

Versatile and Powerful

# Liduro Marine Frequency Converter System

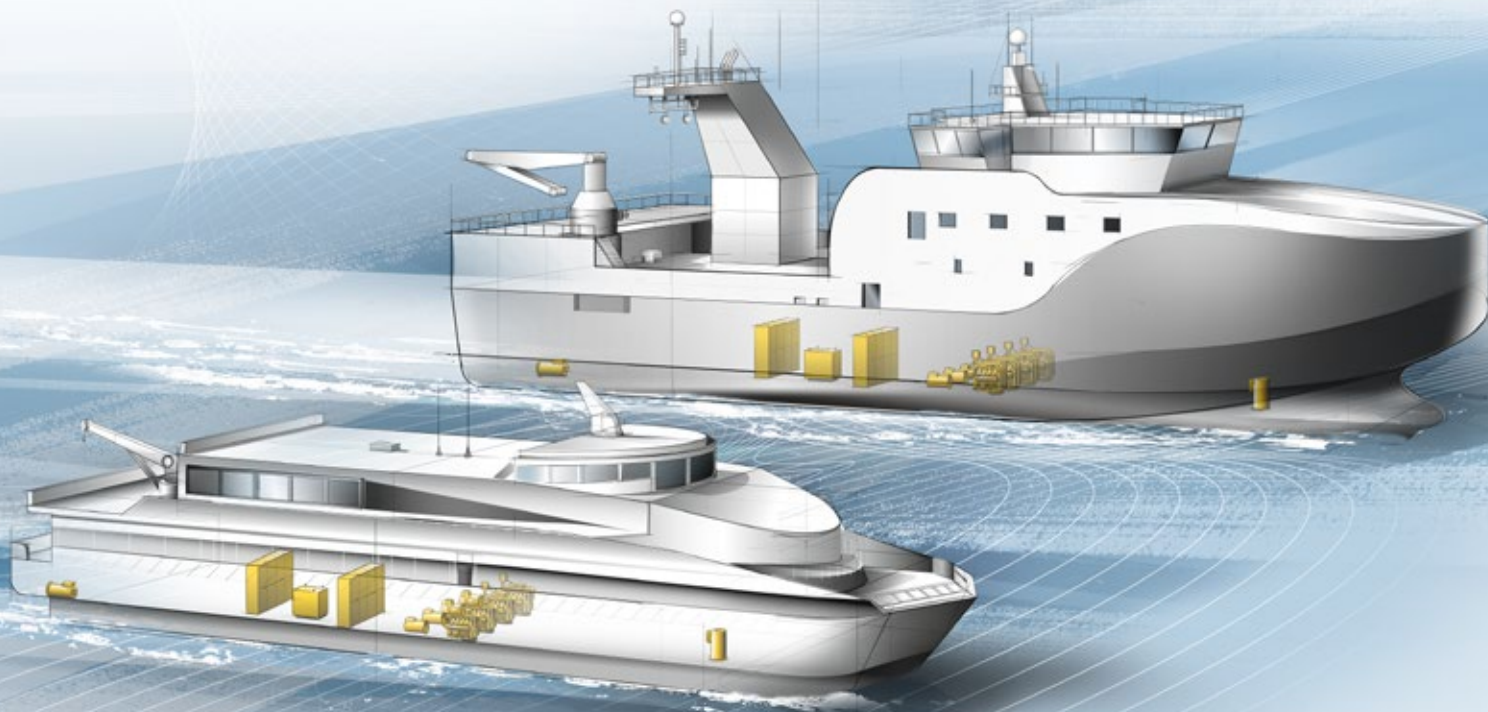


**LIEBHERR**

# Liduro Marine LCM300-Series

Liebherr's liquid-cooled Liduro Marine Frequency Converter System has been specially developed for reliable operation in harsh environmental conditions of a wide range of maritime applications. It thus fulfills a maximum of requirements and

benefits. The high flexibility with regard to power electronic modules and their additional components makes the system extremely versatile. The heart of the new system are the high-power modules of the LCU300 series.



# Maximum safety and quality

## Efficiency and lifetime

The Liebherr-frequency converter systems are designed with optimized components and high protection level, to achieve maximum efficiency and longevity. To fulfill these requirements, the Liebherr-frequency converters are equipped with a new innovative cooling system to keep the temperatures of all components low. This improves the lifetime of all components and their availability. The system losses are transferred directly to the cooling system and no heat is contributed to the installation room.

The completely enclosed frequency converter cabinets are protected against dust and moisture and thus maintenance effort is reduced to a minimum.

## Safety and quality

The intelligent control system supervises all internal and external processes with high precision and reacts to unexpected failures in few milliseconds. Possible failures are quickly detected and the source of the failure will be isolated. The fast disconnection of the failure source will reduce collateral damages. The new developed Liduro Fast Protection system is part of the protection system. The Liduro Fast Protection System allows additional redundancy after detection and disconnection of the defective component.

All components are running through an intensive test procedure to achieve highest quality and reliable functions of all components combined with maximum availability.

### Highly efficient

The liquid cooling system is a specially developed system to achieve maximum lifetime in smallest installation room.



### Intelligent control

The custom developed control system enables fast, precise control processes and reliable protective functions.



### High durability

All system components undergo extensive testing and quality tests.



# LCM300 Marine - The innovative drive solution

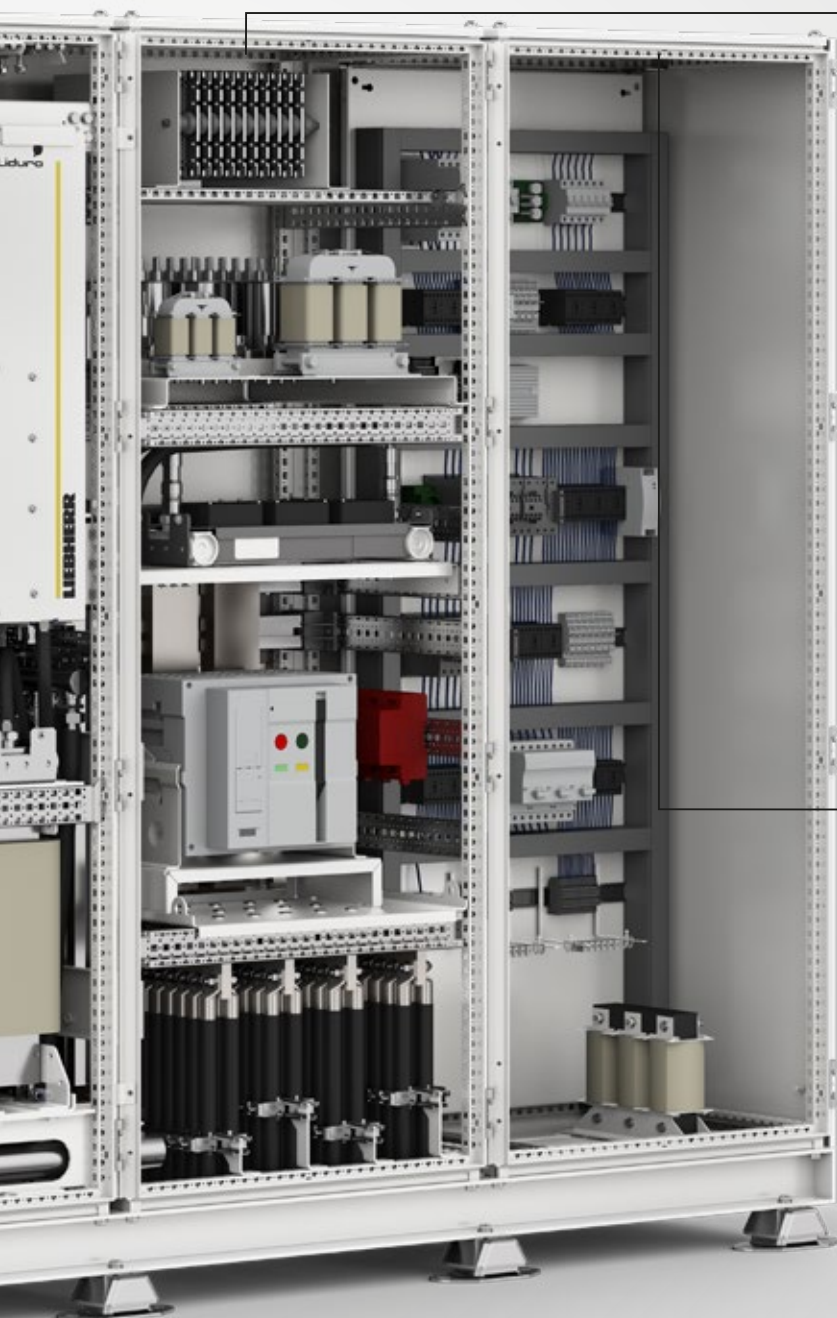
## Converter Unit

- Power electronic modules
- Control module
- Air / water heat exchanger
- dU/dt filter
- Cable connection terminal

## Active Rectifier Unit

- Power electronic modules
- Control module
- Air / water heat exchanger
- Line filter choke





### **Power Supply Infeed Unit**

- Cable connection terminal
- Main circuit breakers
- Mains filter unit
- Optional braking resistor

### **Control**

- Auxiliary power supply
- Communication
- Optional control units

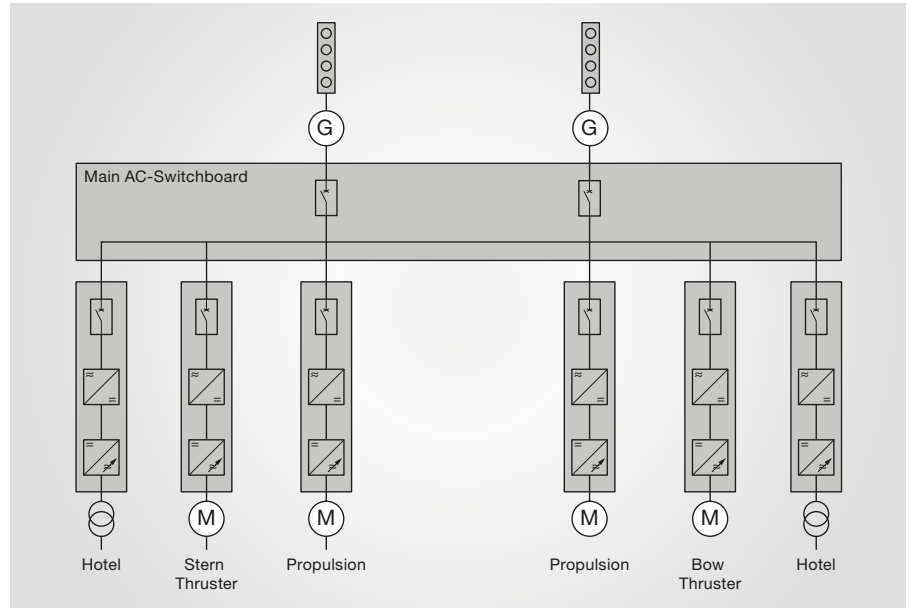
# The flexible system solution

Thanks to the flexible platform architecture of the Liduro Frequency Converter System, customer-specific solutions are easily implemented. Depending on requirements, different

solutions are possible with regard to system topology and system architecture. Among other things, partially redundant drive concepts can be implemented.

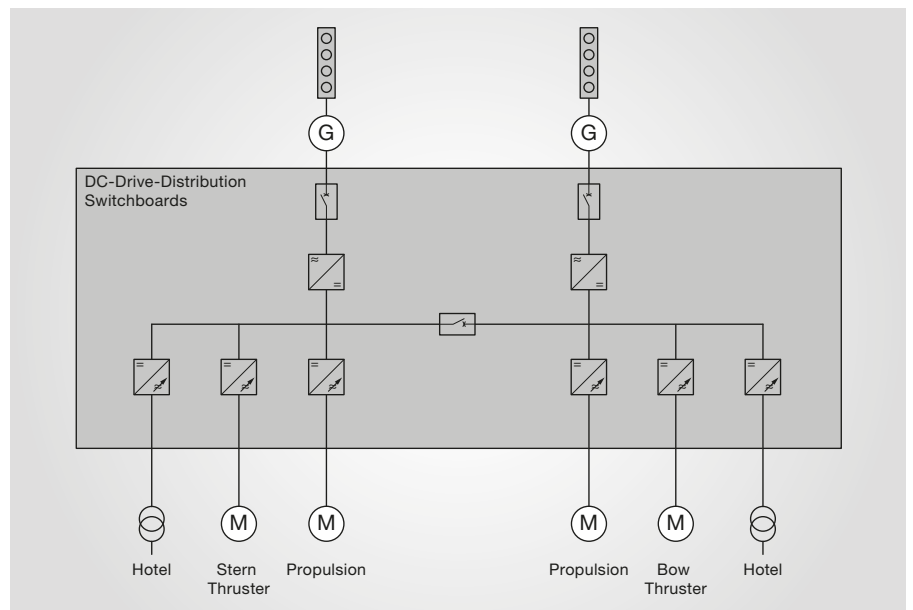
## AC-System

Independent frequency converter units are connected via the 690V main distribution net.



## DC-System

The individual drive units are connected to each other via a common DC bus.



## Liduro LCM300 – cabinet system 690V

The Liduro LCM300 cabinet systems consist of 3 basic units: Control, power supply infeed unit, converter unit. The power level can be individually configured with LCU300 power electronic modules and the associated system components.

### LCM300-0110-06 to LCM300-0800-06



|                                 |                              |
|---------------------------------|------------------------------|
| <b>Power range</b>              | 110 kW ... 800 kW            |
| <b>Nominal output current</b>   | 114 A - 840 A                |
| <b>Power electronic modules</b> | LCU300 – Type NG1            |
| <b>Configuration</b>            | AC / AC                      |
| <b>Dimension (W x H x D)</b>    | 2.400 mm x 2.000 mm x 600 mm |
| <b>Weight</b>                   | 1.500 kg                     |

### LCM300-0900-06 to LCM300-2000-06



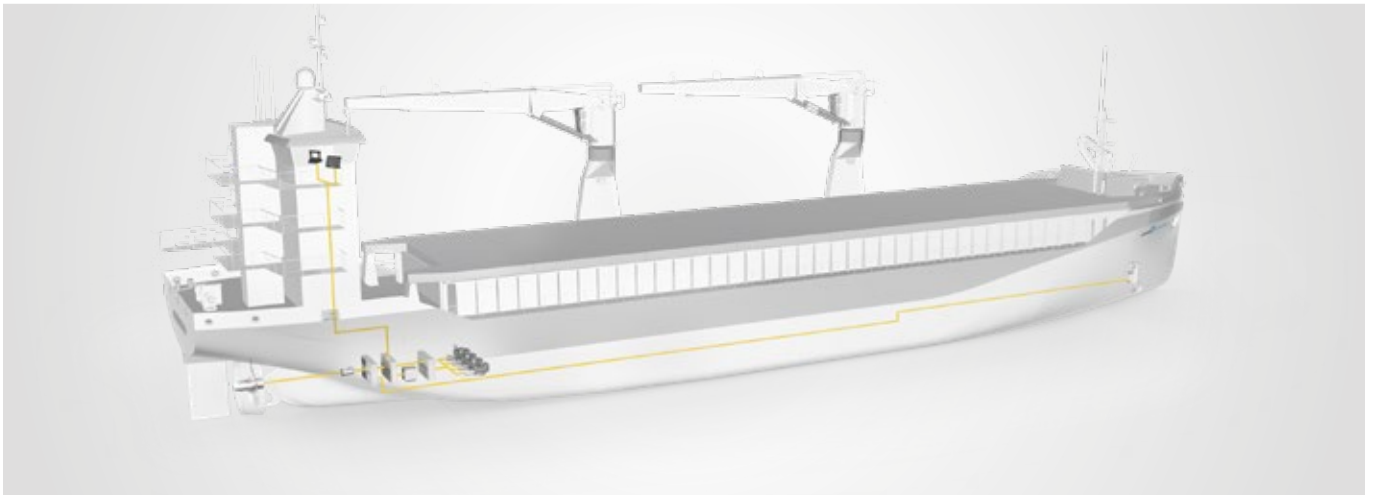
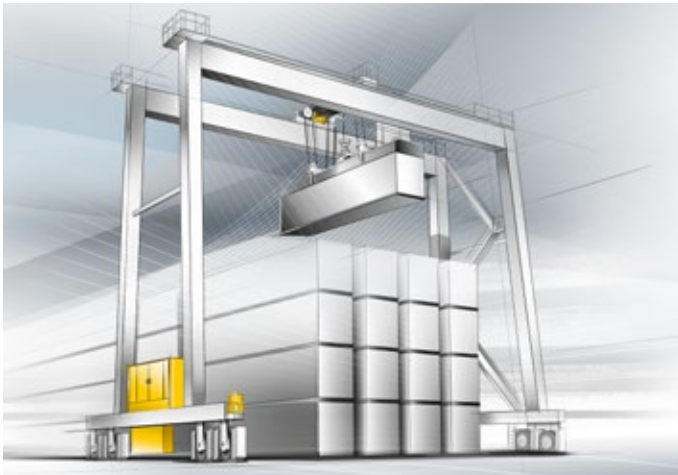
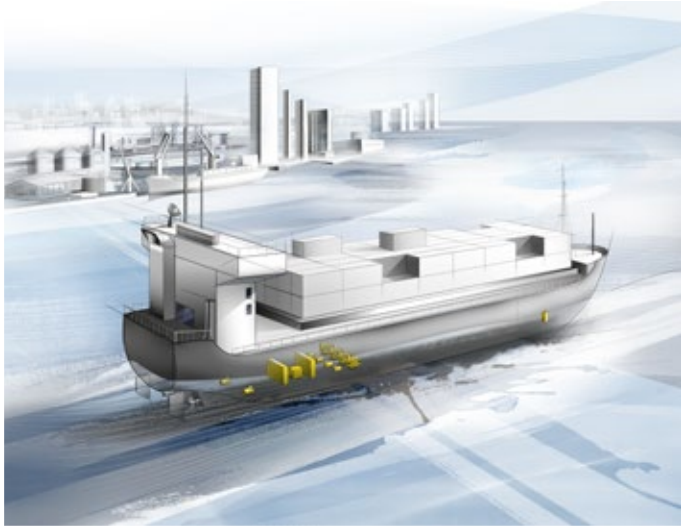
|                                 |                              |
|---------------------------------|------------------------------|
| <b>Power range</b>              | 900 kW ... 2.000 kW          |
| <b>Nominal output current</b>   | 933 A - 2.160 A              |
| <b>Power electronic modules</b> | LCU300 – Type NG2            |
| <b>Configuration</b>            | AC / AC                      |
| <b>Dimension (W x H x D)</b>    | 2.400 mm x 2.000 mm x 600 mm |
| <b>Weight</b>                   | 2.250 kg                     |

### LCM300-1800-06 to LCM300-4000-06



|                                 |                              |
|---------------------------------|------------------------------|
| <b>Power range</b>              | 1.800 kW ... 4.000 kW        |
| <b>Nominal output current</b>   | 1.866 A - 4.000 A            |
| <b>Power electronic modules</b> | LCU300 – Type NG2            |
| <b>Configuration</b>            | AC / AC                      |
| <b>Dimension (W x H x D)</b>    | 3.200 mm x 2.000 mm x 600 mm |
| <b>Weight</b>                   | 3.500 kg                     |

## The versatile industry solution





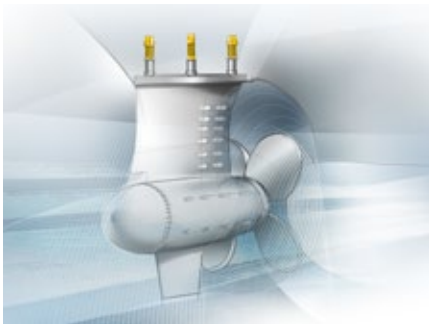
In the marine industry, electrification is an essential part in reducing energy consumption. Lower operating costs and significantly reduced emissions are the demands on manufacturers and operators for low-emission and more efficient drive systems. The advantages and savings of an electric drive system is crucial in partial load operation and can be achieved by improved efficiency compared to a conventional system. With the Electrical operation for main propulsion and thruster drives, the manoeuvrability is additionally increased, especially when mooring and setting down in the harbour area. The electric drive system can be adjustably operated and with variable speeds.

The use of an electric propulsion system on ships also offers the possibility to use several smaller generator sets instead of few large generators. Depending on the actual energy requirement, these can be switched on or off individually. In addition to the savings from improved efficiency when operating at a better operating point, noise emissions are also reduced.

## Applications

Due to the modular design, the cabinet systems can be easily adapted to the individual requirements of the respective application.

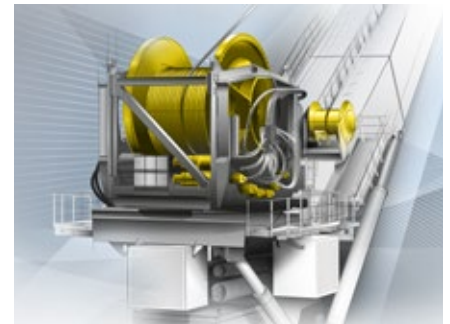
They are suitable for the use of main drives and thrusters on ships, as well as for winches and drives in maritime cranes.



Main propulsion



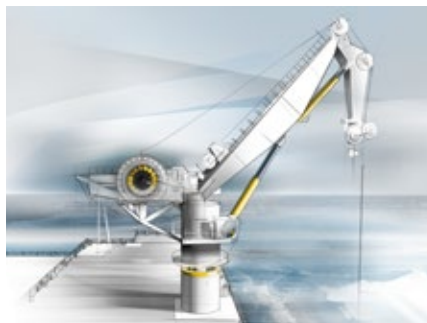
Thrusters



Winches



Pumps



Cranes

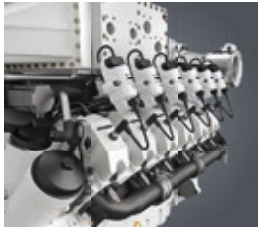


Jack-Ups



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# Liebherr Components



Gas engines



Diesel engines



Fuel injection systems



Axial piston hydraulics



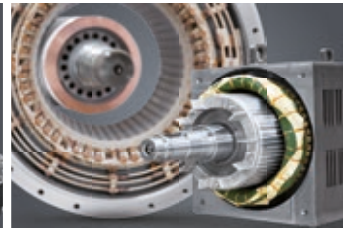
Hydraulic cylinders



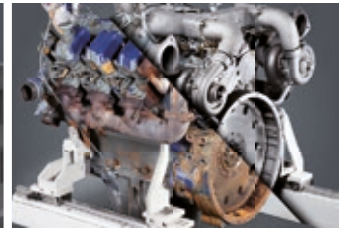
Slewing bearings



Gearboxes and winches



Electric machines



Remanufacturing



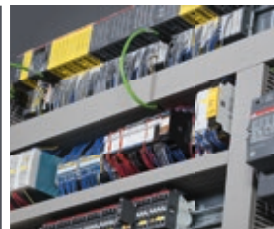
Human-machine interfaces and gateways



Control electronics and sensor technology



Power electronics



Control cabinets



Software

From A to Z – the components division of the Liebherr Group offers a broad range of solutions in the area of mechanical, hydraulic, electric and electronic drive system and control technology. The efficient components and systems are produced at a total of ten production sites around the world to the highest standards of quality. Central contact persons for all product lines are available to our customers at Liebherr-

Components AG and the regional sales and distribution branches.

Liebherr is your partner for joint success: from the product idea to development, manufacture and commissioning right through to customer service solutions like remanufacturing.

[components.liebherr.com](http://components.liebherr.com)