



POWER MANAGEMENT RETROFIT

MEGA YACHT

**TURNKEY POWER
MANAGEMENT UPGRADE
OF DIESEL GENERATORS**

CASE STUDY

Advanced Power Management
Control, Protection & Monitoring
SOLUTIONS



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The Problem

The project concerned a 139-metre mega yacht, built in 1999 in Bremen, Germany. At the time of its construction, the vessel was one of the largest motor yachts in the world and was equipped with highly sophisticated onboard systems.

Almost two decades later, rapid technology evolution had made many of the vessel's electronic systems outdated. Several units had become costly to maintain, while others had reached obsolescence, creating spare parts availability and long-term support risks.

The diesel generator control system was one of the most critical systems affected. Due to ageing electronic controls, repeated failures and lack of spare parts, the reliable operation of the vessel's auxiliary power system could no longer be fully ensured.

For a vessel of this size and operational profile, the risk of generator control failure could directly affect onboard power availability, operational reliability and vessel safety. A modernisation of the generator control and power management system was therefore essential.

The Solution

MAS delivered a complete Power Management System retrofit based on Woodward easYgen-3500XT controllers, replacing the outdated generator control infrastructure with a modern, fully supported and highly capable system.

The upgrade covered all four main diesel generators as well as the emergency diesel generator, creating a unified control and power management environment for the vessel's generator sets.

The new system was engineered to support both manual and automatic operation, isochronous generator operation, active and reactive load sharing, load-dependent start / stop logic and full synchronisation between the main generators, shore connection and emergency diesel generator.

The project was undertaken by MAS on a turnkey basis, covering engineering, procurement, development, installation and commissioning



Scope of Works Undertaken

MAS delivered the full project scope, including:

- Existing system assessment and retrofit engineering
- Power Management System design and configuration
- Procurement
- Software development and application configuration
- Integration of the new control system with the vessel's sub-systems
- HMI and communication interface development
- Installation and commissioning onboard
- System testing under multiple operational scenarios
- Support for approval by the vessel's certification body, Lloyd's Register

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Main System Functionalities

The upgraded Power Management System included:

- Start / stop and monitoring of each generator set
- Manual generator set operation
- Automatic generator set operation
- Isochronous operation of generator sets at 60Hz / 450Vac
- kW and kVAr load sharing
- Load-dependent start / stop according to the load percentage of each generator set
- Soft-transfer synchronisation from main generators to shore connection and vice versa
- Soft-transfer synchronisation from main generators to emergency diesel generator and vice versa
- HMI integration with electrical measurements from all five controllers through Modbus TCP/IP
- User-friendly graphic visualisation through TFT displays and a central 17" SCADA system

Testing, Validation & Approval

The new system was fully tested under the required operating scenarios to validate correct functionality, stable generator coordination and reliable power management performance. Following the client's request, MAS also supported the approval process with the vessel's certification body. The upgraded system was successfully approved by Lloyd's Register and delivered to the client with successful project completion.





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The Result

Following the retrofit, the yacht was equipped with a modern and fully supported Power Management System for the control and monitoring of all generator sets.

The upgraded system delivered:

- Replacement of obsolete technology with latest-generation, manufacturer-supported controllers
- Improved generator set control and power management reliability
- Added operational capability through synchronisation with shore connection
- Full electronic control of speed and voltage, without reliance on potentiometers
- Expanded protection and monitoring through a high number of electrical measurements
- Improved operator visibility through TFT controller screens and a central 17" SCADA system
- Successful Lloyd's Register approval
- A future-ready generator control architecture supporting long-term vessel operation



MAS delivers advanced Control, Protection, Automation and Power Management Systems for maritime applications, supporting shipowners and operators in replacing obsolete control platforms, improving vessel reliability and extending the lifecycle of critical propulsion and power generation assets.



MAS SA is one of the few engineering companies in Europe specializing in the upgrade, design, development and installation of advanced power management control, protection and monitoring systems.

Covering a wide area of expertise for over 50 years, we provide solutions for complex problems both in the Industry of Marine, as well as in the Industry on Land (Power, Oil & Gas and Heavy industry).

For any further information please contact us via email at info@maseurope.com