OPERATOR'S MANUAL



GENERATOR

G115, G115QS, G115S, G116QS, G140, G140QS, G140S, G141, G141QS, G65, G65QS, G65S, G66QS, G90, G90QS, G90S, G91QS

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THIS MANUAL SHOULD ALWAYS STAY WITH THE MACHINE

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Contents **Page No.**

Acronyms Glossary iii

Introduction
About this Manual
Model and Serial Number 1
Using the Manual 1
Left-Hand Side, Right-Hand Side 1
Cross References 2
Safety
Safety - Yours and Others 3
Safety Warnings 3
General Safety 3

About the Product
Introduction
Name and Address of the Manufacturer 5
Product Compliance 5
Description
Main Component Locations 6
Product and Component Identification
General 10
Engine 10
Safety Labels
Safety Label Identification 12
Installation and Removal
Installation 14

Operation
Operating Safety
General 25
Battery Isolator
General 27
Before Starting the Engine
General 28
Starting the Engine
General 29
Instruments
General 39
Control Panel 43
Module Display 47
Operating Environment
General 54

Attachments
Working with Attachments
Attachments for your Machine 57

Preservation and Storage
Cleaning
General 75

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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, you must 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 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 symbol (shown) also helps to identify important safety messages in this manual. When you see this symbol your safety is involved, carefully read the message that follows.

Figure 1. The safety alert system symbol



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:
G115	2288985	
G115QS	2288985	
G115S	2288985	
G116QS	2288985	
G140	2288985	
G140QS	2288985	
G140S	2288985	
G141	2288985	
G141QS	2288985	
G65	2288985	
G65QS	2288985	
G65S	2288985	
G66QS	2288985	
G90	2288985	
G90QS	2288985	
G90S	2288985	
G91QS	2288985	

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

Left-Hand Side, Right-Hand Side

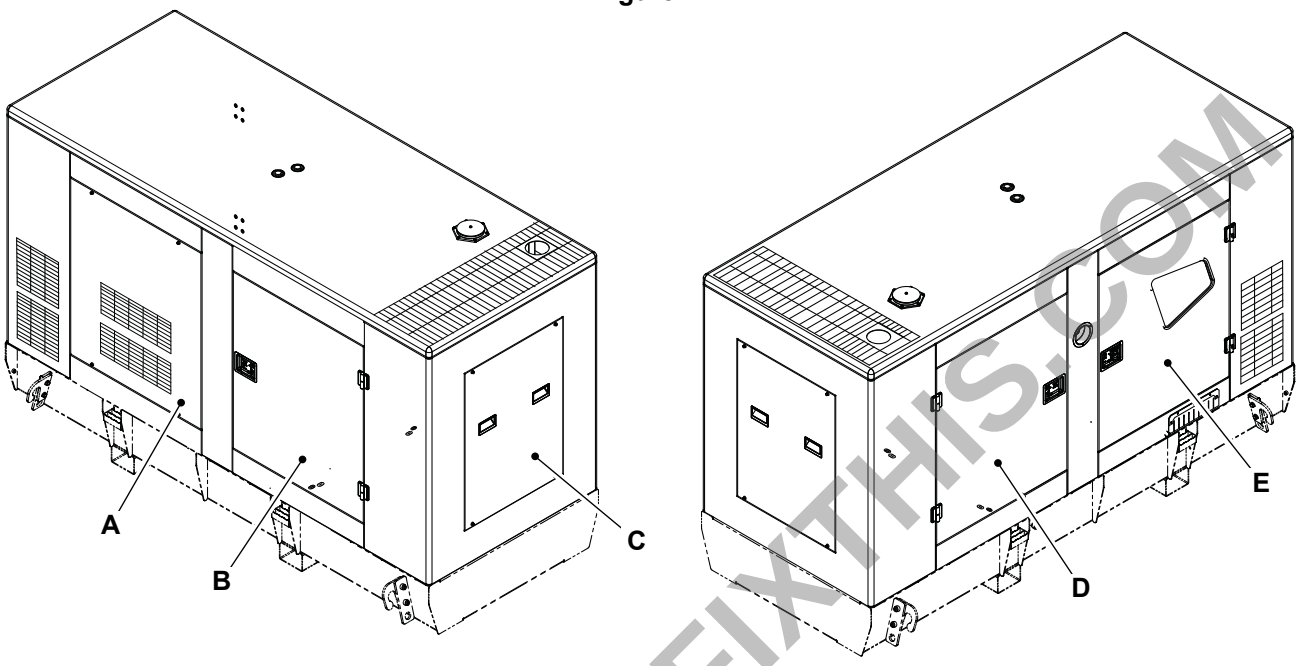
References to the left side and right side of the engine are when view from the flywheel end of the engine.

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Description

Main Component Locations

Figure 2.

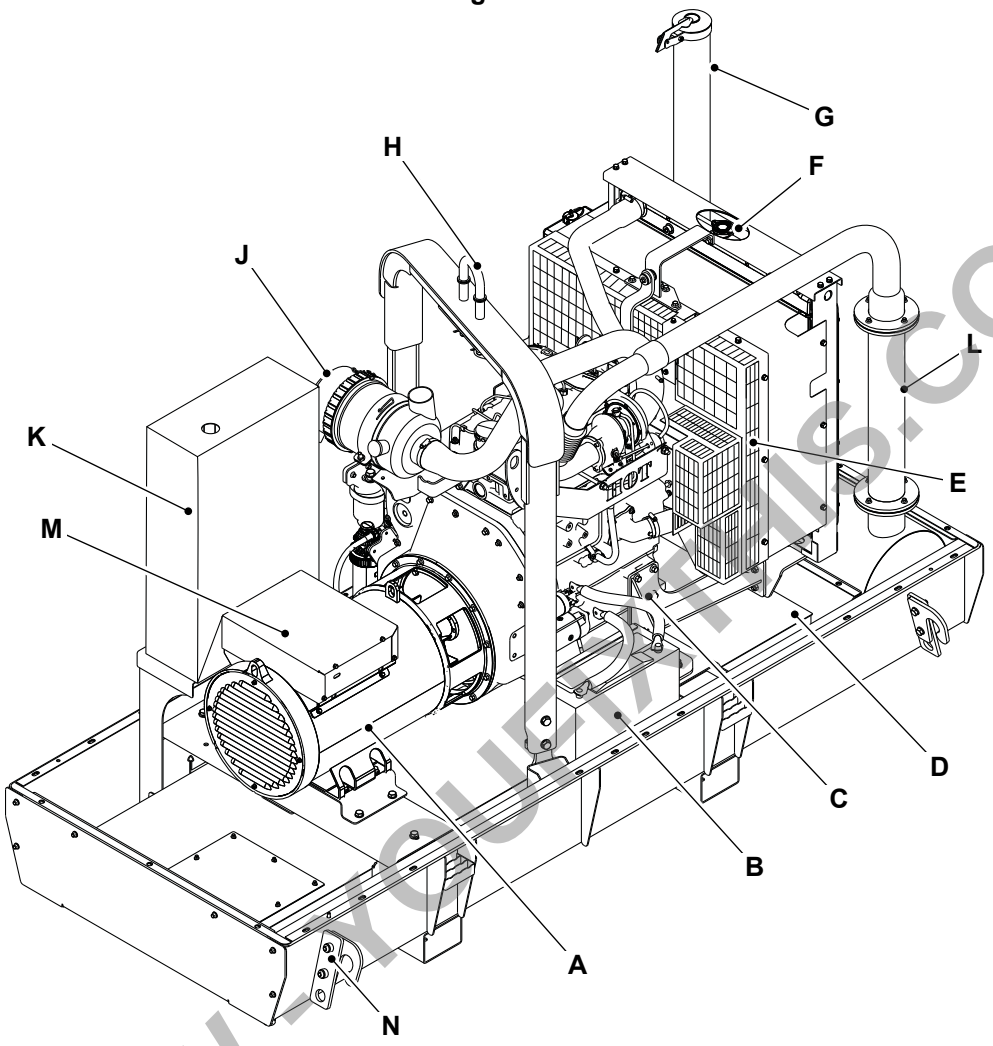


A Access panel for alternator
B Access door for engine and battery
C Access panel for radiator and exhaust muffler
D Access door for the control panel
E Access door for the air filter and engine

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Figure 3.



A Fuel tank
B Control panel
C Emergency stop
D Fuel filter/water separator
E Fuel tank filler neck
F Engine oil filter
G Water separator
H Exhaust silencer
J Radiator cap
K Radiator
L Inlet manifold
M Automatic voltage regulator
N Battery
P Data plate

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In the event of an alarm the LCD jumps to the alarms page and scrolls through all active alarms.

Shutdowns are latching alarms and to remove the fault, press the STOP/RESET Mode button on the module.

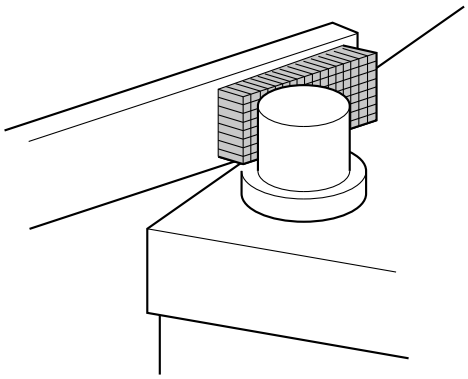
Table 10.

Fault	Description
Auxiliary Inputs	The module detects that an auxiliary input which has been user configured to create a fault condition has become active.
Analogue Input Configured As Digital	The analogue inputs can be configured to digital inputs. The module detects that an input configured to create a fault condition has become active.
Fail To Start	The engine has failed to start after the configured number of start attempts.
Low Oil Pressure	The module detects that the engine oil pressure has fallen below the low oil pressure pre-alarm setting level after the Safety On timer has expired.
Engine High Temperature	The module detects that the engine coolant temperature has exceeded the high engine temperature pre-alarm setting level after the `Safety On' timer has expired.
Under Speed	The engine speed has fallen below the under speed pre alarm setting.
Over Speed	The engine speed has risen above the over speed pre alarm setting.
Charge Failure	The auxiliary charge alternator voltage is low as measured from the W/L terminal.
Low Fuel Level	The level detected by the fuel level sensor is below the low fuel level pre-set alarm setting.
High Fuel Level	The level detected by the fuel level sensor is above the high fuel level pre-set alarm setting.
Generator Under Voltage	The generator output voltage has fallen below the pre-set alarm setting. after the Safety On timer has expired.
Generator Over Voltage	The generator output voltage has risen above the pre-set alarm setting.
Generator Under Frequency	The generator output frequency has fallen below the pre-set alarm setting after the `Safety On' timer has expired.
Generator Over Frequency	The generator output frequency has risen above the pre-set alarm setting.
Delayed Over Current	The measured current has risen above the configured trip level for a configured duration.
kW Overload	The measured kW has risen above the configured trip level for a configured duration.
CAN ECU Fault	The engine ECU has detected an alarm - check engine light Contact Engine Manufacturer for support.
CAN Data Fail	The module is configured for CAN operation and does not detect data on the engine CAN data link.
Emergency Stop	The emergency stop button has been depressed. This failsafe (normally closed to emergency stop) input and immediately stops the set should the signal be removed.
Oil Sender Open Circuit	The oil pressure sensor has been detected as being open circuit.

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Figure 77.



4. Apply a thin layer of petroleum jelly to the terminal posts.

Connect

The batteries leads will require connecting on initial installation.

When connecting the single battery to the machine, always connect the positive terminal first followed by the negative terminal. When connecting the twin batteries to the machine, first connect the link lead or leads, then the positive terminal, and finally the negative terminal.

If the machine has a battery isolator, move the switch to the on position.

When disconnecting, remove the negative first then the positive. These steps will ensure accidental shorting of the battery terminals cannot take place.

Depending on the size of the generating set, the electrical system will either be 12V or 24V.

Figure 78. 12V System

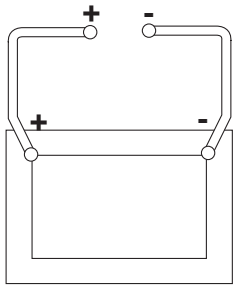
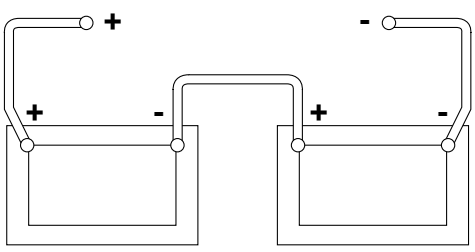


Figure 79. 24V System



Follow the procedure to connect the battery.

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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 55.

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

Table 55.

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

Recommended Oils

Table 56.

Engine Oil	Specification
JCB Extreme Performance	API CI4

Choose the grade of oil to suit the temperature range as detailed. Refer to Table 55.

Engine Oil Capacity

Table 57.

Item	Capacity Litres (UK Gal)
Engine	Maximum 15 L

Fuel

Acceptable and Unacceptable Fuels

Important: No warranty liability whatsoever will be accepted for failure of fuel injection equipment where the failure is attributed to the quality and grade of the fuel used.

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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 16.

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 17.

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 18.

	Operation	Interval (h)						Annually
		10	50	500	1000	2000	6000	
Overall Machine								
Visual inspection	Overall visual check	O	O	□	□	□	□	
Control Panel	Check operation	O	O	□	□	□	□	
Safety decals	Check condition		O	□	□	□	□	
Emergency stop switches	Check operation		O	□	□	□	□	

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3. Use of incorrect fuel will cause the fuel to wax/thicken. This will block filter elements and increase wear in the fuel injection pump and injection systems. At extremely low temperatures trace heating may also be required to prevent the fuel from thickening and waxing.
4. If the engine block heater is not used then the engine may have problems in cold starting. Combined with incorrect coolant mixture will lead to cracks and damage to the engine crankcase or cylinder head due to freezing of the water mixture.
5. Freezing of the condensate within the CCV filter and breather pipe may also occur if the combined extremely low ambient temperature and subsequent air flow wind speed reduce the temperature around the components to a level that the condensate freezes. Moderating the airflow using actuated louvers on the air intake and raising the under canopy temperature helps prevent freezing.
6. For the main alternator, if Anti Condensation Heaters (ACH) are not installed, then in cold climates condensation can form on the windings and electronic AVR boards.
7. This condensation can cause tracking and short circuits of components and subsequent failure. The same can happen inside the control panel and related circuits.
8. To prevent condensation on the alternator and control panel, an Anti Condensation Heater (ACH)/auxiliary canopy heater may be required.
9. Failure to protect the batteries from the cold climate can also cause premature discharge of the battery voltage and give problems with the engine cranking speed.

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8. The generator can now be loaded.
9. To stop the generator, remove any electrical loads.
10. Press the stop button the generator will now stop.

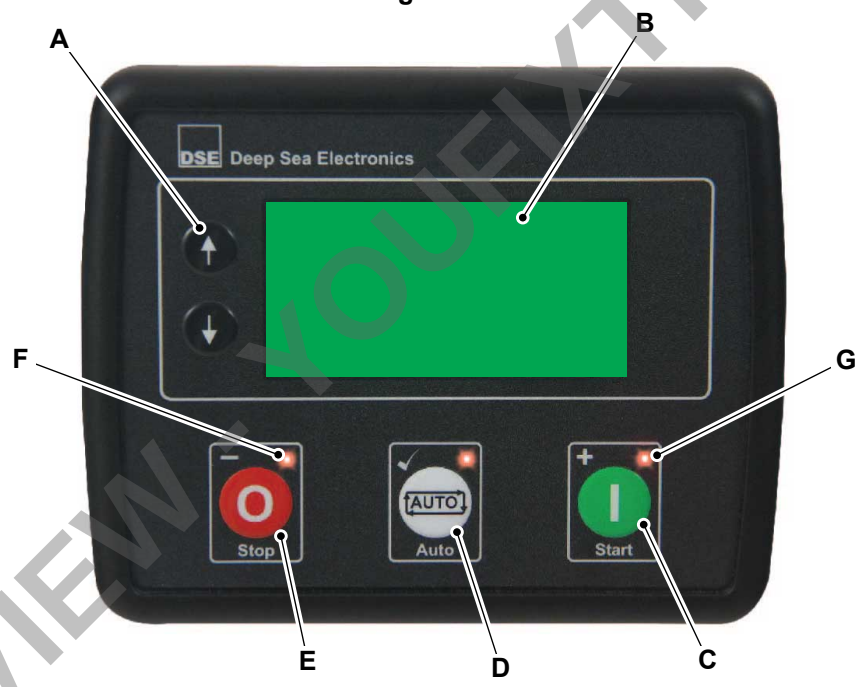
Digital Controller

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 with STOP/RESET mode, AUTO mode and MANUAL/START mode functions. For normal operation, these are the only controls which need to be operated.

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. Prior to performing any maintenance on the system, it is recommended that steps are taken to remove the battery and isolate supplies.

Figure 30.



A Menu navigation (up/down)
B Module display
C Manual/start mode
D Auto mode
E Stop/reset mode
F Stop/reset mode LED
G Stop/reset mode LED

Emergency Stop Button

A machine isolation button/emergency Stop button is mounted both externally on the canopy and internally near the control panel. If either is pressed, all machine systems will stop completely.

Use the emergency stop button in the case of an emergency or if the machine becomes unsafe and does not shutdown automatically.

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