PART NO. KM-4HK1-E-02 (2/2)

HITACHI

Engine Manual (2/2)

4HK1
6HK1

This manual consists of the following sections.
Disassemble and Assemble Engine

Order the manual at mid-west-tech.com >

ENGINE

ENGINE MECHANICAL (4HK1, 6HK1)

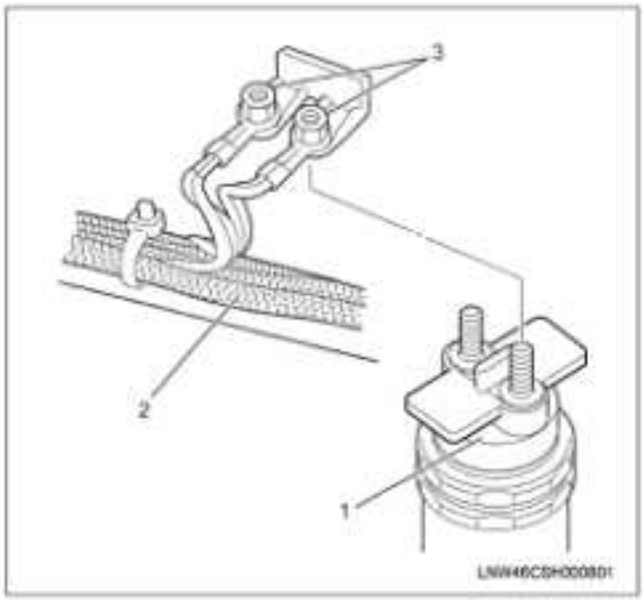
TABLE OF CONTENTS

DIESEL ENGINE (4HK1, 6HK1) 1A-3
Precautions on Service Work 1A-3
Main Data and Specifications 1A-11
Cylinder Head Cover 1A-14
Components 1A-14
Removal 1A-15
Installation 1A-16
Torque Specifications 1A-18
Inlet Cover 1A-20
Components 1A-20
Removal 1A-21
Installation 1A-22
Torque Specifications 1A-24
Turbocharger and Exhaust Manifold 1A-25
Components 1A-25
Removal 1A-26
Inspection 1A-27
Installation 1A-28
Torque Specifications 1A-31
Timing Gear Train 1A-34
Components 1A-34
Removal 1A-35
Inspection 1A-37
Installation 1A-39
Torque Specifications 1A-50
Special Tool 1A-51
Rocker Arm Shaft ASM 1A-52
Components 1A-52
Removal 1A-52
Disassembly 1A-53
Reassembly 1A-55
Installation 1A-56
Torque Specifications 1A-58
Camshaft ASM 1A-59
Components 1A-59
Removal 1A-60
Disassembly 1A-61
Reassembly 1A-63
Fixing torque 1A-65
Special Tool 1A-65
Installation 1A-66
Torque Specifications 1A-68
Valve Stem Seal, Valve Spring 1A-69
Components 1A-69
Removal 1A-69
Inspection 1A-70
Installation 1A-71
Special Tool 1A-73
Cylinder Head 1A-74
Components 1A-74
Removal 1A-74
Disassembly 1A-78
Inspection 1A-81
Reassembly 1A-87
Installation 1A-94
Torque Specifications 1A-101
Special Tool 1A-101
Piston, Connecting Rod 1A-103
Components 1A-103
Removal 1A-103
Disassembly 1A-104
Reassembly 1A-110
Installation 1A-112
Torque Specifications 1A-114
Special Tool 1A-114
Flywheel 1A-115
Components 1A-115
Removal 1A-115
Inspection 1A-117
Installation 1A-117
Torque Specifications 1A-119
Special Tool 1A-119
Front Cover 1A-120
Components 1A-120
Removal 1A-121
Installation 1A-122
Torque Specifications 1A-124
Crankshaft Front Oil Seal 1A-126
Components 1A-126
Removal 1A-126
Installation 1A-128
Torque Specifications 1A-133
Special Tool 1A-133
Crankshaft Rear Oil Seal 1A-134
Components 1A-134
Removal 1A-134
Installation 1A-135
Special Tool 1A-138
Crankshaft 1A-139
Components 1A-139
Removal 1A-139
Disassembly 1A-141
Reassembly 1A-141
Inspection 1A-141
Installation 1A-146
Torque Specifications 1A-150
Special Tool 1A-150
Cylinder Block 1A-152
Components 1A-152
Removal 1A-152
Inspection 1A-153
Installation 1A-154
Lubrication System 1A-157
Precautions on Service Work 1A-157

Order the manual at mid-west-tech.com >

Function Check 1A-158
Special Tool 1A-159
Oil Port Cover ASM 1A-160
Components 1A-160
Removal 1A-160
Installation 1A-160
Oil Cooler 1A-162
Components 1A-162
Removal 1A-163
Disassembly 1A-164
Reassembly 1A-164
Installation 1A-165
Oil Pan 1A-168
Components 1A-168
Removal 1A-168
Installation 1A-169
Oil Pump 1A-171
Components 1A-171
Removal 1A-171
Disassembly 1A-172
Reassembly 1A-172
Inspection 1A-173
Installation 1A-174
Oil Pressure Switch 1A-178
Inspection 1A-178

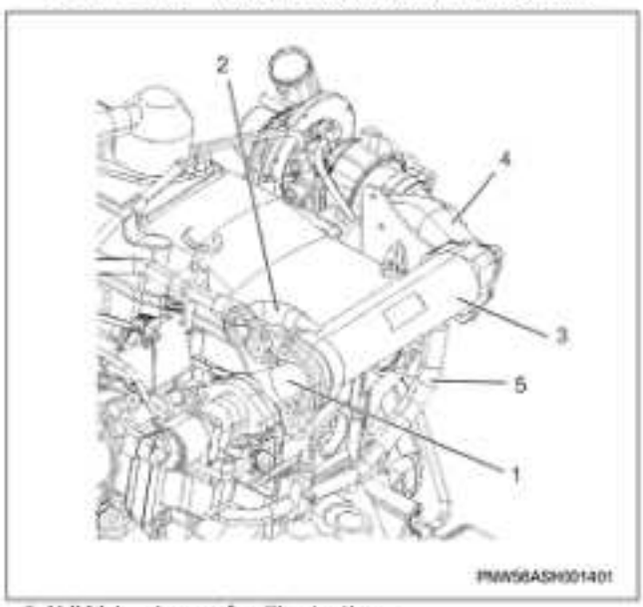
Order the manual at mid-west-tech.com >



Name

1. Fuel Injector
2. Fuel Injector Harness
3. Fuel Injector Terminal Nut

22. Install the cylinder head cover.
    Refer to "Cylinder Head Cover".
23. Connect the radiator upper hose.
24. Install the EGR valve & EGR cooler.
    For details of installation, refer to "EGR Valve and EGR Cooler" of the section of exhaust system.



* 4HK1 is shown for illustration.

Name

1. EGR Adapter
2. Water Return Pipe
3. EGR Cooler
4. EGR Pipe
5. Water Feed Pipe

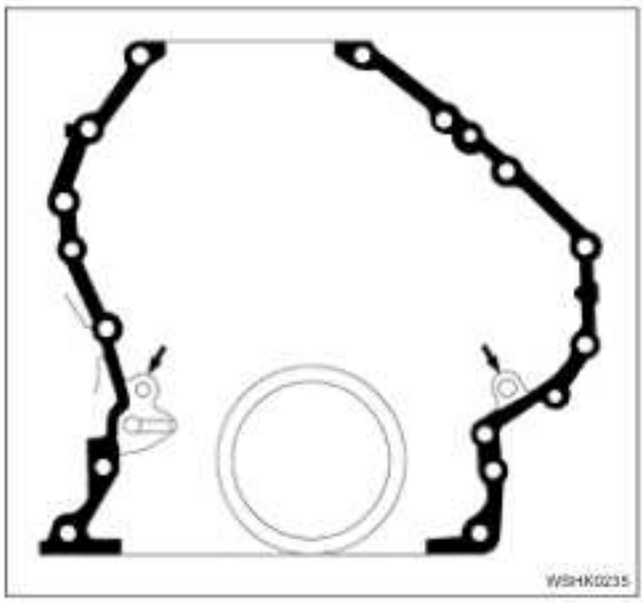
25. Install the oil level gauge and guide tube.
26. Connect the exhaust pipe.
27. Install the engine harness.
28. Replenish the coolant.

Order the manual at mid-west-tech.com >

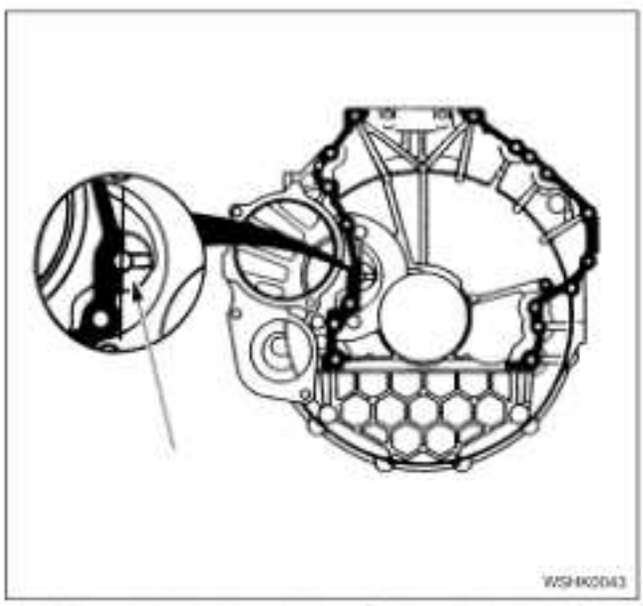
- Apply the liquid gasket (ThreeBond 1207B) uniformly on the inside surface of the bolt holes (excluding the bolt holes indicated by arrows) as shown in the figure.

- After applying the liquid gasket, quickly install it.

4HK1



6HK1



- Align with the knock pin of the cylinder block and install the flywheel housing.

Tightening torque: (4HK1)
Bolt holes marked with "1" =
96 N·m (9.8 kg·m/71 lb ft)
Bolt holes marked with "2" =
77 N·m (7.9 kg·m/57 lb ft)
Bolt holes marked with "3" =
38 N·m (3.9 kg·m/28 lb ft)

Tightening torque: (6HK1)
Bolt holes marked with "1" =
96 N·m (9.8 kg·m/71 lb ft)
Bolt holes marked with "2" =
86 N·m (8.8 kg·m/63 lb ft)
Bolt holes marked with "3" =
119 N·m (12.1 kg·m/88 lb ft)
Bolt holes marked with "4" =
53 N·m (5.4 kg·m/39 lb ft)
Bolt holes marked with "5" =
73 N·m (7.4 kg·m/54 lb ft)
Bolt holes marked with "6" =
26 N·m (2.7 kg·m/19 lb ft)

- The seal is tightened from the cylinder block side.

MidWestTech | Hitachi 4HK1, 6HK1 Engine Service Manual | Publication KM-4HK1-E-02 Order the manual at mid-west-tech.com >

Trouble Shooting

The glow indicator lamp does not light up.

Condition	Possible Cause	Correction
The glow indicator lamp does not light up.	Slow blow fuse has blown.	Replace the slow blow fuse.
	Fuse is unavailable.	Replace the fuse.
	Indicator valve is burnt out.	Replace the indicator valve.
	Engine control system is faulty.	Refer to the "Engine Control System"

Preheating does not work.

Condition	Possible Cause	Correction
Preheating does not work.	Slow blow fuse has blown.	Replace the slow blow fuse.
	Defective or faulty glow plug relay connector contact.	Re-mount or replace the glow plug relay.
	Engine control system is faulty.	Refer to the "Engine Control System"

Preheating time is too long or too short.

Condition	Possible Cause	Correction
Preheating time is too long or too short.	Thermo-sensor fault and break in circuit or short circuit.	Replace the thermo-sensor. Repair the circuit.
	Fault in glow plug.	Replace or tighten the glow plug.
	Engine control system is faulty.	Refer to the "Engine Control System"

Main Data and Specifications

Item		Model
Preheating device model		Glow plug
Glow plug rated voltage/ current	(V-A)	23 – 3.5

Order the manual at mid-west-tech.com >