

# INVERTER GENERATOR

## Model DIG1800

### USER'S MANUAL



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Dear customer

Thank you for buying our inverter generator.

- The copyright of this specification belongs to ELBRO AG.
- Any contents of the manual shall not be copied without the written permission of ELBRO AG.
- ELBRO AG reserve the right of modification of product and revision of the manual without any notice.
- This manual includes instructions for the operation and maintenance of generators. Please read the instruction carefully before using, otherwise the wrong operation may lead to safety trouble or equipment damage. Proper and safe operation will extend the service life of generator.
- ELBRO AG will continue to innovate and improve the design and quality of products.
- All the contents of this book are in line with the latest products at the time of printing this book.
- If there is any trouble, or do not know about the generator, please consult the after-sales service department of ELBRO AG.
- As long as follow the operation of this manual book, the ELBRO's inverter generator is safe and reliable. Be sure to read the manual before using, otherwise the wrong operation will lead to safety risks or equipment failure.

To ensure personal and property safety, please read the following carefully.

## 1. SAFETY INFORMATION

Before use, add gasoline to the red ring in the tank!

Check the oil level before use!



**The engine tail gas contains carbon monoxide, and it is strictly prohibited to run the generator indoor or at a place where the ventilation is not good.**

- Ensure that adequate ventilation is provided while the generator is in operation.
- The muffler is hot when the generator is running and a certain time after use. Be careful not to touch it.
- Under certain conditions, gasoline is extremely flammable and explosive.
- Be sure to add gasoline in a well-ventilated place. Turn off the engine and let it cool down before filling.
- When refueling, keep away from open fire.
- If there is a spill while refueling, wipe the spilled gasoline immediately.
- Using should be prohibited in places with high fire risk.
- Do not connect the generator to the power system because it may cause people to die from electric shock when they come into contact with the wire; damage the generator or damage the home appliance.
- A pre-operation check must be performed before starting the

engine to avoid accidents or equipment damage.

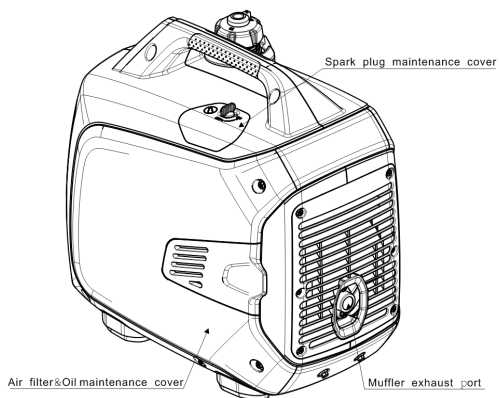
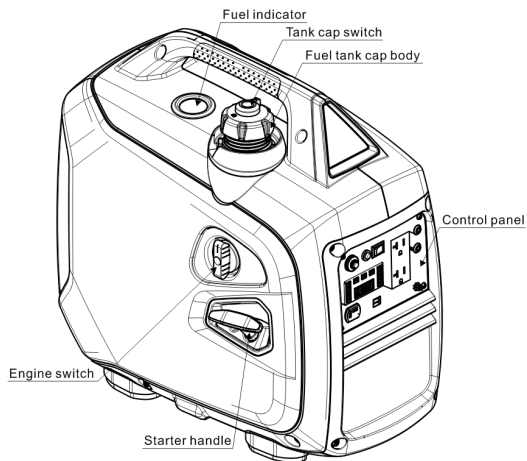
- Generators must operate at least one meter away from the building and other equipment.
- Please put the generator on the horizontal ground. If the generator is tilted, it may cause gasoline overflow.
- Be sure to master how to quickly shut off generators and understand the operation of all control components.
- Children and pets must stay away from the operating area. While the engine is running, all personnel must be away from its rotating parts.
- If the operation is not proper, there is a potential danger to the generator.
- Do not operate the generator with wet hands.
- Do not operate while raining or snowing, lest wet generator.
- Maintenance of generators has to be carried out by professionals.



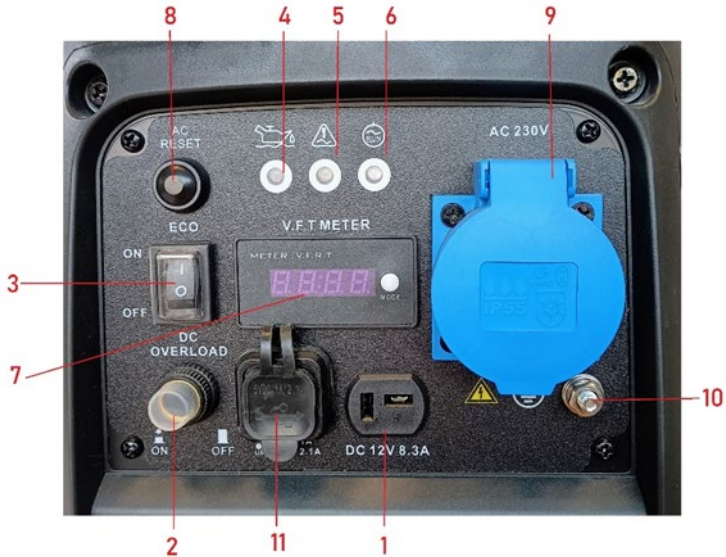
**It is strictly forbidden to use generators in an indoor or enclosed environment!**

- Do not use in environments with explosion hazard.
- The operation and maintenance of equipment requires the use of personal protective equipment such as gloves, earmuffs, etc.

## 2. COMPONENTS IDENTIFICATION



## 1) Control Panel



1. DC output socket
2. DC overload protector
3. ECO switch
4. Low oil indicator (Yellow)
5. Failure indicator (Red)
6. Running indicator (Green)
7. Display
8. AC overload protector
9. AC output socket
10. Ground protection
11. USB output socket

## 2) ECO switch

### Energy conservation

When the energy-saving switch is in the energy-saving position, the generator is in the energy-saving state. When disconnecting or using low power, the engine automatically returns to a low speed state, thus reducing engine fuel consumption.

### Full speed

When the energy-saving switch is in full-speed position, the engine will remain in a high speed state.



- In order to reduce the change of voltage, the energy saving switch should be in the position of "full speed" when the electrical equipment needs a large instantaneous power, or when the generator is connected with the load of some high power apparatus at the same time.
- When using 12 V DC output, put the energy-saving switch in full-speed position.
- "Full speed" means that the energy-saving state is off and the engine is always at high speed, which is suitable for the situation when the load of electrical appliances varies greatly.



- In the non-overload state, the output cannot be restored by pressing the reset key.
- After being switched off five times by the overload switch, the generator must be restarted.

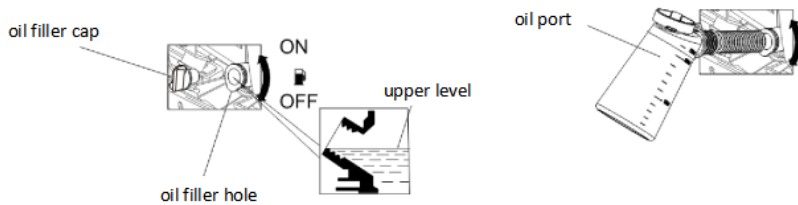


### 3. PRE-OPERATION CHECK

Before using, make sure the generator is placed on a horizontal floor and do not start the engine.

#### 3.1) Check oil level

Remove the dipstick and wipe it with a clean cotton cloth. Re-rotate into the crankcase and remove. Check the oil level. If the oil level is below the oil gauge indicator line, please add oil.



- Do not use 2-stroke oil or detergents-free oil, otherwise the engine life will be shortened.
- Use only high-quality 4-stroke oil that meets or exceeds the classification required for car engines.
- Select oil suitable viscosity according to the average temperature in your area.

The SAE viscosity grade is shown in the following table:

Environmental temperature	Oil type
-25°C - 30°C	10W-30
-15°C - 40°C	15W-40



Store and use oil carefully to prevent dirt or dust from falling into the oil. When adding oil, wipe the area around the refueling opening. Do not mix different specifications of oil to prevent negative effects on oil performance.




Running the engine when the oil level is low can seriously damage the engine.

The engine oil alarm system automatically shuts off the engine before the oil level is lowered to safety limits. However, in order to avoid inconvenience caused by unexpected shutdown, we recommend that you check the oil level regularly.

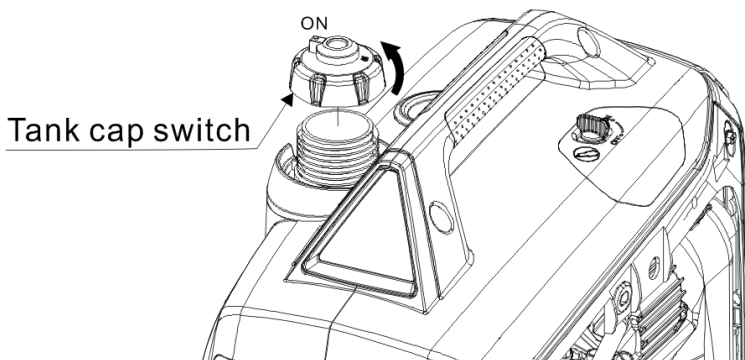
### 3.2) Check fuel level

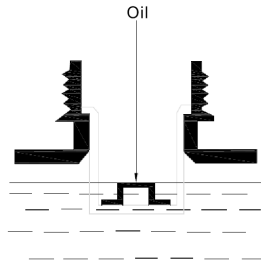
- Please use unleaded gasoline 95 or higher level.
- Do not use a mixture of oil and gasoline or dirty gasoline.
- Prevent dirt and water from entering the tank.
- Do not use gasoline containing more than 10% ethanol or gasoline containing methanol, otherwise the engine will be

seriously damaged.

 **WARNING**

- Under certain circumstances, gasoline is extremely flammable and explosive.
- Please refuel in a well-ventilated place and shut down the engine. No pyrotechnics are allowed in the engine refueling area and gasoline storage area.
- Gasoline shall not overflow the tank (the gasoline level must be lower than the red level indicator). After refueling, tighten the tank cover.
- After refueling, dry the remaining gasoline with a clean and soft cloth.
- Avoid prolonged, repeated contact with gasoline or inhalation of gasoline vapor.
- Do not allow children to touch gasoline.



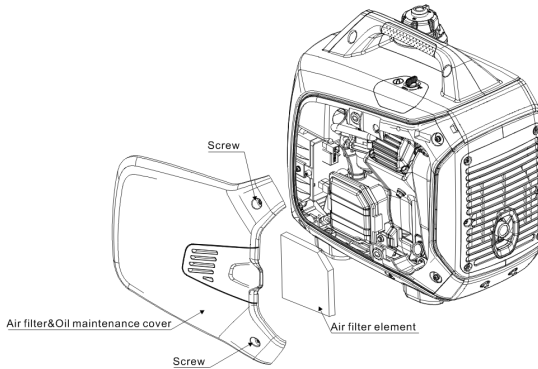


Tank capacity: 4.0 l

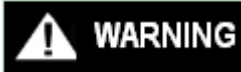
### 3.3) Check air cleaner

Check the air filter to make sure it is clean and functional.

- A、 Loosen the air cleaner maintenance cover screw and remove the air filter maintenance cover.
- B、 Snap open the Air Cleaner cover, and remove it.



- C、 Take out the air filter element. If necessary, clean or replace the filter element.



The engine is not allowed to run without an air filter element, otherwise dirt will enter the engine and cause rapid wear and tear.

#### 4. STARTING THE ENGINE



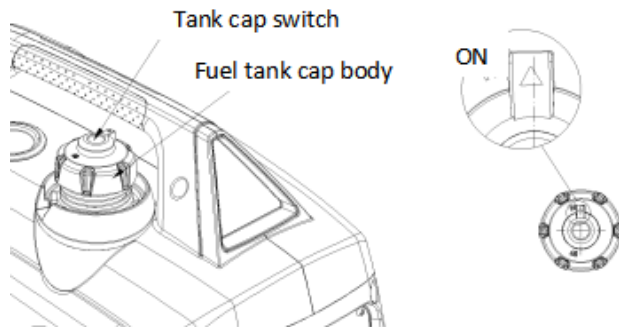
- Disconnect the electrical equipment from the alternator's AC socket before starting the engine.
- For initial use (long unused, start after gasoline is used up), turn the engine switch knob to "ON" position for 10 to 20 seconds before starting, so that gasoline can enter the engine carburetor.



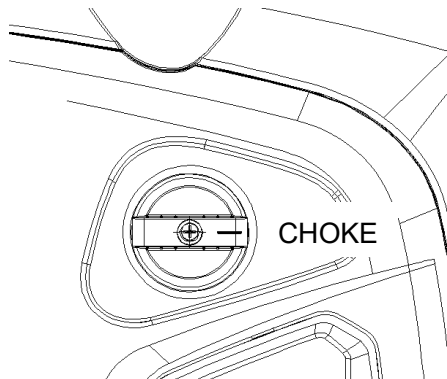
**It is strictly forbidden to use generators indoor and in closed environment.**

1.The tank cap switch rotates to "ON" position.

Note: When the generator is being transported, the tank cover switch shall be cranked to the position of the "OFF".



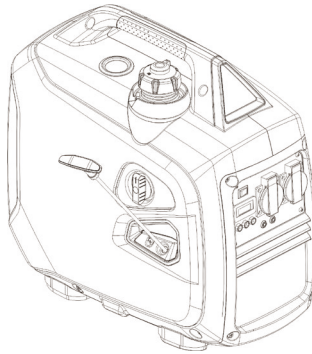
2. Turn the engine switch knob of the generator to the "CHOKE" position.



3. Pull out the choke lever completely.

Note: when the engine is hotter or the ambient temperature is higher, the choke lever does not need to be pulled out.

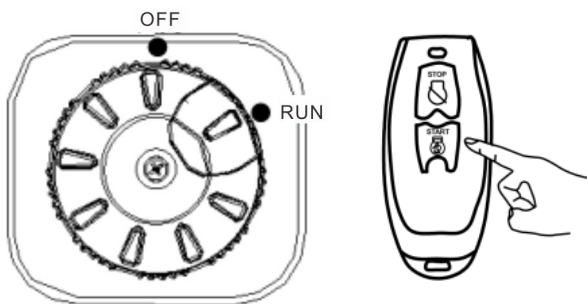
4. Gently pull the start handle until the resistance is felt, and then quickly pull in the direction shown by the arrow in the figure below.



 **WARNING**

- Pay attention to pull the starting handle, the pull angle should not be too large, to prevent the handle from wearing the housing.
- Do not allow the starting handle to rebound and retract automatically to avoid damage to the shell. Slowly put the starting handle back.

5. When the engine is running, turn the engine switch to the running position.



6. When the generator starts, place the AC circuit protector in the "connected" position, then the electrical load can be used.



The generator is designed for use at a maximum sea level of 1500 m.

## 5. USING THE GENERATOR



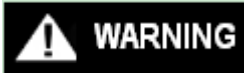
- In order to prevent electric shock due to improper use, the generator shall be grounded.
- As a backup power source, the generator cannot be connected to the grid company's power system.



- Do not overload the generator.
- Do not connect the generator to the power grid company's household power system, otherwise it may cause people to die from electric shock when they come into contact with the wire; and damage the generator or the household appliances.
- Do not run in parallel with other generators.
- Do not lengthen engine exhaust pipe.
- For extended cables, use flexible cables such as rubber sleeves (compliant with electroSuisse or corresponding requirements). Cable length limit: 2.5 mm<sup>2</sup> cable length 60 m; 4.0 mm<sup>2</sup> cable length 100 m.



- Keep generators away from other wires and cables, such as distribution networks.

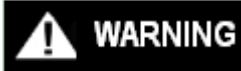


- When using AC power, you can use DC power at the same time.
- If using both AC and DC output sockets, note that the total power does not exceed the sum of AC and DC power.

## 5.1 DC application

The output voltage of DC socket is 15-20 V. It's designed for 12V DC load only.

### 5.1.1 Start the engine



- When AC power is used, DC power supply can be used.
- If the DC current is overloaded, the DC overload protection may be triggered. First remove the DC load, wait a few minutes and press the DC overload protection key for reset.

## 5.2 AC application

5.2.1 Start the engine, make sure the AC output light (green) is on.

5.2.2 Turn off the power supply switch and plug the device into the generator's output socket.

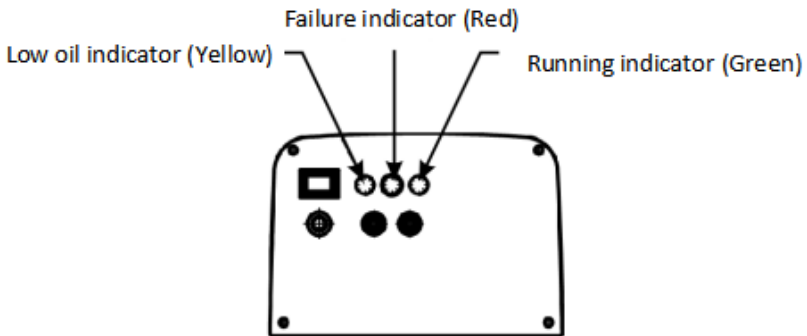
5.2.3 In order to obtain the best operation effect and the maximum service life of the generator, the new generator should run for at least 20 hours under 50% load, so that the engine performance can be optimized.



Before connecting the alternator output, make sure the electrical equipment is working properly. If during use, the electrical equipment suddenly stops working or is not working properly, the electrical equipment should be immediately disconnected and the engine has to be stopped.

### 5.3 Operation indicator light, fault indicator light.

- Under normal operating conditions, the operating indicator (green) light is on.
- If the generator is overloaded, or if the connected electrical equipment is short-circuited, the operating indicator light (green) is extinguished, and the fault indicator (red) is turned on, the output power will be cut off, but the engine will still operate.
- If the fault indicator (red) lights are on, disconnect the electrical equipment first. If the fault indicator (red) is extinguished and the operation indication (green) is on, reconnect the electrical equipment, otherwise shut down the engine and check for malfunction.



### 5.4 Low oil level alarm system

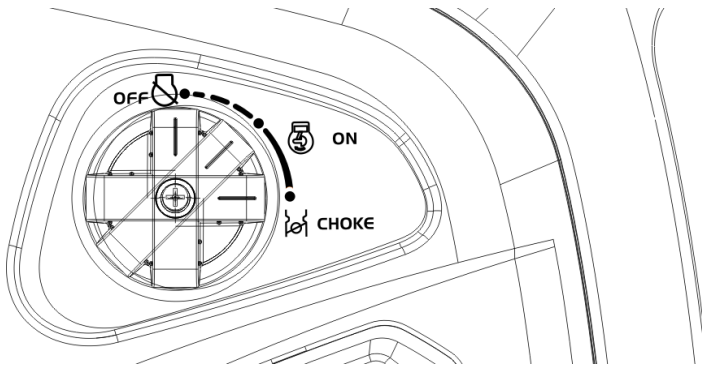
- The low oil level alarm system is designed to prevent engine damage due to insufficient oil in the crankcase. The low oil level alarm system automatically shuts down the engine before the engine oil in the crankshaft box is lowered too low (the generator engine switch remains "on").

- After the low oil level alarm system shuts down the engine, if you start the engine again, the low oil alarm indicator (yellow) lights up and the engine cannot run. If this happens, please re-fill some proper engine oil.

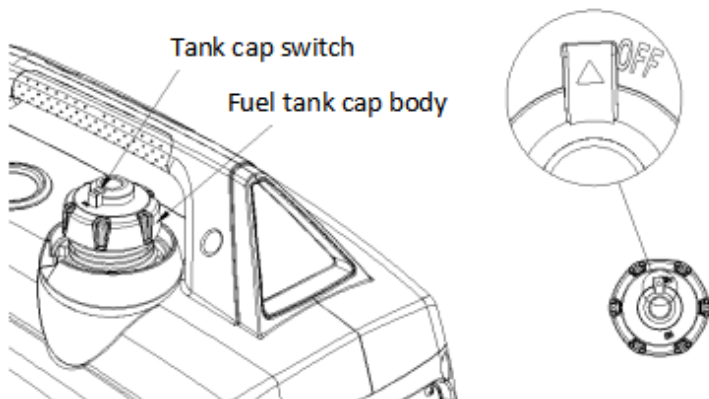
## 6. STOPPING THE ENGINE

To stop the engine in an emergency, turn the Engine Switch to the "OFF" position.

1. Switch off the connected electrical appliances and pull out all inserted plugs.
2. Turn the Engine Switch to the "OFF" position.



3. After the engine has cooled down completely, turn the fuel tank cap switch counterclockwise to the "OFF" position.



Be sure the fuel tank cap switch and Engine Switch locate the “OFF” position, when stopping, transporting, and storing the generator.

## 7. MAINTENANCE

The purpose of maintenance and periodic maintenance is to keep the generator in the best operating condition.



Stop the engine before performing any maintenance. If the engine must run, be sure the area is well ventilated because of the exhaust contains poisonous carbon monoxide gas.



To ensure the quality, please use our original spare parts or the same quality parts when replacing damaged parts.

## Maintenance Schedule

Regular Service <u>Period</u> (3)		Each use	First month or 10 hrs	Every 3 months or 50 hrs.	Every 6 months or 100hrs	Every 2 years or 200 hrs.
Item						
Engine oil	Check level	⊙				
	Replace				⊙	
Air cleaner	Check	⊙				
	Clean			⊙(1)		
Spark plug	Check-adjust			⊙		
	Replace					⊙
Spark Collector	Clean				⊙	
Valve Clearance	Check-adjust					⊙ (2)
Fuel tank & filter	Clean				⊙	
Cylinder	Clean	After every 300 hrs (2)				
Fuel line	Check	Every 2 years (Replace if necessary) (2)				

(1) Maintenance more frequently when used in dusty areas.

(2) The maintenance items in this part need professional maintenance tools and skills.

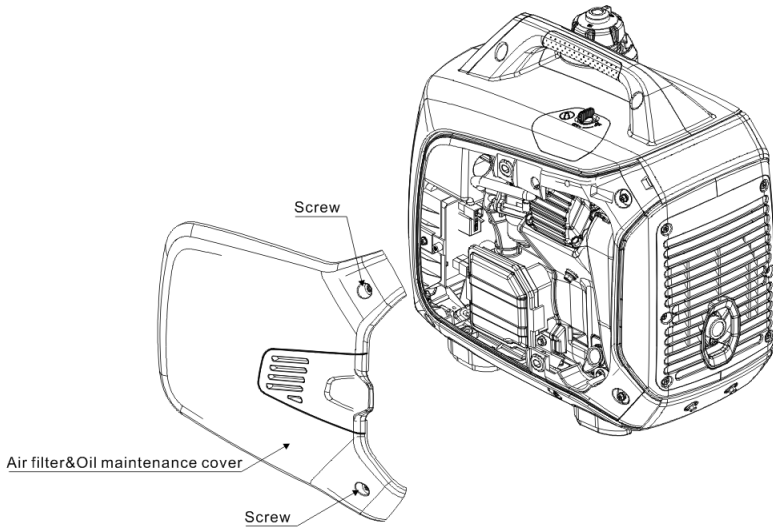
(3) If it is used commercially, the maintenance frequency can be increased due to long-term use.

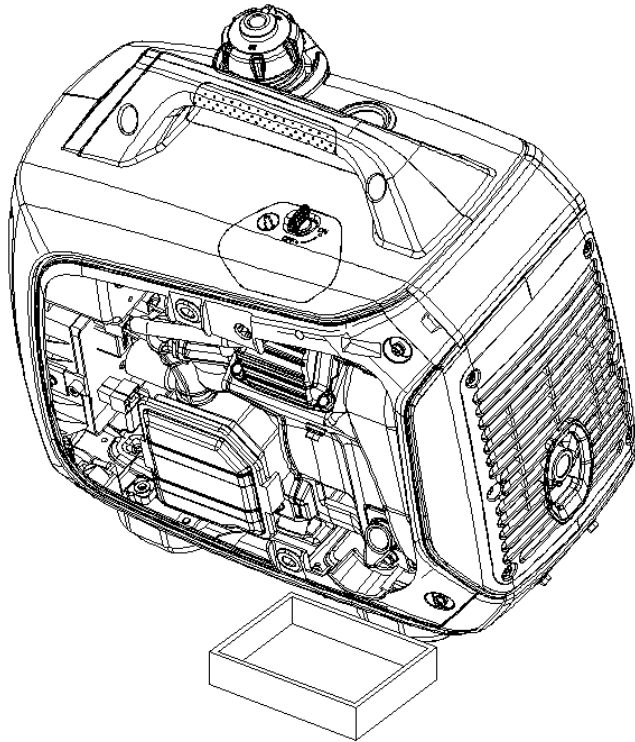


## 7.1 Change Oil

After engine shut down, the oil should be removed quickly and completely.

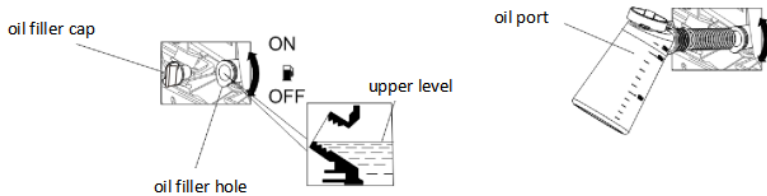
1. Loosen the air filter maintenance cover screw and remove the air filter maintenance cover.





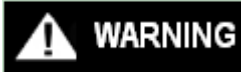
2. Take out the dipstick.

3. Drain out dirty oil.



4. Refill the recommended oil and check the oil level.

5. Re-install the air filter maintenance cover and tighten the dipstick.



For conforming to the environment requirement, the used oil has to be put into a sealed container and then be transported to the service station for recycle. Do not throw it into the trash or pour it on the ground.

## 7.2 Air Cleaner

A dirty Air Cleaner will restrict air flow into the carburetor. Please clean and maintain the air cleaner regularly to prevent carburetor from breaking down. If generators are often used in high dust areas, they need to be maintained more frequently.

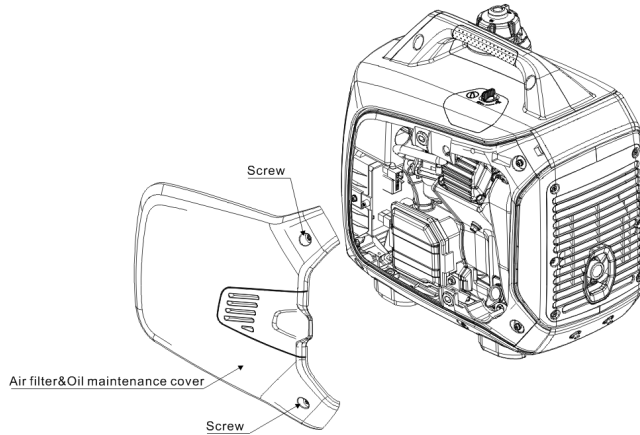


Do not use gasoline or low ignition point solvents for cleaning. They are flammable and explosive under certain conditions.

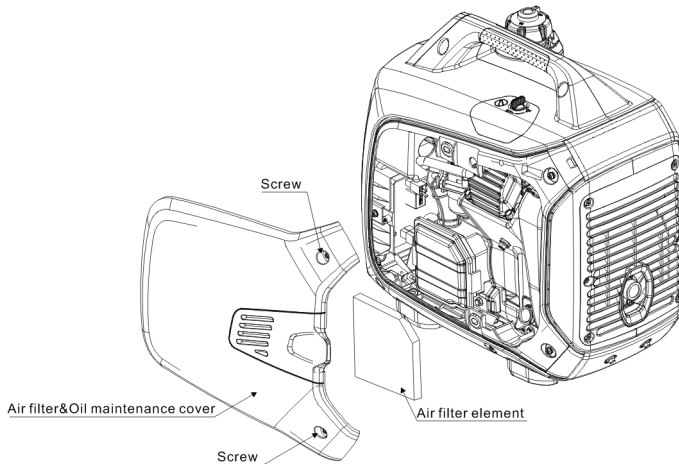


Never run the generator without air cleaner, otherwise that result in engine abrasion rapidly.

A、 Loosen the maintenance cover screws and remove the maintenance cover.

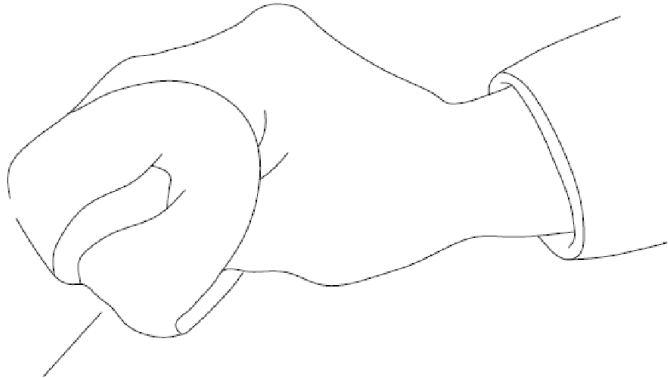


B、 Snap open the Air Cleaner cover, and remove it.



C、 Take out the Air Cleaner element. The filter is cleaned with a special liquid, tapped out or blown through with compressed air and left to dry.

D、 Afterwards, the filter is sprayed with a special oil. These products are available in DIY stores or motorbike accessory shops.



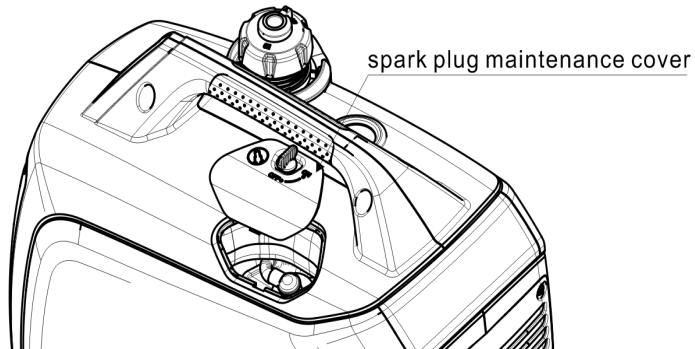
Air filter element

- E、 Re-install the Air Cleaner element and cover.
- F、 Re-install the maintenance cover, and tighten the screws.

### 7.3 Spark Plug

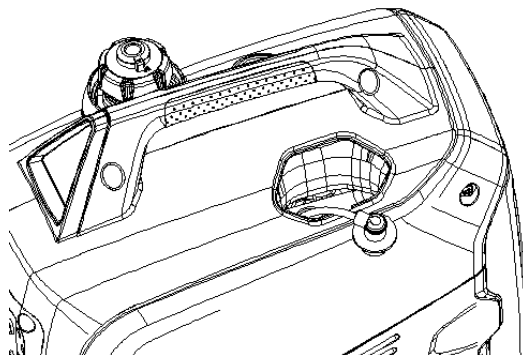
In order to ensure normal engine operation, spark plug clearance must be appropriate, spark plug no carbon incrustation.

7.3.1 Remove the spark plug maintenance cover.



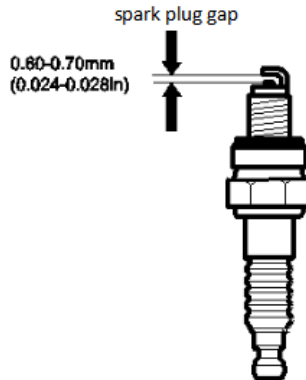
7.3.2 Take off the spark plug cap.

7.3.3 Take off the spark plug with the spark plug spanner.



7.3.4 Visual inspection the spark plug. Change a new one if its insulator cracked or chipped. Clean it with a wire brush if the spark plug is reused.

7.3.5 Measure the spark plug gap with a standard gauge. The normal



value should be:0.6-0.7mm.



The Spark Plug must be securely tightened. Tightening in wrong way will cause Spark Plug hot, even damage the engine. Never use a spark plug with an improper heat range.

- (1) Install the Spark Plug carefully, by hand, to avoid cross-threading.
- (2) A new Spark plug should be tightened 1/2 turn with a spanner for pressing the washer. A used Spark plug should be tightened 1/8 to 1/4 turn with spanner.
- (3) Re-install the spark plug cap.
- (4) Re-install the spark plug maintenance cover and tighten the screws.

## 7.4 Spark Collector

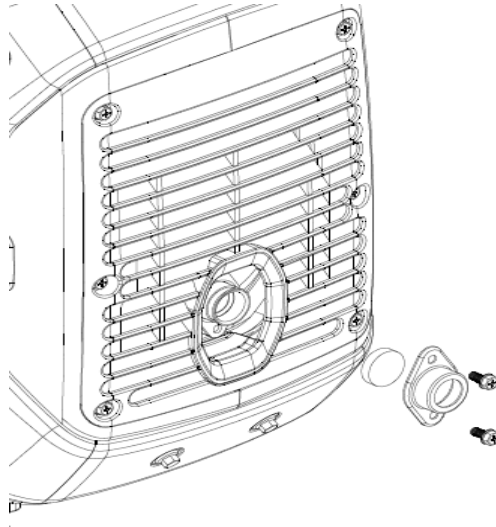


The spark collector must be maintained for every 100 hours of engine operation.

7.4.1 When the muffler is cooled, loosen the screws from the muffler outlet and take off the spark collector.

7.4.2 Use a brush to clean the carbon deposits on the spark collector. If the spark collector is damaged, please replace it.

7.4.3 Re-install the spark collector.





## 8. TRANSPORTING/STORING

Avoid fuel spilling during transporting or temporary storing, both the engine switch and the fuel cap vent leveler should turn to "OFF" position, and the generator should place in normal operating position. After the engine is completely cooled, turn the tank cap switch counterclockwise to the "off" position.

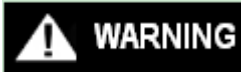


When transporting the generator:

- Do not overfill the fuel tank. (No residual fuel on the neck of tank)
- Do not use the generator on the transport vehicle. The generator should be removed from the car. The generator should be used under a ventilated condition.
- Avoid exposing directly to sun.
- When the generator place in the enclosed transport vehicle for a long time. The high temperature inside the vehicle could cause fuel to vaporize resulting in a possible explosion.
- The generator must not be transported a long time on rough road. If you have to drive on a road like this, drain off the gasoline and oil beforehand.

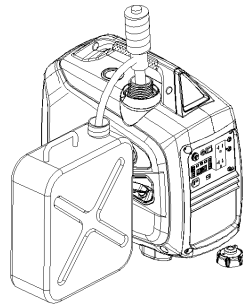
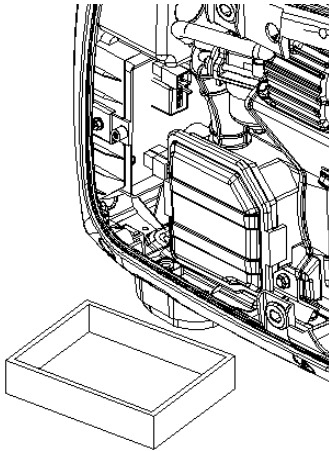
### Storage for a long period:

- 8.1 Make sure the storage area without excessive humidity and dust.
- 8.2 Drain out of gasoline.



Gasoline is explosive and flammable in the specified condition. Fireworks are strictly prohibited near gasoline.

- A、 Drain off the gasoline in the fuel tank, storing into the suitable containers.
- B、 Turn the engine switch to “ON” position, and loosen the carburetor drain screw to discharge gasoline inside of the suitable containers.



- C、 Take off the Spark Plug cap, pull the Starter handle three or four times, discharge the gasoline from the fuel pipe and carburetor.

- D、 Turn the engine switch to “OFF” position, and tighten the drain screw of carburetor.
- E、 Re-install the Spark Plug cap.

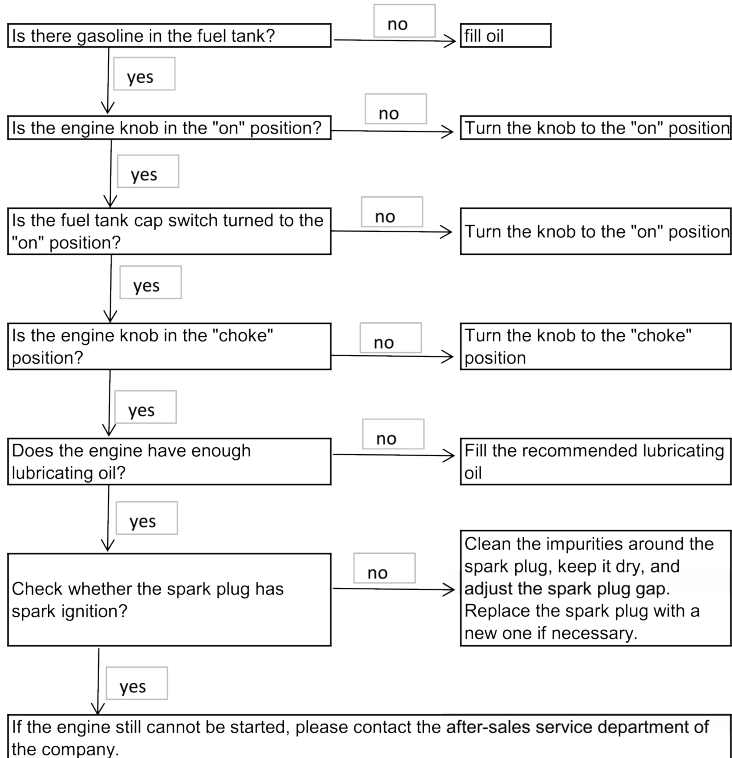
### 8.3 Change the engine oil.

8.4 Remove the spark plug and fill 10-20ml clean engine oil into the cylinder. Slowly pull up the handle and run the engine for several revolutions to evenly distribute the oil, and then reinstall the spark plug.

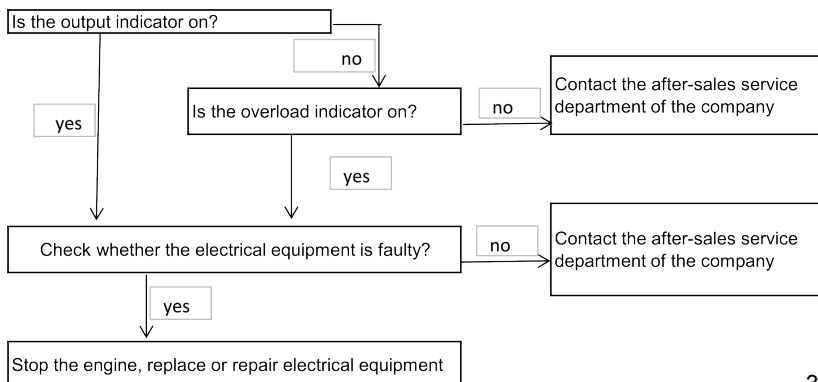
8.5 Pull the Starter handle slowly till resistance is felt. At this point, the piston is coming up on its compression stroke and both the intake and exhaust valves are closed. In this position, it helps to protect the engine from internal corrosion.

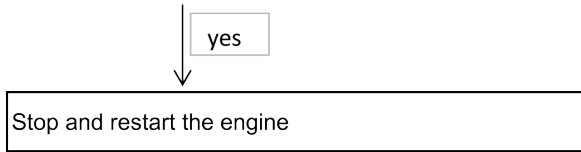
## 9. Common troubleshooting

### Engine does not start:

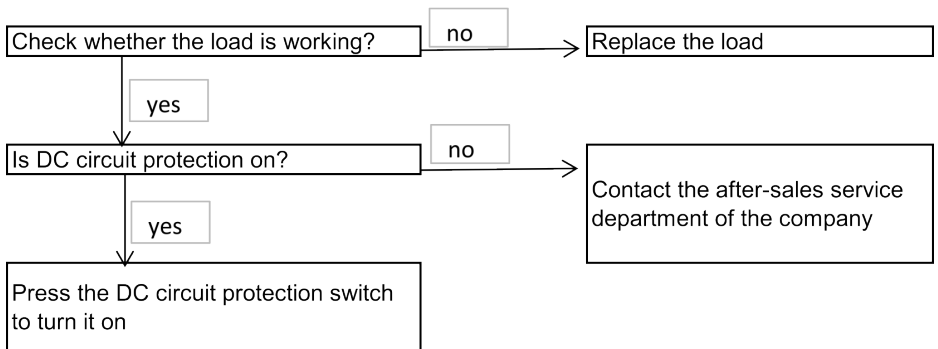


### The equipment connected to the generator cannot be started:





**No current in DC socket:**



## 10. TECHNICAL SPECIFICATIONS

	Specifications	Parameters
ENGINE	Model	K227086
	Type	4-stroke, overhead valve, single cylinder, forced-air cooling
	Engine Displacement(cm3)	79
	Bore*Stroke (mm)	48.6*43.0
	Compression Ratio	9.5:1
	Rated Power (kW/rpm)	2.2/4800
	Ignition System	Full transistor
	Start System	Recoil start
	Fuel Type	Gasoline without lead (95)
	Oil Model	SAE 10W30 / 15W40
GENERATOR	Model	K227086
	Frequency (Hz)	50/60
	Rated Voltage (V)	As in product marking label
	Rated Current (A)	
	Rated Output Power (kW)	
	Max. Output Power (kW)	
	Rated Speed (min-1)	4800
	DC Output	12V, 8.3A
	Fuel Tank Volume (L)	4.0

	Continuous Running Time (h)	4 (Rated power)
	Fuel Consumption (g/(kW,h))	≤500
	Working Ambient Temperature (°C)	-5~40
	Noise (dBA/7m) LpA	69
	Net Weight (kg)	18

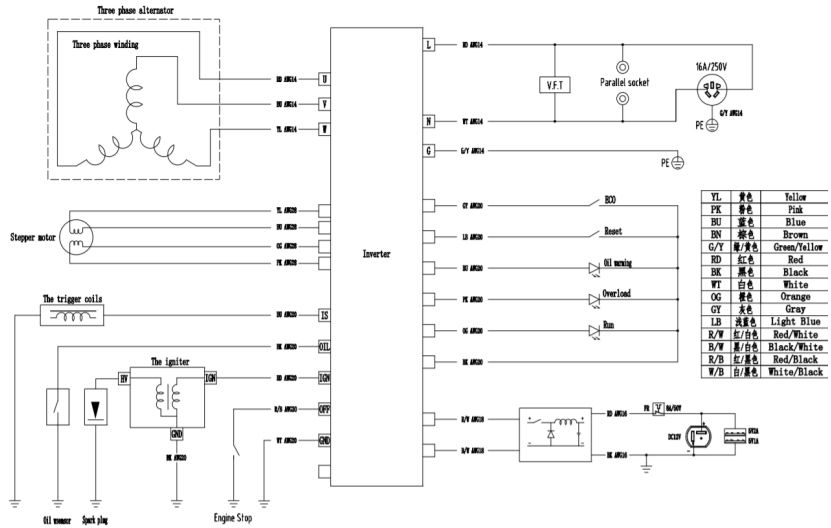
During the noise test, the generator is in energy-saving mode and the energy-saving switch is "energy-saving"

\* LWA shall test the sound power guarantee value at 4m according to the hemispherical method of 2000 / 14 / EC.

\*\* LPA is the measured sound pressure value 7m away from the unit and tested in four directions from no-load to full load.

The noise value of the unit is different in different environments.

# 11.ELECTRICAL DIAGRAM





## 12. APPENDIX

### 1) Environment Correction

The standard condition of rated power output:

Altitude: 0m                      Ambient temperature: 25°C

Relative humidity: 30%

Factor of environment correction:

Altitude (m)	Ambient temperature°C				
	25	30	35	40	45
0	1	0.98	0.96	0.93	0.90
500	0.93	0.91	0.89	0.87	0.84
1000	0.87	0.85	0.82	0.80	0.78
2000	0.75	0.73	0.71	0.69	0.66
3000	0.64	0.62	0.6	0.58	0.56
4000	0.54	0.52	0.5	0.48	0.46

Relative humidity 60% , correction factor C-0.01

Relative humidity 80% , correction factor C-0.02

Relative humidity 90% , correction factor C-0.03

Relative humidity 100% , correction factor C-0.04

Example:

Rated power 1.6KW generator, Altitude: 1000m, Ambient temperature:  
 35°C, Relative humidity: 80%

Rated Output Power:

$$P = P_n * (C - 0.02) = 1.6 * (0.82 - 0.02) = 1.28 \text{KW}$$

## 2) Noise Pollution

Noise pollution measure according to GB 2820-10, EN ISO 3744, European Directive 2000/14/EC and amendment 2005/88/EC

Model of generator set: K227086

Sound Pressure Level: 69 dB(A)

Sound Power Level: 89 dB(A)

Measurement Uncertainty K: 1.7 dB(A)

The quoted figures are emission levels and are not necessarily safe working levels. Whilst there is a correlation between the emission and exposure levels, this cannot be used reliably to determine whether or not further precautions are required. Factors that influence the actual level of exposure of work-force include the characteristics of the work room, the other sources of noise, etc, i.e. the number of machines and other adjacent processes, and the length of time for which an operator is exposed to the noise. Also the permissible exposure level can vary from location. This information, however, will enable the user of the machine to make a better evaluation of the hazard and risk.

### **13.SERVICE INFORMATION**

ELBRO AG will be happy to answer any questions you may have about this product.

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