



## MAGNETIC ENCODERS FOR LARGE SHAFTS MEET THE FORCES OF THE SEA

Indar, with its headquarters in Beasain, in the Basque province of northern Spain, is part of the Ingeteam Group. The company ranks among the absolute world leaders for design and manufacture of rotary electrical machinery. Indar produces generators for the wind industry, as well as hydro generators, and motors, for marine industry.

### The application – quiet perfection in marine propulsion

Indar recently celebrated its 75th anniversary. The company has gained prestige in the shipping industry over the years, for the reliability of its machines, which are exposed to the most adverse operating conditions. Their motors are highly reliable, easy to maintain, and energy-efficient with extremely precise speed regulation. Therefore, all components are required to handle heavy

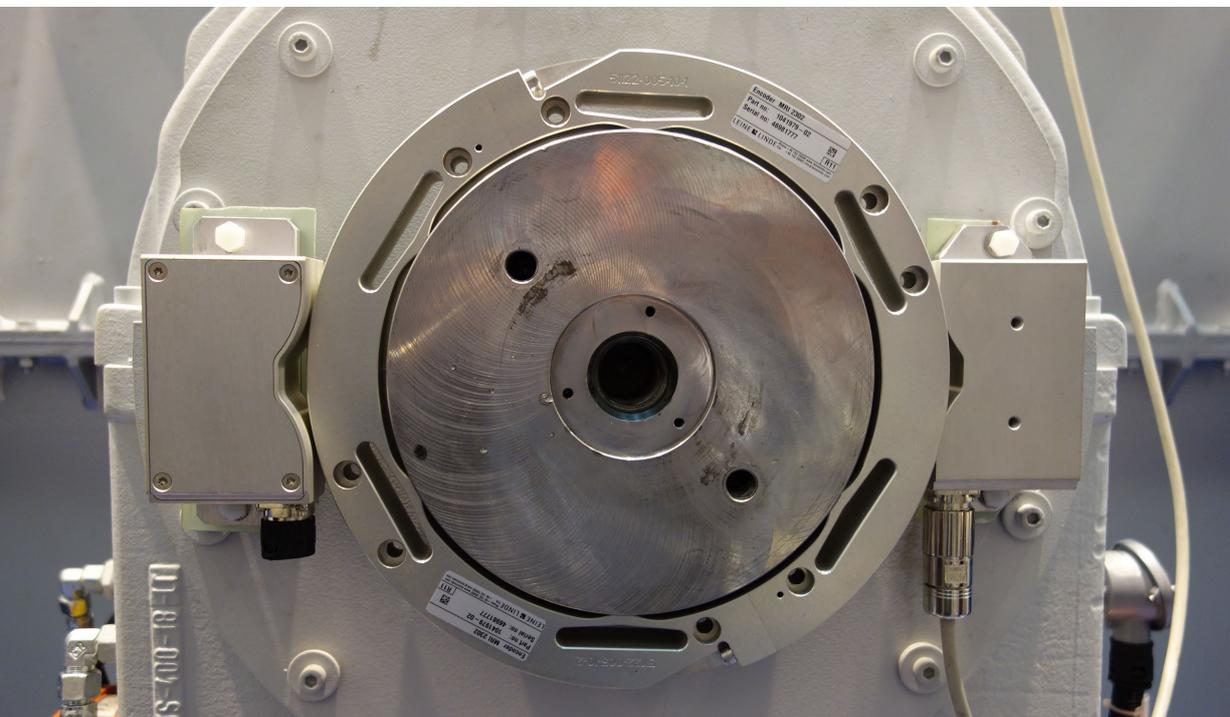
loads with the greatest possible precision. Leine & Linde encoders are used in many of Indar's applications. The focus of this case is a pioneering project with motors built for low frequency technology.

### The solution

In marine applications below deck, space is at a premium. If motor and control system design can be simplified, this will be of great advantage. But most important is that accurate feedback will be delivered without breaks or momentary lapses.

*“Leine & Linde tailored the  
solution to our needs.”*

Rocío Ortiz, Indar



*The bearingless encoder is installed directly on a motor shaft with large dimensions.*

The bearingless, magnetic 2000 series encoder from Leine & Linde has got the shape of a ring, and can be installed directly on a motor shaft with large dimensions, connected to the propeller. Rotation feedback is picked up by two permanently mounted scanning heads. This solution fulfils the special mechanical conditions that occur at sea, where temporary axial displacement of the shaft is inevitable, especially during the motor's start phase. The propulsion system is burdened by the forces of the sea, which create different loads depending on currents, direction and resistance. This encoder solutions is the only one on the market permitting axial displacement of plus-/minus 4 millimetres.

### Cooperation during the process

"The level of Leine & Linde's contribution with technical and design expertise has been decisive in our collaboration", says Rocío Ortiz, head of Control & Instrumentation at Indar Motors.

This application requires a redundant signal, and with the double scanning heads, this system provides the constant rotation feedback that is needed, with a simple and space-saving design. Even though the ring dimensions are large, the encoder is easy to mount, because it can be divided into segments.

### About the project

"I was happy to hear from Indar that their choice of supplier was easy to make", says Francesc Comas, Leine & Linde's country manager for Spain and Portugal. "They said that they were aware of the quality of our services, due to our 862 and 865 encoders being standard parts in their products. They also had praise for our sales and service organisation, and in return I'd like them to know that we work with pleasure to do our part of the job in Indar's world-leading applications."

### Some decisive factors for Magnetic 2000 series

- Reliable feedback
- Space-saving, to be mounted directly at the motor/propeller shaft
- Magnetic scanning handles axial displacement
- Double scanning heads provide redundant signal