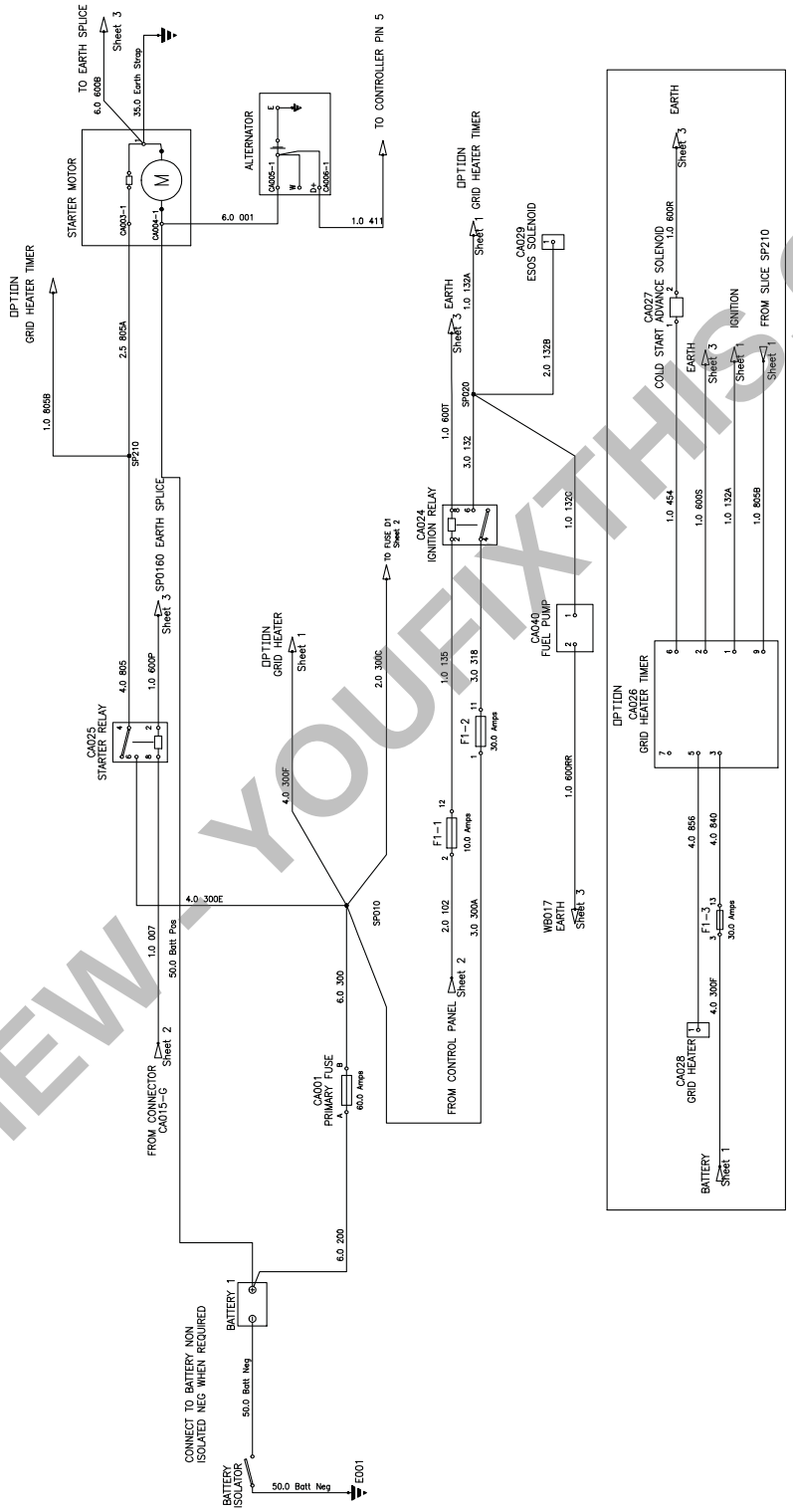
Schematic Circuit

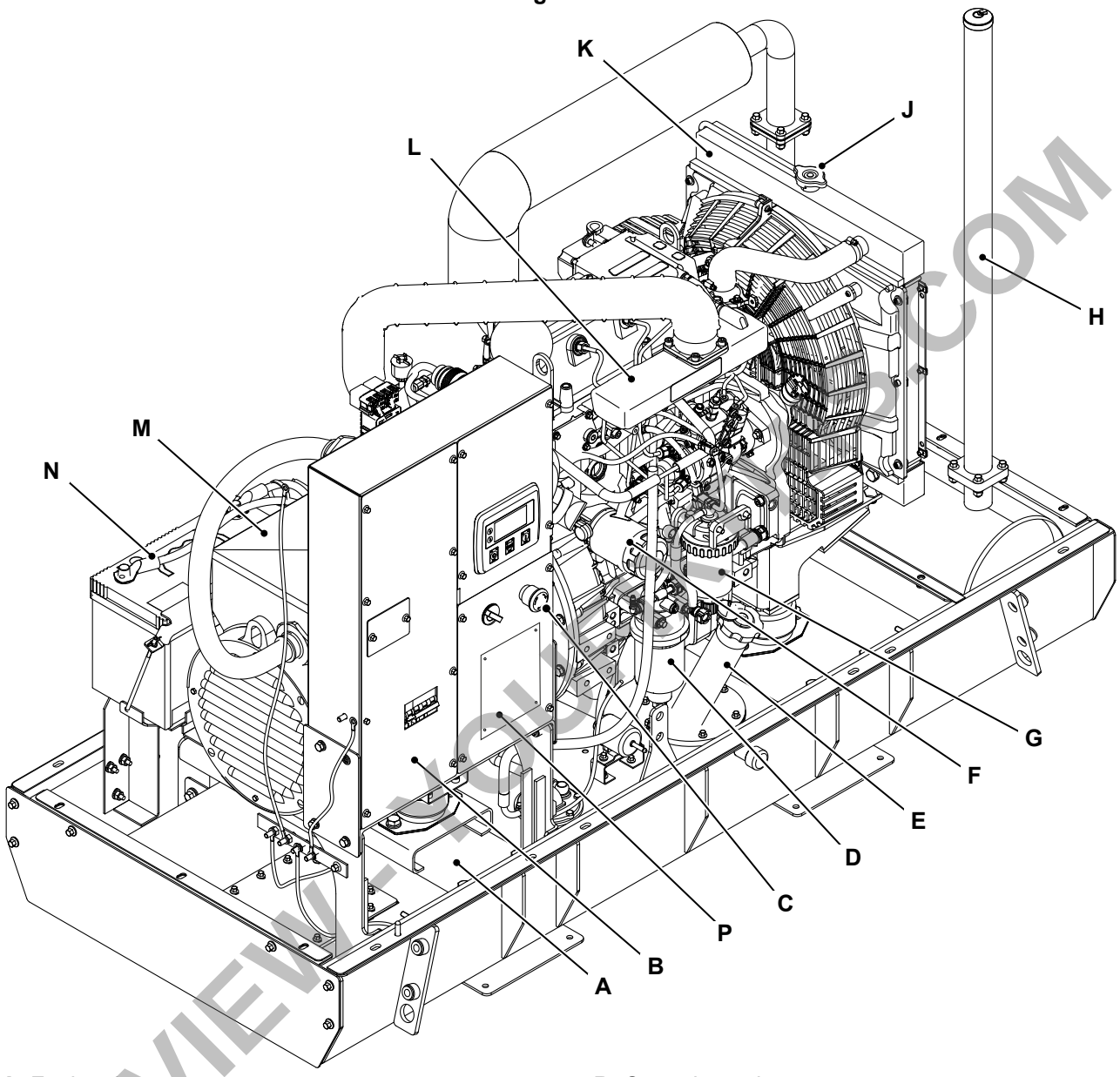
Figure 98. 335/F5093-3 (sheet 1 of 6)



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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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Icon	Fault	Description
	Generator Over Frequency	The generator output frequency has risen above the pre-set pre-alarm setting.
	CAN ECU Fault	The engine ECU has detected an alarm.
	CAN (Controller Area Network) Data Fail	The module is configured for CAN operation and does not detect data on the engine CAN data link.
	Immediate Over Current	The measured current has risen above the configured trip level.
	Delayed Over Current	The measured current has risen above the configured trip level for a configured duration.
	Oil Filter Maintenance Alarm	Maintenance due for oil filter.
	Air Filter Maintenance Alarm	Maintenance due for air filter.
	Fuel Filter Maintenance Alarm	Maintenance due for fuel filter.

Electrical Trip Alarm Icons

Electrical trips are latching and stop the Generator but in a controlled manner. On initiation of the electrical trip condition the module de-energises all the `Delayed Load Output' and the `Close Gen Output' outputs to remove the load from the generator. Once this has occurred the module starts the Cooling timer and allows the engine to cool off-load before shutting down the engine. The alarm must be accepted and cleared, and the fault removed to reset the module.

Electrical trips are latching alarms and to remove the fault, press the STOP/RESET mode button on the module.

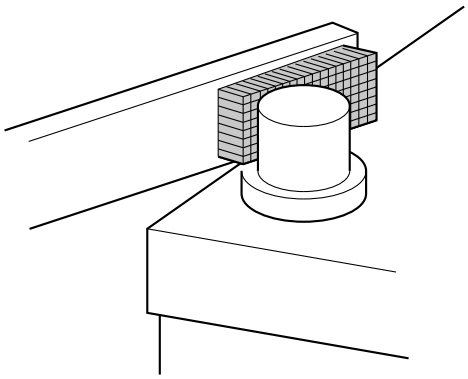
The alarm condition must be rectified before a reset will take place. If the alarm condition remains, it is not possible to reset the unit (The exception to this is the Low Oil Pressure alarm and similar `active from safety on' alarms, as the oil pressure is low with the engine at rest).

Table 10.

Icon	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.

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Figure 88.



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 89. 12V System

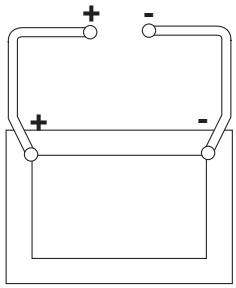
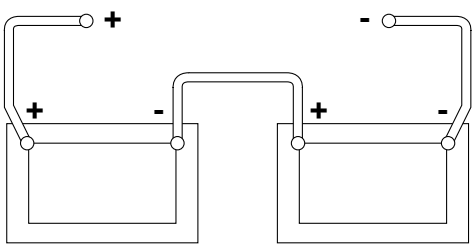


Figure 90. 24V System



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.

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

Table 77.

Oil Viscosity	
SAE	10W-40
	5-W40

Recommended Oils

Table 78.

Engine Oil	**Specification**
JCB Extreme Performance	API CI - 4, CH - 4, CG - 4
	ACEA E4[(1)]
	ACEA E5[(2)]
	ACEA E7[(3)]

(1) High performance (Euro 1 - 2 - 3 Engines) heavy duty
(2) High performance (Euro 1 - 2 Engines) heavy duty
(3) High power over long distances (Euro 4 - 5 engines)

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

Engine Oil Capacity

Table 79.

Item	**Capacity Litres (UK Gal)**
Engine	Maximum 11 (2.9)
	Minimum 8.7 (2.3)

(1) High performance (Euro 1 - 2 - 3 Engines) heavy duty
(2) High performance (Euro 1 - 2 Engines) heavy duty
(3) High power over long distances (Euro 4 - 5 engines)

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

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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 17.

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 18.

Interval (h)	Calendar Equivalent
10	Daily
50	Weekly
250	Three months
500	Six months
1000	Yearly
2000	Two years
6000	Six years
8000	Eight years

Pre-start Cold Checks, Service Points and Fluid Levels

Table 19.

Component	Task	10	50	250	500	1000	2000	5000	6000
Overall Machine									
Visual inspection	Overall visual check	O	O	□	□	□	□	□	□
Control Panel	Check operation	O	O	□	□	□	□	□	□
Safety decals	Check condition			□	□	□	□	□	□

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Engine

General

Clean

⚠ **Notice:** Clean the engine before you start engine maintenance. Obey the correct procedures. Contamination of the fuel system will cause damage and possible failure of the engine.

Notice: The engine or certain components could be damaged by high pressure washing systems; special precautions must be taken if the engine is to be washed using a high pressure system. Ensure that the engine air intake, alternator, starter motor and any other electrical components are shielded and not directly cleaned by the high pressure cleaning system.

Before carrying out any service procedures that require components to be removed, the engine must be properly cleaned.

Cleaning must be carried out either in the area of components to be removed or, in the case of major work, or work on the fuel system, the whole engine and surrounding machine must be cleaned.

Stop the engine and allow it to cool for at least one hour. Do not attempt to clean any part of the engine while it is running.

1. Make sure that the electrical system is isolated.
2. Make sure that all electrical connectors are correctly coupled. If connectors are open fit the correct caps or seal with water proof tape.
3. Cover the alternator with a plastic bag to prevent water ingress.
4. Seal the engine air intake, exhaust and breather system.
5. Make sure that the oil filler caps and dipstick are correctly installed.
6. Use a low pressure water jet and brush to soak off caked mud or dirt.
7. Apply an approved cleaning and degreasing agent with a brush. Obey the manufacturers instructions.
8. Use a pressure washer to remove the soft dirt and oil. Important: Do not aim the water jet directly at oil seals or electrical and electronic components such as the ECU (Electronic Control Unit), alternator or fuel injectors. Do not place the jet nozzle closer than specified to any part of the engine.

   Length/Dimension/Distance: 600mm
9. When the pressure washing is complete move the machine away from the wash area, or alternatively, clean away the material washed from the machine.
10. Before working on specific areas of the engine use a compressed air jet to dry off any moisture. When the area is dry use a soft clean brush to remove any sand or grit particles that remain.
11. When removing components be aware of any dirt or debris that may be exposed. Cover any open ports and clean away the deposits before proceeding.

Oil

Check (Level)

⚠ **WARNING** Never check the oil level or add oil with the engine running. Be careful of hot lubricating oil. Danger of scalding.

Notice: Do not exceed the correct level of engine oil in the sump. If there is too much engine oil, the excess must be drained to the correct level. An excess of engine oil could cause the engine speed to increase rapidly without control.

1. Make the machine safe.

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OPERATOR'S MANUAL



GENERATOR

G20, G20QS, G20S, G27, G27QS, G27S, G33, G33QS, G33S, G34QS, G40, G40QS, G40S, G41QS, G45, G45QS, G45S

EN - 9831/0650 ISSUE 3 - 11/2017

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, 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:
G20	2288985	2298985
G20QS	2288985	2298985
G20S	2288985	2298985
G27	2288985	2298985
G27QS	2288985	2298985
G27S	2288985	2298985
G33	2288985	2298985
G33QS	2288985	2298985
G33S	2288985	2298985
G34QS	2288985	2298985
G40	2288985	2298985
G40QS	2288985	2298985
G40S	2288985	2298985
G41QS	2288985	2298985
G45	2288985	2298985
G45QS	2288985	2298985
G45S	2288985	2298985

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.

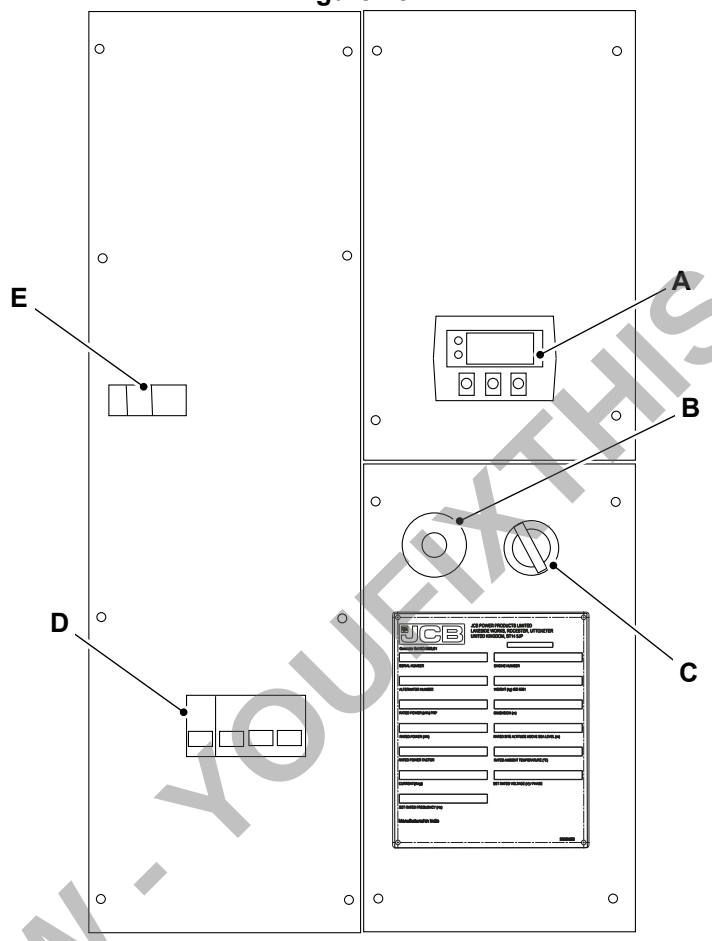
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Instruments

Instrument Panel

Introduction

Figure 18.



A Digital controller
B Emergency stop button
C Digital controller on/off switch
D Main power supply MCCB
E Earth leakage relay

Operation

1. Turn on the digital controller switch.
2. Wait for few seconds, to allow the controller to power up and display to stabilise.
3. Make sure that the power on LED (Light Emitting Diode) is illuminated on earth leakage trip and there is no trip active.
4. Make sure that the main power supply MCCB is switched off.
5. Check that the emergency stop button is fully out, if necessary twist to reset the button.
6. Complete all pre-start, system and engine checks.
7. Press the start button and the machine will start in manual.
8. The engine will run up to speed and stabilise.
9. Check that the machine operation is correct using the screen information.
10. Make sure the power on LED is illuminated on earth leakage trip and there is no trip active.

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