



WARNING!

- Carefully read the manual before the installation or use.
- This equipment is to be installed by qualified personnel, complying to current standards, to avoid damages or safety hazards.
- Before any maintenance operation on the device, remove all the voltages from measuring and supply inputs and short-circuit the CT input terminals.
- The manufacturer cannot be held responsible for electrical safety in case of improper use of the equipment.
- Products illustrated herein are subject to alteration and changes without prior notice. Technical data and descriptions in the documentation are accurate, to the best of our knowledge, but no liabilities for errors, omissions or contingencies arising there from are accepted.
- A circuit breaker must be included in the electrical installation of the building. It must be installed close by the equipment and within easy reach of the operator. It must be marked as the disconnecting device of the equipment: IEC/EN 61010-1 § 6.11.2.
- Clean the device with a soft dry cloth; do not use abrasives, liquid detergents or solvents.



ATTENTION !

- Lire attentivement le manuel avant toute utilisation et installation.
- Ces appareils doivent être installés par un personnel qualifié, conformément aux normes en vigueur en matière d'installations, afin d'éviter de causer des dommages à des personnes ou choses.
- Avant toute intervention sur l'instrument, mettre les entrées de mesure et d'alimentation hors tension et court-circuiter les transformateurs de courant.
- Le constructeur n'assume aucune responsabilité quant à la sécurité électrique en cas d'utilisation impropre du dispositif.
- Les produits décrits dans ce document sont susceptibles d'évoluer ou de subir des modifications à n'importe quel moment. Les descriptions et caractéristiques techniques du catalogue ne peuvent donc avoir aucune valeur contractuelle.
- Un interrupteur ou disjoncteur doit être inclus dans l'installation électrique du bâtiment. Celui-ci doit se trouver tout près de l'appareil et l'opérateur doit pouvoir y accéder facilement. Il doit être marqué comme le dispositif d'interruption de l'appareil : IEC/EN 61010-1 § 6.11.2.
- Nettoyer l'appareil avec un chiffon doux, ne pas utiliser de produits abrasifs, détergents liquides ou solvants.



ACHTUNG!

- Dieses Handbuch vor Gebrauch und Installation aufmerksam lesen.
- Zur Vermeidung von Personen- und Sachschäden dürfen diese Geräte nur von qualifiziertem Fachpersonal und unter Befolgung der einschlägigen Vorschriften installiert werden.
- Vor jedem Eingriff am Instrument die Spannungszufuhr zu den Messeingängen trennen und die Stromwandler kurzschließen.
- Bei zweckwidrigem Gebrauch der Vorrichtung übernimmt der Hersteller keine Haftung für die elektrische Sicherheit.
- Die in dieser Broschüre beschriebenen Produkte können jederzeit weiterentwickelt und geändert werden. Die im Katalog enthaltenen Beschreibungen und Daten sind daher unverbindlich und ohne Gewähr.
- In die elektrische Anlage des Gebäudes ist ein Ausschalter oder Trennschalter einzubauen. Dieser muss sich in unmittelbarer Nähe des Geräts befinden und vom Bediener leicht zugänglich sein. Er muss als Trennvorrichtung für das Gerät gekennzeichnet sein: IEC/EN 61010-1 § 6.11.2.
- Das Gerät mit einem weichen Tuch reinigen, keine Scheuermittel, Flüssigreinerer oder Lösungsmittel verwenden.



ADVERTENCIA

- Leer atentamente el manual antes de instalar y utilizar el regulador.
- Este dispositivo debe ser instalado por personal cualificado conforme a la normativa de instalación vigente a fin de evitar daños personales o materiales.
- Antes de realizar cualquier operación en el dispositivo, desconectar la corriente de las entradas de alimentación y medida, y cortocircuitar los transformadores de corriente.
- El fabricante no se responsabilizará de la seguridad eléctrica en caso de que el dispositivo no se utilice de forma adecuada.
- Los productos descritos en este documento se pueden actualizar o modificar en cualquier momento. Por consiguiente, las descripciones y los datos técnicos aquí contenidos no tienen valor contractual.
- La instalación eléctrica del edificio debe disponer de un interruptor o disyuntor. Este debe encontrarse cerca del dispositivo, en un lugar al que el usuario pueda acceder con facilidad. Además, debe llevar el mismo marcado que el interruptor del dispositivo (IEC/EN 61010-1 § 6.11.2).
- Limpiar el dispositivo con un trapo suave; no utilizar productos abrasivos, detergentes líquidos ni disolventes.



UPOZORNĚNÍ

- Návod se pozorně pročtěte, než začnete regulátor instalovat a používat.
- Tato zařízení smí instalovat kvalifikovaní pracovníci v souladu s platnými předpisy a normami pro předcházení úrazu osob či poškození věcí.
- Před jakýmkoli zásahem do přístroje odpojte měřicí a napájecí vstupy od napětí a zkratujte transformátory proudu.
- Výrobce nenese odpovědnost za elektrickou bezpečnost v případě nevhodného používání regulátoru.
- Výrobky popsané v tomto dokumentu mohou kdykoli projít úpravami či dalším vývojem. Popisy a údaje uvedené v katalogu nemají proto žádnou smluvní hodnotu.
- Spinač či odpojovač je nutno zabudovat do elektrického rozvodu v budově. Musí být nainstalované v těsné blízkosti přístroje a snadno dostupné pracovníku obsluhy. Je nutno ho označit jako vypínací zařízení přístroje: IEC/EN 61010-1 § 6.11.2.
- Přístroj čistěte měkkou utěrkou, nepoužívejte abrazivní produkty, tekutá čistidla či rozpouštědla.



AVERTIZARE!

- Cititi cu atentie manualul înainte de instalare sau utilizare.
- Acest echipament va fi instalat de personal calificat, în conformitate cu standardele actuale, pentru a evita deteriorări sau pericolele.
- Înainte de efectuarea oricărei operațiuni de întreținere asupra dispozitivului, îndepartați toate tensiunile de la intrările de măsurare și de alimentare și scurtcircuitați bornele de intrare CT.
- Producătorul nu poate fi considerat responsabil pentru siguranța electrică în caz de utilizare incorectă a echipamentului.
- Produsele ilustrate în prezentul sunt supuse modificărilor și schimbărilor fără notificare anterioară. Datele tehnice și descrierile din documentație sunt precise, în măsura cunoștințelor noastre, dar nu se acceptă nicio răspundere pentru erorile, omisiunile sau evenimentele neprevăzute care apar ca urmare a acestora.
- Trebuie inclus un disjunctiv în instalația electrică a clădirii. Acesta trebuie instalat aproape de echipament și într-o zonă ușor accesibilă operatorului. Acesta trebuie marcat ca fiind dispozitivul de deconectare al echipamentului: IEC/EN 61010-1 § 6.11.2.
- Curățați instrumentul cu un material textil moale și uscat; nu utilizați substanțe abrazive, detergenți lichizi sau solvenți.



ATTENZIONE!

- Leggere attentamente il manuale prima dell'utilizzo e l'installazione.
- Questi apparecchi devono essere installati da personale qualificato, nel rispetto delle vigenti normative impiantistiche, allo scopo di evitare danni a persone o cose.
- Prima di qualsiasi intervento sullo strumento, togliere tensione dagli ingressi di misura e di alimentazione e cortocircuitare i trasformatori di corrente.
- Il costruttore non si assume responsabilità in merito alla sicurezza elettrica in caso di utilizzo improprio del dispositivo.
- I prodotti descritti in questo documento sono suscettibili in qualsiasi momento di evoluzioni o di modifiche. Le descrizioni ed i dati a catalogo non possono pertanto avere alcun valore contrattuale.
- Un interruttore o disgiuntore va compreso nell'impianto elettrico dell'edificio. Esso deve trovarsi in stretta vicinanza dell'apparecchio ed essere facilmente raggiungibile da parte dell'operatore. Deve essere marchiato come il dispositivo di interruzione dell'apparecchio: IEC/EN 61010-1 § 6.11.2.
- Pulire l'apparecchio con panno morbido, non usare prodotti abrasivi, detergenti liquidi o solventi.



UWAGA!

- Przed użyciem i instalacją urządzenia należy uważnie przeczytać niniejszą instrukcję.
- W celu uniknięcia obrażeń osób lub uszkodzenia mienia tego typu urządzenia muszą być instalowane przez wykwalifikowany personel, zgodnie z obowiązującymi przepisami.
- Przed rozpoczęciem jakichkolwiek prac na urządzeniu należy odłączyć napięcie od wejść pomiarowych i zasilania oraz zewrzeć zaciski przekładnika prądowego.
- Producent nie przyjmuje na siebie odpowiedzialności za bezpieczeństwo elektryczne w przypadku niewłaściwego użytkowania urządzenia.
- Produkty opisane w niniejszym dokumencie mogą być w każdej chwili udoskonalone lub zmodyfikowane. Opisy oraz dane katalogowe nie mogą mieć w związku z tym żadnej wartości umownej.
- W instalacji elektrycznej budynku należy uwzględnić przełącznik lub wyłącznik automatyczny. Powinien on znajdować się w bliskim sąsiedztwie urządzenia i być łatwo osiągalny przez operatora. Musi być oznaczony jako urządzenie służące do wyłączenia urządzenia: IEC/EN 61010-1 § 6.11.2.
- Urządzenie należy czyścić miękką szmatką, nie stosować środków ściernych, płynnych detergentów lub rozpuszczalników.



警告!

- 安装或使用前，请仔细阅读本手册。
- 本设备只能由合格人员根据现行标准进行安装，以避免造成损坏或安全危害。
- 对设备进行任何维护操作前，请移除测量输入端和电源输入端的所有电压，并短接 CT 输入端。
- 制造商不负责因设备使用不当导致的电气安全问题。
- 此处说明的产品可能会有变更，恕不提前通知。我们竭力确保本文件中技术数据和说明的准确性，但对于错误、遗漏或由此产生的意外事件概不负责。
- 建筑电气系统中必须装有断路器。断路器必须安装在靠近设备且方便操作人员触及的地方。必须将断路器标记为设备的断开装置：IEC/EN 61010-1 § 6.11.2。
- 请使用柔软的干布清洁设备；切勿使用研磨剂、洗涤剂或溶剂。



ПРЕДУПРЕЖДЕНИЕ!

- Прежде чем приступать к монтажу или эксплуатации устройства, внимательно ознакомьтесь с содержанием настоящего руководства.
- Во избежание травм или материального ущерба монтаж должен осуществляться только квалифицированным персоналом в соответствии с действующими нормативами.
- Перед проведением любых работ по техническому обслуживанию устройства необходимо обесточить все измерительные и питающие входные контакты, а также замкнуть накоротко входные контакты трансформатора тока (ТТ).
- Производитель не несет ответственность за обеспечение электробезопасности в случае ненадлежащего использования устройства.
- Издания, описанные в настоящем документе, в любой момент могут подвергнуться изменениям или усовершенствованиям. Поэтому каталожные данные и описания не могут рассматриваться как действительные с точки зрения контрактов.
- Электрическая сеть здания должна быть оснащена автоматическим выключателем, который должен быть расположен вблизи оборудования в пределах доступа оператора. Автоматический выключатель должен быть промаркирован как отключающее устройство оборудования: IEC/EN 61010-1 § 6.11.2.
- Очистку устройства производить с помощью мягкой сухой ткани, без применения абразивных материалов, жидких мощных средств или растворителей.



DİKKAT!

- Montaj ve kullanımdan önce bu el kitabını dikkatlice okuyunuz.
- Bu aparatlar kişilere veya nesnelere zarar verme ihtimaline karşı yürürlükte olan sistem kurma normlarına göre kalifiye personel tarafından monte edilmelidir.
- Aparata (cihaz) herhangi bir müdahalede bulunmadan önce ölçüm girişlerindeki genilimi kesip akım transformatorlerinede kısa devre yaptırınız.
- Üretici aparatın hatalı kullanımından kaynaklanan elektriksel güvenliğe ait sorumluluk kabul etmez.
- Bu dokümanda tarif edilen ürünler her an evrimlere veya değişimlere açıktır. Bu sebeple katalogdaki tarif ve değerler herhangi bir bağlayıcı değeri haiz değildir.
- Binanın elektrik sisteminde bir anahtar veya şalter bulunmalıdır. Bu anahtar veya şalter operatörün kolaylıkla ulaşabileceği yakın bir yerde olmalıdır. Aparatı (cihaz) devreden çıkartma görevi yapan bu anahtar veya şalterin markası: IEC/EN 61010-1 § 6.11.2.
- Aparatı (cihaz) sıvı deterjan veya solvent kullanılarak yumuşak bir bez ile siliniz aşındırıcı temizlik ürünleri kullanmayınız.



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MANUAL REVISION HISTORY

| REV | DATE | NOTES |
|-----|------------|---|
| 00 | 24.02.2012 | First release |
| 01 | 14.03.2012 | Added description of alarm A59 – Fuel filling pump failure and weight |
| 02 | 08.10.2012 | Added description of mutual standby and modem GSM functions |
| 03 | 02.10.2013 | Added description of mutual standby alarm. Modified commands menu |
| 04 | 01.10.2014 | Added Current Asymmetry, resistive sensors for engine operation and increased number of programmable inputs |

INTRODUCTION

The RGK800 controller unit has been designed to offer state-of-the-art functions for generating set (genset) applications, both with and without automatic mains outage control. Built with dedicated components and extremely compact, the RGK800 combines the modern design of the front panel with practical installation and rear expansion slotting for EXP series modules. The LCD screen provides a clear and intuitive user interface.

DESCRIPTION

- Genset control with automatic management of mains-generator switching RGK800
- Genset control with only remote starting management (RGK800SA).
- 128x80 pixel, backlit LCD screen with 4 levels of grey
- 13 function and setting keys
- Built-in buzzer (can be deactivated)
- 10 LEDs for operating modes and status indications
- 5-language text for measurements, settings and messages
- Expansion bus with 3 slots for EXP series expansion modules:
 - RS232, RS485, USB, Ethernet, Profibus, GSM/GPRS communications interface
 - Additional digital I/O, static or relay outputs
 - PT100 temperature, current, voltage analog I/O
- Advanced programmable I/O functions
- 4 alternative configurations can be managed, selectable by remote selector switch
- Integrated PLC logic with thresholds, counters, alarms, status
- Fully user-definable alarms
- High accuracy TRMS measurement
- 3-phase + neutral mains voltage reading input
- 3-phase + neutral genset voltage reading input
- 3-phase + neutral or earth load currents reading input
- 12/24 VDC universal battery power supply
- Front optical programming interface, galvanically isolated, high speed, IP65, USB and Wi-Fi compatible
- 4 analog inputs for resistive sensors:
 - Oil pressure
 - Coolant temperature
 - Fuel level
 - Programmable
- 9 digital inputs:
 - 8 programmable, negative
 - 1 for emergency-stop pushbutton, positive
- 10 digital outputs:
 - 6 protected positive static outputs
 - 3 relay outputs
 - 1 pulse static output
- Engine speed reading W and pick-up input
- CAN bus-J1939 engine ECU control communications interface
- Calendar-clock (RTC) with backup reserve energy
- Storage of last 250 events
- Support for remote alarms and remote annunciator.

FRONT KEYBOARD

OFF, MAN, AUT and TEST keys - To choose function mode.

START and STOP keys - Only enabled and used to start and stop the genset in MAN mode. By briefly pressing START, a semiautomatic start attempt is conducted while holding it down, the start command is maintained in manual mode. The LED flashes on the engine symbol to indicate the engine is running, with the alarms inhibited, and is constantly on at the end of the alarms inhibit time. The engine can be stopped immediately with the OFF key.

MAINS and GEN keys - Only enabled in MAN mode and used to switch the load from the mains to the generator and vice versa. The green LEDs near the mains and generator symbols turn on when the respective voltages are available within the preset limits. The LEDs near the switching symbols turn on when the switching devices close but will flash if the closing or opening feedback signal of these devices does not correspond to the command status.

Key ✓ - Calls up the main menu and is also used to confirm choices.

Keys ▲ and ▼ - Used to scroll the pages of the display or select the list of options in a menu.

Key ◀ - Used to select the Mains or Generator measurements, or to decrease a number.

Key ▶ - Used to scroll sub-pages or increase a number.

FRONT LEDs

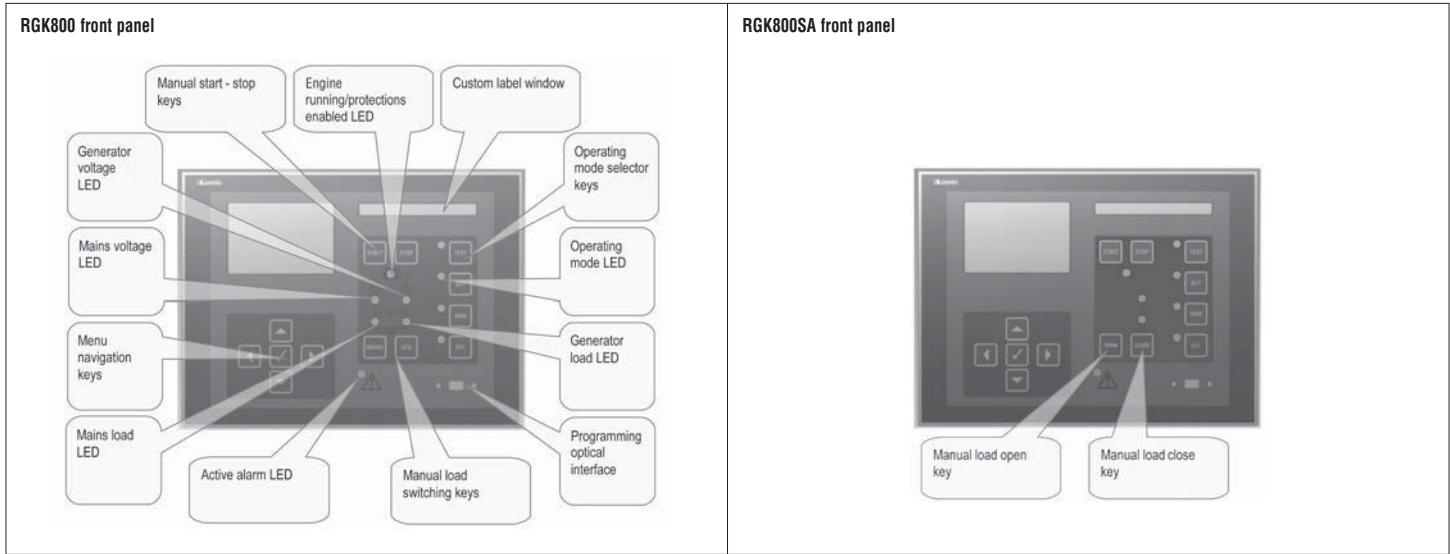
OFF, MAN, AUT and TEST LEDs (red) - A lit LED indicates active mode. If the LED flashes, remote control via serial interface is enabled and therefore the operating mode could be changed by a remote command.

Engine running LED (green) - Indicates the engine is running. The RGK800 detects the status of the engine running on the basis of several signals (generator voltage/frequency, D+, AC, W, Pick-up, etc.). The LED turns on when any one of these signals is present. The LED flashes when the engine is running, but the protections (Alarms), associated with this state have not been enabled yet, which typically takes place for a few seconds after starting.

Mains/generator voltage present LEDs (green) - When lit, these indicate that all the parameters of the respective power sources are within the limits. Any anomaly will immediately turn the LED off. The LED status instantaneously follows the voltage/frequency trend, without programmed delays.

Mains/generator load LEDs (yellow) - Indicate which of the respective power sources the load is connected to when switched on. These light up when feedback signals are received, if programmed, otherwise for output commands. If they are flashing, this indicates that the actual state of the switching devices (read through the feedback inputs) does not correspond to the state of the RGK800 command.

Alarm LED (red) - Flashing, indicates an active alarm.



OPERATING MODES

OFF mode - The engine will not be started. If running, the engine will stop immediately when this mode is selected. The mains contactor is closed. This mode reproduces the status of the RGK800 when it is not powered. Use this system mode to program the parameters and open the commands menu. The siren is disabled in OFF mode.

MAN Mode - The engine can only be started and stopped manually using the START and STOP keys, as well as switching the load from the mains to the generator by pressing the MAINS/GEN keys and vice versa. Holding down the START key extends the set starting time. When START is pressed once, the generator will attempt to start in semiautomatic mode on the basis of the time delays set.

AUT Mode - The engine of the RGK800 is started automatically in the case of a mains outage (out of the set limits) and stops when the mains parameters are once again within said limits, on the basis of the delays set in menu M13-Mains control. In the presence of voltage, the load is switched automatically in both directions.

The RGK800SA is started and stopped remotely through a digital input (remote starting) normally controlled by an ATS. The load can be switched automatically or controlled remotely.

For both models, if the engine fails to start, the start attempts are continued up to the maximum number programmed. If the automatic test is enabled, it runs at the preset time limits.

TEST Mode - The engine is started immediately even in the absence of the conditions normally required for the automatic mode. The engine starts in the programmed automatic mode. There is normally no load switching. If there is a mains outage while the RGK800 is in TEST mode, the load is switched to the generator. If mains voltage is restored, the load will remain switched to the generator until the operating mode is changed.

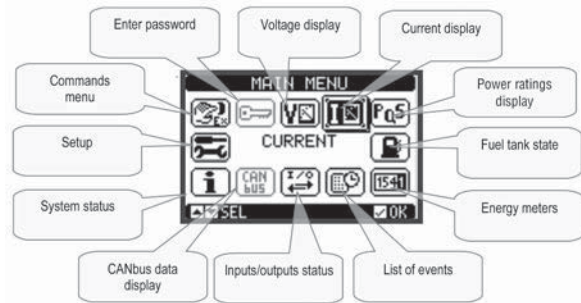
POWER-UP

- The system normally starts in OFF mode.
- If you want the operating mode used before the system powers down to be maintained, change parameter P01.03 in menu M01-Utility.
- The system can be powered at both 12 and 24 VDC, but the correct battery voltage must be set in menu M05-Battery, or a battery voltage alarm will be generated.
- The parameters of menus M02-General (type of connection, rated voltage, system frequency), M11-Engine Starting, and for the type of engine used (sensors, CAN, etc.) should normally be set.

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MAIN MENU

- The main menu is made up of a group of graphic icons (shortcuts) that allow rapid access to measurements and settings.
- Starting from normal viewing, press **✓** key. The main menu screen is displayed.
- Press **▲▼** to rotate clockwise/counter clockwise to select the required function. The selected icon is highlighted and the central part of the display shows the description of the function.
- Press **✓** to activate the selected function.
- If some functions are not available, the corresponding icon will be disabled, that is shown in a light grey colour.
- **V** **I** **PaS** etc. - Shortcuts that allow jumping to the first page of that group. Starting from that page, it is still possible to move forward-backward in the usual way.
- **🔑** - Opens the password entry page, where it is possible to specify the numeric codes that unlock protected functions (parameter setting, commands menu).
- **🔧** - Access point to the setup menu for parameter programming. See dedicated chapter.
- **🔄** - Access point to the commands menu, where the authorised user can execute some clearing-restoring actions.



PASSWORD ACCESS

- The password is used to enable or lock the access to setting (setup) and commands menus.
- For brand-new devices (factory default), the password management is disabled and the access is free. If instead, the passwords have been enabled and defined, then to get access, it is necessary to enter the password first, specifying the numeric code through the keypad.
- To enable password management and to define numeric codes, see setup menu.
- There are two access levels, depending on the code entered:
 - **User access level** - Allows clearing of recorded values and the editing of a restricted number of setup parameters.
 - **Advanced access level** - Same rights of the user access plus full editing restoring of settings.
- At normal viewing, press **✓** to recall main menu, select the password icon and press **✓**.
- The display shows the screen illustrated below:



- Keys **◀** and **▶** move through the digits.
- Keys **▲** and **▼** change the selected digit.
- Enter all the digits of the numeric code, then move on the key icon.
- If the password code entered matches the User access code or the Advanced access code, then the corresponding unlock message is shown.
- Once unlocked the password, the access rights last until:
 - The device is powered off.
 - The device is reset (after quitting the setup menu).
 - The timeout period of two minutes elapses without any keystroke.
- To quit the password entry screen, press **✓** key.

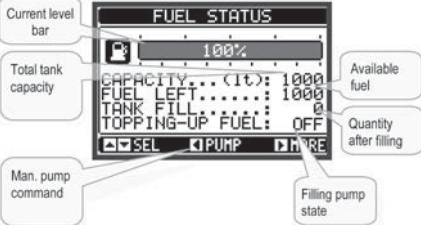
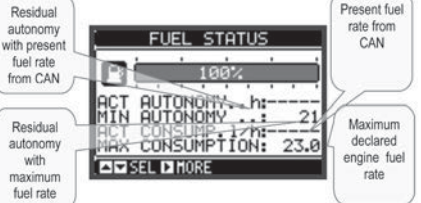
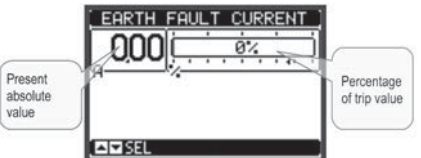
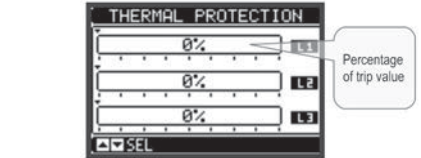
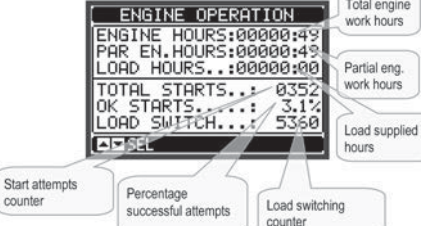
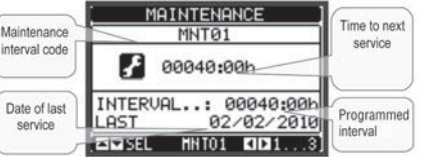


DISPLAY PAGE NAVIGATION

- Keys **▲** and **▼** scroll through the measurement pages one by one. The title bar shows the current page.
- Some measurements may not be shown depending on the controller programming and connections (for example if a fuel sensor is not set, the relevant page will not be shown).
- On some pages of the RGK800, the display can be switched from the mains measurements to the generator measurements and vice versa with key **◀**. The source displayed is always indicated, either in the middle of the page or by the icons **M** and **G** in the status bar.
- Sub-pages, which can be opened with key **▶**, are also available on some pages (displaying voltages and currents in the form of bar graphs, for example).
- The user can specify which page and which sub-page the display should return to automatically when no keys have been pressed for a certain time.
- The controller can also be programmed so the display remains where it was last.
- You can set this function in menu M01-Utility.

TABLE OF DISPLAY PAGES

| PAGES | EXAMPLE |
|---|---------|
| Line-to-line voltages Phase voltages Current ... L-L voltages THD L-N voltages THD Currents THD | |
| Resistive sensors programmed as digital input | |
| L-L Voltages/Currents L-N Voltages/Currents | |
| Current asymmetry | |
| Active power Reactive power Apparent power Power factor | |
| Energy meters | |
| Summary of electrical measurements | |
| Engine speed Note: From this page, the ratio between RPM and W frequency can be automatically acquired. See description of parameter P07.02. | |

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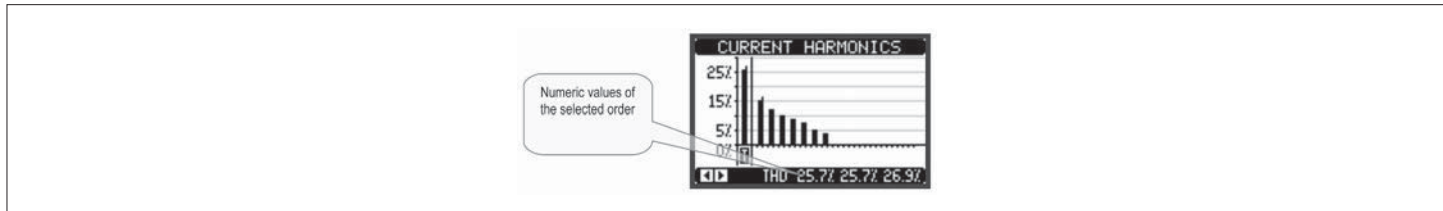
| PAGES | EXAMPLE |
|-------------------------------|---|
| Fuel level status |  <p>Current level bar</p> <p>Total tank capacity</p> <p>Man. pump command</p> <p>Available fuel</p> <p>Quantity after filling</p> <p>Filling pump state</p> |
| Fuel autonomy |  <p>Residual autonomy with present fuel rate from CAN</p> <p>Residual autonomy with maximum fuel rate</p> <p>Present fuel rate from CAN</p> <p>Maximum declared engine fuel rate</p> |
| Earth/Ground fault current |  <p>Present absolute value</p> <p>Percentage of trip value</p> |
| Generator thermal protection |  <p>Percentage of trip value</p> |
| Engine hour and work counters |  <p>Total engine work hours</p> <p>Partial eng. work hours</p> <p>Load supplied hours</p> <p>Start attempts counter</p> <p>Percentage successful attempts</p> <p>Load switching counter</p> |
| Maintenance intervals |  <p>Maintenance interval code</p> <p>Date of last service</p> <p>Time to next service</p> <p>Programmed interval</p> |
| Rent |  <p>Rent start date</p> <p>Time to expiry</p> <p>Programmed duration</p> |
| List of events |  <p>Date and time of event</p> <p>Event code</p> <p>Description of event</p> |

| PAGES | EXAMPLE |
|----------------------------|---------|
| Alternative configurations | |
| I/O status | |
| Real time calendar clock | |
| Info page | |
| System info | |

Note: Some of the pages listed above may not be displayed if the relevant function is disabled. For example, if the rent function is not programmed, the corresponding page will not be shown.

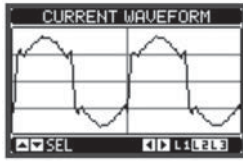
HARMONIC ANALYSIS PAGE

- In the RGK800, it is possible to enable the calculation of the FFT harmonic analysis up to the 31st order of the following measurements:
 - Phase-to-phase voltages
 - Phase-to-neutral voltages
 - Currents.
- To enable the harmonic analysis, set parameter P23.14.
- For each of these measurements, there is a display page that graphically represents the harmonic content (spectrum) with a bar chart.
- Every column is related to one harmonic order, even and odd. The first column shows the total harmonic distortion (THD).
- Every histogram bar is then divided into three parts, one each phase L1,L2, L3.
- The value of the harmonic content is expressed as a percentage with respect to the fundamental (system frequency).
- It is possible to show the harmonic content in numeric format, selecting the required order using ◀ and ▶. The lower part of the screen will display a little arrow that points to the selected column, and the relative percentage value of the three phases.
- The vertical scale of the graph is automatically selected among four full-scale values, depending on the column with the highest value.



WAVEFORM PAGE

- This page graphically views the waveform of the voltage and current signals read by the RGK800.
- It is possible to see one phase at a time, selecting it with ◀ or ▶ key.
- The vertical scale (amplitude) is automatically scaled in order to fit the waveform on the screen in the best possible way.
- The horizontal axis (time) shows two consecutive periods referred to the fundamental frequency.
- The graph is automatically updated almost every second.



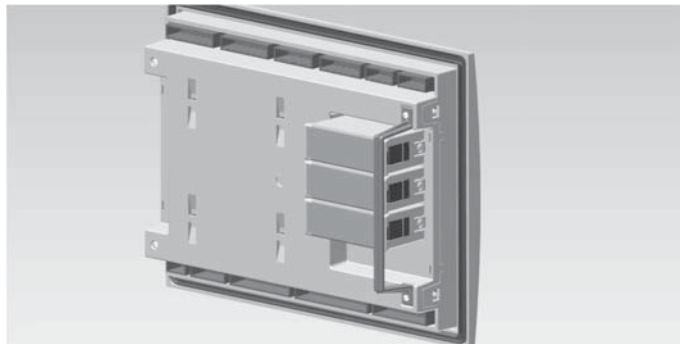
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USER PAGES

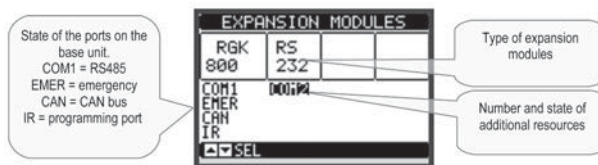
- The user can create a maximum of 4 customised display pages.
- Each of these pages can view 3 measurements, freely chosen among the available readings of the RGK800.
- The title of the page can be freely programmed by the user.
- The user pages are placed in a position that allows to reach them easily starting from the first page, by pressing ▲.
- Like all other pages, it is possible to set the system to return automatically to the user page after a time has elapsed without keystrokes.
- To define the user page, see the dedicated menu M26-User pages in the parameter setup chapter.

EXPANDABILITY

- Thanks to expansion bus, the RGK800 can be expanded with EXP series modules.
- It is possible to connect a maximum of 3 EXP... modules at the same time.
- The supported EXP modules can be grouped in the following categories:
 - Communication modules.
 - Digital I/O modules.
 - Analog I/O modules.
- To insert an expansion module:
 - Remove the power supply to RGK800.
 - Remove the protection cover of one of the expansion slots.
 - Insert the upper hook of the module into the fixing hole on the left of the expansion slot.
 - Rotate the module body to the right, inserting the connector on the bus.
 - Push until the bottom clip snaps into its housing.
- Unless otherwise specified, the modules can be inserted in any sequence.
- In applications subject to considerable vibrations, the expansion modules can be held securely in place with the special module bridge clamp accessory, standard supplied.
- To fit this accessory:
 - Remove the two right screws with a Torx T7 screwdriver.
 - Position the bridge over the connected modules.
 - Tighten the screws back in place again.



- When the RGK800 is powered up, it automatically recognises the EXP... modules that have been mounted.
- If the system configuration has changed with respect to the last saved, (one module has been added or removed), the base unit asks the user to confirm the new configuration. In case of confirmation, the new configuration will be saved and will become effective, otherwise the mismatch will be shown at every subsequent power-up of the system.
- The actual system configuration is shown in the dedicated page of the display (expansion modules), where it is possible to see the number, the type and the status of the modules.
- The I/O numbering is shown under each module.
- The status (energised/de-energised) of every single I/O and communication channel is highlighted in reverse.



ADDITIONAL RESOURCES

- The expansion modules provide additional resources that can be used through the dedicated setup menus.
- The setup menus related to the expansions are always accessible, even if the expansion modules are not physically fitted.
- Since it is possible to add more than one module of the same typology (for instance two communication interfaces), the setup menus are multiple, identified by a sequential number.
- The following table indicates how many modules of each group can be mounted at the same time. The total number of modules must be less or equal than 3.

| MODULE TYPE | CODE | FUNCTION | MAX No. |
|----------------|------------|------------------------------|---------|
| COMMUNICATION | EXP 10 10 | USB | 2 |
| | EXP 10 11 | RS232 | 2 |
| | EXP 10 12 | RS485 | 2 |
| | EXP 10 13 | Ethernet | 1 |
| | EXP 10 15● | GSM-GPRS (antenna excluded)● | 1 |
| INPUTS/OUTPUTS | EXP 10 00 | 4 DIGITAL IN | 2 |
| | EXP 10 01 | 4 STATIC OUT | 2 |
| | EXP 10 02 | 2 DIGITAL IN + 2 STATIC OUT | 3 |
| | EXP 10 03 | 2 RELAY OUT | 3 |
| | EXP 10 04 | 2 ANALOG IN | 3 |
| | EXP 10 05 | 2 ANALOG OUT | 3 |
| | EXP 10 08 | 2 DIGITAL IN + 2 RELAY OUT | 3 |

● It can be used on RGK800/RGK800SA firmware SW rev. level ≥04 and fitted in slot no. 3 only. Antenna CX03 is available and can be purchased separately.

COMMUNICATION CHANNELS

- The RGK800 supports a maximum of 2 communication modules, indicated as COMn, in addition to the base RS-485. The communication setup menu is therefore divided into three parameter sections (n=1 ... 3) for the setting of the ports.
- The built-in RS485 interface on the controller is mapped as COM1, thus the eventual additional channels will be called COM2 and COM3.
- The communication channels are completely independent, both for the hardware (physical interface) and the communication protocol.
- The two channels can communicate at the same time.
- Activating the Gateway function it is possible to use a RGK800 with both an Ethernet port and a RS485 port, that acts as a gateway over other RGKs equipped with RS485 only, in order to achieve a more economical configuration (one Ethernet port only).
- In this network, the RGK with Ethernet port will be set with both communication channels (two among COM1, COM2 and and COM3) with Gateway function set to ON, while the other RGKs will be configured normally with Gateway to OFF.

INPUTS, OUTPUTS, INTERNAL VARIABLES, COUNTERS, ANALOG INPUTS

- The inputs and outputs are identified by a code and a sequence number. For instance, the digital inputs are identified by code INPx, where x is the number of the input. In the same way, digital outputs are identified by code OUTx.
- The sequence number of I/Os is simply based on their mounting position, with a progressive numbering from top to bottom.
- It is possible to manage up to 6 analog inputs (AINx), connected to external analog sensors (temperature, pressure, flow, etc). The value read from the sensors can be scaled to any unit of measure, viewed on the display and transmitted on the communication bus. The value read from analog inputs is shown on the dedicated display page. They can be used to drive LIMx limit thresholds, that can be linked to an internal or external output, or used in a PLC logic function.
- The expansion I/O numbering starts from the last I/O installed on the base unit. For example, with INP1...INP8 digital inputs on the base unit, the first digital input on the expansion modules will be INP9. See the following table for the I/O numbering:

| CODE | DESCRIPTION | BASE | EXP | RES |
|------|----------------------------------|--------|---------|---------|
| INPx | Digital Inputs | 1...8 | 9...16 | 17...20 |
| OUTx | Digital Outputs | 1...10 | 11...16 | - |
| COMx | Communication ports | 1 | 2...3 | - |
| AINx | Analog Inputs | - | 1...6 | - |
| AOUx | Analog Outputs | - | 1...6 | - |
| RALx | Remote relays for Alarm / status | - | 1...24 | - |

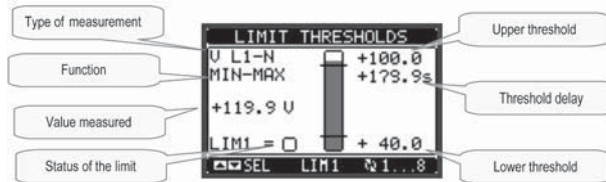
RESISTIVE SENSORS FOR FUEL, OIL, TEMPERATURE AND AUX

- RGK800 can handle three analog resistive sensors for fuel level, engine temperature and oil pressure.
- If you program the sensors in their menus to work as a resistive analog input (measurement source = RES), then display pages will show the corresponding analog measurement, obtained from the curve programmed.
- If instead the measurement source is programmed to OFF, then the screen will display a LED below the icons that indicates the status of the digital input of the corresponding digital sensor.
- If neither digital nor analog sensors are programmed, then the display will show dashes.
- When the source of measurement is set to OFF, the corresponding terminal can be used as normal digital input (FUEL → INP17, TEMP → INP18, PRESS → INP19, AUX → INP20).
- In a similar way, there are some internal bit-variables (markers) that can be associated to the outputs or combined between them. For instance, it is possible to apply some limit thresholds to the measurements done by the controller (voltage, current, power, etc.). In this case, an internal variable named LIMx will be activated when the measurements go out of the limits defined by the user through the dedicated setting menu.
- Furthermore, there are up to 8 counters (CNT1..CNT8) that can count pulses coming from an external source (through a digital input INPx) or the number of times that a certain condition has been verified. For instance, defining a limit threshold LIMx as the count source, it will be possible to count how many times one measurement has exceeded a certain limit.
- The following table groups all the I/O and the internal variables managed by the RGK800.

| CODE | DESCRIPTION | RANGE |
|------|-----------------------------|--------|
| LIMx | Limit thresholds | 1...16 |
| REMx | Remote-controlled variables | 1...16 |
| UAX | User alarms | 1...8 |
| PULx | Energy consumption pulses | 1...6 |
| CNTx | Programmable counters | 1...8 |
| PLCx | PLC logic variables | 1...32 |

LIMIT THRESHOLDS (LIMX)

- The LIMn thresholds are internal variables whose status depends on the out-of-limits of one particular measurement set by the user (e.g. total active power higher than 25kW) among all those measured.
- To make the setting of the thresholds easier, since the limits can span in a very wide range, each of them can be set using a base number and a multiplier (for example: 25 x 1k = 25000).
- For each LIM, there are two thresholds (upper and lower). The upper threshold must always be set to a value higher than the lower threshold.
- The meaning of the thresholds depends on the following functions:
 - Min function:** The lower threshold defines the trip point, while the upper threshold is for the resetting. The LIM trips when the selected measurement is less than the Lower threshold for the programmed delay. When the measured value overtakes the upper setpoint, after the set delay, the LIM status is reset.
 - Max function:** The upper threshold defines the trip point, while the lower threshold is for the resetting. The LIM trips when the selected measurement is more than upper threshold for the programmed delay. When the measured value overtakes the lower setpoint, after the delay, the LIM status is reset.
 - Max+Min function:** Both thresholds are for tripping. When the measured value is less than the lower or more than the upper setpoint, then, after the respective delays, the LIM will trip. When the measured value returns within the limits, the LIM status will be immediately reset.
- Trip denotes either activation or de-activation of the LIM variable, depending on 'Normal status' setting.
- If the LIMn latch is enabled, the reset can be done only manually using the dedicated command of the commands menu.
- See setup menu M24.



REMOTE-CONTROLLED VARIABLES (REMX)

- RGK800 can manage up to 16 remote-controlled variables (REM1...REM16).
- These are variables which status can be modified by the user through the communication protocol and that can be used in combination with outputs, Boolean logic, etc. Example: Using a remote variable (REMX) as a source for an output (OUTx), it will be possible to freely energise or de-energise a relay through the supervision software. This allows to use the RGK800 relays to drive lighting or similar loads.
- REM variables can also remotely enable/disable certain functions by applying them with inputs or outputs in AND logic.

USER ALARMS (UAX)

- The user has the possibility to define a maximum of 8 programmable alarms (UA1...UA8).
- For each alarm, it is possible to define:
 - The source that is the condition that generates the alarm.
 - The text of the message that must appear on the screen when this condition is met.
 - The properties of the alarm (just like for standard alarms), that is which way alarms interact with the generator control.
- The condition that generates the alarm can be, for instance, the overcoming of a threshold. In this case, the source will be one of the limit thresholds LIMx.
- If instead, the alarm must be displayed depending on the status of an external digital input, then the source will be an INPx.
- With the same criteria, it is possible to also link complex conditions to an alarm, resulting from the logic combination of inputs, limits, etc. In this case, the Boolean logic variables PLCx must be used.
- For every alarm, the user can define a free-text message that will appear on the alarm page.
- The properties of the user alarms can be defined in the same way as the normal alarms. You can choose whether a certain alarm will stop the engine, activate the siren, close the global alarm output, etc. See chapter Alarm properties.
- When several alarms are active at the same time, they are sequentially displayed, and their total number is shown on the status bar.
- To reset one alarm that has been programmed with latch, use the dedicated command in the commands menu.
- For details on alarm programming and definition, refer to setup menu M32.

PLC LOGIC (PLCX)

- You can set a ladder program with the Customisation manager software RGKSW10 for an internal logic, to easily create any function required for the genset accessory applications.
- You can enter all the variables managed by the RGK800 in the program logic, such as inputs (INPx), limit thresholds (LIMx), remote variables (REMX), and controller status (RALx), etc.
- The results of processing the various branches of the ladder logic are saved in internal variables (PLCx) which can then be used to control the outputs of the RGK800, or as backup memories to build a more complex logic, or also to control user-defined alarms (UAX).
- The logic function created with the ladder program can be verified in real time and eventually corrected in the relevant window of the Customisation manager software.

AUTOMATIC TEST

- The automatic test is a periodic test carried out at set intervals (set during setup) if the system is in AUT mode and the function has been enabled.
- It is possible to decide in which days of the week the automatic test can be executed and at what time of the day (hours:minutes).
- See menu M16-Autoamtic test for more details on automatic test programming.
- After starting, the genset runs for a set time, after which it will stop. The message 'T.AUT' is displayed before the generator test starts.
- The automatic test can be setup programmed to also run if there is an external stop signal.



- The automatic test can be enabled/disabled without opening the setup menu in the following way:
 - Open the 'AUTOMATIC TEST' page and press the keys **START** and **STOP** to enable the function, or the keys **START** and **STOP** to disable it.
- The automatic test can be stopped with the OFF key.

CANBUS

The CAN port allows RGK800 controllers to be connected to the electronic control units (ECU) of modern engines in order to:

- Read the measurements contained in the ECU without adding sensors to the engine.
 - Considerably simplify wiring.
 - Obtain complete, detailed diagnostics.
 - Avoid assembly of CIU (Control Interface Unit) or CoO (coordinator) type decoding boards.
 - Permit direct control by CAN of engine stopping and starting when ECU supported.
- The board functions in combination with the ECUs of the engines most widely used in gensets applications, using the standard defined by the SAE J1939. For details on CAN parameters, see setup menu M21-CANBUS.

SUPPORTED MEASUREMENTS

- The CAN port can decode and make available a set of measurements defined by the J1939 standard and identified by a number (SPN, Suspect Parameter Number).
- According to the type of engine, a certain number of measurements are available (a sub-set of possible measurements) that are shown on the display of the RGK800.
- The measurements are grouped in several sub-pages, that can be viewed pressing ◀ and ▶ keys.



- Diagnostic SPN codes are listed below.
- Engine speed, oil pressure and cooling fluid temperature are taken directly from the CAN; therefore, neither wiring or setting of the related sensors is required.

| SPN | Description | U/M |
|-----|---------------------------------|--------|
| 190 | Engine speed | RPM |
| 100 | Oil pressure | Bar |
| 110 | Coolant temperature | °C |
| 247 | ECU engine hours | h |
| 102 | Boost pressure | Bar |
| 105 | Intake manifold air temperature | °C |
| 183 | Fuel rate | l/h |
| 513 | Actual torque | % |
| 512 | Demand torque | % |
| 91 | Accelerator pedal position | % |
| 92 | Load percentage | % |
| - | Protection lamp | On-Off |
| - | Amber warning lamp | On-Off |
| - | Red alarm lamp | On-Off |
| - | Malfunction lamp | On-Off |
| 174 | Fuel temperature | °C |
| 175 | Oil temperature | °C |
| 94 | Fuel delivery pressure | Bar |
| 98 | Oil level | % |
| 101 | Crankcase pressure | Bar |
| 109 | Coolant pressure | Bar |
| 111 | Coolant level | % |
| 97 | Water in fuel | On-Off |
| 158 | Battery voltage | VDC |
| 106 | Air intake pressure | Bar |
| 108 | Barometric pressure | Bar |
| 173 | Exhaust gas temperature | °C |

- When the ECU is off, the measurements are not available and are therefore replaced by dashes.
- If a measurement is not available on a particular engine, NA (Not Available) is displayed.
- If a measurement is incorrect (for example, the sensor is disconnected), ERR is displayed instead.

DIAGNOSTICS

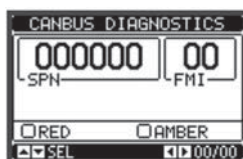
- In the case of failures, many ECUs highlight the problem with a J1939 standard code, called DTC (Diagnostic Trouble Code) consisting of SPN+FMI, where SPN (Suspect Parameter Number) identifies the signal affected by the fault, while FMI (Failure Mode Indicator) identifies the type of failure.

For example:

SPN-FMI
100-01

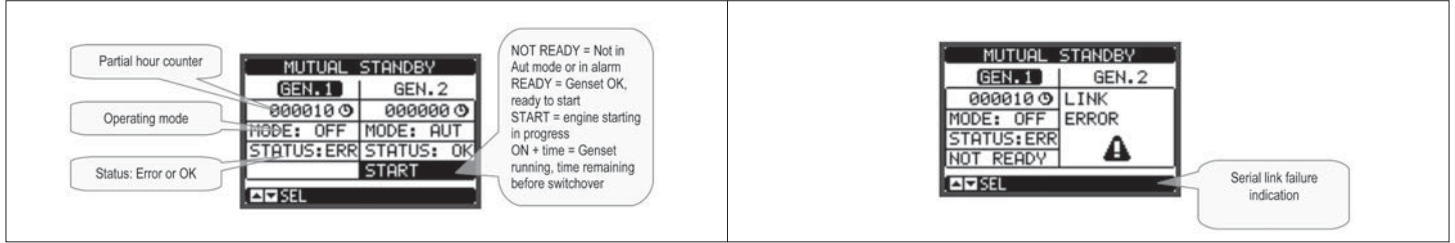
indicates SPN 100 (oil pressure) and FMI 01 (too low).

- In view of the many sensors connected to an ECU, a high number of possible codes is managed. In the case of a fault, this is indicated on the display of the RGK800 with both a code and a description in the related language, in the CAN diagnostics page.
- In the case of several simultaneous alarms, these are sequentially displayed.
- According to the seriousness of the code, an amber alarm lamp (warning) or red alarm lamp (critical alarm) is usually generated.
- Some ECUs do not use the J1939 standard to code the alarms. Also in this case, the DTCs are displayed with their numeric code and, when possible, with an uncode description.
- To reset the alarms, press ✓ or OFF, as usual.
- If enabled, the RGK800 will send a reset alarm command, according to the type of ECU selected, on the BUS.



MUTUAL STANDBY FUNCTION

- The mutual standby function permits to coordinate the operation of two generating sets in redundancy (standby) between each other and to balance the operating hours of both of them.
- The mutual standby function is obtained through the serial interface communication between the two controllers. If the serial link is not working for any reason, the two generators operate independently, that is they start at the same time when there is a request for running and their load connection management is done via electrical interlocks.
- If one of the two generators is not available because of alarm, non-automatic mode or failure conditions, the other unit can take over powering the load.
- Regarding the AC signals, mains voltage is measured by both controllers using the appropriate inputs while each monitors the voltage of their own generator.
- The load is controlled by three contactors, one for each source (MAINS-GEN1-GEN2), interlocked among each other.
- When the mains voltage fails or is not available, the controller which has operated less hours and does not have a global alarm activated, is started and continues to operate until the mains voltage returns.
- With P23.05 = Start, during its operation should the number of operating hours exceed the hours of the other controller, it will continue to operate in any case.
- With P23.05 = Time, the maximum number of hours of consecutive is set running before the alternate generator is activated. In this case, the engine is started first; when the voltage is available, the changeover takes place.
- Whenever a failure (global alarm) on the running generating set takes place, the second generating set is started and steps in as standby.
- During this circumstance should the alarm be resolved, the load remains powered by the standby generating set; this to minimise the power supply cutoffs.
- Normally this cycle provides that both controllers are programmed to AUT mode. All the same, if one of the two controllers is set in another mode, the operation of the system is warranted anyway as long as the operativeness of the alternate system (standby controller) is maintained.



CONFIGURATION

- Link the two controllers together through a dedicated RS485 network, using one of the available communication channels (COMx), for instance the built-in COM1 interface port.
 - Set the serial address (P20.x.01) of the first controller to value 01, and of the second controller to 02.
 - Set the parameters (timing and modes) of the mutual standby function using parameters P23.04, P23.05 and P23.06 of menu M23-MISCELLANEOUS.
 - Set both controllers to AUT mode.
 - Move to the Mutual standby display page and check that each controller is correctly 'seeing' the status of the other one.
- Note:** During testing or normal operation, if the transition from one generator to another is to be anticipated without waiting for the programmed interchange time, press and hold simultaneously ◀ and ▶ for 5 seconds.

GSM /GPRS MODEM

- On the RGK800 expansion bus, it is possible to insert the GSM/GPRS modem module EXP1015. It occupies one of COMx channels.
- This module allows to greatly simplify the use of a modem compared to the traditional solution with an external module as it provides the advantages listed below:
- Quad-band GSM-GPRS modem, suitable for use with worldwide networks.
- The modem power supply is guaranteed by the base unit also during engine starting when the battery voltage momentarily drops to values not compatible with the traditional external modules.
- Built-in SIM card holder.
- SMA connector for quad-band outdoor anti-vandal antenna type CX03, IP65 protection.

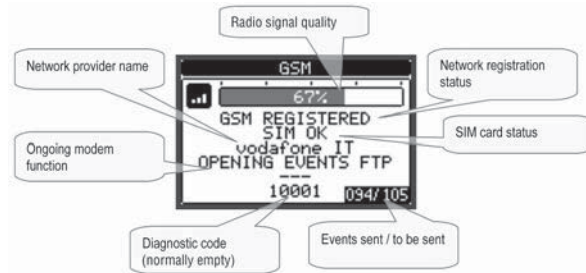
The supported features are summarised below:

- **Online connection (CSD)**
Allows you to connect online via the remote control software, in response to an incoming call from PC or the RGK800 calling a PC on hold.
- **Send SMS with alarms / status / events**
Sending status and alarms via SMS to multiple recipients; in this case, specify the phone numbers of the recipients and the conditions that generate the call.
- **Email sending**
As with SMS, but sent to an email account.
- **Receiving SMS commands**
Allows to control the RGK800 by sending an SMS. The supported commands, which can be concatenated into a single message, are the following:

| COMMAND | Action |
|---------------------|---|
| OFF, MAN, AUT, TEST | Change operating mode according to the command. |
| RESET | Resets alarms. |
| START, STOP | Start / stop engine manually. |
| MAINS=x, GEN=x | Sets the mains or generator switching devices to manual (x=1 or 0). |
| PWD=**** | Allows to specify the password to accept commands, if the phone sending them is not one of those defined as recipients of alarm messages. |
| TIME=ss | Wait ss seconds before executing the remaining commands. |
| INFO? | Ask for general status of the generating set. The answer will be a string like the following: ID=DEMO; OM=MAN; MV=411V,413V,412; GV=000V,000V,000V; LC=0000A,0000A,0000A, MC1,GC0; GF=00.0Hz; ES=STOP; BV=12.0V; FL=000%; EH=0000h |
| FUEL? | Ask for fuel tank status. |

– Sending data and event files on remote FTP server

All the events recorded by the RGK800 can be sent to a file managed by FTP server. In this way, the server has the updated history of what has happened on all gensets in the field. The settings required for the operation of the GSM modem can be made through the appropriate Modem parameters window of the remote control software Synergy. A dedicated page views the status of the modem used with the controllers with its activity in progress, signal quality along with connection problem codes, if any.



MULTIPLE CONFIGURATIONS

- A maximum of 4 basic configurations for the nominal parameters (voltage, current, frequency, speed, etc.) can be loaded. They can be defined by the multiple menu M04.
- The system can then dynamically switch from one configuration to another by a combination of digital inputs set up using the configuration selection function, typically connected to an external selector switch.
- This function is useful, for example, in situations of genset rental where the load characteristics vary from time to time.
- The configuration can be changed only with the engine stopped and the unit in OFF mode. If you change the selection when the conditions are not met, the system maintains its previous configuration and signals the alarm A57-Configuration change not possible.
- See the table below for the correspondence between inputs and active selection.

| INPUT CHANNEL 1 | INPUT CHANNEL 2 | ACTIVE CONFIGURATION |
|-----------------|-----------------|----------------------|
| OFF | OFF | CNF1 (P04.1.xx) |
| ON | OFF | CNF2 (P04.2.xx) |
| OFF | ON | CNF3 (P04.3.xx) |
| ON | ON | CNF4 (P04.4.xx) |

IR PROGRAMMING PORT

- The parameters of the RGK800 can be configured through the front optical port, using the IR-USB CX01 programming dongle, or with the IR-WiFi CX02 dongle.
- This programming port has the following advantages:
 - You can configure and service the RGK800 without accessing the rear of the device or having to open the electrical panel.
 - It is galvanically isolated from the internal circuits of the RGK800, guaranteeing the maximum safety for the operator.
 - High speed data transfer.
 - IP65 front panel protection.
 - Limits the possibility of unauthorised access with device configuration.
- Simply hold the CX... dongle up to the front panel and connect the plugs to the relevant connectors. The device will be acknowledged as shown by the flashing green LINK LED on the programming dongle.



PARAMETER SETTING (SETUP) WITH PC

- You can use the customisation manager setup software RGKSW10 to transfer (previously programmed) setup parameters from the RGK800 to a PC hard drive and vice versa.
- The parameter may be partially transferred from the PC to the RGK, i.e. only the parameters of the specified menus.
- The PC can be used to set parameters as well as define the following:
 - Data on the characteristics of pressure, temperature, fuel level sensor curves and generator thermal protection.
 - Customised logo displayed on power-up and every time you exit keyboard setup.
 - Info page where application information, characteristics, data, etc., can be entered.
 - PLC logic debug and programming.
 - Load alternative set of languages to default.

PARAMETER SETTING (SETUP) FROM FRONT PANEL

- To open the parameters programming menu (setup):
 - Turn the unit in **OFF** mode.
 - At normal measurement viewing, press ✓ to call up the main menu.
 - Select the icon . If it is disabled (displayed in grey) you must enter the password (see chapter Password access).
 - Press ✓ to open the setup menu.
- The table shown below is displayed, with the settings sub-menus of all the parameters on the basis of their function.
- Select the required menu with keys ▲ ▼ and confirm with ✓.
- Press **OFF** to return to measurement viewing.

Settings: menu selection

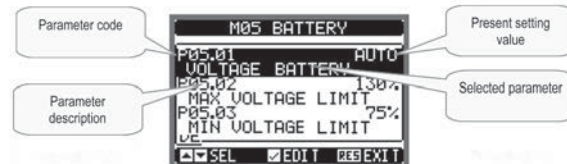


– The following table lists the available submenus:

| CODE | MENU | DESCRIPTION |
|------|------------------|---|
| M01 | UTILITY | Language, brightness, display pages, etc. |
| M02 | GENERAL | System specifications |
| M03 | PASSWORD | Password settings |
| M04x | CONFIGURATIONS | 1 to 4 multiple configurations selectable |
| M05 | BATTERY | Genset battery parameters |
| M06 | ACOUSTIC ALARMS | Internal buzzer and external siren control |
| M07 | ENGINE SPEED | Limit thresholds, rpm measurement source |
| M08 | OIL PRESSURE | Limit thresholds, measurement source |
| M09 | COOLANT TEMP. | Limit thresholds, measurement source |
| M10 | FUEL LEVEL | Filling, limit thresholds, measurement source |
| M11 | ENGINE STARTING | Engine start/stop mode |
| M12 | LOAD SWITCHING | Load switching mode |
| M13 | MAINS CONTROL | Mains voltage limits of acceptability |
| M14 | GEN CONTROL | Generator voltage limits of acceptability |
| M15 | GEN PROTECTION | Earth/Ground-fault, protection curves, thresholds |
| M16 | AUTOMATIC TEST | Automatic test mode, duration, period |
| M17 | MAINTENANCE | Maintenance intervals |
| M18 | PROG. INPUTS | Programmable digital inputs functions |
| M19 | PROG. OUTPUTS | Programmable digital outputs functions |
| M20 | COMMUNICATION | Address, format, protocol |
| M21 | CAN BUS | ECU type, control options |
| M22 | LOAD MANAGEMENT | Priority loads, dummy load management |
| M23 | MISCELLANEOUS | Functions such as mutual standby, EJP, etc. |
| M24 | LIMIT THRESHOLDS | Customisable limit thresholds |
| M25 | COUNTERS | Programmable generic counters |
| M26 | USER PAGES | Custom measurement pages |
| M27 | REMOTE ALARMS | External relay alarm/status signals |
| M28 | RESISTIVE INPUT | Programmable auxiliary resistive input |
| M29 | ANALOG INPUTS | Voltage/current/temperature inputs |
| M30 | ANALOG OUTPUTS | Voltage/current outputs |
| M31 | ENERGY PULSES | Energy count pulses |
| M32 | USER ALARM | Programmable alarms |
| M33 | ALARM PROPERTIES | Alarms effect enabling |

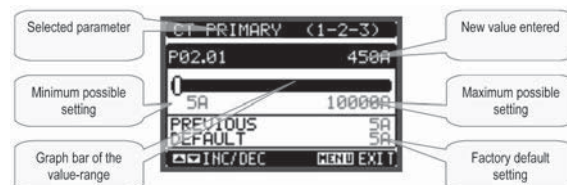
- Select the sub-menu and press **✓** to show the parameters.
- Each parameter is shown with code, description and present setting value.

Setup: parameter selection



- To modify the setting of one parameter, select it and then press **✓**.
- If the Advanced level access code has not been entered, it will not be possible to enter editing page and an access denied message will be shown.
- If instead the access rights are confirmed, then the editing screen will be shown.

Setup: editing page



- When the editing screen is displayed, the parameter setting can be modified with **◀** and **▶** keys. The screen shows the new setting, a bar graph that shows the setting range, the maximum and minimum values, the previous setting and the factory default.
- Pressing **◀** and **▶** together the value is set to the minimum possible, while with **▲** and **▼** it is set to the maximum.
- Pressing simultaneously **◀** and **▶**, the setting is set to factory default.
- During the entry of a text string, keys **▲** and **▼** are used to select the alphanumeric character while **◀** and **▶** are used to move the cursor along the text string. Pressing keys **▲** and **▼** simultaneously will move the character selection straight to character 'A'.
- Press **✓** to go back to the parameter selection. The entered value is stored.
- Press OFF to save all the settings and to quit the setup menu. The controller executes a reset and returns to normal operation.
- If the user does not press any key for more than 2 minutes, the system leaves the setup automatically and goes back to normal viewing without saving the changes done on parameters.
- N.B.: A backup copy of the setup data (settings that can be modified using the keyboard) can be saved in the eeprom memory of the RGK800. This data can be restored when required in the work memory. The data backup 'copy' and 'restore' commands can be found in the commands menu.

TABLE OF PARAMETERS

| M01 - UTILITY | | U/M | Default | Range |
|---------------|----------------------------------|-----|----------|--|
| P01.01 | Language | | English | English Italiano Francais Espanol Portuguese |
| P01.02 | Set clock at power up | | OFF | OFF-ON |
| P01.03 | Power-up operating mode | | OFF mode | OFF mode Previous |
| P01.04 | LCD contrast | % | 50 | 0-100 |
| P01.05 | Display backlight high intensity | % | 100 | 0-100 |
| P01.06 | Display backlight low intensity | % | 25 | 0-50 |
| P01.07 | Time to switch to low backlight | s | 180 | 5-600 |
| P01.08 | Return to default page | s | 300 | OFF / 10-600 |
| P01.09 | Default page | | VLL | (page list) |
| P01.10 | Generator identifier | | (empty) | String 20 chr. |

- P01.01** – Select display text language.
- P01.02** – Active automatic clock settings access after power-up.
- P01.03** – Start system in OFF mode after power-up or in same mode when it was switched off.
- P01.04** – Adjust LCD contrast.
- P01.05 - P01.06** – Display backlight high-low adjustment.
- P01.07** – Display backlight low delay.
- P01.08** – Default page display restore delay when no key pressed. If set to OFF, the display will always show the last page selected manually.
- P01.09** – Default page displayed on power-up and after delay.
- P01.10** – Free text with alphanumeric identifier name of specific generator. Used also for identification after remote reporting alarms/events via SMS/Email.

| M02 – GENERAL | | U/M | Default | Range |
|---------------|----------------------------|-----|---------|-----------------------------|
| P02.01 | No. 1-2-3 CT primary | A | 5 | 1-10000 |
| P02.02 | No. 1-2-3 CT secondary | A | 5 | 1-5 |
| P02.03 | No. 1-2-3 CT current valve | | Load | Load Generator |
| P02.04 | No. 4 CT primary | A | 5 | 1-10000 |
| P02.05 | No. 4 CT secondary | A | 5 | 1-5 |
| P02.06 | No. 4 CT current valve | | OFF | OFF Neutral Earth |
| P02.07 | VT use | | OFF | OFF-ON |
| P02.08 | VT primary | V | 100 | 50-50000 |
| P02.09 | VT secondary | V | 100 | 50-500 |
| P02.10 | Phase sequence control | | OFF | OFF L1-L2-L3 L3-L2-L1 |

- P02.01** – Value of the phase current transformer primary. Example: set 800 for 800/5A CT.
- P02.02** – Value of the phase current transformer secondary. Example: set 5 for 800/5A CT.
- P02.03** – Positioning of phase CT. If positioned on load, the current (and the relative power and energy) are switched to the mains or generator on the basis of which circuit breaker is closed.
- P02.04** – Primary value of the fourth current transformer.
- P02.05** – Secondary value of the fourth current transformer.
- P02.06** – Positioning of the fourth CT. **OFF** = not installed. **Neutral** = Neutral current reading. **Earth** = Earth/Ground leakage current reading. In this case, earth/ground fault trip thresholds can be set.
- P02.07** – Use of voltage transformers (VT) on mains/generator voltage metering inputs.
- P02.08** – Primary value of any voltage transformers.
- P02.09** – Secondary value of any voltage transformers.
- P02.10** – Enable phase sequence control. **OFF** = no control. **Direct** = L1-L2-L3. **Reverse** = L3-L2-L1. Note: Also enable corresponding alarms.

| M03 - PASSWORD | | U/M | Default | Range |
|----------------|-------------------------|-----|---------|------------|
| P03.01 | Password use | | OFF | OFF-ON |
| P03.02 | User level password | | 1000 | 0-9999 |
| P03.03 | Advanced level password | | 2000 | 0-9999 |
| P03.04 | Remote access password | | OFF | OFF/1-9999 |

- P03.01** – If set to OFF, password management is disabled and anyone has access to the setup and commands menus.
- P03.02** – With P03.01 enabled, this is the value to specify for activating user level access. See Password access chapter.
- P03.03** – As for P03.02, with reference to Advanced level access.
- P03.04** – If set to a numeric value, this becomes the code to specify via serial communication before sending commands from a remote control.

| M04 – CONFIGURATIONS (CNFn, n=1...4) | | U/M | Default | Range |
|--------------------------------------|-------------------------|-----|------------|---|
| P04.n.01 | Rated voltage | V | 400 | 50-500000 |
| P04.n.02 | Type of connection | | L1-L2-L3-N | L1-L2-L3-N L1-L2-L3 L1-N-L2 L1-N |
| P04.n.03 | Type of voltage control | | L-L | L-L L-N L-L + L-N |
| P04.n.04 | Rated current | A | 5 | 1-10000 |
| P04.n.05 | Rated frequency | Hz | 50 | 50 60 400 |
| P04.n.06 | Rated engine rpm | RPM | 1500 | 750-3600 |
| P04.n.07 | Rated active power | kW | Aut | Aut / 1-10000 |
| P04.n.08 | Rated apparent power | kVA | Aut | Aut / 1-10000 |

Note: This menu is divided into 4 sections, which refer to 4 configurations CNF1...CNF4. See relevant chapter on managing the variable configurations.

P04.n.01 – Rated voltage of mains and generator. Always set the line-to-line voltage for polyphase systems

P04.n.02 – Choice of the type of connection, 3-phase with/without neutral, 2-phase or single phase.

P04.n.03 – Voltage controls performed on line-to-line voltages, phase voltages or both.

P04.n.04 – Rated current of the generator. Used for the percentage settings of the protection thresholds.

P04.n.05 – Rated frequency of mains and generator.

P04.n.06 – Rated engine rpm.

P04.n.07 – Rated active power of the generator. Used for the percentage settings of the protection thresholds, dummy load management, priority loads, etc.
If set to Aut, it is calculated using the CT primary and rated voltage.

P04.n.08 – Rated apparent power of the generator.

| M05 - BATTERY | | U/M | Default | Range |
|---------------|-------------------------|-----|---------|---------|
| P05.01 | Battery rated voltage | V | 12 | 12 / 24 |
| P05.02 | MAX. voltage limit | % | 130 | 110-140 |
| P05.03 | MIN. voltage limit | % | 75 | 60-130 |
| P05.04 | MIN./MAX. voltage delay | s | 10 | 0-120 |

P05.01 – Rated battery voltage.

P05.02 – Battery MAX. voltage alarm limit threshold.

P05.03 – Battery MIN. voltage alarm limit threshold.

P05.04 – Battery MIN. and MAX. alarm limit delay.

| M06 – ACOUSTIC ALARMS | | U/M | Default | Range |
|-----------------------|---|-----|--------------|--------------------------------------|
| P06.01 | Siren mode for alarm | | Time | OFF Keyboard Time Repeat |
| P06.02 | Siren activation time for alarm | s | 30 | OFF/1-600 |
| P06.03 | Siren activation time before starting | s | OFF | OFF / 1-60 |
| P06.04 | Siren activation time for remote control initialisation | s | OFF | OFF / 1-60 |
| P06.05 | Siren activation time for mains outage | s | OFF | OFF / 1-60 |
| P06.06 | Acoustic warning devices | | BUZZER+SIREN | OFF SIREN BUZZER BUZZER+SIR |
| P06.07 | Buzzer for key press | s | 0.15 | OFF / 0.01-0.50 |

P06.01 – **OFF** = Siren disabled. **Keyboard** = Siren goes off continuously until silenced by pressing a key on the front panel. **Timed** = Activated for the specified time with P06.02.

Repeated = Activated for time P06.02, pause for triple-time interval, then repeated periodically.

P06.02 – Duration of siren activation for alarm.

P06.03 – Duration of siren activation before engine start.

P06.04 – Duration of siren activation after remote control operation via communication channel.

P06.05 – Duration of siren activation after mains outage.

P06.06 – Select acoustic devices.

P06.07 – Activation and duration of buzzer for key press.

| M07 – ENGINE SPEED | | U/M | Default | Range |
|--------------------|-----------------------------|-----|---------|--|
| P07.01 | Engine speed reading source | | W | OFF FREQ-GEN. W LS Pick-up HS Pick-up CAN |
| P07.02 | RPM/W - pick-up ratio | | 1.000 | 0.001-50.000 |
| P07.03 | MAX. speed limit | | 110 | 100-120 |
| P07.04 | MAX. speed alarm delay | | 3.0 | 0.5-60.0 |
| P07.05 | MIN. speed limit | | 90 | 80-100 |
| P07.06 | MIN. speed alarm delay | | 5 | 0-600 |

P07.01 – Select source for engine speed reading. **OFF** = rpm not displayed nor controlled.

FREQ-GEN = RPM calculated on the basis of power alternator frequency. Rated rpm corresponds to rated frequency.

W = RPM measured using the frequency of signal W, with reference to RPM/W ratio set with the following parameter.

LS Pick-up = RPM measured by magnetic pick-up sensor, using a Low Sensitivity input (for strong signals).

HS Pick-up = as above, with High-Sensitivity input (for weak signals).

CAN = RPM read by engine ECU through CAN bus.

P07.02 – Ratio between the RPM and the frequency of the W or pick-up signal. Can be set manually or acquired automatically through the following procedure:

At the engine speed page, with engine running at nominal speed, press **START** and ✓ together for 5 seconds. The controller will acquire the actual speed as the rated one, using the actual frequency of the W signal to calculate the value for this parameter.

P07.03 - **P07.04** – Limit threshold and delay for generating engine speed too high alarm.

P07.05 - **P07.06** – Limit threshold and delay for generating engine speed too low alarm.

| M08 – OIL PRESSURE | | U/M | Default | Range |
|--------------------|------------------------------|-----------|---------|--|
| P08.01 | Reading source | | OFF | OFF RES CAN AINx |
| P08.02 | Channel no. | | 1 | 1..8 |
| P08.03 | Type of resistive sensor | | VDO | VDO VEGLIA DATCON CUSTOM ... |
| P08.04 | Resistive sensor offset | Ohm | 0 | -30.0 to +30.0 |
| P08.05 | Unit of measure for pressure | | bar | bar psi |
| P08.06 | MIN. pressure prealarm | (bar/psi) | 3.0 | 0.1-180.0 |
| P08.07 | MIN. pressure alarm limit | (bar/psi) | 2.0 | 0.1-180.0 |

P08.01 – Specifies which source is used for reading the oil pressure. **OFF** = not managed. PRESS terminal can thereby be used as programmable digital input INP19.

RES = Read from resistive sensor with analog input on PRESS terminal.

CAN = Read from CAN bus.

AINx = Read from analog input of an EXP expansion module.

P08.02 – Channel number (x) to specify if AINx is selected for the previous parameter.

P08.03 – When using a resistive sensor, selects which curve to use. The curves can be custom set using the customisation manager software RGKSW10.

P08.04 – When using a resistive sensor, this allows to add or subtract an offset in Ohms to/from the set curve, for instance to compensate for cable length. This value can also be set, without opening setup, by using the quick function in the commands menu which permits to view the measurements while calibrating.

P08.05 – Selects the unit of measure for oil pressure.

P08.06 - **P08.07** – Define respectively the prealarm and alarm thresholds for MIN. oil pressure. See respective alarms.

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| M09 – COOLANT TEMPERATURE | | U/M | Default | Range |
|---------------------------|---------------------------------------|-----|---------|---|
| P09.01 | Reading source | | OFF | OFF RES CAN AINx |
| P09.02 | Channel no. | | 1 | 1..8 |
| P09.03 | Type of resistive sensor | | VDO | VDO VEGLIA DATCON CUSTOM |
| P09.04 | Resistive sensor offset | Ohm | 0 | -30.0 to +30.0 |
| P09.05 | Temperature unit of measurement | | °C | °C °F |
| P09.06 | MAX. temperature prealarm | ° | 90 | 20-300 |
| P09.07 | MAX. temperature alarm limit | ° | 100 | 20-300 |
| P09.08 | MIN. temperature alarm limit | ° | OFF | OFF/20-300 |
| P09.09 | Load switchover temperature threshold | ° | OFF | OFF/20-300 |
| P09.10 | Heater activation threshold | ° | OFF | OFF/20-300 |
| P09.11 | Heater deactivation threshold | ° | OFF | OFF/20-300 |
| P09.12 | Temperature sensor fault alarm delay | min | OFF | OFF/1-60 |

- P09.01** – Specifies which source is used for reading the coolant temperature. **OFF** = not managed. TEMP terminal can thereby be used as programmable digital input INP18.
RES = Read from resistive sensor with analog input on TEMP terminal. **CAN** = Read from CANbus. **AINx** = Read from analog input of an EXP expansion module.
- P09.02** – Channel number (x) to specify if AINx is selected for the previous parameter.
- P09.03** – When using a resistive sensor, selects which curve to use. The curves can be custom set using the customisation manager software RGKSW10.
- P09.04** – When using a resistive sensor, this allows to add or subtract an offset in Ohms to/from the set curve, for instance to compensate for cable length.
 This value can also be set without opening setup by using the quick function in the commands menu which allows to view the measurements while calibrating.
- P09.05** – Selects the unit of measure for the temperature.
- P09.06 - P09.07** – Define respectively the alarm and prealarm thresholds for MAX. temperature of the coolant. See respective alarms.
- P09.08** – Defines the min. liquid temperature alarm threshold. See respective alarms.
- P09.09** – If the engine temperature is higher than this threshold (engine is warm), then the load is connected to the generator after 5s instead of waiting for the usual presence delay set with P14.05. If instead the temperature is lower, then the controller will wait the elapsing of the programmed time.
- P09.10 - P09.11** – Defines the thresholds for on-off control of the output programmed with Heater function.
- P09.12** – Delay before a temperature resistive sensor fault alarm is generated.

| M10 – FUEL LEVEL | | U/M | Default | Range |
|------------------|------------------------------------|-----|---------|---|
| P10.01 | Reading source | | OFF | OFF RES CAN AINx |
| P10.02 | Channel no. | | 1 | 1..8 |
| P10.03 | Type of resistive sensor | | VDO | VDO VEGLIA DATCON CUSTOM |
| P10.04 | Resistive sensor offset | Ohm | 0 | -30.0...+30.0 |
| P10.05 | Capacity unit of measure | | % | % l gal |
| P10.06 | Tank capacity | | OFF | OFF / 1-30000 |
| P10.07 | MIN. fuel level prealarm | % | 20 | 0-100 |
| P10.08 | MIN. fuel level | % | 10 | 0-100 |
| P10.09 | Start filling with fuel pump level | % | OFF | OFF / 0-100 |
| P10.10 | Stop filling with fuel pump level | % | OFF | OFF / 0-100 |
| P10.11 | Rated hourly engine consumption | l/h | OFF | OFF / 0.0-200.0 |
| P10.12 | Fuel theft alarm sensitivity | % | OFF | OFF / 0-100 |
| P10.13 | Enable energy efficiency page | | OFF | OFF ON |

- P10.01** – Specifies which source is used for reading the fuel level. **OFF** = not managed. FUEL terminal can thereby be used as programmable digital input INP17.
RES = Read from resistive sensor with analog input on FUEL terminal. **CAN** = Read from CANbus. **AINx** = Read from analog input of EXP expansion module.
- P10.02** – Channel number (x) to specify if AINx was selected for the previous parameter.
- P10.03** – When using a resistive sensor, selects which curve to use. The curves can be custom set using the customisation manager software.
- P10.04** – When using a resistive sensor, this allows to add or subtract an offset in Ohms to/from the set curve, for instance to compensate for cable length.
 This value can also be set without opening setup by using the quick function in the commands menu, which permits to view the measurements while calibrating.
- P10.05** – Selects the unit of measure for fuel tank capacity and available fuel.
- P10.06** – Defines the fuel tank capacity, used to indicate autonomy.
- P10.07 - P10.08** – Defines respectively the prealarm and alarm thresholds for min. fuel level. See respective alarms.
- P10.09** – The fuel filling pump starts when the fuel drops below this level.
- P10.10** – The fuel filling pump stops when the fuel reaches or is higher than this level.
- P10.11** – Rated hourly engine consumption. Used to calculate minimum autonomy left.
- P10.12** – Sets a coefficient for fuel theft alarm sensitivity. Low values = high sensitivity; High values = low sensitivity. Recommended values between 3% and 5%.
- P10.13** – Enables the display of a sub-page on the fuel level page, with the genset energy efficiency data.

| M11 – ENGINE STARTING | | U/M | Default | Range |
|-----------------------|---|-----|-------------|-----------------------------------|
| P11.01 | Engine started threshold via battery charger alternator voltage | VDC | 10.0 | OFF/3.0-30 |
| P11.02 | Engine started threshold via generator voltage | % | 25 | OFF/10-100 |
| P11.03 | Engine started threshold via generator frequency | % | 30 | OFF/10-100 |
| P11.04 | Engine started threshold via engine speed | % | 30 | OFF/10-100 |
| P11.05 | Glow plugs preheating time | s | OFF | OFF/1-600 |
| P11.06 | Fuel preheating disconnection temperature | ° | OFF | OFF/20-300 |
| P11.07 | Fuel preheating timeout | s | OFF | OFF/1-900 |
| P11.08 | Time between EV and starter | s | 1.0 | OFF/1.0-30.0 |
| P11.09 | Number of start attempts | | 5 | 1-30 |
| P11.10 | Duration of start attempts | s | 5 | 1-60 |
| P11.11 | Pause between start attempts | s | 5 | 1-60 |
| P11.12 | Pause between end of attempted start and next attempt | s | OFF | OFF/1-60 |
| P11.13 | Alarms inhibition time after starting | s | 8 | 1-120 |
| P11.14 | Overspeed inhibition time after starting | s | 8 | 1-120 |
| P11.15 | Deceleration time | s | OFF | OFF/1-600 |
| P11.16 | Deceleration disable temperature | ° | OFF | OFF/20-300 |
| P11.17 | Cooling cycle mode | | Load | Always Load Temp. thresh. |
| P11.18 | Cooling time | s | 120 | 1-3600 |
| P11.19 | Cooling end temperature threshold | ° | OFF | OFF/1-250 |
| P11.20 | Stop magnet time | s | OFF | OFF/1-60 |
| P11.21 | Gas valve delay | s | OFF | OFF/1-60 |
| P11.22 | Priming valve time | s | OFF | OFF/1-60 |
| P11.23 | Choke time | s | OFF | OFF/1-60 |
| P11.24 | Choke disconnect threshold | % | 5 | 1-100 |
| P11.25 | Number of start attempts with choke | | 2 | 1-10 |
| P11.26 | Attempts with choke mode | | Consecutive | Consecutive Alternating |
| P11.27 | Attempts with compressed air mode | | OFF | OFF Consecutive Alternating |
| P11.28 | Fuel solenoid valve mode | | Normal | Normal Continuous |
| P11.29 | Glow-plugs mode | | Normal | Normal +Start +Cycle |
| P11.30 | Stop magnet mode | | Normal | Normal Pulse No pause |
| P11.31 | Deceleration mode before stopping | | Enabled | Enabled Disabled |

P11.01 – Engine running acknowledgement threshold by means of battery charger alternator voltage (D+/AC) value.

P11.02 – Engine running acknowledgement threshold by means of generator voltage (VAC) value.

P11.03 – Engine running acknowledgement threshold by means of generator frequency value.

P11.04 – Engine running acknowledgement threshold by means of "W" or pick-up speed signal.

P11.05 – Glow plugs preheating time before starting.

P11.06 – Engine temperature above which fuel preheating is disabled.

P11.07 – Max. fuel preheating time.

P11.08 – Time between the activation of fuel solenoid valve (EV) and of starter motor.

P11.09 – Total number of automatic engine start attempts.

P11.10 – Duration of start attempts.

P11.11 – Pause between one start attempt, during which no engine running signal detected, and next attempt.

P11.12 – Pause between one start attempt which was stopped due to a false start and next start attempt.

P11.13 – Alarms inhibition time immediately after engine start. Used for alarms with the "engine running" property activated. Example: min. oil pressure.

P11.14 – As for previous parameter, with reference in particular to max. speed alarms.

P11.15 – Programmed output energising time with decelerator function.

P11.16 – Engine temperature above which the deceleration function is disabled.

P11.17 – Cooling cycle mode. **Always** = The cooling cycle always runs every time the engine stops in automatic mode (unless there is an alarm that stops the engine immediately). **Load** = The cooling cycle only runs if the generator has connected to the load. **Temperature threshold** = The cooling cycle is only run for as long as the engine temperature is higher than the threshold specified in the following parameters.

P11.18 – Max. duration of the cooling cycle. Example: time between load disconnection from the generator and when the engine actually stops.

P11.19 – Temperature below which cooling is stopped.

P11.20 – Programmed output energising time with stop magnet function.

P11.21 – Time between the activation of the start output (starter motor) and the activation of the output programmed with the gas valve function.

P11.22 – Programmed output energising time with priming valve function.

P11.23 – Programmed output energising time with choke function.

P11.24 – Percentage threshold referred to set rated generator voltage, above which the output programmed as choke is de-energised.

P11.25 – Number of attempts with choke on.

P11.26 – Choke command mode for petrol/gasoline engines. **Consecutive** = All starts use the choke. **Alternate** = Starts alternate with and without choke.

P11.27 – Compressed air start output command mode: **OFF** = The output programmed with the compressed air start function is disabled.

Consecutive = The first half of the starts are with the starting output, the second half with the output programmed for compressed air.

Alternate = The starts alternate between activation of the starting output and the output programmed for compressed air.

P11.28 – Fuel solenoid valve output command mode: **Normal** = The fuel solenoid valve relay is disabled between start attempts. **Continuous** = The fuel solenoid valve remains enabled between start attempts.

P11.29 – Glow-plugs preheating output command mode: **Normal** = The glow-plugs output is energised for the set time before starting.

+Start = The glow-plugs output remains energised also during the starting phase. **+Cycle** = The glow-plugs output also remains energised during the entire starting cycle.

P11.30 – Stop magnet output command mode: **Normal** = The stop magnet output is energised during the stop phase and continues for the set time after the engine has stopped.

Pulse = The stop magnet output remains energised for a time pulse only.

No pause = The stop magnet output is not energised between one start and the next. The stop magnet output remains energised during the stop phase for the set time.

P11.31 – Deceleration mode before stopping: **Enabled** = During the last seconds of the cooling phase, before the engine is stopped, the deceleration output is activated (and/or deceleration command sent via CAN).

Disabled = The deceleration output is not activated.

| M12 – LOAD CHANGEOVER | | U/M | Default | Range |
|-----------------------|---|-----|------------|--------------------------------------|
| P12.01 | Mains/generator interlock time | s | 0.5 | 0.0-60.0 |
| P12.02 | Feedback alarm delay | s | 5 | 1-60 |
| P12.03 | Type of switchgear | | Contactors | Contactors Breakers Changeover |
| P12.04 | Generator contactor open for electrical fault | | ON | OFF-ON |
| P12.05 | Type of circuit breaker / c/o switch command | | Pulse | Continuous Pulse |
| P12.06 | Opening pulse duration | s | 10 | 0-600 |
| P12.07 | Closing pulse duration | s | 1 | 0-600 |
| P12.08 | Circuit breakers open command | | OBP | OBP OAP |

- P12.01** – Time from the opening of the Mains switchgear, after which the Generator switchgear closing command is given and vice versa.
P12.02 – Max. time for which the system tolerates that the input of the feedback on the switchgear state fails to correspond to the state controlled by the board, in the presence of the voltage necessary to move the same. Switchgear fault alarms are generated after this time.
P12.03 – Selects the type of switchgear. **Contactors** = Control with 2 outputs. **Motorised circuit breakers** = Control with 4 outputs (open-close Mains/open-close generator). **Motorised changeover switches** = Control with 3 outputs (Close Mains, Open both, close generator).
Note: When motorised circuit breakers or changeover switches are used, the use of feedback inputs is mandatory.
P12.04 – When set to ON, if any alarm with the electrical fault property enabled is active, the generator contactor is opened.
P12.05 – There are the following opening commands for motorised circuit breakers or switches:
Pulse = Maintained for the time needed to complete the operation and extended for the time set in the two following parameters. **Continuous** = Opening or closing command maintained continuously.
P12.06 - P12.07 – Duration time for pulse commands (min. time for each).
P12.08 – Defines the circuit breakers open command time: **OBP (Open Before Presence)** = Sends the open command to a device before there is voltage at the alternative source (for example: following a mains outage, the mains circuit breaker open command is sent immediately, before voltage is supplied by the generator).
OAP (Open After Presence) = The opening command is only generated after voltage from the alternative source is available.

| M13 – MAINS VOLTAGE CONTROL | | U/M | Default | Range |
|-----------------------------|---|-----|---------|----------------------------------|
| P13.01 | MIN. voltage limit | % | 85 | 70-100 |
| P13.02 | MIN. voltage delay | s | 5 | 0-600 |
| P13.03 | MAX. voltage limit | % | 115 | 100-130 / OFF |
| P13.04 | MAX. voltage delay | s | 5 | 0-600 |
| P13.05 | Mains restore within limits delay | s | 20 | 1-9999 |
| P13.06 | MIN./MAX. limit hysteresis | % | 3.0 | 0.0-5.0 |
| P13.07 | MAX. asymmetry limit | % | 15 | OFF / 5-25 |
| P13.08 | MAX. asymmetry delay | s | 5 | 0-600 |
| P13.09 | MAX. frequency limit | % | 110 | 100-120/OFF |
| P13.10 | MAX. frequency delay | s | 5 | 0-600 |
| P13.11 | MIN. frequency limit | % | 90 | OFF/80-100 |
| P13.12 | MIN. frequency delay | s | 5 | 0-600 |
| P13.13 | MAINS control mode | | INT | OFF INT EXT |
| P13.14 | MAINS control in RESET/OFF mode | | OFF | OFF ON OFF+GLOB ON+GLOB |
| P13.15 | MAINS control in MAN mode | | OFF | OFF ON OFF+GLOB ON+GLOB |
| P13.16 | Engine start after mains outage delay | s | OFF | OFF / 1-9999 |
| P13.17 | Mains delay if genset has not started | s | 2 | 0-999 |
| P13.18 | Delays repetition for mains out of limits with engine running and generator within limits | | OFF | OFF ON |

- Note: Menu not present in RGK800SA version.**
P13.01 – Percentage value for minimum voltage trip threshold.
P13.02 – Minimum voltage trip delay.
P13.03 – Percentage value for maximum voltage trip threshold (can be disabled).
P13.04 – Maximum voltage trip delay.
P13.05 – Delay after which the mains voltage is considered within the limits.
P13.06 – Percentage hysteresis calculated with reference to the minimum and maximum values set, to restore the voltage within the limits.
P13.07 – Maximum threshold for asymmetry between the phases, with reference to the rated voltage
P13.08 – Asymmetry trip delay.
P13.09 – Max. frequency trip threshold (can be disabled).
P13.10 – Max. frequency trip delay.
P13.11 – Min. frequency trip threshold (can be disabled).
P13.12 – Min. frequency trip delay.
P13.13 – **OFF** = Mains control disabled. **INT** = Mains controlled by RGK800.
EXT = Mains controlled by external device. A programmable input can be used with the External mains control function connected to the external mains control device.
P13.14 – **OFF** = Mains voltage control in RESET mode disabled. **ON** = Mains control in RESET mode enabled.
OFF+GLOB = Mains control in RESET disabled, but the relay programmed with the global alarm function trips or not depending on whether the mains is respectively absent or present.
ON+GLOB = Mains control in RESET enabled, and the relay programmed with the global alarm function trips or not depending on whether the mains is respectively absent or present.
P13.15 – See P13.14 with reference to MANUAL mode.
P13.16 – Engine start delay when mains voltage fails to meet set limits. If set to OFF, the starting cycle starts when the mains contactor opens.
P13.17 – Mains voltage delay within limits - engine has not started yet.
P13.18 – **OFF** = If the mains voltage goes out of limits with the engine running and generator voltage within limits, the changeover from mains to generator takes place.
ON = Should mains outage occur again, the delays of mains-out-of-limits thresholds are repeated even when the engine is running and generator voltage is within programmed limits.
Example: Mains outage - Generator starting - Mains return - New mains outage (repetition of delays) with engine running and generator voltage within limits.

| M14 – GENERATOR VOLTAGE CONTROL | | U/M | Default | Range |
|---------------------------------|--|-----|---------|-------------------|
| P14.01 | MIN. voltage limit | % | 80 | 70-100 |
| P14.02 | MIN. voltage delay | s | 5 | 0-600 |
| P14.03 | MAX. voltage limit | % | 115 | 100-130/OFF |
| P14.04 | MAX. voltage delay | s | 5 | 0-600 |
| P14.05 | Generator voltage return delay within limits | s | 20 | 1-9999 |
| P14.06 | MIN./MAX. limits hysteresis | % | 3.0 | 0.0-5.0 |
| P14.07 | MAX. asymmetry limit | % | 15 | OFF/5-25 |
| P14.08 | MAX. asymmetry delay | s | 5 | 0-600 |
| P14.09 | MAX. frequency limit | % | 110 | 100-120/OFF |
| P14.10 | MAX. frequency delay | s | 5 | 0-600 |
| P14.11 | MIN. frequency limit | % | 90 | OFF/80-100 |
| P14.12 | MIN. frequency delay | s | 5 | 0-600 |
| P14.13 | Generator voltage control mode | | INT | OFF INT EXT |
| P14.14 | Generator voltage low alarm delay | s | 240 | 1-600 |
| P14.15 | Generator voltage high alarm delay | s | 10 | 1-600 |

P14.01 – Percentage value for minimum voltage trip threshold.

P14.02 – Minimum voltage trip delay.

P14.03 – Percentage value for maximum voltage trip threshold (can be disabled).

P14.04 – Maximum voltage trip delay.

P14.05 – Delay after which the generator voltage is considered within the limits.

P14.06 – Percentage hysteresis calculated with reference to the minimum and maximum values set, to restore the voltage within the limits.

P14.07 – Maximum threshold for asymmetry between the phases, with reference to the rated voltage

P14.08 – Asymmetry trip delay.

P14.09 – Max. frequency trip threshold (can be disabled).

P14.10 – Max. frequency trip delay.

P14.11 – Min. frequency trip threshold (can be disabled).

P14.12 – Min. frequency trip delay.

P14.13 – **OFF** = Generator control disabled. **INT** = Generator controlled by RGK800. **EXT** = Generator controlled by external device. A programmable input must be used with “External mains control” function connected to the external generator control device.

P14.14 – A28 Low generator voltage alarm delay.

P14.15 – A29 High generator voltage alarm delay.

| M15 – GENERATOR PROTECTION | | U/M | Default | Range |
|----------------------------|--|-----|---------|-----------------------------|
| P15.01 | Max. current alarm limit threshold | % | OFF | 100-500/OFF |
| P15.02 | Max. current trip delay | s | 4.0 | 0.0-60.0 |
| P15.03 | Short-circuit alarm limit threshold | % | OFF | 100-500/OFF |
| P15.04 | Short-circuit trip delay | s | 0.02 | 0.00-10.00 |
| P15.05 | Protection reset time | s | 60 | 0-5000 |
| P15.06 | Protection class | | OFF | OFF P1 P2 P3 P4 |
| P15.07 | Thermal protection reset time | s | 60 | 0-5000 |
| P15.08 | Earth/ground fault alarm current threshold | A | OFF | OFF / 0.03 -30.00 |
| P15.09 | Earth/ground fault alarm delay | s | 0.02 | 0.00-60.00 |
| P15.10 | Current asymmetry trip threshold | % | 0 | 0-200 |
| P15.11 | Current asymmetry trip threshold delay | s | 5 | 0-600 |

P15.01 – Percentage threshold with reference to the rated current set for activating the A31 Max. generator current alarm.

P15.02 – Previous parameter threshold trip delay.

P15.03 – Percentage threshold with reference to the rated current set for activating the A32 Generator short-circuit alarm.

P15.04 – Previous parameter threshold trip delay.

P15.05 – Time after which the thermal protection alarm can be reset.

P15.06 – Selects one of the possible integral thermal protection curves for the generator. The curves can be custom set using the Customisation manager software. If set, this enables displaying the page with the thermal state of the generator.

P15.07 – Min. time required for reset after thermal protection tripped.

P15.08 – Trip threshold for Earth/Ground fault alarm (A36). If set, this enables displaying the corresponding page on the display.

P15.09 – Previous parameter threshold trip delay.

P15.10 – Percentage value for current asymmetry trip threshold referred to the rated value and to activate the relative A61 alarm. It is calculated with the following formula: $[\text{MAX} (L1-L2-L3) - \text{MIN} (L1-L2-L3)] / \text{Rated current value}$.

P15.11 – Previous parameter threshold trip delay.

| M16 – AUTOMATIC TEST | | U/M | Default | Range |
|----------------------|--|-----|---------|---------------------------|
| P16.01 | Enable automatic TEST | | OFF | OFF / ON / ON-RESET |
| P16.02 | Time interval between TESTS | dd | 7 | 1-60 |
| P16.03 | Enable TEST on Monday | | ON | OFF / ON |
| P16.04 | Enable TEST on Tuesday | | ON | OFF / ON |
| P16.05 | Enable TEST on Wednesday | | ON | OFF / ON |
| P16.06 | Enable TEST on Thursday | | ON | OFF / ON |
| P16.07 | Enable TEST on Friday | | ON | OFF / ON |
| P16.08 | Enable TEST on Saturday | | ON | OFF / ON |
| P16.09 | Enable TEST on Sunday | | ON | OFF / ON |
| P16.10 | TEST start time - hour | h | 12 | 00-23 |
| P16.11 | TEST start time - minutes | min | 00 | 00-59 |
| P16.12 | TEST duration | min | 10 | 1-600 |
| P16.13 | Automatic TEST with load switching | | OFF | OFF Load Dummy load |
| P16.14 | Automatic TEST run also with external stop enabled | | OFF | OFF/ON |

P16.01 – OFF = Automatic test disabled.

ON = Enable periodic test. This parameter can be changed directly on the front panel without using setup (see chapter Automatic Test) and its current status is shown on the relevant page of the display.

ON-RESET = If the generator has been started before the Automatic Test, the day and time for the next Test is recalculated as if the Automatic Test had been conducted at the set date and time.

P16.02 – Time interval between one periodic test and the next. On the day the period expires if the test was not enabled, the interval will be extended to the next enabled day.

P16.03... P16.09 – Enables the automatic test in each single day of the week. **OFF** means the test will not be performed on that day. **Warning! The calendar clock must be set to the right date and time.**

P16.10 – P16.11 – Sets the time (hour and minutes) when the periodic test starts. **Warning! The calendar clock must be set to the right date and time.**

P16.12 – Duration in minutes of the periodic test

P16.13 – Load management during the periodic test: **OFF** = The load will not be switched. **Load** = Enables switching the load from the mains to the generator.

Dummy load = The dummy load is switched in, while the installation load will not.

P16.14 – ON = Runs the periodic test even if the input programmed with the External stop function is enabled.

| M17 – MAINTENANCE (MNTn, n=1...3) | | U/M | Default | Range |
|-----------------------------------|--------------------------|-----|--------------|---|
| P17.n.01 | Service interval n | h | OFF | OFF/1-99999 |
| P17.n.02 | Service interval n count | | Engine hours | Total hours Engine hours Load hours |

Note: This menu is divided into 3 sections, which refer to 3 independent service intervals MNT1...MNT3.

P17.n.01 – Defines the programmed maintenance period, in hours. If set to OFF, this service interval is disabled.

P17.n.02 – Defines how the time is counted for the specific maintenance interval: **Total hours** = The actual hour count since the date of the previous service. **Engine hours** = The hour count of the engine operation.

Load hours = The hours count when the generator supplied the load.

| M18 – PROGRAMMABLE INPUTS (INPn, n=1...20) | | U/M | Default | Range |
|--|---------------------|-----------|---------|-----------------------------|
| P18.n.01 | INPn input function | (various) | | (see Input functions table) |
| P18.n.02 | Channel index (x) | | OFF | OFF / 1...99 |
| P18.n.03 | Contact type | | NO | NO/NC |
| P18.n.04 | Closing delay | s | 0.05 | 0.0-6000.0 |
| P18.n.05 | Opening delay | s | 0.05 | 0.0-6000.0 |

Note: This menu is divided into 20 sections that refer to 20 possible digital inputs INP1...INP20, which can be managed by the RGK800; INP1..INP8 on the base device and INP9...INP20 on any installed expansion modules. Inputs 17-18-19-20 make reference to analog inputs FUEL, TEMP, PRESS and AUX when these are set to OFF.

Example: If P10.01 is set to OFF, then FUEL terminal can be used as digital input INP17.

P18.n.01 – Function chosen for of the selected input (see programmable inputs functions table on page 32).

P18.n.02 – Index associated with the function programmed in the previous parameter.

Example: If the input function is set to commands menu Cxx execution and this input should perform command C07, adjust to 7.

P18.n.03 – Select type of contact: NO (Normally Open) or NC (Normally Closed).

P18.n.04 – Contact closing delay for selected input.

P18.n.05 – Contact opening delay for selected input.

| M19 – PROGRAMMABLE OUTPUTS (OUTn, n=1...16) | | U/M | Default | Range |
|---|-----------------------|-----|-----------|------------------------------|
| P19.n.01 | Output function OUTn | | (various) | (see Output functions table) |
| P19.n.02 | Function index (x) | | OFF | OFF / 1...99 |
| P19.n.03 | Normal/reverse output | | NOR | NOR / REV |

Note: This menu is divided into 16 sections that refer to 16 possible digital outputs OUT1...OUT16, which can be managed by the RGK800; OUT1...OUT10 on the base device and OUT11...OUT16 on any installed expansion modules.

P19.n.01 – Function chosen for of the selected output (see programmable outputs functions table on page 33).

P19.n.02 – Index associated with the function programmed in the previous parameter. Example: If the output function is set to Alarm Axx, and this output should be energised for alarm A31, then adjust to 31.

P19.n.03 – Sets the state of the output when the function associated with the same is inactive: **NOR** = output de-energised, **REV** = output energised.

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| M20 – COMMUNICATION (COMn, n=1...3) | | U/M | Default | Range |
|-------------------------------------|-----------------------|-----|-------------|--|
| P20.n.01 | Node serial address | | 01 | 01-255 |
| P20.n.02 | Serial speed | bps | 9600 | 1200 2400 4800 9600 19200 38400 57600 115200 |
| P20.n.03 | Data format | | 8 bit – n | 8 bit-n (no parity) 8 bit, odd 8bit, even 7 bit, odd 7 bit, even |
| P20.n.04 | Stop bits | | 1 | 1-2 |
| P20.n.05 | Protocol | | (various) | Modbus RTU Modbus ASCII Modbus TCP Propr. ASCII |
| P20.n.06 | IP address | | 192.168.1.1 | 000.000.000.000 – 255.255.255.255 |
| P20.n.07 | Subnet mask | | 0.0.0.0 | 000.000.000.000 – 255.255.255.255 |
| P20.n.08 | IP port | | 1001 | 0-9999 |
| P20.n.09 | Channel function | | Slave | Slave Gateway Mirror GPS |
| P20.n.10 | CLIENT/SERVER | | Server | Client Server |
| P20.n.11 | IP remote server | | 0.0.0.0 | 000.000.000.000 – 255.255.255.255 |
| P20.n.12 | IP remote server port | | 1001 | 0-9999 |
| P20.n.13 | IP gateway address | | 0.0.0.0 | 000.000.000.000 – 255.255.255.255 |

Note: This menu is divided into 3 sections for communication channels COM1..3.

Channel COM1 identifies serial port RS485, while COM2 and COM3 are for any communication ports on EXP expansion modules.

The front IR communication port has fixed communication parameters, so no setup is required.

P20.n.01 – Serial (node) address of the communication protocol.

P20.n.02 – Communication port transmission speed.

P20.n.03 – Data format. 7 bit settings can only be used for ASCII protocol.

P20.n.04 – Stop bit number.

P20.n.05 – Select communication protocol.

P20.n.06, P20.n.07, P20.n.08 – TCP-IP coordinates for applications with Ethernet interface. Not used with other types of communication modules.

P20.n.09 – Port function mode. **Slave** = Normal operating mode, the device answers the messages sent by an external master.

Gateway = The device analyses messages received locally (sent to its serial address) and forwards those addressed to other nodes through the RS485 interface. See chapter Communication channels.

Mirror = The communication channel is used for connection to a RGK...RD remote display.

GPS = Channel enabling for GPS module connection.

P20.n.10 – Selects if RGK800 operates as client or server.

P20.n.11, P20.n.12, P20.n.13 – TCP-IP coordinates when CLIENT mode is programmed.

| M21 - CANBUS | | U/M | Default | Range |
|--------------|---------------------|-----|---------|--|
| P21.01 | Engine ECU type | | OFF | OFF GENERIC J1939 VOLVO EDC VOLVO EMS VOLVO EMS2 SCANIA S6 DEUTZ EMR2 PERKINS 2800 JOHN DEERE IVECO NEF IVECO CURSOR |
| P21.02 | ECU operating mode | | M | M M+E M+E+T M+E+T+C |
| P21.03 | ECU power input | s | ON | OFF-1...600-ON |
| P21.04 | CAN alarms redirect | | OFF | OFF-ON |

P21.01 – Selects the type of engine ECU. If the ECU you wish to use cannot be found in the list of possible choices, select “Generic J1939”. In this case, the RGK800 only analyses messages on the CAN that meet SAE J1939 standards.

P21.02 – Communication mode on CANbus. **M** = Measurements only. The RGK800 only captures the measurements (pressure, temperature, etc.) sent the CAN by the engine ECU.

M+E – As well as the measurements, the RGK800 captures and displays the diagnostic and alarm messages of the ECU.

M+E+T – As above, but the RGK800 also sends the commands for diagnostics clearing, etc., to the CANbus.

M+E+T+C = As above, but engine start/stop commands are also managed via CANbus.

P21.03 – Extension of ECU power supply time by the output programmed with “ECU power” function, after the solenoid valve has been de-energised. This is also the time for which the ECU is powered after the keys have been pressed on the front keyboard, to read the measurements sent by the same. If set to OFF, ECU power supply is disabled while when programmed to ON, the ECU is continually powered.

P21.04 – Some of the main alarms are generated by a CAN message, instead of in the traditional way. **OFF** = The alarms (oil, temperature, etc.) are managed in the standard way. The ECU diagnostic reports are displayed on the page CAN Diagnostics. Usually, all the CAN alarms also generate the cumulative Amber lamp (warning) or Red lamp (critical alarm), which can be managed with their properties.

ON = CAN diagnostics messages with a direct correspondence in the alarms table also generate this alarm, as well as activating the Amber or Red lamp. See the alarms chapter for the list of redirectable alarms.

| M22 - LOAD MANAGEMENT | | U/M | Default | Range |
|-----------------------|---|-----|---------|---|
| P22.01 | Start-up for kW power threshold | | OFF | OFF-ON |
| P22.02 | Generator start-up threshold | kW | 0 | 0-9999 |
| P22.03 | Start-up threshold delay | s | 0 | 0-9999 |
| P22.04 | Stop threshold | kW | 0 | 0-9999 |
| P22.05 | Stop threshold delay | s | 0 | 0-9999 |
| P22.06 | Dummy load management | | OFF | OFF 1 STEP 2 STEPS 3 STEPS 4 STEPS PHASE-POW |
| P22.07 | Dummy load step switch-in threshold | kW | 0 | 0-9999 |
| P22.08 | Dummy load switch-in delay | s | 0 | 0-9999 |
| P22.09 | Dummy load step switch-out threshold | kW | 0 | 0-9999 |
| P22.10 | Dummy load switch-out delay | s | 0 | 0-9999 |
| P22.11 | Dummy load ON time | min | OFF | OFF/1-600 |
| P22.12 | Dummy load OFF time | min | OFF | OFF/1-600 |
| P22.13 | Load shedding | | OFF | OFF 1 STEP 2 STEPS 3 STEPS 4 STEPS |
| P22.14 | Load shedding step switch-in threshold | kW | 0 | 0-9999 |
| P22.15 | Load shedding switch-in delay | s | 0 | 0-9999 |
| P22.16 | Load shedding step switch-out threshold | kW | 0 | 0-9999 |
| P22.17 | Load shedding switch-out delay | s | 0 | 0-9999 |
| P22.18 | Max. kW alarm threshold | % | OFF | OFF/1-250 |
| P22.19 | Max. kW alarm delay | s | 0 | 0-9999 |

P22.01...P22.05 – Used to start the generator when the load exceeds a threshold in kW measured on a branch of the mains, normally to prevent exceeding the maximum limit set by the energy provider by supplying the load using the generator. When the load drops to below P22.04, the generator is stopped and the load is switched back to the mains.

P22.06 – **1-2-3-4 STEPS** = Enable dummy load management, defining the number of steps to use for the same. When the generator load is too low, dummy loads are switched in for the maximum number of steps set on the basis of incremental logic.

PHASE-POW = Manages dummy load taking into account the phase power. For output functions, STEP1 corresponds to phase L1, STEP2 phase L2, STEP3 phase L3.

ON and OFF thresholds only refer to the phase power.

P22.07...P22.10 – Thresholds and delays for switching-in or switching-out a dummy load step.

P22.11 - P22.12 – If enabled, the dummy load will be cyclically switched in and out at the time intervals defined by these parameters.

P22.13 – Enable non-priority load management (load shedding) defining the number of load sections to disconnect. When the load on the generator is too high, in automatic mode, non-priority loads are disconnected in various sections, on the basis of incremental logic.

P22.14...P22.17 – Thresholds and delays for switching-out or switching-in a non-priority load section.

P22.18 - P22.19 – Thresholds and delays for generating the alarm A35-Generator kW threshold exceeded.

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| M23 - MISCELLANEOUS | | U/M | Default | Range |
|---------------------|---------------------------------|-----|--------------|---|
| P23.01 | Rent hours preloading | h | OFF | OFF/1-99999 |
| P23.02 | Rent hours calculation method | | Engine hours | Total hours Engine hours Load hours |
| P23.03 | Enable emergency input | | ON | OFF/ON |
| P23.04 | Mutual standby function | | OFF | OFF COM1 COM2 COM3 |
| P23.05 | Mutual standby alternating mode | | Start | Start Time |
| P23.06 | Mutual standby alternating time | h | 12 | 1-1000 |
| P23.07 | Remote alarms mode | | OFF | OFF OUT CAN |
| P23.08 | EJP function mode | | Normal | Normal EJP EJP-T SCR |
| P23.09 | EJP starting delay | min | 25 | 0-240 |
| P23.10 | EJP switching delay | min | 5 | 0-240 |
| P23.11 | ELP re-switching block | | ON | OFF/ON |
| P23.12 | Start on mains feedback alarm | | OFF | OFF/ON |
| P23.13 | Operating mode output | | OFF | OFF O M O+M ... |
| P23.14 | Harmonic analysis | | | OFF THD HAR |

- P23.01** – Number of rent hours to preload in the counter on command C16-Reload rent hours.
- P23.02** – Rent hours countdown count mode. When this counter reaches zero, the A48 Rent hours expired alarm is generated.
Total hours = Decreasing count on the basis of the real time expired.
Engine hours = The operating hours of the engine.
Load hours = Load supplying hours.
- P23.03** – Enable emergency input incorporated in terminal +COM1, common positive of outputs OUT1 and OUT2 (default function: Start and fuel solenoid valve).
ON = When +COM1 is disconnected from the positive (+) terminal of the battery, the A23-Emergency stop alarm is automatically generated.
OFF = When +COM1 is disconnected from battery terminal (+/positive), no alarm is generated.
- P23.04** – Enables Mutual standby function and defines the communication port used to connect to an alternative generator.
- P23.05** – Alternating genset mode for mutual standby function. **Start** = The gensets alternate at every service response. If needed, the genset with the lowest number of operating hours is started, and remains running as long as required (until the conditions that started the genset are no longer applicable).
Time = If needed, the genset with the lowest number of operating hours is started, and remains running until its operating hours exceed those of the alternative genset by an amount equal to or greater than those programmed with the following parameter. When this condition arises, the load is switched from one genset to the other.
- P23.06** – Maximum deviation for the operating hours of the gensets in mutual standby. See previous parameter.
- P23.07** – Type of connection between RGK800 and RGKRR remote relay unit.
OFF = Communication disabled.
OUT = Communication through programmable output set as “Remote alarms” function, connected to the digital input of the RGKRR.
CAN = The RGK800 and RGKRR communicate through the CAN interface. Unless there are indications to the contrary for a specific ECU, it is usually possible to communicate simultaneously with the RGKRR and the engine ECU on the same CAN line. Refer to RGKRR manual for more details.
- P23.08** – **Normal** = Standard operation in AUT mode.
EJP = 2 programmable inputs are used, set with the functions Remote starting and Remote switching for EJP. When the starting input closes the engine start (P23.09) delay is enabled, after which the start cycle runs. Then, when the remote switching consent is received, if the engine started properly, the load will be switched from the mains to the generator. The load is restored to the mains by the remote switching consent opening and the genset runs a stop cycle when the start input opens. The EJP function is only enabled if the system is in automatic mode. The protection and alarms function as usual.
EJP-T = The EJP/T function is a simplified variation of the previous EJP and, in this case, the engine start is controlled in the same way, but the load switching is done after a time delay instead of when an external signal is provided. This function therefore uses only one digital input, the starting input. The switching delay starts from when the start command closes, and can be set using parameter P23.10 Switching delay.
SCR = The SCR function is very similar to the EJP function. In this mode, the starting input enables genset starting as for EJP, without waiting for delay P23.09. The remote switching input still has a switching consent function after Switching delay P23.10.
- P23.09** – Delay between the closing of the generator EJP starting signal and the beginning of the starting cycle.
- P23.10** – Delay for switching the load from mains to generator in EJP and SCR mode.
- P23.11** – If ON, in EJP and EJP-T mode, the load will not be switched back to the mains in the case of a generator malfunction, but only when the signals on the EJP inputs give the consent.
- P23.12** – If On, in the case of a mains switchgear malfunction which prevents closing and the consequent generation of the alarm A41-Mains contactor anomaly, the engine is started and the load switched to the generator.
- P23.13** – Defines in which operating mode the programmed output with the Operating mode function is enabled. For example, if this parameter is programmed for O+M, the Operating mode output will be enabled when the RGK800 is in OFF or MAN mode.
- P23.14** – Defines whether the harmonic analysis is performed on the generator voltage and current waveforms. **OFF** = Harmonic analysis not performed.
THD = THD (Total Harmonic Distortion) display and calculation only.
THD+HAR = THD display and calculation of the harmonic spectrum and waveform.

| M24 - LIMIT THRESHOLDS (LIMn, n = 1...16) | | U/M | Default | Range |
|---|------------------------------|-----|---------|--|
| P24.n.01 | Reference measurement | | OFF | OFF- (measur. list) AINx CNTx |
| P24.n.02 | Reference measurement source | | OFF | OFF MAINS GEN |
| P24.n.03 | Channel no. (x) | | 1 | 1..99 |
| P24.n.04 | Function | | Max | Max Min Min+Max |
| P24.n.05 | Upper threshold | | 0 | -9999...+9999 |
| P24.n.06 | Multiplier | | x1 | /100 – x10k |
| P24.n.07 | Delay | s | 0 | 0.0 – 600.0 |
| P24.n.08 | Lower threshold | | 0 | -9999...+9999 |
| P24.n.09 | Multiplier | | x1 | /100 – x10k |
| P24.n.10 | Delay | s | 0 | 0.0 – 600.0 |
| P24.n.11 | Idle state | | OFF | OFF-ON |
| P24.n.12 | Memory | | OFF | OFF-ON |

Note: This menu is divided into 16 sections for the limit thresholds LIM1..16.

P24.n.01 – Defines to which RGK800 measurements the limit threshold applies.

P24.n.02 – If the reference measurement is an electrical measurement, this defines if it refers to the generator or to mains.

P24.n.03 – If the reference measurement is an internal multichannel measurement (AINx for example), the channel is defined.

P24.n.04 – Defines the operating mode of the limit threshold. **Max** = LIMn enabled when the measurement exceeds P24.n.03. P24.n.06 is the reset threshold.

Min = LIMn enabled when the measurement is less than P24.n.06. P24.n.03 is the reset threshold. **Min+Max** = LIMn enabled when the measurement is greater than P24.n.03 or less than P24.n.06.

P24.n.05 - P24.n.06 - Define the upper threshold, obtained by multiplying value P24.n.05 by P24.n.06.

P24.n.07 – Upper threshold trip delay.

P24.n.08, P24.n.09, P24.n.10 - As above, with reference to the lower threshold obtained by multiplying value P24.n.08 by P24.n.09.

P24.n.11 – Inverts the state of limit LIMn.

P24.n.12 – Defines whether the threshold remains stored and is reset manually through commands menu (ON) or if it is reset automatically (OFF).

| M25 - COUNTERS (CNTn, n = 1...8) | | U/M | Default | Range |
|----------------------------------|----------------------------|-----|---------|---|
| P25.n.01 | Count source | | OFF | OFF ON INPx OUTx LIMx REMx PLCx RALx |
| P25.n.02 | Channel number (x) | | 1 | 1-99 |
| P25.n.03 | Multiplier | | 1 | 1-1000 |
| P25.n.04 | Divisor | | 1 | 1-1000 |
| P25.n.05 | Description of the counter | | CNTn | (Text – 16 characters) |
| P25.n.06 | Unit of measure | | UMn | (Text – 6 characters) |
| P25.n.07 | Reset source | | OFF | OFF-ON-INPx- OUTx-LIMx-REMx- PLCx-RALx |
| P25.n.08 | Channel number (x) | | 1 | 1-16 |

Note: This menu is divided into 8 sections for counters CNT1..8

P25.n.01 – Signal that increments the count (on rising edge).

This may be the power-up of the RGK800 (ON), when a threshold is exceeded (LIMx), an external input is enabled (INPx), or for a logic condition (PLCx), etc.

P25.n.02 – Channel number x with reference to the previous parameter.

P25.n.03 – Multiplier K. The counted pulses are multiplied by this value before being displayed.

P25.n.04 – Divisional K. The counted pulses are divided by this value before being displayed. If other than 1, the counter is displayed with 2 decimal points.

P25.n.05 – Counter description. 16-character free text.

P25.n.06 – Counter unit of measure. 6-character free text.

P25.n.07 – Signal that clears the count. As long as this signal is enabled, the count remains zero.

P25.n.08 – Channel number x with reference to the previous parameter.

| M26 - USER PAGES (PAGn, n = 1...4) | | U/M | Default | Range |
|------------------------------------|---------------|-----|---------|--------------------|
| P26.n.01 | Enable page | | OFF | OFF – ON |
| P26.n.02 | Title | | PAGn | (text - 16 char) |
| P26.n.03 | Measurement 1 | | OFF | OFF/ (all measur.) |
| P26.n.04 | Measurement 2 | | OFF | OFF/ (all measur.) |
| P26.n.05 | Measurement 3 | | OFF | OFF/ (all measur.) |

Note: This menu is divided into 4 sections for the user pages PAG1...PAG4.

P26.n.01 – Enables user page PAGn.

P26.n.02 – User page title. Free text.

P26.n.03, P26.n.04, P26.n.05 – Measurements which will be displayed in the text boxes on the user page.

| M27 - REMOTE ALARM/STATUS (RALn, n = 1...24) | | U/M | Default | Range |
|--|-----------------------|-----|-----------|------------------------------|
| P27.n.01 | Output function RALn | | (various) | (See Output functions table) |
| P27.n.02 | Function index (x) | | OFF | OFF / 1...99 |
| P27.n.03 | Normal/reverse output | | NOR | NOR / REV |

Note: This menu is divided into 24 sections for the status/alarms remote variables RAL1...RAL24, available with the RGKRR remote unit.

P27.n.01 – Selects the remote output function RALn. The remote outputs (relays of RGKRR remote unit) can have the same functions as local outputs, including operating status, alarms, etc.

P27.n.02 – Index associated with the function programmed in the previous parameter. Example: If the remote output function is set to Alarm Axx, and this output is to be energised for alarm A31, then adjust to 31.

P27.n.03 – Sets the state of the output when the function associated with the same is inactive: **NOR** = output de-energised, **REV** = output energised.

| M28 - PROGRAMMABLE RESISTIVE SENSOR | | U/M | Default | Range |
|-------------------------------------|-------------------------------------|-----|---------|--|
| P28.01 | Resistive sensor curve | | OFF | OFF VDO VEGLIA DATCON CUSTOM |
| P28.02 | Resistive sensor offset | Ohm | 0 | -30.0...+30.0 |
| P28.03 | Description | | AINn | (text - 16 char.) |
| P28.04 | Unit of measure | | UMn | (text - 16 char.) |
| P28.05 | K multiplier for X-axis coordinates | | 1.000 | 0.001-10.000 |
| P28.06 | Offset for X-axis coordinates | | 0 | -1000...+1000 |

P28.01 – Selects which Measurement/Ohm curve to use. The curves can be custom set using the Customisation Manager software RGKSW10.

P28.02 – This allows to add or subtract an offset in Ohms to/from the set curve, for instance to compensate for cable length. This value can also be set without opening setup by using the quick function in the commands menu which permits to view the measurements while calibrating.

P28.03 – Description of the measurement associated with the programmable resistive sensor (free text).

P28.04 – Unit of measure (free text).

P28.05 – Multiplying factor K of X-axis coordinates defined in Customisation manager software, section AUX Sensor.

P28.06 – Offset value to add to each X-axis coordinate defined in Customisation manager software, section AUX Sensor.

Example: A = X-axis value defined in Customisation manager software, section AUX Sensor.

B = P20.05

C = P20.06

New X axis = (A*B) + C.

| M29 - ANALOG INPUTS (AINn, n=1...6) | | U/M | Default | Range |
|-------------------------------------|----------------------|-----|---------|--|
| P29.n.01 | Type of input | | OFF | OFF 0...20mA 4...20mA 0...10V -5V...+5V PT100 |
| P29.n.02 | Start of scale value | | 0 | -9999 - +9999 |
| P29.n.03 | Multiplier | | x1 | /100 – x1k |
| P29.n.04 | End of scale value | | 0 | -9999 - +9999 |
| P29.n.05 | Multiplier | | x1 | /100 – x1k |
| P29.n.06 | Description | | AINn | (text - 16 char.) |
| P29.n.07 | Unit of measure | | UMn | (text - 6 char.) |

Note: This menu is divided into 6 sections for the analog inputs AIN1...AIN6, available with the EXP1004 expansion modules.

P29.n.01 – Specifies the type of sensor connected to analog input. The sensor must be connected to the appropriate terminal for the type selected. See input module manual.

P29.n.02 and P29.n.03 – Define the value to display for a min. sensor signal, in other words at the start of the range defined by the type (0mA, 4mA, 0V, -5V, etc.). Note: These parameters are not used for a PT100 sensor type.

P29.n.04 - P29.n.05 – Define the value to display for a max. sensor signal, in other words at the end of scale of the range defined by the type (20ma, 10V, +5V, etc.). Note: These parameters are not used for a PT100 sensor type.

P29.n.06 – Description of measurements associated with analog input. 16-character free text.

P29.n.07 – Unit of measure 6-character free text. If the input is PT100 type and the text of the unit of measure is °F, the temperature will be displayed in degrees Fahrenheit, otherwise it will be in degrees Celsius.

Example of application: The analog input AIN3 must read a 4...20mA signal from an electronic level sensor, to display with the description 'Reserve fuel tank level', with a full scale of 1500 litres.

So, you must program section 3 of this menu, that is referred to AIN3.

P29.3.01 = 4...20mA

P29.3.02 = 0 (0 x 1 = 0 litres, initial scale value that corresponds to 4mA)

P29.3.03 = x1

P29.3.04 = 1500 (1500 x 1 = 1500, full scale value that corresponds to 20mA)

P29.3.05 = x1

P29.3.06 = 'Reserve tank level'

P29.3.07 = ' litres'.

| M30 - ANALOG OUTPUTS (AOU _n , n=1...6) | | U/M | Default | Range |
|---|-----------------------|-----|---------|--|
| P30.n.01 | Type of output | | OFF | OFF 0..20mA 4...20mA 0...10V -5V...+5V |
| P30.n.02 | Reference measurement | | OFF | OFF- (meas.) |
| P30.n.03 | Reference source | | OFF | OFF MAINS GEN |
| P30.n.04 | Channel nr. (x) | | 1 | 1-99 |
| P30.n.05 | Start of scale value | | 0 | -9999 - +9999 |
| P30.n.06 | Multiplier | | x1 | /100 – x10k |
| P30.n.07 | End of scale value | | 0 | -9999 - +9999 |
| P30.n.08 | Multiplier | | x1 | /100 – x10k |

Note: This menu is divided into 6 sections for the analog outputs AOU1...AOU6 available with EXP1005 expansion module.

P30.n.01 – Specifies the type of output analog signal. The sensor must be connected to the appropriate terminal on the basis of the type selected. See analog output module manual.

P30.n.02 – Measurement on which the analog output value depends.

P30.n.05 and P30.n.06 – Define the value of the measurement that corresponds to a min. output value in the range (0mA, 4mA, 0V, -5V, etc.).

P30.n.07 and P30.n.08 – Define the value of the measurement that corresponds to a max. value in the range (20mA, 10V, +5V, etc.).

Application example: The analog output AOU2 must emit a 0..20mA signal proportional to the total active power output of the generator, from 0 to 500kW.

So, you must program section 2 of this menu, that is referred to AOU2.

P30.2.01 = 0...20mA

P30.2.02 = kW tot

P30.2.03 = GEN

P30.2.04 = 1 (not used)

P30.2.05 = 0 (0 x 1 = 0 W, initial scale value)

P30.2.06 = x1

P30.2.07 = 500 (500 x 1k = 500 kW, full scale value)

P30.2.08 = x1k

| M31 - ENERGY PULSES (PUL _n , n=1...6) | | U/M | Default | Range |
|--|----------------|-----|---------|---|
| P31.n.01 | Pulse source | | OFF | OFF kWh M kWh G kvarh M kvarh G kVA M kVA G |
| P31.n.02 | Counting unit | | 100 | 10/100/1k/10k |
| P31.n.03 | Pulse duration | s | 0.1 | 0.1-1.00 |

Note: This menu is divided into 6 sections, for the generation of energy consumption pulse variables PUL1...PUL6.

P31.n.01 – Defines which energy source should generate pulsing for the 6 possible counters managed by the RGK800.

kWh M = Mains active energy. **kWh G** = Generator active energy. **kvarh M** = Mains reactive energy. **kvarh G** = Generator reactive energy.

kVA M = Mains apparent energy. **kVA G** = Generator apparent energy.

P31.n.02 – The quantity of energy which must accumulate for a pulse to be emitted (for example: 10Wh, 100Wh, 1kWh, etc.).

P31.n.03 – Pulse duration.

Application example: For every 0.1 kWh output by generator, a pulse of 100ms has to be generated on output OUT10.

First of all you should generate an internal pulse variable, for instance PUL1. Then program section 1 of this menu as follows:

P31.1.01 = kWh G (generator active energy)

P31.1.02 = 100Wh (corresponds to 0,1 kWh)

P31.1.03 = 0.5.

Now set output OUT10 and link it to PUL1:

P19.10.01 = PULx

P19.10.02 = 1 (PUL1)

P19.10.03 = NOR.

| M32 - USER ALARMS (UAN, n=1...8) | | U/M | Default | Range |
|----------------------------------|--------------------|-----|---------|---|
| P32.n.01 | Alarm source | | OFF | OFF INPx OUTx LIMx REMx PLCx RALx |
| P32.n.02 | Channel number (x) | | 1 | 1-8 |
| P32.n.03 | Text | | UAN | (text – 20 char) |

Note: This menu is divided into 8 sections for user alarms UA1...UA8.

P32.n.01 – Defines the digital input or internal variable that generates the user alarm when it is activated.

P32.n.02 – Channel number x with reference to the previous parameter.

P32.n.03 – Free text that appears in the alarm window.

Example of application: User alarm UA3 must be generated by input INP5 closing, and the message 'Doors open' must be displayed.

In this case, set the section of menu 3 (for alarm UA3):

P32.3.01 = INPx

P32.3.02 = 5

P32.3.03 = 'Doors open'

ALARM TABLE

| CODE | DESCRIPTION | DEFAULT ALARM PROPERTIES | | | | | | | | | | | | |
|------|--|--------------------------|----------|--------------|-------------|-------------|-------|-------------|----------------|----------------|----------|-------|--------|--|
| | | Enabled | Retained | Global alarm | Mech. fault | Elec. fault | Siren | Engine stop | Engine cooling | Engine running | Inhibit. | Modem | No LCD | |
| A01 | Engine temperature warning (analog sensor) | | | • | | | • | | | • | | | • | |
| A02 | High engine temperature (analog sensor) | | • | • | • | | | • | | • | | | • | |
| A03 | Analog temperature sensor fault | | • | • | • | | | • | | • | | | • | |
| A04 | High engine temperature (digital sensor) | • | • | • | • | | | • | • | • | | | • | |
| A05 | Low engine temperature (analog sensor) | | | • | | | | • | | | | | • | |
| A06 | Oil pressure warning (analog sensor) | | | • | | | | • | | • | | | • | |
| A07 | Low oil pressure (analog sensor) | | • | • | • | | | • | • | • | | | • | |
| A08 | Analog pressure sensor fault | | • | • | • | | | • | | | | | • | |
| A09 | Low oil pressure (digital sensor) | • | • | • | • | | | • | • | • | | | • | |
| A10 | Digital pressure sensor fault | • | • | • | • | | | • | | | | | • | |
| A11 | Fuel level warning (analog sensor) | | | • | | | | • | | | | | • | |
| A12 | Low fuel level (analog sensor) | | | • | | | | • | | | | | • | |
| A13 | Analog level sensor fault | | • | • | • | | | • | | | | | • | |
| A14 | Low fuel level (digital sensor) | • | | • | | | | • | | | | | • | |
| A15 | High battery voltage | • | • | • | • | | | • | | | | | • | |
| A16 | Low battery voltage | • | • | • | • | | | • | | | | | • | |
| A17 | Inefficient battery | • | • | • | • | | | • | | | | | • | |
| A18 | Battery alternator fault | • | • | • | • | | | • | • | | | | • | |
| A19 | "Pick-up/W" signal fault | | • | • | • | | | • | | • | | | • | |
| A20 | "Pick-up/W" low engine speed | | • | • | • | | | • | | • | | | • | |
| A21 | "Pick-up/W" high engine speed | | • | • | • | | | • | • | • | | | • | |
| A22 | Starting failed | • | • | • | • | | | • | • | | | | • | |
| A23 | Emergency stopping | • | • | • | | • | | • | • | | | | • | |
| A24 | Unexpected stop | • | • | • | • | | | • | • | | | | • | |
| A25 | Engine stopping failure | • | • | • | • | | | • | • | | | | • | |
| A26 | Low generator frequency | • | • | • | • | • | | • | • | • | | | • | |
| A27 | High generator frequency | • | • | • | • | • | | • | • | • | | | • | |
| A28 | Low generator voltage | • | • | • | | • | | • | • | • | | | • | |
| A29 | High generator voltage | • | • | • | | • | | • | • | • | | | • | |
| A30 | Generator voltage asymmetry | | • | • | | • | | • | • | • | | | • | |
| A31 | Max. generator current | • | • | • | | • | | • | • | • | | | • | |
| A32 | Generator short-circuit | • | • | • | | • | | • | • | • | | | • | |
| A33 | Generator overload | • | • | • | | • | | • | • | • | | | • | |
| A34 | Generator external protection trip | • | • | • | | • | | • | • | • | | | • | |
| A35 | Generator kW threshold exceeded | • | • | • | | • | | • | • | • | | | • | |
| A36 | Generator earth/ground fault | | • | • | | • | | • | • | • | | | • | |
| A37 | Generator phase sequence error | | • | • | | • | | • | • | • | | | | |
| A38 | Mains phase sequence error | • | | | | • | | | | | | | | |
| A39 | System frequency setting error | • | | | | • | | | | | | | | |
| A40 | Generator contactor anomaly | • | • | • | | • | | • | | | | | • | |
| A41 | Mains contactor anomaly | • | • | • | | • | | • | | | | | • | |
| A42 | Maintenance request 1 | • | • | • | | | | • | | | | | • | |
| A43 | Maintenance request 2 | • | • | • | | | | • | | | | | • | |
| A44 | Maintenance request 3 | • | • | • | | | | • | | | | | • | |
| A45 | System Error | • | | | | | | | | | | | | |
| A46 | Tank too empty | | | • | • | | | • | • | | | | | |
| A47 | Tank too full | | | • | | | | • | | | | | | |
| A48 | Rent hours expired | | | • | | | | • | • | • | | | | |
| A49 | Radiator coolant level low | • | • | • | • | | | • | • | • | | | • | |
| A50 | Manual circuit breaker closed | | • | • | | • | | • | • | | | | | |
| A51 | Manual circuit breaker open | | • | • | | • | | • | • | | | | | |
| A52 | Battery charger alarm | | • | • | | • | | • | | | | | | |
| A53 | CANbus Red lamp alarm | • | • | • | • | | | • | • | | | | • | |
| A54 | CANbus Amber lamp alarm | • | | • | • | | | • | | | | | | |
| A55 | CANbus error | • | • | • | • | | | • | | | | | • | |
| A56 | Fuel theft | • | • | • | | | | • | | | | | • | |
| A57 | Cannot change configuration | • | • | • | | • | | • | | | | | • | |
| A58 | Water in fuel | • | • | • | • | | | • | • | | | | • | |
| A59 | Fuel filling pump failure | • | • | • | • | | | • | • | | | | • | |
| A60 | Mutual standby link error | • | | | | | | | | | | | | |
| A61 | Current asymmetry | • | • | • | | • | | • | • | • | | | • | |
| UA1 | UA1 | | | | | | | | | | | | | |
| UA2 | UA2 | | | | | | | | | | | | | |
| UA3 | UA3 | | | | | | | | | | | | | |
| UA4 | UA4 | | | | | | | | | | | | | |
| UA5 | UA5 | | | | | | | | | | | | | |
| UA6 | UA6 | | | | | | | | | | | | | |
| UA7 | UA7 | | | | | | | | | | | | | |
| UA8 | UA8 | | | | | | | | | | | | | |

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BG

ALARMS

- When an alarm is generated, the display will show an alarm icon, the code and the description of the alarm in the language selected.



- If the navigation keys in the pages are pressed, the pop-up window showing the alarm indications will disappear momentarily, to reappear again after a few seconds.
- The red LED near the alarm icon on the front panel will flash when an alarm is active.
- If enabled, the local and remote alarm buzzers will be activated.
- Alarms can be reset in one of the following ways:
 - by pressing the key ✓
 - by pressing the OFF key.
- Switching to OFF mode prevents unexpected engine starting after resetting the alarm.
- If the alarm cannot be reset, the problem that generated the alarm must still be solved.
- In the case of one or more alarms, the RGK800 operation depends on the property settings of the active alarms.

ALARM PROPERTIES

Various properties can be assigned to each alarm, including user alarms (User Alarms, UAX):

- Alarm enabled** - General enabling of the alarm. If the alarm is not enabled, it is as if it does not exist.
- Retained alarm** - Remains stored even if the cause of the alarm has been eliminated.
- Global alarm** - Activates the output assigned to this function.
- Mechanical fault** - Activates the output assigned to this function.
- Electrical fault** - Activates the output assigned to this function.
- Siren** - Activates the output assigned to this function, as configured in the acoustic Alarms menu.
- Engine stop** - Stops the engine.
- Engine cooling** - Stops the engine after a cooling cycle, depending on the cooling mode programming (duration and conditions).
- Active with engine running** - The alarm is only generated when the engine is running and the alarms activation time has elapsed.
- Inhibition** - The alarm can be temporarily disabled by activating an input that can be programmed with the Inhibit alarms function.
- Modem** - A modem is connected as configured in setup.
- No LCD** - The alarm is managed normally, but not shown on the display.

ALARM DESCRIPTION

| CODE | DESCRIPTION | ALARM EXPLANATION |
|------|---|--|
| A01 | Engine temperature prealarm (analog sensor) | Engine temperature higher than prealarm threshold set in P09.06. |
| A02 | High engine temperature (analog sensor) | Engine temperature higher than alarm threshold set in P09.07. |
| A03 | Analog temperature sensor fault | Open circuit (disconnected) of resistive temperature sensor. If the measurement has been sent by the CAN, the alarm is generated by a specific diagnostics message. |
| A04 | High engine temperature (digital sensor) | Engine overtemperature signal on activation of digital input programmed with relevant function. |
| A05 | Low engine temperature (analog sensor) | Engine temperature lower than alarm threshold set in P09.08. |
| A06 | Oil pressure prealarm (analog sensor) | Engine oil pressure lower than prealarm threshold set in P08.06. |
| A07 | Low oil pressure (analog sensor) | Engine oil pressure lower than alarm threshold set in P08.07. |
| A08 | Analog pressure sensor fault | Open circuit (disconnected) of resistive pressure sensor. If the measurement has been sent by the CAN, the alarm is generated by a specific diagnostics message. |
| A09 | Low oil pressure (digital sensor) | Low oil pressure signal on activation of digital input programmed with relevant function. |
| A10 | Digital pressure sensor fault | Engine stopped for over one minute, but oil sensor failed to close to signal no pressure. Presumed broken connection. |
| A11 | Fuel level prealarm (analog sensor) | Fuel level lower than prealarm threshold set in P10.07. |
| A12 | Low fuel level (analog sensor) | Fuel level lower than alarm threshold set in P10.08. |
| A13 | Analog level sensor fault | Open circuit (disconnected) of resistive fuel level sensor. |
| A14 | Low fuel level (digital sensor) | Low fuel level signal on activation of digital input programmed with relevant function. |
| A15 | High battery voltage. | Battery voltage higher than threshold set in P05.02 for time greater than P05.04. |
| A16 | Low battery voltage | Battery voltage lower than threshold set in P05.03 for time greater than P05.04. |
| A17 | Inefficient battery | Starting attempts expired with battery voltage below min. starting threshold. |
| A18 | Battery alternator fault | This alarm is generated when the engine is running (voltage and/or frequency from generator or 'Pick-up/W') but the battery-charger alternator signal (D+) remains below engine running voltage threshold P11.01 for more than 4 seconds. |
| A19 | "Pick-up/W" signal fault | With speed measurement enabled, This alarm is generated when the engine is running (battery-charger alternator signal present or voltage and/or frequency from generator) but the 'Pick-up/W' speed signal has not been detected within 5 seconds. If the measurement has been sent by the CAN, the alarm is generated by a specific diagnostics message. |
| A20 | "Pick-up/W" low engine speed | This alarm is generated when the engine is running (battery-charger alternator signal present or voltage and/or frequency from generator) but the 'Pick-up/W' speed signal remains below threshold P07.05 for longer than the time set in P07.06. |
| A21 | "Pick-up/W" high engine speed | This alarm is generated when the 'Pick-up/W' speed signal remains above threshold P07.03 for longer than the time set in P07.04. |
| A22 | Starting failed | This alarm is generated after all set number of start attempts and the engine has not started. |
| A23 | Emergency stopping | This alarm is generated when terminal +COM1 is disconnected (with P23.03 enabled) or by opening a digital input programmed with the 'Emergency stop' function'. |
| A24 | Unexpected stop | This alarm is generated when the engine stops on its own after the alarms activation time without it being stopped by the controller. |
| A25 | No stop | Alarm generated if the engine still has not stopped 65 seconds after the stop phase began. |
| A26 | Low generator frequency | This alarm is generated when the engine is running but the generator frequency is lower than P14.11 for the time set in P14.12. |
| A27 | High generator frequency | This alarm is generated when the generator frequency is higher than P14.09 for the time set in P14.10. |
| A28 | Low generator voltage | This alarm is generated when the engine is running but the generator voltage is lower than P14.01 for the time set in P14.14 |
| A29 | High generator voltage | This alarm is generated when the generator voltage is higher than P14.13 for the time set in P14.15. |
| A30 | Generator voltages asymmetry | Alarm generated when imbalance among the generator voltages exceeds P14.07 for the time set in P14.08. |

(continued on page 31)

ALARM DESCRIPTION (continued from page 30)

| CODE | DESCRIPTION | ALARM EXPLANATION |
|-------------------|--|--|
| A31 | Max. generator current | The generator current exceeds the percentage threshold set in P15.01 for the delay set in P15.02. When this alarm is generated, you must wait for the time set in P15.05 to elapse before resetting it. |
| A32 | Generator short-circuit | The generator current exceeds the percentage threshold set in P15.03 for the delay set in P15.04. |
| A33 | Generator overload | Electronic thermal protection trip because of current percentage and protection curve selected. When this alarm is generated, you must wait for the time set in P15.07 to elapse before resetting it. |
| A34 | Generator external protection intervention | If programmed, this alarm is generated when the contact of the digital input of the generator thermal protection closes, if the genset is running. |
| A35 | Generator kW threshold exceeded | The generator active power exceeds the percentage threshold set in P22.18 for the delay set in P22.19. |
| A36 | Generator earth/ground fault | The earth/ground leakage current of the generator has exceeded the threshold set as an absolute value in P15.08 for the delay set in P15.09. |
| A37 | Generator phase sequence error | The generator phase sequence does not correspond to the programmed sequence. |
| A38 | Mains phase sequence error | The mains phase sequence does not correspond to the programmed sequence. |
| A39 | System frequency settings error | Alarm generated when the system frequency does not correspond to the set rated frequency. |
| A40 | Generator contactor anomaly | Alarm generated if an incongruity is detected after the set time between the status of the command output and the generator contactor/circuit breaker feedback input. |
| A41 | Mains contactor anomaly | Alarm generated if an incongruity is detected after the set time between the status of the command output and mains contactor/circuit breaker feedback input. |
| A42 | Maintenance request 1 | Alarm generated when the maintenance hours of the relevant interval reach zero. |
| A43 | Maintenance request 2 | See menu M17. Use the commands menu to reset the operating hours and the alarm after servicing. |
| A44 | Maintenance request 3 | |
| A45 | System error | RGK800 internal error. See System errors chapter for possible solutions. |
| A46 | Tank too empty | The relevant programmable input signals tank too empty (default active open). Filling pump stopped. |
| A47 | Tank too full | The relevant programmable input signals 'tank too full' (default active closed). Filling pump stopped. |
| A48 | Rent hours expired | Alarm generated when the rent hours reach zero. Use the commands menu to reset the rent hours and the alarm. |
| A49 | Radiator coolant level low | Alarm generated when the coolant level is lower than the min. level. Generated by digital input or CAN diagnostics message. |
| A50 | Manual circuit breaker closed | Alarm generated in MAN mode during the starting phase, when the disabled state of the input programmed with function "Circuit breaker status alarm" is detected. |
| A51 | Manual circuit breaker open | Alarm generated in AUT mode during the starting phase, with the engine running, when the enabled state of the input programmed with function "Circuit breaker status alarm" is detected. |
| A52 | Battery charger alarm | Alarm generated by the input programmed with function "Battery charger alarm" connected to an external battery charger when the mains voltage is within the limits. |
| A53 | CANbus Red lamp alarm | Global alarm generated on the CANbus by the engine ECU for critical anomalies. |
| A54 | CANbus Amber lamp alarm | Global alarm generated on the CANbus by the engine ECU for warnings or minor anomalies. |
| A55 | CANbus error | CANbus communication error. Check wiring diagrams and connecting cables. |
| A56 | Fuel theft | The tank level has dropped at too high average rate compared to the max. nominal engine fuel consumption. Suspected theft of fuel. |
| A57 | Cannot change configuration | The position of the digital inputs for selecting the 4 possible configurations has changed, but there are no conditions that warrant said change (for example: engine running or operating mode other than OFF). |
| A58 | Water in fuel | Alarm generated when the contact signals 'water in fuel. Generated by digital input or CAN diagnostics message. |
| A59 | Fuel filling pump failure | Alarm generated when the fuel level in the tank does not increase by at least 1% in a period of 5 minutes. Available from FW rev. 01 onwards. |
| A60 | Mutual standby link error | Alarm generated when the communication link between the two devices in mutual-standby is not operating properly. Available from FW rev. 03 onwards. |
| A61 | Current asymmetry | Alarm generated when current asymmetry exceeds the threshold set in P15.10 for more than P15.11 time. |
| UA1 ... UA8 | User alarm | The user alarm is generated by enabling the variable or associated input in menu M32. |

INPUT FUNCTION TABLE

- The following table shows all the functions that can be attributed to the INPn programmable digital inputs.
- Each input can be set for an reverse function (NO - NC), delayed energising or de-energising at independently set times.
- Some functions require another numeric parameter, defined in the index (x) specified by parameter **P18.n.02**.
- See menu M18 Programmable inputs for more details on page 22.

| FUNCTION | DESCRIPTION |
|-----------------------------------|--|
| Disabled | Disabled input. |
| Configurable | User configuration free; for instance if the input is used in PLC logic. |
| Oil pressure | Engine oil low pressure digital sensor. |
| Engine temperature | Engine max. temperature digital sensor. |
| Fuel level | Fuel low level digital sensor. |
| Emergency stop | Generates alarm A23 when open. Not required if common +COM1 with built-in input is used. |
| Remote stop | Stops the engine remotely in AUT mode. |
| Off load remote start | Starts the engine remotely without switching the load to the generator in AUT mode. The signal must be maintained as long as the engine is required to run. The engine begins the stop cycle when the signal is disabled. |
| On load remote start | Starts the engine remotely, switching the load to the generator in AUT mode. The signal must be maintained as long as the engine is required to run. The engine begins the stop cycle when the signal is disabled. |
| Starting without stop | Starts the engine remotely without the stop function in the case of an alarm. The signal must be maintained as long as the engine is required to run. The engine begins the stop cycle when the signal is disabled. |
| Automatic test | Starts the periodic test controlled by an external timer. |
| Generator cutout | Generator protection trip signal from external device. |
| Remote control lock | Inhibits the serial port writing and command operations. The data can still be read. |
| Setup access lock | Inhibits access to the programming menu. |
| External MAINS control | Mains voltage control signal from external device. Enabled indicates the voltage is within the limits. Not available on RGK800SA. |
| External GEN control | Generator voltage control signal from external device. Enabled indicates the voltage is within the limits. |
| Enable mains load increase | Consent for connection of load to mains. Not available on RGK800SA. |
| Enable generator load increase | Consent for connection of load to generator. |
| Remote switching | In AUT mode, when enabled this switches from mains to generator. Not available on RGK800SA. |
| Inhibit automatic return to mains | Inhibits automatic switching back to the mains when its values are within the limits. Not available on RGK800SA. |
| MAINS contactor feedback | Auxiliary contact of mains switchgear used to inform RGK800 of its actual status (feedback). Alarm A41 is generated in the case of incongruity between the command output and status. Not available on RGK800SA. |
| GEN contactor feedback | As above, with reference to the generator switchgear. Alarm A40 is generated in the case of incongruity between the command output and status. |
| Tank empty | Tank too empty. Generates alarm A46 with an open contact. The filling pump is stopped. Can operate regardless of start-stop. |
| Start filling. | Tank low level sensor. The filling pump is started with an open contact. |
| Stop filling | Tank full. The filling pump is stopped with a closed contact. |
| Tank too full | Tank too full. Generates alarm A47 with a closed contact. The filling pump is stopped. Can operate regardless of start-stop. |
| Keyboard lock | Inhibits the functions of the front keyboard. |
| Block genset and keyboard | Generator and keyboard block. |
| Radiator coolant level | Alarm A49-Radiator liquid low is generated with the input enabled. |
| Siren OFF | Disables the siren. |
| Circuit breaker state alarm | In manual mode and with input OFF, starting is inhibited, generating alarm A50-Circuit breaker closed. In manual mode, this function is used when the generator contactor is not used and a manually operated circuit breaker is used. This function is required to start the generator being sure the load is disconnected. In AUT mode and with input ON, starting is inhibited, generating alarm A51-Circuit breaker open. This function is required to prevent starting the generator at no-load conditions and consuming fuel needlessly. |
| Battery charger alarm | With the input enabled, generates alarm A52-External battery charger fault. The alarm is only generated when there is mains voltage. |
| Inhibit alarms | If enabled, disables the alarms with the property - Inhibit activated alarms. |
| Alarm Reset | Resets the stored/retained alarms for which the condition that triggered the same has ceased. |
| Commands menu C(x) | Executes the command from the commands menu defined by index parameter (x). |
| Simulate OFF key | Closing the input is the equivalent of pressing the key. |
| Simulate MAN key | Closing the input is the equivalent of pressing the key. |
| Simulate AUTO key | Closing the input is the equivalent of pressing the key. |
| Simulate TEST key | Closing the input is the equivalent of pressing the key. |
| Simulate START key | Closing the input is the equivalent of pressing the key. |
| Simulate STOP key | Closing the input is the equivalent of pressing the key. |
| Simulate MAINS key | Closing the input is the equivalent of pressing the key. |
| Simulate GEN key | Closing the input is the equivalent of pressing the key. |
| Fuel theft | When active, it generates Fuel theft alarm, as an alternative to the fuel theft detection made by analog level. |
| Inhibit automatic test | Inhibits the automatic test. |
| LED key | Turns all the LEDS on the front panel on (indicator test). |
| Select configuration (x) | Selects one of four possible configurations. The binary code weight is defined by index parameter (x). See chapter Multiple configurations. |
| Water in fuel | Generates the alarm A58-Water in fuel. |

OUTPUT FUNCTION TABLE

- The following table shows all the functions that can be attributed to the OUTn programmable digital inputs.
- Each output can be configured so it has a normal or reverse (NOR or REV) function.
- Some functions require another numeric parameter, defined in the index (x) specified by parameter **P19.n.02**.
- See menu M19 Programmable outputs for more details on page 23.

| FUNCTION | DESCRIPTION |
|---|--|
| Disabled | Output disabled. |
| Configurable | User configuration free; for example if the output is used in PLC logic. |
| Close mains contactor/circuit breaker | Command to close mains contactor/circuit breaker. Not available on RGK800SA. |
| Close generator contactor/circuit breaker | Command to close generator contactor/circuit breaker. |
| Open mains circuit breaker | Command to open mains circuit breaker. Not available on RGK800SA. |
| Open generator circuit breaker | Command to open generator circuit breaker. |
| Open mains/generator | Open both circuit breakers/neutral position of motorised changeover switches. |
| Starter motor | Powers the starter motor. |
| Fuel solenoid valve | Energises the fuel valve. |
| ECU power | Powers the engine ECU. |
| Global alarm | Output enabled in the presence of any alarm with the global alarm propriety enabled. |
| Siren | Powers the siren. |
| Decelerator | Reduce rpm in starting phase. Energised as soon as the engine starts, for the max duration set. |
| Accelerator | Contrary function to the above. |
| Stop magnets | Output energised for engine stop. |
| Glow plugs | Glow-plug preheating before starting. |
| Gas valve | Gas delivery solenoid valve. Opening delayed in relation to starter motor activation, and closed in advance in relation to stop command. |
| Choke | Choke for petrol/gasoline engines. |
| Priming valve | Petrol/gasoline injection for starting gas-fuelled engines. The priming valve relay is enabled at the same time as the gas solenoid valve only during the first start attempt. |
| Dummy load steps (x) | Controls the contactors to switch in the dummy load (x=1...4). |
| Load shedding steps (x) | Controls the contactors for load shedding (x=1...4). |
| Compressed air | Start engine with compressed air, as an alternative/alternating with starter motor. See parameter P11.26. |
| Operating mode | Output energised when the RGK800 is in one of the modes set with parameter P23.13. |
| Mains voltage state | Energised when the mains voltage returns within the set limits. Not available on RGK800SA. |
| Generator voltage state | Energised when the generator voltage returns within the set limits. |
| Engine running | Energised when the engine is running. |
| OFF mode | Energised when the RGK800 is OFF. |
| MAN mode | Energised when the RGK800 is in MAN mode. |
| AUT mode | Energised when the RGK800 is in AUT mode. |
| TEST mode | Energised when the RGK800 is in TEST mode. |
| Cooling | Energised when the cooling cycle is running. |
| Generator ready | Indicates the RGK800 is in automatic mode and there are no active alarms. |
| Preheating valve | Controls the fuel preheating valve. See description of parameters P11.06 and P11.07. |
| Heater | Controls the engine heater, using engine temperature reading and parameters P09.10 and P09.11. |
| Fuel filling pump | Controls the fuel filling pump. Can be controlled by the start and stop inputs, or on the basis of the level detected by the analog sensor. See parameters P10.09 and P10.10. |
| Remote alarms/states | Pulse output for communication with the RGKRR device using digital I/O mode. |
| LIM limits (x) | Output controlled by the state of the limit threshold LIM(x) (x=1..16) defined by the index parameter. |
| PUL pulses (x) | Output controlled by the state of the energy pulse variables PUL(x) (x=1..6). |
| Flag PLC(x) | Output controlled by flag PLCx (x=1..32). |
| REM(x) remote variable | Output controlled by remote variable REMx (x=1..16). |
| Alarms A01-Axx | Output energised with alarm Axx is enabled (xx=1...number of alarms). |
| Alarms UA1..UAx | Output energised with alarm UAx is enabled (x=1...8). |

COMMANDS MENU

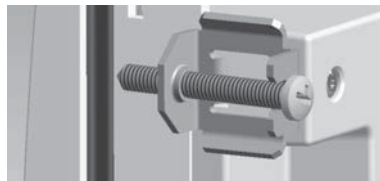
- The commands menu allows executing some occasional operations like measurement resetting, counter clearing, alarm reset, etc.
- If the advanced access level password has been entered, then the commands menu allows executing the automatic operations useful for the device configuration.
- The following table lists the functions available in the commands menu, divided by the access level required.

| CODE | COMMAND | ACCESS LEVEL | DESCRIPTION |
|------|--------------------------------------|--------------|--|
| C01 | Reset maintenance interval 1 | User | Resets maintenance alarm MNT1 and reloads the counter with the set number of hours. |
| C02 | Reset maintenance interval 2 | User | As above, with reference to MNT2. |
| C03 | Reset maintenance interval 3 | User | As above, with reference to MNT3. |
| C04 | Reset engine partial hour counter | User | Clears the partial counter of the engine. |
| C05 | Reset mains partial energy | User | Clears the mains partial energy meter. |
| C06 | Reset generator partial energy | User | Clears the generator partial energy meter. |
| C07 | Reset generic counters CNTx | User | Clears generic counters CNTx. |
| C08 | Reset limits status LIMx | Utente | Resets retentive limits status LIMx. |
| C09 | Reset High/ low | User | Resets High/Low peaks of the measurements. |
| C10 | Reset engine total hour counter | Advanced | Clears the total counter of the engine. |
| C11 | Engine hour counter settings | Advanced | Allows settings of the total hour counter of the engine to the required value. |
| C12 | Reset no. starts counter | Advanced | Clears counter for the number of start attempts and the percentage of successful attempts. |
| C13 | Reset closing counters | Advanced | Clears the generator on-load counters. |
| C14 | Reset mains total energy | Advanced | Clears the mains total energy count (for RGK800) only. |
| C15 | Reset generator total energy | Advanced | Clears the generator total energy count. |
| C16 | Reload rent hours | Advanced | Reloads rent timer to set value. |
| C17 | Reset events list | Advanced | Clears the list of historical events. |
| C18 | Reset default parameters | Advanced | Resets all the parameters in the setup menu to the default factory values. |
| C19 | Save parameters in backup memory | Advanced | Copies the parameters currently set to a backup file for restoring in the future. |
| C20 | Reload parameters from backup memory | Advanced | Transfers the parameters saved in the backup memory to the active settings memory. |
| C21 | Fuel purge | Advanced | Energises the fuel valve without starting the engine. The valve remains energised for 5 minutes max or until the OFF mode is selected. |
| C22 | Forced I/O | Advanced | Enables test mode so any output can be manually energised. Warning! In this mode, the installer alone is responsible for the output commands. |
| C23 | Resistive sensors offset regulation | Advanced | Permits to calibrate the resistive sensors, adding/subtracting a value in Ohms to/from the resistance measured by the resistive sensors, to compensate for cable length or resistance offset. The calibration displays the measured value in engineering magnitudes. |
| C24 | Reset PLC program | Advanced | Deletes the program with the PLC logic from the internal memory of the RGK800. |
| C25 | Sleep mode | Advanced | Enables battery-saving mode (sleep). |

- Once the required command has been selected, press ✓ to execute it. The device will prompt for a confirmation. Pressing ✓ again, the command will be executed.
- To cancel the command execution press **OFF**.
- To quit commands, menu press **OFF**.

INSTALLATION

- RGK800 is designed for flush-mount installation. With proper mounting, it guarantees IP65 front protection.
- Insert the controller into the panel cutout. Making sure that the gasket is properly positioned between the panel and the controller front frame.
- Make sure the strip of the custom label does not get trapped under the gasket and break the seal. It should be positioned inside the panel.
- From inside the panel, for each of the four fixing clips, position the clip in its square hole on the housing side, then move it backwards in order to position the hook.

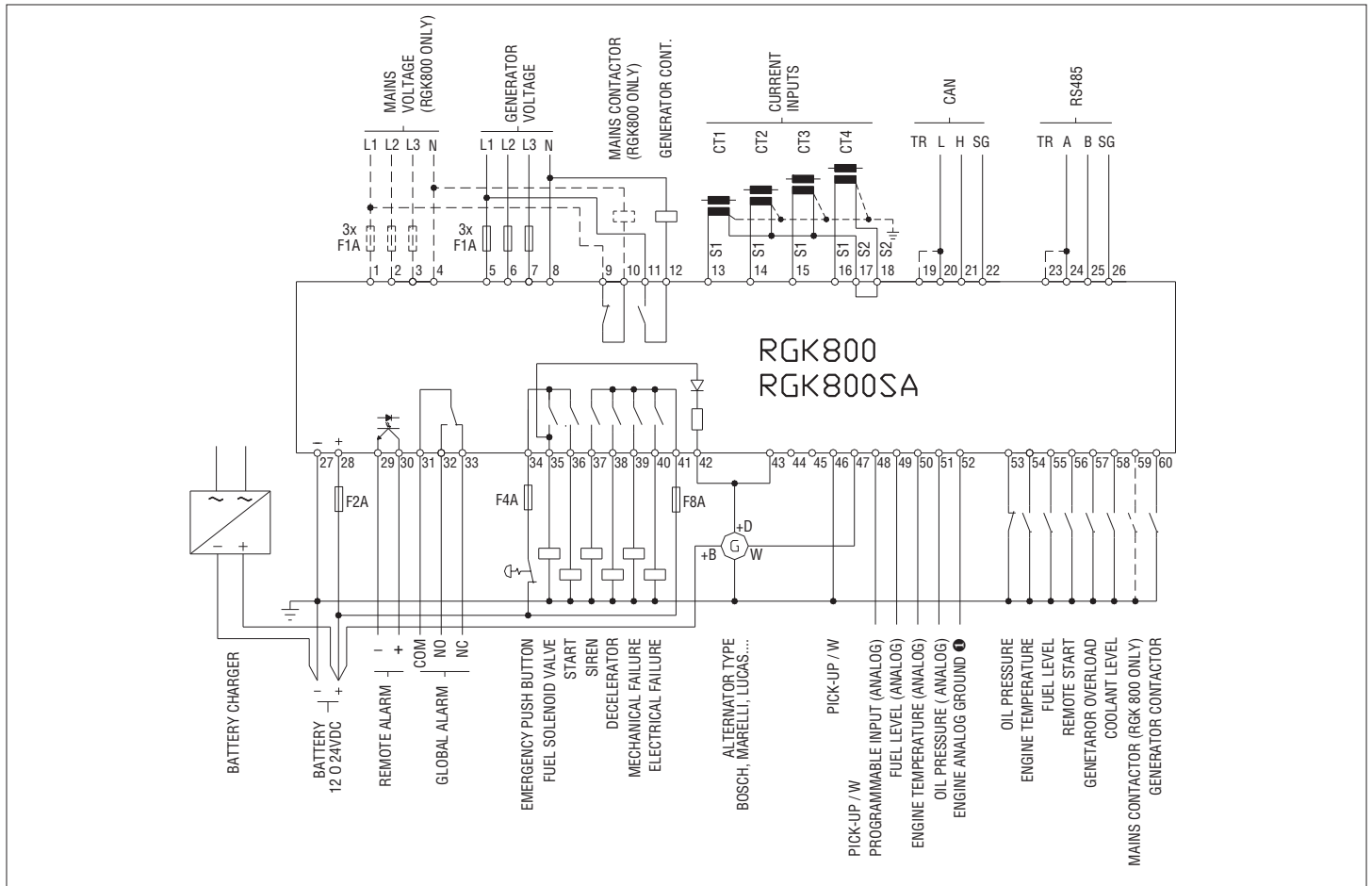


- Repeat the same operation for the four clips.
- Tighten the fixing screw with a maximum torque of 0.5Nm.
- In case it is necessary to dismount the controller, repeat the steps in opposite order.
- For the electrical connection, see the wiring diagrams in the dedicated chapter and the requirements reported in the technical characteristics table.

WIRING DIAGRAMS

Wiring diagram for three-phase generating set with pre-energised battery charger alternator

1336 GB 03 15



● Reference earth/ground for analog sensors to be connected directly on the engine block.

NOTES



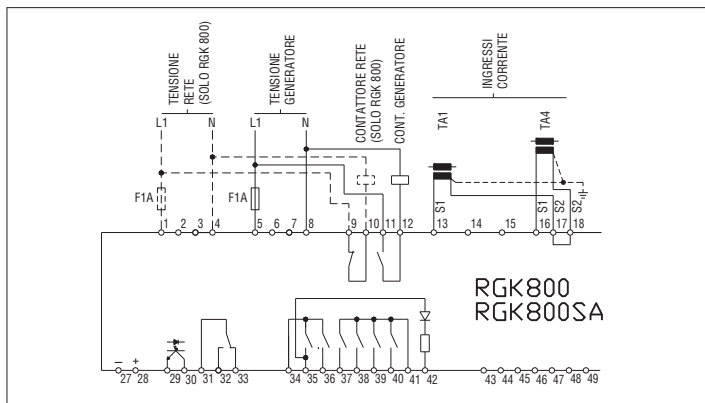
S2 terminals are internally interconnected.
The dotted section refers to use with RGK800 control only.

CANBUS CONNECTION



The CANbus connection has two 120-Ohm termination resistors at both ends of the bus.
To connect the resistor incorporated in the RGK800 board, jumper TR and CAN-L.

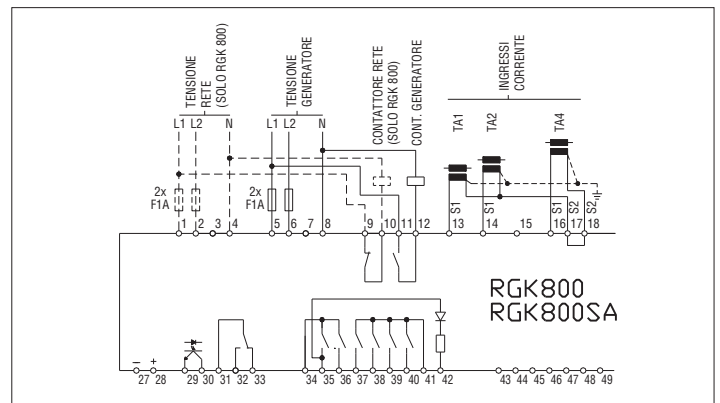
WIRING FOR SINGLE-PHASE GENERATING SET



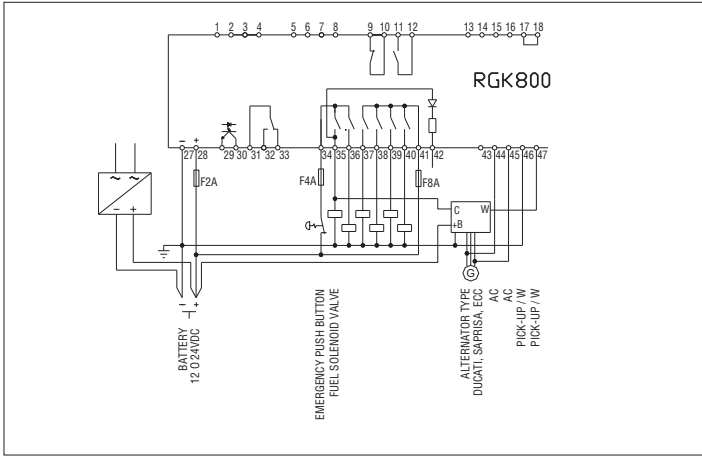
NOTES

S2 terminals are internally interconnected.
The dotted section refers to use with RGK 800 control only.

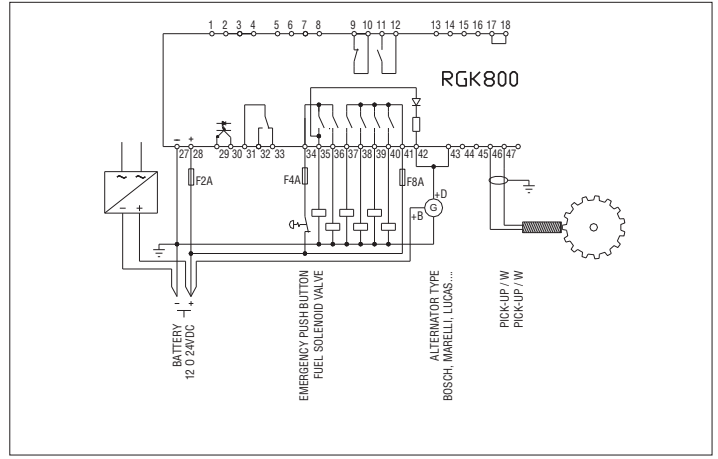
WIRING FOR TWO-PHASE GENERATING SET



WIRING FOR GENERATING SET WITH PERMANENT MAGNET BATTERY CHARGER ALTERNATOR



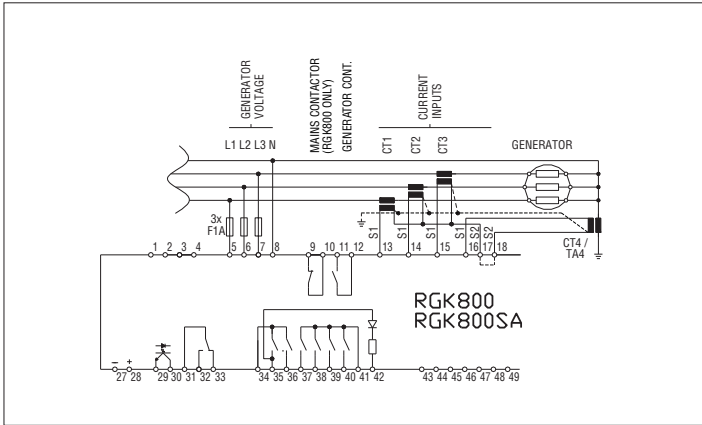
WIRING FOR GENERATING SET WITH MAGNETIC PICK-UP SPEED DETECTOR



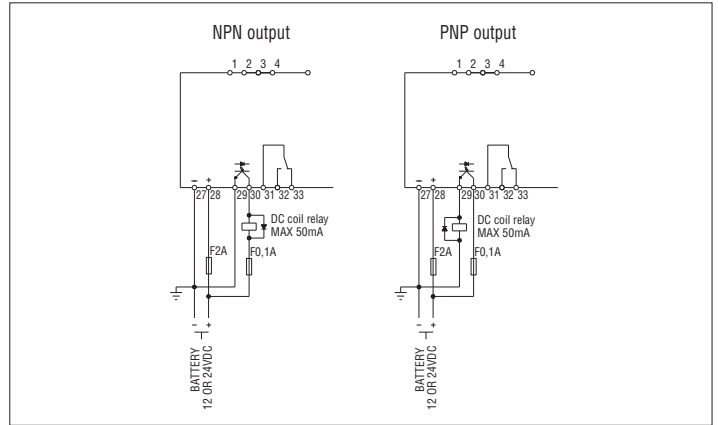
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WIRING FOR EARTH/GROUND FAULT MEASUREMENT

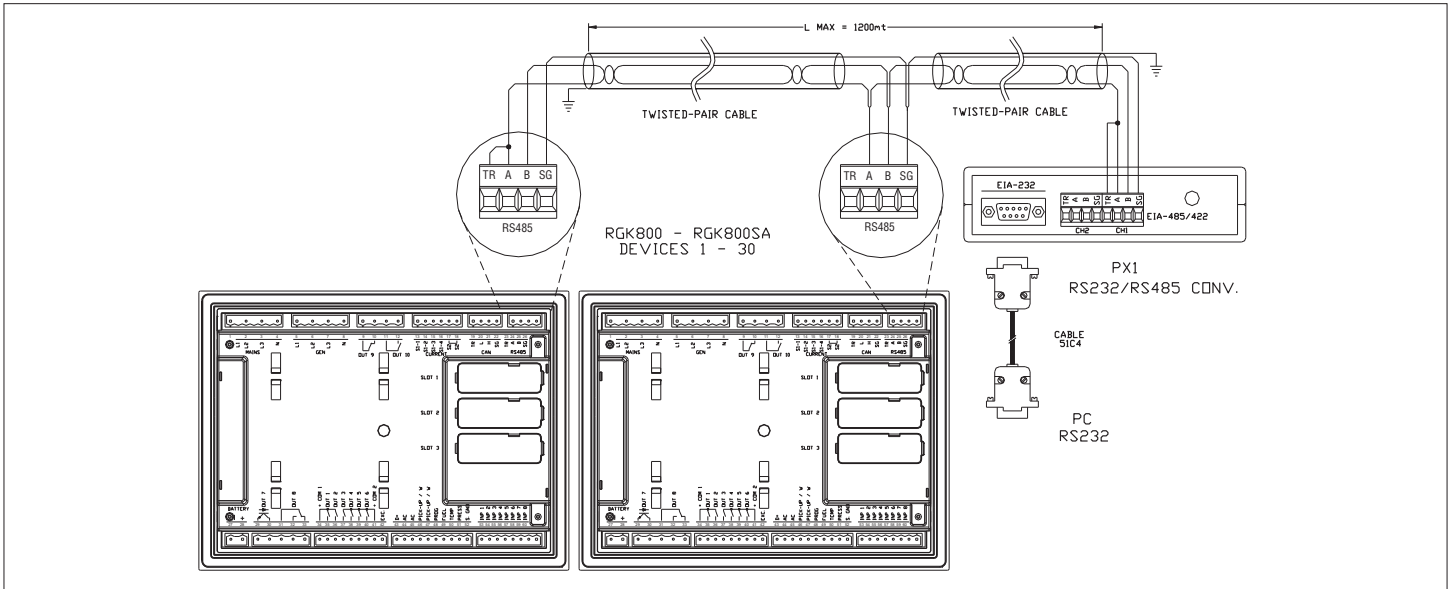


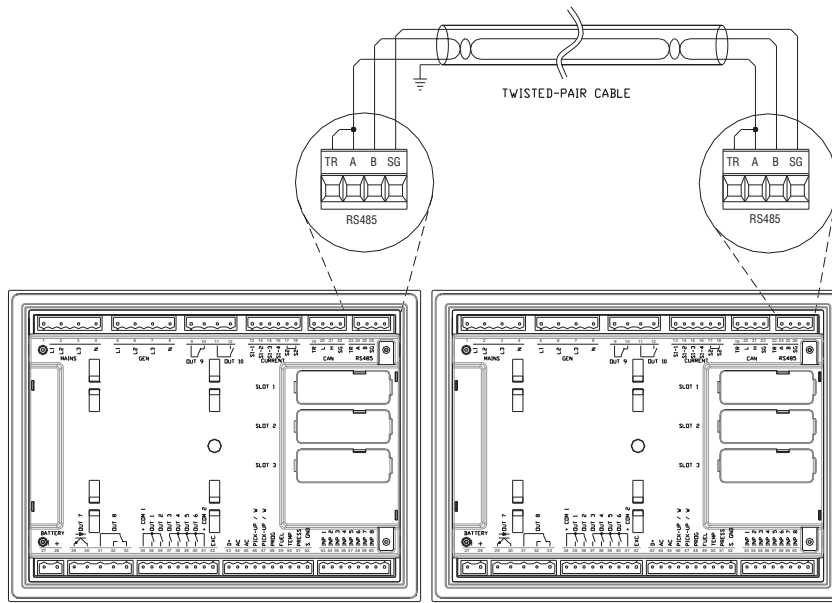
RA OUTPUT (OUT 7) USED AS RELAY DRIVER



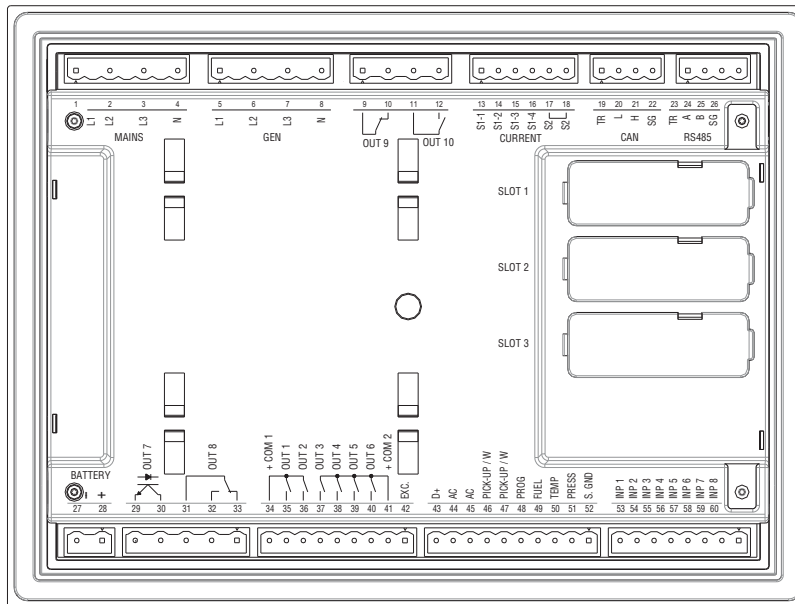
Not as protection.

RS485 INTERFACE WIRING

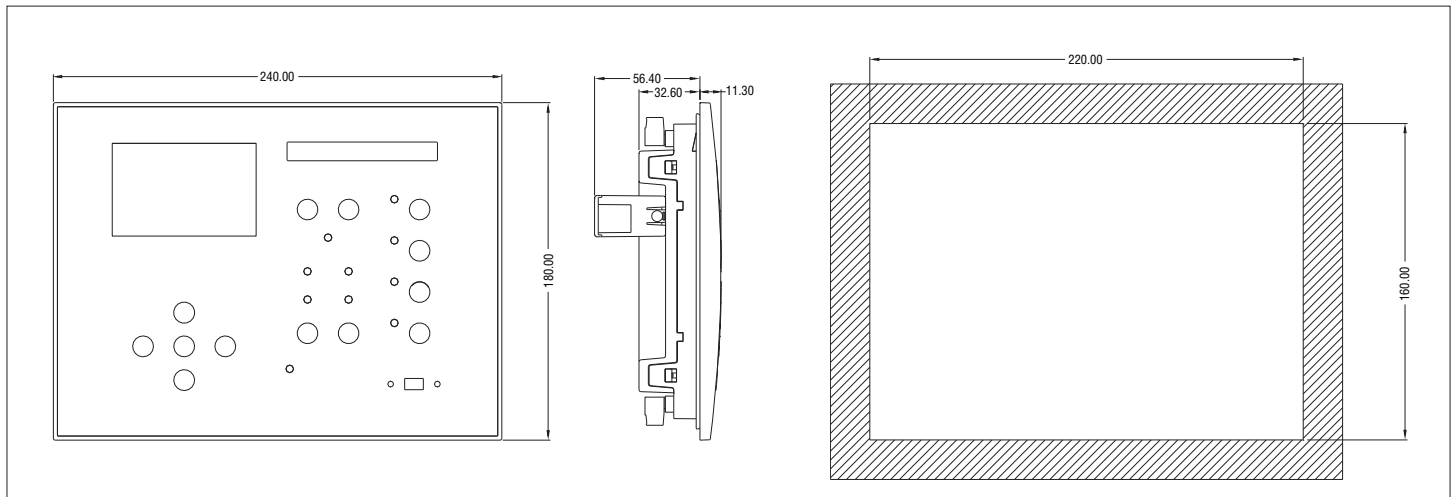




TERMINALS ARRANGEMENT



MECHANICAL DIMENSIONS AND CUTOUT [mm]



TECHNICAL CHARACTERISTICS

| Supply | |
|---|--|
| Battery rated voltage | 12 or 24V= indifferently |
| Maximum current consumption | 400mA at 12V= and 200mA at 24V= |
| Maximum power consumption/dissipation | 4.8W |
| Voltage range | 7...33V= |
| Minimum voltage at the starting | 5.5V= |
| Standby current | 70mA at 12V= and 40mA at 24V= |
| Micro interruption immunity | 150ms |
| Digital inputs | |
| Type of input | Negative |
| Current input | ≤10mA |
| Input "low" voltage | ≤1.5V (typical 2.9V) |
| Input "high" voltage | ≥5.3V (typical 4.3V) |
| Input delay | 80ms + (see P18.n.04 - P18.n.05) |
| Analog inputs | |
| Pressure sensor | Current 10mA = max Measuring range 0 - 450Ω |
| Temperature sensor | Current 10mA = max Measuring range 0 - 1350Ω |
| Fuel level sensor | Current 10mA = max Measuring range 0 - 1350Ω |
| Programmable sensor | Current 10mA = max Measuring range 0 - 1350Ω |
| Analog earth/ground voltage | -0.5V to +0.5V= |
| Speed input "W" | |
| Type of input | AC coupling |
| Voltage range | 2.4...75Vpp |
| Frequency range | 40...2000Hz |
| Pick-up input | |
| Type of input | AC coupling |
| Voltage range | High sensitivity: 1.6...60Vpp – 0.6...21VRMS Low sensitivity: 4.8...150Vpp – 1.7...53VRMS |
| Frequency range | 20Hz...10000Hz |
| Measuring input impedance | >100kΩ |
| Engine running input (500rpm) for permanent magnet alternator | |
| Type of input | AC coupling |
| Voltage range | 0...44V= |
| Engine running input (500rpm) for pre-excited alternator | |
| Voltage range | 0...44V= |
| Maximum input current | 12mA |
| Maximum voltage at +D terminal | 12 or 24V= (battery voltage) |
| Pre-excitation current (42 terminal) | 230mA 12V= – 130mA 24V= |
| Mains and generator voltage inputs | |
| Maximum rated voltage Ue | 600V~ L-L (346V~ L-N) |
| Measuring range | 50...720V L-L (415V~ L-N) |
| Frequency range | 45...65Hz – 360...440Hz |
| Measuring method | True RMS |
| Measuring input impedance | > 0.55MΩ L-N > 1,10MΩ L-L |
| Wiring mode | Single-phase, two-phase, three-phase with or without neutral or balanced three-phase system |
| Current inputs | |
| Rated current Ie | 1A~ or 5A~ |
| Measuring range | for 5A scale: 0.015 - 6A~ for 1A scale: 0.015 - 1.2A~ |
| Type of input | Shunt supplied by an external current transformer (low voltage). Max. 5A |
| Measuring method | True RMS |
| Overload capacity | +20% Ie |
| Overload peak | 50A for 1 second |
| Power consumption | <0.6VA |
| Measuring accuracy | |
| Mains and generator voltage | ±0.25% f.s. ±1digit |
| SSR output OUT1 and OUT 2 (+ battery voltage output) | |
| Type of output | 2 x 1 NO + one common terminal |
| Rated voltage | 12-24V= from battery |
| Rated current | 2A DC1 each |
| Protection | Overload, short circuit and reverse polarity |

| SSR output OUT3 - OUT 6 (+ battery voltage output) | |
|--|--|
| Type of output | 4 x 1 NO + one common terminal |
| Rated voltage | 12-24V= from battery |
| Rated current | 2A DC1 each |
| Protection | Overload, short circuit and reverse polarity |
| SSR output OUT 7 | |
| Type of output | NO |
| Rated voltage | 10 - 30V= |
| Max current | 50mA |
| Relay output OUT 8 (voltage free) | |
| Type of contact | 1 changeover |
| UL Rating | B300 / 30V= 1A Pilot Duty |
| Rated voltage | 250V~ |
| Rated current at 250V~ | 8A AC1 (1,5A AC15) |
| Relay output OUT 9 (voltage free) | |
| Type of contact | 1 NC (mains contactor) |
| UL Rating | B300 / 30V= 1A Pilot Duty |
| Rated voltage | 250V~ (400V~ max) |
| Rated current at 250V~ | 8A AC1 (1,5A AC15) |
| Relay output OUT 10 (voltage free) | |
| Type of contact | 1 NO (generator contactor) |
| UL Rating | B300 / 30V= 1A Pilot Duty |
| Rated voltage | 250V~ (400V~ max) |
| Rated current at 250V~ | 8A AC1 (1,5A AC15) |
| Communication lines | |
| RS485 Serial interface | Opto-isolated |
| Baud-rate | programmable 1200...38400 bps |
| Voltage insulation (RS485-VBatt.) | 1kV |
| CANbus interface | Not isolated |
| Real time clock | |
| Reserve energy | Back-up capacitors |
| Operating time without supply voltage | About 12...15 days |
| Insulation | |
| Rated insulation voltage Ui | 600V~ |
| Rated impulse withstand voltage Uimp | 9.5kV |
| Power frequency withstand voltage | 5,2kV |
| Ambient conditions | |
| Operating temperature | -30 to +70°C |
| Storage temperature | -30 to +80°C |
| Relative humidity | <80% (IEC/EN 60068-2-78) |
| Maximum pollution degree | 2 |
| Overvoltage category | 3 |
| Measurement category | III |
| Climatic sequence | Z/ABDM (IEC/EN 60068-2-61) |
| Shock resistance | 15g (IEC/EN 60068-2-27) |
| Vibration resistance | 0.7g (IEC/EN 60068-2-6) |
| Connections | |
| Type of terminal | Plug-in / removable |
| Conductor cross section (min... max) | 0.2...2.5 mm ² (24...12 AWG) |
| Tightening torque | 0.56 Nm (5 lbin) |
| Housing | |
| Version | Flush mount |
| Material | Polycarbonate |
| Degree of protection | IP65 on front; IP20 terminals |
| Weight | 960g for RGK800; 980g for RGK800SA |
| Certifications and compliance | |
| Certifications obtained | cULus, EAC |
| UL Marking | Use 60°C/75°C copper (CU) conductor only AWG Range: 24 - 12 AWG stranded or solid Field Wiring Terminals Tightening Torque: 5lb.in For use on a flat surface of a type 4X enclosure Tightening torque used for fixing screw –0.5Nm |
| Comply with standards | IEC/EN 61010-1, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL508, CSA C22.2 N°14 |