

Preface

2.8L series high-end diesel engines are manufactured by JAC. With the disadvantages of compact structure, high power, little vibration, low noise and low price, it is an ideal power for 0.5-4 ton series light truck and all kinds of variants or mechanisms.

Being used, diesel engine will run abnormally due to reasons of parts wearing, tightening parts loosening, clearance change, oil going bad. If it is found starting difficulty, power falling, oil consumption adding, please do regular maintenance of cleaning, checking, lubricating, adjusting or replacing parts according to the technical state and working time or vehicle traveled distance.

Please read this manual before using 2.8L series diesel engine and operate it strictly with the manual so as to make the best performance of the engine and reduce the possibility of repairing it.

JAC will reserve the modification rights on this manual. We will not make other notice on any modification on the content of this manual.

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Chapter I Engine specifications and technical parameters

I . Main technical parameters

1. Mode	HFC4DA1-1	HFC4DA1	HFC4DA1-2B	HFC4DA1-2B1
2. Type	Vertical, turbocharger intercooler, direct injection, dry type thin-wall chrome plating liner	Vertical, intercooler, direct injection dry type thin-wall chrome plating liner, 4 stroke	Vertical, turbocharger intercooler, direct injection, dry type liner	Vertical turbocharger intercooler, di-rect injection, dry type liner
3. Cylinders number	4			
4. Bore(mm)	93			
5. Stroke(mm)	102			
6. Total displacement(L)	2.771			
7. Compression ratio	17.5	18.2	18.2	18.2
8. Rated power(KW)	68	57	68	80
9. Rated rotated speed(rpm)	3600			

10. Max torque(N·m)	216	174	210	240
11. Rotate speed at max torque (rpm)	1800~2000		2000~2200	
12. Min oil consumption ratio(g/Kw·h)	218	230	212	208
13. Idle speed (rpm)	750±50		800±50	
14. Firing sequence	1-3-4-2			
15. Direction of crankshaft(facing to flywheel)	Counter clockwise			
16. Lubricating method	Pressure and splash lubrication			
17. Overall dimensions	764×616×698	754×568×698	764×622×714	764×622×714
18. Net mass	240 kg	230 kg	250 kg	250kg
19. Oil capacity in oil sump(L)	6		7.5	
20. Cooling water capacity(L)(not including radiator)	10			
valve timing(use the crankshaft angle to count)				
(1) Intake valve open(before top dead center)			24.5°	
(2) Intake valve close (after bottom top dead center)			55.5°	
(3) Exhaust valve open(before bottom top dead center)			54°	
(4) Exhaust valve close (after top dead center)			26°	

II .Main parts specifications

Parts name	Technical feature			
	HFC4DA1-1	HFC4DA1	HFC4DA1-2B	HFC4DA1-2B1
Fuel filter	Full flow		Full flow	
Oil filter	Full- flow spin-on oil filter		Full- flow spin-on oil filter	
Oil pump	externally meshed gear type		externally meshed gear type	
Cooling water pmp	Centrifugal type		Centrifugal type	
Thermostar	Wax mode		Wax mode	
Generator	Alternator output		Alternator output	
Starter	Decelerating low-speed high torque starter		Decelerating low-speed high torque starter	
Fuel injection-pump	VE distributor pump		Electro pump	
Fuel-injector	Five holes ,pressure chamber		Electro injector	

III. Main checking and adjusting parameters

Mode	HFC4DA1-1	HFC4DA1	HFC4DA1-2B	HFC4DA1-2B1
Valve clearance	0.3~0.4mm	0.3~0.4mm	0.3~0.4mm	0.3~0.4mm
Oil pressure(idle)	≥ 98kpa	≥ 98kpa	≥ 98kpa	≥ 98kpa
Exhaust temperature(main pipe)	≤ 650℃	≤ 700℃	≤ 700℃	≤ 700℃
Oil temperature(main oil gallery)	≤ 130 ℃	≤ 130 ℃	≤ 130 ℃	≤ 130 ℃
Temperature of thermostat	82℃	82℃	82℃	82℃
Temperature of full-open thermostat	95℃	95℃	95℃	95℃
Projected height of glow plug	5.3~6.8mm	5.3~6.8mm	5.6~6.9	5.6~6.9
Projected height of injector	2.1~3.0mm	3.7~4.3mm	2.1~3.0	2.1~3.0
Static fuel supply advanced angle (before top dead center)	12°		16°	

IV. Main Bolt and nut torque HFC4DA1 and HFC4DA1-1

Name	Description	Torque(N·m)
Cylinder head bolt	M11×127-4h	105±5
Crankshaft installing bolt	M12×1.5×47	110±10
Idle gear A installing bolt	M8×55	25±5
Idle gear A installing bolt	M12×1.25×66	110±10
Connecting rod bolt	M11×1.25	85±5
Damped belt installing bolt	M16×1.5×29	210±15
Main bearing housing installing bolt	M14×1.5×89	170±10
Flywheel baffle installing bolt	M12	85±10
Flywheel installing bolt	M13×1.25×36.5	120±10
Cylinder head cover installing bolt	M8×11	13±5
Rocker installing bolt	M10	55±5
Exhaust manifold installing bolt	M8×35	30±5

Name	Description	Torque(N·m)
Inlet manifold installing bolt	M8×25	20±5
Inlet bending pipe installing bolt	M10×30 30±5	30±5
Timing gear chamber installing	M8 25±5	25±5
Camshaft thrust plate installing bolt	M8 25±5	25±5
Water inlet installing bolt	M8 25±5	25±5
Oil sump bolt and nut	M8 20~27	20~27
Oil pumping installing bolt	M8×30 25±5	25±5
Oil filter seat installing bolt	M8×30 25±5	25±5
Water pump installing bolt	M8×45 25±5	25±5
High pressure fuel pipe nut	M12 30±5	30±5
Injection pressing plate bolt	M10×70 40±5	40±5
Injection pump flange tightening bolt	M8 30~40	30~40
Injection pump tightening bolt	M8 25±5	25±5
Injection pump gear installing bolt	M8 65±5	65±5

HFC4DA1-2B and HFC4DA1-2B1

Name	Description	Torque(N·m)
Cylinder head bolt	M11×1.5×127	105±5
Crankshaft installing bolt	M12×1.5×47	110±10
Idle gear A installing bolt	M8	25±5
Idle gear A installing bolt	M8	20~25
Connecting rod bolt	M11×1.25	85±5
Damped belt installing bolt	M16×1.5×55	210±15
Main bearing housing installing bolt	M14×1.5×85	180~200
Flywheel baffle installing bolt	M12	85±10
Flywheel installing bolt	M13×1.25×36.5	140±10
Cylinder head cover installing bolt	M8×11	13±5
Rocker installing bolt	M10	55±5
Exhaust manifold installing bolt	M8	30±5

Name	Description	Torque(N·m)
Inlet manifold installing bolt	M8	20±5
Inlet bending pipe installing bolt	M8	20±5
Timing gear chamber installing	M8	25±5
Camshaft thrust plate installing bolt	M8	25±5
Water inlet installing bolt	M8	20~27
Oil sump bolt and nut	M8×30	25±5
Oil pumping installing bolt	M8	25±5
Oil filter seat installing bolt	M8	25±5
Water pump installing bolt	M12×1.5	27±2
High pressure fuel pipe nut	M12×1.5	20±2
Injection pressing plate bolt	M15×1	27±2
Injection pump flange tightening bolt	M8	6~8+40~45°
Injection pump tightening bolt	M8	30±5
Injection pump gear installing bolt	M14	70±5

Chapter II Starting, running & stopping

I . Before starting

Before starting the engine, you should check the engine as follows:

1. Check the cooling water lever in the radiator, the tightness of all connecting parts and the length of fan belt.
2. Check the oil lever in the oil sump.
3. Check the fuel lever in the fuel tank and the fuel pipeline and all fitting of the fuel system to see whether there is leakage on all joints.
4. Check the liquid lever of electrolyte in the battery
5. Check the tightness of joints on battery, generator, starter and sensor.
6. You must add oil pump with 60ml diesel to make a exhaust disposal before the first start or after long-time perseverance. Prohibit running the oil pump without any diesel in it, in order to prevent it from function failure.

II . Starting procedure

1. Pull the gear shift of transmission to neutral
2. Press down the clutch pedal to reduce the burden when engine starts.
3. Place the ignition key to "START" position, and the engine will start. Do not operate the starter for more than 15 seconds at a time. If it fails to start, wait for 2 minutes to start again. If it fails to work after starting for several times, check the cause and remedy the fault.

4. After starting HFC4DA1-1、HFC4DA1-2B and HFC4DA1-2B1 engine, keep the engine warming-up in idle speed for 2~3 minutes to make the supercharger lubricated well and avoid damaging spare parts.

III. Checking during operating

1. Check whether there are abnormal noises.
2. Check whether there is burning smell from generator or other electrical equipment because of their high temperature.
3. Check the fuel system, cooling system and lubricating system for leakage.
4. Check to make sure that the gauges and meters are performing properly.

IV. Stopping

If the engine operating with high load need to stop, please keep decelerating rotating speed of engine for 2~3 minutes and then stop to avoid damaging the supercharger and other parts because of cooling sharply and prevent engine from being self-combusted.

Chapter III Operation and maintenance of the engine

I . Note for operation

1. 1 Maintain the engine according to the manual.
2. Check earth polarity of battery. Silicon commutation dynamo uses negative pole earthing.
3. Break-in is necessary before using new engine. Do not speed up sharply and get the engine loaded.
4. Fuel mode

Select light fuel according with GB252 based on season alternation and local temperature.

Temp	4°C above	-5°C above	-14°C above	-29°C above
Diesel oil No.	0	-10	-20	-35

5. Stop and check if finding anything abnormally during operation.
6. When draining cooling fluid, open the radiator cap firstly and then switch on after temperature of cooling fluid lowed.

II . Break-in of new engine

Service life of engine has close relationship with initial using situation. Drive new vehicle obeying the following rules to save fuel and prolong service life of vehicle during of initial 2500Km.

1. Do not drive at high speed.
2. Avoid fast starting, fast speeding up, fast braking and long-time high speed running.

3. Keep rotating speed of engine I during breaking-in period in the following scope

Gear position	Engine rotating speed
gear I	0-3200
gear II	1400-1800
gear III	1400-3500
gear IV	>1350
gear V	>1350

4. Do not exceed the limiting loading.

III. Selecting oil

Select oil according with GB11122d based on season alternation and local temperature.

Oil mode	Local temperature	Quality class			
		HFC4DA1-1	HFC4DA1	HFC4DA1-2B	HFC4DA1-2B1
15W/40	-15°C~40°C	Not lower than CF		Not lower than CF-4	
5W/30	9-30°C~5°C	Not lower than CF		Not lower than CF-4	

IV. Maintenance period and maintenance items

Technical maintenance period

According to different law of technical state worsening degree of each part, classify the regular technical maintenance into four classes.

1. Daily maintenance: after 8-10hs' working time
2. Class-one maintenance: after 100h working time or running for 4000-5000km.
3. Class-two maintenance: after 250h working time or running for 10000-12500km.
4. Class-three maintenance: after 1000h working time or running for 30000-40000km.

Technical maintenance items

In order to guarantee diesel engine operate normally, do technical maintenance as follows:

1. Daily maintenance
 - Check oil level of diesel oil, cooling fluid and oil and fill up if necessary.

Note: Check oil level after diesel engine dying.

Diesel oil specification: use light diesel oil according with GB252, NO.0 for summer, NO. -10 or -20 for winter (warm area) and NO.-35 (cold area).

Note: Filling up the fuel tank during operation is forbidden. Do not fill up oil tank when vehicle runs under hot temperature, otherwise oil will overflow because of inflation, once inflating, wipe it immediately.

- Wipe off dust on the battery and splashed electrolyte to ensure air vent unblocked.

It's unnecessary to do maintenance under normal condition. Do regular check on oil level under hot temperature to make sure oil level lies between mark MIN and MAX. When electrolyte in battery is not enough, add aqua distillate into it.

Note: It's forbidden to add supplemented electrolyte or other unclean water, or it can make battery under charge. If oil level falls quickly, take the battery to service station.

Note: Because of the corrosiveness of electrolyte, it will injure you on eye, skin and clothes. If happened, wash with water immediately.

- Check whether there are oil leakage, water leakage or air leakage after starting diesel engine and shoot the trouble immediately.
- Check tightness of accessory.
- After starting diesel engine, check whether it runs normally and working condition of meters. Repair or replace it if found damage.
- Keep diesel engine clean, especially electrical equipment and radiator on water tank.

Note: if diesel engine works in dusty environment, remember to dismantle air filter and clean it to keep it work well.

2. Class-one maintenance

After carrying out daily maintenance, add the following maintenance contents every 100h (4000-5000km).

- Check electrolyte ratio or voltage
- Check length of fan belt and adjust it.

- Clean air filter.
- Check heat removal of cooling fluid.
- Check tightness of diesel engine.

3. Class-two maintenance

After carrying out class-one maintenance, add the following maintenance contents every 250h (10000-12500km). For new engine or after having technical maintenance engine, the maintenance should be carried 100h (4000-5000 km):

- Check injector based on its working condition. Correct injection pressure and watch spray condition and do necessary cleaning and adjustment.

Note: When disassemble the fuel-injector and the oil line cover that in the high pressure oil line interface of the guide rail, use your left hand to hold the interface.

- Check injection pump and adjust it.
- Replace oil in oil sump.
- Replace spin-on oil filter element and spin-on diesel oil filter element.
- Check valve clearance and adjust it.
- Check overflows port of water pump. If badly overflow, replace it.
- Check electrical equipment and wire joint. If burned, replace it.
- Clean pipe water deposit of cooling system.
- Clean crankcase ventilation system.

4. Class-three maintenance

Class-three maintenance focuses on assembly disassembling, cleaning, dismantling, adjustment and hidden trouble removal. After class-two maintenance, add the following maintenance contents every 1000h (30000-40000km)

- Dismantle and clean diesel engine to remove carbon deposit, oily dirt and water dirt.
- Check wear& tear of valve, push rod and rocket contact area. Repair and replace them if necessary.
- Check wear& tear of piston ring, cylinder jacket, connecting rod small end bushing and connecting rod bearing offset. Replace them if necessary.
- Check wear& tear of main bearing liner and thrust plate.
- Check wear& tear of drive mechanism and driving gear meshing surface as well as measuring meshing clearance. Repair and replace them if necessary.
- Check wear& tear of inlet valve& outlet valve and inlet valve seat & outlet valve seat. Repair, lap and test leakage. Replace them if necessary.
- Check injector and lap or replace the injector nozzle pair if necessary. Use the ultrasonic wave to clean the carbon deposit when install the used fuel-injection nozzle, prohibit using silk to wipe or using cutter to shaving, prevent damage the fuel-injection nozzle and clog the injection hole.
- Check oil pump and dismantle or measure the parts that are easy to damage and adjust.
- Check cylinder gasket and inlet pipe shim& outlet pipe shim. If finding damaged, replace them.
- Check supercharger and clean .Wear& tear of supercharger gear and oil seal and replace if necessary.
- Check generator and starter, clean parts and gear and add new lubrication after drying. Check wear& tear of starter

and whether driving device is flexible.

5. Seasonal maintenance

- In winter, use cooling system for diesel engine. Please replace antifreeze coolant once a year. It's necessary to drain off it for a long time parking if not using antifreeze coolant.
- Use lubrication which is only for winter in winter.
- Change concentration of battery electrolyte with season changing.

Technical maintenance of lubrication system

1. Choose lubrication for diesel engine lubrication system according to surrounding temperature.

Use SF diesel engine oil according with GB11122.

Note: mixing different oil is forbidden.

2. Measurement of oil level.

Oil level of oil sump is measured by oil scale mounted on the left side of diesel engine. When measuring, park the vehicle in the horizontal position and stop operating the diesel. Pull out the oil scale after the oil level stopping rocking, use cleaning cloth to wrap away oil on oil scale and then insert the oil scale into oil level. Oil scale should be mounted on the right place, then, pull out the oil scale to check the oil level.

There are two holes on oil scale, oil level should not be lower than the holes below. If not, supply of oil will stop. It's improper to have oil excessive, for crankpin of crankshaft will strike the oil level in this situation to form excessive oil mist and splash oil drop and cause carbon deposit of piston and combustion chamber carbon deposit. At the same time,

piston ring will be glued by coking to make diesel engine smoke and cause fuel permeation. Therefore, apart from paying attention to the oil pressure, checking oil level before running or running every 300-500 is necessary.

Notice: check oil level as well as checking oil pressure.

3. Replace new oil

Been used for a long time, there will be impurity and dust in oil. Due to unburned fuel oil makes oil thin and wasted gas coming into oil with acetic anhydride make oil bad and corrode parts, so, replace new oil after running for 10000km is necessary. CF diesel oil according with GB11122 is recommended.

Warning: hot oil can injure people, make sure to deal with old oil to protect environment. Screw moment and oil bleed plug, add new oil and check oil level.

If there is abundant impurity in oil sump, before the new diesel is put into use, use 5# and 7# mechanical fuel (light bobbin oil) to clean lubrication system. Petrol or kerosene is forbidden.

When cleaning inside of diesel engine, fill 5# and 7# mechanical fuel into oil sump. If oil level rise to central position of two round holes of oil dipstick, dismantle all of the pre-heating plug and rotate crankshaft of diesel engine with jiggle bar for 2-3 minutes, and drain off cleansing oil at once.

After replacing new oil every time, make diesel engine do no-load running for a short time to guarantee lubrication system and other position that needs oil fueled enough.

When filling oil from oil inlet that is on cylinder head shield, clean the cylinder head. Cover the lid after filling.

Note: added oil should be flown into oil sump by pushing rod hole on the cylinder head and one side of tappet. So oil level should be checked after 5 minutes.

Technical maintenance of cooling system

There should be enough coolant to ensure engine work well and coolant in time before running the vehicle.

Note:

- Do not use hard water such as running water and mineral water.
- Do not use bad antifreeze coolant or coolant of different type coolant in case of corroding machine parts
- If coolant is consumed quickly, it showed that there is leakage on cooling system. Check it in service station.

Check length of fan belt: belt deflection is 100N below, new belt is 8-10mm, old belt is 9-11mm.

Check whether there is crack on fan belt, replace belt if it fail to transmit.

Technical maintenance of injection pump

Injection pump is heart of diesel engine, it is composed of many accurate parts. Only the injection pump is maintained right, will it work well and its service life will be prolonged.

1. HFC4DA1series diesel engine adopts fuel injection pump of VE type and is lubricated by light diesel fuel which is accordant with GB252. Watered fuel is not allowed, for injection pump of VE type is lubricated by diesel fuel. Watered fuel will make it lubricated badly and cause injection pump parts damaged. Diesel fuel should be deposited for more than 48h and be put into use after filtrated. Use clean tools and container to fill up the diesel fuel.

2. After new vehicle runs for 2500km during break-in period, clean or replace fuel filter's spin-on filter element. Replace it for running every 10000km afterwards.
3. Check tightness of oil circuit and observe whether there is abnormal voice or phenomenon of local overheating.
4. Check whether binding bolt on injection pump uncrowned if working for 200h.
5. Injection pump has been adjusted in factory and has lead seal. Don't dismantle it when used. User who doesn't have experimental condition, don't dismantle and adjust injection pump assembly.
6. If diesel engine is not used for a long time, drain off diesel fuel in the injection pump and replace antirust oil.

Note:

- Obey technical maintenance rules, maintain diesel engine to guarantee its quality. Especially when working busily, reducing maintenance item or prolonging maintenance period are forbidden arbitrarily.
- Carrying out class -three maintenance indoors to prevent dust going to inside of machine.
- For some complicated maintenances or adjustments, get the help of technical personnel or service station.

Chapter IV Preservation and reusing of engine

I . Long-time preservation of engine

1. Drain off cooling water in radiator, cylinder and pump, start engine to evaporate coolant for 30 seconds.
2. Dismantle battery.
3. Make sure surface of engine clean.
4. Screw off fuel-injector, fill up about 30g dewatering oil and rotate crankshaft for 15-20 circle, then mount fuel-injector.
5. Add dewatering lubrication into lubricating point.
6. Loosen fan belt.
7. Drain off fuel in oil tank and clean oil tank.
8. Use protective material (canvas, waterproof cloth or oil tank paper) to cover engine. Seal the unclosed pipe orifice.
9. Keep storehouse dry and do not store corrosive goods and gas.

II . Start after long-time preservation.

1. Remove grease for anti rusting.
2. Add lubrication into lubricating point.
3. Fill up cooling water.
4. Fill up fuel.

5. Fill up diesel fuel.
6. Check electrolyte in battery.
7. Connected with battery and paste vaseline on terminal.
8. Check electrical circuit and tightness of electrical pipe.
9. For 4DA1-2B series engine, When preservation them screw off fuel-injector, fill up about 30g dewatering oil and rotate crankshaft for 15-20 circle, then mount fuel-injector. Add oil pump with 60ml diesel to make a exhaust disposal, prohibit running the oil pump without any diesel in it, in order to prevent it from function failure.
10. Start engine according to the former operation procedure.

Appendix 1: High-mortality parts list(4DA1)

No.	part number	Name	Quantity	No	part number	Name	Quantity
1	1002411FA	Upper main bearing	5	17	1003012FA	Inlet valve	4
2	1002412FA	Lower main bearing	5	18	1003011FA	Outlet valve	4
3	1004026FA	Connecting rod bearing shell	8	19	1003209FA	Valve adjusting screw	8
4	1004024FA01	The first gas-tight ring	4	20	1003211FA	Valve adjusting nut	8
5	1004025FA01	The second gas-tight ring	4	21	1003015FA	Valve spring	8
6	1004030FA01	Oil ring	4	22	1003018FA	Inlet manifold shim	1
7	1002220FA	Cylinder-head gasket assembly set	1	23	1008015FA01	Inlet angle pipe shim	1
8	1307024FA	Fan belt	1	24	1002016FA	Sight-hole cover shim	2
9	1010300FA	Oil filter and oil cooler assembly	1	25	1003020FA01	Exhaust manifold shim	1
10	1003016FA	Valve oil seal	8	26	1002011FA	Timing gear case shim	1
11	1002420FA	Crankshaft front oil seal	1	27	1002013FA	Gear chamber cover sealing ring	1
12	1002430FA	Crankshaft rear oil seal	1	28	1100352FA	Injection-pump flange sealing ring	1
13	1002107FA	Camshaft bush (front)	1	29	1307229FA	Thermostat housing shim	1
14	1002108FA	Camshaft bush (middle and rear)	各 1	30	1307011FA	Water pump sealing ring	1
15	3701310FA	Glow plug	4	31	1307221FA	Water outlet shim	1
16	1307210FA	thermostat	1	32	1307741FA	Water inlet pipe shim	1

Appendix 2: High-mortality parts list(4DA1-1)

No.	part number	Name	Quantity	No.	part number	Name	Quantity
1	1002411FA	Upper main bearing	5	17	1003012FA	Inlet valve	4
2	1002412FA	Lower main bearing	5	18	1003011FA	Outlet valve	4
3	1004026FA	Connecting rod bearing shell	8	19	1003209FA	Valve adjusting screw	8
4	1004024FA	The first gas-tight ring	4	20	1003211FA	Valve adjusting nut	8
5	1004025FA	The second gas-tight ring	4	21	1003015FA	Valve spring	8
6	1004030FA	Oil ring	4	22	1003018FA	Inlet manifold shim	1
7	1002220FA	Cylinder-head gasket assembly set	1	23	1008015FA	Inlet angle pipe shim	1
8	1307024FA	Fan belt	1	24	1002016FA	Sight-hole cover shim	2
9	1010300FA	Oil filter and oil cooler assembly	1	25	1003020FA	Exhaust manifold shim	1
10	1003016FA	Valve oil seal	8	26	1002011FA	Timing gear case shim	1
11	1002420FA	Crankshaft front oil seal	1	27	1002013FA	Gear chamber cover sealing ring	1
12	1002430FA	Crankshaft rear oil seal	1	28	1100352FA	Injection-pump flange sealing ring	1
13	1002107FA	Camshaft bush (front)	1	29	1307229FA	Thermostat housing shim	1
14	1002108FA	Camshaft bush (middle and rear)	各 1	30	1307011FA	Water pump sealing ring	1
15	3701310FA	Glow plug	4	31	1307221FA	Water outlet shim	1
16	1307210FA	thermostat	1	32	1307741FA	Water inlet pipe shim	1

Appendix 3: High-mortality parts list(4DA1-2B and 4DA1-2B1)

No.	part number	Name	Quantity	No.	part number	Name	Quantity
1	1002411FA	Upper main bearing	5	17	1003012FA	Inlet valve	4
2	1002412FA	Lower main bearing	5	18	1003011FA	Outlet valve	4
3	1004026FA	Connecting rod bearing shell	8	19	1003209FA	Valve adjusting screw	8
4	1004024FA01	The first gas-tight ring	4	20	1003211FA	Valve adjusting nut	8
5	1004025FA01	The second gas-tight ring	4	21	1003015FA	Valve spring	8
6	1004030FA01	Oil ring	4	22	1003018FA	Inlet manifold shim	1
7	1002220FA	Cylinder-head gasket assembly set	1	23	1008015FA01	Inlet angle pipe shim	1
8	1307024FA	Fan belt	1	24	1002016FA	Sight-hole cover shim	1
9	1010300FA020	Oil filter and oil cooler assembly	1	25	1003020FA01	Exhaust manifold shim	1
10	1003016FA	Valve oil seal	8	26	1002011FA	Timing gear case shim	1
11	1002420FA	Crankshaft front oil seal	1	27	1002013FA	Gear chamber cover sealing ring	1
12	1002430FA	Crankshaft rear oil seal	1	28	1100352FA	Injection-pump flange sealing ring	1
13	1002107FA	Camshaft bush (front)	1	29	1307229FA	Thermostat housing shim	1
14	1002108FA	Camshaft bush (middle and rear)	各 1	30	1307011FA	Water pump sealing ring	1
15	3701310FA	Glow plug	4	31	1307221FA	Water outlet shim	1
16	1307210FA	thermostat	1	32	1307741FA	Water inlet pipe shim	1