

OPERATION MANUAL OF SERIRES DG DIESEL GENERATORS



1.Main Technical Specification and Model Definition

1-1 Main technical specification and data of DG12000 generators

Item	Model	DG12000E	DG12000E3
ALTERNATOR	Frequency(Hz)	50	50
	Rated power(KW)	8.0	8.0
	Max. power(KW)	8.5	8.5
	Rated voltage(A.C)(V)	220	380/220
	Rated current(A.C)(A)	45.4	15.1
	Speed(r/min)	3000	3000
	Power factor	1	0.8
	Phase	Single	Three
	Pole no.	1	
	Excitation way	Self-exciting and voltage-constant with AVR	
DIESEL ENGINE	Insulation	F	
	Engine model	1100F	
	Type	Single-cylinder,vertical,4-stroke air-cooled	
	Bore×stroke(mm)	100×85	
	Total displacement(mL)	667	
	Cooling systems	Forced cooling	
	Lubricating way	Pressure & Splash	
	Lube oil capacity(L)	2.0	
	Starting system	Electric start	
GENERATOR	Fuel	Diesel	
	Panel type	Basic panel	
	Structure type	Open frame	
	Noise(7m)dB	80	
	Capacity of fuel tank(L)	30	
	Working time at full fuel tank(h)	9.4	
	Gross weight(Kg)	140	
	Overall dimensions (mm)(L×W×H)	740×515×655	

1.Main Technical Specification and Model Definition

1-2 Main technical specification and data of DG12000 generators

Item	Model	DG12000SE	DG12000SE3
ALTERNATOR	Frequency(Hz)	50	50
	Rated power(KW)	8.0	8.0
	Max. power(KW)	8.5	8.5
	Rated voltage(A.C)(V)	220	380/220
	Rated current(A.C)(A)	45.4	15.1
	Speed(r/min)	3000	3000
	Power factor	0.8	0.8
	Phase	Single	Three
	Pole no.	1	
	Excitation way	Self-exciting and voltage-constant with AVR	
DIESEL ENGINE	Insulation	F	
	Engine model	1100F	
	Type	Single-cylinder,vertical,4-stroke air-cooled	
	Bore×stroke(mm)	100×85	
	Total displacement(mL)	667	
	Cooling systems	Forced cooling	
	Lubricating way	Pressure & Splash	
	Lube oil capacity(L)	2.0	
	Starting system	Electric start	
GENERATOR	Fuel	Diesel	
	Panel type	Basic panel	
	Structure type	Open frame	
	Noise(7m)dB	80	
	Capacity of fuel tank(L)	30	
	Working time at full fuel tank(h)	9.4	
	Gross weight(Kg)	218	
GENERATOR	Overall dimensions (mm)(L×W×H)	1100×625×790	

1-3 Basic parameters

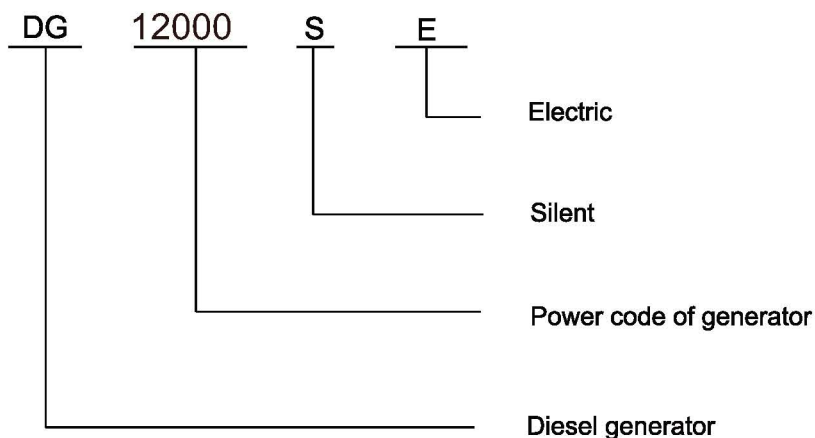
1-3.1 Delivering the rated power under following condition

Sea level(M)	Ambient temperature(°C)	Relative humidity
0	+20	60%

1-3.2 Working reliably under following condition

Sea level(M)	Ambient temperature(°C)	Relative humidity
<1000	5-40	<90%

1-4 Meaning of the Model



2. Operation of Diesel Generator

2-1 Notes of operating diesel generator

Before operating diesel generator, please read the manual. Especially following points should be paid attention to for preventing the accident happened.

2-1.1 Preventing the fire

The engine fuel is light diesel. It is forbidden to adopt gasoline and kerosene etc. When the oil overflows, please use clean cloth to remove the oil. It is not permitted to have diesel generator to gasoline, kerosene, match and inflammable material, because the temperature around the muffler is very high when the engine is operated. For the sake of better ventilation during the generator operation, the distance between diesel generator and the building should be more than 1.5 meters. The diesel generator should be operated on plain ground. Otherwise, the oil will overflow from diesel generator.

2-1.2 Preventing the suction of exhaust gas

For avoiding exhaust gas sucked by the person, the diesel generator will be not allowed to work under conditions of worse ventilation, because exhaust gas emitted from the engine includes harmful CO.

2-1.3 Preventing the damage by high-temperature parts

When diesel engine is working, it is not allowed to touch high-temperature parts, such as muffler and its shell etc.

2-1.4 Preventing the electric shock or short circuit

For avoiding the shock by electricity or short circuit, it is forbidden to touch with hand the generator when working. Do not operate the generator in raining or foggy.

For preventing the shock by electricity, the grounding should be made with adopting the wire, which of one end is connected with the grounding terminal of the generator and another end is connected with the device outside. The grounding terminal of the generator is on control panel, shown in Fig. 2-1.



Fig.2-1

REMARK:

For many alternators, starting current is higher than rated current. So the max. current of the socket should exceed starting current.

2-1.5 Other safety points

It is very important to know how to stop the generator and the functions of all switches. The untrained person is not permitted to operate the generator. The operator should wear safe clothes and shoes during working.

2-1.6 Charging the accumulator

The diesel generator has automatic charging function. The electrolytic liquid of the accumulator contains the sulfuric acid. For protecting the operator, should make suitable protection measurement.

As the hydrogen resulting from the accumulator is of easy explosive gas, do not smoke when charging. It is not also permitted to make the spark around the accumulator.

Be sure that there is better ventilation for charging.

2-2 Preparation before starting

2-2.1 Selection of the fuel

Only adopt light diesel. Fill in the diesel to fuel tank at full level. If the water exists in the diesel, should drain off the water from oil/water separator. Otherwise, the water will enter into fuel pump, resulting in the engine out of order.

Model	DG12000E(3)/DG12000SE(3)
Capacity	
Effective capacity of fuel tank(L)	30

REMARK: Overflowing is very dangerous.

REMARK:

It is not permitted to smoke or make the spark when filling in or at fuel storage. During adding the fuel overflowing should be prevented. After completion, should firmly retighten the tap of fuel tank.



2-2.2 Usage of oil/water separator

When the diesel includes the water, the diesel generator is fit with oil/water separator to remove the water. Only screw down the tap of the separator with left direction to drain off the water, shown in Fig.2-3.

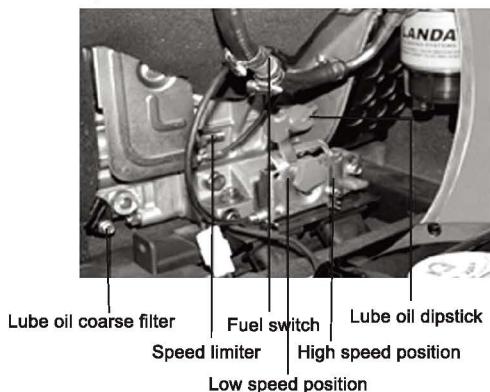
REMARK: After the water is drain off, must screw in the tap in right direction to avoid the diesel leakage.

Oil/water separator



Fig2-3

Fig2-4

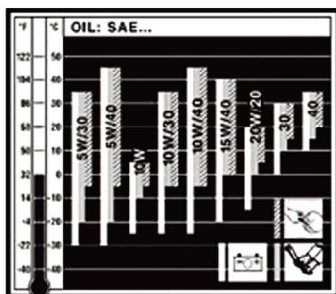


REMARK:

1. Before starting, should open the fuel switch first to avoid the air going into fuel pump under conditions of no fuel in piping.

2. Before starting, should put speed-regulating handler to "RUN" position (It has been adjusted in test bench). If the generator is not used for long-term period, please put the handler to "STOP" position.

2-2.3 Filling in lube oil



A. Lube oil quality

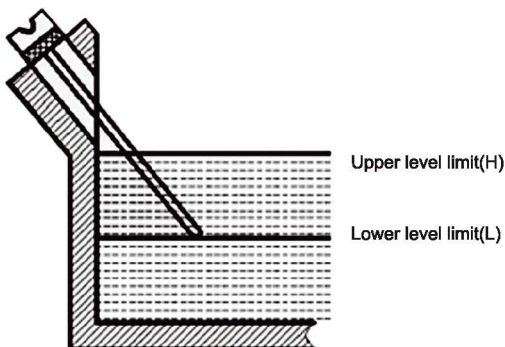
The qualified lube oil should meet following condition.
 ACEA-B2/E2 or higher-grade specification
 API-CD/CE/CF-4/CG-4 or higher-grade specification
 If adopting inferior lube oil, should change the lube oil after every 150 hours operation.

B. Lube oil viscosity

Select lube oil viscosity based on ambient temperature when starting at cold temperature.

Opening for filling in lube oil

Put the generator on plain ground, then fill in lube oil through the opening of oil dipstick. When checking oil level, only screw the dipstick into the opening.



It is very important to pay attention to lube oil quality, because it will affect the performance & reliability of the engine. If using inferior lube oil or lube oil with impurity or not changing lube oil at fixed time, it will cause the piston to be clipped and make the parts easily worn out, such as cylinder, bearing, and other moving parts. The engine life will be greatly shortened.

20 hours at first	Every 100 hours for next three times	Every 200 hours
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Interval for changing lube oil

When starting the generator each time, should check oil level. If not being enough, should add the lube oil to the stipulated level. Draining off lube oil can be immediately done after engine stopped, because it is difficult to drain off the oil thoroughly when the engine is in cold state, shown in Fig .2-5.



Fig.2-5

Lube oil fine filter

Draining bolt

Draining groove

2-2.4 Check air cleaner

A. Unscrew the bolt and take out side plate.

B. Loosen the clipper to take out the cover of air cleaner for getting the element.

It is forbidden to clean the element with detergent.

When output power drops or exhaust gas is black, should change the element.

It is not permitted to start the generator without air cleaner. Otherwise, it will cause the generator to be worn easily.

C. After installing the element, fit the cover of air cleaner and retighten the clipper firmly.

2-2.5 Check the generator

Turn off main switch for unloading, like lamp and motor etc.

Before starting the generator, must turn off main switch. If not in this position, it is very dangerous for the generator to be started with the load.

The generator should be grounded correctly to prevent the shock by electricity.

2-2.6 Checking fuel piping

The fuel and lube oil have been removed prior to delivery. When filling in the fuel, should check whether there is the air in the piping before starting. If existing should drain off the air by unscrewing on fuel pump till no air bubbling comes out from the diesel then retighten the screws again.

2-3 Checking & operating the engine

2-3.1 Checking lube oil level

Check lube oil level prior to each starting. If the engine works under lack of lube oil, oil temperature will rise quickly and the engine will be clogged. If the engine works under enough lube oil, it is very easy to make lube oil burn, resulting in speed increasingly to damage the engine. Hence, it is very important to ensure that oil level is between upper limit and lower limit in oil dipstick.

2-3.2 Operation in trial

For new engine, it is necessary to have 20 hours running-in operation initially.

A.Avoiding over-load

During the trial operation, should prevent over-load.

B. Changing lube oil at fixed period.

Change it after initial 20 hours operation and refer to operation manual for next changing.

2-4 Starting the generator

2-4.1 Preparation before starting.

A. Turn fuel switch to "ON" position.

B. Put speed handler of the engine at "RUN" position.

2-4.2 Starting

A. Insert the key to "OFF" position.

B. Put the speed handler to "RUN" position.

C. Turn the key to "START" position clockwise.

D. After starting successfully, remove the hand from the key to make the key be "ON" position automatically.

E. If failed to start 10 seconds later, please wait 15 seconds for next starting.

If starting motor works too long, the voltage of the accumulator will drop to cause the motor to be blocked. During the operation, let the key be in "ON" position.

F. If the control panel is of intelligent type, also please refer to its manual.

REMARK: If starting motor works too long, the voltage of the accumulator will drop to cause the motor to be blocked. During the operation, let the key be in "ON" position.

When it is difficult to start the engine in winter season, can add 2 ml lube oil in inlet gas passage. It is very important to retighten oil dipstick firmly before starting. Otherwise the engine parts will be worn out by rain, dust and other impurities.

2-5 Accumulator



Fig.2-8

If the accumulator is of liquid-added type, should check the electrolytic level every month. When the level is at lower position, the engine can not be started. Hence it is necessary to add the distillatory water to stipulated limit.

If the electrolytic level is high, the liquid will overflow to corrode the parts nearby. It is very important to keep the electrolytic level within stipulated level.

During the operation, the generator can automatically charge the accumulator. If the generator is used for stand-by application, should charge the accumulator.

If the accumulator is of valve-controlled lead-acid type, it will be charged if necessary.

2-6 Operating the generator

2-6.1 Operating the engine

- A. Check lube oil level. When the level is low, add the oil to stipulated level.
- B. Preheat the engine for three minutes without load.
- C. Do not alter fuel quantity controller or speed limiter (having adjusted before delivery). Otherwise, the performance of the engine will be affected, shown in Fig. 2-4

2-6.2 Making the inspection during the operation.

- A. Check whether there is abnormal sound or strong vibration.
- B. Check whether the engine works out of order.
- C. Check the color of exhaust gas, black or too white.

If any of them mentioned above happens, should stop the generator and then contact with local dealer or company directly.

2-7 Adding the load

2-7.1 Load

Add the load according to stipulated data.

2-7.2 AC application

- A. When starting the generator, should keep the indicating light on to observe work condition.
- B. The generator should be run at rated speed (put the speed handler to "RUN" position). Otherwise, the voltage, frequency and power will be lower than rated limit, shown in 1-1 main technical specification and data.
- C. When voltage indicating on control panel reaches $\pm 10\%$ of rated limit, can add the load.
- D. Following table shows load usage.
- E. When connected with the generator, all kinds of machineries should be by order. If improper operation, the generator will work out of order. At this time, shut off the generator switch in time to unload and then check the problem. If overloading, should reduce the load. Then start the generator again a few minutes later. If the indicating of voltage meter is low or high, must stop the generator for checking.

REMARK:

Do not start more than two machines in the same time. Only start them one by one. Do not use floodlights with other machines meanwhile.

Model Load		Home electric appliance, incandescent lamp	Machine with rectified type motor	Machine with Capacitance-starting type	
		Projector, electric cooker	Drilling machine, grinding machine etc.	Water pump, air compressor etc.	
				Load	50Hz
Synchronous generator	12000	Below 8000W	Below 4000W	1000W	6 pcs

REMARK: *The generator speed is fixed on 3000r/min(speed handler at "RUN" position).*

2.7.3 DC application

- A. When adopting automatic-type accumulator, must disconnect the wire from the cathode of the accumulator when charging.
- B. Starting diesel generator.
- C. Connect charging wire between accumulator terminal and generator anode. Pay attention to the anode and cathode. Otherwise, it will make the generator and accumulator be damaged.

Do not let two terminals contact with each other, which will make the circuit short.

When charging big capacity accumulator, the charging current should be less than 8A. Otherwise, the fuse will burn.

D. During charging, the accumulator will make inflammable gas. So do not let the spark, flame and cigarette be around it. For avoiding the spark near the accumulator, connect charging wire with the accumulator at first before charging and first disconnect from the generator after breaking down.

E. Charge the accumulator under the place with better ventilation. Before charging, open the accumulator cover. If electrolytic temperature is over 45 °C, should break down charging.

REMARK: *When the accumulator is connected with generator DC terminals, do not try to start the engine in car or in vessel.*

3. Maintenance of diesel generator

2-6 Maintenance at fixed period

For the generator working in order, maintenance at fixed period is very important. The diesel generator is consisted of diesel engine, alternator, control panel, frame etc. Please read relative manual for the maintenance.

Before maintaining the generator, stop the engine. The surrounding condition of generator is of better ventilation, because engine exhaust includes harmful CO.

Interval item	every day	20h	100h	200h	500h	every year or 1000h
Check the fuel	○					
Clean fuel tank					○	
Check oil leakage	○					
Check each fastening					● (retighten cylinder head bolt)	
Change lube oil		○ (first time)	○ (next three times)	○		
Clean the element of air cleaner	(shorten the interval in more dust condition) ○				○ (change)	
Clean fuel filter			○		○ (change)	○ (change)
Check fuel pump					●	
Check the injector					●	
Check fuel pipe					● (change if necessary)	
Adjust intake/exhaust valve clearance		● (first time)				
Grind intake /exhaust valve						●
Change piston ring						●
Check the electrolytic or voltage of accumulator	(every month)					

After stopping the generator, clean it immediately to prevent the corrosion and to remove the sediment.

REMARK: The mark "}" indicates special spanner to be used. Please contact local dealer.

3-1.1 Change lube oil

20 hours for first time and 100 hours for next three times and 200 hours for normal operation.
Loosen oil-drained plug located at the bottom of cylinder block when the engine is at hot state.
After removing used lube oil, screw in the plug and add the stipulated oil.

3-1.2 Change the element of air cleaner

Do not clean the element with the detergent.

Time interval 500h

3-1.3 Change fuel filter

Often clean fuel filter to ensure that the engine can deliver maximum power.

Time interval 500h

A. Close fuel switch.

B. Change the element with loosening the covers of oil/water separator.

3-1.4 Re-checking bolt retightened moment of cylinder head with special tool, shown in engine manual

3-1.5 Check the injector and fuel pump

3-1.6 Adjust the clearance of intake / exhaust valves

3-1.7 Grind the intake / exhaust valves

3-1.8 Change piston rings

Need special tool and the protection should be paid attention to.

3-1.9 Check the electrolytic and charge the accumulator

The 12V accumulation, used in the engine, will consume the electrolytic due to charging and discharging continuously.

Check the accumulator before starting. The distillatory water can be added to stipulated limit if necessary. If the accumulator is damaged, exchange it in time.

Check the electrolytic of the accumulator	Once a month
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When the generator is not operated for more than three months, it should be stored. After the storage for six months, be restored again as follows.

- A. Drain off the fuel and lube oil.
- B. Remove the dust and the oily.
- C. Clean the crankcase and gear chamber with diesel and kerosene. Then drain off them.
- D. Inject rust-proofed oil or lube oil without water (heat the lube oil to about 120 C° till no foam exists.) into crankcase at stipulated level. Then run the engine for three minutes to splash the oil to the surface of all moving parts. Last drain off the oil after engine stopped.
- E. Inject rust-proofed oil or lube oil without water into intake manifold and then rotate the engine rapidly. Last make intake/exhaust valve be at close state.
- F. Dismantle cylinder head cover and brush rock arm etc. with a few rust-proofed oil or lube oil without water.
- G. Wrap air cleaner and muffler with wet-proofed paper to prevent the dust and moisture entering.
- H. Remove the dust and the oily on the frame and control panel.
- I. Take out the key.
- J. The generator should be stored at a place with better ventilation, clean, dry and no corrosive material nearby.

4. Remedies of the trouble

4-1 Causes and remedies

	Causes	Remedies
No start of the engine	Insufficient fuel	Fill in the fuel
	Fuel switch not at "OPEN" position	Put fuel switch handler to "OPEN" position
	No spray on injector or a little quantity	Repair and adjust the injector
	Speed control handler not at "RUN" position	Set the handler to "RUN" position
	No electricity in fuel-cut solenoid	Turn the key on "ON" position and check whether there is voltage output(12V-13V)
	Check lube oil lever	The level between upper mark "H" and lower mark "L"
	Dirt on the nozzle	Clean the nozzle
	No electricity in accumulator	Charge or change the accumulator
No output of generator	Not turn on the switch	Turn to "CLOSE" position
	Worse contact of the socket	Adjust the socket
	Not reach rated speed of the engine	According the stipulation
Voltage too low	Not reach rated speed of the engine	Set speed control handler to operation position
	Check AVR	Adjust the resistance clockwise
Automatic stop after a certain time of operation	a. Lack of the fuel b. Lack of lube oil c. Voltage too low or too high d. Frequency too low or too high e. Over-current	Repair according to relative alarming of control panel

If the generate can not deliver the output after checking, please contact with company or local dealer.

4-2 Questions

If it is not clear to the customer in view of the manual or operation, please contact with company with following information.

- A. Model & serial no. of the generator & the engine.
- B. There are same serial no. between the generator and the engine. The serial no. of the engine can be found on cylinder block. The model and production date of the engine are on name plate.
- C. Working condition.
Operation problem at which speed?
- D. How long for operation?
- E. The problem with the detailed information and date.
Please send detailed information to company with email or by fax.

