



easYgen-3100/3200 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, co-generation 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 sequencing.

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

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

LogicsManager™ – Woodward's LogicsManager enables to change the operation sequences and adapt them to specific needs. The LogicsManager accomplishes this by monitoring a range of measuring values 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™ – 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™ – 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™ – The adaptive and interactive 5.7", 320x240 pixel color 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
- Remote control via interface and discrete/analog inputs for adjusting speed, frequency, voltage, power, reactive power, and power factor set points
- Freely configurable PID controllers for various control purposes, such as heating circuit control (CHP applications), water level, fuel level, or pressure and/or other process values
- Special Scania S6, MTU ADEC ECU7/8, Volvo EMS2 & EDC4, Deutz EMR2, MAN MFR/EDC7, SISU EEM, Cummins and Woodward EGS02 ECU support
- 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

- Dynamic mains stabilization (as per BDEW)
- Adjustable vector groups for synchronization
- Mains decoupling and single failure proof feature (as per VDE-AR-N 4105)
- 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
- CANopen / J1939 ECU Control
- Process control

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 (λ/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 M Ω , [4] 2.0 M Ω
 Max. power consumption per path < 0.15 W

Current (Isolated) Rated (I_{rated}) [1] ..1 A or [5] ..15 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 $\pm 10 V / \pm 20 mA / PWM$
 Insulation voltage (continuously) 100 Vac
 Insulation test voltage (1s) 500 Vac
 Resolution 11/12 Bit (depending on analog output)
 $\pm 10 V$ (scalable) internal resistance ≤ 1 kOhms
 $\pm 20 mA$ (scalable) maximum load 500 Ohms

Housing Front panel flush mounting Plastic housing
 Dimensions WxHxD 282 x 217 x 99 mm
 Front cutout WxH 249 [+1.1] x 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

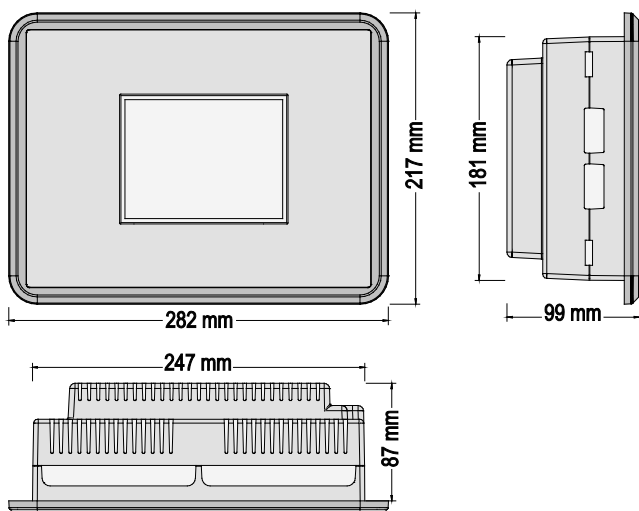
Weight approx. 1,850 g

Housing Switch cabinet back mounting Sheet metal housing
 Dimensions WxHxD 250 x 227 x 84 mm
 Connection screw/plug terminals 2.5 mm²
 Protection system IP 20
 Weight approx. 2,150 g

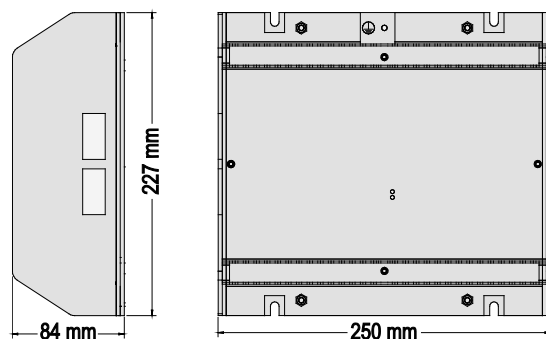
Disturbance test (CE) tested according to applicable EN guidelines
Listings UL, cUL, GOST-R, CSA
Marine LR (Type Approval), ABS (Design Assessment)

DIMENSIONS

Plastic housing for front panel mounting

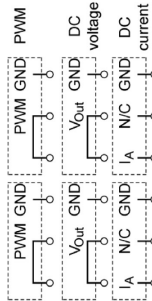


Metal housing for cabinet mounting



TERMINAL DIAGRAM

		Serial #2 RS-485 isolated (Interface #2)	WOODWARD		Serial #1 RS-232 isolated (Interface #1)		
40	480 Vac	Busbar voltage (system 1) L2 N			Relay [R 01] isolated ¹ Fixed to „Ready for operation“	[R 01]	41
39	120 Vac						42
38	480 Vac	Busbar voltage (system 1) L1			Relay [R 02] isolated ¹ Preconfigured to „Centralized alarm“	[R 02]	43
37	120 Vac				Relay [R 03] isolated ¹ Preconfigured to „Starter“	[R 03]	44
36	480 Vac	Generator voltage N			Relay [R 04] isolated ¹ Preconfigured to „Fuel solenoid / gas valve“	[R 04]	45
35	120 Vac						46
34	480 Vac	Generator voltage L3			Relay [R 05] isolated ¹ Preconfigured to „Preglow“	[R 05]	47
33	120 Vac						48
32	480 Vac	Generator voltage L2			Relay [R 06] isolated ¹ Preconfigured to „Command: close GCB“	[R 06]	49
31	120 Vac						50
30	480 Vac	Generator voltage L1			Relay [R 07] isolated ¹ Preconfigured to „Command: open GCB“	[R 07]	51
29	120 Vac						52
28	480 Vac	Mains voltage N			Relay [R 08] isolated ¹ Preconfigured to „Command: close MCB“	[R 08]	53
27	120 Vac						54
26	480 Vac	Mains voltage L3			Relay [R 09] isolated ¹ Preconfigured to „Command: open MCB“	[R 09]	55
25	120 Vac						56
24	480 Vac	Mains voltage L2			Relay [R 10] isolated ¹ Preconfigured to „Auxiliary services“	[R 10]	57
23	120 Vac				Relay [R 11] isolated ¹ Preconfigured to „Alarm class A or B“	[R 11]	58
22	480 Vac	Mains voltage L1			Relay [R 12] isolated ¹ Preconfigured to „Alarm class C, D, E or F“	[R 12]	59
21	120 Vac						60
20	-	[AO 02]	Analog outputs +/-10 Vdc +/-20 mA PWM isolated		Protective earth PE ²		61
19	+				Engine ground		62
18	-	[AO 01]			Power supply	12/24 Vdc 8 to 40 Vdc	63
17	+				Power supply	0 Vdc	64
16	-			Auxiliary excitation isolated	D+	65	
15	+			Common (terminals 67 to 78)		66	
14	+	[AI 03]	Analog inputs 0 to 500 Ohms 0 to 20 mA	Discrete input [DI 01] isolated ¹ Emergency stop	[DI 01]		67
13	-			Discrete input [DI 02] isolated ¹ Start in Auto	[DI 02]		68
12	+			Discrete input [DI 03] isolated ¹ Low oil pressure	[DI 03]		69
11	-	[AI 02]		Discrete input [DI 04] isolated ¹ Coolant temp.	[DI 04]		70
10	+	[AI 01]		Discrete input [DI 05] isolated ¹ Alarm acknowledge	[DI 05]		71
09	-		Discrete input [DI 06] isolated ¹ Enable MCB	[DI 06]		72	
08	s1	L3	Generator current isolated	Discrete input [DI 07] isolated Reply: MCB open	[DI 07]		73
07	s2			Discrete input [DI 08] isolated Reply: GCB open	[DI 08]		74
06	s1	L2		Discrete input [DI 09] isolated ¹	[DI 09]		75
05	s2			Discrete input [DI 10] isolated ¹	[DI 10]		76
04	s1	L1		Discrete input [DI 11] isolated ¹	[DI 11]		77
03	s2			Discrete input [DI 12] isolated ¹	[DI 12]		78
02	s1	Mains or ground current isolated					79
01	s2			MPU input	+		80
			CAN bus #2 Engine level isolated (Interface #4)	easYgen-3100/3200			
				CAN bus #1 Guidance/system level isolated (Interface #3)			



FEATURES OVERVIEW

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		easYgen-3000 Series			
		3100		3200	
Model	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)	<i>FlexApp™</i>	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					
Color Display with Softkey operation	<i>DynamicsLCD™</i>	-	-	✓	✓
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 / 810 / 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 / 810 / 81U	✓	✓	✓	✓
Mains: phase shift / rotation field / ROCOF (df/dt)	78 /	✓	✓	✓	✓
I/Os					
Speed input (magnetic / switching; Pickup)		✓	✓	✓	✓
Discrete alarm inputs (configurable)		10	10	10	10
Discrete outputs (configurable)	<i>LogicsManager™</i>	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)	<i>FlexIn™</i>	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 and evaluation of J1939 analog values (supported SPNs)		100	100	100	100
CAN bus communication interfaces #6	<i>FlexCAN™</i>	2	2	2	2
RS-232/485 Modbus RTU Slave interface(s)		1 / 1	1 / 1	1 / 1	1 / 1
Listings/Approvals					
UL / cUL Listing		✓	✓	✓	✓
GOST-R & CSA		✓	✓	✓	✓
LR & ABS Marine		✓	✓	✓	✓
BDEW / VDE-AR-N 4105		✓	✓	✓	✓
CE Marked		✓	✓	✓	✓
Part Numbers					
1A CT inputs / front panel mounting with display #7	P/N 8440-	-	-	2049	2051
5A CT inputs / front panel mounting with display #7	P/N 8440-	-	-	2050	2052
1A CT inputs / cabinet back mounting w/o display	P/N 8440-	2055	2057	-	-
5A CT inputs / cabinet back mounting w/o display	P/N 8440-	2054	2056	-	-
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