

Points for attention

1. Before delivery, this diesel engine has been tested strictly in accordance with the test specifications, and the throttle position is limited with lead sealing. Do not remove the lead seal and increase the throttle at will. Otherwise, the company's guarantee will be invalid.
2. Before operating the diesel engine, please always read this Operation and Maintenance Manual carefully, familiar with the structure of the engine, and follow the technical operation and maintenance practices therein strictly.
3. For the new diesel engine, 50h test running shall be performed before normal using.
4. After the engine is started in cold state, please run it at idle speed for a while (do not run it at idle speed for a long time) and then increase the engine speed slowly instead of running at high speed suddenly. After running under heavy load, do not stop the engine immediately (except in special cases), you should run the engine at low speed for 5~10 minutes before stopping.
5. After the engine is stopped, if the ambient temperature is probably lower than 0°C and the coolant without antifreeze additive is used, please fully discharge the coolant from the water tank and diesel engine.
6. It's prohibited to run the diesel engine without air filter to avoid the unfiltered air from entering the cylinder directly.
7. The diesel engine should be filled with oil and fuel specified in this Operation and Maintenance Manual (Weichai Power special oil is recommended) and they should be filtered with special clean filters in filling (the fuel should also be deposited for 72h before filling).
8. Inspection and repair of the electrical system components of diesel engine should be carried out by professional technicians.
9. In general, the oil seal period of diesel engine is one year, please check and take necessary measures if exceeded.
10. The calibration and correction of engine power should follow the requirements in GB/T18297 standard.
11. Diesel engine quality information feedback

To serve you better, we will create files and perform quality tracking for all 226B series diesel engines sold, please fill out the "Product Opinion Collection Card" and then send it back to our company and we will keep relation with you by this card.
12. Precautions for diesel engine repair and part replacement: 226B series diesel engine is of high performance product. User must use the approved spare parts to ensure the performance and reliability of diesel engine.

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1 Fuel, lubricating oil, coolant and auxiliary materials of the engine

1.1 Lubricating oil

1.1.1 Quality grade

Lubricating oils are classified based on quality and property according to API or GB standard (oil standard GB/T7631).

The following oils can be used:

API oil grade: CD, CD-II, CE;

GB oil grade: CD, CD-II, CE.

For diesel engine, grade CD oil can be used, and high-grade oil replacing lower grade oil is permitted.

1.1.2 Oil viscosity

The oil viscosity greatly depends on its temperature. Please select proper oil according to the ambient temperature, as refer to figure 1-1.

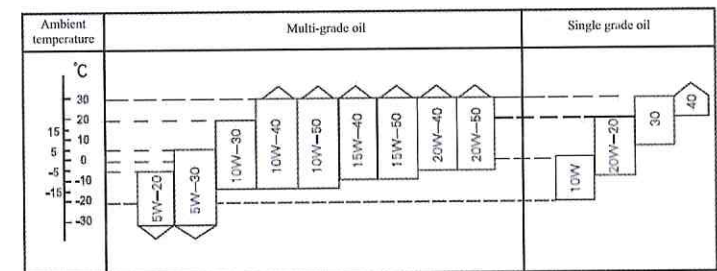


Figure 1-1 Selection of oil grade

Sometimes, the ambient temperature is close to the minimum permissible operating temperature of oil. Although this has an impact on the startup of diesel engine, but will not damage the diesel engine.

In order to reduce engine part wear, the ambient temperature should not exceed the temperature limits for a long time.

1.1.3 Suggestion

If the ambient temperature is above -15°C , grade CD15W-40 oil should be used; and if the ambient temperature is below -15°C , 5W-20 oil should be used. When the season changes, in order to avoid replacement of oil and reduce the fuel consumption, it is recommended to use multi-grade oil.

It is recommended to use Weichai Power special 15W-40 oil, which is prepared by using imported quality base oil and selected additives. For the first oil change, Weichai Power special oil must be used.

1.1.4 Notice

	<p>1. Do not check the oil level when the diesel engine is running.</p> <p>2. It is prohibited to mix the oils with different grade.</p>
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1.2 Fuel

1.2.1 Quality grade

For this diesel engine, the light diesel fuel should be used. And the sulfur content of the specified fuel should not be higher than 0.5%.

1.2.2 The proper diesel fuel should be used according to the ambient temperature

If the ambient temperature is above 5°C, it is recommended to use the 0# diesel fuel (GB 252-94).

Diesel fuel may occur low temperatures, thus affecting the fluidity of fuel and causing blockage of fuel system pipeline and malfunction of diesel engine. Therefore, when the ambient temperature is below 0°C, please use the winter diesel fuel. According to the diesel fuel standard (GB252), if the ambient temperature is above -5°C, please use -10# diesel fuel. And if the ambient temperature is above -14°C, -29°C or -44°C, please use -20#, -25# or -50# diesel fuel respectively.

1.3 Coolant

The coolant of diesel engine must be of soft water containing corrosion inhibitor and long-lasting antifreeze.

Long-lasting antifreeze

For the preparing proportion of long-lasting antifreeze with antirust and antifreezing properties, please refer to the related manual. Some long-lasting antifreezes made in China are shown in table 1-1.

Table 1-1

Items \ Designation	JFL-318	JFL-336	JFL-345
Glycol content, %	33	50	56
Specific gravity (at 15.6 °C)	1.05	1.074	1.082
Boiling point, °C	104.5±1	108.5±1	110.0±1
Freezing point, °C	-18±1	-36±1	-45±1
Applicable lowest ambient temperature, °C	-10	-26	-35

	<p>a) Periodically check the concentration of antifreeze if the ambient temperature is below 0°C. It should be inspected every 1,000h, and at least once for each quarter. The antifreeze should be changed every two years to avoid corrosion.</p> <p>b) As to the regions where the temperature is always higher than 0°C. After rust-proofing and antiscaling treatment, the water can be used as coolant. It is strictly prohibited to use untreated water.</p>
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● Corrosion inhibitor

If the ambient temperature is above 5°C (such as in summer or autumn or the high temperature regions), the corrosion inhibitor (type NL emulsified antirust agent or LQS comprehensive protective agent) can be added to the cooling water. Please refer to the related instructions for the preparing proportion of corrosion inhibitor and soft water.

● Cooling water

The composition of cooling water should be as shown in table 1-2.

Table 1-2 Composition of Cooling Water

Water quality	Min.	Max.	
pH	6.5	8.5	Only when the cooling water meets the requirements in this table, can it be used by mixing with antifreeze or corrosion inhibitor.
Chloride ion content, mg/L	-	100	
Carbonate content, mg/L	-	100	
Total negative ion content, mg/L	-	150	
Total hardness when using the long-lasting antifreeze, mg/L	3	12	
Carbonate hardness, mg/L	3	-	
Total hardness when using the corrosion inhibitor (please refer to the instructions of supplier), mg/L	0	10	

Note: As the inner galvanized tube is not suitable for containing corrosion inhibitor, so it should not be used for cooling water pipe.

1.4 Features of Weichai Power special oil

1.4.1 Higher quality

Adopt imported fine hydro cracking base oil and composite additives to ensure the high quality of lubricating oil.

1.4.2 Under normal using conditions, the oil change interval can be increased by 3,500~7,000km (for grade CH-4 oil, extended by 10,000km). The excellent oxidation resistance at high temperature and outstanding Total Base Number (TBN) retention can effectively prolong the oil change interval of the engine.

1.4.3 Professional protection prolongs the engine life



Through a great number of performance and durability tests conducted on Weichai engines, the special compounding lubricating oil suitable for high power and high load engine is worked out. The special oil can provide Weichai engine with professional protection and can significantly prolong the service life of the engine (the service life can be extended by 30%~40% than that of using common oil).

1.4.4 Better performance

With the features of better wear resistance, TBN retention, rust preventing performance, oxidation resistance, soot dispersing ability, control fuel consumption and shear stability, the special oil can effectively prevent the formation of deposits in turbocharger.

1.4.5 Energy-saving

With "low viscosity + multi-polarization + friction modifiers" and the energy the Weichai Power special oil has the features of high viscosity index, good oil film strength and elasticity, and can make the engine running stably with small resistance and lower fuel consumption.

1.4.6 More environment-friendly with lower contents of ash, sulfur and phosphorus

With the ash content less than 1.0%, the service life of diesel particulate filter (DPF) can be extended. The maximum sulfur content does not exceed 0.4% to prevent the failure of diesel oxidation catalyst (DOC) and reduces the particulate matter. And the maximum phosphorus content does not exceed 0.12% to prevent the failures of DOC and NOx control system. The volatility of the special oil can be controlled at 13%.

1.5 Differences between Weichai Power special oil and common oils

Items	Special oil	Common oils
Additives	Mainly adopt the imported quality composite additives.	Domestic additives.
Oil change interval	Under normal using conditions, the oil change interval can be extended by 3,500-7,000km (for CH-4 oil, extended by 10,000km).	Normal intervals.

1.6 Common products of Weichai Power special oil

Type	Designation	SAE viscosity grade	Package capacity
Diesel engine oil	WP-E1 (CD)	15W/40	4L, 18L, 200L
		20W/50	
	WP-E2 (CF-4)	15W/40	4L, 18L, 200L
		20W/50	
		10W/30	



Diesel engine oil	WP-E3 (CH-4)	5W/30 15W/40 20W/50 10W/30	4L, 18L, 200L
	WP-E4 (CI-4)	15W/40	4L, 18L
Heavy-load vehicle gear oil	GL-5	85W/90 80W/90	4L, 18L
Engine coolant (antifreeze)	-25		4kg, 18kg
	-35		

1.7 Corresponding table between Weichai Power special oils and engine models

Type	Special oil designation	Applicable engine models
High speed engine and high power medium speed diesel engine	WP-E1 (CD)	Medium speed diesel engine set.
	WP-E2 (CF-4)	China I and China II diesel engines; construction machinery (such as 50 and 30 wheel loaders); WD618/WD12 series and WD615/WD10 series; 226B and medium speed engines; heavy-duty trucks of 15t and above.
	WP-E3 (CH-4)	China III diesel engine; Land king series engines; extra-large heavy duty trucks; buses; WP4/WP6 (180-240HP), WP10 (240-360HP), WP12 (400-480HP), WD10 and WD12 engines.
	WP-E4 (CI-4)	China IV series engines (including extra-large heavy duty truck).
Gas engine	CNG	Compressed natural gas engine; bus and generating set fitted with compressed natural gas engines.

1.8 How to correctly choose appropriate oil viscosity

Lubricating oil	SAE viscosity grade	Applicable environment temperature (°C)
	5W/30	-30~35
10W/30	-25~35	
15W/40	-20~40	
20W/50	-15~50	

Gear oil	85W/90	-15~49
	80W/90	-25~49
	85W/140 (with higher viscosity than 85W/90)	-15~49

2 Operating requirements and precautions of the diesel engine

2.1 For 226B series diesel engine, the grade CD oil or higher grade oil should be used.

2.2 The oil seal period of diesel engine is generally one year, please check and take necessary measures if exceeds one year.

2.3 Diesel engine unsealing

After opening the engine packing case, please first check the engine and its accessories according to the packing list, and check the engine appearance for damage and loose connections before carrying out the following operations:

- 1) Wipe away the rust proof coat or anti-corrosion agent on the surfaces of exposed components.
- 2) Drain the sealing oil from the fuel filter and fuel system components (it is allowed to run the engine with load only when the sealing oil is used up and the normal diesel fuel has been supplied).
- 3) Check all water plug screws, oil plug screws, water temperature sensor and oil pressure sensor for absence, and those to be self-equipped shall be complete.

2.4 Preparations for starting of the diesel engine

Notice: Do not start the diesel engine until it is correctly installed and connected in place. If the engine runs in an enclosed space, keep ventilation to ensure that the exhaust gas is discharged to the outside.

2.4.1 Oil filling

- a. The oil should be added as required and the oil must be clean. If not, the oil pressure of engine may be insufficient and thus resulting increased component wear and difficulty in starting of the engine. It is recommended to use Weichai Power special oil CD/15W-40.
- b. Tighten the oil drain screw plug.
- c. Open the oil filler cap 1 (as shown in figure 2-1) to fill oil after filtration.

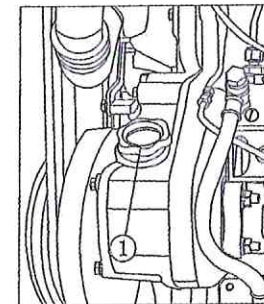


Figure 2-1

- d. Place the diesel engine in a horizontal position, and take out the oil dipstick to check the oil level. Add oil to the upper mark of dipstick if necessary.
- e. Screw on the oil filler cap.

Notice: Check the oil level before starting the engine every time.

2.4.2 Fuel filling

- (1) The diesel fuel added should meet the related regulations (refer to section 1.2).
- (2) The diesel fuel should be clean and be filled through the internal filter screen of fuel tank. And it should be deposited for 72h before being added.

Notice: Check the diesel fuel level before starting the diesel engine every time.

2.4.3 Air removal of the fuel system

- a. Loosen the hollow screw 1 at the outlet of fuel delivery pump by half a turn. Operate the hand pump 2 on the fuel delivery pump 3 until there is diesel fuel overflows and then tighten the screw. As shown in figure 2-2.
- b. Loosen the air bleed screw 4 on the fuel filter 5 (figure 2-3). Operate the hand pump on the fuel delivery pump until there is diesel fuel overflows and then tighten the air bleed screw.
- c. Loosen the air bleed screw 6 on the fuel injection pump 7. Operate the hand pump on the fuel delivery pump until there is diesel fuel overflows and then tighten the air bleed screw.
- d. Continue to operate the hand pump and check if the fuel pipe leaks fuel. And then tighten the hand pump.

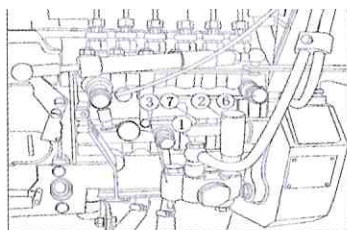


Figure 2-2

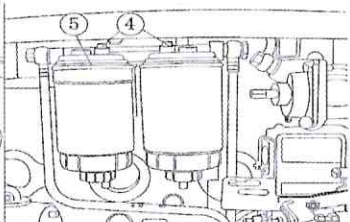


Figure 2-3

2.4.4 Coolant adding

The coolant is prepared by using clean softened water, corrosion inhibitor and long-lasting antifreeze following the instructions of additives.

Notice: Please repair the leakages of the cooling system as soon as possible to avoid the formation of water scale in the cooling system due to frequent water refilling or changing. If needed, fill the cooling system with clean softened water. The coolant drained from the water tank can be reused after being filtrated through fabric or fine filter.

Notice: Check the coolant level before starting the diesel engine every time.

2.4.5 Battery charging

Please refer to the instruction manual of battery.

Notice: Do not smoke around the battery as the gas generated in charging is explosive, and keep the battery away from any open flame and spark. The acid fluid of the battery is strongly corrosive. If splashed to eyes or skin accidentally, please wash with clear water immediately.

Work sequence and precautions during charging:

- (1) Open the sealing cap.
- (2) Add sulfuric acid to the indicating mark place from the filler port of battery.
- (3) Fasten the sealing cap.
- (4) Apply antirust grease to the electrodes of battery.
- (5) Connect the receiving line posts to the electrodes, and connect the anode firstly.
- (6) Do not put any metal product on the battery.
- (7) Check the sulfuric acid liquid level of battery every day after using. Please add distilled water if necessary.

2.5 Notices for engine running

If the engine fails to be started within 15 seconds for the first attempt, start it again 2 minute later. After the engine is started, run the engine at idle speed for about 2~3 minutes, the oil pressure meter shall indicate a pressure of 120kPa. Do not immediately have the cold engine running at high speed with heavy load if the engine coolant temperature is below 60°C to avoid affecting the wear ability and reliability of engine.

In the running-in period, the engine can only be run with load below the moderate.

The oil level of the engine can only be checked after stopping for 5 minutes.

Before stopping the diesel engine, remove the load and reduce the speed, then let the engine running at idle speed for (5~10) minutes.

Notice: In order to avoid damage to the diesel engine, when the engine is working, do not remove the cables connecting the diesel engine voltage regulator and battery anode. Different from the DC generator, checking the alternator voltage by temporarily grounding is strictly prohibited.

In winter, if there is no long-lasting antifreeze in the engine coolant, the coolant must be drained out after the engine is stopped to prevent it from being damaged because of freezing weather. The coolant can be discharged by opening the drain valve designed on the oil cooler. To completely drain off the coolant, the drain valve at the top of air compressor should also be opened.

2.6 Diesel engine stopping

- 1) Normal stopping: Remove the load of diesel engine, adjust the accelerator handle to reduce the speed to (600~1,000) r/min, and then stop the engine by operating the shutdown handle after several minutes of running. Turn the electric key to the middle position. In winter or cold areas, if the coolant contains no antifreeze additive,

please open the drain valves or plug screws on the radiator and water inlet pipe and at the side face of engine block and discharge the coolant completely to prevent the engine from being frost cracked.

2) Emergency stopping: In certain special cases, emergency stopping of diesel engine is needed to avoid serious accidents. Emergency stopping measures: move the shutdown handle to the original position directly, cut off the fuel supply pipe of injection pump, or block the inlet of air filter or outlet of muffler.

3 Regular inspection and technical maintenance of diesel engine

3.1 Maintenance cycle

3.1.1 After maintenance in accordance with the following time, no need to repeat

Table 3-1

Maintenance items	Running time of new engine, h		Remarks
	30	125	
Check belt tension	30	125	
Replace lubricating oil and filter element	30	125	
Check valve clearance	30	125	

3.1.2 Repeat the maintenance according to the following time

Table 3-2

Maintenance items	Running time, h			Remarks
	250	500	1,000	
Clean the air filter element	×			In dusty areas, check and tension the V-belt ahead of the schedule
Replace oil and oil filter element	×			
Check valve clearance			×	
Replace fuel filter		×		
Clean the crankcase ventilating device		×		

3.1.3 Maintenance at standby state

Table3-3

Time interval	Maintenance requirements
Every month	Perform test running once according to section 2.5.
Every 6 months	After running for 6 months, if the running time is less than 500h, please also perform the maintenance items of 500h in table 3-2.

After 12 months	After running for 12 months, if the running time is less than 1,000h, please also perform the maintenance items of 1,000h in table 3-2.
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Inspection and maintenance

To ensure the reliability and avoid malfunction of diesel engine, it is recommended to maintain the diesel engine according to the following table. The first inspection and maintenance should be performed by professionals after running for 2,000h (or two years if less than 2,000h).

Items	Running time, h
Check injector	2,000
Check compression pressure of piston	2,000
Check the bearing clearance of water pump	5,000
Check turbocharger	5,000
Check injection pump	5,000
Check cylinder head	5,000
Check cylinder liner	5,000
Clean the water cavity of exhaust manifold and check for corrosion	10,000
Check connecting rod bearing and main bearing	10,000
Check piston	10,000
Check crankshaft	10,000
Check camshaft and second order balancing mechanism	10,000
Check transmission gear	10,000
Check injection pump thoroughly	10,000
Replace oil pump	10,000
Replace water pump	10,000
Replace the front/rear oil seal of crankshaft	10,000
Replace vibration damper	10,000

4 Common Faults and Troubleshooting

4.1 Diesel engine cannot be started

Causes	Troubleshooting
(1) Ambient temperature is too low	Use auxiliary starting device.
(2) There is air in fuel system	Expel the air. Check the pipe joints for leakage and repair if any.
(3) The inlet filter screen or hose of fuel supply pump clogged	Remove dirt. Check fuel cleanliness.
(4) Faulty fuel injection pump	Check the plunger and delivery valve. Repair or replace the damaged parts.
(5) Valve timing or fuel supply timing incorrect	Check and adjust.
(6) High-pressure fuel pipe damaged or fuel leakage	Repair or replace.
(7) Fuel injector failure	Check the atomization of fuel injector.
(8) Insufficient compression pressure in cylinder	Check the valve and cylinder gasket for leakage and check for worn piston rings. Repair or replace the faulty parts if any.

4.2 Engine stopped soon after starting

Causes	Troubleshooting
(1) Air trapped in fuel system	Check the fuel pipe and its joint for leakage. Check whether the bleeder screw is securely tightened. Expel the air out of the fuel system.
(2) Fuel filter clogged	Take down the filter body. Remove dirt and moisture. If necessary, replace the filter element.
(3) Poor fuel quality with excessive moisture	Clean the filter, and replace fuel.
(4) Fuel supply pump does not work	Check, clean and repair the piston and valve of the fuel supply pump.
(5) Idle speed too low	Re-adjust.

4.3 Insufficient engine power

Causes	Troubleshooting
(1) Intake system (air filter) is clogged	Check the air filter and intake pipe. Clean or replace the filter element.
(2) Exhaust back pressure is too high	Check and adjust the valve timing. Check the exhaust pipe for clogging. Remove clogging if any.
(3) Insufficient pressure in turbocharging system	Check and troubleshoot the leakage in the connecting pipe.



(4) Turbocharger malfunction	Replace the assembly.
(4-1) Compressor, turbine flow passage clogged	Wash or replace.
(4-2) Floating bearing failure	Replace.
(4-3) There is carbon or sludge deposit at the back of turbine and compressor	Clean.
(5) Intercooler leaks or is damaged	Replace or repair.
(6) Fuel pipe leaks or is clogged	Check the fuel pipe and its joint for leakage. Check the fuel filter for contamination. Tighten and clean the fuel pipe. Replace the fuel filter element.
(7) Poor fuel quality	Clean the fuel tank, fuel filter and fuel pipe. Replace fuel.
(8) Injection pump or speed governor is worn excessively	Repair or replace.
(9) Smoker limiter film of injection pump damaged	Repair or replace.
(10) Air pipe of smoker limiter damaged	Replace.
(11) Poor atomization of fuel injector	Check fuel injection pressure. Check the injector for soot deposition. Adjust and repair the injector.
(12) Incorrect valve timing or fuel supply timing	Check and adjust.
(13) The high speed regulated by speed governor is too low	Check and adjust.
(14) Engine oil level in oil pan is too high	Referring to the oil dipstick, discharge excess oil.
(15) Cylinder gasket leaks	Check the compression pressure in the cylinder while the diesel engine is hot. Replace the damaged cylinder gasket.
(16) Piston ring is worn or broken. Bearingshell gap is too large	Replace the worn parts, or overhaul the diesel engine.
(17) Cylinder liner or piston is worn or piston scraping	Overhaul the diesel engine.

4.4 Excessive fuel consumption

Causes	Troubleshooting
(1) Intake system clogged (air filter clogged)	Check the air filter and intake pipe for clogging. Remove clogging if any.
(2) Exhaust back pressure is too high	Check the exhaust pipe and brake valve for clogging. Remove clogging if any.
(3) Poor fuel quality	Replace fuel in accordance with the requirements.
(4) Fuel pipe clogged	Check the fuel pipe for clogging. Remove clogging if any.
(5) Fuel pipe leaks	Check the fuel pipe for leakage. Remove leakage if any.



(6) Poor atomization of fuel injector	Check, adjust and repair the fuel injector.
(7) Incorrect valve timing or fuel supply timing	Adjust the valve clearance and fuel supply advance angle in accordance with the requirements.
(8) Cylinder gasket leaks	Check the compression pressure in the cylinder.
(9) Excessive bearing shell gap, diesel engine overhaul is needed	Check and overhaul the diesel engine.
(10) Piston scuffing	Replace the cylinder liner, piston and piston rings.
(11) Insufficient pressure in turbo charging system	Check and troubleshoot the leakage in the connecting pipe.
(12) Turbocharger malfunction	Check and replace the assembly.
(13) Intercooler leaks air or is damaged	Replace or repair.

4.5 Engine exhaust gas is black

Causes	Troubleshooting
(1) Intake pipe is clogged or exhaust back pressure is high	Clean the intake or exhaust pipe.
(2) Poor fuel quality	Clean the fuel system, replace fuel.
(3) Incorrect valve timing or fuel supply timing	Adjust as required.
(4) Poor atomization of fuel injector	Check, repair or replace.
(5) Excessive fuel injection	Check and adjust.
(6) Insufficient pressure in turbo charging system	Check and troubleshoot the leakage in the connecting pipe.
(7) Turbocharger malfunction	Check and replace the assembly.
(8) Intercooler damaged causing leakage	Repair or replace.
(9) Wrong working point of smoke limiter	Readjust by professional plant.

4.6 Engine exhaust gas is white or blue

Causes	Troubleshooting
(1) Poor fuel quality with excessive moisture	Replace fuel.
(2) Coolant temperature is too low	Check the operating temperature of the thermostat. Replace it if necessary.
(3) Poor atomization of fuel injector	Check and repair.
(4) Incorrect valve timing or fuel supply timing	Check and adjust.
(5) Low compression pressure, incomplete combustion, piston scuffing	Check the piston rings, cylinder liner and cylinder gasket. Repair the damaged ones.
(6) Insufficient running-in of piston ring and cylinder	Continue running-in.

liner	
(7) Piston ring gaps are not staggered	Adjust or reassemble.
(8) Oil control ring failure	Replace.
(9) Excessive clearance between piston and cylinder liner	Repair, replace.
(10) Turbocharger sealing ring is worn	Check, replace.
(11) Turbocharger thrust bearing is worn	Check, replace.
(12) Turbocharger oil return pipe clogged	Clean or repair.

4.7 Too much oil accumulated at the air inlet port and inlet pipe of turbocharger

Causes	Troubleshooting
(1) Turbocharger sealing failure	Repair or replace the turbocharger.
(2) Oil-gas separator failure	Replace.
(3) Oil pan liquid level is too high	Check and release appropriate amount of oil.

4.8 Rotating speed is unstable

Causes	Troubleshooting
(1) Poor fuel quality with moisture or wax	Clean the fuel system, replace the fuel.
(2) Air is sucked into fuel suction pipe	Check the fuel suction pipe and its joint for tightness. Expel the trapped air.
(3) Speed governor weight (mechanical pump) and spring malfunction	Check and adjust by professional plant.
(4) Uneven fuel supply	Check and adjust by professional plant.
(5) Poor atomization of fuel injector	Check and repair.
(6) Turbocharger surging	Check and clean the compressor flow passage, remove the fouling and soot deposition.
(7) Turbocharger bearing damaged	Replace.

4.9 Oil pressure is too low

Causes	Troubleshooting
(1) There is no oil in oil pan or oil is insufficient	Add oil as required.
(2) Engine oil grade is not compliant	Replace with compliant engine oil.

(3) Coolant temperature or engine oil temperature is too high	Check whether the cooling system works normally and eliminate the failure.
(4) Excessive resistance in engine oil filter	Replace with a new filter element.
(5) Engine oil cooler clogged	Check and clean.
(6) Suction filter, engine oil pipe, or washer of pipe joint is clogged or broken	Check the suction filter, pipe joint and oil passage for casting shrinkage porosity.
(7) Leakage from inlet pipe of engine oil pump	Check, repair or replace the inlet pipe and its joint.
(8) Failure of pressure regulator valve in main oil passage	Check, clean or repair the valve.
(9) Main oil passage clogged	Check and clean.
(10) Excessive bearing shell gap, or damaged bearing shell	Check and replace.
(11) Excessive wear of parts and components	Check and overhaul the diesel engine.

4.10 Coolant temperature is too high

Causes	Troubleshooting
(1) Coolant level in expansion tank is too low	Check for leakage. Add coolant.
(2) Water pump belt is slack	Adjust the belt to the requirements.
(3) Damaged washer or worn impeller of water pump	Check, repair or replace.
(4) Damaged water pipe is sucking air in	Check the water pipe, pipe joint and washer. Replace the damaged ones.
(5) Thermostat failure	Replace.
(6) Oil of oil pan is insufficient	Check the oil level. If any leakage, repair it and add engine oil.
(7) Water tank clogged	Check the water tank, clean or repair.

4.11 Parts wear is too fast

Causes	Troubleshooting
(1) Air filter element is unqualified or damaged	Check and replace the air filter element.
(2) Short circuit of air intake system	Check the intake pipe, gasket and connecting sleeve. Repair or replace the damaged ones.
(3) Engine oil filter element is not replaced timely	Replace the filter element at the required interval.
(4) Insufficient oil in oil pan	Check the oil level. Check for and repair leakage. Add engine oil.
(5) Engine oil grade is not compliant	Use engine oil of proper grade.
(6) Engine oil is unqualified	Replace with compliant engine oil.



(7) Oil passage clogged	Clean the oil passage.
(8) Piston ring is broken or worn	Replace the piston ring.
(9) Cylinder liner or piston is worn or piston scraping	Take down and inspect the piston and cylinder liner. Repair or replace the damaged ones.
(10) Crankshaft axis is not in line with the axis of driven shaft	Check and repair the mounting bracket.
(11) Part/component is worn excessively	Check the cumulative mileage to determine whether overhaul is needed.

4.12 Excessive noise level

Causes	Troubleshooting
(1) Poor fuel quality	Replace the fuel.
(2) Coolant temperature is too low	Check the thermostat and replace it if necessary.
(3) Incorrect valve timing or fuel supply timing	Check, repair or adjust.
(4) Poor atomization of fuel injector	Check, repair or adjust.
(5) Vibration damper is worn	Check and replace.
(6) Excessive fuel injection	Check and adjust.
(7) Valve leakage or improperly adjusted	Take down the valve, inspect and adjust.
(8) Excessive gear clearance or broken gear teeth	Check and replace the damaged gear.
(9) Cylinder liner or piston is worn or piston scraping	Check, repair or replace.
(10) Push-rod is bent or broken	Replace.
(11) Piston ring is broken or worn	Check and replaced the damaged piston ring.
(12) Bearing shell is worn excessively	Check and replace.
(13) Crankshaft thrust bearing clearance is too big	Replace thrust bearing.
(14) Main bearings are not properly aligned	Check and repair.
(15) Crankshaft axis is not in line with the axis of driven shaft	Check and repair the mounting bracket.
(16) Part/component is worn excessively	Check the cumulative mileage to determine whether overhaul is needed.
(17) Turbocharger surging	Check and clean the compressor flow passage, remove the fouling and soot deposition.
(18) Turbocharger sealing ring is sintered	Replace.
(19) Turbocharger bearing damaged, rotor part contacts with stationary part	Replace.
(20) Foreign matter comes into turbocharger turbine or compressor impeller	Replace.



4.13 Starter motor does not work

Causes	Troubleshooting
(1) Fuse burnt	Replace the fuse.
(2) Poor contact of circuit	Check the circuit, and tighten the terminals.
(3) Insufficient charge of battery	Check, recharge or replace the battery.
(4) Short circuit of starter motor	Inspect and repair the starter motor or replace the starter assembly.
(5) Poor contact of electric brush	Clean or replace the electric brush.

4.14 Starter motor is powerless

Causes	Troubleshooting
(1) Battery is undercharged	Recharge or replace the battery.
(2) Bearing bush is worn	Replace the assembly.
(3) Poor contact of electric brush	Clean or replace the electric brush.
(4) Commutator is dirty or burnt	Clean the oil stain. Polish the commutator by using sandpaper, or replace the commutator assembly.
(5) Terminal unsoldered	Check and repair the switch.
(6) Poor contact of switch	Check and repair the switch.
(7) Clutch is worn, causing skidding	Adjust the operating torque of the clutch or replace the clutch assembly.

4.15 Alternator does not generate electricity at all

Causes	Troubleshooting
(1) Short circuit or open circuit, connector loosened	Check the wires of alternator and ammeter and repair if necessary.
(2) Rotor or stator coil is short circuit or open circuit, or is grounded	Repair or replace the assembly.
(3) The rectifier valve is damaged	Replace the assembly.
(4) Damaged paper insulation of terminal, causing broken wire	Repair.
(5) Regulator voltage is too low	Repair.
(6) Regulator contactor is burnt	Repair or replace the regulator assembly.

4.16 Battery cannot be charged fully by alternator



Causes	Troubleshooting
(1) Short circuit or open circuit, connector loosened	Repair.
(2) Rotor or stator coil is open circuit or short circuit	Repair or replace the assembly.
(3) The alternator belt is slack	Check and adjust the belt tension.
(4) Damaged rectifier valve of alternator, poor contact of battery terminal	Repair.
(5) The regulating voltage of regulator is too low	Adjust.
(6) The field coil or resistor connection of regulator is disconnected	Repair or replace.
(7) Insufficient electrolyte in battery, or battery is too old	Add electrolyte, or replace the battery.

4.17 Charging current is unstable

Causes	Troubleshooting
(1) The coil of stator or rotor is about to open circuit or short circuit	Repair or replace.
(2) Poor contact of electric brush	Repair.
(3) Loose or poor contact of terminal	Repair.
(4) Voltage regulator is damaged	Repair.
(5) Improper voltage regulation	Check and adjust.

4.18 Battery is overcharged by alternator

Causes	Troubleshooting
(1) Short circuit in battery	Repair or replace.
(2) Regulator voltage is too high	Repair or adjust.
(3) Poor grounding of regulator	Repair.
(4) Regulator contact failure or contaminated, or the voltage coil or resistor wire is disconnected	Repair or replace.



4.19 Alternator has abnormal sound

Causes	Troubleshooting
(1) Improper alternator installation	Repair.
(2) Rotor has come into contact with stator	Repair or replace.
(3) Bearing is damaged	Replace the bearing.
(4) Short circuited rectifier	Replace.
(5) Short circuited stator coil	Repair or replace.



Contact Us

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