

Power Control Solutions for Marine Applications

MANAGE YOUR POWER REQUIREMENT
AT SEA WITH ONE SYSTEM



POWER GENERATION
Always Innovating for a Better Future



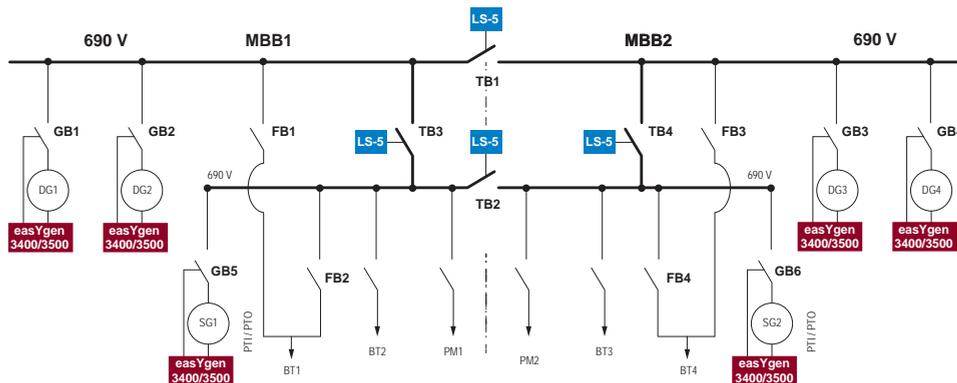
LS-5



Your Benefits | ONE SOLUTION INFINITE POSSIBILITIES

For Power Management System Designers

- Load control strategy by PMS to easYgen
- Start/stop command by PMS through easYgen communication link or automatic start/stop based on load demand
- Communication with LS-5 for complex network segmentation with feeder/tie breakers
- One communication link between PMS and generator set for all engine and generator information leading to less components for the power plant. The easYgens share operating variables with the PMS including:
 - breaker status
 - active and reactive power, power factor
 - voltage, current, and frequency on all three phases
 - Engine sensor values like oil pressure, coolant temperature (via CAN J1939)

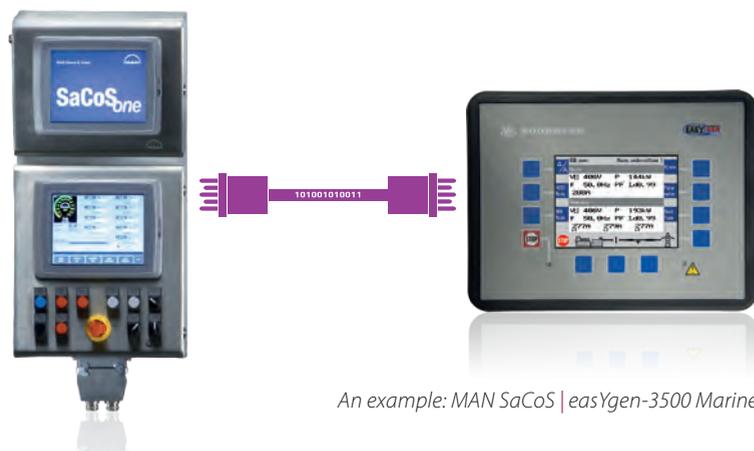


A diesel electric and shaft generator schematic

DG: diesel generator // SG: shaft generator // BT: bow thruster // PM: mains propulsion // TB: tie breaker // FB: feeder breaker // GB: generator breaker

For Engine and Generator Set Suppliers

- Load sharing
- Same unit can be used for a wide range of engines
- Application note available for engine integration with CAT ADEM, MAN SaCos, MTU ADEC, ...*
- CAN J1939 communication with ECU
- External engine-derating function



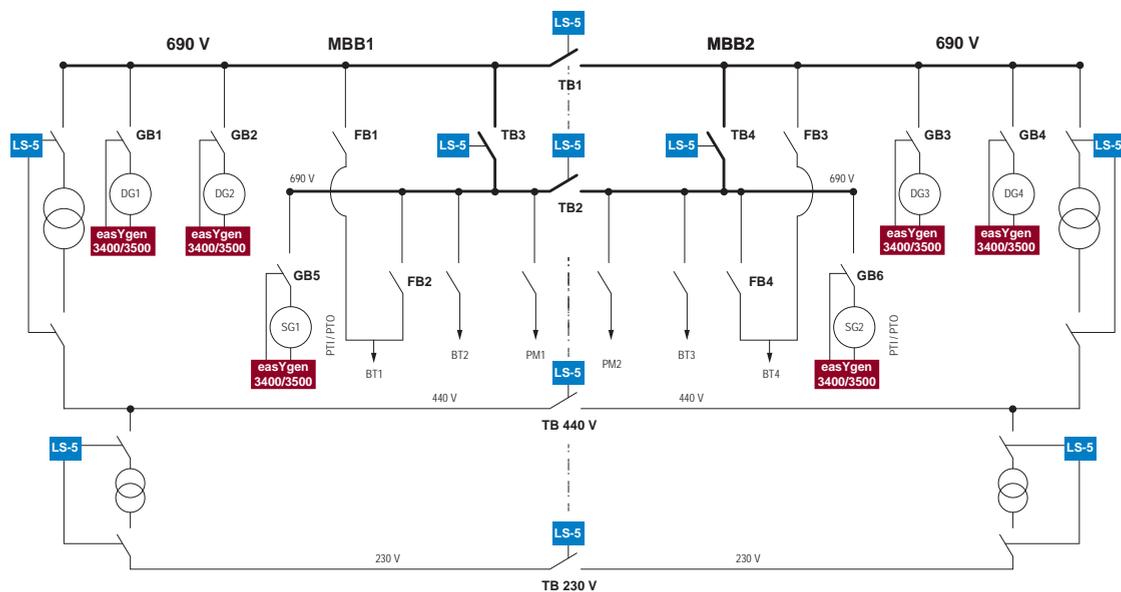
An example: MAN SaCos | easYgen-3500 Marine

*See product specification 37533 on www.woodward.com for more information



Command Your Complex Application

FOR MARINE APPLICATIONS



A sophisticated diesel electric and shaft generator schematic

DG: diesel generator // SG: shaft generator // BT: bow thruster // PM: mains propulsion // TB: tie breaker // FB: feeder breaker // GB: generator breaker

DESCRIPTION

- This complex system taken from a real application ensures that one power source failure does not lead to total loss of the network.
- This application can be implemented with easYgen genset controllers in conjunction with LS-5 circuit breaker control modules and remote panels (if need be).
- The easYgens guide the generator and serve the generator circuit breaker while LS-5 units control feeder or tie-breakers. The remote panel connected to the easYgens helps remote visualization, control, and troubleshooting.
- The modules may serve the PMS by providing the relevant data (e.g. breaker status, alarms, measurements, bus bar status, engine status, and much more).
- Modules communicate individually through CAN. And they provide CAN/RS485/RS232 communication interfaces for the PMS system. The PMS fulfills the supervisory function; monitoring, control and protection functions are fulfilled by easYgen and LS-5 modules.
- The easYgen and LS-5 system is easily configurable and does not require any expert intervention.

easYgen™ Series

easYgen™-3400/3500 Marine | ONE UNIT – INFINITE OPPORTUNITIES

The easYgen-3400/3500 Marine is an exceptionally versatile genset control and protection package with all the flexibility and features needed to fit into a wide range of power generation applications. It allows the user to be centralized on a single, affordable control for many uses – from stand-alone emergency generators to the isochronous parallel operation of up to 32 gensets. Common applications include load share module (LSM), LSM with synchronizer, and LSM with synchronizer interacting with up to 16 external breaker controls (LS-5). Applications can be extended to genset control for providing auxiliary power or emergency power.

FLEXIBILITY

The easYgen-3400/3500 Marine is available in two mounting styles: The back-panel-mounted easYgen-3400 Marine has a rugged aluminum chassis for use in harsh environments or confined spaces, while the flush-mounted easYgen-3500 Marine has sealed soft keys and a large, easy-to-read back-lit display. The integrated logicsManager™ links internal states and input signals with logical operators and time elements to implement complex control tasks. Furthermore, with connectivity to LS-5, it gives you control over circuit breakers configured in various structures.

Certifications and registrations

CE, UL/cUL, CSA, GOST-R,
ABS, BV, DNV, GL, LR

easYgen-3400/3500 Marine

For a wide range of applications – from simple standby generators to parallel applications

OVERVIEW OF FEATURES

- Isochronous load sharing (up to 32)
- Soft load/unload of generator
- Synchronizer and sync-check function
- Configurable monitoring
- Load-dependent start/stop
- True RMS measurement
- System overview display
- Event logger
- Support of up to 16 LS-5
- Capability for remote panel
- Advanced communication (CANopen, J1939)
- Multilingual HMI (Up to 11 languages)



easYgen-3400 Marine | easYgen-3500 Marine

LS-5 Series



LS-511/521 Marine | IMPROVING SYSTEM EFFICIENCY

The LS-511/521 Marine is designed to enable complex power management applications with multiple segments and bus breakers in combination with easYgen-3400/3500-equipped genset controllers. The LS-5 devices manage synchronization, loading and unloading on each bus segment, and send the required voltage and frequency references via CAN bus to the easYgen-3400/3500 genset controllers. Wiring efforts are reduced to a minimum, since only one CAN bus connection is required between all LS-5 and easYgen-3400/3500 controllers. It can be used as a sync-check relay in stand-alone mode without easYgens.

EXPANDABILITY

The LS-5 Marine series is available in two mounting styles: The back-panel-mounted LS-511 Marine with aluminum-powder-coated housing for use in harsh environments or confined spaces.

The flush-mounted LS-521 Marine with sealed soft keys and a convenient, easy-to-read back-lit display door.

Certifications and registrations
CE, UL/cUL, CSA, ABS, BV, DNV, GL, LR

LS5 Marine
The breaker synchronizer and controller for optimum wiring

OVERVIEW OF FEATURES

- Synchronizer and sync-check function
- Automatic segment control
- Supports manual breaker closing
- Configurable breaker reclose timer
- Event logger
- Configurable to work as a stand-alone unit
- Multilingual HMI (Up to 11 languages)
- Eight configurable LEDs in back panel variant for easy troubleshooting



LS-511 Marine | LS-521 Marine



Remote Panel RP-3000 Marine | CONTROLLING REMOTELY

The RP-3000 is a remote control and annunciation panel for use with the back-panel-mounted easYgen-3400 Marine or door-mounted easYgen-3500 Marine genset controls. It offers marine switchboard manufacturers an off-the-shelf HMI option for remote control while retaining the look and feel of your easYgen devices.

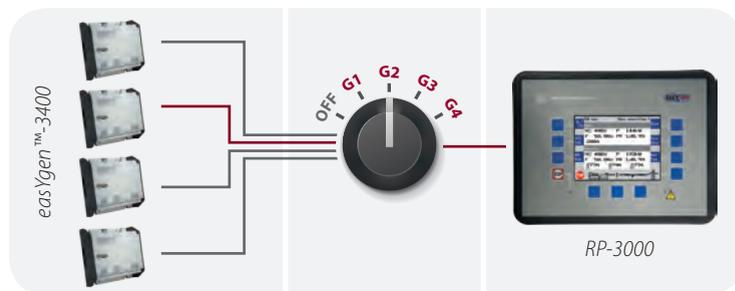
RP-3000 Marine allows remote control, remote visualization (including a sync scope), and password-protected remote configuration of your easYgen marine genset controllers, with access to its complete menu structure and all parameter settings.

Certifications and registrations
CE, UL/cUL, ABS, BV, DNV, GL, LR

RP-3000 Marine
Remote annunciation and control of the easYgen

OVERVIEW OF FEATURES

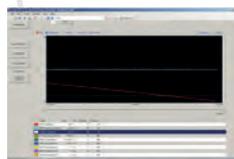
- Color display
- Multilingual
- Displays
 - measurement values
 - alarms
 - system overview
 - event logger
- Alarm acknowledged
- Configuration of easYgen
- Annunciate one or multiple easYgens



easYgen-3400 Marine | Selector switch | RP-3000 Marine

ToolKit™

The Woodward service tool "ToolKit" enables convenient commissioning by the service engineer. Pages especially designed for marine applications make analysis and trending easy.



Trending page



Load share configuration page

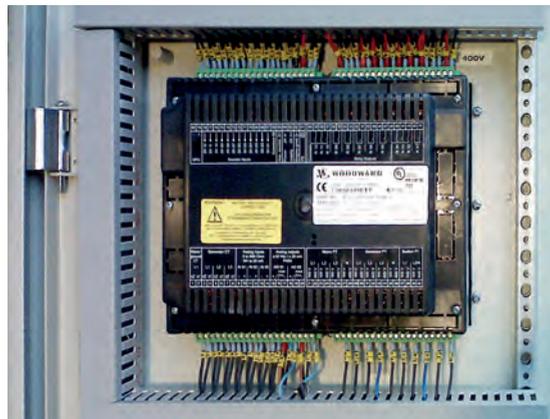


System overview page

Your Benefits | ONE SOLUTION INFINITE POSSIBILITIES

For Switchgear Builders

- Minimum wiring
- One unit for multiple purposes
 - Synchronization
 - Start/stop
 - Engine and generator monitoring
 - One set of PTs and CTs for multiple purposes
 - Breaker status monitoring
- Local/remote control
- Front mounting or back panel mounting with remote display available
- CAN and ModBus communication link
 - Supports Woodward or third-party I/O extensions
 - Supports Woodward or third-party displays



A typical installation

For Shipyard and Ship Owners

- Meets your DP₂/DP₃* requirements
- Single supplier for generator and engine control
- Commissioning by a single Woodward trained engineer for the whole power plant
- Worldwide support network
 - Europe, Middle East, and Africa
 - North, Central, and South America
 - Russia, China, and India
 - ASEAN and Oceania
- The most experience in power generation in the marine market
- Independent supplier



easYgen-3500 | LS-5 | UG-25+

*DP: Dynamic Positioning



FURTHER INFORMATION

Please visit www.woodward.com or contact us for further product-related information.

Description	Specification	Manual
easYgen-3400/3500 Marine	37533	37531
LS-511/521 Marine	37545	37542
RP-3000	37446	37534



CONTACT

Region	Telephone	E-mail
North and Central America	+1 970 962 7331	SalesPGD_NAandCA@woodward.com
South America	+55 193708 4800	SalesPGD_SA@woodward.com
Europe	+49 711 789 54 510	SalesPGD_EUROPE@woodward.com
Middle East and Africa	+971 2 6275185	SalesPGD_MEA@woodward.com
Russia	+7 812 319 3007	SalesPGD_RUSSIA@woodward.com
China	+86 512 8818 5515	SalesPGD_CHINA@woodward.com
India	+91 124 4399 500	SalesPGD_INDIA@woodward.com
ASEAN and Oceania	+49 711 789 54 510	SalesPGD_ASEAN@woodward.com

DISTRIBUTORS AND SERVICE

Woodward has an international network of distributors and service facilities. For your nearest representative, call a number above or see the details in the adjacent box.

For further information please contact:

TURNER ENGINE CONTROL SOLUTIONS

Stoke-on-Trent, United Kingdom info.uk@turner-ecs.com
 Hoofddorp, The Netherlands info.nl@turner-ecs.com
 Langen, Germany info.de@turner-ecs.com
 Desio, Italy info.it@turner-ecs.com
 Middle East (KSA, Qatar, UAE) info.me@turner-ecs.com

