RGCP-3400

Redundant Genset Control Panel for mission critical Applications

DESCRIPTION

Woodward's dual modular Redundant Genset Control Panel (RGCP) was designed to provide an additional layer of power system reliability in mission-critical applications, such as data centers, hospitals, or critical industrial processes where the cost of an outage greatly exceeds the installed cost of a redundant control system. Based on the familiar easYgen-3400 series genset control, the RGCP includes all the features, functionality and proven quality of the industry-leading easYgen-3000 series paralleling genset controls.

The RGCP-3400 is delivered as a fully-wired, factory tested turn-key assembly that easily interfaces with a PLC-based SCADA system. The space-conscious design greatly simplifies switchgear construction and provides peace of mind in critical applications, where even a momentary loss of the on-site power system may result in substantial monetary loss or risk to life or security hazards.

At the heart of the RGCP is a pair of Woodward easYgen-3400 series genset controllers, each housed in a robust metal enclosure. Specially designed firmware allows the two controls to operate in tandem in a primary/standby configuration. Should the CPU of the primary unit fail, control is automatically transferred to the stand-by unit and "bump-less" genset control is resumed; there is negligible effect on generator stability or load sharing during the transfer, even during start-up and synchronization. Manual transfer between primary and standby controls is also possible through a key switch, for making fail-safe check, firmware upgrades, or "hot-swapping" controllers for any reason. The RGCP can be used on an isolated generator or can load share with up to 32 RGCP (or easYgen-3400/3500) equipped gensets in islanded or utility parallel operation. Communication and load sharing between RGCP's in a system can be done over a redundant fiber optic ring network topology; any single break in the ring will not affect the network integrity. The RGCP is also compatible with LS-5 circuit breaker controls, for synchronization and control of up to 16 utility or tie breakers in complex distribution systems. Each RGCP can be used with up to 2 remote panels (RP-3000) for genset control and visualization. Terminal blocks are provided for end user connection of redundant power supplies.

FEATURES

- Fully wired compact turn-key assembly with outside terminal blocks for wiring like a single easYgen-3400
- Unique bias tracking firmware, for bump-less transfer to the backup controller even while the generator is fully loaded and paralleled with other generators
- CT shorting blocks for "hot-swap" of a controller without having to stop the generator
- Automatic detection of primary/stand-by controller status and loss of redundancy. Local annunciation through LEDs and remote indication through potential free contacts
- Parameter alignment monitoring between primary and stand-by controller and mismatch alarm
- Available load share communication line redundancy with fiber optic ring
- Up to 2 remote panels (RP-3000) realizable for genset control and visualization
- Manual switch-over capability for commissioning, maintenance, and troubleshooting
- Full connectivity of up to 32 Generators and 16 LS-5 circuit breaker control devices in one application
- Operation modes: Auto, Stop, Manual, and Load/No Load test modes via RP-3000 or discrete inputs
- Breaker control: Slip frequency / phase matching synchronization, open-close control, breaker monitoring
- Load transfer features: open / closed transition, interchange, soft loading / soft unloading, mains parallel
- Remote control via interface and discrete/analog inputs for adjusting speed, frequency, voltage, power, reactive power, and power factor set points
- Multi-lingual capability: English, German, Spanish, French, Italian, Portuguese, Japanese, Chinese, Russian, Turkish, Polish, Slovenian, Finnish, Swedish
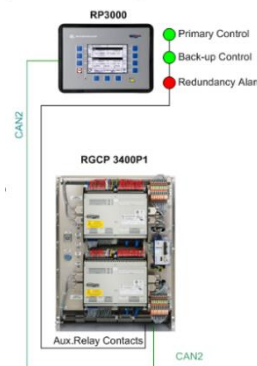
- **For mission critical applications**
- **Pre-Wired, factory tested turn-key assembly**
- **Based on the proven easYgen-3400 series hardware**
- **"Bump-less" transfer between primary/stand-by controllers**
- **"Hot-Swap" capability for online maintenance or replacement**
- **Manual key switch for commissioning, maintenance, and troubleshooting**
- **Available Redundant fiber optic ring communication**
- **Provision for redundant power supply**
- **Simple installation and commissioning**
- **Easy interface with PLC based control systems**
- **Load sharing and load-dependent start/stop for up to 32 units**
- **Compatible with LS-5 circuit breaker controls for complex distribution systems**
- **ABS and LR marine societies component approvals**

SPECIFICATIONS

Power supply..24 V$_{DC}$ (+/- 10%)
Intrinsic consumption .... max. 42 W
Ambient temperature (operation) ....-40 to 60 °C / -40 to 140 °F
Ambient temperature (storage) ....-30 to 80 °C / -22 to 176 °F
Ambient humidity..95%, non-condensing
Voltage .... (入/Δ)
   100 V$_{AC}$ [1]   Rated (V$_{rated}$)................................. 69/120 V$_{AC}$
           Max. value (V$_{max}$)............................... 86/150 V$_{AC}$
           Rated surge volt.(V$_{surge}$)....................................2.5 kV
   and 400 V$_{AC}$ [4]   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 1
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.......[1] 0.249 MΩ, [4] 1.0 MΩ
Max. power consumption per path .... < 0.3 W
Current (Isolated)   Rated (I$_{rated}$)..............................[1] ../1 A or [4] ../5 A
Linear measuring range .... I$_{gen}$ = 3.0×I$_{rated}$
                       I$_{mains/ground}$ = 1.5×I$_{rated}$
Setting range.. 1 to 32,000 A
Rated short-time current (1 s) ....[1] 50×I$_{rated}$, [4] 10×I$_{rated}$
Power ....
Setting range...0.5 to 99,999.9 kW/kvar

Discrete inputs.. isolated
Input range..12/24 V$_{DC}$ (8 to 40 V$_{DC}$)
Input resistance.. < 1.85 VA
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$_{DC}$
Pilot duty (PD)...
         1.00 A$_{DC}$@24 V$_{DC}$ / 0.22 A$_{DC}$@125 V$_{DC}$ / 0.10 A$_{DC}$@250 V$_{DC}$
Analog inputs (none isolated) ....freely scalable
Type .... 0 to 20 mA
Resolution .... 11 Bit
Analog outputs (isolated) ....freely scalable
Type 1 ....± 10 V / ± 20 mA / PWM
Insulation voltage (continuously) ....100 V$_{AC}$
Insulation test voltage (1s)...500 V$_{AC}$
Resolution .... 11/12 Bit (depending on analog output)
± 10 V (scalable) .... internal resistance ≤1 kOhms
± 20 mA (scalable) .... maximum load 500 Ohms
Housing   Back Panel Mounted Turn Key Metal Cabinet
Dimensions   WxHxD closed .... 496 × 650 × 262.5 mm
                  WxHxD swing gate open .... 587 x 650 x 609 mm
Connection.. screw/plug terminals 2.5 mm²
Weight... approx.. 21 kg
Disturbance test (CE) .... tested according to applicable EN guidelines
Listings .... Component Listing per UL, cUL
Marine ..LR (Component Type Approval), ABS (Component Type Approval)

DIMENSIONS

Wall mount housing

Front View
closed position
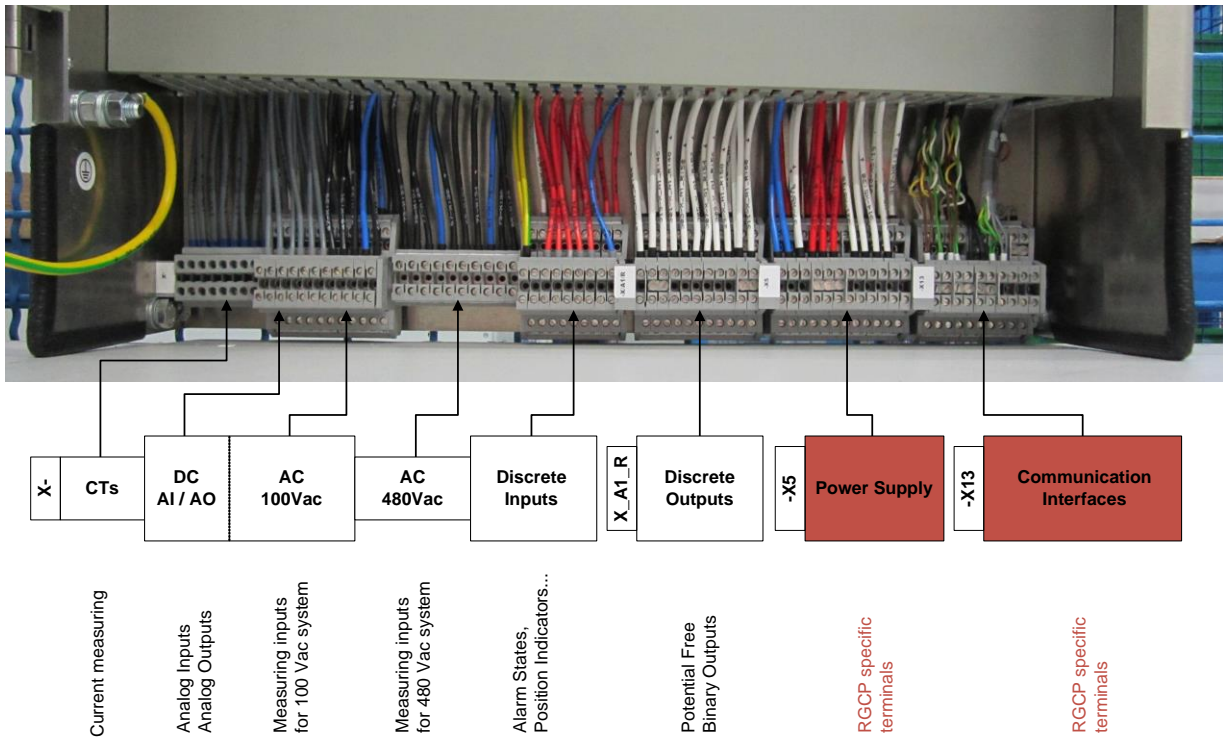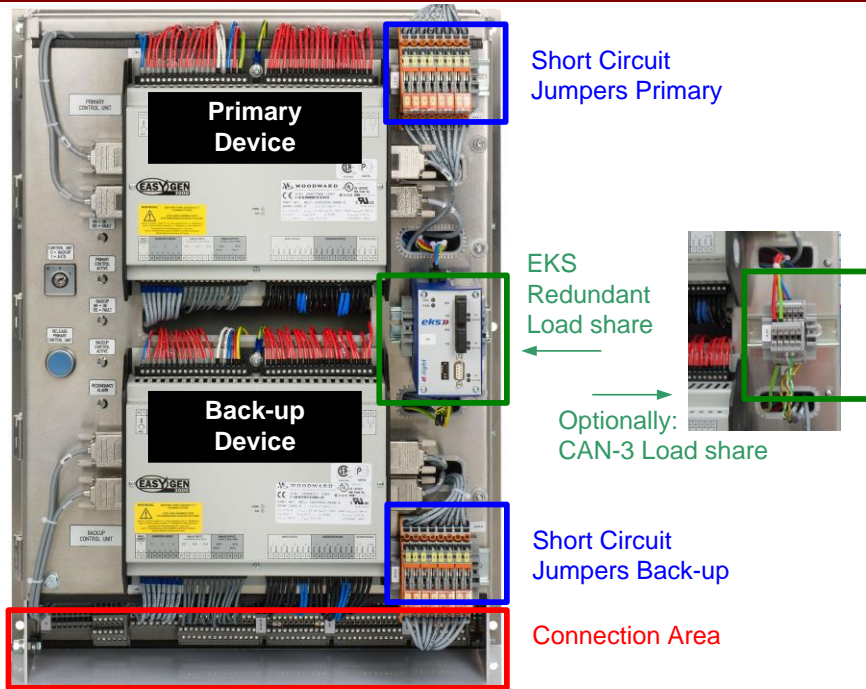
Left Side View
closed position

… and
with open swing frame:

WxHxD = 587 x 650 x 609

NOTE:
ALL DIMENSIONS IN MM

CUSTOMER WIRING CONNECTION TERMINALS
TERMINAL MANUFACTURER: PHOENIX CONTACT
TERMINAL TYPES: MUT 2.5, MBKKB 2.5

HINGE

Earthing connection point
for customer
262,5

TERMINAL DIAGRAM

- Short Circuit Jumpers Primary
- EKS Redundant Load share
- Optionally: CAN-3 Load share
- Short Circuit Jumpers Back-up
- Connection Area

Primary Device

Back-up Device

| -X- | CTs | DC AI / AO | AC 100Vac | AC 480Vac | Discrete Inputs | X_A1_R | Discrete Outputs | -X5 | Power Supply | -X13 | Communication Interfaces |

- Current measuring
- Analog Inputs Analog Outputs
- Measuring inputs for 100 Vac system
- Measuring inputs for 480 Vac system
- Alarm States, Position Indicators…
- Potential Free Binary Outputs
- RGCP specific terminals
- RGCP specific terminals

RELATED PRODUCTS

- Genset Controller **easYgen-3400** (Product Specification # 37523): P/N 8440-2113 & 8440-2188
- Circuit Breaker Controller **LS-511/521** (Product Specification # 37522)
- Remote Panel **RP-3000** (Product Specification # 37446)
- CANbus to Fiber Optic Converter (Application Note # 37598): **DL-CAN** P/N 8445-1049 and **DL-CAN-R** P/N 8445-1048
- Engine Speed Control **actiVgen** (Product Specification # 03419): P/N 8440-2108

- **ToolKit** (Product Specification # 03366)
- I/O Expansion Board **IKD1** (Product Specification # 37171)
- Profibus Gateway (Application Note # 37577): **ESEPRO** P/N 8445-1046
- Ethernet (Modbus/TCP) Gateway (Application Note # 37576): **ESENET** P/N 8445-1044
- Remote Access Gateway (Application Note# 37611) with HMS Netbiter **EasyConnect** EC350

FEATURES OVERVIEW

	Series	**RGCP-**	
EASYGEN RGCP-3400	Model	3400-	
	Package*	SU	MU
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.)		✓	✓
Busbar voltage (1-phase/2-wire)		✓	✓
Control			
Breaker control logic (open and closed transition)		3	3
Number of supported Woodward LS-5 units		16	16
Automatic, Manual, Stop, and test operating modes		✓	✓
Single (AMF), multiple-unit (Islanded) or mains parallel operation (up to 32 units)		✓	✓
GCB and MCB synchronization (slipping / phase matching)		✓	✓
GGB (Generator group breaker) control		✓	✓
Import / export control at the utility interconnect (kW and kvar)		✓	✓
Automatic gen-set sequencing (LDSS)		✓	✓
n/f, V, P, Q, and PF remote control via analog input or interface		✓	✓
Load/var sharing for up to 32 gensets		✓	✓
Configurable load and unload ramp rates		✓	✓
Freely configurable PID controllers		3	3
Redundancy & Diagnostic Features			
Unique bias tracking firmware		✓	✓
Parameter settings alignment check		✓	✓
Alarms alignment check		✓	✓
Loss of redundancy alarm		✓	✓
Manual key switch and status indication		✓	✓
Graphical overview of genset, bus bar, and utility with trending (with RP-3000XT)		✓	✓
Event recorder entries with real time clock (battery backup)		300	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 / 51V	✓	✓
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	59 / 27 / 81O / 81U	✓	✓
Mains: phase shift / rotation field / df/dt (ROCOF) / Q(U)	78	✓	✓
I/Os			
Fiber Optic gateway for communication ring		-	✓
CT shorting terminals for hot serviceability		✓	✓
CAN bus communication interfaces		3	3
RS-232/485 Modbus RTU Slave interface(s)		1 / 1	1 / 1
Speed input: magnetic / switching Pickup		✓	✓
Discrete alarm inputs (configurable)		12 (8)	12 (8)
Discrete outputs, configurable		max. 11	max. 11
External discrete inputs / outputs via CANopen		32 / 32	32 / 32
Analog inputs: 0...20 mA		3	3
Analog outputs: +/- 10V, +/- 20mA, PWM; configurable		2	2
External analog inputs / outputs via CANopen		16 / 4	16 / 4
Display and evaluation of J1939 analog values, "supported SPNs"		100	100
Listings/Approvals			
UL / cUL (Component Listing)		✓	✓
LR & ABS Marine (Component Approval)		✓	✓
CE Marked (Complete Cabinet)		✓	✓
Part Numbers		... with Fiber Optic gateway*	
		NO	YES
RGCP-3400 with 5 A CT inputs		9900-1022	9900-1028
RGCP-3400 with 1 A CT inputs		9900-1029	9900-1030
Optional Remote Panel		8446-1057	

*) SU = Single Unit: without Fiber Optic gateway (retrofit prepared)
   MU = Multi Unit: with Fiber Optic gateway implemented