Commercial Diesel Generator

User Manual

[Revision 2.0 February 2018]

READ THIS MANUAL CAREFULLY BEFORE USE – FAILURE TO DO SO MAY RESULT IN INJURY, PROPERTY DAMAGE AND MAY VOID WARRANTY. • KEEP THIS MANUAL FOR FUTURE REFERENCE. • Products covered by this manual may vary in appearance, assembly, inclusions, specifications, description and packaging.

The product is NOT supplied with engine oil, although traces of oil from the manufacturing process may be present. It is essential to add adequate engine oil of the correct type to the engine before use – see Engine Oil. **Failure to add engine oil will void the product warranty**.

E&OE

Safety

Safety messages are designed to alert you to possible dangers or hazards that could cause death, injury or equipment or property damage if not understood or followed. Safety messages have the following symbols:

 You WILL be KILLED or SERIOUSLY INJURED if you do not follow instructions.	 You CAN be KILLED or SERIOUSLY INJURED if you do not follow instructions.	 You CAN be INJURED if you do not follow instructions or equipment damage may occur.

It is vital that you read and understand this user manual before using the product, including safety warnings, and any assembly and operating instructions. Keep the manual for future reference.

Safety precautions and recommendations detailed here must be fully understood and followed to reduce the risk of injury, fire, explosion, electrical hazard, and/or property damage.

Safety information presented here is generic in nature – some advice may not be applicable to every product. The term "equipment" refers to the product, be it electrical mains powered, battery powered or combustion engine powered.

- **Before Use** - If you are not familiar with the safe operation/handling of the equipment, or are in any way unsure of any aspect of suitability or correct use for your application, you should complete training conducted by a person or organization qualified in safe use and operation of this equipment, including fuel/electrical handling and safety.
- Do NOT operate the equipment in flammable or explosive environments, such as in the presence of flammable liquids, gases or dust. The equipment may create sparks or heat that may ignite flammable substances.
- Keep clear of moving parts.
- Equipment may be a potential source of electric shock or injury if misused.
- Do NOT operate the equipment if it is damaged, malfunctioning or is in an excessively worn state.
- Do NOT allow others to use the equipment unless they have read this manual and are adequately trained.
- Keep packaging away from children - risk of suffocation! Operators must use the equipment correctly. When using the equipment, consider conditions and pay due care to persons and property.

General Work Area Safety

- Work areas should be clean and well it.
- Do not operate the equipment if bystanders, animals etc are within operating range of the equipment or the general work area.
- If devices are provided for connecting dust extraction / collection facilities, ensure these are connected and used properly. Dust collection can reduce dust-related hazards.

General Personal Safety

- Wear appropriate protective equipment when operating, servicing, or when in the operating area of the equipment to help protect from eye and ear injury, poisoning, burns, cutting and crush injuries. Protective equipment such as safety goggles, respirators, non-slip safety footwear, hard hat, hearing protection etc should be used for appropriate equipment / conditions. Other people nearby should also wear appropriate personal protective equipment. Do not wear loose clothing or jewellery, which can be caught in moving parts. Keep hair and clothing away from the equipment.
- Stay alert and use common sense when operating the equipment. Do not over-reach. Always maintain secure footing and balance.
- Do not use the equipment if tired or under the influence of drugs, alcohol or medication.
- This equipment is not intended for use by persons with reduced physical, sensory or mental capabilities.

General Fuel Safety

- Petrol/fuel/gasoline is extremely flammable – keep clear of naked flames or other ignition sources.
- Do not spill fuel. If you spill fuel, wipe it off the equipment immediately – if fuel gets on your clothing, change clothing.
- Do NOT smoke near fuel or when refuelling.
- Always shut off the engine before refuelling.
- Do NOT refuel a hot engine.
- Open the fuel cap carefully to allow any pressure build-up in the tank to release slowly.
- Always refuel in well ventilated areas.
- Always check for fuel leakage. If fuel leakage is found, do not start or run the engine until all leaks are fixed.

General Carbon-Monoxide Safety

- Using a combustion engine indoors **CAN KILL IN MINUTES**. Engine exhaust contains carbon-monoxide – a poison you cannot smell or see.
- Use combustion engines OUTSIDE only, and far away from windows, doors and vents.

General Equipment Use and Care

- The equipment is designed for domestic use only.
- Handle the equipment safely and carefully.
- Before use, inspect the equipment for misalignment or binding of moving parts, loose components, damage or any other condition that may affect its operation. If damaged, have the equipment repaired by an authorised service centre or technician before use.
- Prevent unintentional starting of the equipment - ensure equipment and power switches are in the OFF position before connecting or moving equipment. Do not carry equipment with hands or fingers touching any controls. Remove any tools or other items that are not a part of the equipment from it before starting or switching on.
- Do not force the equipment. Use the correct equipment for your application. Equipment will perform better and be safer when used within its design and usage parameters.
- Use the equipment and accessories etc. in accordance with these instructions, considering working conditions and the work to be performed. Using the equipment for operations different from those intended could result in hazardous situations.
- Always keep equipment components (engines, hoses, handles, controls, frames, housings, guards etc) and accessories (cutting tools, nozzles, bits etc) properly maintained. Keep the equipment clean and, where applicable, properly lubricated.
- Store the equipment out of reach of children or untrained persons. To avoid burns or fire hazards, let the equipment cool completely before transporting or storing. Never place or store the equipment near flammable materials, combustible gases or liquids etc.
- The equipment is not weather-proof, and should not be stored in direct sunlight, at high ambient temperatures or locations that are damp or humid.
- Do not clean equipment with solvents, flammable liquids or harsh abrasives.
- For specific equipment safety use and care, see Equipment Safety.

General Electrical Safety

- Inspect electrical equipment, extension cords, power bars, and electrical fittings for damage or wear before each use. Repair or replace damaged equipment immediately.
- Ensure all power sources conform to equipment voltage requirements and are disconnected before connecting or disconnecting equipment.
- When wiring electrically powered equipment, follow all electrical and safety codes.
- Wherever possible, use a residual current device (RCD).
- High voltage / high current power lines may be present. Use extreme caution to avoid contact or interference with power lines. Electrical shock can be fatal.

General Electrical Safety

- Electrically grounded equipment must have an approved cord and plug and be connected to a grounded electrical outlet.
- Do NOT bypass the ON/OFF switch and operate equipment by connecting and disconnecting the electrical cord.
- Do NOT use equipment that has exposed wiring, damaged switches, covers or guards.
- Do NOT use electrical equipment in wet conditions or in damp locations.
- Do NOT use electrical cords to lift, move or carry equipment.
- Do NOT coil or knot electrical cords, and ensure electrical cords are not trip hazards.

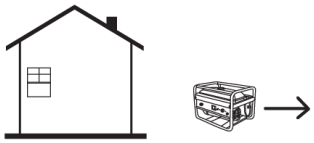
General Service Information

- The equipment must be serviced or repaired at authorised service centres by qualified personnel only.
- Replacement parts must be original equipment manufacturer (OEM) to ensure equipment safety is maintained.
- Do NOT attempt any maintenance or repair work not described in this manual.
- After use, the equipment and components may still be hot – allow the equipment to cool and disconnect spark plugs and/or electrical power sources and/or batteries from it before making adjustments, changing accessories or performing repair or maintenance.
- Do NOT make adjustments while the equipment is running.
- Perform service related activities in suitable conditions, such as a workshop.
- Replace worn, damaged or missing warning/safety labels immediately.

⚠ DANGER ⚠

Using an engine or wood/charcoal/gas fuelled appliance indoors CAN KILL YOU IN MINUTES. Engine exhaust and wood/charcoal/gas fumes contain carbon monoxide. This is a poison you cannot see or smell.

NEVER use inside a building, home, garage, boat, caravan or tent EVEN IF doors and windows are open.



Only use OUTSIDE and far away from windows, doors, and vents.

Avoid other hazards - READ MANUAL BEFORE USE.

GENERAL:

- Do not operate in a hazardous location. Such areas include where there is a risk of explosion of petrol fumes, leaking gas or explosive dusts.
- Do not operate in a confined area where exhaust gases or wood/charcoal/gas fumes could reach dangerous concentrations.

PRODUCTS FEATURING AN ENGINE

- Follow all warnings in the section titled "GENERAL".
- Explosion hazard - never smoke while refuelling.
- Take care not to spill fuel. When refuelling the engine, ensure that the engine has been allowed to cool. Prevent spilling of fuel as this may also ignite with a hot engine.
- Never refuel while engine is running.

GENERATORS

- Follow all warnings in the sections titled "GENERAL" and "PRODUCTS FEATURING AN ENGINE".
- The output of this generator is potentially lethal. The generator should not be connected to a fixed electrical installation except by an appropriately licensed person.
- Not weatherproof – protect your machine. This machine is not weatherproof and should not be exposed to direct sunlight, high ambient temperature, damp conditions, wet conditions or high humidity conditions.

Safety Symbols

The product may have safety warning labels attached to it, explained below. Understand the symbols on your product and their meanings. If any stickers become unreadable, unattached etc, replace them.

 **Flammable Material Hazard** Flammable liquids, gases or substances etc may present. Avoid ignition sources and open flames. Danger of fire.	 **Read User Manual** Read and fully understand product safety warnings, operation, procedures etc before using the product.	 **Use Hand Protection** Wear appropriate hand protection and take due care as the product or use of the product may present hand hazards.	 **Carbon-Monoxide Hazard** Do not use the product in confined areas or without adequate ventilation. Carbon-monoxide poisoning can be fatal.
 **Electrocution / Electrical Shock Hazard** High voltage or high current electricity may be present or required by the product. Take due care when handling electrical products, cables, plugs and leads. Electrical shock can be fatal.	 **Toxic Fumes / Dust Hazard** Using the product or by-products from use may produce fumes, smoke or particles that could be harmful if inhaled. Wear appropriate breathing protection and have adequate ventilation.	 **Explosive Material Hazard** Combustible liquids, gases or substances etc may be present. Avoid ignition sources and open flames. Danger of explosion.	 **Cutting / Amputation Hazard** The product may have blades, edges or mechanical devices that can cause severe cut injury to fingers, limbs etc. Take due care when handling and using the product.
 **Crush Hazard** The product may have blades, edges or mechanical devices that can cause severe crush injury to fingers, limbs etc. Take due care when handling and using the product.	 **Single Operator Only** The product must be operated by a single person only. More than one person operating the product may introduce additional hazards.	 **Use Face Protection** Wear appropriate full-face protection and take due care as the product or use of the product may present face and eye hazards.	 **Use Foot Protection** Wear appropriate foot protection and take due care as the product or use of the product may present foot hazards.
 **Use Eye / Ear / Head Protection** Wear appropriate eye and / or ear and / or head protection and take due care as the product or use of the product may present eye, hearing and head hazards.	 **Running Hazard** Do not run on or near the product as doing so may present a fall hazard.	 **Diving Hazard** Do not dive into the product as doing so may present a neck / head injury hazard.	 **Adult Supervision Required** Always supervise children and other users of a product to prevent drowning or injury.
 **Skin Penetration / Puncture Hazard** The product may produce pressure, emit liquids or objects that can cause severe injury to fingers, limbs, blood etc. Take due care when handling and using the product.	 **Hot Surface Hazard** Be aware that the product may produce high temperatures and hot surfaces that can cause burn injuries.	 **Flying Debris Hazard** Be aware that the product or use of the product may present hazards produced by flying debris. Wear appropriate clothing and protectiove devices.	 **Moving Parts Hazard** Be aware that the product contains or uses mechanical devices that move or rotate. Always wait for moving parts to stop fully before handling the product, adjusting, maintenence etc.

Carbon-Monoxide Hazard
Do not use the product in confined areas or without adequate ventilation. Carbon-monoxide poisoning can be fatal.

Pull Hazard
Be aware that the product contains or uses mechanical devices that can pull in objects and can cause severe injury to fingers, limbs etc. Take due care when handling and using the product.

Slope / Fall Injury Hazard
Be aware that using the product on sloping surfaces or in slippery conditions may present additional dangers from falls and contact with blades, moving parts, hot surfaces etc.

"Slam Dunk" Warning
Do NOT attempt "slam dunk" maneouvres as this may result in severe injury due to falling, product breakage or collapse etc.

Electrocution / Electrical Shock Hazard - Outdoor
High voltage or high current electricity may be present or required by the product. Do NOT use in rain, damp or wet conditions. Electrical shock can be fatal.

Electrocution / Electrical Shock Hazard - Disconnect
High voltage or high current electricity may be present or required by the product. Always disconnect the product from the electrical supply before handling the product, adjusting, maintenence etc.

Power Line Electrocution Hazard
High voltage / high current power lines may be present. Use extreme caution to avoid contact or interference with power lines. Electrical shock can be fatal.

"Kick-Back" Hazard
High level of "kick-back" hazard that can cause the machine to suddenly rotate towards operator. Kick-back injury can be fatal.

Winch Operator Position Hazard
Do NOT stand between winch and load. Do NOT use winch to move people.

Winch Lift Hazard
Do NOT LIFT load vertically. Use machine to PULL only.

Cable Hazard
Ensure that load bearing cable is not kinked or knotted.

Winch Cable Hazard
Ensure that there is a minimum number of cable coils on winching mechanism.

Winch Hook Hazard
Carry hook to load – do NOT throw or run.

Flash / Blinding Hazard
Wear appropriate eye protection for welding. Direct exposure to weld arcs may cause permanent eye injury.

Laser Hazard
Laser may be in use – do NOT look directly at laser, or allow others to.

Corrosive Substance Hazard
The product may contain corrosive substances that can harm or otherwise cause damage. Take due care when handling and using the product.

Explosion Hazard

The product may contain substances that can explode under certain conditions or misuse. Take due care when handling and using the product.

Equipment Safety

Generators can cause serious or fatal injury if proper safety precautions are not followed. **It is extremely important that you read and fully understand the information in this section and all other safety warnings / recommendations and usage instructions before using the equipment**.

Operator

- If you are untrained in the use of a generator, it is highly recommended that you be trained/instructed by a suitably qualified or experienced person before using the equipment.
- NEVER operate the machine when tired, or under the influence of any substance (medication, alcohol, drugs etc) that may impair your judgement, alertness, physical strength, vision or dexterity.
- Maintain sure-footing and balance always when using or handling the machine and have full awareness of your surroundings and any possible hazards.
- Do not operate the equipment with wet hands or clothing.

Work Area Safety

- Be aware of fire risks resulting from machine use. Ensure that the machine exhaust and spark arrestor (if equipped) is well maintained and that engine is tuned correctly.
- Refuel outdoors only. Avoid fuel spillage. Start the machine at least 3m (10') away from the fuelling location.
- If the generator is for back-up power to a house etc, it must be connected to the building electrical system by a qualified electrician and must comply with relevant laws and electrical codes. If not connected correctly, use of the generator may present electrocution, electric shock, explosion and fire hazards.
- Operate the generator on solid, level surfaces only, with at least 1m (3') between it and other equipment or objects.

Operational Safety

- Do NOT use the machine if the throttle or any safety guard or mechanism is not installed or is not operating correctly – have the machine inspected and repaired at an authorised service centre before using it again.
- The generator creates high voltage and current electricity. Do not connect incompatible devices.
- Never insert any object other than compatible connectors into any generator output connector.
- When using the generator, ensure to keep it and all connected cables away from other electrical cables.

Transportation Safety

- Always STOP the engine before transporting or working on it (refuelling, adjusting etc).
- When transporting the machine in a vehicle, ensure the engine is OFF, all appliances are disconnected, and the machine is secured in an upright position to prevent tip-over, machine damage or fuel spills.

Table of Contents

Applicable Models

This manual applies to the following generators:

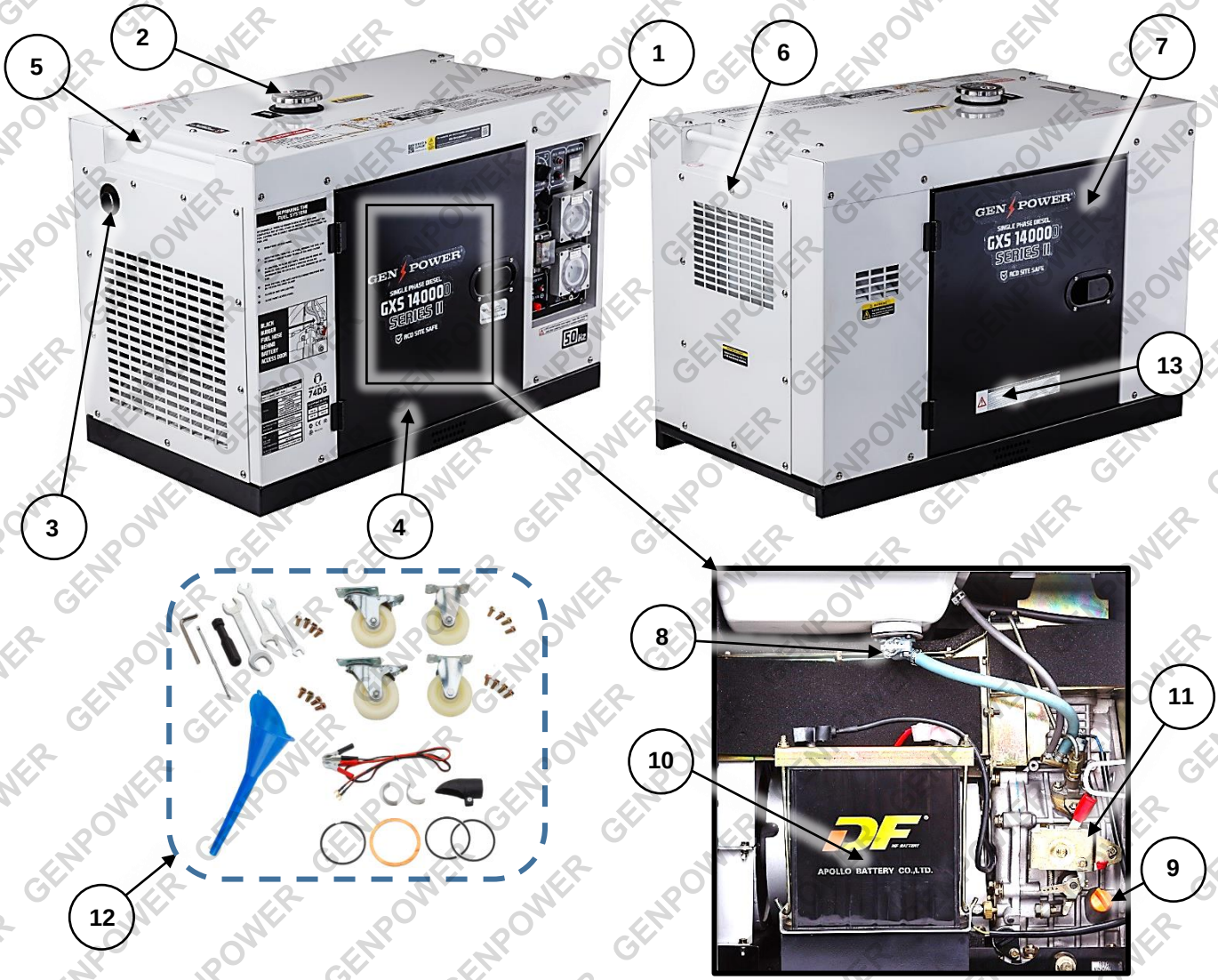
GXS14000D II

GXS14000

TXS14000D III

Parts Identification

Products detailed in this manual may vary in appearance, inclusions, description and packaging from those shown or described. This section shows typical major components common to most diesel powered commercial generators, the position of some components may also vary between models.



No.	Name	No.	Name
1	Control Panel (see Control Panel and Functions)	11	Engine ON / OFF Switch
2	Fuel Filler	12	Accessories / Tools (not all models may include all or any accessories): Wheels (some models also have wheel covers) Wheel Fasteners Funnel Engine Spare Parts (technician use only) Battery Auxiliary Cable Spanners Screwdriver Allen Key
3	Exhaust		
4	Engine Access Cover (front)		
5	Carry Handle		
6	Air Filter Access Cover (filter inside)		
7	Engine Access Cover (rear)		
8	Fuel Tap (fuel strainer / filter inside tank)		
9	Oil Filler/Dipstick		
10	Battery		

Before Use Checklist

Ensure that you carry out all procedures below before starting the engine or operating the equipment. All procedures described are generic in nature and slight variations between different models may exist. **Failure to follow the checklist and carry out the procedures correctly may result in making the product warranty void**. The product is NOT supplied with engine oil, although traces of oil from the manufacturing process may be present. It is essential to add adequate engine oil of the correct type to the engine before use – see Engine Oil. **Failure to add engine oil will void the product warranty**.

Assembly

Minor assembly is required to complete the unit, and is generally limited to fitting the wheels or castors. All necessary parts (wheels and fasteners etc) are supplied with the unit. Suitable tools may be required to lift the generator sufficiently to install the wheels.

Support the generator with blocks etc so it is safe to work on the wheels.

- For models with wheels, place each wheel on the axle, then secure the wheel by placing a split pin through the hole in the axle. Bend the legs of the split pins around the axle to prevent them falling out. If there are wheel covers supplied, attach them to the body of the generator using the supplied fasteners.
- For models with castors, attach each castor (some castors may have brakes) to the underside of the generator using the 4 supplied fasteners per castor.

Engine Oil

Four-stroke engines require engine oil in the crankcase for lubrication of internal components. Severe or irreparable damage may occur if the engine is allowed to run without engine oil. The engine oil level requires regular maintenance. Check the engine oil level and ensure that the oil level is at or just under the maximum level indicator.

Some machines may feature an oil level sensor that will prevent the engine being started or automatically stop the engine if the oil level falls below an acceptable level. This system, however, is not to be solely relied upon. **Always check that the engine oil level is at or near the "MAX" indicator before starting the engine**. See Engine Oil.

Air Filter

The air filter is used to prevent dirt and other particles from possibly entering the engine and causing internal damage to it. The air filter requires regular maintenance.

Always check the air filter before starting the engine. See Air Filter.

Fuel

Petrol/fuel/gasoline is extremely flammable – keep clear of naked flames or other ignition sources.

Adequately fill the fuel tank with the correct fuel type.

- Use commercial diesel fuel. Bio-diesel / blended fuels can be used also. Do not use old or contaminated fuel.

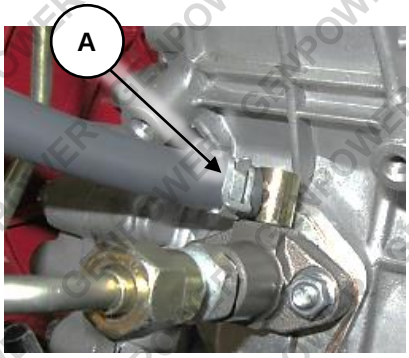
To fill or top up fuel:

1. Place the machine in an upright position on a flat and level surface.
2. Clean the machine around the fuel filler so that no dirt or other material enters the tank when the cap is removed.
3. Remove (rotate left) the fuel filler cap.
4. Using a funnel, carefully fill the tank with fuel. Do not fill above the top of the strainer (if equipped) or otherwise overfill the tank.
5. When finished, reinstall (rotate right) the fuel filler cap until firm. Wipe away any residual fuel from the machine. If fuel has been spilt, move the machine away from the spillage before starting the engine.

Priming the Fuel System

When an engine is new or has been completely run out of fuel it may be necessary to "prime" the fuel system before attempting to start the engine. This means removing any air from the fuel line. To prime 4-stroke engines:

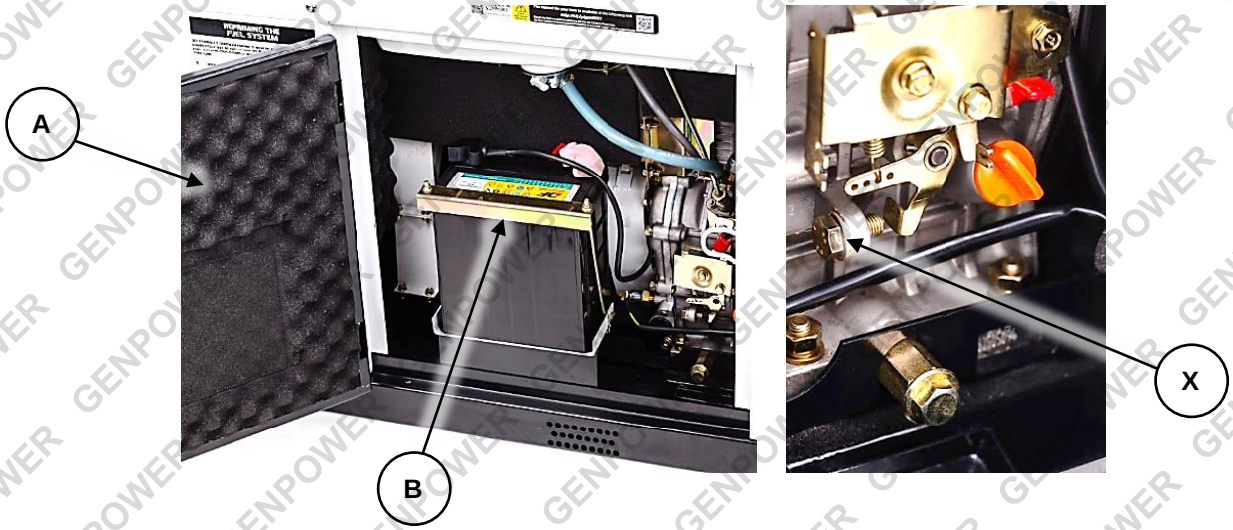
1. Fill the fuel tank with fuel.
2. Remove the fuel line (**A**) from the fuel injector using pliers to loosen the hose-clamp. Hold a container beneath the fuel line to catch any spilt fuel.
3. Place the fuel tap in the "ON" position and allow fuel to flow out (into the container) until no air bubbles can be seen in the fuel stream.
4. Push the fuel line back onto its connection point and re-fasten the hose clamp.
5. Clean up any spilled fuel. If fuel has been spilt, move the machine away from the spillage before starting the engine.
6. Start the engine.



Battery

The engine starting battery is shipped with the unit and comes with the NEGATIVE cable disconnected for shipping reasons. Complete the battery connection. To connect the battery:

1. Open the front engine access cover (**A**). Once open, the battery and cables are accessible.
2. Connect the NEGATIVE (-) battery cable (**BLACK**) to point (**X**) on the engine.
3. Check that both cable connections at the battery terminals are secure, the protective rubber covers are protecting the connections, and the battery bracket (**B**) is secure.



Engine Starting

Before starting the engine, ensure that you have followed all procedures described in the Before Use Checklist. The product is NOT supplied with engine oil, although traces of oil from the manufacturing process may be present. It is essential to add adequate engine oil of the correct type to the engine before use – see Engine Oil. **Failure to add engine oil will void the product warranty**. • **Before starting the generator, disconnect all output sockets so that no load is immediately placed on the generator as it starts up**. • The generator may feature in-built protection that will prevent the engine running if there is insufficient engine oil, the unit is over-temperature or is over-loaded.

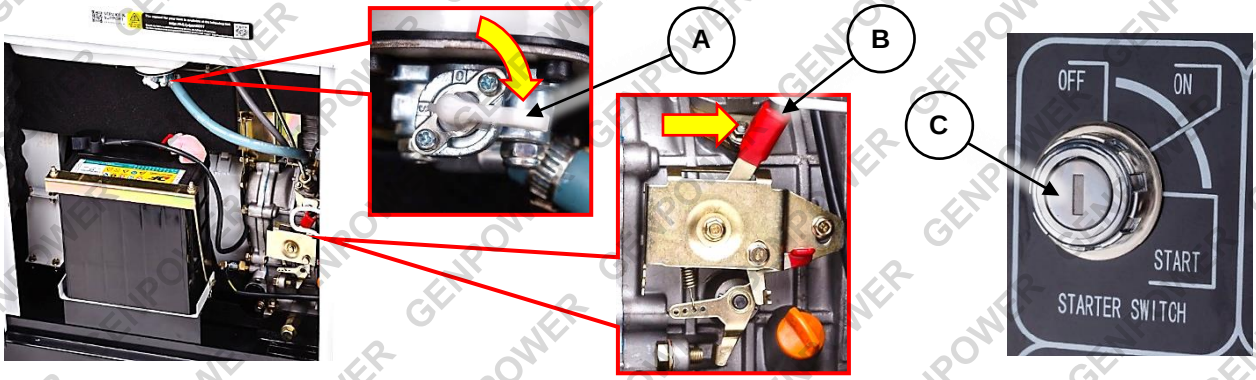
The following procedures and images are typical to all models, however, the position or appearance of controls etc may vary. All major engine controls are identified on the machine by way of stickers or other markings.

Once the engine is started, the engine speed will automatically regulate depending on connected load. For example, under high loads, the engine will run at higher speed to maintain the required output.

Starting

Connect the battery before attempting to start the unit. If the battery is flat, charge it before using the generator, or use the jump-start method. Once the engine is running, it will charge the battery.

1. **FUEL** – Open the front engine access cover, then place the fuel tap (**A**) in the "ON" position (rotate the lever right (clockwise)).
2. **THROTTLE** – Place the throttle control (**B**) in the "RUN" position (to the right). Some models may use a screw to secure the throttle in position – to adjust, loosen the screw and move it to the required position, then tighten it again. Close the front engine access cover.
3. **START** – Insert the generator key into the ignition switch (**C**) on the control panel, then rotate it right to the "START" position, to engage the starter motor. The engine should start.
4. **RUN** – Rotate the generator key left to remain in the "ON" position.



If the engine does not start, repeat step 2 onward. If the engine fails to start after several attempts, refer to Troubleshooting.

Jump Starting

If the battery does not have enough charge to sufficiently crank the engine, the engine can be jump-started. Use a fully charged battery (the "jump" battery) and suitable jump-starting cables. To jump-start:

1. Ensure the ignition is OFF (for some models, this is the position that allows the key to be removed).
2. Connect the jump battery **POSITIVE** ("**+**") terminal to the engine battery **POSITIVE** ("**+**") terminal.
3. Connect the jump battery **NEGATIVE** ("**-**") terminal to the engine battery **NEGATIVE** ("**-**") terminal.
4. Follow the normal start procedure from step 1 onward.

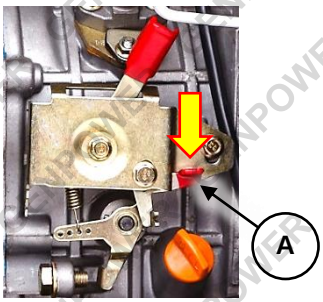
Stopping the Engine

Stopping in an Emergency

1. To stop the engine immediately, place the generator key in the "OFF" position.

After stopping the engine, it is recommended to follow the normal engine stop procedure (disconnect connected devices and ignition and fuel OFF).

Stopping in Normal Use

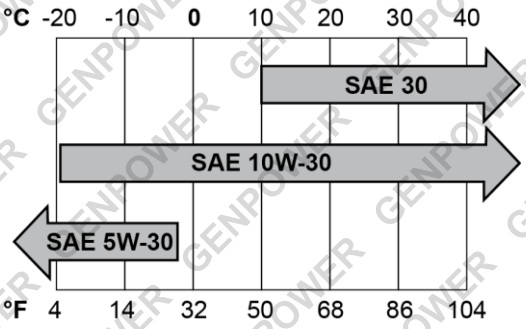


1. **OUTPUTS** – Turn OFF any connected devices, then unplug them from the generator.
2. **IGNITION** – Place the generator key in the "OFF" position. The key can be removed from the ignition switch when in this position.
3. **THROTTLE** – Press the throttle stop lever (**A**) down to release the throttle.
4. **FUEL** – Place the fuel tap in the "OFF" position (rotate the lever left (anti-clockwise)).

Environmental Considerations

Altitude – If the engine is being used in altitudes at or above 1500m (approximately 5000'), adjustments to the engine may be required. This is because there is less oxygen in the air as altitude increases, which effectively "enriches" the ratio of fuel to air going into the engine and the higher the altitude, the richer the fuel mixture becomes. If the engine is being permanently operated at high altitude, it is recommended to have an authorised service centre make the necessary adjustments. If the engine is used occasionally at altitude (not extreme altitudes), no adjustments should be required, however, a slight decrease in engine performance can be expected.

Temperature – If the engine is being used in extremely cold or hot environments; for example, desert or snow conditions, the type of engine oil may need to be changed to suit environmental temperatures. Oil thickens as the temperature decreases and thins as temperature increases, which means that if the engine oil is not suited to the temperature its ability to properly lubricate the engine may be affected. Use the following chart to determine the correct engine oil:



Generator Operation

Allowing the generator to run when being overloaded may permanently damage it and/or shorten its service life and may void product warranty. • Maximum continuous run time per day without cool-off is 6 hours @ 50% load, or 4 hours @ 100% load. The manufacturer recommends that the unit run for no longer than 600 hours per year for optimum machine performance and to extend generator life. These conditions assume the engine oil level is correct, servicing is maintained as per the schedule, and conditions are not considered harsh (high temperature, dust etc). • Ensure that the generator is grounded (earthed) before using it. • Ensure that any device to be powered by the generator is switched OFF before connecting it to the generator. • Ensure that all devices that will be powered by the generator are electrically safe and functioning normally. If at any time a connected device appears to malfunction, stop or slow down etc, immediately switch the generator and device OFF and disconnect the device. • Do not exceed the rated power output of the generator. Consider the power rating for all connected devices that will be running simultaneously, both AC and DC, and ensure that the sum of all power consumption is no more than the generator rated output with consideration given to actual power output based on altitude and temperature (see Understanding Rated Output). For example, 4 x 1500W devices will be acceptable for a 6.0kW rated output generator, however, will overload a 5.0kW unit. • Do not exceed the rated current for the output socket. For example, do not connect a device that draws 15A to a 10A socket. • If using an extension cable, ensure it is an approved type and has a minimum wire gauge of 1.5mm² up to a cable length of 60m; 2.5mm² up to a cable length of 100m. • For appliances that place high "inductive" loads when being started or stopped (for example, electric motors), consideration should be given to the rated output of the generator and the required inductive load capacity. Rated output equates to approximately 45 to 75% of inductive load capacity. • Do not connect devices in parallel to the generator. • Devices sensitive to input voltage fluctuation should be connected via a suitable surge protector.

Understanding Rated Output

The "rated output" is described as the maximum power that the generator can consistently and reliably provide. The rated output of a generator is based around several factors including altitude, ambient temperature and relative humidity. The specified rated output is calculated at an altitude of 0m, ambient temperature of 25°C and relative humidity of 30%. Deviations from these values will affect the actual output capacity of the generator. For example, if the generator is used at high altitude it will produce less power.

Basically, the higher the altitude, the warmer the ambient temperature and the greater the humidity, the less power can be produced. The following table provides a guideline for calculating actual generator output based on ambient temperature and altitude [note that humidity is ignored here as it has a marginal effect]:

	Ambient Temperature (°C)				
	25	30	35	40	45
Altitude (m)	Power Output Coefficient				
0	1.0	0.98	0.96	0.93	0.90
500	0.93	0.91	0.89	0.87	0.84
1000	0.87	0.85	0.82	0.80	0.78
2000	0.75	0.76	0.71	0.69	0.66
3000	0.64	0.62	0.60	0.58	0.56
4000	0.54	0.52	0.50	0.48	0.46

Examples:

- At an approximate altitude of 1000m and 30°C ambient temperature, the power output coefficient is 0.85. So, a rated output of 6kW becomes 6.0 x 0.85, which equates to an actual power output of 5.1kW.
- At an approximate altitude of 2000m and 25°C ambient temperature, the power output coefficient is 0.75. So, a rated output of 6.0kW becomes 6.0 x 0.75, which equates to an actual power output of 4.5kW.
- At an approximate altitude of 3000m and 40°C ambient temperature, the power output coefficient is 0.58. So, a rated output of 6.0kW becomes 6.0 x 0.58, which equates to an actual power output of 3.48kW.

Calculating Generator Load

Most electrical devices clearly state the required power, usually in Watts (W). This information is generally labelled on the device, or listed in its user manual. If a device lists power consumption figures in amperes (A) only, calculate the wattage by multiplying the ampere rating by the voltage. For example, a 10A device @ 240VAC equates to 2400W (10A x 240V). The sum of all devices required to be operating simultaneously needs to equal or be less than the rated output of the generator.

Many devices require a different load on start-up/shut-down that is often much higher than the actual continuous running requirements. For example, a water pump may require 2000W to start, and once started, requires 500W to continue running. When calculating generator load, the start-up requirements need to be factored in. If the start-up power consumption is not known, the table below lists typical consumption figures for several device types that may assist in determining how many or which devices may be connected and a starting order [that is, start the high consumption devices first, followed by devices with no additional start-up power requirements].

	Incandescent Lamp	Radio	Power Tool	Electric Fan	Water Pump	Fluorescent Lamp
Start-up Watts	*50 to 150*	*100 to 200*	*1000 to 1500*	*600*	*2500 to 5000*	*N/A*
Running Watts	*50 to 150*	*100 to 200*	*400 to 600*	*200*	*500 to 1000*	*As Stated*

Example (using the typical values above):

- To run a radio, electric fan and 3 power tools requires an approximate running power consumption of 100W (radio) + 200W (fan) + 1800W (power tools) = 2.1kW. However, when factoring in start-up power requirements, the equation becomes 100W (radio) + 600W (fan) + 4500W (power tools) = 5.2kW.

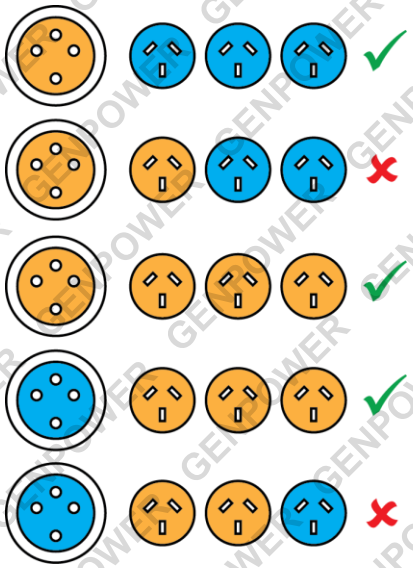
Many generators have a "maximum" output above that of the rated output, which is allowable for a short period. This is to allow (up to a point) for increased start-up loads that reduce once connected devices are running. Using the above example, a generator with a rated output of 3.0kW and maximum output of 5.2kW would be suitable.

Load Balancing – 3-Phase Generators

The following recommendations are applicable to 3-phase capable generators ONLY. • **Failure to correctly "load balance" the outputs on 3-phase generators may damage the unit, and is not covered by warranty**.

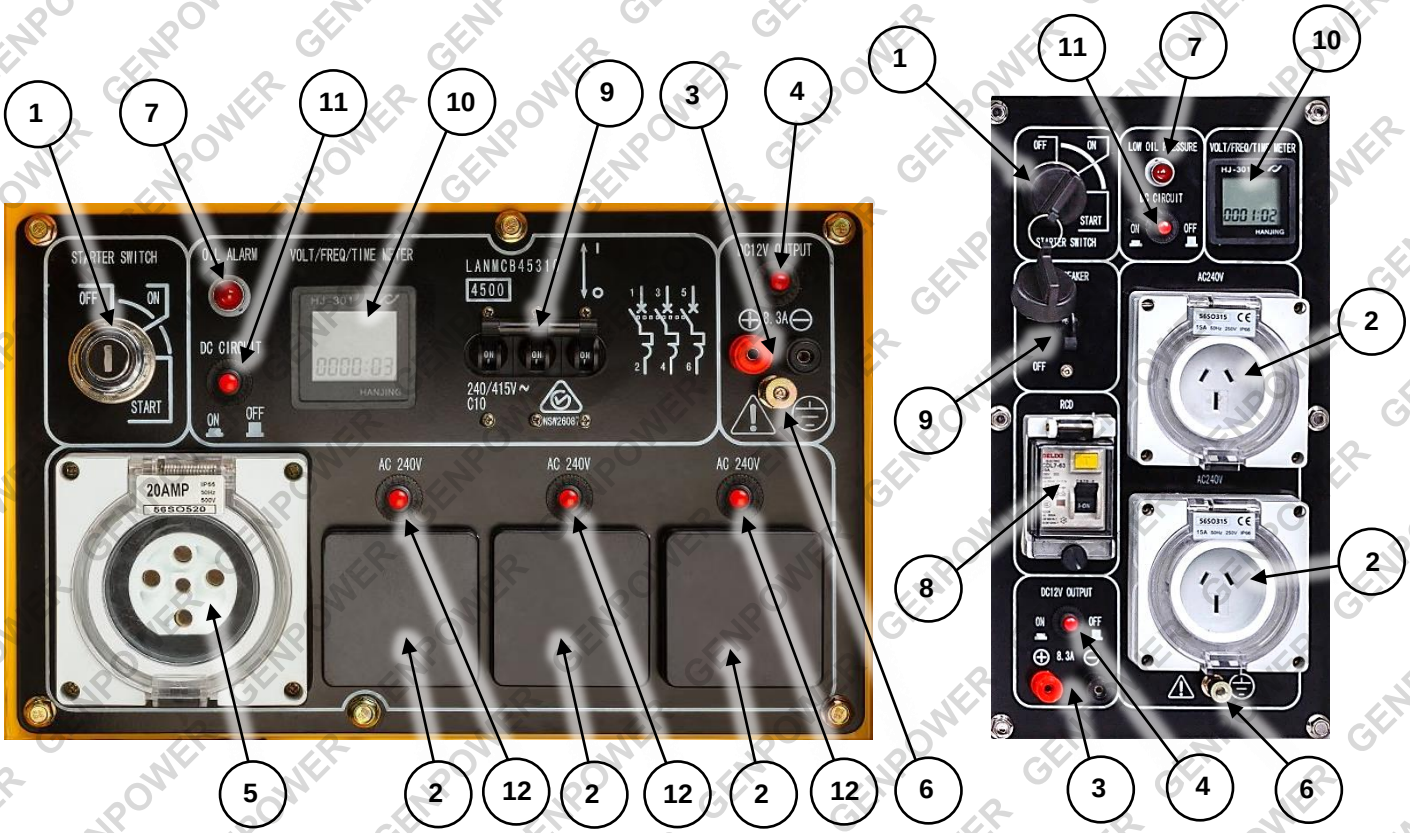
- A maximum of one third (33%) of rated generator output ONLY is available from any 240VAC single-phase output. For example, a 3-phase generator rated at 3kW is capable of supplying a maximum 1kW (3 ÷ 3) at any one 240VAC outlet.
- When using 240VAC power, it is recommended to use ALL 3 outputs simultaneously as each output uses one phase of the generator alternator.
- 240VAC devices that draw surges of power or have a power consumption exceeding 1500W should NOT be powered from 3-phase generators.
- When powering 415V 3-phase and 240VAC single-phase devices simultaneously, it is recommended to run low power devices from the single-phase outlets. Note that the 415V 3-phase outlet maximum current output reduces to 10A.

In the adjacent image, outlets in use are shown as **orange**; unused outlets are shown as **blue**.



Control Panel and Functions

The generator features a control panel for connecting devices and monitor or understand generator status. The features vary between models; for example, some models have different numbers of AC connections, 3-phase connections, RCD etc. The main features of each control panel type are described below.



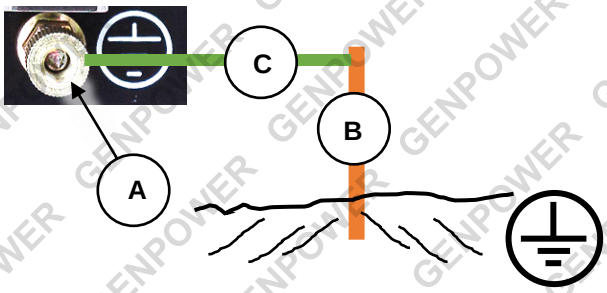
No.	Description
1	**Ignition** – Insert generator key and place in the "START" position to start the generator; place in the "ON" position to run the generator. Place in the "OFF" position to stop the generator.
2	**240VAC Output** – Used for powering a 240VAC device that connects via a standard 3-pin plug. The generator may feature several outlets. Lift the cover to access the connector.
3	**12VDC Battery Charger Output** – Used for charging a 12V battery (charging cable supplied).
4	**12VDC Output Protection Reset** – Used to reset the 12VDC output over-current protection. If the over-current protection trips, the button "pops out". Remove the cause for the protection to trip, then press to re-activate the generator DC output.
5	**415V 3-Phase Output** – Used for powering a 415V 3-phase device that connects via a standard 4-pin 3-phase plug (if equipped). The generator may feature more than one socket. Lift the cover to access the connector. On some models, a lamp indicates that power from the output is in use.
6	**Ground Connection** – Used to ground the generator – see Grounding the Generator.
7	**Low Oil Pressure Indicator** – Illuminates red if the engine oil level is inadequate and will automatically stop the engine. This protection may also prevent the engine being started. If the engine oil level is low, top it up.
8	**RCD Protection Reset** – Used to reset the residual current device (RCD) protection circuit-breaker (if equipped). This breaker trips if a ground circuit fault is detected in an attached device. When tripped, the lever moves to the "OFF" position, and all generator output circuits are automatically cut-off. Remove the cause for the protection to trip, then move the lever to the "ON" position to reset.

No.	Description
9	**Output Over-Current Protection Reset** – Used to reset the 240VAC (and 415V 3-phase, if equipped) over-current circuit-breaker. This circuit-breaker trips if the total current draw on the generator (all outputs combined) is excessive. When tripped, the lever moves to the "OFF" position and all generator output circuits are automatically cut-off. Remove the cause for the protection to trip, then move the lever to the "ON" position to reset.
10	**Display** – Provides generator information: **U** – Shows the AC voltage (V) being generated. If the generator is overloaded, this is blank. **F** – Shows the voltage frequency (Hz) being generated. If the generator is overloaded, this is blank. **Time** – Shows the TOTAL length of the time that the generator has been run for. This is for servicing reasons, and does not reset to zero when the generator is stopped.
11	**Internal 12VDC Circuit Protection Reset** – Used to reset the internal 12VDC starter motor circuit over-current protection. If the over-current protection trips, the button "pops out". Press to re-activate the internal 12VDC circuit.
12	**240VAC Output Over-Current Protection Reset** – Used to reset the associated 240VAC output over-current protection. This circuit-breaker trips if the current draw on the associated 240VAC outlet is excessive. If the protection trips, the button "pops out". Remove the cause for the protection to trip, then press to re-activate the 240VAC output.

Grounding the Generator

The generator must be properly grounded before use. Failure to ground the generator may create a shock or electrocution hazard.

Connect a length of insulated heavy gauge wire (**C**) between the generator **Ground** connector (**A**) (on the control panel) and a suitable ground point. You can create a ground point by driving a metal rod (**B**) into the ground and connecting the free end of the cable to it.



AC Applications

Observe the following safety precautions when powering 240VAC devices:
• Connect only devices that have power requirements compatible with the generator. • Connect only devices that have connectors compatible with the generator output sockets. • Always switch the connected device OFF before connecting to or disconnecting from the generator. • Do not connect devices in parallel to the generator. • Devices sensitive to input voltage fluctuation should be connected via a suitable surge protector. • For 3-phase generators, ensure that the load is balanced across the outlets.

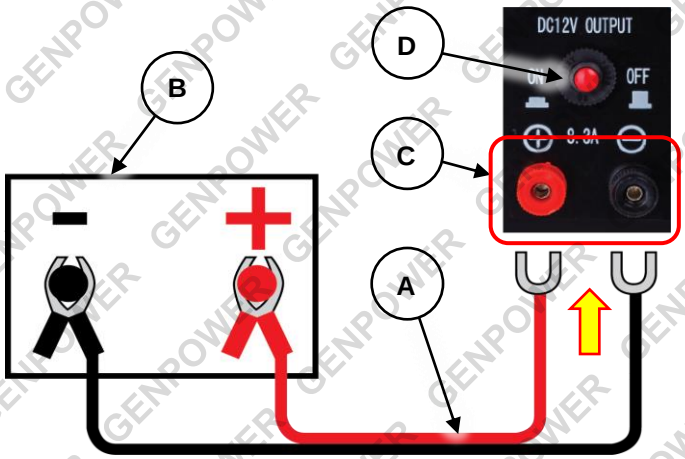
1. Ensure that all circuit-breakers and protection devices are "ON" (not tripped).
2. Start the generator.
3. Ensure that any device to be connected is switched OFF, then plug the device into the applicable 240VAC outlet.
4. Switch the connected devices ON, one at a time to help reduce start-up loads, then operate them as normal.
5. When finished using the device, switch it OFF, then unplug the device from the generator.

DC Applications

Observe the following safety precautions when charging batteries:
When connecting a battery to the DC output, ENSURE that the polarity (**+** to **+** and **–** to **–**) of connections is correct. Failure to do so may represent an explosion hazard and/or damage the generator and/or connected battery. • The DC circuit is not monitored and does not automatically switch off or self-regulate depending on the voltage of the connected battery. This means that you must independently monitor battery charge status and disconnect the battery before it is over-charged. Over-charging batteries may present an explosion hazard. • The DC output over-current protection can be tripped in the event of too much current being drawn (see Specifications for maximum current draw for differing generator models). If this occurs, the DC protection reset switch (on the control panel) will "pop out". Press the switch to reset the protection and re-activate the generator DC output. • To prevent sparking near the generator, when disconnecting a battery, disconnect the battery charging cable from the battery terminals before unplugging it from the generator DC output socket. Disconnect the **negative** (**-**) terminal first, followed by disconnecting the **positive** (**+**) terminal and do not allow the cable ends to touch. • When charging a battery that is mounted in a vehicle, at the vehicle battery, disconnect the **negative** (-) terminal first, followed by disconnecting the **positive** (**+**) terminal. Then, proceed to connect the battery charging cable as normal. Ensure that the battery terminals or charging cable terminals do not make contact with the vehicle chassis as sparking may occur. • Do not attempt to start a vehicle whilst its battery is connected to the generator, as damage to the generator may result. • Batteries that are being charged may emit dangerous gases. Batteries being charged should be in a well ventilated area and a safe distance from any sources of flame, heat, flammable or volatile materials. • Batteries may contain corrosive substances. Contact with skin or eyes may cause burns – wash with water immediately (at least 15 minutes if has contacted eyes) and seek professional medical attention. Wear protective clothing and face mask when handling batteries. • If battery acid is swallowed, administer water or milk and immediately seek professional medical attention. • All batteries should be kept out of reach of children.

Battery Charging

Some generators feature a protected 12VDC outlet that is used for charging suitable batteries (vehicle batteries etc). Use the supplied cable to connect the battery to the generator.



1. Connect the battery charging cable (**A**) to the battery (**B**) terminals – **RED** to the battery **POSITIVE** (**+**) terminal, **BLACK** to the battery **NEGATIVE** (**-**) terminal. Connect the **POSITIVE** (**+**) terminal first.
2. Connect the battery charging cable to the generator DC output connectors (**C**).
3. Start the generator.
4. Switch the 12VDC output ON (**D**).

When finished using the DC output, switch the 12VDC output OFF, disconnect the **BLACK NEGATIVE** (-) battery charging cable from the generator and battery, then disconnect the **RED POSITIVE** (+) cable from the generator and battery.

Maintenance

Running combustion engines in confined areas **CAN KILL IN MINUTES**. Engine exhaust fumes contain carbon-monoxide – a deadly gas that you cannot smell or see. NEVER run a combustion engine in confined areas EVEN IF windows and doors are open. ONLY run combustion engines OUTDOORS and away from doors, windows and vents. • Petrol / fuel / gasoline is extremely flammable – keep clear of naked flames or other ignition sources. • Do not have the engine running during inspection and maintenance unless specifically required. • The engine should be cool enough to touch before performing maintenance activities. • Some maintenance activities may be beyond the scope of some users. Do NOT attempt procedures that you are not comfortable with, or do not have the necessary tools, experience or knowledge for – take the unit to an authorised service centre or qualified technician for servicing. • Harsh operating environments such as extreme temperatures, dust etc may necessitate more frequent maintenance. • **Failure to follow the maintenance schedule, using incorrect or non-compatible accessories or replacements parts, or general negligence may result in making the product warranty void**.

To keep the machine performing at optimal efficiency, regular checks and maintenance is required. The maintenance schedule below specifies preventative maintenance checks and necessary maintenance tasks and how often they should be performed. The schedule applies to multiple engines; some engines may not include some components, so maintenance on those components is not applicable.

Maintenance Schedule

Use the following maintenance schedule for a list of regular maintenance tasks and how often they need to be performed. Maintenance frequency is based on average usage. Be aware of how much the machine is used and be sure to follow the schedule according to time or usage, whichever comes first.

Towards the end of this document is a form you can use for maintenance record keeping. It is recommended that you keep a reference of all maintenance.

Major Servicing and "Heavy-Duty" Usage - For engines that are subject to "heavy-duty" use, which can be defined as being used under loads of 85% or more and / or in use more than approximately 300 hours per year (for example, generators and water pumps), more frequent "Major Service" maintenance is required. In addition to normal service requirements, and as with many smaller machine and off-road bike engines, the following parts (as applicable for petrol, diesel or 2-stroke engines) may require replacement during a major service:

- Piston rings.
- Big-end bearings.
- Small-end bearings.
- Gudgeon pin.
- Oil rings.
- Gaskets and seals.
- Valve seats.

Inspection of the following items is required:

- Piston for cracks and stress fractures.
- Bore for wear requiring reconditioning.
- Full machine for broken, worn or loose parts.

Failure to follow the maintenance schedule, using incorrect or non-compatible accessories or replacements parts, or general negligence may result in making the product warranty void.

Maintenance Schedule – Diesel Engines / Machines

Component / Task	Every Use	After First 5 Hours Use	3 Months / 25 Hours Use	6 Months / 50 Hours Use	12 Months / 100 Hours Use	Major Service – Normal Use 24 Months / 200 Hours Use	Major Service – Heavy-Duty Use Every 200 Hours Use
Engine Oil	Check level. Adjust as necessary	Replace					
Engine Oil Filter *			Clean. Replace as necessary				
Loose Engine / Machine Fasteners	Check. Tighten as necessary						
Air Filter	Check		Clean. Replace as necessary			Replace	
Spark Arrestor *							
Fuel Filter *			Clean. Replace as necessary			Replace	
Fuel Strainer *	Check						
Fuel Lines / Hoses	Check	Replace as necessary					
Fuel injector *					Check. Clean		
Fuel Pump *							
Fuel Tank					Flush and clean		
Idle Speed					Check. Adjust as necessary		
Valve Clearance					Check. Adjust as necessary		
Cylinder Head Fasteners					Check. Tighten as necessary		
Combustion Chamber					Check. Clean / de-coke as necessary		
Battery Electrolyte *		Check level. Adjust as necessary					
Major Service						Perform	
Cutting Blade / Chain *	Check	Sharpen. Replace as necessary					
Water Pump Oil **	Check level. Adjust as necessary					Replace	
Hydraulic Fluid ***	Check level. Adjust as necessary					Replace	
Drive Belt *	Check tension. Adjust as necessary					Check. Replace as necessary	

* Where applicable. ** Pressure washers with non-sealed water pumps. *** Log splitters only.

Engine Oil

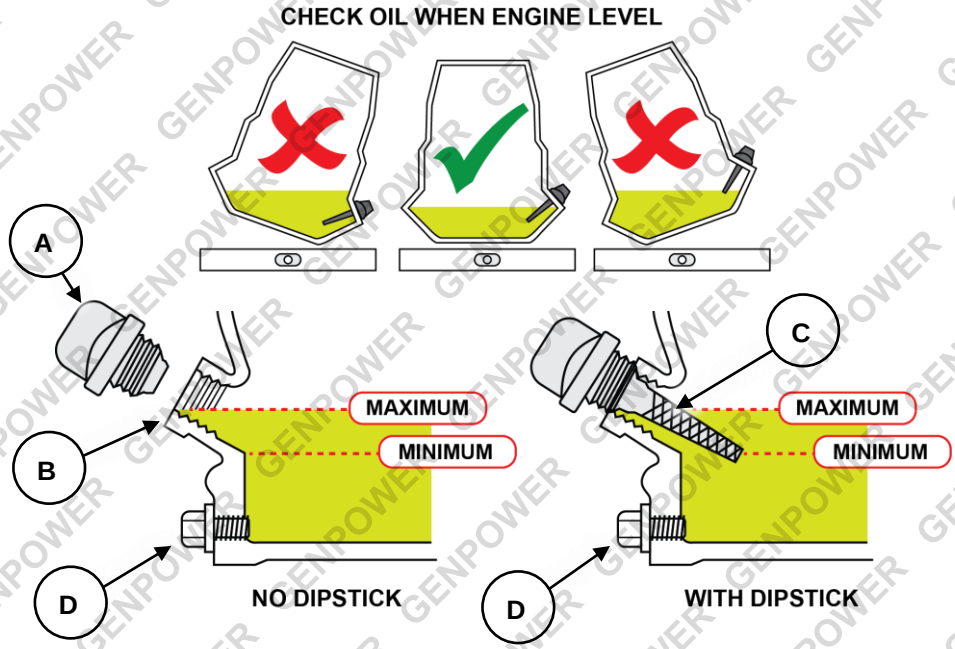
The product is NOT supplied with engine oil, although traces of oil from the manufacturing process may be present. It is essential to add adequate engine oil of the correct type to the engine before use. **Failure to add engine oil will void the product warranty**. • Always check engine oil level when the machine is in an upright position on a flat and level surface. • Do not use used or contaminated engine oils. • Use only engine oils of the correct type (see Specifications). • Perform the first oil change within the first 20 hours of use. Subsequently, change the oil every 20 hours of use. • It is recommended that the engine be warm, but not hot, when performing oil changes. When the oil is warm it drains faster. • Using dirty or incorrect engine oil may cause engine damage and void any warranty • Always use suitable tools. • Always dispose of used oil in an environmentally responsible manner and according to regulations. • Some engines feature oil level detection, which will prevent the engine being started or automatically stop a running engine if there is insufficient oil. • **Always check the oil level and ensure is at or near the "MAX" indicator before using the machine**.

Four-stroke engines require engine oil in the crankcase for lubrication of internal components. Severe or irreparable damage may occur if the engine is allowed to run without engine oil. The engine oil level requires regular maintenance as per the maintenance schedule.

Checking and Changing Engine Oil

To check engine oil level:

1. Ensure that the machine is on a flat and level surface.
2. Clean the machine around the oil filler cap (**A**) so that no dirt or other material enters the engine when the cap is removed.
3. Remove the oil filler cap (rotate left) until fully unscrewed. For machines without a dipstick, the oil level is determined by how close the oil is to the edge of the filler hole (**B**). For machines equipped with an oil level dipstick:
   a. Remove the dipstick (**C**) and wipe clean with a piece of cloth or paper.
   b. Insert the dipstick into the oil filler but do not screw it in.
   c. Remove and inspect the dipstick – the oil level is determined by where oil can be seen on it.
4. Ensure that the oil level is at or just under the "maximum". If the oil level is low, add additional oil until the correct level is reached. If the oil level is too high, drain some oil until the correct level is reached.
5. When finished, re-install (rotate right) the oil filler cap until firm. Wipe off any residual oil from the machine.



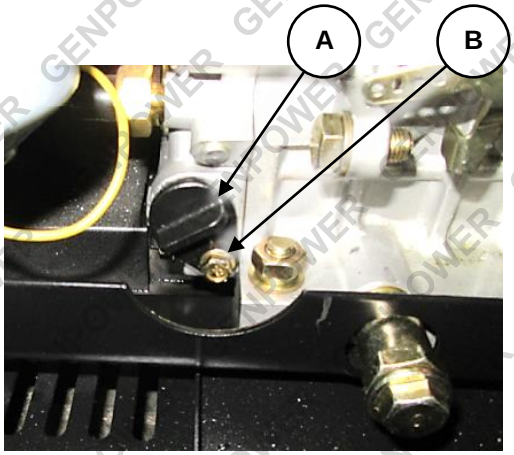
To change the engine oil:

1. Place the machine on a suitable work surface that is flat and level and have a container ready to catch drained oil.
2. Clean the machine around the oil drain plug (**D**) and oil filler cap/dipstick so that no dirt or other material enters the engine when the plug or cap is removed.
3. Unscrew (rotate left) and remove the drain plug and washer.
4. Tilt the machine and drain all oil from the engine. Once drained, allow the machine to sit level again. For engines with an oil strainer, clean it.
5. Clean the drain plug and washer and then reinstall them. Screw in fully (rotate right) and firmly tighten.
6. Remove the oil filler cap (rotate left) until fully unscrewed. Wipe the oil level indicator clean with a piece of cloth or paper.
7. Using a funnel, carefully add oil to the engine until the "maximum" level is reached. Double-check the oil level (described above).
8. When finished, re-install (rotate right) the oil filler cap until firm. Wipe off any residual oil from the machine.

Oil Strainer

Some engines feature an oil strainer that can be removed for cleaning / replacement:

1. Ensure the engine is drained of oil.
2. Clean the machine around the oil strainer (**A**).
3. Remove the oil strainer retainer retaining bolt (**B**).
4. Pull the oil strainer from the engine and clean it thoroughly in solvent or degreaser. Ensure that all particles, sludge etc is removed, then dry it.
5. When finished, slide the oil strainer back into position. Re-install and tighten (rotate right) the retaining bolt. Wipe off any residual oil from the machine.



Air Filter

Operating the machine without a functional air filter may cause severe engine damage and will void any warranty. • A dirty or oil saturated air filter will restrict air flow, which can be mistaken as fuel system problems. Check the condition of the air filter before adjusting engine idle speed, where applicable. • If the air filter is damaged (torn, broken, disintegrating), replace it.

The air filter is used to prevent dirt and other particles from possibly entering the engine and causing internal damage to it. The engine breather may be connected to the air intake assembly – this may lead to a build-up of oil in the air filter over extended use and is normal. The air filter requires regular maintenance as per the maintenance schedule.

Inspection and Cleaning

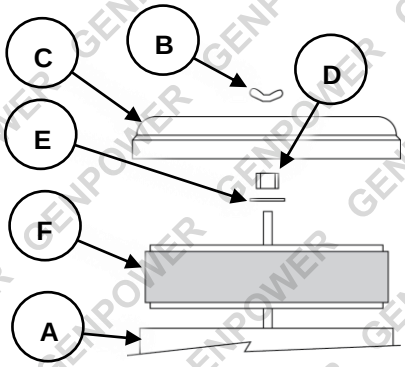
Inspect the air filter for dirtiness and debris, damage etc. Some engine may feature a 2-stage air filter, with a foam "envelope" around a paper element. Clean or replace the filter element as necessary. To clean air filters:

- For foam filters, wash the filter in warm water and mild detergent, then rinse and allow to dry.
- For paper filters, use compressed air to blow particles from it. The air should be blown from the engine side of the filter.
- Clean all other air filter assembly components using water and mild detergent, then dry them.
- For foam filters, place a few drops of clean engine oil on the filter then squeeze it a few times to spread the oil through the filter material and remove any excess oil.

Removal/Installation

To remove the air filter:

1. Remove the screws (rotate left) securing the air filter access cover, and remove the cover. There are differences in appearance and the number of fasteners used between models.
2. Unscrew (rotate left) the nut / wing nut (**B**) securing the air filter cover (**C**) and remove the cover from the air intake assembly (**A**).
3. Unscrew (rotate left) the nut (**D**) and remove the washer (**E**) (if equipped) and filter element (**F**).



To install the air filter:

1. Push the filter element onto the mounting screw and secure with the washer (if equipped) and nut (rotate right) and tighten. Do not over-tighten.
2. Place the air filter cover in position. Reinstall the nut / wing nut (rotate right) and tighten by hand so that all filter components are secure. Do not over-tighten.

Fuel Filter

Remove the battery from the machine before working on the fuel system. • Operating the machine without a functional fuel filter may cause difficulty starting the engine, poor running and may also result in engine or fuel system damage and will void any warranty. • If the fuel filter is damaged (torn, broken, disintegrating) or very dirty, replace it.

The fuel filter is used to prevent dirt and other particles from possibly entering the fuel system / engine and causing internal damage to it. The fuel filter requires regular maintenance as per the maintenance schedule. After working on the fuel system, ensure that there are no leaks before using the machine again.

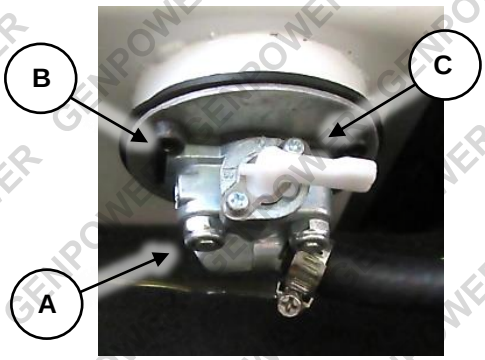
Inspection and Cleaning

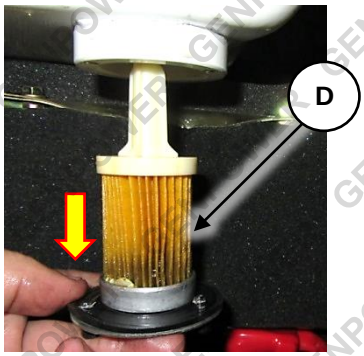
Clean or replace the fuel filter as necessary. To clean fuel filters:

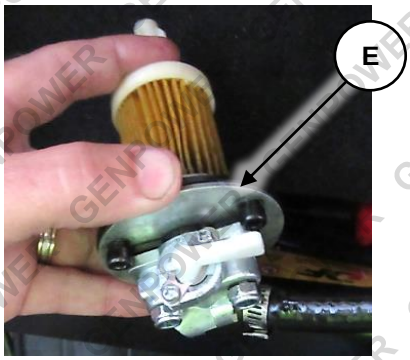
- Use compressed air to blow particles from the filter element. The air should be blown from the engine side of the filter.
- Clean all other fuel filter assembly components, including O-rings, gaskets and fasteners using solvent / degreaser, then dry them.

Removal/Installation – Fuel Filter Internal to Tank

1. Drain the fuel tank.
2. Loosen (rotate left) the 2 fuel tap nuts (**A**), but do not remove them at this stage. Note that these nuts secure both the fuel tap and filter element.
3. Unscrew (rotate left) the 3 cap screws (**B**) securing the fuel tap plate (**C**) to the fuel tank, then lower the assembly from the fuel tank (the assembly consists of the fuel tap, gasket, fuel tap plate, gasket and filter element).
4. Remove the 2 nuts loosened in step 3, then remove the filter element (**D**).





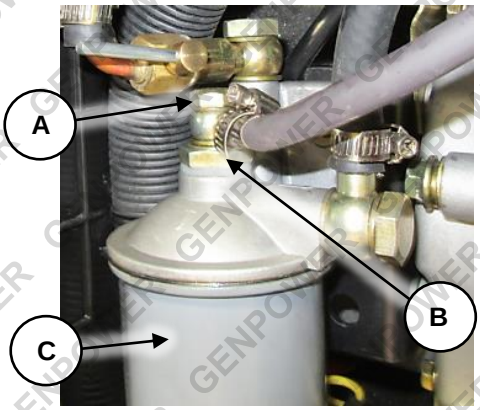


To install the fuel filter:

1. Assemble the fuel tap parts – pass the threaded studs at the bottom of the filter element through the fuel tank plate gasket, then fuel tank plate, then fuel tap gasket, then fuel tap. Screw on (rotate right) the 2 nuts onto the studs, but do not tighten at this stage.
2. Bring the assembled parts (**E**) into position in and against the fuel tank, then attach the fuel tank plate to the tank using the 3 cap screws. Progressively tighten the screws so the plate mounts flush with the fuel tank. Do not over-tighten.
3. Tighten the nuts installed in step 1. Do not over-tighten. Clean up any spilled fuel.

Removal/Installation – Fuel Filter External to Tank

1. Drain the fuel tank.
2. Loosen (rotate left) the fuel hose connection bolt (**A**) so the hose connection can move, but do not remove the bolt.
3. Loosen (rotate left) the filter bolt (**B**), then unscrew (rotate left) the filter housing (**C**) from the bolt (remaining fuel in the filter and hoses may spill at this point) until it can be removed.
4. Remove the filter element (**D**) from the filter housing.



To install the fuel filter:

1. Place the filter element into the housing. Ensure that the smaller hole (**X**) is facing towards the bottom of the housing. This is so the filter element seals against the spring-loaded rubber washer inside the housing.
2. Bring the housing / filter assembly up to the yoke (**E**) and screw it on (rotate right) to the filter bolt. Screw the housing on firmly by hand.
3. Tighten the hose connection bolt. Do not over-tighten.

Battery

Always replace the battery with a battery of the same voltage and current specification as that of the original battery.

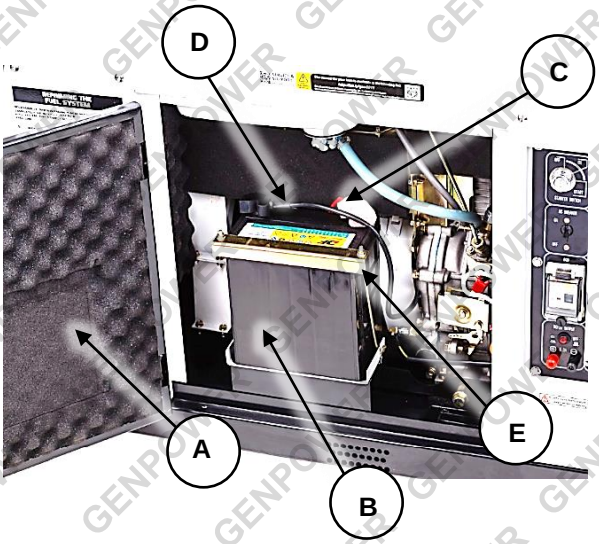
Electric start models feature a 12V battery for engine starting. The generator charges the battery during normal operation, however, the battery will eventually fail and require replacement. The battery also has circuit-breaker protection on the starter circuit. If the battery does not appear to be functional, check the circuit-breaker and reset it before replacing the battery. To check and rest the internal 12VDC starting circuit circuit-breaker:

1. Locate the circuit-breaker (**A**) on the machine control panel.
2. If the button has "popped out", then the circuit-breaker is currently tripped and the starting circuit is disabled.
3. Press the button to rest the circuit-breaker and enable the starting circuit.

If the circuit-breaker trips repeatedly, there may be one or more other faults – have the unit inspected and repaired at an authorised service centre.

Battery Removal/Installation

To remove the battery:



1. Switch OFF the engine.
2. Open the front engine access cover (**A**) to access the battery (**B**).
3. Disconnect the **BLACK NEGATIVE** cable (**C**) from the battery **NEGATIVE** (**-**) terminal.
4. Disconnect the **RED POSITIVE** cable from the battery **POSITIVE** (**+**) terminal.
5. Using a suitable spanner, remove the battery bracket (**C**), then carefully remove the battery from the machine. Ensure that the battery terminals do NOT contact any part of the machine.

To re-install and connect the battery:

1. Carefully insert the battery into the machine. Ensure that the battery terminals do NOT contact any part of the machine, and that the terminals are near the applicable battery cable.
2. Re-install the battery bracket so that the battery is securely held.
3. Connect the **RED POSITIVE** (**+**) cable to the **POSITIVE** (**+**) battery terminal and firmly secure it.
4. Connect the **BLACK NEGATIVE** (**-**) cable to the **NEGATIVE** (**-**) battery terminal and firmly secure it.
5. Ensure that the rubber caps are covering the battery terminals and are fitted securely.
6. Close the engine access cover.

Transportation and Storage

Always ensure that the machine is cool enough to touch before transporting or storing. • Petrol/fuel/gasoline is extremely flammable – keep clear of naked flames or other ignition sources. • Always transport the machine with the fuel tap and engine ON / OFF switch (where applicable) in the "OFF" position. • Drain the fuel tank before transportation or storage.

Preparing for Transport and Storage

- Drain the fuel system by allowing the engine to run until it stops. It is advised to have the fuel tank as empty as possible before draining.
- Ensure that the fuel tap (if applicable), engine ON/OFF or key switch (where applicable) is in the "OFF" position.
- Disconnect the spark plug lead.
- Avoid exposing the equipment to direct sunlight, particularly during transportation.
- Ensure the equipment is secure and upright during transport.
- Store the unit in a dry, well-ventilated area and out of the reach of children.

Long Term Storage

Follow the normal procedures for storage, then:

- Remove the spark plug and put 10ml of clean engine oil into the cylinder. Re-install the spark plug.
- Cover the equipment.

Troubleshooting

Running combustion engines in confined areas **CAN KILL IN MINUTES**. Engine exhaust fumes contain carbon-monoxide – a deadly gas that you cannot smell or see. NEVER run a combustion engine in confined areas EVEN IF windows and doors are open. ONLY run combustion engines OUTDOORS and away from doors, windows and vents. • Petrol/fuel/gasoline is extremely flammable – keep clear of naked flames or other ignition sources. • The product is NOT supplied with engine oil, although traces of oil from the manufacturing process may be present. It is essential to add adequate engine oil of the correct type to the engine before use – see Engine Oil. **Failure to add engine oil will void the product warranty**. • Do not have the engine running during inspection and maintenance unless specifically required. • The engine should be cool enough to touch before performing maintenance activities. • Some maintenance activities may be beyond the scope of some users. Do NOT attempt procedures that you are not comfortable with, or do not have the necessary tools, experience or knowledge for – take the unit to an authorised service centre or qualified technician for servicing.

The following information may assist in identifying a problem and rectifying it.

Difficulty starting the engine.

Possible Fault	Action
Lack of fuel	Check that there is fuel in the tank and the fuel tap is in the "ON" position. • To further check if fuel is reaching the engine, remove the fuel supply carburettor drain plug and check if fuel drains.
Engine "OFF"	Ensure engine ON/OFF switch is in the "ON" position.
Not enough engine oil	Check engine oil level and ensure it is at or just below the MAX indicator. After topping up, shake the generator from side to side a little to distribute the oil.
Engine "flooded" with fuel	Place the choke in "HOT" or "RUN" position. Leave the ON/OFF switch in the "OFF" position. Pull the starter cord several times to assist clearing excess fuel from engine before attempting to start engine.

Electric engine start not working.

Possible Fault	Action
Battery fuse blown	Check and replace fuse if required.
Battery no longer serviceable	Replace battery.

Engine starts but does not idle.

Possible Fault	Action
Blocked air filter	Perform an air filter service.
Idle speed requires adjustment	Adjust idle speed until engine runs smoothly and at a reasonable speed when idling. For fuel-injected models, idle speed adjustment should not be required.

Difficulty restarting the engine after use or engine stops suddenly during use.

Possible Fault	Action
No fuel or engine oil	Check fuel level and ensure adequate fuel is available. For some engines, an engine oil sensor will automatically switch off the engine or prevent starting if a low engine oil level is detected.
Overheating	Allow engine to cool before restarting. If possible, improve engine cooling, such as operating in lower temperatures or in shade etc.
Fuel system blocked	Clean the fuel system.

Reduced engine speed/power during use.

Possible Fault	Action
Blocked air filter	Perform an air filter service.
Carbon build-up in engine and/or entry to exhaust silencer	Remove the engine cylinder head and clean any carbon from the combustion chamber. For the exhaust silencer, remove it and clean any carbon deposits from the exhaust port.
Fuel system blocked	Clean the fuel system.

Generator runs, but connected devices are not receiving power.

Possible Fault	Action
Generator overloaded	Check if **Overload** indicator is illuminated (red). Stop the generator and disconnect all devices. Start the generator and check that **Overload** indicator is not lit and that the **Power** indicator is illuminated green. Connect a device and check that it is being powered properly, if not contact an authorized service centre.

Generator runs and AC outputs OK, but no DC output.

Possible Fault	Action
DC output over-current protection switch tripped	Reset DC over-current protection switch.

Specifications

Engine Type	4-stroke, single cylinder, diesel
Fuel Type	Commercial diesel, including blended types
Valve Clearance	Inlet: 0.08mm ± 0.10mm (0.003" ± 0.001") Exhaust: 0.1mm ± 0.12mm (0.004" ± 0.005")
Engine Oil Type	SAE 10W-30 automotive engine oil recommended for general use
Engine Oil Capacity	Approximately 1.1l (always check level)

Engine Service and Maintenance Record

Use the following tables as a record of machine servicing and maintenance. Keeping accurate records will help ensure longest machine service life and may simplify fault diagnosis and any possible warranty claims. Fill out date, number of hours of use and the activity performed, as required (see Maintenance Schedule).

Date	Hours Use	Maintenance Task / Notes

Some experts believe the incorrect or prolonged use of almost any product could cause serious injury or death. For information that may reduce your risk of serious injury or death, consult the points below and additionally, the information available at www.datastreamserver.com/safety

- Consult all documentation, packaging and product labelling before use. Note that some products feature online documentation which should be printed and kept with the product.
- Check product for loose / broken / damaged / missing parts, wear or leaks (if applicable) before each use. Never use a product with loose / broken / damaged / missing parts, wear or leaks (if applicable).
- Products must be inspected and serviced (if applicable) by a qualified specialist every 6 months assuming average residential use by a person of average weight and strength, above average technical aptitude, on a property matching average metropolitan specification. Intended use outside these guidelines could indicate the product is not suitable for intended use or may require more regular inspection or servicing.
- Ensure all possible users of the product have completed an industry recognized training course before being given access to the product.
- The product has been supplied by a general merchandise retailer that may not be familiar with your specific application or your description of the application. Be sure to attain third-party approval for your application from a qualified specialist before use regardless of prior assurances by the retailer or its representatives.
- This product is not intended for use where fail-safe operation is required. As with any product (take an automobile, aircraft, computer or ball point pen for example), there is always a small chance of technical issues that needs to be repaired or may require replacement of the product or a part. If the possibility of such failure and the associated time it takes to rectify could in any situation inconvenience the user, business or employee then the product is not suitable for your requirements. This product is not for use where incorrect operation or a failure of any kind, including but not limited to a condition requiring product return, replacement, service by a technician or replacement of parts could cause a financial loss, loss of employee time or an inconvenience requiring compensation.
- If this item has been purchased in error after considering the points above, simply contact the retailer directly for details of their returns policy, if required.

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