Genset Control for Multiple Unit Operation

APPLICATIONS

The easYgen-3000 is a versatile genset control, which may be adapted individually to every application. Primarily the intuitive user guidance via the 5.7" LC display and the various selectable languages make the easYgen-3000 a user-friendly control unit. With this, the easYgen-3000 continues the outstanding and highly reliable control solutions of our easYgen series.
The easYgen-3000 is able to control up to 32 gensets connected in a network with automatic sequencing (contact your Woodward sales office if you want to use more than 16 gensets). Load management features include automatic base loading/peak shaving, import/export control and emergency power/back up power generation.

FlexApp™ - This feature provides the tools to easily configure the easYgen-3000. Four different operating modes may be selected:
- Measuring transducer/engine control [0-CB-Mode {0}]
  for engine start/stop and generator measuring and protection no breaker control
- 1-breaker-control [GCB open, {1o}]
  above plus "GCB open" breaker control as generator protection
- 1-breaker-control [GCB open/close, {1oc}]
  above plus full generator breaker control for stand-by power applications and generator soft loading and unloading
- 2-breaker-control [GCB/MCB open/close, {2oc}]
  above plus AMF, open/closed transition, and interchange load transfer applications

DynamicsLCD™ - The interactive LC display ensures an intuitive user guidance.

FlexIn™ – The unit provides three analog inputs that can be freely configured (adaptable for use with each type of sender) as:
- VDO: 0 to 180Ohm [0 to 5bar/0 to 10bar]; 0 to 380Ohm [40 to 120°C/50 to 150°C], isolated (2-pole) and non-isolated (1-pole) ground senders only
- Resistive input: 0-500 Ohm, Pt100, linear 2-point, user-defined 9-point
- 0/4 to 20 mA: linear 2-point, user-defined 9-point

Flexible Outputs – Free configurable speed- and voltage bias outputs for many speed governors and voltage regulators. The outputs can also be used as freely scalable outputs.

FlexCAN™ – The flexible, isolated CAN bus allows networks for multiple uses. Selectable during configuration: CANopen protocols; coupling of IKD 1 expansion cards (up to 16DIs/16DOs) as well as of 3rd party expansion cards (request more detailed information from our sales department).
ECU monitoring and alarm management as well as remote start/stop and control commands with various ECUs via the J1939 protocol are possible (supported ECUs: Scania S6, MTU ADEC, Volvo EMS2 & EDC4, Deutz EMR2 and standard messages).

LogicsManager™ - The *LogicsManager* enables you to change the internal operation sequences of the control.
The various measuring values, inputs and internal states or constant values may be combined logically by Boolean operators and programmable timers. This enables you to create and/or modify monitoring and control functions.

DESCRIPTION

I/Os

The easYgen-3200 provides the following I/Os:
- *FlexRange™* - Two separate sets of 3-phase true r.m.s. voltage measuring inputs for the generator and mains and 2-phase busbar voltage:
  - o 100 Vac rated (max. 150 Vac)
  - o 400 Vac rated (max. 600 Vac)
- 3-phase true r.m.s. generator current/power
- 1-phase true r.m.s. current input freely configurable either as mains current measurement or ground current measurement (ground fault protection)
- 1 speed input (magnetic/switching)
- 10 configurable discrete alarm inputs
- *LogicsManager™* - up to 12 programmable discr. outputs
- *FlexIn™* - 3 configurable analog inputs
- *Flexible Outputs* - 2 configurable analog outputs
- *FlexCAN™* - Two CAN bus communication networks (up to 32 participants, isolated)
- Two serial ports supporting RS-485 and RS-232 (isolated)

Protection (ANSI #)

Generator: Over-/undervoltage (59/27), over-/underfrequency (81O/U), unbalanced voltage, dead bus detection, overload (32), unbalanced load (46), reverse/reduced power (32R/F), definite overcurrent and time-overcurrent (50/51), inverse time-overcurrent (IEC255), measured ground fault (50N/51N), phase rotation
Engine: Over-/underspeed (12), battery over-/undervoltage, auxiliary excitation, speed/frequency mismatch
Mains: Load, kvar, over-/undervoltage (59/27), over-/underfrequency (81O/U), phase shift, rotation field
Various additional monitoring functions for generator, mains and engine values, breakers, analog inputs, interfaces, battery and load sharing participants

Features

- *FlexApp™* - (Four application modes)
- *DynamicsLCD™* - 320×240 pixel graphical interactive 5.7" LC display with soft keys
- Start/stop logic for Diesel/Gas engines
- Engine pre-glow or purge control
- Warm-up control via timer or coolant temperature
- Speed, frequency, voltage, power, reactive power, and power factor set points via analog input or interface
- Power and reactive power load sharing with up to 32 units including load-dependent start/stop
- kWh meter, kvarh meter
- Operating hours/start/maintenance counters
- Configurable trip levels/delays/alarm classes
- PC and/or front panel configurable (ToolKit software)
- Multi-level password protection
- Multi-lingual capability (English, German, French, Spanish, Chinese, Japanese, Italian, Portuguese, Turkish, Russian)
- Event recorder (300 events, FIFO) with real time clock (battery backed; min. 5 years)
- Remote control via interface / discrete inputs

- Isolated & mains parallel operation
- Import/export control at interchange point
- Softload features
- Open/closed transition
- Synchronization with phase matching and slip frequency
- AMF
- Up to 32 units for load sharing
- Load-dependent start/stop for up to 32 units
- 100V-480V True r.m.s. voltage sensing with *FlexRange™*
- True r.m.s. current sensing
- kWh, kvarh meter
- Counters for engine starts, operating hours, maintenance call
- Freely configurable discrete & analog I/Os
- Multi-lingual capability
- CANopen / J1939 ECU Control
- Modbus RTU Protocol
- CE marked
- UL/cUL Listing
- LR Marine Approval

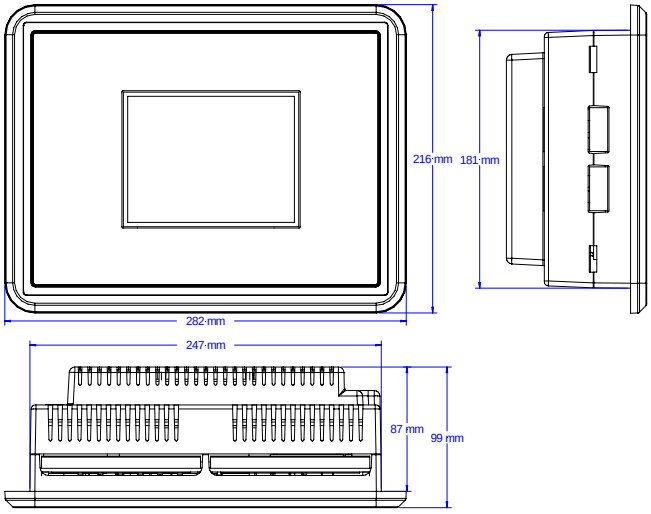
SPECIFICATIONS

Power supply ..... 12/24 Vdc (8 to 40 Vdc)
Intrinsic consumption ..... max. 17 W
Ambient temperature (operation) ..... -20 to 70 °C / -4 to 158 °F
Ambient temperature (storage) ..... -30 to 80 °C / -22 to 176 °F
Ambient humidity ..... 95 %, non-condensing
Voltage ..... (⅄/Δ)
100 Vac [1] Rated (V_{rated}) ..... 69/120 Vac
Max. value (V_{max}) ..... 86/150 Vac
Rated surge volt.(V_{surge}) ..... 2.5 kV
and 400 Vac [4] Rated (V_{rated}) ..... 277/480 Vac
Max. value (V_{max}) ..... 346/600 Vac
Rated surge volt.(V_{surge}) ..... 4.0 kV
Accuracy ..... Class 1
Measurable alternator windings 3p-3w, 3p-4w, 1p-2w, 1p-3w
Setting range ..... primary ..... 50 to 650,000 Vac
Linear measuring range ..... 1.25×V_{rated}
Measuring frequency ..... 50/60 Hz (40 to 85 Hz)
High Impedance Input; Resistance per path ..... [1] 0.498 MΩ, [4] 2.0 MΩ
Max. power consumption per path ..... < 0.15 W
Current (Isolated) Rated (I_{rated}) ..... [1] ../1 A or [5] ../5 A
Linear measuring range ..... I_{gen} = 3.0×I_{rated}
$I_{mains/ground}$ = 1.5×I_{rated}
Burden ..... < 0.15 VA
Rated short-time current (1 s) ..... [1] 50×I_{rated}, [5] 10×I_{rated}
Discrete inputs ..... isolated
Input range ..... 12/24 Vdc (8 to 40 Vdc)
Input resistance ..... approx. 20 kOhms

Relay outputs ..... isolated
Contact material ..... AgCdO
Load (GP) ..... 2.00 Aac@250 Vac
2.00 Adc@24 Vdc / 0.36 Adc@125 Vdc / 0.18 Adc@250 Vdc
Pilot duty (PD) .....
1.00 Adc@24 Vdc / 0.22 Adc@125 Vdc / 0.10 Adc@250 Vdc
Analog inputs (none isolated) ..... freely scaleable
Type ..... 0 to 500 Ohms / 0 to 20 mA
Resolution ..... 11 Bit
Analog outputs (isolated) ..... freely scaleable
Type ..... ± 10 V / ± 20 mA / PWM
Insulation voltage ..... 1,000 Vdc
Resolution ..... 11/12 Bit (depending on output)
± 10 V (scaleable) ..... internal resistance ≤1 kOhms
± 20 mA (scaleable) ..... maximum load 500 Ohms
Housing Front panel flush mounting ..... Plastic housing
Dimensions WxHxD ..... 282 × 217 × 99 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
Disturbance test (CE) ..... tested according to applicable EN guidelines
Listings ..... UL/cUL
Marine Approvals ..... LR, others upon request

DIMENSIONS

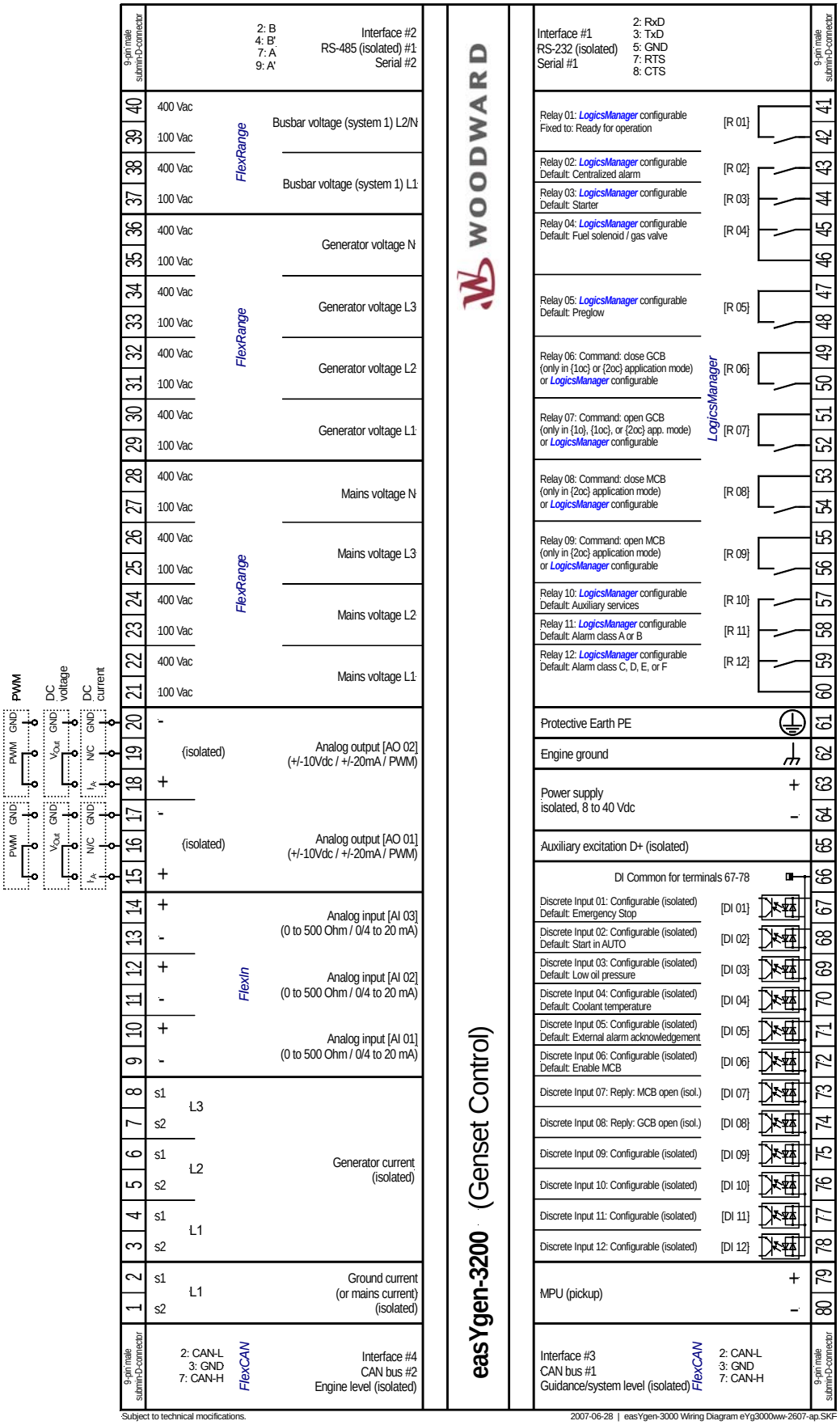
Plastic housing for front panel mounting



PART NUMBERS

Model	Rated PT secondary *FlexRange™*		Rated CT secondary	Mounting (housing)	Part Number (P/N)	Description
3200	69/120 Vac 277/480 Vac	*and*	../5 A	Front panel (plastic)	8440-1831	EASYGEN-3200-5
3200	69/120 Vac 277/480 Vac	*and*	../1 A	Front panel (plastic)	8440-1816	EASYGEN-3200-1

TERMINAL DIAGRAM



Subject to technical mocifications.

2007-06-28 | easYgen-3000 Wiring Diagram eYg3000ww-2607-ap.SKF

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FEATURES OVERVIEW

EASYGEN 3000 Model	easYgen-3000 Series 3200
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.) #1	✓
Busbar voltage (1-phase/2-wire)	✓
Control	
Breaker control logic *FlexApp™*	2
Automatic, Manual, and Stop operating modes	✓
Single and multiple-unit operation	✓
Mains parallel multiple-unit operation (up to 32 units)	✓
AMF (auto mains failure operation)	✓
Stand-by operation	✓
Critical mode operation	✓
GCB and MCB synchronization (slipping / phase matching)	✓
Open (break-before-make) and closed (make-before-break) transition	✓
Interchange	✓
Load-dependent start/stop	✓
n/f, V, P, Q, and PF remote control via analog input or interface	✓
Load/var sharing for up to 32 gensets	✓
HMI	
Soft keys (advanced LC display) *DynamicsLCD™*	✓
Start/stop logic for Diesel/Gas engines	✓
kWh meter, kvarh meter	✓
Operating hours/start/maintenance counter	✓
Configuration via PC #2	✓
Event recorder entries with real time clock (battery backup)	300
Protection ANSI#	
Generator: voltage/frequency 59/27/81O/81U	✓
Generator: overload, reverse/reduced power 32/32R/32F	✓
Generator: unbalanced load 46	✓
Generator: instantaneous overcurrent 50	✓
Generator: time-overcurrent (IEC 255 compliant) 51	✓
Generator: ground fault #3 50G	✓
Generator: power factor 55	✓
Generator: rotation field	✓
Engine: overspeed 12	✓
Engine: underspeed 14	✓
Engine: speed/frequency mismatch	✓
Engine: D+ auxiliary excitation failure	✓
Mains: voltage/frequency 59/27/81O/81U	✓
Mains: rotation field	✓
Mains: phase shift 78	✓
I/Os	
Speed input (magnetic/switching; Pickup)	✓
Discrete alarm inputs (configurable) #4	10
Discrete outputs (configurable) #4 *LogicsManager™*	max. 12
Analog inputs #5 (configurable) *FlexIn™*	3
Analog outputs (+/- 10V, +/- 20mA, PWM; configurable)	2
CAN bus communication interfaces #6 *FlexCAN™*	2
RS-485 Modbus RTU Slave interface(s)	1
RS-232 Modbus RTU Slave interface(s)	1
Listings/Approvals	
UL/cUL Listing	✓
LR Marine Approval	✓
CE Marked	✓
P/Ns	
1A CT inputs / front panel mounting with display #7 P/N 8440-	1816
5A CT inputs / front panel mounting with display #7 P/N 8440-	1831
Connector kit for easYgen-3200 P/N 8923-	1314

#1 mains or ground current selectable
#2 via serial connection and ToolKit software (included)
#3 measured ground current
#4 it is possible to connect up to two digital IO expansion boards (P/N 8440-1041), which provide 8 additional DIs and DOs each.
#5 selectable during configuration between 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, Resistive input (one- or two-pole, 2pt. linear or 9pt. user defined), or 20 mA (0/4 to 20 mA, freely configurable)
#6 freely selectable during configuration between CANopen or J1939; request information
#7 a screw and a clamp kit are delivered with the unit for fastening