

## EGCP-3 LS and SPM-D

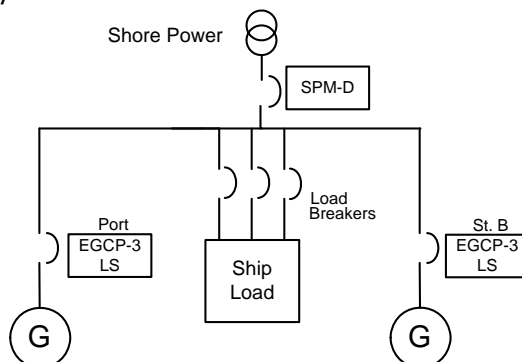
on the Yacht *Sea Jewel*



*Sea Jewel* is a 160 ft (49 m) yacht that uses two Caterpillar 3304 gensets for electric power. The ship's original control system needed repair but had been discontinued; additionally Lloyd's registration was required to comply with new insurance guidelines. So *Sea Jewel* Ltd contacted Governor Control Systems Inc. (GCS) to purchase, install, and commission two Woodward EGCP-3 LS units to control these two Cat gensets. The EGCP-3 LS combines engine, generator, power system, switchgear, bus and generator monitoring, protection, and control functions in a single, compact, and cost-effective package. Woodward representatives were present to help in the commissioning.

### Electrical System

The *Sea Jewel*'s two Cat 3304 gensets are rated for 80 kW each. Each genset is controlled by a Woodward EGCP-3 LS and can connect to the ship electrical load via its generator breaker. The load can also be supplied by shore power when in port. To synchronize the boat to shore power, a Woodward SPM-D delivers synchronization signals to the two EGCP-3 LS units and closes the breaker when phase and frequency are matched.



**Sea Jewel Electrical System**

## Application

The ship's chief engineer required several modes of operation in order to optimize the performance of the yacht's electrical system. During normal operation, the load on the ship can be supplied by one genset, but when seas are rough and the ship's stabilizers are running, there is a need for additional generation. In this mode of operation, both gensets must run continuously. Also, the ship needs to be connected to shore power when in port. In order to eliminate a blackout on the ship during the power transfer, and to reduce the amount of load generated to the shore power, a scheme was developed to provide an automatic closed transition using a Woodward SPM-D.

Using the sequencing functionality of the EGCP-3, the control is configured to start an additional unit two seconds after the load on the master unit exceeds 75%. When the load reduces to below 30%, the slave unit is removed from the system after 60 seconds.

The controls need to be able to trade master/slave relationships, so a switch is used to place one control in Auto and Run w/ Load (Master) and the second unit in Auto (Slave). Both controls have the option to operate in either mode—so if sequencing needs to be avoided, the operator can place both controls in Auto and Run w/ Load, and both units will share the entire electrical load.

The closed transition to shore power was solved by sending a remote fault input to the EGCP-3 when the shore power breaker is closed onto the system. When coming into port, ship's power is reduced before synchronizing to shore power. This means that only one unit is online with low load. When shore power is connected, the operator adjusts a switch from "Generators" to "Shore" power. Instigating this switch turns on the SPM-D and allows the unit to begin sending digital signals to the EGCP-3 LS to synchronize the ship's power to shore power. When the breaker is closed, the aux feedback is sent to a remote input on the EGCP-3 that opens the generator breaker and shuts the generator down. The system is then completely supplied by shore power.

When the ship switches back to Generators, the remote input is cleared and the unit coming online synchronizes to the shore power, closes its breaker, and the shore power breaker is immediately opened. The system is then on Generator power.



## Conclusions

The commissioning of the *Sea Jewel* was a success, and operation of an EGCP-3 and SPM-D illustrated the adaptability of Woodward controls to any application. By applying the EGCP-3 LS units to the control of the Cat gensets and the SPM-D for synchronizing the shore power, the *Sea Jewel* now has a reliable system to begin their chartering business this summer. Woodward would like to thank Sea Jewel Ltd and Governor Control Systems for their time and energy on this project and congratulates them on a great control system.



PO Box 1519, Fort Collins CO 80522-1519, USA  
1000 East Drake Road, Fort Collins CO 80525, USA  
Phone +1 (970) 482-5811 ♦ Fax +1 (970) 498-3058  
Email and Website—[www.woodward.com](http://www.woodward.com)

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