Product Specification
37533F

easYgen™-3400/3500 Marine

Genset Control for Marine Applications

DESCRIPTION

The easYgen-3400/3500 Marine is an exceptionally versatile genset control and protection device 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. The easYgen can be configured for different application levels and responsibilities:

- As Load Share Module only
- As Load Share Module with Synchronizer
- As Load Share Module with (or without) Synchronizer interacting with up to 16 external breaker controls (LS-5)
- As Genset Control with load dependent Start / Stop for auxiliary generators
- As Genset Control for Emergency-Run-Generators.

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 helps you command your complex application.

FEATURES

- Provides full connectivity to Woodward`s LS-5 breaker protection and control devices to enable complex power control applications with multiple feeder and bus breakers. 16 LS-5 units can be used in total in combination with up to 32 easYgens in one application.
- In case transformers are used in the application, configurable voltages and vector group adjustment is available for the synchronization process.
- Run-up synchronization is available to get several synchronous generators onto the load in a very short time. Using the innovative run-up synchronization method allows the generator and transformer to build up voltage gradually through the start without producing large in-rush currents.
- Breaker control: Slip frequency / phase matching synchronization, open-close control, breaker monitoring
- Load transfer features: open / closed transition, interchange, soft loading / soft unloading.
- Remote control via communication interface and discrete/analog inputs for adjusting speed, frequency, voltage, power, reactive power, and power factor set points
- Individual configurable engine and generator protections
- Special Scania S6, MTU ADEC, Volvo EMS2 & EDC4, Deutz EMR2, MAN MFR/EDC7 & SaCos, CAT ADEM, SISU EEM, Cummins and Woodward E3 ECU support
- Configurable trip levels / delay timers / alarm classes for monitoring and protective functions
- Clear text display and evaluation of up to 100 J1939 analog values
- Discrete and analog I/O expansion board connectivity (Woodward IKD 1 or Phoenix Contact IL series)
- Multi-lingual capability (English, German, French, Spanish, Chinese, Japanese, Italian, Portuguese, Turkish, Russian, Polish, Slovak)
- Dual/redundant generator breaker feedback monitoring
- PC-Tool with marine application specific pages: System Overview Display, Trending Tool, Load Share Configuration

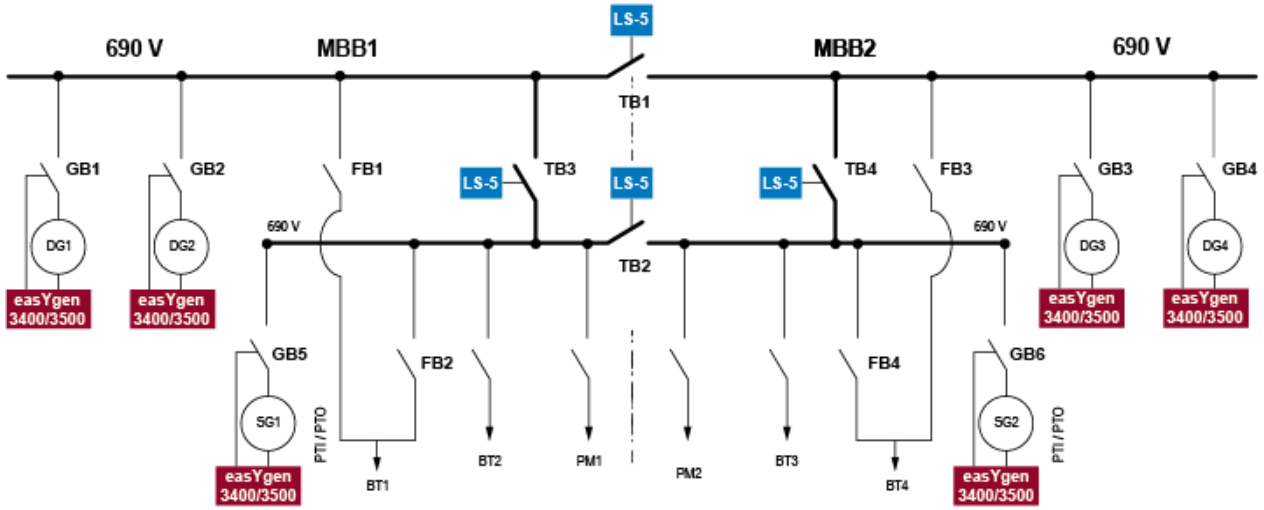
- Load dependent start/stop of up to 32 units
- Isochronous load sharing between units
- Soft load/unload of generator
- Synchronizer and sync-check function
- Engine and generator monitoring
- Configurable start/stop command
- One communication link between PMS and generator set
- Advanced communication (CANopen, J1939)
- Support of up to 16 LS-5
- Event logger
- Capability for remote panel
- Multilingual HMI
- DNV, GL, BV, ABS, and LR marine approved
- Automatic Segment Control
- Stand-by operation
- Open/closed transition

SPECIFICATIONS

Power supply ..... 12/24 Vdc (8 to 40 Vdc)
Intrinsic consumption ..... max. 17 W
Ambient temperature (operation) ..... -20 to 70 °C / -4 to 158 °F
Ambient temperature (storage) ..... -30 to 80 °C / -22 to 176 °F
Ambient humidity ..... 95 %, non-condensing
Voltage ..... (⅄/Δ)
100 Vac [1] Rated (V_{rated}) ..... 69/120 Vac
Max. value (V_{max}) ..... 86/150 Vac
Rated surge volt.(V_{surge}) ..... 2.5 kV
and 400 Vac [4] Rated (V_{rated}) ..... 277/480 Vac
Max. value (V_{max}) ..... 346/600 Vac
Rated surge volt.(V_{surge}) ..... 4.0 kV
Accuracy ..... Class 1
Measurable alternator windings ... 3p-3w, 3p-4w, 3p-4w OD, 1p-2w, 1p-3w
Setting range ..... primary ..... 50 to 650,000 Vac
Linear measuring range ..... $1.25 \times V_{rated}$
Measuring frequency ..... 50/60 Hz (40 to 85 Hz)
High Impedance Input; Resistance per path ..... [1] 0.498 MΩ, [4] 2.0 MΩ
Max. power consumption per path ..... < 0.15 W
Current (Isolated) Rated (I_{rated}) ..... [1] ../1 A or [5] ../5 A
Linear measuring range ..... $I_{gen} = 3.0 \times I_{rated}$
$I_{mains/ground} = 1.5 \times I_{rated}$
Setting range ..... 1 to 32,000 A
Burden ..... < 0.15 VA
Rated short-time current (1 s) ..... [1] $50 \times I_{rated}$, [5] $10 \times I_{rated}$
Power .....
Setting range ..... 0.5 to 99,999.9 kW/kvar
Discrete inputs ..... isolated
Input range ..... 12/24 Vdc (8 to 40 Vdc)
Input resistance ..... approx. 20 kOhms

Relay outputs ..... isolated
Contact material ..... AgCdO
Load (GP) ..... 2.00 Aac@250 Vac
2.00 Adc@24 Vdc / 0.36 Adc@125 Vdc / 0.18 Adc@250 Vdc
Pilot duty (PD) .....
1.00 Adc@24 Vdc / 0.22 Adc@125 Vdc / 0.10 Adc@250 Vdc
Analog inputs (none isolated) ..... freely scalable
Type ..... 0 to 500 Ohms / 0 to 20 mA
Resolution ..... 11 Bit
Analog outputs (isolated) ..... freely scalable
Type ..... ± 10 V / ± 20 mA / PWM
Insulation voltage (continuously) ..... 100 Vac
Insulation test voltage (1s) ..... 500 Vac
Resolution ..... 11/12 Bit (depending on analog output)
± 10 V (scalable) ..... internal resistance ≤1 kOhms
± 20 mA (scalable) ..... maximum load 500 Ohms
Housing Front panel flush mounting ..... Plastic housing
Dimensions WxHxD ..... 282 × 217 × 99 mm
Front cutout WxH ..... 249 [+1.1] × 183 [+1.0] mm
Connection ..... screw/plug terminals 2.5 mm²
Front ..... insulating surface
Sealing Front ..... IP66 (with screw fastening)
Front ..... IP54 (with clamp fastening)
Back IP20
Weight ..... approx. 1,850 g
Housing Back panel mounting ..... Sheet metal housing
Dimensions WxHxD ..... 250 × 227 × 84 mm
Connection ..... screw/plug terminals 2.5 mm²
Protection system ..... IP 20
Weight ..... approx. 2,150 g
Disturbance test (CE) ..... tested according to applicable EN guidelines
Listings ..... UL, cUL, GOST-R, CSA
Marine ..... DNV, GL, BV, LR (Type Approval); ABS (Type Approval)

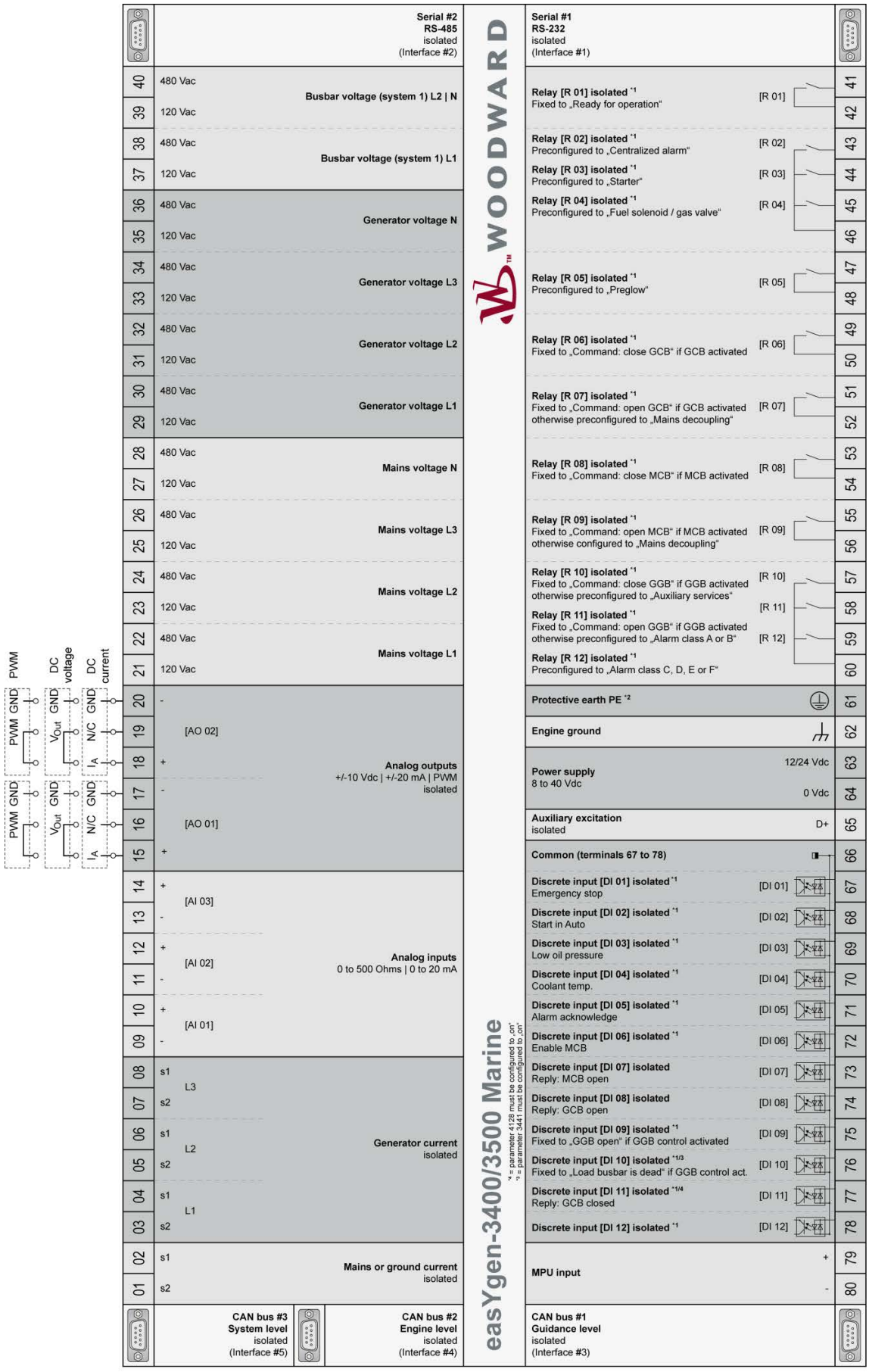
APPLICATION



Description

- The system taken from a real application, guarantees critical power to bow thruster and mains propulsion in case of a genset failure and thus assures continuous power availability.
- easYgens monitor, control, protect and synchronize gensets on the same segment while LS5s synchronize between the two segments and control the tie-breakers.
- LS5 feeds the synchronization parameters to easYgen which in turn controls the engine and generator to match those synchronization parameters and releases a command to LS5 to control the breaker.
- All easYgens and LS5s communicate over CAN bus thus making communication fast and reliable.
- Automatic optimization of number of running gensets through active/reactive load sharing is managed by easYgens.
- The module may serve the PMS by providing the relevant data (e.g. breaker status, alarms, measurements, bus bar status, engine status and many more).

TERMINAL DIAGRAM



Subject to technical modifications.

*1 = configurable via LogicsManager *2 = only available in easYgen-3500

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For more information contact:

This document
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The related manual
37531

FEATURES OVERVIEW

EASYGEN 3000	easYgen-3000 Series	
Model	3400 Marine	3500 Marine
Package	P1	P1
Measuring		
Generator voltage (3-phase/4-wire)	✓	✓
Generator current (3x true r.m.s.)	✓	✓
Mains/Feeder voltage (3-phase/4-wire)	✓	✓
Mains or ground current (1x true r.m.s.) #1	✓	✓
Busbar voltage (1-phase/2-wire)	✓	✓
Control		
Breaker control logic (open and closed transition) *FlexApp™*	2	2
Number of supported Woodward LS-5 units	16	16
Automatic, Manual, Stop, and test operating modes	✓	✓
Single and multiple-unit operation	✓	✓
Paralleling operation (up to 32 units) #2	✓	✓
AMF (auto mains failure) and stand-by operation	✓	✓
Critical mode operation	✓	✓
GCB and MCB synchronization (slipping / phase matching)	✓	✓
GGB (Generator group breaker) control	✓	✓
Run-up synchronization	✓	✓
Interchange (import / export control)	✓	✓
Load-dependent start/stop	✓	✓
n/f, V, P, Q, and PF remote control via analog input or interface	✓	✓
Load/var sharing for up to 32 gensets	✓	✓
Freely configurable PID controllers	3	3
HMI		
Color Display with Soft key operation *DynamicsLCD™*	-	✓
Start/stop logic for diesel / gas engines	✓	✓
Counters for operating hours / starts / maintenance / active/reactive energy	✓	✓
Configuration via PC #3	✓	✓
Event recorder entries with real time clock (battery backup)	300	300
Protection ANSI		
Generator: voltage / frequency 59 / 27 / 81O / 81U	✓	✓
Generator: overload, reverse/reduced power 32 / 32R / 32F	✓	✓
Generator: unbalanced load 46	✓	✓
Generator: instantaneous overcurrent 50	✓	✓
Generator: time-overcurrent (IEC 255 compliant) 51	✓	✓
Generator: ground fault #4 50G	✓	✓
Generator: power factor 55	✓	✓
Generator: rotation field	✓	✓
Engine: overspeed / underspeed 12 / 14	✓	✓
Engine: speed / frequency mismatch	✓	✓
Engine: D+ auxiliary excitation failure	✓	✓
Mains/Feeder: voltage / frequency 59 / 27 / 81O / 81U	✓	✓
Mains/Feeder: phase shift / rotation field / df/dt 78	✓	✓
I/Os		
Speed input (magnetic / switching; Pickup)	✓	✓
Discrete alarm inputs (configurable)	10	10
Discrete outputs (configurable) *LogicsManager™*	max. 12	max. 12
External discrete inputs / outputs via CANopen (maximum)	32 / 32	32 / 32
Analog inputs #5 (configurable) *FlexIn™*	3	3
Analog outputs (+/- 10V, +/- 20mA, PWM; configurable)	2	2
External analog inputs / outputs via CANopen (maximum)	16 / 4	16 / 4
Display and evaluation of J1939 analog values (supported SPNs)	100	100
CAN bus communication interfaces #6 *FlexCAN™*	3	3
RS-232/485 Modbus RTU Slave interface(s)	1 / 1	1 / 1
Part Numbers	Cabinet back mounting	Front panel mounting #7
easYgen-3400 Marine (1A / 5A)	8440-2044 / 8440-2045	-
easYgen-3500 Marine (1A / 5A)	-	8440-2046 / 8440-2047
Spare connector kit	8928-7371	8923-1314
CANbus based Remote Annunciator: easYlite (Product Spec. # 37279)	8446-1023	
Profibus Gateway: ESEPRO	8445-1046	
Ethernet (Modbus/TCP) Gateway: ESENET	8445-1044	

#1 mains or ground current selectable
#2 refer to the Manual for applications with more than 8 parallel gensets because of bus load limits
#3 via serial connection and ToolKit software (included)
#4 measured ground current
#5 selectable during configuration between VDO (0 to 180 Ohm, 0 to 5 bar), VDO (0 to 180 Ohm, 0 to 10 bar), VDO (0 to 380 Ohm, 40 to 120°C), VDO (0 to 380 Ohm, 50 to 150°C), Pt100, Resistive input (one- or two-pole, 2pt. linear or 9pt. user defined), or 20 mA (0/4 to 20 mA, freely configurable)
#6 freely selectable during configuration between CANopen or J1939; request information
#7 a screw and a clamp kit are delivered with the unit for fastening

APPROVALS