of different vessels. Different, well-proven concepts of SISHIP^{CIS} DRIVE LV, depending on type of vessel, are available. The main concepts are:

- One azimuth thruster or conventional propeller with one electric motor
- Two electric motors in tandem directly connected to the propeller
- Two electric motors connected to a twin-input reduction gear
- An electric motor and a diesel engine connected to a twin-input gear
- Two electric motors connected to a twin-input gear, where one of the motors is directly connected to the network

A trend toward electric drive technology

Electric drive solutions, in which required power is produced with the help of gas turbines, diesel engines, or gas engines connected to generators, are used today in numerous variations on hundreds of ships with the most diverse construction designs. This trend continues, with advances in power electronics, integrated power and automation, and reliable control and monitoring systems, accelerating the shift from conventional mechanical propulsion to electric propulsion systems.

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The information in this document contains general descriptions of the technical options available, which do not always have to be present in individual cases. The required features should therefore be specified in each individual case at the time of closing the contract.

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