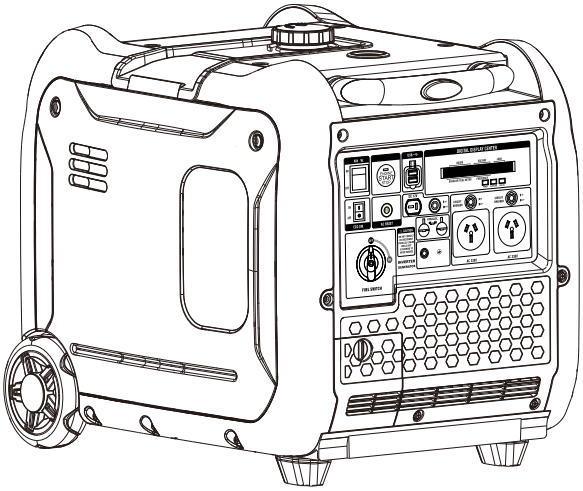
TUSK

Inverter Generator Series

AFTER SALES SERVICE MANUAL



Note: We are always trying to improve our products. Therefore, the final product may differ from the image shown.

- Safety
- Product Structure
- Technical Parameters
- Maintenance
- Troubleshooting
- Air Intake System
- Fuel System
- Ignition System
- Startup System
- Speed Regulation and Gas Distribution System
- Inverter
- Control Panel
- Exhaust System
- Cooling System
- Lubrication System
- Disassembly and Assembly

IMPORTANT TIP

Please read all safety precautions and instructions carefully before operating the equipment. Refer to the operating instructions for this engine. Before performing any maintenance or service, make sure the machine stop running and keep it level.

SECURITY

1. Strictly according to the power calibrated in the instruction manual for supporting, strictly prohibit overload operation.
2. Use the specified grade of gasoline and engine oil, and the oil should be fully settled and filtered clean before use. Refueling apparatus should be kept clean, and the oil should be replaced regularly.
3. Regularly check the tightness of the mounting, connection and the fastening bolts of the generator itself, and tighten them in time.
4. The inverter generator set produced is powered by an air-cooled gasoline engine. The debris and dirt on the air inlet, heat sink, wind cover and fan of the inverter should be removed in time to ensure the normal cooling of the engine.
5. The user should be familiar with the working principle and structure of the engine, understand how to emergency stop and the operation of all control components, and operate in strict accordance with the requirements of the operating instructions. Insist on regular maintenance, troubleshooting in time, prohibit the generator to run with disease.
6. When operating, please make sure that the generator is at least one meter away from buildings and other equipment, and maintain good ventilation. Do not place flammable items (such as gasoline, matches, etc.) next to the generator or near the running generator to avoid fire.
7. To add fuel in a well-ventilated place, when refueling the machine must stopped, in the generator to add fuel or fuel storage place can not smoke or open flame and sparks appear.
8. Do not fill the fuel tank with too much gasoline, and do not spill more fuel than the red mark on the screen of the fuel tank opening (do not exceed the maximum amount of fuel required by the manual). If there is fuel spill, must be thoroughly removed and wait for the spilled fuel to evaporate before starting the generator.
9. It is strictly forbidden to use the generator in a confined area or in a poorly ventilated area.
10. When the generator is running and for a period of time after shutdown, it is strictly forbidden to touch the muffler to avoid burns. It should be handled or stored after the generator has cooled down.

Generator Use Location

- The operation of generators in any confined space, or shed, including building, garage, basement, generator rooms for recreational vehicles, is prohibited
- Never place an SUV, camper, trailer, truck in the rear (regular side, flat or other configuration), under a building under a staircase, under a stairwell, next to a wall or building, or any other location that does not allow the generator to adequately cool or exhaust operate or start the generator in any location that does not allow the generator to cool sufficiently or the exhaust flow to drain properly. Do not operate or store the generator in wet weather conditions such as rain or snow.
- Do not operate or store the generator in wet weather conditions such as rain or snow. Using the generator in a humid environment generator may result in serious injury or death from electric shock or death.
- Generators must have a minimum of 1.5 m clearance from all combustible materials of clearance.
- The generator must also have at least 100 cm (3 ft) of airflow clearance to allow for adequate cooling, maintenance and service. Always place the generator in a well-ventilated in a well-ventilated area.
- Do not place the generator near an air intake or in a space where exhaust gases may be drawn in or in a confined environment. space or in a confined environment where it may be drawn in.
- When positioning the generator, be sure to carefully consider the wind and airflow.
- Always allow the generator to cool properly before transporting or storing properly cooled.
- Failure to follow proper safety precautions can result in personal injury, damage to the generator, and voids the manufacturer's warranty void.

Safety Signs and Warnings

⚠ **DANGER:** Indicates a potential hazard that, if not avoided, could result in death or serious injury to a person.

⚠ **WARNING:** Indicates a potential hazard that, if not avoided, could result in death or serious injury to a person.

⚠ **CAUTION:** Indicates a potential hazard that, if not avoided, could result in minor or moderate injury to persons.

ATTENTION: Used to warn of important information, but does not involve personal injury.

Safety Signs and Their Meaning:

The following symbols will appear in this manual and on the product. In order to use this product safely, please make sure to study and understand its meaning.

Explosive fuels can cause fires and severe burns.

Do not refuel while the engine is hot or running.

Gasoline is extremely flammable, and once ignited, its vapors will explode. Gasoline should be stored only in containers that are specified in a well-ventilated, unoccupied building, far away from sparks or flames. Spilled fuel that comes in contact with hot parts or ignite to create a spark, it may catch fire. Never use gasoline as a cleaning agent.

Rotating parts can cause serious injury.

Keep away when the engine is running.

Hands, feet, hair and clothing should be kept away from all moving parts to avoid injury. Do not operate the engine with the guard removed.

Carbon monoxide can cause severe nausea,fainting or death.

Avoid breathing exhaust fumes. Do not run the engine indoors or in run the engine in an enclosed space.

Engine exhaust gas contains toxic carbon monoxide. Monoxide carbon oxide is odorless and colorless, and if inhaled can cause death.

High temperature parts can cause serious burns.

Do not touch engine while operating or just after stopping.

Never operate engine with heat shields or guards removed.

Cleaning Solvents can cause severe injury or death.

Use only in well ventilated areas away from ignition sources.

Carburetor cleaners and solvents are extremely flammable. Follow cleaner manufacturer's warnings and instructions on its proper and safe use. Never use gasoline as a cleaning agent.

Accidental activation may result in serious injury or death.

Before servicing, disconnect the spark plug leads and ground.

Before servicing the engine or equipment, disable the engine as follows. Disable the engine: 1) Disconnect the spark plug leads. 2) Disconnect the battery cable.

Damaging Crankshaft and Flywheel can cause personal injury.

Using improper procedures can lead to broken fragments. Broken fragments could be thrown from engine. Always observe and use precautions and procedures when installing flywheel.

Electrical Shock can cause injury.

Do not touch wires while engine is running.

Ejected parts can cause serious injury. Wear safety goggles or face protection.

CATALOGUE

PRODUCT STRUCTURE

Understanding the names and functions of the generator components will help to better use and maintain the generator. The following are the exterior structure, main internal structure and names of the inverter generator series, and a detailed illustration of how to disassemble some parts that often require maintenance.

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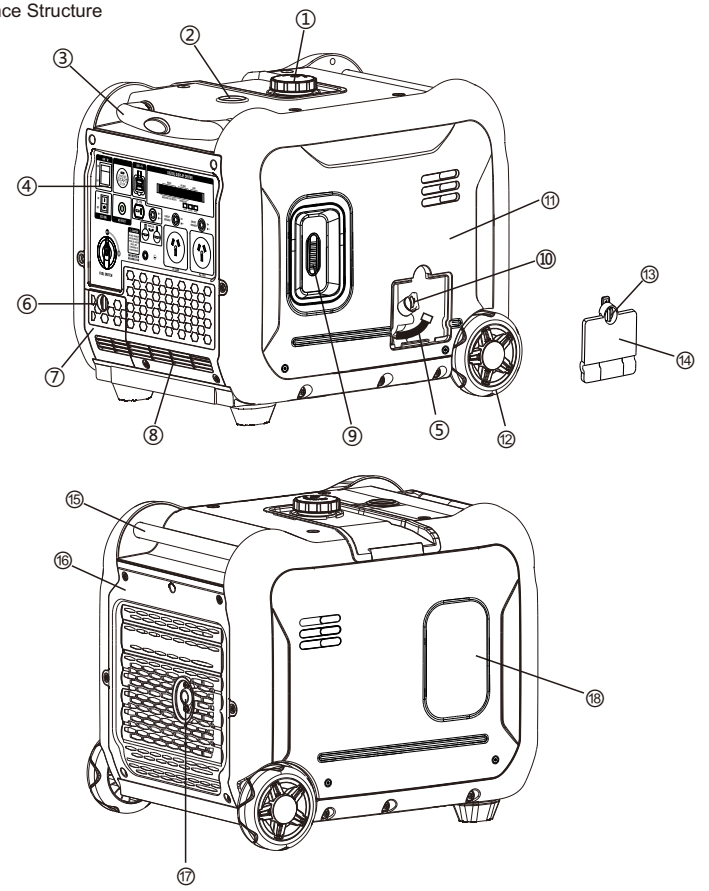
Medium Power Series

Trolley type medium power silent inverter generator

Appearance Structure



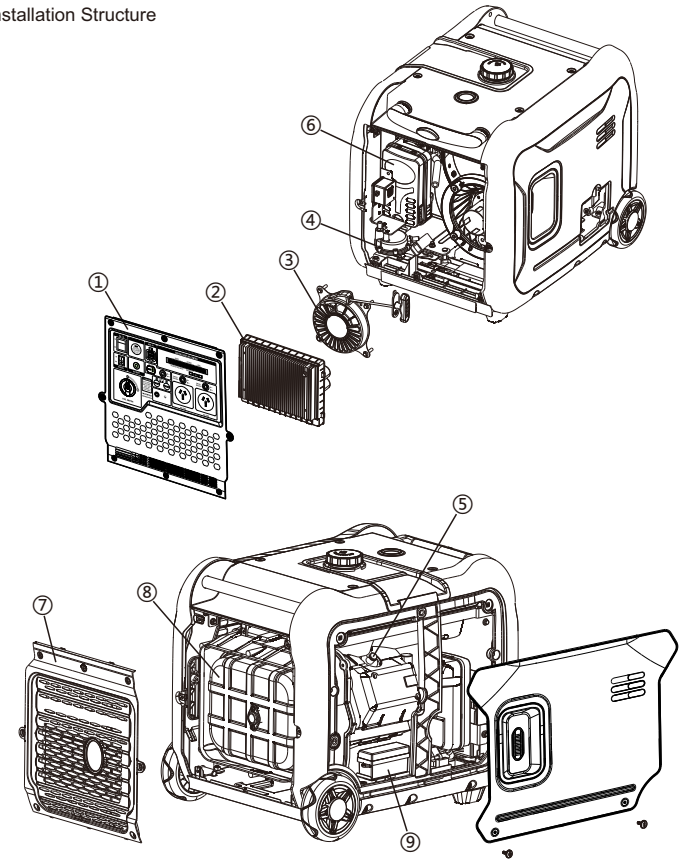
PRODUCT STRUCTURE

①	Fuel Tank Cover	②	Fuel Level Indication	③	Telescopic Tie Rod
④	Control Panel	⑤	Oil Drain Hose	⑥	Knob (Battery Maintenance Cover)
⑦	Battery Maintenance Cover	⑧	Air Inlet	⑨	Start Handle
⑩	Oil Dipstick	⑪	Right Exterior Cover Plate	⑫	Wheel
⑬	Knob (Oil Maintenance Cap)	⑭	Oil Maintenance Cap	⑮	Pushing Rod
⑯	Muffler Shield	⑰	Exhaust Air Outlet	⑱	Left Exterior Cover Plate

Fill with the right amount of oil before use, or replace the oil.

Connect the battery cable before starting.

Internal Installation Structure



①	Control Panel Base	②	Inverter	③	Starter
④	Secondary Pressure Regulator	⑤	Spark Plug	⑥	Air Filter
⑦	Muffler Outer Cover	⑧	Muffler	⑨	Battery

Open the base of the control panel and inspect and repair the inverter, CO alarm, LPG secondary pressure regulator, starter puller and muffler in order of installation as well as replace them.

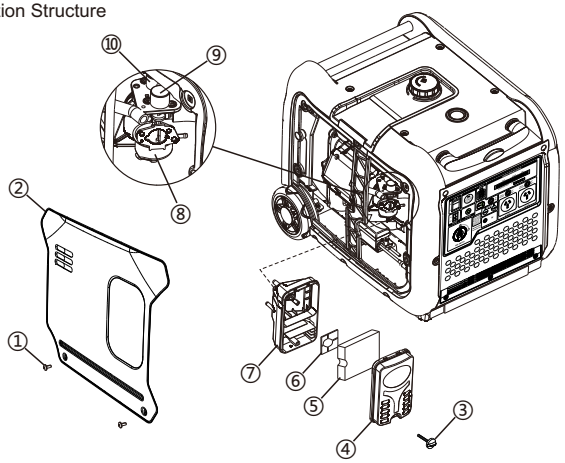
Check if the gas line is bent, bent or broken causing LPG starting or running failure.

Check the fuel line and stretch the bent, bent or broken fuel line straight or replace it to eliminate the fuel line problem.

Spark plugs are an important part of the generator and must be checked regularly.

Check if the battery is charged or charge the battery.

Internal Installation Structure



①	Bolt	②	Left Exterior Cover Plate	③	Air Filter Bolt
④	Air Filter Housing	⑤	Air Filter Cartridge	⑥	Cartridge Holder
⑦	Air Filter Base	⑧	Carburetor	⑨	Stepper Motor (Chokes)
⑩	Stepper Motor (Throttle)				

The air filter, carburetor, and stepper motor are inspected, repaired, and replaced in order of installation.

TECHNICAL PARAMETERS

1. Main models and product parameters

Series	Product Model	Rated Power (Fuel) kW	Max. Power (Fuel) kW	Rated Power Current A	Voltage V	Frequency Hz	Displacement cc	Net Weight kg
Classic Style	TG5500i	5.0	5.5	21.7	230	50	312	52

2. Load Equipment

Inverter generator sets are applicable to a wide range of scenarios, suitable for general lighting, industrial power, recreational facilities, as a portable power source in mountainous areas, pastoral areas, field trips, outings, RV, boats, but also for rescue and relief, emergency power, backup power and other scenarios.

Different types of equipment have different power factors, so not all equipment can reach the rated power of the generator, to choose the right generator according to the power factor of the equipment.

Load Type	Resistive	Inductive	Capacitive/Composite Type
Power Factor	1.0	0.4~0.75(Best 0.85)	0.4~0.75(Best 0.85)
Equipment	Iodine tungsten lamp, incandescent lamp, resistance furnace, oven, electric water heater, electric oven, disinfection cabinet, TV, hair dryer, etc.	Induction cooker, electric fan, washing machine, oil throat machine, electric motor, electric water pump, electric drill, air compressor, etc.	Appliances with capacitive parameters, such as computers, TV, air conditioners, freezers, refrigerators, etc.

Resistive Load: the load in the circuit is pure resistance or can be equated to pure resistance, this kind of load is called resistive load, this kind of load power and voltage, current is linear, such as 1kw generator can drive 1kw resistive load.

Inductive Load: Generally the load with inductive parameters is called inductive load. Generally with coil loads, such as electric machine, transformer. This kind of load starts with higher current, which is 3~7 times of the current in normal operation. Inverter generator sets will automatically increase the current and reduce the voltage to ensure optimal power when starting such equipment, but if the voltage is too low (current is too high), it will also cause the equipment to fail to start, which will seriously burn the generator and equipment. Therefore, this type of load or equipment should choose a generator with higher power.

Capacitive Load: Generally, a load with capacitive characteristic parameters is called a capacitive load. Capacitive loads are mainly composed of capacitors, which have capacitive characteristics and charge discharge properties. This type is responsible for starting characteristics similar to inductive loads.

Multi load usage. When a generator needs to use multiple devices, it is necessary to first calculate that the total power of the devices cannot exceed the rated power of the generator; Secondly, the type of equipment should consider the power factors of inductive and capacitive equipment; Then start the equipment in order of power, start the equipment with higher power first, wait for its stable operation, then start the equipment with lower power, and so on.

Stop the device. Stop the equipment with lower power first, and then stop the equipment with higher power to prevent the sudden increase in generator speed from causing voltage rise and burning down the electrical equipment. Stop the generator after all equipment has stopped.

3. Parallel Operation

When users purchase multiple generators, they can use a parallel kit to connect the generators to double the power for high power load equipment. Make sure both engine switches are in the off position before operating in parallel.

3.1. Use of Parallel Lines

It is recommended to use DINKING standard parallel wires. Connect the black and red parallel leads to the parallel port of the corresponding color on each inverter generator control panel. Do not connect two red leads or two black leads to the same generator. The ground wire on the parallel wire must be connected to the ground terminal on the control panel. If using idle mode, turn on both idle switches after the generator is started.

ATTENTION

If a high electrical load is connected, turn the idle speed (LOW IDLE) switch to the OFF position to reduce the voltage variation. voltage change. When the generator is running, make sure both green output lights are on. If they are not on, turn off the generator, restart the generator, and make sure both green output lights are on. If not, shut down the generator, restart the generator, and make sure both green output lights are on.

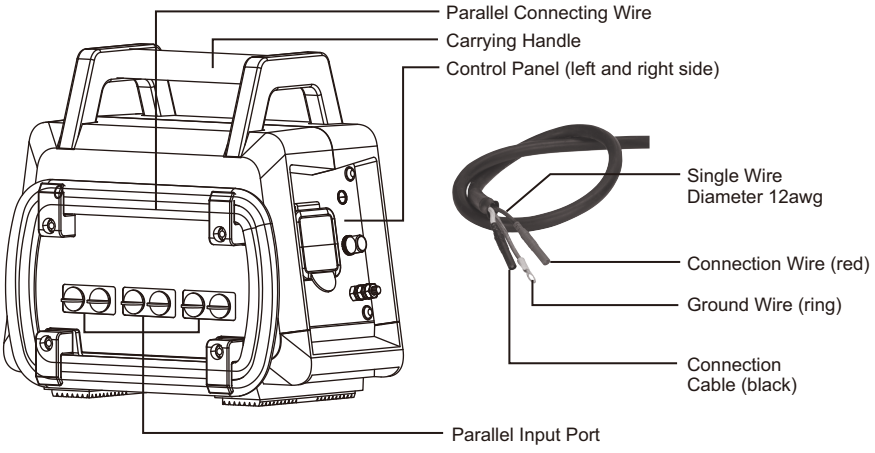
For safe and proper operation of the generator refer to the manual for the parallel line and generator.

3.2. Using the Parallel Kit

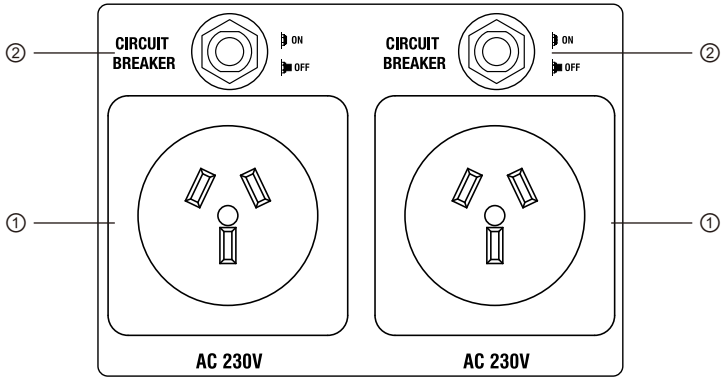
⚠ **WARNING:** Operating the generator may be dangerous if used improperly. Always refer to the instruction manual to ensure safe and proper operation of the generator.

DINKING special parallel kit for inverter generators is recommended.

Parallel Kit Structure:



Control Panel:



① **230-Volt, 50-Amp Receptacle:** This receptacle is capable of carrying up to 50A.

② **Circuit Breaker:** If the generator is overload, the circuit breaker will trip to block current.

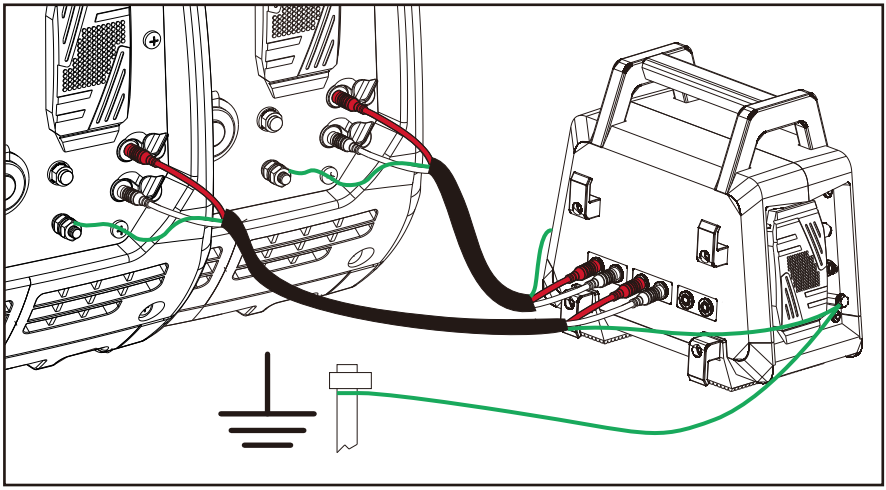
Operation Steps:

(1) Inspect the parallel kit and generator for damage, loose and missing parts prior to installation and start-up.

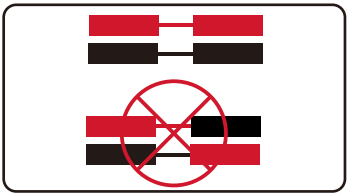
(2) Follow the steps in the generator manual to add fuel and oil to the generator.

(3) Connection cable:

1. Connect the connector (red) to the parallel port (red) on the generator and parallel kit.
2. Connect the connector (black) to the parallel port (black) on the generator and parallel kit.
3. Connect the ground wire (ring) to the ground terminal of the generator and parallel kit, and the ground bolt on the parallel kit to the ground screw with a ground wire. Insert the grounding screw into the ground.



Note: If the cable is not connected correctly, the generator will not output power.



Parallel Kit Troubleshooting

Problem	Possible Causes	Probable Solutions
Parallel Kit doesn't have power.	1. Device not plugged in properly. 2. Circuit Breaker tripped. 3. Parallel Kit needs service.	1. Turn off generator and check outlet connections for correct positioning. Restart generator. 2. Turn off and unplug Parallel Kit, reset Circuit Breaker, plug in Parallel Kit and turn on. 3. Have Parallel Kit repaired.
Overload indicator flashes.	Rated load capacity exceeded.	Lower the number of items plugged into the generator to stay within the rated capacity.

3.3. Parallel Connection and Use of Generators

Please connect the generator set with a special parallel cable or connect the generator to the parallel box with a special parallel cable.

ATTENTION

Parallel sockets are color-coded, so please plug the parallel cable into the parallel socket of the same color.

Make sure that the parallel cable is properly connected to the parallel socket. Start the generator set in sequence.

ATTENTION

Start the other generator set after the first one is running smoothly.

Once the parallel generator sets are started and the green light is on, they are ready to be connected to the electrical equipment for use.

ATTENTION

It is recommended that the total power output of the parallel-connected generator sets does not exceed 90% of the sum of the rated power of each generator set connected in parallel.

After successful parallel connection, the sockets on the generator set panel as well as the sockets on the parallel box can output power. Note that when the equipment is connected to the socket, make sure that the current of the power- using equipment will not exceed the maximum current of the socket, otherwise it will lead to thermal protection of the socket or even burn the socket.

3.4. Notes On Parallel Connection

- The voltage and frequency of the parallel generators must be the same.
- The output power of a parallel generator is not equal to the sum of the power of the two generators.
- When different power generators are connected in parallel, when the load power is higher, the generator with less power will overload protection and then disconnect the output, resulting in another generator also overload protection to disconnect the output, so in this case, when starting the equipment, first observe the generator with less power so that the overload light is not flashing (or always on) to ensure normal operation of the generator.
- Wire specifications must meet the requirements of the sum of the two generator current, otherwise it is easy to overheat resulting in wire burnout, short circuit, fire and other accidents.
- Selection of generator output sockets. According to the current specified in the equipment and load nameplate, select the corresponding socket on the generator panel. When the socket current cannot meet the equipment, multiple sockets on the generator panel can be used simultaneously to act as a shunt.
- Over-current use is strictly prohibited. Damage to electrical appliances and generators caused by improper use will be the responsibility of the user.
- Shutdown operation. Stop the equipment or load first, wait for the generator to run steadily, then turn off the generator, and finally remove the parallel cable or parallel box.

4. Usage Environment

The generator is recommended to be used at an altitude of less than 3281 foot (1,000m) above sea level, at a temperature of 77℉(25℃) and in a fresh air environment. Attention is required when using the following environments:

Low temperature environment

When the temperature is below 23℉(-5℃), the low temperature oil must be replaced to prevent the oil from freezing. Electricity in low temperature environment The effective capacity of the pool will drop, the number of electric starts will be significantly reduced, and it may not start. Very low temperature, the generator may not start, insufficient power, unstable operation, so if long-term use in low-temperature environment, please purchase a generator suitable for low-temperature environment;

High temperature environment

If the temperature exceeds 104℉(40℃), the heat loss of the generator increases, the output power will significantly decrease, and the cooling effect of the generator will decrease. Therefore, when using the generator in a high-temperature environment, the power should be appropriately reduced to ensure stable operation of the generator.

High altitude environment

The higher the altitude, the thinner the oxygen, the generator output power will be significantly reduced. Reduce the power of the equipment appropriately to ensure the generator runs smoothly (no black smoke from the muffler). If used at high altitude for a long time, purchase a generator or high altitude kit suitable for high altitude;

Wilderness, mining, construction site environment

Due to the dusty construction environment, it is easy to block the air filter and carburetor, which will seriously lead to engine cylinder pulling, piston locking, serious oil burning, etc. Use of generators in this environment, to frequently replace or clean the air filter element, often replace the oil;

- When using the generator, the air inlet of the generator must be kept clear, and the exhaust port of the generator must not face the wall, easy combustibles, etc., to prevent fire and poor exhaust;
- When using the generator, pay attention to water, rain and flammable materials. Strictly prohibit fire and smoke;
- The use of generators indoors and in poorly ventilated environments is prohibited. Generator exhaust contains CO, which can cause personal injury.

MAINTENANCE

Good maintenance and care is the best guarantee for safe, economical and zero-failure operation. It also helps the environment.

In order to keep your generator in good condition, you must have it checked and maintained regularly.

⚠ WARNING

When performing any maintenance:

1. Turn off the generator set first. The exhaust gas from the generator sets contains toxic carbon monoxide gas, which can cause shock or even death if inhaled.
2. Remove the spark plug cap. Prevent the generator set from starting accidentally and the rotating parts from causing personal injury.
3. Allow the generator set to cool sufficiently. Hot parts may cause burns.
4. Keep away from fire and sparks. Gasoline is flammable and can explode under certain conditions. Smoking, open flames or sparks are strictly prohibited at the operation site.
5. When you need to maintain or disassemble the engine, pour out the lubricant inside the machine first and put it in a proper container to prevent the lubricant from spilling out and causing environmental pollution during maintenance.
6. Gasoline should not be used as a cleaning agent.

ATTENTION

Please use the special parts of our company,LTD, If you use poor quality substitutes may lead to abnormalities in the function of the generator, and may also damage the generator.

1. Maintenance Interval Table

Item \ Maintenance cycle		Each	First in 1 month or 20 hours	Then every three months or every 50 hours	100 hours per year or use
Engine oil	Check-fill	√			
	Replace		√	√	
Gearbox gear Oil (if any)	Check oil	√			
	Replace		√	√	
Air cleaner element	Inspection	√			
	Clean		√		
	Replace			√	
Settling cup (if any)	Clean				√
Spark plug	Clean-adjust				√*
Spark eliminator	Clean			√	
Idle speed (if any)**	Check-adjust				√
Valve clearance**	Check-adjust				√

Fuel tank and fuel filter***	Clean				√
Fuel line	Inspection	Every two years (Please replace if necessary)			
Cylinder head, piston	Remove carbon deposit**	Displacement < 225cc, every 125 hours; displacement capacity ≥ 225cc, every 250 hours.			

* These items shall be replaced if necessary;
** These items shall be maintained by the dealer authorized by the Company, unless the user has proper tools and maintenance ability.

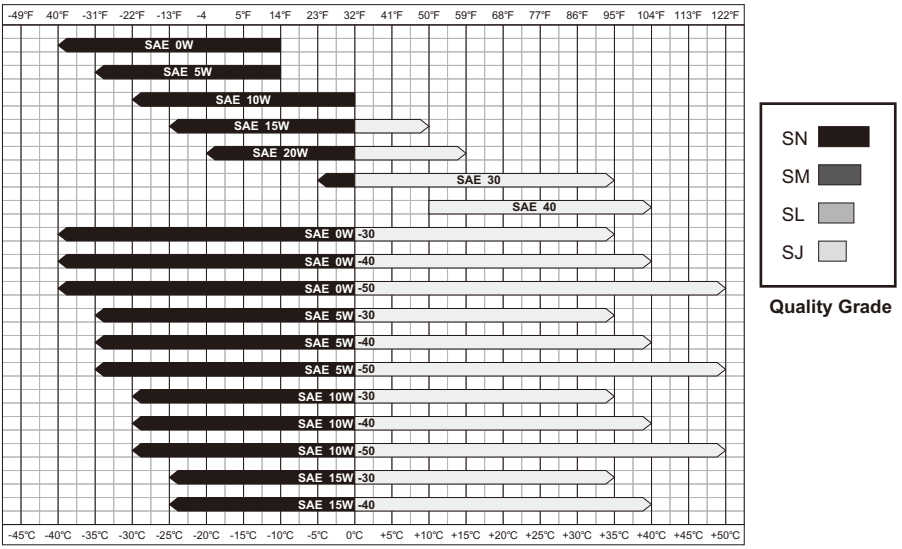
ATTENTION

- Oil should be changed every 25 hours if working at high temperatures or under high loads on a regular basis;
- If often working in dusty or harsh environments, the air filter element should be cleaned every 10 hours, and if necessary, replaced every 25 hours;
- The inspection cycle and time, should be the first to arrive for maintenance;
- If the maintenance cycle time has expired, the maintenance should be carried out as soon as possible according to the above table.

2. Lubricant Use Recommendations

The main role of lubricating oil is to lubricate the moving parts of the engine, make the moving parts cool and dissipate heat, clean, and also prevent rust and corrosion. The good or bad quality of oil and the way it is used not only affect the performance and service life of the engine, but also affect the service life of the oil. Therefore, the appropriate oil type should be selected according to the ambient temperature of the engine. At the lowest calibrated ambient temperature, the oil should have good fluidity and at the highest temperature, it should have proper kinematic viscosity, which is especially important for air-cooled engines.

The lubricant must be API (American Petroleum Institute) with a quality rating of SJ or better. Select the viscosity based on the actual ambient temperature as shown in the chart below.



3. Fuel Usage Recommendations

⚠ WARNING


The fuel and its vapors are extremely flammable and explosive and can cause burns, fires or explosions resulting in death or serious injury and/or property damage.

- Stay away from stoves, furnaces, water heaters, clothes dryers or other appliances with pilot lights or other ignition sources that could ignite fuel vapors.
- Store gasoline only in approved containers in well-ventilated, unoccupied buildings, away from sparks or flames. Spilled fuel may catch fire if it comes in contact with hot parts or ignites to create a spark. Never use gasoline as a cleaning agent.

The fuel must meet the following requirements:

- Clean, Fresh, Unleaded Gasoline.
- Octane number 87 (R+M)/2 or higher.
- Research octane number (RON) 93 is the minimum octane number.
- Gasoline can contain up to 10% alcohol and 90%.
- Do not add motor oil to the gasoline.
- Do not fill the oil tank with oil.
- Do not use gasoline that is more than 30 days old.

4. Oil and Fuel Volume

Product Model	Oil Volume L	Fuel Tank Volume L
TG5500I	0.8	13.5

Note: We are always trying to improve our products. Therefore, the final parameters may differ from the listed data. For standard data, please refer to the instruction manual that came with the generator.

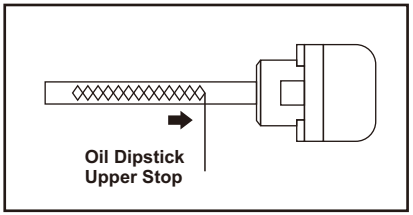
5. Maintenance of Generators

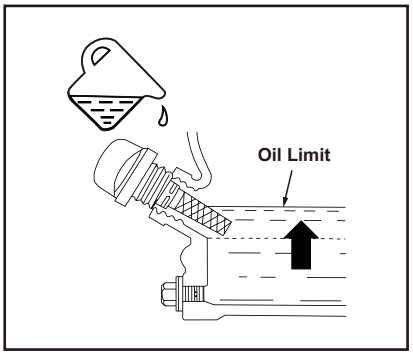
5.1. Oil Change

1. Place the generator on a level surface and run it for a few minutes to raise its temperature, then turn it off;
2. Opening the oil window cover;
3. Unscrewing the oil dipstick;
4. Place the oil basin under the generator, tilt the generator and quickly pour the oil out;
5. Return the generator to a level surface;

Note: When filling the oil, please do not make the generator frequency tilt, to prevent adding too much oil to damage the power.

6. Refill the oil to the proper level (no more than the uppermost mesh of the dipstick);





Recommended Motor Oil: SAE 10W-30

Oil Grade: API standard SJ type or higher

7. Tighten the oil dipstick and cover the oil window flap.

Tip: For detailed operating procedures, please refer to the instruction manual that came with the generator you purchased.

5.2. Air Filter Maintenance

The role of the air filter is to block the larger particles, filter the dust in the air, to prevent dust from entering the combustible mixture, into the combustion chamber, resulting in piston ring seizure, eventually causing oil consumption, engine pull cylinder, crankshaft rod mechanism seizure and other irreversible consequences. Therefore, maintain good habits, often check, clean or replace the air filter element, can effectively improve the service life of the engine, and make the engine in a good working environment.

The maintenance of the air filter is mainly cleaning or replacing the cartridge. According to the material of the cartridge, choose the maintenance method reasonably.

1. Foam (sponge) cartridge, generally cleaned directly. If the cartridge is damaged, or not cleaned, directly replaced.
2. Paper cartridge, direct replacement. In general, the paper cartridge cannot be cleaned. After the cartridge is soaked, the air cannot pass effectively, which will lead to the engine not starting, or running with a lot of black smoke and unstable operation.
3. The maintenance steps for the foam (sponge) cartridge are as follows:

① Remove the air filter service cover (or generator housing);

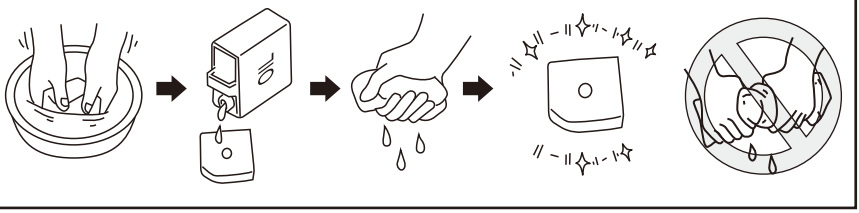
② Remove the air filter cover and take out the filter element;

③ Clean the cartridge with detergent and blow dry or air dry, after ensuring the cartridge is dry, drop in a little oil (about 5ml) and knead it evenly (the main purpose is that the oil can adhere to the dust or particles in the air so that they do not enter the combustion chamber), do not twist the filter element to avoid damage;

④ Put back the filter element and air filter cover;

⑤ Put back the air filter service cover (or generator housing).

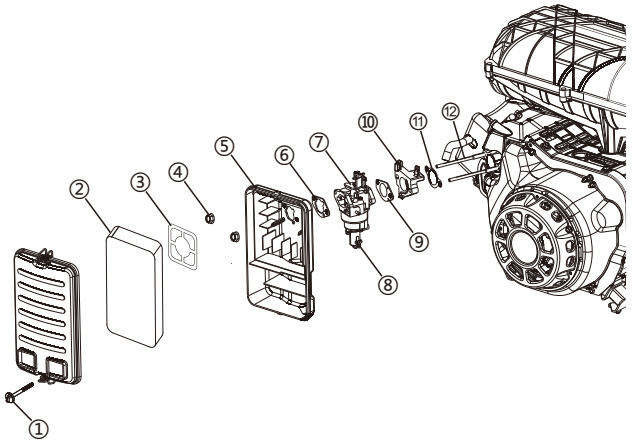
Tip: For detailed operating procedures, please refer to the instruction manual that came with the generator you purchased.



5.3. Carburetor Maintenance

The role of the carburetor is to atomize gasoline and mix it with air to form a combustible mixture, which is fed into the engine combustion chamber for combustion, generating heat and eventually transferring kinetic energy outward through the crankshaft.

The engine is a self-priming gasoline engine, and the condition of the carburetor determines the performance and exhaust emissions of the engine. Therefore, the use and maintenance of the carburetor is particularly important. Before maintaining the carburetor, disassemble or assemble the carburetor according to the following steps. (See the product structure breakdown for the location of the carburetor on each model.

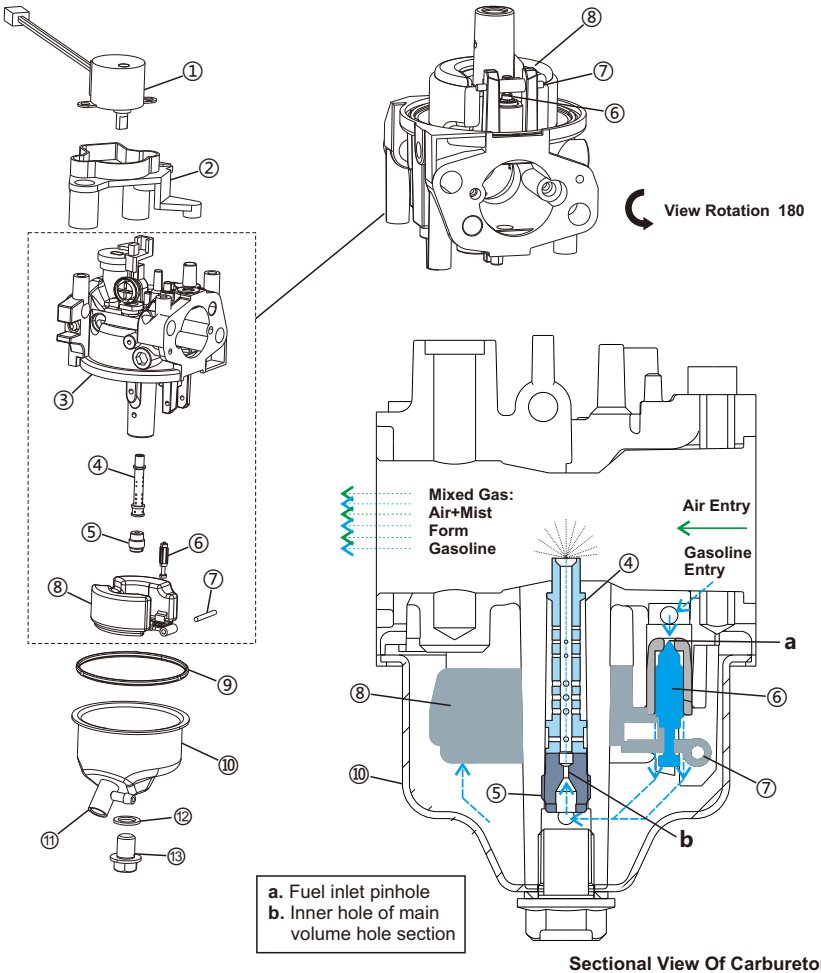


①	Air Filter Bolt	②	Air Filter Cartridge	③	Cartridge Holder
④	Nut	⑤	Air Filter Base	⑥	Air Filter Gasket
⑦	Carburetor	⑧	Solenoid Valve	⑨	Carburetor Gasket
⑩	Carburetor Connection Block	⑪	Air Inlet Gasket	⑫	Carburetor Mounting Bracket

ATTENTION

- Ensure that the carburetor gasket, air filter gasket and air inlet gasket are intact and clean;
- When assembling, carburetor, air filter and each gasket fit tightly;
- It is prohibited to start and run the engine without installing the air filter.

Carburetor Structure Decomposition



Sectional View Of Carburetor

①	Throttle Stepper Motor (Optional)	②	Stepper Motor Mount	③	Carburetor Body
④	Main Nozzle	⑤	Main Measuring Hole	⑥	Fuel Inlet Needle
⑦	Float Pins	⑧	Float	⑨	Oil Cup Seals
⑩	Oil Cup	⑪	Oil Drain Bolt	⑫	Gasket
⑬	Oil Cup Fastening Bolt				

Cleaning Carburetors:

1. Remove the carburetor oil cup, clean the oil on the inner surface of the oil cup, and pay attention to the preservation of the rubber seal between the oil cup and the carburetor body, which cannot be lost;
2. Remove the float, clean the oil on the surface of the float, check the fuel inlet needle and the spring for impurities, and keep it properly and not lose it;
3. Remove the main volume hole and the main nozzle, check whether the inner hole of the main volume hole and the main nozzle hole are blocked by impurities, and check whether the fuel inlet pinhole is blocked by impurities;
4. Cleaning the parts with cleaning agents and drying them or blowing them dry; 5. Assembly of the main volume orifice, main jet, float and fuel inlet needle;
6. Put back the oil cup, pay attention to the rubber seal can not be missed, otherwise it will leak oil.

Note: The fuel inlet pin hole (a) and the main volume hole (b) are the two places where the carburetor is most likely to be clogged. (See carburetor structure breakdown diagram)

(For details, see Chapter 16, Disassembly and Assembly, "Cleaning the Carburetor")

Carburetor Working Principle:

- Gasoline enters the carburetor, passes through the fuel inlet needle and flows into the internal space of the fuel cup. If the engine is not working at this time, when the gasoline fills up, the float floats up and drives the fuel inlet needle to move upward to block the inlet and stop the gasoline from continuing to flow in;
- When the engine is working, the gasoline in the oil cup is sucked into the main volume hole and the main nozzle by the suction force formed by the engine piston movement, forming a mist of fine particles in the main nozzle hole and mixing with the air to form a combustible mixture;
- The combustible mixture enters the engine combustion chamber and is ignited by the electric arc generated by the spark plug, which pushes the piston to work.
- The fuel inlet pinhole (a) and the inner hole of the main volume hole (b) are the most likely places for the carburetor to clog.

When position **a** is blocked by impurities, gasoline cannot be cut off effectively and will keep flowing into the carburetor oil cup and then out of the carburetor. Therefore, this area should be checked when the carburetor is leaking.

When position **b** is blocked by impurities, gasoline cannot flow into the main jet pipe to atomize and enter the combustion chamber, which will cause the engine to fail to start.

Causes Of Carburetor Blockage:

a. The gasoline is not clean and has impurities.

b. Impurities generated inside the oil pipe and screen.

c. Machines that have been stored for a long time. Oil scale and oil skin from gasoline deterioration and gasoline precipitation.

d. Machines that have been stored for a long time. Moisture inside the gasoline is deposited in the oil cup, causing the engine not to start. Loosen the oil opening bolt to drain this spoiled gasoline.

e. Ethanol gasoline. Particulate matter formed by corrosion on carburetors when ethanol content is high.

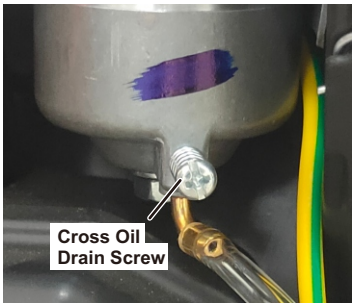
When the generator is not used for a long time, store it according to the maintenance specification process. When used again, clean the carburetor and replace with fresh gasoline.

f. When the main measuring hole, main nozzle and fuel inlet pinhole are blocked, remove them and blow them clean with an air gun.

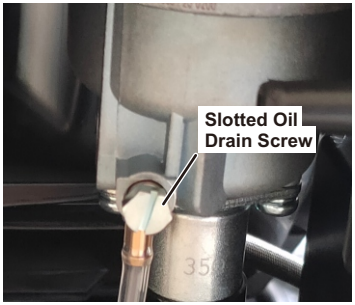
g. Do not use sharp objects to enlarge the bore of the main nozzle without permission, otherwise it will cause increased gasoline consumption.

Carburetor Oil Drain Bolt

There is a drain bolt at the bottom of the carburetor to drain the gasoline from the carburetor oil cup. Common types of carburetor drain bolts:



Type	Cross Drain Screw
Common Models	1kW-6kW low power models

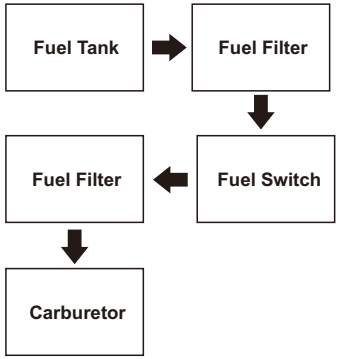


Type	Slotted Oil Drain Screw
Common Models	7kW-9kW high power models

5.4. Replace Fuel Filter

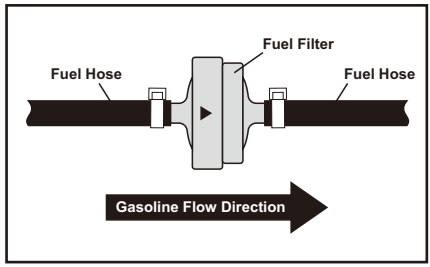
The role of the fuel filter: filter the larger impurities and particles in the gasoline. Prevent it from flowing into the control switch, carburetor and other parts, leading to blockage of the oil circuit and the engine not starting.

When replacing the fuel filter, pay attention to the " ▶ " mark on the filter housing, which indicates the direction of gasoline flow. The direction of gasoline flow in the engine and the installation position of the fuel filter are as follows:



Tip:

Depending on the product, some models may not have a fuel filter, or only a certain oil section may have a fuel filter.



Fuel Filter Structure Schematic

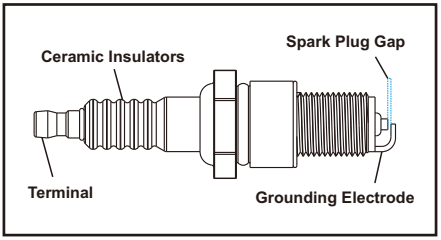
5.5. Spark Plug Maintenance

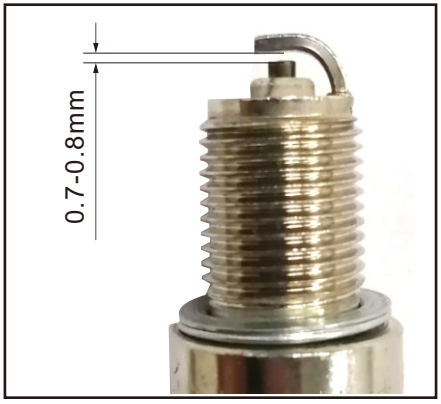
Spark plug is an important component of the ignition system of gasoline engines, its role is to send a high-voltage wire (ignition coil) to the pulse of high-voltage discharge, penetrating the air between the two electrodes of the spark plug, producing an electric spark to ignite the combustible mixture of gas in the cylinder. The ignition energy of the spark plug directly affects the combustion rate of the combustible mixture in the cylinder, thus affecting the performance of the engine. The maintenance of spark plugs, a total of the following points.

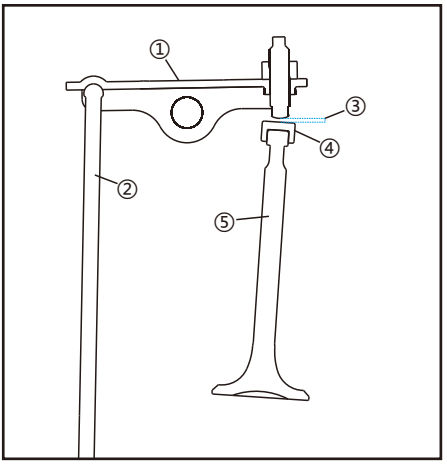
1. Check the spark plug electrode for carbon build-up and clean it.
2. Check the gap between the spark plug electrodes and adjust it.

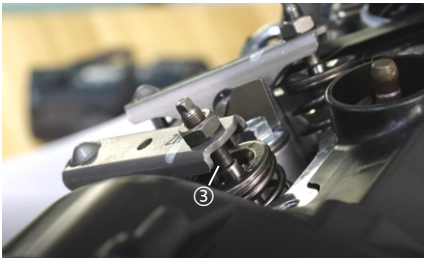
3. Replace the spark plug with a new one. If the spark plug ceramic insulator is broken, the electrode is fractured, or it is impossible to clean or repair, directly replace the spark plug with a new one. (For detailed procedures, see Chapter 16, Disassembly and Assembly, " Replacing Spark Plugs")

Standard Spark Plug Gap: 0.7~0.8mm









①	Rocker Arm	②	Pusher
③	Valve Clearance	④	Top Cap
⑤	Valve		

5.6. Valve Rocker Arm System Inspection

Valve clearance is the clearance between the end face of the valve stem and the rocker arm.

Valve clearance position:

The valve will expand and deform when it is subjected to high temperature in the combustion chamber, and the thermal expansion will cause the valve to be directly held by the rocker arm (no clearance), resulting in poor valve closure and air leakage, which will cause the engine power to drop and the temperature to rise, and will cause the engine to backfire and damage the carburetor and air filter. The engine will not start.

If the valve clearance is too large, the cylinder pressure is too large when the piston stops, the engine start will cause the pull rope rebound, start resistance, etc., affecting the start. Seriously, it will produce a large sound (noise), and the valve

opening will be reduced, the intake and exhaust is not smooth, the combustion is not sufficient, exhaust is not complete, the engine temperature rises, power decreases, the muffler black smoke, spark plug carbon, the engine running instability.

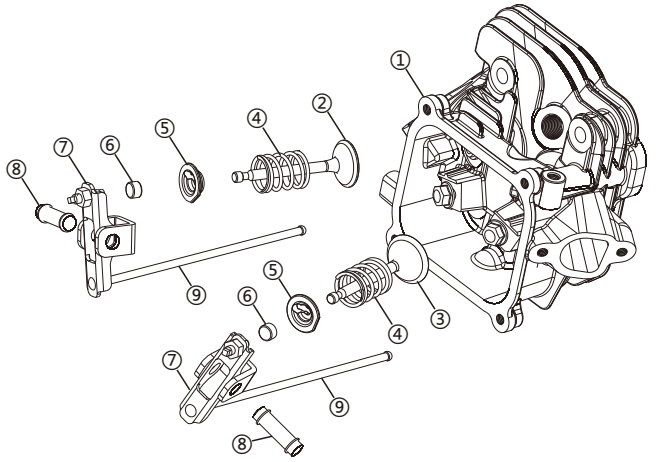
Therefore, it is necessary to check and correct the valve clearance during engine maintenance. It is recommended to check it every 12 months or 300 hours (please use the professional tool "Feeler"), or when there is an obvious noise.

(For the adjustment method of valve clearance, please refer to Chapter 9 "Valve Clearance Adjustment Method" for speed regulation and valve distribution system)

Valve clearance of the engine:

Model	Intake Valve Clearance	Exhaust Valve Clearance
TG1200I~TG3500I (silent and open frame)	0.03mm~0.08mm	0.03mm~0.08mm
TG5500I~TG10500I (silent and open frame)	0.10mm~0.15mm	0.15mm~0.20mm

Valve structure of the engine:



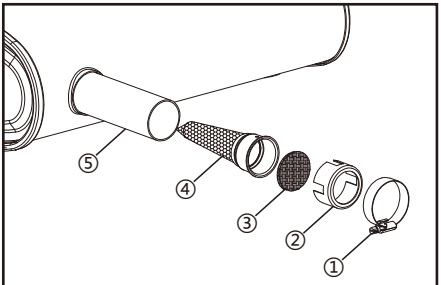
①	Cylinder Head	②	Exhaust Valve	③	Intake Valve
④	Valve Spring	⑤	Valve Spring Seat	⑥	Top Cap
⑦	Rocker Arm Assembly	⑧	Rocker Pin	⑨	Pusher

5.7. Muffler Carbon Cleaning

After the engine runs for a long time, the exhaust port of the muffler will produce carbon blocking the exhaust port, resulting in incomplete exhaust, higher engine temperature and lower power. If you don't clean the carbon in the exhaust port for a long time, it will cause black smoke from the muffler and the engine will run unstably.

Judgment of muffler exhaust port carbon accumulation:

Directly observe the net cake at the exhaust port of the muffler, if there is a layer on top of the net cake, a black substance indicates that the mesh is clogged, and then the carbon must be cleaned.



①	Hoop	②	Bracket
③	Screen	④	Spark Arrestor
⑤	Muffler		

CAUTION

After the engine is running, the engine and muffler will become very hot, please do not touch the engine or muffler immediately. Be careful not to let your skin and clothing touch the engine and muffler directly during the inspection and repair. Allow the engine to cool before servicing.

6. Handling and Storage

⚠ WARNING

- To avoid combustion or fire caused by contact with hot engine parts, the engine must be allowed to cool before packaging and storage.
- When handling the inverter generator, move the Fuel Switch to the OFF position. Keep the generator level to prevent fuel from spilling. Fuel volatilization or spillage may cause a fire.

Preparations to be made for long term storage of generators:

Some custodial measures for generators according to the correct method and cycle can prevent aging, reduce failure, lower fuel consumption rate, reduce emission pollution, extend the life of the whole machine and improve the reliability of work.

		Recommended Storage Solutions
Storage Time	Less than two months	Turn off the Fuel Switch.
	Two months to one year	1. Turn off the oil switch and add a small amount of fresh gasoline to the fuel tank. 2. Drain the gasoline from the carburetor cup: ① Place an oil basin under the engine. ② Loosen the drain bolt and drain the fuel from the carburetor.

		Recommended Storage Solutions
Storage Time	Two months to one year	③ Tighten the oil drain bolt. 3. Replace the lubricant with a new one. **Tip:** From an environmental point of view, please dispose of used gasoline (or motor oil) generated after use properly. We strongly recommend that you: put used gasoline (or oil) in a sealed container and take it to your local service station or used oil recycling center. **Remember:** Do not throw it in the garbage or dump it on the ground or in the gutter.
	More than one year	1. Add a small amount of fresh gasoline to the fuel tank, run the machine for 2-3 minutes, and turn off the engine; 2. Turn off the oil switch and drain the gasoline from the carburetor cup; 3. When the machine is hot, replace it with fresh lubricating oil; 4. Remove the spark plug, add about 0.0013-0.0026Us gallon (5-10ml) of new engine oil to the cylinder, reinstall the spark plug, slowly pull the start handle, turn the engine two times, and then stop when there is resistance (let the intake and exhaust valves close), which helps to prevent internal corrosion of the engine; 5. Disconnect the negative (-) cable of the battery; 6. Place the machine in a clean and dry place.
Battery Storage Measures		The electric starter generator should have the battery removed and charged. Store it in a dry place and charge it once a month. Do not store the battery in a place that is too hot or too cold (above 86℉(30°C) or below 32℉(0°C)).
First Use After Long Term Storage		1. Replace with new fuel and engine oil; 2. Turn on the Fuel Switch, loosen the carburetor drain bolt until clean gasoline flows out, and tighten the drain bolt; 3. Remove the spark plug, check the corrosion of the spark plug electrode, and clean or replace the spark plug; 4. Slowly pull the start handle to confirm that the engine can rotate flexibly; 5. Connect the positive and negative battery cables; 6. Start the generator normally. If the battery level is low, electric starting will not be successful. If the generator is manually started, it will automatically charge the battery when running.

⚠ WARNING

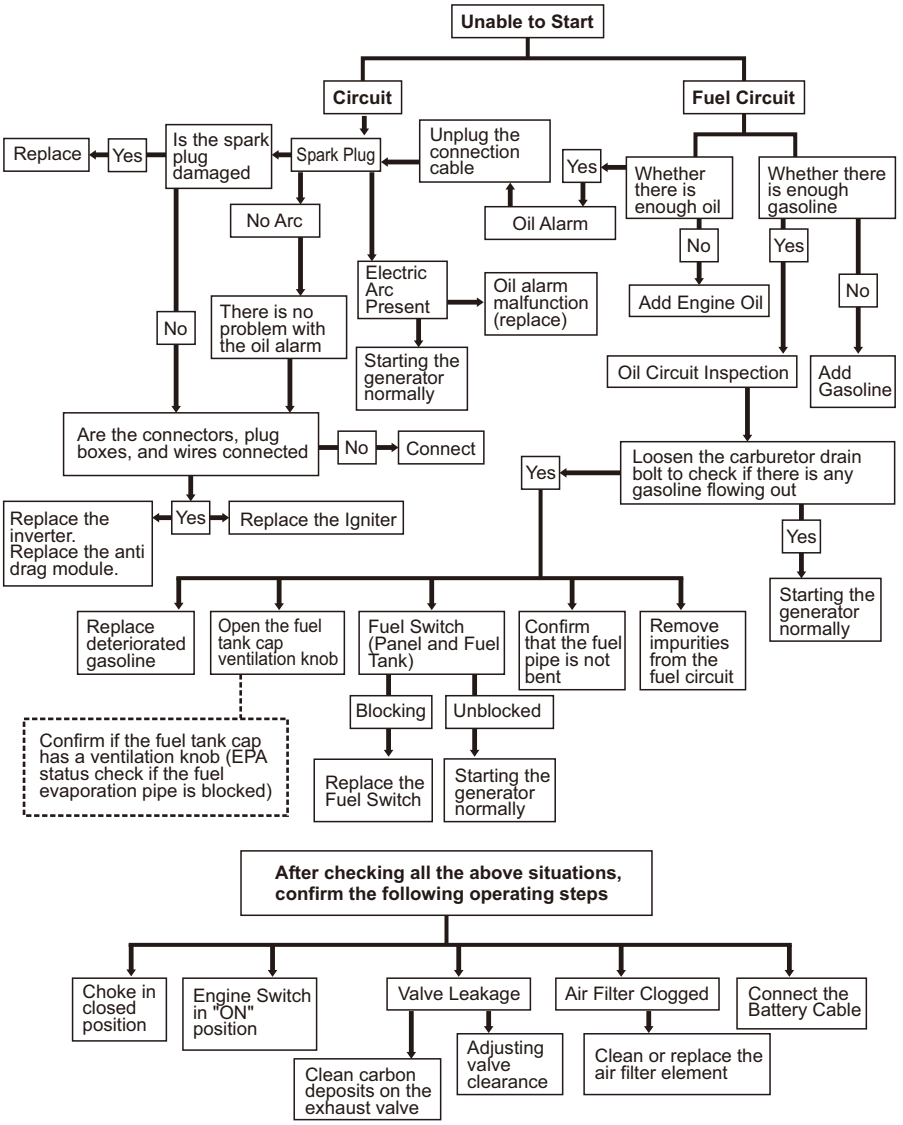
Gasoline is flammable and can explode under certain conditions. Smoking, open flames or sparks are strictly prohibited at the operation site.

TROUBLESHOOTING

1. Unable to Start and Difficult to Start (Gasoline)

The main reason for the generator not starting properly is the fuel circuit or circuit failure.

Troubleshooting flow chart for failure to start and difficult start:



The above flowchart mainly focuses on the basic troubleshooting of generator startup faults. If the problem is not resolved, please refer to the troubleshooting plan in the table below for a detailed inspection.

Generator Condition	Inspection Items	Possible Causes and Troubleshooting Steps	Solution
New	Check the engine oil system	The engine oil should be kept between the scales "L" and "H" on the dipstick (or the middle section of the mesh pattern), as close as possible to "H", indicating that it is qualified; If it is lower than "L", it indicates that the engine oil is insufficient and needs to be increased; If it is higher than "H", it indicates that there is too much oil. When the machine is running, there may be faults such as blue smoke from the muffler and high machine temperature, and an appropriate amount of oil needs to be discharged.	Check the oil level.
		The “low oil" warning lamp lights up yellow when starting, indicating that there is not enough oil.	Add the right amount of oil.
		There is enough oil. Unplug the oil alarm connection and try to start it. This step is used to rule out the possibility of a bad alarm. It can start, the alarm is damaged. Shake the generator a few times and connect the wiring harness, if the generator runs normally, there is no problem.	If it still cannot start, please replace the oil alarm.
	Check the fuel circuit	Check that the ventilation knob above the fuel tank cover is in the “ON” position.	Turn the knob to “ON”.
		Is the Fuel Switch in the "ON" position.	Turn on the Fuel Switch.
		Loosen the drain bolt of the carburetor and check if there is any gasoline flowing out. (After inspection, tighten the oil drain bolt) If not, it indicates that the gasoline in the fuel tank has not flowed into the carburetor. It is necessary to check whether the oil pipe from the fuel tank outlet to the fuel switch, the fuel switch itself, and the oil pipe from the fuel switch to the carburetor are blocked, and whether the carburetor is blocked. 1. The oil pipe is bent or blocked. 2. The fuel switch is damaged.	1. Replace the fuel pipe. 2. Replace the fuel switch.
		Open the exterior cover and check that the fuel switch under the fuel tank is open.(DK9000i only)	Turn on the Fuel Switch.
	Check the circuit system	Spark plug inspection. 1. The spark plug gap is greater than or less than 0.7~0.8mm. 2. The ceramic insulator of the spark plug is damaged. 3. Remove the spark plug and insert the terminal onto the spark plug cap, with the grounding electrode close to the metal part of the generator, and then start the generator without any electrical sparks. (The correct electric spark should be a strong blue arc.) 4. Unplug the connection wire of the oil alarm, start the generator, and the spark plug has electric sparks.	1. Adjust the spark plug gap. 2. Replace the spark plug. 3. Continue to check backwards. 4. Replace the oil alarm.

Generator Condition	Inspection Items	Possible Causes and Troubleshooting Steps	Solution
New	Check the circuit system	Igniter or ignition circuit. 1. The connector plug of the igniter is loose or detached. 2. The spark plug cap comes off. 3. The gap between the trigger and the flywheel is greater or less than 0.3~0.5mm. 4. The trigger connection wire has fallen off. 5. Igniter (or ignition coil) malfunction. 6. The anti drag module is faulty. 7. Inverter failure.	1. Connect the line plug. 2. Insert the spark plug cap. 3. Adjust the gap to 0.3~0.5mm. 4. Reconnect the wiring harness. 5. Replace the igniter. 6. Replace the anti drag module. 7. Replace the inverter.
	There is engine oil, gasoline, and spark plugs with electric sparks	Confirm that the start switch is in the "START" position. (or confirm that the choke is closed)	If it cannot be started, switch the switch to the "ON" or "RUN" position and start again. Repeatedly switching gears to try starting.(Or repeatedly open/close the choke valve)
		Clean the main measuring hole of the carburetor and restart it.	If it cannot start, replace the carburetor.
		Stepper motor check. When remote control or one-click start, check whether the stepper motor shaft rotates. 1. No rotation. The connection wire of the stepper motor may fall off. 2. No rotation. If the stepper motor harness does not fall off, the stepper motor is faulty.	1. Connect the wiring harness. 2. Replace the stepper motor.
	Electric start, remote start, engine running but unable to start. (After troubleshooting the above faults)	Check if the temperature sensor below the cylinder head is detached or broken. 1. The temperature sensor is detached. 2. The temperature sensor is broken.	1. Connect the temperature sensor plug. 2. Replace the temperature sensor.
		Starting motor idling and slipping. Repeatedly start 3-5 times, with a start interval of no less than 10 seconds and a start time of no more than 5 seconds.	If it can start, then there is no problem. If it cannot start, replace the starting motor.
		The starter motor turns weakly. Check the battery voltage and make sure it cannot be lower than 12V.	The voltage is low, replace the battery. Or charge the battery.
		Pull the rope by hand (at a slow speed), usually there will be a noticeable resistance every two revolutions of the machine. If there is no obvious resistance, check the valve clearance. If there is no clearance, the valve may have air leakage.	Adjust the valve clearance. (See "Valve Clearance Adjustment Method")
	Difficult hand pull start, rebound	Hand pulling resistance is very high, will rebound, and cannot be pulled. Check that the valve clearance may be greater than the standard clearance, and at this point, manual starting will rebound, making it difficult to start.	Adjust the valve clearance. (See "Valve Clearance Adjustment Method")

Generator Condition	Inspection Items	Possible Causes and Troubleshooting Steps	Solution
New	Difficult hand pull start, rebound	The pulling rope does not spring back or jam. Or pulling the rope without any resistance. The starter is damaged.	Replacing the starter.
New/ Old	There is no problem with manual starting, electric starting and remote control cannot start, but they can turn off the engine	Check if the battery cable is connected. There is no battery cable connected, and the remote control module and electric starter assembly are not energized, so it cannot be started. After a successful hand-pull start, the generator supplies power to the module, so you can use the remote control to turn off the engine.	Connect the battery cable.
		Check the generator battery voltage. Make sure the battery voltage cannot be lower than 12V.	The voltage is low, replace the battery, or charge the battery.
		Check if the remote control match is unsuccessful.	Matching is not successful, replace the remote control and match again.
Old	The engine is stuck and cannot be pulled	When the machine is stored for a long time, it may be upside down, causing oil to enter the combustion chamber and cannot be pulled by hand.	Remove the spark plug, pull the machine, and drain the oil from the combustion chamber. Confirm that the engine oil in the combustion chamber has been completely drained, install the spark plug, and manually pull the pull rope again to confirm that it can be pulled. **Attention: Do not stand in the direction of the spark plug (cylinder head) to avoid oil spraying onto people, which may cause danger.**
		Foreign objects enter the combustion chamber, and when the piston reaches the top dead center, it becomes stuck and cannot be pulled. Open the cylinder head for inspection. (Professional operation)	Send to repair station.
		Foreign objects inside the flywheel are stuck. Open the flywheel for inspection. (Professional operation)	Send to repair station.
	Fuel circuit inspection	Prolonged storage, gasoline deterioration, precipitation, resulting in clogging of gasoline fuel circuit. Line up the fuel circuit.	Check the fuel circuit and follow the previous steps. Clean or replace the carburetor, fuel tank, and fuel switch.
		Fresh gasoline has been added to the tank, but there is still spoiled gasoline in the carburetor fuel cup.	Loosen the fuel drain bolt and drain the stale gasoline from the carburetor fuel cup. Turn on the fuel switch to let fresh gasoline flow in the tank for 2~3 seconds.
		Clogged carburetor main volume hole, as well as the accumulation of fuel scale in the fuel cup.	Clean the carburetor. (See "Cleaning the carburetor")

Generator Condition	Inspection Items	Possible Causes and Troubleshooting Steps	Solution
Old	Check the Engine Oil System	Follow the steps in the previous "Engine Oil System Check" to troubleshoot.	
	Check the circuit system	Follow the previous "Circuit System Check" steps to troubleshoot.	
New/ Old	Check the air filter	Check the air filter element for blockage by dust, oil or other foreign objects and poor air intake.	Clean or replace the air filter element.
		Check if the air inlet of the air filter is blocked.	Clear the air filter inlet blockage or replace the air filter.
	Just finished using the shutdown and failed to start again	After shutdown, the internal temperature of the machine is high. 1. High temperature may cause temporary failure of internal electronic components. 2. High temperature causes gasoline to boil in the carburetor, fuel pipe, and fuel tank, preventing it from flowing smoothly into the carburetor. And the air filter element is blocked by gasoline.	1. Cool down for a period of time and try to start the machine again. 2. Cool down for a period of time and dry the air filter element before attempting to start the machine again.
	Check the valve rocker arm system	The rocker arm is broken and the valve is detached, causing the valve to not open.	Replace damaged components (see "Valve Clearance Rocker Arm System")

2. Unable to Turn Off the Engine

When the machine cannot shut down, it must be forced to shut down first before troubleshooting.

In general, the flameout wire (connected to the engine metal substrate) falls off or breaks, and the ignition wire does not form a current circuit with the engine metal substrate, resulting in the inability to flameout.

1. Turn off the fuel switch, and the gasoline in the carburetor will automatically turn off after burning.

2. In emergency situations, directly remove the spark plug cap and turn off the engine.

Attention: Insulated gloves should be worn and it is prohibited to touch the metal parts of the generator to prevent electric shock hazards.

3. Close the choke valve to reduce the generator speed (such as in abnormal situations such as speeding), and then operate according to Method 1 or Method 2.

Screening Items	Possible Causes and Troubleshooting Steps	Solution
Engine Switch	Check if the internal connection wire of the flameout switch is broken, detached, or has poor contact.	Connect the wires.
	Check if the switch handle is slipping and idling, making the switch itself not rotating.	Replace the handle.
	Damaged engine switch.	Replace the switch.

Flame Out Line	Check the connection lines from the ignition switch to the high-voltage package, inverter, igniter, anti drag module, and engine substrate to ensure they are not detached, broken, or unstable.	Reconnect the line.
Inverter or Ignition	The anti drag module is damaged.	Replace the anti drag module.
	The inverter is damaged.	Replace the inverter.
	The igniter is damaged.	Replace the igniter.

3. Stalling in the Middle of Running After Starting

Screening Items	Possible Causes and Troubleshooting Steps	Solution
Fuel Circuit is Not Smooth	The fuel line is bent and deformed, causing not enough gasoline to enter the carburetor.	Check, adjust, and stretch the fuel pipe to make it smooth.
	The higher temperature leads to the formation of gasoline vapor inside the fuel line blocking the fuel line, and gasoline cannot enter the carburetor smoothly.	Shake the fuel line to make the gasoline in the line flow into the carburetor.
Fuel Circuit is Not Smooth	The high temperature and excessive gasoline filling result in oil vapor entering the air filter and carbon canister from the fuel tank. 1. The air filter element is wet with gasoline, blocked, and not ventilated. 2. The carbon canister is soaked in gasoline and is not ventilated.	1. Dry the filter element. Reduce the amount of gasoline in the fuel tank. 2. Replace the carbon canister (air dry the original canister).
Clogged Fuel Tank	The screen on the outlet nozzle is clogged by impurities in the gasoline.	Clean the filter screen on the fuel outlet nozzle.
Fuel Switch Blocked	The fuel switch is blocked by impurities in the gasoline.	Replace the fuel switch.
Line Fault	The oil alarm is broken, and the generator immediately shuts down when started. At this time, the oil alarm light on the panel lights up yellow. Unplug the connection wire of the oil alarm and troubleshoot. (In general, the oil alarm is blocked by impurities in the oil and fails)	a. Shake the machine multiple times to restore normal operation of the oil alarm. b. Replace the oil alarm.
	When not loaded, the overload light comes on and then turns off. 1. The indicator light on the panel is wired incorrectly and the oil alarm light is connected to the overload light. 2. Inverter failure.	1. Adjust to the correct line. 2. Replace the inverter.

Screening Items	Possible Causes and Troubleshooting Steps	Solution
Inverter and Anti Drag Module Malfunction	The inverter or anti drag module integrates ignition and oil alarm light functions, and the fault light (red light) will light up in case of abnormal shutdown.	Replace the inverter and anti drag module.
Air Filter Clogged	Check whether the air filter element is blocked by dust, oil, or other foreign objects, or if the air intake is not smooth. The insufficient intake of the air filter results in insufficient power during generator operation or loading, making it unable to carry the load equipment and causing the machine to shut down. Generally, there will be significant machine shaking, black smoke from the muffler, and machine weakness.	Clean the air filter element or replace the air filter.

4. No Output of Generator

Type of Output	Inspection Items	Possible Causes and Troubleshooting Steps	Solution
AC	Check circuit breakers and thermal protection	Check if the circuit breaker is open.	Ensure that the circuit breaker is in the "ON" position.
		Check if the thermal protection is ejected. Under normal circumstances, the thermal protection is not ejected. If the thermal protection is ejected due to overload or short circuit, the output will be disconnected.	Press the thermal protection button, and if the thermal protection fails, replace it.
	Check wiring harness	Check if the panel connection harness plug is loose or detached.	Reconnect the wiring harness plug.
		Check if the wiring harness plugs between the inverter and the motor, and between the inverter and the panel are loose or detached.	Reconnect the wiring harness plug.
	Socket	Use a multimeter to check if the inverter output line and other sockets or parallel sockets are energized. This socket is damaged.	Replace the socket.
	Internal short-circuit	There is an internal short circuit in the generator.	Returns.
	Machine overload, overheating	Overload protection, no output.	Press the resume button to resume output.
		Inverter overheat protection, machine has no output.	Check if the inverter air inlet is blocked; Is the inverter air duct (shell) installed completely.
	Other	After troubleshooting the above steps, there is still no output.	Returns.

Type of Output	Inspection Items	Possible Causes and Troubleshooting Steps	Solution
DC	Check DC thermal protection	Check if the circuit breaker is open.	Ensure that the circuit breaker is in the "ON" position.
		Check if the thermal protection is ejected. Under normal circumstances, the thermal protection is not ejected. If the thermal protection is ejected due to overload or short circuit, the output will be disconnected.	Press the thermal protection button, and if the thermal protection fails, replace it.
	Check wiring harness	Check the wiring harness of the DC socket (including USB) for looseness or detachment.	Connect the harness plug or replace the DC socket.
	Check the voltage regulating rectifier	Check if the wiring harness of the voltage regulating rectifier is loose or detached.	Connect the harness plug or replace the voltage regulating rectifier.
	Check the motor	Check if the DC winding of the motor output line has electricity, or if the harness plug is loose or detached.	Connect the harness plug or replace the motor.

5. Indicator Light Malfunction

Screening Items	Possible Causes and Troubleshooting Steps	Solution
Line Fault	When not loaded, the overload light comes on and the generator turns off. The indicator light on the panel is wired incorrectly and the oil alarm light is connected to the overload light.	Adjust the circuit to the correct position.
	The harness plug is loose.	Connect the wiring harness plug.
	There is an internal short circuit in the generator.	Returns.
Unstable Speed	The generator speed is very low, causing the overload light to light up.	Adjust the idle screw of the carburetor to increase the speed, turn off the overload light, and turn on the running light (green light).
	After the generator started, the choke valve did not open, and the machine ran unstable and did not reach normal speed.	Open the choke.
Inverter Failure	Inverter failure.	Replace the inverter.

6. Loading Fault

Overload	The load power is greater than the generator power. The generator shakes severely and operates unstable. The engine speed rapidly decreased. The voltage rapidly decreases and the current increases. The overload light is on.	Reduce load power.
On Load Shutdown	Severe overload caused the generator to stall.	Reduce load.
	The cold machine suddenly loads (with a large load) just after starting. The generator has not been preheated yet, and its operation is unstable.	Warm up the machine and slowly load it.
	When the inverter malfunctions, continuing to load results in stalling.	Replace the inverter.
Generator Unable to Load	The choke is not open.	Open the choke.
	Circuit breaker, thermal protection failure. The circuit breaker and thermal protection trip during loading.	Replace the circuit breaker and thermal protection.
	Internal circuit short circuit, generator in protected state, no output.	Returns.
	Inverter overheat protection, generator has no output.	Check if the inverter air inlet is blocked; Check if the inverter air duct (shell) is installed completely.
Generator Unable to Load	Capacitive and inductive loads are suddenly loaded at full power. Due to the nature of the load, when suddenly loaded at full power, the starting current is high and the generator load is very high, making it unable to operate stably.	Reduce load power; When using multiple devices, start from high power to low power in sequence.
Insufficient Power	Assuming the load equipment is air conditioning (high-power electrical equipment). After the air conditioning is turned off, wait for more than 10 minutes before starting the air conditioning again. If the starting interval is too short, it may lead to unsuccessful starting, causing the generator to overload protection and disconnect the output.	Choose a generator that is suitable for the load power.

7. Unstable Operation of the Generator

Screening Items	Possible Causes and Troubleshooting Steps	Solution
There is a popping sound when the engine is unloaded	Environmental factors affect the atomization effect of carburetors in different regions and temperatures.	Slight and discontinuous popping sound, connected to a low-power load, gradually stabilizing the operation of the generator.
Engine Speed	Inspection of the stepper motor for engine runaway. (Above the carburetor near the cylinder head) Manually check whether the stepper motor shaft rotates flexibly.	If the rotation is stuck, replace the stepper motor.
	Check the wiring. 1. Check if the stepper motor harness plug is loose, detached, or broken. 2. Check if the plug connecting the stepper motor to the inverter is loose. 3. Check if the plug connecting the stepper motor to the inverter is connected incorrectly.	1. Connect the wiring harness plug. 2. Connect the plug. 3. Connect the plug correctly.
	All possible reasons have been investigated and the problem has not been resolved.	Replace the inverter.
Engine Traveling Block	Slight traveling, normal after connecting to the load.	Affected by environmental factors is a normal situation.
	Engine traveling under no-load and load conditions. 1. Check if the accelerator stepper motor shaft rotates flexibly. 2. Carburetor or inverter malfunction.	1. If the engine is stuck, replace the stepper motor. 2. Replace the carburetor or inverter.
	Check whether the sealing paper pads between the air filter, carburetor, and cylinder head are damaged, properly assembled, or clogged with impurities.	Replace the sealing paper pad.
Engine without idle or high speed	Check if the energy-saving (idle) switch wiring harness is detached or broken.	Connect the wiring harness plug.
	Check if the plug of the energy-saving (idle) switch harness is disconnected or correctly connected to the interface of the inverter.	Connect the wiring harness plug.
Engine Without Idle or High Speed	The engine has no high speed, the running light is not on, the machine speed is low, and there is no output.	Adjust the idle screw on the carburetor to increase the energy-saving speed.
	Carburetor or accelerator stepper motor malfunction.	Replace the carburetor or accelerator stepper motor.
	Inverter failure.	Replace the inverter.

Screening Items	Possible Causes and Troubleshooting Steps	Solution
Engine Jitter	Check whether the air filter element is blocked by dust, oil, or other foreign objects, or if the air intake is not smooth. The insufficient intake of the air filter results in insufficient power during generator operation or loading, making it unable to carry the load equipment and causing the machine to shut down. Generally, there will be significant machine shaking, black smoke from the muffler, and machine weakness.	Clean the air filter element or replace the air filter.
	The spark plug gap is incorrect, the arc energy is low, and the operation is unstable. Check the spark plug gap.	Adjust the spark plug gap or replace the spark plug.
	Due to insufficient oil intake, the generator will generally experience severe shaking under high-power loads. 1. Check the gasoline circuit to ensure sufficient fuel intake. 2. The carburetor is blocked.	1. Adjust the fuel circuit and fuel hoses. 2. Clean or replace the carburetor.
	The generator is overloaded.	Reduce load.
	Insufficient ignition energy, unstable generator operation.	Replace the igniter or inverter.
	Shake and abnormal noise caused by engine combustion system, crankshaft connecting rod structure, etc.	Returns.

8. Abnormally Loud Sound

Screening Items	Possible Causes and Troubleshooting Steps	Solution
Engine Valve	The engine valve clearance is too large.	Adjust the valve clearance.
Engine Muffler	The muffler is damaged, or internal welding slag falls off, causing vibration and noise during operation.	Replace the muffler.
Engine Starter	Foreign objects fell inside the engine starter.	Disassembly inspection.
Wheel	The placement is not smooth, and the metal adjustment gasket of the wheel vibrates and makes a noise.	Place the generator in a stable position.
After the generator is shut down, there is a blasting sound in the muffler	After shutdown, the engine is still rotating, and excess gasoline or gas in the carburetor enters the muffler, causing secondary combustion due to high temperature and producing a blasting sound.	When the fuel is gasoline, turn off the fuel switch before shutting down the machine. When the fuel is LPG, turn the transfer switch to the middle position and then stop the machine.
Knocking sound at the cylinder head when fully loaded	The compression ratio is high, and gasoline combustion produces explosive sounds.	Reduce load.
	The gasoline grade is on the high side, and the explosion sound generated by gasoline combustion.	Replace the gasoline.

9. Exhaust Abnormalities

Engine emits black smoke	The air filter is blocked and the air intake is insufficient. Insufficient combustion emits black smoke.	Clean the air filter element or replace the air filter.
	The choke is not open. Insufficient combustion emits black smoke.	Open the choke.
	Seriously overloaded, engine speed severely reduced.	Reduce load.
	The carburetor has a high concentration and insufficient combustion. Due to environmental factors, the atomization effect of the carburetor is not good.	Replace the main orifice or carburetor.
Engine emits blue smoke	The generator tilts and oil enters the air filter and carburetor, producing blue smoke after combustion.	Clean the air filter element.
	The generator tilts backwards, and the oil enters the muffler. The high-temperature gas discharged burns the oil again, producing blue smoke.	Run at high speed without load until the oil burns out. After the generator cools down, remove the spark collection net from the exhaust port of the muffler, brush off any carbon deposits on it, and reinstall it. (Normally, it can burn out after running for about 2-5 minutes. If there is a large amount of oil, the running time may be extended.)
	Excessive oil filling causes oil to enter the combustion chamber and produce blue smoke after combustion. Check the oil level and do not exceed the "H" (or top of the grid) position on the oil dipstick.	Pour out excess oil.
	The piston ring fails, causing the engine to burn oil and produce blue smoke. The piston ring is stuck and severely worn, resulting in poor sealing. The oil in the box flows into the combustion chamber and produces blue smoke, which usually persists and cannot be eliminated.	Replace the piston rings. (Professional operation)

Screening Items	Possible Causes and Troubleshooting Steps	Solution
Engine emits white smoke	The engine was not protected, causing water to enter the engine. The muffler emits white smoke during combustion. When checking the oil, it can be found that the oil is black with a white viscous emulsion.	Stop the machine and pour out the oil from the engine. Add new oil and run for about 1 minute. Stop the machine again and replace it with new oil.
Muffler exhaust port turns red	The ternary catalyst that comes with the muffler undergoes secondary combustion with the unburned oil gas mixture, causing the muffler exhaust port to appear red.	It is a normal phenomenon.
The muffler has flames spewing out	Engine malfunction.	Returns.
	The gasoline grade is low and the combustion conditions change.	Switch to gasoline that meets the standards.
	The engine timing is incorrect and the valve timing has changed.	Send to the maintenance station.

10. Engine Oil or Gasoline Leakage

Oil Leakage	Check the location of the oil leakage: 1. There is oil leakage at the oil dipstick. 2. There is oil leakage at the drain bolt at the bottom of the engine box. 3. The engine case has oil leakage. 4. There is oil leakage under the cylinder head. 5. Oil leakage at the cylinder head cover.	1. Tighten the oil dipstick or replace the oil dipstick sealant pad. 2. Tighten the oil drain bolt or replace the sealing gasket of the oil drain bolt. 3. Return. 4. Return. 5. Open the cylinder head cover and replace the sealing paper gasket.
Gasoline Leakage	Check the location of gasoline leakage: 1. The fuel tank is leaking gasoline. 2. The fuel tank outlet nozzle leaks gasoline. 3. The oil pipe ruptures and leaks gasoline. 4. The gasoline filter leaks gasoline. 5. The carburetor leaks gasoline.	1. Replace the fuel tank. 2. Replace the oil nozzle and sealing gasket. 3. Replace the oil pipe. 4. Replace the filter. 5. Clean or replace the carburetor.

11. Other

Problem	Possible Cause	Possible Consequences
Engine overheating	The air inlet is blocked.	Reduced air intake and insufficient heat dissipation of the machine.
	The exhaust outlet is not smooth, and hot air rebounds.	The hot air cannot be discharged, which affects the heat dissipation of the machine.
	The cooling effect of the generator is not good.	The use environment is in a closed space, or the generator has a lot of dust, resulting in poor heat dissipation of the generator.
	Muffler exhaust port blockage and carbon accumulation.	The hot air cannot be discharged, which affects the heat dissipation of the machine.
	Overload use.	The temperature of the engine increases after overloading.
	Excessive oil filling.	The heat from the piston is transferred to the engine oil in large quantities.
	The valve clearance is too large.	The intake and exhaust are not smooth.
Insufficient power and increased fuel consumption	The air filter is blocked.	The air intake volume is not enough, and the combustion is not enough.
	Spark plugs accumulate carbon.	Insufficient ignition energy and insufficient combustion.
	Muffler exhaust port blockage and carbon accumulation.	A portion of the exhaust gas after combustion does not exit, resulting in insufficient intake of fresh combustible mixture.
	Carbon buildup on the valve.	Valve leakage, insufficient intake, insufficient thermal power.
	Carbon accumulation in the combustion chamber.	Insufficient combustion of gasoline.
Increased engine oil consumption	Excessive oil filling.	Enter the combustion chamber for combustion.
	Dust enters the air filter.	The piston rings are worn and poorly sealed, causing oil to enter the combustion chamber and burn.
	The generator overheats.	The engine oil has failed and is discharged in large quantities from the exhaust pipe.
	The piston ring has failed.	The seal is not tight, and the oil enters the combustion chamber for combustion.
	Use engine oil of poor quality.	The oil has poor viscosity and is discharged in large quantities from the exhaust pipe.

AIR INTAKE SYSTEM

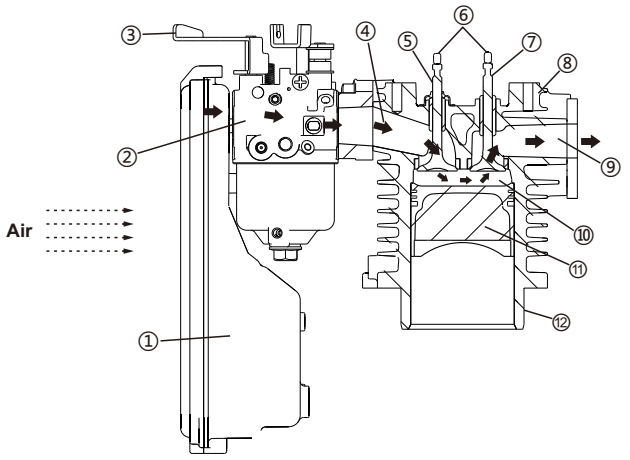
The air intake system consists of the generator air inlet, engine air filter, carburetor, air intake tract (inside the engine cylinder head), and intake valves.

The generator air inlet is the air inlet channel formed by the air inlet grille of the inverter generator housing (usually at the bottom of the control panel), whose function is to allow outside air enter.

The function of the air filter is to block out airborne particles and filter airborne dust.

The air enters the generator from the generator inlet, passes through the air filter, enters the carburetor, mixes with gasoline to form a combustible mixture, enters the intake tract of the engine cylinder head, and when the intake valve is opened, the combustible mixture enters the combustion chamber.

Schematic diagram of engine intake and exhaust tract and combustion chamber structure:



①	Air Filter	②	Carburetor	③	Chokes Handle
④	Air Intake Tract	⑤	Intake Valve	⑥	Rocker
⑦	Exhaust Valve	⑧	Cylinder Head	⑨	Exhaust Duct
⑩	Combustion Chamber	⑪	Piston	⑫	Cylinder

When the intake of the generator is not smooth and the muffler emits black smoke, check and clean the air filter, carburetor, intake duct, and intake valve according to the corresponding components in this structural diagram to eliminate any faults caused by blockages or impurities (mainly carburetor and air filter). Clean the carbon deposits on the surfaces of various components (mainly valves and combustion chambers), especially old machines that have been in use for a long time.

The components of the intake system should be tightly fitted together, otherwise air leakage and dust entry may occur. Therefore, during disassembly and maintenance, it is necessary to check the integrity of each sealing gasket and avoid missing or incorrect installation, otherwise it will affect the use of the engine.

FUEL SYSTEM

1. Gasoline System

⚠ WARNING

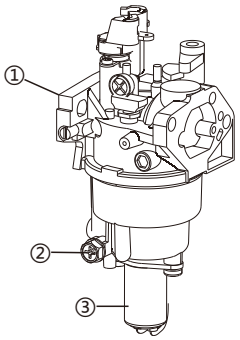
The fuel and its vapors are extremely flammable and explosive and can cause burns, fires or explosions resulting in death or serious injury and/or property damage.

- Stay away from stoves, furnaces, water heaters, clothes dryers or other appliances with pilot lights or other ignition sources that could ignite fuel vapors.
- Store gasoline only in approved containers in well-ventilated, unoccupied buildings, away from sparks or flames. Spilled fuel may catch fire if it comes in contact with hot parts or ignites to create a spark. Never use gasoline as a cleaning agent.
- Be careful not to spill fuel when refueling, as spilled fuel or fuel vapors can burn. If fuel is spilled, make sure the area has evaporated before starting.
- Do not dump your waste gasoline as this will pollute the environment. It should be taken to your local service station or recycling center in a sealed container for recycling.

1. The fuel system consists of fuel tank, fuel level indicator (fuel gauge), fuel filter, fuel switch, fuel pipe, carburetor, fuel pump, fuel solenoid valve, dumping valve, fuel evaporation pipe, carbon tank, etc.
2. The fuel level indicator shows the gasoline capacity in the tank (tank surface). In total, there are mechanical and electronic types. Mechanical fuel level indicators are generally used for open-frame generators, which can directly observe the remaining amount of fuel in the tank; electronic fuel level indicators are LED digital display meters connected to the control panel, which can display the fuel capacity more accurately and clearly.
3. The fuel solenoid valve is installed on the carburetor, the main function is to cut off or open the gasoline fuel line.

3.1 Large displacement generators and carburetors are usually equipped with fuel solenoid valves. When the generator shuts down, due to the effect of rotational inertia, the generator will continue to rotate. At this time, gasoline will continue to enter the combustion chamber, and the spark plug has stopped igniting. Therefore, unburned gasoline will be discharged into the muffler. Under the high temperature of the muffler, the gasoline combustion will make a burst sound, forming the phenomenon of "the generator shuts down and the muffler makes a burst sound". So the carburetor is equipped with a fuel solenoid valve, which works to block gasoline from entering the combustion chamber when the engine is shut down.

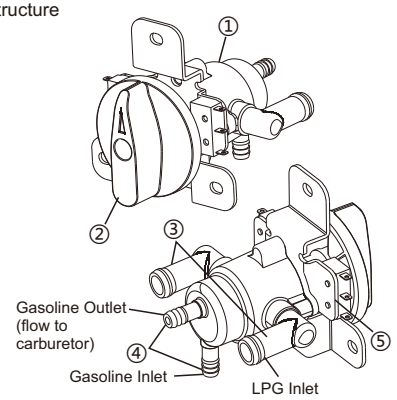
Schematic of the fuel solenoid valve



①	Carburetor	②	Fuel Drain Bolt
③	Fuel Solenoid Valve		

1. The fuel solenoid valve must be connected to the circuit in order to operate.
2. When assembling the fuel solenoid valve with the carburetor, it must be sealed without oil leakage.

Schematic diagram of fuel selection switch structure



①	fuel Selection Switch	②	Handle
③	LPG Inlet/Outlet	④	LPG Inlet/Outlet
⑤	Microswitch (connected to circuit)		

Fuel Evaporation Collection

The dump valve, fuel evaporation pipe, carbon canister, and air filter form a secondary collection system for fuel, allowing the volatile gasoline in the fuel tank to re-enter the carburetor and combustion chamber without evaporating into the natural environment.

The dump valve can prevent gasoline from overflowing from the tank when the machine is tilted.

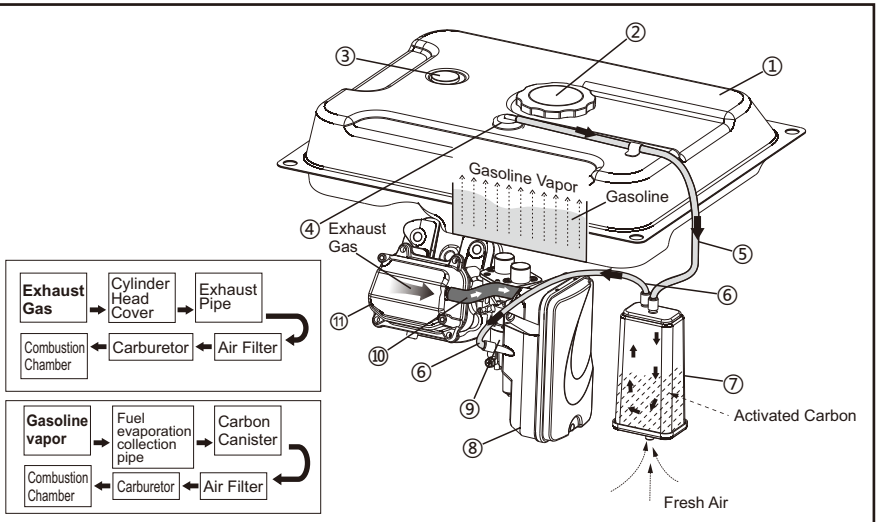
The carbon canister is generally installed between the gasoline tank and the engine. Due to gasoline being a volatile liquid, the fuel tank is often filled with vapor at room temperature. The function of the fuel evaporative emission control system is to introduce the vapor into combustion and prevent it from evaporating into the atmosphere. The activated carbon canister storage device plays an important role in this process. After the engine shuts down, gasoline vapor is mixed with fresh air in the tank and stored in the activated carbon canister. When the engine starts, the electromagnetic valve installed between the activated carbon canister and the intake manifold opens. The gasoline vapor in the activated carbon canister is brought into the cylinder by clean air under the vacuum of the intake pipe (the degree of gas thinness under vacuum) to participate in combustion.

This not only reduces emissions, but also reduces fuel consumption.

Exhaust Gas Circulation

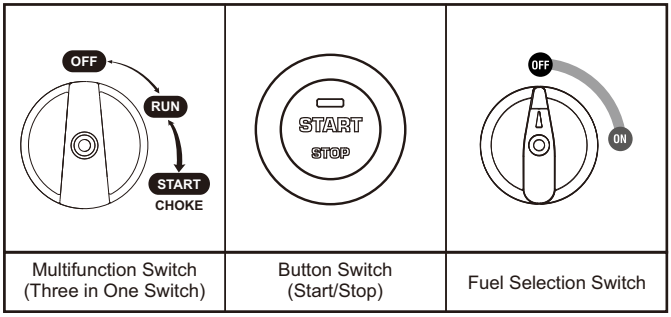
The gasoline vapor and residual exhaust gas from combustion leakage inside the engine ultimately pass through the internal airway of the engine, pass through the cylinder head, flow into the air filter from the exhaust pipe, and then enter the combustion chamber through the carburetor for secondary combustion, without being directly discharged into the atmosphere.

Structure diagram of fuel evaporation collection system and exhaust gas circulation system



①	Fuel Tank	②	Fuel Tank Cover	③	Fuel Gauge
④	Dump Valve	⑤	Fuel Evaporation Tube	⑥	Fuel Pipe
⑦	Carbon Canister	⑧	Air Filter	⑨	Carburetor
⑩	Exhaust Gas Pipe	⑪	Cylinder Head Cover		

2. Control Switch



Multifunction Switch (Three in One Switch)	Button Switch (Start/Stop)	Fuel Selection Switch

Multi Function Switch (Three in One Switch): Engine start and stop, fuel, choke.

- When placed in the "OFF" position, turn off the oil circuit and turn off the generator.
- When placed in the "RUN (ON)" gear, the engine runs, the oil circuit opens, and the choke opens.
- When placed in the "START (CHOKE)" gear, the choke closes and the oil circuit opens. (If the engine is hot, there is no need for this step.)

Multi Function Switch (Four in One Switch): Engine start and stop, fuel, choke, start.

● When placed in the "OFF" position, turn off the oil circuit and turn off the generator.

● When placed in the "RUN (ON)" gear, the engine runs, the oil circuit opens, and the choke opens.

● When in the "START (CHOKE)" gear:

1. The choke is closed and the oil circuit is open.

2. Press the start button to start the generator, and then switch to the "RUN (ON)" gear for operation.

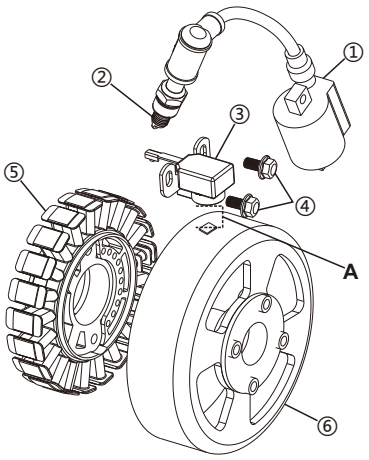
Button Switch (Start/Stop): Press the first time to start and run the generator, and then press the second time to stop the generator.

IGNITION SYSTEM

The working principle of the ignition system: The voltage output by the motor is boosted by a high-voltage coil and transmitted to the spark plug. The high-voltage current breaks through the air and forms an arc, igniting the combustible mixture in the combustion chamber.

Principle of flameout switch: When the flameout switch is turned on, the current of the ignition coil is directly connected to the ground (metal parts of the engine) through the flameout switch. The high-voltage current does not pass through the spark plug and does not form an arc. Therefore, the combustible mixture is not burning, and the engine stops working.

The function of a trigger: On some generators, a trigger is installed. When the motor rotor rotates to a certain angle, the trigger is subjected to magnetic field changes and sends an ignition signal to the igniter (usually integrated in the inverter). At this time, the high-voltage coil and spark plug work.



①	High Voltage Coil	②	Spark Plug
③	Trigger	④	Bolt
⑤	Motor Stator	⑥	Motor Rotor

⚠ WARNING

Rotating parts can cause serious injury.

Keep away when the engine is running.

Hands, feet, hair and clothing should be kept away from all moving parts to avoid injury. Do not operate the engine with the guard removed.

In the figure, A represents the distance between the trigger and the convex hull on the motor rotor, commonly referred to as the "trigger gap".

The trigger gap is generally 0.3~0.5mm.

Adjust trigger gap:

1. Use a 0.4mm feeler gauge to insert it between the convex hull of the trigger and the motor rotor;
2. Tighten the bolts of the trigger;
3. Take out the feeler gauge and use 0.3mm and 0.5mm feeler gauges to check. A 0.3mm feeler gauge can pass, but a 0.5mm feeler gauge cannot. And rotate the motor rotor one turn to confirm that there is no interference between the rotor and the trigger.

STARTUP SYSTEM

The generator starting system consists of components such as the starter (including the starter shell, Pull Start Assembly, handle), starting motor (starting motor), battery, high-voltage coil, spark plug, stepper motor, inverter, etc.

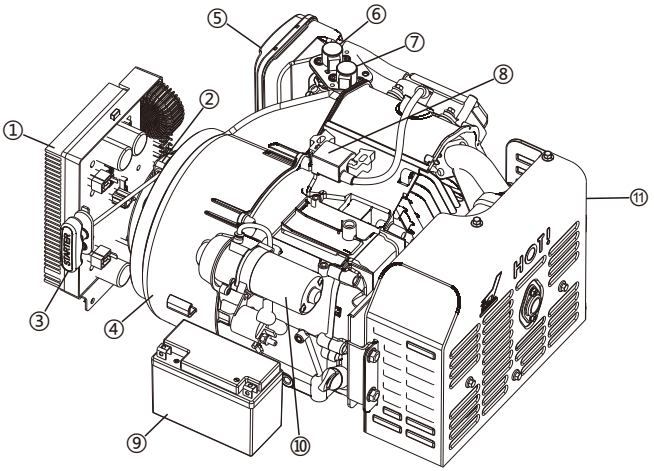
The main component of manual starting is the starter;

Electric starting consists of a starting motor and a battery;

The inverter mainly controls the operation of the stepper motor;

High voltage coils and spark plugs are part of the ignition system.

Structure diagram of generator starting system



①	Inverter	②	Pull Start Assembly	③	Starter Handle
④	Starter Shell	⑤	Air Filter	⑥	Stepper Motor (Choke)
⑦	Stepper Motor (Throttle)	⑧	High Voltage Coils	⑨	Battery
⑩	Starting Motor	⑪	Muffler		

1. Starting Method

The traditional starting methods for generators are divided into recoil start, electric start, and remote start (including push-button start).

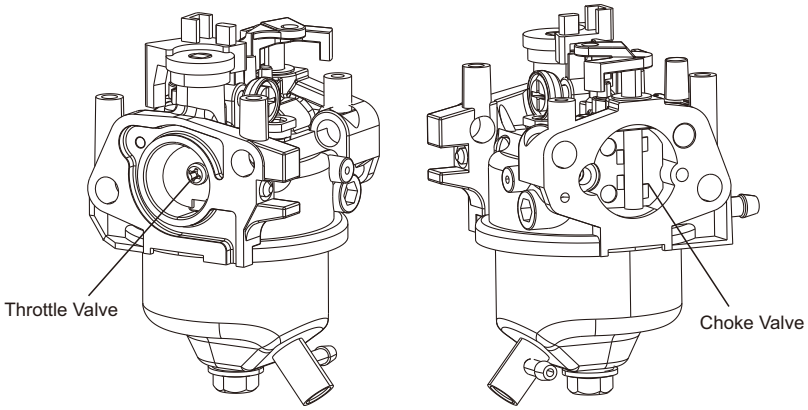
In a cooled generator or low-temperature environment, due to the low volatility of gasoline and poor atomization effect, a higher concentration of atomized gasoline is required to improve the ignition success rate when the generator is started. Therefore, it is necessary to close the carburetor choke to reduce the amount of air entering. On the contrary, when the engine is hot or the ambient temperature is high, the gasoline volatilization rate is high and the atomization effect is good. It is necessary to increase the air intake volume in order to successfully ignite, so the carburetor choke needs to be opened.

The general operation mode of the generator damper is manual, and there is a damper operating lever or multi-functional switch (three in one switch) control on the control panel.

If a generator is equipped with remote control or push-button start, the opening and closing of the choke are automatically controlled by the remote control module and do not require manual control. Before use, it is

necessary to connect the battery in order for the remote control module to work. Therefore, before using this type of generator, the battery cable must be connected first. If the startup is weak (the battery is running low), a fully charged battery needs to be replaced.

Schematic diagram of carburetor throttle and choke structure



When installing the carburetor on the engine, the method for determining the throttle and choke is as follows:

1. The throttle valve is usually close to the direction of the cylinder head.
2. The choke is usually close to the direction of the air filter.
3. The above figure shows that the throttle and choke are both closed.

Anti drag start

The starting method of some models is different from traditional manual starting and starting motors. There are no models that start the motor, but instead use the motor as the starting motor. When the motor is powered on (the battery provides power), the controller controls the motor to rotate and generate electricity, providing energy to the high-voltage coil, and then igniting the spark plug. After the engine is successfully ignited, the controller detects the starting situation of the engine. At this time, the controller disconnects the control of the motor, which is used as a traditional power generation functional component to generate electricity externally.

In the case of overheating, the reverse traction power of a generator with reverse traction starting method will decrease. It should be allowed to cool down for a period of time before starting, or use the starting rope of the generator to manually start the generator.

For reverse drag start models, simply press the one button start button on the control panel to start the machine.

2. Operation steps for starting and stopping the generator

Starting the generator

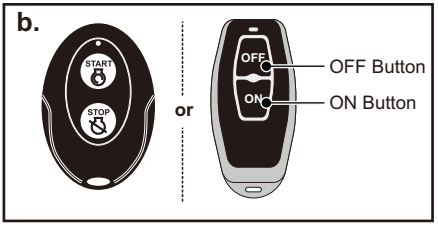
1. Connect the battery cable. (This step is available for electric starting models)
2. Turn on the oil switch.
3. Place the choke in the closed position (the choke switch on the control panel is in the "START (CHOKE)" position). (Usually, manual start models require manual closing of the choke. When using a one click button or remote start, there is no need to manually close the choke.)

a. Recoil Pull Start

1. When starting the generator by hand, it is necessary to grasp the handling handle of the generator to prevent it from tipping over;

2. Press the remote control ON or OFF, the green light of the start/stop button will turn off, and the remote control pairing is successful.

Tip: The remote control delivered with the generator has been paired successfully.



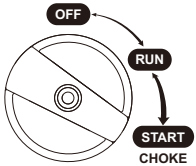
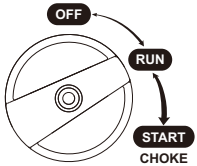
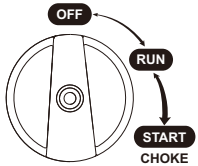
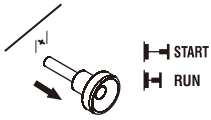
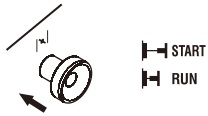
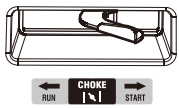
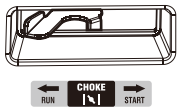
1. Long press the start/stop button for 5 seconds, and release when the start/stop button indicator lights up;
2. Press any key on the remote control;
3. The red indicator of the start/stop button blinks for 2-3 times and then goes off, indicating that the remote start pairing is successful.

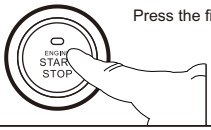
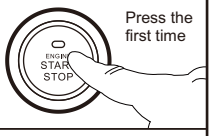
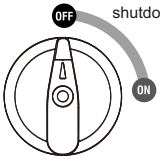
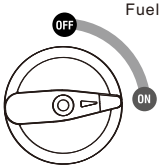
Tip: The remote control provided by the generator factory has been successfully paired.

Stop the Generator

Place the Multifunction Switch (Three in One Switch) in the "OFF" position and the generator will stop running. If the start/stop button and the generator are started remotely, directly press the start/stop button or the OFF (STOP) button on the remote control to stop the generator from running.

Schematic diagram of the gear positions of various types of switches during generator startup, operation, and shutdown:

Initiation Step / Switch Type	Start	Running	Stop
Multifunction Switch (Three in One Switch) (Recoil Pull Start)			
Pull Rod Type Choke Switch (Recoil Pull Start)			Unable to control engine shutdown
Rocker Type Choke Switch (Recoil Pull Start)			Unable to control engine shutdown

<table>
<tr><th>Initiation Step
Switch Type</th><th>Start</th><th>Running</th><th>Stop</th></tr>
<tr><td>Button Switch
(Start/Stop)
(Electric Start)</td><td colspan="2"> 
</td><td> 
</td></tr>
<tr><td>Remote Control
(Electric Start)</td><td colspan="2"> 
</td><td> 
</td></tr>
<tr><td colspan="4">Fuel selector switch has only fuel select and fuel off functions</td></tr>
<tr><td>Fuel Selector
Switch</td><td> 
</td><td> 
</td><td></td></tr>
</table>

3. Battery Cable Connection and Removal

⚠ WARNING

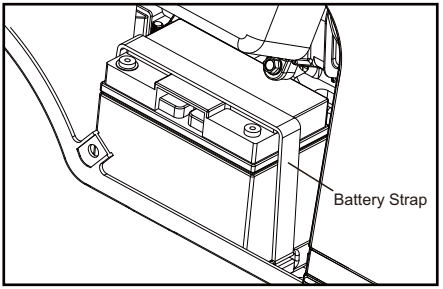
- Do not start the generator while it is charging from an external power source.
- The battery should be kept away from fire.
- Please keep the battery in a cool and dry place, away from direct sunlight.
- Do not let children touch the battery.
- It is forbidden to dissect, squeeze or run through the battery without permission, which will produce the danger of fire and explosion.
- Electric batteries contain harmful metals, which will pollute the environment, and used batteries need to be recycled and treated by professional departments.

As the starting power source for the generator, the battery needs to be connected or removed when using the generator for the first time or replacing the battery.

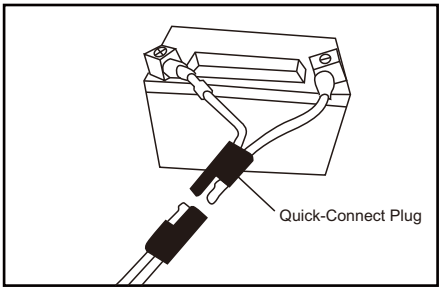
1. Confirm the positive (+) and negative (-) poles of the battery terminal;
2. When wiring, connect the positive pole of the battery first and then the negative pole of the battery;
3. When disassembling the cable, first remove the negative electrode of the battery, and then remove the positive electrode of the battery;
4. During wiring and dismantling, tools (sleeves, screwdrivers, etc.) should not come into contact with the metal parts of the generator as much as possible to prevent short circuits and sparks.

Connect the Battery

1. Open the generator maintenance cover.
2. Check whether the rubber battery strap is securely fixed to the battery. If loose, pull on the strap and hook it onto the mounting base.



3. A quick-connect battery plug is pre-installed on the battery. Remove the cable tie securing the plugs then push firmly to connect them.



Note: The generator is equipped with a battery charging feature. Once the engine is running, a small charge will slowly recharge the battery.

ATTENTION

1. Charge properly

Keeping lithium-ion batteries properly charged and discharged can prolong battery life. Maintaining a power level of 10%-90% in lithium-ion batteries is beneficial for battery protection.

2. Choose the appropriate charging temperature

Lithium battery charging temperature range: 0℃-45℃.

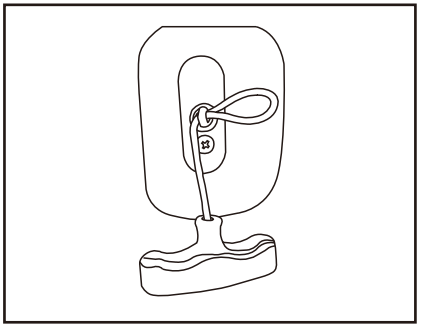
3. Avoid overcharging

Overcharging of lithium-ion batteries must be avoided during the charging process. Overcharging of lithium-ion batteries in any form will lead to serious damage to battery performance and even explosion.

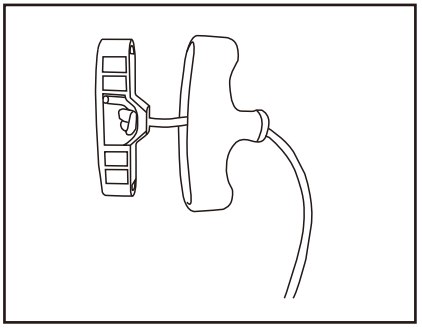
4. Replace the Starting Rope Handle

The starting rope handle is damaged, please replace it according to the following steps.

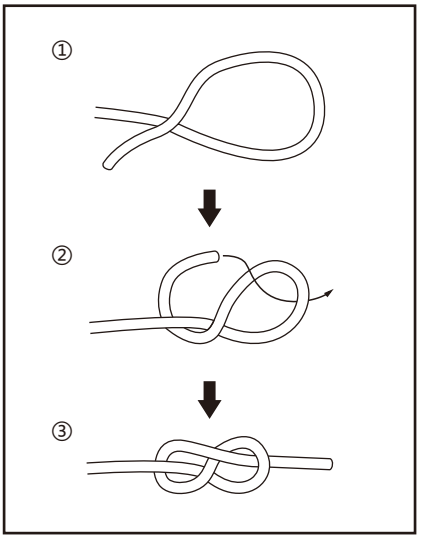
1. First, pull out a section of the starting rope and tie a movable buckle in the appropriate position to prevent the starting rope from retracting inside the starter.



2. Take out the knotted rope inside the handle, loosen the buckle, and replace it with a new handle.



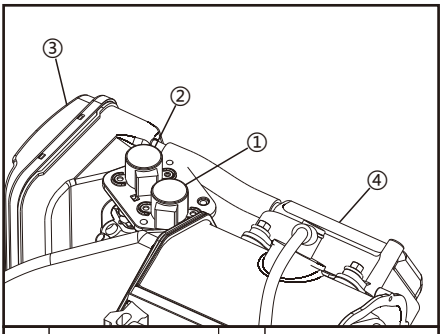
3. Tie the rope with a buckle inside the new handle and tighten the buckle to prevent slipping. The knot is usually in the shape of an "8" or double "8", which ensures that the rope does not loosen and becomes tighter as it is pulled.



4. After confirming that the rope is firmly tied, loosen the movable knot in step 1. The replacement of the start handle is complete.

SPEED REGULATION AND GAS DISTRIBUTION SYSTEM

The speed regulation of the inverter generator is automatic, with the inverter as the control core and the stepper motor implementing the control.



①	Stepper Motor (Throttle Valve)	②	Stepper Motor (Choke)
③	Air Filter	④	Cylinder Head

1. The throttle stepper motor is located near the cylinder head direction.
2. The choke stepper motor is located near the air filter.

1. Speed Control Principle

When the generator is working, the inverter will judge the working status and output power of the generator according to the output current of the generator. When the output current is higher, it means that the load equipment is more powerful at this time, and the inverter will transmit the command to the stepper motor to increase the throttle opening, increase the oil intake and increase the output power of the generator. Conversely, reduce the output power of the generator.

Low idel mode. When there is no load, the inverter controls the generator to run at the minimum stable speed to reduce fuel consumption.

Trouble: If the stepper motor is damaged, or the rotation is inflexible or stuck, it will cause the carburetor throttle and air damper to be incomplete fully controlled, unstable generator operation or other malfunctions.

Solution: Remove the stepper motor, turn the shaft of the stepper motor by hand for more than two turns, clockwise and counterclockwise, to confirm that the rotation is flexible and there is no stalling. If the stepper motor is damaged, replace the stepper motor with a new one.

2. Gas Distribution System

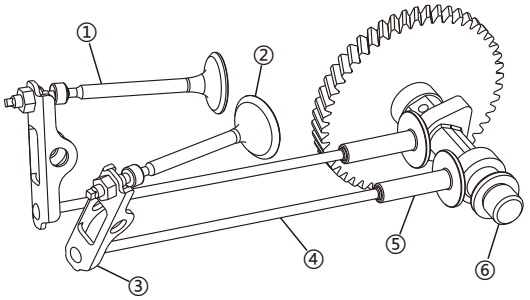
Gas distribution system is the engine in the work, the gas distribution mechanism components in accordance with the set requirements of the timely intake and exhaust.

Gas distribution system consists of valve sets and valve transmission mechanism. The valves are divided into intake and exhaust valves, inverter generators used the engine is a single-valve structure, which means one intake valve and one exhaust valve.

The valve train is the structure that drives the opening and closing of the valve. It consists of rocker arm, rocker arm shaft, push rod, tappet and camshaft. The camshaft timing gear engages with the crankshaft formal gear, and when the crankshaft rotates, it drives the camshaft to rotate. There are two cams on the camshaft, the intake cam and the exhaust cam, and when the cams rotate, they push the tappet and the push rod to move, which makes the rocker arm swing and then forces the valve to open. The two cams of the camshaft make a certain angle to control the opening and closing of the intake and exhaust valves respectively.

Timing Point

Timing point is an important point in the engine distribution system (the correct moment of ignition), the timing point is closely related to the upper stop of the piston, which is related to the normal operation of the engine, ignition angle and intake and exhaust.

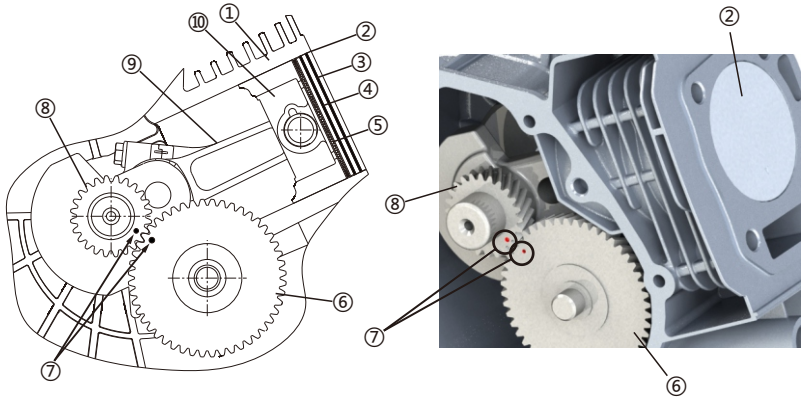


①	Exhaust Valve
②	Intake Valve
③	Rocker Arm Assembly
④	Push Rod
⑤	Tappet
⑥	Camshaft

2. Gas Distribution Phase

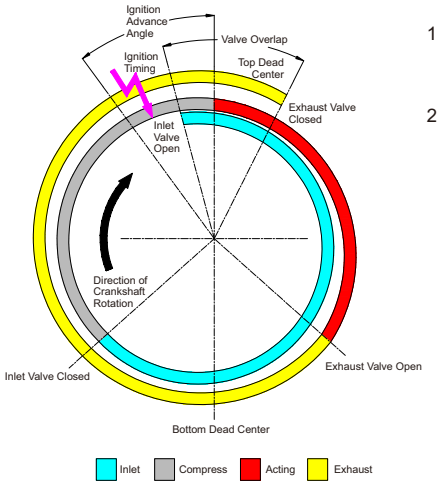
Gas distribution phase refers to the precise control of the opening and closing of the intake and exhaust valves, as well as the size and opening time of the valve opening stroke, within a certain rotation angle of the camshaft, to achieve the fullest combustion of the combustible mixture and combustion at the optimal time. The opening and closing time of the valve is the valve timing, usually represented by a circular diagram of the crankshaft angle relative to the top and bottom dead center crank positions.

Schematic Diagram of Top Dead Center and Timing Point



①	Crankcase	②	Top Dead Center	③	Piston Ring (First Ring)
④	Piston Ring (Second Ring)	⑤	Piston Ring (Oil Ring)	⑥	Camshaft Timing Teeth
⑦	Timing Mark	⑧	Crankshaft Timing Gear	⑨	connecting rod
⑩	Piston				

Valve Timing Diagram



1. It can be clearly seen in the figure that the "ignition advance angle" is before the top dead center;
2. Valve overlap angle: During the exhaust stroke, if there is insufficient exhaust, the exhaust valve will delay closing, while in order to ensure sufficient intake, the intake valve will open earlier. At this point, the intake and exhaust valves are both open, so a small amount of gas will be expelled from the intake valve in the opposite direction, which is a visual phenomenon of the air filter injecting air in the opposite direction. If the gas distribution phase is incorrect, there will be a phenomenon of "air filter sparking". If this situation occurs, please seek professional repair.

Top Dead Center

The piston moves inside the cylinder, and the top of the piston reaches its highest point, which is called the top dead center. The top of the piston is the farthest from the center of rotation of the crankshaft.

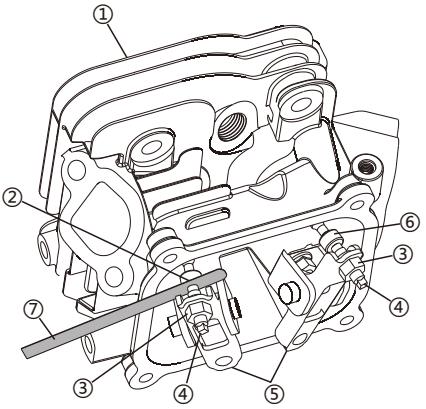
Bottom Dead Center

The piston moves inside the cylinder, and the position at which the top of the piston reaches its lowest point is called the bottom dead center. The top of the piston is closest to the center of rotation of the crankshaft.

When the Piston is at Top Dead Center

At the top dead center, assemble the camshaft, and the timing gear timing points of the crankshaft and camshaft coincide.

Adjust the valve clearance at the top dead center.



①	Cylinder Head	②	Exhaust Valve
③	Rocker Arm Adjustment Nut	④	Rocker Arm Adjustment Bolt
⑤	Rocker Arm	⑥	Intake Valve
⑦	Feeler		

3. Valve Clearance Adjustment Method

⚠ WARNING

Accidental activation may result in serious injury or death. Before servicing, disconnect the spark plug leads and ground.	Before servicing the engine or equipment, disable the engine as follows. Disable the engine: 1) Disconnect the spark plug leads. 2) Disconnect the battery cable.

Tools	Specifications						QTY
Feeler	0.03mm	0.05mm	0.08mm	0.10mm	0.15mm	0.2mm	1
Wrench	9 # open-end wrench (or determined based on actual situation)						1
Pliers	Needle nose pliers						1

1. Remove the cylinder head cover and locate the position of the valve and rocker arm.
2. Identify the intake and exhaust valves. The intake valve is located near the air filter, and the exhaust valve is located near the muffler.
3. Confirm the top dead center. When we remove the cylinder head, we can rotate the crankshaft to find the top dead center (see the "Top Dead Center and Timing Point Diagram"). However, when adjusting the valve clearance for general maintenance, the cylinder head and crankcase are not disassembled, which requires manual judgment of the top dead center. There are two methods to determine.

a. Slowly pull the start handle. During the slow rotation of the engine, feel the feedback force of the pull rope and observe the movement of the valve and rocker arm (the intake and exhaust valves will alternately move up and down). When you feel a sudden increase in resistance, continue to slowly pull the handle and observe the valve rocker arm, so that the rocker arms of the intake and exhaust valves are not moving and flush at the same time (at this time, the intake and exhaust valves are both closed), which is the top dead center. If you continue to pull the handle, the valve rocker arm will start alternating motion again, then continue to rotate the engine to find the top dead center.

b. Remove the spark plug (there is no resistance when pulling the handle), and use a longer screwdriver (the screwdriver should be clean and free of impurities) to place it into the combustion chamber from the spark plug hole, so that it is against the surface of the piston. Then slowly pull the start handle to rotate the engine. At this point, the piston movement will cause the screwdriver to move up and down together. At the same time, observe the valve rocker arm, so that the rocker arms of the intake and exhaust valves are both stationary and flush (at this time, the intake and exhaust valves are both closed), and when the screwdriver moves to the top, it is the top dead center.

4. Use a 9 # wrench to loosen (rotate counterclockwise) part ③ (rocker arm adjustment nut), clamp part ④ (rocker arm adjustment bolt) with pointed pliers, rotate part ④, loosen counterclockwise (gap increases), tighten clockwise (gap decreases).
5. Insert a feeler gauge between ② (valve) and ④ (rocker arm adjustment bolt), rotate ④ to just press against the feeler gauge, and then tighten ③. Remove the feeler gauge.

The standard valve clearance values for different models are shown in the table below:

Model	Intake Valve	Exhaust Valve
Small Generator Below 5kW	0.03~0.08mm	0.03~0.08mm
Large Models Above 5kW (Including 5kW)	0.10~0.15mm	0.15~0.20mm

6. Check the gap.

a. Adjustment and inspection methods for valve gap values ranging from 0.03 to 0.08mm. Use a 0.05mm feeler gauge for adjustment, and use 0.03mm and 0.08mm feeler gauges for inspection. If a 0.03mm feeler gauge can pass, but a 0.08mm feeler gauge cannot pass, then there is no problem. If the 0.03mm feeler gauge cannot pass, it indicates that the gap is very small or even non-existent, and needs to be readjusted. If a 0.08mm feeler gauge can pass, it indicates a large gap and needs to be readjusted. (The value of 0.03mm is very small, and a 0.05mm feeler gauge can be used instead of a 0.03mm feeler gauge for adjustment and inspection, which is difficult for non professionals to adjust.)

b. Adjustment and inspection methods for valve clearance values ranging from 0.10 to 0.15mm. Use a 0.10mm feeler gauge for adjustment and use a 0.10mm and 0.15mm feeler gauge for inspection. A 0.10mm feeler gauge can pass, but a 0.15mm feeler gauge cannot pass, so there is no problem. If the 0.10mm feeler gauge cannot pass, it indicates that the gap is very small and needs to be readjusted; If a 0.15mm feeler gauge can pass, it indicates a large gap and needs to be readjusted.

c. Adjustment and inspection methods for valve clearance values ranging from 0.15 to 0.20mm. Use a 0.15mm feeler gauge for adjustment and use a 0.15mm and 0.20mm feeler gauge for inspection. A 0.15mm feeler gauge can pass, but a 0.20mm feeler gauge cannot pass, so there is no problem. If the 0.15mm feeler gauge cannot pass, it indicates that the gap is very small and needs to be readjusted; If a 0.20mm feeler gauge can pass, it indicates a large gap and needs to be readjusted.

d. In principle, the valve clearance value should be small rather than large, but there must be a clearance.

7. Confirm again. After checking the clearance value, recheck and confirm the tightening of component ③ (rocker arm adjustment nut). After tightening, it is necessary to recheck the valve clearance value. (Because the clearance value may change during the tightening of the rocker arm adjustment nut ③, it needs to be confirmed again).

8. Pull the start handle to rotate the engine several times, then confirm the top dead center and check the valve clearance value again. If it does not meet the requirements, it needs to be adjusted again. This step is very important.

Attention: When adjusting the valve clearance, gloves should be worn to ensure safety and avoid sharp edges of metal parts scratching the body.

Ignition Advance Angle

The angle at which the crankshaft rotates from the ignition moment until the piston reaches the top dead center of compression is called the ignition advance angle. That is to say, the engine does not ignite at the top dead center of the piston. Because it takes a certain amount of time for the combustible mixture to start burning and fully burn, it needs to be ignited before the top dead center. When the piston reaches the top dead center, the combustible mixture will just fully burn and produce the maximum thrust acting on the top of the piston, optimizing engine power. At the same time, full combustion of the combustible mixture can also reduce exhaust pollution. In the previous valve phase diagram, the ignition advance angle can be easily seen.

INVERTER

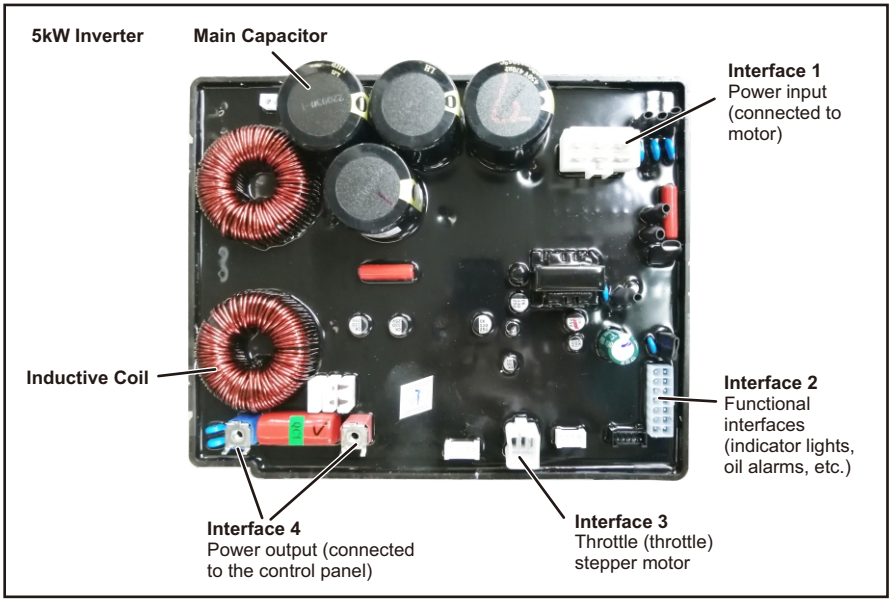
Inverter, also known as frequency converter, integrates functions such as rectification, voltage transformation, frequency conversion, and control.

Within a certain range, the higher the speed of the generator, the higher its output power. However, the output frequency and voltage also increase. In addition, the different speeds of the generator in energy-saving and non energy-saving states will result in different voltages and frequencies, which cannot meet the normal usage requirements.

The inverter is to adjust and control the unstable voltage output by the generator to the rated value, such as 230V. Stabilize the output frequency to the required value, such as 50Hz, so that no matter how the generator speed fluctuates, it does not affect the quality of the output current.

The inverter also has a control function, the most commonly used being to control the carburetor throttle, automatically adjusting the generator speed based on the output power, to maintain the generator always operating in the most economical and energy-saving mode.

Some inverters also have oil alarm function and output indication function. When there is less oil, the engine will shut off, preventing the generator from starting and running, ensuring that the engine will not pull or lock due to a lack of oil. The output indication function mainly provides data signals such as operation, fault, oil, time, voltage, frequency, power, etc. when the generator is running. It is displayed by the display meter or light on the control panel, allowing users to more intuitively view the operating status of the generator.

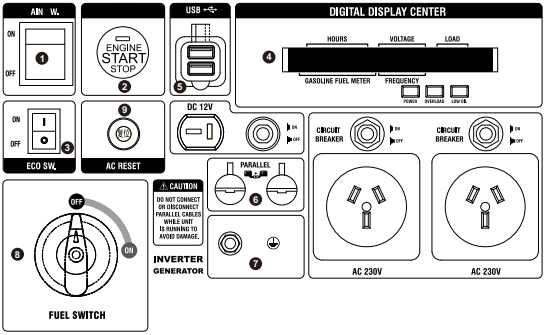


Inverter Troubleshooting

1. Connection situation. Check whether each interface plug box is properly connected and confirm that the connected wires are not broken or loose; Each interface plug box is not damaged, and the pins inside the plug box are not loose, skewed, or twisted. The connection between power input interface 1 and power output interface 4 is stable and not loose. The throttle stepper motor interface 3 is securely connected.
2. Inverter condition. The main capacitor is undamaged; The inductance coil is intact without any signs of burning;
3. Connection status between control panel and inverter. The connection between the control panel wiring harness and each interface of the inverter is intact, and the wiring harness is free from any defects such as breakage, damage, loose plug boxes, or incorrect plug box connections.
4. The back of the inverter is equipped with heat dissipation fins, which need to be dissipated through the cooling air duct of the generator. After debugging and replacing the inverter, it is necessary to fully assemble the inverter onto the generator and install the inverter shell to prevent overheating caused by insufficient heat dissipation;
5. Unauthorized disassembly of inverters is prohibited;
6. It is prohibited to replace or debug the inverter with power. Before replacing, inspecting, and debugging the inverter, the generator must be stopped.
7. When interface 1 (power input) of the inverter is not connected, it is prohibited to rotate the generator. Pay special attention to the TG5000I and TG9000I series. The motor is directly connected to the inverter through wires, and when not connected, the wires may come into direct contact with each other. If the generator is turned at this time, the current of the generator will form a short circuit, causing the generator to burn out or causing leakage or electric shock hazards.

CONTROL PANEL

The generator control panel contains AC output, DC output, function keys, display meter, start/stop switch, circuit breaker, thermal protector and other functions.



①	Main Switch	②	Push-button Start	③	Energy Saving Switch (Idle Switch)
④	Digital Display Center	⑤	USB Socket	⑥	Parallel Connectors
⑦	Ground Terminal	⑧	Fuel Switch	⑨	AC Reset

STATEMENT: The image above is a sample image, the panel configuration varies by generator model and we are always improving our products, so the image display may differ from the final product.

The control panel in the example diagram has an electric start function, and the choke and shutdown functions of the generator are controlled by the Push-button start.

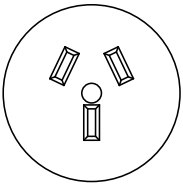
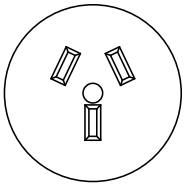
Connect the battery cable and turn the fuel switch to the "ON" position to turn on the fuel. Turn on the main switch (set to the ON position), and at this time, the generator power is connected before starting the generator normally.

AC Output

Mainly through various types of sockets and online interfaces. When using, first check the specifications of the socket and the corresponding power usage of the device, and avoid overloading. For example, if the. If the device is greater than, the socket cannot be used alone. The second socket on the control panel should be used together to distribute equipment power to multiple sockets; Alternatively, use a socket on the control panel with a power greater than the device's power.

Power Calculation: Voltage (V volts) × Current (A amperes)=Power (W watts).

Common sockets and their corresponding voltage and current relationships:

Socket Type	IP44 15A	IP44 15A
Pictures		
Standard Voltage	240V	240V
Maximum Current	15A	15A

Direct Current (DC) Output

The DC output is mainly reflected in the USB interface, cigarette lighter interface, and DC socket. DC is generally used for external battery charging or other DC devices. The output power of the DC socket is not more than 100w, the standard voltage is 12V, and the maximum current is 8.3A.

The output process of the generator: motor → inverter → control panel (socket, circuit breaker, thermal protection)

Output Troubleshooting

According to the above power generation process, the main inspection is to inspect the wiring harness and plug boxes between each main body (motor, inverter, panel) and the main body.

AC output failure. When there is a fault in the AC output, the troubleshooting steps should be in order from easy to difficult.

Check if the socket is burnt out

⬇

Is the connection wire of the socket loose or detached

⬇

Confirm that the AC protector or circuit breaker is in the ON position (if the circuit breaker is damaged, replace it)

⬇

Use a multimeter to check if there is voltage at the output interface of the inverter

⬇

(If there is no voltage) Check the connection of each plug of the inverter

⬇

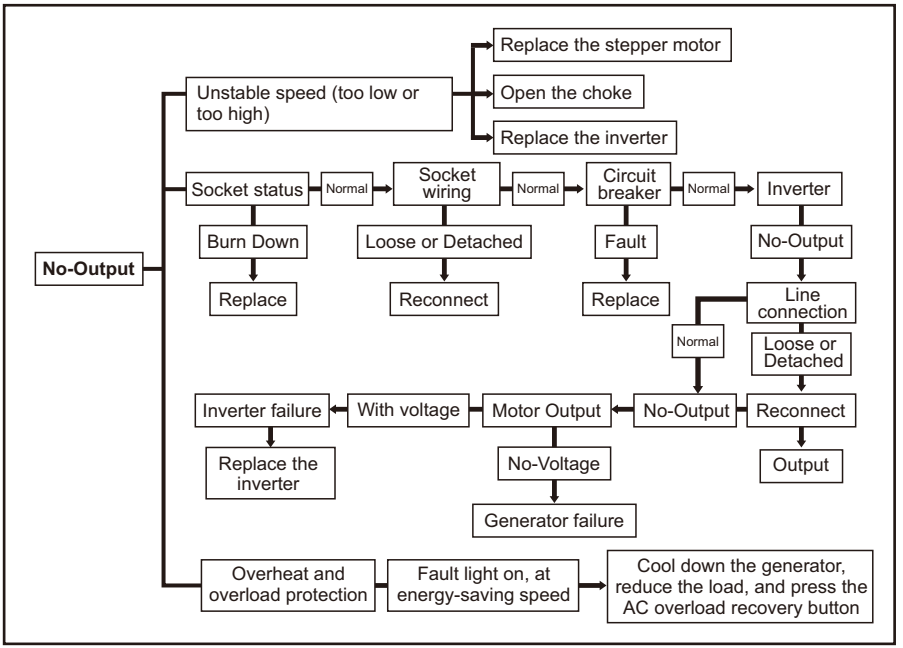
Measure the voltage of the generator winding

⬇

1. If there is voltage in the generator winding, it indicates that the inverter is faulty and needs to be replaced.
2. If there is no voltage in the generator winding, it indicates that the generator is faulty.

If the generator is overloaded or overheated, the output will also be disconnected. At this point, the fault light of the generator is constantly on, and the machine is in energy-saving speed mode. Pressing the overload recovery button can clear the fault. So you need to:

1. Reduce the power of the device used.
2. Allow the generator to cool down for a period of time before running. Check the operating environment of the generator to ensure sufficient heat dissipation; Check the air inlet of the generator to ensure there is no blockage and sufficient air intake.



DC output failure. The DC of the generator is mainly through the rectifier to rectify the AC into DC, so the DC output failure, the main check each DC socket, wire connection, rectifier, DC thermal protector, replace damaged parts.

EXHAUST SYSTEM

The exhaust system mainly refers to the exhaust gas generated after engine combustion, which is discharged into the natural environment after passing through the exhaust valve, exhaust pipe, muffler, and catalyst. Due to the high temperature of the exhaust gas after combustion, a cooling system is also installed in the exhaust system.

The catalyst is mainly a ternary catalyst, aimed at purifying exhaust gas. Because engines cannot achieve complete combustion, incomplete combustion of fuel can produce harmful gases (such as carbon monoxide, nitrogen oxides, sulfur dioxide, etc.), pollute the environment and are harmful to human health, therefore it is necessary to purify the exhaust gas. The main function of a ternary catalyst is to cause the exhaust gas to burn again during the emission process under the action of the catalyst, and to neutralize harmful gases through chemical reactions. The ternary catalyst is generally installed inside the muffler. With the development of engine technology, small displacement engines no longer require the ternary catalyst to meet exhaust emission standards.

After the engine has been running for a period of time, carbon particles in the exhaust gas will adhere to the exhaust port of the muffler. After a long period of sedimentation, it will block the exhaust port of the muffler, causing the exhaust to be blocked and affecting the use of the engine. When there is black carbon accumulation at the exhaust port of the muffler, it needs to be cleaned (see muffler maintenance for cleaning methods).

Exhaust gas circulation. The "exhaust gas" referred to here refers to a small amount of high-temperature gas in the combustion chamber that passes through the piston ring and enters the inside of the box during engine operation (the piston ring cannot be 100% sealed), as well as the oil vapor generated by the engine oil at high temperatures. These gases must be discharged from the engine box, otherwise it will increase the pressure inside the box and damage the engine. These "exhaust gases" cannot be directly discharged into the natural environment (causing environmental pollution), so the engine is specially designed with an exhaust gas circulation system to concentrate and guide the exhaust gas into the exhaust gas filtration system, filtering out the oil in the exhaust gas, and the remaining gas enters the air filter, carburetor, and combustion chamber for secondary combustion.

Exhaust Abnormalities and Faults

Common exhaust faults generally include the following:

Blue Smoke

Mainly due to burning engine oil causing blue smoke from the engine.

1. Too much oil is added and enters the combustion chamber.
2. The machine is inverted, and the oil enters the air filter, carburetor, and then the combustion chamber through the oil passage. The engine can be run for a short period of time.
3. When the machine is inverted and the oil enters the muffler through the oil duct, it will generate thick blue smoke, allowing the engine to run for an additional period of time until the oil inside the muffler is completely burned.
4. The quality of the engine oil is poor, and the viscosity is poor. At high temperatures, oil vapor enters the combustion chamber. The additional performance is severe fuel injection in the exhaust pipe and fast oil consumption.
5. If the piston ring fails (or is installed incorrectly), the piston ring loses its airtightness, and the oil inside the box enters the combustion chamber to produce blue smoke. In this case, replacing the piston ring by a professional can solve the problem.

Black Smoke

Insufficient combustion causes the engine to emit black smoke.

1. Check the air inlet of the generator to ensure it is not blocked.
2. Check the choke to ensure it is in the open position; The additional performance is unstable engine operation and low RPM.
3. If overloaded, reduce the load power and allow the engine to operate under normal operating conditions.
4. The atomization effect of the carburetor is poor or the ambient air pressure is low. When the engine is used in high altitude areas, due to the lower atmospheric pressure, the atomization effect of the carburetor becomes worse, and the oxygen content decreases, causing incomplete combustion and black smoke.

5. When the engine first starts, the choke is in the closed position, with low oxygen content and insufficient combustion. When the choke is opened, a large amount of black smoke is emitted.

White Smoke (see “Troubleshooting”)

There is a Blasting Sound During Shutdown (see “Troubleshooting”)

Silencer Turns Red (see “Troubleshooting”)

Spit Fire

Abnormal combustion causes the engine to spray flames.

1. Poor gasoline quality. Abnormal combustion.
2. The gasoline grade is low. The combustion rate of gasoline does not match the compression ratio and valve timing of the engine. If the combustion rate of gasoline in the combustion chamber is too slow, there will be a phenomenon of sparking. In theory, when the piston reaches the top dead center, the gasoline should have burned completely. If it has not yet burned completely, when the exhaust valve is opened, the burning flame will be discharged.
3. The ignition timing has changed. The ignition advance angle is too small, resulting in incomplete combustion of gasoline and the emission of flames. This situation should be repaired by professional personnel.
4. The timing is incorrect. The valve timing changes, and the opening and closing times of the intake and exhaust valves change. This situation should be repaired by professional personnel.

COOLING SYSTEM

The engine (internal combustion engine) generates a lot of heat when it runs, and this heat needs to be discharged in time to keep the engine in a good operating environment. The inverter generator set needs to discharge not only the heat of the engine, but also the heat of the generator, as well as the heat of the inverter and electrical parts, so the cooling air duct of the inverter generator set is crucial.

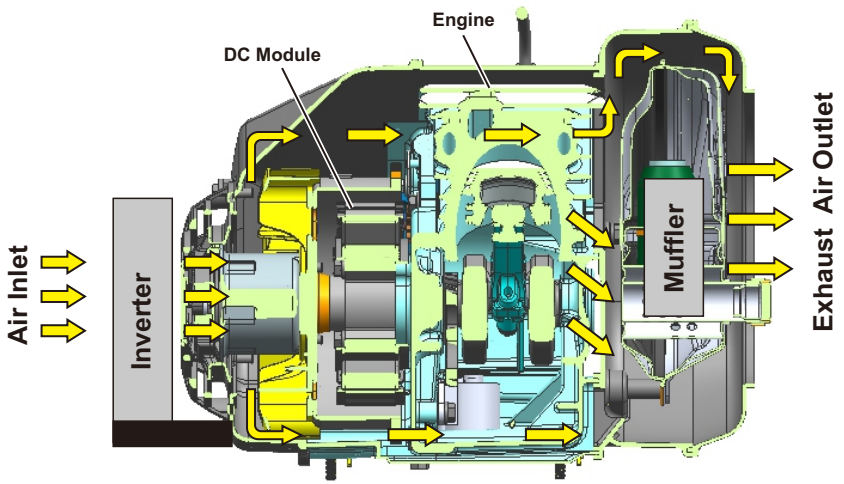
Overheating of generators can occur as follows:

1. The inverter will be protected by high temperature and disconnect the output, at which point the fault light comes on.
2. The engine runs erratically and the power drops.
3. Cylinder head temperature increases, thermal expansion and deformation, poorly closed valve leakage, valve deformation, valve carbon build-up, power drop, exhaust gas overload, hot engine start difficulty, service life decline.
4. The temperature of the body increases, the cylinder bore is deformed, the piston ring seal is not tight, the oil loss increases, the amount of exhaust gas increases, the exhaust gas exceeds the standard, and the combustion chamber accumulates carbon.
5. The life of electrical components is reduced, the aging of rubber parts is aggravated, and the motor winding burned out, etc.

Cooling air duct circulation process of inverter generator:

Air Inlet → Inverter → Motor → Engine → Muffler → Exhaust Air Outlet

Schematic diagram of the cooling air flow process inside the variable frequency generator set



From the above figure, it can be seen that all the cooling air for the variable frequency generator comes from the air inlet. If the air inlet is blocked, the entire generator will overheat.

The air entering the air inlet is divided into two parts after passing through the inverter:

1. After entering the motor and engine, dissipate heat.
2. Enter the air filter and enter the combustion chamber through the carburetor.

Therefore, when the air inlet is blocked, it not only causes the machine to overheat, but also causes

insufficient combustion and a decrease in engine power. So the air inlet must be kept unobstructed.

If the exhaust outlet is blocked, heat will accumulate inside the generator set, causing the temperature to become higher and higher.

The heat output of the muffler is relatively high, requiring a large amount of air flow for cooling, and the air duct should surround the muffler as much as possible. If the exhaust port of the muffler is clogged with carbon deposits, the engine exhaust cannot be effectively discharged, which can also cause the temperature of the generator to rise.

LUBRICATION SYSTEM

When the engine is running, the lubricating oil is driven by the lubrication mechanism to lubricate the various motion pairs of the engine through various oil channels, reducing frictional resistance, taking away frictional heat, and cleaning impurities.

The Role of the Lubrication System

Lubricate each motion pair. The operation of the engine cannot be separated from various motion mechanisms, which are designed and processed with great precision and have very small fitting gaps. It is necessary to reduce frictional resistance and prevent the engine from locking up.

The following is a detailed explanation of the lubrication and faults of the two main motion pairs in the engine.

Piston - Cylinder Bore

The piston moves back and forth at high speed and bears the high temperature of the combustion chamber. While lubricating, the lubricating oil also carries away the heat on the surface of the piston and cylinder bore, preventing the piston and cylinder bore from expanding and deforming due to high temperature.

Troubleshooting:

a. The piston is locked. The piston is stuck in the cylinder bore and cannot move back and forth. Mainly due to the severe expansion and deformation of the piston caused by high temperature.

- Allow the engine to cool sufficiently, check and replenish sufficient qualified engine oil.
- Check if the exhaust port of the muffler is clogged with carbon deposits, which may cause insufficient exhaust and cause the machine to overheat.
- Check the cooling system. For example, whether the cooling fan, air inlet, and exhaust outlet of the engine are blocked.

b. Carbon accumulation in the combustion chamber. The piston ring is stuck or fails. During the piston movement, carbon particles scratch the surface of the piston and the inner surface of the cylinder bore, resulting in severe tensile marks.

- Insufficient combustion, check if the air inlet is blocked.
- Check if the air filter element is blocked.
- The location where the generator is used has a high altitude and insufficient combustion.
- Burn engine oil, cause carbon buildup on the piston ring to get stuck, replace the piston ring.
- Clean the air filter element to prevent dust from entering the combustion chamber.

Crankshaft - Connecting Rod

The crankshaft rotates with the force of the work done by the piston. The lubrication of the crankshaft is very important and the lubricant has to play a role in cleaning up impurities here.

Troubleshooting:

The crankshaft is locked. Lack of oil and high levels of impurities in the oil.

- Add sufficient qualified engine oil.
- Regularly change the engine oil to avoid accumulation of impurities.
- Clean the air filter element to avoid dust from the air entering the combustion chamber, causing the piston ring to become stuck and not sealed tightly, and the carbon deposits after combustion entering the engine oil to form impurities.

Valve - Valve Guide

During the reciprocating movement of the valve, it also bears the high temperature of the combustion chamber, making it easy to deform and accumulate carbon.

Carbon accumulation in the valve can cause the valve to stick and not close tightly. It can cause a sudden and significant decrease in power, abnormal exhaust, etc.

Valve deformation can cause the valve to not move back and forth normally, and the valve cannot open or close normally, leading to engine malfunction, such as inability to start or sudden shutdown.

Troubleshooting:

a. Valve stuck. Due to carbon accumulation in the valve, impurities inside the lubricating oil when cooling and lubricating the valve form carbon accumulation at high temperatures, which accumulates on the valve stem and causes the valve to jam.

b. Carbon buildup on the valve.

- Due to impurities in the lubricating oil, replace the lubricating oil regularly.
- Burn engine oil. The wear of the valve stem decreases, and lubricating oil enters the combustion chamber along the valve stem, forming carbon deposits and adhering to the valve stem after combustion. Replace the valve.

- The oil baffle is invalid. The sealing rubber ring of the oil baffle has aged and lost its sealing effect, causing lubricating oil to enter the combustion chamber and form carbon deposits attached to the valve stem after combustion. Replace the oil shift cover.
- The machine overheats, causing the lubricating oil in the cylinder head to carbonize and adhere to the cylinder head wall and valve stem, resulting in carbon deposition. Check the cooling system.

Heat Dissipation

When lubricating oil circulates inside the engine, it will take away a large amount of heat from the engine and lower the engine temperature.

Clean Up Impurities

When lubricating oil circulates inside the engine, it will remove impurities from each moving pair to prevent them from locking up. Therefore, it is necessary to regularly check and replace the lubricating oil. If used in a dusty environment for a long time, it should be checked and replaced daily to keep the oil clean and sufficient.

Maintenance of Lubricating Oil

- Lubricant filling and replacement.
- Check the amount of lubricating oil.
- Selection of lubricating oil.
- Troubleshooting abnormal oil consumption rate.
- The impact of too much or too little lubricating oil.

Excessive Lubricant Filling

1. The machine overheats.
2. Burn engine oil and emit blue smoke from the muffler.
3. The amount of engine oil or oil vapor sprayed into the exhaust pipe increases, and a large amount of engine oil flows out of the air filter.

Insufficient Lubrication Oil Filling

1. Insufficient lubrication, causing various motion pairs to lock up.
2. Unable to effectively clean impurities in each motion pair, resulting in motion pair locking (mainly manifested as crankshaft locking and piston locking).
3. The oil alarm system is working and the machine cannot start.