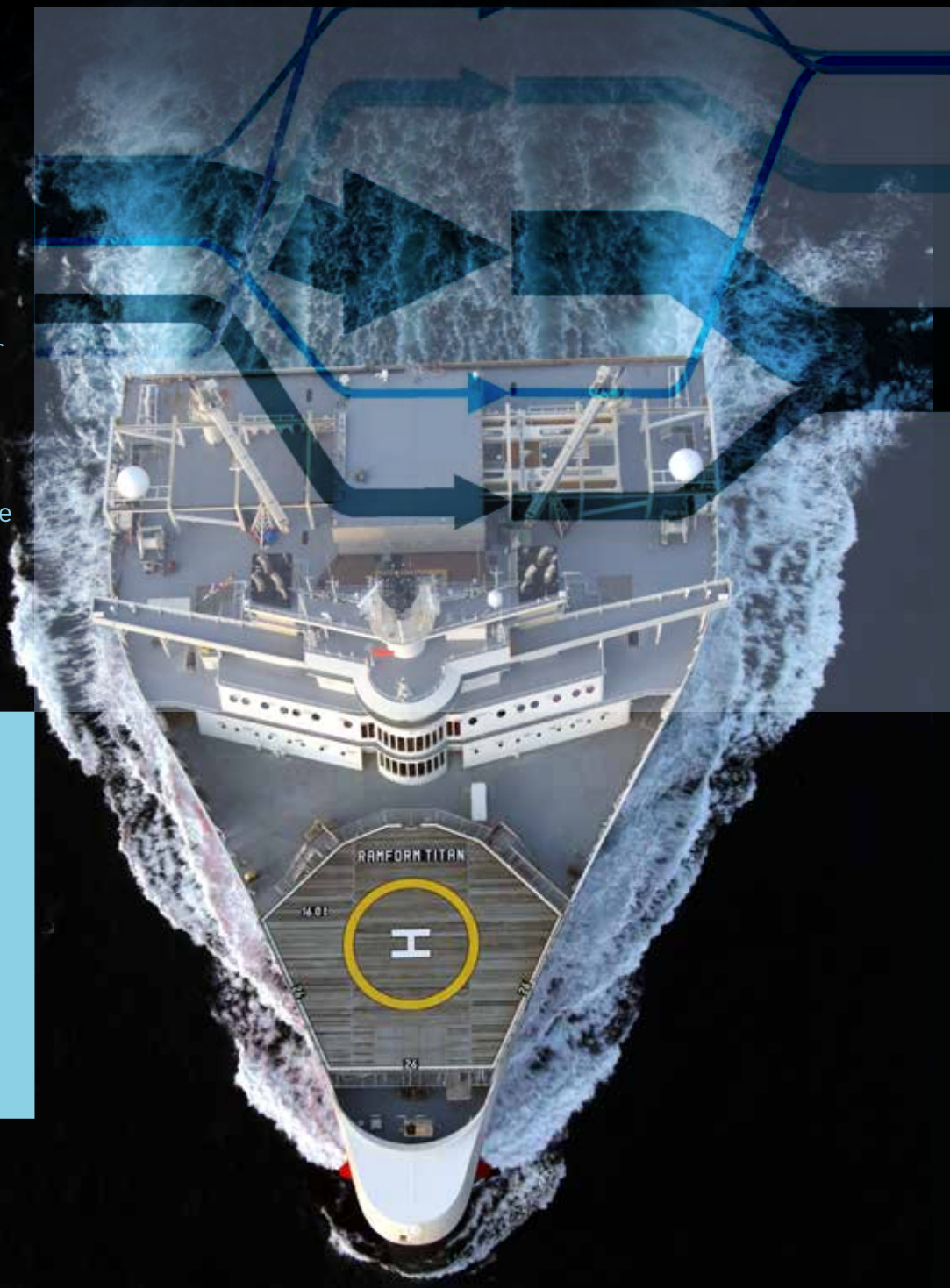
høglund
POWER SOLUTIONS

Variable speed shaft generator

Optimise your onboard power plant

- Enjoy savings of between 5-20%.
- Increase operational flexibility by installing a modern, future proof IGBT-based variable speed shaft generator system.
- Run your auxiliary generator during slow steaming operations to extend maintenance periods on the main engine.
- Install a smaller main engine by utilising the boosting function where there is a high energy demand from the propeller.



Benefits

- Cheaper energy
- Reduced propeller loss
- Reduced maintenance costs
- Operational flexibility
- Increased ship safety

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Variable speed shaft generator: operation modes

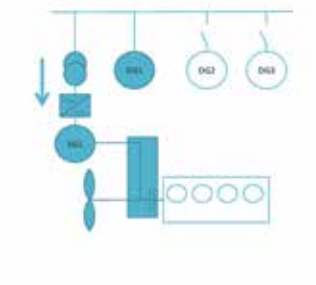
Power take in (PTI)
The shaft generator is used as a motor – driving the propeller with electric energy being produced by the diesel or gas generators.

Power take out (PTO)
The shaft generator is used to take out excessive energy from the main engine to power the ship's grid. This increases the efficiency of the main engine as well as eliminating the need for auxilliary generators while the main engine is running.

Boost mode
By fitting a VSSG system, a smaller main engine can be installed and boosted by running the main engine and the shaft generator to power the propeller. This increases power in demanding operations like towing or icebreaking.

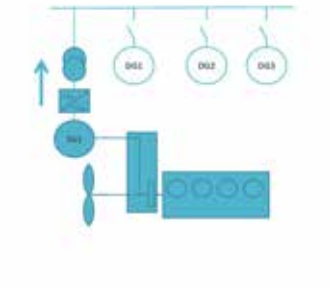
Variable speed mode
The auxilliary generator can be run at variable speeds to optimise the power capacity to match the power demand. This operation mode decreases not only fuel consumption, but also noise and exhaust emission levels.

OPERATION MODE: PTI

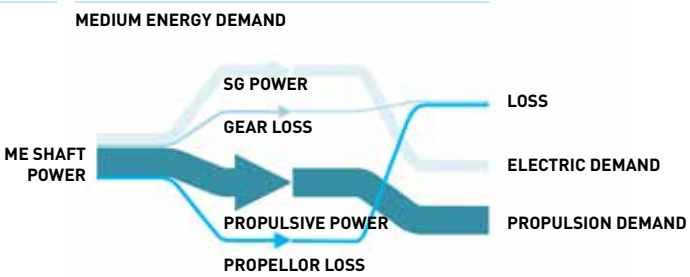


LOW ENERGY DEMAND

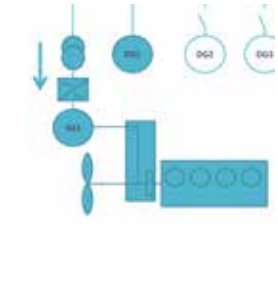
OPERATION MODE: PTO



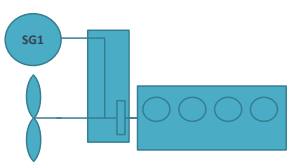
MEDIUM ENERGY DEMAND



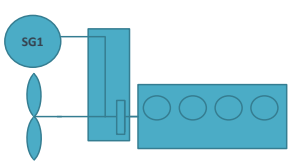
OPERATION MODE: PTI + BOOST



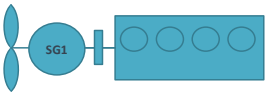
HIGH ENERGY DEMAND



Electric machines
Induction machine connected to PTO shaft
- Standard industrial motor
- PTI operation from zero speed
- Robust construction
- Low purchase price



Synchronous machine connected to PTO shaft
- High efficiency
- Standard generator used
- Enables bypass of drive at fixed speed

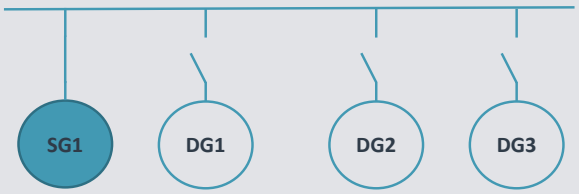


PM Synchronous machine connected directly onto propeller shaft
- High efficiency
- 2-stroke application
- High power density
- Flexible production
- Long service life

Drives and transformer
- Compact water cooled
- Standardized power modules
- Easy servicing. Crew can replace power modules with limited training.
- Remote connection with full support to reset alarms and change parameters. Reduces MTTR.
- Connection direct to LT system on ship, no need for special cooling water system.
- Isolating transformer assures galvanic insulation.

Variable speed shaft generator

FIXED SPEED SHAFT GENERATOR



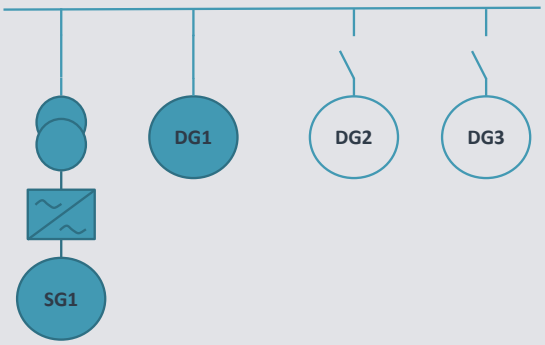
Characteristics of a fixed speed shaft generator

- Can be optimised for design speed.
- Can not run in parallel with diesel generators (DG).
- Needs to be designed for full load.
- Needs fixed speed engine.
- Ship's speed adjustment using pitch control only.
- Vessel efficiency will decrease if operated outside of design speed and design draft.

Characteristics of a variable speed shaft generator

- Can be optimised for different vessel speeds.
- Can run in parallel with diesel generators. If load is increased a diesel generators can start and run in parallel.
- Vessel efficiency can be optimised across a wider speed variant and draft area.
- Main engine speed can be optimised according to propeller curve, increasing propeller efficiency.
- A smaller main engine can be installed.
- Propeller efficiency is best at design pitch

VARIABLE SPEED SHAFT GENERATOR



Newbuild and retrofit applications
A variable speed shaft generator system can be retrofitted to any vessel with an existing shaft generator. The actual machine can be reused if found to be compatible with a variable frequency drive (VFD) operation. For new builds, integration of a variable speed shaft generator does not require any special considerations from the ship yard.

Easy debugging and troubleshooting
The Genius Modular Redundancy (GMR) Human machine interface (HMI) software delivers a wide range of debugging and troubleshooting capabilities.

Playback
Høglund's bespoke solution comes with a data logging facility which can easily be played back if there are issues with the system. The operator can also use this function to monitor the nominal working values of the system at any time.

Remote connection
If a remote connection option is installed, Høglund engineers will log onto the system, perform remote troubleshooting and implement programme changes. 95% of all operational issues are solved remotely. Ship owners benefit through lower mean time to repair (MTTR) hours and reduced service costs.

Seamless integration
By selecting a Høglund control system it is simple to mix and match with other Høglund systems and amalgamate all the data within one presentation interface. Interfaces for other IAS vendors are also available.

Modular approach
Both hardware and software modules are designed as changeable units with clear interfaces. This approach enables future retrofits and upgrades by replacing only the faulty or obsolete unit.

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