

RENK

SHIPPING INDUSTRY SOLUTIONS

Marine propulsion
systems.
Driving forces for
leading fleets.

Navy, governmental and research vessels

At home across all oceans.



UNLEASH THE POWER OF 70 YEARS OF EXPERIENCE.

RENK demonstrates unique competence when it comes to mastering extreme forces across the world's oceans. Just as we have for over 70 years. Whether single- or multiple-engine naval gear units, hybrid or electric transmissions, or system solutions – our innovative marine propulsion systems set standards wherever extreme forces have to be controlled and maximum power needs to be managed with absolute precision, while meeting demanding requirements for operational flexibility and signature.

/ Outstanding performance

Engineered for outstanding results in all applications

/ Excel with precision

Uncompromising quality down to the smallest detail

/ Trust in reliability

Safety and workmanship for your mission-critical needs



Glossary:

RENK PSI	RENK Propulsion System Integration
RVM Advanced	RENK Vibration Monitoring Advanced
RENK ILS	RENK Integrated Logistics Support
RENK AED	RENK Advanced Electric Drive
ASW	Anti-Submarine Warfare
PTI/PTO	Power Take In/Power Take Off
CODAD	COmbined Diesel And Diesel
CODAG	COmbined Diesel And Gas
CODOG	COmbined Diesel Or Gas
COGAG	COmbined Gas And Gas
COGOG	COmbined Gas Or Gas
CODELAD	COmbined Diesel-Electric And Diesel
CODELOD	COmbined Diesel-Electric Or Diesel
CODAG-CC	COmbined Diesel And Gas-Cross-Connect
CODELAG-CC	COmbined Diesel-Electric And Gas-Cross-Connect
CODAD-E	COmbined Diesel And Diesel with PTI/PTO

You set the mission. RENK delivers the tailor-made solution to accomplish it.

Innovating for efficient
power transmission
– matching your needs.

The RENK portfolio ranges from single-engine marine gearboxes to highly complex gear systems.

Our tailor-made propulsion solutions are available for any type of ship – including, corvettes and frigates, supply and fleet support ships, aircraft carriers and landing ships. RENK offers propulsion solutions and electric drive modules for special-purpose and research vessels with very low-noise.

Naval and research vessels are among the most complex ships on the high seas and have to meet particularly high requirements in many respects. From low-noise excitation to extraordinary shock requirements, high-speed capability and low lifecycle costs, extremely varied specifications have to be fulfilled depending on the application area – while continually living up to the requirements for ultimate reliability, economic efficiency and safety.

RENK marine propulsion technology has been meeting these requirements in many naval programs with absolute precision down to the smallest detail. By transferring technologies across industries, we are able to offer our customers best in class solutions for marine applications – from the first feasibility study and concept phase of the propulsion system through the particular design of the power transmission trains to the detailed definition of drive-mode conditions and control principles of the propulsion system.

Whether for an auxiliary, amphibious, special purpose or combat ship, authority vessel, coast guard vessel, frigate, patrol boat or carrier ship – RENK offers state-of-the-art propulsion and control systems that are tailored to the respective requirements of the ship and that always impress thanks to their functionality, precision and reliability. Thus, RENK high-performance gear systems are the core components of many propulsion trains worldwide.

We plan, develop and implement the complete propulsion system for our customers with perfectly matched components and integrate it into the ship in an optimal way. This approach lets us support our customers and their shipbuilding engineers at a very early stage when they work to select the right propulsion system – and then implement it perfectly together with them.

/ #1 in innovation

For your decisive
technological advantage

/ Robust technology

For the most extreme
marine requirements

/ Proven in more than 40 Navies

Trusted by most
blue water navies



Holland-Class

The RENK CODELOD gear systems provides efficient and flexible hybrid propulsion to the Offshore Patrol Vessels (OPV) of the Royal Netherlands Navy.



Tide-Class

The British Royal Fleet Auxiliary replenishment ships carry fuel, food, fresh water, ammunition and other supplies to Royal Navy vessels around the world. The vessels are equipped with CODELOD systems, providing Power-Take-Off (PTO) capability underway and in harbor.

Bhumibol

Adulyadej-Class Frigate

The CODAG-CC propulsion system of the frigates in the Royal Thai Navy is equipped with the RVM Advanced.



Australian Antarctic supply research vessel (ASRV)

A CODELAD propulsion system with ultra-quiet RENK AED efficiently propels this research vessel.



Iver Huitfeldt-Class Frigate

A powerful combination of two diesel engines per shaft (CODAD) in the Royal Danish Navy frigates. A proven propulsion taken as a parent design for the Type 31 frigates of the Royal British Navy as well.





Bergamini-Class Frigate

Fremm Frigates of the Italian Navy are equipped with a CODELAG propulsion system, where a gas turbine and two electric engines are driving the two propeller shafts. RENK and Fincantieri teamed up to manufacture the gear units.



Incheon-Class Frigate

Future Frigate eXperimental (FFX-1) Frigate with traditional CODOG-arrangement on board, combining a gas turbine and a diesel engine on the two propeller shafts each.



Independence-Class

Littoral Combat Ship (LCS) of the US Navy with CODAG system consisting of four water-jet propulsion trains, two with gas turbines and two with diesel engines.

Unleash the thrust your mission requires with RENK propulsion systems.

Our products and services

RENK marine propulsion system – applications

More information starting on page 10

RENK hybrid propulsion p. 12

RENK combined mechanical propulsion p. 14

RENK silent propulsion p. 16

RENK standard mechanical propulsion p. 18

RENK system realization

More information starting on page 20

RENK PSI p. 22

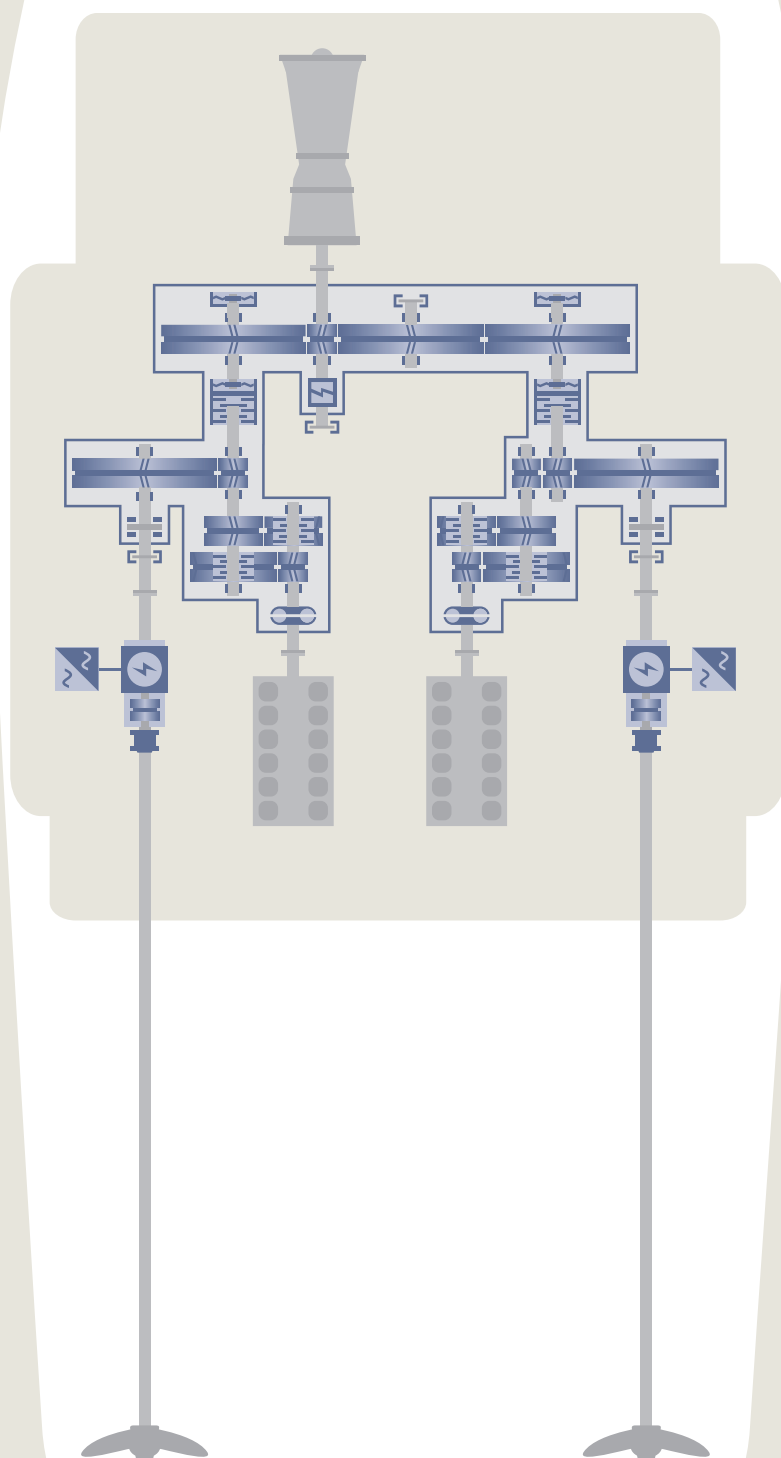
RENK manufacturing expertise for best results p. 24

RENK services

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RENK ILS p. 30



RENK services

- RENK condition monitoring system
- RENK training solutions
- RENK testing solutions

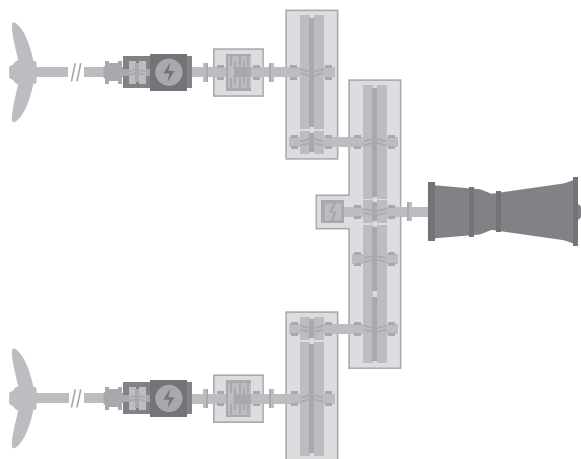
RENK technology

- RENK gear system
- RENK couplings
- RENK AED
- RENK bearings

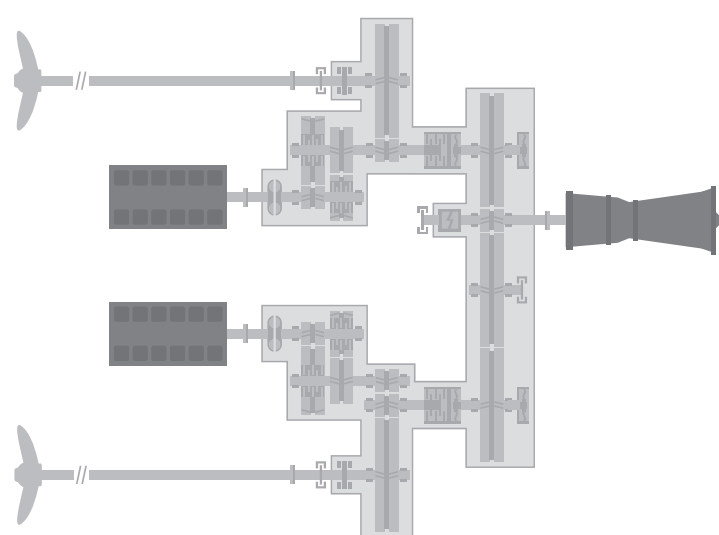
Your goals may vary.
Your solution is always RENK.



RENK hybrid propulsion solution

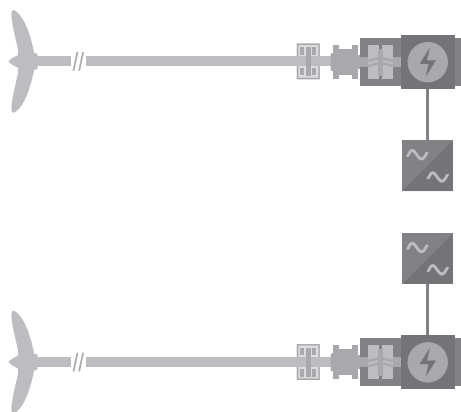


RENK combined mechanical propulsion solution

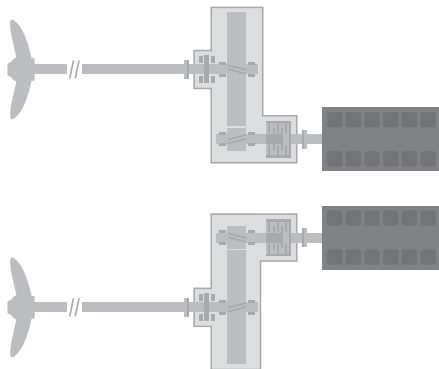




RENK silent propulsion solution



RENK standard mechanical propulsion solution



Why choose between flexibility and efficiency? RENK hybrid propulsion solutions deliver both.

Traveling all the world's oceans

Naval forces from all over the world rely on the innovative RENK hybrid propulsion systems.

- **Italian Navy**
CODELAG-CC system (FREMM)
CODELAG-CC-E system (PPA)
CODOG-E system (LHD)
- **German Navy**
CODELAG-CC system (Baden-Württemberg class/F125)
- **British Royal Fleet Auxiliary**
CODELOD system (Tide class)
- **Royal Netherlands Navy**
CODELAD system (Holland OPV)
- **Indonesian Navy**
CODELOD system (PKR frigate)
- **Australia**
CODELAD system (ASRV)
- **Korean Coast Guard**
CODAD-E system (KCG 3000 and KCG 5000)

All the advantages of electrical and mechanical propulsion systems in a single solution.

By offering tailor-made combinations of mechanical and electric drives, RENK opens up completely new possibilities for naval applications that enhance performance while simultaneously reducing costs.

As a pioneer in the field of hybrid propulsion systems for the naval sector, RENK supplies perfectly matched end-to-end solutions for a wide variety of applications. From supplementing combined mechanical propulsion systems with an electric motor to the sophisticated CODELAG/CODELOG variant – the perfectly matched combinations of mechanical and electric drives enable not only exceptionally quiet operation at lower speed ranges, yet also offer maximum power without compromise at high power density.

Flexible configuration for the perfect fit.

RENK hybrid propulsion solutions are available in almost unlimited possible combinations among the various drive types and can thus be designed flexibly for use in almost any type of vessel, while also ensuring low lifecycle cost.

What always stand out thanks to their high suitability for integration into the ship. Because not only the gear units themselves yet also the equipment is custom-designed to suit the particular requirements of each individual project. RENK has excelled for decades with unrivalled experience in the production and further development of drive components and intelligent control systems.

/ Silent superiority

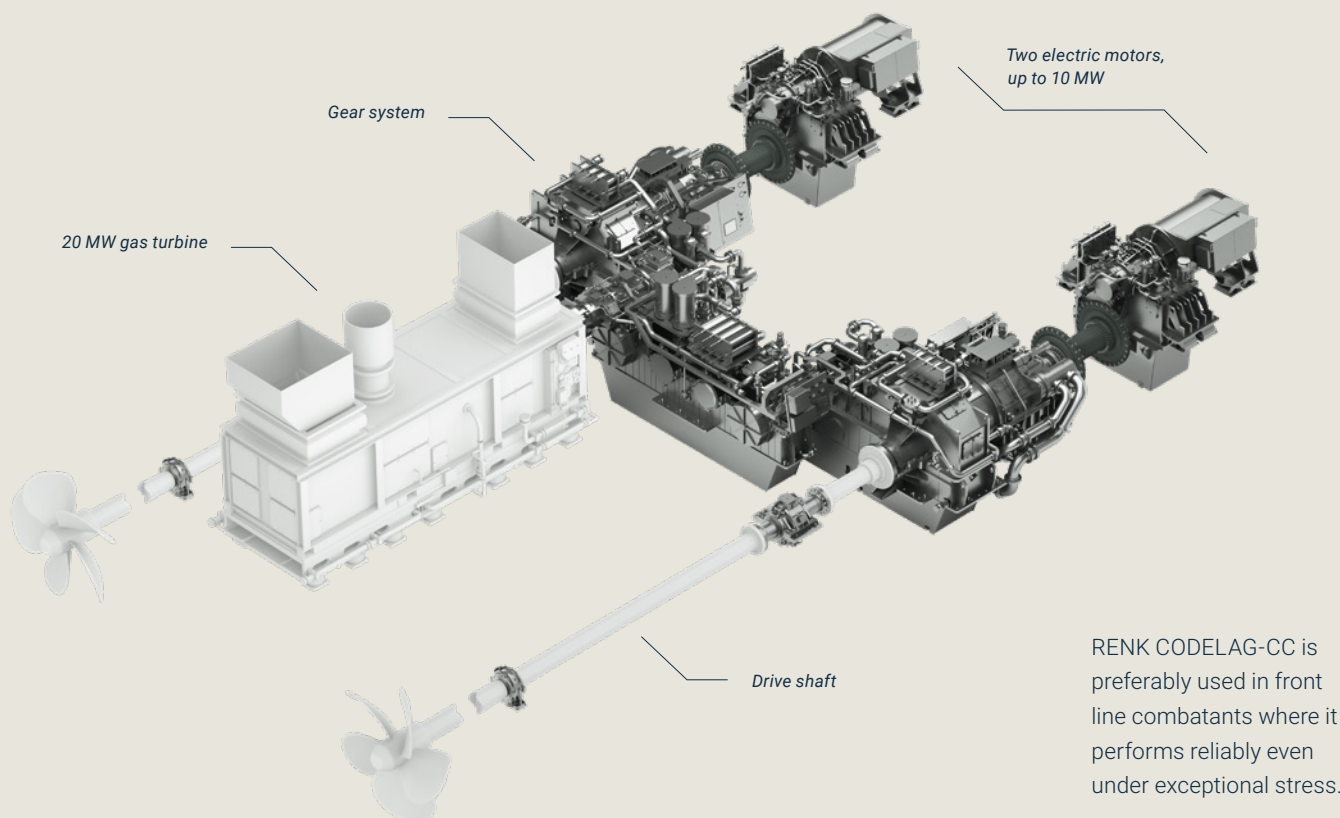
With low-noise, low-vibration gear units and electric drives for low speed ranges

/ Perfect adaptability

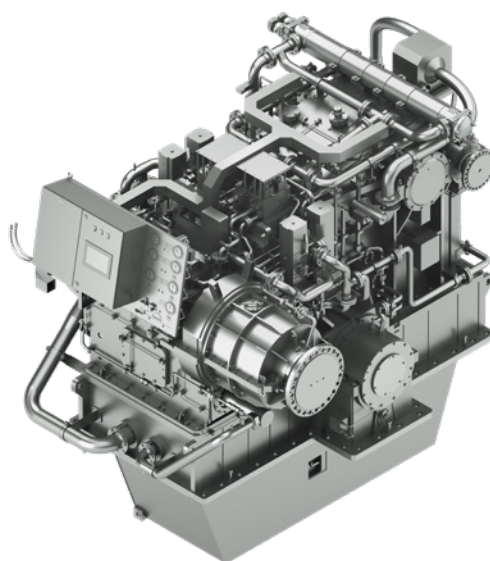
Flexible arrangement of the drive combinations to your individual requirements

/ Your needs, net

Find the matching propulsion solutions for your application



Supply vessels, such as in the Tide class-fleet tankers of the British Royal Fleet Auxiliary, are equipped with the tailor-made RENK CODELOD propulsion system.



Maximum performance with optimized fuel consumption. Combined mechanical propulsion solutions from RENK.

Traveling all the world's oceans

Naval forces from all over the world rely on combined mechanical propulsion solutions from RENK.

- **German Navy**
CODAG-CC system
(Sachsen class/F124)
- **Turkish Navy**
CODAG-CC system
(Ada class and Istanbul class)
- **Royal Thai Navy**
CODAG-CC system
(HTMS Bhumibol Adulyadej)
- **Danish Navy**
CODAD system
(Iver Huitfeldt class)
- **US Coast Guard**
CODAG-CC system
(Legend class/NSC)
- **US Navy**
CODAG system
(Freedom class/LCS)
- **Royal Malaysian Navy**
CODAD system
(Second Generation Patrol Vessel/LCS)
- **Indian Navy**
CODOG system (Shivalik class/P17 and Nilgiri class/P17A) COGAG system (INS Vikrant/P71)
- **Israeli Navy**
CODAD system (Sa'ar 6)
- **Philippine Navy**
CODAD system
(Jose Rizal class)
- **UK Royal Navy**
CODAD system
(Active class/T31e)

RENK takes your naval power to a whole new level with a wide range of drive types.

As a leading system supplier, RENK is able to configure the right propulsion system for every ship by creating the appropriate combination of different drive types.

Each type of engine has its own characteristics. A diesel engine is efficient and cost effective yet lacks power density. Gas turbines, on the other hand, enable maximum power with a minimal footprint and weight yet are significantly less efficient.

By offering a tailored combination of diesel engines for lower speeds and additional diesel or gas turbines, RENK ensures that the engines always run in their efficient speed range avoiding low-load operation, thus enabling a combination of maximum performance and maximum efficiency in a single solution. The various propulsion solutions are combined to match the application profile depending on the power requirements.

In the category of combined mechanical propulsion systems, RENK offers a variety of configuration variants, such as CODAD, CODOG/CODAG, and COGOG/COGAG.

RENK CODAG gear units in particular were among the pioneering developments in the naval sector. They were introduced early in the 21st century on board the German Saxony class frigates and National Security Cutters of the US Coast Guard, which were considered the most modern ships of their kind at that time. CODAG systems are being used on a large number of ships.

/ Your weight advantage

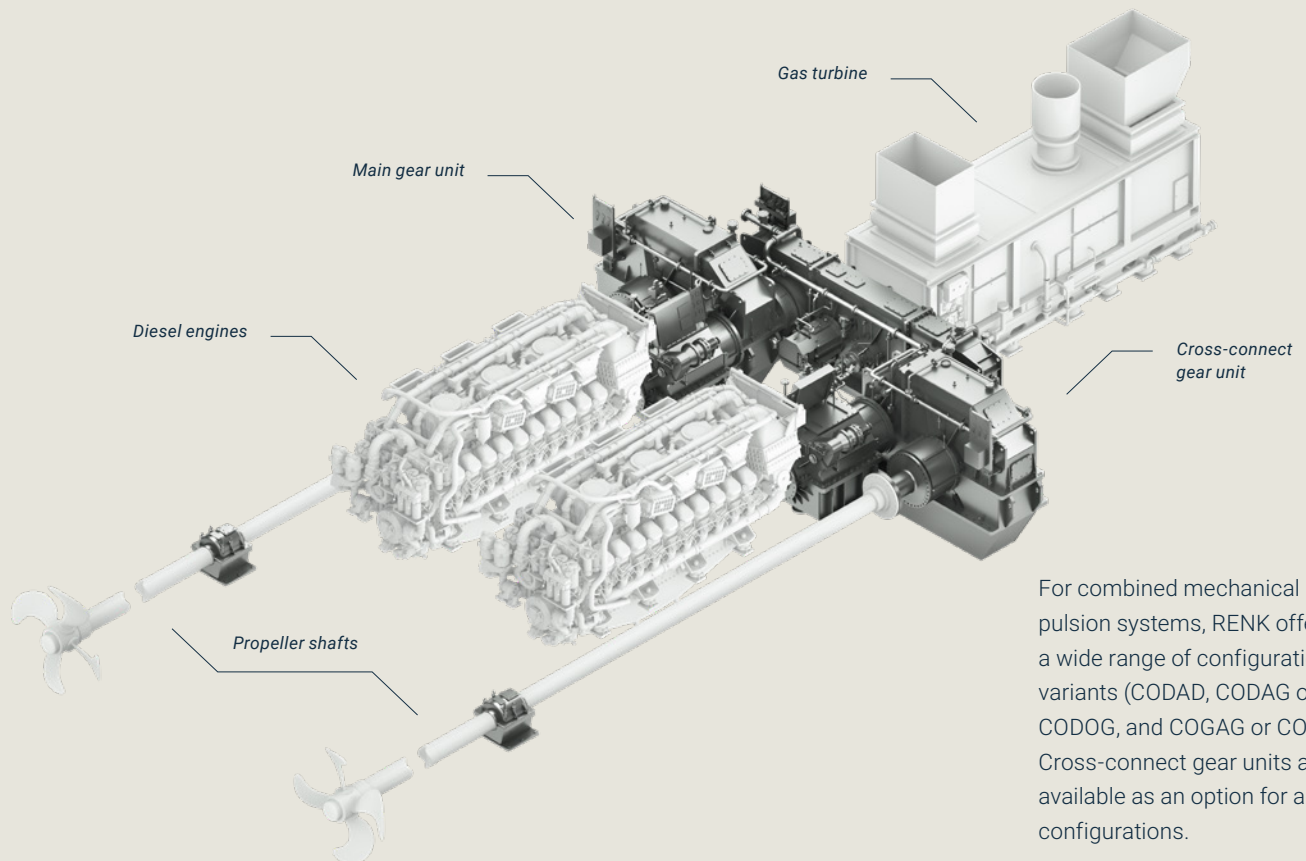
Space-saving, precise integration into your engine room

/ Thrust you can trust

Optimum drive power at all times thanks to combined drive systems

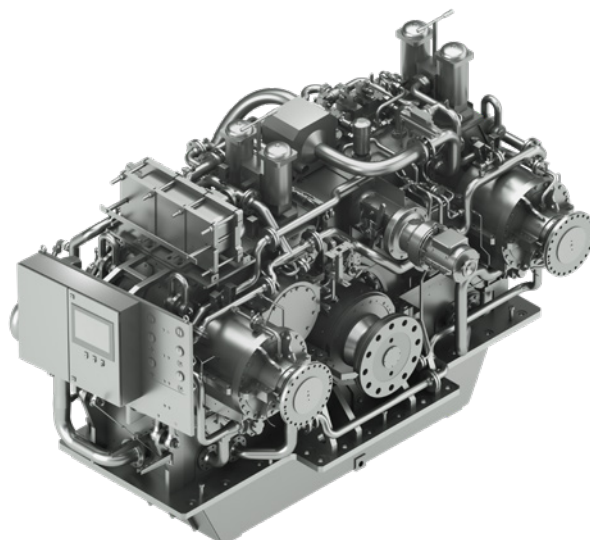
/ A perfect match

Tailored to your engines and your specific application profile



For combined mechanical propulsion systems, RENK offers a wide range of configuration variants (CODAD, CODAG or CODOG, and COGAG or COGOG). Cross-connect gear units are available as an option for all configurations.

RENK offers flexibly selectable vertical and horizontal center distances for ideal integration into the ship's design. Working on this basis, a very compact, two-stage gear unit was designed for the Philippine Navy.



RENK electric drive systems: the silent power on all seas.

Traveling all the world's oceans

Customers from all over the world rely on electric propulsion solutions from RENK.

- **Australia**
Tunnel AED-ASRV
(RSV Nuyina)
- **Finnish Navy**
Front-End AED –
Pohjanmaa-class
(Program SQ2020)

RENK AED – a geared electric motor provided as a turnkey system for ultra-low-noise applications.

Electric propulsion offers many advantages for specific applications, in particular quiet operation. That is why RENK has developed the AED, which meets all requirements of the naval sector. It enables navies to operate with extremely low-noise signature of the vessel, which is most important e.g. during Anti-Submarine Warfare (ASW) operation. The AED can withstand severe shock impacts and guarantees propulsion and maneuverability of the vessel in any scenario.

The AED's quiet operation allows high-quality survey work without disturbance of any laboratory equipment or measurement devices by the propulsion, thus making it a perfect fit for research and surveillance vessels.

The AED concept

RENK AED is a highly integrated combination of a high-speed electric motor together with a gear unit. Both components are designed and manufactured with a focus on acoustic performance, weight and space claim.

In order to meet challenging acoustic performance requirements, the AED propulsion module is fitted with project-specifically and optimal soft-elastic mounts so that the vessel is propelled as quietly as possible.

The highly integrated module allows simple and trouble-free installation of the AED into the vessel. In combination with the supply of frequency converters, the interfacing of the electric machine and the converter is ensured by RENK and the high performance is already validated ashore during combined testing. This reduces the responsibility and risk on the customer side and assures optimal setting of the electric propulsion system once it has been fitted into the engine room.

If the AED is part of a hybrid propulsion system with a diesel engine or a gas turbine, the AED can also operate as generator in PTO-function, thus significantly reducing lifecycle cost.

/ Ultra-quiet operation

Unsurpassed low-noise solution for silent missions

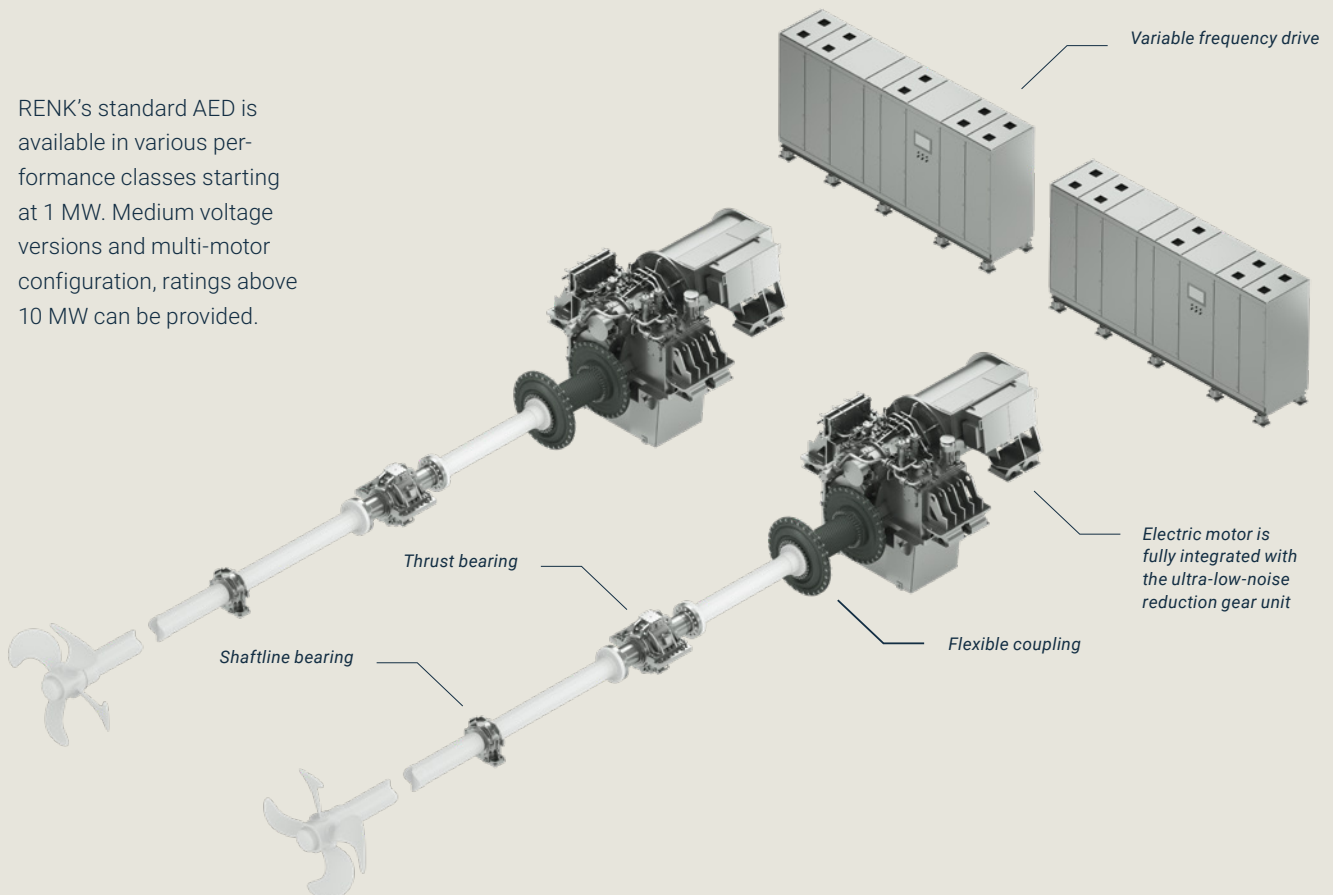
/ Unique power output

With excellent power-to-weight ratio

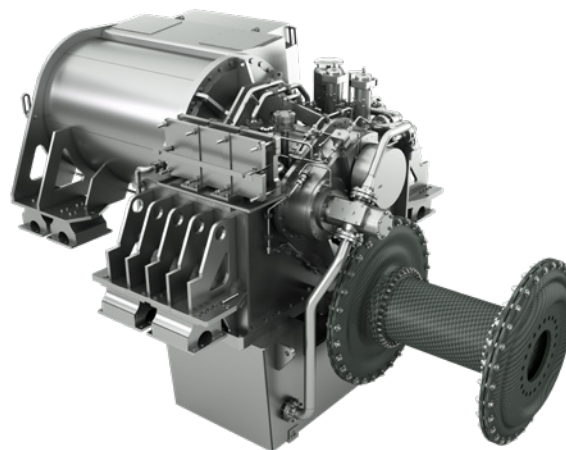
/ Space-saving design

Flawlessly integrates into the on-board system

RENK's standard AED is available in various performance classes starting at 1 MW. Medium voltage versions and multi-motor configuration, ratings above 10 MW can be provided.



Individual, project-specific adjustments are possible with a high focus on installation space, weight, and acoustics.



In line with your claim to leadership: RENK standard mechanical propulsion solutions.

Making waves on all the world's oceans

Naval forces from all over the world rely on standard mechanical propulsion solutions from RENK.

- **Indian Navy**
Marine reversing gear unit
AWS (Large Survey Vessel)
- **German Navy**
Planetary gear unit PLS
(K130 – second lot)
- **Algerian Naval Force**
Diesel gears (OPV)

Ultra-compact, fully customizable and packed with smart options.

RENK's portfolio of specially designed single-input marine gear units ranges from small, compact gear units for less-demanding applications to customized gear units that meet the special requirements of all types of ships and/or transmit very high outputs.

Single-input marine gears are available for power transmission from any type of propulsion drive such as medium- or high-speed diesel engine, gas turbine or electric motor to any kind of propeller or water-jet. You can also choose between a version with a main drive (single-in/single-out) or a distribution gear version with two outputs (single-in/double-out). Gear types with parallel offset, single-, two- or tri-ple-stage gearsets for a wide range of reduction ratios as well as planetary gear designs for extremely compact solutions can be applied.

Reversing gears, as required for fixed- pitch propellers and some types of water jets driven by non-reversing engines, are also available in both parallel offset gear and planetary gear designs.

All marine gear types can be individually adapted to the specific requirements of the respective drive concepts and are available in shock-resistant and/or noise-optimized designs.

RENK's customer-specific solutions offer a wide range of equipment variants and options across the entire performance range: especially low-noise design, flexible mounting, flexible positioning of drive units, shock resistance, operation in flooded condition and much more.

The scope of delivery can also be supplemented by a wide range of additional features for the propulsion system. Optionally, seawater-cooling components, shaft-brake and shaft-turning devices, and external thrust bearings can be selected from RENK's scope of supply.

When it comes to standard mechanical propulsion solutions, RENK offers preconfigured systems at low procurement costs.

/ Easily adapts

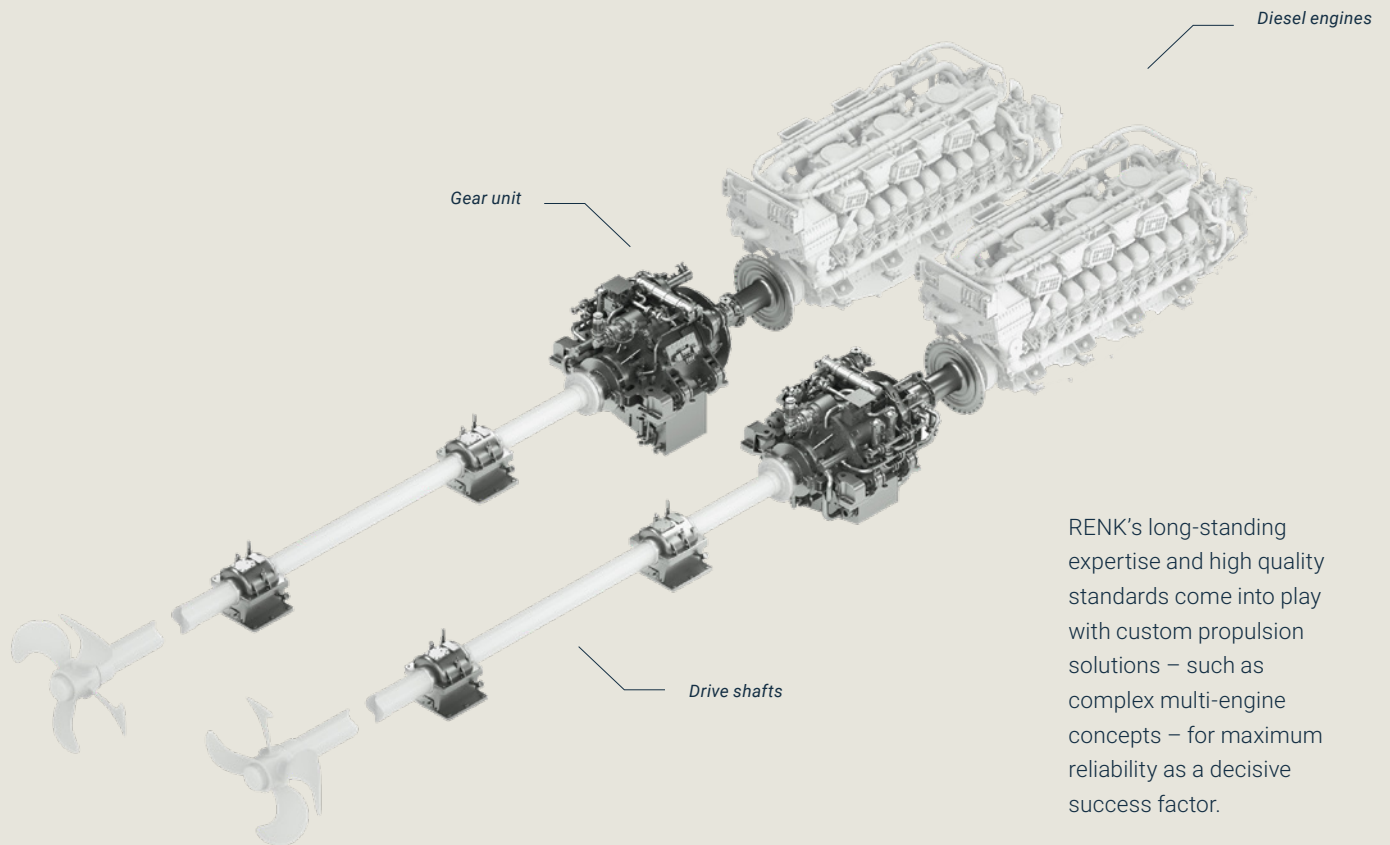
Customizable through equipment packages for almost any requirement

/ Always delivers

With technology proven to last in the toughest conditions

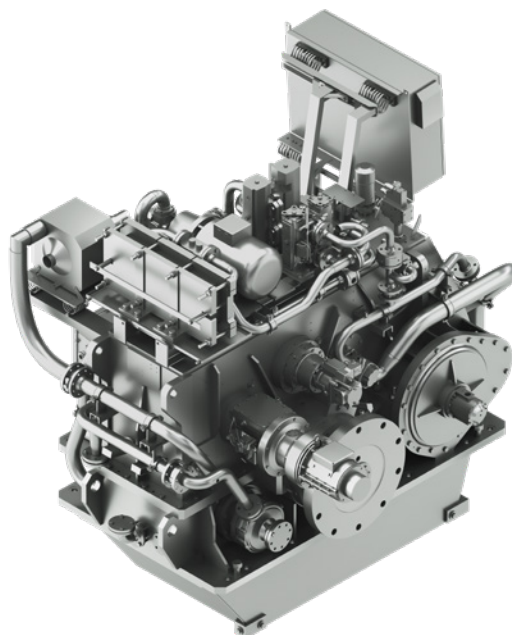
/ Works smart

Delivering ultimate power density with low weight and a small footprint



RENK's long-standing expertise and high quality standards come into play with custom propulsion solutions – such as complex multi-engine concepts – for maximum reliability as a decisive success factor.

With RENK, you can also easily and flexibly adapt single-engine marine gear units to a wide range of operating conditions, requirements and individual needs for new platforms.



Conquer the elements with engineering excellence from RENK.



Successful fleets set standards in all areas – with outstanding speed and range. And with an especially low signature and high efficiency. In other words, with marine propulsion technology from RENK – the driving force behind the world's most modern fleets.



Your ambitious plans, perfectly implemented: RENK PSI (Propulsion System Integration).

On board on all the world's oceans, right from the start – RENK PSI.

RENK PSI has impressive references that prove its unique expertise in the areas of concept design, detailed design, and integration of propulsion systems.

- **Australian supply and research vessel (ASRV)** built by Damen Schelde – contribution to the concept design and simulation of CODELAD propulsion system.
- **Indian Navy P17A stealth frigates** built by MDL and GRSE – PSI services for CODOG propulsion system
- **Escort and rescue vessel** designed by Severnaye Design Bureau, built by Yantar Shipyard – PSI services for CODAD propulsion system
- **Indian Navy survey vessel** built by GRSE – PSI services for DE-FPP propulsion system
- **DIMDEG, supply ship for the Turkish Navy** – PSI services for CODOG-E propulsion system

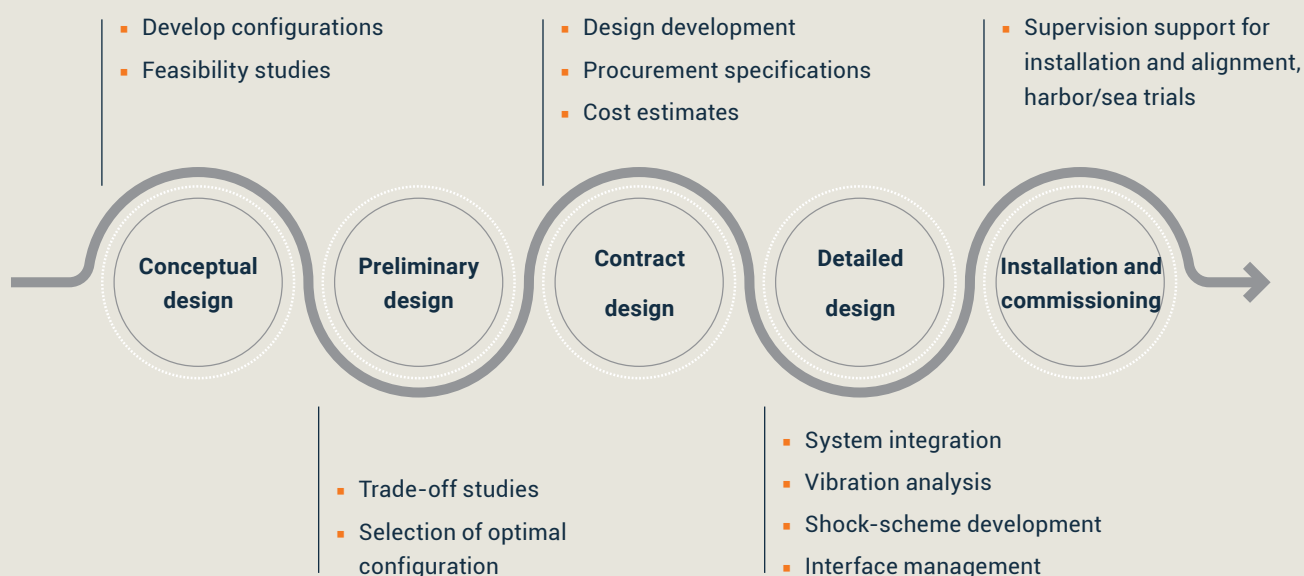
Benefit from our unique project expertise in planning and implementing of your customized propulsion solution.

RENK has been setting new benchmarks for decades as a central partner in the design and production of sophisticated propulsion systems – with a unique history in the development and integration of advanced gear unit concepts.

This is especially the case when it comes to intelligently combining the specific technological advantages of electric motors, diesel engines and gas turbines with propellers and water jets, while getting the best value in terms of the operational characteristics and mission capabilities of the ship.

The RENK PSI department is a hub for all the expertise involved in developing modern project-specific propulsion and power-transmission systems. As a result, RENK is capable of providing interdisciplinary support to ship designers and shipyards across the entire spectrum of propulsion systems from an early stage of the ship-design process. From start to finish – from planning to execution. To ensure perfect integration of the drive into the ship's structure. From purely mechanical single-motor drives to highly complex hybrid propulsion systems.





Make the Leading Experts for Propulsion Systems Your Team: RENK PSI.

A variety of aspects are involved in the design and integration of propulsion systems. To perfectly master the complex project requirements in every phase, an interdisciplinary team of experts at RENK PSI approaches each task on the basis of a holistic, overall context.

Conceptual design

The primary configuration of the propulsion system architecture is usually finalized during the conceptual design of the ship. RENK undertakes such studies for shipbuilders to develop the propulsion system architecture based on modeling and simulation studies, which lead to an optimized and well-integrated design.

The study includes detailed analyses of requirements and guidance to the builder in translating the design criteria into a feasible design. The study begins by creating a large number of architectures, which are individually assessed for their feasibility and aligned with design objectives. The feasible designs are then evaluated for the functionality they offer terms of modes of operation,

efficiency, dimensions, weight, physical signatures, vulnerability and redundancy. RENK also performs the trade-off study for various propulsion-system options to guide the shipbuilder to the best-suited design for the application.

Preliminary design

RENK PSI prepares detailed comparative studies and optimization proposals on the basis of simulations of the expected operating behavior of propulsion systems. This enables our team to perfectly implement the end user's specifications and to clearly identify the advantages and disadvantages of the various concepts.

Contract design

In the phase of a ship's contract design, RENK PSI supports customers in further development of propulsion-system designs and preparation of procurement specifications for major propulsion equipment. Our customers can also rely on our assistance in evaluating the proposals of and technical negotiations with the candidate suppliers.

Detailed design

In the detailed design phase, RENK PSI offers comprehensive support for propulsion system related issues – from defining the details of modes of operation and change-overs, through the design review and interface management, to the integrated installation, alignment and testing procedures. Vibration analyses, impact and noise investigations can also be selected from the portfolio of RENK PSI services.

Installation and commissioning

RENK PSI's support also includes supervision of the major quality gates during the shipbuilding, such as the installation and alignment check, setting-to-work checks, and harbor and sea trials. The analysis of the test results and recommendation of necessary steps towards the final validation of the system performance naturally belongs to RENK's understanding of customer service.

RENK: ensuring your fleet's superiority with leading technology, testing and manufacturing expertise.

RENK test stands – for marine propulsion systems that will not leave you at sea:

- Practical testing of the systems
- Reproducibility of the test runs
- Flexibility thanks to modular design

Naval scenarios, tested ashore: the unique RENK test facility.

The RENK test stand for propulsion systems offers state-of-the-art functionality and technology. It enables meaningful tests of propulsion systems and makes the verification of systems and components transparent and effective, thereby guaranteeing our customers decisive advantages in terms of validation of equipment performance and successful execution of projects.

The toughest challenge for propulsion systems outside the seven seas.

The testing area at our test facility measures 1,250 square meters and is divided into two large and two small test stands, which are located in separate rooms inside the building. The entire area is covered with 30-centimeter-thick slabs and is anchored on reinforced concrete foundations which are up to three meters thick for loads of up to 1,000 metric tons. Our cranes can lift loads weighing up to 200 metric tons.

Maximum functionality – precise adjustment

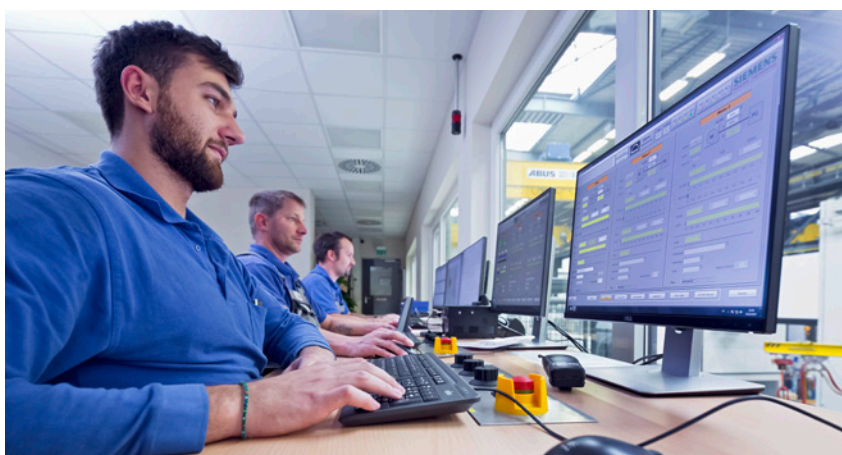
The extensive equipment at RENK's test facility allows for a wide variety of test types, from functional and performance tests to measurements of process parameters and highly dynamic response behavior, as well as external influences. Efficiency tests are also possible.

Performance data

With the aid of special reduction gears, the test specimens can be loaded with torques of up to 500,000 Nm and maximum speeds of up to 20,000 rpm under loads of up to 12 MW. Square testing at full torque – full speed is also possible.

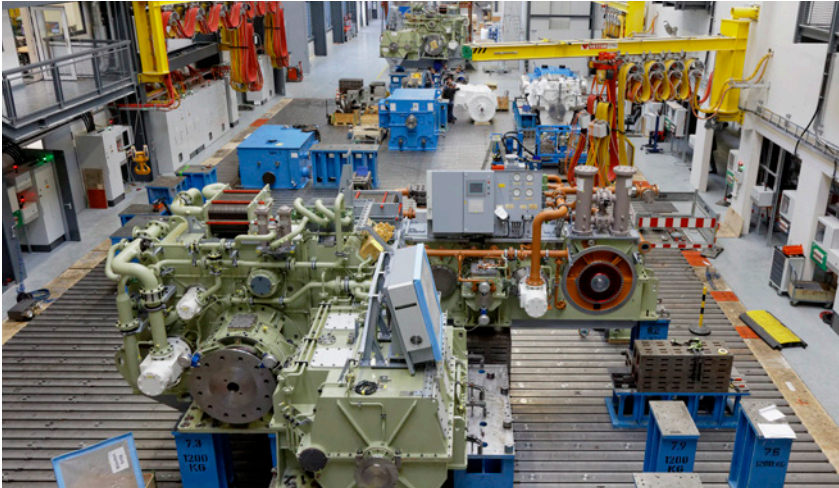
Successful systems based on precise analytics.

Our test systems ensure transparency in terms of systems and their interplay – and thus help to maximize success during ongoing operations.



/ Proof of Performance

Comprehensive testing ensures uncompromising quality and safety

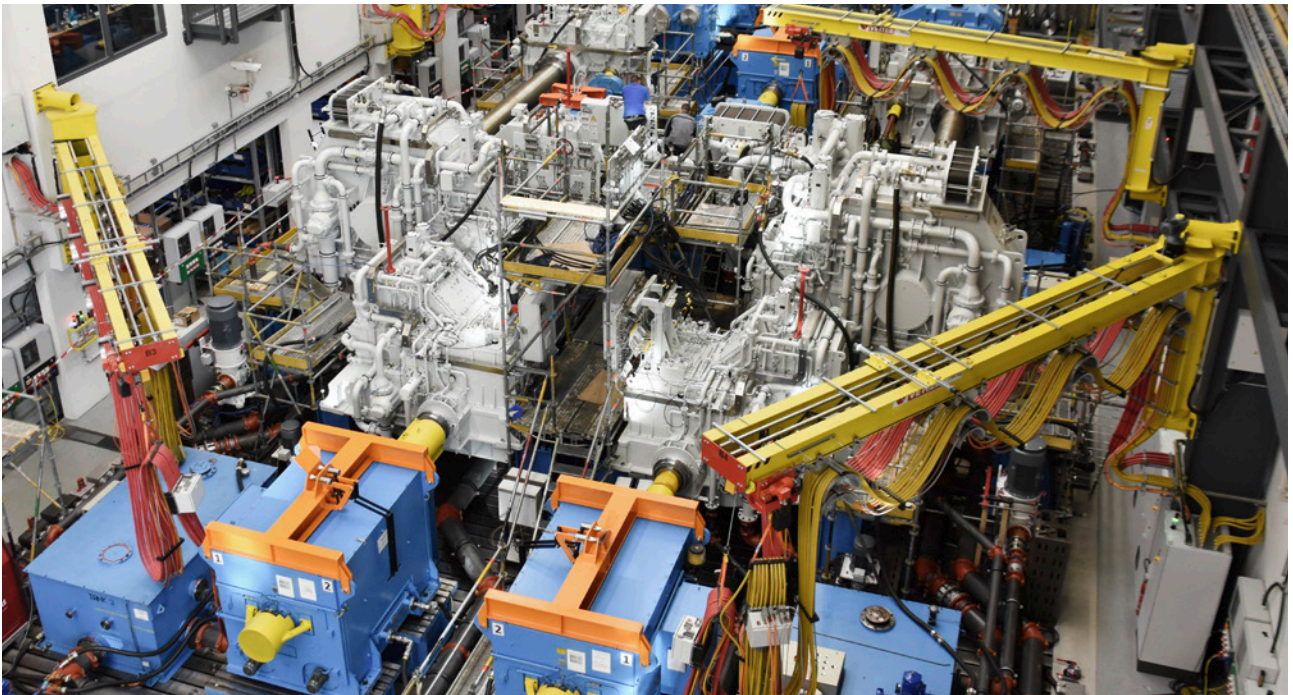


/ Plug & Play

The fully tested and approved system is ready for installation

/ Ready for Action

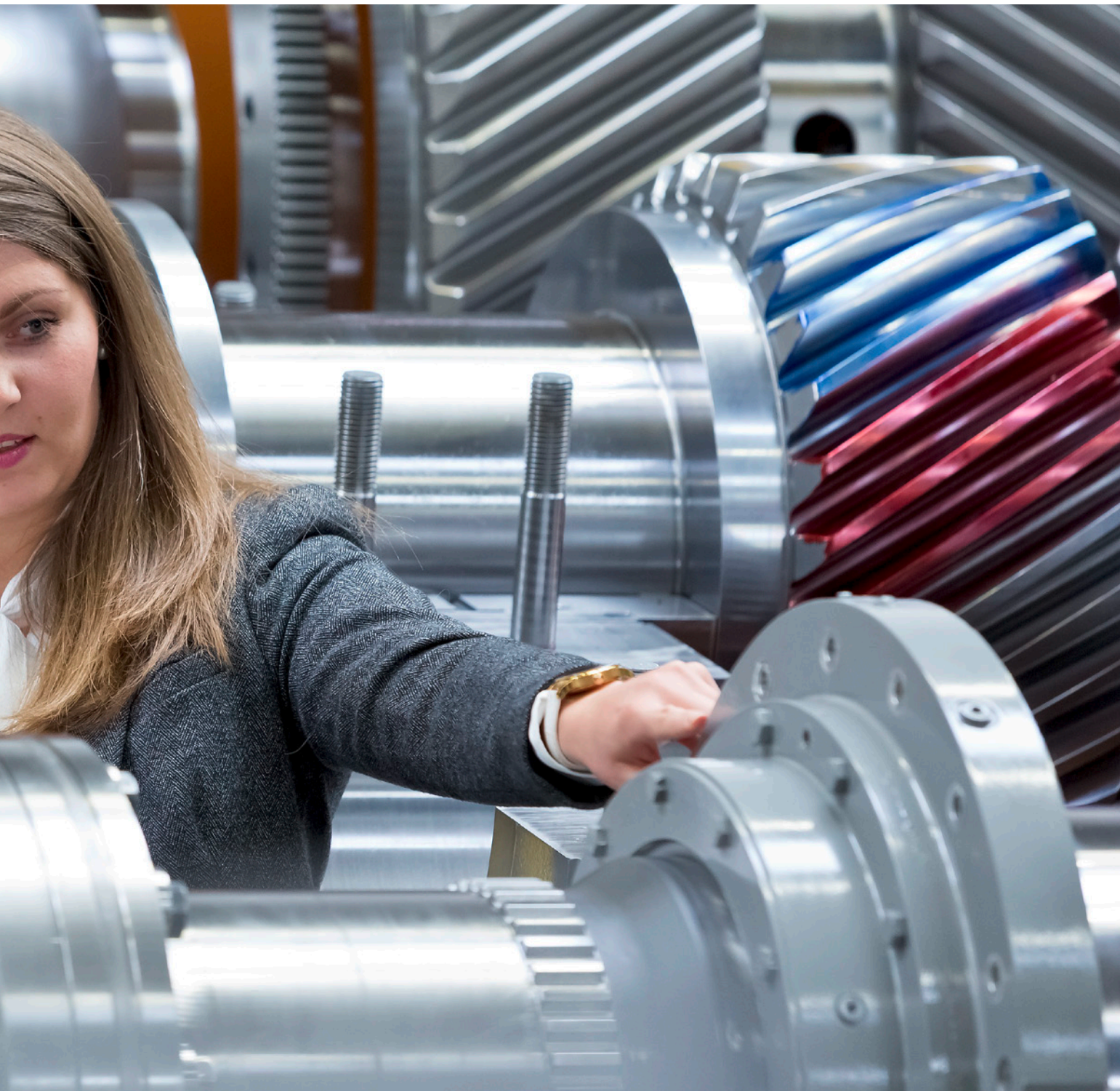
Perfectly tailored to the ship – straight from the factory



Your naval forces deserve.
The best support: our service.



The RENK name has stood for groundbreaking innovations and strong partnerships in the field of marine propulsion solutions worldwide. As a leading system supplier, RENK offers reliable, end-to-end solutions from a single source and combines state-of-the-art technologies with unparalleled customer proximity. We provide our customers with comprehensive services for all aspects of our propulsion solutions – based on outstanding process intelligence, unique project expertise and the highest quality standards for methods and materials.



Solving problems before they arise: RVM Advanced (RENK Vibration Monitoring Advanced) with artificial intelligence.

Features

- All interfaces for bus communication, such as Modbus RTU, Modbus TCP, Profibus, etc.
- Intelligent, software-supported anomaly detection to localize errors in relation to the kinematics of the entire drive train
- Bi-directional data transfer with external controllers for IPMS*, diesel engine, electric motor, gas turbine, etc. for easy integration in existing architectures

Unsurpassed drive availability through RENK expertise and permanent measurement in the center of the drive train.

The earlier an anomaly can be detected and assigned a clear cause, the easier it is for you to plan a cost-efficient repair or replacement of the affected component.

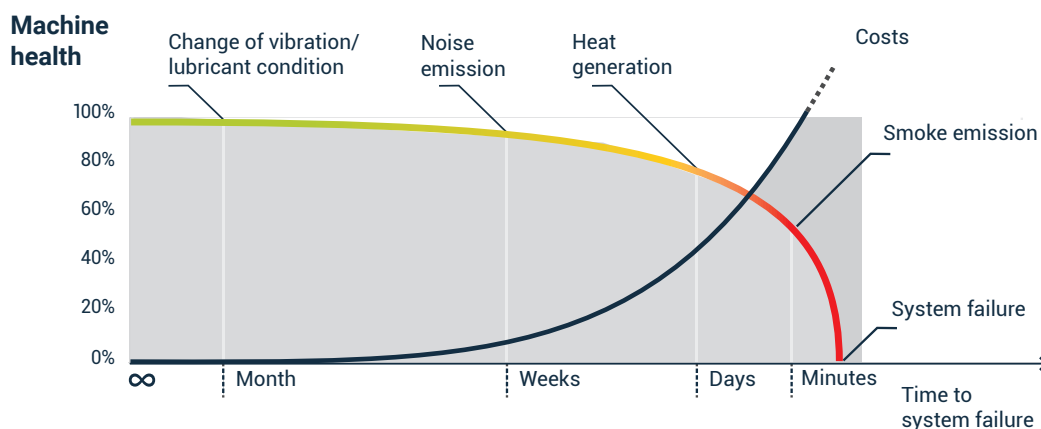
This is where RVM Advanced combines RENK's many years of experience in fault analysis with the software-supported intelligence of a condition monitoring system.

The system is thus able to detect the smallest irregularities in the entire drive train before human senses can detect on them. It then assigns them to a clear error or wear pattern in the analysis so the appropriate measures can be identified. Because issues are precisely detected early on, RVM Advanced can prevent serious, expensive secondary damage, up to and including total failure, and significantly increase plant availability.

Flexibility via simple system integration, communication and modularity – perfect in combination with ISO CAT 3 certified service experts.

RVM Advanced collects, logs and stores all relevant data from the propulsion system directly on board and issues targeted alerts when anomalies are detected.

Detected anomalies can be quickly and reliably forwarded to external experts on request in the form of precise data extractions. This enables the crew to initiate suitable measures to keep the system running and to prevent serious incidents from occurring through preventative maintenance and early indication of critical component failures.



Maximum Availability

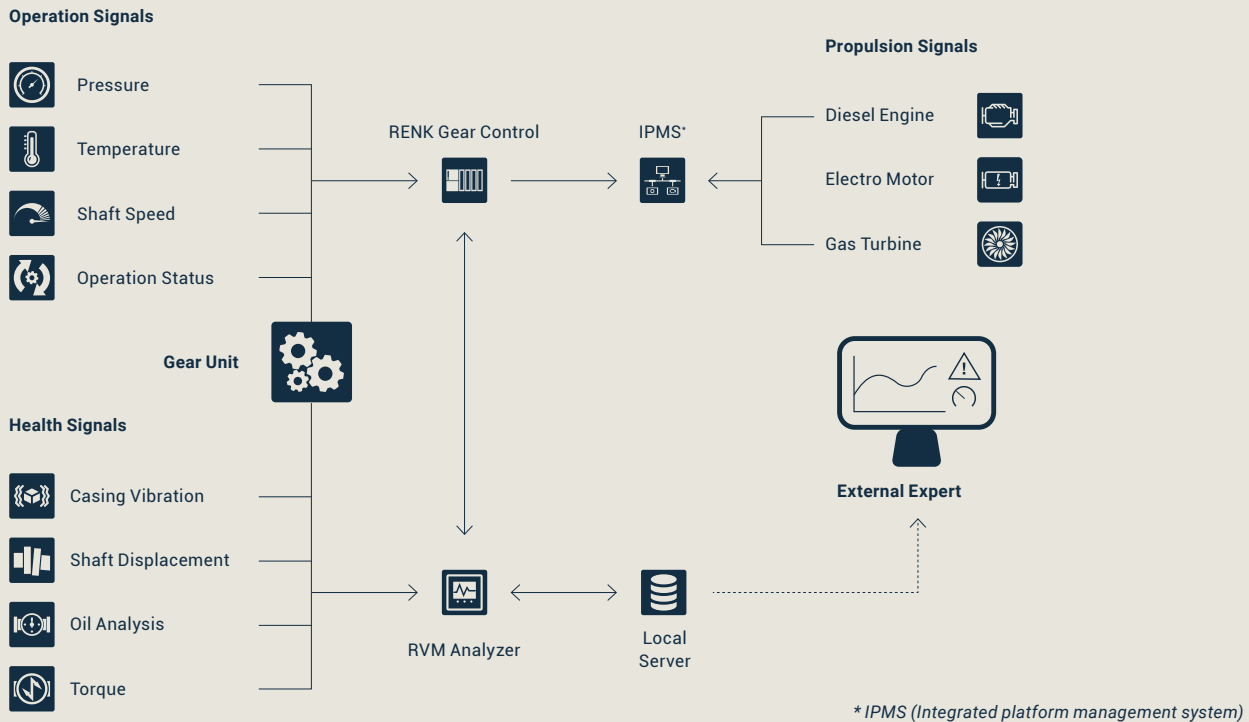
Take preventive action to avoid wear and secondary damage

Responsibility and Reliability

For crew, ship, and mission

Optimized Lifecycle Costs

Based on intelligent spare parts and maintenance management



The gear unit – the central data source in the drive train.

Housing vibration, shaft displacement, torque, speed, oil particles, temperature, power, and more. The area next to the gear unit is an especially good place to detect anomalies from the entire drive train. That is why RVM Advanced collects all relevant parameters from the gear units, bearings and couplings and, if required, combines them with data on the propulsion units from the central ship control system for extended capabilities in its root cause analysis.

RVM Advanced creates highly effective conditions for the smooth, efficient operation of the entire system based on this cross-system condition monitoring – so abnormalities and their interplay can be detected before they occur and the cause precisely identified.

Data is stored locally in the RVM Advanced systems on board. If detailed analysis by external experts is necessary, data can be transferred either via storage media such as USB sticks or via a remote connection made available by the customer.

RENK ILS (Integrated Logistics Support): for maximum availability, we are on board throughout the entire lifecycle.

RENK services

- On-site service: certified technicians carry out almost all repairs directly on board
- Inspection and repair: if required, your gear unit will also be analyzed at RENK and reinstalled following a general overhaul
- Upgrades: to increase the efficiency and thus the value of your existing or future investment, our technical experts optimize your propulsion solution directly on-site – world-wide

Analysis (methods):

- Failure mode and effects analysis (FMEA)
- Reliability block diagram (RBD)
- Lifecycle costs (LCC)

Spare parts:

- Global service network ensures fast delivery of all necessary spare parts
- RENK obsolescence management ensures the availability of RENK spare parts
- User-friendly digital spare-parts catalogs

Tools:

- Use of high-end tools for RENK products
- Maintenance work possible with standard tools
- Special tools and test equipment available

More than just maintenance. On-site service, upgrades and original spare parts.

The right maintenance strategy is the basis for maximum availability of your vessels. RENK ILS means service without compromise – professional, on schedule and with transparent costs: anytime, anywhere.

RENK takes care of planning and implementing all commissioning, inspection and maintenance work, including stand-

ard revisions and overhauls. All work is carried out quickly and smoothly thanks to perfect scheduling with guaranteed availability of expert personnel and the necessary materials. With an end-to-end service that ticks all the boxes.

RENK supports its customers through a customized ILS package to build up the right information, parts and required personnel in order to ensure the vessel can operate independently if and as desired.



/ Economical at all stages

Thanks to our holistic, cost-saving spare-parts and maintenance concept

/ Assured supply

Count on OEM availability of spare parts and standard components

/ Advanced training

Brings your team up to speed anywhere and anytime with virtual-reality-based training solution

Taking care of the key factors allowing for maximum availability: documentation and training.

Documentation and training are central components of the RENK ILS package for the optimization of availability and LCC – especially for customer-specific drives. And not only during commissioning yet over the entire service life of the systems up to their decommissioning. Quick access to information and clear instructions via customized manuals and instructions for maintenance and operation are key factors for high system availability.

This is why RENK relies on state-of-the-art technologies in the field of education and training to ensure an effective and sustainable transfer of knowledge – for highly qualified crews, who are the backbone of every highly efficient unit.

The RENK virtual-reality and augmented-reality training system.

RENK virtual-reality (VR) and augmented-reality (AR) technologies offer unique advantages in the context of education and training:

- Detailed reproduction of the gear system
- Interactive, intuitive use of the environment by several participants in team training
- Cross-location networking of team members in a virtual space
- Simulation of processes and technical correlations on a digital twin
- Detailed presentation of maintenance and operating steps
- Development of practical tests to check the level of knowledge





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