WOODWARD™ **EASYGEN 3000XT**

Product Specification
37582

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 -40⁰ 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.

- **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 or hot redundant CAN/Ethernet
- 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
- 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 port
- 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
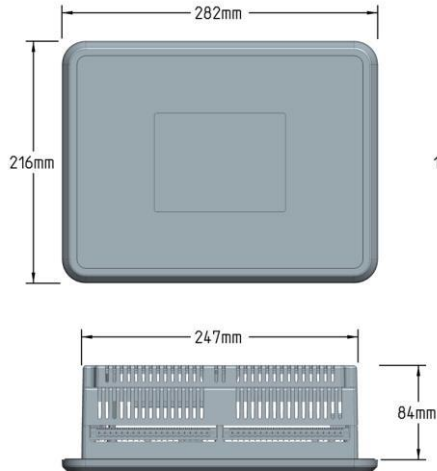
SPECIFICATIONS

Power supply...12/24 V_{DC} (8 to 40 V_{DC})
Intrinsic consumption .... max. 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) .... (λ/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 MΩ
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

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 mm²
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 mm²
Protection system .... IP 20
Weight.. approx. 2,150 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)

DIMENSIONS

Plastic housing for front panel mounting   **Metal housing for cabinet mounting**
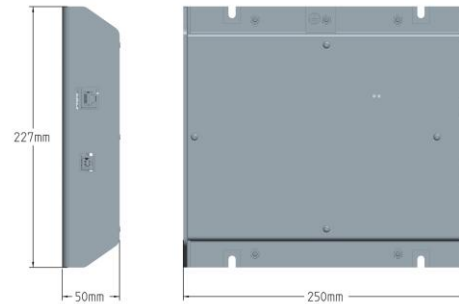
TERMINAL DIAGRAM

Mains|Gnd Current AC 1 A | 5 A L1		Generator Current AC 1 A | 5 A						Analog Inputs 0 to 2 kOhm | 0/4 to 20 mA | 0 to 1 V						Engine Ground	Analog Outputs ±10 Vdc | ±20 mA | PWM				
		L1		L2		L3		AI 01		AI 02		AI 03			Speed AO 01			Voltage AO 02	
s2	s1•	s2	s1•	s2	s1•	s2	s1•	−	+	−	+	−	+		+	−	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	N | 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
R12	R11	R10		R09		R08		R07		R06		R05			R04	R03	R02		R01

Relay Outputs

80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64	63	62	61
−	+	DI12	DI11	DI10	DI09	DI08	DI07	DI06	DI05	DI04	DI03	DI02	DI01	Common DI	Auxiliary Excitation D+	−	+	NC	*
MPU		Discrete Inputs														Power Supply 12/24 Vdc			

* 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 8440-2116
- 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 Gen**eration **Learning Module** (Product Specification # 03412): P/N 8447-1012
- Data **TelegramMapper** software (Application Note # 37684)
- Modbus master software (Application Note # B37919)
- HMI localization tool (Product Specification # B37918)
- 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

FEATURES OVERVIEW

For more information contact:

37582 – Rev. F 2021/07/Stuttgart

EASYGEN 3000XT

	easYgen-3000XT Series		
Model	3100XT	3200XT	
Package	P1	P1	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) *FlexApp™*	2		
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)	✓		
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 (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 Equivalent ANSI#			
Generator: voltage / frequency 59 / 27 / 81O / 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 78 PS			
Engine: overspeed / underspeed 12 / 14			
Engine: speed / frequency mismatch			
Engine: D+ auxiliary excitation failure			
Engine: Cylinder temperature			
Mains: voltage / frequency / synch check 59 / 27 / 81O / 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 *LogicsManager™*	max. 12		
External discrete inputs / outputs via CANopen	32 / 32		
Analog inputs [1], configurable *FlexIn™*	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] *FlexCAN™*	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, VDE-AR-N 4105/ 4110			
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   Possible to create hot swap redundant CAT-Ethernet network
#4   a screw and a clamp kit are delivered with the unit for fastening