WOODWARD

EASY GEN 3000

Genset Control for Multiple Unit Operation

DESCRIPTION

The easYgen-3000 Series are control units for genset management applications. The numerous inputs and outputs, along with a modular software structure, permit you to use the easYgen-3000 Series for a wide range of applications with only a single part number. This includes stand-by, AMF, peak shaving, import-export, coge-neration or distributed generation, among others. Also the easYgen-3000 Series is compatible for island, island parallel, mains parallel and multiple unit mains parallel operations.

The easYgen-3000 Series is able to control up to 32 gensets connected in a network with automatic sequenc-ing.

The easYgen-3000 Series is available in two variants, the easYgen-3100 for cabinet back panel installation, and the easYgen-3200 with graphical display and soft keys for front panel mounting.

FlexApp[TM] – This feature provides the tools to easily configure the number of operated breakers: None, GCB, GCB and MCB.

LogicsManager[TM] – Woodward's LogicsManager software enables to change the operation sequences and adapt them to specific needs. The LogicsManager accomplishes this by monitoring a range of measuring val-ues and internal states, which are combined logically with Boolean operators and programmable timers. This enables to create and/or modify control and relay functions.

FlexIn[TM] – The analog inputs are configurable to operate with VDO, resistive, and/or 0 to 20 mA senders.

Flexible Outputs – Speed and voltage bias outputs are configurable to function with all speed governors and voltage regulators. The outputs can also be used as freely scalable outputs (e.g. for driving external meters).

FlexCAN[TM] – Advanced network interfaces ensure unsurpassed control performance – from engine control up to total plant operation. The easYgen-3000 Series is capable of working with all common industrial interfaces, including CAN, RS-232, and RS-485. The multiple communication protocols permit the easYgen-3000 Series to communicate with a vast majority of engine control units (ECUs), external I/O boards, PLCs, and modems. CANopen, J1939, Modbus RTU, and Modem protocols are supported.

DynamicsLCD[TM] – The adaptive and interactive 5.7", 320x240 pixel graphical LC display with soft keys and a clear menu structure ensures intuitive user operation and navigation.

Features

- Operation modes: Auto, Stop, Manual, and Load/No Load test modes via discrete input possible
- Breaker control: Slip frequency / phase matching synchronization, open-close control, breaker monitoring
- Load transfer features: open / closed transition, interchange, soft loading / soft unloading, mains parallel
- Process and load-dependent start/stop logic for diesel and gas engines programmable for spinning or system reserve with fixed or dynamic priorities.
- Real and reactive power load sharing with up to 32 units
- Remote control via interface and discrete/analog inputs for adjusting speed, frequency, voltage, power, reactive power, and power factor set points
- Complete integrated engine and generator protection as well as mains monitoring features
- Freely configurable PID controllers for various control purposes, such as heating circuit control (CHP applica-tions), water level, fuel level, or pressure and/or other process values
- Special Scania S6, MTU ADEC, Volvo EMS2 & EDC4, Deutz EMR2, MAN MFR/EDC7, SISU EEM, Cummins and Woodward EGS02 ECU support (depending on Package)
- Counters for operating hours / engine starts / maintenance / active energy / reactive energy
- 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)
- Front panel and PC configurable (ToolKit software)
- Multi-level password protection for access via HMI or interface
- Multi-lingual capability (English, German, French, Spanish, Chinese, Japanese, Italian, Portuguese, Turkish, Russian, Polish)
- Event recorder (300 events, FIFO) with real time clock

- Peak shaving operation
- Stand-by operation
- AMF operation
- Cogeneration (CHP)
- Isolated & mains parallel operation
- Import/export control
- Soft loading features
- Open/closed transition
- Load sharing and load-dependent start/stop for up to 32 units
- Programmable operation sequences
- Multi-lingual capability
- CANopen / J1939 ECU Control
- Modbus RTU Protocol
- CE marked
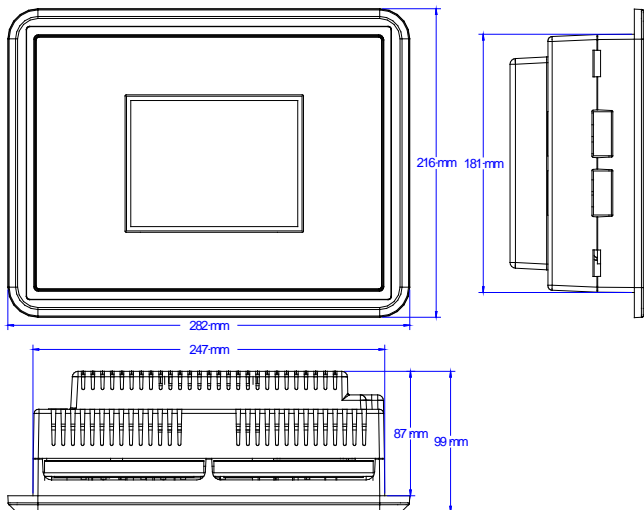- UL/cUL Listing
- LR & ABS Marine

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 ....($\curlywedge$/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×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 .... $I_{gen} = 3.0×I_{rated}$
                                                $I_{mains/ground} = 1.5×I_{rated}$
Setting range.. 1 to 32,000 A
Burden...< 0.15 VA
Rated short-time current (1 s) ....[1] 50×I_{rated}, [5] 10×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 scaleable
Type .... 0 to 500 Ohms / 0 to 20 mA
Resolution .... 11 Bit
Analog outputs (isolated) ....freely scaleable
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 (scaleable) .... internal resistance ≤1 kOhms
± 20 mA (scaleable) .... maximum load 500 Ohms
Housing (3200)   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 (3100)   Switch cabinet back mounting .....Sheet metal housing
Dimensions   WxHxD .... 250 × 228 × 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 (cUL only for easYgen-3100)
Marine ....LR (Type Approval), ABS (Design Assessment)

DIMENSIONS

Plastic housing for front panel mounting (3200)

Metal housing for cabinet mounting (3100)

TERMINAL DIAGRAM

easYgen-3000 Series (WOODWARD)
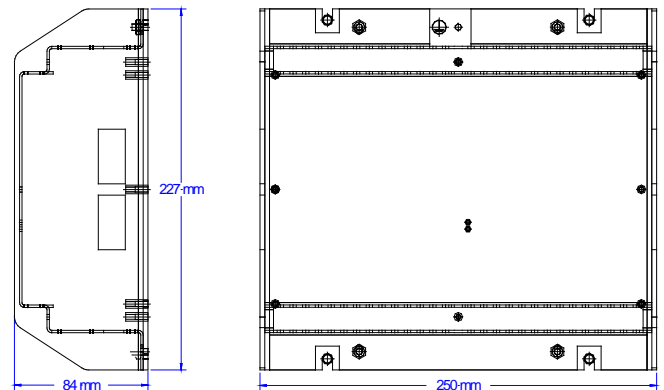
Left connector (Serial #2 / RS-485 isolated, Interface #2)

Terminal	Signal	Description
40	400 Vac	Busbar Voltage (system 1) L2 | N
39	100 Vac	
38	400 Vac	Busbar Voltage (system 1) L1
37	100 Vac	
36	400 Vac	Generator Voltage N
35	100 Vac	
34	400 Vac	Generator Voltage L3
33	100 Vac	
32	400 Vac	Generator Voltage L2
31	100 Vac	
30	400 Vac	Generator Voltage L1
29	100 Vac	
28	400 Vac	Mains Voltage N
27	100 Vac	
26	400 Vac	Mains Voltage L3
25	100 Vac	
24	400 Vac	Mains Voltage L2
23	100 Vac	
22	400 Vac	Mains Voltage L1
21	100 Vac	
20	−	
19	[AO 02]	Analog outputs +/-10 Vdc | +/-20 mA | PWM isolated
18	+	
17	−	
16	[AO 01]	
15	+	
14	+	[AI 03]
13	−	
12	+	[AI 02] Analog inputs 0 to 500 Ohms | 0/4 to 20 mA
11	−	
10	+	[AI 01]
09	−	
08	s1	L3
07	s2	
06	s1	L2 Generator current isolated
05	s2	
04	s1	L1
03	s2	
02	s1	L1 Ground or mains current isolated
01	s2	

PWM / PWM GND / DC voltage (GND / V_out) / DC current (GND / N/C / I_A)

CAN bus #2
Engine level
isolated
(Interface #4)

Right connector (Serial #1 / RS-232 isolated, Interface #1)

Description	Label	Terminal
Relay [R 01] isolated *1 Fixed to „Ready for operation"	[R 01]	41
		42
Relay [R 02] isolated *1 Preconfigured to „Centralized alarm"	[R 02]	43
Relay [R 03] isolated *1 Preconfigured to „Starter"	[R 03]	44
Relay [R 04] isolated *1 Preconfigured to „Fuel solenoid / gas valve"	[R 04]	45
		46
		47
Relay [R 05] isolated *1 Preconfigured to „Preglow"	[R 05]	48
		49
Relay [R 06] isolated *1 Preconfigured to „Command: close GCB"	[R 06]	50
		51
Relay [R 07] isolated *1 Preconfigured to „Command: open GCB"	[R 07]	52
		53
Relay [R 08] isolated *1 Preconfigured to „Command: close MCB"	[R 08]	54
		55
Relay [R 09] isolated *1 Preconfigured to „Command: open MCB"	[R 09]	56
		57
Relay [R 10] isolated *1 Preconfigured to „Auxiliary services"	[R 10]	
Relay [R 11] isolated *1 Preconfigured to „Alarm class A or B"	[R 11]	58
Relay [R 12] isolated *1 Preconfigured to „larm class C, D, E or F"	[R 12]	59
		60
Protective Earth PE	⏚	61
Engine ground		62
Power supply 8 to 40 Vdc	12/24 Vdc	63
	0 Vdc	64
Auxiliary excitation isolated	D+	65
Common (terminals 67 to 78)		66
Discrete input [DI 01] isolated *1 Emergency stop	[DI 01]	67
Discrete input [DI 02] isolated *1 Start in Auto	[DI 02]	68
Discrete input [DI 03] isolated *1 Low oil pressure	[DI 03]	69
Discrete input [DI 04] isolated *1 Coolant temp.	[DI 04]	70
Discrete input [DI 05] isolated *1 Alarm acknowledge	[DI 05]	71
Discrete input [DI 06] isolated *1 Enable MCB	[DI 06]	72
Discrete input [DI 07] isolated Reply: MCB open	[DI 07]	73
Discrete input [DI 08] isolated Reply: GCB open	[DI 08]	74
Discrete input [DI 09] isolated *1	[DI 09]	75
Discrete input [DI 10] isolated *1	[DI 10]	76
Discrete input [DI 11] isolated *1	[DI 11]	77
Discrete input [DI 12] isolated *1	[DI 12]	78
MPU input	+	79
	−	80

CAN bus #1
Guidance/system level
isolated
(Interface #3)
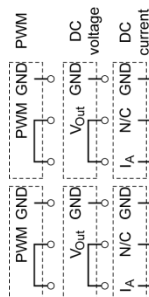
FEATURES OVERVIEW

For more information contact:

We appreciate your comments about the content of our publications. Please send comments including the document number below to
stgt-doc@woodward.com

37258G - 2010/05/Stuttgart

	easYgen-3000 Series			
Model	3100		3200	
Package	P1	P2	P1	P2
Measuring				
Generator voltage (3-phase/4-wire)	✓	✓	✓	✓
Generator current (3x true r.m.s.)	✓	✓	✓	✓
Mains 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	2	2
Automatic, Manual, Stop, and test operating modes	✓	✓	✓	✓
Single and multiple-unit operation	✓	✓	✓	✓
Mains parallel multiple-unit operation (up to 32 units)	✓	✓ [#2]	✓	✓ [#2]
AMF (auto mains failure) and stand-by operation	✓	✓	✓	✓
Critical mode operation	✓	✓	✓	✓
GCB and MCB synchronization (slipping / phase matching)	✓	✓	✓	✓
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				
Soft keys (advanced LC display) *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	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: voltage / frequency 59 / 27 / 81O / 81U	✓	✓	✓	✓
Mains: phase shift / rotation field 78 /	✓	✓	✓	✓
I/Os				
Speed input (magnetic / switching; Pickup)	✓	✓	✓	✓
Discrete alarm inputs (configurable)	10	10	10	10
Discrete outputs (configurable) *LogicsManager*™	max. 12	max. 12	max. 12	max. 12
External discrete inputs / outputs via CANopen (maximum)	16 / 16	32 / 32	16 / 16	32 / 32
Analog inputs [#5] (configurable) *FlexIn*™	3	3	3	3
Analog outputs (+/- 10V, +/- 20mA, PWM; configurable)	2	2	2	2
External analog inputs / outputs via CANopen (maximum)	-	16 / 4	-	16 / 4
Display of J1939 analog values (number of SPNs)	16	-	16	-
Display and evaluation of J1939 analog values (supported SPNs)	-	100	-	100
CAN bus communication interfaces [#6] *FlexCAN*™	2	2	2	2
RS-232/485 Modbus RTU Slave interface(s)	1 / 1	1 / 1	1 / 1	1 / 1
Listings/Approvals				
UL Listing	✓	✓	✓	✓
cUL Listing	✓	✓	-	-
LR & ABS Marine	✓	✓	✓	✓
CE Marked	✓	✓	✓	✓
Part Numbers				
1A CT inputs / front panel mounting with display [#7] P/N 8440-	-	-	1922	1924
5A CT inputs / front panel mounting with display [#7] P/N 8440-	-	-	1923	1925
1A CT inputs / cabinet back mounting w/o display P/N 8440-	1931	1933	-	-
5A CT inputs / cabinet back mounting w/o display P/N 8440-	1930	1932	-	-
Spare connector kit P/N 8923-	1314	1314	1314	1314

#1 mains or ground current selectable
#2 refer to the Application Manual 37471 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