

Azipod® Propulsion

Azimuthing Electric Propulsion Drive

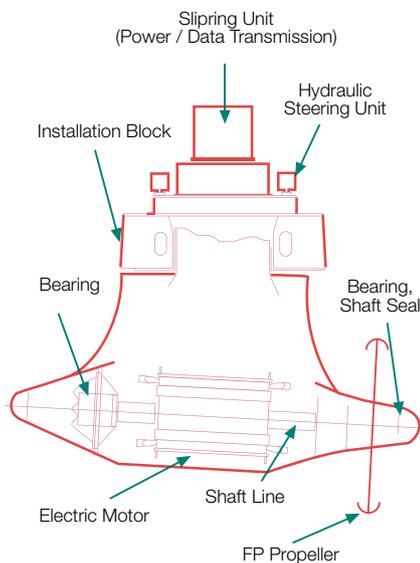


The World's First Azimuthing Electric Propulsion Drive

Azipod® is a registered trademark of ABB.

Azipod is a podded propulsion system, azimuthing through 360°. It incorporates an electric single- or doublewound AC motor mounted directly on the extremely short propeller shaft. The motor drives a fixed-pitch propeller.

The electric motor is controlled by a frequency converter, which produces full nominal torque, available in either direction over the entire speed range. The propeller rpm can be freely optimised according to the varying hydrodynamics of each project.



Design

Design of the Azipod propulsion system is based on simplicity, reliability, experience and dedication. The unit itself is very uncomplicated, as all components are standard and have earlier been used in different types of applications.

However, designing this kind of equipment is not just a case of assembling the components to form a podded propulsion unit; the dimensioning of the unit and the components inside require experience and know-how. The system engineering consists of hydrodynamics, electrical engineering, electronics, mechanics and naval architecture, just to mention a few. The Azipod propulsion system consists not only of the Azipod unit itself, but also frequency converters, transformers, switchboards, generators, automation, controls etc. The system engineering used to reach the best possible overall efficiency, functionality and reliability is just the first step.



A 1620 kW Azipod unit displayed at SMM98 in Hamburg.

What We Offer for our Customers?

We want to help the customer

- *to find the optimum ship solution by providing expertise*
- *advice in hydrodynamics*
- *general arrangements*
- *system solutions and, of course*
- *electrical engineering.*

The Azipod® Applications

Successful and Reliable Experience

The first podded propulsion, Azipod®, installation was made in 1990 after several years of engineering and R&D. The Azipod propulsion is the first electric podded propulsion system. In June 2000 the milestone of 183 000 cumulative operating hours was passed, and the number is increasing rapidly.

The FrontRunner in Research and Development

Since the idea of the Azipod system first emerged in the mid-1980's we have placed heavy emphasis on R&D. For over a decade we have worked closely together with the leading model test facilities in doing research and developing solutions. It has been our philosophy to avoid using our customers as test sites for our technology. We have always made a distinction between prototypes and commercial technology. In the end, this benefits the customer, as the technology we deliver has always been carefully evaluated before it is commercialised.



Cruise vessel *M/S Europa*



Shuttle tanker *M/T Uikku*

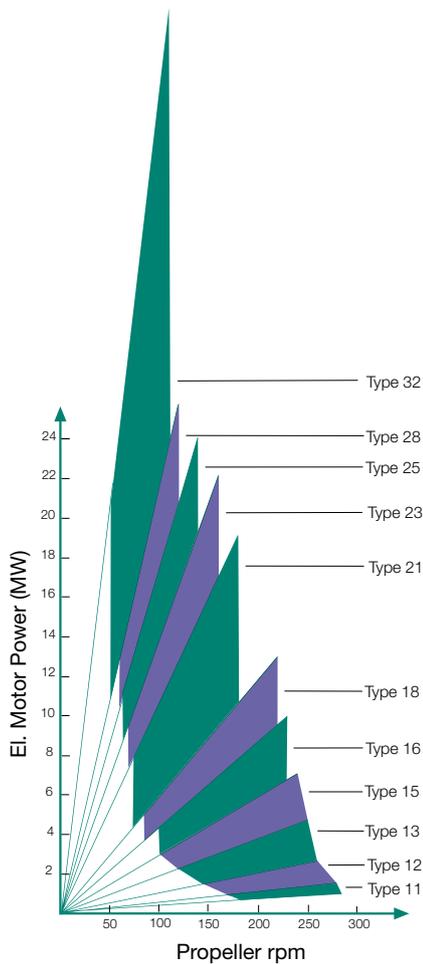


Icebreaker *MSV Botnica*



Supply vessel *M/S Arcticaborg*

The Azipod® Products



The Azipod® Propulsion

The hydrodynamics of the ship are firmly connected with the propulsion parameters. Therefore, the propulsion power, propeller diameter and rpm need to be optimised on a case-by-case basis. Furthermore, the selected propulsion power and rpm affect the dimensioning of the power plant, which means that the propulsion of the ship needs to be viewed as an integrated system, starting from the propeller and ending at the generators.

The Azipod power range starts at around 5 MW and reaches power levels of approximately 30 MW, depending on the selected rpm. Higher power levels are also available, but these need to be evaluated separately.



Radiance of the Seas, 2 x 19,5 MW Azipod® propulsion



Botnica, 2 x 5 MW Azipod® propulsion

The Compact Azipod® Propulsion

The new Compact Azipod propulsion system for a power range from 400 kW up to 5 MW is designed to meet the constantly growing demand for enhanced manoeuvrability and operation economy also for smaller vessels. The latest marine propulsion technology combined with standardized designs makes the new Compact Azipod series attractive for a wide range of merchant and offshore vessels.

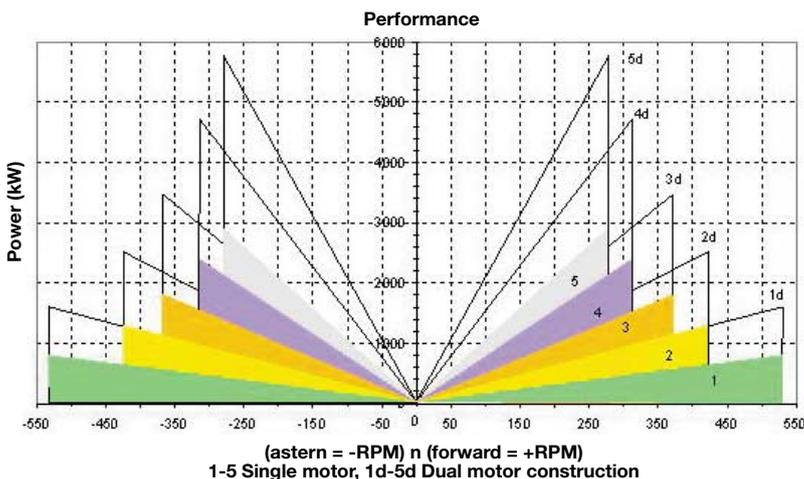
The electric motor is controlled by new water cooled ACS 600 Marine Drive, which produces full nominal torque, available in either direction over the entire speed range.



The CRP Azipod® Propulsion Concept

In the CRP Azipod propulsion concept a steerable Azipod unit is mounted immediately behind the shaft-driven propeller. Located on the same axis, but without any physical connection, the pod pulling propeller will contra-rotate in relation to the shaft-driven main propeller.

CRP Azipod propulsion's high total propulsion efficiency makes the initial cost of the system attractive, and keeps operating costs much lower than with a conventional propulsion system. The concept is seen to have a great potential e.g. for

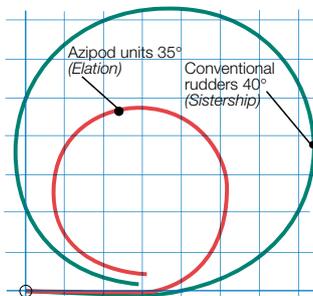


- Container vessels
- Car carriers
- RoRo/RoPax vessels
- Reefer vessels
- Shuttle tankers
- Chemical Tankers
- Product Tankers
- LNG/LPG carriers

Benefits

- Easy to handle
- Low noise
- Low vibration
- Higher redundancy
- Fuel efficiency
- Lower emissions
- Excellent harbour manoeuvring
- Passenger comfort

Turning circle test at full speed



Full scale comparison of turning circles *M/S Elation* and *Paradise* with conventional shaftlines and rudders.



25 knots ahead



Customer Comments:

“I strongly believe in affirming the technical superiority and reliability of the Azipod Propulsion System.”

Giorgio Pagano
Master De/Az *Paradise*

Patents

17 knots astern

5 knots sideways



ABB has been the frontrunner in many aspects of electric propulsion including power plant and podded propulsion. For example, Azipod® has become a well-known trademark in propulsion systems throughout the shipbuilding industry, giving our product a clear identity of its own.

Intellectual property rights have been an issue for Azipod propulsion since the very beginning of the development process in the 1980s. ABB has a number of patents granted and patents pending for several technical solutions and innovations in connection with Azipod propulsion.

Patent references

- FI76977 (basic mounting principle of the Azipod unit)
- US5,923,113 (slipring unit design)
- US5,403,216
- EP590,867

"I would be very surprised if future iceworthy vessels built in Finland were fitted with any propulsion system other than the ABB Azipod."

Atso Uusiaho
Master MSV Botnica

"Azipods have extremely good fuel efficiency. The saving is around 10-15 per cent compared with conventional propellers."

Harri Kulovaara
Senior Vice President of
Royal Caribbean International

"She is vibration-free and easy to handle, even in poor weather and difficult passages."

Captain Uwe Beck
MS Europa



ABB Oy

Marine and Turbocharging
Strömbergintie 1 P.O. Box 185
00381 Helsinki, Finland
Tel. +358 (0) 10 2211
Fax +358 (0) 10 222 2350
www.abb.com/marine