

easYgen-3500XT



Genset Control for Complex Paralleling Operation

New Features

- ✓ Built-In Redundant Ethernet
- ✓ Power Measurement Class 1
- ✓ Direct Connect Up to 690 V_{AC}
- ✓ AnalogManager & Editable Screens
- ✓ Multi-Interface ToolKit connectivity
- ✓ New face plate with tactile buttons
- ✓ Drop-In replacement
- ✓ Dual Starter application

DESCRIPTION

Woodward raised the standard in genset paralleling control and power management system with the easYgen-3000XT Series controllers. These controllers come with standardized software that is simple to configure, yet easily customized for individual applications. Enhanced connectivity enables fast, reliable and secure interfacing to other controls and communications systems while the enhanced hardware is a drop-in replacement for previous generation easYgen-3000 Series Controls.

The easYgen-3500XT with a dedicated CANopen network for connectivity to up to 16 LS-5 Circuit Breaker Controls, enables control of complex distribution systems having multiple utility feeds and tie breakers, and parallel load sharing of up to 32 generators on up to 32 different bus segments. Redundant load sharing is selectable using Ethernet B and C networks for improved reliability. The control combines complete engine-generator control and protection with advanced, peer-to-peer paralleling functionality and innovative features in a robust, attractive, user-friendly and all-in-one package. The easYgen-3500 XT controls are designed to direct connect up to 690Vac and operate to 4000m above sea level without derating.

The easYgen-3500XT package. Focused at complex paralleling applications provides redundant Ethernet communication, LS-5 connectivity, and standard I/O set. P/N: 8440-2260 also include programmed logic managers for use in dual starter redundancy application.

FEATURES

- Full connectivity of up to 32 Generators and 16 LS-5 circuit breaker controls in one application
- Run-up synchronization / Dead Field Paralleling to quickly get several synchronous generators onto the load
- Three-phase true RMS power sensing with Class I accuracy
- Operation modes: AUTO, STOP, MANUAL, and TEST - accessible through face plate or discrete input
- Breaker control: Slip frequency / phase matching synchronization, open / close control, breaker monitoring
- Load transfer: open / closed transition, interchange, soft loading / unloading, Utility parallel
- Load share and device to device communication over CAN or Ethernet (Redundant possible)
- Remote control via interface (Modbus TCP, Modbus RTU) and via 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, pressure and / or other process variables
- Optional configuration for Dual Starter application, A-Starter crank fail 3 times switch to B-Starter in Auto mode only.
- Direct support to several ECUs: Scania S6, MTU ADEC ECU7/8/9, Volvo EMS2 & EDC4, Deutz EMR2 & EMR3, MAN MFR / EDC7, SISU EEM, Cummins and Woodward EGS02 ECU
- Field ECU support and additional I/O expansion board connectivity through sequencer files
- "System Update" function for online troubleshooting and adding / removing generator sets
- Time / Date synchronization over Simple Network Time Protocol (SNTP)
- Cylinder head / exhaust temperature monitoring (Temperatures come from J1939 or CANopen devices)
- Woodward ToolKit™ software for flexible setup from a single connection to the network. The ToolKit can be accessed either via USB, or via Ethernet, or via CAN ports.
- Multi-lingual capability: English, German, Spanish, French, Italian, Portuguese, Japanese, Chinese, Russian, Turkish, Polish, Slovakian, Finnish, Swedish

- Premium genset control for complex paralleling applications of up to 32 gensets and up to 16 MCB/GGB/Tie Breakers in
- Prime Power & Cogeneration (CHP)
- Peak shaving operation
- Emergency operation
- Import/Export operation
- Islanded & Utility parallel operation
- Integrated Generator Group Breaker (GGB) control
- Run-Up Synchronization
- Dual Starter capability
- Master or Slave control capability
- Complete engine, generator and utility protection
- Up to 9 communication ports: 3xEthernet,3xCAN (CANOpen and J1939), RS-485, USB, Interface expansion card
- Customizable logic, HMI screens, and alarms
- UL 61010, UL 6200, CSA, RoHS 2, and marine (ABS, LR) compliance

SPECIFICATIONS

Power supply	12/24 V _{DC} (8 to 40 V _{DC})
Intrinsic consumption	max. 22 W (LT: max. 32 W)
Ambient temperature (operation)	-20 to 70 °C
Ambient temperature (storage)	-30 to 80 °C / -22 to 176 °F
Ambient humidity	95%, non-condensing
Voltage (software configurable)	(Δ/Δ)
100 V _{AC} Rated (V _{rated})	69/120 V _{AC}
Max. value (V _{max})	86/150 V _{AC}
and 400/600 V_{AC} Rated (V_{rated})*	400/690 V _{AC}
Max. value (V _{max})	520/897 V _{AC}
Rated surge volt. (V _{surge})	6.0 kV
Accuracy	Class 0.5
Measurable alternator windings	3p-3w, 3p-4w, 3p-4w OD, 1p-2w, 1p-3w
Setting range	primary 50 to 650,000 V _{AC}
Linear measuring range	1.25×V _{rated}
Measuring frequency	50/60 Hz (30 to 85 Hz)
High Impedance Input; Resistance per path	2.5 M Ω
Max. power consumption per path	< 0.15 W
Current (Isolated, software configurable)	Rated (I _{rated}) 1A or 5A
Linear measuring range	I _{gen} = 3.0×I _{rated}
	I _{mains/ground} = 1.5×I _{rated}
Setting range	1 to 32,000 A
Burden	< 0.10 VA
Rated short-time overcurrent (1 s)	[1] 50×I _{rated} , [5] 10×I _{rated}
Accuracy	Class 0.5
Power	
Setting range	0.5 to 99,999.9 kW/kvar
Accuracy	Class 1.0
Discrete inputs	isolated
Input range	12/24 V _{DC} (8 to 40 V _{DC})
Input resistance	approx. 20 kOhms
Rated switching voltage	max. 24 V _{DC}
Maximum switching voltage	40 V _{DC}
Maximum switching current	300 mA DC
Isolation Test voltage (<1s)	500 V _{AC}
Isolation voltage (continuously)	100 V _{AC/DC}
Relay outputs	isolated
Contact material	AgCdO
Load (GP)	2.00 A _{AC} @250 V _{AC}
	2.00 A _{DC} @24 V _{DC} / 0.36 A _{DC} @125 V _{DC} / 0.18 A _{DC} @250 V _{DC}

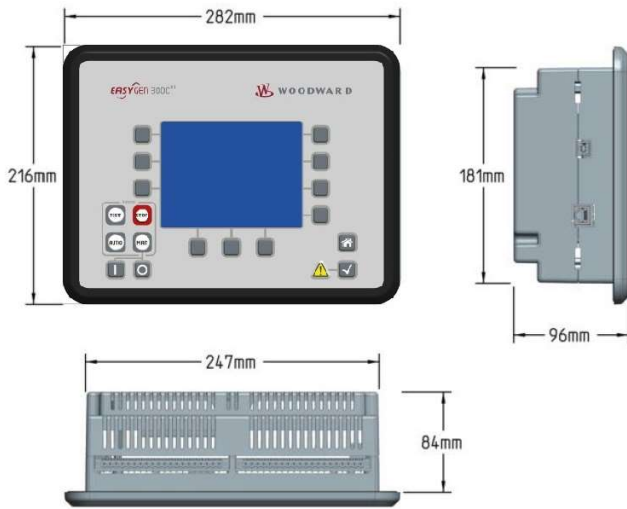
Analog inputs (isolated)	freely scalable
Type	0 to 1 V / 0 to 2000 Ohms / 0 to 20 mA
Resolution	16 Bit
Maximum permissible voltage against genset Ground	9 V
Maximum permissible voltage between genset Ground & PE	100 V
Analog outputs (isolated)	freely scalable
Type	± 10 V / ± 20 mA / PWM
Basic insulation voltage (continuously, AVR _{out})	500 V _{AC}
Reinforced insulation voltage (continuously, AVR _{out})	300 V _{AC}
Insulation voltage (continuously, GOV _{out})	100 V _{AC}
Resolution	12 Bit
Output ± 10 V (scalable)	internal resistance
Output ± 20 mA (scalable)	maximum load 500 Ohms

Housing Front panel flush mounting	Plastic housing
Dimensions WxHxD	282 × 216 × 96 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	approx. 1,850 g
Housing Back panel mounting	Powder Coated Sheet metal housing
Dimensions WxHxD	250 × 228 × 50 mm
Connection	screw/plug terminals 2.5 mm ²
Protection system	IP 20
Weight	approx. 1,750 g
Disturbance test (CE)	tested according to applicable IEC standards
Listings	CE, UL, EAC, VDE, BDEW, CSA
Marine	LR (Type Approval), ABS (Type Approval)

* 3 phase 3 wire Δ constellations are limited to 600 V_{AC} system

DIMENSIONS

Plastic housing for front panel mounting



TERMINAL DIAGRAM

Mains Gnd Current AC 1 A 5 A		Generator Current AC 1 A 5 A						Analog Inputs 0 to 2 kOhm 0/4 to 20 mA 0 to 1 V							Analog Outputs ±10 Vdc ±20 mA PWM Speed Voltage AO 01 AO 02									
s2	s1	L1	L1	L2	L3	L3	L3	AI 01	AI 02	AI 03	Engine Ground	+	-	NC	+	-								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20					
Mains Voltage AC 120 V 480 V ph-ph		Generator Voltage AC 120 V 480 V ph-ph						Busbar Voltage AC 120 V 480 V ph-ph																
NC	L1	NC	L2	NC	L3	NC	N	NC	L1	NC	L2	NC	L3	NC	N	NC	L1	NC	L2					
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					
Relay Outputs																								
MPU		Discrete Inputs														Common DI		Auxiliary Excitation DI		Power Supply 12/24 Vdc		NC		P.E
-	+	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64	63	62	61					
		D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01			-	+	NC	P.E					

Relay 03 – for Starter A
Relay 12 – for Starter B (optional)

Optional configuration preprogrammed for Dual Starter application, Starter A crank 3 times followed by Starter B 3 times. Applicable in Auto mode only.

RELATED PRODUCTS

- Circuit Breaker Controller **LS-511/521 & LS-512/LS-522** (Product Specification # 37522 and #37661/37663)
- Remote Panel **RP-3000XT** (Product Specification # 37592)
- **ToolKit** (Product Specification # 03366)
- I/O Expansion Board **IKD1** (Product Specification # 37171)
- Engine Speed Control **actiVgen** (Product Specification # 03419): P/N 8440-2100
- Load Share Gateway **LSG** (Product Specification # 37451)
- Electronic Pickup Unit **EPU-100** (Product Specification # 37562)
- CANbus based Remote Annunciator (Product Specification # 37279): **easYlite 100** P/N 8446-1023
- **Power Generation Learning Module** (Product Specification # 03412): P/N 8447-1012
- Data **TelegramMapper** software (Application Note # 37684)
- Profibus Gateway (Application Note # 37577): **ESEPRO** P/N 8445-1046
- Ethernet (Modbus/TCP) Gateway (Application Note # 37576): **ESENET** P/N 8445-1044
- CANbus to Fiber Optic Converters (Application Note # 37598):
DL-CAN P/N 8445-1049 and **DL-CAN-R** P/N 8445-1048
- Remote Access Gateway (with HMS Netbiter **EasyConnect EC250** and **EC350**)
- Thermocouple Scanner (**AXIOMATIC AXTC20**)
- WAGO and Phoenix expansion CAN Couplers

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Subject to technical modifications.

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		easYgen-3000XT Series	
	Model	3500XT	
	Package	P1	
Measuring			
Generator voltage	(up to 690 V _{AC})	3-ph	
Generator current	(1 A or 5 A software selectable)	3-ph	
Mains voltage	(up to 690 V _{AC})	3-ph	
Mains or ground current	(1 A or 5 A software selectable)	1-ph	
Busbar voltage	(up to 690 V _{AC})	1-ph	
Control			
Breaker control logic (open and closed transition <100 ms)	FlexApp™	3	
Number of supported Woodward LS-5 units (1 or 2 breaker controls) ^{#1}		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			
Import / export control (kW and kvar)			
Load-dependent start/stop			
n/f, V, P, Q, and PF control via analog input or interface			
Load/var sharing for up to 32 gensets			
Freely configurable PID controllers			
		3	
HMI			
Color Display with Softkey operation	DynamicsLCD™	✓	
Start/stop logic for diesel / gas engines			
Counters for operating hours / starts / maintenance / active/reactive energy			
Configuration via PC (USB serial connection & ToolKit software (included))			
Event recorder entries with real time clock (battery backup)			
		1000	
Operating Temperature			
		-20 to 70 °C	
Protection			
		ANSI#	
Generator: voltage / frequency	59 / 27 / 810 / 81U		
Generator: overload, reverse/reduced power	32 / 32R / 32F		
Generator: Synch Check	25		
Generator: unbalanced load	46		
Generator: instantaneous overcurrent	50		
Generator: time-overcurrent (IEC 255 compliant)	51 / 51 V		
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 / synch check	59 / 27 / 810 / 81U / 25		
Mains: phase shift / rotation field / ROCOF (df/dt)	78		
Busbar: voltage / frequency / Phase Rotation		✓ / ✓ / -	
I/Os			
Speed input: magnetic / switching; Pickup			
		✓	
Discrete alarm inputs (configurable)			
		12 (9)	
Discrete outputs, configurable			
		max. 12	
External discrete inputs / outputs via CANopen			
		32	
Analog inputs #2: configurable			
		3	
Analog outputs: ± 10V, ± 20mA, PWM; configurable			
		2	
Analog outputs: 0 to 20 mA (0 to 10 V with external 500 Ω resistor)			
		-	
External analog inputs / outputs via CANopen			
		16/4	
Display and evaluation of J1939 analog values, "supported SPNs"			
		100	
CAN bus communication interfaces #3			
		3	
Ethernet Modbus TCP Slave interface			
		3	
USB Serial interface			
		1	
RS-485 Modbus RTU Slave interface			
		1	
Interface Expansion Capability			
		-	
Listings/Approvals			
UL / cUL Listing (61010 ,6200), CSA (USA and Canada),			
		✓	
BDEW, VDE, EAC, CE Marked			
LR, ABS Marine			
Part Numbers			
Front panel mounting with display #4		8440-2260	
Cabinet back mounting w/o display		-	

#1 The easYgen-3500/LS5 communication system allows up to 48 members on the bus. If the easYgen count is reduced from 32, the LS-5 count can be increased (up to 32).
 #2 selectable senders: 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, Pt1000, resistive input (one- or two-pole, 2pt. linear or 9pt. user defined)
 #3 CAN#2 freely selectable during configuration between CANopen or J1939; please feel free to request more information
 #4 a screw and a clamp kit are delivered with the unit for fastening