

Section 1

Power Head

CONTENTS

Precautions	1-1	Precautions.....	1C-1
Precautions.....	1-1	Precaution for Engine Electrical Device	1C-1
Precautions for Powerhead.....	1-1	General Description	1C-1
Engine Control.....	1A-1	Sensor and Switch Description	1C-1
Precautions.....	1A-1	ECM Power Source.....	1C-4
Precautions on Engine Control Diagnosis.....	1A-1	Component Location	1C-5
General Description	1A-2	Location of Sensor and Switch.....	1C-5
Engine Control System Description	1A-2	Service Instructions.....	1C-5
Engine Control Module (ECM).....	1A-5	Resistance Check	1C-5
Caution System Description.....	1A-9	ECM Power Source Coil Peak Voltage	
Self-Diagnostic System Description	1A-11	Inspection	1C-6
Fail-Safe System Description.....	1A-13	ECM Power Source Coil Removal and	
Oil Change Reminder System Description.....	1A-14	Installation	1C-6
Component Location	1A-15	CKP Sensor Peak Voltage Inspection.....	1C-6
Engine Control System Components / Engine		CKP Sensor Removal and Installation	1C-6
Electrical Device Location	1A-15	Cylinder Temp. Sensor Removal and	
Diagnostic Information and Procedures	1A-15	Installation	1C-7
Troubleshooting with Self-Diagnostic Code	1A-15	Cylinder Temp. Sensor Inspection	1C-8
Self-Diagnostic Code "3 – 4" MAP Sensor.....	1A-15	IAT Sensor Removal and Installation.....	1C-8
Self-Diagnostic Code "1 – 4" Cylinder Temp.		IAT Sensor Inspection.....	1C-8
Sensor.....	1A-16	CMP Sensor Removal and Installation	1C-9
Self-Diagnostic Code "2 – 3" IAT Sensor	1A-17	CMP Sensor Inspection	1C-9
Self-Diagnostic Code "4 – 2" CKP Sensor	1A-18	MAP Sensor Removal and Installation.....	1C-10
Self-Diagnostic Code "2 – 4" CMP Sensor.....	1A-19	MAP Sensor Output Voltage Inspection.....	1C-11
Self-Diagnostic Code "2 – 2" Air Intake		IAC Valve Removal and Installation.....	1C-12
System	1A-20	IAC Valve Inspection	1C-12
Self-Diagnostic Code "3 – 2" MAP Sensor 2.....	1A-21	TPS Inspection	1C-12
Self-Diagnostic Code "4 – 3" Fuel Injector	1A-22	Emergency and Engine Stop Switch	
Self-Diagnostic Code "2 – 1" TPS (Throttle		Inspection	1C-13
Position Sensor).....	1A-23		
Self-Diagnostic Code "1 – 1" Rectifier /			
Regulator (Over Charging).....	1A-23		
Self-Diagnostic Code "5 – 3" Oil Pressure			
Switch	1A-24		
Troubleshooting Without Self-Diagnostic			
Code	1A-24		
IAC System Troubleshooting	1A-25		
Service Instructions.....	1A-26		
How to Use The 26 Pin Test Cord	1A-26		
Inspection of The ECM and Its Circuit.....	1A-27		
ECM Removal and Installation.....	1A-30		
Caution Lamp Inspection	1A-30		
Engine Electrical Devices	1C-1		
		Precautions.....	1C-1
		Precaution for Engine Electrical Device	1C-1
		General Description	1C-1
		Sensor and Switch Description	1C-1
		ECM Power Source.....	1C-4
		Component Location	1C-5
		Location of Sensor and Switch.....	1C-5
		Service Instructions.....	1C-5
		Resistance Check	1C-5
		ECM Power Source Coil Peak Voltage	
		Inspection	1C-6
		ECM Power Source Coil Removal and	
		Installation	1C-6
		CKP Sensor Peak Voltage Inspection.....	1C-6
		CKP Sensor Removal and Installation	1C-6
		Cylinder Temp. Sensor Removal and	
		Installation	1C-7
		Cylinder Temp. Sensor Inspection	1C-8
		IAT Sensor Removal and Installation.....	1C-8
		IAT Sensor Inspection.....	1C-8
		CMP Sensor Removal and Installation	1C-9
		CMP Sensor Inspection	1C-9
		MAP Sensor Removal and Installation.....	1C-10
		MAP Sensor Output Voltage Inspection.....	1C-11
		IAC Valve Removal and Installation.....	1C-12
		IAC Valve Inspection	1C-12
		TPS Inspection	1C-12
		Emergency and Engine Stop Switch	
		Inspection	1C-13
		Power Unit Mechanical	1D-1
		General Description	1D-1
		Power Unit Construction Description	1D-1
		Diagnostic Information and Procedures	1D-1
		Cylinder Compression Check	1D-1
		Oil Pressure Check	1D-1
		Service Instructions.....	1D-1
		Valve Clearance Inspection	1D-1
		Recoil Starter Removal and Installation	1D-1
		Cylinder Head Cover Removal and	
		Installation	1D-1
		Air Intake Silencer Case Removal and	
		Installation	1D-3
		Intake Manifold and Throttle Body	
		Components	1D-4

Intake Manifold Removal and Installation	1D-5	Fuel System	1G-1
Throttle Body Removal and Installation	1D-7	Precautions.....	1G-1
Throttle Body Inspection	1D-7	Precautions on Fuel System Service	1G-1
Camshaft Pulley Removal and Installation.....	1D-7	General Description	1G-2
Power Unit Removal and Installation	1D-8	Electronic Fuel Injection System Description	1G-2
Camshaft, Rocker Arm and Rocker Arm Shaft Removal and Installation.....	1D-16	Fuel Delivery System Components Description	1G-4
Camshaft, Rocker Arm and Rocker Arm Shaft Inspection.....	1D-17	High Pressure Fuel Pump Control System Description	1G-6
Cylinder Head Assembly Components	1D-19	Air Intake Components Description.....	1G-7
Cylinder Head Removal and Installation.....	1D-20	Idle Air Control System Description	1G-9
Cylinder Head Disassembly and Assembly	1D-21	Diagnostic Information and Procedures	1G-10
Cylinder Head Components Inspection and Servicing	1D-23	Fuel Pressure Inspection	1G-10
Pistons, Piston Rings, Connecting Rods, Cylinder and Crankshaft Components	1D-30	Fuel System Diagnosis	1G-12
Pistons, Piston Rings, Connecting Rods, Cylinder and Crankshaft Disassembly and Assembly	1D-31	Fuel Injection System Troubleshooting	1G-13
Cylinder, Piston and Piston Ring Inspection and Servicing	1D-39	Service Instructions	1G-14
Piston Pin and Conrod Inspection.....	1D-42	Fuel Pressure Relief Procedure	1G-14
Crank Pin and Conrod Inspection	1D-43	Fuel Line Removal and Installation	1G-14
Crankshaft Inspection	1D-45	Fuel Line Inspection	1G-14
Crankshaft Main Bearing Inspection	1D-46	Fuel Leakage Check Procedure	1G-14
Crankshaft Oil Seal Inspection.....	1D-48	Inspection of Fuel Hose Connections	1G-15
Power Unit Lubrication	1E-1	Fuel Vapor Separator Removal and Installation	1G-15
General Description	1E-1	Inspection of Fuel Vapor Separator	1G-16
Engine Lubrication Description	1E-1	High Pressure Fuel Pump Removal and Installation	1G-16
Schematic and Routing Diagram.....	1E-1	High Pressure Fuel Pump Inspection.....	1G-17
Engine Oil Lubrication Chart	1E-1	Fuel Injector Inspection with Injector in Place ..	1G-17
Diagnostic Information and Procedures.....	1E-2	Individual Fuel Injector Operating Sound Inspection.....	1G-18
Oil Pressure Check	1E-2	Fuel Injector Operating Signal Inspection	1G-19
Low Oil Pressure Caution System	1E-2	Fuel Injector Removal and Installation	1G-20
Powerhead Lubrication System Diagnosis.....	1E-2	Low Pressure Fuel Pump Removal and Installation	1G-22
Service Instructions	1E-2	Low Pressure Fuel Pump Inspection	1G-23
Oil Pump Removal and Installation	1E-2	Fuel Tank Construction	1G-24
Oil Pump Disassembly and Assembly	1E-3	Fuel Tank Disassembly and Reassembly	1G-24
Inspection Oil Pump Component Parts	1E-4	Fuel Tank Components Inspection	1G-24
Oil Pressure Switch Removal and Installation	1E-5	Ignition System.....	1H-1
Oil Pressure Switch Inspection	1E-5	General Description	1H-1
Power Unit Cooling System	1F-1	Ignition System Description	1H-1
General Description	1F-1	Ignition Control Description	1H-2
Water Cooling System Description	1F-1	Component Location	1H-3
Displacement Type Water Pump Description	1F-1	Ignition System Components Location	1H-3
Schematic and Routing Diagram.....	1F-2	Diagnostic Information and Procedures	1H-3
Cooling Water Circulation Chart.....	1F-2	Ignition System Symptom Diagnosis	1H-3
Diagnostic Information and Procedures.....	1F-3	Ignition System Troubleshooting	1H-3
Powerhead Cooling System Diagnosis	1F-3	Service Instructions	1H-5
Service Instructions	1F-3	Spark Plug Removal and Installation	1H-5
Thermostat Removal and Installation.....	1F-3	Spark Plug Inspection	1H-5
Thermostat and Related Items Inspection	1F-4	Ignition Coil Removal and Installation	1H-5
Water Pump Removal and Installation.....	1F-5	Ignition Coil Inspection	1H-6
Water Pump Related Item Inspection	1F-5	Spark Plug Cap Inspection	1H-7
Water Tube Removal and Installation	1F-5	Ignition Coil Primary Peak Voltage Inspection	1H-7
Water Tube Related Item Inspection.....	1F-5	CKP Sensor Inspection	1H-7

Starting System	1I-1	Recoil Starter Removal and Installation	1J-3
General Description	1I-1	Recoil Starter Disassembly and Assembly	1J-4
Electric Starter System Description.....	1I-1	Recoil Starter Components Cleaning and	
Start-In-Gear Protection System Description	1I-1	Inspection.....	1J-7
Component Location	1I-2	NSI Cable Installation and Adjustment.....	1J-8
Starting System Components Location.....	1I-2		
Diagnostic Information and Procedures	1I-2		
Starter System Symptom Diagnosis	1I-2	Charging System	1K-1
Starter System Troubleshooting	1I-3	General Description	1K-1
Service Instructions	1I-5	Charging System Description.....	1K-1
Starter Motor Removal and Installation.....	1I-5	Battery Requirement Description	1K-2
Starter Motor Test	1I-6	Component Location	1K-2
Starter Motor Components.....	1I-8	Charging System Components Location.....	1K-2
Starter Motor Disassembly and Assembly	1I-8	Diagnostic Information and Procedures	1K-2
Starter Motor Components Inspection and		Charging System Diagnosis	1K-2
Servicing	1I-10	Service Instructions	1K-3
Starter Motor Relay Inspection	1I-14	Charging System Construction	1K-3
Neutral Switch Inspection	1I-15	Flywheel Removal and Installation.....	1K-4
Starter Button Inspection	1I-16	Battery Charge Coil / CKP Sensor / Stator	
Manual Starting System.....	1J-1	Base Removal and Installation.....	1K-5
Precautions.....	1J-1	ECM Power Source Coil / Battery Charge Coil	
Precaution for Manual Starting System.....	1J-1	/ CKP Sensor / Stator Base Removal and	
General Description	1J-1	Installation	1K-10
Manual Starting System.....	1J-1	Battery Charge Coil Inspection	1K-15
Service Instructions	1J-2	Rectifier / Regulator Removal and Installation ..	1K-15
Recoil Starter Components	1J-2	Rectifier / Regulator Inspection	1K-16
		Battery Relay Inspection	1K-17
		Fuse Inspection	1K-18