



21世纪高职高专规划教材

汽车专业英语教程

■ 主 编 徐莉芳 任冠伟
■ 主 审 冯永忠 Brenda Thurston



中国电力出版社

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内容提要

本书是 21 世纪高职高专规划教材,也可以作为汽车维修部门英语培训材料。全书共分为 15 个单元,以最新汽车模块分类及维修基础为主线,且每单元之间又相对独立。

对话部分强调如何做好维修业务接待常用语及步骤。内容包括:预约、接待、填写和确认施工单、派工和作业、检验、交车、结算及回防等。

课文部分是最新汽车分类模块的各个机体的结构、原理、电控等系统的应用及其汽车零部件的用途。内容包括:润滑系统、冷却系统、启动和充电系统、燃油系统、排放物控制、防抱死制动系统、辅助约束系统、混合动力车、卫星导航系统等。

维修必备部分提示在实际工作中的操作程序及怎样更好地使用维修手册。内容包括:基础维修指导、如何排除系统故障、客户故障分析、症状模拟、电路检测程序、怎样使用诊断故障码图、了解故障流程图及汽车的保养与维护等。

每个单元中还有汽车部件的整体概述、科技英语语言特点解析,并配有相应的练习,在“汽车俱乐部”里还有中英文识标图等。

本书内容全面、条理清晰、通俗易懂、实用性强。不仅是一本教材,也是一本很好的汽车爱好者的参考书。

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前 言

21 世纪不仅给我们带来了信息时代的黎明,也让汽车行业成为国家的支柱产业。汽车业的突飞猛进及大量的汽车新技术的引进,对汽车专业人才英语水平的要求也越来越高。根据当前汽车最新技术发展的特点和人才需求,提高汽车专业的学生及汽车行业人员的专业英语水平已成为当务之急。

本书为了与常见的英语学习模式相衔接,采用对话、课文的形式编排。共分为 15 个单元。每个单元紧密配合,又不相互重复。单元内的内容又相对独立,可根据学生的实际情况调整侧重点。同时每个知识点都编配了练习以帮助学生学汽车专业英语、熟悉相关的汽车专业词汇,并提高自己的英语阅读能力。

本书有两条主线:一条是按最新汽车的分类模块介绍其各个机体的结构、原理、电控系统等,内容包括:润滑系统、冷却系统、启动和充电系统、燃油系统、排放物控制、防抱死制动系统、辅助约束系统、混合动力车、卫星导航系统等。

另一条主线是按检修维修的实际应用。主要内容包括:基础维修指导、如何排除系统故障、客户故障分析、症状模拟、电路检测程序、怎样使用诊断故障码图、了解故障流程图及汽车的保养与维护等。

本书的作者有来自学校的主讲汽车专业的英语教师,也有来自汽车维修一线的维修高级技师,他们具有丰富的教学与实践经验,以确保本书的教学可操作性、汽车技术的前瞻性和检修维修的实用性。

主编由北京科技大学的徐莉芳和北京广播电视大学的任冠伟担任。副主编由北京师范大学的刘大为、北京科技大学的陈永生和北京博瑞凌志汽车销售服务有限公司的杨洪举担任。还有任东风本田北京国机隆盛汽车有限公司技术服务总监的王振超及北京科技大学、北京中德培训学校的周军、李海英、王雅殊等参与本书的编写。

本教材在编写过程中,参考了大量的书籍和资料,有些内容难免引自其中,在此对原作者表示诚挚的谢意!同时对许多同事、朋友给予的帮助与支持,一并表示衷心的感谢。

编者深知自己才疏学浅,知识有限,书中肯定存在着许多缺点和错误,望广大师生和读者,及各位专家学者不吝指教,编者在此表示诚挚的谢意。

编 者

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Unit 1 4-Stroke Spark-Ignition Engine

Communicative Samples

Dialog 1

Bob, a college student, finds himself fond of cars recently. This summer vacation, he comes to his uncle, Mr. White, a senior car mechanic (Auto Maintenance), talking something about cars.

Mr. White: Hi, young boy. How's your school day?

Bob: Everything is going well, and I got 3 As in my final exam. Uncle, I'm look forward to seeing you.

Mr. White: Well, I guess you missed my new cars. (Laugh) Your mother told me that you suddenly became a car fan.

Bob: Oh, yes. I want to learn driving a car, you know. And I think you can give me a hand.

Mr. White: That's no problem. Before learning car driving, you'd better to know some basic knowledge of cars first.

Bob: Yes. Like its history of development, its basic construction...

Mr. White: Speaking of its basic construction, do you know its basic sections?

Bob: It's just a piece of cake for me. Any automobile are made up of four basic sections: engine, chassis, body and electrical system.

Mr. White: Right. Then, do you know what the automobile engine is used for?

Bob: Oh, I once read it on a car magazine. It, er... it makes the car move.

Mr. White: Yes. The automobile engine is an internal combustion engine. It converts the heat energy of fuel into mechanical energy, thus supply the power to move the car.

Bob: see. But would please give me a detailed explanation of engine operating principles?

Mr. White: Oh, this question takes time to explain. Why don't you have dinner with me and your aunt first? I think you must be hungry.

Bob: Oh, great idea. I really missed aunt's dishes too. You know, they're too delicious.

Dialog 2

A man is calling Great Wall Automobile Service Company.

Bruce: Hello, Great Wall Automobile Service Company. This is Bruce, after-sales receptionist. What can I do for you?

Mr. Green: Hello, this is Dean Green. And I think my car needs maintenance.

Bruce: Well, what is your license plate number?

Mr. Green: Yes. It is JB8574320.

Bruce: Wait a minute, please. Let me check. Oh, sorry, we have no your information in our system. Is this your first time to maintain you car in our company, Mr. Green?

Mr. Green: Yes.

Bruce: May I have your car style, please?

Mr. Green: Well, my car is LEXUS LS460L, and the plate number is JB8574320.

Bruce: And the traveling mileage of your car?

Mr. Green: About 20,000 kilometers.

Bruce: And I will keep your name and telephone number, so that we can contact you later.

Mr. Green: OK. Dean Green, and my phone number is 1361468350.

Bruce: Dean Green, and 1361468350. OK, I get it.

Mr. Green: Then when can I come to your company?

Bruce: Well, let me check. Is tomorrow afternoon convenient for you?

Mr. Green: Yes. I'll come tomorrow afternoon. Thank you. Bye.

Bruce: My pleasure. Bye.



Communicative Practice

Ex.1 Work with your partner for the conversation

Topic1: Talking about the modern cars.

Topic2: Making an appointment with the maintenance company through the phone.

Paragraph Reading:

4-Stroke Spark-Ignition Engine



Pre-reading

- (1) How many parts does an automobile probably contain?
- (2) What are the four strokes of an engine?
- (3) What do you do first when you own a vehicle?

Along with the rapid development of the society, remarkable changes have taken place in automobiles' engine. At the beginning of learning this paragraph, it is necessary to understand some terms in the descriptions of the 4-stroke spark-ignition engine.

Stroke: This term is used to describe the movement of the piston from TDC (top dead center) to BDC (bottom dead center), or BDC to TDC.

TDC: When the piston reaches its highest position inside the cylinder, it is said to be at Top Dead Center.

BDC: When the piston moves to its lowest position inside the cylinder, it is said to be at Bottom Dead Center.

1. Basic 4-stroke principles

The 5 events of an internal combustion engine are Intake, Compression, Ignition, Power, and Exhaust. In a 4-stroke gasoline engine, the crankshaft does 2 revolutions in each engine cycle. Only 1 of its 4-strokes delivers energy to the crankshaft.

There is a cylinder shown in the picture (Fig. 1-1) for a 4-stroke Petrol/Gasoline engine. The first step is to get the air-fuel mixture into the chamber. Mixture enters through an inlet port that is opened and closed by an inlet valve. This is called Intake. Next is compression. The piston compresses the air-fuel mixture into a smaller volume. A spark across

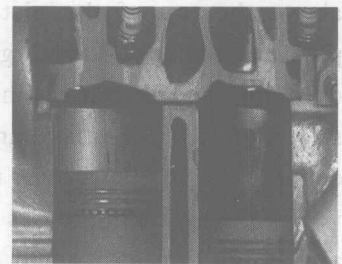


Fig. 1-1

the electrodes of a spark plug ignites it, and it burns. This burning is called combustion. The burning gases expand rapidly, and push the piston down the cylinder until it reaches bottom dead center. The reciprocating action of the piston turns into the rotary motion of the crankshaft. The crankshaft forces the piston back up the cylinder, pushing leftover gases out past an exhaust valve. And everything is back where it started, ready to repeat the whole process. The whole process is a cycle. A new mixture enters and is ignited. When Combustion occurs, expanding gases drive the piston down and turn the crankshaft which pushes the piston back up the cylinder. These 5 events occur in all internal combustion engines. How they happen can change but they are always there. In one 4-stroke cycle, the crankshaft does 2 revolutions. In those 2 revolutions how many strokes does the piston make? It does 4 strokes. Out of those 4 strokes how many actually produce energy? In one 4-stroke cycle, only 1 stroke out of 4 delivers new energy to turn the crankshaft.

2. 4-stroke engine cycle

A 4-stroke engine (Fig. 1-2) has the following “strokes”, intake, compression, power, and exhaust. A 4-stroke gasoline engine uses “internal” combustion, meaning that the heat that causes the air in the cylinder to expand is generated “internally”. Those 4 strokes must include the 5 key events common to all internal combustion engines — Intake, Compression, Ignition, and Power & Exhaust. Let’s look at a simplified model. Note that the valves are only open during their respective strokes, i.e., intake valve open ONLY during the intake stroke, exhaust valve ONLY during the exhaust stroke. Both are CLOSED during compression and power!

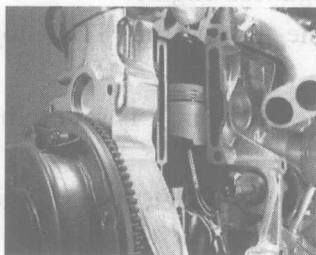


Fig. 1-2

The intake stroke starts with the exhaust valve closed, the inlet valve opening, and the piston at its highest point, top dead center. It starts to move down, increasing the volume above the top of the piston. This makes pressure inside the cylinder lower than the pressure outside. This higher outside air pressure forces the air-fuel mixture into the cylinder. The piston reaches bottom dead center, the inlet valve closes, and the intake stroke ends. Both intake and exhaust valves stay closed as the piston leaves bottom dead center. The piston moves up, squeezing the air-fuel mixture into a smaller and smaller volume, which compresses it. That causes the air/fuel charges temperature to rise, and that makes ignition easier and combustion more complete. Just before the piston reaches top dead center, the next key event occurs — ignition. The air expanding in the cylinder

pushes the piston down the cylinder. This is the Power stroke that drives the engine. The piston now moves from bottom dead center to top dead center. The exhaust valve opens, and the piston pushes out the leftover gases. Let's look at a complete 4-stroke cycle.

Intake — takes in air-fuel mixture.

Compression — squeezes the air-fuel mixture into a smaller and smaller volume.

Ignition — the mixture under pressure is ignited.

Power — burning, expanding gases push the piston down and creating a power stroke that turns the crankshaft.

Exhaust — the piston moves upward, forcing burned gases from the chamber.

NISSAN Words

Ignition	/ig'nɪʃən/	n.	点火
Exhaust	/ɪg'zɔ:st/	n. & v.	排气
Crankshaft	/'kræŋkʃɑ:ft/	n.	曲轴
Stroke	/strəʊk/	n.	冲程
Electrode	/'ɪlektroʊd/	n.	电极
Cylinder	/'sɪlɪndə/	n.	气缸
Chamber	/'tʃeɪmbə/	n.	燃烧室
Piston	/'pɪstən/	n.	活塞
Reciprocating	/rɪ'sɪprəkeɪtɪŋ/	n.	往复运动
Squeezing	/skwi:z/	n. & v.	挤压



Notes

1) A spark across the electrodes of a spark plug ignites it, and it burns.

本句由两个分句组成并用“and”连接。前一个分句是一个介宾结构，“across the electrodes”作定语修饰前面的名词“spark”，然后它们的组合形式与“of a spark plug”构成所属格形式共同成为它的主语部分，“ignites”作谓语，“it”作宾语；后一个分句只是一个简单的主谓形式。

2) When combustion occurs, expanding gases drive the piston down and turn the crankshaft which pushes the piston back up the cylinder.

这个句子前面的“combustion occurs”构成主谓形式，逗号后面是现在分词作伴随性状语的句子，其中的“drive”和“turn”是状语中的并列动词，在本句的最后部分又有一个由“which”引导的定语从句，修饰前面的“crankshaft”。

3) That causes the air/fuel charges temperature to rise, and that makes ignition easier

and combustion more complete.

本句是由“and”连接的两个并列分句。前面分句结构为“that”作主语，“causes”作谓语，“the air/fuel charges temperature to rise”作宾语；而后面分句结构为“that”作主语，“makes”作谓语，“ignition”和“combustion”作宾语，而“easier”和“more complete”作宾语补足语。



Check your understanding

Ex.2 Multiple Choices

- According to the passage, in a 4-stroke gasoline engine, the crankshaft does _____ revolutions in each engine cycle.
A. 1 B. 2 C. 3 D. 4
- A mixture of fuel and air is taken into the cylinder in _____ stroke.
A. exhaust B. power C. compression D. intake
- In _____ stroke, the air-fuel mixture is ignited by a spark plug.
A. intake B. exhaust
C. power D. compression
- Both intake valve and exhaust valve are closed during the _____ stroke.
A. intake and exhaust B. intake
C. compression and power D. compression and exhaust
- In a 4-stroke engine, only _____ stroke delivers energy to the crankshaft.
A. power B. compression C. intake D. exhaust
- The 5 key events common to all internal combustion engines are intake, compression, _____ power and exhaust.
A. combustion B. ignition C. reciprocation D. expansion

Ex.3 Fill in the blanks with the words given below. Make changes where necessary

ignite	compression	repeat	expand	exhaust
chamber	mixture	leftover	deliver	revolve

- The force makes the air _____ in a smaller space.
- The _____ fumes from the cars are becoming a main source of air pollution.
- The shop promises that they will _____ our order to our door.
- The town is a _____ of old and new buildings.

- 5) Our foreign trade has grown greatly in recent years.
- 6) That poor girl is living on others alone.
- 7) It's too noisy here, would you please repeat what you said just now?
- 8) The earth revolves round the sun on its axis.
- 9) He struck a match and lit the firewood.
- 10) There is an opening underground called.

Ex.4 Translating

- 1) At the end of the second stroke, the mixture is compressed in the top part of the cylinder (the combustion chamber) into a space approximately eight or nine times as small as the space at the beginning of the stroke.
- 2) During the four-stroke cycle, therefore, the crankshaft revolves through two full revolutions (720°) before one cycle has been completed.
- 3) During the compression stroke of an engine cycle, the volume of mixture drawn into the cylinder (the swept volume) is compressed into a small space above the piston when the piston reaches the top of the cylinder.
- 4) The mixture continues to be forced into the cylinder until the piston reaches BDC. At this approximate position the inlet valve is made to close.
- 5) An engine will run with the four basic systems — fuel, ignition, lubricating, and cooling.
- 6) 发动机完整的循环要求有活塞的四个冲程：进气、压缩、做功、排气。
- 7) 四冲程发动机的工作循环是以活塞在上止点、进气门打开为开始的。
- 8) 第二个冲程使得活塞向上运动。
- 9) 进气冲程中空气燃料混合气充满单个气缸时的体积可以通过测量气缸计算得到。
- 10) 大多数汽车发动机是以四冲程原理工作的。

Text in Chinese:

四冲程发动机

随着社会的快速发展，汽车的发动机有了显著的变化。在学习本课之前，先了解一些四冲程发动机的术语。

冲程：冲程是活塞从上止点（TDC）到下止点（BDC），或者从下止点到上止点的移动。

上止点：当活塞在气缸内到达最高点时，就叫上止点。

下止点：当活塞在气缸内移至最低点时，就叫下止点。

1. 四冲程发动机的基本原理

内燃机要做的五件事是进气、压缩、点火、做功和排气。在四冲程汽油发动机中，发动机每完成一个工作循环，曲轴旋转两圈。在这四个冲程中，只有一个冲程给曲轴传递能量。

图 1-1 所示为一个四冲程汽油发动机的气缸。第一步是使空气和燃油混合物进入燃烧室。混合物通过进气道进入燃烧室，进气道由进气门打开和关闭，这就是进气冲程。下一步是压缩。活塞把空气和燃油混合物的容积压缩得较小。火花塞电极的火花点燃混合物，混合物开始燃烧，这就是燃烧过程。燃烧的气体迅速膨胀，向下推动活塞，直到活塞到达下止点。活塞的往复运动转变成曲轴的旋转运动。曲轴迫使活塞返回气缸，通过排气门排出废气。每件事又重新开始，重复全过程。全过程就是一个循环。新的混合物进入并点火，气体燃烧，膨胀的气体向下推动活塞，使曲轴旋转，曲轴把活塞推回气缸。这五件事发生在所有内燃机中。怎样进行可能会有变化，但这五件事总会发生。每一个四冲程循环，曲轴转两圈。这两圈活塞完成几个冲程呢？四个冲程。在这四个冲程中，哪些确实产生能量呢？在一个四冲程循环中，只有一个冲程传递新能量，以便使曲轴旋转。

2. 四冲程发动机的循环

一个四冲程发动机有进气、压缩、做功、排气四个冲程，如图 1-2 所示。四冲程发动机是内燃机，这就意味着引起气缸内空气膨胀的热量在内部产生。这四个冲程一定包括所有内燃机共有的五个关键过程——进气、压缩、点火、做功和排气。我们看一个简单样式。注意这些气门在它们各自的冲程才打开，例如：只有在进气冲程才打开进气门，只有在排气冲程才打开排气门。在压缩和做功冲程两种气门都关闭！排气门关闭时，进气冲程开始。打开进气门，活塞在最高点即上止点位置。活塞向下移动，增大了活塞顶部的容积。这就使气缸内部的压力低于外部的压力。较高的外部空气压力迫使空气和燃油混合物进入气缸。活塞到达下止点，进气门关闭，进气冲程结束。当活塞离开下止点时，进气门和排气门都关闭。活塞向上运动，把空气和燃油混合物的容积挤压得越来越小，这样可以压缩混合物。这就引起进入的空气燃油温度升高，点火更容易，燃烧更完全。活塞将要到达上止点时，发生下一个关键事件——点火。空气在气缸内的膨胀把活塞推向气缸的下方。这就是驱动发动机的做功冲程。此时活塞从下止点运动到上止点，排气门打开，活塞排出废气。我们看一个全部的四冲程循环。他们是：

进气——吸入空气和燃油混合物。

压缩——把空气和燃油混合物的容积挤压得越来越小。

点火——点燃有压力的混合物。

做功——燃烧和膨胀的气体向下推动活塞，产生使曲轴旋转的做功冲程。

排气——活塞向上运动，迫使废气离开燃烧室。



中国红旗

维修必备指南：基础维修指导

Nowadays, the automobile in our society has been growing steadily with the development of this technology. The automobile contributes daily to our economic and social systems. This basic form of transportation gives people the freedom to travel where they want to go and enjoy the happy journey. But sometimes it's also put them to any trouble when it broke down. Thus, the repairing plays an important role. Before repairing the automobile, it is pretty necessary that we read the BASIC REPAIR HINT (Fig.1-3).

BASIC REPAIR HINT

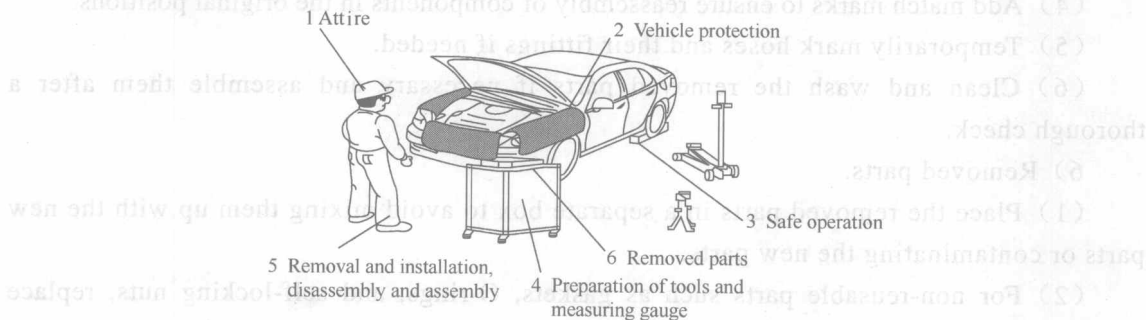


Fig. 1-3

1. HINTS ON OPERATIONS

1) Attire.

Always wear a clean uniform and hat and safety shoes must be worn.

2) Vehicle protection.

Prepare a grille cover, fender cover, seat cover and floor mat before starting the operation.

3) Safe operation.

(1) When working with 2 or more persons, be sure to check safety for one another.

(2) When working with the engine running, make sure to provide ventilation for exhaust fumes in the workshop.

(3) If working on high temperature, high pressure, rotating, moving, or vibrating parts, wear appropriate safety equipment and take extra care not to injure yourself or others.

(4) When jacking up the vehicle, be sure to support the specified location with a safety