BUNDU POWER

OPERATIONS & CONTROLLER

MANUAL

1500 RPM

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WARNING

- Read and understand all safety precautions and warnings before operating or performing maintenance on the generator.

- Failure to follow instructions, procedures and safety precautions in this manual may increase the possibility of accidents or injuries.

- Do not alter or adjust any part of the generator set without prior approval, as Bundu Power will not be held responsible for faults or accidents caused by modifications or alterations.

- It is very important to regularly carry out checks suggested in this manual to maximise the generators lifespan and prevent accidents from occurring.

- Never start the generator unless all foreign items are removed from inside the sound attenuated canopy and the doors are securely closed.

- Do not attempt to operate the generator in unsafe conditions.

- If the generator set is unsafe to operate, disconnect the battery negative (-) lead to prevent starting the generator until the problem has been rectified.

- Disconnect the generators negative battery lead prior to attempting any repairs or cleaning the inside of the sound attenuated canopy.

- Install and operate this generator within the local and national legislation applicable to your territory.

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GENERATOR

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CONTROLLER

1. INSTALLATION AND HANDLING

This manual covers the basic procedures to install and maintain your generator as well as the operation of the generator controller. In addition it outlines the general safety precautions whilst utilizing the generator.

All relevant chapters should be read before attempting to install, lift, move or perform maintenance on the generator. Installation should always be performed by a qualified electrician who will supply you with a compliance certificate on completion (COC).

Electrical work, including earth grounding and insulation should be carried out in compliance with local regulations and laws of your country.

Additional fuel tanks should comply with local regulations, laws and by-laws.

Generators installed within a structure should have the exhaust fumes vented out of the structure by an air tight exhaust. The exhaust should vent the fumes away from the structure and be capable of very high temperatures.

***** WARNING *****

Failing to vent the exhaust fumes out of a structure can lead to death by asphyxiation. It is imperative that all fumes produced by the generator are not inhaled at any time.

Never lift or move the generator using the engine or alternator lifting points. Always perform lifts or moves of the generators by using the holes provided at the bottom of the sound attenuated enclosure.

Ensure the lifting rigging and supporting structure is in good condition and has a capacity suitable for the load.

Keep all personnel away from the generator whilst it is suspended.

The generator should always be placed on a level and stable surface for transport and operation. If the generator is to be installed in a permanent location a concrete plinth should be used. Never operate the generator whilst it is moving. The generator should only be operated when stationary.

2. SAFTY CONSIDERATIONS

2.1. FIRE AND EXPLOSION

Fuels and fumes which are used and produced by generators can be flammable and potentially explosive. The proper precautions should be taken whenever dealing with these items to ensure that the risks of explosions are limited. Safety compliance requires a fully charged class BC (Regular dry chemical extinguisher) and class ABC (Multipurpose dry chemical extinguisher) to be installed in the vicinity of the generator. Personnel must know how to operate this equipment.

If the generator is installed in a room ensure the room is properly ventilated and that the generator has at least 1m open area around it for servicing requirements and ventilation.

Keep the room, the floor and generator clear and clean of debris.

Spills of fuel, oil, coolant or battery acid must be cleaned immediately.

Never store flammable liquids near the generator.

Do not smoke or allow sparks, flames or other sources of ignition around the fuel or battery(s). Fuel vapours are explosive. Hydrogen gas generated by charging batteries is also explosive.

Turn off or disconnect the power to the battery charger before making or breaking connections with the battery.

Keep tools and other metal objects away from exposed electrical parts such as terminals, to avoid arcing. Sparks and arcing might ignite fuel or vapours or cause electrocution if touched.

Avoid refuelling the generator while it is running.

Do not attempt to operate the generator with any known leaks in the fuel system. Repair all leaks before operation.

Only use recommended fuel, oil and coolant. Ensure that the fuel is not contaminated and that the fuel cap is secured tightly to prevent contamination.

2.2. MECHANICAL

The generator has protective covers for moving parts, but precautions should be taken when working around the generator to prevent bodily harm or damage to the mechanical components of the generator.

Do not attempt to operate the generator with the protective covers removed. Do not attempt to do any maintenance or modifications while the generator is running as it could result in damage to the generator or cause bodily harm.

Keep all body parts away from the generator, its belts and mechanisms at all times. Also ensure that jewellery and hair is kept clear of the moving parts while in operation.

Some moving parts cannot be seen clearly when the generator is running.

Keep access doors closed and latched at all times unless specific access is required.

Avoid contact with hot oil, hot coolant, hot exhaust gases and hot surfaces.

Wear protective clothing when working on or around the generator.

Do not remove the radiator cap until the coolant has cooled. Then loosen the cap slowly to relieve any excess pressure before removing the cap completely.

2.3. CHEMICAL

All fuels, oils, coolants, acids and lubricants should be handled with care and any spills in and around the generator should be cleaned up immediately.

Do not swallow or allow skin contact with fuel, oil, battery acid or lubricants. If swallowed seek medical treatment immediately. Do not induce vomiting. For skin contact, wash with soap and water thoroughly.

Do not wear clothing contaminated with fuels or other chemical products as they may cause skin irritation or ignite.

Wear an acid resistant apron and face shield or goggles when servicing the battery. If acid gets onto the skin or clothing, flush immediately with large quantities of water.

2.4. ELECTRICAL

Ensure all electrical equipment and components are correctly installed to prevent damage to the components and the operator. In addition ensure that these items are correctly and regularly maintained.

The generator must be connected to the load only by trained and qualified electricians who are authorised to do so. Connections should be in compliance with relevant electrical codes, standards and other regulations in your country. When required, their work should be inspected and accepted by the inspection agency prior to operating the generator or a certificate of compliance (COC) should be issued.

Ensure the generator is effectively grounded/earthed in accordance with all relevant regulations prior to operation.

The generator should be shutdown with the battery negative (-) terminal disconnected prior to attempting to connect or disconnect load connections.

Do not attempt to connect or disconnect load connections while standing in water.

Do not touch the inter-connecting cables, conductors or electrical components of the generator which are not insulated.

Replace the terminal box and all covers once connected before attempting to start and run the generator.

Ensure that the bolts securing the load cables are securely fastened and are checked to ensure they have not loosened during operation.

Connect the generator only to load and that is compatible with its electrical characteristics and that is within its rated capacity. (Correct Hz, Frequency, Voltage and capable of supplying sufficient power for the load)

Be sure all electrical power is disconnected from electrical equipment being serviced.

Keep all electrical equipment clean and dry. Replace any wiring where the insulation is cracked, cut, damaged or degraded. Replace terminals that are worn, discoloured or corroded. Keep terminals clean and tight.

Insulate all connections and disconnected wires.

Use only class BC or class ABC extinguishers on electrical fires.

3. FIRST AID FOR ELECTRIC SHOCK

Do not touch the victim's skin with bare hands until the source of electricity has been turned off.

Switch off power, if possible, or pull the plug or cable away from the victim as quickly and safely as possible.

If this is not possible, stand on dry insulating, material and pull victim clear of the conductor, preferably using non-conductive material such as dry wood. Immediately contact a hospital to treat patients who have been injured.

4. STARTER BATTERY

Ensure that the battery is installed correctly in the battery cradle within the generator and that the terminals are correctly connected and tightened. Batteries should not be placed too far from the generator if not placed in the battery cradle as the increased resistance from the extended cable will decrease the likelihood of the generator starting on the reduced current.

5. ELECTRICAL CONNECTION

The cables connecting the generator with the distribution system should be protected by means of a circuit breaker, fuses or other means to disconnect the generator in case of overload or short circuit.

5.1. LOADING

When planning your distribution system it is important to ensure that a balanced load is placed on the generator (If 3 phase generator). If loading on one phase is excessive in comparison to the other two phases this will cause overheating in the alternator windings, imbalance in the phase to phase voltage output and possible damage to sensitive 3 phase equipment connected to the system. Ensure that no phase current exceeds that of the current rating of the generator.

It may be necessary to reorganise the electrical distribution system if the generator is to be connected to an existing installation.

5.2. POWER FACTOR

The power factor (cos) of the connected load should be determined. Factors below 0.8 will overload the generator. The generator will provide its kilowatt rating and will operate satisfactorily from 0.8 to unity (1.0) power factor.

Particular attention must be given to installation with automatic or manual power factor correction equipment to ensure that a leading power factor is not present under any conditions. This will lead to voltage instability on the generator output and may result in damaging over voltages.

The load power factor compensator, for use with a commercial electrical power source, should be automatically isolated while the generator is in operation.

5.3. GROUNDING REQUIREMENTS

Enquire with your local electrical company or supplier as to what the grounding / earthing requirements are in your country. Bundu Power connects the frame of the alternator to the frame of the generator. The earthing of the star point / neutral of the alternator is the responsibility of the electrician installing the generator.

6. START UP

Before starting the generator, please see the relative chapter of the engine manual to ensure the engine is in good working condition.

- If this is the first start-up of the generator ensure that you have read the relevant chapters in this manual about the fuel, oil, coolant and battery.

- Connect the battery wires to the output terminals of the battery. Ensure the circuit breaker is in the OFF position.

START 

- Turn the key on, press and hold the green start button for 5 seconds. You will then see “Preheat” on the screen, wait for the generator to start.

STOP 

- First turn off the circuit breaker, then push and hold the red button until engine stops.

7. GENERAL

To ensure the longevity of your generator it is imperative to have a strict and rigorous maintenance regime. At the back of this book there is a program that should keep your generator in optimal running condition.

Ensure that all servicing is conducted by a trained and competent technician preferably with experience on generator sets. In addition records of the servicing regime should be kept. A record can be kept in the back of this manual.

These records will allow quick reference and may help diagnosing a problem in the future.

7.1. DAILY OPERATION

Prior to starting the generator, check the oil and fuel level in the engine. Should the levels be low, add the necessary liquids. In addition check the radiator coolant level and battery electrolytes before starting up the generator.

7.2. PREVAENTATIVE MAINTENANCE

Depending on the application of each generator the requirement for preventative maintenance operations will vary. The following schedule is outlined with intervals based on the calendar and hours of service. The maintenance requirement should be carried out when the first interval is met (hourly or calendar periods.)

If your generator is used for emergency backup or used about once a week, you should do a minimum of weekly check- ups.

8. MAINTENANCE EVERY 6 MONTHS OR "X" HOURS 250 HOURS (1500RPM) / 100 HOURS (3000RPM)

- Repeat the daily requirements.
- Check all safety devices by electrically simulating a fault to ensure that all systems will function properly, in the event of a fault.
- Clean the battery terminals.
- Start the generator and observe the control panel does not have any warnings or faults displayed.
- Tighten all exhaust connections.
- Tighten all electrical connections.
- Refer to the engine maintenance manual for further instructions.

8.1. WATER

- Check the water level by opening the filler cap on the top of the radiator or by reading the gauge level on the top of the radiator, and add water if necessary.

- Replace the radiator filler cap if it is damaged or loose.

- When pouring antifreeze solution, first drain out the old antifreeze from cylinder block and radiator, then flush them with a cleaning solution.

- Check the percentage of antifreeze on the chart below.

Antifreeze solution (%)	Freezing Point (°C)
20	-10
27	-15
33	-20

Table 1

- If more than 50% of the solution is antifreeze this will cause the engine to overheat. Avoid placing this amount of antifreeze into the engine.

- Add at least 5% antifreeze to the engine to prevent possible engine corrosion in hot weather.

8.2. FAN BELT

- Only use an approved Bundu Power fan belt of the correct dimensions for the generator in question to replace worn or broken fan belts.

- Check the fan belt tension is correct.

If the belt tension is lower than specified limit, adjust tension by relocating the charging alternator and idle pulley.

8.3. ENGINE OIL

- Check oil level using oil dip stick and replenish with approved oil if needed. Regular clean diesel motor vehicle can be used (L-ECD grade or 15W40).

- Check oil level on even ground when the engine has cooled. Oil level must be between MAX and MIN lines on the dipstick.

- Engine oil to be changed at specified intervals. The oil filter should be changed simultaneously.

8.4. OIL FILTER

- Check for oil pressure and oil leaks, and repair or replace filter if necessary.
- Replace oil filter element every time engine oil is changed.
- Oil filter should be replaced on the following schedule:
    - **1500 RPM Engines:** 250 Hours
    - **3000 RPM Engines:** 100 Hours
- Only fit approved Bundu Power Oil Filters to the generator to ensure warranty remains in effect.

8.5. FUEL FILTER

- Fuel filters should be replaced on the following schedule:
    - **1500 RPM Engines:** 250 Hours
    - **3000 RPM Engines:** 100 Hours
- If the fuel quality is bad ensure you replace the fuel filter more regularly.
- Only fit approved Bundu Power Fuel Filters to the generator to ensure warranty remains in effect.

8.6. AIR CLEANER

- Air filters / Cleaners should be replaced on the following schedule:
    - **1500 RPM Engines:** 250 Hours
    - **3000 RPM Engines:** 100 Hours
- Only fit approved Bundu Power Air Filters to the generator to ensure warranty remains in effect.
- If air filters are still in good condition, they can be cleaned and reused.
- Clean ONLY using compressed air.

9. MAINTENANCE

- Check the battery for damage or leaks. Replace the battery if damaged.
- Ensure there is no obstruction of the exhaust pipe.
- Keep the battery away from fire and sources of heat.
- Keep the generator in a well-ventilated area.

10. MAINTENANCE CHECK LIST

* If there is an Automatic Transfer Switch (ATS)

Automatic Transfer Switch *

1. Start / Stop the generator by simulating a power cut.
2. Transfer the load to the generator after warm-up period.
3. Record Loads.

General Operation

1. Record AC Voltage with and without load.
2. Record Frequency with and without load.
3. Record the Hours on the unit.

Oil System

1. Check the oil level
2. Check the oil filters – Replace if necessary
    a. Every 250 Hours or 1 year | 1500 RPM Engines
    b. Every 100 Hours or 1 year | 3000 RPM Engines.
    ALWAYS use original Bundu Power parts.
3. Service the oil system, drain and replace oil if necessary.
4. Look for oil leaks, clean up and repair them.

Fuel System

1. Check the fuel connections are secure and not leaking. Clean up and repair any leaks found.
2. Check the fuel filters – Replace if necessary.
    a. Every 250 Hours or 1 year | 1500 RPM Engines.
    b. Every 100 Hours or 1 year | 3000 RPM Engines.
    ALWAYS use original Bundu Power parts.
3. Check fuel solenoid is functioning correctly.

Cooling System

1. Check the coolant level – Replenish if necessary.
2. Check for water leaks, clean up and repair any water leaks.
3. Check flexible water lines are not perished. Replace perished or leaking lines.

Fan Belts and Battery

1. Check fan belts are in condition and are not perished.
2. Replace any necessary fan belts.
   ALWAYS use original Bundu Power parts.
3. Check the battery is charged and there are no visible leaks.
   *****NOTE** BP19SK and BP19SK3***

   These models require the Cam-Belt to be changed every 500 hours.

Additional technical support is available from Bundu Power on their Johannesburg office number +27 11 397 7373 or via email on support@bundupower.co.za.

Bundu Power reserves the right to change the content of this book at any stage and will not be held responsible for clerical errors.

It is the responsibility of the Generator Owner to schedule regular maintenance and keep the generator in good working order. If the generator is not maintained, the warranty will be void at the discretion of Bundu Power.

The Bundu Power warranty is offered on a carry-in basis. Mileage will be charged for in the event that a Bundu Power technician is dispatched to site for a warranty claim.

YOUR LOCAL AGENT IS:

GENERATOR CONTROLLER

WARNING	Read the entire manual before operating this controller. Practice all plant and safety instructions and precautions. Failure to follow instructions can cause personal injury and/or damage to equipment or property.

CAUTION	Controllers contain static-sensitive parts. Observe the following precautions to prevent damage to these parts: Do not disassemble the controller.

11. DESCRIPTION

The GU611A is an Automatic Mains Failure Controller. The controller will monitor the incoming MAINS electricity feed when in “AUTO” mode. If the MAINS electricity fails, the generator will automatically start and transfer the load to the generator. When the MAINS electricity is restored the generator will be shut down and the load will be transferred back to the MAINS electricity feed. In order for this to occur the controller needs to be coupled with an Automatic Transfer Switch (ATS). The generator will continue to run for a number of minutes when the MAINS electricity feed is restored to cool down.

In MANUAL mode the generator can be started and stopped using the buttons on the controller when needed.

- The controller displays faults, operational and metering data.
- The controller has a backlit LCD display for easy viewing
- The controller can be used in AUTO or MANUAL mode.
- The generator Output Voltage, Current, Oil Pressure, Coolant Temperature, Frequency, DC Source and many more parameters can be displayed by the controller.

12. PANEL OPERATION

The operation panel consists of 3 sections:

1. LCD display indicating measurement and parameters.
2. LED indicator lights.
3. Push buttons for mode selection and setting parameters.

The LCD displays different measuring parameters. When a failure occurs, the LCD displays the corresponding fault indicator. The backlight will automatically illuminate when a button is pressed and will automatically turn off.

13. CONTROL BUTTONS AND LED INDICATORS

NAME	FUNCTION DESCRIPTION	BUTTON
SCROLL BUTTON	Enter into submenu / Modify / confirm modification / scroll menu to display.	
MUTE BUTTON	When a failure occurs, an alarm will sound. Pressing mute button for 2 seconds will mute the alarm. The LCD will display a mute icon.	
AUTO MODE BUTTON	The auto button is used for selecting “AUTO mode”. When the controller is running in AUTO mode, the LED above the auto button will be lit. In AUTO mode a start signal will automatically be sent to the generator on the failure of the MAINS electricity feed when an ATS is attached.	
MANUAL MODE BUTTON	The manual button is used for selecting “MANUAL mode”. When the controller is running in MANUAL mode, the LED above the manual button will be lit. The Start and Stop buttons can now be used to operate the generator.	
START / INCREASE BUTTON	The start button is used to manually start the generator when in manual mode. It is also used to increase values when setting parameters.	
STOP / RESET DECREASE BUTTON	The stop button is used for manually stop the generator when in manual mode. Press and hold the button for 2 seconds. If a failure occurs, press this button to clear the failure. It is also used to decrease values when setting parameters.	
COMMON FAILURE LED	The LED will flash when a warning occurs. The LED will remain lit when a shutdown alarm occurs.	

14. CONTROL AND OPERATION INSTRUCTION

The controller has 2 modes: AUTOMATIC and MANUAL.

14.1. OPERATION MODE SETTINGS

OPERATION	BUTTON
Press and hold the “AUTO” button for 2 seconds to select AUTO mode, the LED above the button will be lit when AUTO mode has been selected.	
Press and hold the “MANUAL” button for 2 seconds to select manual mode, the LED above the button will be lit when Manual mode has been selected.	

NOTE: Only 1 mode can be selected at a time from the above 2 modes.

14.2. AUTOMATIC CONTROL SEQUENCE

Controller is running in “AUTO” mode:

When Mains Electricity feed is available (Live):

When the Mains electricity feed is present and the voltage and frequency of Mains are within the normal operating parameters, the Mains LED will be lit.

If the Mains LED is not lit, this indicates that the Mains feed is either not available or that the voltage or frequency of the Mains feed is not within the pre-set parameters and could harm your electrical equipment.

Generator Auto Start Sequence:

When the Mains electricity feed fails or falls outside of the pre-set voltage and frequency parameters the following sequence is implemented in AUTO mode when an Automatic Transfer Switch (ATS) is attached.

The Start delay timer begins to countdown. On completion the engine preheater is initialised. The preheater is used to prevent damage to the generator. Once the preheat sequence has completed, the generator will start.

When the engine has started and has reached operating speed the controller will monitor voltage, frequency, oil pressure, coolant temperature to ensure they are within operating parameters. If no failures are detected the LCD display will show various parameters, this indicates the generator is running normally.

The ATS will now automatically transfer the load to the generator.

If the Mains electricity is restored during the above start up sequence the generator will automatically shut down and return to standby mode.

	To avoid damage to the start motor please ensure the generator's battery voltage is higher than 15V.

If the generator fails to start during the above starting sequence, the controller will display the "Failed to Start" icon on the screen. The controller will then attempt to start the generator again after a period of time. The controller will attempt to start the generator continually for the pre-set number of starting attempts. If a failure occurs during any of the attempts, the controller will stop attempting to start the generator immediately and an error will be displayed on the screen unless it is manually cleared.

Start Failure: If after attempting the pre-set number of start attempts the engine does not start. "Fail to Start" will be displayed on the LCD screen. If this occurs, check the whole generator to determine the reason for the start failure.

	If “Fail to Start” is displayed. The operator must check the whole Generator to determine what has caused the failure. Only after determining the cause of the failed start attempts press the “STOP/RESET” button to reset the generator and attempt to start the generator again.

Generator Auto Shutdown Sequence:

When the Mains electricity feed is restored the Mains LED will be lit. A delayed sequence is activated to shut down the generator. The ATS will automatically receive the signal from the controller to transfer the load back to the Mains electricity feed. The generator will start its cool down procedure, running under no load for a period of time. Once the generator has shut down, it will return to its standby state ready for any future Mains failures.

Stop Failure: If the generator fails to shutdown correctly the “Failure to Stop” icon will be displayed on the screen.

Conditions Required for Automatic Start:

When the controller is in “AUTO” mode, it will automatically start under the following 3 conditions:

- Mains Electricity Feed Voltage below / above threshold.
- Remote start signal is active.
- Mains Electricity Feed Failure.

14.3. MANUAL CONTROL SEQUENCE

The controller is in “MANUAL” mode.

If the mains electricity feed is present, the ATS will feed the building or application when an ATS is attached to the controller.

When Mains is present, the Mains LED will be lit.

Manual Generator starting sequence:

Pressing the “START” button will start the start sequence. After a 300ms delay the engine preheat will start, on completion the engine will attempt to start. Once the generator is up to speed the controller will monitor the various parameters to ensure the generator is ready to take load. If successful the controller will display the various measurements onscreen.

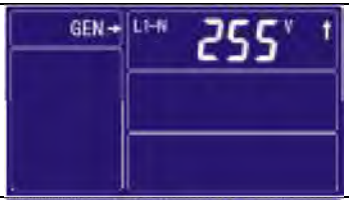
Transfer to the load to the generator manually by switching the ATS to generator. The Normal operation LED will now be lit.

15. WARNINGS (PRE-ALARMS)

NOTE: Warnings are non-critical failure conditions and do not affect the operation of the generator. They are intended to notify the operator of any impending problems or failures prior to them occurring. When warnings occur, the LED indicator flashes, but the unit will not shutdown. Once the warning has been cleared with LED will stop flashing.

Warnings are important and should be attended to ensure the longevity of your generator set.

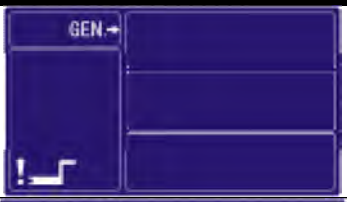
PRE-ALARM / DESCRIPTION	LCD DISPLAY
CHARGE FAILURE: If the voltage from the charging alternator is too low the common failure LED indicator flashes, the LCD displays the Charge failure icon. This affects the charging of the starting battery.	
BATTERY UNDER VOLTAGE: If the controller detects that the starting battery voltage is too low, the common failure LED will flash and the voltage will be displayed in the bottom right corner of the LCD screen. The downward arrow indicates low voltage.	
BATTERY OVER VOLTAGE: If the controller detects that the starting battery voltage is too high, the common failure LED will flash and display the voltage in the bottom right corner of the LCD screen. The upward arrow indicates high voltage.	

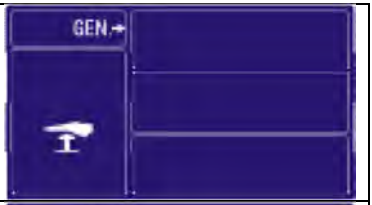
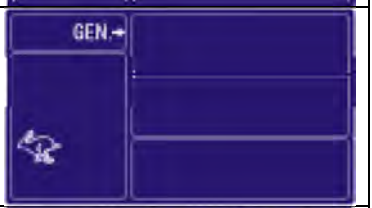
LOW OIL PRESS: If the generator's oil pressure is too low the common failure LED will flash. The current pressure will be displayed in the top right corner of the LCD screen. The default pre-set low pressure is 2.2 bar. The downward arrow indicates low pressure.	
HIGH TEMP: If the generator temperature is too high. The common failure LED will flash and the temperature will be displayed in the middle right section of the LCD screen. The upward arrow indicates that the temperature is too high.	
OVER SPEED: If the engine exceeds its RPM threshold, the common failure LED will flash. The RPM will be displayed in the middle section of the LCD screen. The upward arrow indicates the engine warning of an over speed state.	
UNDER SPEED: If the engine falls below its RPM threshold, the common failure LED will flash. The RPM will be displayed in the middle section of the LCD screen. The downward arrow indicates the engine warning of an under speed state.	
OVER CURRENT: If the phase output current of the generator is too high (On any phase) the common failure LED will flash. The current for each phase (L1, L2 and L3 – If applicable will be displayed on the screen) The upward arrows next to the current indicates the over current on that phase.	
GEN. OVER VOLT: If the voltage output is too high, the common failure LED will flash. The voltage will be displayed on the LCD screen with an upward arrow to indicate the voltage is too high on that particular phase.	
GEN. UNDER VOLT: If the voltage output is too low, the common failure LED will flash. The voltage will be displayed on the LCD screen with a downward arrow to indicate the voltage is too low on that particular phase.	

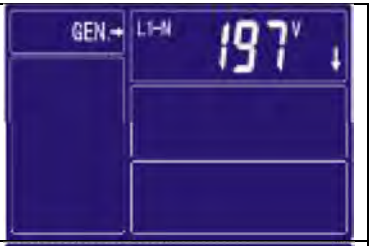
LOW FUEL LEVEL: If the fuel level is low, the common failure LED will flash. This is indicated on the LCD screen in the bottom right corner. The downward arrow indicates that the fuel level is low.	
AUXILIARY PRE-ALARM: If an auxiliary input is defined as a warning, when the input signal is active the common failure LED will flash. The LCD screen will display Aux. Warning icon on the left of the screen.	

NOTE	Controller continuously detects battery voltage during standby and **Battery Low/High Voltage** pre-alarms are active. **Battery Low Voltage** pre-alarm is inactive during cranking.

16. SHUTDOWN ALARMS

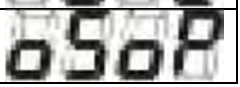
PRE-ALARM / DESCRIPTION	LCD DISPLAY
START FAILURE: If the generator does not start after the pre-defined number of start attempts. The Shutdown Alarm LED will be lit. The LCD screen will display the "Start Failure" icon in the bottom left corner.	
STOP FAILURE: If the generator does not shut down after the shutdown sequence, The Shutdown LED will be lit. The LCD screen will display the "Stop Failure" icon in the bottom left corner.	

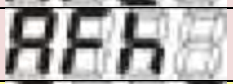
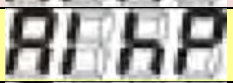
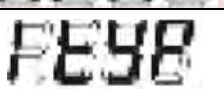
EMERGENCY STOP: If the emergency stop button is pushed. The generator will be shut down immediately. The shutdown alarm LED will be lit. The LCD screen will display the emergency stop icon.	
LOW OIL PRESS: If the controller detects low oil pressure below the warning threshold. The generator will shut down automatically and the Shutdown LED will be lit. The LCD screen will display the low oil pressure icon.	
ENGINE HIGH TEMP: If the controller detects engine high temperature above the high temperature warning threshold the generator will shut down automatically and the Shutdown LED will be lit. The LCD screen will display the High Temperature icon.	
OVER SPEED: If the controller detects engine over speed above the warning threshold the generator will automatically shut down. The Shutdown LED will be lit. The over speed icon will be displayed on the LCD display.	
OVER CURRENT: If the controller detects over current above the warning threshold the generator will automatically shut down. The Shutdown LED will be lit. The over current will be displayed on the LCD screen with upward arrows alongside the phases with over current.	
GEN. OVER VOLT: If the controller detects over voltage above the warning threshold the generator will automatically shut down. The Shutdown LED will be lit. The over voltage will be displayed on the LCD screen with upward arrows alongside the phases with over voltage.	

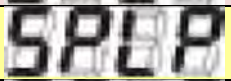
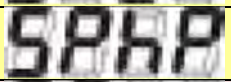
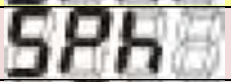
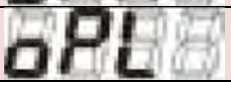
GEN. UNDER VOLT: If the controller detects under voltage below the warning threshold the generator will automatically shut down. The Shutdown LED will be lit. The under voltage will be displayed on the LCD screen with downward arrows alongside the phases with under voltage.	
AUXILIARY FAILURE: If the controller detects an auxiliary failure outside of the warning threshold the generator will shut down automatically. The Shutdown LED will be lit. The LCD screen will display the Auxiliary failure icon.	

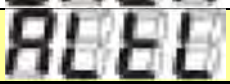
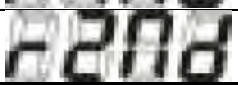
17. CONTROLLER CODES

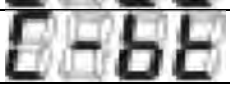
NAME	CODE
CHARGE FAILURE	
BATT. UNDER VOLT	
BATT. OVER VOLT	
START FAILURE	
STOP FAILURE	
EMERGENCY STOP	
LOW OIL PRESS	

NAME	CODE
ENGINE HIGH TEMP	
OVER SPEED	
UNDER SPEED	
OVER CURRENT	
GEN. OVER VOLT	
GEN. UNDER VOLT	
P-SENSOR OPEN	

GENERAL PARAMETERS				
NO.	ITEMS		PRESET	VALUE RANGE
2.1	Under Voltage Alarm		0	20-200% / 0 (not set)
2.2	Under Voltage Warning		90%	20-200% / 0 (not set)
2.3	Over Voltage Warning		115%	20-200% / 9999 (not set)
2.4	Over Voltage Alarm		9999	20-200% / 9999 (not set)
2.5	Hz low alarm		45.0Hz	10.0-100.0Hz / 0 (not set)
2.6	Hz high alarm		57.0Hz	10.0-100.0Hz / 999.9 (not set)
2.7	Over current Warning		100%	0-200%
2.8	Over current alarm		150%	0-200%
2.9	Over current action		0	0-1 (0- electrical tripping, 1-shutdown alarm)
2.10	Alarm delay		10S	0-600 S
2.11	Gen. On delay		5S	1-9999 S
2.12	GCB opening delay		5S	1-9999 S
ENGINE PARAMETERS				
NO.	ITEMS		PRESET	VALUE RANGE
3.1	Pair of poles		2	1-4
3.2	Fuel mode		0	0-1 / 0(NC) / 1 (NO)
3.3	T-sensor type		3	0-15 / 0 (not used)
3.4	P-sensor type		4	0-15 / 0 (not used)

3.5	Start delay		10S	0-300 S
3.6	Crank attempt		3 times	1-10 times
3.7	Crank time		5S	0-30 S
3.8	Crank rest		10S	0-300 S
3.9	Crank cut-out RPM		300RPM	1-9999 RPM
3.10	Crank cut-out Oil-P		1.0BAR	0.1-150.0BAR/999.9(not set)
3.11	cut-out P-delay		0	1-60 S / 0(not set)
3.12	Idle delay		0	0-9999 S
3.13	Preheat delay		3S	0-300 S
3.14	Preheat mode		1	1-3
3.15	Safety-on delay		10S	0-600 S
3.16	Cool down delay		300S	0-600 S
3.17	Stop delay		20S	0-60 S
3.18	Under SP Alarm		0RPM	0-9999 RPM / 0 (not set)
3.19	Under Speed Warning		1440RPM	0-9999 RPM / 0 (not set)
3.20	Over Speed Warning		1600RPM	1-9999 RPM / 0 (not set)
3.21	Over SP Alarm		1710RPM	1-9999 RPM / 0 (not set)
3.22	Oil-P low Alarm		1.1BAR	0-45.0 BAR

3.23	Oil-P low Warning		1.4BAR	0-45.0 BAR
3.24	Coolant Warning		90	70-320℃ / 9999 (not set)
3.25	Coolant Alarm		100 Deg	70-320℃ / 9999 (not set)
3.26	Batt. Undervolt.		8.0V	1.0-25.0V / 0 (not set)
3.27	Batt. overvolt		28.0V	1.0-35.0V / 99.9 (not set)
3.28	Charge Volt. Warning		8.0V	1.0-25.0V / 0 (not set)
Configurable Inputs and Outputs				
NO.	**ITEMS**		**PRESET**	**VALUE RANGE**
4.1	Configurable input 1		8	0-12 (define code as 8.8)
4.2	Configurable input 2		7	0-12 (define code as 8.8)
4.3	Configurable input 3		12	0-12 (define code as 8.8)
4.4	Input 1 delay		2S	0-60 S
4.5	Input 2 delay		2S	0-60 S
4.6	Input 3 delay		2S	0-60 S
4.7	Configurable relay 1		2	0-80 (define code as 8.9)
4.8	Configurable relay 2		3	0-80 (define code as 8.9)
Mains Parameters				
NO.	**ITEMS**		**PRESET**	**VALUE RANGE**
5.1	Low Mains voltage		90%	20-200% / 0 (not set)
5.2	High Mains voltage		115%	20-200% / 9999 (not set)
5.3	Mains frequency		50.0 Hz	50.0-60.0Hz

5.4	Mains On Delay		5S	1-9999 S
5.5	MCB opening delay		5S	1-9999 S
Calibration Menu				
NO.	**ITEMS**		**PRESET**	**VALUE RANGE**
6.1	GEN. V1 offset			±10.0%
6.2	Current I1 offset			±10.0%
6.3	Current I2 offset			±10.0%
6.4	Current I3 offset			±10.0%
6.5	MAINS V1 offset			±10.0%
6.6	MAINS V2 offset			±10.0%
6.7	MAINS V3 offset			±10.0%
6.8	Pressure offset			±10.0%
6.9	Temperature offset			±10.0%
6.10	Batt. Voltage offset			±10.0%

WARNING
ALARM

The optional items for P/T-sensor		
CODE	**The brand model of LOP sensor**	**The brand model of HET sensor**
0	not used	not used
1	close for low oil pressure	close for high temperature
2	open for low oil pressure	open for high temperature
3	VDO 5 bar	VDO 120 ℃
4	VDO 10 bar	VDO 150 ℃
5	Datcon 7 bar	Datcon
6	Murphy 7 bar	Murphy
7	Pre-set 1	PT100
8	Pre-set 2	Pre-set 1
9	Pre-set 3	Pre-set 2
10	Pre-set 4	Pre-set 3
11	configured by user	Pre-set 4
12		configured by user

WARRANTY

Bundu Power offers warranty on all generators as per the table below.

TYPE	PERIOD OR TIME
1500 RPM	1 Year or 1000 Hours of operation. Whichever occurs first.
3000 RPM	6 Months or 500 Hours of operation. Whichever occurs first.

PLEASE NOTE: Warranty is on a “Carry-In basis”. If a technician is dispatched to site by Bundu Power, the mileage will be for the clients account. The labour and warranty parts will be covered by the Warranty Agreement.

This is due to the nature of the equipment and the unknown location and distance of the generator once onsite.

GENERATOR INFORMATION	
MODEL:	
SERIAL NO:	
PURCHASE DATE: (As per Invoice)	

18. SERVICE RECORDS

50 HOURS OF OPERATION	
MAINTENANCE	**PERFORMED**
1. Replace Engine Oil	
2. Replace Oil Filter	
3. Check Hose Connections	
	DEALER STAMP
NO OF HOURS:	
DATE:	
JOB DONE BY:	
NOTES	

250 HOURS OF OPERATION	
MAINTENANCE	**PERFORMED**
1. Replace Engine Oil	
2. Replace Oil Filter	
3. Replace Fuel Filter	
4. Replace / Clean Air Filter	
5. Check Belts and tension	
	DEALER STAMP
NO OF HOURS:	
DATE:	
JOB DONE BY:	
NOTES	

500 HOURS OF OPERATION

MAINTENANCE	PERFORMED
1. Replace Engine Oil	
2. Replace Oil Filter	
3. Replace Fuel Filter	
4. Replace / Clean Air Filter	
5. Check Belts and tension	
6. Replace Cam-Belt (BP19 Only)	

		DEALER STAMP
NO OF HOURS:		
DATE:		
JOB DONE BY:		

NOTES

750 HOURS OF OPERATION

MAINTENANCE	PERFORMED
1. Replace Engine Oil	
2. Replace Oil Filter	
3. Replace Fuel Filter	
4. Replace / Clean Air Filter	
5. Check Belts and tension	

		DEALER STAMP
NO OF HOURS:		
DATE:		
JOB DONE BY:		

NOTES

1000 HOURS OF OPERATION

MAINTENANCE	PERFORMED
1. Replace Engine Oil	
2. Replace Oil Filter	
3. Replace Fuel Filter	
4. Replace / Clean Air Filter	
5. Check Belts and tension	
6. Replace Cam-Belt (BP19 Only)	

		DEALER STAMP
NO OF HOURS:		
DATE:		
JOB DONE BY:		

NOTES

1250 HOURS OF OPERATION

MAINTENANCE	PERFORMED
1. Replace Engine Oil	
2. Replace Oil Filter	
3. Replace Fuel Filter	
4. Replace / Clean Air Filter	
5. Check Belts and tension	

		DEALER STAMP
NO OF HOURS:		
DATE:		
JOB DONE BY:		

NOTES

1500 HOURS OF OPERATION

MAINTENANCE	PERFORMED
1. Replace Engine Oil	
2. Replace Oil Filter	
3. Replace Fuel Filter	
4. Replace / Clean Air Filter	
5. Check Belts and tension	
6. Replace Cam-Belt (BP19 Only)	

		DEALER STAMP
NO OF HOURS:		
DATE:		
JOB DONE BY:		

NOTES

1750 HOURS OF OPERATION

MAINTENANCE	PERFORMED
1. Replace Engine Oil	
2. Replace Oil Filter	
3. Replace Fuel Filter	
4. Replace / Clean Air Filter	
5. Check Belts and tension	

		DEALER STAMP
NO OF HOURS:		
DATE:		
JOB DONE BY:		

NOTES

2000 HOURS OF OPERATION

MAINTENANCE	PERFORMED
7. Replace Engine Oil	
8. Replace Oil Filter	
9. Replace Fuel Filter	
10. Replace / Clean Air Filter	
11. Check Belts and tension	
12. Replace Cam-Belt (BP19 Only)	

		DEALER STAMP
NO OF HOURS:		
DATE:		
JOB DONE BY:		

NOTES

2250 HOURS OF OPERATION

MAINTENANCE	PERFORMED
6. Replace Engine Oil	
7. Replace Oil Filter	
8. Replace Fuel Filter	
9. Replace / Clean Air Filter	
10. Check Belts and tension	

		DEALER STAMP
NO OF HOURS:		
DATE:		
JOB DONE BY:		

NOTES

2500 HOURS OF OPERATION

MAINTENANCE	PERFORMED
13. Replace Engine Oil	
14. Replace Oil Filter	
15. Replace Fuel Filter	
16. Replace / Clean Air Filter	
17. Check Belts and tension	
18. Replace Cam-Belt (BP19 Only)	

		DEALER STAMP
NO OF HOURS:		
DATE:		
JOB DONE BY:		

NOTES

2750 HOURS OF OPERATION

MAINTENANCE	PERFORMED
11. Replace Engine Oil	
12. Replace Oil Filter	
13. Replace Fuel Filter	
14. Replace / Clean Air Filter	
15. Check Belts and tension	

		DEALER STAMP
NO OF HOURS:		
DATE:		
JOB DONE BY:		

NOTES

3000 HOURS OF OPERATION

MAINTENANCE	PERFORMED
19. Replace Engine Oil	
20. Replace Oil Filter	
21. Replace Fuel Filter	
22. Replace / Clean Air Filter	
23. Check Belts and tension	
24. Replace Cam-Belt (BP19 Only)	

		DEALER STAMP
NO OF HOURS:		
DATE:		
JOB DONE BY:		

NOTES

3250 HOURS OF OPERATION

MAINTENANCE	PERFORMED
16. Replace Engine Oil	
17. Replace Oil Filter	
18. Replace Fuel Filter	
19. Replace / Clean Air Filter	
20. Check Belts and tension	

		DEALER STAMP
NO OF HOURS:		
DATE:		
JOB DONE BY:		

NOTES

3500 HOURS OF OPERATION

MAINTENANCE	PERFORMED
25. Replace Engine Oil	
26. Replace Oil Filter	
27. Replace Fuel Filter	
28. Replace / Clean Air Filter	
29. Check Belts and tension	
30. Replace Cam-Belt (BP19 Only)	

		DEALER STAMP
NO OF HOURS:		
DATE:		
JOB DONE BY:		

NOTES

3750 HOURS OF OPERATION

MAINTENANCE	PERFORMED
21. Replace Engine Oil	
22. Replace Oil Filter	
23. Replace Fuel Filter	
24. Replace / Clean Air Filter	
25. Check Belts and tension	

		DEALER STAMP
NO OF HOURS:		
DATE:		
JOB DONE BY:		

NOTES

NOTES

YOUR LOCAL AGENT IS: