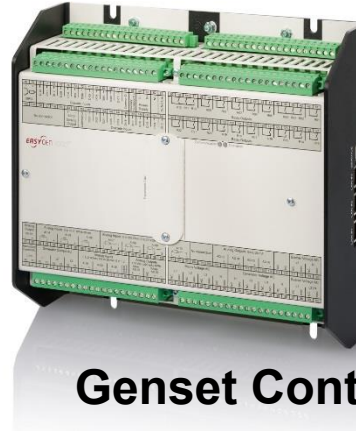


easYgen-3400XT/3500XT


Genset Control for Complex Paralleling Operation

New Features

- ✓ Built-In Redundant Ethernet
- ✓ Power Measurement Class 1
- ✓ Direct Connect Up to 690 VAC
- ✓ AnalogManager & Editable Screens
- ✓ Multi-Interface ToolKit connectivity
- ✓ Face plate with tactile buttons
- ✓ Drop-In replacement

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.

Targeted at enabling complex power management applications, the easYgen-3500XT supports easYgen | GC-3000XT to manage a large genset fleet of up to 496 sets and easYgen | LS-6XT to control up to 64 synchronizing breaker or manual switches on up to 128 complex bus segments. Redundant load sharing is selectable using Ethernet B and C networks for enhanced 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 is available in two packages. P1, focused at complex paralleling applications provides redundant Ethernet communication, LS-5 connectivity, and standard I/O set, while P2, Co-Gen/CHP model offers expanded onboard I/O set, 3-ph busbar voltage measurement capability and phase rotation monitoring between gen-busbar and busbar-utility. These packages are available without a display in a rugged metal housing suitable for back panel installations (easYgen-3400XT-P1 and easYgen-3400XT-P2 respectively). A sophisticated touch screen remote panel (RP-3000XT) complements them as an operator control panel. A version of easYgen-3500XT (easYgen-3500XT-P1-LT and easYgen-3500XT-P2-LT) is designed to operate down to -40° C for outdoor applications.

FEATURES

- Enables several power generation topologies. Some frequently used are:
 - only with easYgen-3500XT: 32 gensets, one generator group breaker and one mains circuit breaker
 - with easYgen-3500XT and LS-5: 32 gensets and 16 breakers (Tie/GGB/MCB) or 16 gensets and 32 breakers on CAN bus
 - with easYgen-3500XT and LS-6XT: 32 gensets and 32 breakers (Tie/GGB/MCB) on single or redundant Modbus/TCP
 - with easYgen-3500XT and GC-3000XT: 496 gensets, one generator group breaker and one mains circuit breaker
 - with easYgen-3500XT, LS-6XT and GC-3000XT: The control topology is cascaded in three layers. Layer-1 consists of easYgen (and also LS-6XT), Layer-2 group controls and Layer-3 LS-6XT. At Layer-1 total 496 gensets (16 x 31), at Layer-2 16 Group controllers and at Layer-3 64 LS-6XT on up to 128 segments are supported. Communication between Layer-1 and Layer-2 controls is CAN, Ethernet A or hot redundant CAN/Ethernet A and between Layer-2 and Layer-3 controls is Ethernet B, Ethernet C or hot redundant Eth B/Eth C.
- 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, Ethernet or hot redundant ETH/ETH, CAN/ETH
- 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

- Premium genset control for complex paralleling applications of up to 32 gensets in
- Prime Power & Cogeneration (CHP)
- Peak shaving operation
- Emergency operation
- Import/Export operation
- Islanded & Utility parallel operation
- Group controller and LS-6XT support to manage large fleet of gensets and circuit breakers
- Run-Up Synchronization
- Built-in active voltage regulation
- 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
- Dedicated low temperature display variants
- UL 61010, UL 6200, CSA, RoHS 2, and marine (ABS, LR) compliance

FEATURES continued

- 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
- 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
- Modbus master and modbus data telegram mapper support with dedicated PC tools
- CAN J1939 support to exhaust gas after-treatment (DPF, SCR) triggered by global diesel emissions regulations
- „System Update“ function ensures every unit recognizes other units in the network and helps isolate root-cause quickly during troubleshooting
- 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 and an empty slot for custom language via a dedicated MS Excel based PC tool

SPECIFICATIONS

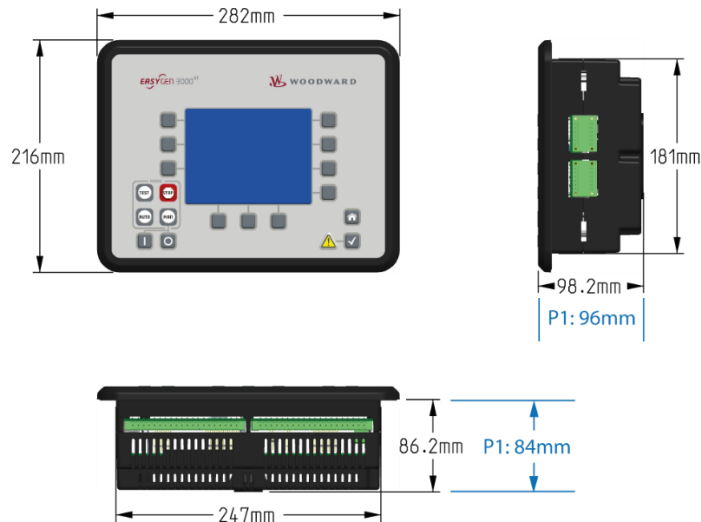
Power supply	12/24 V _{DC} (8 to 40 V _{DC})
Intrinsic consumption	max. 22 W (LT: max.32 W)
Ambient temperature (operation)	-20 to 70 °C (LT: -40 to 70 °C)
Ambient temperature (storage)	-30 to 80 °C / -22 to 176 °F
Ambient humidity	95%, non-condensing
Voltage (software configurable)	(Δ / Δ)
100 V _{AC} 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 k Ω s
Transistor outputs (P2 only)	isolated
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 1	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
Type 2 (P2 only)	0 to 10 V / 0 to 20 mA
Resolution	14 Bit
Maximum permissible voltage against PE (Ground)	100 V
Maximum differential voltage to other DC Analog Inputs	15 V
Type 3 (P2 only)	0 to 250 Ohms / 0 to 2500 Ohms
Resolution	14 Bit
Maximum permissible voltage against PE (Ground)	100 V
Maximum differential voltage to other DC Analog Inputs	10 V
Analog outputs (isolated)	freely scalable
Type 1	± 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
Type 2 (P2 only)	0/4 to 20 mA
Insulation voltage (continuously)	100 V _{AC}
Insulation voltage (test; >2 s)	1700 V _{AC}
Resolution	12 Bit
Output	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 P1:	250 × 228 × 50 mm
P2:	250 × 228 × 84 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-AR-N 4105/ 4110, CSA
Marine	LR (Type Approval), ABS (Type Approval)

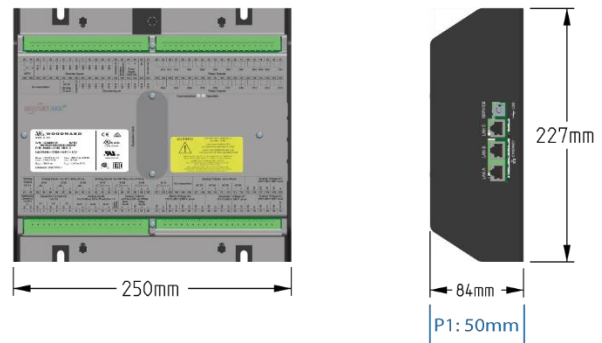
* 3 phase 3 wire Δ constellations are limited to 600 V_{AC} system

DIMENSIONS

Plastic housing for front panel mounting



Metal housing for cabinet mounting



P1 is more compact (note depth/height in blue)

TERMINAL DIAGRAM

Discrete Inputs																Relay Outputs																							
80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41
Discrete Inputs																Relay Outputs																							
Discrete Inputs																Relay Outputs																							
Discrete Inputs																Relay Outputs																							

Analog Inputs																Analog Outputs															
Analog Inputs																Analog Outputs															
Analog Inputs																Analog Outputs															
Analog Inputs																Analog Outputs															

Mains Voltage AC																Generator Voltage AC																Busbar Voltage AC															
Mains Voltage AC																Generator Voltage AC																Busbar Voltage AC															
Mains Voltage AC																Generator Voltage AC																Busbar Voltage AC															
Mains Voltage AC																Generator Voltage AC																Busbar Voltage AC															

P2: pins 01-160 as shown above; P1: pins 01-80 only!

* pin 61 easYgen-3400XT: No connection
easYgen-3500XT: Protective earth

RELATED PRODUCTS

- Group Breaker Controller easYgen | GC-3000XT (Product Specification #37896)
- Excitation module for synchronous generators easYgen | exciter-10 (Product Specification #37909)
- Circuit Breaker Controller easYgen | LS-6XT, LS-511/521 & LS-512/LS-522 (Product Specification #37913, #37522 and #37661/37663)
- Remote Panel RP-3000XT (Product Specification # 37592)
- ToolKit (Product Specification # 03366)
- I/O Expansion Board IKD1 (Product Specification # 37171): P/N 8440-2116
- 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
- Remote Access Gateway (with HMS Netbiter EasyConnect EC250 and EC350)
- Modbus master software (Application Note # B37919)
- HMI localization tool (Product Specification # B37918)
- Thermocouple Scanner (AXIOMATIC AXTC20)
- WAGO and Phoenix expansion CAN Couple



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For more information contact:

EASYGEN 3000 ^{XT}		easYgen-3000XT Series			
		3400XT		3500XT	
Model	Package	P1	P2	P1(-LT)	P2(-LT)
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	3-ph	1-ph	3-ph
Control					
Breaker control logic (open and closed transition <100 ms)	FlexApp™	3			
Number of supported Woodward LS-x units (1 or 2 breaker controls) #1		32			
Number of supported Woodward GC-3000XT units #2		16			
Automatic, Manual, Stop, and test operating modes					
Mains parallel multiple-unit operation (up to 32 units)					
AMF (auto mains failure) and stand-by operation					
Solar-diesel support					
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					
Active voltage regulation					
Freely configurable PID controllers					
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)					
Operating Temperature					
		-40 to 70 °C		(-40)/-20 to 70 °C	
Protection					
Equivalent 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: Pole slip monitor	78PS				
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)	23 (20)	12 (9)	23 (20)
Discrete outputs, configurable					
		LogicsManager™			
		max. 12	max. 22	max. 12	max. 22
External discrete inputs / outputs via CANopen					
		32 / 32			
Analog inputs configurable #3					
		FlexIn™			
		3	10	3	10
Analog outputs: ± 10V, ± 20mA, PWM; configurable					
		AnalogManager™			
		2	2	2	2
Analog outputs: 0 to 20 mA (0 to 10 V with external 500 Ω resistor)					
		-	4	-	4
External analog inputs / outputs via CANopen					
		16/4			
Display and evaluation of J1939 analog values, "supported SPNs"					
		100			
CAN bus communication interfaces #4					
		FlexCAN™			
		3			
Ethernet Modbus TCP Slave interface					
		3			
USB Serial interface					
		1			
RS-485 Modbus RTU Slave interface					
		1			
Listings/Approvals					
UL / cUL Listing (61010 ,6200), CSA (USA and Canada),					
VDE-AR-N 4105/ 4110, VDE, EAC, CE Marked					
LR, ABS Marine					
Part Numbers					
Front panel mounting with display #5					
		-	-	8440-2085	8440-2088
		(8440-2086) (8440-2089)			
Cabinet back mounting w/o display					
		8440-2084	8440-2087	-	-

#1 The easYgen-3500/LS-x communication system allows up to 48 members on the CAN bus. If the easYgen count is reduced from 32, the LS-x count can be increased (up to 32). LS-5 connects on CAN bus, LS-6XT connects on CAN bus, Modbus/TCP or redundant Modbus/TCP

#2 each GC-3000XT supports up to 31 easYgen-3500XT

#3 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)

#4 CAN#2 freely selectable during configuration between CANopen or J1939; please feel free to request more information

#5 a screw and a clamp kit are delivered with the unit for fastening