

LOVATO ELECTRIC S.P.A.

24020 GORLE (BERGAMO) ITALIA

VIA DON E. MAZZA, 12

TEL. 035 4282111

FAX (Nazionale): 035 4282200

FAX (International): +39 035 4282400

E-mail info@LovatoElectric.com

Web www.LovatoElectric.com



GB GENERATING SET CONTROLLER

Instructions manual

RGK750



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 § 6.11.3.1.
- 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 § 6.11.3.1.
- 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 § 6.11.3.1.
- Das Gerät mit einem weichen Tuch reinigen, keine Scheuermittel, Flüssigreiniger 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 § 6.11.3.1).
- 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 kdýkoliv projít úpravami či dalším vývojem. Popisy a údaje uvedené v katalogu nemají proto žádnou smluvní hodnotu.
- Spínač či odpojovač je nutno zabudovat do elektrického rozvodu v budově. Musejí být nainstalované v těsné blízkosti přístroje a snadno dostupné pracovníku obsluhy. Je nutno ho označit jako vypínači zařízení přístroje: IEC / EN 61010-1 § 6.11.3.1.
- Přístroj čistěte měkkou utěrkou, nepoužívejte abrazivní produkty, tekutá čistidla či rozpouštědla.



AVERTIZARE!

- Citiți cu atenție manualul înainte de instalare sau utilizare.
- Acest echipament va fi instalat de personal calificat, în conformitate cu standardele actuale, pentru a evita deteriorări sau pericolose.
- 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 disjuncteur 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 § 6.11.3.1.
- 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 cortocircuare 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 § 6.11.3.1.
- 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 § 6.11.3.1.
- 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 § 6.11.3.1
- 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 обеспечить 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.
- Изделия, описанные в настоящем документе, в любой момент могут подвергнуться изменению или усовершенствованию. 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 § 6.11.3.1.
- Очистку устройства производить с помощью мягкой сухой ткани, без применения абразивных материалов, жидких мощных средств или растворителей.



DIKKATI!

- Montaj ve kullanımdan önce bu el kitabını dikkatlice okuyunuz.
- Bu aparatlar kişilere veya nesnelere zarar verme ihtimaline karşı yürürlükte olan sistem kuma normlarına göre kalifiye personel tarafından monte edilmelidir
- Aparatı (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 dokümanın 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 § 6.11.3.1.
- Aparatı (cihaz) sıvı deterjan veya solvent kullanılarak yumuşak bir bez ile siliniz aşındırıcı temizlik ürünleri kullanmayınız.



INDEX	Page	Page	
Manual revision history	2	CAN bus	10
Introduction	2	Supported measurements	11
Description	2	Diagnostics	11
Keyboard functions	3	Mutual Stand-by function	12
Front LED indication	3	Set-up	12
Operating modes	3	GSM-GPRS modem	12
Power-up	4	IR programming port	13
Main menu	4	Parameter setting through PC	13
Password access	4	Setting of parameters (setup) from front panel	13
Display page navigation	4	Parameter table	15
Table of display pages	5	Alarm table	28
Harmonic analysis page	7	Alarms	29
Waveform pages	8	Alarm properties	29
User pages	8	Alarm description	29
Expandability	8	Input function table	31
Additional resources	9	Output function table	32
Communication channels	9	Command menu	33
Inputs, outputs, internal variables, counters	9	Installation	33
Limit thresholds	10	Wiring diagrams	34
Remote-controlled variables	10	Terminal arrangement	36
User alarms	10	Mechanical dimensions	36
PLC Logic	10	Panel protection	36
Automatic test	10	Technical characteristics	37

MANUAL REVISION HISTORY

REV	DATE	NOTES
00	03.05.2018	First release

INTRODUCTION

The RGK750 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 RGK750 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
- 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 2 slots for EXP series expansion modules:
 - RS232, RS485, USB, Ethernet, GSM/GPRS communications interface
 - Additional digital I/O, static or relay outputs
- 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 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
- 3 analog inputs for resistive sensors:
 - Oil pressure
 - Coolant temperature
 - Fuel level
- 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.

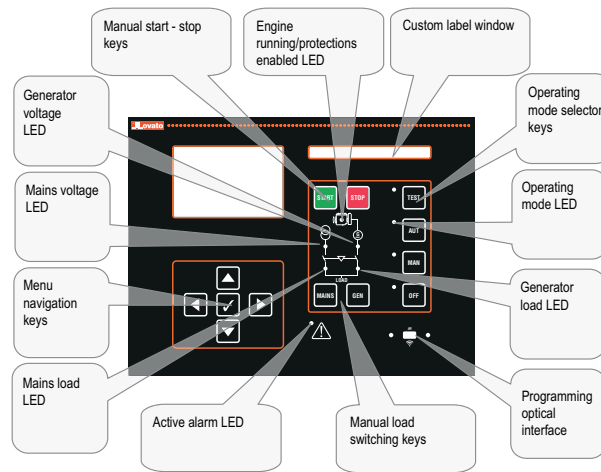
Engine running LED (green) - Indicates the engine is running. The RGK750 detects the status of the engine running on the basis of several signals (generator voltage/frequency, D+, AC, W, Pick-up, etc.). The LED turns on when any one of these signals is present. The LED flashes when the engine is running, 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 RGK750 command.

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

Front panel



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 RGK750 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 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 load can be switched automatically or controlled remotely.

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.

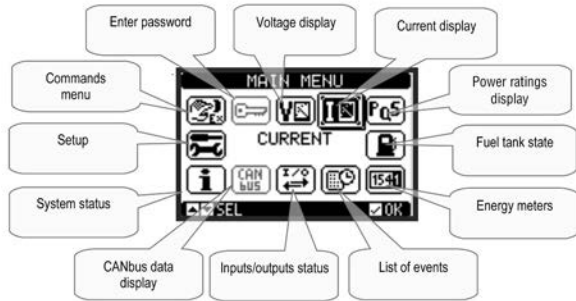
TEST Mode - The engine is started immediately even in the absence of the conditions normally required for the automatic mode. The engine starts in the programmed automatic mode. There is normally no load switching. If there is a mains outage while the system is in TEST mode, the load is switched to the 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.

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.



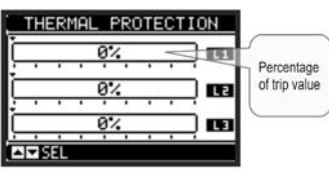
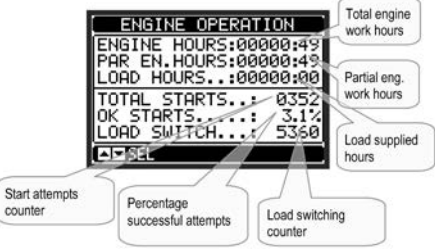
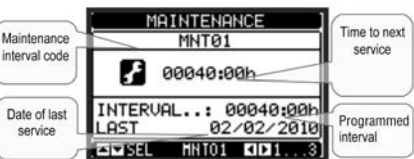


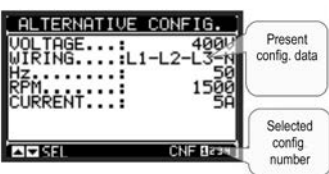
DISPLAY PAGE NAVIGATION

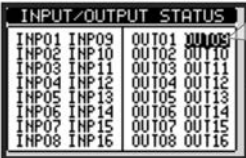

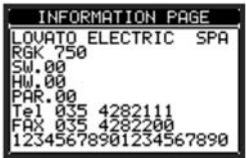
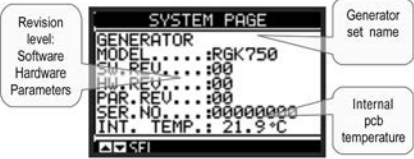
- Keys **▲** and **▼** scroll through the measurement pages one by one. The title bar shows the current page.
- Some measurements may not be shown depending on the controller programming and connections (for example if a fuel sensor is not set, the relevant page will not be shown).
- On some pages of the 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.	

1567 GB 04 18

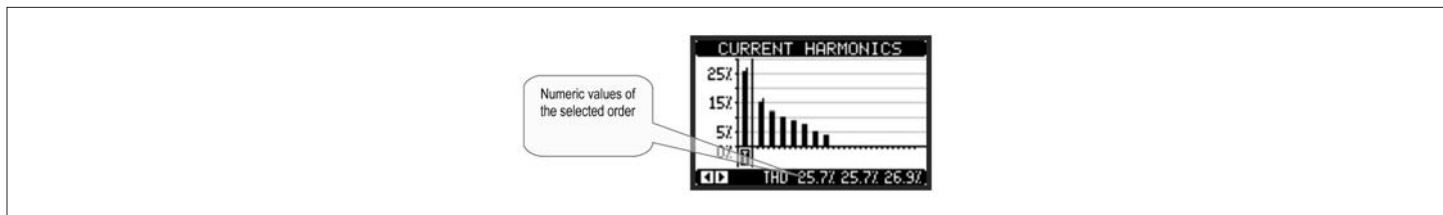
PAGES	EXAMPLE
Fuel level status	 <p>Current level bar</p> <p>Total tank capacity</p> <p>Man. pump command</p> <p>Available fuel</p> <p>Quantity after filling</p> <p>Filling pump state</p>
Fuel autonomy	 <p>Residual autonomy with present fuel rate from CAN</p> <p>Present fuel rate from CAN</p> <p>Residual autonomy with maximum fuel rate</p> <p>Maximum declared engine fuel rate</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>Time to next service</p> <p>Date of last service</p> <p>Programmed interval</p>
Rent	 <p>Time to expiry</p> <p>Rent start date</p> <p>Programmed duration</p>
List of events	 <p>Date and time of event</p> <p>Event code</p> <p>Description of event</p>
Alternative configurations	 <p>Present config. data</p> <p>Selected config number</p>

PAGES	EXAMPLE
I/O status	 <p>Digital I/O status In reverse = enabled</p>
Real time calendar clock	
Info page	
System info	 <p>Revision level: Software Hardware Parameters</p> <p>Generator set name</p> <p>Internal pcb temperature</p>

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.

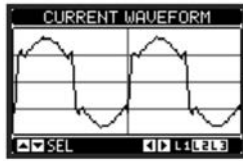
HARMONIC ANALYSIS PAGE

- In the RGK750, 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 RGK750.
- 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.



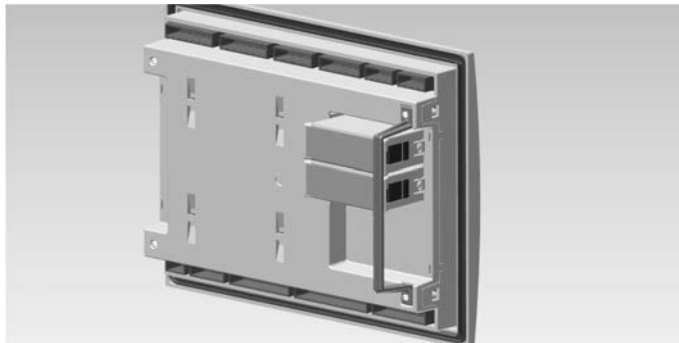
1567 GB 04 18

USER PAGES

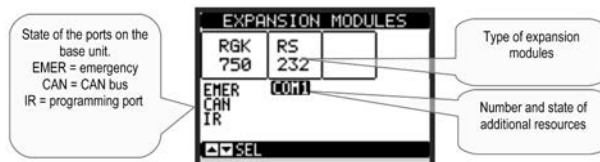
- The user can create a maximum of 4 customised display pages.
- Each of these pages can view 3 measurements, freely chosen among the available readings of the RGK750.
- The title of the page can be freely programmed by the user.
- The user pages are placed in a position that allows to reach them easily 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 RGK750 can be expanded with EXP series modules.
- It is possible to connect a maximum of 2 EXP... modules at the same time.
- The supported EXP modules can be grouped in the following categories:
 - Communication modules.
 - Digital I/O modules.
- To insert an expansion module:
 - Remove the power supply to RGK750.
 - 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 RGK750 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 2.

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	2
	EXP 10 03	2 RELAY OUT	2
	EXP 10 08	2 DIGITAL IN + 2 RELAY OUT	2

COMMUNICATION CHANNELS

- The RGK750 supports a maximum of 2 communication modules, indicated as COMn. The communication setup menu is therefore divided into two parameter sections (n=1 ... 2) for the setting of the ports.
- 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 RGK750 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 with Gateway function set to ON, while the other RGKs will be configured normally with Gateway to OFF.

INPUTS, OUTPUTS, INTERNAL VARIABLES, COUNTERS

- 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.
- 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...19
OUTx	Digital Outputs	1...10	11...16	-
COMx	Communication ports	-	1...2	-
RALx	Remote relays for Alarm / status	-	1...24	-

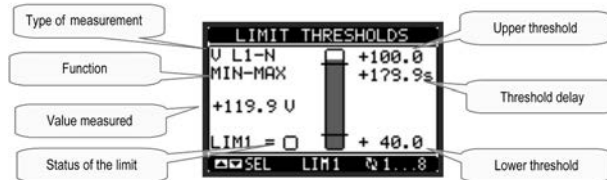
RESISTIVE SENSORS FOR FUEL, OIL, TEMPERATURE AND AUX

- RGK750 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).
- 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 RGK750.

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)

- RGK750 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 RGK750 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 RGK750 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 RGK750, 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 Xpress.

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 RGK750 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 RGK750.
- 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

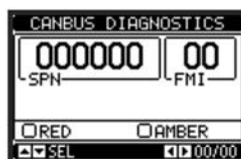
- In the case of failures, many ECUs highlight the problem with a J1939 standard code, called DTC (Diagnostic Trouble Code) consisting of SPN+FMI, where SPN (Suspect Parameter Number) identifies the signal affected by the fault, while FMI (Failure Mode Indicator) identifies the type of failure.

For example:

SPN-FMI
100-01

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

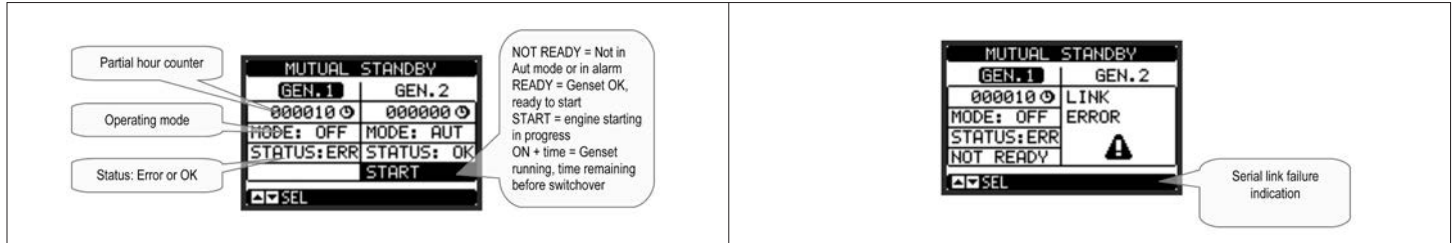
- In view of the many sensors connected to an ECU, a high number of possible codes is managed. In the case of a fault, this is indicated on the display of the RGK750 with both a code and a description in the related language, in the CAN diagnostics page.
- In the case of several simultaneous alarms, 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 uncoded description.
- To reset the alarms, press ✓ or OFF, as usual.
- If enabled, the RGK750 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.

1567 GB 04 18



CONFIGURATION

- Link the two controllers together through a dedicated RS485 network, using one of the available communication channels (COMx).
 - 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 RGK750 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.

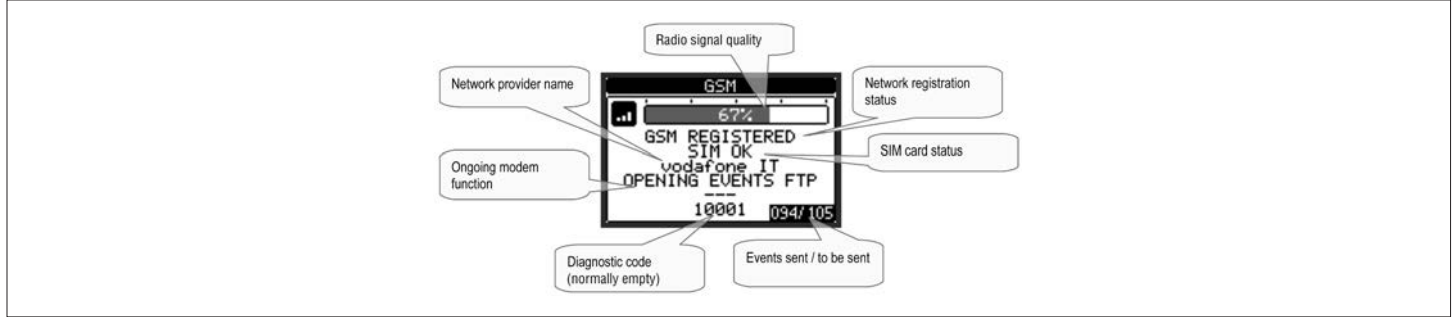
The supported features are summarised below:

- **Online connection (CSD)**
Allows you to connect online via the remote control software, in response to an incoming call from PC.
- **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 RGK750 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 RGK750 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 software Xpress. 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.



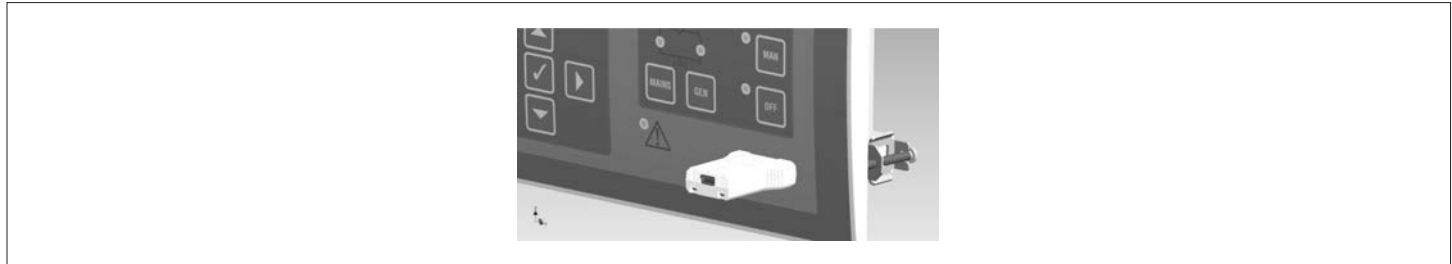
MULTIPLE CONFIGURATIONS

- 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 RGK750 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 RGK750 without accessing the rear of the device or having to open the electrical panel.
 - It is galvanically isolated from the internal circuits of the RGK750, 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 RGK750 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
M31	ENERGY PULSES	Energy count pulses
M32	USER ALARM	Programmable alarms
M33	ALARM PROPERTIES	Alarms effect enabling

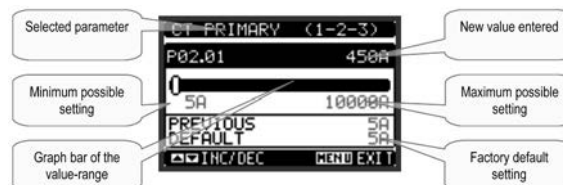
- Select the sub-menu and press ✓ to show the parameters.
- Each parameter is shown with code, description and present setting value.

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 RGK750. 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 Russian
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
P02.07	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
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.

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.

M09 – COOLANT TEMPERATURE		U/M	Default	Range
P09.01	Reading source		OFF	OFF RES CAN
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.

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
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.

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

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 RGK750.

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 RGK750. **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
P15.10	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.

P15.10 – 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...19)		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 19 sections that refer to 19 possible digital inputs INP1...INP19, which can be managed by the RGK750; INP1..INP8 on the base device and INP9...INP16 on any installed expansion modules. Inputs 17-18-19 make reference to analog inputs FUEL, TEMP, PRESS and 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 RGK750; 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.

M20 – COMMUNICATION (COMn, n=1...2)		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 2 sections for communication channels COM1..2.

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 RGK750 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 RGK750 only analyses messages on the CAN that meet SAE J1939 standards.
- P21.02** – Communication mode on CANbus. **M** = Measurements only. The RGK750 only captures the measurements (pressure, temperature, etc.) sent the CAN by the engine ECU.
M+E – As well as the measurements, the RGK750 captures and displays the diagnostic and alarm messages of the ECU.
M+E+T – As above, but the RGK750 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.

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
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 RGK750 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 RGK750 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 RGK750 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 RGK750 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 RGK750 (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.

M31 - ENERGY PULSES (PULn,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 RGK750.

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	●	●	●		●	●	●	●			●		
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													

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 RGK750 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 30)

ALARM DESCRIPTION (continued from page 29)

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.
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	RGK750 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.
A60	Mutual standby link error	Alarm generated when the communication link between the two devices in mutual-standby is not operating properly.
A61	Current asymmetry	Alarm generated when current asymmetry exceeds the threshold set in P15.10 for more than P15.11 time.
UA1	User alarm	The user alarm is generated by enabling the variable or associated input in menu M32.
...		
UA8		

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.
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.
Enable generator load increase	Consent for connection of load to generator.
Remote switching	In AUT mode, when enabled this switches from mains to generator.
Inhibit automatic return to mains	Inhibits automatic switching back to the mains when its values are within the limits.
MAINS contactor feedback	Auxiliary contact of mains switchgear used to inform RGK750 of its actual status (feedback). Alarm A41 is generated in the case of incongruity between the command output and status.
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.
Close generator contactor/circuit breaker	Command to close generator contactor/circuit breaker.
Open mains circuit breaker	Command to open mains circuit breaker.
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 RGK750 is in one of the modes set with parameter P23.13.
Mains voltage state	Energised when the mains voltage returns within the set limits.
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 RGK750 is OFF.
MAN mode	Energised when the RGK750 is in MAN mode.
AUT mode	Energised when the RGK750 is in AUT mode.
TEST mode	Energised when the RGK750 is in TEST mode.
Cooling	Energised when the cooling cycle is running.
Generator ready	Indicates the RGK750 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

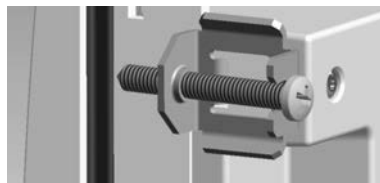
- The commands menu allows executing some occasional operations like measurement resetting, counter clearing, alarm reset, etc.
- If the advanced access level password has been entered, then the commands menu allows executing the automatic operations useful for the device configuration.
- The following 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.
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 RGK750.
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

- RGK750 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.

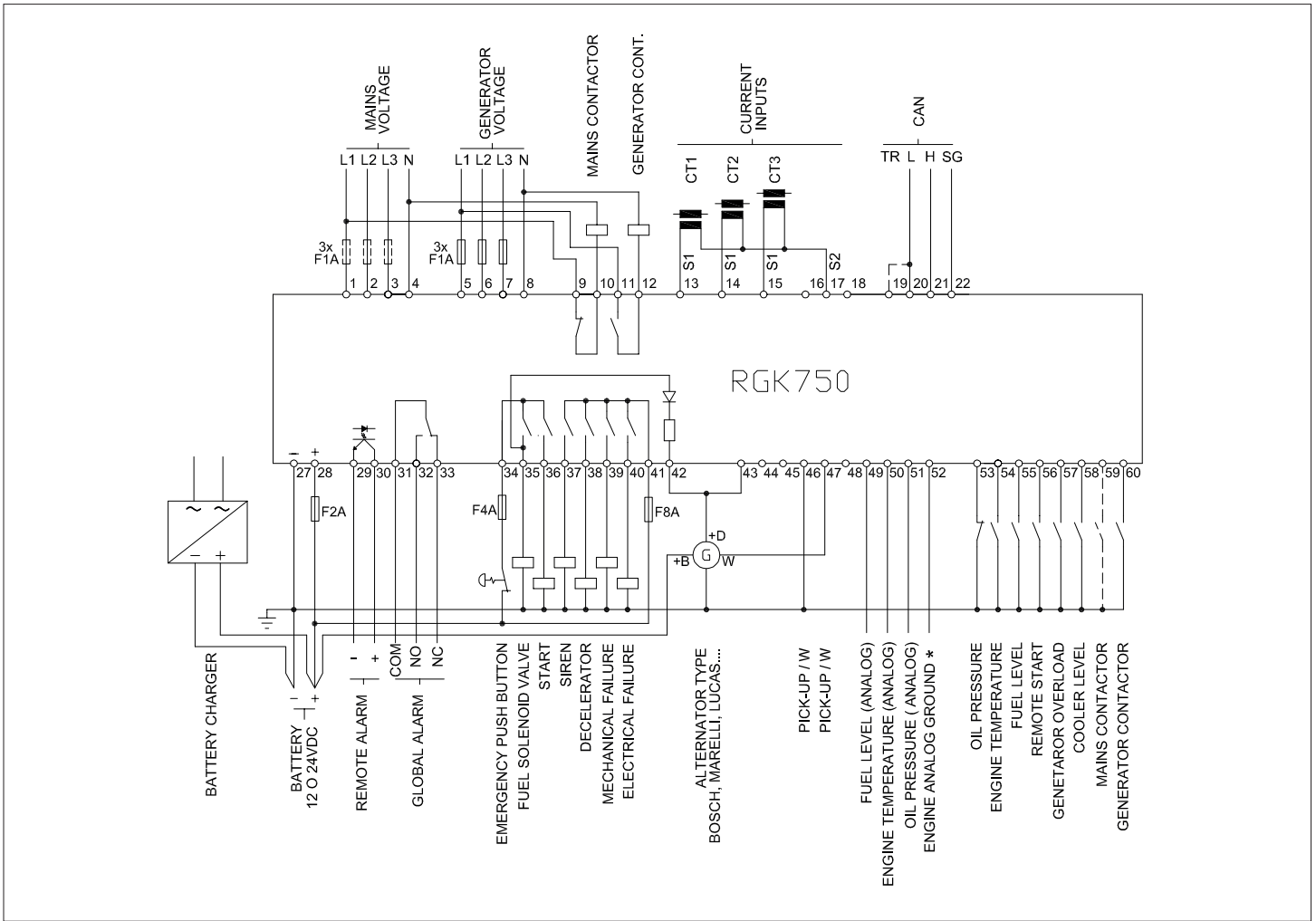


- Repeat the same operation for the four clips.
- Tighten the fixing screw with a maximum torque of 0.5Nm.
- In case it is necessary to dismount the controller, repeat the steps in opposite order.
- For the electrical connection, see the wiring diagrams in the dedicated chapter and the requirements reported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

WIRING DIAGRAMS

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

1567 GB 04 18



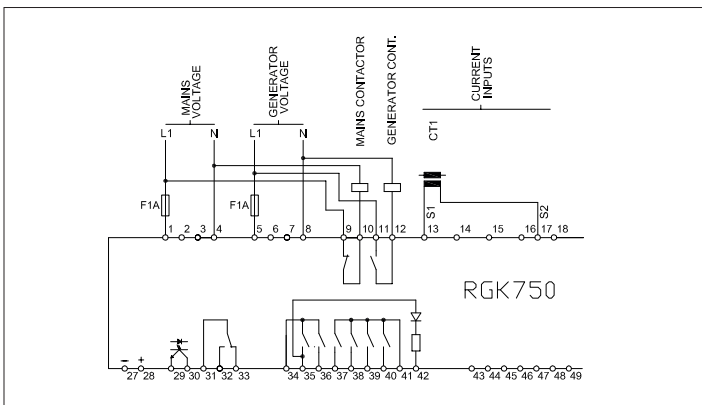
Reference earth/ground for analog sensors to be connected directly on the engine block.

CANBUS CONNECTION

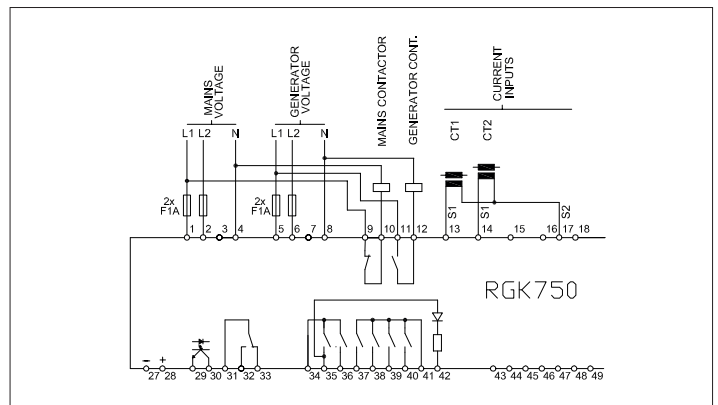


The CANbus connection has two 120-Ohm termination resistors at both ends of the bus. To connect the resistor incorporated in the RGK750 board, jumper TR and CAN-L.

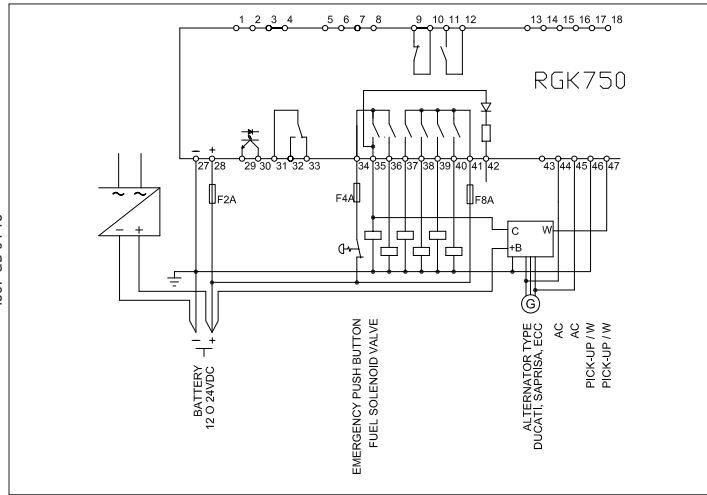
WIRING FOR SINGLE-PHASE GENERATING SET



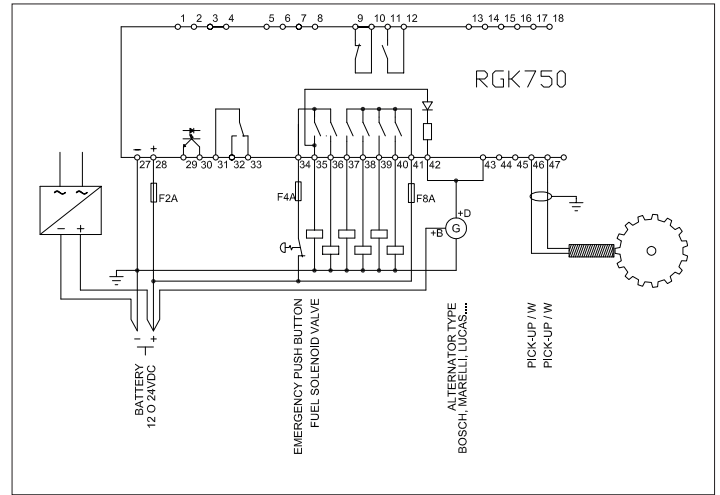
WIRING FOR TWO-PHASE GENERATING SET



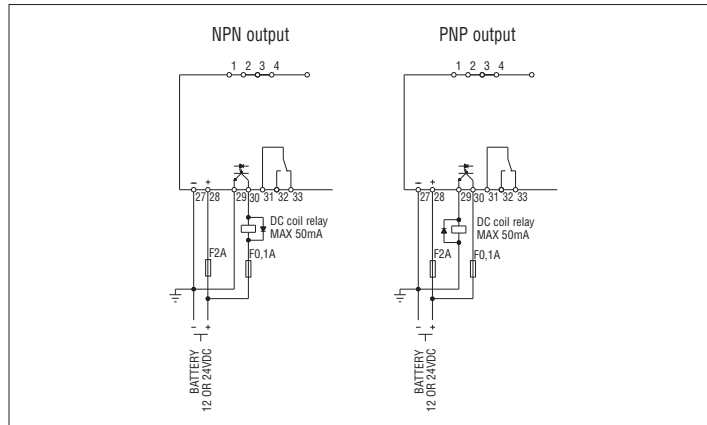
WIRING FOR GENERATING SET WITH PERMANENT MAGNET BATTERY CHARGER ALTERNATOR



WIRING FOR GENERATING SET WITH MAGNETIC PICK-UP SPEED DETECTOR

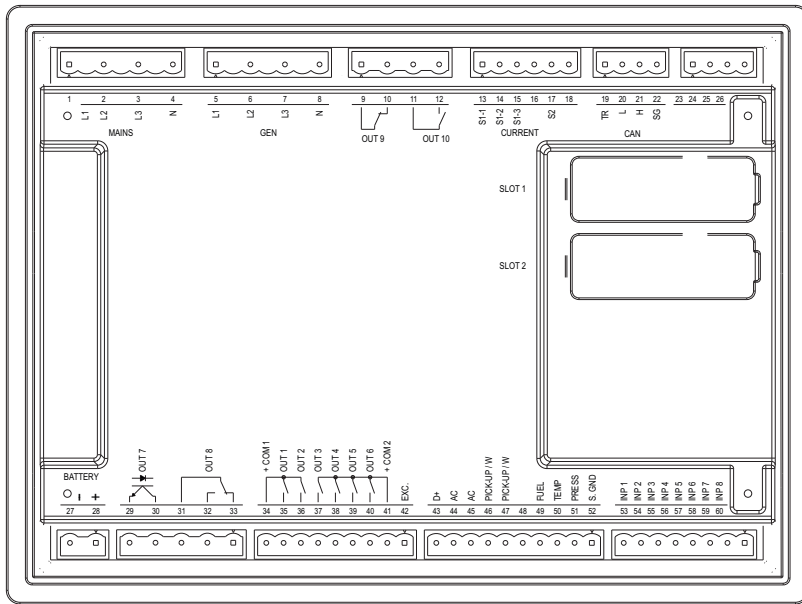


RA OUTPUT (OUT 7) USED AS RELAY DRIVER

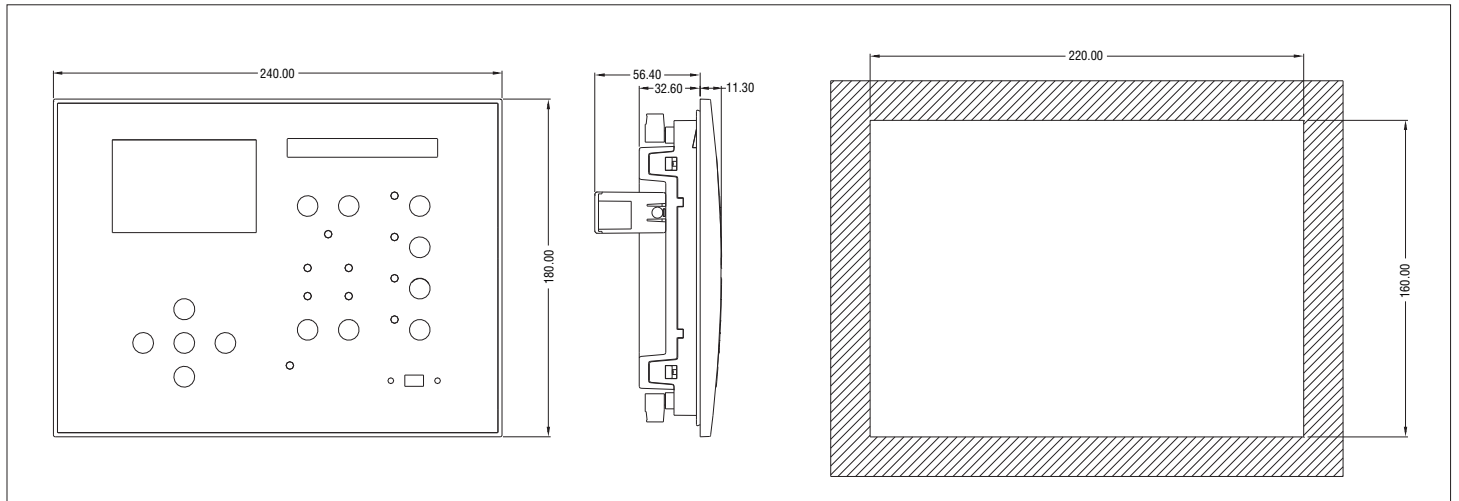


TERMINALS ARRANGEMENT

1567 GB 04 18



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
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. ±1 digit
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	
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 mm² (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
Certifications and compliance	
Certifications obtained	EAC
Comply with standards	IEC/EN 61010-1, IEC/EN 61000-6-2, IEC/EN 61000-6-3, UL508, CSA C22.2 N°14