

## 7. TROUBLESHOOTING GUIDE

### 1. ENGINE

If the engine does not function properly, use the following chart to identify and correct the cause.

#### 1) WHEN IT IS DIFFICULT TO START THE ENGINE

Trouble	Service	Remark
Fuel is thick and doesn't flow.	<ul style="list-style-type: none"> <li>• Check the fuel tank and fuel filter.</li> <li>• Remove water, dirt and other impurities.</li> <li>• As all fuel will be filtered by the filter, if there should be water or other foreign matters on the filter, clean the filter with kerosene.</li> </ul>	
Air or water mixed in fuel system.	<ul style="list-style-type: none"> <li>• If air is in the fuel filter or injection lines, the fuel pump will not work properly.</li> <li>• To attain proper fuel injection pressure, check carefully for loosened fuel line coupling, loose cap nut, etc.</li> <li>• Loosen joint bolt stop fuel filter and air vent screws of fuel injection pump to eliminate all the air in the fuel system.</li> </ul>	
Valve clearance is not as specified.	<ul style="list-style-type: none"> <li>• Adjust valve clearance to 0.18 to 0.22mm (0.007 to 0.0087 in.) when the engine is cold.</li> </ul>	
Leaking valves.	<ul style="list-style-type: none"> <li>• Grind valve.</li> </ul>	
Fuel injection timing is not as specified.	<ul style="list-style-type: none"> <li>• Check injection timing</li> </ul>	
Engine oil becomes thick in cold weather and engine cranks slow.	<ul style="list-style-type: none"> <li>• Change grade of oil according to the weather (temperature.)</li> </ul>	
Low compression	<ul style="list-style-type: none"> <li>• Bad valve or excessive wear of rings, pistons and liners cause insufficient compression. Replace with new parts.</li> </ul>	
Battery is discharged and the engine will not crank.	<ul style="list-style-type: none"> <li>• Charge battery. In winter, always remove battery from machine, charge fully and keep indoors. Install in machine at time of use.</li> </ul>	

## 2) WHEN OUTPUT IS INSUFFICIENT

Trouble	Service	Remark
Compression is insufficient. Leaking valves.	<ul style="list-style-type: none"> <li>• Bad valve and excessive wear of rings, pistons and liners cause insufficient compression. Replace with new parts.</li> <li>• Grind valves.</li> </ul>	
Fuel is insufficient.	<ul style="list-style-type: none"> <li>• Check fuel system.</li> </ul>	
Overheating of moving parts.	<ul style="list-style-type: none"> <li>• Check lubricating oil system.</li> <li>• Check to see if lubricating oil filter is working properly.</li> <li>• Filter element deposited with impurities would cause poor lubrication. Change element.</li> <li>• Check the clearance of bearing are within specs.</li> <li>• Check injection timing.</li> <li>• Adjust timing</li> </ul>	
Valve clearance is not as specified.	<ul style="list-style-type: none"> <li>• Adjust to proper valve clearance of 0.18 to 0.22 mm(0.007 to 0.087 in.) with engine cold.</li> </ul>	
Air cleaner is dirty.	<ul style="list-style-type: none"> <li>• Clean the element every 100 hours of operation.</li> </ul>	
Fuel injection pressure is wrong.	<ul style="list-style-type: none"> <li>• Check injection pressure. 13.7MPa(140kgf/cm<sup>2</sup>, 1991psi)</li> </ul>	
Injection pump wear.	<ul style="list-style-type: none"> <li>• Do not use poor quality fuel as it will cause wear of the pump.</li> <li>• Check the fuel injection pump element and delivery valve assembly and replace as necessary.</li> </ul>	

### 3) WHEN ENGINE SUDDENLY STOPS

Trouble	Service	Remark
Lack of fuel	<ul style="list-style-type: none"> <li>• Check the fuel tank and refill the fuel, if necessary.</li> <li>• Also check the fuel system for air or leaks.</li> </ul>	
Bad nozzle	<ul style="list-style-type: none"> <li>• If necessary, replace with a new nozzle.</li> </ul>	
Moving parts are overheated due to shortage of lubrication oil or improper lubrication.	<ul style="list-style-type: none"> <li>• Check amount of engine oil with oil level gauge.</li> <li>• Check lubricating oil system.</li> <li>• At every 2 times of oil change, oil filter cartridge should be replaced.</li> <li>• Check to see if the engine bearing clearances is within specs.</li> </ul>	

### 4) WHEN COLOR OF EXHAUST IS ESPECIALLY BAD

Trouble	Service	Remark
Fuel governing device bad	<ul style="list-style-type: none"> <li>• Contact dealer for repairs.</li> </ul>	
Fuel is of extremely poor quality.	<ul style="list-style-type: none"> <li>• Select good quality fuel.</li> </ul>	
Nozzle is bad.	<ul style="list-style-type: none"> <li>• If necessary, replace with new nozzle.</li> </ul>	
Combustion is incomplete.	<ul style="list-style-type: none"> <li>• Cause is poor atomization, improper injection timing, etc. Because of trouble in injection system or in poor valve adjustment, or compression leakage, poor compression, etc. Check for the cause.</li> </ul>	

### 5) WHEN ENGINE MUST BE STOPPED IMMEDIATELY

Trouble	Service	Remark
Engine revolution suddenly decreases or increases.	<ul style="list-style-type: none"> <li>• Check the adjustments, injection timing and the fuel system.</li> </ul>	
Unusual sound is heard suddenly.	<ul style="list-style-type: none"> <li>• Check all moving parts carefully.</li> </ul>	
Color of exhaust suddenly turns dark.	<ul style="list-style-type: none"> <li>• Check the fuel injection system, especially the fuel injection nozzle.</li> </ul>	
Bearing parts are overheated.	<ul style="list-style-type: none"> <li>• Check the lubricating system.</li> </ul>	
Oil lamp lights up during operation.	<ul style="list-style-type: none"> <li>• Check the lubricating system.</li> <li>• Check, if the engine bearing clearances are within specs.</li> <li>• Check the function of the relieve valve in the lubricating system.</li> <li>• Check pressure switch.</li> <li>• Check filter base gasket.</li> </ul>	

## 6) WHEN ENGINE OVERHEAT

Trouble	Service	Remark
Engine oil insufficient.	• Check oil level. Replenish oil as required.	
Fan belt broken or elongated.	• Change belt or adjust belt tension.	
Coolant insufficient.	• Replenish coolant.	
Excessive concentration of antifreeze.	• Add water only or change to coolant with the specified mixing ratio.	
Radiator net or radiator fin clogged with dust.	• Clean net or fin carefully.	
Inside of radiator or coolant flow route corroded.	• Clean or replace radiator and parts.	
Fan or radiator or radiator cap defective.	• Replace defective parts.	
Thermostat defective.	• Check thermostat and replace if necessary.	
Temperature gauge or sensor defective.	• Check temperature with thermometer and replace if necessary.	
Overload running.	• Reduce load.	
Head gasket defective or water leakage.	• Replace parts.	
Incorrect injection timing.	• Adjust to proper timing.	
Unsuitable fuel used.	• Use the specified fuel.	

## 2. ELECTRICAL SYSTEM

Trouble	Service	Remark
Starting motor does not turn when starting switch is turned on.	<ul style="list-style-type: none"> <li>• Inspect and repair the wiring.</li> <li>• Charge the battery.</li> <li>• Check starting switch.</li> <li>• Check battery relay switch.</li> <li>• Place the foot pedal and travel/swing control lever in the neutral.</li> </ul>	
Starting motor turns the engine sluggishly.	<ul style="list-style-type: none"> <li>• Charge the battery.</li> <li>• Check the starting motor.</li> </ul>	
Starting motor disengages before the engine starts up.	<ul style="list-style-type: none"> <li>• Check and repair the wiring.</li> <li>• Charge the battery.</li> </ul>	
Engine oil pressure lamp does not light up when engine is stationary(When the starting switch is ON position).	<ul style="list-style-type: none"> <li>• Check the lamp.</li> <li>• Check the oil pressure switch.</li> </ul>	
Charge lamp does not light up when the engine is stationary (When the starting switch is in ON position).	<ul style="list-style-type: none"> <li>• Check the lamp.</li> <li>• Check and repair the wiring.</li> </ul>	

### 3. HYDRAULIC SYSTEM

Trouble	Service	Remark
Bucket lacks lifting power. Bucket lifting speed is slow.	<ul style="list-style-type: none"><li>• Check the hydraulic oil level and add if necessary.</li><li>• Replace filter on rear.</li></ul>	
Bubbles in oil.	<ul style="list-style-type: none"><li>• Replace with specified oil.</li><li>• Add oil if needed.</li></ul>	
Oil pressure is too low.	<ul style="list-style-type: none"><li>• Bleed air from oil line.</li><li>• Add oil and bleed air.</li></ul>	
Cylinder vibrates when operating.	<ul style="list-style-type: none"><li>• Add oil.</li></ul>	