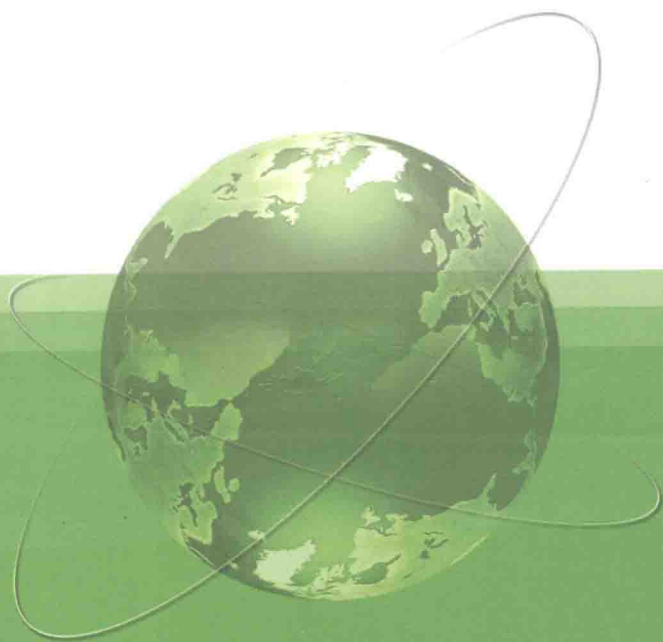




21世纪高职高专规划教材

(汽车类)

# 汽车专业英语



彭小红 主编



机械工业出版社  
CHINA MACHINE PRESS



配电子教案

**21 世纪高职高专规划教材**  
(汽车类)

# 汽车专业英语

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机械工业出版社

本书为 21 世纪高职高专汽车专业规划教材之一。全书共分 7 部分 26 个单元并有 3 个附录, 主要内容包括汽车概述、汽车构造、汽车电子控制系统、汽车维修与维护、汽车营销与售后服务、汽车保险、汽车美容等 7 个方面, 内容模块化, 有利于按需施教。书中运用了大量的插图, 便于读者理解和记忆汽车专业英语词汇; 每一部分结尾都有对应的练习题和参考译文, 增加了本书的自学性和阅读性。

本书可作为高职高专院校汽车运用、汽车维修、汽车检测、汽车电子技术、汽车美容、汽车贸易、汽车保险等汽车类相关专业教材, 也可作为中职学校教材和汽车技术人员培训用书, 同时可供本科院校师生、汽车从业人员和汽车爱好者参考。

本书配有电子教案, 凡一次购书 30 本以上者免费赠送一份电子教案。请与本书策划编辑余茂祚联系 (联系电话 010-88379759); 邮箱 yumaозuo@163.com)。

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# 前 言

随着我国汽车工业的迅速发展,汽车车型不断增加,结构越来越复杂,性能不断改善,电子化程度不断提高,新的结构和装置相继涌现。大量进口汽车涌入中国市场,车型种类繁多,车辆年年改型,而且进口汽车的使用说明书、维修手册、仪表板、熔丝、继电器、各类传感器和主要零部件等大多数都用英文来表达和标注,全球各大汽车公司向各汽车维修站提供技术指导的技术服务公告也是用英文发布的,尤其是现在网上接触的先进汽车技术信息多数也都是用英文来表达的。因此,为了提高汽车类专业学生和汽车行业相关从业人员的英语水平,为他们合理地使用汽车和快速正确地维修汽车提供方便,作者根据多年的教学、科研实践经验,按照教学大纲的要求编写了本书。

本书内容丰富,不仅涉及汽车构造方面的知识,而且包括汽车文化、维修与保养、营销、保险、美容等内容;在内容取材、图文表现等方面符合职业教育的规律和特点。

本书在内容与形式上有以下特色:

1. 内容紧密结合当前最新的汽车技术,通过本书读者不仅可以学到最新的汽车专业词汇,而且还可从中学到最新的汽车技术知识。
2. 中英文对照,图文并茂,通俗易懂。
3. 书后附有常用的汽车技术词汇、进口车型中英文对照以及汽车常用工具及设备中英文对照等,便于读者查询和记忆。

全书共分7部分,其中第1、第7部分由安徽交通职业技术学院程章编写;第2部分由北京电子科技职业学院张贺达编写;第3部分和附录由陕西交通职业技术学院彭小红编写;第4部分由陕西交通职业技术学院黄晓鹏编写;第5部分由陕西交通职业技术学院赵苑编写;第6部分由陕西交通职业技术学院刘涛编写。全书由彭小红担任主编,赵苑和张贺达担任副主编,陕西交通职业技术学院任春晖担任主审。

在本书的编写过程中,陕西交通职业技术学院的崔选盟、廖发良、王保新、蔺宏良、代新雷、黄珊珊、魏秋兰、李占峰以及陕西汽车集团有限责任公司的谷雪松、赵卫艳等给予了大力支持和无私帮助,在此表示衷心的感谢。

在编写中参阅了国内、国外有关资料,在此一并向原作者表示诚挚的谢意。

由于编者水平有限,书中难免会有疏漏和不足之处,敬请读者和同行们批评指正。

编 者

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# **Part One    Automobile Outline**

## **Unit 1    History of the Automobile**

The automobile industry is one of the most important industries affecting not only the economy but also the culture of the world. The manufacture, sale and servicing of automobiles have become the key elements of industrial economy. Automobiles revolutionized transportation in the 20<sup>th</sup> century, changing thoroughly the way people live, travel and do business.

Automobiles are classified by size, style, number of doors and intended use. The typical automobile, also called a car, auto, motorcar and passenger car, has four wheels and can carry up to five people including a driver. Vehicles designed to carry more passengers are called vans, minivans, omnibuses or buses. Those used to carry cargo are called pickups or trucks, depending on their size and design. Sport-utility vehicles, also known as SUVs, are designed for driving in mud or snow.

Today automobiles production has grown from small workshops making simple horseless carriages to international corporations that mass-produce advanced automobiles. Automobiles are the products of centuries of innovation and improvements.

### **Steam-powered Vehicles**

In the 15<sup>th</sup> century, Italian inventor Leonardo da Vinci envisioned the possibilities for power-driven vehicles. By the late 17<sup>th</sup> century, English physicist Sir Isaac Newton had proposed a steam carriage, and the 1769 French army captain Nicholas-Joseph Cugnot actually built a steam-powered, three-wheeled tractor that was used to haul military equipment at the speed of 2.5 miles per hour. Later, he designed another vehicle to carry people. Other inventors made many improvements to vehicles in the following several decades. Steam-powered stagecoaches were in regular service in many towns in Britain in the early 1800s. Half a century later, the popularity of steam vehicles began to decline because they were dangerous to operate and difficult to maintain.

## **Electricity-powered Vehicles**

From 1832 to 1839, Scottish inventor Robert Anderson designed a more practical vehicle that used a battery to power a small motor. This was hailed as a breakthrough, even though this vehicle was still very slow and often needed to stop for recharge. But the idea of electricity-powered vehicles did catch on. Streetcars and trams using electricity for power became the most popular transportation mode of choice in Europe and the U. S. in the mid 1800s.

## **Gasoline-powered Vehicles**

It was the invention of the gasoline-powered engine that really brought reliable and workable automobiles to the world. Gasoline-powered engines were not new; some of the first designs could be dated back to the late 1700s. Some inventors attempted to make a wagon car or a carriage run by a motor, but with moderate success.

In 1885, Karl Benz built the first three-wheeled gasoline-powered car in Germany. In the following year, the milestone vehicle was built by Gottlieb Daimler, another German. He perfected the two-cylinder gasoline engine and attached it to the stagecoach, thereby producing the first four-wheeled motor vehicle in the world. By the early 1900s, motor-powered vehicles had become more popular than any other type of vehicles.

## **The First Vehicle Workshop**

In 1889, former woodworkers Rene Panhard and Emile Levassor in France set up the first workshop that built complete motor vehicles. They made each new car a little bit different from its predecessors for years. Cars were refined during processing. Improvements included moving the engine to the front of the vehicle and designing a rear-wheel drive for better control of the vehicle.

## **Mass-produced Vehicles**

In 1913, Henry Ford began making automobiles on a moving conveyor line in his factories. He realized that efficient mass production could lower car prices, making cars affordable for the average person, thus generating a huge market. This was a smashing success. By 1916 annual U. S. auto production reached one million units, a level not reached by any other country until about 40 years later in England.

Today, auto-making has become the world's largest manufacturing activity, with nearly 58 million new vehicles built each year worldwide. By some estimates, for every job created on the automobile assembly line, three to four jobs are created in the automobile parts industry. The automobile industry is surely an important source of employment and transportation for billions of people. The 1900s can be called the Age of Automobile, and cars will not doubt continue to shape our culture and economy well in the 21<sup>st</sup> century.

### New Words

- revolutionize *v.* 在……方面引起突破性变革  
 military *adj.* 军事的 *n.* 军人, 军事  
 cargo *n.* 货物  
 pickup *n.* 皮卡  
 innovation *n.* 革新, 创新  
 recharge *v.* 再充电 *n.* 再充电  
 stagecoach *v.* 驿站马车  
 tram *n.* 有轨电车  
 predecessor *n.* 原有事物  
 smashing *adj.* 了不起的, 出色的  
 assembly *n.* 装配, 组装

### Phrases and Expressions

- catch on 被(人)接受, 流行起来  
 two-cylinder gasoline engine 双缸汽油发动机  
 steam-powered vehicles 蒸汽汽车  
 electricity-powered vehicles 电动汽车  
 gasoline-powered vehicles 汽油车  
 transportation mode 出行方式  
 moving conveyor line 流水线

## Unit 2 Basic Components of the Automobile

Today's average car contains more than 15,000 separate parts that must work together. These parts can be grouped into four major categories: engine, body, chassis and electrical equipments, as shown in Fig. 1-1.

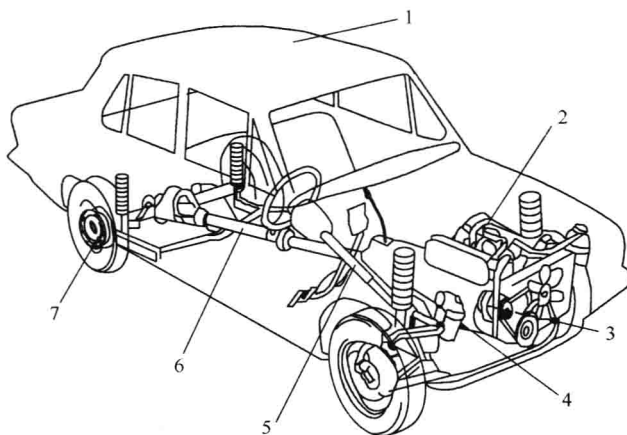


Fig. 1-1 Layout of a modern automobile (现代汽车结构图)

1—body (车身) 2—engine (发动机) 3—electrical equipments (电器设备)  
4—suspension (悬架) 5—steering (转向系统) 6—transmission (变速器) 7—brakes (制动系统)

## Engine

The engine acts as the power unit. The internal combustion engine is most common; this obtains its power by burning liquid fuel inside the engine cylinders. There are two types of engines: gasoline engine (also called a spark-ignition engine) and diesel engine (also called a compression-ignition engine). Both engines are called heat engines; the burning fuel generates heat which causes the gas inside the cylinder to increase its pressure and supply power to rotate a shaft connected to the transmission.

All engines have fuel, exhaust, cooling, and lubrication systems. Gasoline engines also have an ignition system. The ignition system supplies the electric spark to ignite the air-fuel mixture in the cylinders. The automobile supplies all the electricity it needs through its electrical system. The fuel system stores liquid fuel and delivers it to the engine. The fuel is stored in the tank, which is connected to a fuel pump by a fuel line. The fuel is mixed with air to form a combustible mixture in the carburetor, the manifold or the cylinders themselves.

The cooling system removes excessive heat from the engine. The temperature in engine combustion chambers is about  $2,000^{\circ}\text{F}$  ( $1,094^{\circ}\text{C}$ ). Since steel melts at around  $2,500^{\circ}\text{F}$  ( $1,354^{\circ}\text{C}$ ), this heat must be carried away to prevent engine damage. Air and coolant are used to carry away the heat.

The lubrication system is important in keeping the engine running smoothly, and motor oil is the lubricant used in the system. To keep this system working efficiently,

oil filters and motor oil must be changed regularly. All other moving parts in an automobile must also be lubricated.

## Body

An automobile body is a sheet metal shell with windows, doors, a hood and a trunk deck built into it. It provides a protective covering for the engine, passengers and cargo. The body is designed to keep passengers safe and comfortable. The body styling provides an attractive, colorful, modern appearance for the vehicle. It is streamlined to lessen wind resistance and to keep the car from swaying at high driving speeds.

A sedan has an enclosed body with a maximum of 4 doors to allow access to the passenger compartment. The design also allows for storage of luggage or other goods. Multi-purpose vans (MPV) can be based on common sedan designs or redesigns so that maximum cargo space is available. Usually it has stronger chassis components and suspension than a sedan to support greater gross vehicle mass.

## Chassis

The chassis is an assembly of those systems that are the major operating parts of a vehicle. The chassis includes the power train, suspension, steering and brake systems (see Fig. 1-2).

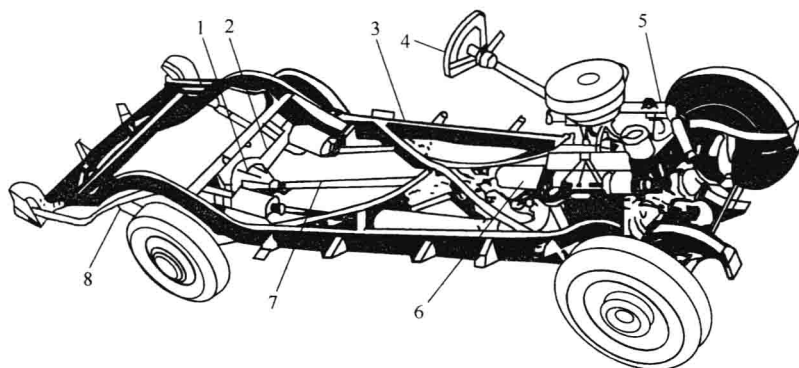


Fig. 1-2 Chassis of a car (汽车底盘)

- 1—differential (差速器) 2—rear-axle housing (后桥壳) 3—frame (车架) 4—steering wheel (转向轮)  
5—engine (发动机) 6—transmission (变速器) 7—drive shaft (传动轴) 8—suspension (悬架)

### (1) Power Train

The power train system comprises clutch, transmission, drive shaft, rear axle, differential and the driving road wheels.

The clutch or torque converter has the task of disconnecting and connecting the engine's power from and to the driving wheels of the vehicle. This action may be manual or automatic.

The main purpose of the transmission or gearbox is to provide a selection of gear ratios between the engine and driving wheels, so that the vehicle can operate satisfactorily under all driving conditions. Gear selection may be done manually by the driver or automatically by a hydraulic control system.

The function of the propeller (drive) shaft is to transmit the drive from the transmission to the input shaft of the rear axle and differential assembly. Flexible joints allow the rear axle and wheels to move up and down without affecting operation.

The rear axle and differential unit transmits the engine's rotational power through 90° from propeller shaft to axle shaft and road wheels. A further function is to allow each driving wheel to turn at a different speed. The third function is to introduce another gear ratio for torque multiplication.

## (2) Suspension System

The axles and wheels are isolated from the chassis by a suspension system. The basic job of the suspension system is to absorb the shocks caused by irregular road surfaces that would otherwise be transmitted to the vehicle and its occupants, thus helping to keep the vehicle on a controlled and level course, regardless of road conditions.

## (3) Steering System

The steering system, under the control of the driver at the steering wheel, provides the means by which the front wheels are directionally turned. The steering system may be power assisted to reduce the effort required to turn the steering wheel and make the vehicle easier to maneuvers.

## (4) Braking System

The braking system on a vehicle has three main functions. It must be able to reduce the speed of the vehicle, when necessary; it must be able to stop the car in as short a distance as possible; it must be able to hold the vehicle stationary. The braking action is achieved as a result of the friction developed by forcing a stationary surface (the brake lining) into contact with a rotating surface (the brake drum or brake disc). Each wheel has a brake assembly, of either the drum type or the disc type, hydraulically operated when the driver applies the foot brake pedal.

## Electrical Equipment

The electrical system supplies electricity for the ignition, horn, lights, heat and

starter. The electricity level is maintained by a charging circuit. This circuit consists of a battery and an alternator (or generator). The battery stores electricity. The alternator changes the engine's mechanical energy into electrical energy and recharges the battery.

## New Words

chassis *n.* 底盘

transmission *n.* 变速器, 传动, 传动系统

lubrication *n.* 润滑

ignition *n.* 点火, 点燃

**boost** *v.* 升压, 推进, 增加, 增压, 提高

carburetor *n.* 化油器

radiator *n.* 散热器, 冷却器

sludge *n.* 软泥, 淤泥

hood *n.* 发动机罩

styling *n.* 花(式)样

streamlined *adj.* 流线形的, 现代化的

sedan *n.* 轿车

enclosed *adj.* 封闭的, 密闭的

gross *adj.* 总的, 毛重的; *n.* 总额

axle *n.* 轮轴, 车轴

suspension *n.* 悬架, 悬浮

differential *n.* 差速器 *adj.* 差动的

clutch *n.* 离合器

hydraulic *adj.* 液压的, 水压的

course *n.* 过程, 经过, 进程

**man oeuvre = maneuvers**    *v.* 策划, 调动, 演习, 操纵, 机动 (动作);  
                                       *n.* 策略, 调动

battery *n.* 蓄电池

## Phrases and Expressions

ignition coil 点火线圈

charging circuit 充电电路

combustion chamber 燃烧室

passenger compartment 乘客室, 乘客艙

motor oil = engine oil 润滑油, 机油  
 sheet metal 钢板, 金属板  
 multi-purpose van (MPV) 多用途厢式车  
 power train 传动系, 动力装置  
 propeller shaft 传动轴  
 torque converter 液力变矩器  
 gear ratio 传动比  
 flexible joint 柔性接头  
 axle shaft 半轴  
 brake drum 制动鼓  
 brake disc 制动盘  
 brake lining 制动摩擦衬片

## Unit 3 Performance Parameter of the Automobile

### Dimensions of an Automobile

The dimensions of an automobile can make you know the appearance of it. They contain the wheelbase, the track front and rear, the overall length, the overall width, the overall height, overhang front, overhang rear, the angle of approach, the angle of departure, interior length, interior width, interior height, the ground clearance, curb weight, gross vehicle weight, number of the doors, seating capacity and trunk or cargo space, as shown in Fig. 1-3.

Whether the performance of an automobile is outstanding depends on its engine and the chassis. Whether the engine is powerful depends on its type, displacement, compression ratio, maximum output and torque. What is more, the advanced suspension system, the brake type, the transmission and the wheels are made up of the tough, durable chassis.

### Engine Performance Parameter

Engine performance parameters include engine type, bore and stroke, displacement, compression ratio, valve train, power, torque and ignition system type.

The diameter of the cylinder is called the engine bore. Displacement and compression ratio are two frequently used engine specification. Displacement indicates engine size, and compression ratio compares the total cylinder volume to compression



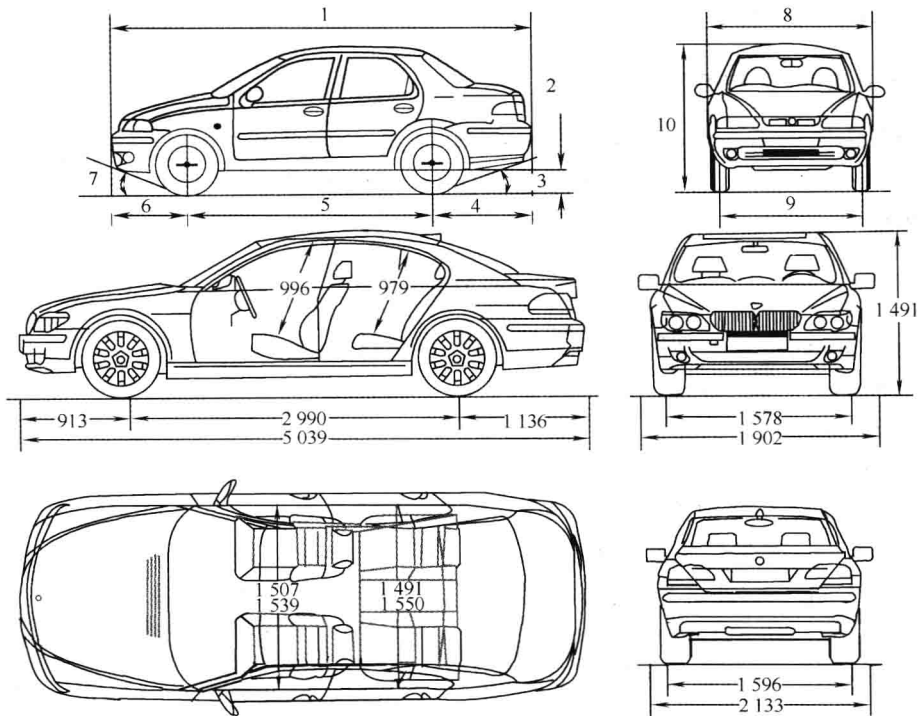


Fig. 1-3 Dimensions of an automobile (汽车尺寸参数)

- 1—overall length (总长) 2—ground clearance (最小离地间隙) 3—angle of departure (离去角)  
 4—overhang rear (后悬) 5—wheelbase (轴距) 6—overhang front (前悬)  
 7—angle of approach (接近角) 8—overall width (总宽) 9—track front (轮距) 10—overall height (总高)

chamber volume.

Power is defined as the rate work is being done. Brake power is defined as the actual power measured at the rear of the engine under normal conditions. Indicated power is defined as theoretical power. It represents the maximum power available from the engine under ideal or perfect conditions. Indicated power is calculated on the basis of engine size, displacement, speed, and the pressure developed theoretically in the cylinder. Frictional power is defined as the power used to overcome internal friction within the engine and the drive train. Sources of frictional power include bearing, pistons sliding inside the cylinder, the compression stroke, the generator fan, water pump, belts, air conditioner, transmission, drive shaft, rear differential assemblies, and so on. Road power is the power available at the drive wheels of the vehicle. Torque is one way to measure work and defined as twisting force. This force is produced in an engine because of the combustion of fuel. Combustion pushes the piston down. The piston causes the crankshaft to rotate, producing torque. This force causes