



easYgen-3400XT/3500XT





Genset Control for

Complex Paralleling Operation

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

New Features

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

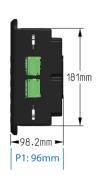
	10/04 \ / (0) 10 \ / \
Power supply	12/24 VDC (8 to 40 VDC)
Intrinsic consumption	max. 22 vv (L1: max.32 vv)
Ambient temperature (operation)2	
Ambient temperature (storage)	30 to 80 °C / -22 to 1/6 °F
Ambient humidity	
Voltage (software configurable)	(\(\Lambda/\Delta\)
100 V _{AC} Rated (V _{rated})	
	86/150 V _{AC}
and 400 /600 V _{AC} Rated (V _{rated})*	
	520/897 V _{AC}
Rated surge volt. (V _{surge})	
Accuracy	Class 0.5
Measurable alternator windings . 3p-3w, 3p-	
Setting rangeprimary	
Linear measuring range	
Measuring frequency	
High Impedance Input; Resistance per path	
Max. power consumption per path	
Current (Isolated, software configurable)	
Linear measuring range	$I_{gen} = 3.0 \times I_{rated}$
	$I_{\text{mains/ground}} = 1.5 \times I_{\text{rated}}$
Setting range	
Burden	
Rated short-time overcurrent (1 s)	
Accuracy	
Power	
Setting range	
Accuracy	
Discrete inputs	
Input range	
Input resistance	
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	
Load (GP)	
2.00 Apc@24 Vpc / 0.36 Apc@	125 V _{DC} / 0.18 A _{DC} @250 V _{DC}

 $[\]stackrel{\star}{}$ 3 phase 3 wire Δ constellations are limited to 600 V_{AC} system

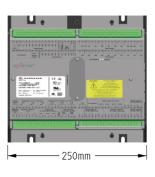
Analog inputs (isolated)
Type 1
Resolution
$\begin{array}{llllllllllllllllllllllllllllllllllll$
Maximum permissible voltage between genset Ground & PE
Maximum permissible voltage between genset Ground & PE
$\begin{tabular}{lllllllllllllllllllllllllllllllllll$
Resolution
$\label{eq:maximum permissible voltage against PE (Ground)} 100 \ V \\ \text{Maximum differential voltage to other DC Analog Inputs} 15 \ V \\ \text{Type 3 (P2 only)} 0 \ \text{to 250 Ohms} / 0 \ \text{to 2500 Ohms} \\ \text{Resolution} 14 \ \text{Bit} \\ \text{Maximum permissible voltage against PE (Ground)} 100 \ \text{V} \\ \text{Maximum differential voltage to other DC Analog Inputs} 10 \ \text{V} \\ \textbf{Analog outputs (isolated)} \\ \text{Type 1} 10 \ \text{V} / \pm 20 \ \text{mA} / \text{PWM} \\ \text{Basic insulation voltage (continuously, AVR_{out})} 500 \ \text{V}_{AC} \\ \text{Reinforced insulation voltage (continuously, AVR_{out})} 300 \ \text{V}_{AC} \\ \text{Insulation voltage (continuously, Gov_{out})} 100 \ \text{V}_{AC} \\ \text{Resolution} 12 \ \text{Bit} \\ \text{Output ± 10 V (scalable)} \\ \text{internal resistance} \\ \text{Output ± 20 mA (scalable)} \\ \text{maximum load 500 Ohms} \\ \end{aligned}$
$\label{eq:maximum} \begin{array}{llllllllllllllllllllllllllllllllllll$
$\begin{tabular}{lllllllllllllllllllllllllllllllllll$
Resolution
$\label{eq:maximum permissible voltage against PE (Ground)} \begin{tabular}{lllllllllllllllllllllllllllllllllll$
$\label{eq:maximum} \begin{tabular}{lllllllllllllllllllllllllllllllllll$
$ \begin{array}{llllllllllllllllllllllllllllllllllll$
$\label{eq:total_problem} \begin{array}{llllllllllllllllllllllllllllllllllll$
Basic insulation voltage (continuously, AVR _{out})
Basic insulation voltage (continuously, AVR _{out})
Insulation voltage (continuously, Gov _{out})
Insulation voltage (continuously, Gov _{out})
Resolution
Output ± 10 V (scalable)internal resistance Output ± 20 mA (scalable)maximum load 500 Ohms
Output ± 20 mA (scalable) maximum load 500 Ohms
Type 2 (P2 only)
Insulation voltage (continuously)
Insulation voltage (continuously) 100 VAC Insulation voltage (test; >2 s) 1700 VAC
Resolution
Resolution 12 Dit
Output maximum load 500 Ohms
Housing Front panel flush mounting
Dimensions WxHxD
Front cutout WxH249 [+1.1] × 183 [+1.0] mm
Connection screw/plug terminals 2.5 mm²
Frontinsulating surface
Sealing Front
FrontIP54 (with clamp fastening)
BackIP20
Weight approx. 1,850 g
Housing Back panel mountingPowder Coated Sheet metal housing
Dimensions WxHxD P1:250 × 228 × 50 mm
P2:
Connection screw/plug terminals 2.5 mm ²
Protection system
Weight
Listings
Marine LR (Type Approval), ABS (Type Approval)

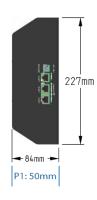
DIMENSIONS

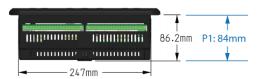
Plastic housing for front panel mounting



Metal housing for cabinet mounting

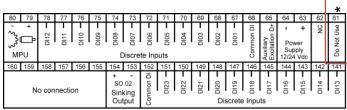


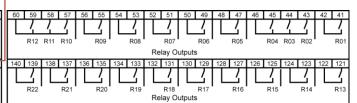




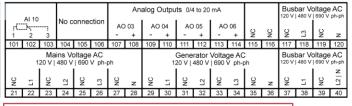
P1 is more compact (note depth/height in blue)

TERMINAL DIAGRAM





Sinl Out SO		Analog Inp Al 04 mA +			AI 05			4 to 20 mA AI 06 MA			Analog Inputs Al 07 1 2 3			0 to 250 Ohm 0			Al 09		
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
Mains Curre 1 A L	nt AC 5 A	1AI5A					ı	2 20					±10 Spi						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20



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:

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×1700		easYgen-3000XT Series							
EASYGEN 3000XT	Model		0XT	3500XT					
)	Package	P1	P2	P1(-LT)	P2(-LT)				
Measuring		<u>'-</u>							
Generator voltage	(up to 690 V _{AC})			-ph					
Generator current (1 A	or 5 A software selectable)			-ph					
Mains voltage	(up to 690 V _{AC})			-ph					
1	or 5 A software selectable)	4		-ph	2 1-				
Busbar voltage	(up to 690 V _{AC})	1-ph	3-ph	1-ph	3-ph				
Control	100) - 74	T							
Breaker control logic (open and closed transition				3					
Number of supported Woodward LS-x units (1 or Number of supported Woodward GC-3000XT unit				32 16					
Automatic, Manual, Stop, and test operating mod				10					
Mains parallel multiple-unit operation (up to 32 ur									
AMF (auto mains failure) and stand-by operation									
Solar-diesel support									
Critical mode operation									
GCB and MCB synchronization (±slipping / phase	e 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 int	erface								
Active voltage regulation				•					
Freely configurable PID controllers				3					
НМІ		1							
Color Display with Softkey operation	DynamicsLCD™		-	v	/				
Start/stop logic for diesel / gas engines									
Counters for operating hours / starts / maintenance				✓					
Configuration via PC (USB serial connection & To Event recorder entries with real time clock (batter			1(000					
Operating Temperature	у раскир)	40 to	70 °C		to 70 °C				
-	Carrieral and ANICH	-40 10	70 0	(-407)-20	10 70 0				
Protection	Equivalent ANSI#	Ī							
Generator: voltage / frequency	59 / 27 / 810 / 81U 32 / 32R / 32F								
Generator: overload, reverse/reduced power Generator: Synch Check	32 / 32R / 32F 25								
Generator: unbalanced load	46								
Generator: instantaneous overcurrent	50								
Generator: time-overcurrent (IEC 255 compliant)	51 / 51 V								
Generator: ground fault (measured ground currer									
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)	1 1 14 TW	12 (9)	23 (20)	12 (9)	23 (20)				
Discrete outputs, configurable	LogicsManager™	max. 12	max. 22	max. 12 / 32	max. 22				
External discrete inputs / outputs via CANopen Analog inputs configurable #3	FlexIn™	3	10	3	10				
Analog outputs: ± 10V, ± 20mA, PWM; configura		2	2	2	2				
Analog outputs: 0 to 20 mA (0 to 10 V with extern		-	4	-	4				
External analog inputs / outputs via CANopen				6/4					
Display and evaluation of J1939 analog values, "s				00					
CAN bus communication interfaces #4	FlexCAN™			3					
Ethernet Modbus TCP Slave interface				3					
USB Serial interface				1					
RS-485 Modbus RTU Slave interface									
Listings/Approvals		I							
UL / cUL Listing (61010 ,6200), CSA (USA and C	anada),			,					
VDE-AR-N 4105/ 4110, VDE, EAC, CE Marked				✓					
LR, ABS Marine									
Part Numbers									
Front panel mounting with display #5	,	_	_	8440-2085	8440-2088				
(and enhanced operating temperature range]	8440-2084	8440-2087	(8440-2086)	(8440-2089)				
Cabinet back mounting w/o display					•				
#1 The easYgen-3500/LS-x communication system allows up to bus. If the easYgen count is reduced from 32, the LS-x coun			VDO (0 to 180 Oh 380 Ohm, 40 to 120	nm, 0 to 5 bar), VDO					

¹¹ 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

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), P1100, P1100, resistive input (one- or two-pole, 2pt. linear or 9pt. user defined)
 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