

**Operation & Maintenance Manual and User's Service Guide
for WP10 Series National IV Vehicle Diesel Engine**

Foreword

WP10 series National IV diesel engine is a high speed diesel engine developed with the adoption of brand new design concept. This series diesel engine features compact structure, reliable uses, excellent technical indexes (power performance, economy and emission), fast startup, simple operations, and easy maintenance and is an ideal power unit for heavy-duty trucks and large-sized luxury buses.

This manual provides an overview of the structural characteristics and operation and maintenance precautions for WP10 series National IV diesel engine. While the user is using this diesel engine, the truly fulfillment as per the requirements specified in this manual will surely prolong the service life of diesel engine greatly.

The diesel engine covered by this manual is the basic model of WP10 series National IV diesel engine. Following the continual development and improvement of the WP10 series product, we hope that you can timely pay attention to all technical information released by our company. This manual is subject to change without notice. Please access Weichai website at <http://cn.weichai-group.com> for the latest product information.

You are welcome to put forward proposals and suggestions for further improvement to our products.

August, 2010

Special Instructions

- Before operation, the operator of the diesel engine must carefully read the *Operation and Maintenance Manual of the Diesel Engine* and strictly abide by the operation and maintenance practices specified in the operation and maintenance manual.
- This diesel engine is tested strictly as per the test specification before delivery. Do not adjust the ECU data at will to increase the power of diesel engine, otherwise our warranty commitment will be voided.
- The ECU, common rail fuel pump, and fuel injector are of precision parts. Do not disassemble these parts by self, otherwise our warranty commitment will be voided.
- The strict torque and angle requirements are specified for the main bearing bolts and connecting rod bolts of the diesel engine. Please do not loosen or disassemble any bolt by self. The connecting rod bolts are of one-time bolts and can't be reused, otherwise our warranty commitment will be voided.
- The grades of the engine oil or fuel added into the diesel engine must conform to the requirements specified in the operation and maintenance manual and the engine oil or fuel added must be filtered by the special clean filter. The fuel shall be deposited for at least 72h. Before driving the vehicle each time, make sure that the filling amounts of the coolant and engine oil conform to the requirements.
- It's prohibited to run the diesel engine without air cleaner, in order to prevent the ingress of non-filtered air into the cylinders.
- While using a new engine, the user shall fulfill the 50h run-in.
- After the cold start of the diesel engine, slowly increase the engine speed, instead of running at high speed suddenly or long-term idling. After the running under heavy load, run the engine at low speed for 5~10min before stopping, instead of stopping the engine suddenly (except special cases).
- After the engine is stopped, if the temperature of working environment is probably below 0° and the coolant without antifreeze additive is used, fully drain the coolant from the water tank and diesel engine.
- The checking and repair for all parts of the electric system must be fulfilled by the professional electric technicians.
- The checking and repair for all parts of electronic control system must be fulfilled by the professionals of our service station.
- The diesel engine is oil sealed before delivery to prevent rusting. Generally, the oil sealing period for diesel engine is one year. If the oil sealing time is more than one year, conduct checking and take necessary supplemental measures.

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I. Operation and Maintenance Manual for WP10 Series National IV Vehicle Diesel Engine

1. Fuel, Lubricating Oil, Coolant, Urea Solution, and Auxiliary Materials for Diesel Engine

1.1 Fuel:

Summer: 0# diesel (GB252)

Winter: Generally, appropriate grade of diesel fuel shall be selected depending on the actual environment temperature

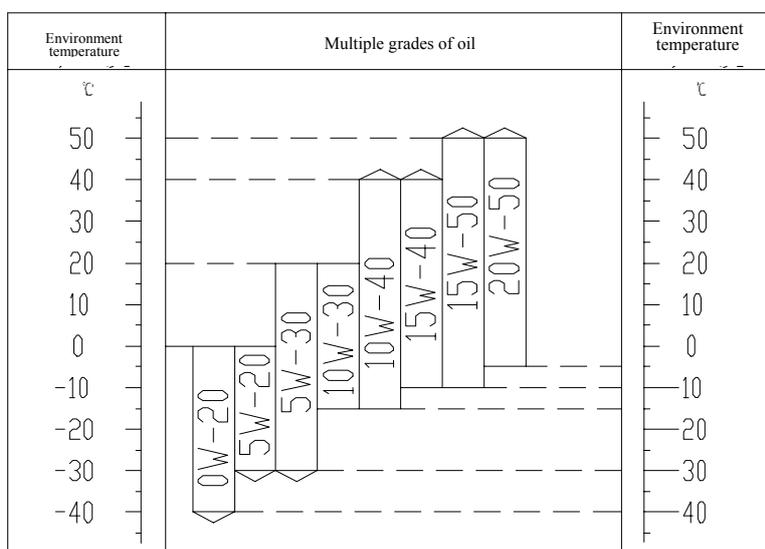
Attention: The fuel in use must conform to the requirements in Appendix C of national standard GB 17691-2005 (Revised in June, 2008).

1.2 Lubricating Oil for Diesel Engine

The capacity of lubricating oil depends on the marking of the oil dipstick (The oil capacities vary depending on different models).

Choice of lubricating oil: To ensure safe and reliable running of your diesel engine, please choose grade 15W/40 CF-4 or 20W/40 CF-4 lubricating oil. The 15W/40CF-4 oil can be used under the temperature range of -15°C~+30°C, the 20W/40CF-4 oil can be used under the temperature range of -10°C~+30°C (The Weichai Power special oil is recommended), the 5W/20CF-4 shall be adopted for the temperature below -15°C.

Table 1 Table for Choice of Lubricating Oil Grades



Attention: It's disallowed to use grade CE, CD, CC, CB, or CA lubricating oil for WP10 series National IV diesel engine. The engine oil filter element shall be replaced at each replacement of engine oil.

1.3 Lubrication of Water Pump

The water pump shall be lubricated by general lithium-based lubricating grease for vehicles (Refer to standard GB/T5671-1995).

1.4 Antifreeze Additive for Engine Cooling System

The glycol antifreeze additive is adopted. It's allowed to substitute with home-made long-acting antifreeze additive, provided that the quality of such additive is reliable. Please refer to the relevant instructions for the specific operation methods. Two home-made long-acting antifreeze additives that are available recently are recommended as below:

JFL—336# long-acting antifreeze additive

FD—30# long-acting antifreeze additive

It shall be noted that the long-active antifreeze additive in use shall be periodically replaced as per the relevant requirements.

1.5 Urea Solution

The inappropriate urea solution will easily lead to poisoning failure of SCR catalyst or insufficient reduction rate (For instance, the out-of-tolerance of phosphor, sodium, potassium, and calcium contents in the urea solution will easily lead to poisoning of catalyst and the out-of-tolerance of urea solution concentration will easily lead to excessive leakage of NH₃ or insufficient reduction rate of NO_x) and out-of-tolerance of emission and warning of malfunction indicator lamp. Therefore, the quality and the performance of urea solution in use shall meet the requirements specified in standard ISO 22241.

Table 2 Contents of Urea (Refer to standard ISO 22241)

Content	Unit	Minimum	Maximum
Urea mass percentage	%	31.8	33.2
Density at 20°C	kg/m ³	1087	1093
Refraction rate at 20°C	-	1.3814	1.3843
Ammonia soda mass percentage	%	-	0.2
Biuret mass percentage	%	-	0.3
Acetaldehyde	mg/kg	-	5
Insoluble substance	mg/kg	-	20
Phosphorus (Phosphorus tetroxide)	mg/kg	-	0.5
Calcium	mg/kg	-	0.5
Ferrum	mg/kg	-	0.5
Copper	mg/kg	-	0.2
Zinc	mg/kg	-	0.2
Chromium	mg/kg	-	0.2
Nickel	mg/kg	-	0.2
Aluminum	mg/kg	-	0.5
Magnesium	mg/kg	-	0.5
Sodium	mg/kg	-	0.5
Potassium	mg/kg	-	0.5

1.6 Characteristics of Weichai Power Special Oil

1.6.1 High configuration guarantees high quality

The imported fine hydrocracking base oil and imported composite additive are mainly selected to guarantee the high quality of lubricating oil.

1.6.2 Under normal working conditions, the oil replacement interval can be prolonged by 3,500~7,000km (The oil replacement interval can be prolonged to 10,000km for CH-4). The excellent high temperature oxidation resistance and outstanding retentivity of base number (TBN) effectively prolong the oil replacement interval of engine.

1.6.3 Professional protection prolongs engine life

Through a great number of performance and durability tests in response to the Weichai engine, the professional compound for lubricating oil of high horsepower and high load engine is developed to provide professional protection for Weichai engine and effectively prolong the service life of engine (by 30%~40% against common engine oil).

1.6.4 Better performance requirements

It features better wear resistance, base number retentivity, rusting protection, oxidation resistance, fuel consumption control, and shear stability and reduces the formation of deposits in the turbocharger.

1.6.5 Energy-saving

With “low viscosity + multi-polarization + friction improving agent”, the energy-saving compound features high viscosity index of oil, good oil film strength and elasticity, and stable running, low resistance and low fuel consumption of the engine.

1.6.6 Low contents of ash, sulfur and phosphorous and better environment-friendly

The maximum ash content of 1.0% prolongs the service life of diesel particle filter (DPF). The maximum sulfur content of 0.4% prevents the failure of oxidation catalyst (DOC) and reduces the particulate matters. The maximum phosphorous content of 0.12% prevents the failure of DOC and the failure of NOx control system. The volatility can be controlled at 13%.



1.7 Differences between Weichai Power Special Oils and Common Engine Oils

Item	Special engine oil	Common engine oils
Base oil	Mainly the imported class III hydrocracking base oil is adopted	Mostly the home-made class I or a little class II base oil is adopted.
Additives	Mainly the imported quality composite additives are adopted	Home-made additives
Performance	The targeted professional compound features good lubrication performance, strong cleanliness, and effectively improved fuel economy (saving fuel by 3~8%) and provides professional caring for the engine under harsh working conditions (heavy load or heavy dust).	Only the general lubrication performance can be met.
Oil replacement period	During normal use, the oil replacement period can be prolonged by 3,500~7,000km (by 10,000km for CH-4)	Conventional value

1.8 Some Common Products of Weichai Power Special Oils

Type	Grade	Specification	Package capacity
Diesel engine oil	WP-E1 (CD)	15W/40	4L, 18L, 200L
		20W/50	
		10W/30	
	WP-E2 (CF-4)	15W/40	4L, 18L, 200L
20W/50			
10W/30			
WP-E3 (CH-4)	5W/30	4L, 18L, 200L	
	15W/40		
	20W/50		
WP-E4 (CI-4)	10W/30	4L, 18L	
	15W/40		
Heavy-load vehicle gear oil	GL-5	85W/90	4L, 18L
		80W/90	

1.9 Corresponding Table between Weichai Power Special Oils and Engine Models

Type	Standard number of special oil	Recommended main applicable models
High speed engine and high horsepower medium speed diesel engine	WP-E1 (CD)	Medium speed diesel engine unit
	WP-E2 (CF-4)	National I and National II diesel engines; construction machinery (50 and 30 loaders); WD618/WD12 series and WD615/WD10 series; 226B and medium speed engine; heavy-duty trucks of 15t and above.
	WP-E3 (CH-4)	National III diesel engine; Landking Engine series; ultra-heavy duty truck; bus; WP4/WP6 (165~270HP), WP10 (240~375HP), WP12 (336~460HP), WD10, WD12, and WP5/WP7 (160~300HP).
	WP-E4 (CI-4)	National IV series (including ultra-heavy duty truck)
Gas engine	CNG	Compressed natural gas engine and bus and alternator unit fitted with compressed natural gas engine

1.10 How to correctly choose appropriate viscosity

	SAE viscosity grade	Applicable environment temperature (°C)
Lubricating oil	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 (higher viscosity than 85W/90)	-15~49

1.11 Auxiliary Materials

No.	Name	Color	Applications
1	Molykotte Pulver (Fine molybdenum powder)	Black	Applied on smooth metal surfaces to prevent seizure For instance: Applied onto outer surfaces of cylinder liner
2	Molykotte G.u.plus (Molybdenum disulfide oiling agent)	Dark grey	Achieve lubrication function before establishment of lubricating oil pressure For instance: Applied onto intake valve stem.

Table 3 Reference Table for Application of Sealant for Diesel Engine

Trademark	Main Applications	List of locations for application of sealant	Additional description
Loctite 242	It's applied onto the threads to prevent being vibrated to looseness, with moderate strength.	Flywheel housing bolt Camshaft thrust plate bolt Camshaft timing gear bolt Intermediate idler bolt Front end cap bolts Engine oil filter seat bolt Engine oil cooler bolt Screw plug of engine oil cooler regulator valve Bolt of oil pump return pipe fixing device Air compressor shaft end thread Strainer bolt Bolt of sensor and harness fixing device	Alternatively, the DriLoc204 thread pre-application sealant can be pre-applied.
Loctite 262	It's applied onto the external threads to lock, seal, and prevent being vibrated to looseness	Cylinder head auxiliary bolt	
Loctite 271	Locking and tightening	Bowl plug for oil port	
Loctite 277	For sealing between element and bore	Other bowl plugs	
Loctite 270	For sealing top surface of cylinder head	Push rod tube – Cylinder head	
Loctite 518 (Updated product of 510)	It's applied onto shining metal surfaces for sealing purpose.	Mating face between cylinder block and crankcase Between front end face of engine block and front end cap and between rear end face and flywheel housing connecting plate Mating face between engine oil filter seat and crankcase Water pump rear cap – Engine block front end face Flywheel housing connecting plate – Flywheel housing Mating face between cylinder block and engine oil cooler Mating face between cylinder block and engine oil filler port cover	

2. Uses and Operations of Diesel Engine

2.1 Unsealing of Diesel Engine

After the diesel engine is unpacked, the user shall firstly count the diesel engine and its accessories as per the delivery packing list, check the exterior of diesel engine for presence of damage and the connectors for presence of looseness, and then conduct the following works:

- ◆ Wipe the anti-rusting layer and anticorrosive agent on the exposed parts.
- ◆ Drain the oil sealing oil from the inside of fuel filter and the parts of fuel system (It's allowed to start the engine without draining the oil sealing oil from the fuel system. However, it's permitted to run the engine under loaded condition only when the oil sealing oil in the fuel system is used up and the diesel fuel is supplied to the engine normally).

Attention: Generally, the oil sealing period for diesel engine is one year. If the oil sealing time is more than one year, conduct checking and take necessary supplemental measures.

- ◆ Rotate the flywheel and spray solvent into the intake pipe, till the oil sealing oil in the cylinder is completely removed.
- ◆ Spray solvent to the intake and exhaust ports of the turbocharger, till the oil sealing oil is completely removed.
- ◆ As agreed between the manufacturer and the user, the oil sump not filled with oil shall be added with oil as specified. For the oil sump filled with engine oil containing run-in accelerator at the time of delivery, it's recommended to drain oil and replace with new oil after the initial 2,000km mileage (or 50 running hours).
- ◆ If the coolant is filled fully before delivery as agreed between manufacturer and user to meet the user's demands, check the performance of coolant at the time of unsealing. If the antifreeze capability meets -30°C or -35°C , with PH value at 7~8 (neutral) and total hardness at 5~15°D [9~15°f (hardness)], the coolant can be used. If disqualified, drain the coolant and refill the coolant with antifreeze additive.

2.2 Hoisting of Diesel Engine

During the hoisting, maintain level the centerline of engine crankshaft. It's prohibited to hoist in tilted or at one side. Hoist up and down slowly (Refer to Figure 2-1).

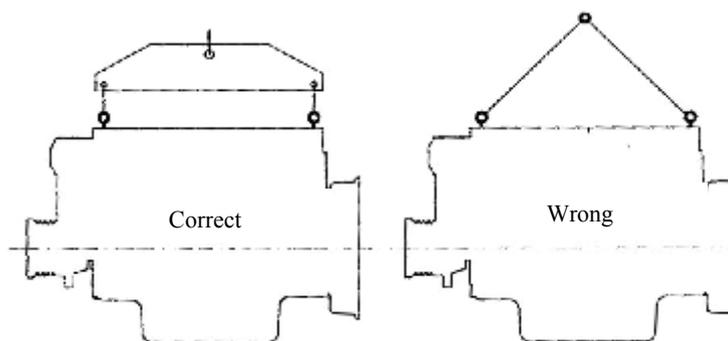


Figure 2-1 Hoisting Diagram of Diesel Engine

2.3 Installation of Diesel engine

For supply installation, ensure that the crankshaft centerline of the diesel engine is coaxial with the axis of input shaft of drive unit (gearbox, transmission, or alternator) and ensure that the crankshaft is free of additional axial force due to installation.

2.4 Preparations before Start

◆ Checking of Coolant Level

If the engine is installed on the vehicle or on the stand, the coolant level is visible from the glass sight hole on the expansion water tank at all times. If the coolant is insufficient, add coolant through the filler port cap. While opening the filler port cap with pressure relief valve and air bleeding button, if the engine is under hot state, make sure to push down the air bleeding button to open the cap. It's prohibited to add a great amount of coolant while the engine is under hot state, as the high thermal change will damage the parts. If there is not coolant under special cases, it's allowed to slowly add cool water with not very low temperature. Add the coolant through the filter port, till the coolant overflows. Start the engine. While the engine is running (1,000r/min), continue to add the coolant, till the coolant level is stable, and finally install the filler port cap.

◆ Checking of fuel level

If the engine is installed on the vehicle, turn on the power switch and check the fuel level from the fuel gauge or check the fuel tank.

◆ Checking of engine oil level

The engine oil level shall be between upper and lower markings of the oil dipstick. If necessary, add engine oil through the engine oil filler port.

◆ Checking of urea level in urea tank

Generally, the urea consumption accounts for 3~5% of the fuel consumption (by volume). Check the level of urea solvent depending on the working condition. Maintain the level at 30~80% and timely add if insufficient. Do not add excessive urea, or it will lead to overflow of urea.



Figure 2-2 Urea Level Marking in Urea Tank

◆ Checking of diesel engine accessories

Check various accessories of diesel engine for reliable connections and resolve any abnormal phenomenon. Check the starter system for normal wiring and check whether the battery is sufficiently charged. Then, open the fuel tank valve, loosen the air bleeding bolt on the fuel strainer, and use manual pump on the fuel strainer to bleed the air from the fuel system. Check the SCR system for reliable pipeline connections. No leakage of urea solvent is allowed.

2.5 Start of Diesel Engine

- ◆ Place the power switch and electric key on the vehicle to position START, place the gearshift lever to neutral gear, and begin to start the engine.
- ◆ Turn the electric key to start the diesel engine. If the engine fails to start in 5~10s, wait for 1min before retry. If the engine can't be started by three consecutive attempts, stop the attempt and find out and resolve the malfunction before retry. After the start of engine, observe the readings of various instruments. The engine oil pressure gauge shall indicate the pressure immediately. Pay attention not to run the cold engine at high speed. Firstly, idle run the engine for a while. However, do not idle run the engine for a long period.
- ◆ The auxiliary starter shall be used to start the diesel engine under cold temperature. By means of the electric heating flange via relay, the engine can start successfully under -30°C environment.

2.6 Running of Diesel Engine

- ◆ After the diesel engine is started, idle run for several minutes and then increase the speed to 1,000~1,200r/min and apply partial load. It's permitted to run the engine under full load only when the water outlet temperature is higher than 60°C and the engine oil temperature is higher than 50°C. The load and speed shall be increased gradually. Avoid the haste acceleration and haste application of load as far as possible.
- ◆ Within the 60h run-in period (or the initial 3,000km mileage) of the diesel engine, it's preferable to run the engine under moderate load and without trailer.
- ◆ Timely decelerate the engine while driving on slopes. It's not preferable to run the engine for a long period under high torque condition. In addition, it's not preferable to run the engine under extremely low load or speed, or it will easily lead to malfunctions such as oily smoke.
- ◆ During normal use of the diesel engine, it's permitted to continually run the engine at rated power and rated speed. However, if running the engine at 105% of rated speed and 110% of rated power, it's permitted to run the engine for up to 20min. Once unloaded, please idle run the diesel engine for 1~2min before stopping the engine.
- ◆ Parameters and checking locations to be real-time observed in using:

Pressure of main lubricating oil passage: 350~500kPa;

Oil temperature of in oil sump: <110°C.

Coolant outlet temperature: 80+5°, no more than 105°C.

Exhaust temperature after turbine: <600°C;

Intake temperature after inter-cooler: 50~55°C.

Check the color of exhaust gas to judge the working quality and application load of the fuel injector. If the color of exhaust gas is really bad, stop the engine for checking.

Pay attention to observe the diesel engine for presence of water, air and fuel leakages. If any, stop the engine for troubleshooting.

- ◆ The operator shall understand the following characteristics of diesel engine:
 - ① The fuel consumption is really low when the torque output is at maximum value and increases along with the increasing of speed.
 - ② The torque reaches the best value at the moderate speed range of the engine (1,200~1,600r/min).
 - ③ The power output of the engine increases along with the increasing of the speed and reaches rated power at the rated speed.
- ◆ Precautions for running under cold environments:
 - ① Fuel: Choose diesel fuel of different grades depending on the outdoors temperature in winter.
 - ② Lubricating oil: Choose lubricating oil of different viscosities depending on the seasons.
 - ③ Coolant: Add antifreeze additive into the cooling system and choose antifreeze of different trademarks and quantities depending on different outdoors temperatures.
 - ④ Start: The auxiliary starter can be adopted if necessary in winter. After the start of the diesel engine, wait for the oil pressure and water temperature are normal before running at high speed under loaded condition.
 - ⑤ Before the approach of the cold season, make sure to check the electrolyte level and viscosity and unit voltage of the battery. If the diesel engine is not to be used for a long time and is under extremely low temperature, remove the battery and store in a warmer indoors place.
 - ⑥ Stop: To stop the engine under cold weathers, unload the engine, idle run the engine for 1~2min, and wait for the water temperature and oil temperature to cool down before stop. Please be noted that it's disallowed to drain the coolant containing antifreeze additive. If the coolant contains no antifreeze additive, make sure to open the water drainage valves or water plugs on the engine block, engine oil cooler cap, radiator, and water inlet pipe to fully drain the coolant, in order to prevent the frozen cracking of the engine.

3 Periodical Checking and Technical Maintenance of Diesel Engine

3.1 Daily Maintenance

Check the coolant level, engine oil level, and fuel level, check the lubricating grease application points for sufficient lubricating grease, check for leakage of oil, water and gas, check the peripheral parts and accessories for good connections and fastening, check the fan and belts for presence of over-tightness and looseness, check the oil pressure and coolant temperature of the diesel engine, check the temperature, color of exhaust gas, the sound and vibration of the engine for normality, and check the engine for stable speed.

- ◆ Check the coolant level and temperature

Observe the coolant level via glass sight hole. If the coolant is insufficient, open the filler port cap and add coolant.

Attention: While opening the filler port cap, make sure to push down the air bleeding button, in order to prevent the coolant from causing personal injuries under hot state of engine.

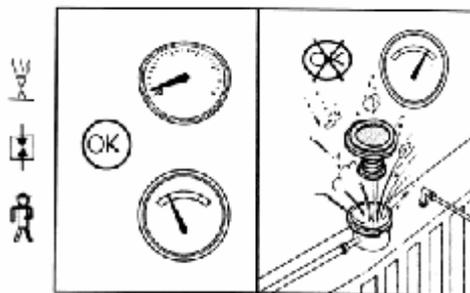


Figure 3-1



Figure 3-2

◆ Check engine oil level

It's prohibited to start the diesel engine when the oil level is below lower marking of oil dipstick or is above upper marking of oil dipstick.

After the diesel engine is stopped, wait for at least 5min before checking the oil level, in order to enable the engine oil to have sufficient time to flow back to oil sump.

The oil amount difference between lower marking and upper marking of oil dipstick is 3L.

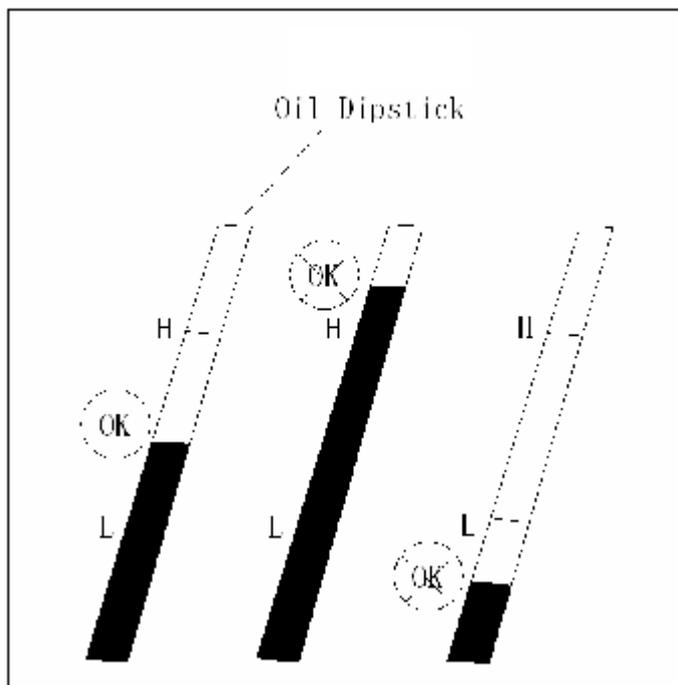


Figure 3-3

◆ Check fuel level

Check for leakages: The entire engine shall be free of leakage of water, gas or oil.



Figure 3-4

◆ Check the urea solvent level

The urea solvent level shall be maintained at 30~80% of total capacity of urea tank.

◆ Check the fan

Visually check the blades of fan for presence of damage and check connecting bolts for fastening.



Figure 3-5

◆ Check belt

The belt is automatically tensioned by belt tensioner. Check the tension of belt by pushing the belt with hand.



Figure -3-6

- ◆ Check exhaust gas for normal color

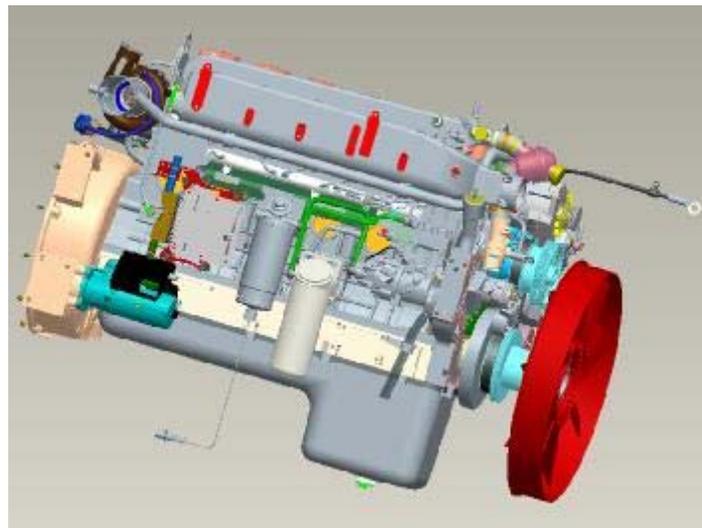
The normal color of exhaust gas is light grey. In event of change in color, check cause and resolve, as shown in Figure 3-6.

- ◆ Check for normal sound
- ◆ Check for normal speed and normal vibration

5.2 Items for various levels of maintenance

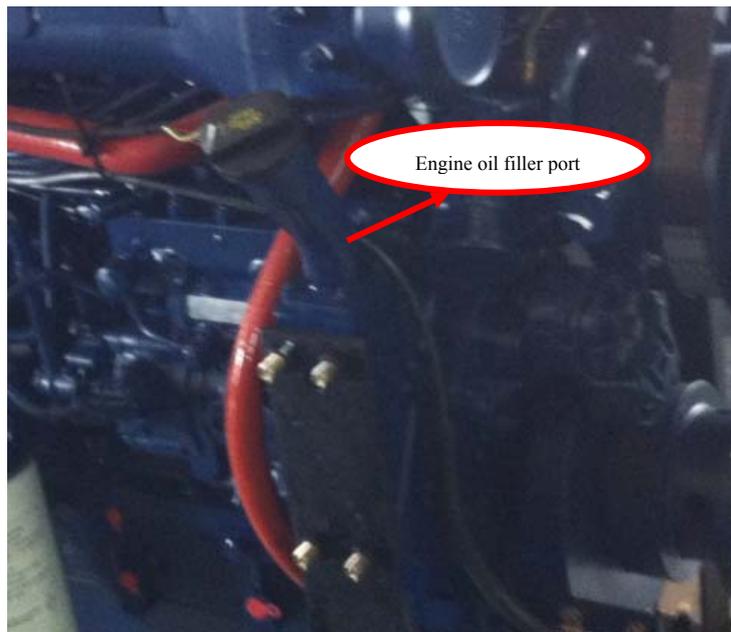
In addition to the daily maintenance items, fulfill the following items:

- ◆ Replace the diesel engine oil.
- ◆ Screw off the oil drainage plug from the bottom of oil sump to fully drain the engine oil and then screw on the oil drainage plug, as shown in Figure 3-7.
- ◆ Open the oil filler cap (as shown in Figure 3-8), add engine oil through engine oil filler port, observe the level of oil dipstick till the required oil level is reached, and then install the oil filler cap.



Oil drainage plug

Figure 3-7



Engine oil filler port

Figure 3-8

Attention: The waste oil shall be placed in designated location and container to ease the recycling.

- ◆ Replace engine oil filter or filter element. See Figure 3-9:

At the replacement of engine oil filter, operate as per the following procedure:

- ① Remove used engine oil filter.
- ② Fill the new filter completely with clean engine oil.
- ③ Before installing new engine oil filter, apply engine oil onto the rubber gasket.
- ④ After the rubber gasket comes into contact with the base, tighten for 3/4~1 turn to seal.
- ⑤ Start the diesel engine and check for presence of oil leakage.

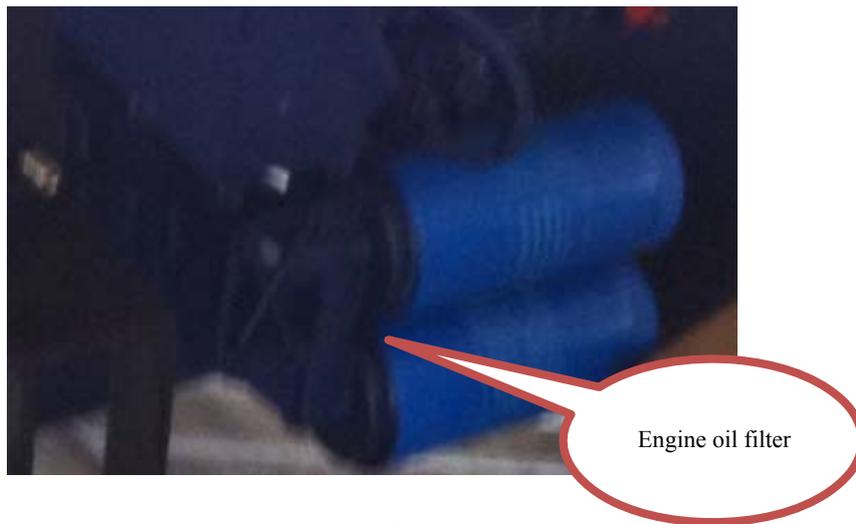


Figure 3-9

- ◆ Replace the fuel filter element. See Figure 3-10.

At the replacement of fuel filter, operate as per the following procedure:

- ① Remove the used fuel filter element. The water collector installed on the strainer can be reused. Please take out the water collector.
- ② Lubricate the sealing port.
- ③ Screw on the filter with hand, till the sealing port comes into contact with the connecting port.
- ④ Continue to screw on the filter with hand, till the filter is securely installed (for approximate 3/4 turn).
- ⑤ Bleed the air, till there is no presence of air bubble.

- ⑥ Conduct the leakage test.



Figure 3-10

Attention: At the replacement of strainer or at the reinstallation of fuel delivery pipe, it's necessary to bleed the air from the strainer.

Procedure: (As shown in Figure 3-11).

- ① Stop the engine.
- ② Remove the air bleeding screw.
- ③ Pump up fuel filter with the manual pump, till only the fuel overflows from the air bleeding screw.
- ④ Retighten the air bleeding screw.

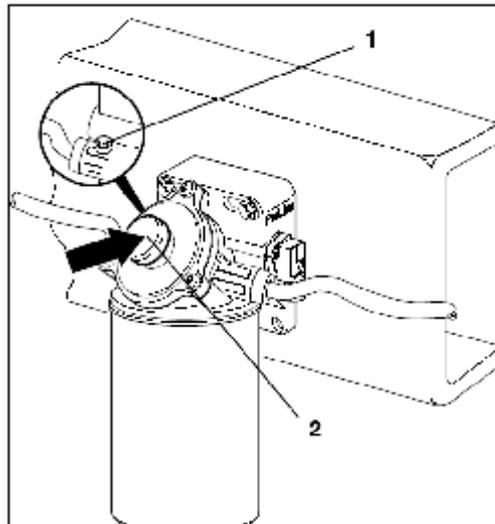


Figure 3-11 Air bleeding of strainer

Drain the water from the water collector:

Attention: When the water collector is full or the spin-on filter is replaced, it's necessary to drain the water collected.

Procedure (As shown in Figure 3-12)

- ② Open the fuel drainage plug 2 on the bottom of water collector 1 to fully drain the water.
- ② Retighten the fuel drainage plug.

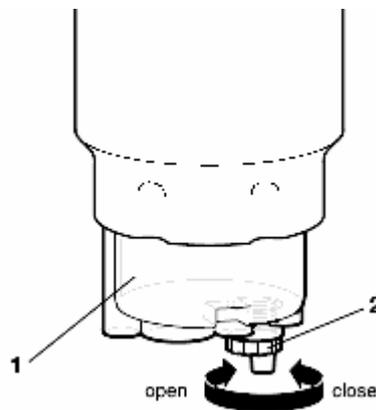


Figure 3-12

Replace the water collector:

Procedure (As shown in Figure 3-13)

- ① Stop the engine.
- ② Drain water from the water collector.
- ③ If possible, remove the screw 1 of water collector with hand. If the screw 1 is too tight, use the remover tool attached in the new water collector.
- ④ Lubricate the seal ring 2 of new water collector with several drops of oil.
- ⑤ Install the screw with hand and tighten with tool.
- ⑥ If the water collector is reused on a new spin-on filter, check for presence of damage.
- ⑦ Install with torque wrench and tighten to 20N.m.

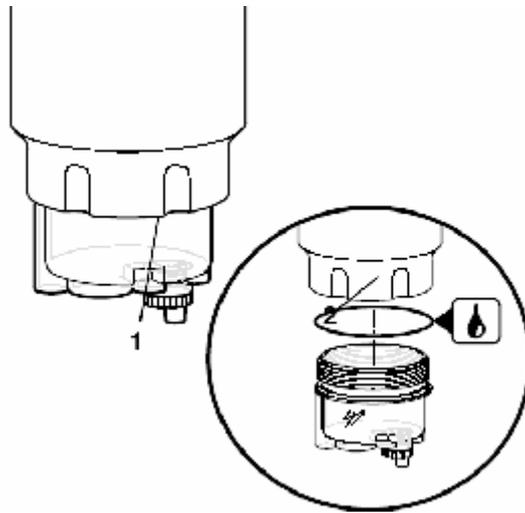


Figure 3-13 Replacement of water collector

◆ Check the air intake system

Check the intake hose for presence of aging or cracking and check the hoop for presence of looseness. When necessary, tighten or replace parts to ensure air-tightness of intake system.

◆ Check urea pump filter element

At the time of maintenance, it's necessary to remove the filter element of urea pump and thoroughly clean with clean water before installation. Do not slap or knock the filter element with high force.

◆ Check the urea nozzle gasket

At each replacement or disassembly/installation of urea nozzle, it's necessary to check the status of urea nozzle gasket. In event of damage or deformation, replace the urea nozzle gasket.

◆ Clean the urea tank and urea tank filter element

At the time of maintenance, it's necessary to check the cleanliness of urea tank and filter element and when necessary clean.

3.3 Maintenance for long-term storage of diesel engine

◆ Clean the diesel engine.

◆ Take protective measures:

- ① After the engine warm-up, drain the engine oil, clean engine oil filter, and add anti-rusting oil.
- ② Drain the fuel and refill anti-rusting oil mixture.
- ③ Drain the water and add coolant with anti-rusting agent.
- ④ Start the engine and idle run for 15~25min.
- ⑤ Fully drain the engine oil, fuel, coolant and urea solvent.
- ⑥ Take protective measures for other portions.

◆ Protection during storage:

Plug with caps or wrap with plastic film all inlets and outlets of oil, gas and water and seal up the entire diesel engine with weather anti-rusting film.

◆ If the transport is required, the outer package shall be supplemented.



3.4 Fulfill the maintenances and complete maintenance records

Table 3-1 Operation Conditions for Two Classes of Vehicles

(Class WG I)	(Class WG II)
Harsh working conditions (cold or hot weathers, heavy dust, short-distance transport, operation in working sites, and bus, municipal engineering vehicle, snow sweeper, and fire truck) or no more than 2×10^4 km yearly driving mileage or no more than 600h working hours	All kinds of commercial vehicles with more than 2×10^4 km yearly driving mileage

Table 3-2 Maintenance Period

Working condition Item	Driving mileage (time)	WG I	WG II
Initial mandatory maintenance	3000km (50h)	A	A
Routine maintenance	10000km (200h)	B	C
	30000km (400h)		B
	For class WG II vehicles, replace the engine oil filter element at the Weichai's designated service center at interval of 10,000km (200h)		

A – Initial mandatory maintenance: Replace oil and oil filter element and do not replace fuel strainer and fuel fine filter elements.

B – Routine maintenance: Replace engine oil, engine oil filter element, fuel strainer and fuel fine filter elements.

C – Only replace oil filter element.

Table 3-3 Maintenance Specification of Diesel Engine

Maintenance item of diesel engine	1 st checking	Routine checking	Level 1 maintenance	Level 2 maintenance	Level 3 maintenance	Level 4 maintenance
Replacement of oil (at least once a year)	•	•	•	•	•	•
Replacement of oil filter element	•	At each replacement of diesel engine oil				
Checking and adjustment of valve clearance.	•		•	•	•	•
Replacement of fuel filter element.			•	•	•	•
Cleaning of fuel strainer or replacement of filter element			•	•	•	•
Checking of coolant amount and refilling	•	•	•	•	•	•
Replacement of coolant	Replace once a year					
Fastening of cooling pipeline clamps	•					
Fastening of intake pipeline, hose and flange connector	•		•	•	•	•
Checking of air cleaner maintenance indicating lamp or indicator			•	•	•	•
Cleaning of air cleaner dust collector (except automatic dust discharge type)		•	•	•	•	•
Cleaning of air cleaner main filter element	When the indicator lamp lights up					
Replacement of air cleaner main filter element	Refer to relevant regulations of vehicle manual					
Replacement of air cleaner safety filter element	After main filter element is cleaned for 5 times					
Checking and fastening of belt	•	•	•	•	•	•
Checking of turbocharger bearing clearance						•
Urea pump filter element			•	•	•	•
Urea nozzle gasket	At each disassembly of urea nozzle					
Cleaning of urea tank and urea tank filter element			•	•	•	•

Note: • denotes necessity of maintenance.

The relevant maintenance must be conducted for the diesel engine that is stored for more than half year, such as oil resealing.

Weichai will provide maintenance recommendations upon request of the user.

4 Analysis and Troubleshooting of Common Malfunctions

WP10 series National IV diesel engine is designed and manufactured under strict quality assurance system and each delivered diesel engine passed the specified tests. In addition, the diesel engine is a kind of precision machinery and the long-term guarantee of its functionality is closely related to the normal maintenance. The causes leading to earlier failure of diesel engine are generally as below:

- ◆ Operations against rules or improper management and operations.
- ◆ Failure to fulfill maintenance as specified or even repair works instead.
- ◆ Poorly manufactured parts, especially the counterfeit products procured due to temptation of cheap prices, which will greatly shorten the service life of diesel engine.

Inappropriate grade of fuel or lubricating oil or disqualified fuel or lubricating oil

4.1 Diagnosis method

The common diagnosis methods for malfunctions of diesel engine are generally as below:

- ◆ Observation method: Judge the malfunction situation by observing the malfunction symptom, such as exhaust smoke of diesel engine.
- ◆ Listening diagnosis method: Judge the characteristic and extent of the malfunction portion by listening as per the abnormal sound of diesel engine.



Figure 4-1

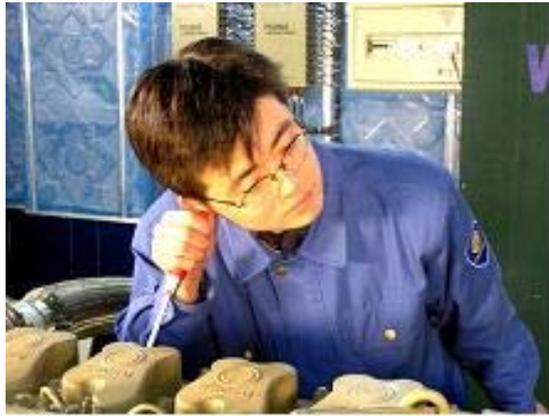


Figure 4-2

- ◆ Cylinder interruption method: Interrupt the working of certain cylinder to judge whether the malfunction occurs in such cylinder. Generally, the cylinder interruption method is to cut off the fuel supply to the suspiciously malfunctioned cylinder and compare the status changes of the engine before and after the interruption of cylinder, in order to narrow the scope for further detection of the malfunction portion or cause.
- ◆ Comparison method: For some assemblies or parts, the replacement method is adopted to determine the presence of malfunction.

Attention:

- ① Judging the malfunction formation cause of diesel engine is a really careful work. Before the cause is basically identified, do not disassemble the diesel engine casually, or it will not only eliminate the malfunction, but also lead to more serious malfunction due to improper assembly after disassembly.
- ② For critical parts such as high pressure fuel pump, ECU, rail supply pipe, and turbocharger, please have them checked and repaired by Weichai's designated service station.

4.2 Common Malfunctions and Troubleshooting

4.2.1 Start failure of diesel engine

(1) No working of starter

The starter of WP10 series National IV diesel engine is controlled by ECU. During normal working, the ECU outputs a current to drive the starter relay and, after the relay is actuated, the battery drives the start of the starter. In event of malfunction, mainly check the neutral gear.

There are several elements during the checking: Relevance of neutral gear switch, starter relay, battery and underframe stop switch.

◆ Check whether it is shifted at neutral gear

Before the start, firstly check whether the gearshift lever is shifted at neutral gear.

◆ Check the position of underframe stop switch (which shall be under OFF state)

The underframe stop switch is of inching type and is capable of automatic reset. Check this switch for normal functioning.

If this switch is other than automatic reset type, check whether this switch is at ON state.

◆ Check the neutral gear switch and wiring for intactness. Try to use the emergency start (Push down and hold the ignition switch for more than 5s).

For the engine with starter controlled by ECU, at the time of start, the ECU will firstly judge whether it's at neutral gear as per the signal transmitted from neutral gear switch. If the neutral gear switch is damaged or the wiring is poorly connected, the ECU fails to receive neutral gear signal and the starter can't work.

◆ Check whether the battery voltage is too low to drive the starter

Generally the battery voltage is 24V. The under-low voltage can't drive the working of starter. Use the voltage measurement of multimeter to check or read the actual "battery voltage" by malfunction diagnostic unit.

◆ Check starter relay and wiring for intactness

Check surfaces of wiring terminals for presence of excessive oxide and check the bolts on surfaces of wiring posts for looseness and breakage.

◆ Check the starter for burnout

Use a multimeter to check the starter relay for normal working.

◆ Check whether the ignition switch and starter switch are damaged.

Turn the ignition key to position ON and observe whether the instrument lamps light up.

Turn the ignition key to position START and observe whether the starter acts (Provided that all other causes are excluded)

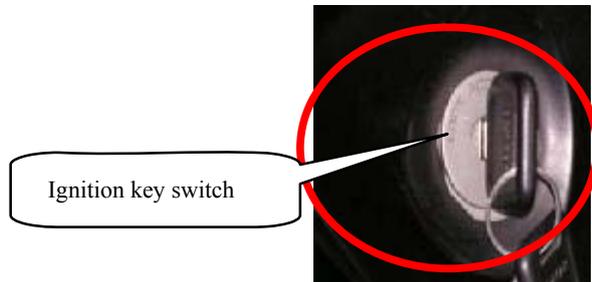


Figure 4-3

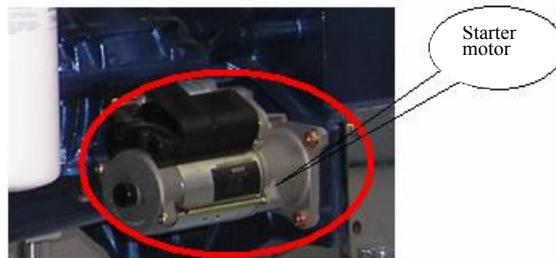


Figure 4-4

(2) Establishment failure of rail pressure (The starter can work normally, but can't start)

Figure 4-5

- ◆ Check the fuel tank for low fuel level. This cause can be easily ignored and shall be paid with attention.
- ◆ Check the manual fuel pump for normal working and push the manual fuel pump with hand to check for normality.
- ◆ Check the low pressure fuel line for presence of air and bleed the air (Sometime the leakage of low pressure fuel line is not obvious and shall be carefully checked)

Air bleeding method: Mainly bleed the air from the strainer. Loosen the air bleeding bolt on the strainer and push the manual pump on the strainer with hand, till the fuel flows out continually at the air bleeding bolt.

If the diesel engine can't be started after the air in the low pressure fuel line is completely bled, it can be judged that there is air in the high pressure fuel line and it's necessary to bleed the air from high pressure fuel line.

Air bleeding method: Loosen high pressure fuel pipe for certain cylinder and drive the working of diesel engine with starter, till the fuel flows out continually from the high pressure fuel pipe (It's recommended not to disassemble the high pressure fuel pipe connector frequently!)

- ◆ Check the high pressure fuel line for presence of leakage

This symptom is relatively obvious. Check the nut of high pressure fuel pipe connector for presence of looseness. If yes, tighten the nut.

- ◆ Check the fuel line for blockage and check the diesel filter for presence of blockage. It's recommended to timely replace the diesel filter element.

Checking method: Loosen the outlet bolt of filter, drive the running of diesel engine with starter, and observe for spray-out or flow-out of diesel. If only a small amount of diesel flows out, it can be determined that the filter element is blocked. In such case, it's necessary to replace the filter element.

- ◆ Check whether the initial voltage of the rail pressure sensor is at approximate 500mV or the rail pressure setting is at 30~50MPa.

(3) Improper connection of engine harness or vehicle harness or open-circuit or short-circuit of harness

- ◆ Check the installations of connectors and use a multimeter (preferable “circuit diagnostic unit”) to check the continuity of circuit as per the pin definition of the circuit diagram.

(4) Loss of crankshaft signal and camshaft signal

Two speed sensors are installed on the diesel engine, on the outer sides of flywheel housing and high pressure fuel pump respectively. The functions are crankshaft position sensor and cylinder judgment sensor respectively. The fuel injection timing of the electronically controlled engine depends on these two sensors. In event of start failure of diesel engine, both the signals are lost completely.

- ◆ Possible cause for loss of both signals

(1) Damage of sensor or short-circuit or open-circuit of harness

(2) Insecure fixing of sensor, leading to over-high or under-low gap between sensor and inductive tooth (generally $1\pm 0.5\text{mm}$)

Troubleshooting: Check the sensor for presence of damage, check the harness for good connection, and check the sensor for looseness.

- ◆ After the disassembly of high pressure fuel pump and flywheel, the reinstallation shall be conducted strictly as per the relevant process documentation, in order to ensure signal synchronization.

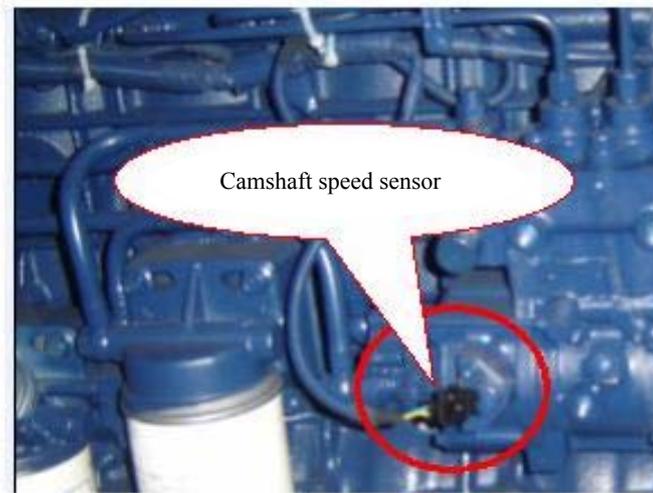


Figure 4-6

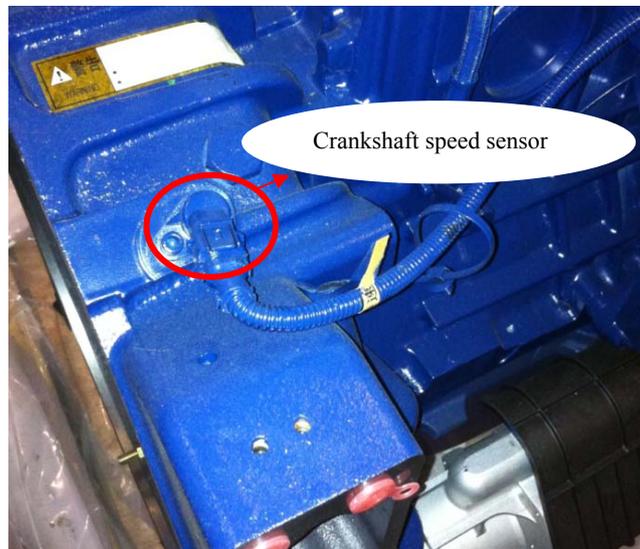


Figure 4-7

4.2.2 Difficult start

Cause and troubleshooting for difficult start of engine:

- ◆ The diesel engine is not running for a long time: The fuel return pipe shall reach beneath the fuel level.
- ◆ There is a small amount of air in low pressure pipeline: Bleed the air.
- ◆ The crankshaft speed signal and the camshaft signal are weak and the synchronization judgment time is long: Find out specific cause and readjust.
- ◆ The environment temperature is too low or the preheater is failed: Check the heating flange for normal wiring or replace preheater.
- ◆ Poor or disqualified fuel or oil: Replace with quality fuel or oil.
- ◆ Broken teeth of starter or flywheel gear ring: Replace starter and flywheel gear ring.
- ◆ Wear of piston ring and cylinder liner or poor sealing of valve: Replace piston ring, cylinder liner or valve seat and valve
- ◆ Blockage of exhaust brake butterfly valve at OFF state, leading to choked exhaust: Replace the butterfly valve.

4.2.3 Low engine power

Limping home: One running mode of engine under malfunctioned state. Upon detection of engine malfunction, the ECU will not stop the engine immediately. Instead, it will restrain the engine power in such manner that the engine speed can only accelerate to 1,500r/min so that the driver can drive the vehicle to the nearest service station for repair.

(1) Malfunction of fuel injector

The malfunction of fuel injector is generally composed of mechanical malfunction and wiring malfunction.

The mechanical malfunction is the blockage of needle valve. Due to excessive dirt in the diesel fuel or corrosion from air ingress, the needle valve is blocked within the fuel injector against actions (Attention: The ECU may not report error!).

Wiring malfunction is the disconnection of harness or short-circuit of harness to ground due to direct grounding of the cylinder head, arising from the causes such as vibration and wear. In such case, the ECU will report error.

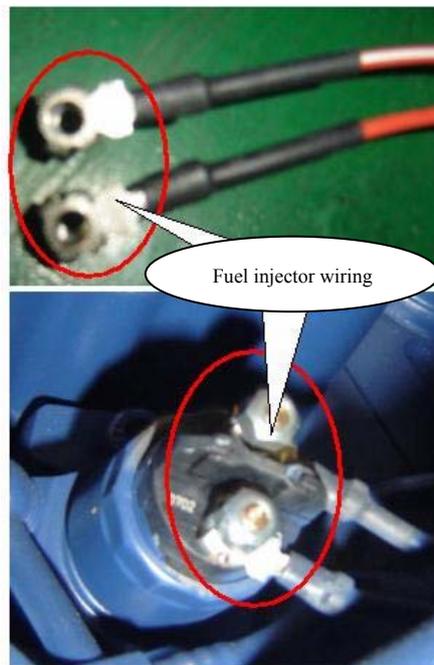


Figure 4-8

(2) Over-high water temperature, oil temperature or intake temperature

When the water temperature, oil temperature or intake temperature is over-high, the ECU will activate the overheating protection function to restrain the engine power.

Before solving the malfunction, firstly the distorted feedback of sensors and instruments shall be excluded.

◆ Causes and troubleshooting for over-high water temperature

- ① Low level in water tank: Check for leakage and add water
- ② Slow speed or no rotation of fan: Check the drive parts of fan
- ③ Blockage of water tank: Check water tank and clean or repair
- ④ Loose water pump belt: Adjust the tension as specified
- ⑤ Damage of water pump gasket or wear of water pump impeller: Check and repair or replace
- ⑥ Thermostat malfunction: Replace

⑦ Damage of water pipe seals or ingress of air: Check water pipes, connectors and gaskets and replace damaged parts

◆ Causes and troubleshooting for over-high engine oil temperature

- ① Low level or oil shortage in oil sump: Check oil level and leakage, repair and add oil
- ② High water temperature: Check and resolve the above-mentioned causes leading to over-high water temperature
- ③ Blocked flow of oil cooler: Check and clean

◆ Causes and troubleshooting for over-high intake temperature

Check the heat radiation capability of inter-cooler.

(3) Signal synchronization error

In event of this problem, generally the signal of one sensor is failed.

Read the flash code by flash code lamp and find out and resolve the specific cause with reference to the flash code table.

(4) Malfunction of flow metering unit

The flow metering unit is the actuator for control of rail pressure and is installed on the high pressure fuel pump. When it's malfunctioned, the high pressure fuel pump will supply fuel to the common rail pipe at its maximum capacity. In such case, the pressure relief valve on the common rail pipe generally opens and there is a “click” noise in the diesel engine. There is a similar symptom when the rail pressure sensor is malfunctioned.

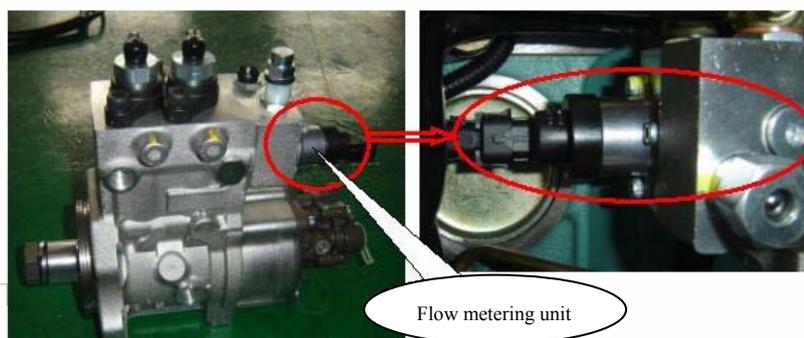


Figure 4-9

◆ Troubleshooting: Check the circuit, determine the malfunction of flow metering unit or rail pressure sensor, and notify the office for handling.

(5) Abnormal fluctuation of rail pressure due to leakage of fuel pipeline

During the traveling of the vehicle, the vehicle speed will be unstable and the vehicle will have symptom of forward jumping.

◆ Troubleshooting:

Restart after 1min power cutoff. If the problem still exists, check the air-tightness of fuel pipeline and resolve.

(6) Sensor malfunction

The intake pressure sensor is the sensor used by ECU to estimate the air intake flow (installed on the intake pipe). The water temperature sensor is the sensor used to judge the thermal load of the engine (installed on the water outlet pipe). The rail pressure sensor is used to check the fuel pressure of common rail tube (installed on the common rail tube).

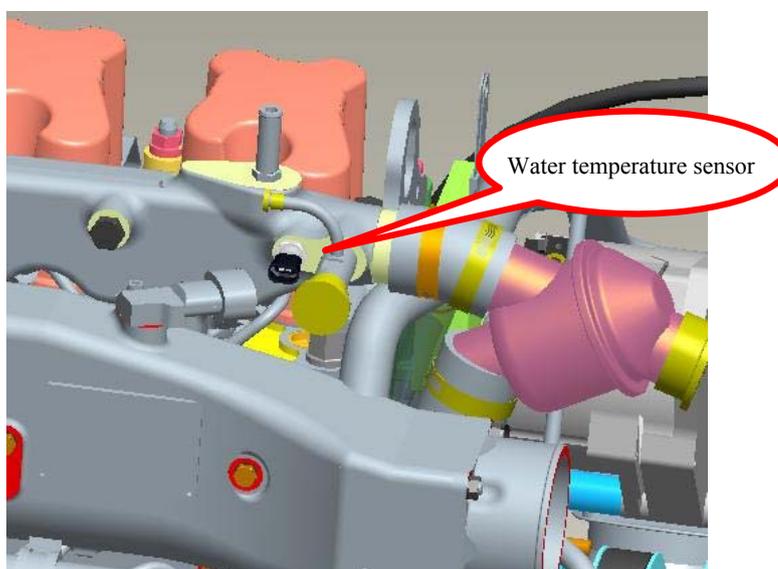


Figure 4-10

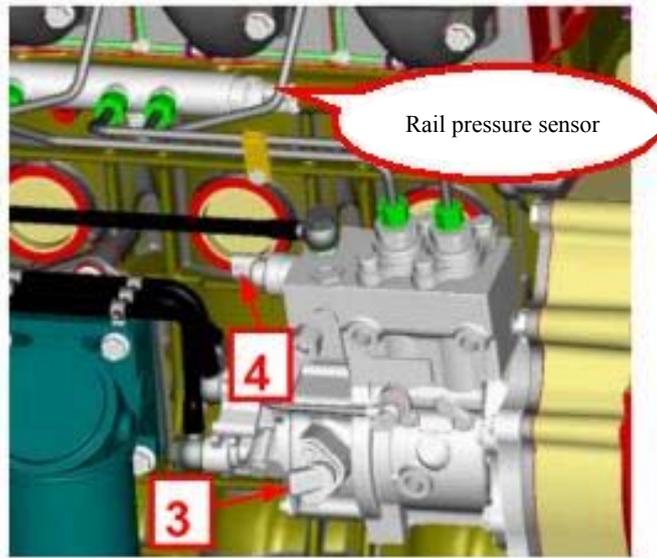


Figure 4-11

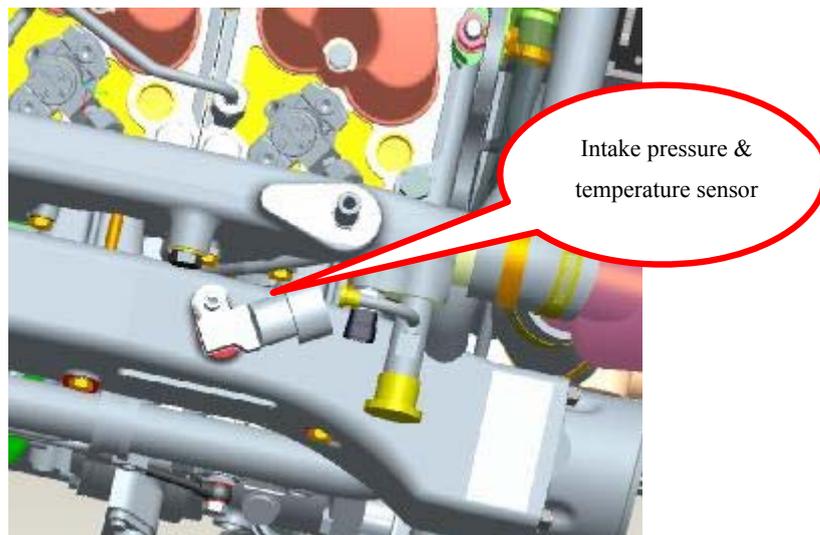


Figure 4-12

◆ Troubleshooting

Check the intake temperature and pressure sensors, water temperature sensor and rail pressure sensor and check the connectors for secure connection.

Attention: In event of malfunction 1, 3, 4, 5 or 6, the diesel engine will enter the “Limping Home” mode.

4.2.4 Constant running of engine at 1,000r/min

In such case, the throttle is failed. The ECU judges the load as per the signal from the pedal potentiometer. In event of malfunction of pedal, for safety consideration, the ECU will control the diesel engine to automatically drop to 1,000r/min idling.

◆ Loose electronic throttle pedal wire or error connection

Reconnect or check throttle for correct wiring and reconnect the wiring.

◆ Water ingress in connector of electronic throttle pedal

Use a tool to blow the connector and then start the engine.



Attention: At the replacement of throttle pedal, keep the same model of pedal.

4.2.5 Swing during idling of engine

◆ Causes and troubleshooting for rough idling of engine:

- ① Abnormal working of fuel injector: Check fuel injectors and harnesses for all cylinders.
- ② For the complete vehicle with vehicle speed sensor, there is an input of vehicle speed signal when the vehicle is parked: Check the speedometer and signal and wiring of vehicle speed sensor.

- ③ Poor fuel quality, with water or waxy content: Clean fuel system and replace fuel filter
- ④ Air ingress in low pressure fuel pipeline: Check air-tightness of fuel pipes and connectors and bleed the air
- ⑤ Unstable atomization of fuel injector nozzle: Check and repair.

Attention: It's a normal function of ECU that the idling speed is increased due to low water temperature. If other load is available (for instance, the air conditioner is turned on), the idling speed will be increased naturally!

4.2.6 Malfunction of SCR

◆ Failure for normal injection of urea

If the SCR system is not working during normal running of the engine, check the connectors at SCR urea pump, urea nozzle and urea sensor for reliable connections and check the urea connection pipelines and connectors for presence of bending, looseness or breakage.

Check the urea level in urea tank. If the urea is insufficient, add the urea timely. In event of poor quality of urea solvent, with excessive impurities, check the cleanliness in the urea tank and clean the urea tank depending on actual condition. Check the contamination state of the urea pump filter element and clean the filter element of urea pump depending on actual condition. In event of serious contamination, replace the filter element. Check the contamination in the vicinity of the urea nozzle port. If the urea nozzle port is blocked, clean or replace the urea nozzle.

When the engine is running under cold weathers, it's normal if the urea solvent can't be normally sprayed as the unfreezing of urea is not completed. If the unfreezing can't be completed after a long period, the heating function is probably malfunctioned and it's necessary to contact the service station.

◆ Increased exhaust backpressure of engine

In event of serious black smoke or increased fuel consumption during running of the engine, check the inside of exhaust pipe for serious crystallization or stone of urea. The low environment temperature and poor atomization of urea sprayed by the urea nozzle will probably lead to clear crystallization of urea on the inner walls of pipeline. Depending on the actual condition, take the heat preservation measures for the walls of exhaust pipe or check the blockage of urea nozzle. Check catalyst carrier within the SCR tank for presence of falloff or breakage and timely contact the service station.

II. User Service Guide (Warranty Card)

Warranty Card for Weichai Power Products (To be preserved by user)

Name	Description	Name	Description
Model		User Name	
Ordering number		Postal code	
Number		Address	
Purchase date		Office tel.	
Dealer		Residence tel.	

Distinguished user:

Welcome to using Weichai product and thanks for your favor to Weichai product!

To use and maintain the diesel engine correctly, please carefully read the operation and maintenance manual of diesel engine and operate strictly as per the relevant regulations. In event of malfunction of diesel engine, please contact Weichai Service Center or Customer Service Center of Weichai Power. We will provide you with timely and effective repair services.

Some items of the “Maintenance Registration Form” are to be filled by the Service Center. Please properly preserve the “Maintenance Registration Form”.

Weichai Power Co., Ltd.

Address: No. 26, Minsheng East Street, Kuiwen District, Weifang, Shandong, China

Postal Code: 261001

Website: <http://www.weichai.com>

Sales hotline for engines: 0536-8232488 8233371

Sales hotline for parts: 0536-2297313 2297319

Service hotline:

400 toll-free service hotline: 400-6183066 }
800 toll-free service hotline: 800-8603066 } 24-hour service hotline

Customer Service Center Hotline: 0536-8235369 (fax)

Customer Service Center Complaint Hotline: 0536-2297322

Warranty Instruction

1. Service Commitment

Within the responsible service region, upon receipt of the user's information, the service unit of our company will arrive at the service site within 3 hours for the city in which the service unit is located, within 24h for general areas, and 48h for remote areas once the service need is confirmed (except the force majeure factors).

2. Special Instructions

- The operator of the diesel engine must carefully read the operation and maintenance manual, understand the structure of diesel engine, strictly abide by the technical operation and maintenance practices specified in the manual, and pay attention to the warning instructions and warning signs.
- This diesel engine passed our company's tests strictly as per the test specification before delivery and it's absolutely prohibited to change the ECU data without consent, otherwise Weichai will not provide warranty services.
- There are strict torque requirements and service times for various bolts of the diesel engine. Do not loosen the main bearing bolts or connecting rod bolts at will. Refer to the operation and maintenance manual for the specific requirements.
- Please fulfill the 50h run-in while using a new engine.
- After the cold start of the diesel engine, slowly increase the engine speed. Do not run at high speed suddenly or idle run for a long time.
- It's prohibited to run the diesel engine without the air cleaner, in order to prevent the ingress of non-filtered air into the cylinders. Under harsh working environment, increase the cleaning or replacement times of the air cleaner filter element, in order to prevent malfunctions (such as earlier wear) of diesel engine.
- While adding fuel and engine oil into the diesel engine, make sure to select the specified trademarks. Make sure to use Weichai special oil and special clean container. The oil shall be filtered by filter screen during refilling.

3. "Warranty" Service Principle and Rule

(1) Warranty service principle

- After the user purchases Weichai product or vehicle equipped with Weichai product, under normal operation and maintenance conditions, Weichai product is warranty covered within warranty period against all damages due to assembly or manufacture causes of the product.
- For the diesel engine and its parts, the repair is the priority method. Those determined as non-repairable shall be replaced. For the replacement of entire engine, the conditions of Weichai Power Co., Ltd. for replacement of entire engine must be met and the request shall be submitted to the responsible leader for approval.

(2) Warranty Period



- For the end-products manufactured by Weichai, the warranty service and warranty period shall start from the actual purchase date and shall be based on the sales invoice and warranty card of Weichai or the sales invoice of the dealer (For the marine main unit, the warranty period shall start from the actual adjustment test date of the engine).
 - The warranty for the products supplied to the vehicle manufacturers shall be as agreed by both parties. If the vehicle manufacturer has explicit rules on the warranty of engine, the rule of the vehicle manufacturer shall be followed, with the criterion as per the vehicle attached warranty card. If there is no explicit criterion or contents on the warranty service of the engine, the criterion of Weichai shall be followed. The warranty service and warranty period shall start from the actual purchase date of the vehicle and shall be based on the sales invoice and warranty card.
 - If the parts purchased from Weichai are attributed to the original quality cause, the warranty period is 3 months for assemblies and 1 year for basic parts. No warranty is provided for the wearing parts, rubber parts, piston rings, oil seals, bushings, bolts and fuel injector couplings once they are assembled on the engine. In event of quality issues of basic parts within warranty period, upon the site confirmation of the service personnel from externally station center with the presence of effective photos, the labor cost will be calculated for the warranty service. The warranty period for the spare parts is based on the date of sales invoice of the central warehouse or the authorized service center. For the assembly quality issues, Weichai will not provide warranty service and the warranty service shall be provided by the assembly unit.
4. Rule for exclusion of warranty
- The malfunctions of diesel engine due to improper use, maintenance or matching. Such as the damage due to loading and unloading during self transportation, the application conditions out of the scope specified in the operation manual of the product, improper matching, over-speed and over-load use, the failure for fulfillment of run-in or maintenance as specified in operation manual, and the use of disqualified or poor oils, antifreeze and water, oil and air filters.
 - The malfunctions of the portions and parts due to self modification, adjustment and assembly and disassembly, which are disallowed for self adjustment or assembly and disassembly as specified in the operation manual.
 - The oil, antifreeze, filter element, hose, belt and fuel injector coupling replaced during normal use, consumption and maintenance.
 - There is warranty evidences (warranty card and invoice) and the coverage of warranty period for the product purchased can't be proved. The product specification and model on the warranty evidence or invoice are not consistent with the product requested for warranty service or there is a trace of modification on the warranty evidence or invoice.
 - The failure to maintain the original statue in event of malfunction and the self handing, which leads to impossible technical authentication of the malfunction cause.
 - The malfunction arising from misoperation.
 - The damages arising from force majeure, such as war and natural disaster.
 - The diesel engine is damaged on the vehicle after traffic accident.



Rule of Warranty Period for Weichai Power Diesel Engine

No.	Product Model		Warranty period	Remarks
I. Complete diesel engine				
1	Diesel engine for road vehicles		1 year or 60,000km	
2	Diesel engine for engineering vehicles		0.5 year or 30,000km	
3	Diesel engine for buses		1 year or 100,000km	
4	Gas engine for buses		1 year or 100,000km	
II. Diesel engine parts				
1	Basic parts	Cylinder block, crankshaft, engine base and connecting rod	2 years or 200,000km (attributed to original manufacture defect, such as sand inclusion)	Based on the actual sales date and the sales invoice, warranty card, or timer. Warranty period or mileage (hour), whichever comes first.
2	Important parts	Cylinder head, flywheel, flywheel housing, connecting rod bolt, piston, piston ring, piston pin, connecting rod bushing, main shaft bushing, camshaft bushing, camshaft, cylinder liner, valve, valve spring, valve seat, valve guide tube, valve cover, tappet, tappet rod, rocker arm and rockshaft, various gears and gear shafts, tensioner, gear ring, oil pump, intake and exhaust manifolds, oil sump, pulley, high pressure fuel pump, fuel injector body, air compressor, various cover plates and pads, water pump, oil radiator, silicone oil clutch, pressure limiting valve, shock absorber, crankshaft balancer, various metal oil pipes, water pipes and pipe connectors, steering pump, thermostat, fuel-water separator, cylinder gasket, ECU, common rail tube, air cleaner body, diesel filter body, oil filter body, muffler, distribution disc, starter valve, inter-cooler, thermal exchange, air reservoir, thrust plate, strainer, oil dipstick subassembly, cooling oil nozzle, SCR tank and urea tank.	Follow the warranty period of above complete diesel engine.	
3	General parts	Front oil seals and other oil seals, turbocharger, intake manifold gasket, exhaust manifold gasket, turbocharger gasket, valve cover gasket, rubber hose, fuel injector return pipe, fuel delivery pump, oil dipstick, fan, water-proof and oil-proof rubber rings, and cup plug.	6 months or 30,000km for road vehicles. 3 months or 15,000km for engineering vehicles. 6 months or 50,000km for buses.	
4	Electric units	Starter, alternator, instruments, various sensors, electric regulators, throttle pedal, harness, solenoid valve and flame preheater.	6 months or 30,000km for road vehicles. 3 months or 15,000km for engineering vehicles. 6 months or 50,000km for buses.	
5	Wearing parts	Belt, shroud, fuel injector nozzle, plunger coupling, other gaskets, various braided hoses, clamps and timer.	5,000km or within mandatory maintenance period. 1 month or 10,000km for buses.	
<p>Note: 1. If the engine odometer of the road vehicle is damaged, the warranty period will be calculated based on 325km a day.</p> <p>2. If the engine odometer of the engineering vehicle is damaged, the warranty period will be calculated based on 300km a day.</p> <p>3. If the engine odometer of the bus is damaged, the warranty period will be calculated based on 400km a day for touring buses and 200km a day for public buses.</p> <p>4. The road vehicles include trucks, truck-mounted cranes, and mixer trucks and the engineering vehicles include dump trucks.</p> <p>5. If the vehicle manufacturer has explicit rules, such rules shall be followed.</p>				



Weichai International Marketing Service Network

Area	Office	Sales in charge	Service in charge	Local TEL	Mobile	E-mail	Address
Commonwealth of independent States	Russia	Tutubalin	An pengfei	0074953152825	0079267519073	weichairussia@yahoo.com.cn	117519 , г.Москва ул.кировоградская , дом 32.Апартотель ЭРИДАН кв.15-С1
	Mongolia		Liu weijun		00976-99602398	mongoliaweichai@yahoo.com.cn	
	Kazakstan		Shan hongwu		0077011725466	kazakstanweichai@yahoo.com.cn	Республика Казахстан , г.Алматы, ул.Бузурбава 23
	Azerbaijan		Zhang lei		00994-773301769	syriaweichai@yahoo.com.cn	Azərbaycan,Bakı,Nəsimi,2-ci Mikrorayon,Rəşid Məmmədov,ev 0025,mən 0099
Southeast Asia	Singapore	Zhang jingping	Dai liancheng	0065-67794869	0065 9623 4801	dailc@weichai.com.sg	WESTECH BUILDING No 237, PANDAN LOOP,#05-11 SINGAPORE 128424
	Indonesia	Zhang jingping					
	Philippines	Wang hongshan					
	Vietnam	Xue hua					
	Hong kong	Zhang jingping	Liu Haitao		0085293364201	hongkongweichai@yahoo.com.cn	
	Thailand	Zhuo laixian	Zhang yunjian	0066-27212357	0066-867001639	thailandweichai@yahoo.com.cn	235/1,Seri-onnut Village,Onnut Soi 70/1,Sukhumvit 77 Road,Khet Pravate,Bangkok 10250 Thailand
	Burma	Liu sen	wang jiaquan	0095-1-541348	0095-9-5008728	lius@weichai.com	ROOM NO.14-08, 17 FLOOR, BLOCK (D), PEARL CONDO, BAHAN TOWNSHIP.
South Asia	Bangladesh	Liu jingrui	zhang yong			liujingr@weichai.com	
	India	Li jian	Pan shankao	0091-20-30262800	0091-7387006182	lijian@weichai.com	No.201,Pentagon-3,Magarpatta City,Hadapsar,Pune-411013,Maharashtra,India
Middle east	United Arab Emirates	Sun lifeng	Chen yun	0097142381447	00971509420629	uaeweichai@yahoo.com.cn	Flat No.705,Jscome Tower-11,AI Qusais-1,AI Qusais,Dubai,UAE.
	Iran		Zhong lei	00982122344130	00971506753806	iranweichai@yahoo.com.cn	No.1,Floor-7,Block-11,Atisaz,EXP,Chamran,Tehran,Iran
	Saudi Arabia		Sui zhen		00966-56-2108200	saudiweichai@gmail.com saudiweichai@yahoo.cn	Villa No.17, Dana compound, Naseem Dist. Khurais Road Exit 30, Riyadh, Kindom of Saudi Arabia
Europe	Italy	Hao feng				haof@weichai.com	
	France					zhanggp@weichai.com	
North Africa	Algeria	Gao donghai	Huo chunlei		00213551883843	algeriaweichai@yahoo.com.cn	Cite Krim Belkacem ilot 17 n° 14-Dar El Beida-Alger-Algerie
	Egypt		Zhou jingwei		00201125846195	egyptweichai@yahoo.com.cn	السبع الحى حذيفة ابي الامام شارع 40- نصر مدينة القاهرة العربية مصر جمهورية
East Africa	Kenya	Gao jingui	Cao lei		00254-705978578	kenyaweichai@yahoo.com.cn	No.601 lakeside apartment, kiambu lane road kizingo mombasa P.O.Box:99206 Mombasa
	Ethiopia		Hu xiaoqun		00251-924909463	ethiopiaweichai@yahoo.com.cn	P.O.BOX 1947 .Debre Zeit , Ethiopia TOMMY INTERNATIONAL HOTEL
	Sundan		Wang zimao	00249 155255168	00249 922868539	sudanweichai@126.com	السودان العاصمة الخرطوم في 02 غرفة 1 طابق 15 العمارة السكنى نصر مجمع
South Africa	South Africa	Wan kuishao	Wan kuishao		0027717282045	nanfeiweichai@163.com	11 Glenrosa, 30 Arterial Road, Bedfordview, Johannesburg, South Africa.
	Angola		Fu yongsheng		00244924771275	angolaweichai01@yahoo.com.cn	
West Africa	Nigeria	Wang ge	Wang changcong		00234-815577771	nigeriaweichai@yahoo.com.cn	No22,citrus close . Alfred garden estate Oregon Ikeja . Lagos State.
South America	Venezuela	Wang lu	Xia jianing		00233-541164989	wanglu@weichai.com	
	Cuba		Huang jinggui	0053-07-2033597		GUBAHUANG.JG@126.com	Calle21#8214e/82y84PlayaHabanaCuba.
	Brazil		Song zhiping		005511976427085	brazilweichai@yahoo.com.cn	rua pires da mota 647,aclimacao,sao paulo,brazil
North America	America	Liu haifeng			+1(847)718-0602	liuhf@weichai.com	3100 Golf Rd, Rolling Meadows, IL, US

Engine Mandatory Maintenance Card

License plate number		Manufacturer	
User name		Engine number	
Detailed address		Mandatory maintenance date	
		Mandatory maintenance mileage	
Purchaser		Purchase date	
Audited by:	User signature:		Weichai Power special engine oil label:
Seal of service station:	Valid certificate:		
	Customer tel.:		

Sheet 1 Stub

Tips: This mandatory card is in triple sheets and must be signed by customer for approval. All items shall be filled and the card with missing item will be considered void.

Supervision Tel. of Weichai Power: 400-6183066 800-8603066

At completion of mandatory maintenance, the service station shall summarize the offices within responsible region along with the Customer Satisfaction Survey attached in this manual.

Engine Mandatory Maintenance Card

License plate number		Manufacturer	
User name		Engine number	
Detailed address		Mandatory maintenance date	
		Mandatory maintenance mileage	
Purchaser		Purchase date	
Audited by:	User signature:		Weichai Power special oil label:
Seal of service station:	Valid certificate:		
	Customer tel.:		

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Seal of service station:	Valid certificate:		
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User name		Engine number	
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		Mandatory maintenance mileage	
Purchaser		Purchase date	
Audited by:	User signature:		Weichai Power special oil label:
	Valid certificate:		
Seal of service station:	Customer tel.:		

Sheet 2 For Weichai

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Engine Mandatory Maintenance Card

License plate number		Manufacturer	
User name		Engine number	
Detailed address		Mandatory maintenance date	
		Mandatory maintenance mileage	
Purchaser		Purchase date	
Audited by:	User signature:		Weichai Power special oil label:
	Valid certificate:		
Seal of service station:	Customer tel.:		

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Engine Mandatory Maintenance Card

License plate number		Manufacturer	
User name		Engine number	
Detailed address		Mandatory maintenance date	
		Mandatory maintenance mileage	
Purchaser		Purchase date	
Audited by:	User signature:		Weichai Power special oil label:
	Valid certificate:		
Seal of service station:	Customer tel.:		

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Supervision Tel. of Weichai Power: 400-6183066 800-8603066

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Engine Mandatory Maintenance Card

License plate number		Manufacturer	
User name		Engine number	
Detailed address		Mandatory maintenance date	
		Mandatory maintenance mileage	
Purchaser		Purchase date	
Audited by:	User signature:		Weichai Power special oil label:
Seal of service station:	Valid certificate:		
	Customer tel.:		

Sheet 3 For Service Station

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Supervision Tel. of Weichai Power: 400-6183066 800-8603066

At completion of mandatory maintenance, the service station shall summarize the offices within responsible region along with the Customer Satisfaction Survey attached in this manual.

Engine Mandatory Maintenance Card

License plate number		Manufacturer	
User name		Engine number	
Detailed address		Mandatory maintenance date	
		Mandatory maintenance mileage	
Purchaser		Purchase date	
Audited by:	User signature:		Weichai Power special oil label:
Seal of service station:	Valid certificate:		
	Customer tel.:		

Sheet 3 For Service Station

Tip: This mandatory card is in triple sheets and must be signed by customer for approval. All items shall be filled and the card with missing item will be considered void.

Supervision Tel. of Weichai Power: 400-6183066800-8603066

At completion of mandatory maintenance, the service station shall summarize the offices within responsible region along with the Customer Satisfaction Survey attached in this manual.

Engine Mandatory Maintenance Card

License plate number		Manufacturer	
User name		Engine number	
Detailed address		Mandatory maintenance date	
		Mandatory maintenance mileage	
Purchaser		Purchase date	
Audited by:	User signature:		Weichai Power special oil label:
Seal of service station:	Valid certificate:		
	Customer tel.:		

Sheet 3 For Service Station

Tips: This mandatory card is in triple sheets and must be signed by customer for approval. All items shall be filled and the card with missing item will be considered void.

Supervision Tel. of Weichai Power: 400-6183066800-8603066

At completion of mandatory maintenance, the service station shall summarize the offices within responsible region along with the Customer Satisfaction Survey attached in this manual.

Customer Satisfaction Survey

Item	Evaluation element	Very satisfied	Satisfied	Moderate	Dissatisfied	Very dissatisfied
Engine Article quality	Appearance					
	Performance					
	Reliability					
Engine Delivery quality	Engine integrity					
	Attached spare parts and tools					
	Attached documentation					
	Delivery time					
Engine Service quality	Service timeliness					
	Maintenance quality					
	Service attitude					
Others	Customer interruption					
	Return					
	Additional freight					
	Other opinion of customer					
Customer seal				Date		
Customer Service Center of Weichai Power Co., Ltd. Address: No. 26, Minsheng Street, Kuiwen District, Weifang, Shandong, China Postal Code: 261001 Tel.: 400-6183066 (for mobile and landline) and 800-8603066 (for landline) Fax: 0536-8235369						

Note: Please mark “√” in corresponding column.