



easYgen-3400/3500

Genset Control for Complex Breaker Applications

DESCRIPTION

The easYgen-3000 Series are control units for genset 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. This includes stand-by, AMF, peak shaving, import-export, cogeneration or distributed generation, among others. Also the easYgen-3000 Series is compatible for isolated, 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 for simple paralleling as well as for complex paralleling applications. Choose easYgen-3200 should you want to take your fleet of gen-sets parallel to grid or choose easYgen-3500 with LS-5 for multi grid, multi segment applications. These controllers are also available without display, in a rugged metal housing suitable for back panel installation. A remote panel (RP-3000) can be used for visualization/control purpose in this case.

FlexApp™ – This feature provides the tools to easily configure the number of operated breakers: None, GCB, GCB and MCB, GGB (Generator Group Breaker) and additional modes for Woodward LS-5 device interaction.

LogicsManager™ – Woodward's LogicsManager enables changes to the operation sequences and adaption 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.

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

- Full connectivity of up to 32 Generators and 16 LS-5 circuit breaker control devices in one application
- Run-up synchronization to get several synchronous generators onto the load in a very short time. All generators are started with closed generator breakers. At the configured operating speed the voltage regulators are turned on and the voltage increases constantly to rated value. This method allows also to start-up a transformer without producing large in-rush currents.
- 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
- Supported ECU: Scania S6, MTU ADEC ECU7/8, Volvo EMS2 & EDC4, Deutz EMR2 & EMR3, MAN MFR/EDC7, SISU EEM, Cummins and Woodward E3 ECU
- Discrete and analog I/O expansion board connectivity (Woodward IKD 1 or Phoenix Contact IL series)
- Multi-lingual capability: English, German, Spanish, French, Italian, Portuguese, Japanese, Chinese, Russian, Turkish, Polish, Slovakian, Finnish, Swedish
- Configurable voltage/frequency control allows manual control of breakers
- Neutral interlocking determines and controls one common neutral in a network of generators
- Cylinder temperature monitoring for in-line and V engines
- Reactive power regulation at the grid interchange point (KVar or PF)
- Provides full connectivity of up to 16 Woodward LS-5 Series controllers for complex power management applications with multiple mains and bus tie breakers
- Integrated Generator Group breaker GGB control
- Run-up Synchronization
- Automatic Segment Control
- Master or Slave control capability
- Peak shaving operation
- AMF operation
- Cogeneration (CHP)
- Islanded & mains parallel operation
- Load sharing and load-dependent start/stop for up to 32 units
- Import/export control
- Open/closed transition
- CANopen / J1939 ECU Control
- Free configurable alarms and texts
- Fast configuration by partial setting files
- Dynamic mains stabilization (as per BDEW)
- Adjustable vector groups for synchronization

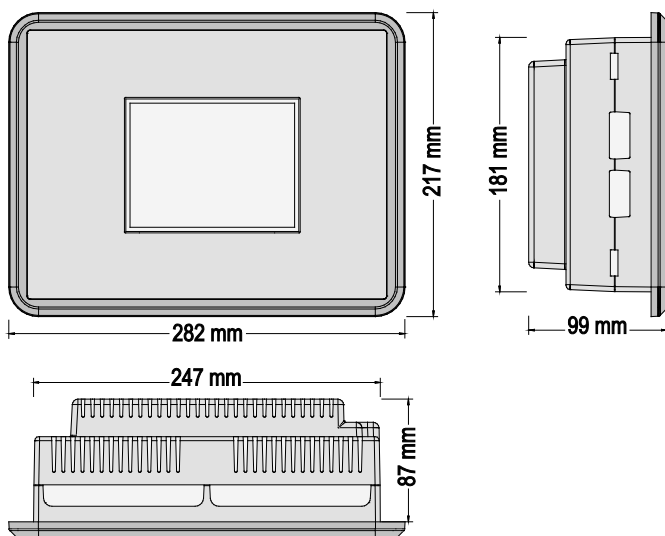
SPECIFICATIONS

Power supply	12/24 Vdc (8 to 40 Vdc)
Intrinsic consumption	max. 19 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× 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× 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)	

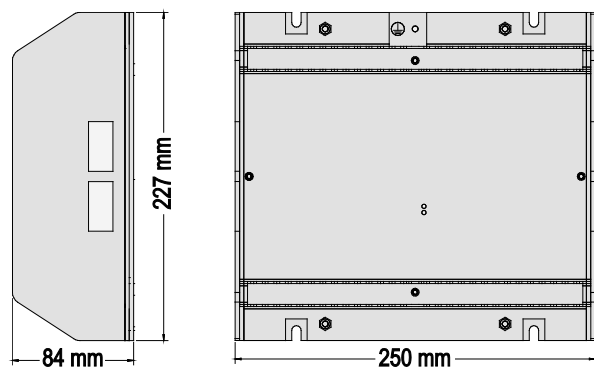
	1.00 Adc@24 Vdc / 0.22 Adc@125 Vdc / 0.10 Adc@250 Vdc
Analog inputs (none isolated)	freely scalable
Type 1	0 to 500 Ohms / 0 to 20 mA
Type 1 resolution	11 Bit
Type 2 (in P2)	0 to 10V / 0 to 20 mA
Type 3 (in P2)	0 to 250 Ohms / 0 to 2500 Ohms
Type 2/3 resolution	12 Bit
Analog outputs (isolated)	freely scalable
Type 1	± 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
Type 2 (in P2)	0/4 - 20 mA / 0 - 10 Vdc
Insulation voltage (continuously)	100 Vac
Insulation test voltage (1s)	500 Vac
Resolution	12 Bit
Output	maximum load 500 Ohm
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 mm ²
Front	insulating surface
Sealing	Front IP66 (with screw fastening)
	Front IP54 (with clamp fastening)
	Back IP20
Weight	max. 2,170 g
Housing	Back panel mounting Sheet metal housing
Dimensions	W x H x D 250 × 227 × 84 mm
Connection	screw/plug terminals 2.5 mm ²
Protection system	IP 20
Weight	max. 2,270 g
Disturbance test (CE)	tested according to applicable EN guidelines
Listings	UL, cUL, GOST-R, CSA
Marine	LR (Type Approval), ABS (Type Approval)

DIMENSIONS

Plastic housing for front panel mounting



Metal housing for cabinet mounting



TERMINAL DIAGRAM

easYgen-3400/3500 P1 and P2

MAINS CURRENT (OR GROUND C.)		GENERATOR CURRENT						ANALOG INPUTS 0 to 500 Ohm 0/4 to 20 mA						ANALOG OUTPUTS ±10 Vdc ±20mA PWM					
L1		L1		L2		L3		AI 01		AI 02		AI 03		AO 01		AO 02			
S2	S1	S2	S1	S2	S1	S2	S1	-	+	-	+	-	+	PWM_Vdc	+	PWM_Vdc	+		
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20

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

60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41
R12		R11		R10		R09		R08		R07		R06		R05		R04		R03	
RELAY OUTPUTS																			

80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64	63	62	61
MPU		DI12	DI11	DI10	DI09	DI08	DI07	DI06	DI05	DI04	DI03	DI02	DI01	COMMON	Aux. Excitation D+	0 Vdc	12/24 Vdc	Engine Ground	*
DISCRETE INPUTS																			
POWER SUPPLY																			

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For more information contact:

FEATURES OVERVIEW

		easYgen-3000 Series			
		Model Package	3400	3500	
			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.; mains or ground current selectable)			✓	✓	✓
Busbar voltage (1-phase/2-wire)			✓	✓	✓
Control					
Breaker control logic (open and closed transition)	<i>FlexApp™</i>	3	3	3	3
Number of supported Woodward LS-5 units		16	16	16	16
Automatic, Manual, Stop, and test operating modes		✓	✓	✓	✓
Single and multiple-unit operation		✓	✓	✓	✓
Mains parallel multiple-unit operation (up to 32 units)		✓	✓	✓	✓
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		✓	✓	✓	✓
Import / export control (kW and kVar)		✓	✓	✓	✓
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	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 (serial connection and ToolKit software (included))		✓	✓	✓	✓
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 / 51V	✓	✓	✓	✓
Generator: ground fault (measured ground current)	50G	✓	✓	✓	✓
Generator: power factor	55	✓	✓	✓	✓
Generator: rotation field		✓	✓	✓	✓
Engine: overspeed / underspeed	12 / 14	✓	✓	✓	✓
Engine: speed / frequency mismatch		✓	✓	✓	✓
Engine: D+ auxiliary excitation failure		✓	✓	✓	✓
Engine: Cylinder temperature		✓	✓	✓	✓
Mains: voltage / frequency	59 / 27 / 810 / 81U	✓	✓	✓	✓
Mains: phase shift / rotation field / df/dt (ROCOF)	78	✓	✓	✓	✓
I/Os					
Speed input: magnetic / switching; Pickup		✓	✓	✓	✓
Discrete alarm inputs (configurable)		12 (9)	12 (9)	12 (9)	23 (20)
Discrete outputs, configurable	<i>LogicsManager™</i>	max. 12	max. 12	max. 12	max. 22
External discrete inputs / outputs via CANopen		32 / 32	16 / 16	32 / 32	16 / 16
Analog inputs #1: +/- 20 mA, 0...10 V, 0...250/500/2500 Ω configurable	<i>FlexIn™</i>	3	10	3	10
Analog outputs: +/- 10V, +/- 20mA, PWM; configurable +		2	5	2	5
External analog inputs / outputs via CANopen		16 / 4	-	16 / 4	-
Display and evaluation of J1939 analog values, "supported SPNs"		100	100	100	100
CAN bus communication interfaces #2	<i>FlexCAN™</i>	3	3	3	3
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 #3		-	-	8440-1935	8440-1937
5A CT inputs / front panel mounting with display #3		-	-	8440-1934	8440-1936
1A CT inputs / cabinet back mounting w/o display		8440-1956	8440-2079	-	-
5A CT inputs / cabinet back mounting w/o display		8440-1945	8440-2078	-	-
Spare connector kit		8928-7371	8928-7371	8923-1314	8923-1314

#1 selectable senders: VDO (0 to 180 Ohm, 0 to 5/10 bar), VDO (0 to 380 Ohm, 40 to 120°C or 50 to 150°C), Pt100, Pt1000, resistive input (one- or two-pole, 2pt. linear or 9pt. user defined)
 #2 freely selectable during configuration between CANopen or J1939; request information
 #3 a screw and a clamp kit are delivered with the unit for fastening

Related devices (# Product Specification number):

- esepro
- esenet
- easYlite 100 (# 37279)
- Remote Panel RP-3000 (# 37446)
- LS-511/521 (# 37522)