



HINO TRUCK

2002 WORKSHOP MANUAL

FD.FE.FF.SG

ENGINE



HINO DIESEL TRUCKS (U.S.A.), INC.

FOREWORD

This workshop manual has been prepared to provide information covering repairs on 2002 FD, FE, FF, and SG series Hino trucks.

To use Hino trucks for years, smoothly, safely, and economically without trouble, it is important to perform inspections.

Maintenance required to be performed is the responsibility of the owner. Some recommended repairs of your truck are mentioned.

When making any repair of your truck, be careful not to be injured through improper procedures.

As for maintenance items, refer to the Owner's and Driver's Manual.

All information and specifications in this manual are based upon the latest product information available at the time of printing.

HINO DIESEL TRUCKS (U.S.A.),INC. reserves the right to make changes at any time without prior notice.

WORKSHOP MANUAL

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CHAPTER 1

GENERAL INTRODUCTION

Models FD, FE, FF and SG

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IDENTIFICATION INFORMATION

1. VEHICLE IDENTIFICATION NUMBER

VEHICLE IDENTIFICATION NUMBER (VIN) is comprised of 17 digits and letters. The VIN plate, as shown in Fig. 1, is affixed to the left-side door step of the cab.

The following is an explanation of the items that are listed on the VIN plate.



Fig. 1

1) VIN

See VEHICLE IDENTIFICATION NUMBER (VIN) STRUCTURE on the following page.

2) P.S.CODE AND VEHICLE COMPONENTS

MODEL SERIES	P.S. CODE	CLUTCH SIZE	TRANSMISSION SERIES	TRANSMISSION RATIO						REAR AXLE SERIES	REAR AXLE RATIO	SERVICE BRAKE	PARKING BRAKE
				1ST	2ND	3RD	4TH	5TH	6TH				
FA4J	SA-HC5	350 MM	LF05S	7.46	4.18	2.42	1.42	1.00	-	SH13-2	3.36	V	C
	SA-JC5	-	AT542	3.45	2.25	1.41	1.00	-	-	SH13-2	3.36	V	C
FB4J	SA-HC5	350 MM	LF05S	7.46	4.18	2.42	1.42	1.00	-	SH13-2	3.36	A	C
	SA-JC5	-	AT542	3.45	2.25	1.41	1.00	-	-	SH13-2	3.36	A	C
FD2J	SA-SF5	350 MM	LF06S	6.09	3.85	2.34	1.42	1.00	0.76	SH14-1	5.12	A	C
	SA-TF5	-	LCT2400	3.51	1.90	1.44	1.00	0.74	-	SH14-1	4.33	A	C
FE2J	SA-QF5	350 MM	LJ06S	6.89	4.27	2.60	1.56	1.00	0.77	SH14-1	5.12	A	C
	SA-RF5	-	LCT2400	3.51	1.90	1.44	1.00	0.74	-	SH14-1	5.85	A	C
FF2J	SA-QN5	350 MM	LJ06S	6.89	4.27	2.60	1.56	1.00	0.77	SH16-1	5.42	A	C
	SA-RN5	-	LCT2000	3.51	1.90	1.49	1.00	0.74	-	SH16-1	5.85	A	C
SG2J	SA-PS5	380 MM	LJ06S	6.89	4.27	2.60	1.56	1.00	0.77	SH16-1	5.42	F	W
	SA-RS5	-	MD3060P	3.49	1.86	1.41	1.00	0.75	-	SH16-1	5.42	F	W
SG1J	SA-TS5	380 MM	MF06S	7.39	4.75	3.07	1.93	1.34	1.00	SH16-1	4.10	F	W
	SA-US5	-	MD3060P	3.49	1.86	1.41	1.00	0.75	-	SH16-1	5.42	F	W
	SA-VS5	380 MM	RT8709	9.16	6.53	4.80	3.57	2.56	1.83	SH16-1	4.10	F	W

CODE

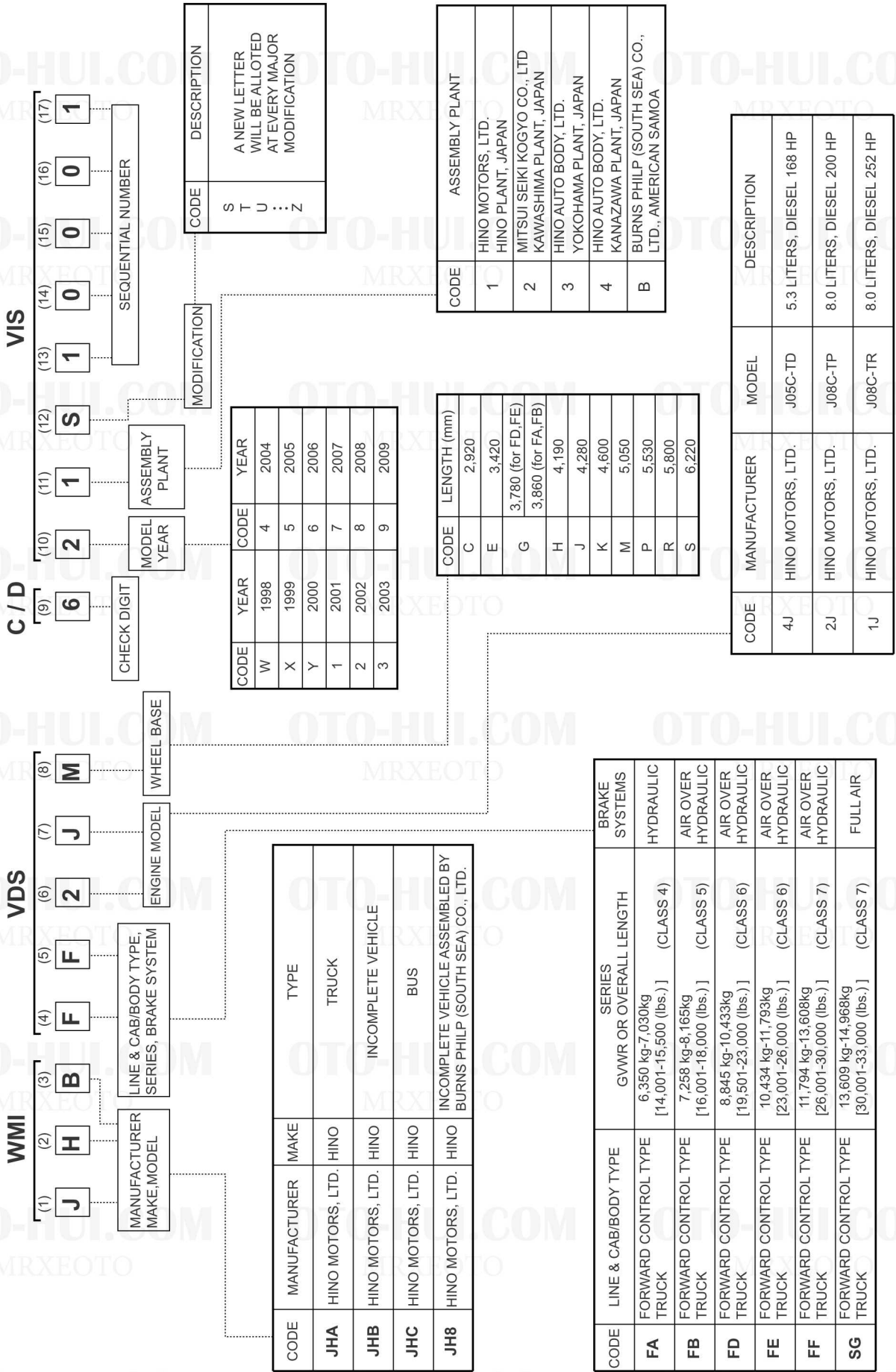
SERVICE BRAKE CONTROL CODE

V : VACUUM SERVO
 A : AIR OVER HYDRAULIC
 F : FULL AIR

PARKING BRAKE CONTROL CODE

C : ACTING ON TRANSMISSION OUTPUT SHAFT
 W : ACTING ON REAR WHEEL

VEHICLE IDENTIFICATION NUMBER (VIN) STRUCTURE



– EXAMPLE –

THIS CHASSIS-CAB CONFORMS TO FEDERAL MOTOR VEHICLE SAFETY STANDARD NOS. 101, 102, 103, 104, 106, 111, 113, 116, 119, 124, 205, 206, 207, 208, 209, 210 AND 302.

THIS VEHICLE WILL CONFORM TO STANDARD NOS. 108, 120 AND 121 IF IT IS COMPLETED IN ACCORDANCE WITH THE INSTRUCTIONS CONTAINED IN THE INCOMPLETE VEHICLE DOCUMENT FURNISHED PURSUANT TO 49 CFR PART 568.

CONFORMITY TO THE OTHER SAFETY STANDARD APPLICABLE TO THIS VEHICLE WHEN COMPLETED IS NOT SUBSTANTIALLY AFFECTED BY THE DESIGN OF THE CHASSIS-CAB.

DATE OF MANUFACTURE [REDACTED]

CHASSIS-CAB MFD BY HINO MOTORS, LTD.

THIS CHASSIS-CAB CONFORMS TO FEDERAL MOTOR VEHICLE SAFETY STANDARD NOS. 101, 102, 103, 104, 106, 111, 113, 119, 124, 205, 206, 207, 208, 209, 210 AND 302.

THIS VEHICLE WILL CONFORM TO STANDARD NOS. 108, 120 AND 121 IF IT IS COMPLETED IN ACCORDANCE WITH THE INSTRUCTIONS CONTAINED IN THE INCOMPLETE VEHICLE DOCUMENT FURNISHED PURSUANT TO 49 CFR PART 568.

CONFORMITY TO THE OTHER SAFETY STANDARD APPLICABLE TO THIS VEHICLE WHEN COMPLETED IS NOT SUBSTANTIALLY AFFECTED BY THE DESIGN OF THE CHASSIS-CAB.

DATE OF MANUFACTURE [REDACTED]

CHASSIS-CAB MFD BY HINO MOTORS, LTD.

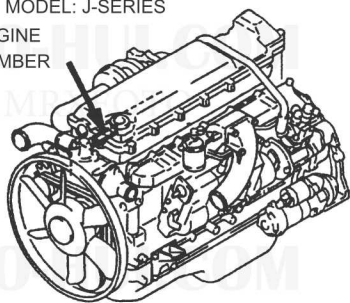
2. VEHICLE CERTIFICATION LABEL

The Vehicle Certification Label, as shown in Fig. 2, is affixed to the left hand side door of the cab. The name of manufacturer, production year and month, and verification of items which are in conformity with Federal Motor Vehicle Safety Standards are displayed.

Fig. 2 SM1-060B

ENGINE MODEL: J-SERIES

ENGINE NUMBER



3. ENGINE NUMBER

The Engine Number, as shown in Fig. 3 is on the right side of the engine block.

Fig. 3 SM1-J014

4. CHASSIS NUMBER

The Chassis Number is displayed on the left siderail of the frame near the front axle, as shown in Fig. 4.

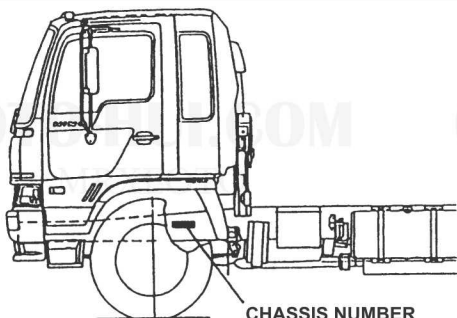


Fig. 4

CHAPTER 3

ENGINE

Models: J08C-TP and J08C-TR

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TROUBLESHOOTING (ENGINE)

Symptom	Possible cause	Remedy/Prevention
Engine overheating	Coolant	
	● Insufficient coolant	Add coolant
	● Defective thermostat	Replace the thermostat
	● Overflow of coolant due to leakage of exhaust into cooling system	Repair
	● Damaged rubber hose	Replace rubber hose
	● Coolant leakage due to deteriorated rubber hose	Replace rubber hose
	● Coolant leakage from coolant pump	Replace the coolant pump
	● Coolant leakage from rubber hose	Retighten or replace clamp connection
	● Coolant leakage from cylinder head	Replace gasket gasket
	Coolant pump	
	● Bearing seizure	Replace
	● Damaged (corroded) vane	Replace vane
	Radiator	
	● Clogged with rust and scale	Clean radiator
	● Clogged with iron oxide due to leakage of exhaust into cooling system	Clean coolant passage and correct exhaust leakage
	● Coolant leakage	Repair or replace radiator
	● Damaged cooling fan	Replace cooling fan
	● Clogged radiator core due to mud or other debris	Clean radiator
	● Defective radiator cap pressure valve	Replace radiator cap
	Abnormal combustion	
	● Incorrect injection timing	Adjust injection timing
	● Reduced injection pressure	Adjust injection pressure
	● Poor fuel	Use good quality fuel
	● Poor nozzle spray	Adjust or replace nozzle
	● Unsatisfactory automatic timer	Repair or replace timer advance angle

Symptom	Possible cause	Remedy/Prevention	
Engine overheating	Other problems		
	● Defective or deteriorated engine oil	Change engine oil	
	● Unsatisfactory operation of oil pump	Replace or repair	
	● Insufficient oil	Add oil	
	● Brake drag	Adjust	
	Severe operating conditions		
	● Lugging the engine	Operate engine properly	
	Excessive oil consumption	Pistons, cylinder liners and piston rings	
		● Wear of piston rings and cylinder liner	Replace piston rings and cylinder liner
		● Worn, sticking or broken piston rings	Replace piston rings and cylinder liner
● Insufficient tension on piston rings		Replace piston rings and cylinder liner	
● Unsatisfactory break-in of piston rings		Replace piston rings and cylinder liner	
● Unsuitable oil (viscosity too low)		Change oil as required and replace piston rings and cylinder liner	
● Incorrectly fitted piston rings (upside down) ..		Replace piston rings	
● Gaps of piston rings in line with each other ..		Reassemble piston rings	
Valves and valve guides			
● Worn valve stem		Replace valve and valve guide	
● Worn valve guide		Replace valve guide	
● Incorrectly fitted valve stem seal		Replace the stem seal	
● Excessive lubricant on rocker arm		Check clearance of rocker arm and shaft	
Excess oil feed			
● Defective oil level gauge		Replace oil level gauge	
● Oil level too high		Drain excess oil	

Symptom	Possible cause	Remedy/Prevention
Excessive oil consumption	Oil leakage from miscellaneous parts	
	<ul style="list-style-type: none"> ● Oil leakage from oil seal Replace oil seal ● Cracks or blowhole in cylinder block Replace cylinder block ● Oil leakage from connections of oil lines Tighten connections of oil lines ● Oil leakage from oil cooler Replace oil cooler ● Oil leakage from oil pan gasket Replace oil pan gasket ● Oil leakage from O-ring Replace O-ring 	
	Other problems	
	<ul style="list-style-type: none"> ● Overcooled engine Warm up engine before moving vehicle (low temperature wear) 	Check cooling system

NOTE: If oil consumption is excessive, the problems above will occur. Complaints from the customer are often related to such problems.

1. White smoke is emitted continuously when the engine is run at high speed.
2. White smoke is emitted only immediately after the engine speed is abruptly raised when idling.
3. The tail pipe is blackened with oil.
4. Oil leaks from the flanges of the exhaust manifold.
5. Lack of power.
6. Excessive blow-by gas.

Piston seizure	Pistons, cylinder liners and piston rings	
	<ul style="list-style-type: none"> ● Incorrect clearance between piston Replace piston, piston rings and cylinder liner ● Unsatisfactory installation of piston pin Replace piston, piston rings, cylinder liner and piston pin as required ● Broken piston ring Replace piston, piston rings and cylinder liner ● Difference in expansion due to use of Replace piston, piston rings and cylinder liner wrong piston 	

Symptom

Possible cause

Remedy/Prevention

Piston seizure

Coolant

- Reduction in capacity of coolant pump Replace the coolant pump (due to vane corrosion)
- Leakage of coolant..... Repair
- Insufficient coolant Add coolant
- Dirty coolant Clean and replace coolant
- Defective radiator Repair or replace the radiator (coolant leakage, clogging)
- Defective rubber hose (leakage) Replace rubber hose
- Defective thermostat Replace the thermostat
- Leakage of exhaust into cooling system Repair

Operation

- Abrupt stoppage of engine after running Operate engine properly at high speed
- Hill climbing using unsuitable gear Select suitable gear

Oil

- Insufficient oil Add oil
- Dirty oil Change oil
- Poor quality oil Replace with proper engine oil
- High oil temperature Repair
- Low oil pressure Repair
- Defective oil pump Repair oil pump
- Reduced performance due to worn Replace oil pump oil pump
- Suction strainer sucking air Add oil and/or repair strainer

Abnormal combustion

- Use of defective fuel Change fuel
- Incorrect injection timing Adjust injection timing
- Engine overheating See Symptom: "Engine overheating"

NOTE: If piston seizure occurs, the problems above will occur. Complaints from the customer are often related to these problems.

1. White smoke is emitted.
2. Lack of power
3. Excessive blow-by gas

Symptom	Possible cause	Remedy/Prevention
Lack of power	Injection pump	Refer to "FUEL INJECTION PUMP"
	Intake	
	● Clogged air cleaner	Clean element or replace element
	Overheating	See Symptom: "Engine overheating"
	Fuel and nozzle	
	● Poor nozzle spray	Adjust or replace injection nozzle
	● Nozzle clogged with carbon	Clean nozzle
	● Wear or seizure of nozzle	Replace nozzle
	● Air in fuel system	Repair and bleed air from fuel system
	● Clogged fuel filter	Replace element
● Use of poor fuel	Use good quality fuel	
Pistons, cylinder liners and piston rings		
● Seized or wear of piston	Replace the piston, piston rings and liner	
● Worn or broken piston rings, piston and cylinder liner	Replace piston rings, piston and liner	

Symptom

Possible cause

Remedy/Prevention

Lack of power

Other problems

- Exhaust brake butterfly valve stuck..... Replace or repair exhaust
in half-open position brake
- Connecting rod bent..... Replace or repair connecting
rod
- Exhaust pipe or muffler crushed Replace exhaust pipe or
(increased back-pressure) muffler
- Breakage of turbine or blower Refer to TURBOCHARGER in
CHAPTER 51

Leakage of exhaust

Head gasket

- Fatigued gasket (aging) Replace gasket
- Damage Replace gasket
- Improper installation Replace gasket

Head bolts

- Loose bolts Tighten bolts
- Elongated bolts Replace bolts
- Improper tightening torque or Tighten properly
tightening sequence

Cylinder block

- Cracking Replace cylinder block
- Surface distortion Repair or replace
- Fretting of cylinder liner insertion portion Replace cylinder block
(insufficient projection of cylinder liner)

Cylinder head

- Cracking Replace cylinder head
- Surface distortion Repair or replace

Cylinder liners

- Cracking Replace cylinder liner
- Corrosion Replace cylinder liner
- Insufficient projection of cylinder liner Replace cylinder liner

<u>Symptom</u>	<u>Possible cause</u>	<u>Remedy/Prevention</u>
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Leakage of exhaust	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Other problems</div> <ul style="list-style-type: none"> ● Incorrect injection timing Adjust injection timing 	
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NOTE: If leakage of the exhaust occurs, the problems above will occur. Complaints from the customer are often related to these problems.

1. Lack of power.
2. The engine overheats.
3. The coolant is discolored.

Difficulty starting engine	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Electrical system</div> <ul style="list-style-type: none"> ● Discharged battery Charge battery ● Defective wiring in starter-circuit Repair wiring of starter ● Loose or open-circuit battery cable Tighten battery terminal connections or replace battery cable ● Breakdown of starter Replace starter ● Broken glow plug Replace 	
	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Injection pump</div> Refer to "FUEL INJECTION PUMP"	
	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Air cleaner</div> <ul style="list-style-type: none"> ● Clogged element Clean the element or replace the element 	
	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Fuel system</div> <ul style="list-style-type: none"> ● No fuel in tank Supply fuel ● Clogged fuel line Clean fuel line ● Air sucked into fuel system through fuel line connections Tighten fuel line connections ● Clogged fuel filter Replace element ● Loose connection in high-pressure line Tighten sleeve nut of high pressure line ● Water in fuel Drain and clean fuel system 	

Symptom

Possible cause

Remedy/Prevention

Difficulty starting engine

Nozzles

- Seized nozzle Replace nozzle
- Broken or fatigued nozzle spring Replace spring

Oil system

- Oil viscosity too high Use proper viscosity oil, or install an oil immersion heater and warm up oil

Other problems

- Seized piston Replace piston, piston rings, and liner
- Seized bearing Replace bearing and crankshaft
- Reduced compression pressure Overhaul engine
- Ring gear damaged or worn Replace the ring gear and/or starter pinion
- Improperly adjusted or broken Adjust or replace the accelerator cable

Rough idling

Injection pump

Refer to "FUEL INJECTION PUMP"

Nozzles

- Uneven injection pressure Adjust
- Poor nozzle spray Adjust or replace nozzle
- Carbon deposit on nozzle tip Remove carbon
- Seized needle valve Replace nozzle

Engine proper

- Improper valve clearance Adjust valve clearance
- Improper contact of valve seat Replace or repair valve and valve seat
- Idling speed too low Adjust idling speed
- Coolant temperature too low Warm up engine
- Compression pressure of cylinders Overhaul engine markedly different from one another

Symptom

Possible cause

Remedy/Prevention

Rough idling

Other problems

- Clogged high pressure injection line Replace line
- Leakage due to improper tightening Tighten sleeve nut of high pressure injection line
- Improperly adjusted or broken Adjust or replace accelerator accelerator cable cable
- Engine seizure Replace pistons, piston rings and liners
- Incorrect valve timing Replace camshaft

Diesel knock

Injection pump

Refer to "FUEL INJECTION PUMP"

Nozzles

- Incorrect injection pressure Adjust
- Poor nozzle spray Adjust or replace nozzle
- Sticking of nozzle Check and/or replace
- Fatigued or broken nozzle spring Replace spring

Fuel system

- Use of poor fuel Use good quality fuel
- Fuel leakage into combustion chamber Adjust nozzles (during engine starting)

Other problems

- Excessively cooled or heated engine Warm up or cool engine
- Insufficient air intake Correct
- Insufficient compression pressure Repair
- Compression pressure leaks at Replace head gasket cylinder head gasket
- Improper valve clearance or valve sticking ... Adjust or repair
- Tappet sticking Replace tappet and camshaft

Symptom

Possible cause

Remedy/Prevention

Unusual engine noise

Piston

- Wear of piston pin boss or piston pin Replace piston and/or piston pin
- Seized, damaged, or worn piston pin Replace piston pin bushing.
- Worn pistons or cylinder liners Replace piston or cylinder liner
- Damaged or seized piston Replace piston and cylinder liner
- Foreign matter on top surface of the piston .. Remove foreign matter and repair or replace piston, cylinder liner, and/or cylinder head

Valve mechanism

- Incorrect valve clearance Adjust valve clearance
- Valve cotter out of place Replace valve cotter
- Seized valve stem Replace valve and valve guide
- Broken valve Replace valve
- Damaged rocker arm support Replace rocker arm support
- Broken valve spring Replace valve spring

Bearings seizure

- Insufficient lubricating oil Add oil
- Excessive or insufficient tightening of Retighten to specified torque bearing housings
- Pits and scratches on bearing surface Replace bearing and crankshaft
- Oil film formed on back of bearing Replace bearing
- Improper installation of bearing Replace bearing
- Reduction of spread dimension of bearing ... Replace bearing
- Distorted bearing housing Replace or correct bearing housing
- Excessive oil clearance Replace bearing

Symptom

Possible cause

Remedy/Prevention

Unusual engine noise

Various other parts

- Exhaust gas leakage from exhaust Retighten joints pipe joints
- Loosen or missing intake manifold Retighten or replace flange gasket
- Intake valve seating is not concentric Replace or correct the valve and valve seat
- Intake gas leakage Retighten

Other problems

- Loose cooling fan mounting bolts or Tighten the fan and fan pulley nut crankshaft pulley
- Lack of lubricating oil Lubricate (coolant pump, valves, etc.)
- Worn timing gear Replace the timing gear
- Breakage of turbine or blower Refer to TURBOCHARGER in CHAPTER 51

NOTE: The items on this page concern unusual engine noise which is due to causes other than those given for diesel knock.

(FUEL INJECTION PUMP)

Symptom

Possible cause

Remedy

Engine does not start

Fuel not reaching injection pump

- Fuel lines clogged or damaged Clean or replace fuel lines
- Fuel filter clogged Clean or replace the filter element
- Air in fuel caused by improper connections of fuel line between fuel tank and feed pump Repair connections
- Filter incorporated in inlet side of feed pump clogged Remove foreign material
- Faulty feed pump check valve Repair or replace it
- Feed pump piston spring broken Replace it
- Feed pump push rod or tappet sticking Repair or replace it

Fuel reaching injection pump

- Faulty connection of accelerator cable to pump adjusting lever Repair connection
- Control rack faulty or sticking Repair it
- Damaged camshaft bearing Repair it
- Plunger worn or sticking Correct or replace it
- Faulty connection of engine stop cable to pump stop lever Repair it

Nozzle faulty

- Fuel leakage caused by loosened nozzle holder Inspect and tighten it
- Low opening pressure of nozzle Adjust it
- Nozzle pressure spring broken Replace it
- Nozzle needle sticking to nozzle body Correct or replace it

Pump out of timing

- Improperly retarded injection timing Correct injection timing
- Incorrect timing caused by improper installation of pump Check engine timing and correct it
- Woodruff key for pump camshaft cut off. Replace it
- Improper pre-stroke adjustment Correct it to obtain specified injection timing