

easYgen-3100XT/3200XT


Genset Control for Multiple Unit 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 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-3000XT Series controllers operate gen-sets of all sizes and applications. These controllers include specifically designed algorithms and logic to start, stop, control, and protect the genset, circuit breaker and the utility, where applicable. It allows standardizing on a single, affordable genset controller for distributed power generation applications. The applications range from single stand-alone emergency backup power to parallel load sharing of multiple gen-sets in complex, segmented distribution systems with multiple utility feeds and tie breakers. Woodward's easYgen-3000XT Series paralleling genset controllers provide exceptional versatility and value for OEM switchgear builders, generator packagers, and system integrators.

The easYgen-3200XT application range spans from isolated operation of a single genset to load sharing of up to 32 gen-sets in islanded and/or parallel operation with a single utility. It 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. Its integrated LogicsManager™ and AnalogManager™ programmable logic functionalities provide outstanding application flexibility and can often eliminate the need of an additional PLC control, yet can easily integrate with SCADA or PLC-based control systems where desired.

The easYgen-3200XT also comes without a display in a rugged metal housing suitable for back panel installations. A sophisticated touch screen remote panel (RP-3000XT) complements it as an operator control panel. A version of easYgen-3200XT (easYgen-3200XT-P1-LT) is designed to operate down to -40°C for outdoor applications.

Easy-to-use software tools simplify configuring the easYgen-3000XT Series controllers while making it easy to customize the unit for specific applications. These tools include:

FlexApp™ – This feature provides the tools to easily configure the number of operated breakers: None, Generator Circuit Breaker (GCB), and Mains Circuit Breaker (MCB).

LogicsManager™ & AnalogManager™ (LM & AM) – Woodward's LM/AM enables to customize the operation sequences and adapt them to specific needs. The LM/AM accomplishes this by handling a range of measuring values and internal states, which are combined logically with operators and programmable timers and can be cascaded through. This enables to create and/or modify control and relay functions.

FlexIn™ – The analog inputs are configurable to operate with variable resistance sensors (0 to 2000 Ω), (0 to 1V) and/or 0 to 20 mA senders.

Flexible Outputs – Speed and voltage bias outputs are configurable to function with all speed governors and voltage regulators. The outputs can also be used as freely scalable outputs (e.g. for driving external meters).

FlexCAN™ – Advanced network interfaces ensure unsurpassed control performance – from engine control up to total plant operation. The easYgen-3000XT Series is capable of working with common industrial interfaces, including Ethernet, CAN, USB, and RS-485. The multiple communication protocols permit the easYgen-3000XT Series controls to communicate with a vast majority of engine control units (ECUs), external I/O boards, and PLCs. Modbus TCP, CANopen, SAE J1939, and Modbus RTU are supported.

DynamicsLCD™ – The adaptive and interactive 5.7", 320x240 pixel sharp color graphical LCD display with soft keys and a clear menu structure ensures intuitive user operation and navigation. Customizable screens provide flexibility to program and visualize frequently used data at the press of a button. The face plate with tactile and illuminated buttons enhances the aesthetics and ergonomics of push button operation.

New Features

- ✓ Ethernet Connectivity
- ✓ AnalogManager
- ✓ Power Measurement Class 1
- ✓ Editable Screens
- ✓ Multiple interface ToolKit connectivity
- ✓ New face plate with tactile buttons
- ✓ Drop-In replacement

- **Standard paralleling applications for up to 32 generators in**
 - Peak shaving operation
 - Stand-by operation
 - AMF (Automatic Mains Failure) operation
 - Emergency operation
 - Import/Export operation
 - Islanded & Utility parallel operation
- **Easy to set up and commission**
- **Master or Slave control capability**
- **Complete engine, generator and utility protection**
- **Open/Closed Transition**
- **Five communication ports: Ethernet, 2xCAN (CANOpen and J1939), RS-485, USB**
- **Customizable logic, HMI screens, and alarms**
- **Dedicated low temperature display variants**
- **UL 61010, UL 6200, CSA, RoHS 2, and marine (ABS, LR) compliance**

FEATURES

- Three-phase true RMS power sensing with Class I accuracy
- Operation modes: AUTO, STOP, MANUAL, and TEST modes 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 Ethernet or CAN (“warm redundancy” 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 values
- Direct support to several ECUs: Scania S6, MTU ADEC ECU7/8, 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 port.
- Multi-lingual capability: English, German, Spanish, French, Italian, Portuguese, Japanese, Chinese, Russian, Turkish, Polish, Slovakian, Finnish, Swedish

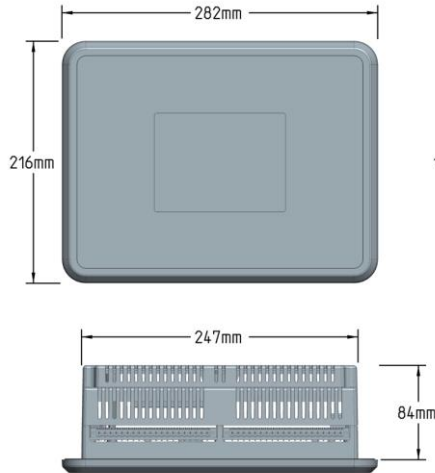
SPECIFICATIONS

Power supply	12/24 V _{DC} (8 to 40 V _{DC})
Intrinsic consumption	max. 14 W (LT: max.22W)
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 Vac Rated (V _{rated})	69/120 V _{AC}
Max. value (V _{max})	86/150 V _{AC}
and 400 Vac Rated (V _{rated})	277/480 V _{AC}
Max. value (V _{max})	346/600 V _{AC}
Rated surge volt. (V _{surge})	4.0 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 (40 to 85 Hz)
High Impedance Input; Resistance per path	2.0 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

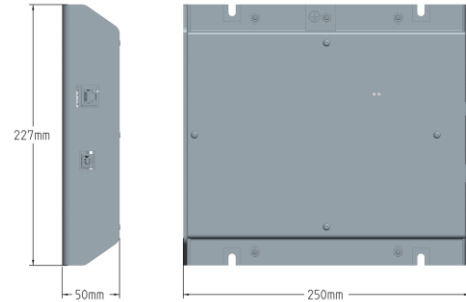
Relay outputs	isolated
Contact material	AgCdO
Load (GP)	2.00 A _{AC} @250 V _{AC}
	2.00 A _{DC} @24 V _{DC} / 0.36 A _{DC} @125 V _{DC} / 0.18 A _{DC} @250 V _{DC}
Analog inputs (isolated)	freely scalable
Type	0 to 1V / 0 to 2000 Ohms / 0 to 20 mA
Resolution	16 Bit
Maximum permissible voltage against 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
± 10 V (scalable)	internal resistance
± 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 × 227 × 50 mm
Connection	screw/plug terminals 2.5 mm ²
Protection system	IP 20
Weight	approx. 2,150 g
Disturbance test (CE)	tested according to applicable IEC standards
Listings	CE, UL, EAC, VDE, BDEW, CSA
Marine	LR (Type Approval), ABS (Type Approval)

DIMENSIONS

Plastic housing for front panel mounting



Metal housing for cabinet 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									
L1	s2	s1	L1	s2	s1	L2	s2	s1	L3	s2	s1	AI 01	AI 02	AI 03	Engine Ground	Speed AO 01	NC	Voltage AO 02	+	-				
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	N				
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		Power Supply 12/24 Vdc		NC		*
80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64	63	62	61					

* pin 61
 easYgen-3100XT-P1: No connection
 easYgen-3200XT-P1: Protective earth

RELATED PRODUCTS

- Engine Speed Control **actiVgen** (Product Specification # 03419): P/N 8440-2100
- Remote Panel **RP-3000XT** (Product Specification # 37592)
- **ToolKit** (Product Specification # 03366)
- I/O Expansion Board **IKD1** (Product Specification # 37171): P/N 8440-2028
- Load Share Gateway **LSG** (Product Specification # 37451)
- Electronic Pickup Unit **EPU-100** (Product Specification # 37562): P/N 8445-1045
- CANbus based Remote Annunciator **easYlite 100** (Product Specification # 37279): P/N 8446-1023
- **Power Generation Learning Module** (Product Specification # 03412): P/N 8447-1012
- Data **TelegramMapper** software (Application Note # 37684)
- Profibus Gateway **ESEPRO** (Application Note # 37577): P/N 8445-1046
- Ethernet (Modbus/TCP) Gateway **ESENET** (Application Note # 37576): 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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FEATURES OVERVIEW

	Model Package	easYgen-3000XT Series		
		3100XT P1	3200XT P1	3200XT P1-LT
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 <100 ms)	<i>FlexApp™</i>		2	
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)			✓	
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	<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)			1000	
Operating Temperature		-40 to 70 °C	-20 to 70 °C	-40 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			
I/Os				
Speed input: magnetic / switching; Pickup			✓	
Discrete alarm inputs (configurable)			12 (10)	
Discrete outputs, configurable	<i>LogicsManager™</i>		max. 12	
External discrete inputs / outputs via CANopen			32 / 32	
Analog inputs #1: configurable	<i>FlexIn™</i>		3	
Analog outputs: +/- 10V, +/- 20mA, PWM; configurable			2	
External analog inputs / outputs via CANopen			16/4	
Display and evaluation of J1939 analog values, "supported SPNs"			100	
CAN bus communication interfaces #2, #3	<i>FlexCAN™</i>		2	
Ethernet Modbus TCP Slave interface #3			1	
USB Serial interface			1	
RS-485 Modbus RTU Slave interface			1	
Listings/Approvals				
UL / cUL Listing (61010, 6200), VDE, EAC, BDEW				
CSA (USA and Canada)			✓	
LR, ABS Marine				
CE Marked				
Part Numbers				
Front panel mounting with display #4	-	8440-2082	8440-2083	
Cabinet back mounting w/o display	8440-2081	-	-	
Spare connector kit	8923-2318	8923-2318	8923-2318	

#1 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)
 #2 CAN#2 freely selectable during configuration between CANopen or J1939; please feel free to request more information
 #3 It is possible to toggle between CAN and Ethernet load share line in STOP mode ("warm redundancy")
 #4 a screw and a clamp kit are delivered with the unit for fastening