

# Chapter 1 Malfunction and Troubleshooting for Diesel Engine

## 1. Causes and Troubleshooting for the Engine Not Being Started

CAUSES	TROUBLESHOOTING
It is cold Machine oil is viscous	Fill machine oil into crankcase after warming-up. Fill machine oil into inlet pipe Remove the connection belt from the machine Start the engine and stop it when it is heating, assemble the belt and then restart the engine.
Failure of fuel system Water mixed in the fuel	Clean fuel tank, fuel filter and fuel pipe, then change the fuel.
The fuel get thickening and can't flow easily	Use prescribed brand fuel
Air exists in fuel system	Emit the air, tighten each connect part to the fuel pipe
Injection fuel is little or the spray is not excellent	Check the position of governing handle or check and clean the fuel nozzle, change the nozzle if necessary.
Incomplete combustion	Mainly by ill spray Incorrect delivery angle Leakage in gasket of cylinder head Deficiency in pressure of compression
Interrupted of diesel fuel	Lack of oil, should fill fuel into the fuel tank. If have obstruction or leakage in the fuel pipe and fuel filter, drain out them with the air.
Deficiency in pressure of compression; Loosen in the nut of cylinder head; Damage or leakage in the gasket of cylinder	Tighten the nut of cylinder head in the diagonal sequence; check the gasket of cylinder as per the standard requirement. When the engine with the new gasket is heating, tighten the nut of cylinder head again.
Big gap in the piston ring due to wear and tear	Change the piston ring
Leakage caused by each gap of piston ring lined in one direction	Make each gap of piston at angle of 120
Serious stickiness or breakage in piston ring	Clean it by diesel fuel or change the piston ring.
Leakage in gas valves	Skive the gas valve, or send it to repair factory if the vestige is too deep.
Incorrect in valve clearance	Adjust the gap as specified.
The valve stem is clipped in the guide pipe	Disassemble the gas valve, clean the stem and guide pipe with diesel fuel.

## 2 Causes and Troubleshooting for Deficient Power of Diesel Engine

CAUSES	TROUBLESHOOTING
Malfunction of fuel system; Parts obstruction in fuel filter and fuel pipe; Inadequate fuel supplying;	Check the fuel switch, they should be opened fully. Clean the fuel filter and fuel pipe.
Bad pressing of fuel pump	Check or change the damaged parts of fuel pump.
Malfunction of the fuel nozzle; Incorrect injection pressure	Adjust the injection pressure
Carbon deposit in the nozzle hole	Clean
Needle was bit	Clean or change
Loose fit between needle and needle body	Change
Obstruction in air filter	Remove, clean or change the filter core.
Not fast enough of engine speed	Check the speed of engine with the tachometer, and then readjust the speed limit bolt.

## 3 Causes and Troubleshooting for Engine Stopping Automatically

CAUSES	TROUBLESHOOTING
Malfunction of the fuel system Run out of fuel	Fill fuel.
Obstruction in fuel pip or air filter	Check or clean.
Air exists in fuel system	Emit the air.
Nozzle needle was bitted	Clean, skive the nozzle or change it if necessary.
Obstruction in air filter	Check, clean or brush off, or change the filter element
Sudden increase of load	Lighten the load.

## 4 Causes and Troubleshooting for Exhaust with Black Smoke

CAUSES	TROUBLESHOOTING
Overload	Lighten the load; change the matched machine if it does not comply with the requirements.
Bad spray	Check injection pressure and spray condition and remedy; change the nozzle if it was damaged.
Lack of air or leakage	Clean the air filter; check the cause of leakage and remedy.

### 5 □ Causes and Troubleshooting for Exhaust with Blue Smoke

CAUSES	TROUBLESHOOTING
Machine oil mixed in cylinder	Check the oil level, drain off the redundant engine oil
Piston ring is clipped, worn or lack of elasticity, hatch of each ring turned to the same direction and make engine oil up	Check and replace the piston ring, and cross hatch of each ring
Big gap between piston and cylinder	Remedy or change
Wear and tear of valve and guide	Change

### 6 □ Causes and Troubleshooting for Exhaust with White Smoke

CAUSES	TROUBLESHOOTING
Water mixed in diesel fuel	Clean the fuel tank and filter and change the diesel fuel.

### 7 □ Checking Methods when the Engine Encounters Malfunction

CAUSES	TROUBLESHOOTING
Speed sometimes fast, sometimes slow	Check if the speed governing system is flexible, and if air mixed in oil pipeline.
Abnormal noise suddenly sent out	Stop the engine and inspect each movable parts carefully
Exhaust with black suddenly	Check fuel system, especially the nozzle.
Rhythmically metal knocking sound in the cylinder	The fuel delivery angle is too big, should adjust the angle.

## Chapter 2 Overhaul and Troubleshooting for Diesel Generator

### 1 □ Causes and troubleshooting for the generator not being started

CAUSES	TROUBLESHOOTING
Lack of diesel fuel	Add diesel fuel
Oil switch is not on the position of “ON” (start switch)	Turn oil switch handle to the position of “ON”
No or little spray from injection pump and nozzle	Disassemble the nozzle and adjust it on the test table
The governor handle is not on the position of “RUN”	Turn the governor handle to the position of “RUN”
Check the lubricating oil level	The standard of lubricating oil is between upper line “H” and bottom line “L”
Recoil starter is not swift and powerful enough	Start the engine according to “ Start Operation Procedure”
Dirty in the nozzle	Clean the nozzle
No electricity of storage battery	Charge up or change the storage battery

### 2 □ Causes and troubleshooting for the generator not generating electricity

CAUSE	TROUBLESHOOTING
Power switch is on the position of “OFF”	Turn the switch handle to the position of “ON”
Bad contact of the socket	Adjust the socket pins
Damage of capacitor	Change the capacitor

### Chapter 3 Damage Cause and Remedy of Brushless Alternator

Phenomena	Cause	Remedy
<i>Can not generate</i>	1. Switch is on the position of "OFF".	1. Turn the switch to the position "ON".
	2. Worse connection of the plug or the control panel.	2. Adjust the contactor of the plug or the wires inside the control panel.
	3. Circuit break of the coil of the stator; or the capacitor overloads.	3. Check the stator at the point of the break; If it is the just reason that causes problem, change the stator; Or check the capacitor with the multimeter, if the needle does not move, change the capacitor.
	4. Short circuit of the rectifier.	4. Check the rectifier by the Multimeter as the following steps: connect the pens to each two of the four contactors of the rectifiers both in the clock-wise way and in the counter-clock-wise way; if you find that
	5. Connection between the coil of the rotor and the rectifier is wrong, which can not make the different magnetic poles (N/S).	5. Check the reel and the rectifier by the Multimeter. Kindly note the current way while connecting. The correct connecting diagram is just shown as the right one.
Low Voltage	1. Low engine speed	1. Increase the engine speed.
	2. Short-circuit of the rotor reels.	2. Change the rotor.
	3. Short-circuit of the capacitor or the stator.	3. Chang the stator.
Others	1. The rectifier of the rotor got short circuit by the over-current. The voltage decreases.	1. Check the rectifier as per the above instruction. Replace a new one.
	2. After loading, the PTO shaft skids. And the voltage decreases, the alternator overheats.	2. Disassemble the engine. Maintain the PTO shaft and the inside pole of the rotor until the conic degree reaches to the reasonable level. Then assemble the engine.
	3. Short-circuit of the rotor or the stator makes the alternator overheat. The voltage decreases.	3. Change the stator or the rotor.

## Chapter 4 Damage Cause and Remedy of The Brush Alternator

Phenomena	Cause	Remedy
<b>Can not generate</b>	1. Switch is on the position of "OFF".	1. Turn the switch to the position "ON".
	2. Worse connection of the plug or the control panel.	2. Adjust the contactor of the plug or the wires inside the control panel.
	3. The connection of the AVR contactor is bad or AVR burns.	3. Connect the contactor well or change AVR.
	4. The carbon brush wears out or its positive pole and its negative poles are connected crossly.	4. Change the carbon brush or make the wrong connection right.
	5. The second reel of the alternator has turnoff.	5. Check the reel by the Multimeter. And change the stator if it needs.
	6. The rotor has turnoff.	6. Check the reel by the Multimeter. And change the rotor if it needs.
<b>Low Voltage</b>	1. Low engine speed	1. Increase the engine speed.
	2. Short-circuit of the rotor reels. AVR burns.	2. Change AVR firstly. If the voltage is not high enough, change the rotor.
	3. Short-circuit of the capacitor or the staor.	3. Chang the stator.
	4. The sample voltage has short circuit.	4. Adjust the resistance of AVR. If the voltage remains, change the stator of the alternator
<b>Others</b>	1. AVR burns after load. The voltage decreases, even disappear.	1. Change AVR.
	2. After loading, the PTO shafts skids. And the voltage decreases, the alternator overheats.	2. Disassemble the engine. Maintain the PTO shaft and the inside pole of the rotor until the conic degree reaches to the reasonable level. Then assemble the engine.
	3. Short-circuit of the rotor or the staor makes the alternator overheat. The voltage decreases.	3. Change the stator or the rotor.

## Chapter 5      Inspections before Operation and Maintenance

### 5.1 Inspection before operation

#### 5.1.1 Check the insulated resistance:

An insulated resistance usually results in the creepage of the alternator when it is below the regulated value and then brings on the security problems. The user should check the insulated resistance between the master and subordinate reels and the insulated resistance between the reels and the crust with 500V megohmmeter regularly. The value should not be under 2 M ohms at normal temperature; otherwise these parts should be dried. Use the electric cooker, infrared ray or big bulb or something else to heat them up outside until the insulated resistance reaches the regulated value.

#### 5.1.2 Check the alternator assembly

Make sure all the firming components are tight and the rotor is easy to turn by hand without impacting, scrubbing and any abnormal noise. Do not let the rain or other liquid drop into the alternator.

### 5.2 Starting the generator

The end of voltage output should be on before running the machine. Generator should self excite, generate voltage in gear and reach the rated power when engine speed is accelerated to the rated value. Otherwise, stop the machine and check it.

### 5.3 Maintenance

Keep generator away from the oil, vapor, acidic/alkaline gas, saline brume and do not let any other solid matter fall into the generator. Keep drafty when the generator is running. Do not put anything on the surface of generator for baffling ventilation and heat dispersion. Do not operate under over-loading condition continuously and inspect bolts and mechanical firming components routinely.