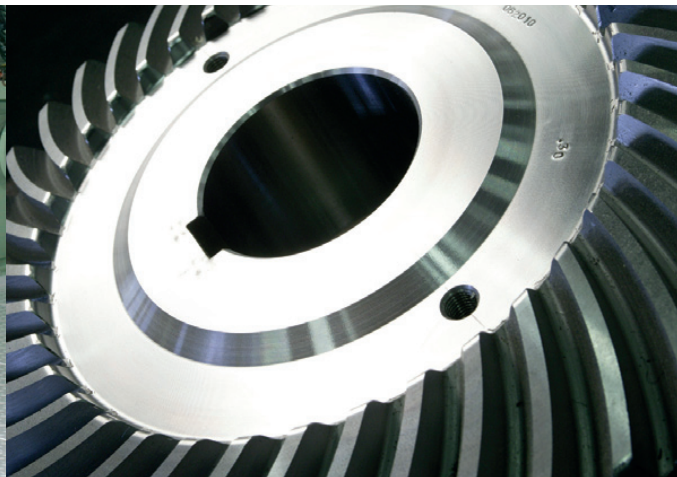
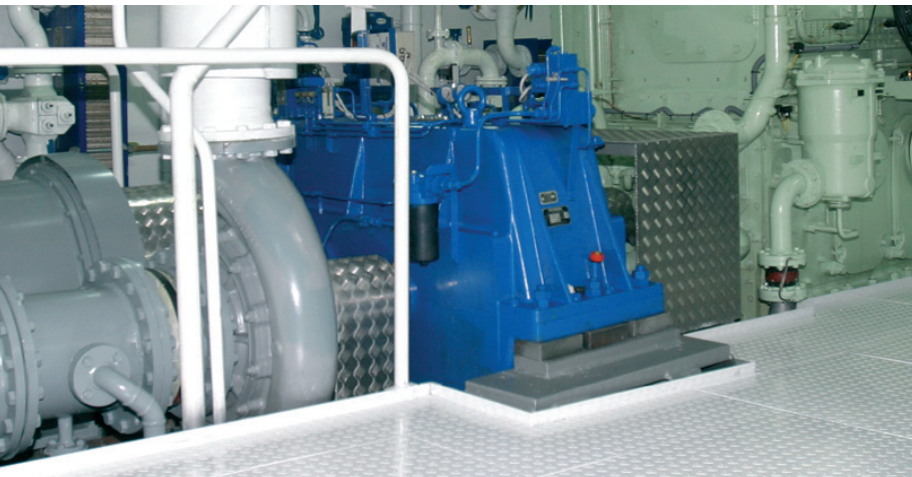


Norgear Hybrid Propulsion gears for Tugs & Workboats

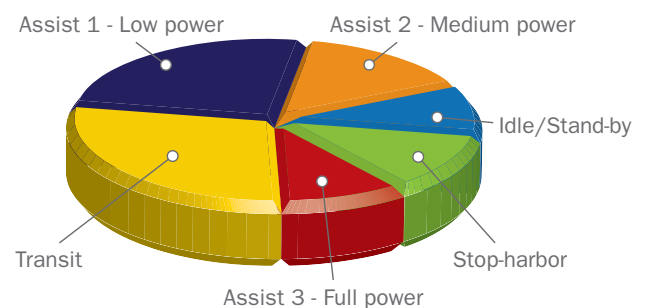


Norgear Hybrid gears

Operating modes for hybrid drive concepts

The operating modes for the tug or the workboat decide the fuel and emission reductions which can be expected. A harbor tug is used for a large variety of tasks with various speeds and bollard pull. Depending on the vessels operating pattern considerable fuel savings can be achieved. In some cases fuel savings up to a level of 40-50 % can be obtained with hybrid drives.

The classic operating modes for a harbor tugs are; stop-harbor, idle/standby, transit, with loads from low, medium and up to full load. A study of operations over time will indicate the vessels operating profile.



In order to meet present and future environmental requirements the hybrid propulsion system offers the following benefits

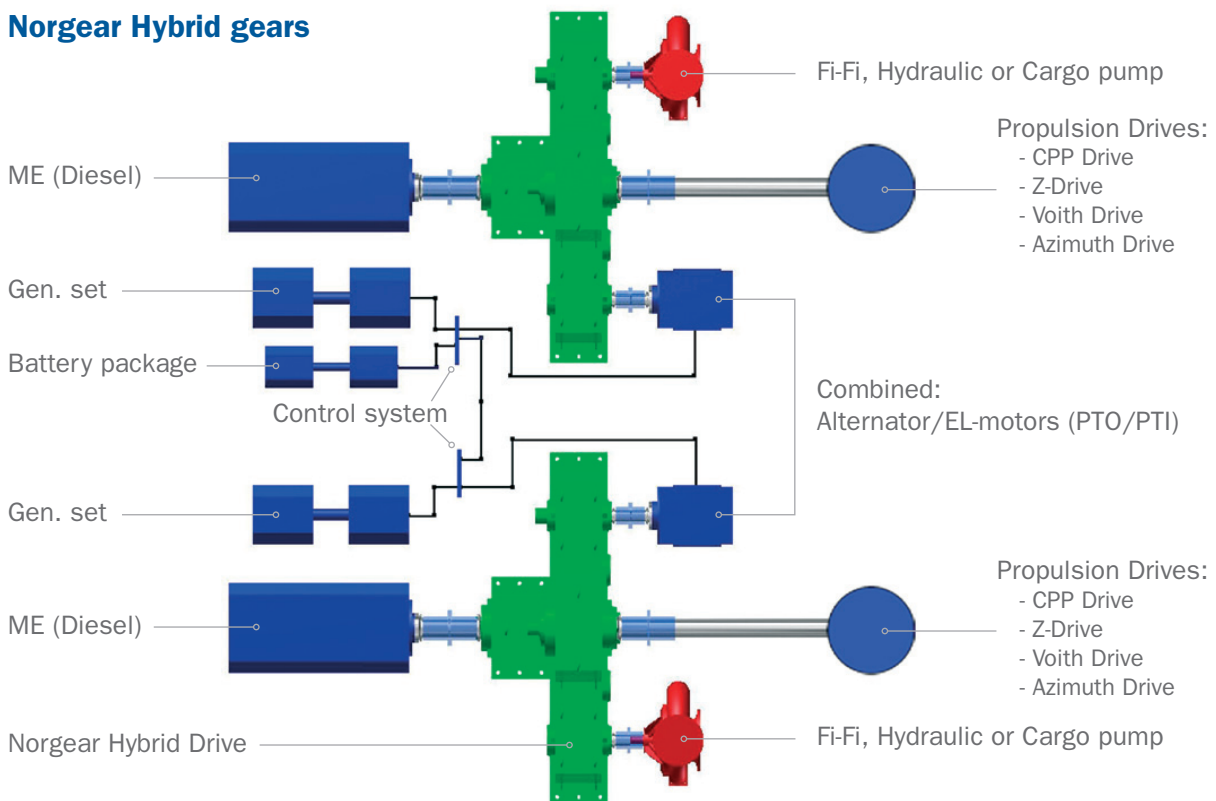
- Reduction of fuel consumption and emissions (CO₂, SO_x and NO_x).
- Downsizing of main engines with electrical boost for max bollard pull.
- Reduction of noise level in most operating modes.
- Improved redundancy.
- Reduced main engine operational hours and reduced service costs.
- Modular system with integrated auxiliary drives for Fi-Fi, Hydraulic and Cargo pumps.
- Satisfies ECA requirements allowing versatile operation in more geographical areas.
- Improves present and future design factors (IMO/EU).
- Meets main contractors and operators demand for “green profiles”.
- Access to Official financing and TAX refund (NO_x) now available in some markets.
- Improved competitive power through innovative technical solution.



Main operating modes for Norgear Hybrid systems

- Main engine (diesel) drive.
- Electric drive from generator sets and/or battery package.
- Power boost from main engine and electric drive for max power.
- Electrical power supply from generator sets or from main engines.
- Auxiliary drives from each main engine or from generator sets.

Norgear Hybrid gears



The Norgear Hybrid gears are available with and without auxiliary drives for Fi-Fi, Hydraulic and cargo pump drives. Built in multidisc hydraulic clutches with soft engagement are standard.



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Norgear Hybrid Propulsion gears for Tugs & Worksboats

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