

上海桑塔纳2000 GSi 轿车结构图册

COLORED STRUCTURE DIAGRAM BOOK OF SHANGHAI SANTANA 2000 GSi CAR

主编 陈因达



上海汽车工业(集团)总公司

人民交通出版社

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序

值此，《上海桑塔纳 2000 GSi 轿车结构图册》与大家见面之际，我怀着十分高兴的心情，对全体编绘出版人员的辛勤劳动表示衷心感谢。这是继数年前成功绘制出版《上海桑塔纳轿车结构图册》之后的又一丰硕成果，它的出版问世，不仅满足了广大用户迫切要求了解桑塔纳 2000 GSi 轿车新技术、新工艺、新结构、新特点的心情，而且是对 2000 GSi 轿车魅力的再现。

作为人类生活基本需求排行之四的“行”，与“衣”、“食”、“住”一起构成了人类生活的四大基本要素。换句话说，只要有人类生活的地方，就会有上述需求，就会有上述市场，就会有上述要素不断发展的基本条件。人们为了改善和提高出行能力和质量，研制发明了包括代步、运货在内的各种快速、便捷的交通工具，它们已渗入到天上、地上、地下、水上、水下所有领域。其中汽车扮演了极其重要的角色，承担了提高人们生活质量的重大责任并为全球经济的发展作出了巨大贡献。可以深信，她定将发挥越来越大的作用。当今全球平均每 10 人拥有 1 辆汽车，总计已达 6 亿多辆，保有量就是她的地位和作用的明证。随着人口的增长，人们生活水平的提高，汽车保有量亦将继续攀升。事实证明，凡与人类生活基本要素相关的产业，永远会在激烈的竞争中发展壮大。

上海桑塔纳 2000 GSi 轿车（俗称“时代超人”）是上海汽车工业系统员工继引进、消化、国产化生产一百多万辆桑塔纳轿车之后，与外方合作开发的新车型。她的问世，既壮大了桑塔纳轿车家族，又丰富了我国轿车市场，同时，还锻炼了一批从事轿车开发的科技人员，提高了我国轿车自主开发的能力，使轿车产品的开发进入了实质性运作的阶段，成功地迈出了十分可喜的第一步。值此《上海桑塔纳 2000 GSi 轿车结构图册》出版之际，衷心祝愿上海汽车工业的明天更加灿烂辉煌！衷心祝愿我国汽车工业兴旺发达！

胡茂元

2000 年 11 月

Preface

Pleased to hear that *Colored Structure Diagram Book of Shanghai Santana 2000 GSi Car* will make its debut, I hereby extend my sincere thanks to all the parties and individuals involved for their hard work. It can be regarded as another fruitful achievement following the successful publishing of *Colored Structure Diagram Book of Shanghai Santana Car* several years ago. Its debut not only meets the urgent demand of Santana users to know new technology, new structure and new features about Santana 2000 GSi, but gives Santana 2000 GSi a new stage to show its charm.

Ranked the fourth among the four basic needs of human life, transport, along with clothing, food and housing, also constitutes four grass-root elements of human life. That is to say, the above needs will arise where human lives, subsequently, the needs will give rise to the corresponding markets where the above grass-root elements can develop in a continuous way. In order to enhance and improve the capability and quality of transport, a great variety of quick and convenient transport tools for passengers and cargoes have been invented and developed. Nowadays, they have spread to everywhere from air to ground and waters and from ground and waters to underground and sub-waters, of which autos play an extremely important role. The autos not only take on the great responsibility of improving the living quality, but contribute a great deal to the global economic development. We are deeply convinced that autos will play a more and more important role in the coming days. In today's world; one out of every ten persons owns a car, and the car in-use volume in the world-wide range exceeds 600 million. These two figures prove the important position and role of autos. With the increased population and improved living standards, the in-use volume will continue to climb. The facts show that any industry closely related to the grass-root elements of human life will inevitably grow stronger and stronger in the fierce competition.

Shanghai Santana 2000 GSi, also called Era Superman, was the new model jointly developed with foreign partners after Shanghai automotive industry introduced and absorbed foreign advanced technologies and localized the production of more than 1 million Santana cars. Its debut has not only expanded the Santana family, but enriched the car market of China. Meanwhile, the Santana 2000 GSi development has cultivated many technical personnel experienced in auto R&D, enhanced our independent car R&D capabilities of China as a whole. Its launch marks the entry of the auto R&D into the phase of real operation and the exciting success of the first step forward of the car R&D of China. On the occasion of *Colored Structure Diagram Book of Shanghai Santana 2000 GSi Car* being smoothly published, I sincerely wish the auto industry of Shanghai enjoy a brighter future and that of China as a whole prosper.

Hu Maoyuan
November 2000

前言

桑塔纳2000 GSi轿车是上海大众汽车有限公司自1985年成立以来,继向市场推出普通型、豪华型、旅行轿车等7种车型后研制开发的又一新车型。该车在桑塔纳2000的基础上,进行了14项改进和增加了新的先进装置,如ABS和三元催化净化器等,提高了安全性、经济性,具有合理的性能价格比。该车外观造型圆润饱满、线条流畅,具有时代气息。这款新车最显著的特点是装备了由上海大众、德国大众和德国奥迪联合设计开发的AJR发动机。这种全新发动机设计先进,无中间轴,无分电器,结构简单,技术完美,工作可靠,拥有强劲动力,整车加速快,油耗低,被命名为“时代超人”。

在上海汽车工业(集团)总公司的组织和指导下,我们成立了由多方人员组成的编写组,经过一年多的通力协作,完成了《上海桑塔纳2000 GSi轿车结构图册》的编写与出版。本《图册》以彩色立体图形为主,并配以中英文对照的说明文字,图文并茂,形象直观,好学易懂。与其它产品一样,桑塔纳2000 GSi轿车也在经历不断发展与完善的过程,其结构也会逐步地改进与更新,敬请读者使用时注意。

本《图册》在编写过程中,得到了上海汽车工业(集团)总公司、上海汽车工业技术中心、上海大众汽车有限公司、上海汇众汽车制造有限公司以及诸多直接配套厂商的大力支持。此外,还有许多领导和专家在本《图册》的编写过程中给予了多方的指导和帮助,在此一并表示诚挚的谢意。

由于编者水平所限,本《图册》中难免存在不足和错误,恳请广大专家和读者批评、指正。

《上海桑塔纳2000 GSi轿车结构图册》编写组
2000年11月

Foreword

Shanghai Santana 2000 GSi car is a new member joining the seven-member Shanghai Santana family including Santana standard series, Santana variant series and Santana 2000 series launched by Shanghai Volkswagen Automotive Co., Ltd (SVW), which was established in 1985. Based on Santana 2000, 14 improvements and addition of advanced devices have been applied to Santana 2000 GSi. These measures, such as ABS and 3-way catalytic converter, enhance Santana 2000 GSi safety, economy and performance-price ratio. With its plump, streamlined and trendy appearance, the highlight of Santana 2000 GSi lies in AJR engine jointly designed and developed by SVW, German VW and German Audi. This engine, called "Era Superman", is characterized with state-of-the-art design, no intermediate shaft, distributorless, succinct structure, mature technology, great reliability, high power, excellent acceleration and low fuel consumption.

Under the leadership and guidance of Shanghai Automotive Industry(Group) Corporation (SAIC), an editorial board consisting of professionals from various fields was set up. After more than one year of joint efforts made by all the professionals involved, *Colored Structure Diagram Book of Shanghai Santana 2000 GSi Car* has been smoothly finished and published. Dominated by three-dimensional color pictures, the book is easy to learn and understand with bilingual description in Chinese and English and vivid visualization. Like any other products, Santana 2000 GSi is also in a way of constant development and improvement, which may result in changes in its structure. Readers are supposed to notice these changes.

Sincere thanks will go to SAIC (Group), Shanghai Automotive Industry Technology Center, SVW, Shanghai Huizhong Automotive Co., Ltd. and many direct suppliers for their sincere help and support during the whole compiling process. Besides, thanks will also go to the leaders and experts involved for their direction and help.

Any suggestion on correction will be warmly welcome, and we will take responsibilities for any possible defect and error.

Editorial Board of *Colored Structure Diagram Book of
Shanghai Santana 2000 GSi Car*
November 2000

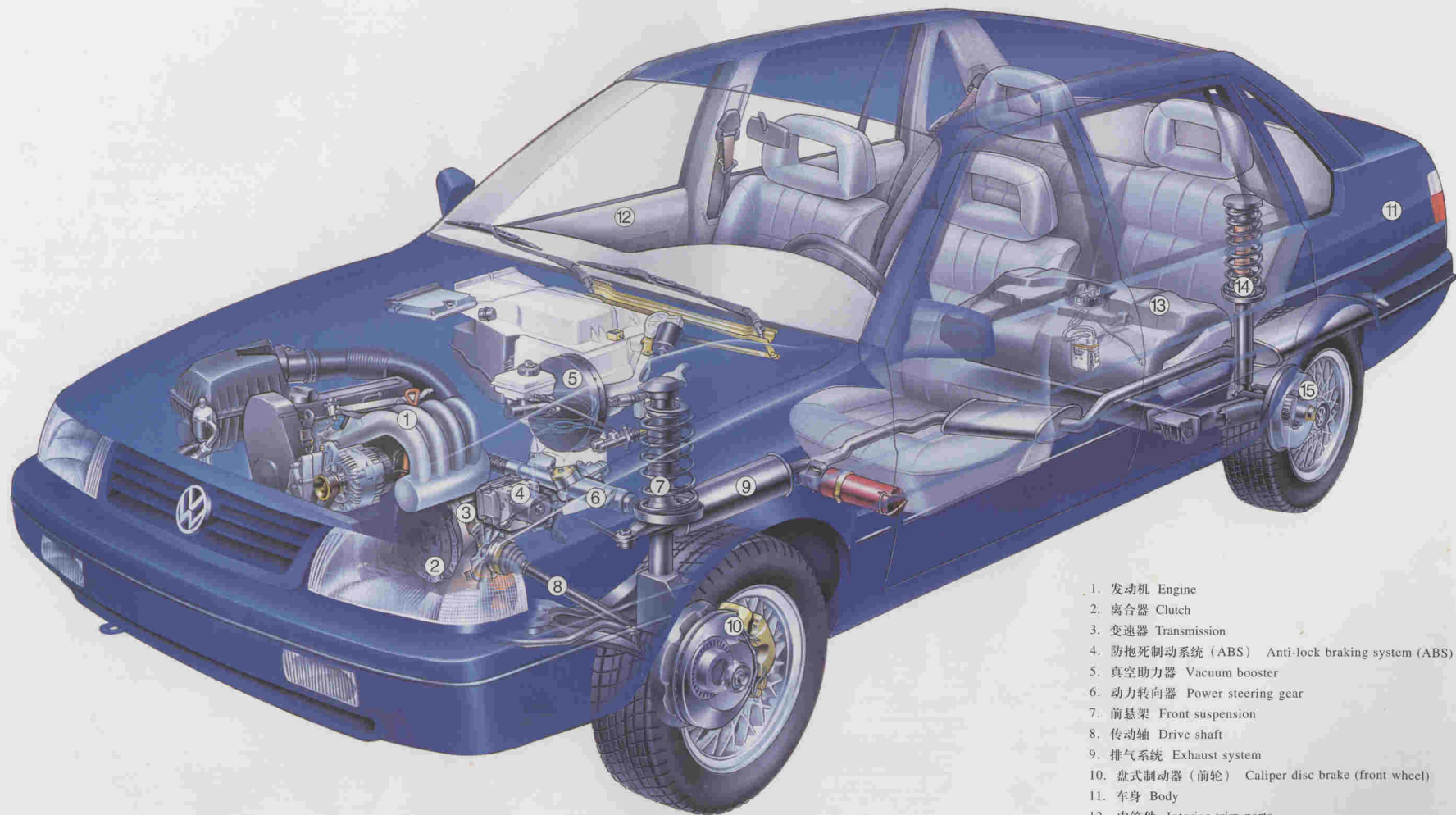
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桑塔纳 2000 GSi 轿车技术参数 SANTANA 2000 GSi TECHNICAL DATA

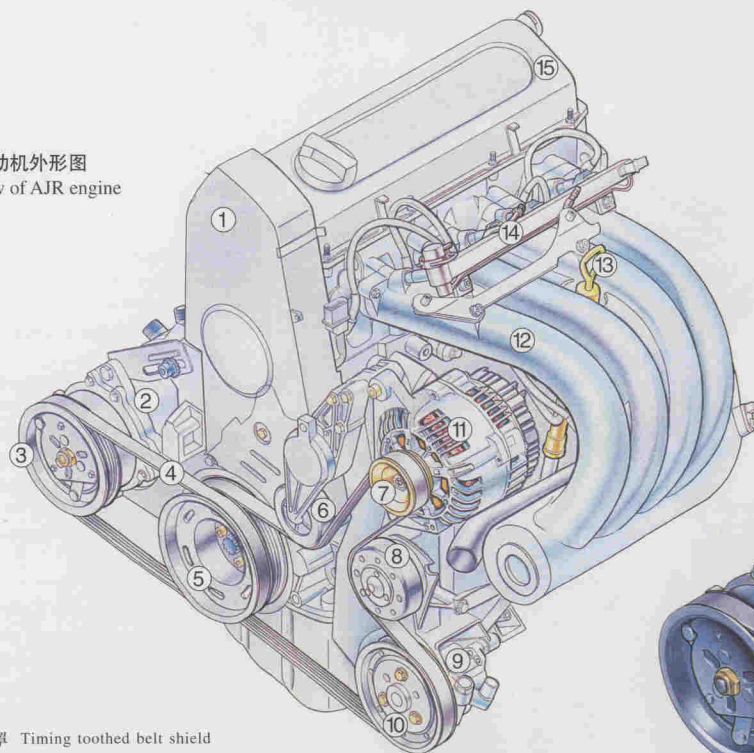
发动机型式	AJR 型, 电控燃油喷射式	Engine type	AJR type, electronic fuel injection
排量	1.781 升	Displacement	1.781 L
缸径 / 行程	81 / 86.4 毫米	Cylinder bore / stroke	81 / 86.4 mm
最大功率	74 千瓦 (5200 转 / 分)	Max. output	74 kW (5200r / min)
最大扭矩	155 牛·米 (3800 转 / 分)	Max. torque	155 N·m (3800r / min)
压缩比	9.5 : 1	Compression ratio	9.5 : 1
燃油分配系统	M 3.8.2 顺序多点汽油喷射系统	Fuel distribution system	Sequential multipoint fuel injection system M 3.8.2
变速器	全同步五档手动变速器	Transmission	5-speed manual gearbox, fully synchronized
最高速度	175 千米 / 小时	Top speed	175 km / h
油耗	90 千米 / 小时为 6.8 升 / 100 千米	Fuel consumption	6.8 L / 100km at 90km / h

总长	4680 毫米	Overall length	4680 mm
总宽	1700 毫米	Overall width	1700 mm
总高 (空载)	1423 毫米	Overall height (unladen)	1423 mm
轴距	2656 毫米	Wheelbase	2656 mm
轮距: 前	1414 毫米	Track width: front	1414 mm
后	1422 毫米	rear	1422 mm
离地间隙	138 毫米	Ground clearance	138 mm
转弯直径	11 米	Turning circle diameter	11 m
轮胎型号	195 / 60 R14 86H	Tyre size	195 / 60 R14 86H
整车整备质量	1120 千克	Complete vehicle curb weight	1120 kg
许用总质量	1540 千克	Gross weight authorized	1540 kg

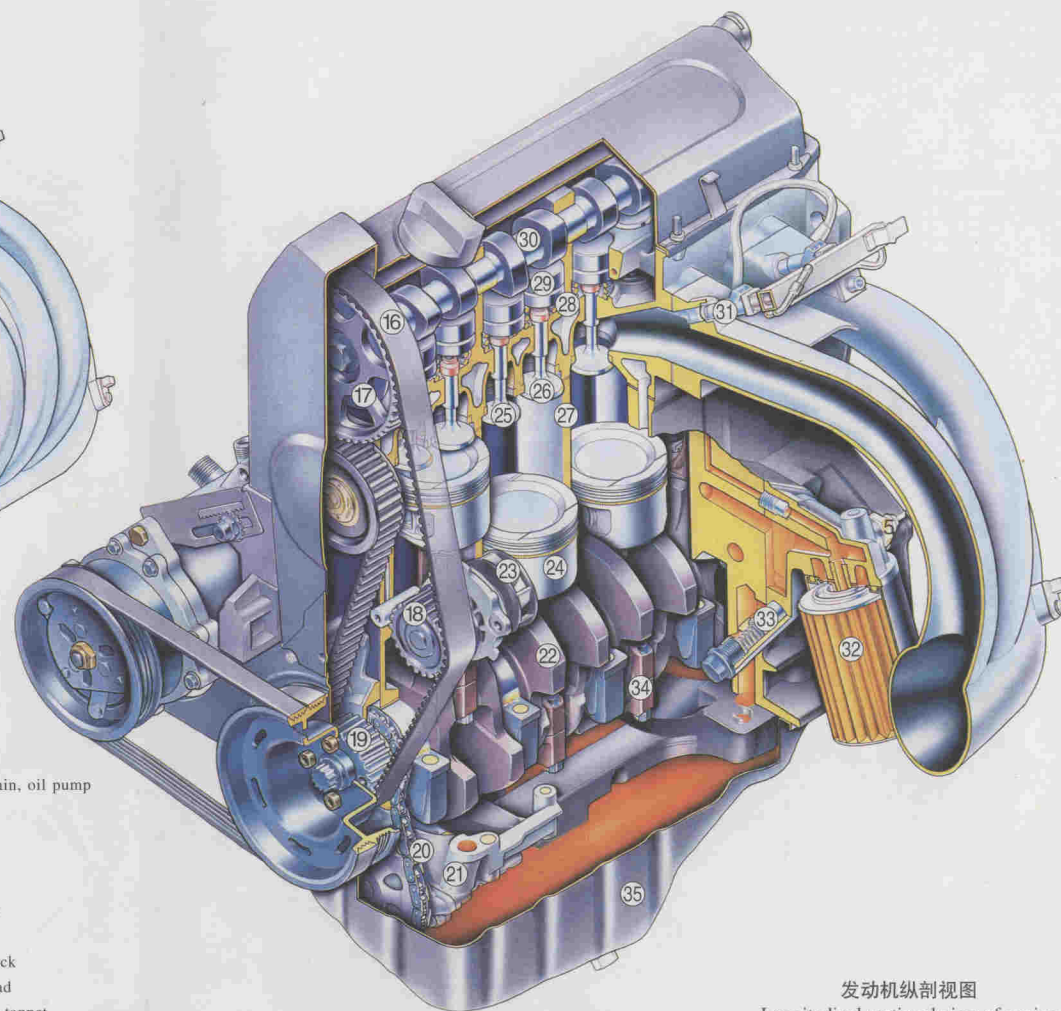


1. 发动机 Engine
2. 离合器 Clutch
3. 变速器 Transmission
4. 防抱死制动系统 (ABS) Anti-lock braking system (ABS)
5. 真空助力器 Vacuum booster
6. 动力转向器 Power steering gear
7. 前悬架 Front suspension
8. 传动轴 Drive shaft
9. 排气系统 Exhaust system
10. 盘式制动器 (前轮) Caliper disc brake (front wheel)
11. 车身 Body
12. 内饰件 Interior trim parts
13. 燃油箱 Fuel tank
14. 后悬架 Rear suspension
15. 鼓式制动器 (后轮) Drum brake (rear wheel)

AJR 发动机外形图
Exterior view of AJR engine



1. 正时齿形带护罩 Timing toothed belt shield
2. 空调压缩机 A/C compressor
3. 空调压缩机带轮 Multi-wedge belt pulley, A/C compressor
4. 多楔带 Multi-wedge belt
5. 曲轴带轮 Multi-wedge belt pulley, crankshaft
6. 张紧轮 Tensioner
7. 发电机带轮 Multi-wedge belt pulley, alternator
8. 导向轮 Guide pulley
9. 动力转向油泵 Power steering pump
10. 动力转向泵带轮 Multi-wedge belt pulley, power steering pump
11. 发电机 Alternator
12. 进气歧管 Intake manifold
13. 油尺 Dipstick
14. 燃油分配管 Fuel rail
15. 气缸盖罩 Cylinder head cover



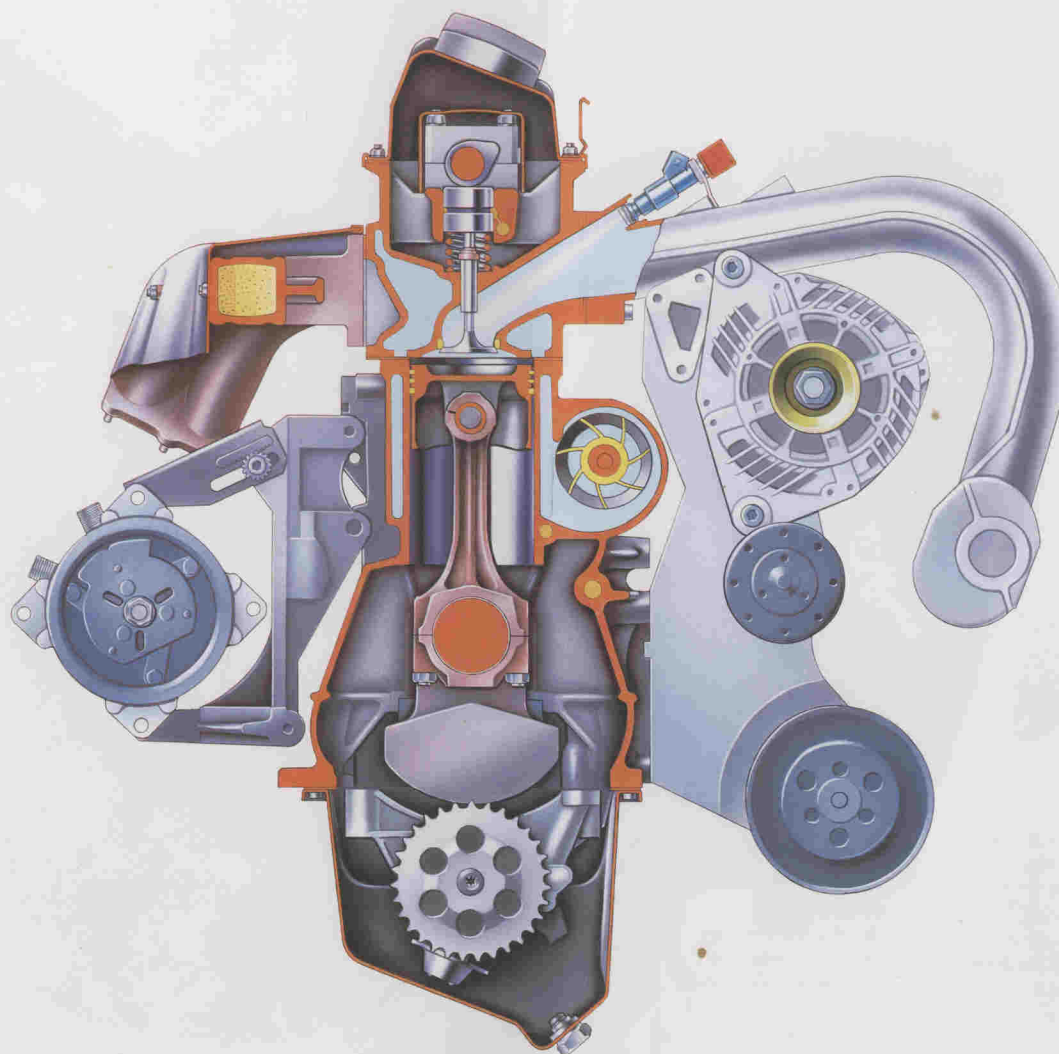
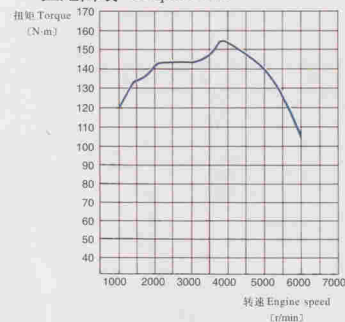
16. 正时齿形带 Timing toothed belt
17. 凸轮轴正时齿形带轮 Timing toothed pulley, camshaft
18. 水泵齿形带轮 Toothed pulley, water pump
19. 曲轴正时齿形带轮 Timing toothed pulley, crankshaft
20. 机油泵链 Roller chain, oil pump
21. 机油泵 Oil pump
22. 曲轴 Crankshaft
23. 水泵 Water pump
24. 活塞 Piston
25. 排气门 Exhaust valve
26. 进气门 Intake valve
27. 气缸体 Cylinder block
28. 气缸盖 Cylinder head
29. 液压挺柱 Hydraulic tappet
30. 凸轮轴 Camshaft
31. 喷油器 Fuel injector
32. 机油滤清器 Oil filter
33. 限压阀 Oil pressure relief valve
34. 连杆 Connecting rod
35. 机油盘 Oil pan

发动机纵剖视图
Longitudinal sectional view of engine

功率曲线 Power curve



扭矩曲线 Torque curve



发动机横剖视图
Cross-sectional view of engine

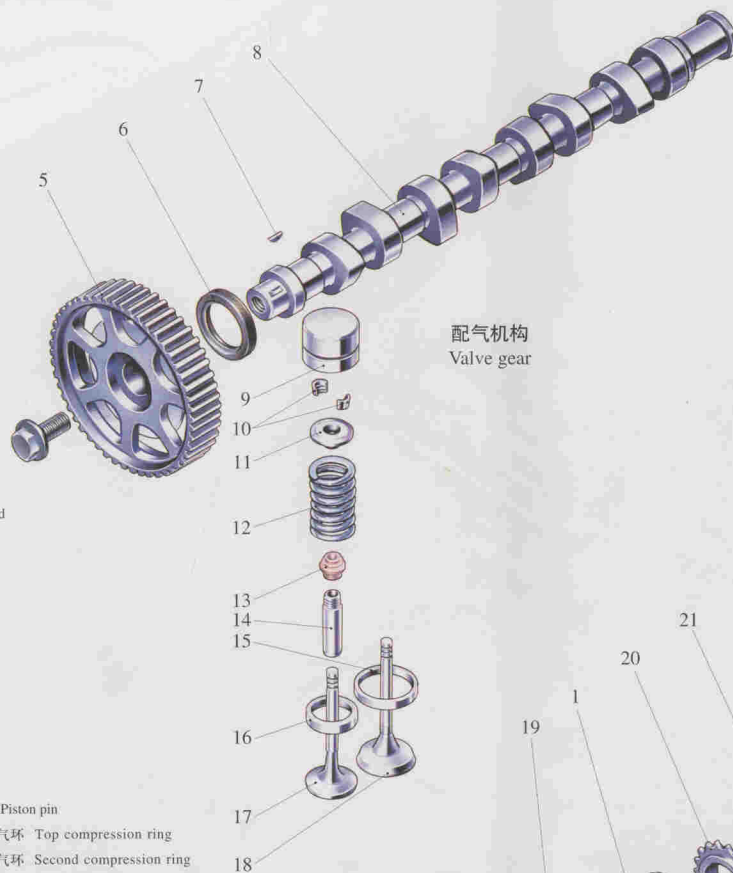
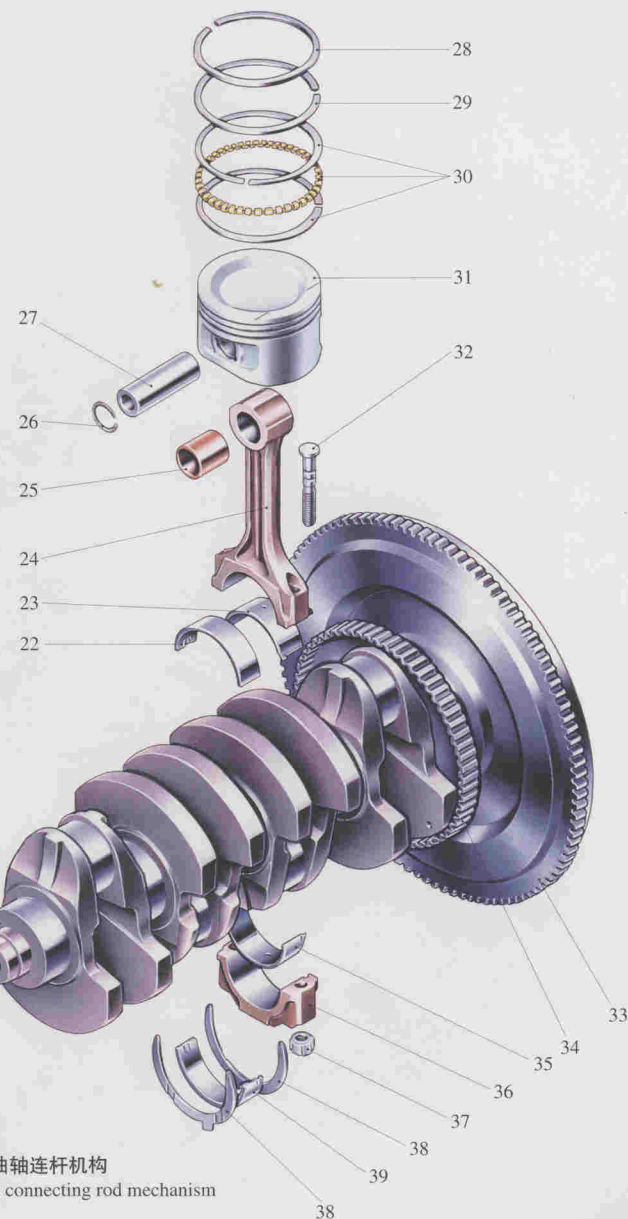
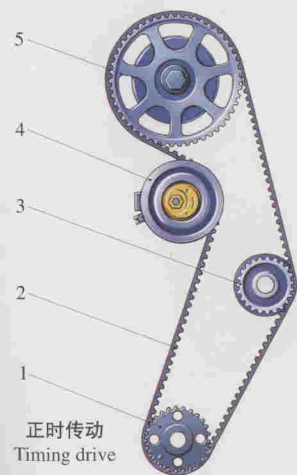
AJR 发动机的特点:

- 无中间轴设计, 简化缸体结构, 提高发动机可靠性, 维护更加方便;
- 取消分电器, 结构更紧凑, 消除因机械驱动而产生的磨损, 减少电磁辐射干扰;
- 进、排气管分侧布置, 提高进气密度, 增加进气量, 从而使发动机功率和扭矩明显提高;
- 先进的汽油喷射控制系统, 提高发动机功率, 降低油耗, 减少废气中有害成分的排放;
- 装用两个爆震传感器, 确保发动机免受劣质汽油引起强烈爆震的损害;
- 改进排气管和消声器系统, 降低排气噪声, 大大提高了乘坐的舒适性。

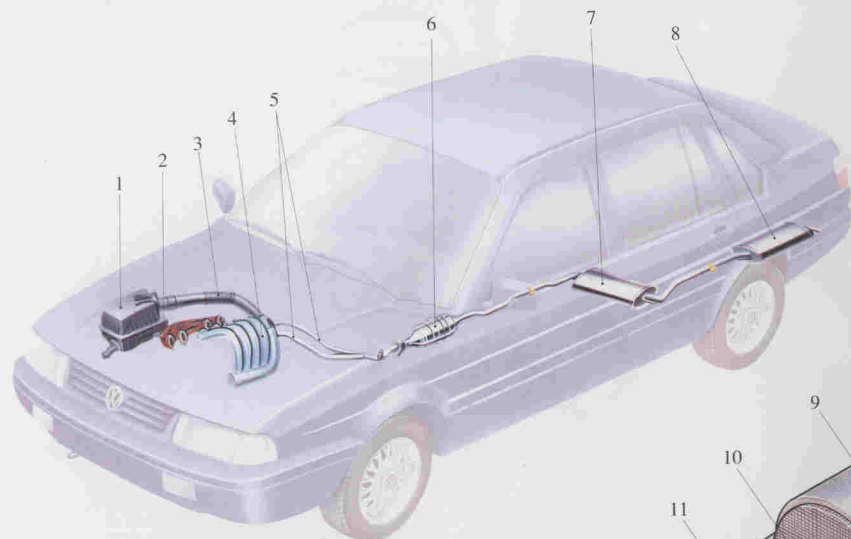
Features of the newly equipped AJR engine:

- More reliability and easier service for cancellation of intermediate shaft and simplified cylinder block;
- Distributor eliminated to minimize magnetic interference;
- Separate side arrangement of intake and exhaust manifolds to increase the air intake volume and boost the engine power and increase torque;
- Advanced fuel injection control system helps raise power efficiency and reduce fuel consumption, at the same time it decreases harmful emission from the exhaust system;
- Double knock sensors system ensures the engine will not be damaged by explosions caused by low quality fuel;
- Improved exhaust pipe and silencing systems reduce annoying noise levels to enhance riding comfort.

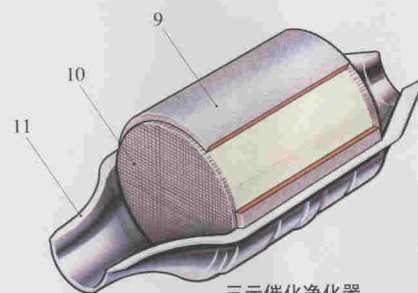
1. 曲轴正时齿形带轮 Timing toothed pulley, crankshaft
2. 正时齿形带 Timing toothed belt
3. 水泵齿形带轮 Toothed pulley, water pump
4. 张紧轮 Tensioner
5. 凸轮轴正时齿形带轮 Timing toothed pulley, camshaft
6. 凸轮轴油封 Camshaft seal
7. 半圆键 Woodruff key
8. 凸轮轴 Camshaft
9. 挺柱体 Tappet body
10. 气门锁片 Valve lock split
11. 上气门弹簧座 Upper valve spring retainer
12. 气门弹簧 Valve spring
13. 气门油封 Valve seal
14. 气门导管 Valve stem guide
15. 进气门座 Intake valve seat
16. 排气门座 Exhaust valve seat
17. 排气门 Exhaust valve
18. 进气门 Intake valve
19. 曲轴带轮 Multi-wedge belt pulley, crankshaft
20. 曲轴链轮 Crankshaft sprocket
21. 曲轴 Crankshaft
22. 主轴承上轴瓦 Upper bearing bush, main bearing
23. 连杆大头轴瓦 Upper bearing bush, big end of connecting rod
24. 连杆 Connecting rod
25. 连杆小头轴瓦 Bearing bush, small end of connecting rod
26. 卡环 Snap ring

配气机构
Valve gear曲轴连杆机构
Crankshaft and connecting rod mechanism正时传动
Timing drive

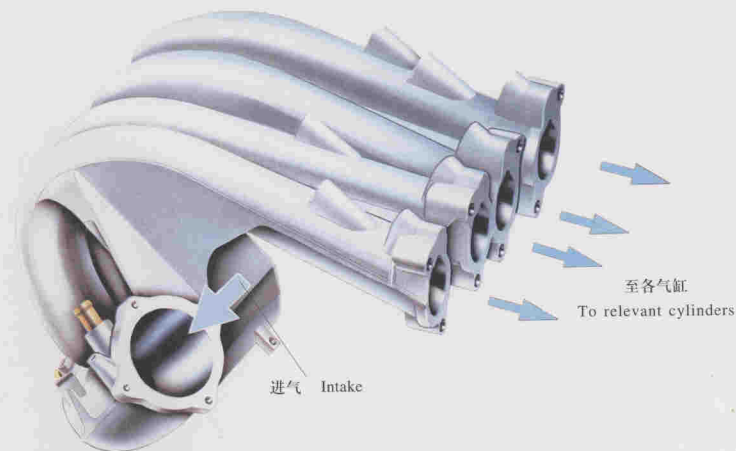
27. 活塞销 Piston pin
28. 第一道气环 Top compression ring
29. 第二道气环 Second compression ring
30. 油环 Oil control ring
31. 活塞 Piston
32. 连杆螺栓 Connecting rod bolt
33. 飞轮 Flywheel
34. 转速传感器脉冲轮 Pulse wheel, speed sensor
35. 连杆大头下轴瓦 Lower bearing bush, big end of connecting rod
36. 连杆盖 Connecting rod cap
37. 连杆螺母 Connecting rod nut
38. 止推片 Thrust halfing
39. 主轴承下轴瓦 Lower bearing bush, main bearing



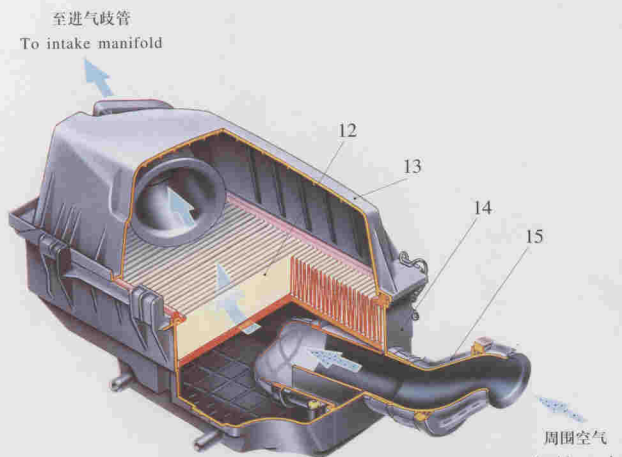
进排气系统简图
Sketch of intake & exhaust system



三元催化净化器
Three-way catalytic converter

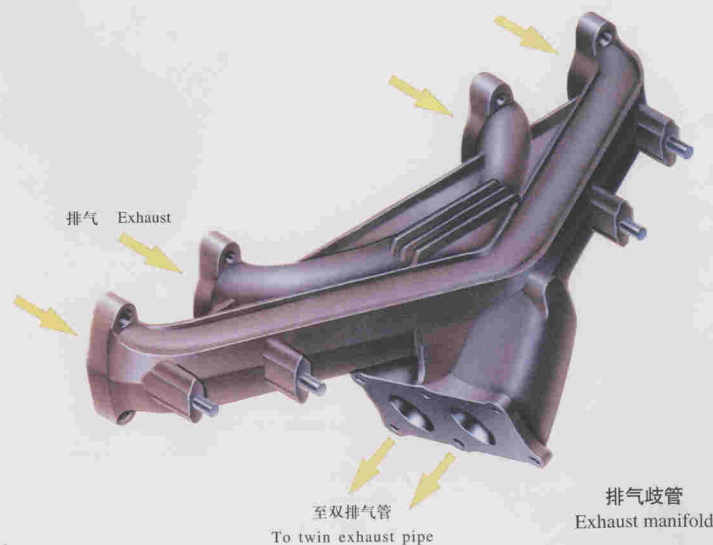


进气歧管
Intake manifold

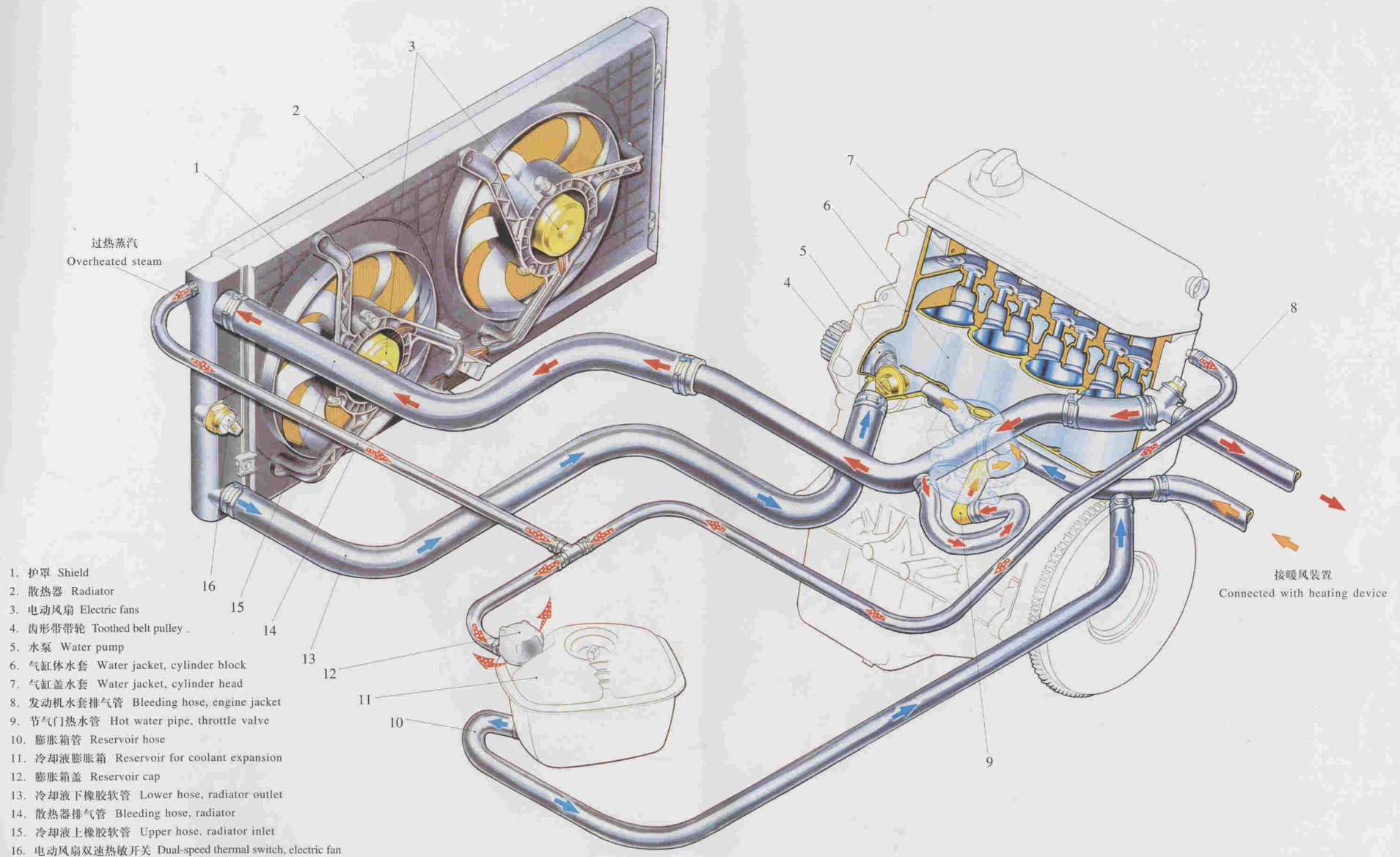


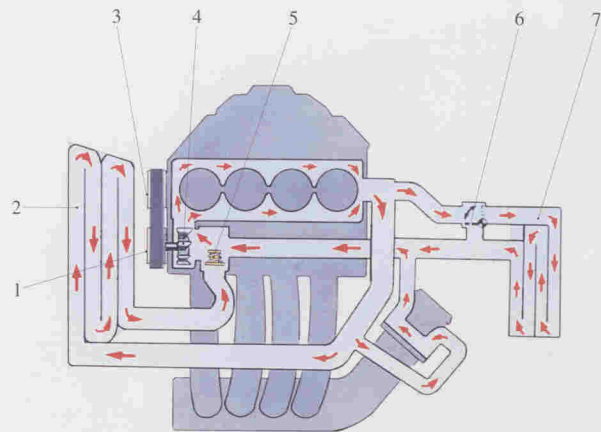
空气滤清器
Air cleaner

1. 空气滤清器 Air cleaner
2. 排气歧管 Exhaust manifold
3. 进气软管 Intake hose
4. 进气歧管 Intake manifold
5. 双排气管 Twin exhaust pipes
6. 三元催化净化器 Three-way catalytic converter
7. 中间消声器 Mid-muffler
8. 主消声器 Main muffler
9. 隔热软垫 Heat-insulated swelling mat
10. 陶瓷催化反应体 Ceramic catalytic converter
11. 壳体 Housing
12. 纸质滤芯 Paper cartridge
13. 空滤器上壳体 Upper housing, air cleaner
14. 空滤器下壳体 Lower housing, air cleaner
15. 带粗滤器进气管组件 Air inlet unit with sieve

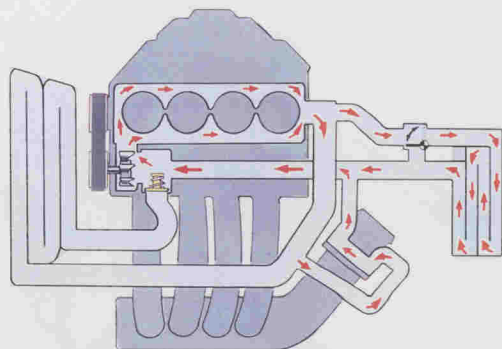


排气歧管
Exhaust manifold

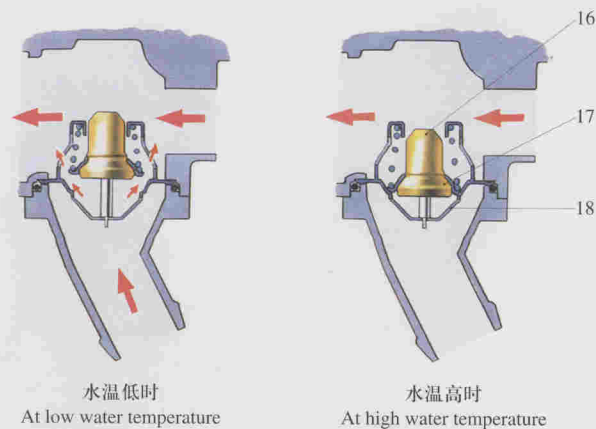




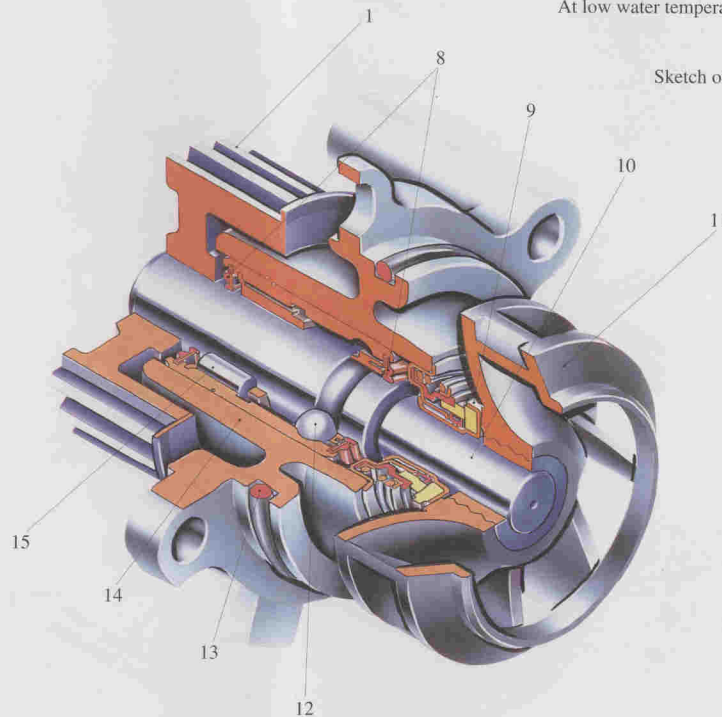
冷却系统的大循环示意图
Sketch of full circulating of cooling system



冷却系统的小循环示意图
Sketch of simple circulating of cooling system

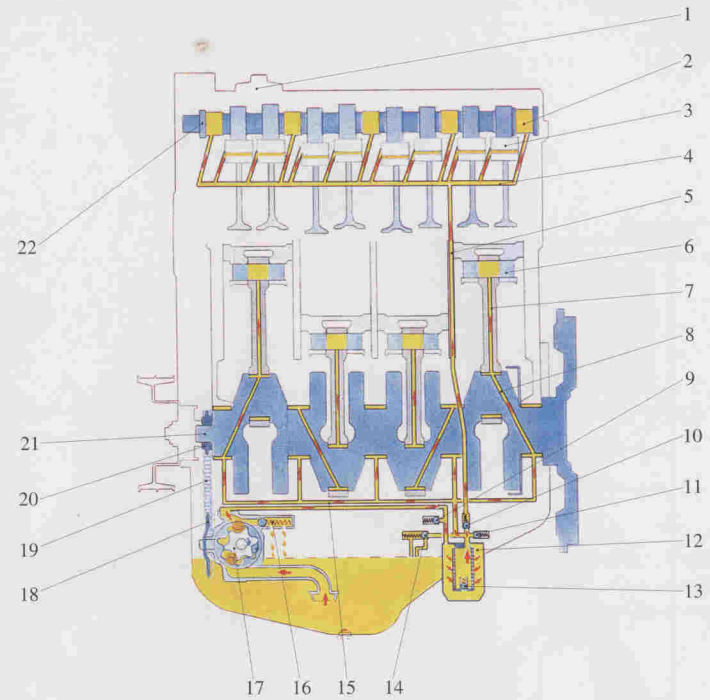
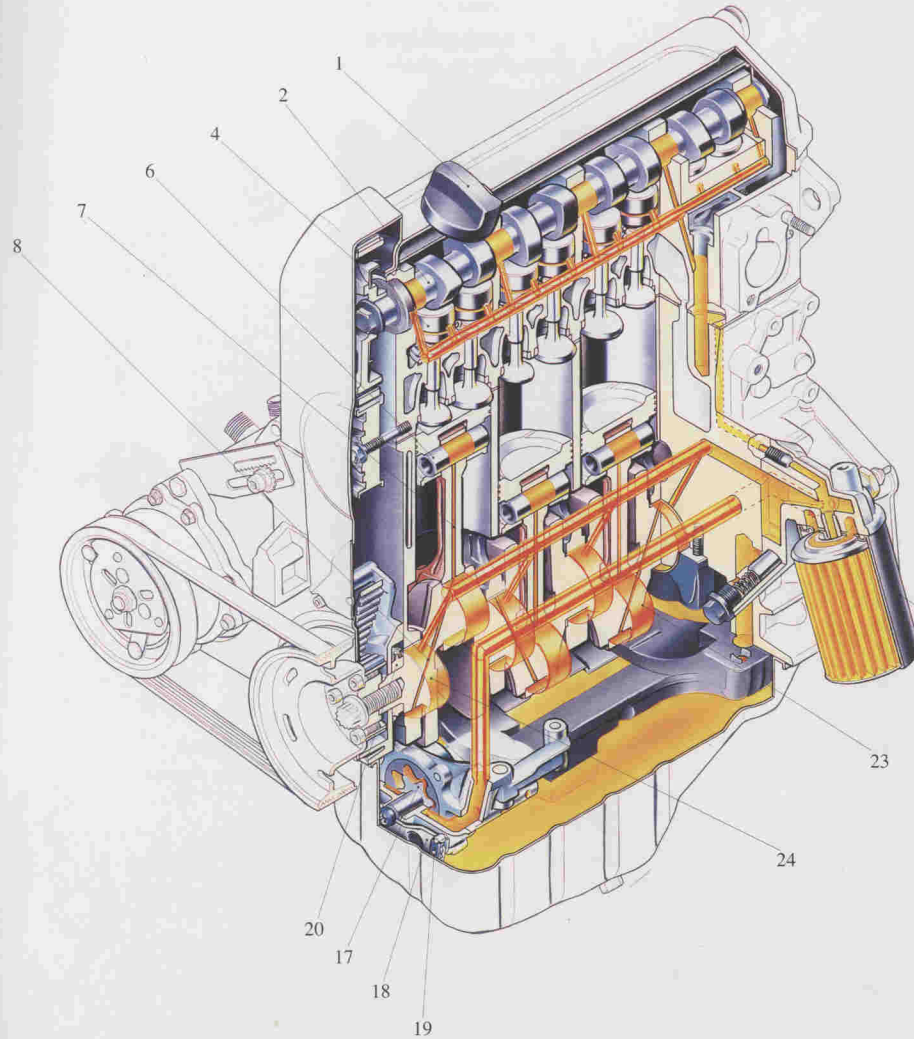


节温器工作原理示意图
Sketch of operational principle of thermostat



水泵总成
Water pump assembly

1. 水泵齿形带轮 Toothed pulley, water pump
2. 散热器 Radiator
3. 曲轴齿形带轮 Toothed pulley, crankshaft
4. 水泵叶轮 Impeller, water pump
5. 节温器 Thermostat
6. 控制阀 Control valve
7. 暖风装置的热交换器 Heat exchanger, heating device
8. 轴承密封 Bearing seals
9. 密封组件 Seal unit
10. 水泵轴 Shaft, water pump
11. 水泵叶轮 Impeller, water pump
12. 球轴承 Ball bearing
13. O形密封圈 O-ring
14. 水泵壳体 Housing, water pump
15. 圆柱滚子轴承 Roller bearing
16. 节温器芯 Thermostatic core
17. 阀 Valve
18. 阀座 Valve base

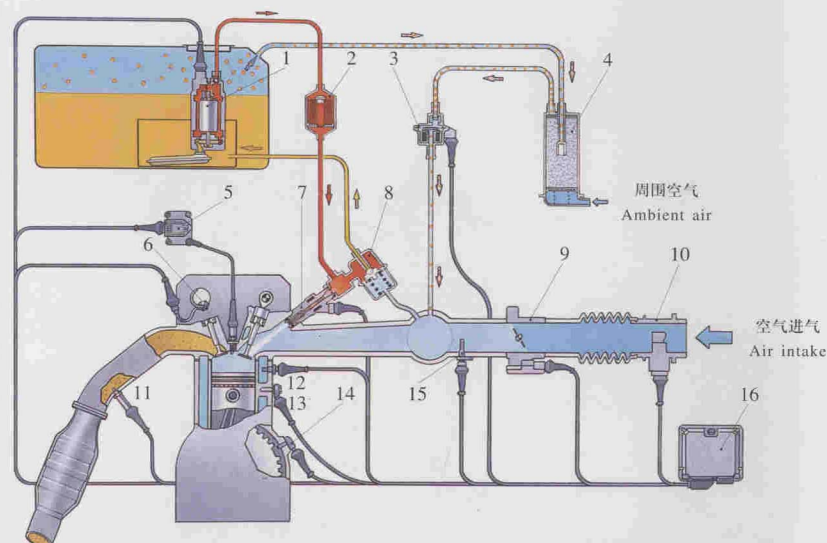


润滑系统示意图
Sketch of lubrication system

1. 加机油口盖 Oil filler cap
2. 凸轮轴轴颈 Camshaft journal
3. 液压挺柱 Hydraulic tappet
4. 气缸盖主油道 Main oil gallery, cylinder head
5. 气缸体-气缸盖主油道 Main oil gallery, cylinder block & head
6. 活塞销 Piston pin
7. 连杆油道 Oil circuit, connecting rod
8. 曲轴油道 Oil circuit, crankshaft
9. 油压开关 (25千帕) Oil pressure switch (25kPa)
10. 单向阀 Check valve
11. 油压开关 (180千帕) Oil pressure switch (180kPa)
12. 机油滤清器 Oil filter

13. 旁通安全阀 (当滤芯堵塞时) Bypass relief valve (in case of plugging cartridge)
14. 限压阀 Oil pressure relief valve
15. 气缸体主油道 Main oil gallery, cylinder block
16. 溢流阀 Overflow valve
17. 机油泵 Oil pump
18. 机油泵链轮 Sprocket, oil pump
19. 链条 Chain
20. 曲轴链轮 Sprocket, crankshaft
21. 曲轴 Crankshaft
22. 凸轮轴 Camshaft
23. 曲柄销轴颈 Journal, crank pin
24. 曲轴主轴颈 Main journal, crankshaft

Motronic M3.8.2 电喷系统简图
Sketch of Motronic M3.8.2 system



1. 电动燃油泵 Electric fuel pump
2. 燃油滤清器 Fuel filter
3. 活性炭罐电磁阀 Charcoal canister-purge valve
4. 活性炭罐 Charcoal canister
5. 带输出驱动级的点火线圈组件 Ignition transformer unit with output driver stage
6. 相位传感器 Phase sensor
7. 喷油器 Fuel injector
8. 燃油压力调节器 Fuel pressure regulator

9. 节气门控制部件 Throttle valve control unit
10. 空气质量计 Air mass meter
11. 氧传感器 Lambda sensor
12. 冷却液温度传感器 Coolant temperature sensor
13. 爆震传感器 Knock sensor
14. 发动机转速传感器 Engine speed sensor
15. 进气温度传感器 Intake air temperature sensor
16. 发动机控制单元 Engine control unit
17. 传感器插头支架 Supporter for sensors connectors

系统各组件的安装布置简图
Sketch of the location of system components

