



easYgen Series Controls for Rental Genset Applications

DESCRIPTION

Woodward's easYgen paralleling genset controls for rental applications expand upon the versatility of the popular easYgen-2000 series and easYgen-3000 series genset controls by providing added flexibility for mobile applications.

The easYgen rental genset controllers include all the highly-valued features and functionality of the standard easYgen models, with the addition of 4 switchable parameter settings blocks that allow the user to quickly change the rated values of the system. Switchable parameter blocks make it easier to apply the genset in rental applications, without requiring the operator to reprogram the easYgen.

The easYgen series rental controls allow genset packagers to standardize on a single, affordable control to fit many different rental genset applications – from single, stand-alone emergency backup generators, to island or utility parallel operation of up to 32 gensets.

The easYgen rental genset application functionality is available in 3 models:

- **easYgen-2500P1 Rental "K33" model** – includes 4 switchable parameter settings blocks, plus all the features of the standard easYgen-2500 P1 model. Applications include isolated operation, parallel operation of a single genset with a utility or islanded load sharing of up to 16 gensets.
- **easYgen-3400/3500P1 Rental "K32" models** – include 4 switchable parameter settings blocks, plus all the features of the standard easYgen-3400/3500 P1 models. Applications include isolated operation or load sharing of up to 32 gensets in islanded or utility parallel operation. The "K32" versions are also compatible with Woodward LS-5 series circuit breaker controls, for complex distribution systems with multiple utility feeds and tie breakers.

FEATURES

- 4 setting blocks, each containing 16 configurable parameters
 - System rated frequency
 - Engine rated speed
 - Mains rated voltage
 - Bus bar 1 rated voltage
 - Gen. rated voltage
 - Gen. rated active power
 - Gen. rated reactive power
 - Gen. rated current
 - Gen. CT prim rated current
 - Setpoint frequency 1
 - Setpoint voltage
 - Setpoint active power
 - Setpoint power factor
 - Load control
 - Application mode
 - Breaker transition mode
- Switching parameter blocks either through the password-protected front display of the device itself or of a Remote Panel, or by changing the state of 2 discrete inputs or through ToolKit
- Operation modes: Auto, Stop, Manual, and Load/No Load test
- Breaker control: Slip frequency / phase matching / run-up synchronization, open-close control, breaker monitoring
- Load transfer features: open / closed transition, interchange, soft loading / soft unloading, mains parallel
- Active power and reactive power sharing including load-dependent start/stop
- Period of use / total operating hours / start / maintenance counters – Operating hours also available from a connected ECU via SAE-J1939
- Special Scania S6, MTU ADEC ECU7/8, Volvo EMS2 & EDC4, Deutz EMR2, MAN MFR/EDC7, SISU EEM, Cummins and Woodward E3 ECU support
- Discrete and analog I/O expansion board connectivity (Woodward IKD 1 or Phoenix Contact IL series)
- Event recorder (300 events, FIFO) with real time clock (battery backed; min. 5 years)
- Multi-level password protection
- Multi-lingual capability

- For rental or mobile genset applications
- Allows packagers to standardize on a single control platform for multiple uses
- Four switchable parameter sets with 16 tunable each
 - Quickly and easily switch system rated values without reprogramming
 - Select by external switch, PC equipped with ToolKit or via the front display
- Period of use counter
- Soft loading/unloading features
- Open/closed transition
- CANopen / J1939 ECU Control

easYgen-3400/3500P1 Rental:

- Sophisticated control with load sharing and load-dependent start/stop of up to 32 units
- Provides full connectivity of up to 16 Woodward LS-5 circuit breaker controller
- Integrated Generator Group breaker control
- Run-up Synchronization

easYgen-2500P1 Rental:

- Economical option with load sharing and load-dependent start/stop for up to 16 units
- 4 configurable AI/AO
- Smaller footprint

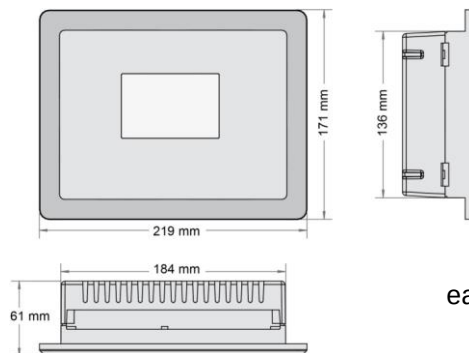
SPECIFICATIONS

Power supply	12/24 Vdc (8 to 40 Vdc)
Intrinsic consumption	max. ~ 12 W (easYgen-2500-P1)
	max. 19 W (easYgen-3400/3500-P1)
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/Δ)
120 Vac [1]	Rated (V_{rated}).....69/120 Vac
	Max. value (V_{max}).....86/150 Vac
Rated voltage phase – ground	150 Vac (easYgen-2500P1)
Rated surge volt. (V_{surge})	2.5 kV
and 480 Vac [4]	Rated (V_{rated}).....277/480 Vac
	Max. value (V_{max}).....346/600 Vac
Rated voltage phase – ground	150 Vac (easYgen-2500P1)
Rated surge volt. (V_{surge})	4.0 kV
Accuracy	Class 1
Measurable alternator windings	(easYgen-3400/3500P1)
	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 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 (easYgen-3400/3500P1)
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/potential free
Contact material	AgCdO

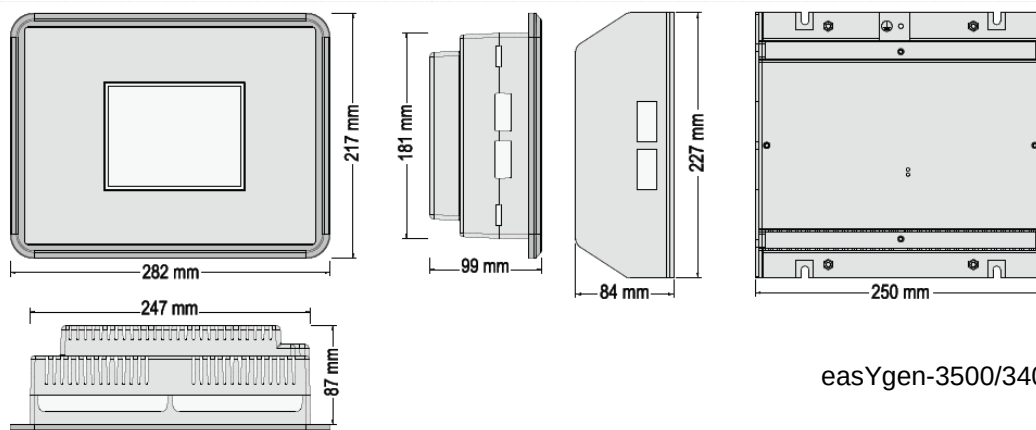
Load (GP)	2.00 Aac@250 Vac
	2.00 Adc@24 Vdc / 0.36 Adc@125 Vdc / 0.18 Adc@250 Vdc
Pilot duty (PD)	1.00 Adc@24 Vdc / 0.22 Adc@125 Vdc / 0.10 Adc@250 Vdc
Analog inputs (none isolated)	freely scalable
Type	0 to 500 Ohms / 0 to 20 mA
Resolution	11 Bit
Analog outputs (isolated)	freely scalable
Type	± 10 V / ± 20 mA / PWM
Insulation voltage (continuously)	100 Vac
Insulation test voltage (≤ 5 s)	1000 Vac (easYgen-2500P1)
	(1s).....500 Vac (easYgen-3400/3500P1)
Resolution	11/12 Bit (depending on analog output)
± 10 V (scalable)	internal resistance ~ 500 Ohms (easYgen-2500P1)
	internal resistance ≤ 1 kOhms (easYgen-3400/3500P1)
± 20 mA (scalable)	maximum load 500 Ohms
Housing	Front panel flush mountingPlastic housing
	Back panel mounting.....Sheet metal housing
Dimensions	WxHxD219 × 171 × 98 mm (easYgen-2500P1)
	WxHxD250 × 227 × 84 mm (easYgen-3400P1)
	WxHxD282 × 217 × 99 mm (easYgen-3500P1)
Front cutout	WxH186 [+1.1] × 138 [+1.0] mm (easYgen-2500P1)
	WxH249 [+1.1] × 183 [+1.0] mm (easYgen-3500P1)
Connection	screw/plug terminals 2.5 mm ²
Front	insulating surface
Sealing	Front.....IP65 (with screw fastening, easYgen-2500P1)
	Front.....IP66 (with screw fastening, easYgen-3500P1)
	Front.....IP54 (with clamp fastening)
	Back.....IP20
Weight	approx. 1.1 kg (easYgen-2500P1)
	approx. 2.2 kg (easYgen-3400/3500P1)
Disturbance test (CE)	tested according to applicable EN guidelines
Listings	UL, cUL, CSA
Marine	LR (Type Approval), ABS (Design Assessment: easYgen-2500P1), ABS (Type Approval: easYgen-3400/3500P1)

DIMENSIONS

Plastic housing for front panel mounting



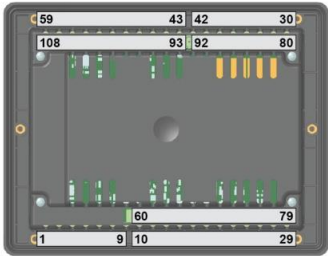
easYgen-2500P1 Rental



easYgen-3500/3400P1 Rental

TERMINAL DIAGRAM

easYgen-2500P1 Rental



01	+	AO 01	ANALOG OUTPUT
02	-	PWM Vdc	
03	-	±10Vdc ±20mA	
04	GND	PWM	
05	L1	GENERATOR CURRENT	
06	L2		
07	L3		
08	s2	MAINS CURRENT	
09	s1		

10	GND	ANALOG INPUTS
11	+ AI 01	
12	+ AI 02	
13	+ AI 03	
14	120 Vac	L1
15	480 Vac	L2
16	120 Vac	L3
17	480 Vac	L1
18	120 Vac	L2
19	480 Vac	L3
20	120 Vac	N
21	480 Vac	N
22	120 Vac	L1
23	480 Vac	L2
24	120 Vac	L3
25	480 Vac	L1
26	120 Vac	L2
27	480 Vac	L3
28	120 Vac	N
29	480 Vac	N

30		R 01
31		R 02
32		R 03
33		R 04
34		R 05
35		R 06
36		R 07
37		R 08
38		R 09
39		R 10
40		R 11
41		R 12
42		R 13

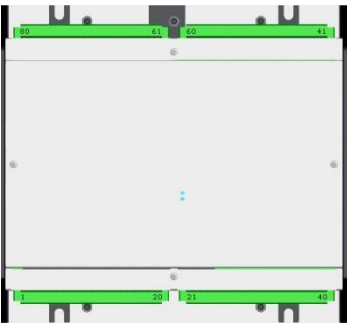
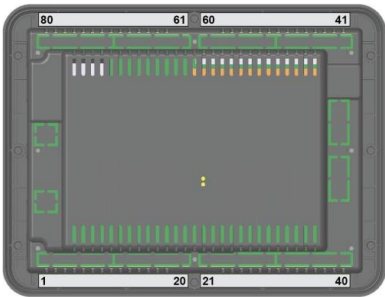
43	COMMON	DISCRETE INPUTS
44	→ DI 01	
45	→ DI 02	
46	→ DI 03	
47	→ DI 04	
48	→ DI 05	
49	→ DI 06	
50	→ DI 07	
51	→ DI 08	
52	D+ Aux. Excitation	
53	12/24 Vdc	POWER SUPPLY
54	0 Vdc	
55	Function Earth	
56	+	MPU
57	-	
58	CAN-L	CAN #1
59	CAN-H	

60	+	AO 02	ANALOG OUTPUTS
61	-	±10Vdc ±20mA	
62	-	PWM	
63	GND	AO 03	
64	I _A	0.4 to 20 mA	
65	GND	AO 04	
66	I _A	0.4 to 20 mA	
67	GND	AI 04	ANALOG INPUT
68	+	0 to 500 Ohm	
69			
70			
71			
72			
73			
74			
75	COMMON	DISCRETE INPUTS	
76	→ DI 09		
77	→ DI 10		
78			
79			

80		R 07
81		R 08
82		R 09
83		R 10
84		R 11
85		R 12
86		R 13
87		R 14
88		R 15
89		R 16
90		R 17
91		R 18
92		R 19

93	CAN-L	CAN bus 2
94	CAN-H	
95	GND	
96	Shield	
97		
98		
99		
100		
101	Function Earth	
102	RS-485-A (RXD-)	
103	RS-485-B (RXD+)	
104	GND	
105	Shield	
106		
107		
108		

easYgen-3400/3500P1 Rental



01	s2	L1	MAINS CURRENT
02	s1	(or ground G)	
03	s2	L1	GENERATOR CURRENT
04	s1		
05	s2	L2	
06	s1		
07	s2	L3	
08	s1		
09	-	AI 01	ANALOG INPUTS
10	+	0 to 500 Ohm	
11	-	AI 02	
12	+	AI 03	
13	-		
14	+		
15	+	PWM Vdc	ANALOG OUTPUTS
16	-	±10Vdc ±20mA	
17	-	PWM	
18	+	PWM Vdc	
19	-	±10Vdc ±20mA	
20	-		

21	120 Vac	L1
22	480 Vac	L2
23	120 Vac	L3
24	480 Vac	L1
25	120 Vac	L2
26	480 Vac	L3
27	120 Vac	N
28	480 Vac	N
29	120 Vac	L1
30	480 Vac	L2
31	120 Vac	L3
32	480 Vac	L1
33	120 Vac	L2
34	480 Vac	L3
35	120 Vac	N
36	480 Vac	N
37	120 Vac	L1
38	480 Vac	L2
39	120 Vac	L3
40	480 Vac	N

41		R 01
42		R 02
43		R 03
44		R 04
45		R 05
46		R 06
47		R 07
48		R 08
49		R 09
50		R 10
51		R 11
52		R 12
53		R 13
54		R 14
55		R 15
56		R 16
57		R 17
58		R 18
59		R 19
60		R 20

61	Protective Earth	POWER SUPPLY
62	Engine Ground	
63	12/24 Vdc	
64	0 Vdc	
65	D+ Aux. Excitation	
66	COMMON	DISCRETE INPUTS
67	→ DI 01	
68	→ DI 02	
69	→ DI 03	
70	→ DI 04	
71	→ DI 05	
72	→ DI 06	
73	→ DI 07	
74	→ DI 08	
75	→ DI 09	
76	→ DI 10	
77	→ DI 11	
78	→ DI 12	
79	+	MPU
80	-	

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For more information contact:

		easYgen Rental		
	Model	easYgen-2500P1 Rental	easYgen-3400P1 Rental	easYgen-3500P1 Rental
Measuring				
Generator voltage (3-phase/4-wire)		✓	✓	✓
Generator current (3x true r.m.s.)		✓	✓	✓
Mains voltage (3-phase/4-wire)		✓	✓	✓
Mains or ground current (selectable, 1 x true r.m.s.)		✓	✓	✓
Busbar voltage (1-phase/2-wire)		-	✓	✓
Control				
Breaker control logic (open and closed transition)	<i>FlexApp™</i>	2	3	3
Number of supported Woodward LS-5 units		-	16	16
Automatic, Manual, Stop, and test operating modes		✓	✓	✓
Single and multiple-unit operation		✓	✓	✓
Mains parallel multiple-unit operation (up to ...)		1	32 ^{#1} units	32 ^{#1} units
AMF (auto mains failure) and stand-by operation		✓	✓	✓
Critical mode operation		✓	✓	✓
GCB and MCB synchronization (slip synchronization / phase matching)		✓	✓	✓
Open (break-before-make) and closed (make-before-break) transition		✓	✓	✓
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 ...		16 gensets	32 gensets	32 gensets
Freely configurable PID controllers		-	3	3
HMI				
		with Remote Panel only:		
Display with Softkey operation	<i>DynamicsLCD™</i>	Monochrome	Color	Color
Start/stop logic for diesel / gas engines		✓	✓	✓
Counters for period of use / total operating hours / starts / maintenance		✓	✓	✓
Configuration via PC (ToolKit software included)		✓ (needs DPC cable)	✓	✓
Event recorder entries with real time clock (battery backup)		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 #2	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: rotation field		✓	✓	✓
Mains: phase shift / df/dt (ROCOF)	78	✓	✓	✓
I/Os				
External switch for parameter set selection (1 of 4)		✓	✓	✓
Speed input (magnetic / switching; Pickup)		✓	✓	✓
Discrete alarm and control inputs (configurable)		10	10	10
Discrete outputs (configurable)	<i>LogicsManager™</i>	11	max. 12	max. 12
External discrete inputs / outputs via CANopen (maximum)		16 / 16 ^{#3}	32 / 32	32 / 32
Analog inputs (configurable)	<i>FlexIn™</i>	4	3 ^{#4}	3 ^{#4}
Analog outputs (+/- 10V, +/- 20mA, PWM; configurable)		4	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
CAN bus communication interfaces ^{#5}	<i>FlexCAN™</i>	2	3	3
RS-485 Modbus RTU Slave interface(s)		1	1	1
Service Port to connect via RS-232 DPC cable or DPC USB cable		✓	✓	✓
Listings/Approvals				
UL / cUL Listing and CE Marked		✓	✓	✓
CSA		✓	✓	✓
LR & ABS Marine		✓	✓	✓
BDEW / VDE-AR-N 4105		-	✓	CT inputs:
Part Numbers				
		With display	NO display	With display
With display: Plastic housing for front panel mounting incl. screw and clamp kit	CT inputs: 1A	8440-2096	8440-2162	8440-2095
NO display: Metal housing for rear panel mounting	CT inputs: 5A	8440-2029	8440-2163	8440-2030
Spare connector kit		8928-7297	8923-1314	8923-1314
DPC Service Port cable	RS-232 DPC cable	5417-557	-/-	-/-
	DPC USB cable	5417-1251	-/-	-/-

#1 Refer to the Manual for applications with more than 8 parallel gensets because of bus load limits

#2 Measured ground current

#3 Two digital IO expansion boards (P/N 8440-2028) are connectable via CAN bus to provide 8 additional DIs and DOs each

#4 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)

#5 Freely selectable during configuration between CANopen or J1939; request information