

**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 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 <sub>DC</sub> (8 to 40 V <sub>DC</sub> )
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) .....	( $\Delta$ / $\Delta$ )
100 V <sub>AC</sub> Rated (V <sub>rated</sub> ) .....	69/120 V <sub>AC</sub>
Max. value (V <sub>max</sub> ) .....	86/150 V <sub>AC</sub>
and 400/600 V <sub>AC</sub> Rated (V <sub>rated</sub> ) * .....	400/690 V <sub>AC</sub>
Max. value (V <sub>max</sub> ) .....	520/897 V <sub>AC</sub>
Rated surge volt. (V <sub>surge</sub> ) .....	6.0 kV
Accuracy .....	Class 0.5
Measurable alternator windings . 3p-3w, 3p-4w, 3p-4w OD, 1p-2w, 1p-3w	
Setting range .....	primary .....
Linear measuring range .....	50 to 650,000 V <sub>AC</sub>
Measuring frequency .....	1.25×V <sub>rated</sub>
Measuring frequency .....	50/60 Hz (30 to 85 Hz)
High Impedance Input; Resistance per path .....	2.5 M $\Omega$
Max. power consumption per path .....	< 0.15 W
Current (Isolated, software configurable) Rated (I <sub>rated</sub> ) .....	1A or 5A
Linear measuring range .....	I <sub>gen</sub> = 3.0×I <sub>rated</sub>
	I <sub>mains/ground</sub> = 1.5×I <sub>rated</sub>
Setting range .....	1 to 32,000 A
Burden .....	< 0.10 VA
Rated short-time overcurrent (1 s) .....	[1] 50×I <sub>rated</sub> , [5] 10×I <sub>rated</sub>
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 <sub>DC</sub> (8 to 40 V <sub>DC</sub> )
Input resistance .....	approx. 20 kOhms
Transistor outputs (P2 only) .....	isolated
Rated switching voltage .....	max. 24 V <sub>DC</sub>
Maximum switching voltage .....	40 V <sub>DC</sub>
Maximum switching current .....	300 mA DC
Isolation Test voltage (<1s) .....	500 V <sub>AC</sub>
Isolation voltage (continuously) .....	100 V <sub>AC/DC</sub>
Relay outputs .....	isolated
Contact material .....	AgCdO
Load (GP) .....	2.00 A <sub>AC</sub> @250 V <sub>AC</sub>
	2.00 A <sub>DC</sub> @24 V <sub>DC</sub> / 0.36 A <sub>DC</sub> @125 V <sub>DC</sub> / 0.18 A <sub>DC</sub> @250 V <sub>DC</sub>

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 <sub>out</sub> ) .....	500 V <sub>AC</sub>
Reinforced insulation voltage (continuously, AVR <sub>out</sub> ) .....	300 V <sub>AC</sub>
Insulation voltage (continuously, Gov <sub>out</sub> ) .....	100 V <sub>AC</sub>
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 <sub>AC</sub>
Insulation voltage (test; >2 s) .....	1700 V <sub>AC</sub>
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 <sup>2</sup>
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 <sup>2</sup>
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  $\Delta$  constellations are limited to 600 V<sub>AC</sub> system

- ## RELATED PRODUCTS

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For more information contact:

<b>EASYGEN 3000<sup>XT</sup></b>		<b>easYgen-3000XT Series</b>			
		3400XT		3500XT	
Model	Package	P1	P2	P1(-LT)	P2(-LT)
<b>Measuring</b>					
Generator voltage (up to 690 V <sub>AC</sub> )				3-ph	
Generator current (1 A or 5 A software selectable)				3-ph	
Mains voltage (up to 690 V <sub>AC</sub> )				3-ph	
Mains or ground current (1 A or 5 A software selectable)				1-ph	
Busbar voltage (up to 690 V <sub>AC</sub> )		1-ph	3-ph	1-ph	3-ph
<b>Control</b>					
Breaker control logic (open and closed transition <100 ms) <b>FlexApp<sup>TM</sup></b>				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				3	
<b>HMI</b>					
Color Display with Softkey operation <b>DynamicsLCD<sup>TM</sup></b>		-			✓
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		-40 to 70 °C			(-40)/-20 to 70 °C
<b>Protection</b> 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		✓ / ✓ / -	✓ / ✓ / ✓	✓ / ✓ / -	✓ / ✓ / ✓
<b>I/Os</b>					
Speed input: magnetic / switching; Pickup				✓	
Discrete alarm inputs (configurable)		12 (9)	23 (20)	12 (9)	23 (20)
Discrete outputs, configurable <b>LogicsManager<sup>TM</sup></b>		max. 12	max. 22	max. 12	max. 22
External discrete inputs / outputs via CANopen				32 / 32	
Analog inputs configurable #3 <b>FlexIn<sup>TM</sup></b>		3	10	3	10
Analog outputs: ± 10V, ± 20mA, PWM; configurable <b>AnalogManager<sup>TM</sup></b>		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 <b>FlexCAN<sup>TM</sup></b>				3	
Ethernet Modbus TCP Slave interface				3	
USB Serial interface				1	
RS-485 Modbus RTU Slave interface				1	
<b>Listings/Approvals</b>					
UL / cUL Listing (61010 ,6200), CSA (USA and Canada),					
VDE-AR-N 4105/ 4110, VDE, EAC, CE Marked				✓	
LR, ABS Marine					
<b>Part Numbers</b>					
Front panel mounting with display #5		-	-	8440-2085 (8440-2086)	8440-2088 (8440-2089)
(... and enhanced operating temperature range)					
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