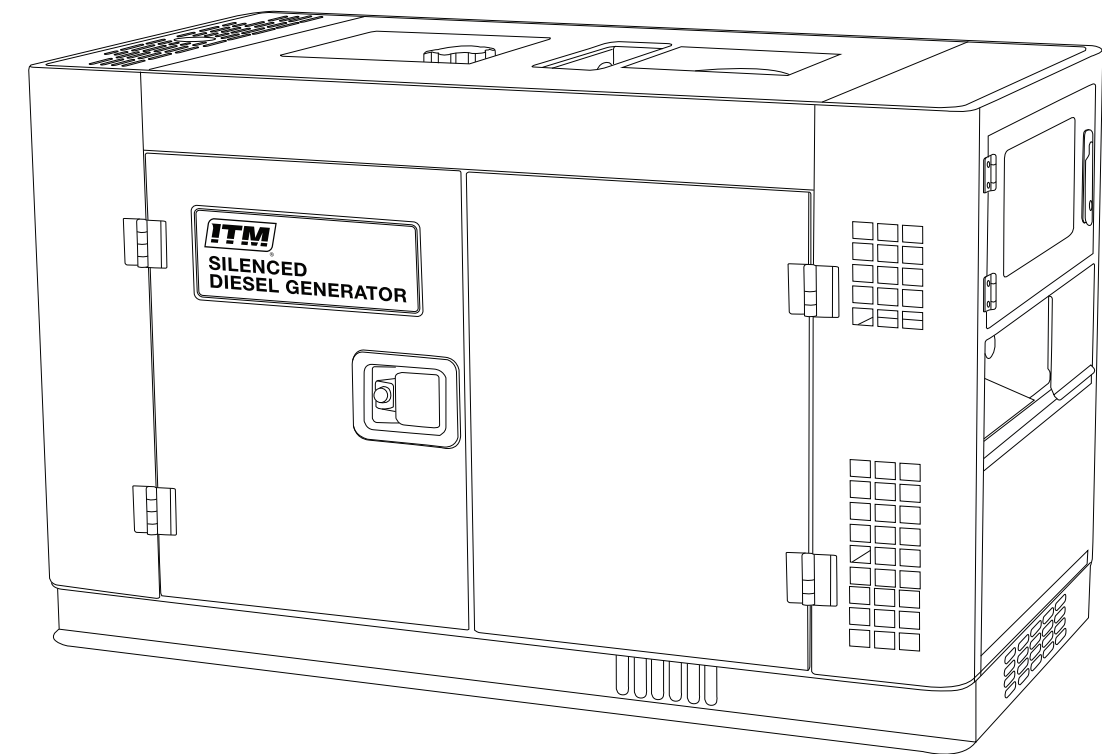


# DIESEL GENERATOR

## OPERATOR'S MANUAL



### PART NO:

- TM524-6500 • TM524-6500S • TM524-8300S • TM524-12000S

**⚠ TO PREVENT SERIOUS INJURY OR DAMAGE TO YOUR GENERATOR, READ AND UNDERSTAND ALL WARNINGS AND INSTRUCTIONS BEFORE USE ⚠**

Ver: 1.0

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**LIMITED WARRANTY**

Industrial Tool & Machinery Sales (hereinafter referred to as ITMS) will, within twelve (12) months from the original date of purchase, repair or replace any goods found to be defective in materials or workmanship.

This warranty is void if the item has been damaged by accident, neglect, improper service or other causes not arising out of defects in materials or workmanship. This warranty does not apply to machines and/or components which have been altered, changed, or modified in any way, or subjected to overloading or use beyond recommended capacities and specifications. Worn componentry due to normal wear and tear is not a warranty claim. Goods returned defective shall be returned prepaid freight to ITMS or agreed repair agent, which shall be the buyer's sole and exclusive remedy for defective goods. ITMS accepts no additional liability pursuant to this guarantee for the costs of travelling or transportation of the product or parts to and from ITMS or the service agent or dealer, such costs are not included in this warranty.

Our goods come with guarantees which cannot be excluded under the Australian Consumer Law. You are entitled to replacement or refund for a major failure and to compensation for other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

**THE MANUFACTURER RESERVES THE RIGHT TO MAKE IMPROVEMENTS AND  
MODIFICATIONS TO DESIGN WITHOUT PRIOR NOTICE.**

PRODUCTS IMPORTED AND DISTRIBUTED NATIONALLY BY:



**INDUSTRIAL TOOL & MACHINERY SALES**  
18 BUSINESS ST, YATALA QLD 4207  
T: 07 3287 1114 E: sales@industrialtool.com.au  
W: www.itmtools.com.au

## PRODUCT SPECIFICATIONS

Thank you for purchasing your GC Series Generator. This generator is fitted with IP66 outlets and RCD meaning it is worksite compliant. With built-in Pure Sine Wave technology (THD<5%), it's also ideal for powering tools, domestic appliances and sensitive electronics.

Please read and understand the content of this manual for safety guidelines, start-up, shutdown, operation, adjustment and maintenance instructions before using this product. Take all possible precautions to protect your own safety and that of the people in the immediate vicinity. Save this manual for future reference.

Model	TM524-6500	TM524-6500S	TM524-8300S	TM524-12000S
Type	Open Frame	Silenced Cabinet	Silenced Cabinet	Silenced Cabinet
Voltage	240V ~ 50Hz	240V ~ 50Hz	240V ~ 50Hz	240V ~ 50Hz
Kva	8.125	8.125	10.375	15
Max Power (W)	6500	6500	8300	12000
Rated Power (W)	6000	6000	7800	11000
Amps	26.1	26.1	34.8	47.8
Horse Power (HP)	10.3	10.3	12.7	19
Engine Type	Air Cooled OHV	Air Cooled OHV	Air Cooled OHV	Air Cooled OHV
Fuel Tank (L)	12.5L	30L	26L	26L
Fuel Type	Diesel	Diesel	Diesel	Diesel
Engine Power cc	499	499	667	997
Noise @ 7m (full load) (dB)	85	73	75	75
Running Time @ 50% load	12 Hours	12 Hours	12 Hours	12 Hours
DC Power	12V 8.3A	12V 8.3A	12V 8.3A	12V 8.3A
AC Outlets	2 x 15A IP66	2 x 15A IP66	1 x 15A IP66, 1 x 32A IP66	2 x 15A IP66, 1 x 32A IP66
Start System	Electric	Electric	Electric	Electric
Pure Sine Wave	No	No	No	No
Alternator	AVR	AVR	AVR	AVR
Total Harmonic Distortion	<5%	<5%	<5%	<5%
Residual Current Device	Yes	Yes	Yes	Yes
Oil Capacity (L)	1.65L	1.65L	2L	2.75L
Recommended Oil	10W30	10W30	10W30	10W30
Low Oil Sensor	Yes	Yes	Yes	Yes
Wheel Kit	Yes	Yes	Yes	Yes
Weight (KG)	124	171	210	320

## GENERAL SAFETY RULES FOR OPERATION

### DANGER



Never use the generator in a location that is wet or damp. Never expose the generator to rain, snow, water spray or standing water while in use. Protect the generator from all hazardous weather conditions. Moisture or ice can cause a short circuit or other malfunction in the electrical circuit.

Never operate the generator in an enclosed area. Engine exhaust contains carbon monoxide. Only operate the generator outside and away from windows, doors and vents.

### WARNING



Voltage produced by the generator could result in death or serious injury.

- Never operate the generator in rain or a flood plain unless proper precautions are taken to avoid being subject to rain or a flood.
- Never use worn or damaged extension cords.
- Always have a licensed electrician connect the generator to the utility circuit.
- Never touch an operating generator if the generator is wet or if you have wet hands.
- Never operate the generator in highly conductive areas such as around metal decking or steel works.
- Always use grounded extension cords. Always use three-wire or double-insulated power tools.
- Never touch live terminals or bare wires while the generator is operating.
- Be sure the generator is properly grounded before operating.

### WARNING



Petrol and petrol vapors are extremely flammable and explosive under certain conditions.

- Always refuel the generator outdoors, in a well-ventilated area.
- Never remove the fuel cap with the engine running.
- Never refuel the generator while the engine is running. Always turn engine off and allow the generator to cool before refueling.
- Only fill fuel tank with petrol.
- Keep sparks, open flames or other form of ignition (such as match, cigarette, static electric source away when refueling.
- Never overfill the fuel tank. Leave room for fuel to expand. Overfilling the fuel tank can result in a sudden overflow of petrol and result in spilled petrol coming in contact with HOT surfaces. Spilled fuel can ignite. If fuel is spilled on the generator, wipe up any spills immediately. Dispose of rag properly. Allow area of spilled fuel to dry before operating the generator.
- Wear eye protection while refueling.
- Never use petrol as a cleaning agent.
- Store any petrol containers in a well-ventilated area, away from any source of ignition.
- Check for fuel leaks after refueling. Never operate the engine if a fuel leak is discovered.

### WARNING



Never operate the generator if powered items overheat, electrical output drops, there is sparking, flames or smoke coming from the generator, or if the receptacles are damaged.



Never use the generator to power medical support equipment.



Always remove any tools or other service equipment used during maintenance from the generator before operating.

### NOTICE

Never modify the generator.

Never operate the generator if it vibrates at high levels, if engine speed changes greatly or if the engine misfires often.

Always disconnect tools or appliances from the generator before starting.

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## **ADDITIONAL SAFETY RULES FOR GENERATORS**

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Do not force the generator. Use the correct generator for your application. The correct generator will do the job better and safer at the rate for which it was designed.

Do not use the generator if the engine switch does not turn it on and off. Any generator that cannot be controlled with the switch is dangerous and must be repaired.

Know exactly how to use the generator correctly. Be thoroughly familiar with proper use of the equipment and all engine controls, output receptacles, and connections. Know how to stop the engine quickly (see "Stopping the Generator").

Instruct operators. The engine owner must instruct all operators in safe engine set-up and operation. Only trained adults should set up and operate the engine – Do not let children operate.

Intended use. Carefully read about and understand the intended use of this engine. Do not use for other purposes, as unforeseen hazards or equipment damage may result.

Never operate, or let anyone else operate the generator while under the influence of alcohol, drugs, or medication.

Do not operate the generator with damaged, missing, or broken parts.

Do not modify the generator in any way. Modifications can create serious safety hazards and will also void the warranty.

Never attempt to modify the generator speed setting. The generator speed is preset for safe and optimal performance of the generator. If speed needs adjusting, it must be done by factory authorised personnel.

Never attempt to connect external fuel sources in order to increase generator run time. Larger tank at pressure or higher elevation will cause to leak from carburetor during operation. Fire or explosion could result.

Always turn off generator and remove spark plug(s) or spark plug wire(s) before working on the generator to prevent accidental starting. Always discharge the capacitor before working on the generator head to prevent electrical shock. (See Maintenance & Repair section of this manual for instructions on how to do this.)

The running of a generator gives off carbon monoxide, a poisonous gas that can kill you. You CAN NOT smell it, see it, or taste it. Follow all instructions for site selection and positioning the generator, and avoid inhaling the exhaust. If you start to feel sick, dizzy, or weak while using the generator, shut off the generator and get to fresh air RIGHT AWAY. See a doctor. You may have carbon monoxide poisoning.

## CHAPTER 2 OPERATING THE DIESEL GENERATOR

### 2-1 General main points of safety during operation of the generator set.

In order to operate the generator set safely, please follow all the instructions provided in this manual carefully. Doing so otherwise may lead to accidents and or equipment damage.

#### 2-1.1 Fire prevention

The proper fuel for the diesel generator set is light diesel fuel. Do not use gasoline, kerosene and or other fuels other than light diesel fuel. Keep all flammable fuels away from the generator as the generator may spark and ignite these gases. In order to prevent fires from occurring and to provide enough ventilation for people and the machine, keep the diesel generator at least 1.5 meters away from buildings or other equipment. Always operate your diesel generator on a level site. If the generator is operated on an incline, the lubricating system within the engine will not perform well and may lead to failure of the engine.

#### 2-1.2 Prevention from inhaling exhaust gases

Never inhale exhaust gases emitted by the generator, these gases contain Carbon Monoxide which can be fatal. Do not operate this generator indoors or in poor ventilated areas.

#### 2-1.3 Prevention from accidental burns

Never touch the muffler and its cover when the diesel engine is running or shortly after use. Muffler and cover can remain hot for a period of time and could cause severe burns if touched.

#### 2-1.4 Electric shock and short circuits

Never touch the generator if the generator is wet, also do not touch the generator with wet hands.

Do not operate the generator in poor weather conditions such as rain, snow or heavy fog. To prevent electric shock, the generator should be grounded using a lead and ground spike.

Fig.2-1

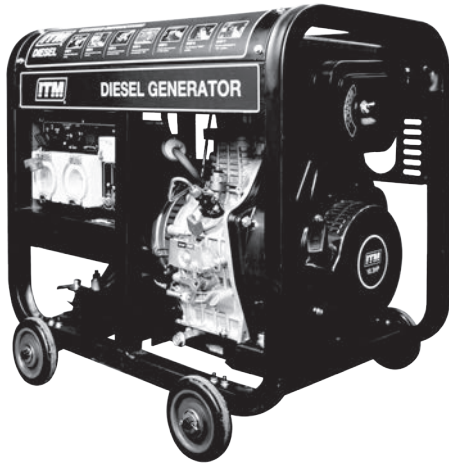
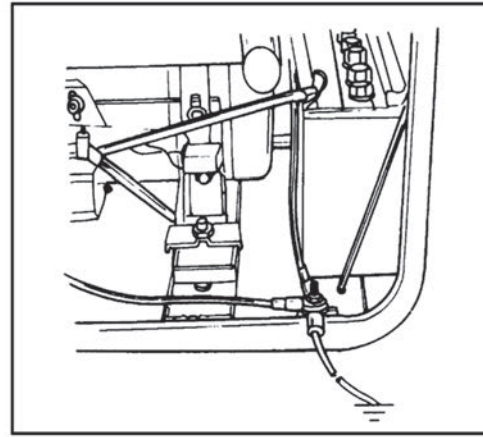


Fig. 2-2



### 2-1.5 Other safety points

Before operating this generator, all operators should have a good knowledge of how to break the circuit if any accidents occur. Also, all operators should be familiar with all the switches and functions of the generator before using this machine. While operating the generator, wear safe shoes and suitable clothes during operation. Always keep children and animals away from the generator.

### 2-1.6 Battery

The electrolytic liquid of the battery also known as battery acid contains sulfuric acid. In order to protect your eyes, skin and clothing, wear protective gear when working with the battery. If you come in contact with the electrolytic liquid, wash it immediately with cleanwater. Also, if the electrolytic liquid comes in contact with your eyes, see a doctor immediately.

## 2-2 Preparation before operation

### 2-2.1 Fuel choices and fuel treatment

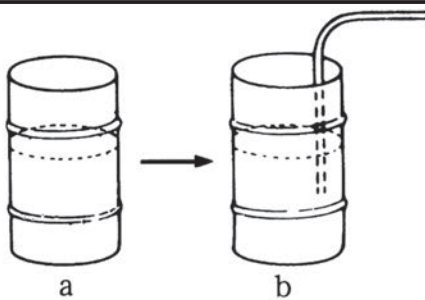
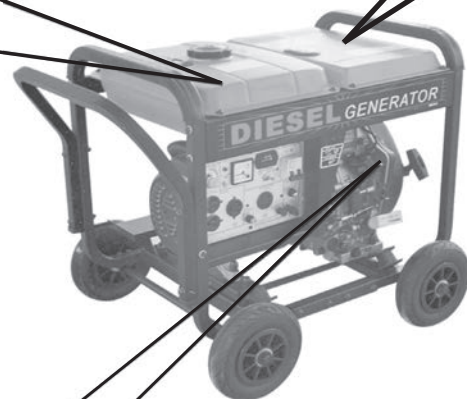
#### Fuel tank

Use only diesel fuel. The fuel should be filtered clean. Never let dust and water mix with fuel in the fuel tank. Otherwise it will clog the fuel lines and oil nozzles. It may also damage your pressure pump. Note: It is dangerous to overfill the fuel tank. Never exceed the red piston in the filter.

Oil Capacity: 12.5L

#### Air filter element

Do not wash the air filter. The element is made of dry material, which does not permit washing. When the output of the diesel engine is bad or the color of the exhaust gas is abnormal, replace the air filter element. Never start the diesel engine without the air filter.

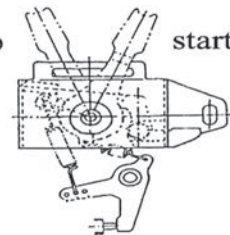


- a. After purchasing fuel, put it into a drum and let it sit for 3-4 days.
- b. 3-4 days later, insert half of the fuel sucker into the drum (water and impurities stay in the lower portion of the drum)

gearlever

stop

start/run



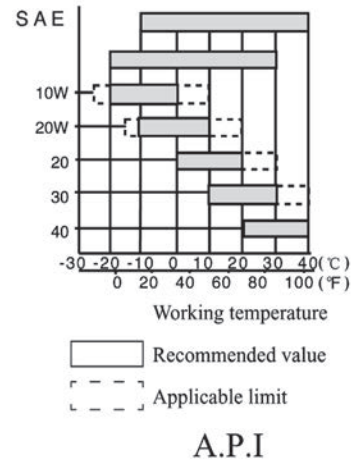
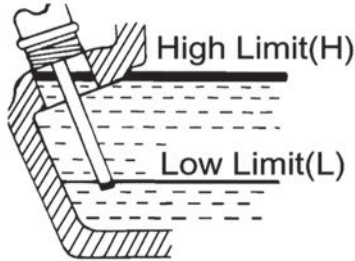
Note:

Never smoke near the opening of the fuel tank. Do not let sparks get near the fuel or fuel tank and do not overfill tank. After filling, tighten the fuel cap.

2-2. 2 Filling engine oil

**Pouring inlet of lubricating oil**

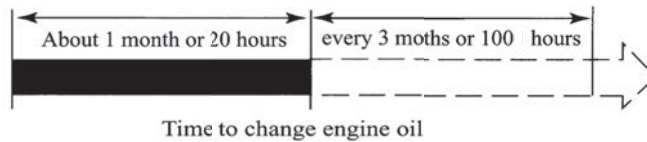
Place the generator on stable, level ground and remove the inlet dipstick. Add recommended engine oil slowly and check oil level with dipstick. When filling, just insert the dipstick lightly, there is no need to rotate and tighten each time. once desired level is reached, replace and secure the dipstick.



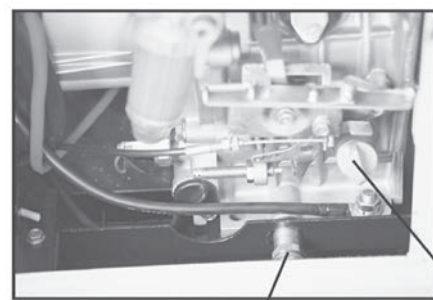
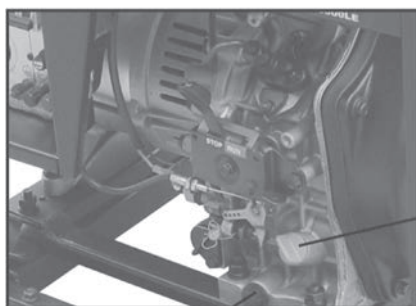
Type	TM524-6500	TM524-6500S	TM524-8300S	TM524-12000S
Volume(L)	1.65L	1.65L	2L	2.75L
England gallon				

Classification of maintenance for diesel engine  
The lubricating oil should be CC or CD grade.

Engine oil is the most important factor in determining the life of your generator engine. If you use poor engine oil or if you don't change the oil regularly, the piston and cylinder will wear easily or seize up. Also, the life of the other parts in your engine such as bearings, and other rotating parts will shorten considerably.



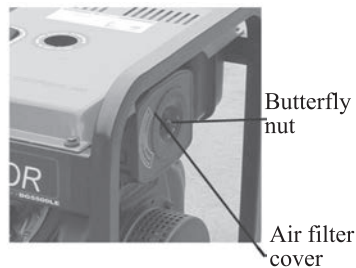
Although there is an alarm system to check for low oil pressure, it is always a good idea to check the amount of oil inside the engine. If the oil level is low, fill it before starting the engine. A good time to drain the oil from the engine is when the diesel engine is still hot. If the engine is fully cooled, it is more difficult to drain all the oil out or some impurities will remain in the engine.



Warning: Don't fill engine oil when diesel is operating

### 2-2.3 Check the air filter

(1) Loosen the butterfly nut, take the cover of the air filter off and take the air filter element out.



Do not use detergent to wash the air filter element. When the performance of the engine decreases or when the color of the exhaust gases is bad, exchange the filter element. Never start the engine without the air filter as foreign objects may enter the intake and damage the engine.



Filter core

(2) After replacing the air filter element, replace the cover and tighten the butterfly nut firmly.

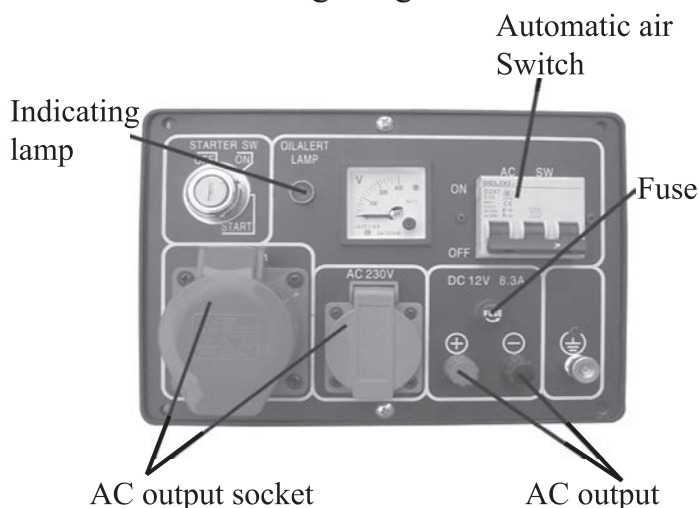
Before starting the generator, make sure the air switch is in the "off" position. Starting the generator with the switch in the "on" position is very dangerous.

The generator should be grounded in order to prevent electric shock.

Use dry compressed air (with pressure about  $1.96 \times 10^5$  Pa) to blow the dust out in the electric control cabinet and at the surface of the generator. Check to see how clean the surface of the sliding ring is. Check the pressure of the carbon brush. Also, check whether the position of the carbon brush at the slide ring is correct and the fixture is reliable with a good contact.

According to the electric wiring diagram, check to see whether the connecting wire is correct and the connected place is firm.

### 2-2.4 Checking the generator



2-2.5 The fuel and oil in a new engine is drained before sold. Before you start the engine, please fill the fuel tank and engine oil first. Then check to see if there are air bubbles in the engine. If there are, follow these procedures. Loosen the connecting nut between the oil injection pump and oil pipe. Bleed the air from the system until there are no more bubbles. Then replace the connecting nut and tighten it.

### 2-3 Checking the operation of the diesel engine

#### 2-3.1 Low-pressure alarm system.

The diesel engines have a low-pressure sensor system where if the oil pressure drops to low, the sensor will shut the engine off. The purpose of having this system is to ensure that the engine does not seize up. If there is not enough oil in the engine, the temperature of the oil will be raised too high. On the contrary, if there is too much oil in the engine, the engine oil can slow the engine down considerably.

#### 2-3.2 Engine break in

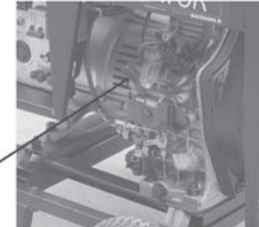
- (1) Avoid overloading the engine when brand new.
- (2) Change the engine oil according to specifications. An oil change for a brand new engine is approx. 20 hours or every month, an older engine, the oil change is approx. 100 hours or three months

### 2-4 Starting the generator set

#### 2-4.1 Manual starting.

Start the engine in accordance with procedures below:

- (1) Put the fuel switch in the "ON" position.
- (2) Turn the handle of the engine to the "RUN" position.



- (3) Pull the recoil starter handle out until you feel resistance. It will reset to its original position automatically. The handle should be reset into its recoil device slowly to prolong the life of the engine starter.

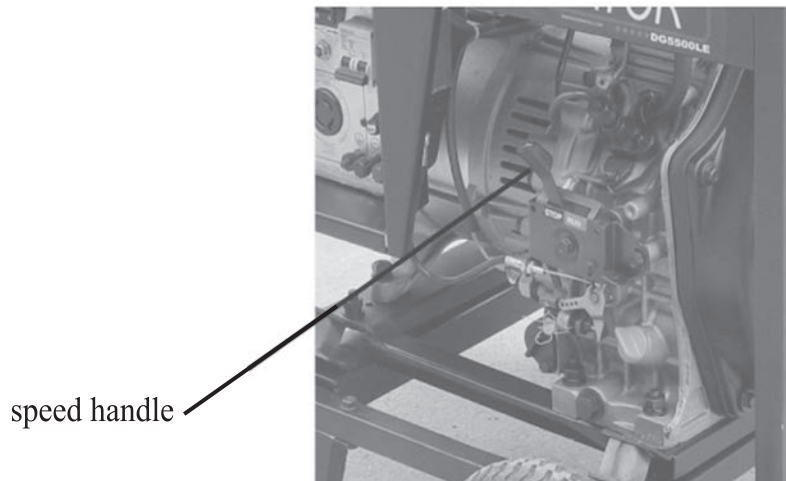
(4) In cold climate, it is difficult to start the engine. To remedy this, pull the rubber plug out from the rocker of the diesel engine and fill 2 ml of engine oil. Before starting, put the rubber plug back in place.

If you don't put the rubber plug back in place, rain, dust and other dirt can enter into the diesel engine. It will cause the parts inside the diesel engine to wear quickly and lead to engine failure.

### 2-4.2 Electric starting

The procedures for preparing to start the engine are the same as the manual starting engine.

1. Insert key into ignition and put it in the “off” position.
2. Put the speed handle in the “Run” position.
3. Turn the start switch clockwise to the “START” position; to set the silent type, first turn it clockwise to the “RUN”(ON) position for 1-2 seconds. The electromagnetic iron will be triggered, now turn it clockwise to the “START” position.
4. After the diesel engine is started, remove your hand from the switch handle; the switch will automatically reset itself to the “ON” position.
5. If the engine is not starting after 10 seconds of cranking, wait about 15 seconds before trying it again. If you crank too long, the voltage of the battery will drop. This can lead to improper ignition. When the diesel engine is operating, let the ignition retain on the “ON” position.





## OPERATION

### LOCATION SELECTION

Before starting the generator, avoid exhaust and location hazards by verifying:

- You have selected a location to operate the generator that is outdoors and well ventilated.
- You have selected a location with a level and solid surface on which to place the generator.
- You have selected a location that is at least 15 feet (4.5 m) away from any building, other equipment or combustible material.
- If the generator is located close to a building, make sure it is not located near any windows, doors and/or vents.

<b>⚠ DANGER ⚠</b>	
<p>Using a generator indoors <b>CAN KILL YOU IN MINUTES.</b> Generator exhaust contains carbon monoxide. This is a poison you cannot see or smell.</p>	
 <p><b>NEVER</b> use inside a home or garage, <b>EVEN IF</b> doors and windows are open.</p>	 <p>Only use <b>OUTSIDE</b> and far away from windows, doors, and vents.</p>
<p>Avoid other generator hazards. <b>READ MANUAL BEFORE USE.</b></p>	

<b>⚠ WARNING ⚠</b>
<p>Always operate the generator on a level surface. Placing the generator on non level surfaces can cause the generator to tip over, causing fuel and oil to spill. Spilled fuel can ignite if it comes in contact with an ignition source such as a very hot surface.</p>

### HIGH ALTITUDE OPERATION

Engine power is reduced the higher you operate above sea level. Output will be reduced approximately 3.5% for every 1000ft of increased altitude from sea level. This is a natural occurrence and cannot be adjusted by engine. Increased exhaust emissions can also result due to increased fuel mixture. Other issues include hard starting, increased fuel consumption and spark plug fouling.

## NOTICE

Only operate the generator on a solid, level surface. Operating the generator on a surface with loose material such as sand or grass clippings can cause debris to be ingested by the generator that could:

- Block cooling vents
- Block air intake system

### WEATHER

Never operate your generator outdoors during rain, snow or any combination of weather conditions that could lead to moisture collecting on, in or around the generator.

### DRY SURFACE

Always operate the generator on a dry surface free of any moisture.

### NO CONNECTED LOADS

Make sure the generator has no connected loads before starting it. To ensure there are no connected loads, unplug any electrical extension cords that are plugged into the control panel receptacles.

## NOTICE

Starting the generator with loads already applied to it could result in damage to any appliance being powered off the generator during the brief start-up period.

## ⚠ WARNING ⚠

Be sure the generator is properly connected to earth ground before operating. The generator must be grounded to prevent electrical shock due to faulty appliances.

## OPERATION

### GENERATOR SET UP

#### PLANNING THE POWER LOAD

Plan your power load so that you do not exceed the generator's rated capacity. To calculate the running and starting wattage requirements for the devices you will be powering.

#### SET UP AS A PORTABLE POWER SOURCE

This generator is designed to provide up to its max power (in watts) of electrical power. When using the generator as a portable power source, you can plug electric devices and appliances directly into the generator's electrical outlets. This generator is equipped with two SAA approved IP66 rated socket outlets.

Make sure you plug each electrical device/appliance into the correct generator outlet based on the device's plug configuration and voltage/ampere rating. Never exceed the ampere rating of an outlet. Note: You must not overload the generator. Overloading may cause serious damage to the generator and attached electrical devices.

#### SET UP AS A BUILDING BACKUP

For this application, you must arrange for a licensed electrician to connect the generator to your building's electrical system via the installation of an approved transfer switch. The transfer switch must be installed in accordance with building electrical code and guidelines supplied by your power company.

A transfer switch does the following:

- Safely connects the generator to your building's electrical system by isolating your generator from your utility company's power lines.
- Connects your generator to a critical subset of your building's circuits that are needed for emergency power needs.

## ⚠ DANGER ⚠

A transfer switch must be installed in order to isolate your generator from the utility power grid. If your generator is NOT properly isolated from the utility system, serious hazards will arise.

When your generator is running, its output will back feed into the utility power line and transformer that are normally used to provide you with power. The transformer will step up the current to the normal line voltage. An unsuspecting utility line worker working on what he thinks is a deactivated line could be electrocuted.

If your generator is connected (running or not) when utility power is restored, your generator will be destroyed. It could also explode or cause fire.

## NOTICE

Regardless of whether you use your generator as a back-up power source connected to a building or as a portable power source, you must not overload the generator. Overloading may cause serious damage to the generator and attached electrical devices.

If your generator will be connected to your building's electrical system, it **MUST ALWAYS** be isolated from the utility power grid with a approved transfer switch installed by a licensed electrician in compliance with all applicable building and electrical codes and in accordance with guidelines supplied by your power company. *continued over page*

## OPERATION

### NOTICE

There may be Federal or State Occupational Safety and Health Administration (OSHA) regulations, local codes, or ordinances that apply to the intended use of the generator. Please consult a qualified electrician, electrical inspector, or the local agency having jurisdiction.

- In some areas, generators are required to be registered with local utility companies.
- If the generator is used at a construction site, there may be additional regulations that must be observed.

### GROUNDING THE GENERATOR

#### ⚠ WARNING ⚠

In order to avoid electrical accidents, all connections to the distribution panel must be carried out by qualified technicians. Incorrect connections can harm people and damage the generator.

Operating the generator when it's not properly grounded can result in electrical shock.

Standard generators are protected by electrical separators. This equipment has a thermic protection device and/or a magne to thermic device to protect against a surge of current, overloading and short-circuiting. In these cases the Generator should under no circumstances be earthed using the terminal "PE" or with any other part of the generator.

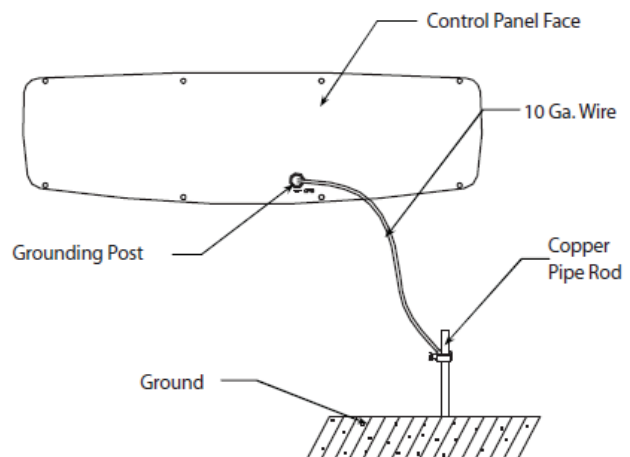
If a licensed electrician installs the generator with a connection to your building's electrical circuit for use as a back-up power system, grounding may alternatively be completed through the building's grounding system. Ask your electrician.

#### ⚠ WARNING ⚠

Grounding is not required when the generator is used as a portable power source. Below grounding method is only needed by a qualified electrician if not connecting through your building's electrical system.

If the generator is not grounded through your building's electrical system, follow the procedure below. This procedure can only be carried out by a licensed electrician.

1. Drive a 3/4" or 1" copper pipe or rod into the ground close to the generator. The pipe/rod must penetrate moist earth - the depth required will be dictated by local soil conditions.
2. Connect an approved ground clamp to the pipe.
3. Run a 10 gauge wire from the clamp to the generator grounding post located on the rear of the generator head.
4. Do not connect the generator grounding post to a water pipe or a ground used by a radio system.



## OPERATION

### **⚠ IMPORTANT ⚠**

This generator is fitted with a MEN link cable, the neutral is internally bonded to the generator earth. When a licensed electrician is installing the generator to a building to be used as backup power the MEN must be removed. The MEN link is located underneath the alternator end cap which is labeled to indicate its location. The MEN link cable clearly labeled as "MEN Link".

### **EXTENSION CORDS**

Extension cords may be used to power devices that are located at a distance from the generator. However, use only Australian approved outdoor - rated, grounded extension cords. Locate the generator in a convenient place and where possible avoid long extension leads and possible damage to leads by pedestrian or vehicular traffic.

Extension leads should be heavy duty with at least 1mm, of appropriate current rating and in any case not less than 1mm cross-section of conductor and must incorporate an earthing conductor to ensure that there is no voltage difference between the generator set and any equipment powered by the generator.

The electrical continuity of the 'earthing' core should be checked periodically from pin to socket to ensure continued electrical safety. Some electrical appliances, e.g. portable drills, are marked or 'double insulated', in which case there should not be an earthing conductor in its mains lead (even though it may have a three-pin plug).

### **⚠ WARNING ⚠**

Use of under sized extension cords can cause electric shock, fire, or damage to connected devices. All extension and appliance cords must be in good condition and not worn, bare, frayed, or otherwise damaged.

Use of damaged electric cords can cause electric shock or fire. Note: If an extension cord becomes hot to the touch, it is overloaded or damaged and must be replaced. ITM is NOT responsible for damage or injury resulting from customer use of inadequate extension cords.

## OPERATION

### ENGINE SPEED

Engine speed has been factory set to provide safe operation. Tampering with the engine speed adjustment could result in overheating of attachments and could cause a fire.

### **⚠ WARNING ⚠**

The generator must be run at the correct speed in order to produce the proper electrical voltage and frequency. Failure to do so could result in damage to equipment powered by the generator and possible injury to the individual.

### CONNECTING LOADS

You will want to be careful when connecting loads so as not to overload the generator, especially if you are powering devices with motors that require a higher starting power load. Instructions are provided below for connecting loads when you are using the generator as a portable power source.

### **⚠ WARNING ⚠**

Do not overload generator. Make sure that combined starting and running loads do not exceed rated capacity of generator. Overloading the generator can cause damage to the generator and attached electrical devices and may result in fire.

### 240V AC CONNECTION

Connect electrical loads one at a time according to the following instructions:

1. Allow engine to reach operating speed by allowing it to warm up for approximately 5 minutes before connecting electrical devices.
2. Check the devices to be connected is turned "OFF" before connecting them to the AC outlets.
3. After engine is warmed up, begin by connecting the items that require the highest wattage first.

The recommended sequence is as follows:

1. Connect items with motors such as refrigerators, freezers, air conditioners, or small hand tools, one at a time.
2. Let each motor stabilize before connecting the next device.
3. Connect any lights you are planning on powering.
4. Connect voltage sensitive equipment such as electronics via surge protectors. Plug devices such as TV's, computers and microwaves into a voltage surge protector, then plug the surge protector into the generator.

### 12V DC CONNECTION

The generator is fitted with a socket outlet specifically for connection to a lead acid battery for charging. The output voltage is 12V with maximum output current of 8.3A. The generator will charge lead acid batteries of various sizes from small to large.

DO NOT attempt to charge Nicad, Nickel Metal hybrid, or lithium type batteries. ONLY use provided charger cable.

## OPERATION

### CHARGING A BATTERY

#### **! WARNING !**

It's suggested to wear protective clothing, gloves and eye protection when handling and working with lead acid batteries. For operators with pacemakers or similar medical devices and conditions, it is recommended not to attempt the following procedure.

**DO NOT** attempt to charge a lead acid battery in confined areas. Ensure the charging process takes place in an area where there is fresh air circulating.

Remove the battery from the car, boat or any other device. The battery **MUST** be totally isolated from any other circuitry. After connection to the battery, **RECHECK** to ensure the connections are as below.

- Insert the T-shaped plug to the generator with the opposite end of the cable connected to the battery.
- Connect the positive (+) alligator clip (red) to the positive (+) terminal on the battery.
- Connect the negative (-) alligator clip (black) to the negative (-) terminal on the battery.
- Start the generator and allow the generator to warm up.
- Check the DC reset button is pressed inward (ON position).

The battery charging process is now underway. To disconnect the battery on charge, **STOP THE ENGINE** and remove the plug from the generator socket and disconnect the cable clamps from the battery, in that order.

Note: The battery charging socket should only be used while the 240V AC outlets are **NOT** being used. If the battery was originally in a low level of charge, the battery will take many hours to recharge fully. The time frame will depend on the size of the battery.

#### **! WARNING !**

**DO NOT** leave battery charging unattended. Charging battery for a long period of time can damage the battery once the battery is full.

Over-charging or over-heating can damage the battery, the water and acid solution can boil and leak out of the battery.

**OPERATION**

**⚠ WARNING ⚠**

NEVER exceed the rated wattage capacity of your generator. OVERLOADING may cause SERIOUS DAMAGE to the generator and attached electrical devices and may result in fire.

Your generator MUST BE SIZED PROPERLY to provide both the running and starting (surge) wattage of the devices you will be powering. Before using your generator, determine the running and starting wattage requirements of all the electrical devices you will be powering simultaneously. Following below 4 simple steps and example on the right:

Step 1. Determine the tools and appliances you want to power at the same time

Step 2. List the start up and running power usage (Watts) for each product

Step 3. Add the total power usage and add 10% as a safety net

Step 4. Choose a generator with a rated and maximum power that equals or exceeds your totals. In this case a generator with a rated power of at least 3108W and a maximum power output greater than 7233W would be required.

PRODUCT	RUNNING	START UP
1HP Water Pump	750W	4500W
Lights	75W	75W
Table saw	2000W	2000W
<b>Total</b>	<b>2825W</b>	<b>6575W</b>
+10%	<b>3108W</b>	<b>7233W</b>

**STARTING POWER CONSUMPTION**

Electronic appliances and brushed motors generally will not draw more than running Watts at start up. Induction motors in equipment like air conditioners, welders, water pumps and compressors can draw 2 to 5 times their running power to start. Please consult your equipment's rating label, manual or the manufacturer to confirm specific requirement. If only the running wattage is given on the nameplate for a device with an electric motor, the starting wattage can be approximated to be three to five times the running wattage. Estimates for the running wattage requirements for common devices are listed in the table below. Guidance for starting wattages is provided in the table's footnotes. To size your generator correctly you need to use Watts - here are some useful calculations:

Watts = Volts x Amps Example 240 Volts x 5 Amps = 1200 Watts

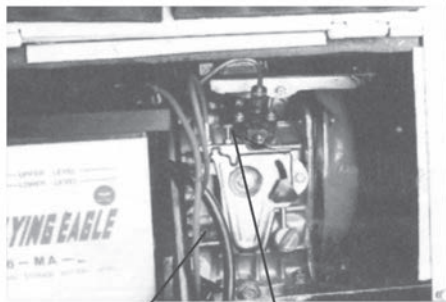
DEVICE	RUNNING WATTS	DEVICE	RUNNING WATTS	DEVICE	RUNNING WATTS
Air conditioner (12,000 BTU)	1700 (a,b)	Freezer	800 (b)	Oven	4500
Battery charger (20 Amp)	500	Hair dryer	1200	Paint sprayer, Airless (1/3 HP)	600 (a)
Belt sander (3")	1000	Hand drill (1")	1100	Paint sprayer, Airless (handheld)	150
Chain saw	1200	Hand drill (3/8")	500	Radio	200
Circular saw(6½")	2000 (a,b)	Hedge trimmer	450	Refrigerator	600 (b)
Coffee maker	1800 (a,b)	Home computer	150	Slow cooker	200
Compressor (1 HP)	1400 (a,b)	Kettle	2400	Submersible pump (1-1/2 HP)	2800 (a)
Compressor (3/4 HP)	1800 (a)	Jet pump	800 (a)	Submersible pump (1 HP)	2000 (a)
Compressor (1/2 HP)	1400 (a)	Lawn mower	1200	Submersible pump (1/2 HP)	1500 (a)
Curling iron	700	Light bulb (100 Watt)	100	Sump pump	600 (a)
Dishwasher	1200	Microwave oven	700	Television	500
Edge trimmer	500	Milk cooler	1100 (a)	Toaster	1000
Electric nail gun	1200	Oil burner on furnace	300	Vacuum cleaner	250
Electric range (1 element)	1500	Oil-red space heater (140,000 Btu)	400	Water heater	3000
Electric skillet	1250	Oil-red space heater (85,000 Btu)	225		
Furnace fan (1/3 HP)	1200 (a)	Oil-red space heater (30,000 Btu)	150		

(a) Hard-starting motors require 3-5 times the rated running watts (b) For extremely hard to start loads such as air conditioners and air compressors, consult the equipment dealer to determine max wattage.

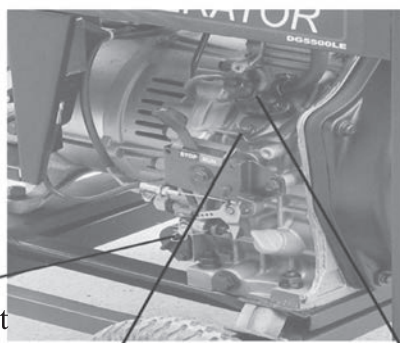
## 2-6 Proper operation of the generator set

### 2-6.1 Operating the diesel engine

1. Pre-heat the diesel engine for 3 minutes under no load conditions.
2. First check the height of the lubricating oil level, if it is low, refill it. Our diesel engines are equipped with an alarm system that will notify you if the oil pressure is too low. The alarm system will shut down the engine if the oil pressure is too low.
3. Do not adjust the speed limit regulation bolt or the fuel adjustment bolt. These bolts have been set by the factory already, changing them will affect the properties of the engine performance.



Fuel adjustment bolt      Speed limit bolt



High-pres fuel pipe nut      Fuel adjustment bolt      Fuel adjustment bolt

### 2-6.2 Checks during engine operation

1. Check to see if there are abnormal noises.
2. Check to see if the performance is good or bad.
3. Check the color of the exhaust gases (whether it is too black or too white). If any of these conditions exist, stop the engine and find the cause of the problem. If no problems are found, please contact your local dealer or our nearest company branch.

## 2-7 Loading

### 2.7.1 Load conditions

Exert loads in accordance with the specified parameters.

### 2.7.2 Output of electricity

1. Raise the revolutions per minute (turn the speed handle to the max setting) of the generator to get the maximum power out of the generator. If not, the automatic voltage regulator device will excite and doing this for long periods of time will cause the capacitor to burn. For the rated speed of the generator, please refer to Chapter 1, item 1-1 technical specification and data.

2. Observe the pointer of the voltmeter, it should point to  $230\text{V}/400\text{V} \pm 5\%$  (50Hz). (For 60Hz set, it will be  $240\text{V} \pm 5\%$ ). Meanwhile put the switch in the GEN(generator) position. The AC voltage from the socket of the power supply can be output.
3. When connecting devices to the generator, make sure to connect these devices in order. Connect the large loads onto the generator first. If everything is functional, smaller loads can then be added. If the generator shuts off, it may be because the load being drawn by all the various devices are too high. In this event, decrease the number of small devices until everything is functional. The total drawn power should not exceed the maximum output power of the generator. Please see Table 1-1 for technical specifications of what the generator can output. In order to reset the generator after overdrawn power, let it sit for several minutes. If the indication of the voltmeter is too high or too low, adjust the speed accordingly. If there are problems, stop the generator immediately and fix the issue.
4. During operation, the generator should be in a place that has very good ventilation. Never cover the engine to solve a ventilation problem, as this will damage your equipment.

Note: Do not start more than two devices simultaneously. Each device should be started one by one to prevent overloading the generator.

The generator should be running at 3000/3600 revolutions per minute in order to achieve the (50/60Hz) frequency. The speed of the engine can be adjusted from the speed governor.

### 2-7.3 Charging the battery

1. For the electric starter on the generator, the 12V battery is automatically charged through the regulator on the side of the engine when it is running.
2. If the generator is not used for long periods of time, the battery should be disconnected to avoid energy loss from the battery.
3. Do not connect the negative and positive terminals of the battery together at any time. Doing so will damage the battery.
4. Do not reverse the polarities when attaching the battery cables to the battery. Doing so will damage both the battery and the electric starter.
5. When charging the battery, the battery produces flammable gases. Do not smoke, let flames, and sparks far away the battery while it is charging as this may cause a fire. To avoid sparking while connecting the cables to the battery, first, connect the cables to the battery then to the motor, To disconnect battery cables, first disconnect the motor end of the cable.

## 2-8 Stopping the generator

1. Take the electrical load off the generator.
2. Put the speed handle in the "RUN" position and let the engine run for 3 minutes after unloading. Do not stop the diesel engine immediately let it warm down. Stopping the diesel engine suddenly may raise the temperature of the engine abnormally and lock the nozzle and damage the diesel engine.

Note:

1. If the speed handle is in the "Stop" position and the engine is switch running, turn the fuel switch to the "Off" position or loosen the high pressure oil pipe nut. The engine could be stopped more than one-way other than the speed handle way.
2. If you cannot stop the engine with a load on it, then remove the load first than stop the engine.

3. Press down on the brake handle.
4. If equipped with an electric starter, turn the key to the "Off" position.
5. Put the fuel handle to the "Stop" position.
6. Finally, pull slowly on the recoil handle until you feel resistance (this is when the piston is on the compression stroke, where the intake and exhaust valves are closed). What this does is prevent the engine from rusting when not in use.

## CHAPTER 3 MAINTENANCE

### 3-1 Maintenance schedules

Kepping your generator well maintained will prolong the life of your generator. Everything needs to be checked including the diesel engine, welder, generator, control cabinet, and frame. For overhauling procedures, please refer to the instruction manual of the relative subassembly. If you need these manuals, plsaes call our company and we will send you one.

Before starting the maintenance, make sure the diesel engine is off. Pleaes refer to the Table 3-1 for the proper maintenance schedule.

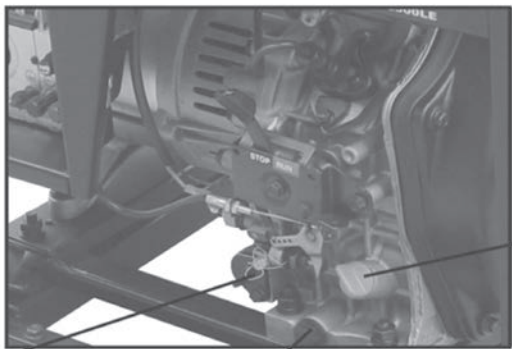
Table 3-1. Maintenance schedulefor diesel generator set

Interval of maintenance Item	Every time	1st month or after 20 hours	3rd month or 100 hours	6th month or 500 hours	Every year or 1000 hours
Check and fill enough fuel	○				
Discharge fuel		○			
Check and fill enough engine oil	○				
Check whether it leaks oil	○				
Check and screw each fastened part	○			● Screw the boll of cylinder head firmly	head firmly
Exchange engine oil		○ (1st time)	○ (2 nd time late)		
Clean filter of engine oil				○ (Exchange)	
Exchange air filter element	If operated at dusty region the period of maintenance should be shorten			○ (Exchange)	
Clean filter of fuel				○	● (Exchangel)
Check high pressure oil pump				●	
Check nozzle				●	
Check fuel pipe				● (If necessary,exchange it)	
Adjust the gaps of air intake and air exhausted gate		● (1st time)		●	
Grind air intake and air exhausted gate					●
Exchange piston ring					●
Check electrolytic solution of accumulator	(each month)				
Check electric brush and slide ring				●	
Check insulation resistance	The time of stop is over 10 days. ○				

Note:“●” mark indicates that it needs special wrench,please contact with dealer.

### 3-1.1 Changing the engine oil(every 100 hours)

Take the oil cover out. Remove the oil drain plug when the diesel engine is still hot. Be careful of hot oil and hot engine as you may get burned. The bolt is located at the bottom of the cylinder. After draining the oil, put the bolt back and tighten it. Then fill with the proper engine oil to the proper level.



High-pressure  
fuel pipe bolt

Oil drain bolt

Dipstick

### 3-1.2 Air filter maintenance schedule

1. Clean air-filter every 6 months or 500 hours of operation.
2. If necessary. exchange it.
3. Do not use detergent to clean air filter element.



#### Note:

Never start the engine without the air filter. This can cause serious damage to the engine if foreign objects enter the intake system. Always change the air filter on time.

### 3-1.3 Fuel filter maintenance

1. The fuel filter should be cleaned often to keep the engine running at maximum performance.
2. The recommended time period for cleaning the fuel filter is 6 months or 500 hours of operation.
  - a. To do this, first drain the fuel from the fuel tank.
  - b. Loosen the small screws on the fuel switch and remove the fuel filter from the port. Use diesel fuel to clean the fuel filter. Also, remove the fuel injector and clean the carbon deposit around it. The recommended time period for this is 3 months or 100 hours.

### 3-1.4 Cylinder head bolt tensions

The cylinder head bolts should be tightened to specifications please refer to the diesel engine manual for specifications and the special tools required to do this.

### 3-1.5 Battery check

Make sure the battery acid is full. The engine uses a 12V battery. Due to numerous starting cycles, the battery acid may be used up. Also, before filling, verify that the battery is not damaged in any way. Add distilled water to the battery when filling. Perform checks on the battery once a month.

### 3-2 Storing for long periods of time

If your generator needs to be stored for long periods of time, the following preparations should be made.

1. Start the diesel engine for 3 minutes then stop it.
2. When the engine is still hot, change the engine oil with new engine oil of the proper grade.
3. Pull the rubber plug out of the cylinder head cover and put 2CC of lubricating oil in it, then cover the plughole up again.
4. For manual starting generator welders, press the decompression handle down and pull the recoil handle 2 or 3 times. This pushes the intake out. (Do not start the engine)
5. For electric started generator, press the decompression handle down and crank the engine for 2-3 seconds. To do this, put the starter switch in the "Start" position. (Do not start the diesel engine)
6. Finally, pull the recoil starter until you feel resistance; this is when the piston is on the compression stroke where the intake and exhaust valves are closed. Having the intake and exhaust valves closed will prevent rust, as moisture cannot get inside the combustion chamber.
7. Clean the engine and store it in a dry place.

## CHAPTER 4 TROUBLE SHOOTING

### 4-1 Troubleshooting procedures

	Causes of malfunction	Remedy
Diesel cannot be started	Not enough fuel	Add enough fuel
	The switch of fuel is not at "OPEN" position High-pressure pump and nozzle do not inject	Turn the switch of fuel to "OPEN" position
	fuel or the injected amount is less	Disassemble the nozzle and adjust it at test table
	Speed control lever is not at "RUN" position	Turn speed control lever to "RUN" position
	Check level of lubrication oil	The standard oil amount of lubricating oil should be between high graduation "H" and low graduation "L"
	It is not quick and powerful to pull reactive starter	Start diesel engine in accordance with the requirements of "start operation procedures"
	Nozzle exists dirt	Clean the nozzle
	The Battery is lower power	Charge the battery or exchange it
Generator cannot generate electricity	Master switch is not be switched on	Turn capacity switch handle to "ON" position
	Carbon brush of generator was worn, The contact is not good	Exchange the carbon brush
	The contact of socket is not good	Adjust the contact feet of socket
	The electric switching	Make it reach to the rated revolution in accordance with the requirements
	AVR automatic governor is damaged	Exchange it
	The fuse is not work	Exchange it

If you are still having trouble, please contact with your nearest dealer or with our company directly if necessary.

### 4-2 Questions and doubts

If you do not understand anything or have any questions, please feel free to contact your local dealer or with our company directly. Below is a list of some information you should have ready before contacting your local dealer or us.

1. Model of diesel engine generator and engine model number.
2. State of residency
3. Number of hours of operating equipment along with the problem that occurred.
4. A detailed condition and time when the problem occurred, in other words, climate and atmosphere