LETAN®

Diesel Generator set

for air cool type

3-12kVA Genset Manual

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Chapter 1 Main Technical Specifications and Data

	MODEL		LT5	LT8	LT10	LT300W
GENERATOR	Type		Air Cooled Single Cylinder Diesel Generator			
	Max.AC Output	KVA	6.0	8.0	10.0	3.5
	Rated AC Output	KVA	5.0	7.0	8.5	3.0
	Rated AC Voltage	V	230(Single Phase),230/400(Three Phase)			230
	Frequency	Hz	50	50	50	50
	Phase No		Single Phase/Three Phase			Single Phase
	Power Factor	Cosø	1.0/0.8			1.0
	Voltage Regulate		Automatic Voltage Regulator (AVR)			
ENGINE	Model		188FE	192FE	195FE	178FE
	Type		Forced Air-cooled,4-Stroke,Direct-Injection			
	Displacement	cc	456	499	531	425
	Max. Output	HP	9.5	11.5	12.2	7.5
	Fuel		Diesel Light Fuel			
	Fuel Tank Capacity	L	15	15	15	15
	Continuous Operating Hours	H	15	15	15	15
	Oil Capacity	L	1.65	1.65	1.65	1.65
	Ignition System		Direct-Injection			
	Starting System		Electric			
	Operating Noise Level(7m)	dB(A)	68~75			
PACKAGE DIMENSIONS	Overall Dimension L×W×H	mm	740×500×605			
	Net/Gross Weight	kg	115/120			120/125

Chapter 1 Main Technical Specifications and Data

	MODEL		LT5B	LT8B	LT10B	LT12 LT1200W
GENERATOR	Type		Air Cooled Single Cylinder Diesel Generator			
	Max.AC Output	KVA	6.0	8.0	10.0	12.0
	Rated AC Output	KVA	5.0	7.0	8.5	10.0
	Rated AC Voltage	V	230(Single Phase),230/400(Three Phase)			
	Frequency	Hz	50/60	50/60	50/60	50/60
	Phase No		Single Phase/Three Phase			
	Power Factor	Cosø	1.0/0.8			
	Voltage Regulate		Automatic Voltage Regulator (AVR)			
ENGINE	Model		188F	192F	195FE	1100F
	Type		Forced Air-cooled,4-Stroke,Direct-Injection			
	Displacement	cc	456	499	531	668
	Max. Output	HP	9.5	11.5	12.2	13.6
	Fuel		Diesel Light Fuel			
	Fuel Tank Capacity	L	15	15	15	24
	Continuous Operating Hours	H	15	15	15	15
	Oil Capacity	L	1.65	1.65	1.65	2.1
	Ignition System		Direct-Injection			
	Starting System		Electric			
	Operating Noise Level(7m)	dB(A)	68~75			
PACKAGE DIMENSIONS	Overall Dimension L×W×H	mm	990×565×810			990×565×810
	Net/Gross Weight	kg	165/175	170/180	170/180	180/190

Chapter 2 Use for the Generator Set

2.1 Use Essentials and Cautions

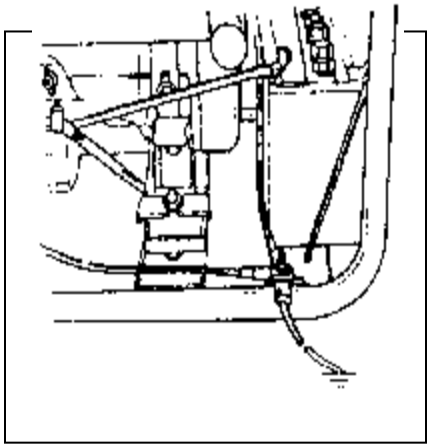
In order to ensure that you safely operate the generator set, be sure that you read and understand the operation manual. Especially the attention should be paid to the use main points listed below. Otherwise the personal accidents and the equipment damages may be caused.

2.1.1 Fire prevention.

- ✧ The combustion oil used in the diesel engine is light diesel oil. The gasoline, kerosene and other oils should not be used.
- ✧ Use a clean cloth to wipe off the overflowed oil. The gasoline, kerosene, match and other inflammable and explosive matters should not be put near the set because the temperature for the place around the exhaust noise suppressor is very high while the diesel engine is running.
- ✧ For the purpose to prevent the fire and to supply the sufficient ventilation condition, during the operation, at least 1.5m distance between the set and the building and other equipment should be kept.
- ✧ Operating the welder and generator set should be carried out on a smooth floor. If the set is oblique, the oil will overflow.

2.1.2 Prevent the suction of the exhausted gas includes the poison carbon monoxide.

- ✧ At the places with poor ventilation, the welder and generator set should not be used. If it is necessary to operate the set indoors, the suitable ventilation condition should be supplied to prevent the personnel and livestock from the affection.



2.1.3 Prevent the burn.

- ✧ When the diesel engine is running and is hot, it is not allowed to touch the noise suppressor and its housing.

2.1.4 Electric shock and short-circuit.

- ✧ In order to avoid the electric shock or the short-circuit, when the welder and generator set is wet or when your hand is wet, contacting the welder and generator set is not allowed. This welder and generator set is not waterproof so that it should not be used at the places in rain, snow and water mist.
- ✧ In order to prevent the electric shock, the welder and generator set should be grounded. Connect the grounding terminal of the generator with the external grounding device by using a conductor. Don't connect the other equipment with the welder and generator set.

2.1.5 Other safety main points.

- ✧ In order to know how to quickly brake the set, the operators should be familiar with operating all the switches. Anyone without passing through the correct guidance should not carry out the operation. The operators should wear the safety shoes and the suitable clothes. The children and livestock should be kept far from the welder and generator set.

2.1.6 Charge the battery.

- ✧ The electrolyte of the battery contains sulphuric acid. In order to protect your eyes, skin and clothes, if you touch it, it is necessary to use water for wash. If your eyes touch it, you should

go to a clinic for wash.

✧ The hydrogen produced from the battery is the explosive gas. Don't smoke particularly at the charge time. Any spark should not be splashed to the places near the battery.

✧ Charge the battery at the places with good ventilation.

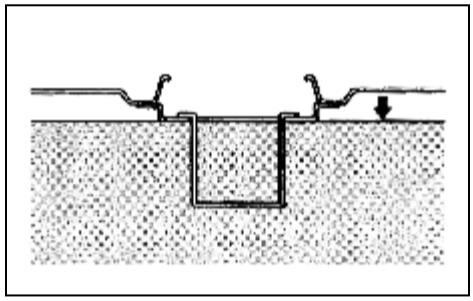
2.2 Preparation before the Start

2.2.1 Select and treat with the combustion oil.

Only use the light diesel oil. The combustion oil should filtered cleanly. The attention should be paid to that don't let any dust and water to be mixed into the combustion oil and the oil tank. Otherwise the High-pressure pump and the oil nozzle may be blocked up.

ATTENTION:

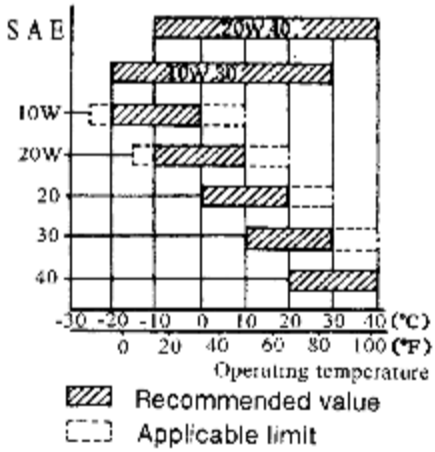
- Overflowing the oil is very dangerous. Filling the oil into the oil tank should not exceed the top of the red cock inside the filler.
- At the places of filling the oil into the diesel engine or of storing the diesel oil, don't smoke. Don't let any spark go into this area. At the time of filling the oil, the oil should not be overflowed. After the oil filling, be sure fastening the cover nut on the oil inlet.

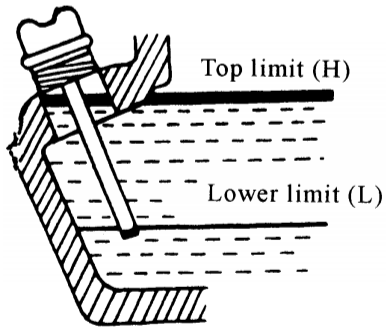


2.2.2 Filling the Machinery Oil

Put the generator set in a level state. Fill the oil into the oil-filling inlet. At the time of checking the oil level, it is necessary only to lightly insert the oil ruler. Please pay attention to that you should not rotate the oil ruler.

Type	170	178	186
Volume (L)	0.8	1.1	1.65



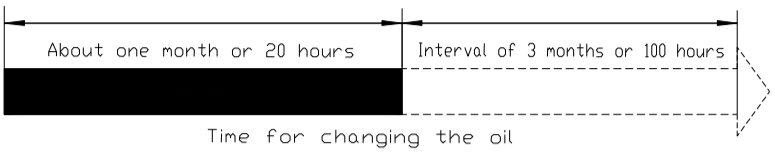


A.P.I. Diesel engine maintenance classification.

The lubrication oil should be CC or CD grade.

The factor of the affection, to the performance and reliability of the diesel engine, caused by your lubrication oil, is bigger than other factors. If you use any poor quality machinery oil or if you do not change the oil for your diesel engine according to the stipulation, it is easy to block up the piston. It is also to quicken the wearing of the cylinder, bearings, and other moving components so

that the life of your diesel engine is reduced.



Although there are the low oil pressure alarm system-the stop device. At the time of starting the set, it is necessary to check the oil quantity is not sufficient, please add some oil. Discharging the machinery oil should be carried out while the diesel engine is hot. After the cooling, it is very difficult to discharge the oil cleanly.

WARNING!

Don't fill the machinery oil into the diesel engine when the diesel engine is running

2.2.3 Check the air filter

- ✧ Unfasten the butterfly nut, open the filter cover, and take out the filter core. Never wash the filter core by using any detergents. When the output is reduced or the color of the exhausted gas is not good, change the filter core. Never start the generator set without the air filter core. Otherwise the diesel engine will soon be worn out.
- ✧ After mounting the filter core, cover the air filter housing and fasten the butterfly nut.

2.2.4 Inspection for the generator set

- ✧ Before starting the set, be sure that the air switch should be turned to "OFF" state. If the switch is not turned to "OFF" state, when starting the diesel engine, suddenly loading is very dangerous.
- ✧ The generator should be grounded to prevent the electric shock.
- ✧ Blow the dust out of the generator control box inside and surface by using dry compressed air (air pressure should be less than 1.96×105Pa) or manual. Check the clean condition on the slide rings, check the carbon brush pressure, check whether the position on the slide rings are correctly fitted. Check whether the fixing is reliable and whether the contact is good.
- ✧ According to the electric wiring diagram, check whether the wiring lines are correct and whether the connection joints are firm.

2.2.5 Before delivering the diesel engine from the factory, the fuel oil and the machinery oil had been discharged.

- ✧ Before filling the fuel oil and starting the diesel engine, it is necessary to check whether there is any air mixed into the oil circuit. If there is any, the air should be discharged. The concrete method is to unfasten the connecting nut between the oil injection pump and the oil transmission pipe so as to discharge the air in the fuel oil until there is no air bubble to be appeared. Then faster the connecting nut again.

2.3 Inspection and Operation of the Diesel Engine

2.3.1 Low oil pressure alarm system/ breaking device

- ✧ Diesel engine possesses the low oil pressure alarm system/breaking device. When the oil pressure goes down, the device will automatically brake the diesel engine to avoid the

blocking-up of the diesel engine because the oil pressure is too low and the lubrication is insufficient.

✧ If the diesel engine is running under the condition that the lubrication oil is insufficient, the oil temperature will go up too high. On the other hand, it is also dangerous if there is too much oil. Because the machinery oil may be burned, this will make that the revolution speed of the engine increases suddenly and results in "abnormal fast running". For this purpose, it is necessary to check the machinery oil and the oil level should reach the stipulated height.

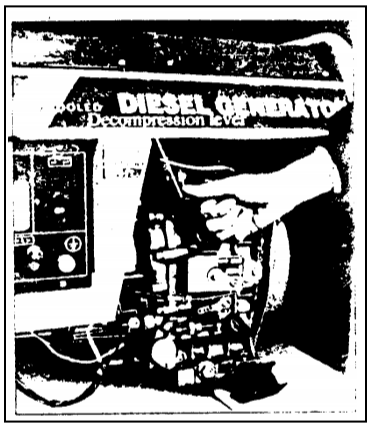
2.3.2 Trial run operation

When your diesel engine is a new set, a large loading will reduce the engine's life. Within the first 20 hours, it is necessary to carry out the trial run.

✧ Avoid the overload. During the trial run stage, it is necessary to avoid the large load. It uses only 75% of the rated load.

✧ Change the machinery oil of the engine according to the stipulation. At the beginning of the use, change the oil once each 20-hours or once a month. After this, change the oil once each 3-months or once for each 100-hours.

2.4 Starting the Generator Set



2.4.1 Recoil start (manual start)

Start the engine according to the following procedures:

(1) Switch on the fuel oil switch (in "ON" position).

(2) Set the speed handle of the engine at "run" position.

(3) Draw out the buffer start handle.

✧ Draw out the handle till you feel your hand has the resistance force. Then relieve it and let it restore to the initial position.

✧ Press down the pressure reduction handle (when the buffer starter is drawn, it will automatically be restored.).

✧ Quickly draw out the buffer start handle by two hands. While operating (or after the start), don't let the handle fly out of your hand to avoid that it smashes onto the diesel engine. Slowly and lightly let the handle return its position to avoid damaging the starter.

CAUTION:

When the diesel engine is running, never draw out the start handle otherwise it will damage the diesel engine**.**

✧ In the cold days, when it is difficult to start the diesel engine, unplug the rubber cock on the rocker arm of the diesel engine and fill in 2ml machinery oil.

Plug the rubber cock before the start.

The rubber cock should be plugged except filling in the oil. Otherwise the rain, water, dust and other dirt may enter into the diesel engine to cause the fast wearing of the inside components. This will result in serious problem.

2.4.2 Electric start

1. Start (The preparation for this start is the same as the hand start.)

✧ Insert the electric door key and make it in "OFF" position.

✧ Set the speed handle of the diesel engine in "RUN" position.

- ✧ Turn the start switch to "START" position clockwise
- ✧ After the diesel engine starts, your hand should relieve the switch handle. Let the switch restore to "ON" position automatically.
- ✧ If the diesel engine doesn't start after 10 seconds, please wait for anther 15 seconds and make the start again.

CAUTION:

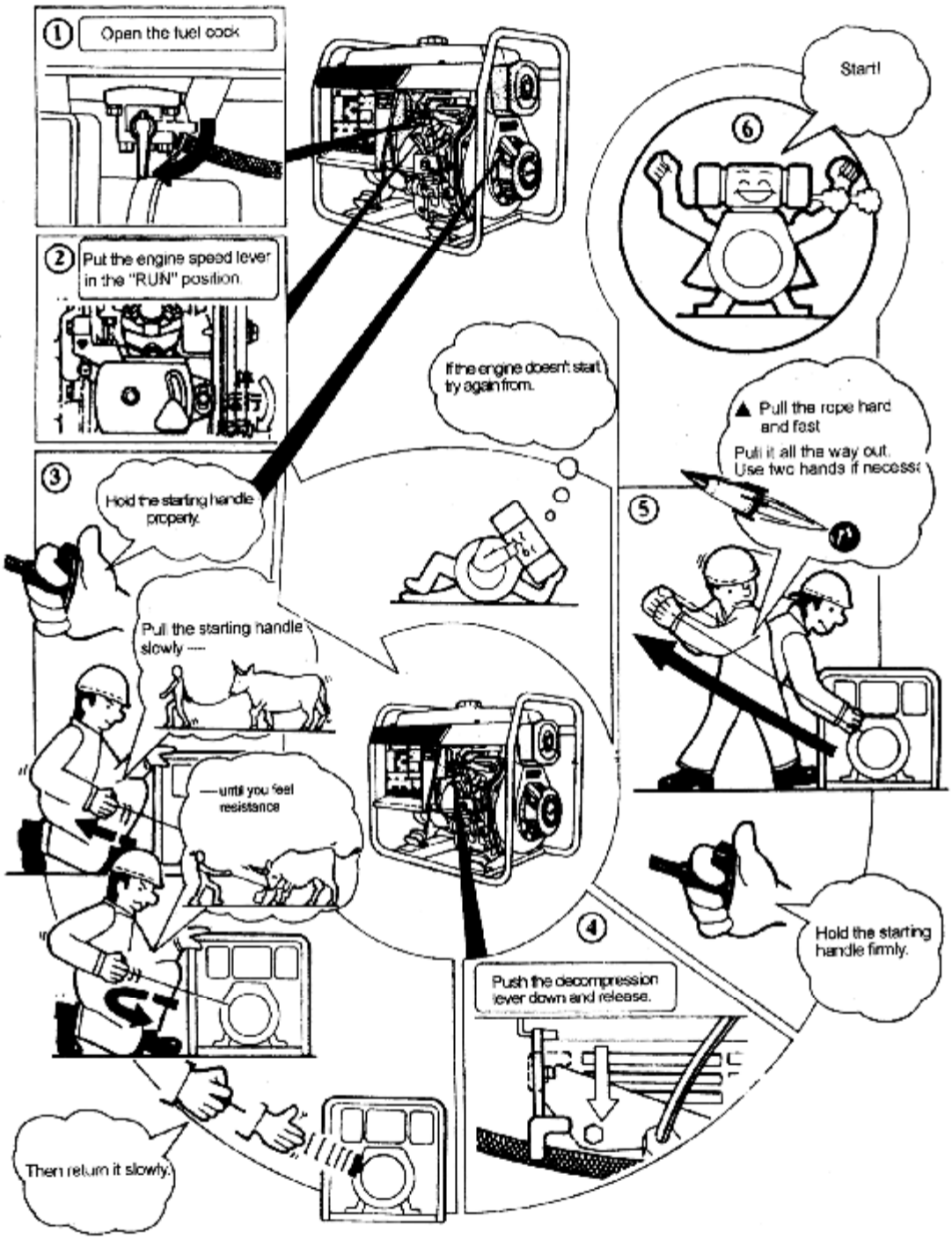
- If the start motor rotates for a long time and the voltage of the battery will go down to cause the start motor running hysteresis.
- When the diesel engine is in operation, always leave the start key in "ON" position.

2. Battery

- ✧ Check the electrolyte level height of the battery once a month. When the liquid level goes down to a lower mark, add some distilled water to make that the liquid level goes up to a higher mark.
- ✧ If the electrolyte in the battery is too less, the diesel engine will not start. Because the electric power is insufficient at this time, it is necessary to keep the liquid is at a place between the higher limit and the lower limit.
- ✧ If the electrolyte in the battery is too much, the liquid may overflow and this may corrode its surrounding components.
- ✧ Attention should be paid to avoiding that the electrolyte is too much or is too less.
- ✧ Charge the battery once a month.

2.5. Operation Procedure for Starting the Generator Set

This operation procedure is suitable series recoil hand drawing start mode.



2.6. How to Operate the Welder and Generator Set

2.6.1 Operating the Diesel Engine

- ✧ Preheat the diesel engine for three minutes under the condition without any load.
- ✧ For the diesel engine having the low oil pressure alarm system, it is necessary to check whether the oil pressure signal indicator lights up. For the diesel engine having the low oil pressure alarm system, the lubrication oil alarm indicator will light up when the oil pressure is low or the lubrication oil is insufficient, and the diesel engine will stop automatically. If no lubrication oil is added and you do not make a restart, the diesel engine will still stop immediately. It is necessary to check the oil height and add some oil.
- ✧ Do not unfasten the adjustment bolt used for adjusting the speed limit of the diesel engine or do not unfasten the high-pressure pump limit bolt (They were adjusted well when delivered from the factory.). otherwise their performance will be affected.

2.6.2 Inspection during the Operation

- ✧ Check whether there is any abnormal sound or vibration.
- ✧ Check whether the diesel engine does not start or the operation is not good.
- ✧ Check the exhausted gas color (Is it black or is it too white?). If you find one of the above-mentioned phenomena, it is necessary to brake the set, to find out the trouble cause and shoot the trouble. If the settlement can not be made, please contact agency of our company nearby, or contact our company directly.

2.7. Loading

2.7.1 Load

- ✧ Load according to the stipulated parameters. For the electric principle diagram of the generator set, please see the following figure.

2.7.2 AC Application

- ✧ Be sure that the revolution speed of the generator set be increased to the rated speed (the speed handle of the diesel engine should be turned to the top.). please see Main Technical Specifications and Data in Chapter 1.
- ✧ After switching on the air switch, observe the voltmeter on the panel of the control cabinet and the voltmeter should point to the single phase set 220V±5% (50Hz), then the loading can be carried out.
- ✧ When the double voltage generator set charges over the voltage, the air switch should be set at "OFF" state. Otherwise the generator set and the electric devices may be burned out and damaged.

CAUTION:

Do not start more than two machines at the same time. The machines should be started one by one. Do not use the floodlight at the same time of using other machines.

- ✧ At the time of connecting with the generator, all kinds of equipment should be connected in order. For the matter of the motor load, firstly the large power motors should be connected. After the operation is normal, then the small power motors can be connected. If the operation is incorrect, the generator will cause the running hysteresis or will brake suddenly. It is necessary

to unload immediately and to turn off the generator switch. Check where the trouble appears.

If the circuit overload makes that the air switch of AC circuit trips, it is necessary to reduce the circuit load. It is not allowed that the set runs under the overload condition. Maximum output power of the generation for the set should not exceed the stipulation .It is necessary to wait for several minutes before restoring the operation. If the indication on the voltmeter is too low or too high, the revolution speed can be adjusted. If there is any trouble and any abnormal running condition, it is necessary to stop the generator for check.

2.7.3 DC application

- ✧ DC terminals are used only for charging 12V battery.
- ✧ At the time of using 12Vfor charge, the air switch should be set at "OFF" state. On the 12Voutput terminals, a charge switch can be connected so the switch can be used for on-and-off purpose.
- ✧ At the time of using the automatic type battery with the battery conductors, be sure that the battery negative conductor should be disconnected at the time of charge.
- ✧ Connect the positive and negative poles of the battery with the positive and negative poles of DC terminals separately. Do not misconnect the positive and negative poles of the battery. Otherwise it will damage the generator and the battery.
- ✧ Do not connect the positive pole of the battery with its negative pole. Otherwise it will damage the battery.
- ✧ Do not let the positive and negative poles of the DC contact each other. Otherwise it will damage the generator.
- ✧ At the time of charging the large capacity battery, because the current is too big (the charge current should not be more than 10A). Otherwise the fuse of the DC power supply will be burned off and broken easily.
- ✧ Charging the battery will produce the flammable gas. Do not let any spark, flame and cigarette approaching the place. In order to avoid producing the spark near the battery. Firstly connect the charging conductors with the battery, then with the generator. At the time of disconnection, firstly disconnect the motor cable.
- ✧ Charging the battery should be at a place with good ventilation. Before turning on, open the battery cover. If the electrolyte temperature exceeds 45℃, terminate the charge.
- ✧ In order to protect the motor, at the terminals of the generator, the generator set has a fuse. When the user find that the circuit is normal and there is no DC output, please open the back cover of the motor. If the fuse is burned out, please check whether the rectification-bridge is normal and change the fuse in time. If the generator set is not in use for a time, the battery connection lines should be removed to prevent the electric leakage of the battery.

2.8 Braking the Generator Set

2.8.1 Remove the load of the generator set.

2.8.2 Turn off the air switch of the generator set.

2.8.3 Set the speed handle of the engine to "RUN" position. Carry out the unload operation of the diesel engine for there minutes. Do not brake the diesel engine suddenly because this may make that the temperature goes up abnormally to cause the blocking-up of the oil nozzle and the damage of the diesel engine.

- ✧ Press the braking handle downwards.

- ✧ When using the electric starter ,turn the key to "OFF"
- ✧ Set the fuel switch handle to "S"osition.
- ✧ Slowly draw out the recoil handle till you feel the pressure (i.e., at this point of the compression stroke, the suction and exhaust valves are close.). Stop the handle at this position. In such a way, when the engine is not in use, the rusting can be prevented.

CAUTION:

- When the speed handle is set at "STOP" position and the diesel engine is still in operation, it is possible to stop the diesel engine either by setting the fuel switch to "OFF" position or by unfastening the high pressure oil pipe nut. Do not brake the diesel engine by using the pressure reduction handle.
- It is not allowed that the set stops with the load. It is necessary to firstly remove the load and then to stop the set.

Chapter 3 Maintenance of the Generator Set

3.1 Regular Maintenance

Item \ Service period regular	Daily check	First month or 20 Hrs	Every 3 months or 100 Hrs	Every 6 months or 500 Hrs	Every year or 1000 Hrs
Check and replenish fuel	○				
Drain fuel from F.O. tank		○			
Check and replenish lube oil	○				
Check for oil leakage	○				
Check and tighten each parts engine	○			● tighten head bolts	
Chang lube oil		○ 1st time	○ 2nd and thereafter		
Clean oil filter				○ (replace if necessary)	
Air cleaner element replacement	(Service more frequently when used in dusty areas)			○ (replace)	
Clean fuel filter				○	● (replace)
Check fuel injection pump				●	
Check fuel injection nozzle				●	
Check fuel pipe				● (replace if necessary)	
Adjust valve clearance for intake and exhaust valves		● (1st time)		●	
Lap intake and exhaust valves					●
Replace piston rings					●
Check battery fluid	(monthly)				

"●" The chart above indicates which checks to make and when to make them, the mark (●) Indicates that special tools and skills one required, consult your dealer.

In order to keep that the welder and generator set is in a good state, the regular inspection and maintenance is very important. The set is composed of the diesel engine, welder generator, control cabinet, frame and so on. For the details about the inspection and maintenance, please read the operation and maintenance manual for each assembling section.

Before carrying out the maintenance to the set, please turn off the diesel engine. If it is necessary to run the diesel engine, its surrounding should be in good ventilation to discharge the gas that contains the poison carbon monoxide.

After using the set, it is necessary to wipe off dirt by using a clean cloth to prevent the corrosion and remove the sink materials.

3.1.1 Changing engine oil (every 100Hrs)

Remove the oil filler cap. Remove the drain plug and drain the old oil while the engine is still warm. The plug is located on the bottom of the cylinder block. Tighten the drain plug and refill with recommended oil.

3.1.2 Cleaning the oil filter

Clean	Every 6 months or 500 hours.
Replace	Replace if necessary.

3.1.3 Changing the air cleaner element

Do not wash the air cleaner element with detergent because this is a wet type element.

Change	Every 6 months or 500 hours. (or earlier if dirty)

CAUTION:

Never start the engine without the element, or with a defective element. Change the element in time.

3.1.4 Cleaning and replacing the fuel filter

The fuel filter also has to be cleaned regularly to insure maximum engine output.

Clean	Every 6 months or 500 hours.
Replace	Every year or 1000 hours.

- ✧ Drain the fuel oil from the fuel tank.
- ✧ Loosen the small screws of the fuel cock and pull out the filter from the F.O. tank. Wash the filter thoroughly with diesel fuel.

Remove the lock nut, end cap and diffuser discs and clean the carbon deposit.

Clean time	Every 3 months or 100 hours.

3.1.5 Tightening cylinder head bolts (refer to the manual of diesel engine) requires a special tool. Don't try it yourself.

3.1.6 Checking the injection nozzle, injection pump, etc.

✧ Adjusting the valve head clearance for the intake and exhaust valves.

✧ Lapping of intake and exhaust valves.

✧ Replacing piston ring.

All these require special tools and skills. Do not perform the injection nozzle test near an open fire or any other kind of fire. The fuel spray may ignite. Do not expose bare skin to the fuel spray. The fuel may penetrate the skin and cause injury to the body. Always keep your body away from the nozzle.

3.1.7 Checking and replenishing battery fluid and charging the battery.

This diesel engine uses a 12V battery. The battery fluid will be lost through continuous charging and discharging.

Before starting, check for physical damage to the battery and also the electrolyte level, and replenish with distilled water up to the upper mark if necessary, when actual damage is discovered, replace the battery.

Battery fluid check	monthly

3.2 Maintenance for a long time storage

If your generator should be storage in a long time, the following preparation should be made:

3.2.1 Operate the diesel engine about 3 minutes, the stop it.

3.2.2 Close the diesel engine when the diesel engine is still hot, drain old lubricate of diesel engine oil out, then refill new one.

3.2.3 Pull out the rubber plug at the cover of diesel engine and add 2ml of lubricate in cylinder, and finally put the plug on its original place.

3.2.4 Maintenance of starting position.

✧ Manual starting

Press the pressure-reduce handle (non-compression position), pull the recoil handle 2~3 times. (Don't start the diesel engine).

✧ Electric starting

When the starting handle is in the position of non-compression position, operate the diesel engine 2~3 seconds. When the switch is in the position of start, don't start the diesel engine.

3.2.5 Pull the pressure-reduce handle out, pull the recoil starter slowly.

When full it is fasten, then stop. (At this time the intake and drain valve is at the status of close, it is suitable to prevent from rust.).

3.2.6 Clean and store it in a dry place.

Chapter 4 Maintenance and remedy of generator set

Cause		Remedy
The diesel engine can no start	Oil fuel is not enough	Add oil fuel
	The switch is not at "ON" position	Turn it to "ON" position
	The pump of high pressure and oil nozzle can not inject oil or the oil amount is not enough	Remove the oil nozzle out and repair it at test table
	The control lever of speed is not at "RUN" position	Put the control level to "RUN" position
	Check the level of lubricant	The specified oil level should be between upper level "H" and lower level "L"
	The speed and force to pull the recoil starter is not enough	Start the diesel engine according to the requirements of operating procedure of start
	The oil nozzle has dirty	Clean the nozzle
	The battery has no electricity	Charge it or replace it with a new one
The generator can not generate	Main switch(AC SW) is not closed	Put the main switch to the "ON" position
	Capacitor damage	Change capacitor
	The contact of socket is not closed	Adjust the feet of socket
	The rated speed of generator can not be reached	Adjust it according to the requirement

If electricity is still not generated, take the generator to a dealer.

This manual may update without notice.

Please be noted that if the malfunction is out of the scope of the warranty, the user should bear the charges of accessories, spare parts for repairing at the manufacture's price. If necessary, LETON Power will send engineers to the user's location and the user should bear all cost including Visa, round air ticket,room & boarding, extra charge USD 100~300 per man per day (subject to different served country or region).In order to judge whether the malfunction is caused by the user or by LETON Power defective manufacturing quality, the user is prohibited from dissembling or attempting to repair the generator without prior consent from LETON Power. Otherwise, the warranty will be NULL or VOID.during the lifespan of genset after warranty period expires, LETON Power is still supplying technical support, damageable spare parts at manufacture's price