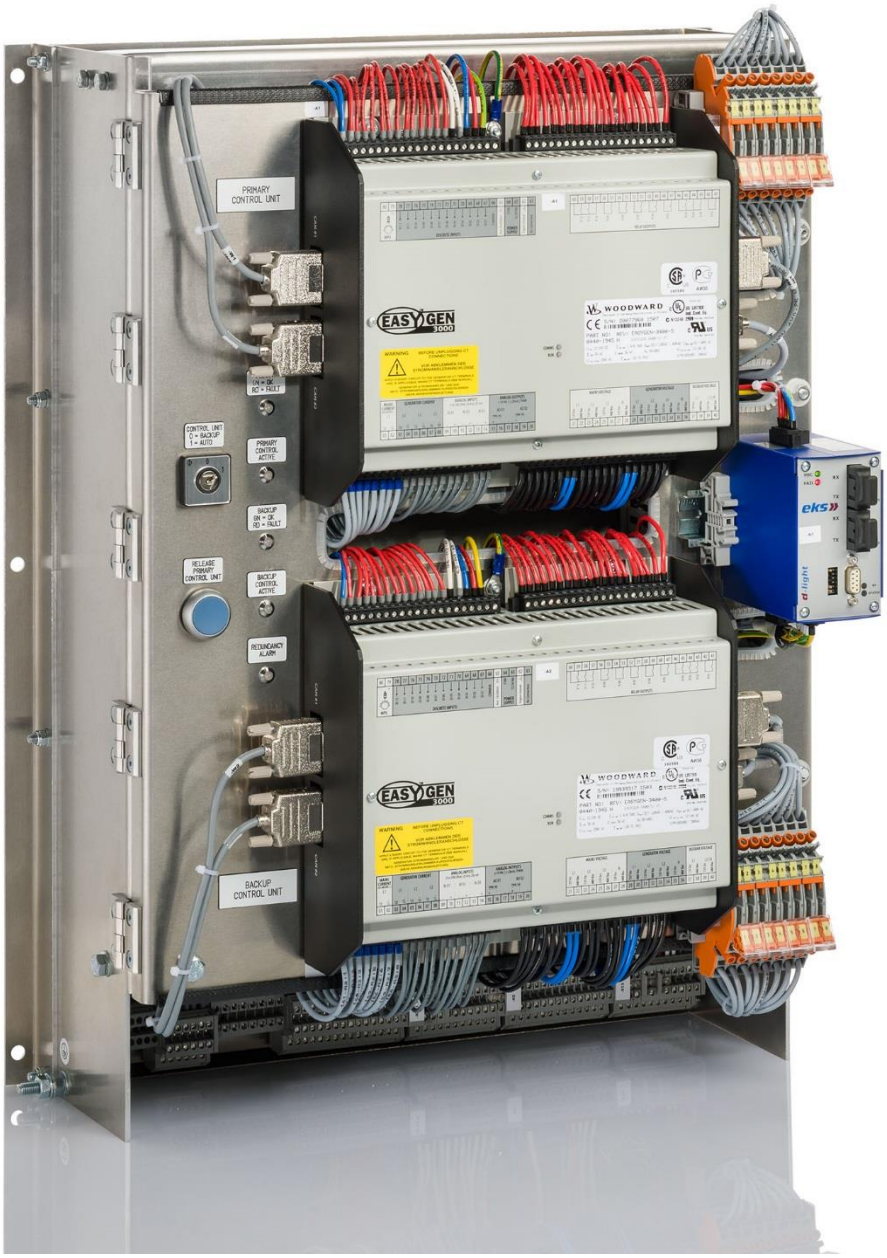
Released

RGCP-3400 Manual



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1 Brief Overview

The RGCP Redundant Genset Control Panel is a redundant Genset control. It can be used in applications such as:

- co-generation,
- stand-by, AMF,
- peak shaving,
- import/export or
- distributed generation.

The RGCP can be used for the following operating modes:

- island,
- island parallel,
- mains parallel and
- multiple unit mains parallel operations.

The RGCPs offers a wide range of functionality and applications, and is designed for communication with Woodward's LS-5 synchronizers and load share controllers.

The RGCP device comprises two easYgen3400-P1 devices with redundant specific firmware.

The RGCP offers nearly the full scope of features that are offered by a stand-alone easYgen3400.

Key Features
The key benefit is that the RGCP offers highest redundancy in terms of the Genset-Controller itself. That ensures highest availability in critical applications (highest availability). In the unlikely event of an outage of an easYgen3400, the redundant counterpart easYgen3400 will overtake the control of the Genset seamless with little or no disruption of the power system).

The following are some of the operational advantages of the redundant control.

Automatic transfer to secondary Genset-Controller in the case of failure of the primary Genset-Controller. The failed primary Genset-Controller can be hot swapped, removed while the engine is running and can be replaced with a spare.

Manual transfer to secondary Genset-Controller by the operator for means of test or service. The primary Genset-Controller can be hot swapped while the engine is running.

The back-up Genset-Controller fails (self-test relay trips). The primary Genset-Controller will continue to control the Genset while. The secondary Genset-Controller can be hot swapped.

State of Health Indication
The availability of redundancy (both units) and the loss of redundancy is indicated by LEDs and trigger specific auxiliary relays. If the RGCP changes its state from primary to back-up control it will never return automatically, except in the case the back-up control fails as well.

Power Supply Redundancy
In order to maximize redundancy and availability, the power supply of the Genset-Controllers can be redundant as well (strongly recommended). The Digital Inputs can be fed by an isolated power source, the switching potential must be positive.

Identical Genset Controller Settings
Both Genset-Controllers are programmed with identical configurations. This ensures that both controls always react in the same manner. It permits a single spare to be readied for replacement of either primary or secondary controller.

Parameter Mismatch Supervision
The master control continuously compares it's settings to the other control. If the settings differ, the RGCP will raise an alarm and inform the operator that there is a parameter mismatch between the two Genset-Controllers. The alarm will be indicated via a LED on the metal housing of the Genset-Controller or at the HMI (e.g. Remote Panel).

Alarm Mismatch Supervision
The master control also compares its alarms with the alarms of the slave control and initiates an alarm, if both alarm lists do not match. The alarm will be indicated via a LED on the metal housing of the Genset-Controller or at the HMI (e.g. Remote Panel).

Example application setup

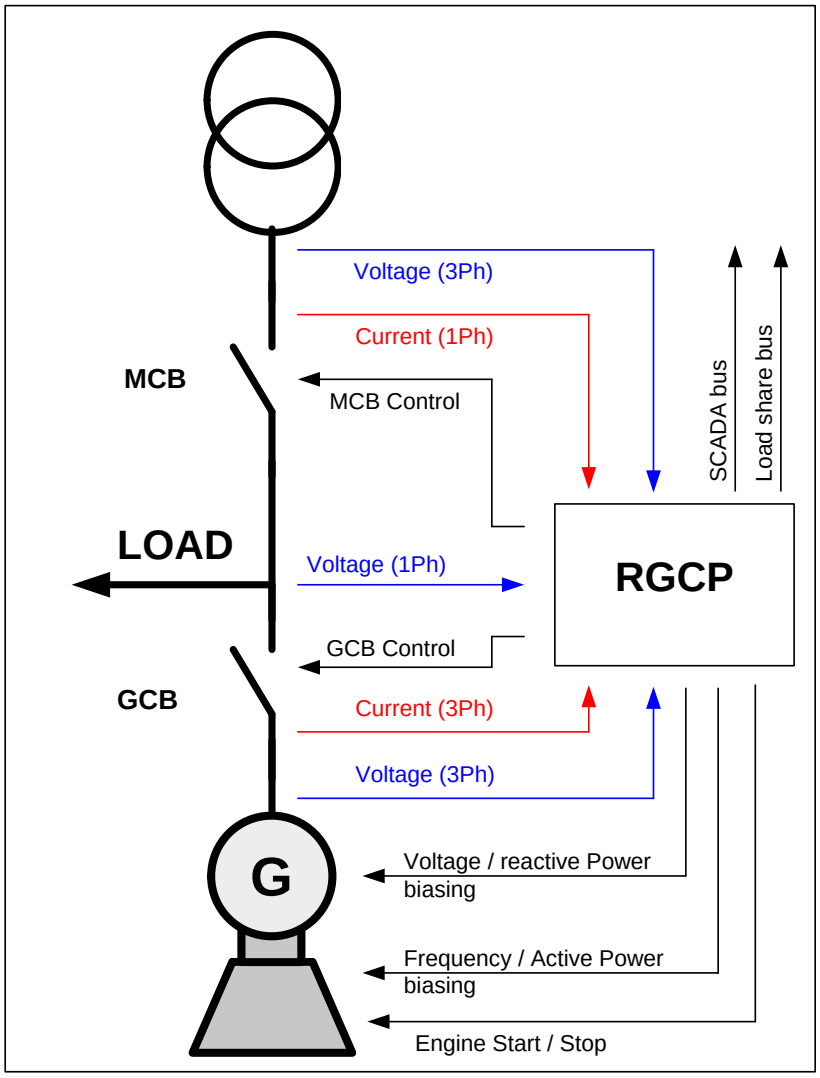


Fig. 1: Sample application setup: Mains parallel operation

The RGCP will function as an easYgen engine control with generator, mains and engine protection.

Table of contents

2 Scope of delivery

The following parts are included in the scope of delivery. Please check prior to the installation that all parts are present.

- The RGCP assembly
- RGCP Documentation
  - Installation Manual Package comprising:
    - Wiring instructions (printed version)
    - Cabinet overview (printed version)
  - easYgen3400 CD comprising:
    - Wiring instructions (pdf-version)
    - Cabinet overview (pdf-version)
    - Bill of materials
    - Construction layout
    - Terminal diagrams
    - easYgen3400 manuals and related files

3 General Information

3.1 About this Manual

This manual is an add-on to the current easYgen3400 P1 manual. This manual covers all relevant features and additional information required for the RGCP device, e.g. behavior of the RGCP that differs from the standard easYgen3400 device.

Chapter easYgen3400P1 K39 describes the software differences with respect to the standard easYgen3400 P1 device.

3.1.1 Revision History

Rev.	Date	Editor	Changes
A	2016-06-09	GG	Checked for updates, changes, and corrections. Typos corrected. Rear page added. Status changed from PRELIMINARY to standard.
New	14.03	KW	Preliminary Version

3.1.2 Depiction of Notes and Instructions

Safety instructions

Safety instructions are marked with symbols in these instructions. The safety instructions are always introduced by signal words that express the extent of the danger.

DANGER!

This combination of symbol and signal word indicates an immediately dangerous situation that could cause death or severe injuries if not avoided.

WARNING!

This combination of symbol and signal word indicates a possibly dangerous situation that could cause death or severe injuries if it is not avoided.

CAUTION!

This combination of symbol and signal word indicates a possibly dangerous situation that could cause slight injuries if it is not avoided.

NOTICE!

This combination of symbol and signal word indicates a possibly dangerous situation that could cause property and environmental damage if it is not avoided.

Tips and recommendations

This symbol indicates useful tips and recommendations as well as information for efficient and trouble-free operation.

Additional markings

Marking	Explanation
1.>	Step-by-step instructions
⇨	Results of action steps
	References to sections of these instructions and to other relevant documents
■	Listing without fixed sequence
[Buttons]	Operating elements (e.g. buttons, switches), display elements (e.g. signal lamps)
“Display”	Screen elements (e.g. buttons, programming of function keys)

3.2 Copyright and Disclaimer

Disclaimer

All information and instructions in this manual have been provided under due consideration of applicable guidelines and regulations, the current and known state of the art, as well as our many years of in-house experience. Woodward GmbH assumes no liability for damages due to:

- Failure to comply with the instructions in this manual
- Improper use / misuse
- Willful operation by non-authorized persons
- Unauthorized conversions or non-approved technical modifications
- Use of non-approved spare parts

The originator is solely liable to the full extent for damages caused by such conduct. The agreed upon obligations in the delivery contract, the general terms and conditions, the manufacturer's delivery conditions, and the statutory regulations valid at the time the contract was concluded, apply.

Copyright

3.3 Service and Warranty

Our Customer Service is available for technical information. Please see page 2 for the contact data.

In addition, our employees are constantly interested in new information and experiences that arise from usage and could be valuable for the improvement of our products.

Warranty terms

Please enquire about the terms of warranty from your nearest Woodward representative.

For our contact search webpage please go to:

http://www.woodward.com/Directory.aspx

3.4 Safety

3.4.1 Intended Use

The Genset-control unit has been designed and constructed solely for the intended use described in this manual.

The Genset control unit must be used exclusively for redundant engine-generator system management applications.

- Intended use requires operation of the control unit within the specifications listed in the easYgen3400 manual.
- **All permissible applications are outlined in the easYgen 3400 manual and in this manual.**
- Intended use also includes compliance with all instructions and safety notes presented in this manual.
- Any use that exceeds or differs from the intended use shall be considered as improper use.
- No claims of any kind for damage will be entertained if such claims result from improper use.

NOTICE!

Damage due to improper use!

Improper use of the Genset control unit may cause damage to the control unit as well as connected components.

Improper use includes, but is not limited to:

– Operation outside the specified operation conditions.

3.4.2 Personnel

WARNING!

Hazards due to insufficiently qualified personnel!

If unqualified personnel perform work on or with the control unit hazards may arise which can cause serious injury and substantial damage to property.

– Therefore, all work must only be carried out by appropriately qualified personnel.

This manual specifies the personnel qualifications required for the different areas of work, listed below:

- Well trained for electrical installations.
- Skilled and competent to be aware especially of the local safety regulations.
- Experienced in working on electronic measuring and control devices.

- Allowed to manage the redundant controlled (engine/generator) system.

The workforce must only consist of persons who can be expected to carry out their work reliably. Persons with impaired reactions due to, for example, the consumption of drugs, alcohol, or medication are prohibited.

When selecting personnel, the age-related and occupation-related regulations governing the usage location must be observed.

3.4.3 General Safety Notes

Electrical hazards

WARNING!

Life-threatening hazard from electric shock!

There is an imminent life-threatening hazard from electric shocks from live parts. Damage to insulation or to specific components can pose a life-threatening hazard.

- Only a qualified electrician should perform work on
- The electrical equipment.
- Immediately switch off the power supply and have it repaired if there is damage to the insulation.
- Before beginning work at live parts of electrical systems and resources, cut the electricity and ensure it remains off for the duration of the work. Comply with the five safety rules in the process:
  - cut electricity;
  - safeguard against restart;
  - ensure electricity is not flowing;
  - earth and short-circuit;
  - cover or shield neighboring live parts.
- Never bypass fuses or render them inoperable. Always use the correct amperage when changing fuses.
- Keep moisture away from live parts. Moisture can cause short circuits.

Prime mover safety

WARNING!

Hazards due to insufficient prime mover protection

The engine, turbine, or other type of prime mover should be equipped with an over-speed (over-temperature, and over-pressure, where applicable) shutdown device(s), that operates totally independently of the prime mover control device(s) to protect against runaway or damage to the engine, turbine, or other type of prime mover with possible personal injury or loss of life should the mechanical-hydraulic governor(s) or electric control(s), the actuator(s), fuel control(s), the driving mechanism(s), the linkage(s), or the controlled device(s) fail.

Be careful in changing safety relevant settings!

WARNING!

Uncontrolled operation due to faulty configuration

The discrete output "Ready for operation OFF" must be wired in series with an emergency stop function.

This means that it must be ensured that the generator circuit breaker is opened and the engine is stopped if this discrete output is de-energized.

If the availability of the plant is important, this fault must be signaled independently from the unit.

Modifications

WARNING!

Hazards due to unauthorized modifications

Any unauthorized modifications to or use of this equipment outside its specified mechanical, electrical, or other operating limits may cause personal injury and/or property damage, including damage to the equipment.

Any unauthorized modifications:

– constitute "misuse" and/or "negligence" within the meaning of the product warranty thereby excluding warranty coverage for any resulting damage

– Invalidate product certifications or listings.

Use of batteries/alternators

NOTICE!

Damage to the control system due to improper handling

Disconnecting a battery from a control system that uses an alternator or battery-charging device whilst the charging device is still connected causes damage to the control system.

– Make sure the charging device is turned off before disconnecting the battery from the system.

Electrostatic discharge

NOTICE!

Damage from electrostatic discharge

All electronic equipment sensitive to damage from electrostatic discharge, which can cause the control unit to malfunction or fail.

– To protect electronic components from static damage, take the precautions listed below.

1.> Avoid build-up of static electricity on your body by not wearing clothing made of synthetic materials. Wear cotton or cotton-blend materials as much as possible because these do not store static electric charges as easily as synthetics.

2.> Before any maintenance work on the control unit, ground yourself by touching and holding a grounded metal object (pipes, cabinets, equipment, etc.) to discharge any static electricity.

Alternatively wear an ESD wrist band connected to ground.

3.> Keep plastic, vinyl, and Styrofoam materials (such as plastic or Styrofoam cups, cigarette packages, cellophane wrappers, vinyl books or folders, plastic bottles, etc.) away from the control unit, modules and work area.

4.> Opening the control cover may void the unit warranty. Do not remove the printed circuit board (PCB) from the control cabinet unless instructed by this manual.

If instructed by this manual to remove the PCB from the control cabinet, follow these precautions:

- *Ensure that the device is completely voltage-free (all connectors have to be disconnected).*
- *Do not touch any part of the PCB except the edges.*
- *Do not touch the electrical conductors, connectors, or components with conductive devices or with bare hands.*
- *When replacing a PCB, keep the new PCB in the plastic antistatic protective bag it comes in until you are ready to install it. Immediately after removing the old PCB from the control cabinet, place it in the antistatic protective bag.*

For additional information on how to prevent damage to electronic components caused by improper handling, read and observe the precautions in:

- *"Woodward manual 82715, Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules".*

Notes on marine usage

Marine usage of the easYgen genset control requires additional precautions as listed below:

The specified marine approvals are initially only valid for metal housing units. They are only valid for plastic housing units, if they are installed using the screw kit.

- *Use all 12 screws and tighten accordingly.*

- The easYgen-3000 Series has an internally isolated power supply.

NOTICE!

Malfunctions due to insufficient protection against electromagnetic interference

Exposure to increased electromagnetic interference on bridge and deck zones may cause malfunctions or incorrect internal readings.

- Install an EMI filter (i.e. TIMONTA FSS2-65-4/3) for the power supply inputs when using the control unit on bridge and deck zones.

Some additional, independent safety and protection devices are necessary to meet safety requirements of Rules and Regulations of marine Classification Societies.

– Please refer to the corresponding documents issued by marine Classification Societies for the applicable requirements.

The easYgen is type approved by LR Lloyd's Register.

– Please consider final functional arrangements to comply with appropriate Lloyd's Register Rules as subject of the Plan Approval process.

3.4.4 Protective Equipment and Tools

Protective gear

Personal protective equipment serves to protect risks to the safety and health of persons as well as to protect delicate components during work.

Certain tasks presented in this manual require the personnel to wear protective equipment. Specific required equipment is listed in each individual set of instructions.

The cumulative required personal protective equipment is detailed below:

ESD wrist band

The ESD (electrostatic discharge) wrist band keeps the user's body set to ground potential. This measure protects sensitive electronic components from damage due to electrostatic discharge.

Tools

Use of the proper tools ensures successful and safe execution of tasks presented in this manual.

Specific required tools are listed in each individual set of instructions.

The cumulative required tools are detailed below:

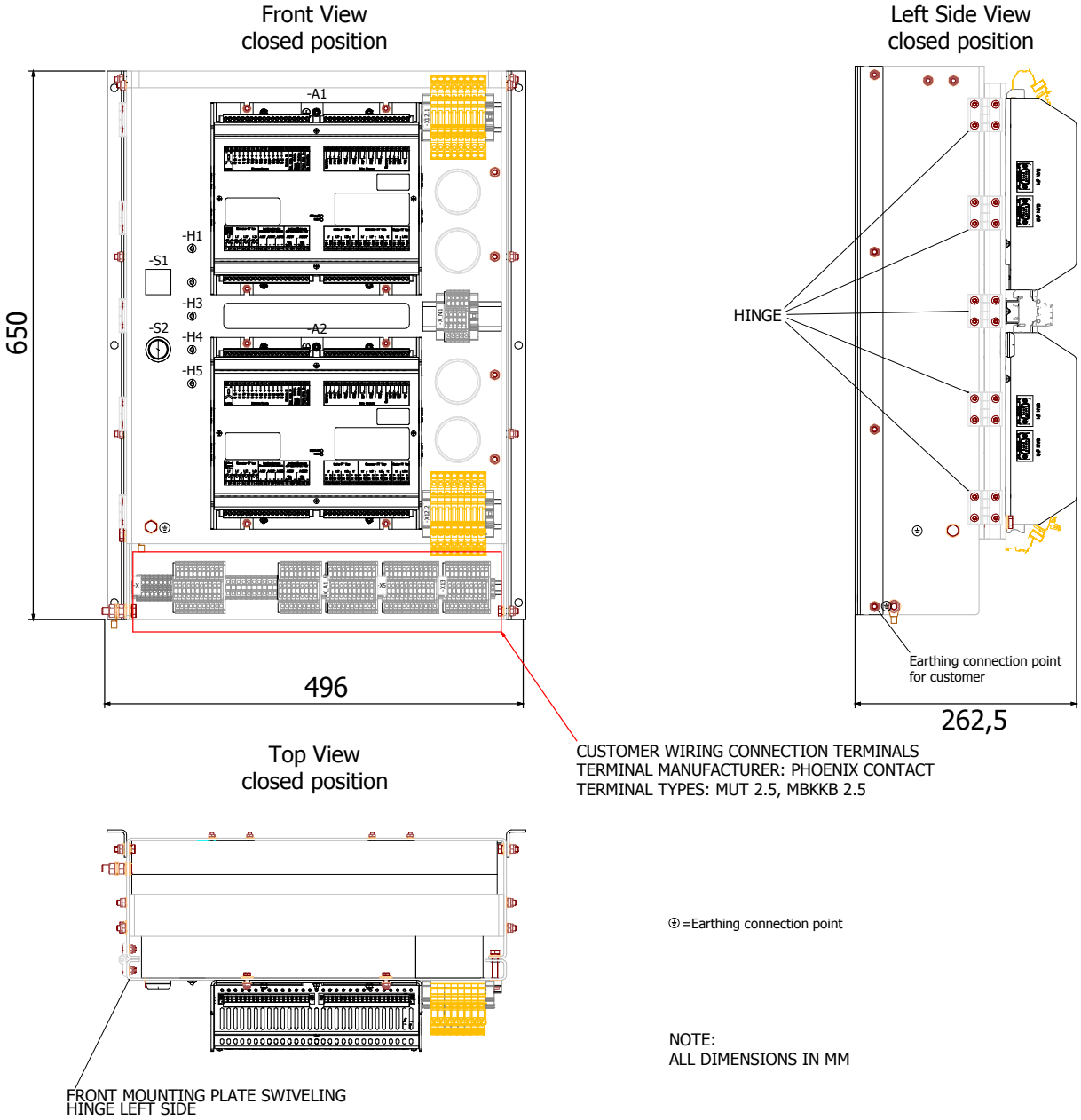
Torque screwdriver

A torque-screwdriver allow fastening of screws to a precisely specified torque.

- Note the required torque range individually specified in the tasks listed in this manual.

4 Installation

4.1 Mounting Unit – 3 Side View



WARNING!

Please take care for adequate mounting – especially considering the leverage effect with opening the swiveling hinge.

4.1.1 Mounting into a cabinet

When designing the RGCP into a switch gear cabinet, it shall be considered,

1. Ensure that the single controls are remove-able. That means there must be enough space to the left and right for a technician/person to reassemble the single Genset-Controller.

2. Ensure that the RGCP can be opened to the left. This gives good access to the inner technic of the control. This is very helpful in case of the need of a servicing/repair.

4.2 Setup Connections

4.2.1 Terminal Allocation

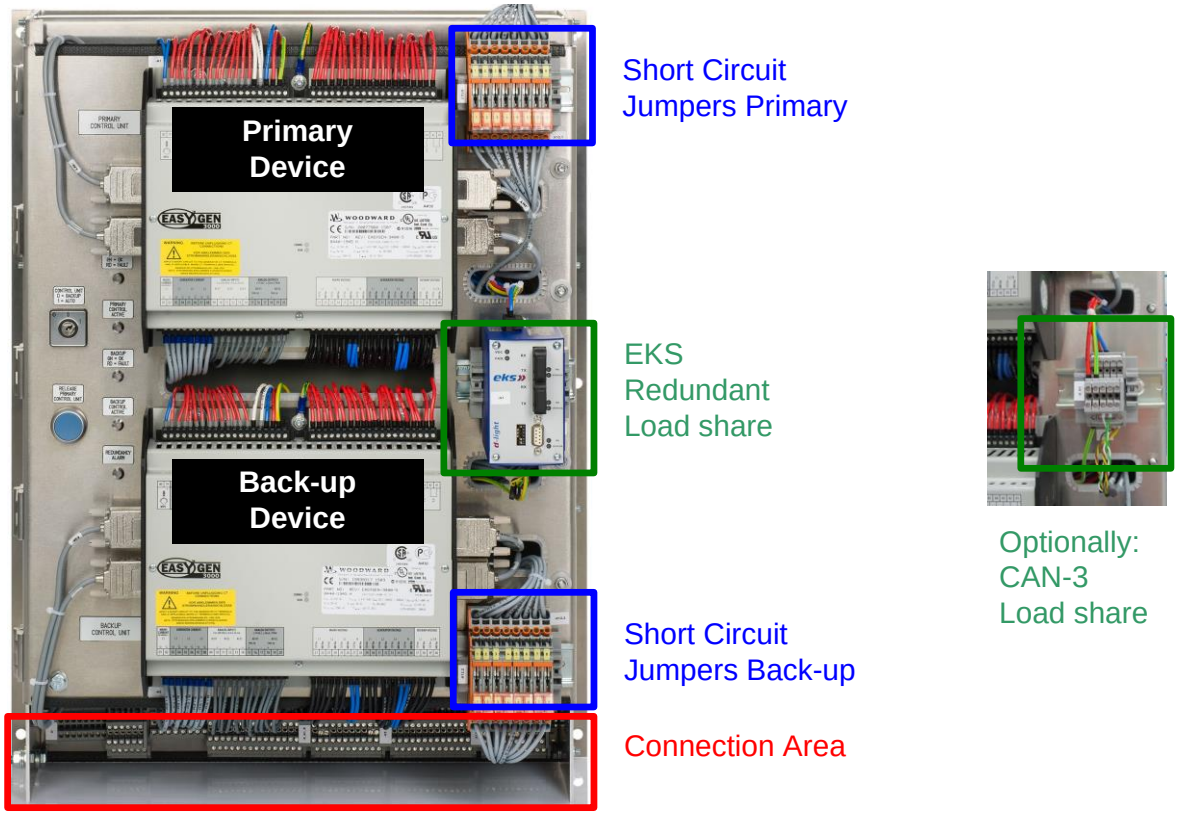


Fig. 2: Terminal Allocation

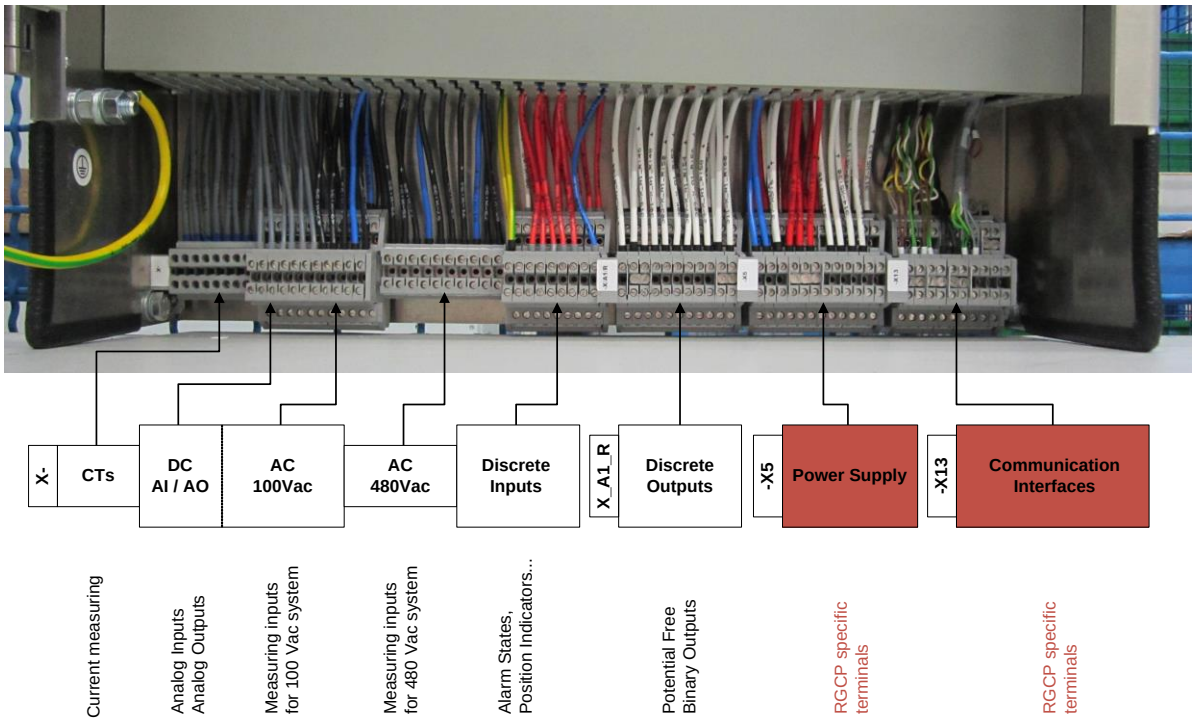


Fig. 3: Connection Area

X- Terminals

MAINS CURRENT (OR Ground CT)		GENERATOR CURRENT					
L1		L1		L2		L3	
S2	S1•	S2	S1•	S2	S1•	S2	S1•
1	2	3	4	5	6	7	8

ANALOG INPUTS 0/4 to 20mA		
AI 01	AI 02	AI 03
+	+	+
10	12	14
-	-	-
9	11	13

ANALOG OUTPUTS +/-10Vdc +/-20mA PWM		
AO 01	AO 02	
Shunt	+	-
16	18	20
+	-	Shunt
15	17	19

Discrete Inputs								
Engine GND	N/A	DI 02	DI 04	DI 06	DI 08	DI 10	N/A	- MPU
62	66	68	70	72	74	76	78	80
N/A	Aux. Excit. D+	DI 01	DI 03	DI 05	DI 07	DI 09	DI 11	+ MPU
61	65	67	69	71	73	75	77	79

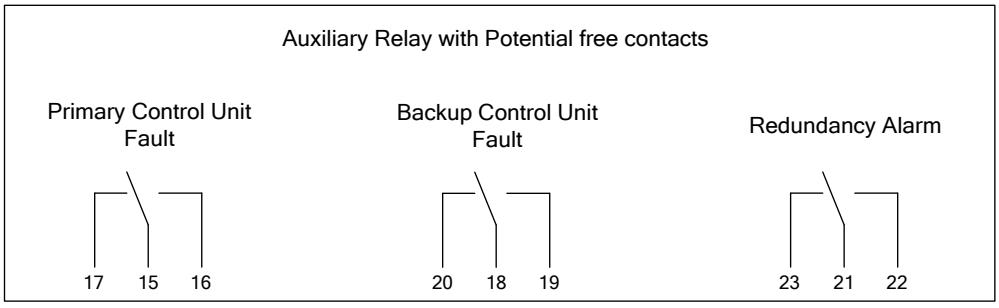
X_A1_R Terminals

Discrete Outputs										
R03	Com. R2, R3, R4	Com. R2, R3, R4	R05	R06	R07	R08	R09	R11	Common R10, R11, R12	
44	46	46	48	50	52	54	56	58	60	60
R02	R04	R04	R05	R06	R07	R08	R09	R10	R12	R12
43	45	45	47	49	51	53	55	57	59	59

DISCRETE INPUTS

-X5 Terminals (RGCP specific)

Power Supply							Auxiliary Contacts					
L-	L-	DI -	DI +	DI +	DI +	N/A	PrimConFault B	BackConFault A	PrimConFault C	Red. Alarm B	N/A	N/A
2	4	6	8	10	12	14	16	18	20	22	24	26
Primary Con L+	Backup Con L+	DI + (Source)	DI +	DI +	DI +	Internal DI+	PrimConFault A	PrimConFault C	PrimConFault B	Red. Alarm A	Red. Alarm C	N/A
1	3	5	7	9	11	13	15	17	19	21	23	25



-X13 Terminals (RGCP specific)

Communication Ports									
CAN						RS485			
CAN1: GND	N/A	CAN2: GND	N/A	CAN2: Shield	N/A	RS485: B' (RxD+)	RS485: A' (RxD-)	N/A	N/A
2	4	6	8	18	20	22	24	26	28
CAN1: CAN-L	CAN1: CAN-H	CAN2: CAN-L	CAN2: CAN-H	CAN1: Shield	N/A	RS485: B (TxD+)	RS485: A (TxD-)	RS485: Plug GND	N/A
1	3	5	7	17	19	21	23	25	27

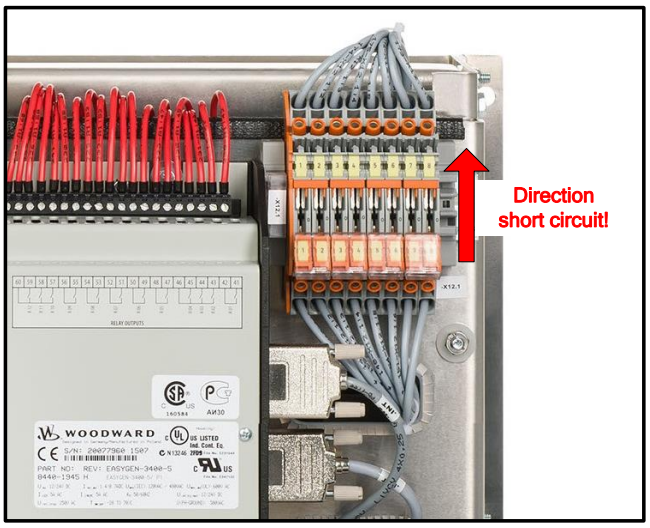
Fig. 4: -X13 Terminals

4.2.2 Short ~~Circuit~~ Terminals for the CT Connections

The RGCP provides for the primary and for the secondary Genset-Controller shorting terminals.

Short Circuit Terminals for the Primary Control

➔ Short-circuit all CTs by moving the clamp to the upper position



CT short-circuit (1x mains, 3x generator)

CT Connection:

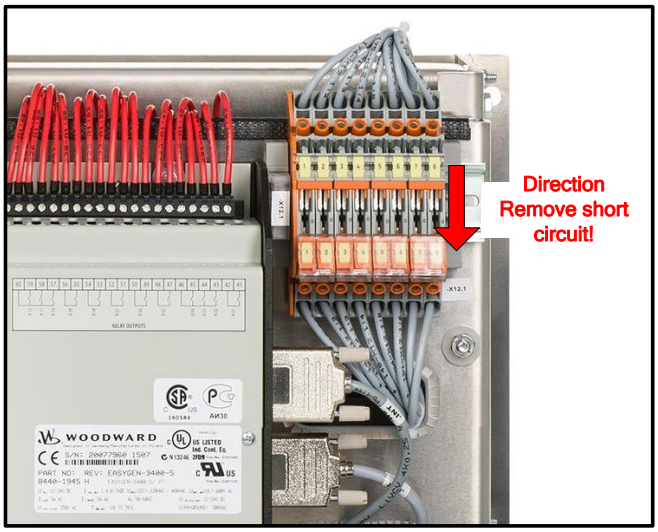
1-2: Mains CT

3-4: Generator CT L1

5-6: Generator CT L2

7-8: Generator CT L3

➔ The short-circuit of all CTs of the primary control must be removed by moving the clamp to the lower position.



Remove CT short-circuit (1x mains, 3x generator)

CT Connection:

1-2: Mains CT

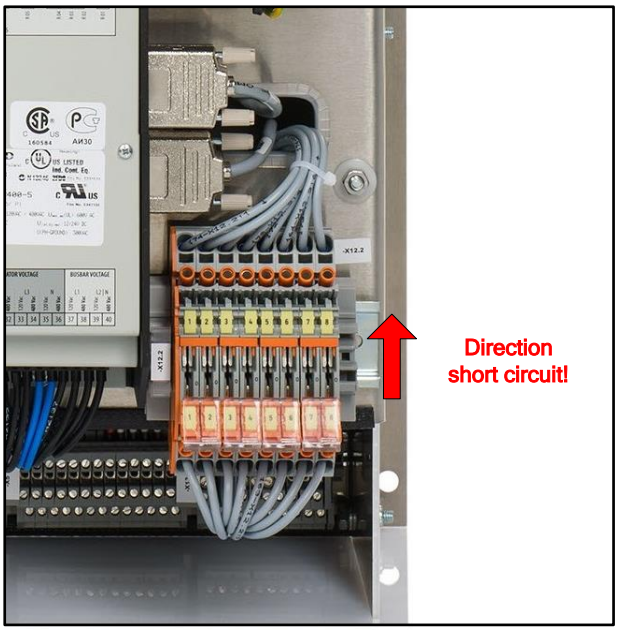
3-4: Generator CT L1

5-6: Generator CT L2

7-8: Generator CT L3

Shorting Terminals for the Back-up Genset-Controller

➔ Short-circuit all CTs by moving the clamp to the upper position



CT short-circuit (1x mains, 3x generator)

CT Connection:

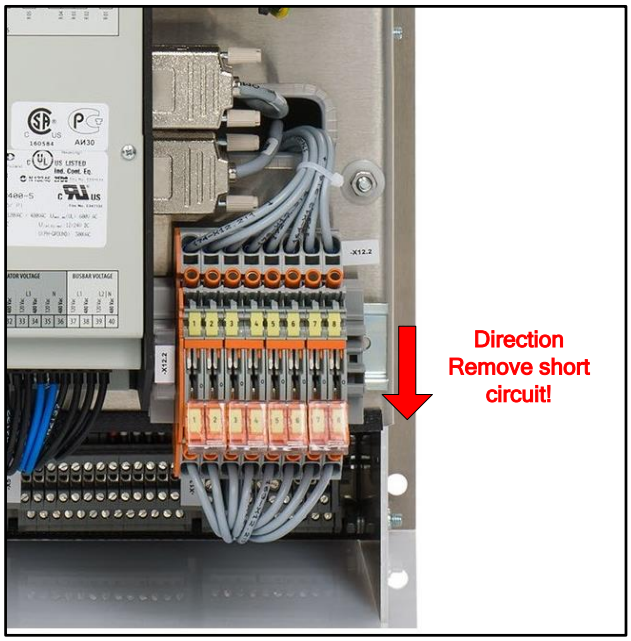
1-2: Mains CT

3-4: Generator CT L1

5-6: Generator CT L2

7-8: Generator CT L3

➔ The short-circuit of all CTs of the primary control must be removed by moving the clamp ~~in~~to the lower position.



CT Connection:

1-2: Mains CT

3-4: Generator CT L1

5-6: Generator CT L2

7-8: Generator CT L3

4.2.3 Power Supply

General notes

The power supply is restricted to 24 Volt systems!

A crank waveform (shown in the easYgen manual) is not applicable for the RGCP. Ensure that there is no loss or voltage drop in the supply voltage.

Schematic and terminals

Wiring and terminals

The RGCP-3400 supports the following different power supply variants:

Variant1: Redundant Power Supply, additional Power Supply for the Digital Inputs

Variant 2: Redundant Power Supply feeds also Digital Inputs

Variant 3: Single Source Powered (Redundant Fused) Power Supply feeds also Digital Inputs

Variant 4: Single Source Powered (Single Fused) Power Supply feeds also Digital Inputs

By means of setting jumpers on dedicated terminals on the “-X5“terminal block, the different power supply variants can be set. Details can be taken from the following wiring diagrams. The black bars are symbolizing the jumper that have to be set.

Variant 1: Redundant Power Supply, additional Power Supply for Digital Inputs

Usage of two power supply sources 24VDC and one additional power source for the discrete inputs (see picture figure 1). This variant is taken, if each of the easYgens shall get its own power supply to ensure the best redundancy for the Genset-Controllers.

The additional source for the discrete input in this case is to isolate the power supply minus from the discrete inputs minus connection.

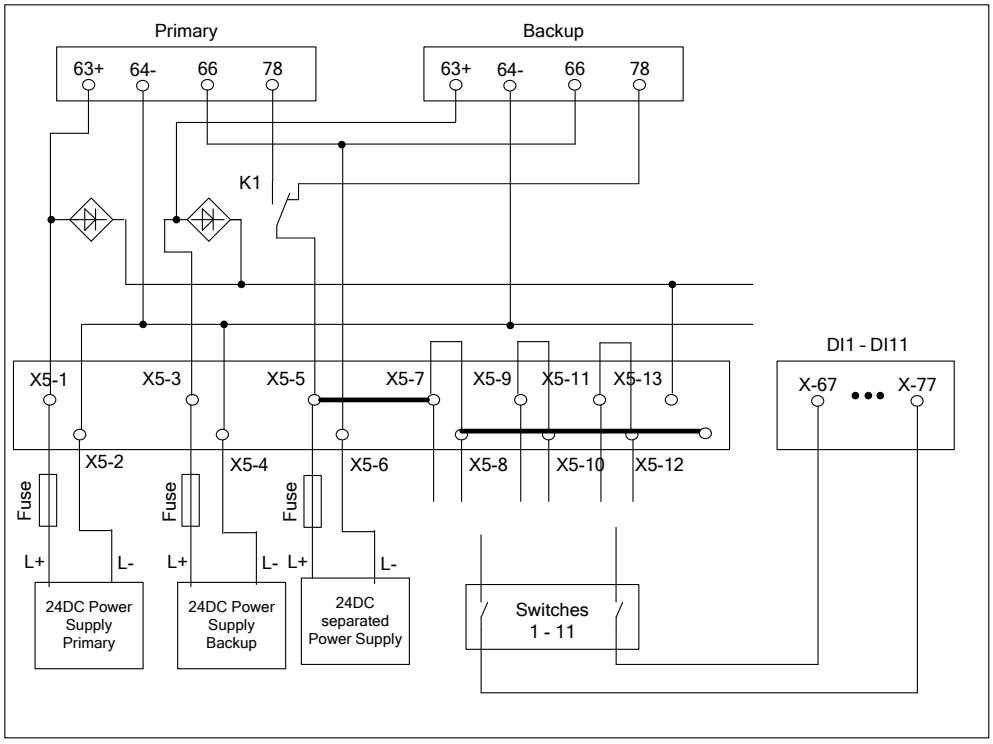


Fig. 5: Two power supply sources 24VDC and one additional power source for the discrete inputs

Place fuses for each power supply. This preferred variant ensures highest availability of the system.

Variant 2: Redundant Power Supply feeds also Digital Inputs

Usage of two power supply sources 24VDC (see picture figure 2). The power for the discrete inputs is provided by the RGCP-3400. This variant is taken, if each of the easYgens shall get its own power supply to ensure the best redundancy for the Genset-Controller.

The power supply for the discrete inputs is taken out from the internal power supply. This redundant power supply is created inside the device.

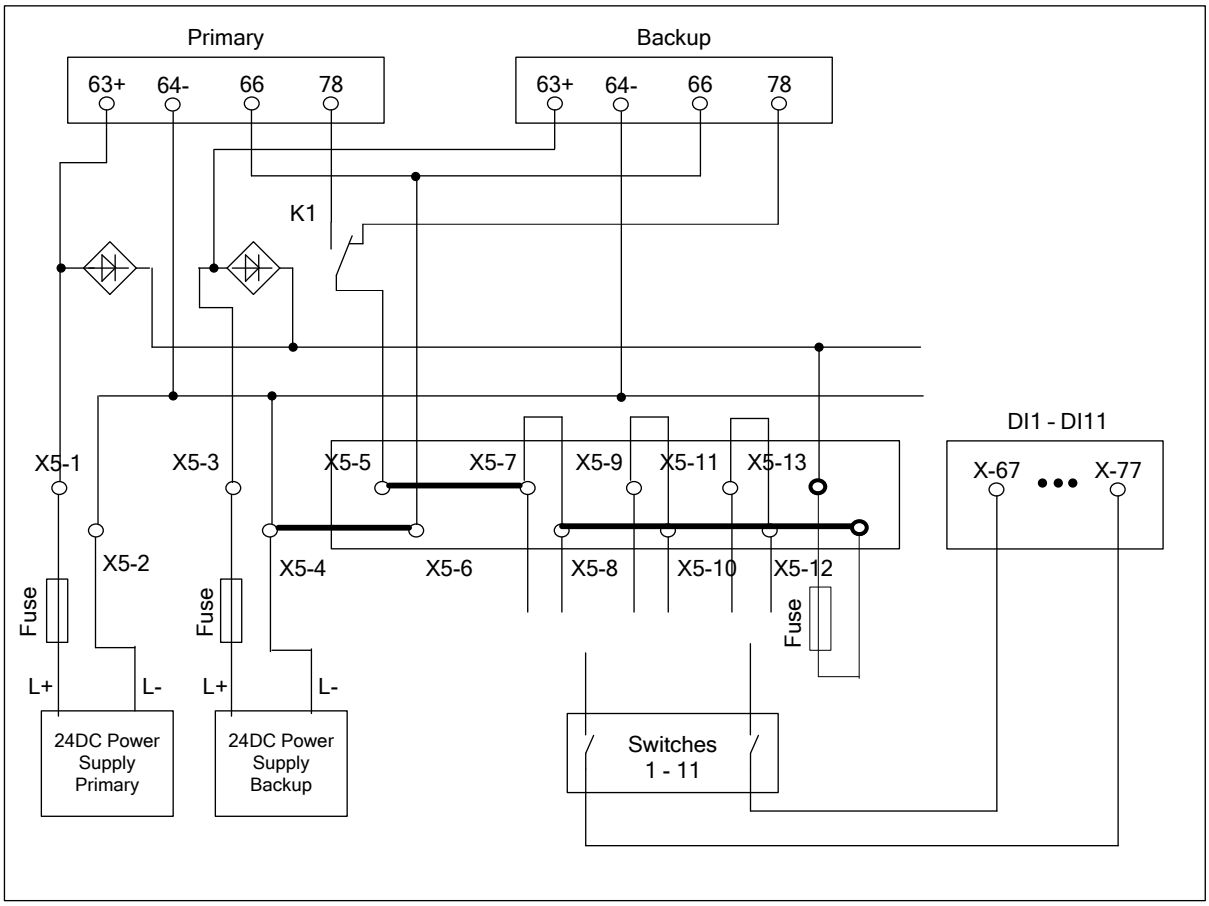


Fig. 6: Two power supply sources 24VDC

Place fuses for each power supply. A fuse for the connection X5-12 to X5-13 is strongly recommend. The value for the fuse shall be lower than the value for the single power supplies. This ensures, that a short circuit outside the device cannot burn the two main power supply fuses.

Variant 3: Single Source Powered (Redundant Fused) Power Supply feeds also Digital Inputs

Usage of one power supply source 24VDC (see picture figure 3). This source also feeds the discrete inputs. This variant is taken, if only one power supply is available. Be aware that with the loss of the power supply the complete device is lost.

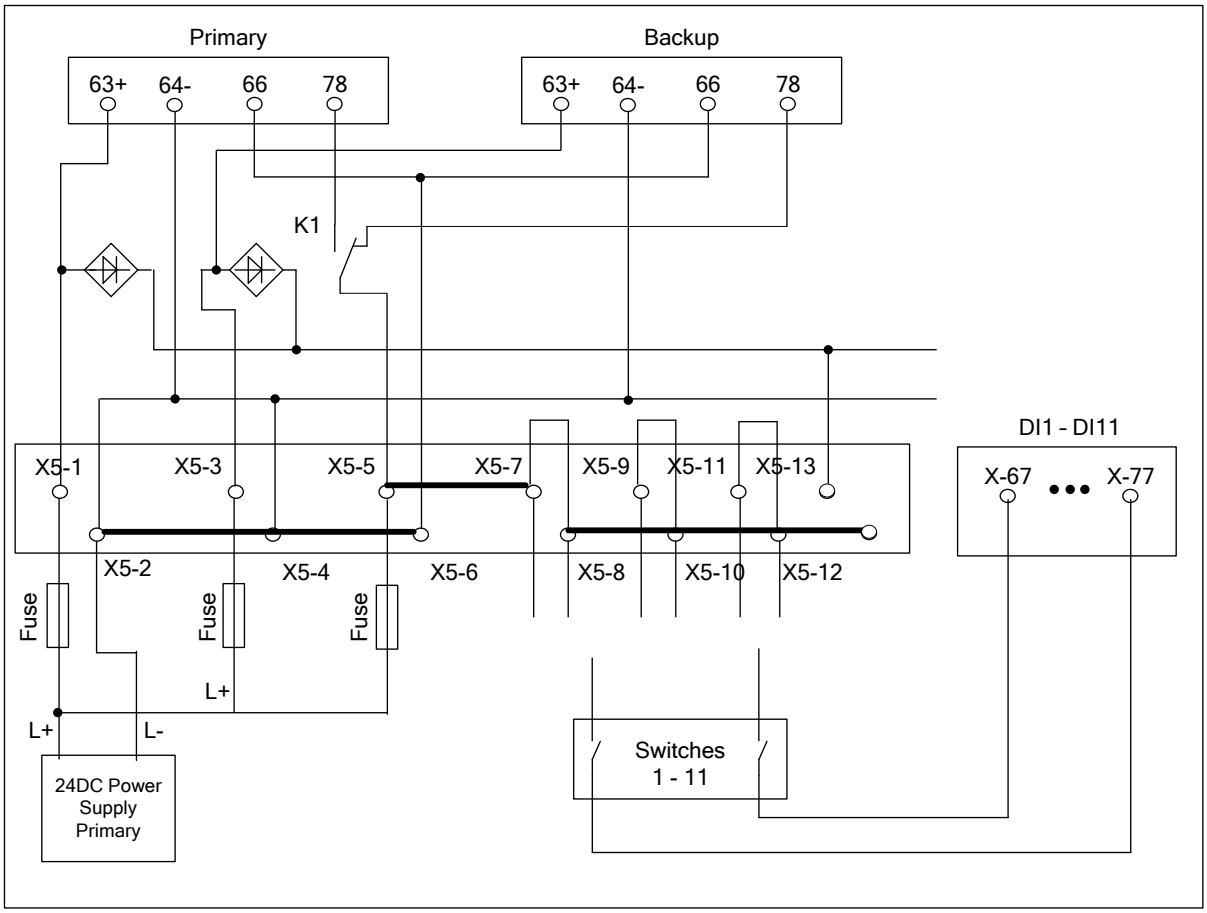


Fig. 7: One power supply source 24VDC

This connection example is not recommended. There is no (n-1) redundancy in the power supply. To keep a minimum level of security, place a fuse for each path.

Variant 4: Single Source Powered (Single Fused) Power Supply feeds also Digital Inputs

Usage of one power supply source 24VDC with one fuse (see picture figure 4). This is the simplest connection of a power supply. Be aware that with fail of the power supply the complete device is lost.

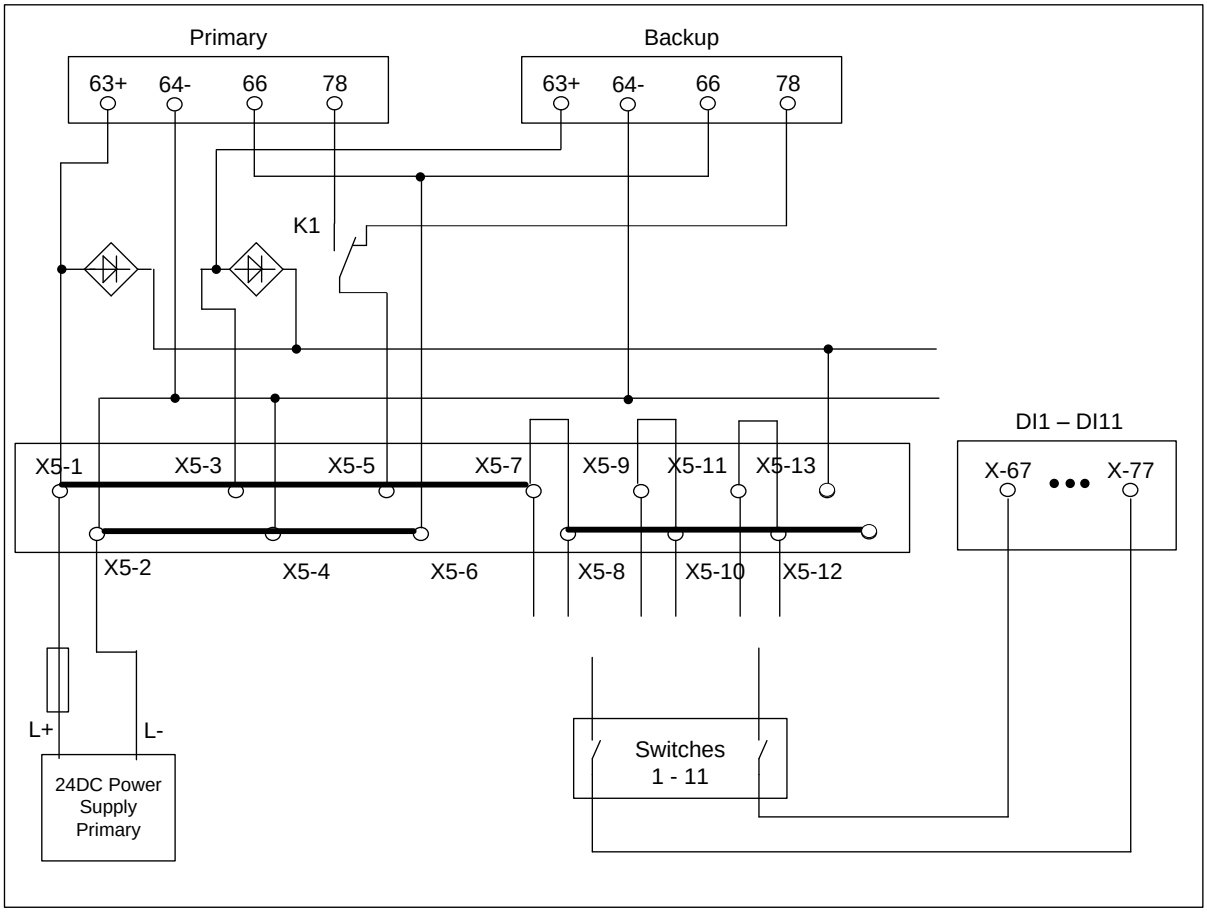


Fig. 8: One power supply source 24VDC with one fuse.

This connection example is strongly not recommended. There is no (n-1) redundancy in the power supply and in addition to that no redundancy in fusing.

5 Redundant Genset Control (K39) – Function Restrictions

Deviations on the Hard- and Software of the RCGP compared to a default easYgen3400

5.1 Hardware Restrictions Tabular Overview

Item	Function	Comment
1	**Hardware related restrictions**	**Notice:** Some hardware functions of the easYgen are not feasible in the redundant control concept.
1.1	The Analog inputs AI1, AI2 & AI3 are only usable as 0/4 to 20mA inputs.	The easYgen with tripped self-test relay will be bridged over the Analog input to keep the current flow for the other one.
1.2	The Analog outputs AO1 & AO2 are switched over from the primary control to the backup control. The break time is < 30ms.	Usually each speed governor and AVR should accept that. The result should be a small ripple in the frequency/active power accordingly voltage/reactive power, if a “hot swap” occurs.
1.3	The DI12 is not usable.	The DI12 is used for redundant control purposes.
1.4	The DIs can only be enabled with a positive voltage. Switching with minus is not allowed.	Is needed to provide a secure exchange of the backup control.
1.5	The auxiliary excitation D+ (terminal 65) will drive the double current during engine start.	Change in technical data: Output current approx. 240 mA@12/24 Vdc
1.6	The relay output R1 (terminal 41/42) is not usable.	The R1 is used for redundant control purposes. Notice: The redundant genset control provides 2 dedicated relay outputs, which informs about the both controllers condition and which can be incorporated into the emergency stop function.
1.7	The GCB close relay R06 (terminals 49/50) must work with close pulse mode. The self-holding of the GCB must be maintained outside or in the GCB itself.	To provide a proper hot swap and hot plug, the GCB close order must be an active order.
1.8	The GCB open relay R07 (terminals 51/52) must work with normally open contacts. Contacts open -> No opening of GCB Contacts closed -> Opening of GCB	To provide a proper hot swap and hot plug, the GCB open order must be an active order. Concerns, the GCB will not go open when the control energy fails, can be removed by using the auxiliary condition contacts. [Primary Lost + Backup Lost -> Open GCB]

5.2 Discrete Inputs

The discrete inputs DI 1 up to DI 11 are at your disposal. The DI 12 is not usable by the User; it is part of the redundancy concept. Please note, the DIs can only be enabled with a positive voltage (sinking logic). Switching with (negative voltage sourcing logic) is not allowed.

The RGCP provides a dedicated terminal field to feed senders with a positive voltage. (Please refer to the different power supply variants)

5.3 Analog Outputs

The Analog outputs AO1 & AO2 are switched over from the primary control to the backup control. The break time is < 30ms usually acceptable for uninterrupted by most speed governors and AVR's.

5.4 Serial Interfaces

RS232 NOT carried out onto terminals

The RS232 port is not carried out onto the terminals (connection area). The RS232 is accessible direct on the Genset-Controller (default). The RS232 is only usable as service port interface for Toolkit. The RS232 interface cannot be used for any other purposes!

RS485 carried out onto terminals

The RS485 is carried out onto the terminals. The RS485 follows the redundant concept, whereby only the master easYgen replies to a Modbus master request.

Note: Modbus on RS-485 should NOT be used for remote control messages as only the master easYgen receives the write messages from the Modbus master. Use of the ESENET CAN-Modbus TCP converter on easYgen CAN1 is recommended for Modbus remote control.

5.5 CAN Bus Interfaces

CAN carried out on terminals

The CAN1 has dedicated terminal descriptions. The termination resistor is to be installed by the operator.

The CAN2 has dedicated terminal descriptions. The termination resistor is to be installed by the operator.

The CAN3 has dedicated terminal descriptions.

If an EKS control for redundant load share is in use, the CAN3 connection is not available for any other purpose.

RGCP variants without EKS providing dedicated CAN3 terminals. The termination resistor is to be installed by the operator.

Software Restrictions

Item	Function	Comment
2	**Software related restrictions**	**Notice:** Some software functions of the easYgen are not executable within the redundant control concept.
2.1	Entering the password over Remote Panel can require sometimes up to three tries.	The use of the remote panel is difficult in regards to the password entry. The communication is executed with two easYgens simultaneously this can lead sometimes to a communication error.
2.2	Entering an algorithm password over Remote Panel is not possible.	The algorithm passwords is based on the random number displayed on the device. The random numbers of both control will never match and so this method cannot be taken. *For algorithm code entry use Toolkit and adjust each device separately.*
2.3	The Neutral Interlocking Function is not supported.	The DI12 is usually taken for the Neutral Interlocking Function. The redundant control occupies the DI12 for internal use.
2.4	The GCB close command (ID3414) shall be configured always to pulse mode.	Because of the hot swap and exchange capability, the constant mode is not usable.
2.5	The run-up synchronization (ID3435) is not recommended.	Due to a possible hot swap exactly during run-up synchronization, a proper run-up synchronization cannot guaranteed.
2.6	The Load dependent Start Stop (LDSS) function (ID12930) is not recommended.	Because of the hot swap and exchange capability, the LDSS of the backup control is properly not tracked accordingly. The generator load mode should be avoided completely!
2.7	The engine warm up mode (ID5533) should be not “Time controlled” and should rely on real measured water temperature.	Because of the exchange capability, the backup control would run again through the time controlled active power up ramping.
2.8	The Auto idle mode (ID12570) is not recommended.	Because of the exchange capability, the backup control would run again through the idle time procedure.
2.9	General counters are difficult to use and shall be not taken into account for important functions. These are: • Operating hours • Kwh counter • Kvarh counter	Because a primary or backup control can run the engine without the neighbor unit, the counters will drift apart. This is to consider.

6 Operation

The RGCP3400 is designed for back panel installation. For visualization purposes, there are two options:

- third party HMI via PLC or supplied with appropriate communications interface
- Woodward Remote Panel RP3000.

If no remote panel is installed, the operation modes AUTOMATIC, MANUAL and STOP are to be set by any outside-located three position switch or via a PLC.

6.1 Visualization (HMI) via Remote Panel RP3000

This is an example of a RGCP3400 installation. The RGCP3400 is installed inside the switch board and the front panel RP3000 is installed in the front door. For a better monitoring, it is recommended to install indications[*1], which inform the Operator about:

1. Which Genset-Controller is controlling the Genset (Master),
2. Whether the redundancy is gone.

Please note: The remote panel is usually connected via the CAN2 bus.

[1*]: The information for the indications is provided through the auxiliary relays on the –X5 terminal block.

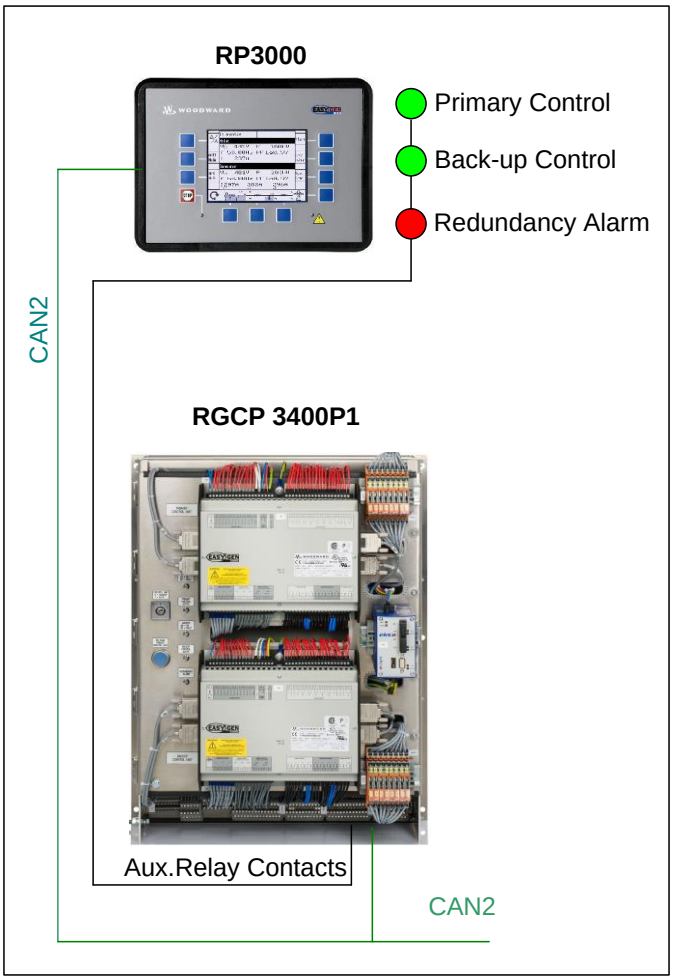


Fig. 9: Example of a RGCP3400 / RP3000 installation.

By means of the remote panel, the operation of the Genset is nearly the same like in an easYgen3000 default application. The operating modes can be set/adjusted and the manual operation can be executed. The RP3000 communicates to the master control only. This can be either the primary or the back-up Genset-Controller. The RP3000 does not know to which Genset-Controller it is communicating. So it is strongly recommended to place indicators close to the RP3000 to indicate, which Genset-Controller is currently controlling the engine. Usually the Remote Panel is connected to the primary Genset-Controller and thus the primary Genset-Controller indication will be mainly active. In cases, in which the backup Genset-Controller is active the indication changes from “Primary Control” to “Back-up Control” and the values shown by the remote panel are coming from the backup Genset-Controller. Both cannot be active to the same time.

If the primary or the back-up Genset-Controller fails, the “Redundancy Alarm” indication will become active. This gives the operator the opportunity to start proper counter actions, to search and fix the failure before the next failure would lead to a complete loss of the Genset-Control.

6.2 Visualization (HMI) via PLC

It is also possible to take alternative HMIs. For example, a Panel PLC with a graphical display might visualize the Genset-Controllers and all relevant values.

This is an example for a RGCP3400 installation. The RGCP3400 is installed in the switch board and a Panel PLC is installed in the front door. The PLC receives states via hard-wired contacts, which Genset-controller is engaged and whether the redundancy is gone [*1].

The PLC is usually connected via the CAN2 bus or the RS485 bus.

[1]: The information for the indications is provided through the auxiliary relays on the –X5 terminal block.*

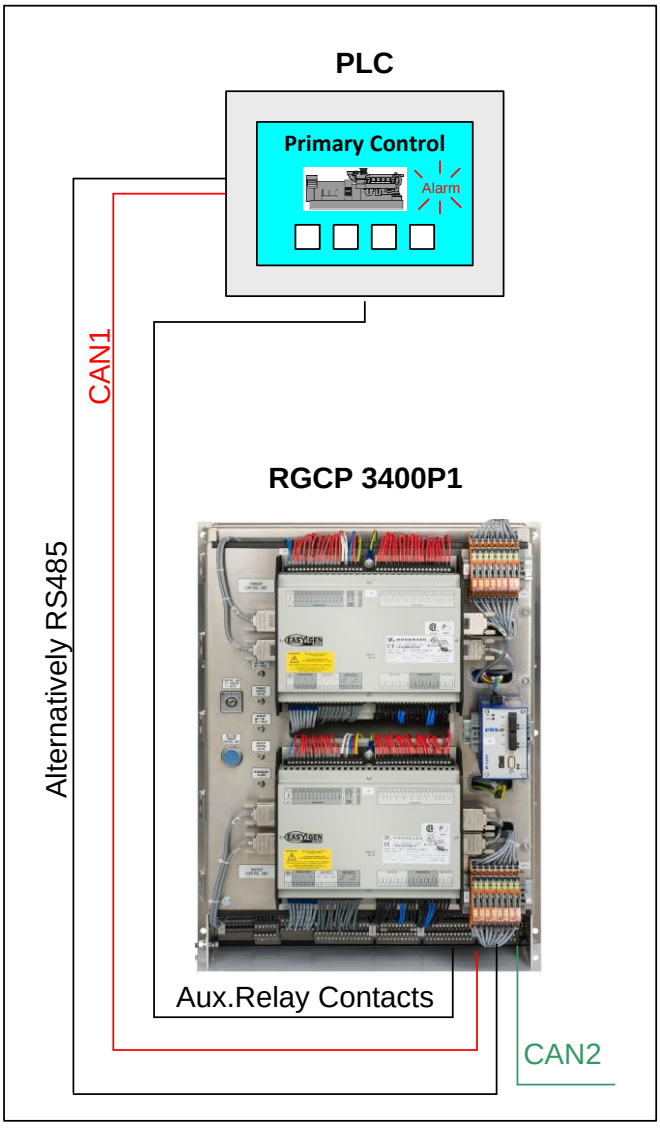


Fig. 10: Example of a RGCP3400 / PLC Panel installation.

In an application like that, the PLC is getting all relevant data from the RGCP. It determines the operation mode and coordinates the manual

control, if needed. The PLC can directly show on the display, which easYgen is engaged and monitors the loss of redundancy.

The PLC communicates with the master control. This can be either the primary or the back-up Genset-Controller. The PLC does not know with which control it is communicating to. By means of the auxiliary contacts, which are provided by RGCP the PLC is provided with the information, which Genset-Controller is controlling the engine and to which control the PLC communicates. This should be shown on display of the PLC. If the backup control is active the indication in the Panel changes from “Primary Control” to “Back-up Control” and the values indicated on the remote panel are coming now from the backup control. Both cannot be active at the same time.

If the primary or the back-up control fails, the “Redundancy Alarm” indication will become active. This gives the operator the opportunity to start proper counter actions, to search and fix the failure before the next failure would lead to a complete loss of the Genset-Control.

6.3 The Operation Elements

The RGCP3400 is designed for back panel installation. The equipped operation elements on the RGCP are intended for commissioning or to determine the master control.

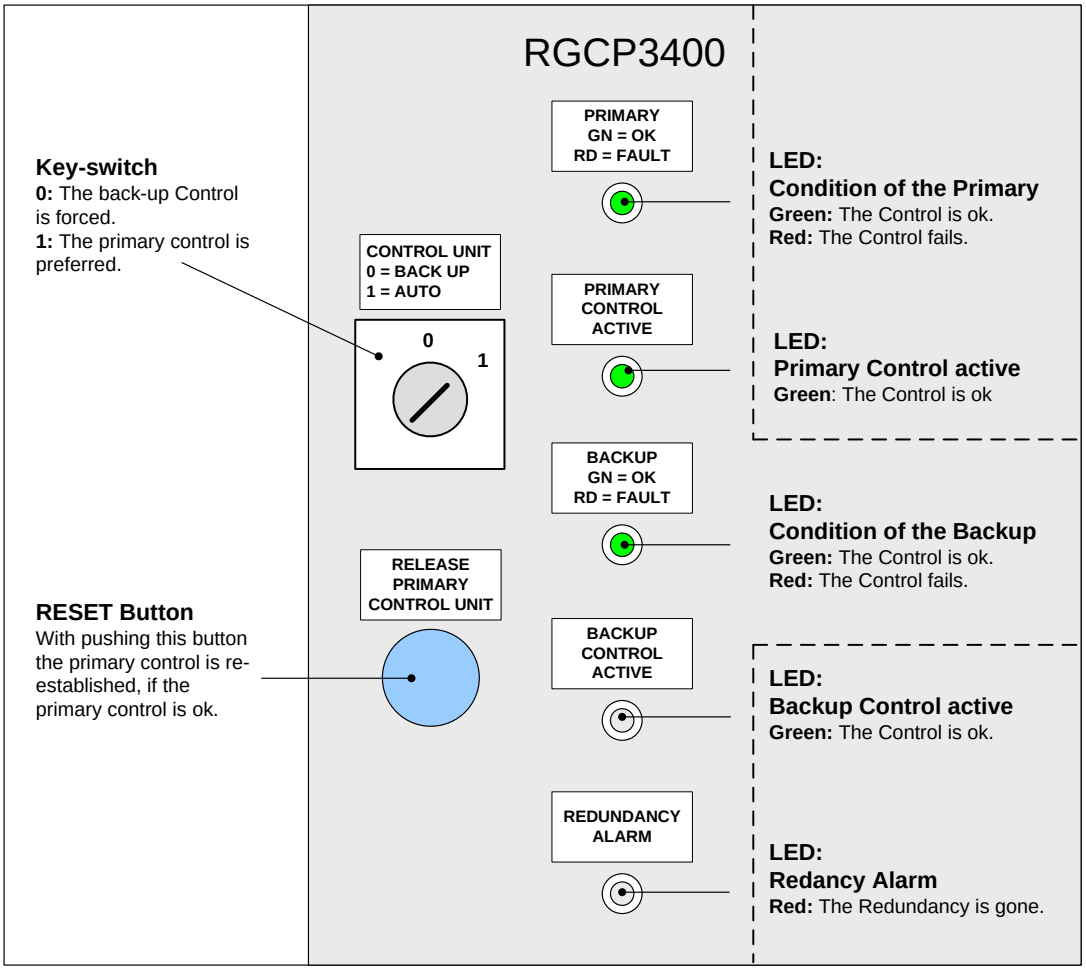


Fig. 11: The operation elements of the RGCP

The key-switch

By means of the key-switch, the operator can determine, whether he wants to run the system in AUTO mode or if he wants force the back-up control to control the system (setting backup as master).

Position 1 = AUTO: The control will switch from primary to back-up control or from back-up to primary control as long the redundancy requires it.

Position 0 = Back-up: The RGCP switches always to back-up control and remains there. The redundancy is gone. This is interesting for test purposes or if the primary control is not working as expected.

The RESET Button

The RESET Button is only active, if the key-switch is in the position AUTO. If the back-up control is engaged, the operator can force by the RESET Button the primary control to become active again.

This feature prevents an uncontrolled re-change between both controls.

LED Condition Primary

If the LED lights up green, the self-test of the primary Genset-Control does not recognize any faults within the Genset-Controller (State of Health).

If the LED lights up red, the self-test of the primary Genset-Controller has recognized a self-supervision failure. Presupposed the back-up control has no self-test failure, the back-up control will overtake the control (hot swap).

LED
Primary Control is active

A green LED signalizes, that the primary control is engaged. At this time, the back-up control has no influence on the engine. The remote panel RP3000 or any other control connected to the RGCP, communicates now with the primary control.

LED Condition Primary

If the LED lights up green, the self-test of the back-up control does not recognize any faults within the Genset-Controller. The back-up control is ready for takeover (hot swap).

If the LED lights up red, the self-test of the back-up control has recognized a failure. In this case, the back-up control wouldn´t be able to overtake the control. Presupposed the primary control has no self-test failure, the primary control comes into action.

LED
Back-up Control is active

A green LED signalizes, that the back-up control is engaged. The primary control has no influence on the engine. The remote panel RP3000 or any other control connected to the RGCP, communicates with the back-up Genset-Controller.

LED
Redundancy Alarm

A red LED signalizes, that there will be no backup Genset-Controller available, if the current engaged Genset-Controller would get lost.

7 Redundancy Self-Supervision of the RGCP

The RGCP3400 is equipped with two redundancy self-supervision functions. These alarms help the operator to recognize that the both controls run properly according to the redundancy function.

7.1 Parameter Mismatch Self-Supervision (K39: Parameter comparison)

The RGCP3400 redundancy system consists of two easYgen3400 devices that need to be configured identically.

The master unit, usually the primary Genset-controller, compares its settings with the settings of the slave unit, usually the back-up Genset-controller. If the master recognizes a deviation, it will raise an alarm "Parameter mismatch".

The monitoring is enabled by default and has usually a warning character with self-acknowledge purpose.

7.2 Alarms Mismatch Self-Supervision (K39: Parameter comparison)

Each of the two independent Genset-controllers inside the RGCP has its own alarm management. In a redundant system, the slave control, usually the back-up control identifies the same alarms, like the master control, usually the primary control. A self-supervision monitoring feature in the RGCP3400 master control compares the active alarms with the alarms of the slave control. This helps to recognize if the two Genset-controllers differ from each other. A deviation in the alarm management could e.g. be caused by different measurements, by any hardware defects, which needs to be fixed.

The master unit, usually the primary control, compares its alarms with the alarms of the slave unit, usually the back-up control. If the master recognizes a deviation, it will raise an alarm "Alarms mismatch".

The monitoring is enabled by default and has usually a warning character with self-acknowledge purpose.

Note: *All alarms in the slave device, except the discrete inputs DI01 until DI11 have a warning character with self-acknowledge function independent on their configuration. This is important to provide an easy exchange of the slave control, whenever it is needed.*

8 First Commissioning of RGCP3400

The commissioning is a three-step procedure:

1st Step: Setting the Genset into operation with the Primary Control.

2nd Step: Setting the Genset into operation with the Secondary Control.

3rd Step: Transfer Test - Check the switching over from primary to back-up control.

8.1 Setting the Genset in to operation with the Primary Control (1st Step)

At first, the primary control is to be set into operation (complete setup). Therefore, connect ToolKit via RS232 directly to the primary control. Ensure that the Key-Switch is set into position “AUTO” and the according LEDs are activated. Maybe you have to push the RESET button. As long the back-up control is not selected by means of the key-switch, the back-up control can be completely ignored. It has anyway no influence onto the control relays and analog outputs. After successful commissioning the engine with the primary device, the operator has to store the wset-file of the primary on his computer.

8.2 Setting the Genset into operation with the Secondary Control (2nd Step)

The User has to connect his computer via RS232 to the backup control and upload the primary wset-file into the back-up Genset controller. Once both Genset-controllers are running with identical parameter settings, the K39-alarms “Alarms mismatch” and “Parameter deviation” should fall back (extinguish).

In order to make the back-up controller engaged (Master), the operator has to set the key-switch into the position “Back-up”. This leads to a switch over from primary to back-up control (hot swap). The RGCP should now run in the same manner, like with the primary control engaged.

To switch back to the primary control (Master), the operator has to switch the key-switch into position “AUTO” and to push the RESET button. From there on, he can run the RGCP3400 in its usual way.

8.3 Transfer Test - Switching over Primary to Back-up Control (3rd Step)

To test the switching over (hot swap test) from primary to back-up control, the operator has to turn the key-switch into the position “Back Up”. To bring the RGCP back to primary control he has to set the key-switch into position “AUTO” and to push the “RESET” button. During switching over the according indications and auxiliary relays can be tested in terms of proper operation.

The switching over tests should be done in following order:

1. *Operation mode AUTOMATIC, Engine in Stand-by*

   -> No reaction expected

2. *Operation mode AUTOMATIC, Engine in idle run, GCB is open*

   -> Engine speed should not change dramatically.

3. *Operation mode AUTOMATIC, Engine runs, GCB is closed (isolated operation)*

   -> Engine speed should not change dramatically. The GCB shall be kept close.

4. *Operation mode AUTOMATIC, Engine runs, GCB is closed (parallel- or island parallel operation)*

   -> Engine speed / power should not change significantly. The GCB shall be kept close.

9 Option for Load Sharing - Redundant Load share (EKS)

The RGCP3400 is optionally available with a special version of the device EKS DL-CANR. The EKS converter transfers easYgen3400 load share messages into fiber optic signals. The ring topology of the fiber lines can ensure redundancy for the load share line. An additional benefit of the EKS system is the expansion capability of the load share line. Please refer for details to the separate EKS manual.

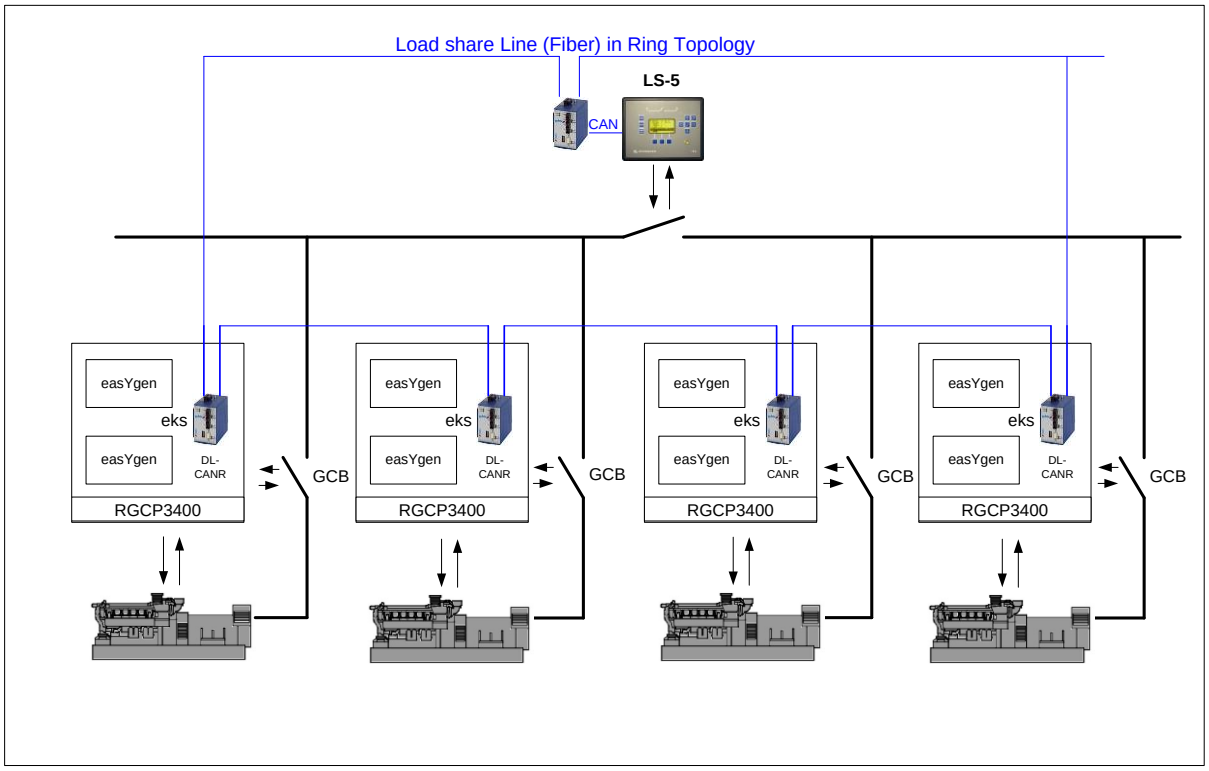


Figure: Example of redundant load share line in conjunction with fiber optic technology

The packaging of the fiber-optic cables are not explained in this manual. Please refer to the company EKS (manufacturer) for more information. The product CD of the RGCP3400P1 provides the standard manual/document of EKS.

10 Loss of Redundancy Trouble Shooting

This chapter gives guidance what is to do in the different scenarios, when the redundancy is gone. But before the different cases will be discussed, here are some explanations to the concept:

Background Information

The usual operation of the RGCP3400 is that the primary controller controls the Genset. The secondary control is actually never engaged. The redundancy concept of the RGCP implies, that the back-up controller always does exactly the same like the primary controller in order to be able to do a hot swap. All functions, which are executed from the primary control (master control), are also executed by the back-up control (slave control). The difference from the slave controller to the master control is, that the relay outputs and the biasing analog outputs are not connected / galvanic coupled to the engine. Once the back-up controller becomes active, i.e. because of an outage of the primary, the relay outputs and the analog outputs of the back-up control becomes active/galvanic coupled. Then the outputs of the primary are disengaged.

The switching over from primary control to secondary control is initiated by the tripping self-test relay R1 of the primary easYgen3400P1. This switching over (hot swap) can be initiated by setting the key-switch manually into the position “Back up” (e.g. for test purposes or if the back-up control shall run intentional). If the R1 of the primary control trips or the key-switch is switched to “Back up” the redundancy alarm LED and the according auxiliary relay will become active/set into operation.

Both controls are able to run as master or as slave control. This is determined by the digital input DI12. (This is the reason, why DI12 is not usable for any other free control or alarm purposes.) The R1 information of the primary control is connected to the primary DI12 and inverted connected to the back-up control. Through this constellation only one control runs as master and is engaged to the engine. Only the master control communicates over the interface. The slave control is listening only. The outside controls does not know to whom it is communicating. This is, like frequently mentioned, detectable by the auxiliary relays or the LEDs on board. Additionally both controls communicating over the CAN2 bus to be synchronized or to make crosschecks, like parameter comparison or alarm comparison.

The RGCP3400 supports redundant power supply (two power supplies). According to the redundancy concept, each easYgen is fed by its own power supply. This has the advantage that a failure in a single easYgen will not lead to a fail of the complete RGCP.

Note for commissioning: To provoke redundancy cases the operator can disconnect a single power supply to evaluate how the engine behaves in such cases.

10.1 The Primary Genset-Controller fails

Pre-assumption: The RGCP is running in operation mode “AUTO” and the primary control runs (controls).

In case that the primary control fails, the back-up control will overtake the control. This case will be indicated by means of the red LED “PRIMARY FAULT” and the LED “REDUNDANCY ALARM” respectively via the according auxiliary relays.

A simple root cause could be a broken power supply for the primary control. In this case, the operator can exchange the power supply without stopping the engine. After fixing the power supply, the operator has the option to switch back onto the primary control by pushing the RESET button.

In case that the power supply is free of fault, then probably the easYgen primary control itself is faulty. The Genset-controller must be removed and overhauled. The next section will explain how this can be done with or without stopping the engine.

Note: *It is possible to replace a Genset-controller within the RGCP while the engine is running. But this should be done only, if there is no opportunity for stopping the engine. Exchanging the disengaged device while the CT current and all measurements are under voltage is not without personal risks for non-educated/trained persons. Not electrical educated persons are not allowed to exchange the Genset-controller while the system is hot/running.*

Removing the primary control, if the engine is stopped (preferred solution):

This is the most secure way and should be chosen:

1. The RGCP has to be in Operation Mode STOP.
2. Short-circuit all CTs of the **primary control**. Refer to installations to see how to short-circuit the according terminals.
3. Plug-off all connections.
4. It is possible to run the back-up control without primary control but in this case it is mandatory to keep the CT short-circuited on the primary site.
5. After reinstalling the primary control, remove the short-circuits of all CTs.
6. Check that no alarm “Alarms Deviation” or “Parameter Deviation” is indicated. If yes, resolve the root cause first.

Removing the primary control while the back-up control runs the engine:

1. Set the key-switch into the position “BACK UP”.
2. The CTs of the primary control must be all short-circuited. Therefore, the RGCP provides short-circuit terminals on the upper right corner of the RGCP panel.
    - Short-circuit all CTs of the **primary control** by moving the clamp in the upper position. (Refer to chapter Installation to get more explanation)
3. Plug-off the connections of the primary control
    - At first disconnect terminals 61-80 (includes power supply)
    - Then disconnect terminals 41-60, disconnect terminals 1-20 and disconnect terminals 21-40
    - At least disconnect terminals all interface connections
4. Open the 4 x M8 screws and remove the device

Installing the primary control while the back-up control runs the engine:

1. Install the device with the 4 x M8 screws.
2. Plug in all interfaces
3. Connect the **plug 41-60**, **plug 1-20** to the control
4. Connect the **plug 61-80** to the control
5. The short-circuit of all CTs of the primary control have to be removed by moving the clamp into the lower position. (Refer to chapter Installation to get more explanation)
6. Check if the configurations in the primary are already correct.
    - If yes, then continue with item 7
    - If you are not sure, then load the configuration of the secondary Genset-controller into the primary control first. Proceed with item 9
7. Finally connect the **plug 21-40** into the control (Please be aware of the high AC voltages!)

8. Check the alarm list of the primary control (by connecting Toolkit to the primary control) and check the alarm list of the **back-up controller** e.g. via the remote panel RP3000.

   - If no alarm “Parameter Deviation” is indicated, the primary control is ready for taking over the control again. In this case item 9 can be skipped. Continue with item 10.
   - If an alarm “Parameter Deviation” is indicated, the primary control must be reconfigured. Continue with item 9.

9. If both controls do not match each other, the primary and secondary control settings seem to have differences (are not identical). In order to reconfigure the primary, it should be loaded with the project configuration file. Remember: There exists only one wset-file for primary and back-up control. This file is to be loaded into the primary control by Toolkit (using RS232 connection). If no configuration file exists, then connect Toolkit first with the back-up Genset-control (using RS232 connection) and download the back-up control configuration via “Settings/Save from device to file…” onto your Computer.

To upload the wset-file into to the primary control, proceed as follows:

- Disconnect the **plug 21-40** from the control (Please be aware of the high AC voltages!)
- If the speed sensor (MPU) is used, remove the wirement 79 and 80 from the control (Please be aware not to shortcut the wires!)
- Force by means of Toolkit the primary control into the operating mode STOP via the LogicsManager ID12530. Toolkit should show now the operation mode STOP.
- Start the upload of the configuration file into the primary control via “Settings/Load settings file to device…” from your Computer.
- After successful upload:
  - Wire the MPU back to the control: (79 and 80, please be aware not to shortcut the wires!)
  - Connect the **plug 21-40** into the control (Please be aware of the high AC voltages!)

10. After reestablishing the primary control, check the Alarm list of the primary control. Usually no alarms shall be present anymore.

11. At least check the primary control of any issues regarding redundancy (No alarm “Alarms Deviation” or “Parameter Deviation” is indicated). If no failures exist anymore you can switch, whenever you want from back-up control to primary control.

10.2 The Back-up Control fails

The RGCP is running in operation mode “AUTO” and the primary control runs (controls)

In case that the back-up control fails, nothing would happen on short-term. But the operator can recognize the loss of redundancy by means of the red LED “BACK UP FAULT” and the LED “REDUNDANCY ALARM” respectively via the according auxiliary relays.

A root cause could be e.g. a broken power supply for the back-up control. In this case, the operator can fix the power supply without stopping the engine. If the power supply is restored, the back-up control should come back on track.

If the power supply is okay, then probably the easYgen back-up control is faulted. The control must be removed and overhauled. In the next section it shall be explained how this can be maintained with or without stopping the engine.

Note: *It is possible to replace a Genset-controller within the RGCP while the engine is running. But this should be done only, if there is no opportunity for stopping the engine. Exchanging the disengaged device while the CT current and all measurements are under voltage is not without personal risks for non-educated persons. Not electrical educated persons are not allowed to exchange the Genset-controller while the system is hot/running.*

Removing the back-up control, if the engine is stopped:

This is the most secure way and should be maintained usually.

1. The RGCP must be in Operation Mode STOP
2. Short-circuit all CTs of the **back-up control**. Refer to installations to see how to short-circuit the according terminals.
3. Plug-off all connections
4. If you want run the primary control without back-up is possible, but keep the CT short-circuited on the back-up control site.
5. After reinstalling the back-up control, remove the short-circuits of all CTs
6. Check that no alarm “Alarms Deviation” or “Parameter Deviation” is indicated. If yes, resolve the root cause first.

Removing the back-up control during the primary control runs the engine:

1. The key-switch is to be kept in the position “AUTO”.
2. The CTs of the back-up control must be all short-circuited. For that the RGCP provides short-circuit terminals on the lower right corner of the device.
   - Short-circuit all CTs of the back-up control by moving the clamp in the **upper** position. (Refer to chapter Installation to get more explanation)
3. Disconnect the terminals of the back-up control
   - At first disconnect terminals 61-80 (includes the power supply)
   - Then disconnect terminals 41-60, disconnect terminals 1-20 and disconnect terminals 21-40
   - At least disconnect all interface connections
4. Open the 4 x M8 screws and remove the device.

Installing the back-up control during the primary control runs the engine:

1. Install the device with the 4 x M8 screws.
2. Plug in all interfaces
3. Connect the **plug 41-60**, **plug 1-20** to the control
4. Connect the **plug 61-80** to the control
5. The short-circuit of all CTs of the back-up control must be removed by moving the clamp into the lower position. (Refer to chapter Installation to get more explanation)
6. Consider, whether the configurations in the back-up are already correct.
   - If yes, then continue with item 7
   - If you are not sure, then load the configuration into the back-up control first. Proceed with item 9
7. Finally connect the **plug 21-40** into the control (Please be aware of the high AC voltages!)
8. Check the alarm list of the back-up control (by connecting Toolkit to the back-up control) and check the alarm list of the **primary control** via the remote panel RP3000.
   - If no alarm “Parameter Deviation” is indicated, the back-up control is ready for taking over the control again. The item 9 can be skipped. Continue with item 10.
   - If the alarm “Parameter Deviation” is indicated, the back-up control must be reconfigured. Continue with item 9.
9. If both controls do not match each other, the primary and secondary control settings seem to have differences (are not identical). In order to reconfigure the back-up, it should be loaded with the project configuration file. Remember: There exists only one wset-file for primary and back-up control. This file is to be loaded into the back-up control by Toolkit (using RS232 connection). If no configuration file exists, then connect Toolkit first with the primary Genset-control (using RS232 connection) and download the primary control configuration via “Settings/Save from device to file…” onto your Computer.
10. To upload the wset-file upload it into the back-up control, proceed as follows:
    - Disconnect the **plug 21-40** from the control (Please be aware of the high AC voltages!)

- If the speed sensor (MPU) is used, remove the wiring 79 and 80 from the control (Please be aware not to shortcut the wires!)
- Force with Toolkit the back-up control into the operating mode STOP via the LogicsManager ID12530. Toolkit should show now the operation mode STOP.
- Start the upload of the configuration file into the back-up control via “Settings/Load settings file to device…” from your Computer.
- After successful upload:
    - Wire the MPU back to the control: (79 and 80, please be aware not to shortcut the wires!)
    - Connect the **plug 21-40** into the control (Please be aware of the high AC voltages!)

11. After reestablishing the back-up control, check the alarm list of the back-up control. Usually no alarms shall be present anymore.
12. At least check the primary control of any issues regarding redundancy (No alarm “Alarms Deviation” or “Parameter Deviation” is indicated). If no failures exist anymore you can switch, whenever you want from primary control to back-up control.

10.3 The Primary and the Back-up Control fails

An outage of a Genset-controller is indicated by relay R1.

In the unlikely event of an outage of both Genset-Controllers, the RGCP will indicate both Genset-controllers as faulty. In this case, both Genset-controllers have tripped their R1 self-test relay.

Please check in this unlikely event:

Check the power supply according to the chosen power supply variant (Refer to chapter installation).

If the Relay 1 (self-test relay) is tripped on both easYgen controls check if Relay 1 has been misconfigured by the user. Relay 1 is only for internal use within the RGCP.

11 easYgen3400P1 K39 - Configuration

The K39 section describes the software derivate (differences) of the easYgen3400 P1 in regards to run a redundant Genset-control concept. The software contains features to enable Genset-control redundancy (two hot swappable easYgens) side by side and keeping themselves synchronized to each other.

The DI12 is here a main element to bring the device into a slave mode, which makes the device passive listening to the master device.

To make the redundancy purposes more transparent in regards of commissioning and troubleshooting the software provides additional features, like:

- Compare and monitor both parameter sets
- Compare and monitor the alarms in both controls
- Synchronize the internal sequences onto each other

Additional Alarms and its Parameters - K39

The K39 device comes with two redundancy specific alarms compared with the standard easYgen. This alarms monitor parameter deviation and/or alarms deviation between both redundant devices. Each alarm is set-up with four parameters.

Only the master device issues the alarm.

11.1 Configuration K39: Parameter comparison

... find in ToolKit & RP-HMI: > > > *Parameter* ➔ *Configuration* ➔ *Configure Monitoring* ➔ *Miscellaneous*

"K39: Parameter comparison": The master unit compares its settings with the settings of the backup unit. If the master recognizes a deviation, it will raise an alarm "Parameter mismatch". With falling into backup mode, the alarm will be reset. The comparison takes some seconds.

ID	Parameter	CL	Setting range [Default]	Description
5184	**Monitoring**	2	**[On]**	If the own device is the master control, it compares the own parameter set with the parameter set of the slave control. In case of a parameter mismatch the alarm "Parameter mismatch" will be displayed.
			Off	Monitoring is disabled.
5188	**Delay**	2	00.02 to 99.99 s **[0.5 s]**	The parameter check sum is compared with the back-up control check sum. If the values are not equal for the delay time configured here, an alarm will be issued.
5185	**Alarm class**	2	Class A/B/C/D/E/F, Control **[B]**	Each limit may be assigned an independent alarm class that specifies what action should be taken when the limit is surpassed.
5186	**Self acknowledge**	2	No	The control unit does not automatically reset the alarm when the fault condition is no longer detected.
			[YES]	The control unit automatically clears the alarm if the fault condition is no longer detected.

11.2 Configuration K39: Alarms comparison

... find in ToolKit & RP-HMI: > > > *Parameter ➔ Configuration ➔ Configure Monitoring ➔ Miscellaneous*

"K39: Alarms comparison": The master unit compares its latched alarms with the backup unit. If the master recognizes a deviation, it raises an alarm "Alarms mismatch". With falling into backup mode, the alarm will be reset. The comparison takes some seconds.

ID	Parameter	CL	Setting range [Default]	Description
5190	**Monitoring**	2	**[On]**	This monitor compares the tripped alarms of the primary control with the backup control. In case of alarms mismatch the alarm "Alarms mismatch" will be displayed.
			Off	Monitoring is disabled.
5194	**Delay**	2	00.02 to 99.99 s **[5 s]**	The alarms check sum is compared with the back-up control check sum. If the values are not equal for the delay time configured here, an alarm will be issued.
5191	**Alarm class**	2	Class A/B/C/D/E/F, Control **[B]**	Each limit may be assigned an independent alarm class that specifies what action should be taken when the limit is surpassed.
5192	**Self acknowledge**	2	No	The control unit does not automatically reset the alarm when the fault condition is no longer detected.
			[YES]	The control unit automatically clears the alarm if the fault condition is no longer detected.

12 Technical Data

For the technical data of the Genset-Controllers, please refer to the easYgen manuals.
RoHS 10 Substances Status is unclear. For details please see document 37934 “Declaration of RoHS-10 exclusion on application of easYgen-3000 series genset controllers”.

Output Relays

Technical data of the RGCP specific output relay type:

RIF-0-RPT-24DC/21 -29003370 please refer to the product data sheet of the manufacturer Phoenix Contact. The file is currently available via this link:

https://www.phoenixcontact.com/de/produkte/2903370

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