

Hybrid electric power and propulsion systems

Operational features and benefits

- Broad power range up to 2 MW
- Utilises Ultra's power dense electric motor and drive technology
- Improved fuel efficiency and environmental performance across the operational profile
- Prolonged service intervals of the main engines
- Maintenance access to main engines whilst en-route
- Configurable to regenerate electrical power from the main shaft to support the platform's energy needs
- Ultra's power dense technology enables insertion into existing platforms and designs

Ultra Electronics PMES is an established supplier of power conversion and control systems for naval and energy applications worldwide.

The trend to increased electrification of naval and marine vessels and the need for improved fuel economy, has resulted in the growing demand for hybrid electric propulsion. To meet this need, PMES is able to provide state-of-the-art solutions utilising power-dense electric motors (PDEM) and their associated Power Dense Motor Drives (PDMD).

PMES's capability builds on core competencies in power and system engineering and in-house design and manufacture of innovative power dense electric drive and electric motor solutions.



Power dense drives



Power dense motors

Applications

- Ships and submarines
- Hybrid electric propulsion
- Emergency propulsion
- Shaft line power generation for ship services (PTO & PTI)

Design benefits

- Essentially the system comprises a Power Dense Motor Drive (PDMD) driving a Power-Dense Electric Motor (PDEM) coupled to the main-engine gearbox.
- The motor occupies much less space and lower weight than conventional motors, providing significant volume

and weight savings.



- The motor controller is a digital solid-state Power-Dense Motor Drive that is also of small size when compared to its commercial equivalent.
- This compact system provides greater freedom to the designer to position the equipment to best advantage and operational benefit to the end-user. Such aspects offer significant advantages for vessels where weight and space budgets are constrained.



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- The maximum space and weight benefit can be realised by closely integrating the motor with the gear box, without the need for a clutch.
- Wild heat conveyed to the machinery space is minimised through this arrangement.
- When using the main engines, this slow speed drive system is inherently capable of continuously regenerating electrical power to act as an additional electrical generator to supply the platform load. This can be used to improve electrical power availability and system simplicity and efficiency.



Three OPVs built by BAES Surface Ships for the Royal Navy of Oman, utilises Ultra's PDMD technology

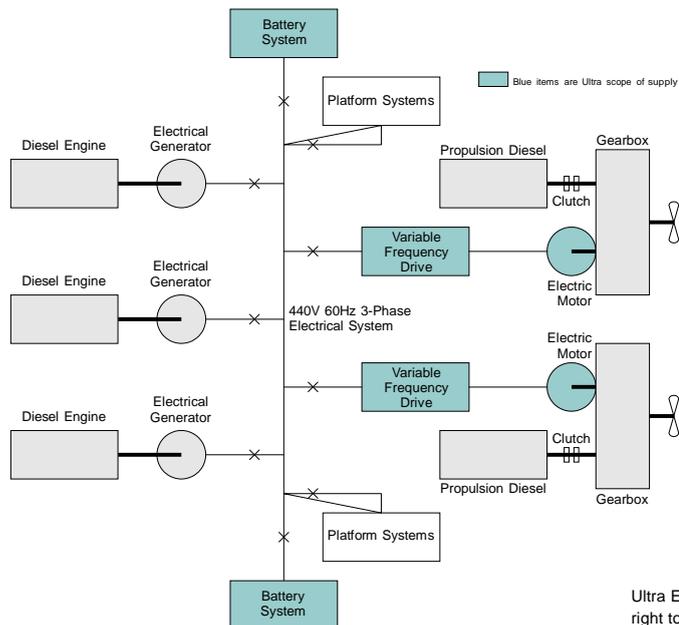
Typical system specification

Rated power	100 kW to 2 MW
Supply voltage	Up to 690 V rms
Speed range	Up to 15,000 rpm
Cooling	oil or water
Enclosure	IP56
Motor can be flange or foot mounted	

Optional

- Braking unit "Chopper" for protecting PDMD against unwanted regenerative power
- Subject to Lloyds Register certification

Hybrid electric propulsion system



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