



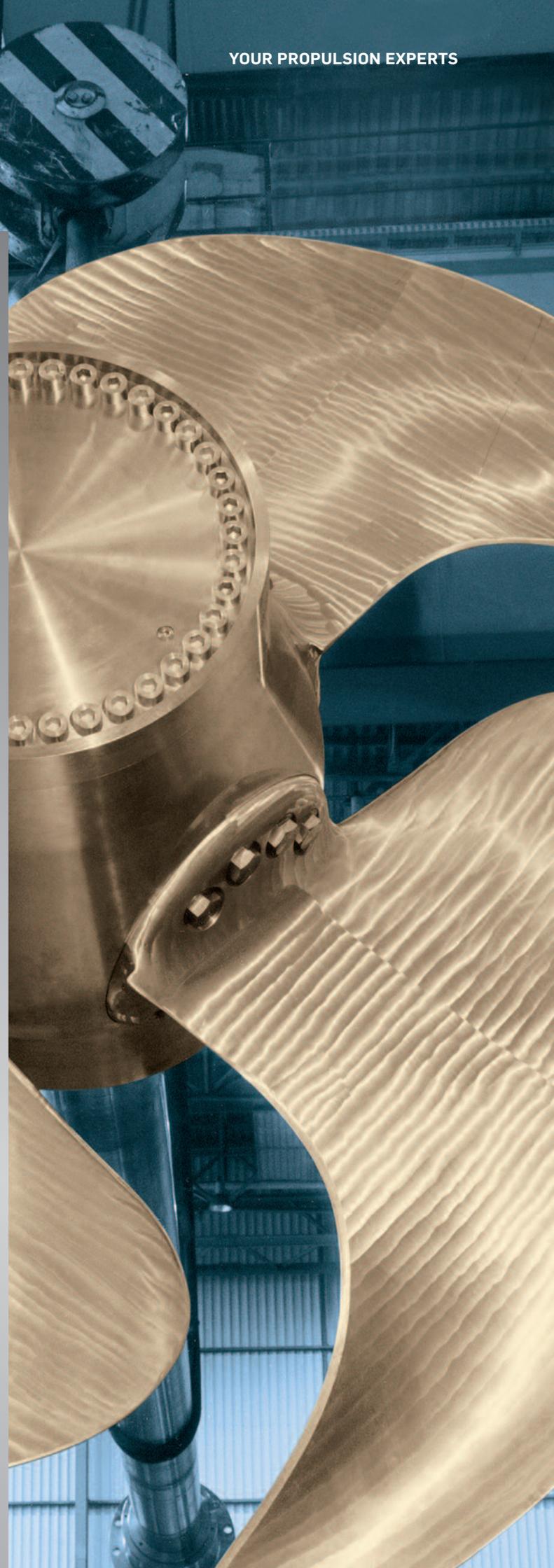
YOUR PROPULSION EXPERTS

SCHOTTEL CP PROPELLER

RELIABLE AND POWERFUL



SCP · SCHOTTEL CP PROPELLER
Controllable-Pitch Propellers for all ships up to 30,000 kW.



RELIABLE PROPULSION SYSTEMS RATED AT UP TO 30,000 KW

SCHOTTEL Controllable Pitch Propellers (SCP) are the appropriate solution when highest propulsive efficiency for changing speed or load are required and best manoeuvrability is needed. No matter whether big ferries, container ships, heavy lift vessels or offshore supply vessels are to be equipped.

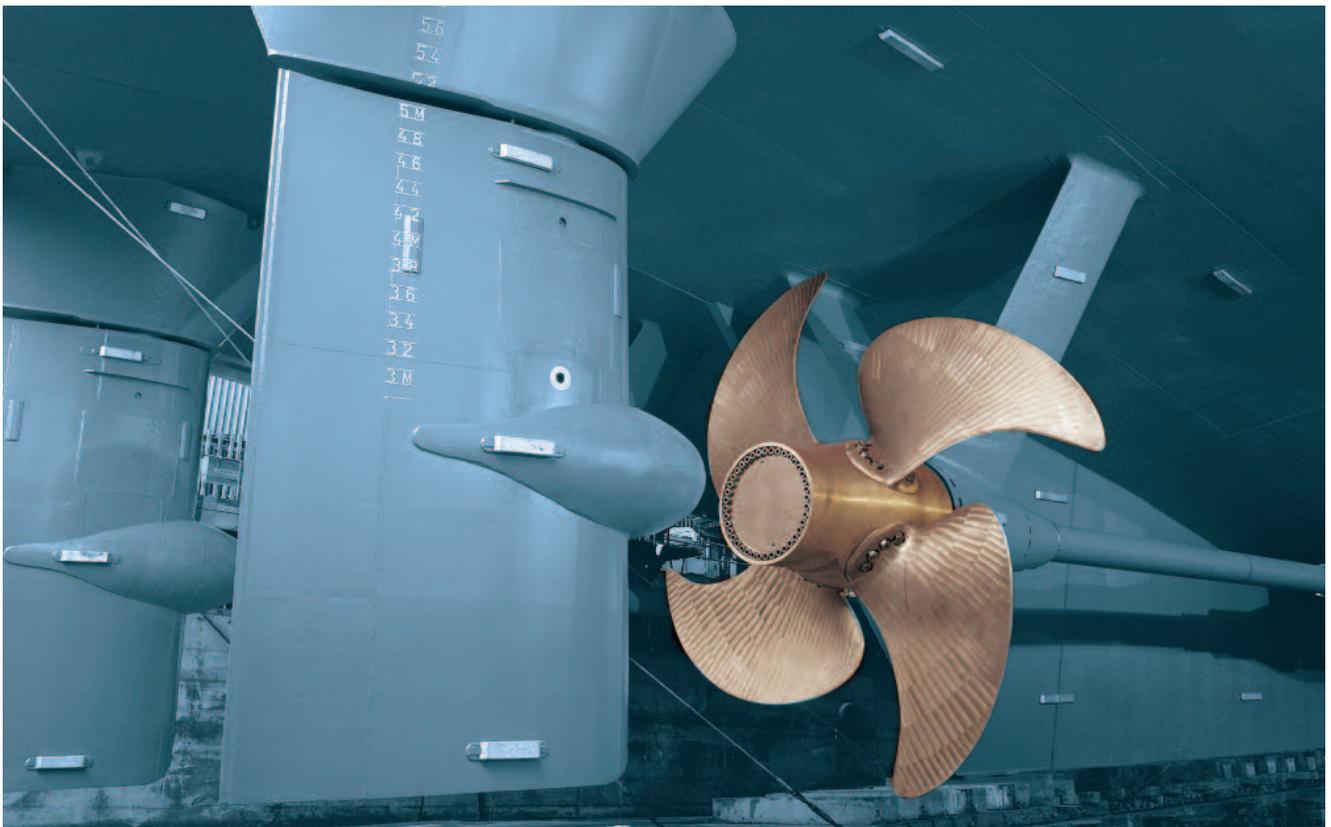
The power spectrum ranges from 1000 kW to 30,000 kW, with propeller sizes varying between approximately 1.5 to 8.0 metres.

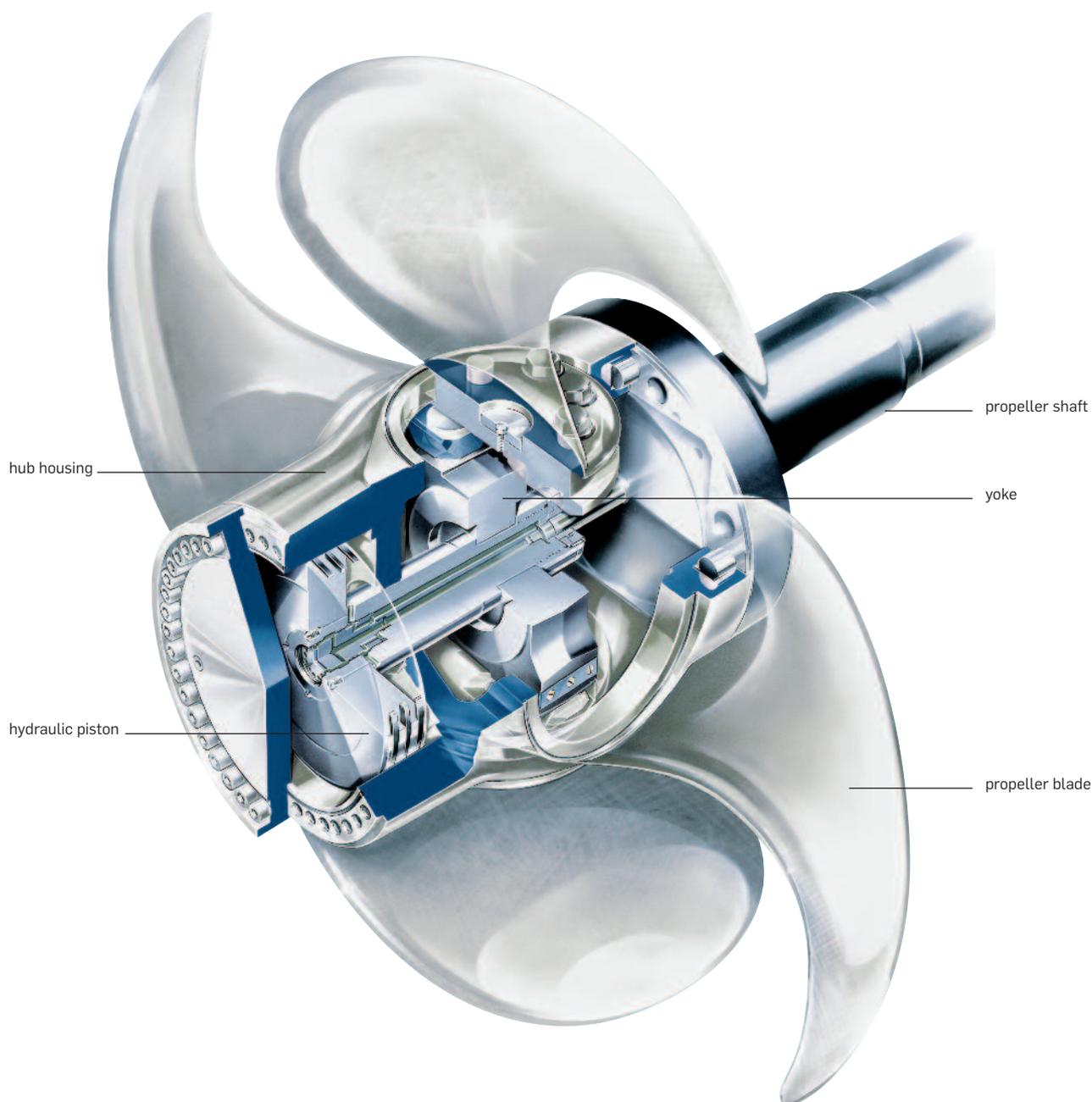
The simple structure of the SCP guarantees a high level of user-friendliness, and the robust design keeps maintenance requirements to a minimum and ensures a long service life.

OPERATION PRINCIPLE

Contrary to a conventional propeller with a fixed pitch, blades can be rotated around their axis and change their pitches variably and stagelessly from zero thrust to headway or reversing.

Advanced calculation methods allow the SCP to be optimally adjusted to the hydrodynamic conditions on the vessel's hull, thereby maximizing efficiency and minimizing noise generation.





The SCP power range starts at approx. 1000 kW and goes up to 30,000 kW, with corresponding hub diameters from 0.46 m to 2 m. The propellers are available with 3, 4 or 5 blades, the standard version being the four-bladed design.

SCHOTTEL supplies the complete package including the CP propeller, shaftline, hydraulic system and remote control system, if required including stern tube with seals, nozzle and gearbox.

ADVANTAGES

- Highest propulsive efficiency for changing speed or load
- A reversing gear is not needed.
- Enhanced manoeuvrability
- Easy maintenance thanks to robust design
- Easy operation
- Propulsion package available

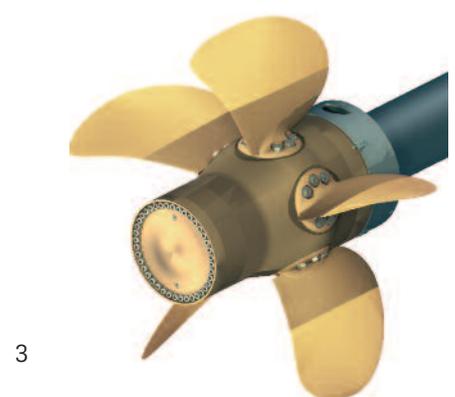
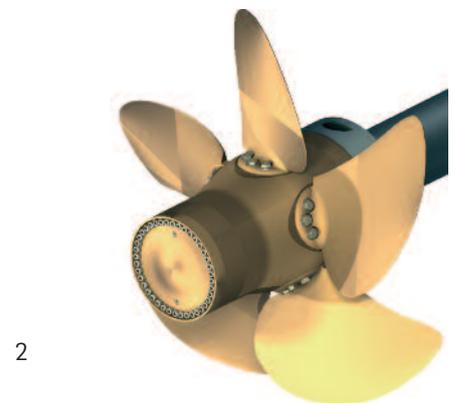
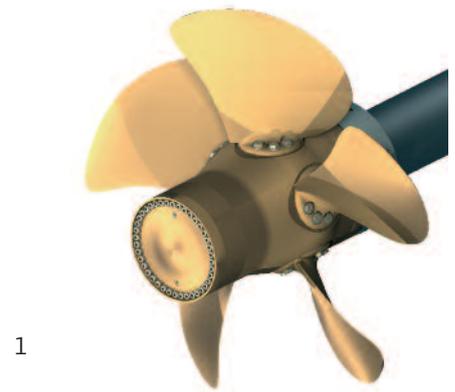
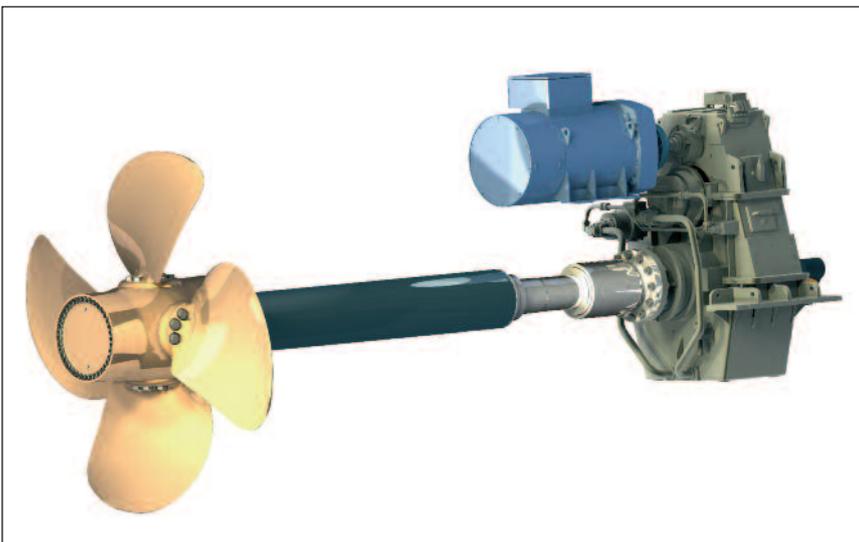
POWER PACKAGES TAILORED TO YOUR NEEDS

The standard SCP-package supplied by SCHOTTEL includes the hydraulic system, the remote control and the stern tube with seals. If required SCHOTTEL also supplies packages including gearboxes, shaft generators and nozzles.

SCHOTTEL meets special customer requirements for stern tube design regarding seal types, oil or water lubricated systems and maker. The propulsion packages are completed by additional components such as torque measurement systems, brakes, etc.

For special applications SCHOTTEL supplies propeller shafts, blades and hubs in stainless steel.

Twin screw vessels can be equipped with SCHOTTEL's full feathering propellers thus minimizing fuel consumption in flexible operating profiles.



FULL FEATHERING 5-BLADED PROPELLER
in ahead (1), astern (2) and in feathered position (3).



VARIOUS DESIGNS FOR DIVERSE REQUIREMENTS

SCHOTTEL Controllable Pitch Propeller Systems (SCP) are available in various designs, including:

- **X-type** - hydraulic cylinder mounted in the propeller hub
- **Z-type** - hydraulic cylinder mounted in the propeller shaft

Oil is distributed via an Oil Distribution (OD) box of

- **G-type** - mounted in front of the gearbox
- **W-type** - mounted in the shafting.

Therefore different combinations of hydraulic cylinder arrangement and position of oil supply can be implemented. The most common is the X-type hub combined with oil supply in front of the gearbox, the so-called "XG" configuration.

X-TYPE HUB

The "X-type" hub incorporates a hydraulic cylinder with the piston directly connected to the yoke. The hub is of simple design with a minimum of moving parts and of highest reliability. To obtain optimum strength the hub is cast in one piece. The propeller blades are mounted on large-sized blade carriers to minimize the stresses in the system.

The yoke moving inside the hub is supported by sliding pieces. Crank pins on the yoke turn the propeller blade carriers. The hub is sealed by a well-proven system consisting of a pre-loaded sealing ring between the hub and the blade foot. The hub is lubricated via a connection in the OD-box.

The hydraulic oil flows through an inner and outer oil pipe, both mounted concentrically inside the hollow-bored shaft. The movable double oil pipe also functions as a feedback system indicating the current pitch of the propeller system.

Z-TYPE HUB

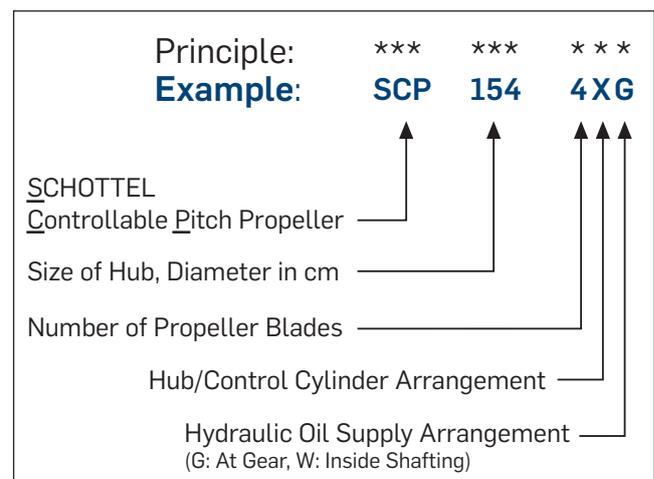
The "Z-type" hub with the hydraulic cylinder within the propeller shaft results in a considerably shorter propeller hub. The shaft-integrated hydraulic cylinder moves the yoke by means of a rod leading through the hollow-bored shaftline.

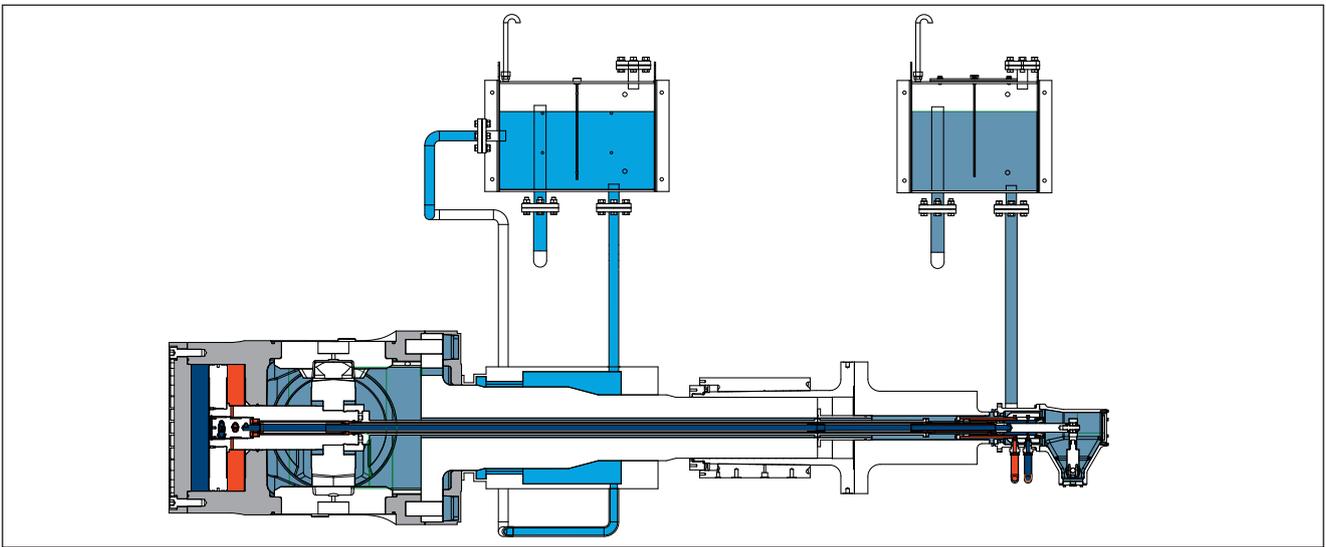
For all systems, propeller blades and hubs are available made of Cu-Ni-Al or stainless steel.

Controllable pitch propellers designed by SCHOTTEL offer the following advantages:

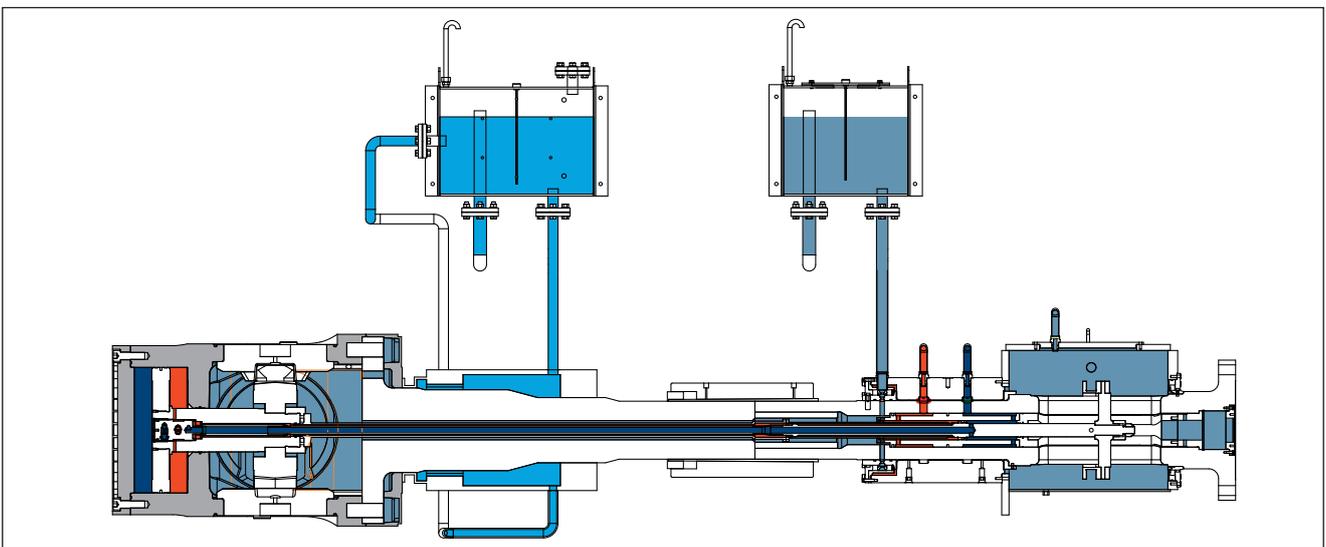
- Blocking valves for pitch setting installed in the cylinder space of the hub, easily accessible when docked without dismantling of the hub
- Blocking valves allow operation in the ahead condition with 100% engine power without restriction
- Blades can be dismantled in a nozzle without pulling the shaft
- The blade moving pin is part of the cast yoke, which achieves a larger control stroke near the end positions of the blades, allowing finer pitch control. This also results in lower stresses in the pin.
- Optimum matching of material between hub and blade carriers
- Larger hub is cast in one piece, giving a rigid structure

SCP TYPES

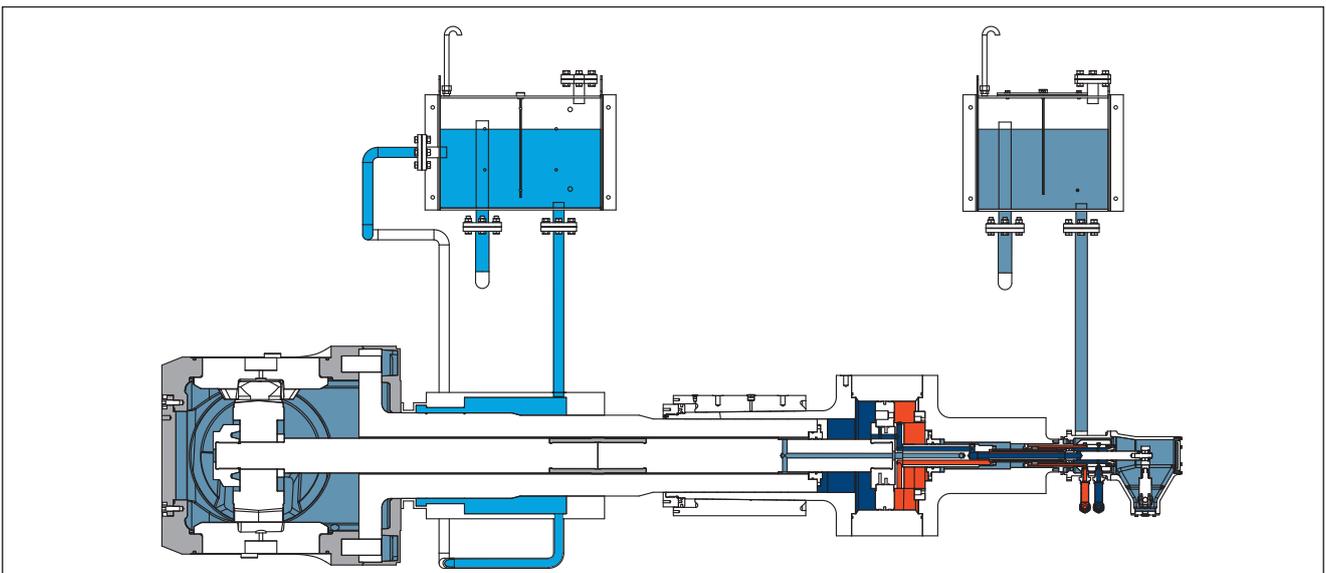




Type SCP-XG: X-type hub with the servomotor fitted in the hub, the oil supply unit arranged in front of the reduction gear.



Type SCP-XW: X-type hub with the servomotor fitted in the hub and the oil supply unit arranged in the shafting.



Type SCP-ZG: Z-type hub with the servomotor in the shaft line, the oil supply unit arranged in front of the reduction gear.

— lubrication oil for stern tube

— lubrication oil of OD-box and lubrication oil for hub

— hydraulic oil in direction ahead

— hydraulic oil in direction astern

USER-FRIENDLY AND RELIABLE REMOTE CONTROL SYSTEM

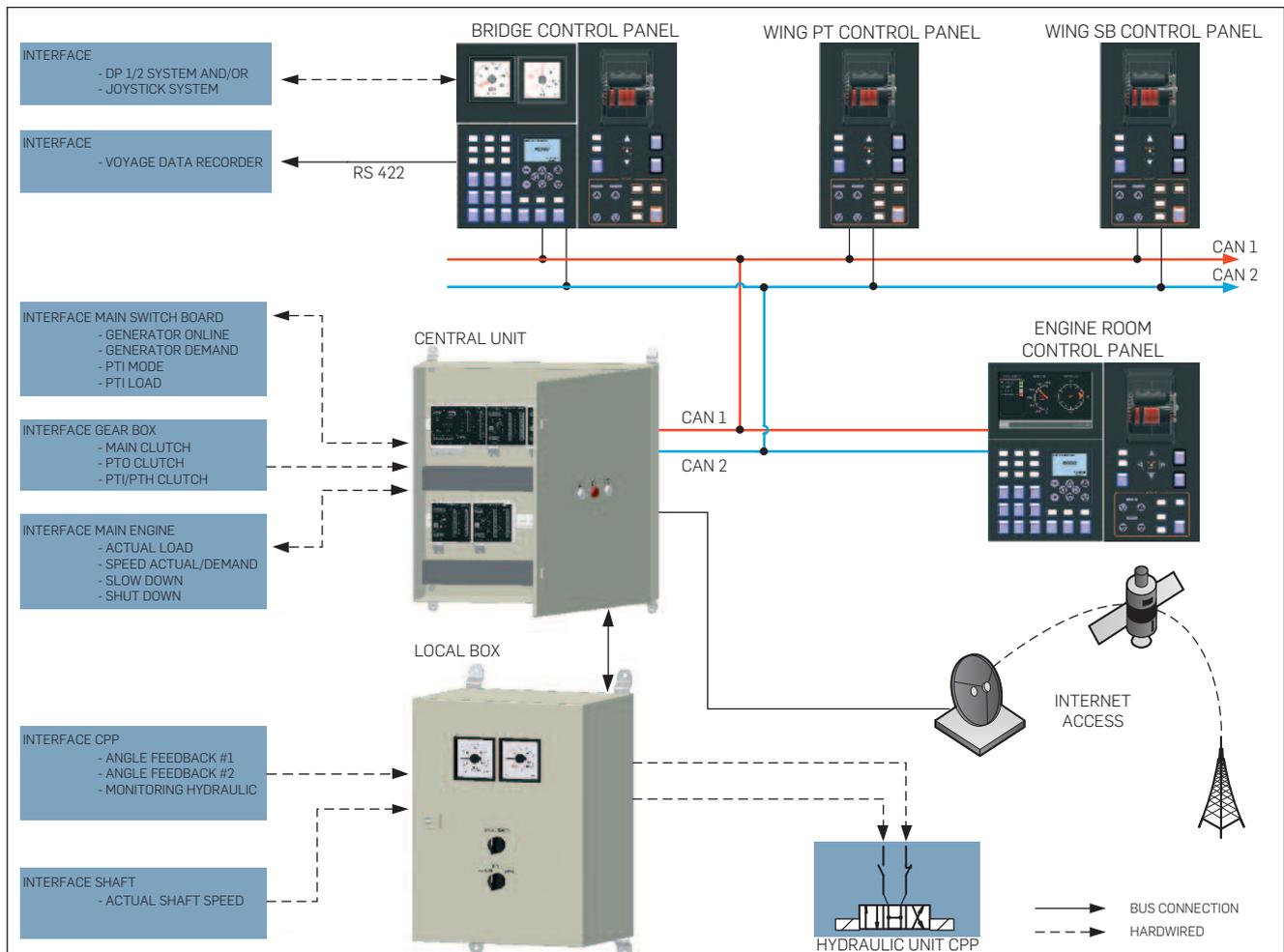
REMOTE CONTROL FOR THE SCP

The remote control system is designed to provide automatic control of a SCHOTTEL Controllable Pitch Propeller. It is based on a microprocessor-controlled system architecture with 2-wire bus communication between central unit, ECR and bridge. An HMI (human-machine interface) allows clear, user-friendly control, set-up and maintenance.

The system is type-tested to GL, LRS and ABS (other classes on request) and meets class requirements according to AUT24 and UMS.

It is powered with 24 V DC. A separate supply should be provided for the back-up system.

Remote access to the system from shore or office is available via Internet due to an integrated webserver.



Typical system layout

MEETING YOUR DEMANDS WITH THE RIGHT PROPELLER DESIGN

DESIGN DEPENDS ON EXPERTISE

Designing a CP propeller blade is a complex process, requiring an extensive range of expert knowledge in the specialized fields of fluid physics and mechanical engineering. In addition to hydrodynamic blade design, the calculation of hydrodynamic loads and their effects when the blade pitch is changed in various operating conditions are of great importance.

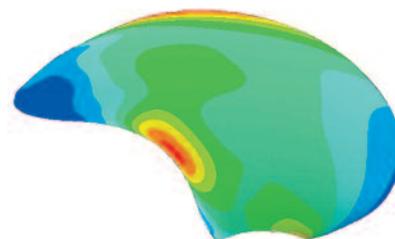
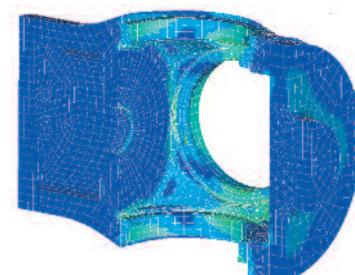
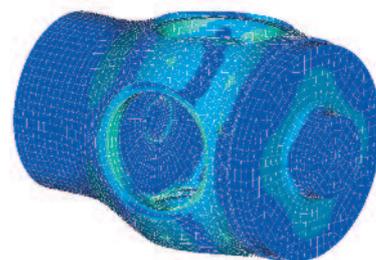
In order to provide advanced blade shapes and to satisfy ever growing requirements, latest calculation methods are applied, refined continuously by means of research projects carried out in cooperation with research institutes.

The blade design is initially executed through the use of circulation theory verification and optimization techniques. Here SCHOTTEL employs two tried-and-tested methods developed at the HSVA in Hamburg and the SVA in Potsdam, which are currently the most powerful programs in existence. Open water diagrams, pressure distribution, cavitation and pressure fluctuation properties are calculated for all relevant operating states in the vessel's wake.

In addition to close cooperation with research institutes, SCHOTTEL also draws on the invaluable years of experience of leading experts in the field of propeller design.

The strength of the blade is verified through the use of FEM (Finite Element Method), achieving the optimum combination of mechanical expedience and hydrodynamic efficiency. Almost every propeller undergoes extensive model tests, where it must prove that it actually possesses the required characteristics with regard to efficiency, cavitation and pressure fluctuations.

In these tests the SCHOTTEL design regularly competes head-to-head with technology from other suppliers, and as the results show, SCHOTTEL produces some of the best propeller designs on the market.



DIGITAL PROTOTYPING WITH FEM

Calculation of natural frequencies and eigenforms using FEM for optimal design of the component.

QUALITY – COMMITTED TO DURABILITY AND RELIABILITY

QUALITY MEANS MEETING EXPECTATIONS

Delivering quality is not just a question of good will. We develop and build propulsion systems which have to prove themselves under the toughest conditions in worldwide service. We are responsible for ensuring that these systems can be optimally commissioned, operated and maintained – a fact which our employees are acutely aware of. We see our work as an elementary link in our customers' value creation chain.





DOUBLE-ENDED FERRY COASTAL INSPIRATION

2 x SCP 141/4-XS (11,000 kW each)



1036 TEU CONTAINER VESSEL STEFAN SIBUM

1 x SCP 141/4-XG (9000 kW)



HEAVY LIFT VESSEL ANNE-SOFIE

1 x SCP 154/4-XG (12,600 kW)



OFFSHORE SUPPLY VESSEL DIONNE CHOUËT

2 x SCP 077/4-ZG (2110 kW each) / 2 x STT 1010 T-LK CP (1000 kW each)



RORO CARRIER CITY OF HAMBURG

2 x SCP 91/4-XG (4000 kW each)



220 T OCEAN-GOING TUG JANUS

2 x SCP 119/4-XG (7000 kW each) / 3 x STT 330 T-LK CP (400 kW each)



45-M YACHT MARCO POLO

1 x SCP 050/4-XG (1425 kW) / 1 x SPJ 57 RD (235 kW)



CONRO CARRIER MAZARINE

1 x SCP 141/4-XG (10,800 kW)

PROFESSIONAL PARTNERSHIP – THROUGHOUT THE VESSEL'S LIFE

As a SCHOTTEL customer, you benefit from individual, in-depth advice and support at all stages of a project, from planning and commissioning through to preventive maintenance.

A dense worldwide service network is ready to offer assistance and ensures the swift supply of spare parts – along with experienced SCHOTTEL technicians if required.

The name of SCHOTTEL traditionally stands for quality in engineering, with over 90 years of experience in design and the precision workmanship of a family-owned enterprise. Our innovative propulsion systems are a byword for reliability and high performance and set standards in global shipping.

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