SERVOGEAR

servogear.no

PROPULSION EFFICIENCY BEYOND BELIEF

Workboats | Fast Ferries | Offshore | Yachts

BEYOND BELIEF

Servogear Ecoflow Propulsor™ is the superior propulsion concept for fast moving vessels. “Propulsion efficiency beyond belief” is a bold statement, but the proven results are truly ground-breaking.

Both tank and full scale verification tests document that the EcoFlow Propulsor™ concept is more efficient than any other propulsion for high speed vessels operating in the range of 20- 50 knots. This results in reduced fuel consumption, emissions and operating costs.

EcoFlow Propulsor™ provides a unique combination of high speed and thrust.

CONTENT

SUPERIOR PROPULSION EFFICIENCY

SERVOGEAR EcoflowPropulsor™

Servogear Ecoflow Propulsor™ is a unique controllable pitch propeller system for high speed workboats, fast ferries, offshore vessels and yachts. The concept offers an optimal combination of speed, bollard pull, manoeuvrability and fuel efficiency.

Through continuous theoretical and practical research since 1973, we have developed an incredible efficient system, which today runs successfully on a large number of vessels worldwide.

Our unique propeller tunnel ensures an optimal water flow entering the propeller. Together with other detail improvements, this provides the best possible working conditions - resulting in a smooth and efficient propeller thrust.

Efficient propulsion leads to lower fuel consumption, more economic operation and less emissions. Servogear EcoFlow Propulsor™ combines its efficiency with a high level of comfort.

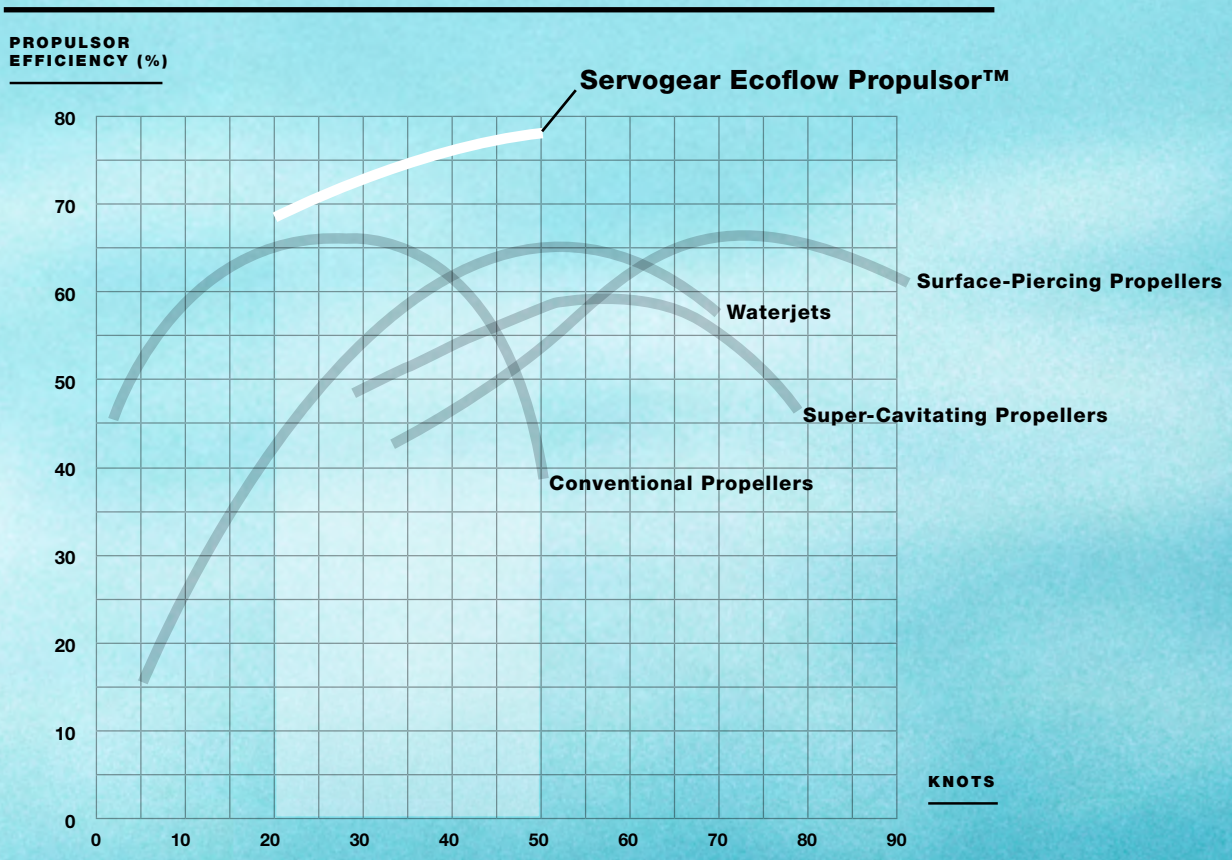
Servogear Ecoflow Propulsor™ covers an engine range from 300 to 4000 kW and speed up to 50 knots.

ADVANTAGES:

- Improved fuel economy
- Reduced NO_x and CO_2 emissions.
- A unique combination of high speed, superb acceleration and ample bollard pull
- Wider operational range
- Reduced hull resistance
- Slimmer and more efficient equipment
- Reduced levels of noise and vibrations

PROVEN EFFICIENCY

Tank and full-scale verification tests have proven that the Servogear Ecoflow Propulsor™ is more efficient than any other known propulsor concept available for high speed vessels operating in the range 20 - 50 knots.



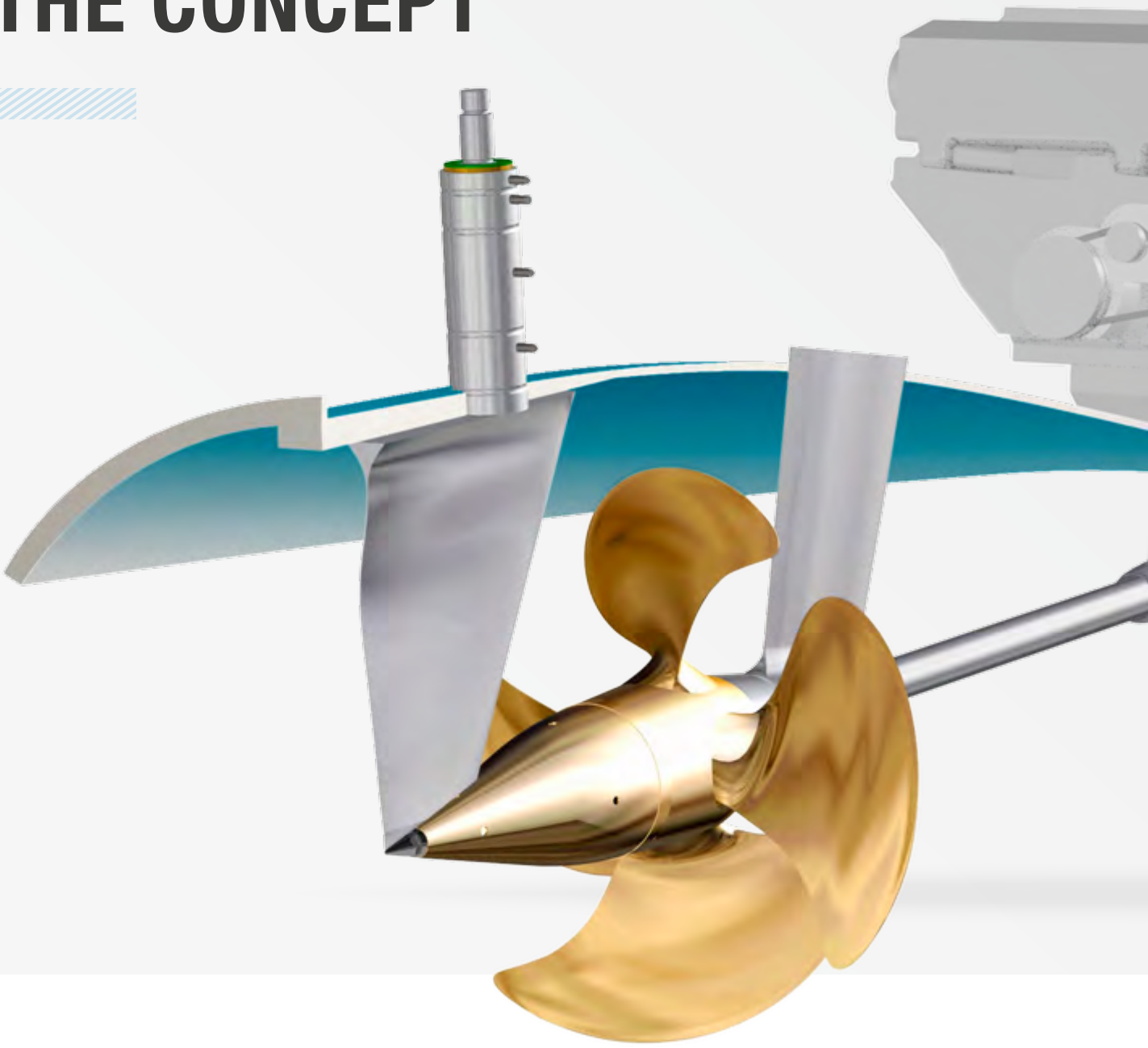
Test results:

This graph shows the typical efficiency of different propulsors (Marintek). Results from tank test and full scale verification tests with an optimized Servogear Ecoflow Propulsor™ have been plotted in for the purpose of comparison. The tests were conducted by SSPA in Sweden and Marintek in Norway.

Servogear Ecoflow Propulsor™ operational range is 20 - 50 knots.

SERVOGEAR EcoflowPropulsor™

THE CONCEPT



PROPELLER TUNNEL

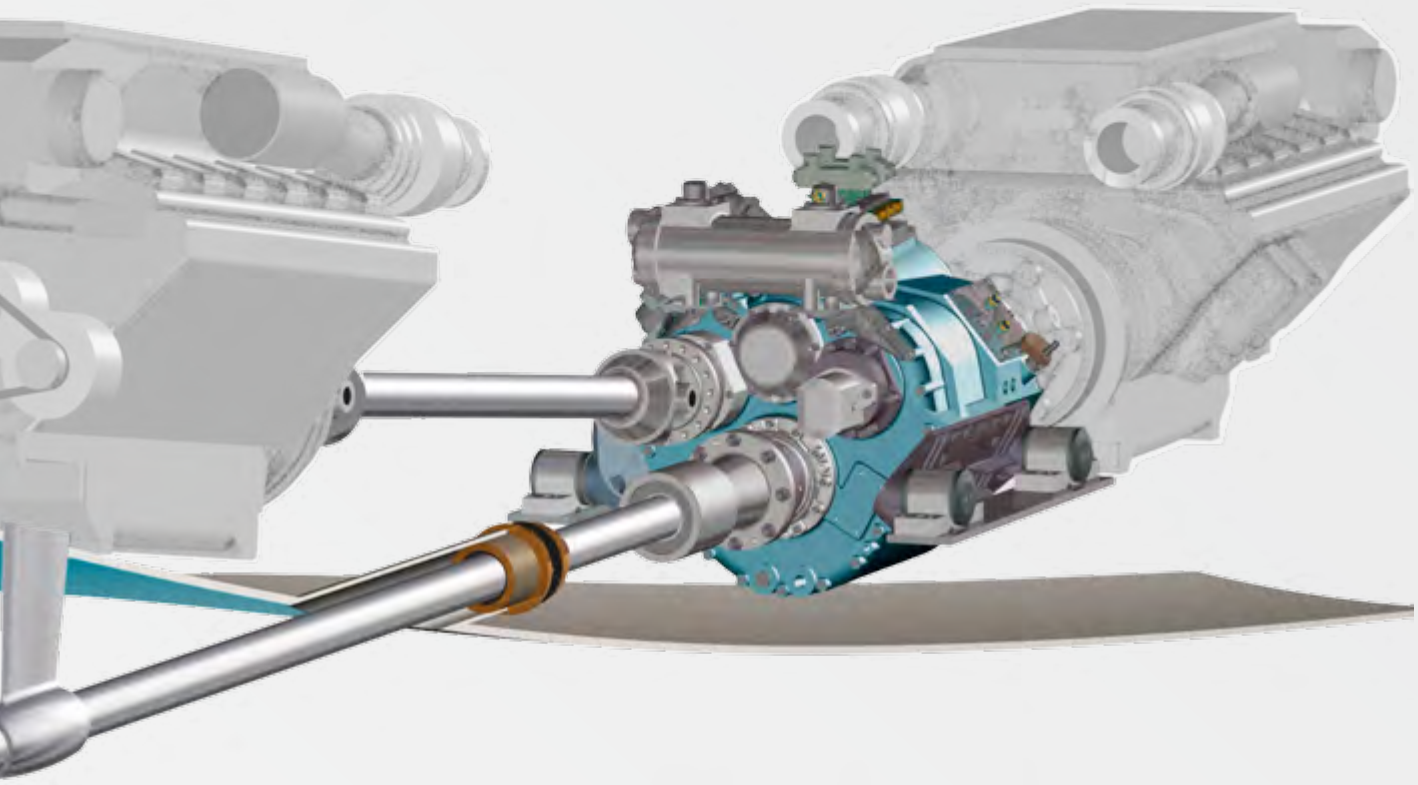
Servogear's unique propeller tunnel designs ensure optimal performance for the propulsor.

EFFECT RUDDER

Asymmetric airfoil design rudders combine minimal drag with the creation of forward thrust.

CONTROLLABLE PITCH PROPELLER

Servogear's unique, well-known and proven CPP design ensures a number of benefits compared to fixed pitch propellers and water jets.



SHAFT BRACKETS

The slim design reduces drag for high speed operations up to 50 knots.

GEARBOX

Reduction gearboxes are part of the Servogear Ecoflow Propulsor™ solution. The special design offers advantages and possibilities for versatile configurations, with built in PTO's for auxiliary equipment.

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Read on for details.

SERVOGEAR CONTROLLABLE PITCH PROPELLERS

The controllable pitch propellers (CPP) are the centrepieces of our EcoFlow Propulsor™ systems. It's a thoroughly tested and proven design, with both hubs and blades made of strong and durable NiAlBz material.

The Servogear EcoFlow propellers are ideal for vessels operating under varying load and speed conditions. Pitch actuation is performed through a mechanical connection from the propeller blades to a hydraulic actuation system inside the gearbox. This is a very simple and robust solution, which requires minimal maintenance work.

Our CPPs can also have feathering position capabilities. This feature can be used by vessels to minimize drag and speed loss while sailing - or by multi-screw motor vessels for special operational conditions. This results in a significant improved fuel economy in transit/steam.

IDEAL FOR VARYING CONDITIONS

SERVOGEAR ECOFLOW PROPELLERS COMPARED TO FIXED PITCH PROPELLERS

Better acceleration:
Acceleration of a vessel with CPPs is considerable better than with fixed pitch propellers (FPPs). With CPPs the pitch can be increased as the vessel speed and load increase. For a FPP the pitch will be too high during acceleration, and can overload the engines.

Higher efficiency:
In general, when operating a vessel in various off-design conditions, the efficiency of a CPP is far better than for a FPP. If there are high variations in the displacements on the vessel, i.e. if a vessel is going from running fully loaded in strong wind ahead to running empty in tailwinds, a CPP provides much higher total efficiency than any other propulsion system.

Smooth and precise steering:
CPPs ensure smooth and precise steering at all speeds, with no sudden movements. When running in harbor areas, the vessel speed can quickly be reduced all the way down to zero knots.

Automatic overload control:
Most of today's vessels are equipped with automatic overload control systems as integrated parts of the propulsion control systems. Should the engine be overloaded, a propulsion system with CPP can reduce the pitch automatically down to the programmed load curve.

Optimal engine performance:
With a CPP the engines can run optimal in all loads and weather conditions.

THE RIGHT SPEED AND THRUST – WHEN YOU NEED IT

SERVOGEAR REDUCTION GEARBOXES

Servogear supplies reduction gearboxes as an integrated part of our Ecoflow Propulsor™ systems. Our special gearbox design offers advantages and possibilities, especially if space is a limitation.

All gearboxes are class approved by DNV, have an integrated servo system for CP propellers, and are available with PTO's.

KEY ADVANTAGES/ FEATURES:

- Gear housing in cast iron ensures low noise excitation
- A very compact design, with a rounded bottom to obtain a limited shaft angle
- Possibilities for PTO drive
- High quality gear wheels ensure low noise levels
- Integrated servo system for pitch alteration
- Custom built gearbox mountings
- Tailor-made gearboxes

FLEXIBLE CONFIGURATIONS

We offer full customization of shaft arrangements. The following illustrations show some of the most usual configurations.

H-GEAR CONFIGURATION

This configuration is recommended wherever the space in the vessel, or the vessel's trim, allows it. The arrangement is simple and light. It also has normal reduction of noise and vibrations.

U-GEAR CONFIGURATION

This is the best solution if space considerations or the vessel's trim require the engine to be located as far as possible towards the stern.

PTI-GEAR CONFIGURATION

This is the most flexible configuration. The propeller can be run optimally on one or two engines, depending on the desired speed. This arrangement provides extra good operational reliability. Because of the position of the engines, this configuration fits well into the hull of a catamaran.

SERVOGEAR TUNNEL DESIGN

Conventional propulsors, such as propellers or water jets, work most efficiently in open water conditions. In Servogear we develop tailor-made propeller tunnels which actually provide greater propulsion efficiency below a hull than in open water. The propeller tunnel itself also reduces hull resistance.

OUR UNIQUE HULL SOLUTION

OUR PROPELLER TUNNELS OFFER SEVERAL ADVANTAGES

Optimal flow into the propeller:

A Servogear propeller tunnel is designed according to the propeller momentum theory and will therefore secure optimal water flow through the propeller. The shape of the tunnel is designed in accordance with the contraction of water flow calculated from the propeller momentum theory. The tunnel is tailor-made for each project.

Optimal propeller diameter:

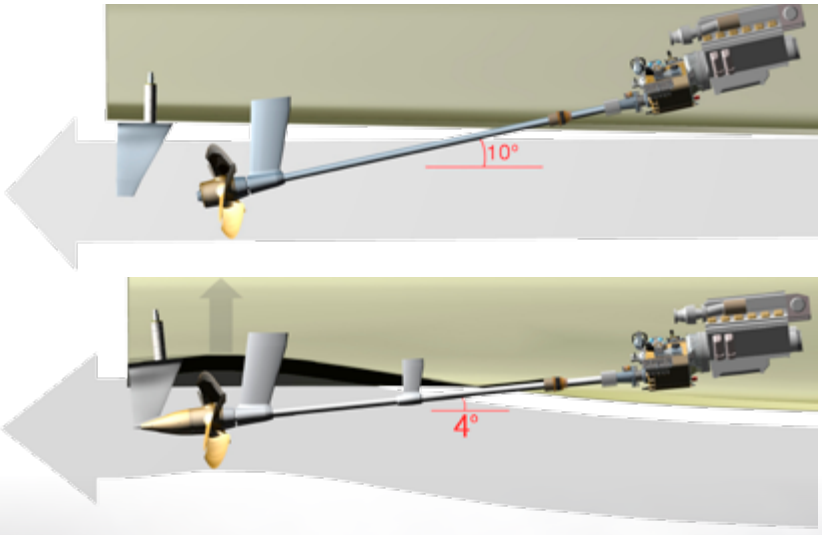
Normally, the propeller diameter is limited by the tip clearance and the draft. Servogear's propeller tunnel provides space for a propeller diameter that enables the largest possible diameter with minimum shaft inclination. This result in higher propulsion efficiency, as well as low noise and vibration levels.

Reduced shaft angle:

The propeller tunnel also minimizes the shaft angle and reduces the thrust variation on the propeller. This increases the lifetime of the equipment significantly. The reduced shaft angle also decreases drag caused by shaft, brackets etc.

Reduced hull resistance:

Based on experience from sea trials and model tests, a propeller tunnel normally reduces the hull's resistance in water. The reduction in resistance is caused by less transom area, which again reduces the loss in stern wave energy.



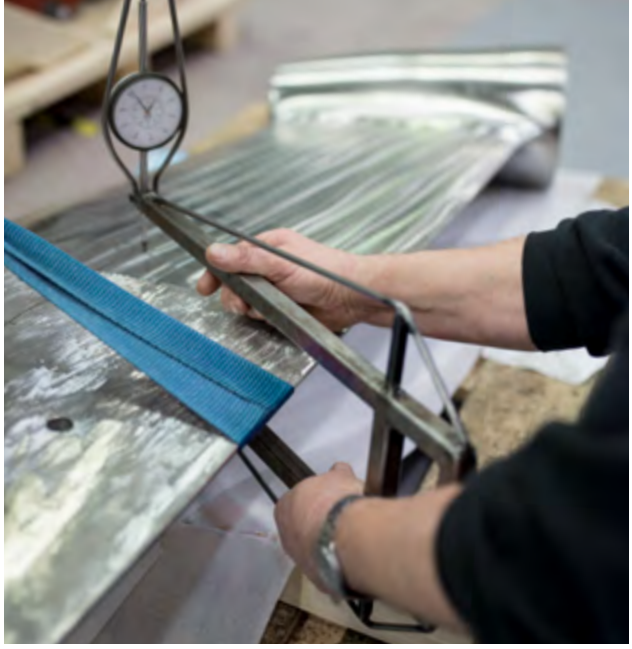
SERVOGEAR EFFECT RUDDERS

Our effect rudders are designed as an airfoil, providing a lift in the water flow which again produces a forward thrust. This results in a minimum drag on the rudder.

The arrangement of the effect rudder and propeller cone is designed to gain some of the loss of rotational energy in the slip stream. The inclined water flow from the propeller generates a pressure and a suction side on the rudder blade. The seal between the rudder and the propeller cone forces the pressure balance to work in opposite direction of the rotating water flow from the propeller. This reduces the loss of rotational energy.

Most of Servogear effect rudders are made of high tensile stainless steel castings to reduce the blade thickness to a minimum, and they are also designed with progressive strength (For explanations, see the chapter about shaft brackets).

SUPERIOR STEERING WITH ADDITIONAL THRUST



SERVOGEAR SHAFT BRACKETS

Due to design and location, our shaft brackets causes minimum drag and resistance. They also ensure no cavitation and improved steering performance.

The brackets are of heavy-duty single leg design. They are cast in high tensile stainless steel and NiAlBz.

Servogear shaft brackets are also designed with progressive strength. This means that the section modulus of the bracket leg is decreasing from the hull intersection to the bracket barrel. Should a severe grounding occur, the bracket will deform as a “J” – avoiding serious damages like cracks and leakages in the hull. This is an important safety feature. Normally, the shaft brackets can be straightened easily – without the need for replacements.

WE PROVIDE OPTIMAL PROPULSION FOR YOUR VESSEL

WORKBOATS

Depending on the type of operations, workboats have highly variable propulsion requirements. Servogear Ecoflow Propulsor™ has all the necessary properties needed for most fast multi-purpose workboats: High speed, superb towing capability, excellent manoeuvrability and superior vessel control in adverse weather conditions.

Our propeller tunnel reduces the draught and gives the propeller better protection against floating debris.

A tailor made control system for wind farm service vessels has been developed in cooperation with Scana Mar-El, to ensure optimum interaction between the propulsion system and engine. By the press of a button, the wind turbine landing mode takes full advantage of the extreme manoeuvring abilities of the CPP, giving you pinpoint manoeuvring accuracy when approaching and making first contact with the wind turbine.

When safe mode has been activated, full bollard thrust is achieved within seconds without overloading the engines, allowing safer transfer of personnel and goods. In addition, our engine overload protection is proven to prolong engine ife and time between overhauls.

FAST FERRIES

Servogear EcoFlow Propulsor™ offers a number of advantages for high-speed passenger vessels. Our all-inclusive approach makes the concept more efficient than any other known concept on the market. It enables the most economical operation, generating extensive savings for the owners of the vessel without compromising speed and regularity. Lower fuel consumption also protects the environment from harmful emissions.

Servogear Ecoflow Propulsor™ combines efficient propulsion with a high level of comfort. It is most reliable in operation and non-sensitive to load changes – an important feature for regular scheduled services.

Safe, reliable and environmentally friendly transports are vital to success in today's passenger transportation.

OFFSHORE

Speed, range and the ability to operate in rough weather are key features for fast offshore vessels. The Servogear Ecoflow Propulsor™ concept delivers in all these areas.

Compared to other propulsors, an offshore vessel with a Servogear solution has higher top speed, higher bollard pull and superior towing capabilities, as well as a significantly better ability to keep up the speed in severe weather conditions. In addition, vessel speed is also affected less by heavy loads.

Our system provides a wider distance range and a significantly higher efficiency at off-design conditions and heavy displacements.

Multi-screw engine vessels can also be installed with feathering position of the propeller blades to minimize resistance. This results in a significantly improved fuel economy in transit/steam.

YACHTS

Servogear EcoFlow Propulsor™ concept has been developed especially for high-speed vessels, where economical running with light equipment of high quality and finish is essential.

Our solutions reduce draught and allows for smooth and precise manoeuvring without abrupt movements. A vessel can be operated optimally in all conditions, right down to zero knots.

Servogear Ecoflow Propulsor™ is quiet-running and efficient, resulting extended operating time between each refueling.

Our state-of-the-art, strong and light propeller can also be supplied with feathering position capabilities for sailing. With its minimal resistance it is highly suitable for sailing yachts. The controllable pitch propeller provides a unique combination of long range when running on engines, and minimal loss of speed when sailing.

AFTER SALE & SERVICES

WORLDWIDE & 24/7

Servogear's service division is there for you whenever you need it, and we always have a large selection of spare parts in stock. Our service personnel are well qualified and dedicated persons with long experience in the business.

Our After sale & Service organization allows for some of the service work to be carried out by experienced local mechanics who receive assistance or training from our service office. You can contact our after sale office either directly or through our local agent at any time.

24/7 SERVICE
+47 40 40 13 85

REPRESENTED IN:

- Australia
- England
- France
- Singapore
- China
- USA

Please contact main office for representative and service partner details. You can find our contact information on the backside of the brochure or on our website **servogear.no**

SOLVING CHALLENGES

Torleif Stokke
Managing Director

The ocean never runs out of challenges to send our way ... It's just as well we enjoy solving them.

We meet our challenges through our customers' wishes and requests which we listen to with great enthusiasm. To achieve the best results we seek to establish close and fruitful collaboration with all the involved parties at the earliest possible stage of each project. For our calculations and designs we use the very latest computer technology, including specially developed software.

Servogear puts great importance on job satisfaction and professional development opportunities for our capable employees. This has resulted in a loyal and innovative staff with a high level of integrity and service-mindedness, serving the best interests of our customers and partners. Today, this enables us to offer our customers the very best total concept customized to fit the requirements of each individual craft.

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