In SINAVY[CIS] Permasyn propulsion motors for submarines, excitation is achieved with the help of permanent magnets. These ground-breaking systems are smaller and lighter than conventional propulsion solutions, but achieve a significantly higher level of efficiency at very low signatures.

SINAVY[CIS] Permasyn – reliable, small and difficult to trace

An especially high degree of reliability and availability is demanded from submarine motors and they must have low signatures to make them hard to trace. Additionally, the more efficient the propulsion system, the longer the submarine can remain submerged.

Low heat emission, economy of space and good accessibility to the components for maintenance purposes are criteria that additionally play a particularly important role in submarine design.

SINAVY[CIS] Permasyn – our solution in detail

With SINAVY[CIS] Permasyn, a part of the propulsion system is already integrated. Changing propulsion speed ranges are no longer necessary – rpm regulation is achieved via integrated power electronics without torque-free shift intervals, switching noise or high current peaks.

Compared to conventional propulsion system solutions, SINAVY[CIS] Permasyn can generate higher torque at low rpm's. As such, it is possible to utilize larger propellers with a higher degree of efficiency.

Five good reasons for SINAVY[CIS] Permasyn

- Highly efficient, light weight and compact design
- High degree of availability through redundant design
- Low structure- and air-borne noise levels
- Continuous rpm adjustability throughout the entire operating range
- Elimination of torque-free speed range switching and consequently no high current peaks or switching noises

SINAVY[CIS] Permasyn

More compact and efficient: future-oriented propulsion motors for the new generation of submarines

Marine Solutions

SIEMENS

SINAVY[CIS] Permasyn – our solution in detail

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Fewer losses, space-saving design

Given that SINAVY[CIS] Permasyn propulsion motors utilize permanent magnets, no electrical exciter power is needed. The poles and coils are also designed and constructed for low power loss. The optimization of current curve shape and pulse frequency, as well as changing the number of phases depending on the speed, further reduce power loss and noise.

SINAVY[CIS] – Completely Integrated Solutions for the Navy

As a comprehensive specific solution for naval vessels, our SINAVY[CIS] product family integrates all the products and services you need for sustained maximization of your ship's performance.

For each particular task, a solution has been defined that

- **horizontally** improves all of your ship's operations
- **vertically** integrates the ship's information and security management end-to-end, helping to make better-founded decisions
- and, at the same time, is designed for optimum vessel-specific maintenance and comes with assured further development **over the whole life cycle.**

Due to this unique combination of horizontal, vertical and life cycle dimensions, our solutions all carry the genes of an exhaustive and sustained plant productivity in their very core.

For More Efficiency. More Performance. More Power. Completely Integrated Solutions from Siemens.

With its short, compact design, SINAVY[CIS] Permasyn is perfectly suited to fit the tight space constraints on board submarines. This is achieved through the integration of IGBT converters, which also markedly reduce expenditures for EMC filtering as compared to conventional systems with fragmented designs.

Signatures/active noise compensation

From the very beginning, efforts were directed at achieving the lowest noise levels possible in designing SINAVY[CIS] Permasyn. The "active noise compensation" is capable of reducing low-frequency noise.

Not only is the propulsion motor smaller and lighter than comparable systems, it also helps significantly reduce traceability, with very low signatures for noise, electrical-and magnetic fields and heat emission.

Siemens has already outfitted some 150 submarines with propulsion systems, including over 130 SINAVY[CIS] DC PROP systems.

The first SINAVY[CIS] Permasyn passed its initiation with flying colors aboard the submarine U 212A of the German Navy in early 2004 – at present, orders for Permasyn propulsion motors are commissioned for 25 submarines (Germany, Italy, Korea, Greece).

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