

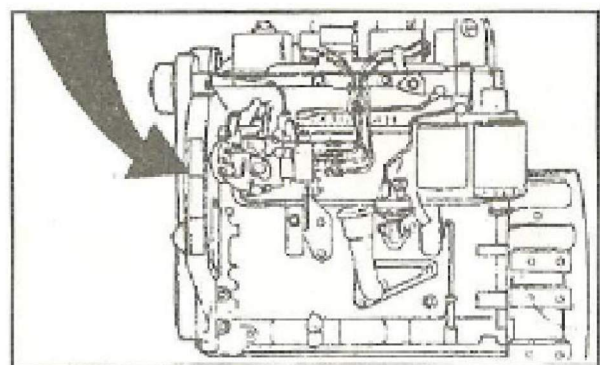
Cummins B Series

Engine Operation and Maintenance Manual

I: User Guidelines

- 1: The vehicle operating should not out range of the approved number of people and cargo weight.
- 2: You should take new engine checking and mileage compulsory maintenance when beyond the running travelled distance.
- 3: You should be clearly that you can't modify the structure of the engine or vehicle.
- 4: if you need to change the spare parts, make sure that you use original spare parts. After-market parts might damage your engine.
- 5: The quality of lubricating oil using on mechanical B series engine should not lower than API CF-4/SG standard, the viscosity is 15W-40 or when using in the arctic climate 10W-30 and 5W-20. The quality of lubricating oil using on electronic B & C series engine should not than API CH-4/SJ Performance range, the viscosity is 15W-40 or when using in the arctic climate 10W-30 and 5W-20.
- 6: Your engine must use antifreeze anti-rusted solution, and should change the liquid timely. Cummins recommend to use composite coolant or 50/50 high quality water mix with composite anti freeze.
 - a. The high quality water should meet all technical requests: concentration of chloride is lower than 40ppm, concentration of sulfate is lower than 100ppm, calcium/magnesium is lower than 170ppm; the prior choice is ionized water, distilled water or softened water.
 - b. Glycol working range between 40-60% is acceptable.
 - c. The concentration of SCA is in the range of 0.3-0.8.

II: Engine Nameplate



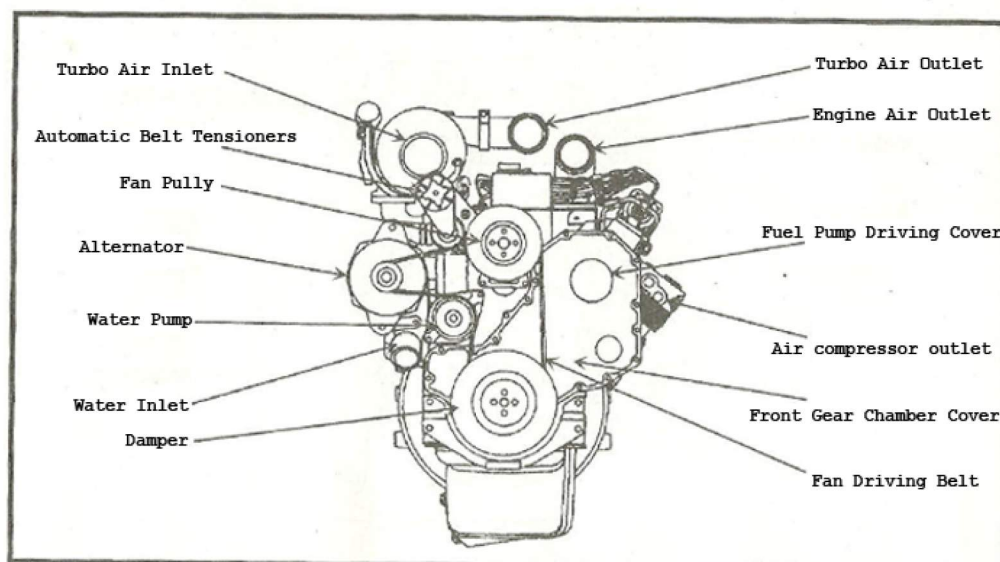
Engine nameplate is in the position shows on the left picture, the data in the data plate are very important for you to maintain and repair the engine, please don't lose it!

Such as follows:

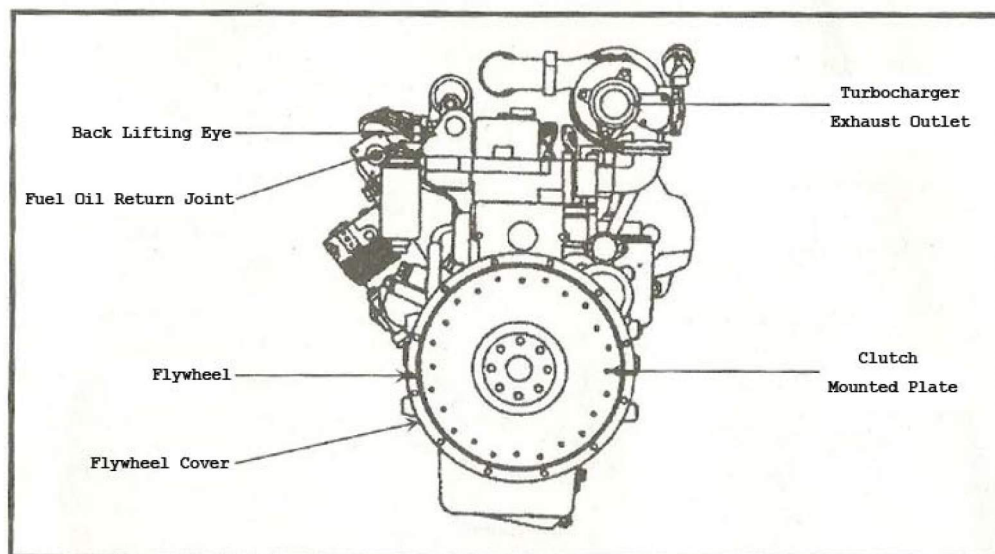
 东风康明斯发动机有限公司 Dongfeng Cummins Engine Co., Ltd. 5258272 中国 湖北 襄樊 Xiangfan, Hubei, China	排量 Displacement	净质量 Net Weight	怠速 Idle Speed	型号 Model	
	8.9 L	796 kg	700 r/min	L340 30	
	允许使用海拔高度限值 Altitude Limit	3000 m	发动机序列号 Engine Serial No.	87698375	
	排放型式核准号 Emission Type Approval NO.	UN CJ 03 03520046	订单号 Shop Order	30555E	
	控制性零件表号 CPL	43470	额定功率/转速 Rated kW	250 at 2000 rpm	
<p>注意: 若用户超出本发动机所规定的供油量/转速/海拔高度运转, 由此引起的损坏, 不在保修范围内。 WARNING: Injury may result and warranty is voided if fuel rate rpm or altitudes exceed published maximum values for this model and application.</p>	生产许可证 Licence NO.	11	额定供油量 Fuel rate at rated HP	182 mm³/kwh	
	制造日期 Date of Mfg.	2011.12.14	发动机总成号 Engine ASSY. NO.	8030555E	供应商代码 Supplier ID

III: B Series Engine External Recognition

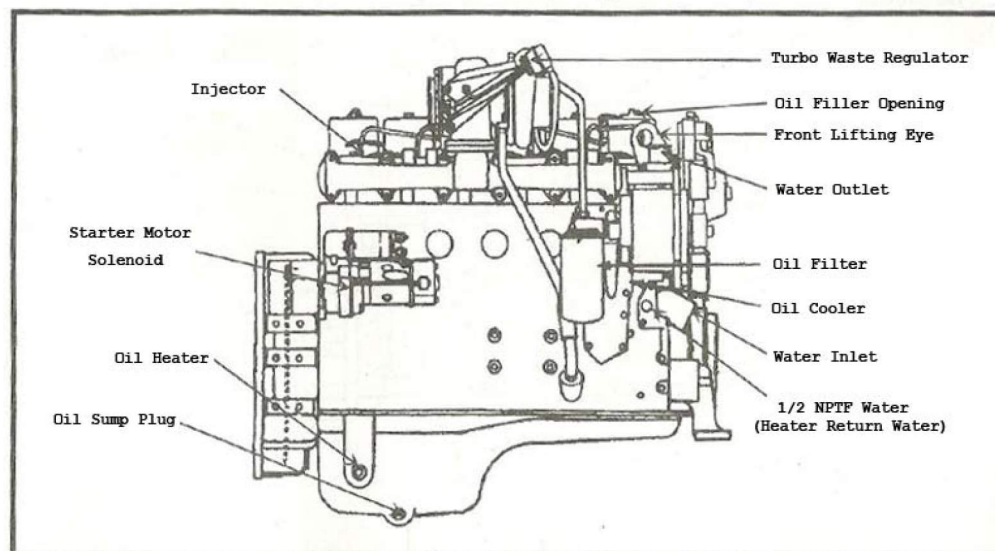
Front View



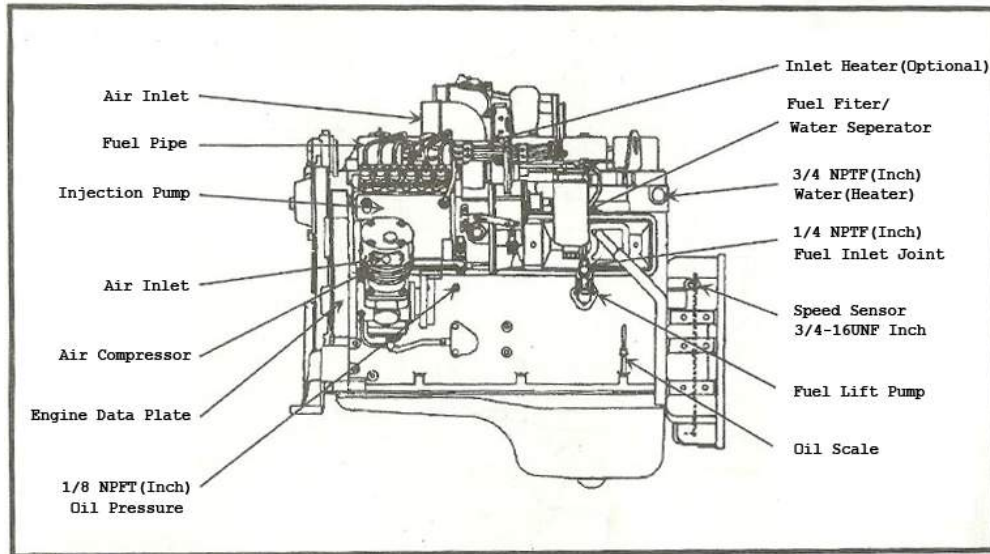
Back View



Side View-Turbocharge Side

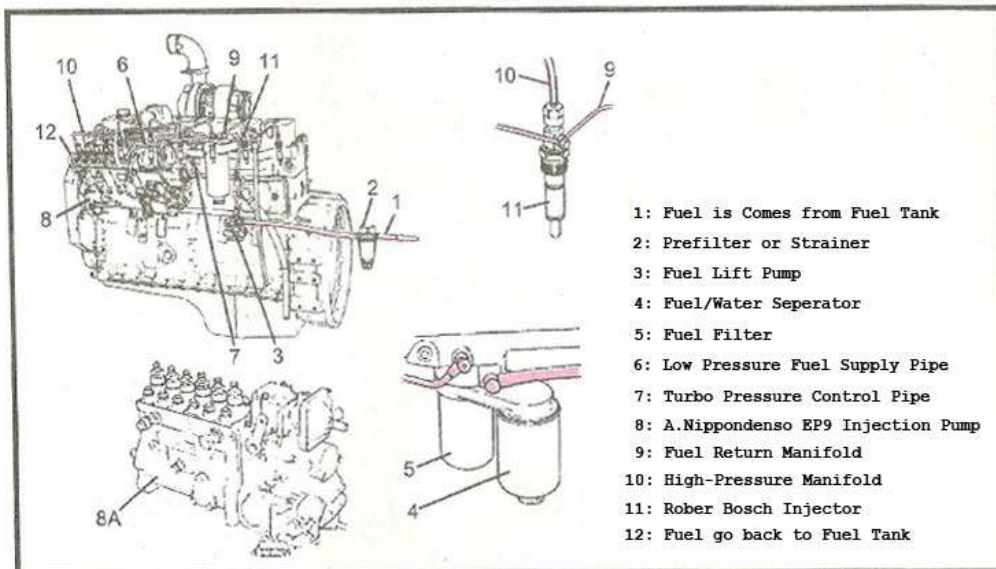


Side View-Injection Pump Side

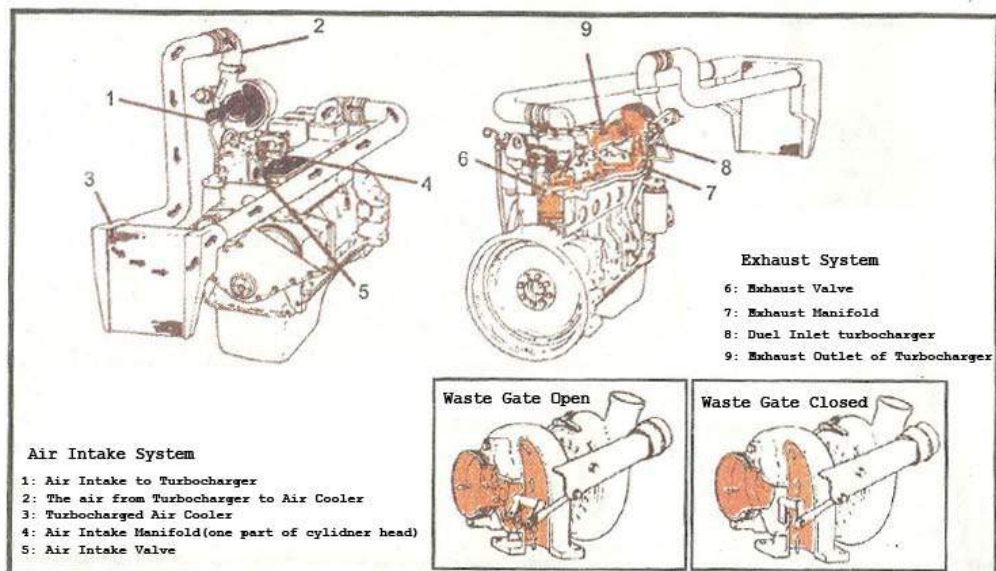


IV: Major Systems of Cummins B Series Engine

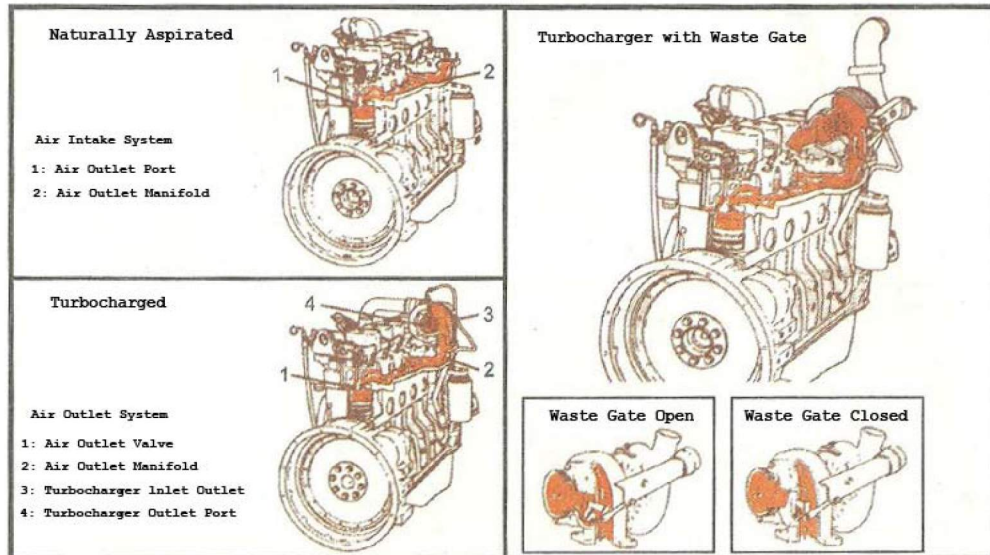
Fuel System



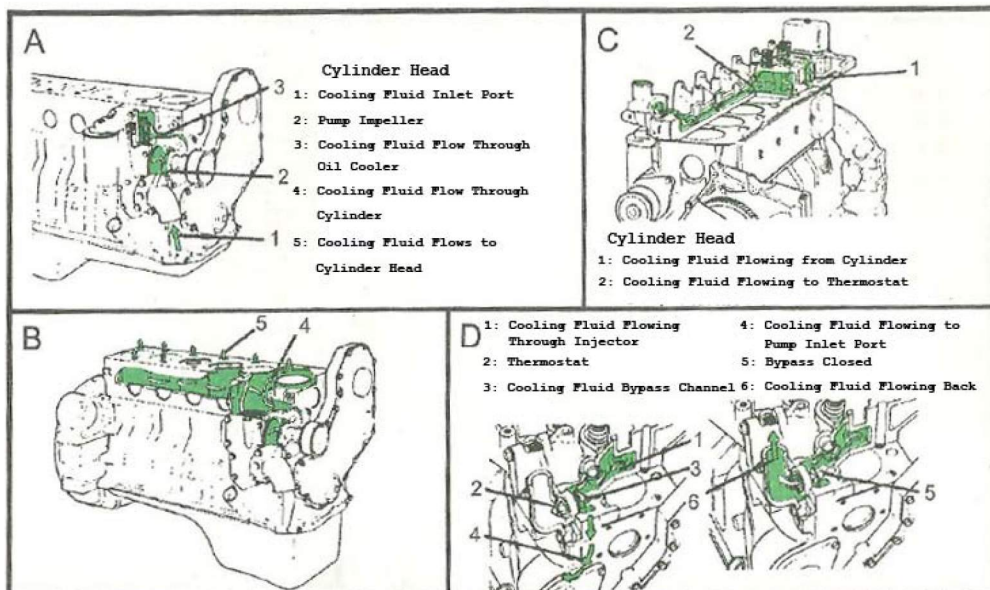
Air Intake/Exhaust Sytem



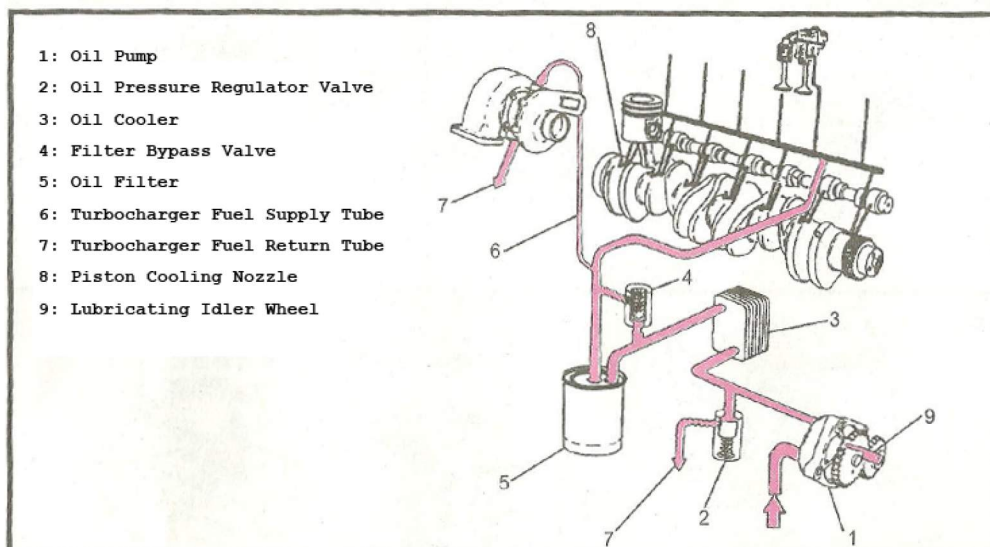
Exhaust System



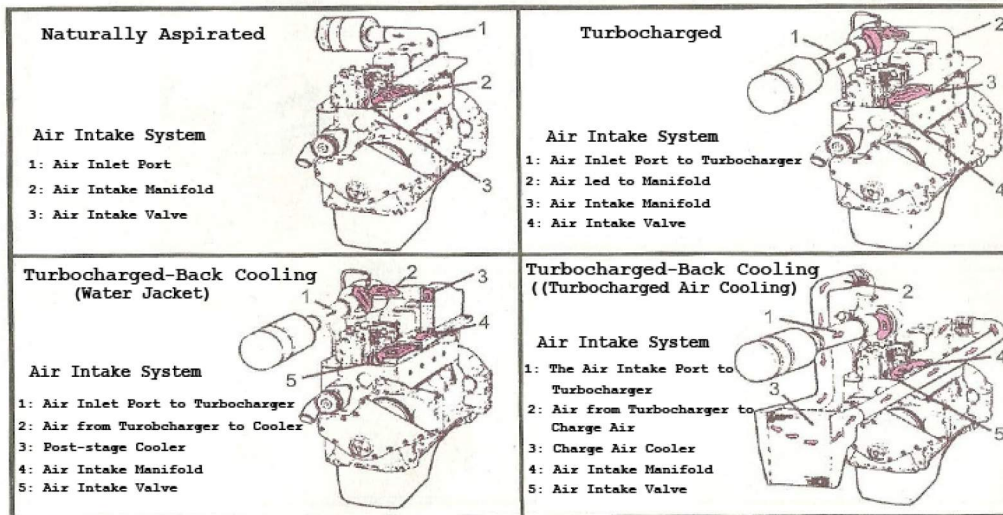
Cooling System



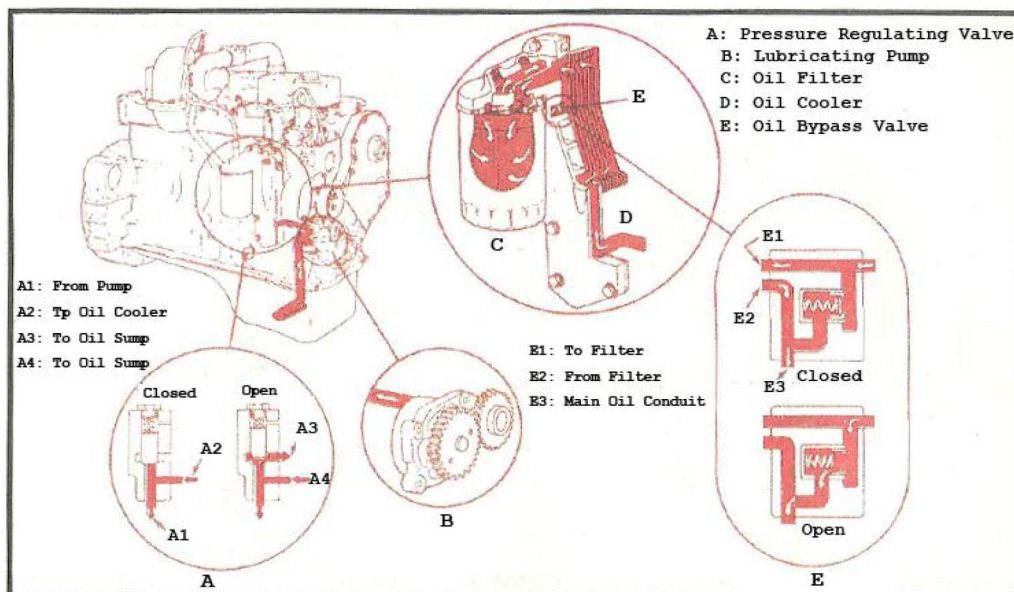
Lubricating System Sketch Map



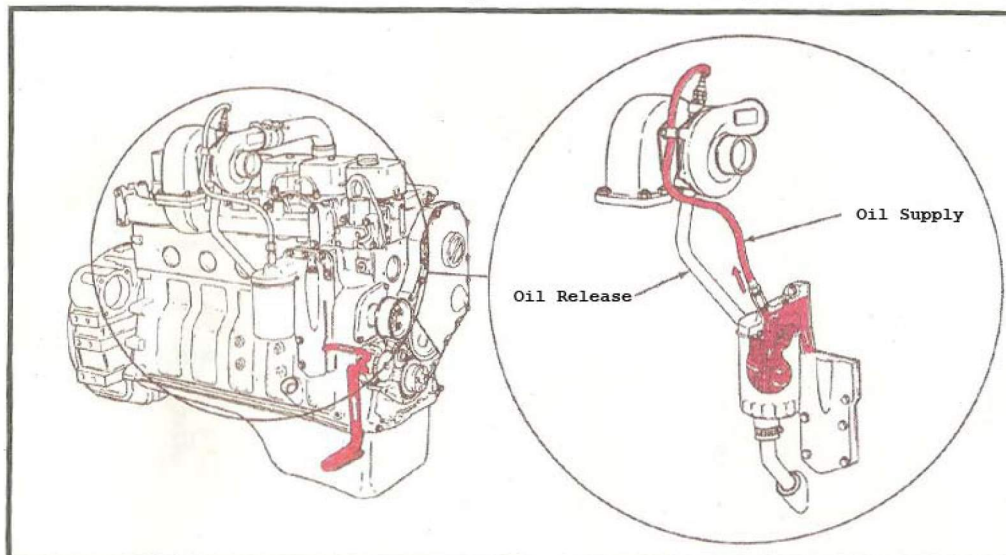
Air Intake System



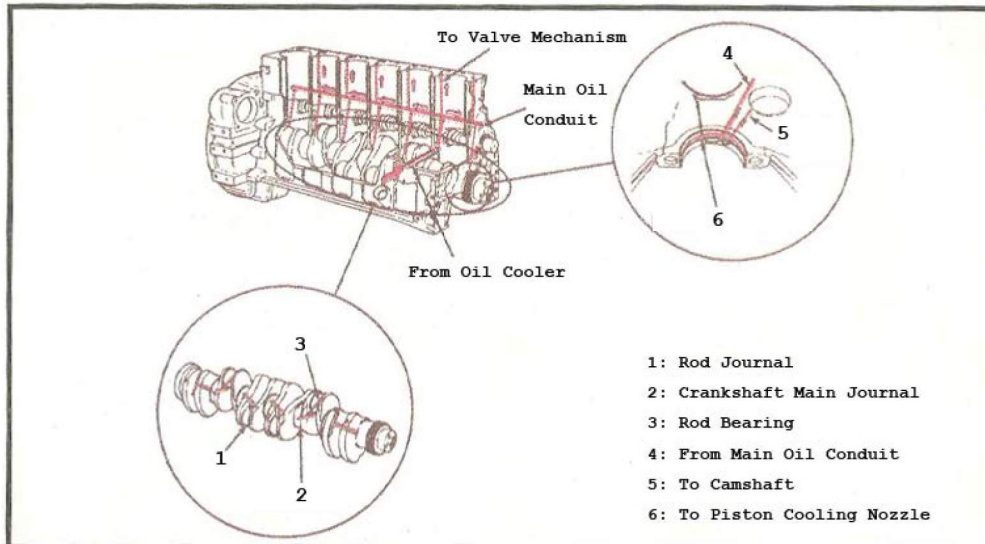
Lubricating System



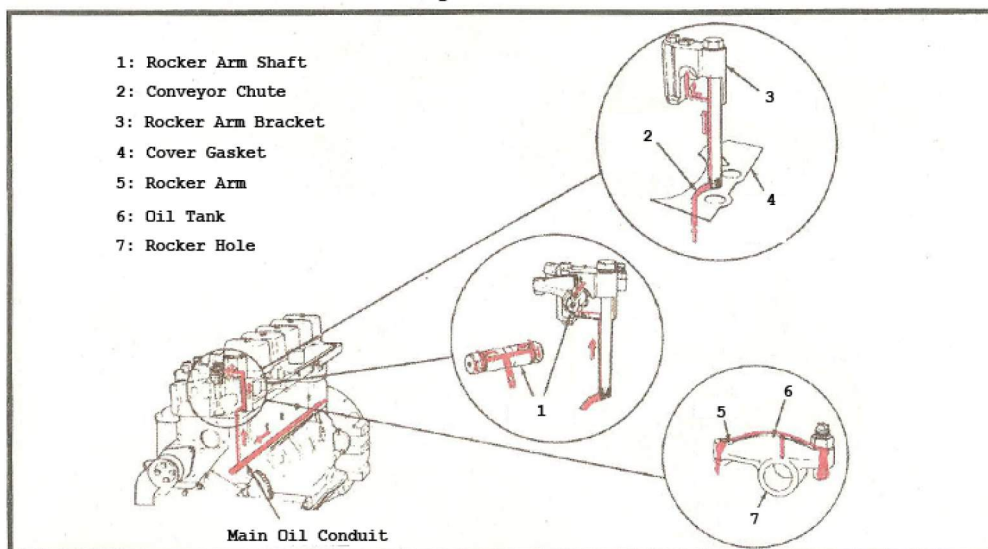
Lubricating of Turbocharger



Lubricating of Power System Components



The Lubricating of Rocker Mechanism



V: Engine Using and Announcements

1: Running-in Process of New Engine

For the first running 1500-2500 miles or before 30-50 hours running, should observe the following rules:

- The engine should runs at Medium-Low Speed, should avoids high speed and large heavy duty running.
- The engine is forbidden to runs at Idle Speed or Full Speed-Full Load for over 5 minutes.
- Shift gear properly, avoiding engine attrition too hard.
- Check the oil temperature meter, oil pressure meter and water temperature gauges' status.
- Check lubricating oil and coolant liquid level
- Forbidden to take trailer, max load should smaller than 70% of rated load weight.

Warning!

- After running-in period, no need to change oil, oil filter.
- During running-in period, the engine don't need special running-in oil.

- After running-in period, should procedure the first checking and maintenance.

2: Engine Start

- For the 1st start of the engine every day, should checking the coolant lever, dipstick and drain off the water in Oil/Water Separator.
- The starter motor can't running over 30 seconds, should leave at least 2 minutes between every 2 times starting.
- Within 15 seconds after engine start, watching the change of oil pressure.
- For the 1st start of the engine every day, should warming the engine for 5 minutes, especially when running in the temperature below 0 °C.

3: Engine Preheat and Idle Speed

- When engine running at preheat running period, should improve the engine speed step by step, forbid to run the engine with big accelerator.
- Forbid engine runs at idle speed over 10 minutes.

Note:

If the engine runs too long at idle speed, it will lower down the temperature of the combustion chamber, led to poor combustion, form carbon deposit block the injector hole and resulted in adhesive of piston ring and air valve.

4: Engine Stop

- Before engine stop running, should runs at idle speed for 3-5 minutes, to take away the heat from the combustion chamber, bearing and friction pairs by lubricating oil and coolant, especially important for turbocharged and turbocharged inter-cooled engine!

5: Announcements of Engine Operating

- Avoid running engine with the coolant temperature lower than 60°C or higher than 100°C, should find out the reasons as soon as possible.
- Forbid running engine when the oil pressure is too low

Note:

At the normal water temperature, the minimum oil pressure shouldn't lower than follows:

Idle speed (750-800 r/min)	69Kpa
Full load-full speed	207Kpa

- Avoid the engine over speed when downslope.
- Forbid running the engine with failure.

Note:

In the normal running of the engine, all the failures are has it's signs, should observe the engine performance, sound and the changes of all parameters, if found out any unusual, should stop the engine immediately to inspect or repair.

The following is some signs before the failure, should observe carefully:

- Hard to start the engine or has vigorous shaking.
- Engine losing power suddenly.
- Unusual noisy.
- Fuel, oil and coolant leaking.
- The pressure of crankcase is too high.
- Water temperature changing suddenly.
- Unusual smoke (blue smoke, black smoke or white gas) .
- Oil pressure dropping.

- Oil and fuel increase obviously.

6: the right method to fill coolant

- Don't fill too fast, otherwise, the air inside engine cooled jacket can't get out, this will lead to overheat of engine in running.
- After complete the filling of coolant, check it again after the engine running warmly, until has been full fill the coolant.
- If the inter cooler is water cooled, should open the release valve on the water cooler when filling coolant.

Caution!

Should follow these requests when you filling the coolant, otherwise might damage your engine!

Note:

- B series engine should fill with antirust-antifreezing liquid.
- Antirust-antifreezing liquid is made from the mixture of glycol and purified water, different kinds of antirust-antifreezing liquid has different application of different environment. Generally, the 50:50 glycol and purified water mixture can meet the requirement of engine, but should checks the mixture's color and add some glycol when necessary.

The data in the table is recommended to the user:

Specifications	color	Ambient Temperature	Proportion	PH Value
-50	Blue	-50	1.070-1.060	7.5-9
-40	Blue	-40	1.060-1.055	7.5-9
-35	Blue	-35	1.055-1.050	7.5-9
-30	Blue	-30	1.050-1.040	7.5-9
-20	Red	-20	1.030-1.035	7.5-9
-10	Red	-10	1.020-1.025	7.5-9

Note:

- The replacement period of antirust-antifreezing liquid is 2 years.
- When winter comes, should check the concentration of antirust-antifreezing liquid.
- Before you filling antirust-antifreezing liquid to an old engine, you should wash the cooling system.
- Forbid to replace antirust-antifreezing liquid with water.
- When ambient temperature is below 0°C, should check the concentration of antirust-antifreezing liquid for every 20,000.00 kilometers.

VI: Engine Maintenance

Maintenance is very important way to ensure engine works well. To extend operating life of the engine, you should do the maintenance as requested follows:

- The vehicle runs for every 10,000 kilometers ($\pm$ 1000 kilometers), dumper runs for every 4000 kilometers ($\pm$ 500 kilometers), you should do the maintenance items requested.
- After 100,000 (40,000 for dumper) kilometers maintenance item, you should repeat the item start from 50,000 (20,000 for dumper) kilometers maintenance.

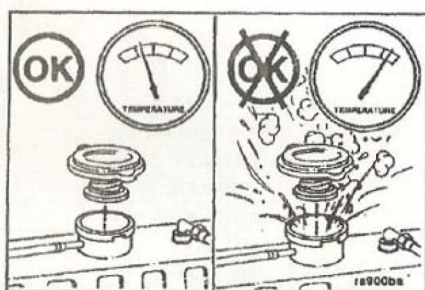
1: Engine Maintenance List:

Normal	Daily Checking	10,000km	20,000km	30,000km	40,000km	50,000km
Dumper		4,000km	8,000km	12,000km	16,000km	20,000km
Inspection Items	Lubricating Oil Level	Air Filter	Air Filter	Air Filter	Air Filter	Air Filter
	Cooling Liquid Level	Air Intake System	Air Intake System	Air Intake System	Air Intake System	Air Intake System
	Driving Belt and Fan	Intercooler	Intercooler	Intercooler	Intercooler	Intercooler
	Oil-water Separator Disembogue		Rust prevention anti-icing fluid		Rust prevention anti-icing fluid	
	The Leakage of Air Compressor Locking Bolt, Nut and Break System					
	Intake Pipe					
	Gas Tank and Oil Tank(if has)					
	Ureophil Level (Euro IV engine Only)					
Adjustment			Valve Clearance			Valve Clearance
Requested Replace Items		Lubricating Oil	Lubricating Oil	Lubricating Oil	Lubricating Oil	Lubricating Oil
		Oil Filter	Oil Filter	Oil Filter	Oil Filter	Oil Filter
		Coolant Filter	Coolant Filter	Coolant Filter	Coolant Filter	Coolant Filter
		Fuel Filter	Fuel Filter		Fuel Filter	Antifreezing liquid
			Steering Hydraulic Oil		Steering Hydraulic Oil	

Normal	Daily Checking	60,000km	70,000km	80,000km	90,000km	100,000km
Dumper		24,000km	28,000km	32,000km	36,000km	40,000km
Inspection Items	Lubricating Oil Level	Air Filter	Air Filter	Air Filter	Air Filter	Air Filter
	Cooling Liquid Level	Air Intake System	Air Intake System	Air Intake System	Air Intake System	Air Intake System
	Driving Belt and Fan	Intercooler	Intercooler	Intercooler	Intercooler	Intercooler
	Oil-water Separator Disembogue	Rust prevention anti-icing fluid		Rust prevention anti-icing fluid		Rust prevention anti-icing fluid
	Leakage of Air Compressor Locking Bolt, Nut and Break System					

	Intake Pipe					
	Gas Tank and Oil Tank(if has)					
	Ureophil Level (Euro IV engine Only)					
Adjustment				Valve Clearance		Valve Clearance
Requested Replace Items		Lubricating Oil	Lubricating Oil	Lubricating Oil	Lubricating Oil	Lubricating Oil
		Oil Filter	Oil Filter	Oil Filter	Oil Filter	Oil Filter
		Coolant Filter	Coolant Filter	Coolant Filter	Coolant Filter	Coolant Filter
		Fuel Filter		Fuel Filter		Fuel Filter
		Steering Hydraulic Oil		Steering Hydraulic Oil		Steering Hydraulic Oil
		Thermostat		Fuel Primary Filter		Anti-freeze Fluid

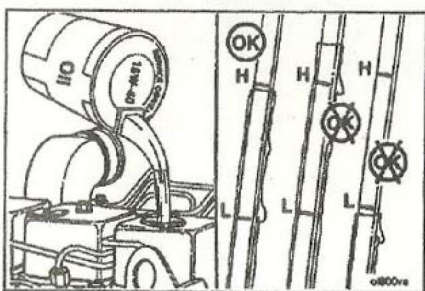
2: Daily Checking Items:



● Checking the Cooling System Leakage

Note:

Don't open the water tank when the coolant temperature is higher than 50°C avoid to scalding by the hot coolant. Make sure you use the right tools for all the checking and maintenance items.



● Checking the Lubricating System leakage

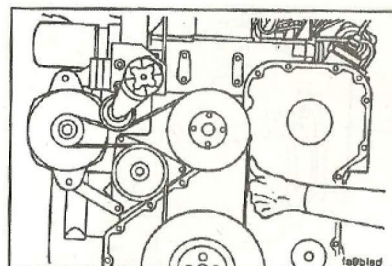
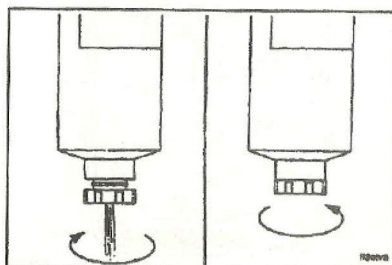
When filling the lubricating oil, the oil level should below the line on the dipstick.

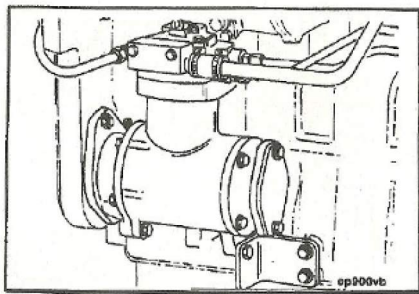
Oil Pan Capacity:

4 Cylinders B series engine: 9.5L

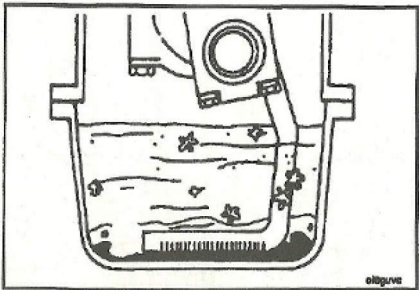
6 Cylinders B series engine: 14.2L

- Checking if the engine fan belt is loose and the damage condition, test the deflection of the belt, the largest deflection should between 9.5-12.7mm, the tensioner bearing should rotate freely when press it, shouldn't have any stuck situation. Fan hub should rotate freely and don't have too big axial clearance.
- Check the fuel filter and fuel system leakage, let out the water and precipitate inside the water separator. Don't screw too hard on the valve, otherwise will damage the thread.





- Check if the air compressor lock bolt and nut is loose and the break system leakage.



3: 10,000.00 Miles Maintenance Items (Consult Engine Maintenance Item Table):

A. Change Oil and Oil Filter

- When changing the oil, the engine running until outlet water up to 60°C, , stop draining oil, because when the oil in the hot status, impurity and suspended mater are won't stay in the oil pan.

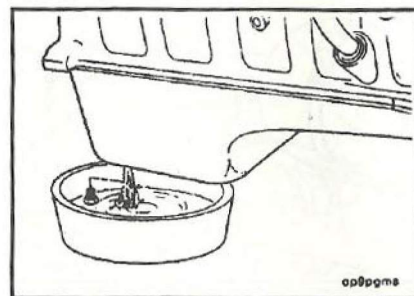
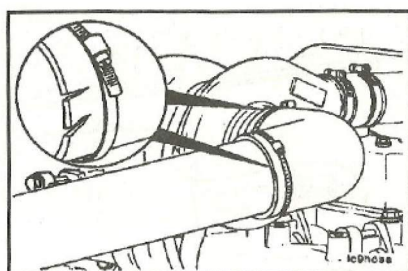
- When draining oil, should observe oil color carefully, if the oil has been diluted, should find out the reason, otherwise will caused serious damage.

- Fuel + Lubricating Oil=Dark Black(oil diluted)
- Water + Lubricating Oil=Milk Color(or water in the oil)

Caution!

Cummins Engines are using the lubricating oil above CF Class, as different oil has different using ambient:

Oil Plate Number	Suitable Ambient Environment
15W-40CF4 above	-10-- -15°C
10W-30CF4 above	-5-- -20°C
5W-20F4 above	Below -25°C

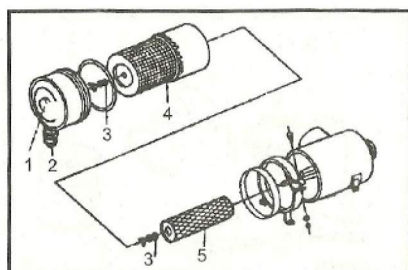


B. Check and Maintenance of Air Intake System and Air Filter

- Checking air intake pipe damage, flexible pipe craze, clamp loose.

Note:

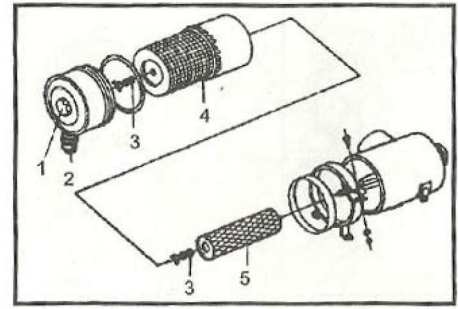
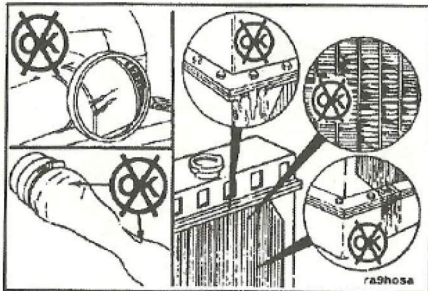
Forbid running the engine without air filter(there has alarm for clogged air filter).



- Take off air filter element (number 4), using not over 689Kpa(7Kg/cm2), air compressor to blow inside the element, checking the damage of element after

finished cleaning, never use petrol or water to wash.

- When installing element No.4 & security element No.5, make sure the bottom seal ring is in good condition, if the seal ring degumming from element, should glue them together.
- When installing element No.4 & security element No.5, don't missing install seal ring No. 3
- Don't screw too hard the thumb nut of No. 4 element, otherwise might degumming, the element must scrap if the cover degumming.
- There is no need to clean the security element No. 5 for the whole using process, until replace it.
- The Max. intake resistance of natural aspirated engine is 510mmH₂O, the Max. intake resistance of turbocharged engine is 635mmH₂O, then should clean or change the air filter element.

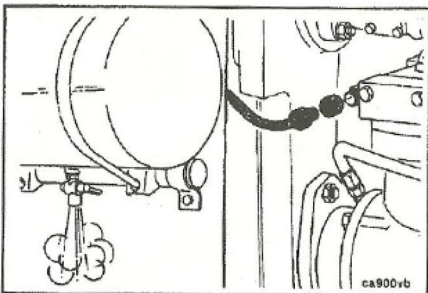


C: Check and Maintenance of Cooling System and Inter Cooling System

- Check if the cooling system has leakage, the water pipe clamp fracture or loose. The water tank has leakage, damage or has collecting dirt.

D: Check and Maintenance of air compressor lock bolt, lock nut and break system

- Check the air compressor lock bolt, lock nut loose.
- Check if the break system has leakage.
- Check if the air compressor and stable pressure box connecting pipe and the inwall of elbow has carbon deposit, if the thickness of the carbon deposit is over 1mm, should clean or change it.



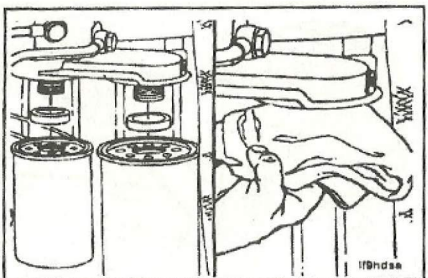
E: Check and Maintenance of Cooling System

- Check the leakage of cooling system

4. Maintenance Items for 20,000.00 miles (Consult Engine Maintenance List):

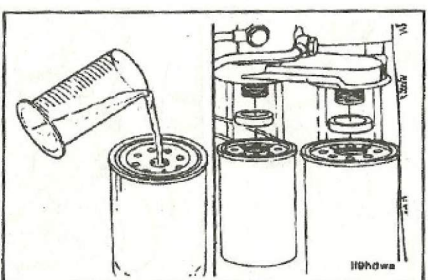
A: Replace the Fuel filter

- Clean the fuel filter cover area, dismantle the filter, cleaning the face of fuel filter cover gasket.
- Replace O-ring seal.
- Fill the cleaned fuel filter with clean diesel after 72 hours precipitated, otherwise if the air gets into fuel system will engine hard start-up and unstable running.



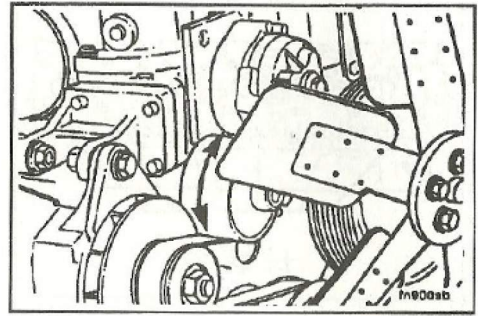
B: Change power steering hydraulic oil (please read the maintenance operating manual of the vehicle to get information for related maintenance announcements)

C: The rest maintenance items are the same as requested in 10,000.00 miles maintenance.



5: 30,000.00 miles check and maintenance items

A: All the maintenance items are the same as requested in 10,000.00 miles



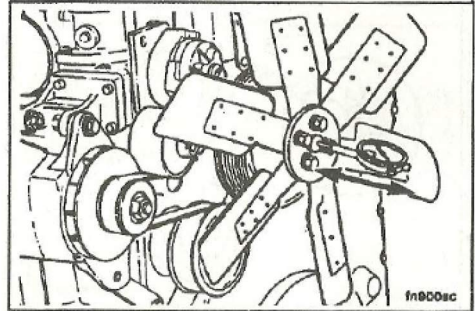
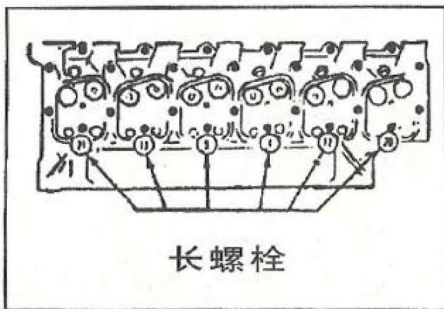
6: 40,000.00 miles check and maintenance items:

A: check the belt tensioner bearing and the tension of belt

- Checking if the engine fan belt is loose and the damage condition, test the deflection of the belt, the largest deflection should between 9.5-12.7mm, the tensioner bearing should rotate freely when press it with hand, shouldn't have any stuck situation. Fan hub should rotate freely and don't have too big axial clearance.

- If found out the large deflection over 12.7 mm, the bearing get stuck or fan hub axial clearance is large than 0.15mm, should repair or change it immediately.

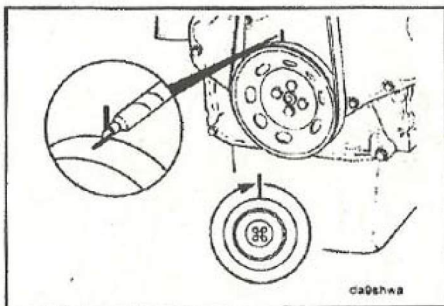
B: the rest maintenance items are the same with requested in 10,000.00 miles.



7. Check and Maintenance Items at 50,000.00 running

A: Check and fastening of cylinder bolt

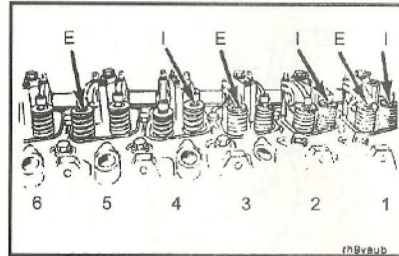
- Dismantle the rock arm cover, using star test method to check the cylinder head bolt torque. Reference torque is 150N.M



B: Check the valve clearance

- Adjust the first cylinder of engine to top dead center, when adjusting, gentle pressure engine timing pin, rotate the crankshaft slowly, until the timing pin press-in the pin hole, and make timing marks on the related parts of belt pulley or damper, for the reference when adjusting the top dead center of the 6th cylinder.

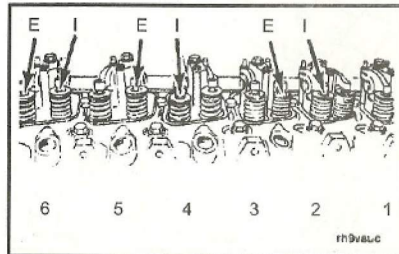
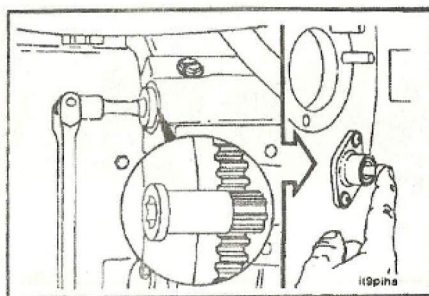
- When the 1st piston on the top dead center, adjust the valve clearance of No. 1, 2, 4 or No. 1, 3, 5 cylinders.



- Rotate the engine by clockwise for 360 degrees, then mark alignment, adjust the valve clearance of No. 3,5,6 and 2,4,6 cylinders.

Intake Valve Clearance: $0.25 \pm 0.05 \text{ mm}$

Exhaust Valve Clearance: $0.50 \pm 0.05 \text{ mm}$

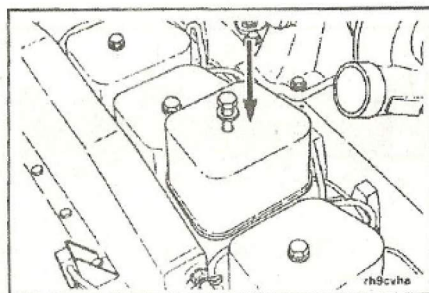


Caution!

When adjusting the top dead center of the 6th cylinder, make sure the timing pin has disconnected from the pin on the injection pump gear, to avoid damage the timing pin or parts.

- Check if the seal ring of rocker arm cover has fracture and ageing phenomenon, change it if necessary. Install the rocker arm cover, the torque of tightening bolt: 24N.M.

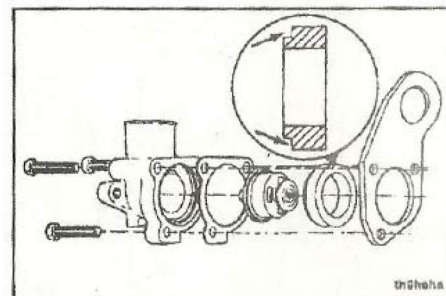
C. The rest maintenance items are the same as requested in 10,000.00 maintenance.



8: Check and Maintenance Items of running at 60,000.00 miles

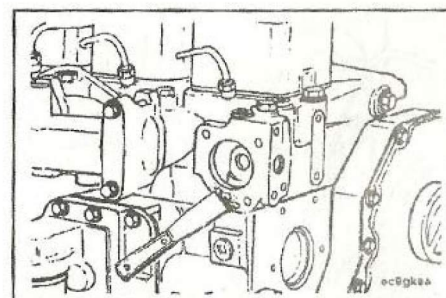
Dismount thermostat cover, thermostat and thermostat seal ring.

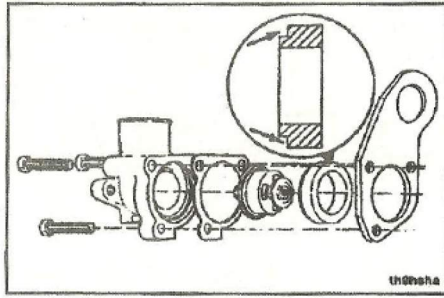
- When cleaning the gasket surface, don't let any sundries drops into the thermostat.



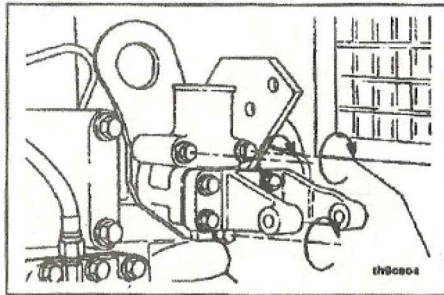
Warning!

If the engine didn't mount the thermostat, the cooling liquid won't go through water tank and flow back to water pump directly, which will make the engine overheat and damage the engine.





- When mounting thermostat, be careful for the assembly relationship of all parts, make sure the hole of gasket bolt alignment with the bolts on the thermostat seat.



- Tighten mounting bolts, tighten bolt torque: 24N.M.
- The rest maintenance items are requested the same with 20,000.00 miles running.

9: Check and Maintenance Items of running at 70,000.00 miles

All the maintenance items are the same with requested at 10,000.00 miles

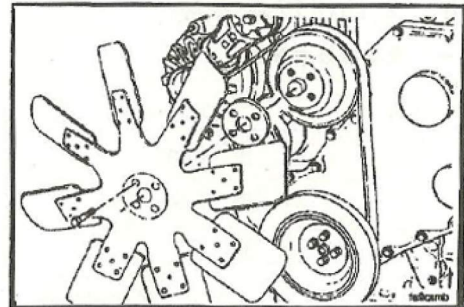
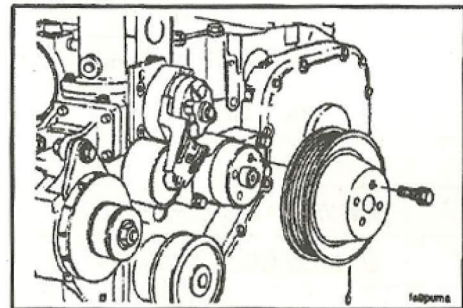
10: Check and Maintenance Items of running at 80,000.00 miles

A: Check the Fan Hub and bolt torque

M8 bolt tightening torque: 24N.M

M10 bolt tightening torque: 43N.M

B: The rest check and maintenance items are requested the same as running at 40,000.00.



11: Check and Maintenance Items of running at 90,000.00 miles

All the items are requested the same as at running 10,000.00 miles

12: Check and Maintenance Items of running at 100,000.00 miles

Change the hydraulic power steering oil(Please read the manual of vehicle to find out the related announcements)

A. The rest maintenance items is the same as requested at 50,000.00 running

VII: Fuel Oil for Engine (GB252-94)

Recommend to use the light diesel oil cetane number>45, and should precipitate for over 72 hours.

VIII: Common Faults and Cause Analysis

Faults Phenomenon	Cause Analysis	Solutions
Engine can rotate, but can't start running(no smoke)	(1)no oil in the fuel tank (2) fuel solenoid valve is closed (3) pipeline plugging (4) fuel supply pump doesn't work (5) fuel filter blocked (6) fuel injection pump doesn't work (7) fuel injection pump fuel supplying timing fault	(1) check pipeline and oil suction pipe, fill diesel oil (2) check whether the solenoid power or replace the solenoid valves (3)check whether the pipeline is blocked and clear it up (4) check the oil pressure of fuel pump or replace the pump (5) replace the fuel filter (6) check whether there are high-pressure fuel spray at pump head (7) check whether the fuel injection timing is correct or not
Engine hard to start or can't start (exhaust pipe has discharge smoke)	(1) starting speed is too low (2) need cold starting device or this device doesn't working (3) the diesel fuel has water or impurities (4) air filter blocked (5) has air in fuel pipeline (6) injection timing is wrong (7) valve clearance is wrong (8) more than two injector wear or fault	(1) check the connector of battery, starter, and line is fastness (2) check the necessary device and if this device is suitable (3) discharge water, cleaning impurities or replace the filter (4) clean or replace the air filter (5) check the leakage, discharge the air in the fuel pipeline (6) check and adjust the injection pump timing (7) check and adjust valve clearance (8) check and replace the fuel injector
The engine can't keep continuous running afeter starting	(1) idle speed is too low (2) starting with load (3) has air in the fuel system (4) the diesel fuel has water or impurities (5) fuel injection timing is not correct	(1)check and adjust the low idle speed screw (2) check whether is the load caused by abnormal accessories (3) check the leakage, discharge the air in the fuel pipeline (4) discharge of water, cleaning impurities or replace the filter (5) check and adjust the fuel injection timing

Engine can't stop	<ul style="list-style-type: none"> (1) oil cutoff valve stem not in the place (2) fuel cut solenoid valve failure 	<ul style="list-style-type: none"> (1) adjusted the length of oil cutoff valve stem (2) check and replace sealing washer and plunger
Has big vibration when engine at idle speed	<ul style="list-style-type: none"> (1) idle speed is too low (2) has air in the fuel system (3) fuel pipeline and filter throttling (4) lack of diesel fuel (5) injection pump doesn't work well (6) fuel injector doesn't work well 	<ul style="list-style-type: none"> (1) check and adjust the idle speed screw (2) check the leakage, discharge the air in the fuel pipeline (3) cleaning fuel pipeline or replace the filter (4) fill diesel (5) check and adjust fuel pump (6) check whether the injection pressure and atomization is good or replace fuel injector
Heat engine idle speed instability	<ul style="list-style-type: none"> (1) idle speed is too low (2) has air in the fuel system (3) fuel injection timing is not correct (4) fuel supply pump failure (5) fuel injection pump doesn't work well (6) engine support bracket is broken or loose (7) injector nozzle blocked or atomization is bad 	<ul style="list-style-type: none"> (1) check and adjust the idle speed screw (2) check the leakage, discharge the air in the fuel pipeline (3) check and adjust fuel injection timing (4) replace fuel supply pump (5) check and adjust fuel supply (6) replace the engine support bracket (7) replace the injector nozzle
Engine misfire(one or more cylinders is not completely work)	<ul style="list-style-type: none"> (1) the diesel fuel has water or impurities (2) has air in fuel pipeline (3) High-pressure pipeline leakage (4) the pressure of injection pump head is low (5) injector nozzle blocked or not work well (6) valve clearance is not suitable 	<ul style="list-style-type: none"> (1) discharge water, clear the fuel system or replace filter (2) check the leakage, discharge the air in the fuel system (3) replace the leakage fuel pipeline (4) adjust the pump head pressure and fuel supply evenly (5) replace the fault injector nozzle (6) check and adjust the valve clearance
Oil pressure is too low	<ul style="list-style-type: none"> (1) oil level in oil pan is too low or too high (2) oil pressure gauge, the sensor not working properly (3) oil dilution (4) oil filter blocked (5) pressure adjusting valve does not work (6) oil suction pipe sealing leakage or broken (7) oil pump bearing wear 	<ul style="list-style-type: none"> (1) add or drain lubricating oil (2) check and replace oil pressure gauge or the sensor (3) check the reason of oil dilution and replace oil (4) check the replacement cycle and replace the oil filter (5) replace the seal gasket or suction pipe (6) contact the service stations repair or replacement the parts (7) replace the oil pump

Oil pressure is too high	<ul style="list-style-type: none"> (1) oil pressure gauge, the sensor not working properly (2) engine operating temperature too low (3) oil specification is wrong (4) pressure adjusting valve bonding in the closed position 	<ul style="list-style-type: none"> (1) replace oil pressure gauge or the sensor (2) check cooling system, thermostat or replace the thermostat (3) replace the suitable lubricating oil (4) check and adjust pressure adjusting valve or replace it
Oil consumption increase	<ul style="list-style-type: none"> (1) an external leakage of lubrication system (2) crankcase pressure is too high, press the oil out (3) oil cooler leak (4) valve conduit wear (5) turbocharger failure (6) air compressor failure 	<ul style="list-style-type: none"> (1) check the external leakage of lubricating system, fastening seal parts, and replace the seal washer (2) observed whether oil spray in dipstick nozzle when engine operating in medium-speed, measuring cylinder bore wear, replace the piston rings when necessary (3) check oil cooler leak, repair or replace another one (4) check the catheter port for wear, whether retaining cover is aging, repair or replace it when necessary (5) sealing washer of air compressor leak oil, sealing ring of turbocharger wear, repair or replace it when necessary (6) check whether air compressor channeling oil, repair or replace it when necessary
Engine overheat	<ul style="list-style-type: none"> (1) coolant level is too low (2) water pump and fan pulley is too loose (3) water tank heat sink blockage (4) radiator cap pressure is proper (5) no thermostat or thermostat failure (6) water pump failure (7) indicating instrument failure (8) oil excessive or injection timing is not correct (9) car overload 	<ul style="list-style-type: none"> (1) check the leak, add coolant (2) check and replace belt tensioner (3) clear the blockage, blown through the heat sink (4) use the provisions water tank cover (5) check and replace thermostat (6) replace the water pump (7) checking instrument or replace it (8) check or replace the injection pump (9) load base on requirement
Engine temperature is too low	<ul style="list-style-type: none"> (1) indicating instrument malfunction (2) thermostat failure or doesn't work 	<ul style="list-style-type: none"> (1) check and inspect the instrument or replace a new one (2) check whether thermostat work well or replace a new one

Engine can't reach the rated speed at no load operating	(1) improper adjustment of the throttle lever (2) high speed adjustment screw placement incorrect (3) governor high-speed improper adjustment (4) tachometer failure	(1) check and adjust the throttle lever (2) adjust the high speed adjustment screw (3) adjust injection pump governor (4) check the tachometer
When engine operating with full load, can't reach the rated speed	(1) vehicle overload (2) improper adjustment of the throttle lever (3) tachometer failure (4) fuel injection pump oil supply improper adjustment (5) lack of fuel supply (6) lack of air in cylinder (7) exhaust back pressure is too high	(1) carry according to the requirement (2) check and adjust the throttle lever (3) check the tachometer (4) check and adjust the oil supply (5) check the oil pump or replace a new one (6) check whether there is leakage in the intake system; check the compressor outlet pressure and flow (7) check exhaust back pressure
Engine power is too low	(1) vehicle overload (2) lack of oil or improper adjustment of the throttle lever (3) air and fuel control pipeline leaks or throttling (4) air in the fuel (5) fuel pipeline or filter throttling (6) fuel return pipe throttling (7) leak of turbocharger intake and exhaust (8) turbocharger doesn't work well (9) fuel pump doesn't work well (10) injection timing is not correct (11) injection nozzle spray bad or wear (12) injection pump doesn't work well	(1) carry according to the requirement (2) check and adjust the throttle lever (3) use qualified fuel, replace filter and clear the pipeline (4) check the connector or replace the pipeline (5) check connector of fuel system (6) replace filter and clear the pipeline (7) oil lever must be appropriate (8) clear up the obstruction (9) check sealing and leak of fuel pump or replace a new one (10) check and adjust the injection timing (11) check the opening pressure and atomization conditions or replace injection nozzle (12) check and adjust the valve clearance

Engine failed	<ul style="list-style-type: none"> (1) impurities or water in the fuel (2) air in the fuel system (3) leak in the fuel system (4) oil supply shortage of the fuel pump (5) valve clearance is not correct (6) injection nozzle blocked or failed (7) injection timing is wrong 	<ul style="list-style-type: none"> (1) clear up the pipeline and replace filters (2) check leak and exhaust the air (3) check or replace the pipeline (4) check the pressure and flow of the fuel pump or replace a new one (5) check the wear of pushrod and tappet, and adjust the valve clearance (6) cleaning the fuel pipeline, check the nozzle opening pressure and atomization, repair or replace the nozzle (7) check and adjust the injection timing
Engine vibration is too large	<ul style="list-style-type: none"> (1) engine mounting bracket loose or damaged (2) fan damaged or accessories failure (3) absorbers failure (4) alternator bearings wear or damaged 	<ul style="list-style-type: none"> (1) check and repair the engine mounting bracket (2) check and replace the fan bearings and vibration components (3) check the position of the absorber or replace a new one (4) check or replace the alternator
Smoke intensity is too heavy with load	<ul style="list-style-type: none"> (1) engine load deceleration (2) air in the fuel (3) air filter blocked (4) injection pump timing is not correct (5) one more sealing gasket mounted on the injector (6) oil leak for the fuel nozzle (7) leak happens between the air compressor and the intake pipe or between turbocharger and the exhaust pipe (8) oil supply overload (9) engine temperature too low (10) turbocharger failure 	<ul style="list-style-type: none"> (1) choose the right gear while driving (2) discharge the air in the fuel system (3) check or replace the air filter (4) check and adjust the injection timing (5) remove the excess gasket (6) adjust the opening pressure and replace the fuel nozzle (7) repair the leak pipe (8) check the oil supply (9) check the thermostat and cooling system (10) repair or replace the turbocharger
Rough burning	<ul style="list-style-type: none"> (1) engine overload (2) fuel in poor quality (3) has air in the fuel system (4) injection pump timing is not correct (5) injection nozzle failure 	<ul style="list-style-type: none"> (1) choose the right gear while driving (2) drain off the diesel, change qualified diesel and replace the fuel filter (3) discharge the air in fuel system (4) check and adjust the injection timing (5) repair or replace a new injection nozzle