

Wärtsilä HY

The first integrated hybrid power module in the marine industry

PRODUCT LEAFLET



Wärtsilä has leveraged its technological leadership in both engines and electrical & automation systems to set a new industry benchmark in marine hybrid propulsion. Through combining its unique range of in-house competences, Wärtsilä has turned a complex system into an innovative single product that delivers unrivalled and guaranteed performance. The module is tailor-designed for individual vessel market segments and can be optimized for specific operating profiles, thanks to a new generation energy management system.

FROM SYSTEM TO PRODUCT

The various components are tuned and harmonised into a single entity through the enhanced energy management system. Full control over all the hardware and software enables Wärtsilä HY to be approached as a unified product during engineering, testing and its operational life.

In order to match the specific demands of different market segments, Wärtsilä HY comes in highly customizable forms.

The standard mechanically driven configuration includes:

- Main engine with clutch
- PTO/PTI on the gearbox (or in-line shaft generator/motor)
- Energy storage system
- DC link and power drives
- Energy Management System

The standard electrically driven configuration includes:

- Generating set
- Energy storage system
- DC link and power drives
- Energy Management System

NEW APPROACH TO PERFORMANCE

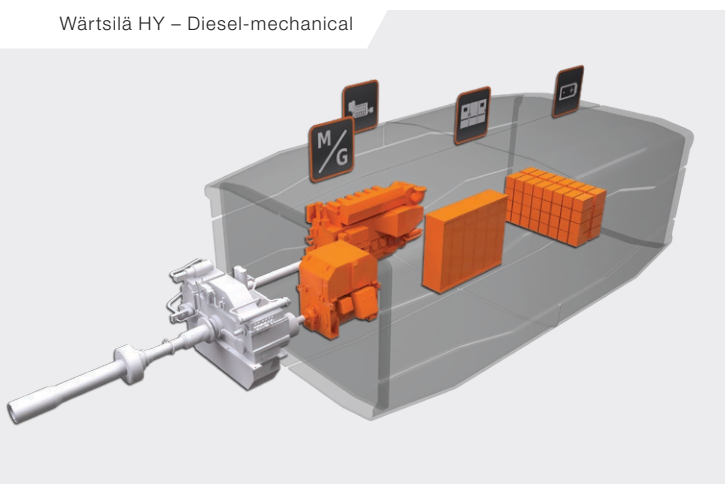
Conventional performance control inside the engine room is limited to each individual component. The logic embedded in the Wärtsilä HY, which are based on the response characteristics of the Wärtsilä equipment, optimize the flow of energy within the module. The best possible behaviour is therefore guaranteed in every operation, and performance control is elevated to a much higher level.

NEW APPROACH TO POWER

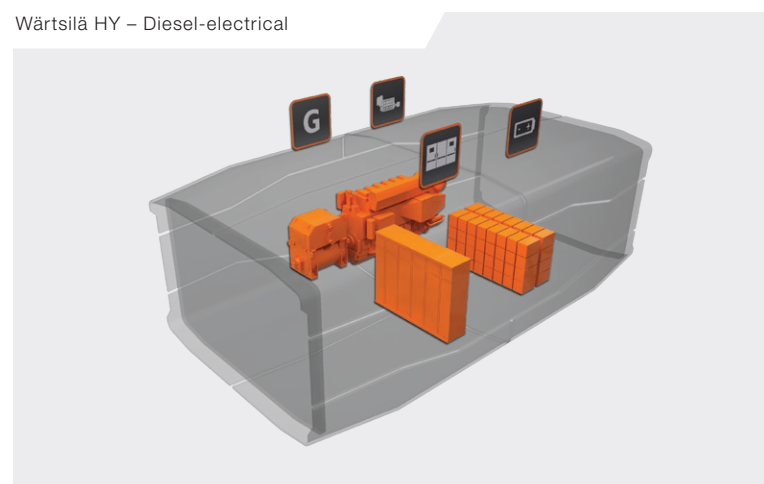
Maximum continuous rating has always been the main parameter for machinery sizing. The Wärtsilä HY configuration is based not only on the maximum power demand of the ship, but also on its specific operational profile (i.e. how much power for how long, green mode operation, etc.). The time factor also enters the equation, and the dimensioning approach evolves from power-based to energy-based.

An optimal balance between engine power and energy storage leads to a more compact design. This means fewer cylinders running at a higher efficiency loading rate, built-in redundancy, and a boost in power.

Wärtsilä HY – Diesel-mechanical



Wärtsilä HY – Diesel-electrical



KEY BENEFITS

- Guaranteed module performance
- Instant load taking capability
- No visible smoke under all normal conditions
- Green mode (zero emissions)
- Optimized plant dimensioning
- Built-in redundancy
- Reduced maintenance (less cylinder-hours, reduced stress to the components)
- Increased efficiency (lower fuel consumption, fewer emissions)
- Possible future upgrades (EMS fine-tuning / increased battery capacity)
- Ship type optimized design and specific application tuning
- Wärtsilä as the single supplier

CUSTOM-DESIGNED FOR DIFFERENT SEGMENTS

The Wärtsilä HY is offered in segment-dedicated versions. The operational philosophy is integral to the design so as to meet the typical requirements of different vessel typologies. A higher level of customisation can be achieved through project-tailored tuning, which can be easily adjusted at any time during the ship's lifetime.

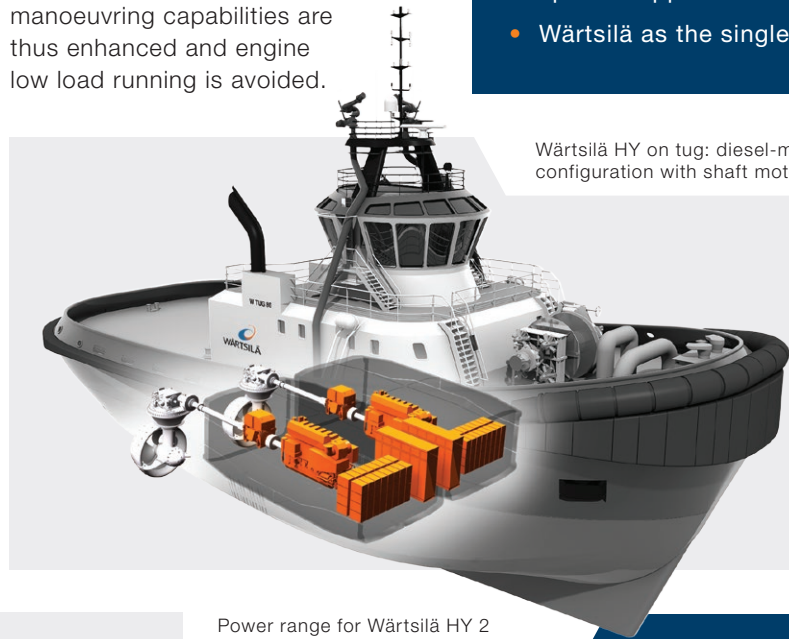
OPERATIONAL PHILOSOPHY

The algorithms embedded in the Wärtsilä HY energy management system enable smart features, such as:

- **Smokeless operation:** the synergy between the energy storage system and the engine allows the avoidance of visible smoke emissions under all normal conditions;
- **Cold system start-up:** the necessity to wait for the engines to warm-up is overcome by the energy storage, leading to instant ship readiness;
- **Instant load taking:** the module is able to react instantly to fast and broad changes in the power demand;
- **Automatic power back-up:** an increased level of safety is reached through emergency back-up algorithms and built-in redundancy of the power sources;
- **Start & stop:** at low loads the power is supplied exclusively by the energy storage system until

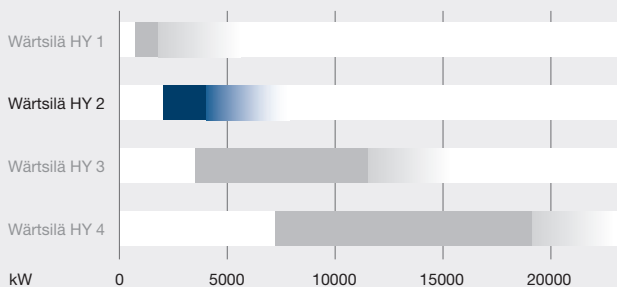
it reaches a pre-set minimum state of charge. At this point the engine is automatically activated, providing power to the ship and simultaneously re-charging the energy storage system;

- **Green mode:** when selected by the operator, power is supplied exclusively through the energy storage system until the pre-set minimum state of charge is reached;
- **Power boost:** the engine and energy storage system can supply power at the same time, thus enabling an Instant power boost in output;
- **Peak shaving:** load fluctuations are absorbed by the energy storage system, allowing stable operation of the machinery;
- **Propeller slow turning:** propellers can be started by the energy storage system and operated at low rpm; manoeuvring capabilities are thus enhanced and engine low load running is avoided.



Wärtsilä HY on tug: diesel-mechanical configuration with shaft motor/generator

Power range for Wärtsilä HY



Power range for Wärtsilä HY 2

