



**VACON AC DRIVES  
SAVE FUEL AT SEA**

**vacon**  
DRIVEN BY DRIVES

## VACON AC DRIVES SAVE FUEL AT SEA

In the highly competitive marine sector, increased demand for efficiency is the main reason for using AC drives in fan, winch, propeller, and various special applications. This is equally true of all vessel types, from large luxury liners and cargo ships to small workboats. Consequently, the annual growth in this market segment ranges between 20 and 30%.

### Demanding environments

The reliability of onboard equipment is a crucial factor at sea where vibration, humidity, and salt can be harmful for both mechanical and electronic components. Sudden breakdowns lead to costly downtime and expensive service operations and are also a safety risk. To ensure trouble-free operation, special requirements are therefore placed on the choice of components and materials.

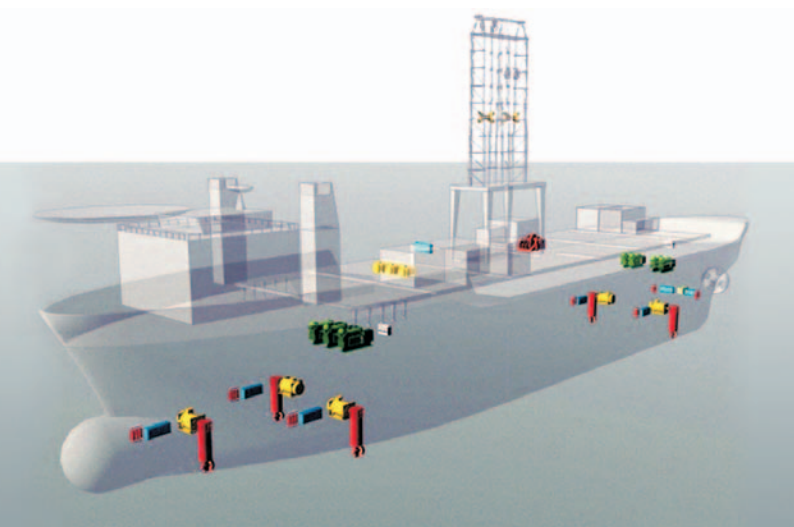
In spite of the strict standards, marine applications have not been an obstacle for Vacon. The load and vibration tolerances of Vacon AC drives are well within the required limits in marine applications. The fireproof halogen-free cabling used in all applications is also a major advantage. Today, the number of Vacon drives in marine operation exceeds 4000, about 2500 of which are in fan applications and about 1000 in winch applications. Other applications include cargo pumps, compressors, propulsion and its steering gears. The reference list includes some of the latest and most luxurious cruise liners where the number of units onboard a single vessel exceeds 250, and fast ferries, cable layers, offshore vessels and fishing boats, to mention only a few.

### A customer-friendly approach

By applying its accumulated expertise and field experience, Vacon, in close cooperation with global system integrators and OEMs, has further developed its marine drives concept to ensure easy planning and optimum technology for each installation. The approach includes a range of air and liquid cooled standard AC drives. All products meet the requirements of classification societies and can be delivered with a survey report.

The concept is to a great extent focused on the modular Vacon NX with separate power and control sections and easily customised software. The NX range provides options for both air and liquid based cooling. Although both solutions use the same control section, the liquid cooled NX has a specially designed power section where all components requiring cooling are mounted on aluminium cooling elements. This unique liquid-cooling of power components allows space savings of up to 70% compared with conventional air cooled drives, making it an ideal choice for marine and other applications where the space is at a premium. The plug-and-play modules also allow easy maintenance and simplified logistics.

Vacon drives are available from 0.25 kW up to 3 MW, rated at 400 to 500 V and 525 to 690 V.



### Why use speed control?

- energy savings up to 40%
- less electro-mechanical stress for electrical system
- process control according to demand
- flexibility in power generation and distribution
- flexibility in ship design, providing more freedom in layout

## CASE: DREDGER MELLINA



Many studies have been made for trailing suction hopper dredgers with electric propulsion and even for all electric ships. Until now these two seemed to be a world apart. The most common conclusion of all these studies was that electric propulsion is the best to have but not the easiest to buy.

### Energy savings up to 40%

Electrical system designer van der Leun, Sliedrecht in the Netherlands, has succeeded in designing an all-electric suction hopper dredger and still achieve overall cost reduction.

### Mellina

Type .....Hopper dredger  
Owner .....Krul  
System integrator .....van der Leun

### Vacon drives

- 2 x 1300 kW liquid cooled AC drives for main propulsion
- 1 x 350 kW for bow thruster drive
- 5 x 15-30 kW for trunion, intermediate, dredgehead and anchor winches
- 2 x 15 kW steering drives
- 2 x 22 kW for driving the rotating converters for auxiliary net
- 1 x 1.5 kW for the whistle

For example, diesel engines run the main dredge pump and additionally the main generator. The net frequency supplied to the AC drives is not constant. The result is a ship with a dredging-worthy electrical installation and a sustainable cost reduction. Operational costs can also be significantly lower with fuel reductions up to 40% in the dredging process.

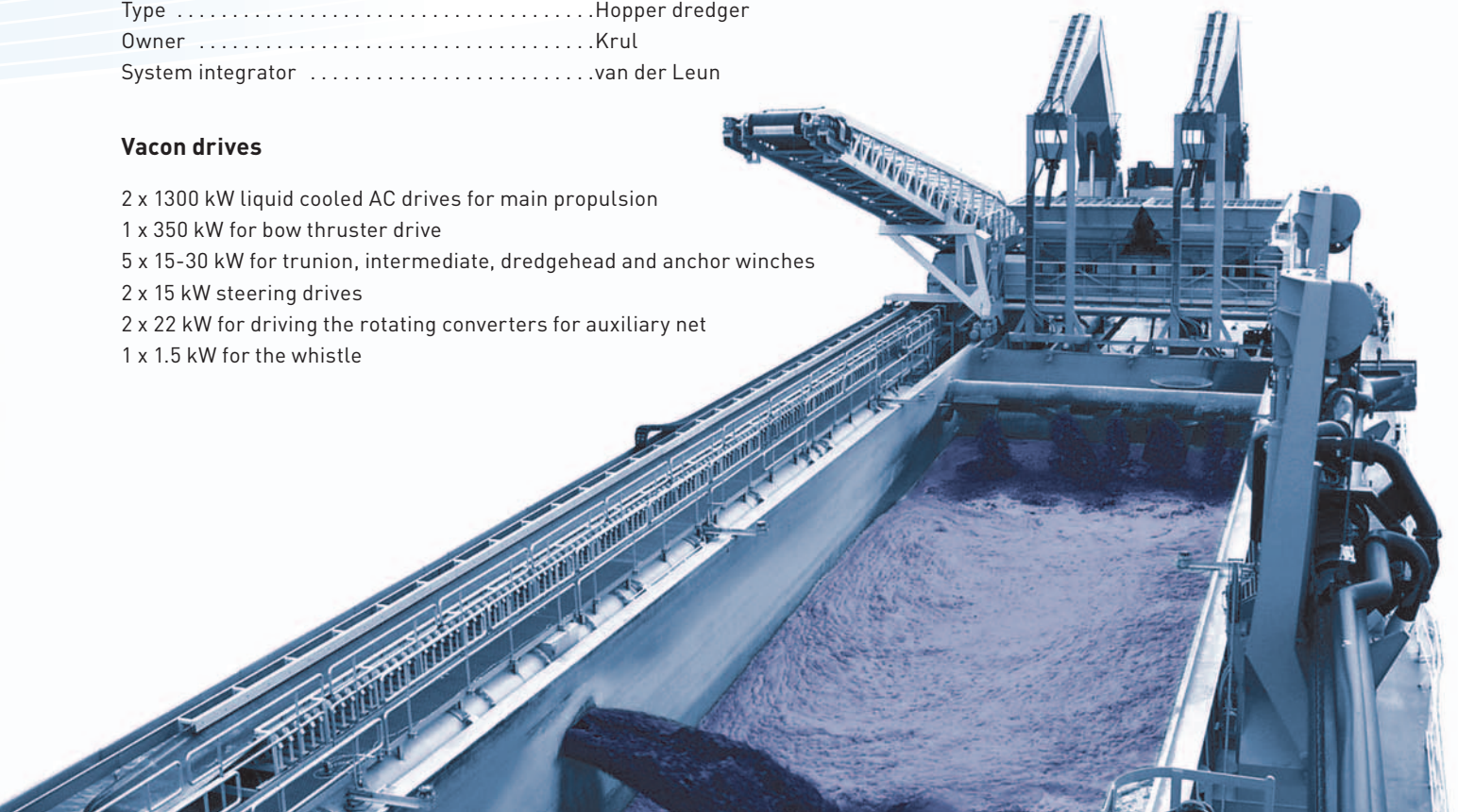
The energy savings are a result of hull shape, propulsion, optimised dredging process, a dedicated but simple power management and an optimised arrangement for her use.

Besides the electrical propulsion, Vacon AC drives in the dredger Mellina are used for:

- bow thrusters
- suction tube hoisting winch
- anchor winch
- steering
- rotating converters for separate auxiliary net

The total output of the Vacon drives is 3.3 MW.

Early consideration in the design stage of the vessel make the difference on the successful use of electric propulsion. In the future, ships with an electrical propulsion will undoubtedly occupy an increasingly important position.



**Semisubmersible Accommodation Support Unit**

Type ..... Accommodation platform  
 Owner ..... Keppel FELS  
 System integrator ..... Offshore & Marine AS

**Vacon drives**

4 x 2500 kW liquid cooled

**Rotterdam 58**

Type ..... Inland deepsuction dredger  
 Owner ..... Dekker  
 System integrator ..... Verhoef Elektrotechniek

**Vacon drives**

400 kW for submersible dredging pump  
 400 kW for booster pump / 2 x 132 kW for jetpumps  
 30 kW and 18.5 kW for suction tube hoisting winches  
 6 x 11 kW winches for manoeuvring

**Limitless**

Type ..... Luxury yacht  
 Owner ..... Private owner  
 System integrator ..... Imtech

**Vacon drives**

2 x 1800 kW liquid cooled drives for main propulsion

**Seili**

Type ..... Fairway maintenance and  
 ..... oil gathering vessel  
 Owner ..... Finstaship  
 System integrator ..... ASLE Metals Oy

**Vacon drives**

2 x 1100 kW for main propulsion  
 6 x 11 kW for steering gear

**Maersk Boulder**

Type ..... Supply vessel  
 Owner ..... A.P. Moeller / MAERSK  
 System integrator ..... Rolls Royce

**Vacon drives**

2 x 500 kW for auxiliary winches  
 IP54 stand alone drives

**Chemical tanker**

Type ..... Chemical tanker  
 Owner ..... F.T. Everard & Sons Ltd  
 Amount of similar vessels . . . 4  
 System integrator ..... Imtech

**Vacon drives**

2 x 900 kW liquid cooled frequency converter for main propulsion, 350 kW bow thruster drive  
 6 x 150 kW for cargo pumps  
 3 x 52 kW for slops / ballast pumps

**Cable laying vessel**

Type ..... Cable laying/repair vessel  
 Owner ..... Dockwise B.V (2 vessels)  
 ..... TyCom Ltd (6 vessels)  
 System integrator ..... Odim

**Vacon drives**

Fibre optic cable laying and repair system  
 80 low harmonic regenerative drives per vessel  
 11 kW ... 250 kW CXi drives in Main Cable Engines:  
 Linear Cable Engine, capstan

**Navigator of the Seas**

Type ..... Cruiser  
 Owner ..... Royal Caribbean Cruise Line  
 System integrator ..... Kværner Masa Yards

**Vacon drives**

250 drives for air conditioning  
 18 drives for winches  
 7 drives for machine room pumps  
 4 drives for swimming pool pumps

**Fjordveien**

Type ..... Ferry  
 Owner ..... Stavangerske AS  
 System integrator ..... Offshore & Marine AS

**Vacon drives**

4 x 15 kW steering drives  
 2 x 1500 kW main propulsion drives Stadt-Vacon

Vacon Partner

**Vacon Plc**

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