



Foreword

Engine Maintenance Manual of Chery Oriental Son is mainly for the reference of maintenance operators of Chery Automobile special maintenance station. Engine Maintenance Manual consists of mechanics section and electronic section, which introduces basic parameters of Oriental Son engine, brief introduction, fitting, assembling and adjustment tips of assembly components and general troubleshooting. It is convenient for maintenance staff to refer to related documents.

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Chapter 1 Overview

Oriental Son car adopts electronic multi-point sequential fuel injection system. Engine electronic unit uses all kinds of sensors installed in different engine parts to measure engine operation parameters. It will control injection volume precisely by controlling injector according to pre-setup computer-embedded control program, which will adjust the mixture density to the most suitable under different environment. Additionally, electronic fuel injection system may implement these functions such as start enrichment, warming up enrichment, acceleration enrichment, full load enrichment, deceleration dilution, enforce idle speed fuel cutoff and automatic idle speed control etc. by computer control program, which will satisfy mixture requirements under special environment, improve excellent engine fuel economy and emission performance, as well as motor vehicle usage performance.

I. Basic Specifications

Item		Specifications
Throttle Body	Throttle tank	54
	Throttle position sensor	Rheostat meter
	Idle speed control servo	Stepper motor type (Bypass air control system, with air mass limiter)
	Idle speed position switch	Rotation touch type within throttle body sensor
Sensor	Airflow sensor	Karman vortices airflow meter
	Barometric pressure sensor	Semiconductor
	Intake air temperature sensor	Thermo resistance
	Coolant temperature sensor	Thermo resistance
	Vehicle speed sensor	Magneto-resistive component
	Anti manual shift switch	Contact switch
	Cam position sensor	Hall component
	Crank angle sensor	Hall component
	Power steering switch	Contact switch
Actuator	Engine control relay	Contact switch
	Fuel pump relay type	Contact switch
	Injector type and number	Solenoid, 4 pcs
	Injector model	CDH240
	EGR control solenoid	Load circular solenoid
Fuel pressure regulator	Adjustment Pressure kPa	329

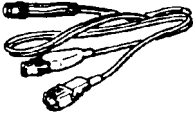
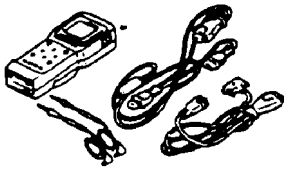
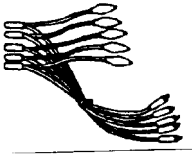


II. Maintenance Specifications

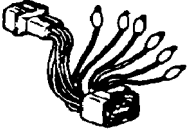
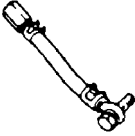
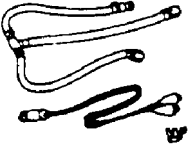
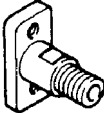
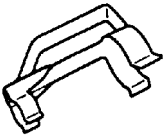
Item		Specifications
Basic idle speed r/min		750±50
Throttle position sensor adjustment voltage mV		400~1000
Throttle position sensor resistance Ω		28~33 at 20°C
Intake air temperature sensor resistance k Ω	20°C	2.3~3.0
	80°C	0.30~0.42
Coolant temperature sensor resistance k Ω	20°C	2.1~2.7
	80°C	0.26~0.36
Fuel pressure kPa	Vacuum soft tube disconnected	About 324~343 at idle limitation speed
	Vacuum soft tube connected	About 265 at idle limitation speed
Injector coil resistance Ω		13~16 at 20°C
Mixture adjustment bolt (Rheostat) Resistance k Ω		4~6



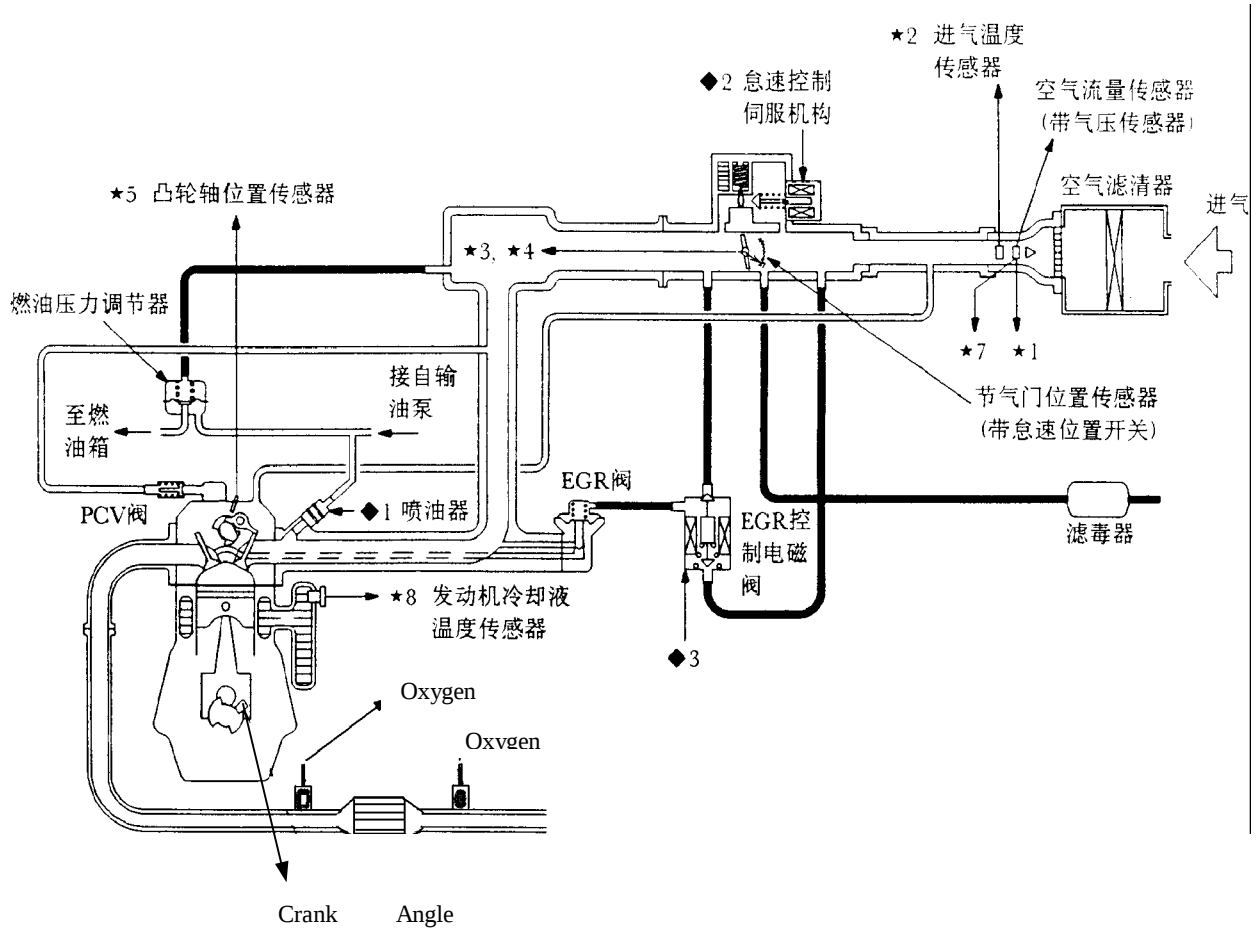
III. Special Tools

Tools	Number	Name	Purpose
A  B  C  D 	MB991223 A MB991219 B MB991220 C MB991221 D MB991222	Wring assembly A Wiring for test B LED wiring C LED wiring header D Detect pin	Fuel indicator simple check A Connector pin contact pressure check B Power supply circuit check C Power supply circuit check D: Marketing measurement table measure rod
	MB991502	MUT-II accessories	I Read error code I MPI system check
	MB991348	Wiring assembly for test	I Measure voltage during diagnostic troubleshooting
	MB991709	Wiring for test	
	MB991519	Alternator wiring connector	Measure voltage during diagnostic troubleshooting



	MD998463	Test wiring (6-pin, square)	Idle speed control servo check
Tools	Number	Name	Purpose
	MD998478	Test wiring (3-pin, 3 shape)	Measure voltage during diagnostic troubleshooting
	MD998709	Connecting soft tube	Fuel pressure measurement
	MD998742	Soft tube joint	
	MD998706	Injector experimental assembly	Check the spray shape of injector.
	MD991607	Injector experimental wiring	
	MD998741	Injector experimental joint	
	MD991608	clip	

IV. System Principle Figure



Intake air temperature sensor

Idle speed control servo

Airflow sensor (Sensor with air pressure)

Camshaft position sensor

Air cleaner

Air inlet

Fuel pressure regulator

to fuel tank

Connected from fuel feed pump

Throttle position sensor (With idle speed position switch)

PCV PCV valve

Injector

EGR EGR valve

EGR EGR control solenoid

Canister

Engine coolant temperature sensor

Oxygen sensor

Crank angle sensor



V. Electronic System Control Process

Fuel Injection Control

ECU will control injector drive time and injection timing to make mixture of best density for engine under different environment. There is an injector at each cylinder inlet port. Fuel pump in fuel tank will pump out fuel and transfer it to fuel distribution pipe. Fuel pressure regulator will keep fuel pressure stable and injector will inject fuel gas directly to each cylinder port. In each engine operation cycle (every two cycles for crank), each cylinder injects oil once (Injection sequence is 1-3-4-2, which is named sequential injection). When engine is at cold or high load running, ECU will implement open loop control and provide dense mixture for good performance. When engine is at normal status (medium/small load), ECU will implement close loop control and make the best proportion of air and fuel gas according to the signal feed backed by oxygen sensor, which will make three-way catalytic converter at best purge efficiency.

Idle Speed Control

It will control throttle bypass airflow according to idle speed status and engine load variety at idle speed, which will keep idle speed at most suitable speed. According to engine coolant temperature and air conditioner load, ECU will driver idle speed control motor (ISC) to make engine running at target idle speed. Additionally, when engine is running at idle speed, please open or close air conditioner switch. ISC motor will adjust airflow according to engine load status to prevent instable idle speed.

Ignition Timing Control

Electronic unit control power transistor ON/OFF controls primary current conductivity in ignition coil. Ignition timing control is to get the best ignition time, which will satisfy engine requirement under different environment. ECU will confirm ignition time according to engine speed, airflow, airflow temperature, engine coolant temperature and barometric pressure.

Self-Diagnostic

- 1 When one sensor and actuator detect abnormality, engine failure indicator will light up to warn the driver.
- 2 When one sensor and actuator detect abnormality, the error code related to the failure will be output.
- 3 RAM data related to sensor and actuator inside engine ECU may be read through MUT-II. Additionally, the actuator will be driven by force in some case.

Other Control Operation

- 1 Fuel pump control;
During engine starting on and running, fuel pump relay starts and provides fuel pump with current.
- 2 A/C relay control
Air conditioner compressor ON/OFF
- 3 Purge solenoid control
- 4 EGR solenoid control
- 5 Fan motor control



Electronic System Relation Schematic Map

