

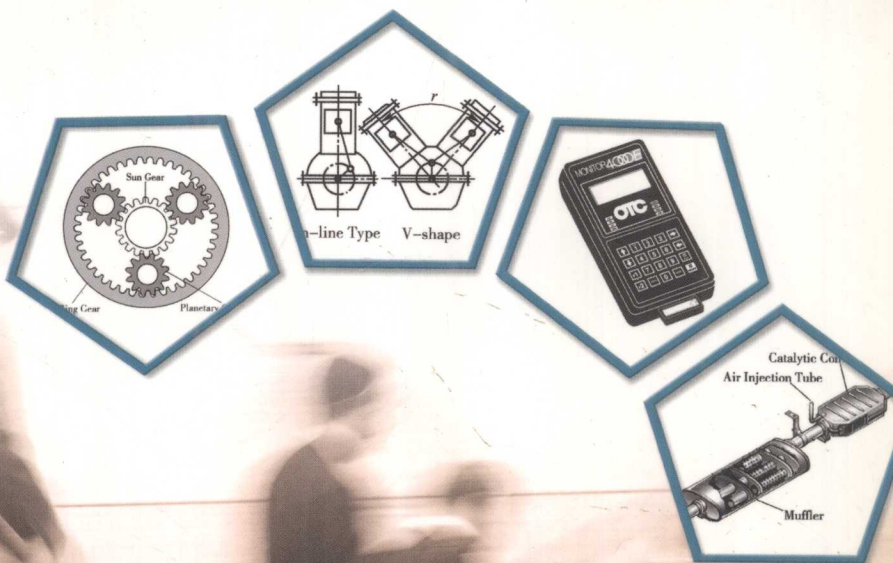


交通职业教育教学指导委员会推荐教材  
高等职业院校汽车运用技术专业教学用书

高等职业教育汽车运用技术专业规划教材

# 汽车实用英语 (下册)

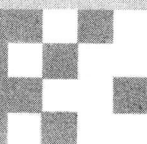
主编 马林才 主审 陈 斌



人民交通出版社  
China Communications Press



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Qiche Shiyong Yingyu

# 汽车实用英语

(下册)

主编 马林才

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## 内 容 提 要

本书是高等职业教育汽车运用技术专业规划教材,也是汽车运用与维修专业技能型紧缺人才培养培训教材。由交通职业教育教学指导委员会汽车运用与维修学科委员会根据教育部颁布的《汽车运用与维修专业领域技能型紧缺人才培养培训教材指导方案》以及交通行业职业技能规范和技术工人标准组织编写而成。

本书共 21 单元,分别选编了汽车发动机、汽车底盘、汽车电器、汽车检测设备、排放控制装置、自动变速器、汽车防抱死制动系统(ABS)、汽车智能运输系统(ITS)、全球定位系统(GPS)、前轮定位仪、发动机模拟仪、车身电器模拟板、汽车计算机控制系统等汽车专业英语短文。书中有大量清晰精致的插图,便于认识和理解汽车专业英语单词与词汇;每个单元结尾都有对应练习题,便于复习和巩固所学知识;书后附有参考翻译,增强了本书的自学性和阅读性。

本书供高等职业院校汽车运用技术专业教学使用,也可作为相关行业岗位培训或自学用书,同时可供汽车维修人员学习参考。

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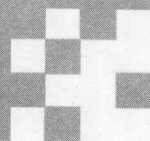
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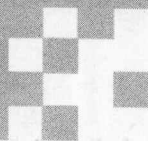
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为贯彻《国务院关于大力推进职业教育改革与发展的决定》以及教育部等六部委《关于实施职业院校制造业和现代服务业技能型紧缺人才培养培训工程的通知》精神,全面实施《2003—2007 年教育振兴行动计划》中提出的“职业教育与培训创新工程”,积极推进课程改革和教材建设,为职业教育教学和培训提供更加丰富、多样和实用的教材,更好地满足职业教育改革与发展的需要,交通职业教育教学指导委员会汽车运用与维修学科委员会组织全国交通职业技术学院的专业教师,按照教育部颁布的《汽车运用与维修专业领域技能型紧缺人才培养培训指导方案》的要求,紧密结合目前汽车维修行业实际需求,编写了高等职业教育规划教材,供高等职业院校汽车运用技术专业教学使用。

本系列教材符合国家对技能型紧缺人才培养培训工作的要求,注重以就业为导向,以能力为本位,面向市场、面向社会,为经济结构调整和科技进步服务的原则,体现了职业教育的特色,满足了汽车运用技术领域高素质专业实用人才培养的需要。

本系列教材在组织编写过程中,认真总结了全国交通职业院校多年来的专业教学经验,注意吸收发达国家先进的职教理念和方法,形成了以下特色:

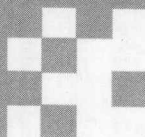
1. 专业培养目标设计基本指导思想是以行业关键技术操作岗位和技术管理岗位的岗位能力要求为核心,确定专业知识和能力培养目标,对实际操作能力要求达到中级技术工人水平,在系统专业知识方面要求达到高级技师水平,并为毕业生在其职业生涯中能顺利进入汽车运用工程师行业奠定良好发展基础;

2. 全套教材以《汽车文化》、《汽车专业英语》、《汽车电工与电子基础》、《汽车机械基础》、《汽车发动机构造与维修》、《汽车底盘构造与维修》、《汽车电气设备构造与维修》、《汽车维修质量检验》八门课程搭建专业基本能力平台,以若干专门化适应各地各校的实际需求;

3. 打破了教材传统的章节体例,以专项能力培养为单元确定知识目标和能力目标,使培养过程实现“知行合一”;

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## Unit 1 Introduction to the Four-stroke Engine

### 单元一 四冲程发动机介绍

#### 学习目标



##### 知识目标

1. 掌握与发动机四冲程的工作过程、发动机分类相关的专业术语、词汇；
2. 掌握发动机常见术语的英语表达方法。



##### 技能目标

1. 能对关于发动机四个冲程的资料进行中英互译；
2. 能进行相关内容的阅读和翻译；
3. 能在汽车实物上标识出英语单词或词汇。

#### Internal Combustion Engine

The engine is a self-contained power unit which converts the heat energy of fuel into mechanical energy for moving the vehicle.<sup>[1]</sup> Because fuel is burned within the engine, it is known as an internal combustion engine. In the internal combustion engine, air/fuel mixture is introduced into a closed cylinder where it is compressed and then ignited. The burning of the fuel causes a rapid rise in cylinder pressure which is converted to useful mechanical energy by the piston and crankshaft. The most common engine is the four-stroke piston engine. These four strokes are intake stroke, compression stroke, power stroke and exhaust stroke.

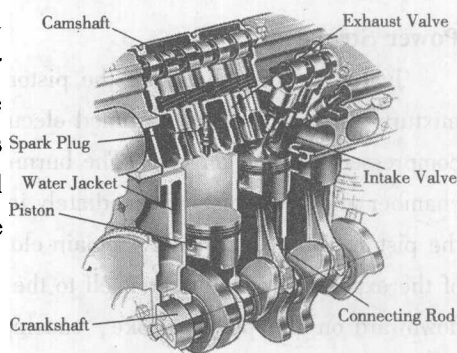


Fig. 1-1 Engine

#### Intake Stroke

The intake stroke of a four-stroke engine begins with the piston at top dead center (TDC). The starter causes the crankshaft to rotate in a clockwise direction. The crankshaft, through the connecting rod, forces the piston to move downward. This downward movement of the piston creates a vacuum, a difference in pressure, in the space above the piston. The engine manufacturer times the intake valve action so that it opens automatically at or slightly before the piston starts down. Therefore, a mixture of gasoline and air, pushed by the atmospheric pressure outside the engine, rushes through the intake manifold and into the engine cylinder. At the same time, the exhaust valve remains closed during this downward stroke of the piston. This valve closure prevents the entering air/fuel charge from



escaping through the exhaust port. After the piston reaches the bottom of its first stroke, the cylinder is practically full of an air/fuel charge. The drawing of an air/fuel charge into the cylinder in this manner, during the downward movement of the piston, constitutes the intake stroke of the piston. [2]

### Compression Stroke

After the piston reaches bottom dead center (BDC), it moves upward again as the starter continues to turn the crankshaft in a clockwise direction. As the piston is beginning to move upward, the intake valve closes, and the exhaust valve remains closed. Since both valves are closed, the piston compresses the air/fuel mixture in the small space between the top of the piston and the cylinder head. As the piston reaches TDC again during its upward travel, the compression stroke of the piston is over. The air/fuel charge is now under compression so that it will produce a great deal of power when the spark plug ignites it.

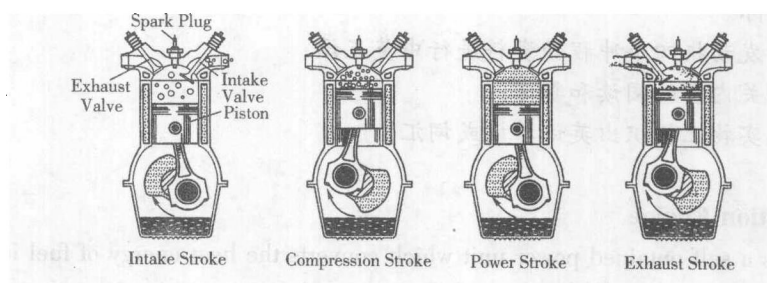


Fig. 1-2 Engine Four-stroke

### Power Stroke

Just as or slightly before the piston reaches TDC on the compression stroke with the air/fuel mixture fully compressed, a timed electrical spark appears at the spark plug. This spark ignites the compressed air/fuel mixture. The burning mixture begins to expand; the pressure in the combustion chamber above the piston immediately increases. This results in a high pressure applied to the top of the piston. Now, both valves remain closed during the power stroke. This assures that the total force of the expanding gas applies itself to the head of the piston. This tremendous force pushes the piston downward on the power stroke, causing the connecting rod to rotate the crankshaft. [3] In other words, the force resulting from the expansion of the burning air/fuel mixture is turning the crankshaft.

### Exhaust Stroke

Near the end of the downward movement of the piston on the power stroke, the camshaft opens the exhaust valve, but the intake valve remains closed. Although much of the gas pressure has expended itself driving the piston downward, some pressure still remains when the exhaust valve opens. This remaining pressurized gas flows comparatively freely from the cylinder through the passage (port) opened by the exhaust valve. [4] Then, as the piston again moves up in the cylinder, it drives any remaining gases out of the cylinder past the open exhaust valve. In other words, while the exhaust valve is open, the upward movement of the piston provides an effective method for



discharging all waste gases from the engine cylinder and combustion chamber. As the crankshaft nears the end of its second complete revolution, the piston again approaches the TDC position. At this point the exhaust valve is closing and the intake valve starts to open. Both valves are open together for a short period of time in order to accelerate the fresh air/fuel charge to flow into the cylinder. As the piston travels through the TDC position and starts downward again in the cylinder, a new operating cycle begins. The four strokes are continuously repeated in every cylinder as long as the engine remains running.

### Flywheel

The engine cycle has only one power stroke where the piston is actually driving the crankshaft. During the other three strokes, the rotating crankshaft is moving the piston up or down in its cylinder. Thus, during the power stroke, the crankshaft tends to speed up; during the other three strokes, it tends to slow down. To keep the crankshaft turning smoothly between two power strokes, the flywheel is attached to the end of the crankshaft.<sup>[5]</sup> This wheel resists any effort to change its speed of rotation. When the crankshaft tends to speed up or slow down, flywheel inertia resists it. In fact, the flywheel absorbs power from the crankshaft during the power stroke and returns it to the crankshaft during the remaining three piston strokes of the engine cycle.

### Multiple-Cylinder Engines

The single-cylinder engine just described as above provides only one power stroke during every two crankshaft revolutions or delivers power only one-fourth of the time. To provide a more even and continuous flow of power, automobiles have engines with four, six, or eight cylinders. These engines have power strokes arranged so as to follow one another closely or overlap one another.

### Engine Classification

For identification purposes, manufacturers classify automobile engines by their cylinder arrangement, valve arrangement, and type of system used to cool the engine.<sup>[6]</sup>

Engine manufacturers basically use three distinct ways to arrange the cylinders in an engine: in-line, V-shape, or opposed. In-line engines, for example, have a single row of cylinders, one behind the other. Most four- and six-cylinder engines have this design. A V-type engine has two rows or banks of cylinders. Also, the cylinders, at their centerlines, usually have an inclination of 60 or 90 degrees. Horizontally opposed engines have two banks of cylinders 180 degrees apart.

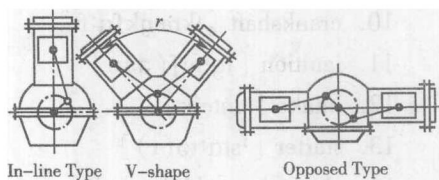


Fig. 1-3 Engine Arrangement

Automobile engines have their valves arranged in one of three ways. In an L-head engine, the valves are in the block, sitting side by side, adjacent to the cylinder. This engine design was at one time very common, but because of its limited compression ratio, the usage now has been confined. The F-type engine has one valve in the cylinder head and one in the engine block. Modern automotive engines utilize the third type of valve arrangement, with both valves in the cylinder head.

Manufacturers also classify engines as being either air- or water-cooled. In these air-cooled





engines, the cylinders are cooled by the air flowing around. A liquid-cooled engine uses a liquid coolant as the medium to remove heat from the engine. With this system, the engine has the water jackets in the block and head, which surround the cylinders and combustion chambers and through which coolant circulates freely.<sup>[7]</sup> This coolant enters the engine from the bottom of the radiator and circulates throughout the engine, where it absorbs heat. Then it exits from the upper water jackets and pours into the upper portion of the radiator. As the coolant passes through the radiator, it picks up the heat contained in the coolant and passes this heat to the air flowing around the radiator passages or tubes. Thus, the coolant leaving the lower tank is cool ready to flow through the engine again.

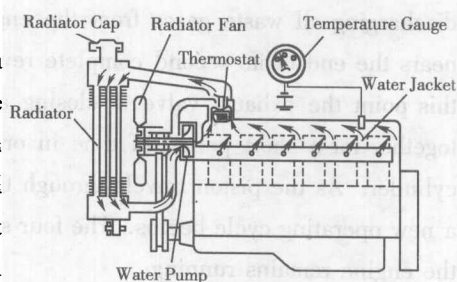


Fig. 1-4 Water-cooled Engine

### New Words

- |                                  |                         |
|----------------------------------|-------------------------|
| 1. introduction [intrə'dʌkʃ(ə)n] | n. 介绍,传入,初步,导言,绪论,入门    |
| 2. unit ['ju:nit]                | n. 元件,部件,零件,装置          |
| 3. vehicle ['wi:ik(ə)l]          | n. 交通工具,车辆              |
| 4. engine ['endʒɪn]              | n. 发动机                  |
| 5. cylinder ['silində(r)]        | n. 气缸,圆筒,圆柱体            |
| 6. combustion [kəm'bʌstʃ(ə)n]    | n. 燃烧                   |
| 7. burn [bɜ:n]                   | vi. 燃烧 vt. 燃烧           |
| 8. convert [kən'veɪt]            | vt. 使转变,转换              |
| 9. piston ['pɪst(ə)n]            | n. 活塞                   |
| 10. crankshaft ['kræŋkʃɑ:ft]     | n. 曲轴                   |
| 11. ignition [ɪg'niʃ(ə)n]        | n. 点火,点燃                |
| 12. intake ['ɪnteɪk]             | n. 入口,进口                |
| 13. starter ['stɑ:tə(r)]         | n. 起动机                  |
| 14. clockwise ['klɒkwaɪz]        | adj. 顺时针方向的 adv. 顺时针方向地 |
| 15. movement ['mu:vmənt]         | n. 运动,动作,运转             |
| 16. vacuum ['vækjuəm]            | n. 真空 adj. 真空的          |
| 17. gasoline ['gæsəli:n]         | n. 汽油                   |
| 18. manifold ['mænɪfəʊld]        | n. 进、排气歧管               |
| 19. stroke [strəʊk]              | n. 冲程,行程                |
| 20. remain [ri'mein]             | vi. 保持,逗留,剩余            |
| 21. charge [tʃɑ:dʒ]              | n. 充气,装料                |
| 22. draw [drɔ:]                  | vt. 吸引,吸入               |
| 23. constitute ['kɒnstɪtju:t]    | vt. 组成,构成               |



- |                                  |                    |
|----------------------------------|--------------------|
| 24. compress [kəm'pres]          | vt. 压缩, 浓缩         |
| 25. travel ['træv(r)l]           | v. 旅行, 传播, 行进      |
| 26. power ['paʊə(r)]             | n. 能量, 动力          |
| 27. ignite [ig'nait]             | v. 点火, 点燃          |
| 28. spark [spɑ:k]                | n. 火花              |
| 29. revolution [revə'lʊ:f(ə)n]   | n. 旋转, 转数, 旋转一周    |
| 30. expand [ik'spænd]            | vt. 使膨胀, 详述, 扩张    |
| 31. apply [ə'plai]               | vt. 申请, 应用, 作用     |
| 32. expend [ik'spend]            | vt. 消耗, 花费, 支出     |
| 33. passage ['pæsidʒ]            | n. 通道, 通路          |
| 34. port [pɔ:t]                  | n. 通道, 港口, 端口      |
| 35. approach [ə'prəʊtʃ]          | vt. 接近, 动手处理       |
| 36. accelerate [ək'seləreit]     | vt. 加速, 促进, 催促     |
| 37. continuously [kən'tinjuəsli] | adv. 不断地, 连续地      |
| 38. attach [ə'tætʃ]              | vt. 安装上, 系上, 贴上    |
| 39. resist [ri'zist]             | vt. 抵抗, 反抗, 抗, 忍得住 |
| 40. inertia [i'nɜ:ʃə]            | n. 惯性, 惯量          |
| 41. even ['i:v(ə)n]              | adj. 平滑的, 偶数的, 平均的 |
| 42. automobile ['ɔ:təməbi:l]     | n. 汽车              |
| 43. arrange [ə'reindʒ]           | v. 排列, 安排          |
| 44. flywheel ['flaiwi:l]         | n. 飞轮              |
| 45. arrangement [ə'reindʒmənt]   | n. 排列, 安排          |
| 46. centerline [ˌsentə(r)'laɪn]  | n. 中心线             |
| 47. inclination [ɪnkli'neɪf(ə)n] | n. 倾斜, 交角, 倾角      |
| 48. adjacent [ə'dʒeɪsənt]        | adj. 邻近的, 接近的      |
| 49. coolant ['ku:lənt]           | n. 冷却液             |
| 50. medium ['mi:diəm]            | n. 媒体, 媒介, 介质      |
| 51. radiator ['reɪdiəɪtə(r)]     | n. 散热器             |
| 52. tank [tæŋk]                  | n. 水箱              |
| 53. overlap [əʊvə'læp]           | v. (与……) 交迭, 部分重叠  |
| 54. bank [bæŋk]                  | n. 一排, 一系列         |
| 55. camshaft ['kæmʃɑ:ft]         | n. 凸轮轴             |

## Phrases and Expressions

- |                               |     |
|-------------------------------|-----|
| 1. self-contained             | 自备的 |
| 2. internal combustion engine | 内燃机 |
| 3. heat energy                | 热能  |



4. mechanical energy	机械能
5. air/fuel mixture	空气燃油混合物(可燃混合气)
6. intake stroke	进气行程
7. compression stroke	压缩行程
8. power stroke	作功行程
9. exhaust stroke	排气行程
10. top dead center (TDC)	上止点
11. connecting rod	连杆
12. intake valve	进气门
13. atmospheric pressure	大气压力
14. intake manifold	进气歧管
15. exhaust valve	排气门
16. bottom dead center (BDC)	下止点
17. spark plug	火花塞
18. speed up	加速
19. slow down	(使)慢下来
20. combustion chamber	燃烧室
21. result in	导致
22. side by side	并排, 并肩
23. compression ratio	压缩比
24. cylinder head	气缸盖
25. engine block	气缸体
26. water jacket	水套

### Notes on the Text

1. The engine is a self-contained power unit which converts the heat energy of fuel into mechanical energy for moving the vehicle.

发动机是个自备动力的装置,它将燃料的热能转换成机械能,用于推动车辆前进。

语法:which converts...引导定语从句。

2. The drawing of an air/fuel charge into the cylinder in this manner, during the downward movement of the piston, constitutes the intake stroke of the piston.

可燃混合气在活塞向下运动时被吸入气缸,这个过程就是进气行程。

语法:during the downward movement of the piston 作时间状语从句。

3. This tremendous force pushes the piston downward on the power stroke, causing the connecting rod to rotate the crankshaft.

在作功行程时,巨大的气体压力推动活塞向下运动,带动连杆转动曲轴。

语法:causing the connecting rod to rotate the crankshaft 是现在分词作结果状语从句。



4. This remaining pressurized gas flows comparatively freely from the cylinder through the passage (port) opened by the exhaust valve.

残余的带压废气相对顺畅地从已被排气门打开的排气道中排出。

5. To keep the crankshaft turning smoothly between two power strokes, the flywheel is attached to the end of the crankshaft.

为了使曲轴在两个相连的作功行程间平稳地转动,我们将飞轮安装在曲轴的后端。

6. For identification purposes, manufacturers classify automobile engines by their cylinder arrangement, valve arrangement, and type of system used to cool the engine.

发动机制造商将汽车发动机按气缸排列、气门布置以及冷却系统的类型进行分类。

语法: for identification purposes 作目的状语。

7. With this system, the engine has the water jackets in the block and head, which surround the cylinders and combustion chambers and through which coolant circulates freely.

在水冷式发动机上,发动机气缸体和气缸盖内均有水套,它围绕着气缸和燃烧室,内部有冷却液自由循环流动。

语法: which 引导的定语从句修饰 the water jackets。

## Exercises

### 1. Choose the best answer from the following choices according to the text

1) In the internal combustion engine, air/fuel mixture is introduced into a closed \_\_\_\_\_ where it is compressed and then ignited.

- A. tank      B. spark      C. cylinder      D. flywheel

2) The air/fuel charge is now under \_\_\_\_\_ so that it will produce a great deal of power when the spark plug ignites it.

- A. compression      B. inflation      C. vacuum      D. ignition

3) As the crankshaft nears the end of its second complete revolution, the piston again approaches the \_\_\_\_\_ position.

- A. BDC      B. BBTC      C. TDC      D. ATDC

4) Thus, the coolant leaving the lower tank is \_\_\_\_\_ ready to flow through the engine again.

- A. hot      B. cool      C. cold      D. warm

### 2. Translate the following into Chinese

- |                               |                      |                         |
|-------------------------------|----------------------|-------------------------|
| 1) internal combustion engine | 2) vehicle           | 3) power stroke         |
| 4) exhaust valve              | 5) gasoline          | 6) liquid-cooled engine |
| 7) flywheel                   | 8) air-cooled engine | 9) crankshaft           |

### 3. Translate the following into English

- |           |         |         |
|-----------|---------|---------|
| 1) 四冲程发动机 | 2) 进气行程 | 3) 排气行程 |
| 4) 燃烧室    | 5) 气缸   | 6) 活塞   |
| 7) 可燃混合气  | 8) 火花塞  | 9) 连杆   |





#### 4. Translate the following sentences into Chinese

- 1) In the internal combustion engine, an air-fuel mixture is introduced into a closed cylinder where it is compressed and then ignited.
- 2) The intake stroke of a four-stroke engine begins with the piston at top dead center (TDC).
- 3) After the piston reaches bottom dead center (BDC), it moves upward again as the starter continues to turn the crankshaft in a clockwise direction.
- 4) Just as or slightly before the piston reaches TDC on the compression stroke with the air/fuel mixture fully compressed, a timed electrical spark appears at the spark plug.
- 5) The engine cycle has only one power stroke where the piston is actually driving the crankshaft.

#### 5. Translate the following passage into Chinese

The engine is considered by most to be the definitive factor of an automobile. It provides the motivational force for the vehicle and drives the electrical and auxiliary systems required for operation. The internal combustion engine changes energy forms to provide propulsion. Combustible materials are detonated to create a forceful explosion (and thus expansion of gasses) that is then converted into some form of rotational motion. This rotational force or torque is then applied to the wheels to provide linear motion. Engines can consist of two or four-cycle piston units, turbines, rotary units, or free piston units. The most common is the four-cycle piston engine.

### Reading Material

## Two-stroke Engine Operation 二冲程发动机工作过程

In the four-stroke engine, the complete cycle of events requires four piston strokes. In the two-stroke engine, or two-stage engine, the intake and compression strokes and the power and exhaust strokes are in a sense combined. This permits the engine to produce a power stroke every two piston strokes, or every crankshaft rotation.

In the two-stroke engine, the piston acts as a valve, clearing valve ports in the cylinder wall as it nears BDC.<sup>[1]</sup> A fresh air-fuel charge enters through the intake port, and the burned gases exit through the exhaust port. The complete cycle of operation is as follow: As the piston nears TDC, ignition takes place. The high combustion pressures drive the piston down, and the thrust through the connecting rod turns the crankshaft. As the piston nears BDC, it passes the intake and exhaust ports in the cylinder wall. Burned gases, still under some pressure, begin to stream out through the exhaust port. At the same time, the intake port, now cleared by the piston, begins to deliver air-fuel mixture, under pressure, to the cylinder.<sup>[2]</sup> The top of the piston is shaped to give the incoming mixture an upward movement. This helps to sweep the burned gases ahead and out through the