OPERATOR'S MANUAL



GENERATOR

G250RX, G275QX, G275X, G330QX, G330X, G380QX, G380X, G440QX, G440X, G500QX, G500X, G550QX, G550X, G600QX, G600X

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THIS MANUAL SHOULD ALWAYS STAY WITH THE MACHINE

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Safety

Safety - Yours and Others

All machinery can be hazardous. When a machine is correctly operated and maintained, it is a safe machine to work with. When it is carelessly operated or poorly maintained it can become a danger to you (the operator) and others.

In this manual and on the machine you will find warning messages, read and understand them. They inform you of potential hazards and how to avoid them. If you do not fully understand the warning messages, ask your employer or JCB dealer to explain them.

Safety is not just a matter of responding to the warnings. All the time you are working on or with the machine you must be thinking of what hazards there might be and how to avoid them.

Do not work with the machine until you are sure that you can control it.

Do not start any work until you are sure that you and those around you will be safe.

If you are not sure of anything, about the machine or the work, ask someone who knows. Do not assume anything.

Remember:

- Be careful
- Be alert
- Be safe.

Safety Warnings

In this manual and on the machine, there are safety notices. Each notice starts with a signal word. The signal word meanings are given below.

The signal word 'DANGER' indicates a hazardous situation which, if not avoided, will result in death or serious injury.

The signal word 'WARNING' indicates a hazardous situation which, if not avoided, could result in death or serious injury.

The signal word 'CAUTION' indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

The signal word 'Notice' indicates a hazardous situation which, if not avoided, could result in machine damage.

The safety alert system (shown) also helps to identify important safety messages in this manual and on the machine. When you see this symbol, be alert, your safety is involved, carefully read the message that follows, and inform other operators.

Figure 1. The safety alert system



General Safety

The following safety checklist is intended to help remind you of safety procedures and practices.

Safety is Your Responsibility

You must also refer to local regulations in the country your equipment is being used in. Some of the information may be repeated in the following warnings and cautions pages and in the main text.

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Introduction
About this Manual

Model and Serial Number

This manual provides information for the following model(s) in the JCB machine range:

Model	From:	To:
G250RX	1650000	
G275QX	1650000	
G275X	1650000	
G330QX	1650000	
G330X	1650000	
G380QX	1650000	
G380X	1650000	
G440QX	1650000	
G440X	1650000	
G500QX	1650000	
G500X	1650000	
G550QX	1650000	
G550X	1650000	
G600QX	1650000	
G600X	1650000	

Using the Manual

This operator's manual is arranged to give you a good understanding of the machine and its safe operation. It also contains maintenance and technical data.

Read this manual from the front to the back before you use the machine for the first time, even if you have used machines of a similar/same type before as the technical specification, systems and controls of the machine may have changed. Particular attention must be given to all the safety aspects of operating and maintaining the machine.

If there is anything you are not sure about, ask your JCB dealer or employer. Do not guess, you or others could be killed or seriously injured.

The general and specific warnings in this section are repeated throughout the manual. Read all the safety statements regularly, so you do not forget them. Remember that the best operators are the safest operators.

The illustrations in this manual are for guidance only. Where the machines are different, the text and or the illustration will specify.

The manufacturer's policy is one of continuous improvement. The right to change the specification of the machine without notice is reserved. No responsibility will be accepted for discrepancies which may occur between specifications of the machine and the descriptions contained in this manual.

All of the optional equipment included in this manual may not be available in all territories

Cross References

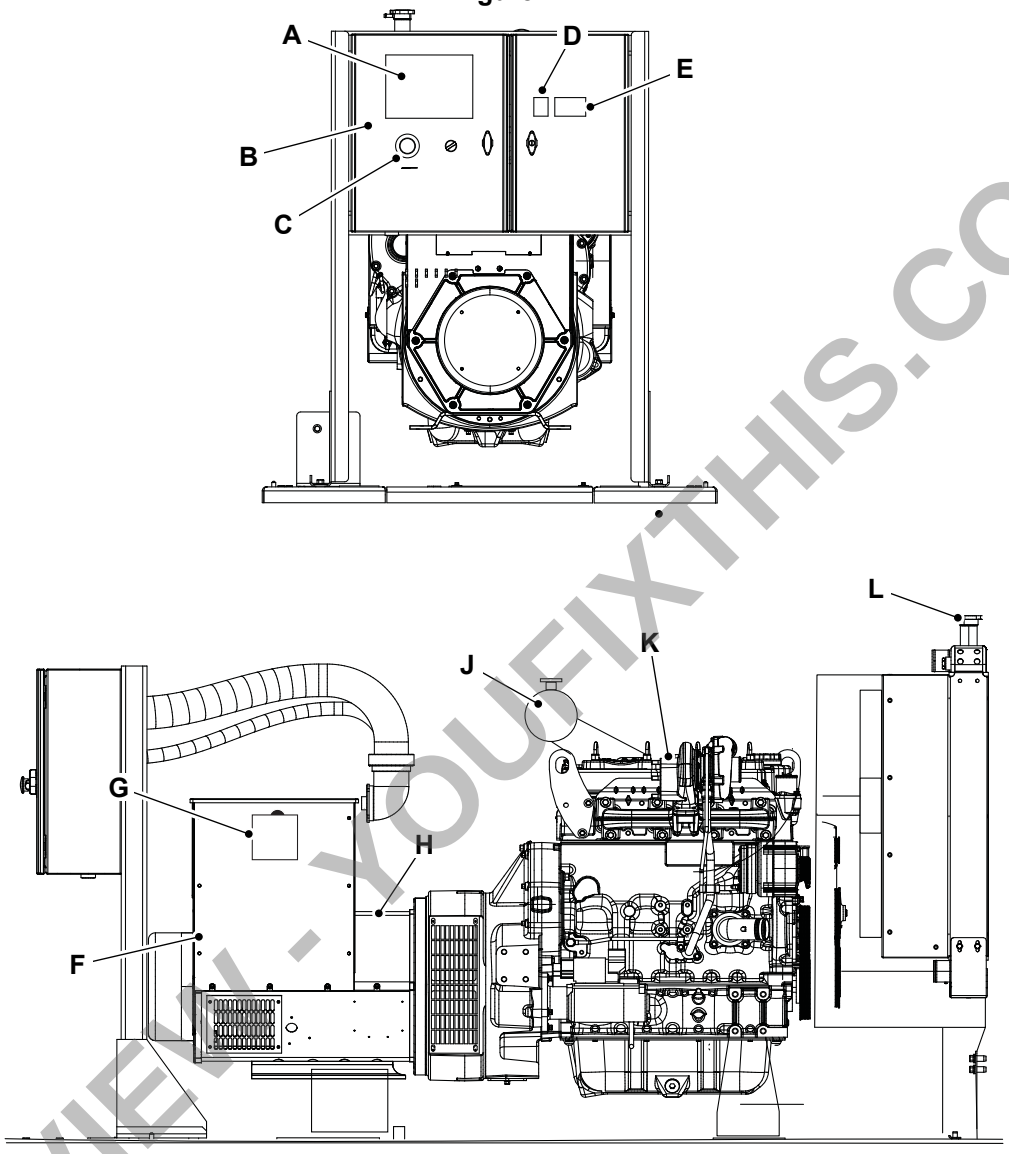
In this manual, cross references are made by presenting the subject title in blue (electronic copy only). The number of the page upon which the subject begins is indicated within the brackets. For example: Refer to: Cross References (Page 1).

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Description

Main Component Locations

Figure 2.

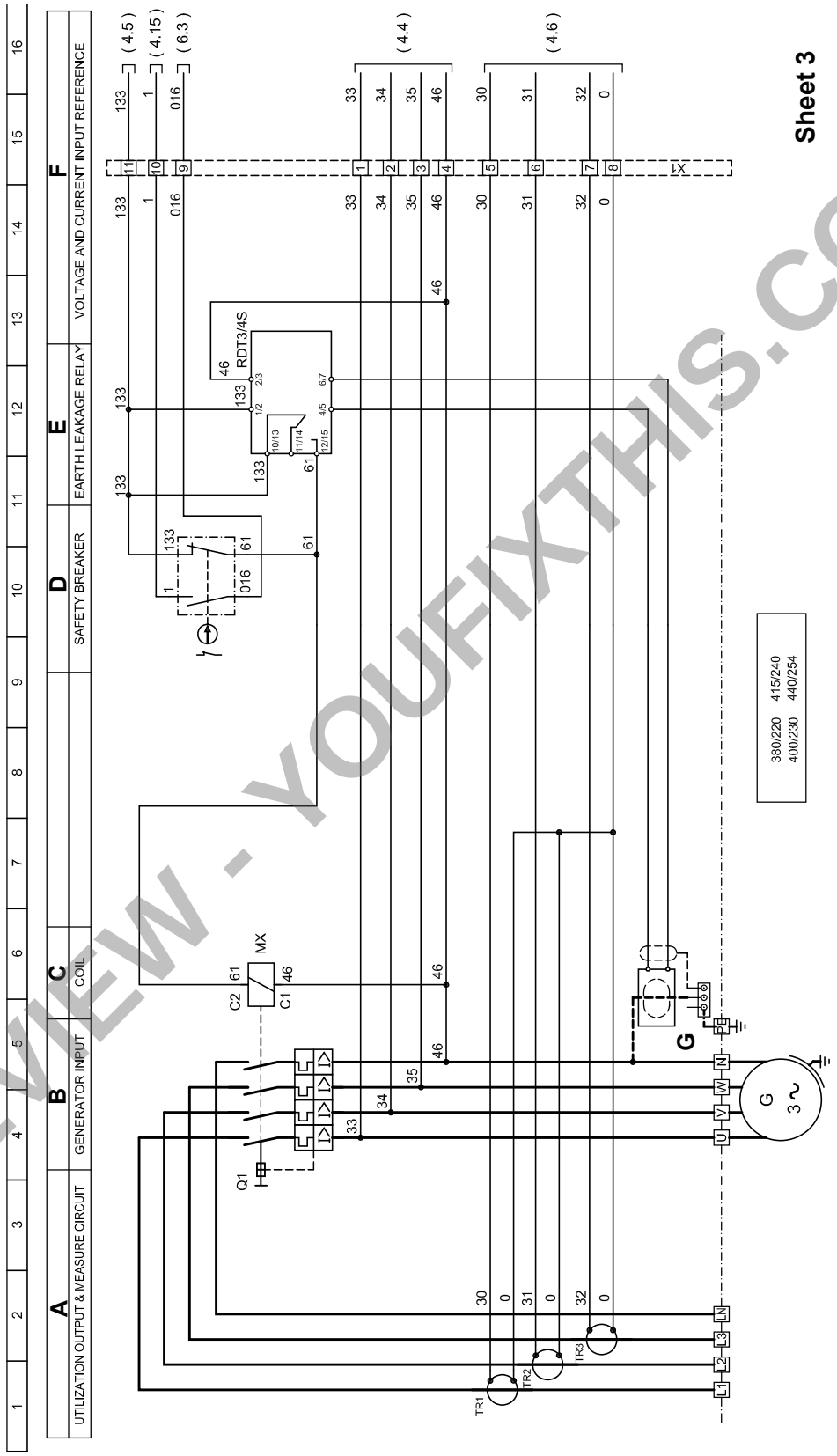


A Control panel
B Panel on/off switch
C Emergency stop
D Earth leakage relay (option)
E Circuit breaker
F Alternator terminal box
G Automatic voltage regulator
H Alternator
J Air filter
K Engine
L Coolant cap

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Figure 112. Power Circuit



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Reading Off Control Unit Fault Codes

1. Turn on the ignition.
2. Activate the diagnostics switch to the left to view the flashing codes for the control unit (EMS).
3. A fault code will then flash on the diagnostics lamp.
   3.1. This flashing code consists of long flashes (approximately 1 second long) and short flashes (0.3 seconds long). Long flashes are equivalent to tens and short flashes to units. Example: long - short - short = fault code 12.
4. Repeat this procedure until the first flashing code is repeated.
   4.1. This means that the entire fault code memory has been flashed up. If the fault code memory is empty, only one long flash approximately 4 seconds long will be given. Refer to Table 60.
5. In order to obtain further information on the fault code, the PC-based diagnostics tool or EMS display must be used. Contact an authorised workshop.
6. When a fault has been rectified the fault code can be erased as described below.

Erasing Fault Codes

1. Turn the ignition off.
   1.1. If the vessel has dual instrumentation the ignition must be switched off on both panels.
2. Activate the diagnostics switch in the same direction as the flashing codes indicate, i.e. to the right for the coordinator (COO) or to the left for EMS.
3. Turn the ignition switch to the on position and keep the diagnostics switch activated, to the right (COO) or to the left (EMS), for three seconds.
   3.1. This will erase passive fault codes which can be read off via flashing code for the relevant system. The rest of the fault code will remain in the EEPROM and can only be deleted using the PC tool.

Table 60. Overview of Flashing Codes for EMS Control Unit

Code	Description
0	No fault detected
11	Overspeed - One or both engine speed sensors are displaying speeds in excess of 3000rpm
12	Engine speed sensor 1 faulty or faulty signal
13	Engine speed sensor 2 faulty or faulty signal
14	Coolant temperature sensor faulty or faulty signal
15	Charge air temperature sensor faulty or faulty signal
16	Charge air pressure sensor faulty or faulty signal
17	Oil temperature sensor faulty or faulty signal
18	Oil pressure sensor faulty or faulty signal
20	Coolant level sensor faulty
23	Fault code internally in the coordinator
24	Accelerator/brake. If the accelerator and brake have been operated simultaneously.
25	Accelerator sensor/idle switch. Accelerator sensor/kickdown switch.
27	Engine shutdown bypassed
28	Shut-off due to oil pressure
31	Torque limitation due to oil pressure
32	Incorrect parameters for limp home function
33	Battery voltage incorrect or no signal
37	Emergency shut-off switch activated in accordance with CAN message from coordinator
43	CAN circuit faulty in the control unit

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Fault-Finding

General

⚠ **WARNING** Machinery utilizing the engine must be correctly isolated and prepared, for example safety strut installed, prior to completing maintenance tasks on the engine. Maintenance must be completed by suitably qualified personnel. You or others could be killed or seriously injured if the machine is not correctly prepared and maintained.

The fault finding procedures are given in the form of flow charts. There are a number of charts, each one dedicated to a particular fault category.

The charts are designed to identify possible causes by performing checks and where applicable, specific tests on the engine. Having identified a cause the suggested remedy is given. The charts are designed to identify causes through a process of elimination, starting with the simplest, most easily rectified faults.

Due to the time and effort involved in removing, dismantling, assembling and replacing an engine, it is recommended that fault finding procedures are carried out until a fault can be identified with a good degree of certainty.

There are many reasons why an engine may malfunction, time and effort will be saved by following basic troubleshooting steps:

- Do not make assumptions.
- If possible, talk to the operator for a description of the fault. Also, check if any recent maintenance or repair has been completed on the engine.
- Start simple - for instance many starting and running faults can be attributed to low fuel level.
- Systematically work through each of the possible causes.
- Confirm your diagnosis before dismantling and assembling.
- Follow the recommended repair procedures in this manual.

Some of the tasks listed in the fault finding must only be completed by suitably qualified and competent personnel, for example, fuel injection pump removal and replacement. If you are unsure, do not attempt the task.

Alternator

Table 53.

Operating Condition and Symptom		Fault	Action
No load	No voltage	Voltage monitoring faulty	Check voltage output at alternator terminals
			Check wiring and connections between alternator and control panel
			Check voltage monitoring fuses
			Check connections on AVR
		Load applied during start-up	Open circuit breaker and re-test
		Control panel fault	Contact JCB dealer
		Alternator fault	Contact JCB dealer
	Low voltage	Voltage monitoring faulty	Check voltage output at alternator terminals
			Check wiring connections between alternator and control panel
			Check voltage monitoring fuses
			Check connections on AVR
		Engine speed low - under frequency protection (UFRO) circuit activated	Check LED on AVR, if lit this indicates engine speed low - contact your JCB dealer
		AVR voltage set incorrectly	Adjust voltage on AVR trimmer, ensure UFRO LED is not activated
		Control panel fault	Contact JCB dealer

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Fluids, Lubricants and Capacities

General

The generating set engine oil is pre-filled in factory. However it is important to check the level of oil in the engine before any starting can take place, and also as part of a regular maintenance schedule.

New engines do not require a running-in period. The engine/machine should be used in a normal work cycle immediately, glazing of the piston cylinder bores, resulting in excessive oil consumption, could occur if the engine is gently run-in. Under no circumstances should the engine be allowed to idle for extended periods; (e.g. warming up without load).

For vehicle applications a minimum API CF-4 grade oil must be used. Superior grade oils may be more appropriate for heavy duty applications (such as sustained high loads and operation at elevated temperatures).

Important: Operation of the engine with some types of fuel requires use of superior grade oil.

For generator set applications a minimum API CI-4 grade oil must be used. Superior grade oils may be more appropriate for heavy duty applications (such as sustained high loads and operation at elevated temperatures).

The choice of lubricant viscosity should be made based on the lowest ambient temperature at which the machine will be started and the maximum ambient temperature at which it will operate.

The following table provides guidance as to the temperature range that can be accommodated by standard oil viscosities and can be used to select an appropriate grade. Refer to Table 62.

Important: When selecting the oil viscosity grade make sure the oil conforms with or exceeds the recommended specification.

Table 62.

Oil Viscosity	Minimum Temperature °C (°F)	Maximum Temperature °C (°F)
SAE 0W30	-40 (-40)	30 (86.0)
SAE 0W20	-40 (-40)	10 (50.0)
SAE 5W20	-30 (-22)	10 (50.0)
SAE 5W40	-30 (-22)	40 (103.9)
SAE 10W30	-20 (-4)	40 (103.9)
SAE 15W40	-15 (-5)	50 (121.9)

Recommended Oils

Table 63.

Engine Oil	Specification
JCB Extreme Performance	API CI4+

Choose the grade of oil to suit the temperature range as detailed. Refer to Table 62.

Engine Oil Capacity

Table 64.

Item	Capacity Litres (UK Gal)
Engine	Maximum 19.8L

Fuel

⚠ **WARNING** Do not use petrol in this machine. Do not mix petrol with the diesel fuel. In storage tanks the petrol will form flammable vapours.

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Maintenance Schedules

General

A poorly maintained machine is a hazard. Doing the regular maintenance and lubrication jobs listed in these schedules will help keep the machine in safe running order.

Apart from the daily jobs, the schedules are based on machine running hours. Keep a regular check on the hour meter reading. Do not use a machine which is due for a regular service. Rectify any defects found during regular maintenance before clearing the machine for use.

Generators may be used in either 'Prime' or 'Stand-by' applications. Minimum annual servicing is included to cover 'Stand-by' units where minimal hours will be accumulated.

Apart from the daily jobs, the schedules are based on machine running hours. Keep a regular check on the hourmeter readings to correctly gauge service intervals. Do not use a machine which is due for a service. Make sure any defects found during the regular maintenance checks are rectified immediately.

How to Use the Maintenance Schedules

The schedules show the service tasks which must be done and their intervals.

The services must be done at either the hourly interval or the calendar equivalent, whichever occurs first.

The intervals given in the schedules must not be exceeded. If the machine is operated under severe conditions (high temperature, dust, water, etc.) shorten the intervals.

Table 27.

O	Service task can be completed by a competent operator. Details of how to complete the service task are given in the Operator's Manual.
□	We recommend that a Service Engineer completes the service task. Details of how to complete the service task are given in the Service Manual.

Maintenance Intervals

Table 28.

Interval (h)	Calendar Equivalent
10	Daily
50	Weekly
500	Six months
1000	Yearly
2000	Two years
6000	Six years

Pre-start Cold Checks, Service Points and Fluid Levels

Table 29.

		First Time At			Interval (h)					At Least	
Component	**Task**	**10**	**First Start**	**400**	**200**	**400**	**1200**	**2400**	**4800**	**1000**	**Every 5th Year**
Oil level	Check	O	O								
Oil	Change					□	□	□	□	□	
Oil cleaner	Clean					□	□	□	□	□	
Oil filter and CCV filter	Change					□	□	□	□	□	

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Starting the Engine

General

If the fuel tank has been run dry or if the engine has not been used for a long time, bleed the fuel system.

Out of consideration for our common environment, your engine has been designed to use a smaller amount of fuel when starting. Using unnecessarily large amounts of fuel when starting the engine always results in the discharge of unburnt fuel.

1. Open the fuel cock, if fitted.
2. Disengage the engine.
3. Switch on the power by means of the battery master switch for engines with battery master switch.
4. Start the engine with the key in the control panel (SCP) or the start button (only from RCB).
5. The diagnostics lamp should go out after approximately two seconds when starting.

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Instruments

Control Panel

For: Control Panel 7320 ..... Page 28
For: Control Panel 8610 ..... Page 29
For: Control Panel CP1, CP2 ..... Page 31
For: Control Panel ATP1, ATP2 ..... Page 43

(For: Control Panel 7320)

⚠ **WARNING** Electric shock hazard. High voltage can cause serious injury or death. Make sure that all work is performed by qualified personnel. All cabling to the load must comply with the applicable laws and electrical standards.

Notice: Possibility of equipment damage. Proper sizing is critical to the operation and performance of the generator. Make sure that the load is sized correctly for the capacity of your generator.

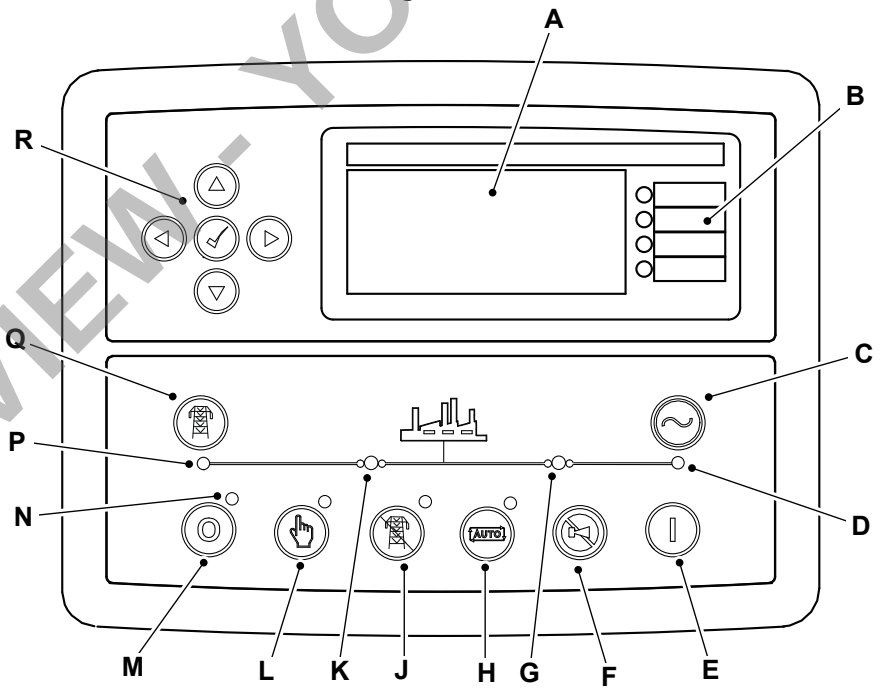
This is the stand alone generator controller. It does not have synchronising function.

The following description details the sequences followed by a module containing the standard `factory configuration'. Always refer to your configuration source for the exact sequences and timers observed by any particular module in the field.

Control of the module is via push buttons mounted on the front of the module which need to be operated for the normal operation. Refer to Table 2.

The module may instruct an engine start event due to external influences. Therefore, it is possible for the engine to start at any time without warning when it is set to Auto Mode. Prior to performing any maintenance on the system, it is recommended that steps are taken to remove the battery and isolate supplies.

Figure 13.



A Module display
B Four configurable status LED (Light Emitting Diode)
C Transfer to generator - manual mode only (not used)
D Generator available LED
E Start button
F Alarm mute and lamp test
G Generator breaker LED (not used)
H Auto mode
J Test mode (not used)
K Mains breaker LED (not used)

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